STØTTET AF
Mælkeafgiftsfonden

# Singlestep type traits

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The aim of this report is to document the genetic trend for single-step for type traits in the Nordic cattle evaluation. The breeding values are standardized and compared with traditional EBVs.

It is a model with 1. -3. Lactation but only results for 1. Lactation is shown
Explanations:

- f1 = full 1. lactation
- r1= reduc 1. lactation
- e1= traditional EBV 1. lactation

Explanation for correlations:

- r1_bv = correlation between full 1. lactation and reduc 1. lactation
- e1_bv = correlation between full 1. lactation and EBV 1 lactation
- two = correlation between full 1. lactation and two-step

For females only females with phenotypes are shown.
For bulls only domestic AI bulls are shown

## Content

# Type traits

| | |
|---|---|
| 1 | Stature |
| 2 | Body depth |
| 3 | Chest width |
| 4 | Dairy form |
| 5 | top line |
| 6 | Rump width |
| 7 | Rump angle |
| 9 | Roar legs, side view |
| 10 | Roar legs, back rear view |
| 11 | Hock quality |
| 12 | Bone quality |
| 13 | Foot angle |
| 16 | Fore udder attachment |
| 17 | Rear udder height |
| 18 | Rear udder width |
| 19 | Udder cleft support |

| | |
|---|---|
| 20 | Udder depth |
| 21 | Teat length |
| 22 | Teat thinkness |
| 23 | Teat placement front |
| 24 | Teat placement Back |
| 25 | Udder balance |

# Results and discussion

Below, you find a summary of the results from cows and bulls for each of the three breeds. For many of the type traits the singlestep full is higher than the EBV's and often the singlestep reduced is even higher than the singlestep full. The magnitude of the difference is for several traits only 3-5 indices but for some traits the difference is as big as 10 indices or more. The inflation problem is bigger for bulls than cows.

Study of genetic trend and correlations based on singlestep evaluation of May data are shown in appendix 1. Here are some comments:

HOL cows with records:
For some traits the genetic trend for singlestep full is higher than the genetic trend for EBV's for the latest birth years. Furthermore, there is for some traits indication of inflation, where the singlestep reduced is higher than the singlestep full for the latest birth years. Examples are BV1, BV10, BV11, BV16, BV17, BV18, BV20 and BV25. For other traits the genetic trend is at similar level for singlestep and for EBV's.
Holstein domestic AI bulls:
There seems to be challenges with inflation for BV1, BV4, BV10, BV11, BV12, BV13, **BV16, BV17, BV18, BV20.** For BV2 and BV3 the singlestep full and singlestep reduced have lower genetic trend than the EBV's for the latest birth years.
The inflation is bigger for AI bulls than for cows with records.
The legarra reverter regression gives b1 values, which is lower than 0.95 for BV3, **BV4**, BV13, BV23 and BV24. The interbull test gives b1 values, which is lower than 0.90 for BV2, BV3, **BV4**, BV13, BV18, BV19, BV20, BV23.

For RDC cows with records:
The singlestep full and singlestep reduced have higher genetic trend than EBV's in the latest birth years for BV1, BV4, BV10, BV11, **BV16, BV17, BV18, BV19,** BV20, BV23, BV24, BV25.
For RDC domestic AI bulls:
The singlestep full and singlestep reduced have higher genetic trend than EBV's in the latest birth years for BV1, BV4, BV10, BV11, BV12, **BV16, BV17, BV18, BV19, BV20, BV23, BV24**, BV25
The singlestep full and singlestep reduced has the same genetic trend as EBV's but higher than twostep genetic trend for **BV2** and BV3
The Legarra Reverter regression b1 value is lower than 0.95 for **BV4**, BV11, BV13, BV16, BV18, BV20.
The interbull test b1 value is lower than 0.90 for BV1, **BV4**, BV6, BV11, BV13, BV16, BV18, BV19, BV20, BV24.

For Jersey cows with records:
The singlestep full and singlestep reduced have higher genetic trend than EBV's in the latest birth years for BV1, BV4, BV13, BV16, BV17, BV18, BV19, BV20.
The singlestep genetic trend are lower than EBV for the latest birth years for BV9.
For Jersey domestic AI bulls:

The singlestep full and singlestep reduced have higher genetic trend than EBV's in the latest birth years for **BV1**, BV4, BV5, BV10, BV13, **BV16, BV17, BV18**, BV19, **BV20,** BV25.
The singlestep full and singlestep reduced has the same genetic trend as EBV's but higher than twostep genetic trend for BV2.
The genetic trend for twostep is much higher than singlestep, which is higher than EBV for BV6, BV23 and BV24.
The Legarra Reverter regression b1 value is lower than 0.95 for BV1, BV4, BV21, and BV22. The b1 value is higher than 1.10 for BV11
The interbull test b1 value is lower than 0.90 for BV1, BV17, BV18, BV20. The b1 values is higher than 1.10 for **BV10, BV11**, BV22.

Results of study of stability is shown in appendix 2.
For Holstein singlestep with November data are compared with singlestep with May data.
For RDC and Jersey singlestep with August data are compared with singlestep with May data.

The correlation between singlestep new (November or August) and singlestep old (May) are close to 1 for cows with records and domestic AI bulls born from 2010 to 2020.
The correlation between singlestep full and singlestep reduced are close to 1 for older birth classes but then reduces at the youngest birth classes. The level of correlations are similar for nov.full_nov.reduc or aug.full_aug.reduc and for may.full_may.reduc.
The mean GEBV is at similar level for singlestep full November or August and for singlestep full May. Furthermore, the mean GEBV is at similar level for singlestep reduc November or August and for singlestep reduc May.
Therefor it can be concluded that the stability of singlestep is high, and the problems with inflation described in appendix 1 is still existing in the new singlestep evaluation.
Below you find a more detailed description of results in appendix 2. Only results which deviates from the expectation of same level of genetic trend are discussed below.

HOL cows with records:
The genetic trend for singlestep reduced is higher than for singlestep full for the latest birth years for BV2, BV10, BV18.
The genetic trend for singlestep reduced is lower than for singlestep full for the latest birth years for BV9,
The genetic trend for the singlestep full and reduced for May is higher than singlestep full and reduced for November (also first birth classes) for BV16, BV17, BV20, BV23.
HOL domestic AI bulls:
The genetic trend for singlestep reduced is higher than for singlestep full for the latest birth years for BV2, BV4, BV10, BV18, BV19, BV25
The genetic trend for singlestep reduced is lower than for singlestep full for the latest birth years for BV9

RDC cows with records:
The genetic trend for singlestep reduced is higher than for singlestep full for the latest birth years for BV18, BV19
The genetic trend for singlestep reduced is lower than for singlestep full for the latest birth years for BV9
RDC domestic AI bulls:
The genetic trend for singlestep reduced is higher than for singlestep full for the latest birth years for BV1, BV2, BV18, BV19

JER cows with records:
The genetic trend for singlestep reduced is higher than for singlestep full for the latest birth years for BV10, BV13, BV19, BV25

JER domestic AI bulls:
The genetic trend for singlestep reduced is higher than for singlestep full for the latest birth years for BV10, BV19, BV25.
The genetic trend for singlestep reduced is lower than for singlestep full for the latest birth years for BV5, BV6, BV11.

# Final conclusions

There are some challenges with singlestep, where the latest birth classes have higher genetic trend for singlestep reduced than for singlestep full, which indicates inflation. This problem is more pronounced for bulls than for cows. The level of inflation is for some traits for some breed only 1-3 indices while for other traits it is severe at the magnitude of 10 or more indices. There is a tendency that it is often but not always BV16, BV17, BV18, BV19 and BV20 which is most problematic. The interbull validation test and the Legarra Reverter regression shows most problematic results for BV4.
The stability of singlestep is overall high, meaning that the genetic trend does not differ very much between evaluations when comparing May evaluation with either November or August.
The stability of singlestep is positive, but the inflation is problematic especially for some traits and some breeds and sex.

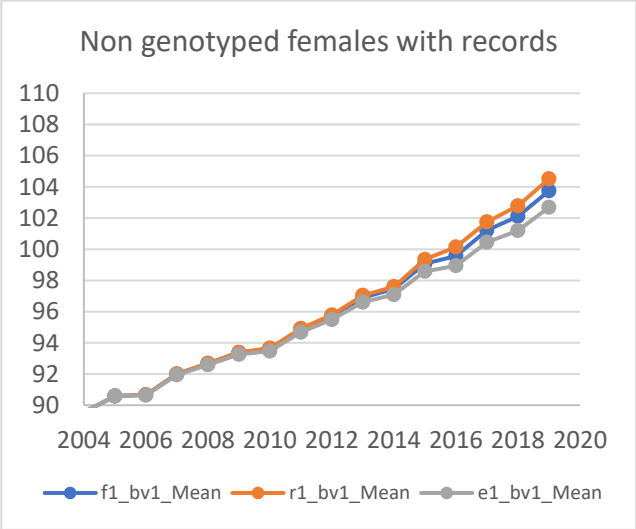
# Appendix 1

## Holstein

### Cows

#### Trend (mean and SD)

***bv1***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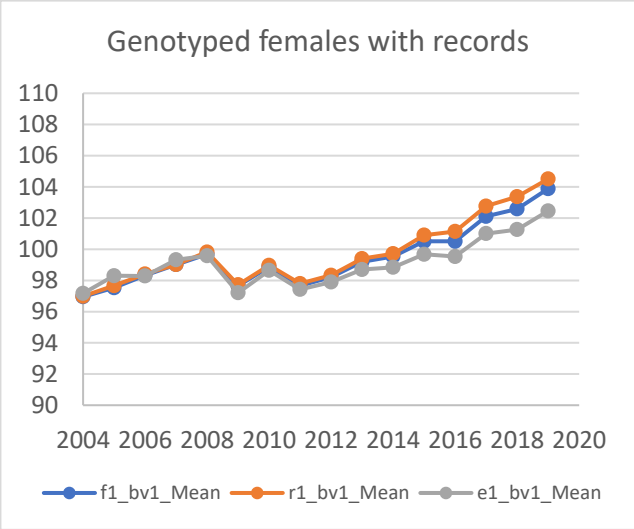
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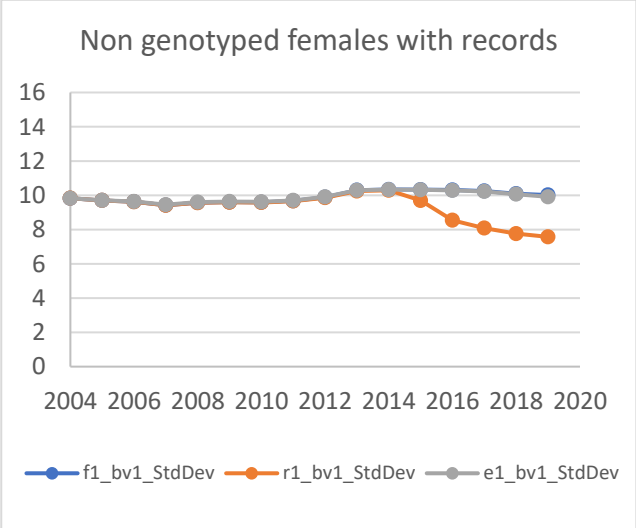
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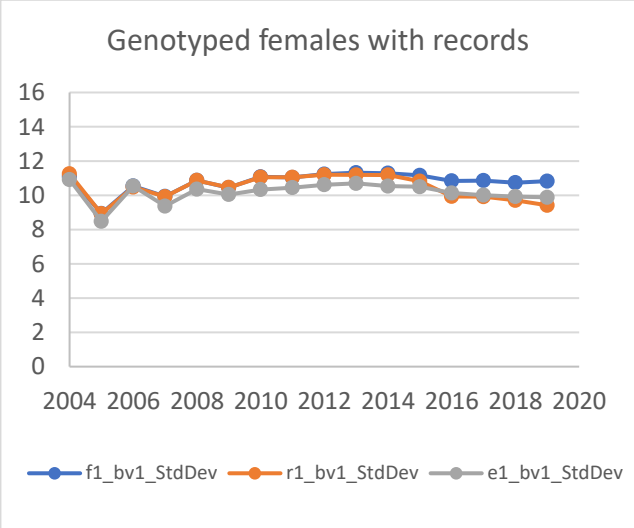
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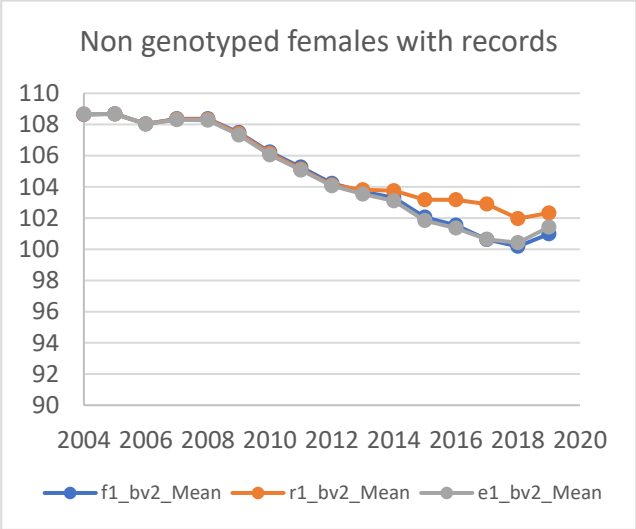
***bv2***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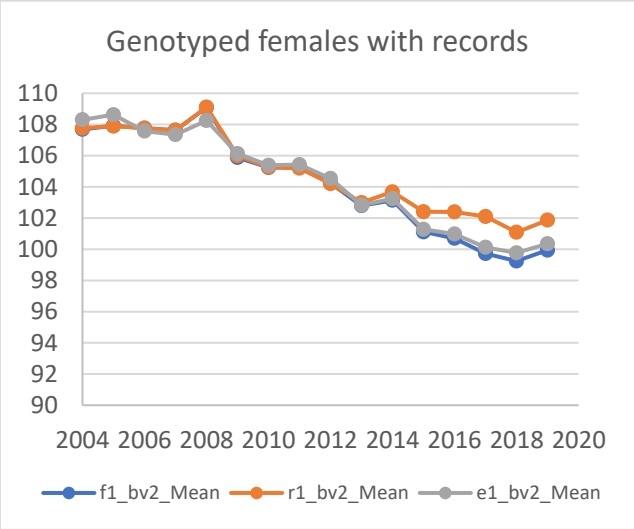
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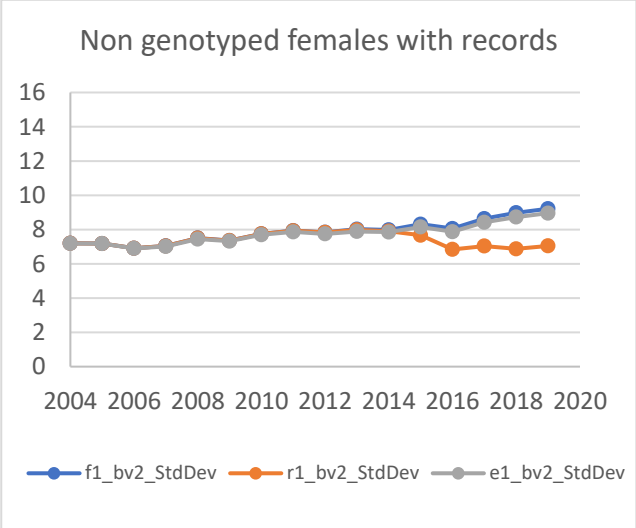
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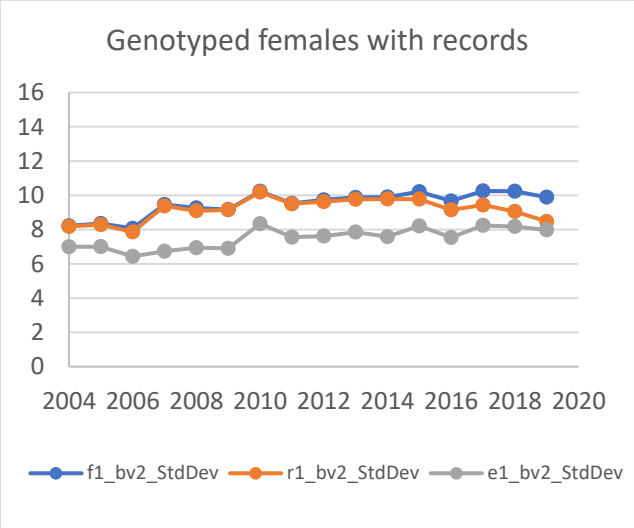
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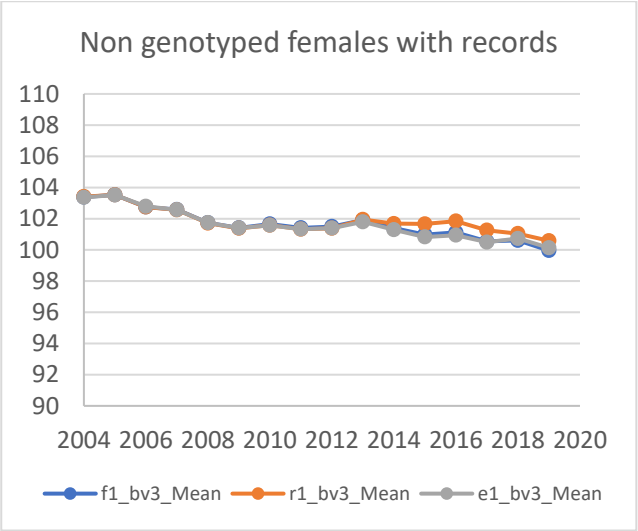
***bv3***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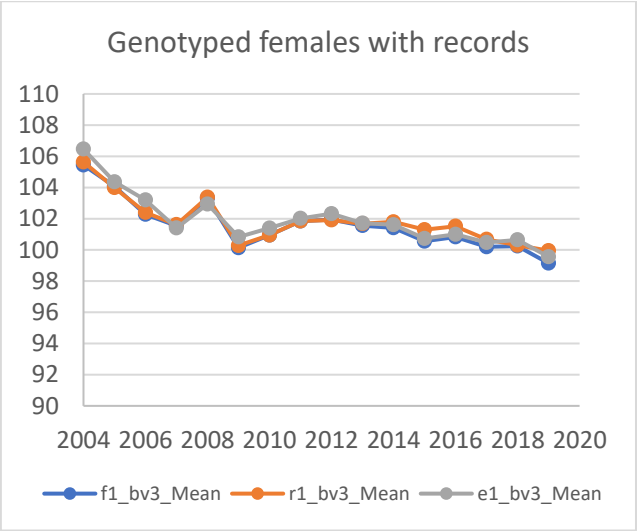
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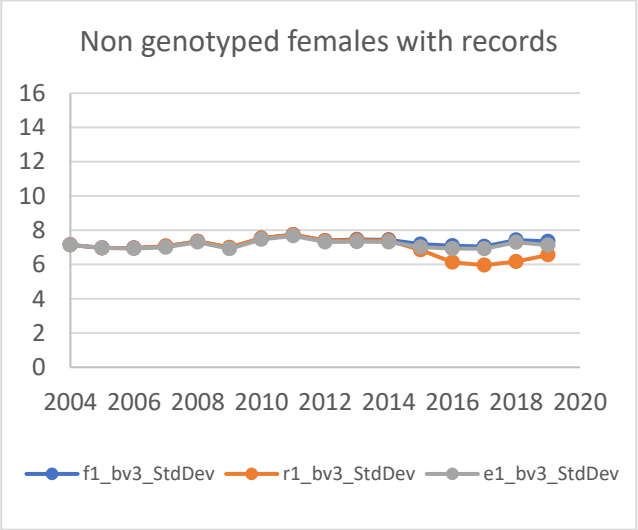
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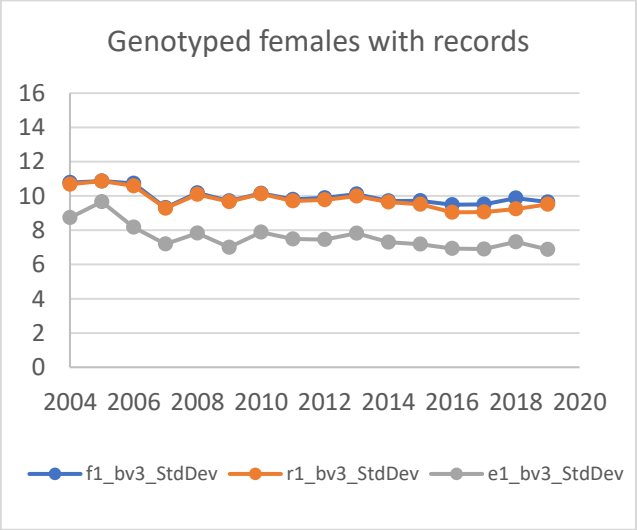
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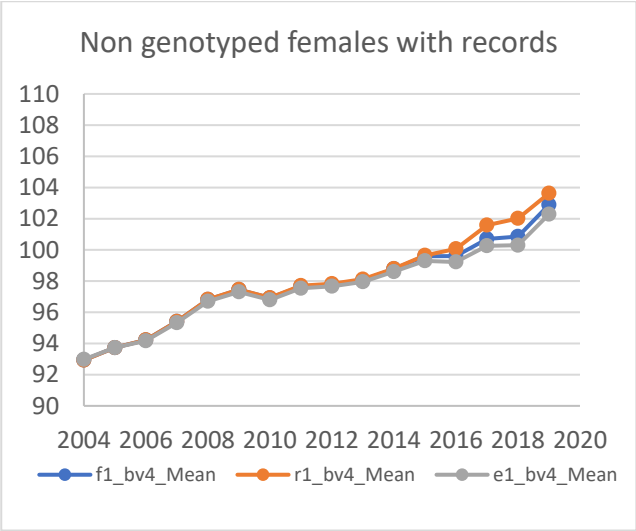
***bv4***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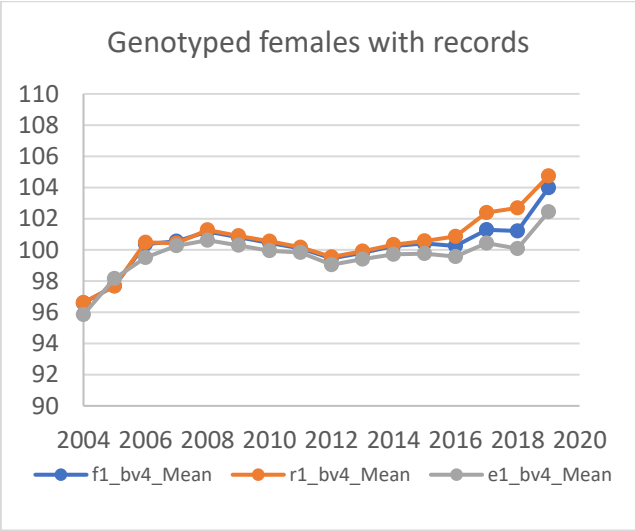
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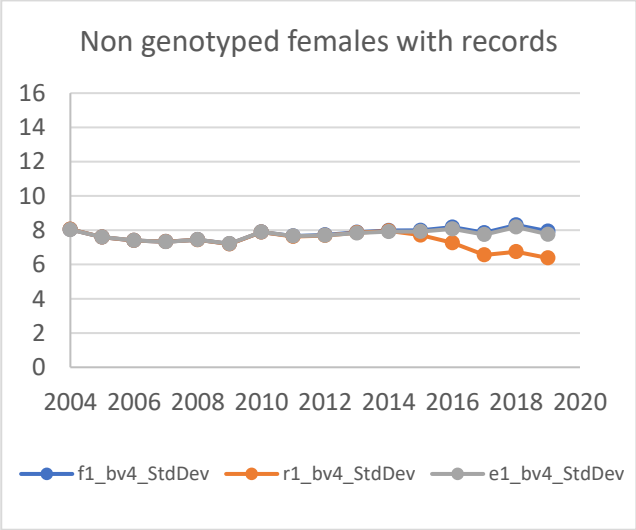
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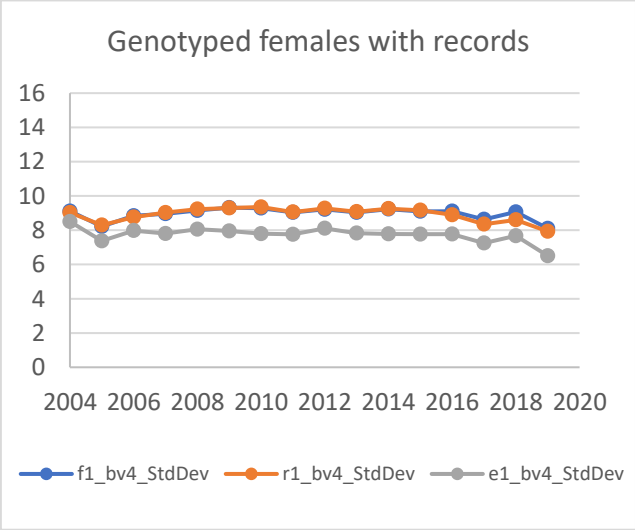
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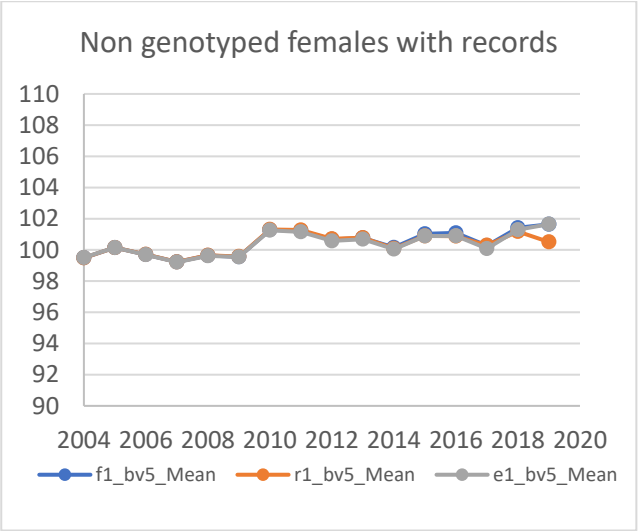
***bv5***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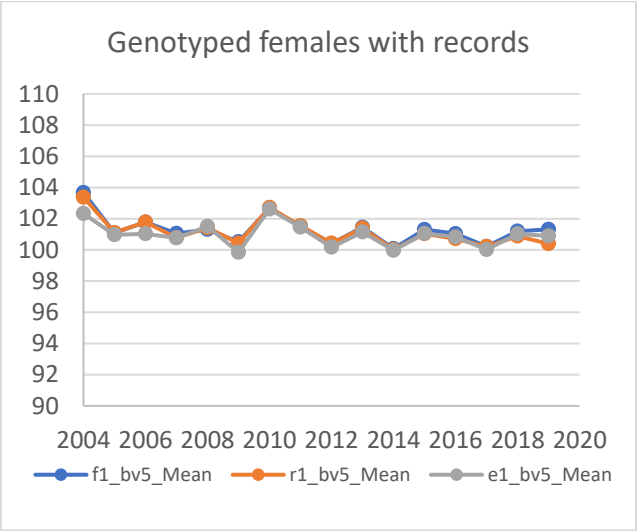
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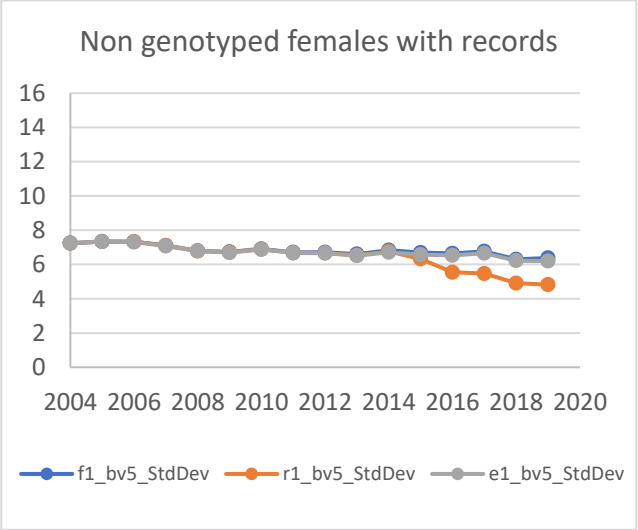
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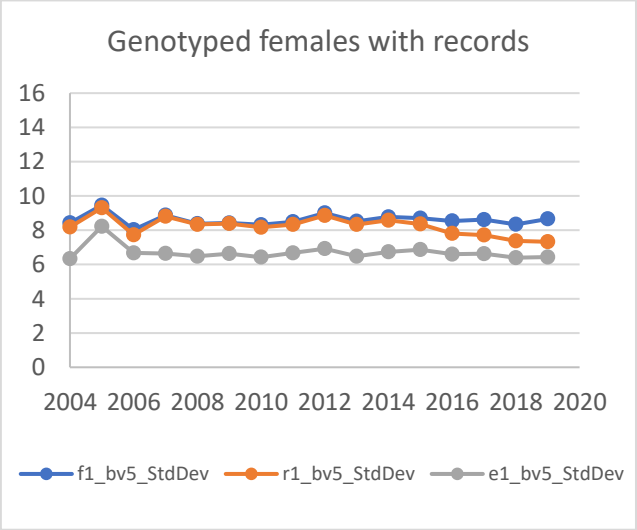
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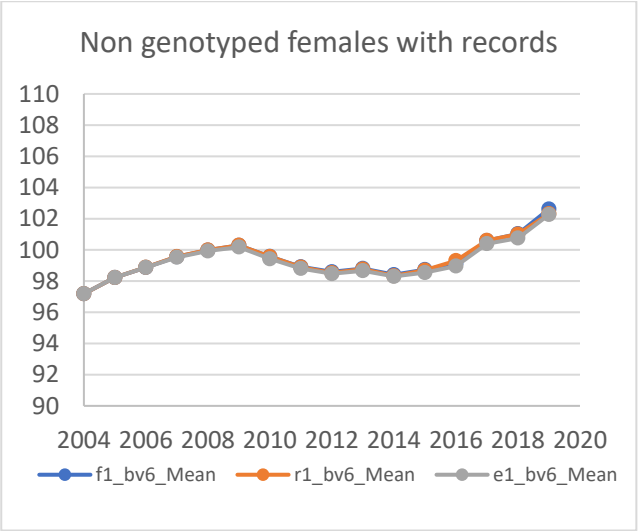
***bv6***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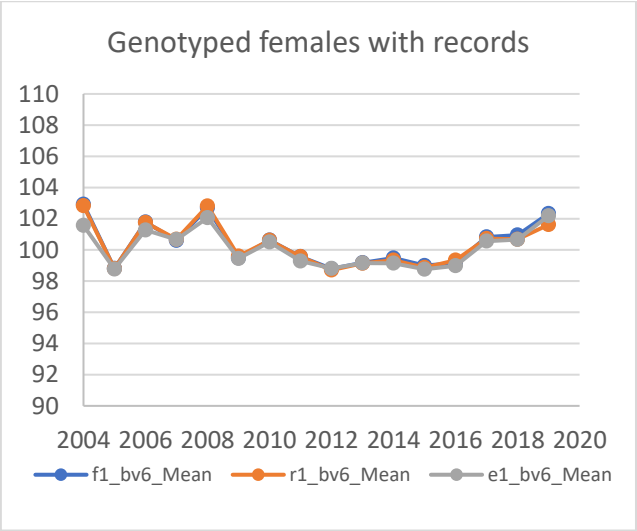
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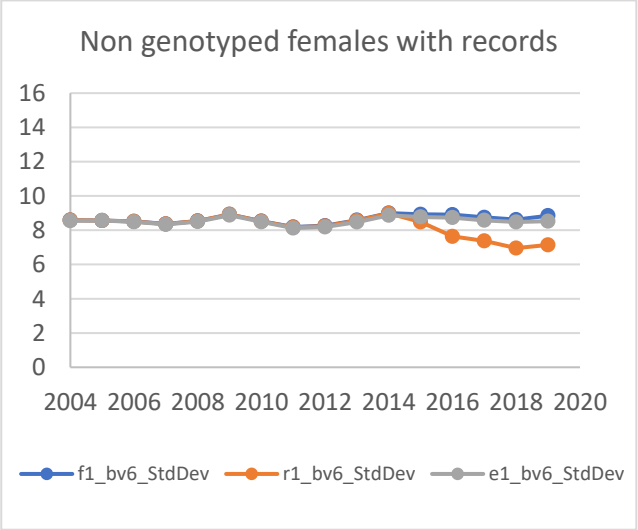
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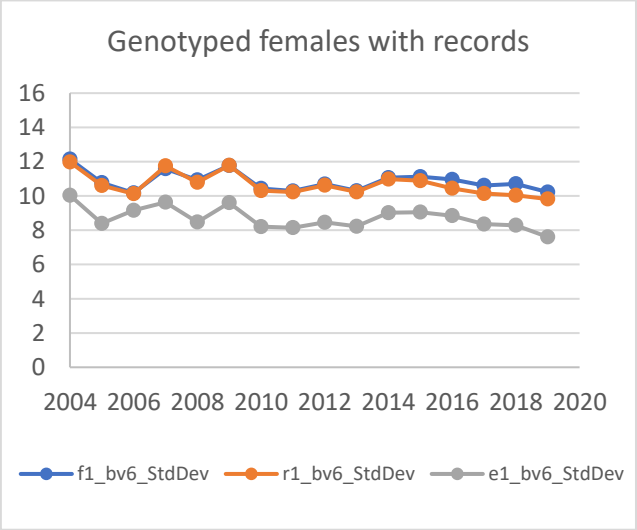
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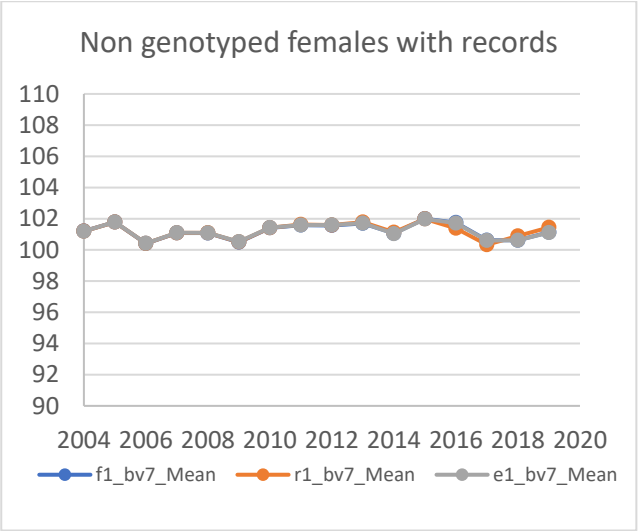
***bv7***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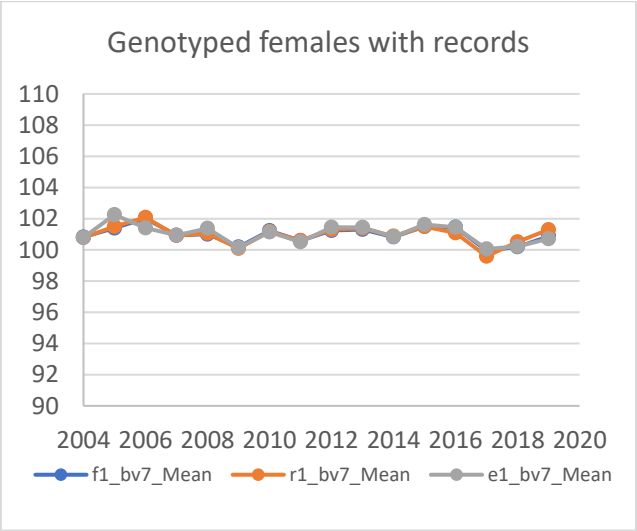
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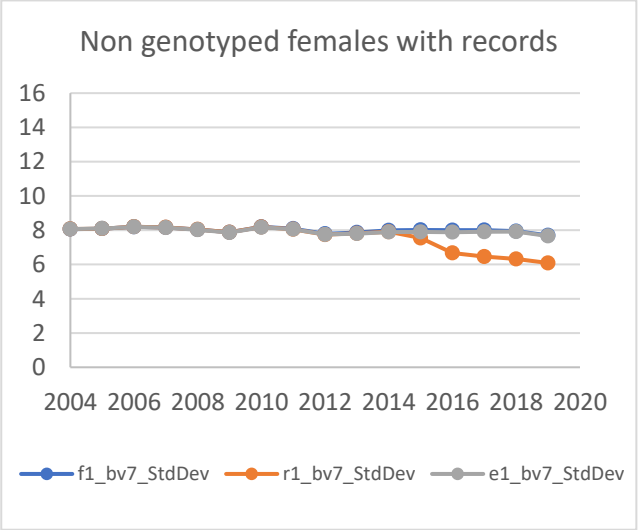
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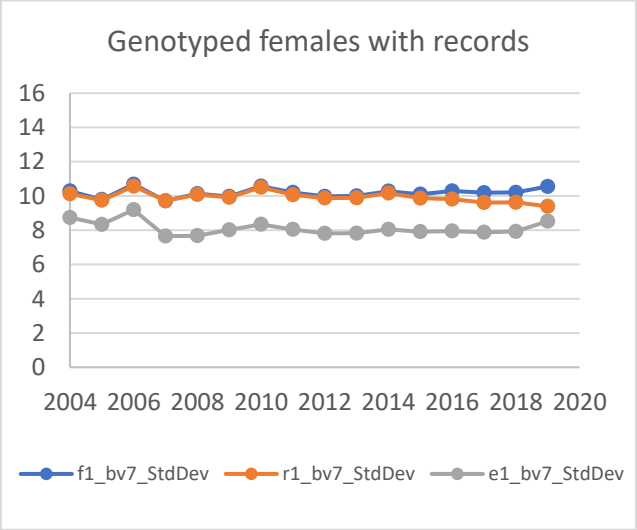
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f1_bv7_StdDev
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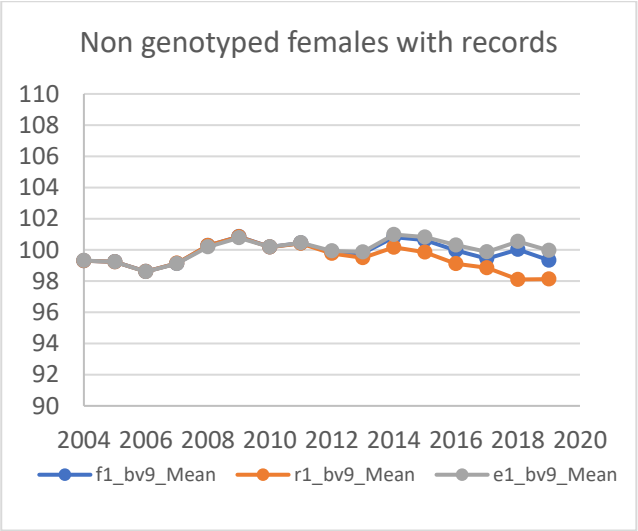
e1_bv7_StdDev

***bv9***


Non genotyped females with records
110
108
106
104
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100
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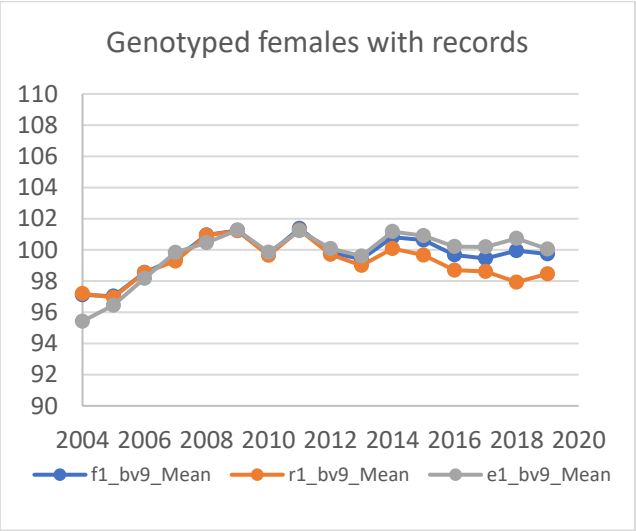
96
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv9_Mean
r1_bv9_Mean
e1_bv9_Mean


Genotyped females with records
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104
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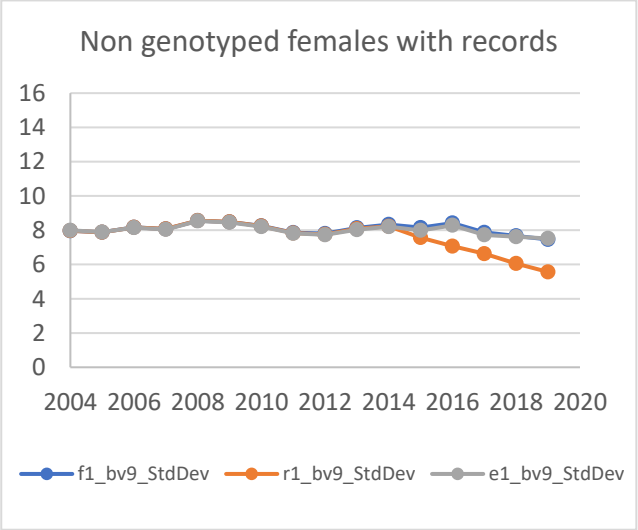
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv9_Mean
r1_bv9_Mean
e1_bv9_Mean


Non genotyped females with records
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14
12
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4
2
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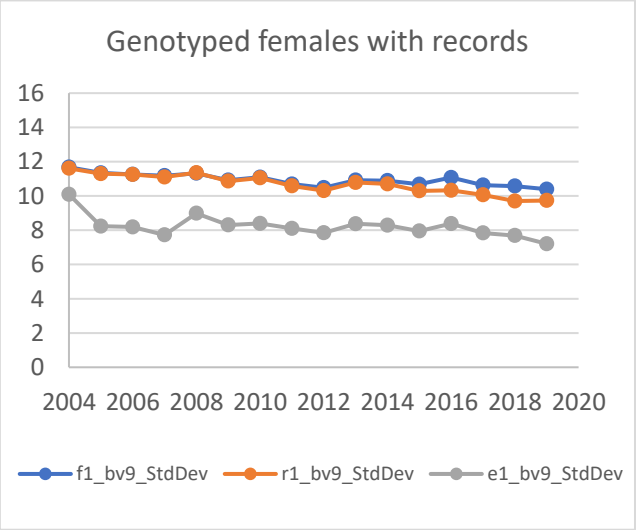
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv9_StdDev
r1_bv9_StdDev
e1_bv9_StdDev


Genotyped females with records
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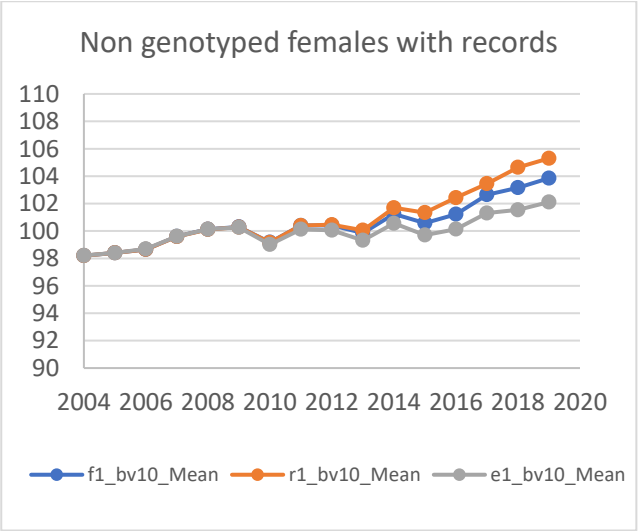
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv9_StdDev
r1_bv9_StdDev
e1_bv9_StdDev

***bv10***


Non genotyped females with records
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108
106
104
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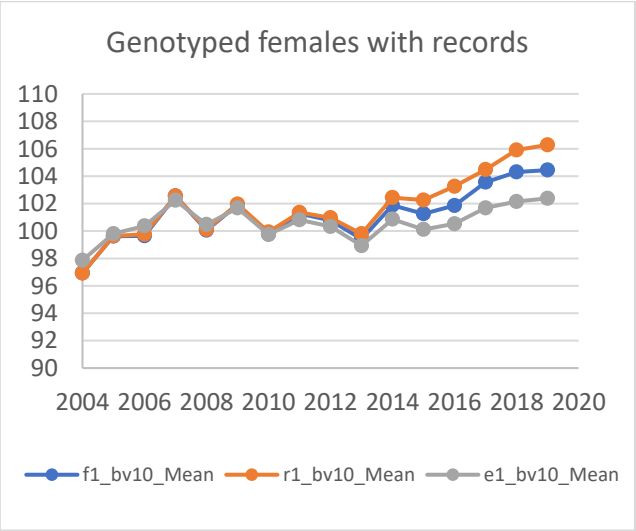
96
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv10_Mean
r1_bv10_Mean
e1_bv10_Mean


Genotyped females with records
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106
104
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92
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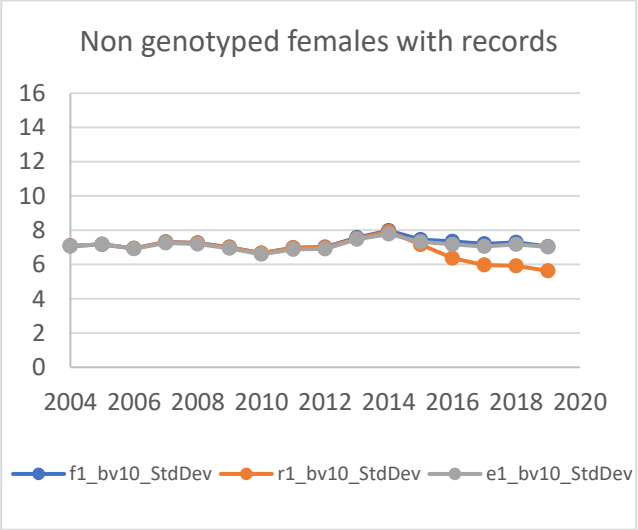
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv10_Mean
r1_bv10_Mean
e1_bv10_Mean


Non genotyped females with records
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14
12
10
8
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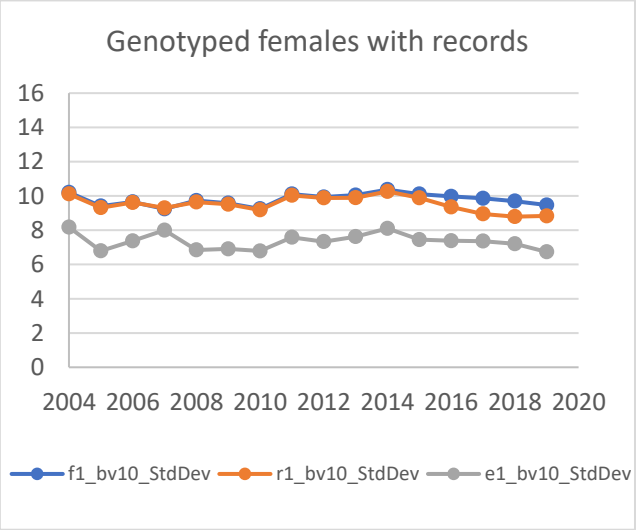
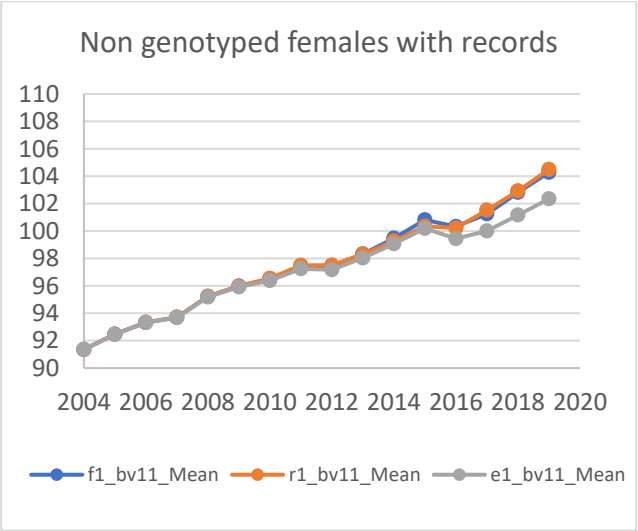
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv10_StdDev
r1_bv10_StdDev
e1_bv10_StdDev


Genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv10_StdDev
r1_bv10_StdDev
e1_bv10_StdDev

***bv11***


Non genotyped females with records
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108
106
104
102
100
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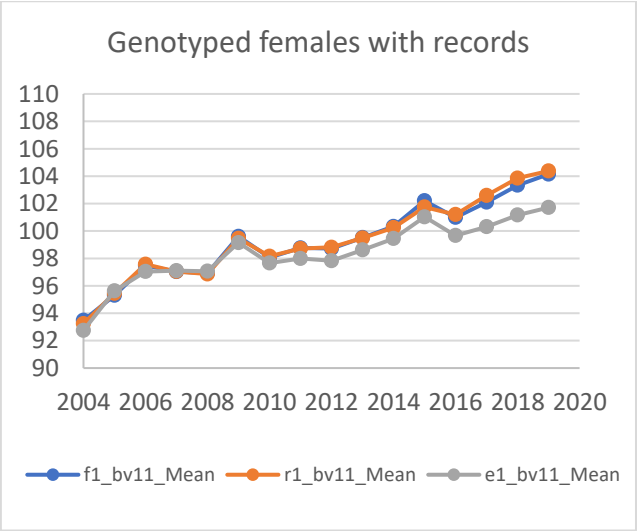
96
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv11_Mean
r1_bv11_Mean
e1_bv11_Mean


Genotyped females with records
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108
106
104
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100
98
96
94
92
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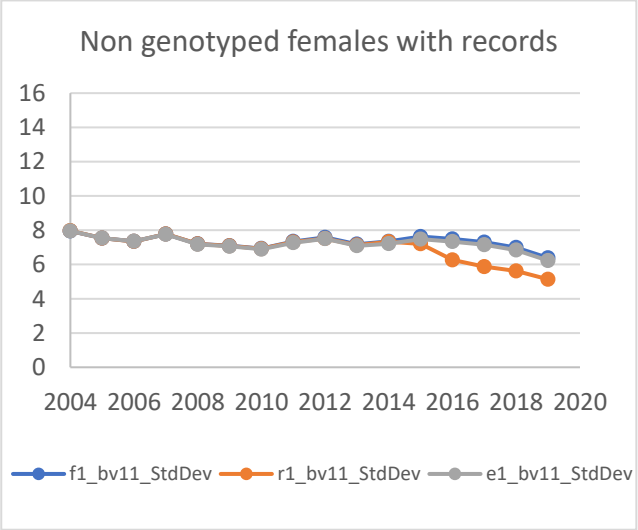
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv11_Mean
r1_bv11_Mean
e1_bv11_Mean


Non genotyped females with records
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14
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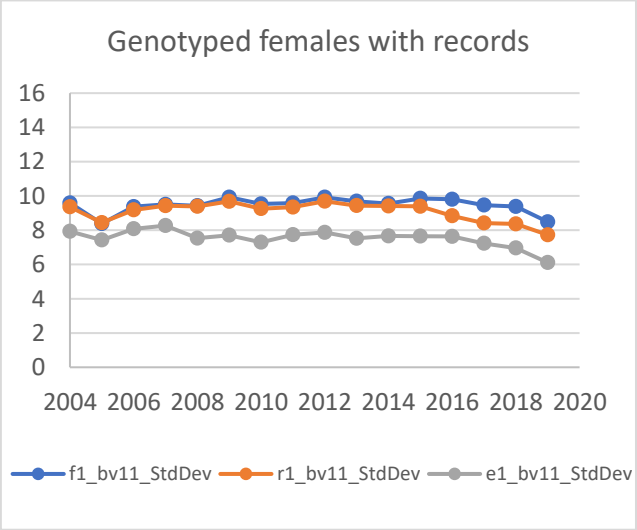
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv11_StdDev
r1_bv11_StdDev
e1_bv11_StdDev


Genotyped females with records
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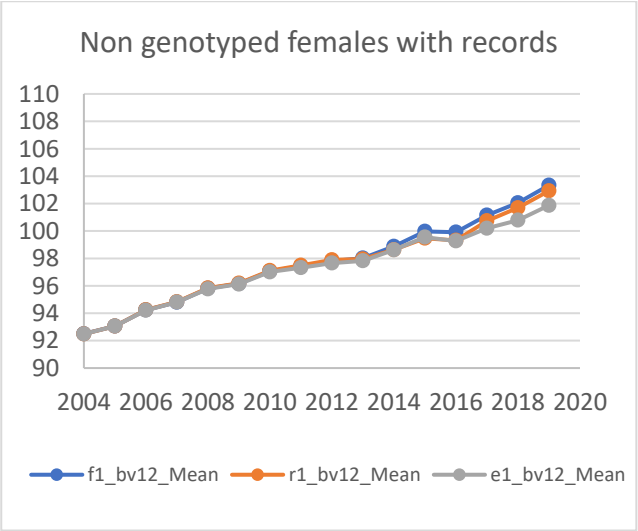
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv11_StdDev
r1_bv11_StdDev
e1_bv11_StdDev

***bv12***


Non genotyped females with records
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96
94
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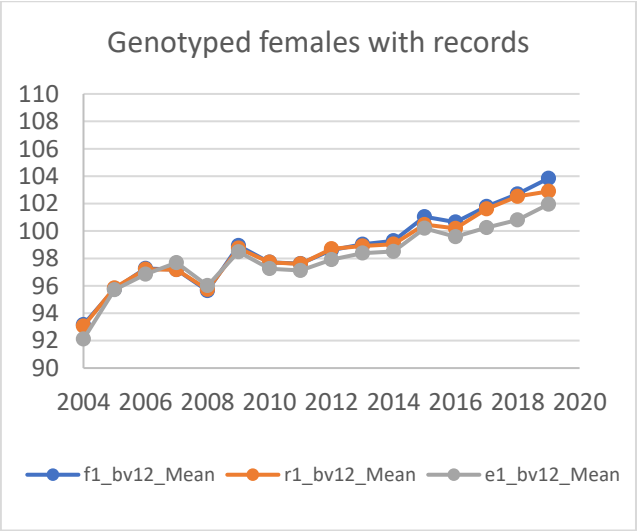
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv12_Mean
r1_bv12_Mean
e1_bv12_Mean


Genotyped females with records
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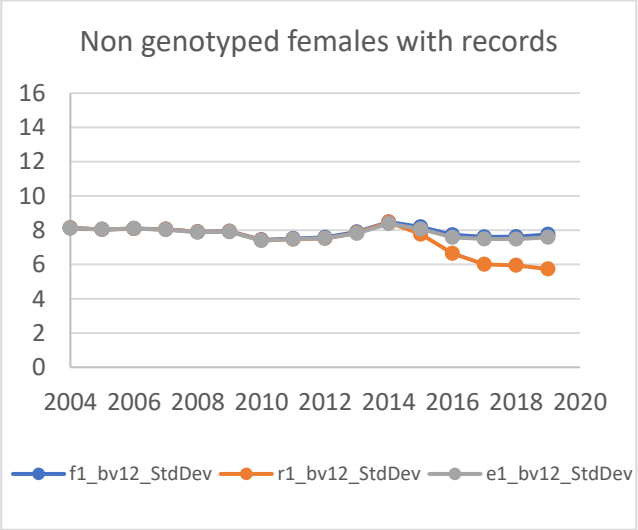
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv12_Mean
r1_bv12_Mean
e1_bv12_Mean


Non genotyped females with records
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14
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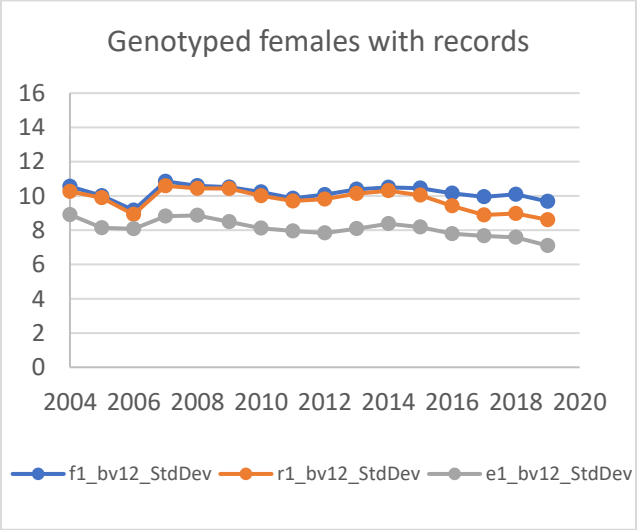
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv12_StdDev
r1_bv12_StdDev
e1_bv12_StdDev


Genotyped females with records
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14
12
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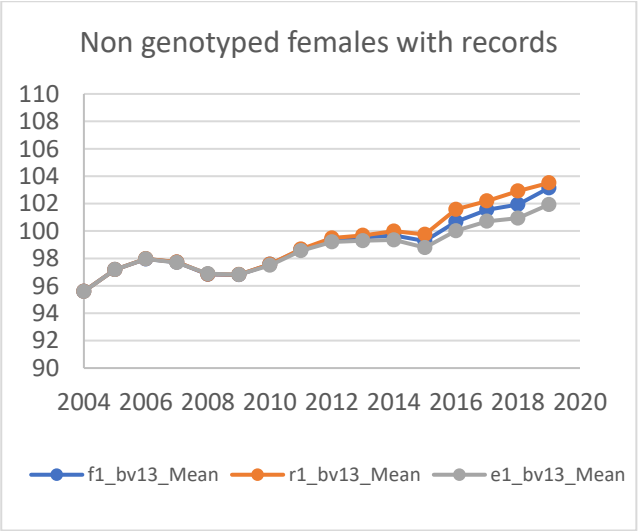
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv12_StdDev
r1_bv12_StdDev
e1_bv12_StdDev

***bv13***


Non genotyped females with records
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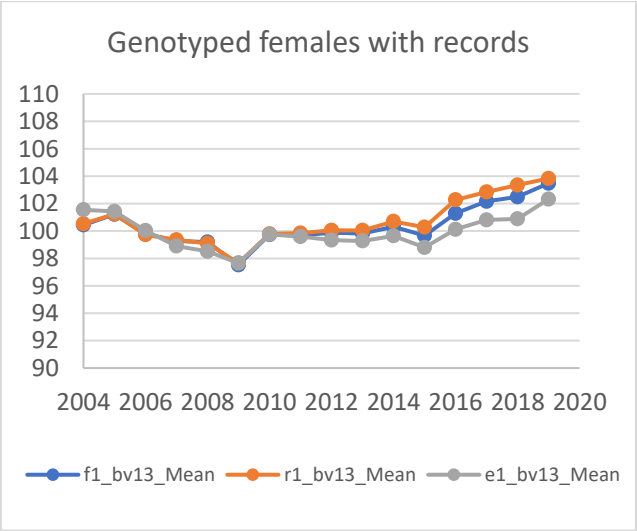
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv13_Mean
r1_bv13_Mean
e1_bv13_Mean


Genotyped females with records
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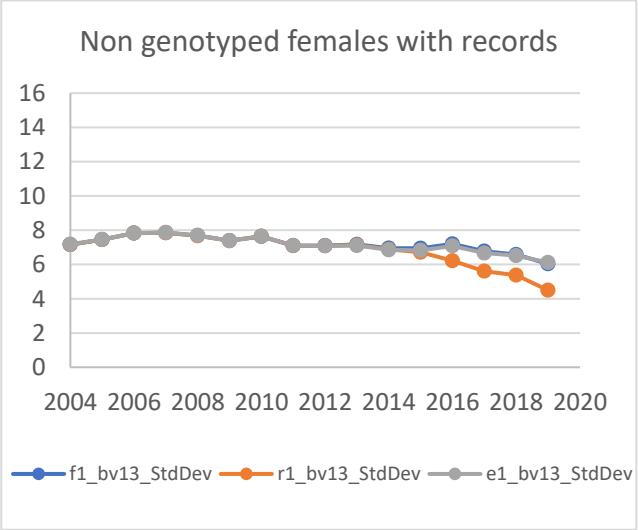
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv13_Mean
r1_bv13_Mean
e1_bv13_Mean


Non genotyped females with records
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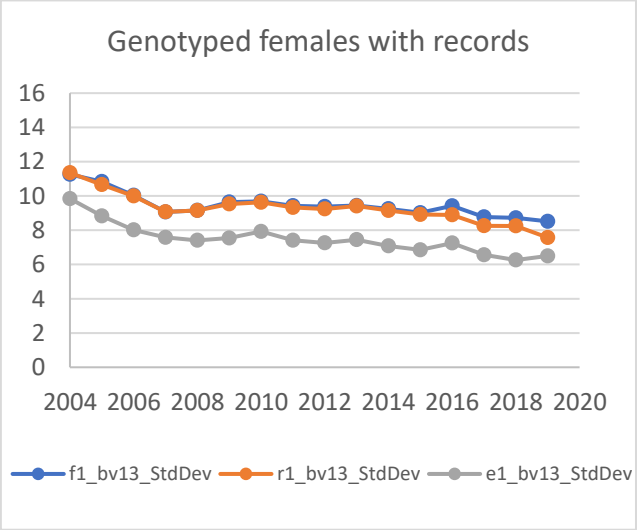
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv13_StdDev
r1_bv13_StdDev
e1_bv13_StdDev


Genotyped females with records
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14
12
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4
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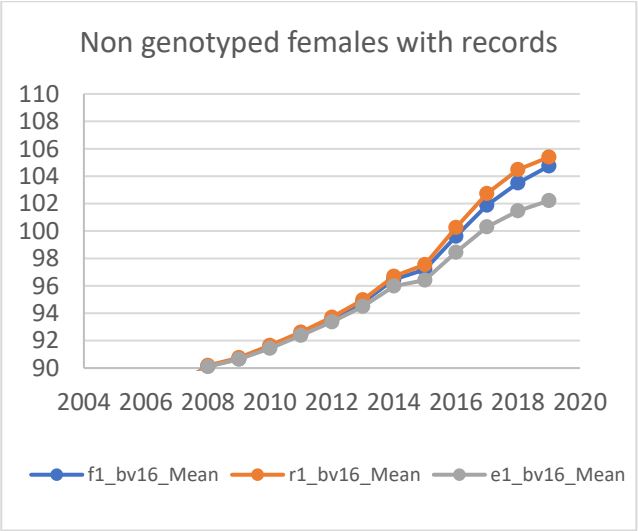
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv13_StdDev
r1_bv13_StdDev
e1_bv13_StdDev

***bv16***


Non genotyped females with records
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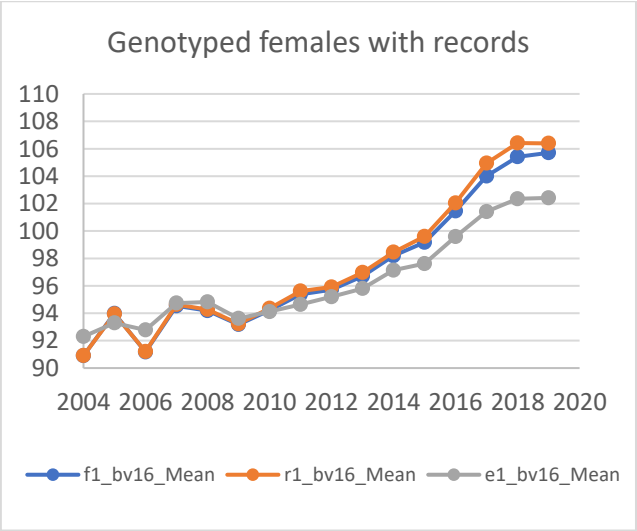
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv16_Mean
r1_bv16_Mean
e1_bv16_Mean


Genotyped females with records
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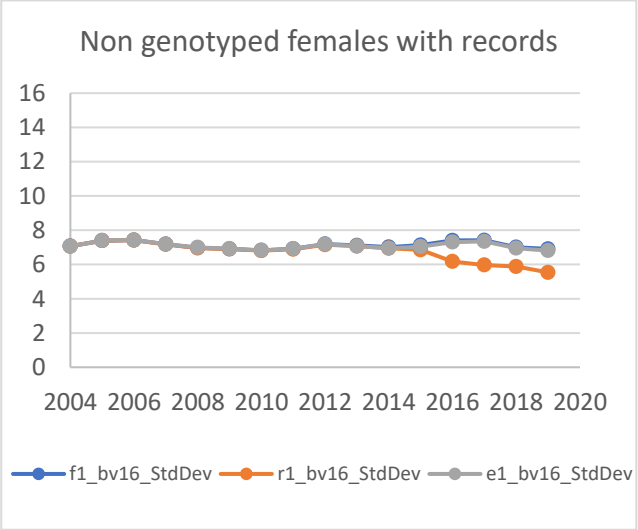
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv16_Mean
r1_bv16_Mean
e1_bv16_Mean


Non genotyped females with records
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14
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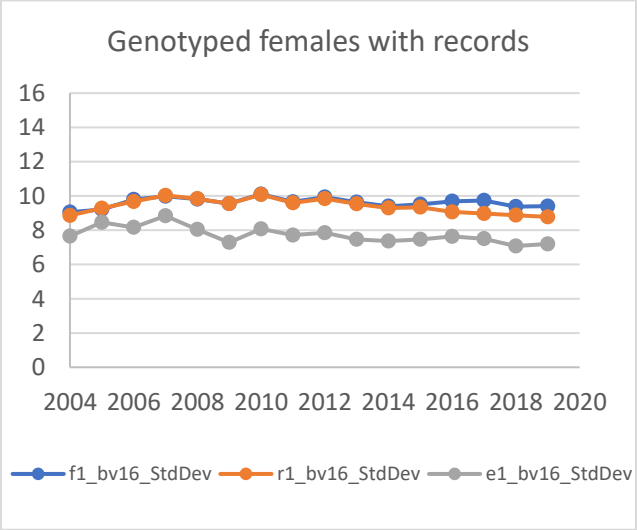
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv16_StdDev
r1_bv16_StdDev
e1_bv16_StdDev


Genotyped females with records
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14
12
10
8
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4
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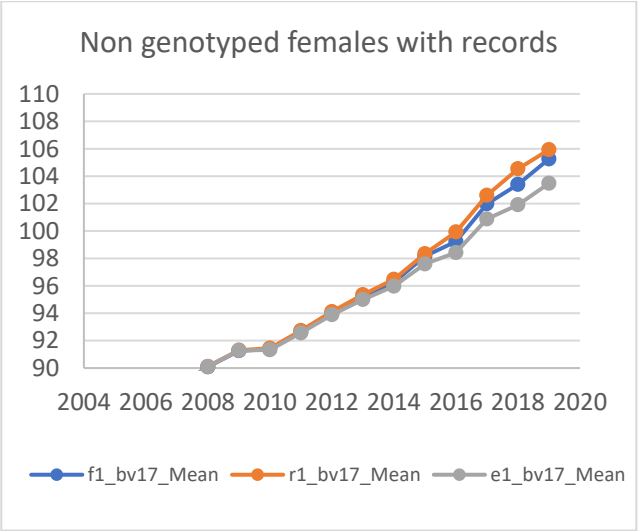
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv16_StdDev
r1_bv16_StdDev
e1_bv16_StdDev

***bv17***


Non genotyped females with records
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108
106
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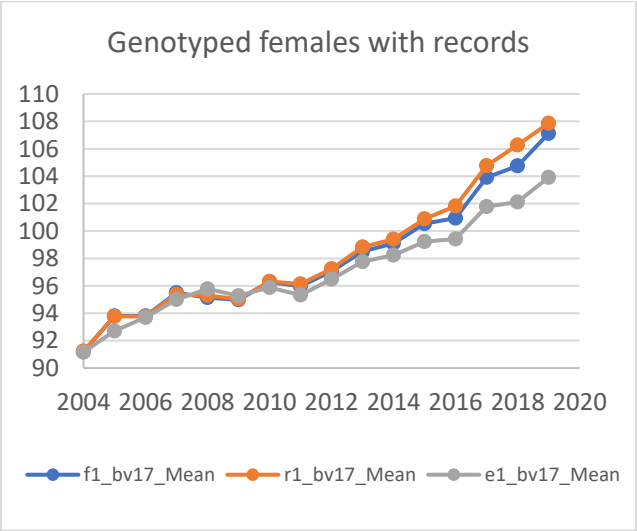
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv17_Mean
r1_bv17_Mean
e1_bv17_Mean


Genotyped females with records
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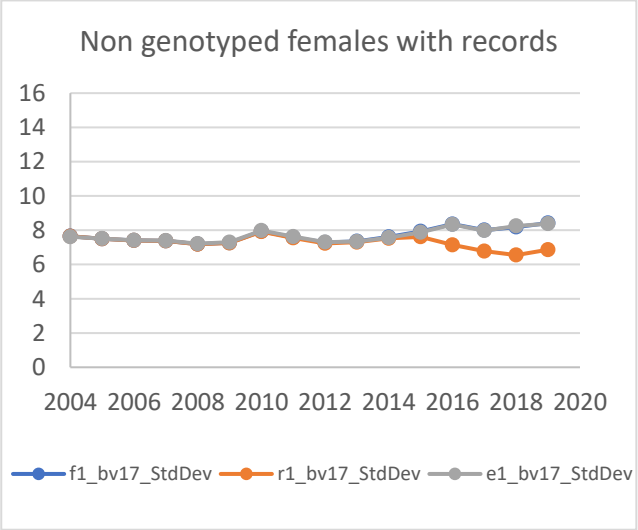
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv17_Mean
r1_bv17_Mean
e1_bv17_Mean


Non genotyped females with records
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14
12
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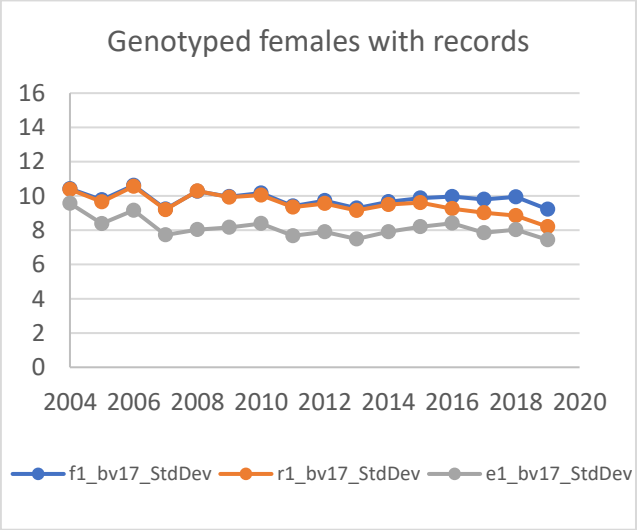
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv17_StdDev
r1_bv17_StdDev
e1_bv17_StdDev


Genotyped females with records
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14
12
10
8
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4
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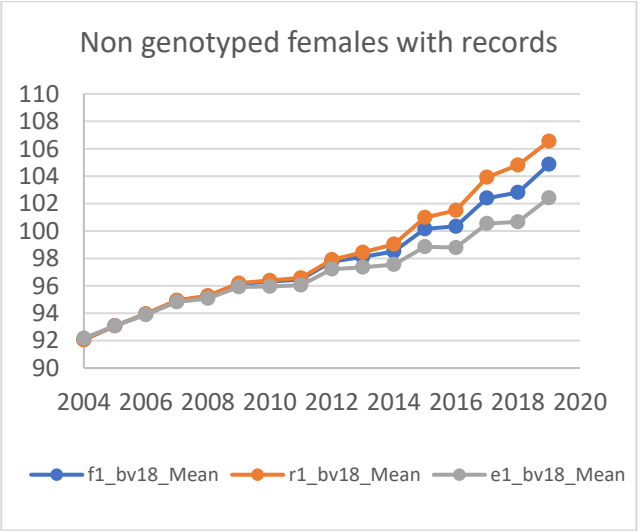
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv17_StdDev
r1_bv17_StdDev
e1_bv17_StdDev

***bv18***


Non genotyped females with records
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108
106
104
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92
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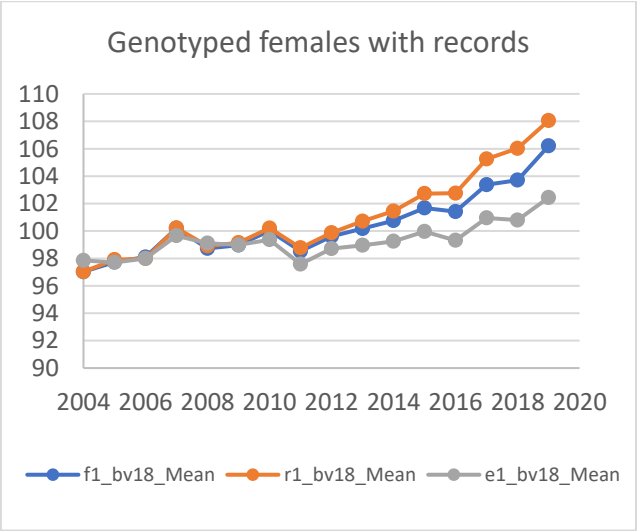
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv18_Mean
r1_bv18_Mean
e1_bv18_Mean


Genotyped females with records
110
108
106
104
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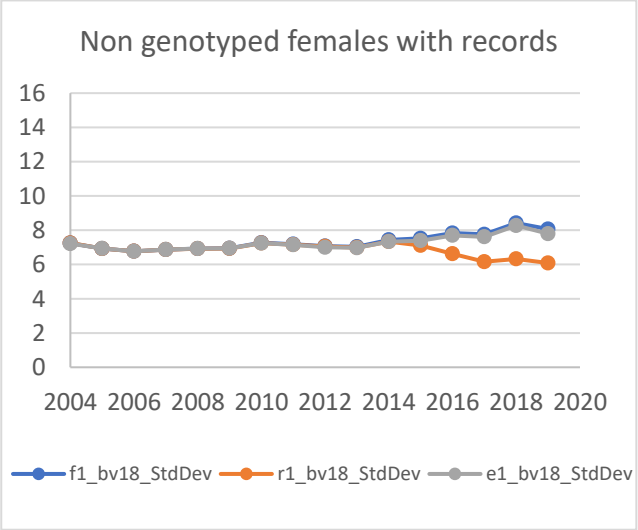
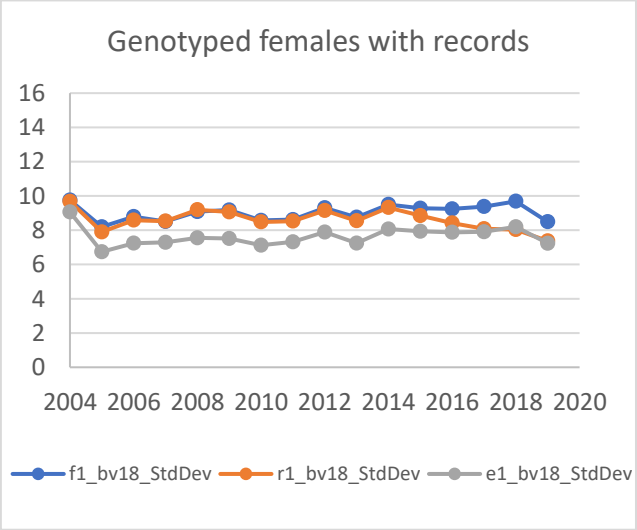
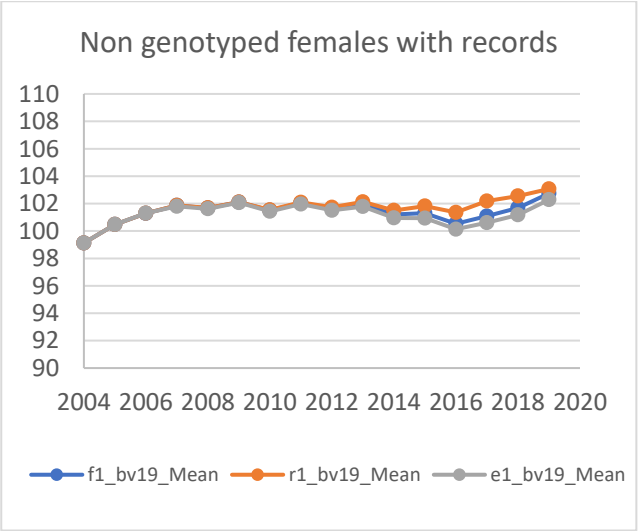
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv18_Mean
r1_bv18_Mean
e1_bv18_Mean


Non genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv18_StdDev
r1_bv18_StdDev
e1_bv18_StdDev


Genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv18_StdDev
r1_bv18_StdDev
e1_bv18_StdDev

***bv19***


Non genotyped females with records
110
108
106
104
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100
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96
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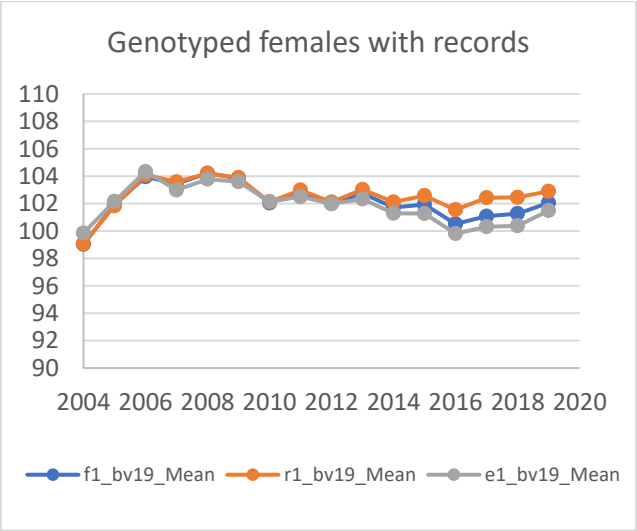
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv19_Mean
r1_bv19_Mean
e1_bv19_Mean


Genotyped females with records
110
108
106
104
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100
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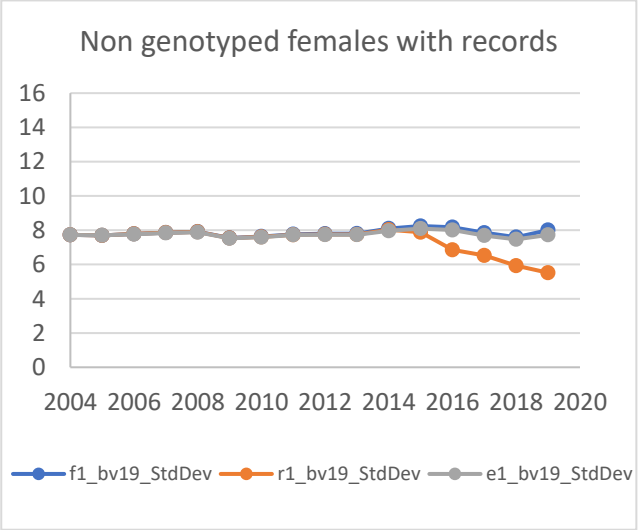
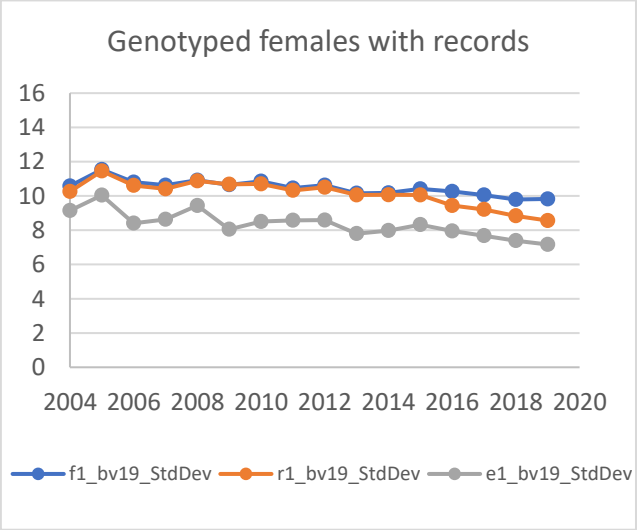
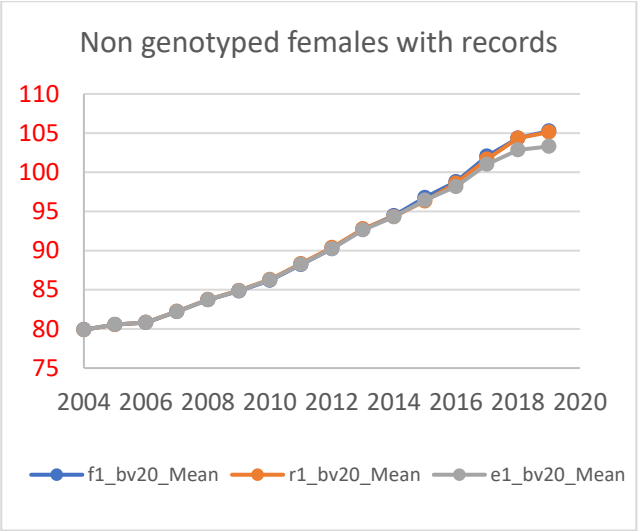
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv19_Mean
r1_bv19_Mean
e1_bv19_Mean


Non genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv19_StdDev
r1_bv19_StdDev
e1_bv19_StdDev


Genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv19_StdDev
r1_bv19_StdDev
e1_bv19_StdDev

***bv20***


Non genotyped females with records
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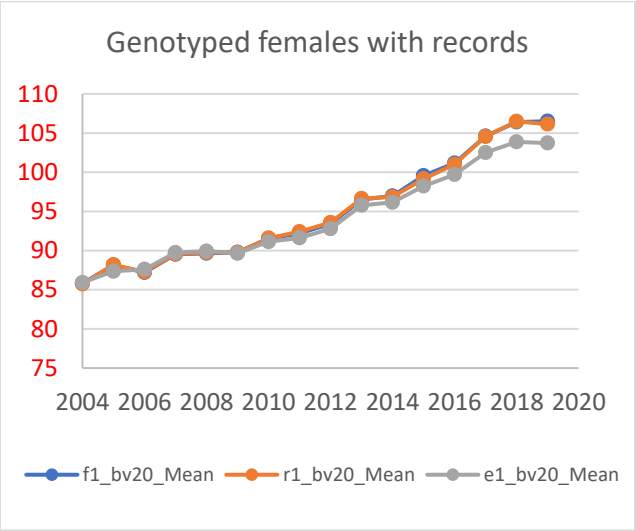
85
80
75
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv20_Mean
r1_bv20_Mean
e1_bv20_Mean


Genotyped females with records
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105
100
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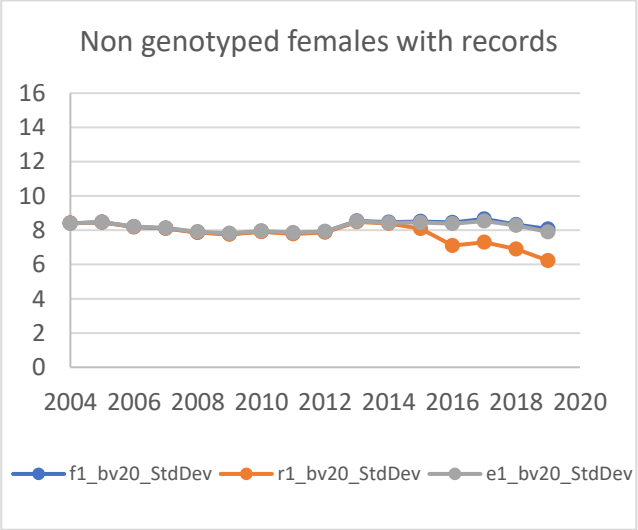
85
80
75
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv20_Mean
r1_bv20_Mean
e1_bv20_Mean


Non genotyped females with records
16
14
12
10
8
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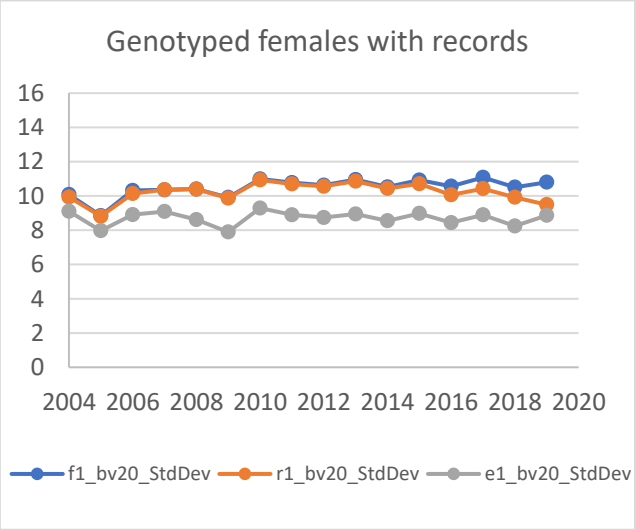
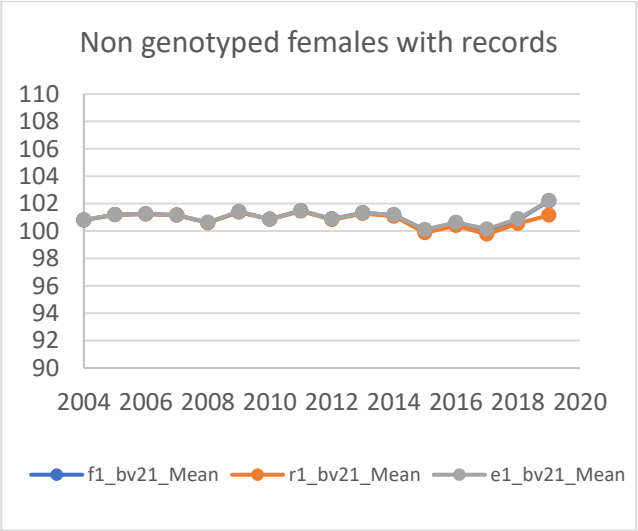
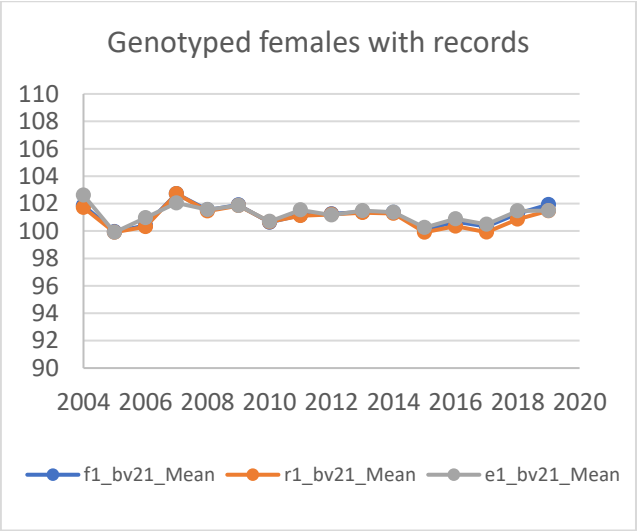
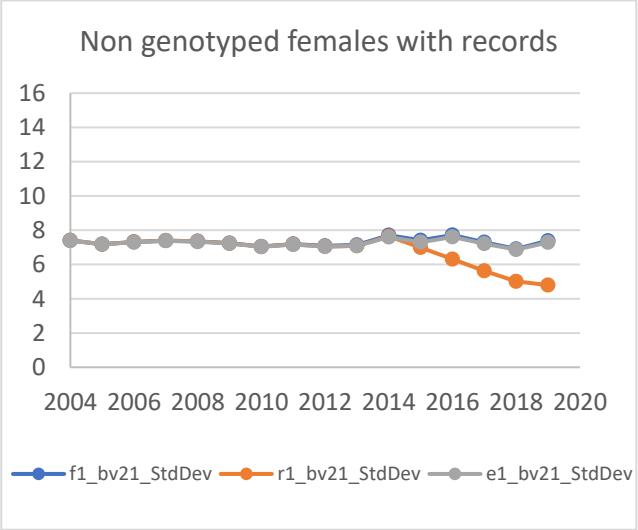
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv20_StdDev
r1_bv20_StdDev
e1_bv20_StdDev

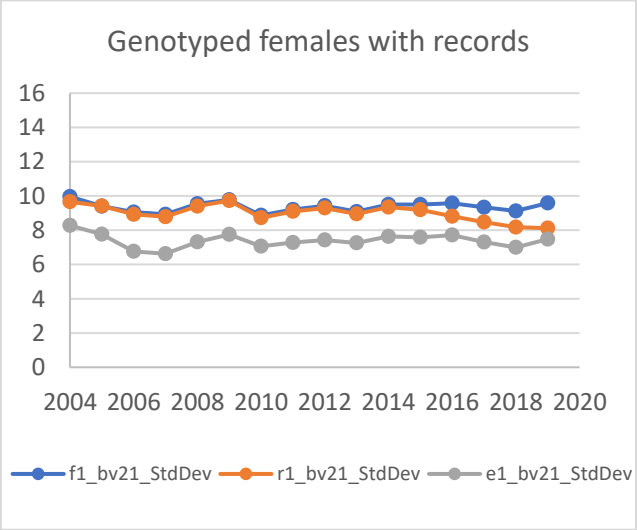

Genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv20_StdDev
r1_bv20_StdDev
e1_bv20_StdDev

***bv21***

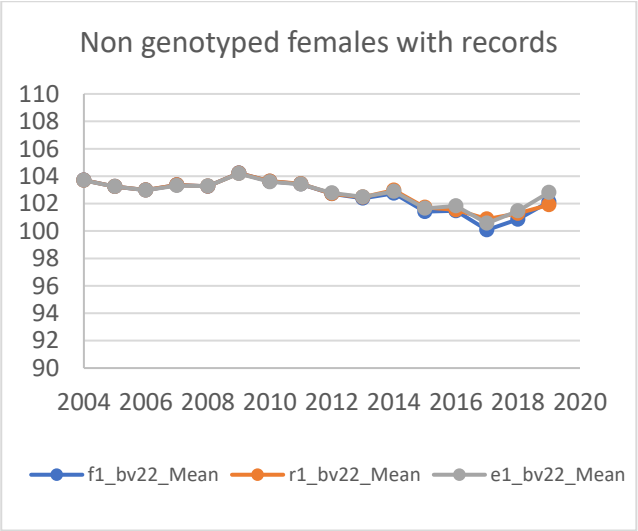

Non genotyped females with records
110
108
106
104
102
100
98
96
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv21_Mean
r1_bv21_Mean
e1_bv21_Mean

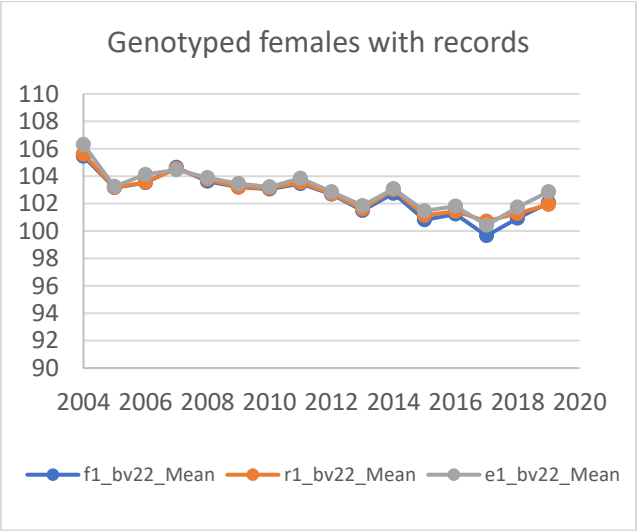

Genotyped females with records
110
108
106
104
102
100
98
96
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv21_Mean
r1_bv21_Mean
e1_bv21_Mean

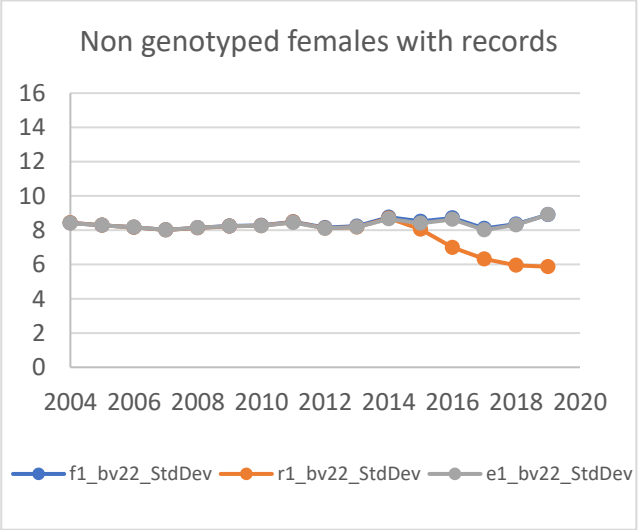

Non genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv21_StdDev
r1_bv21_StdDev
e1_bv21_StdDev

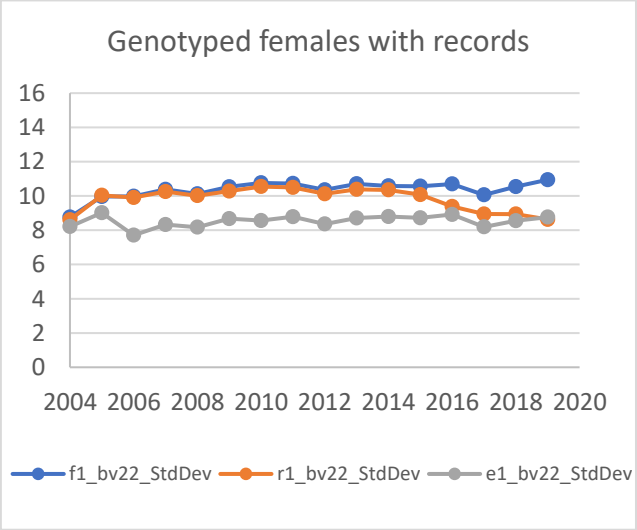

Genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv21_StdDev
r1_bv21_StdDev
e1_bv21_StdDev

***bv22***

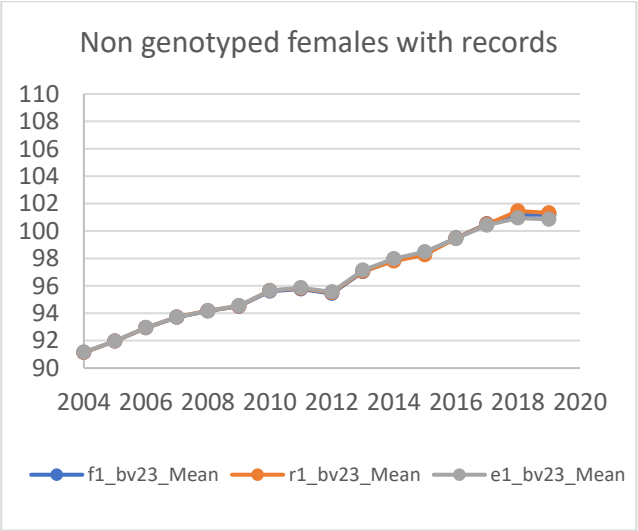

Non genotyped females with records
110
108
106
104
102
100
98
96
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv22_Mean
r1_bv22_Mean
e1_bv22_Mean

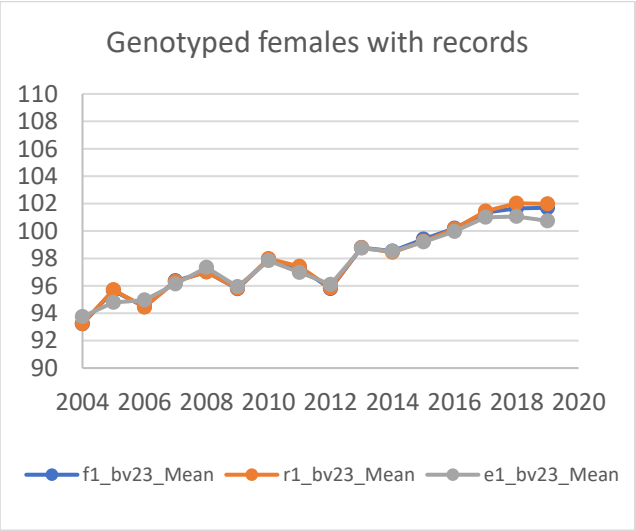

Genotyped females with records
110
108
106
104
102
100
98
96
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv22_Mean
r1_bv22_Mean
e1_bv22_Mean

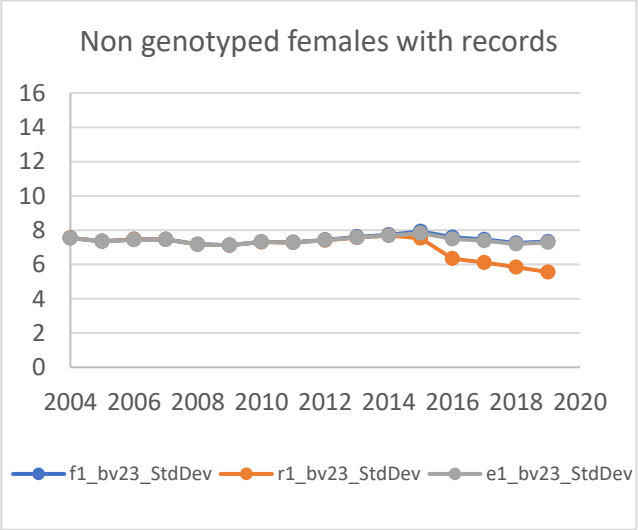

Non genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv22_StdDev
r1_bv22_StdDev
e1_bv22_StdDev

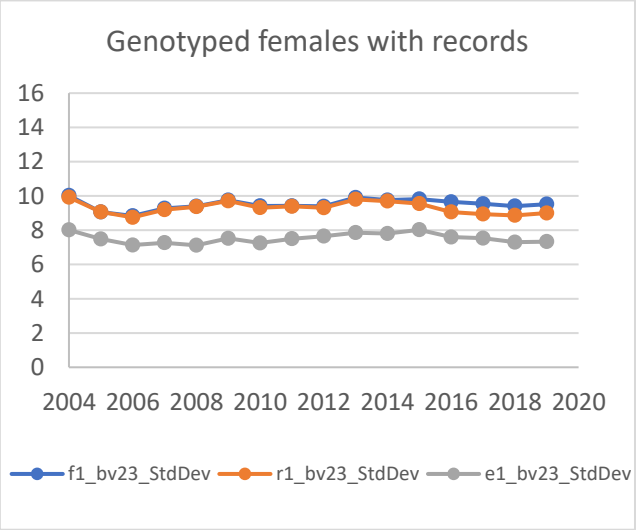

Genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv22_StdDev
r1_bv22_StdDev
e1_bv22_StdDev

***bv23***

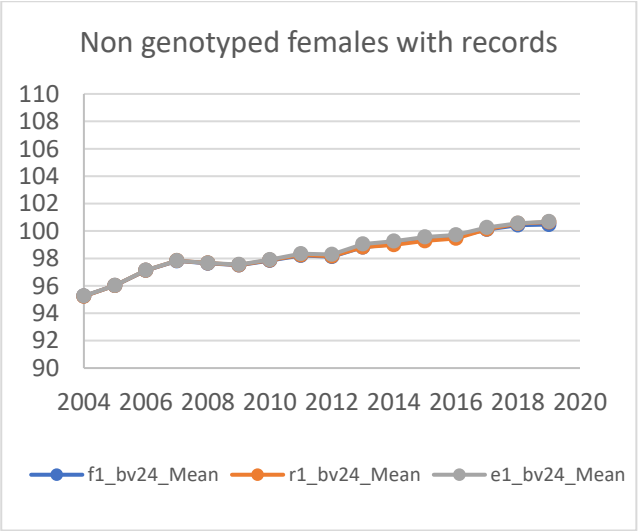

Non genotyped females with records
110
108
106
104
102
100
98
96
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv23_Mean
r1_bv23_Mean
e1_bv23_Mean

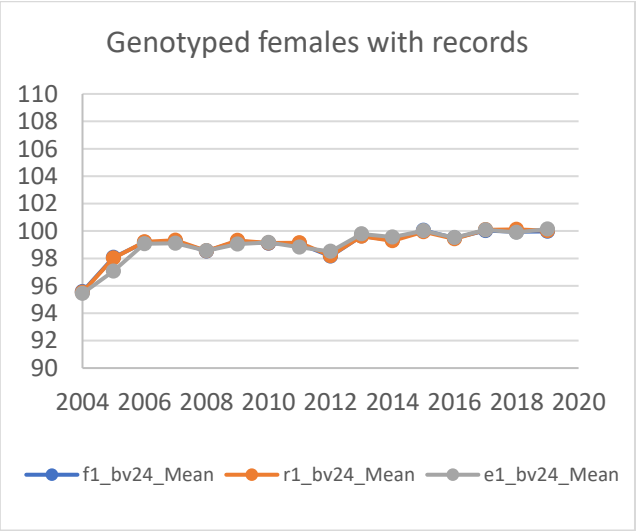

Genotyped females with records
110
108
106
104
102
100
98
96
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv23_Mean
r1_bv23_Mean
e1_bv23_Mean

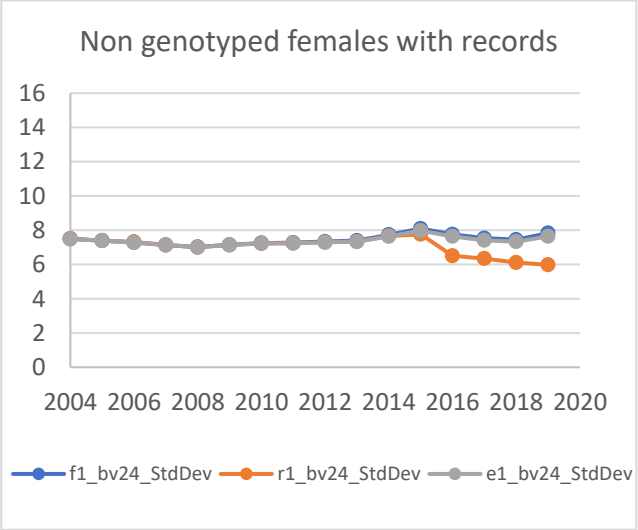

Non genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv23_StdDev
r1_bv23_StdDev
e1_bv23_StdDev

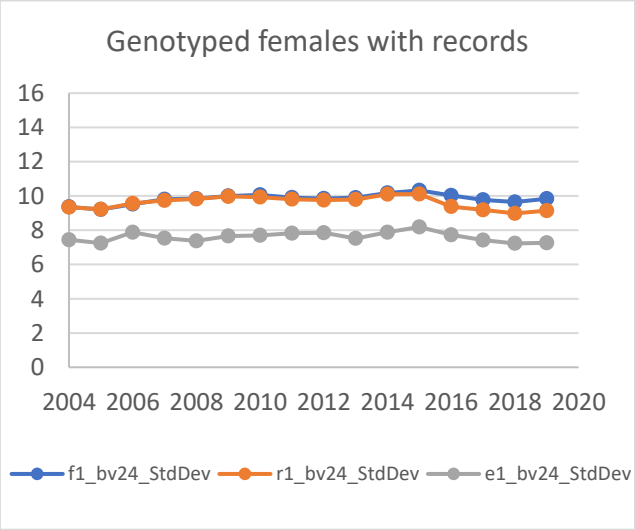

Genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv23_StdDev
r1_bv23_StdDev
e1_bv23_StdDev

***bv24***

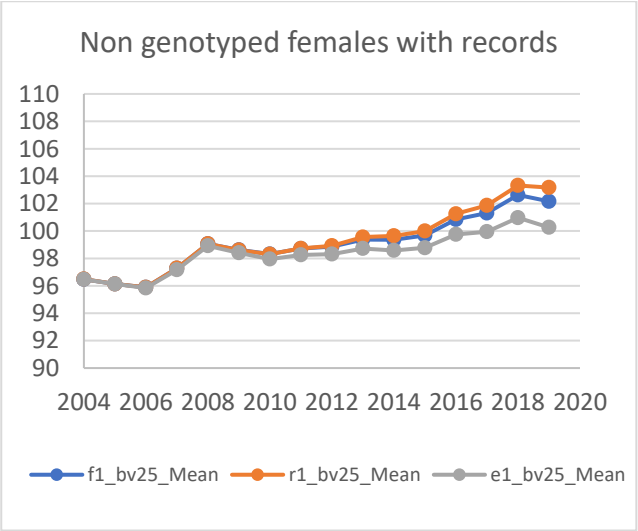

Non genotyped females with records
110
108
106
104
102
100
98
96
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv24_Mean
r1_bv24_Mean
e1_bv24_Mean

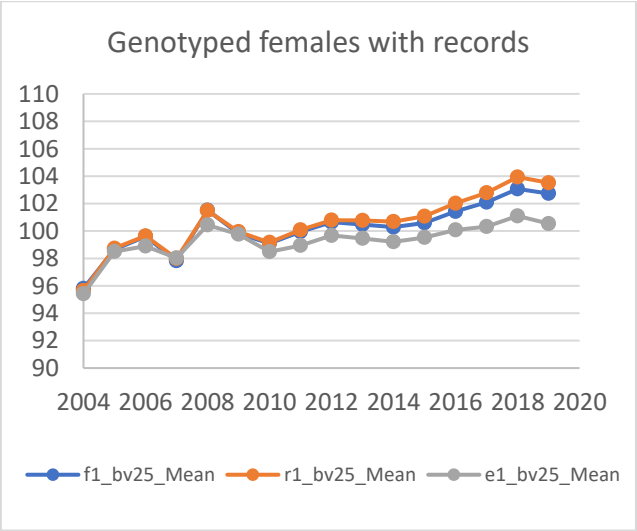

Genotyped females with records
110
108
106
104
102
100
98
96
94
92
90
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv24_Mean
r1_bv24_Mean
e1_bv24_Mean

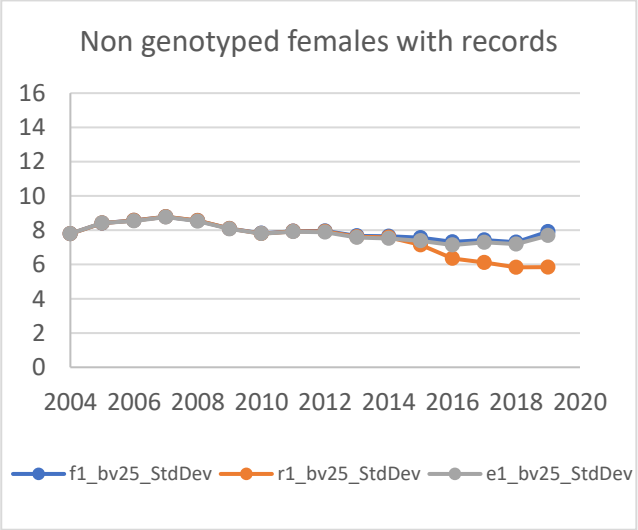

Non genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv24_StdDev
r1_bv24_StdDev
e1_bv24_StdDev

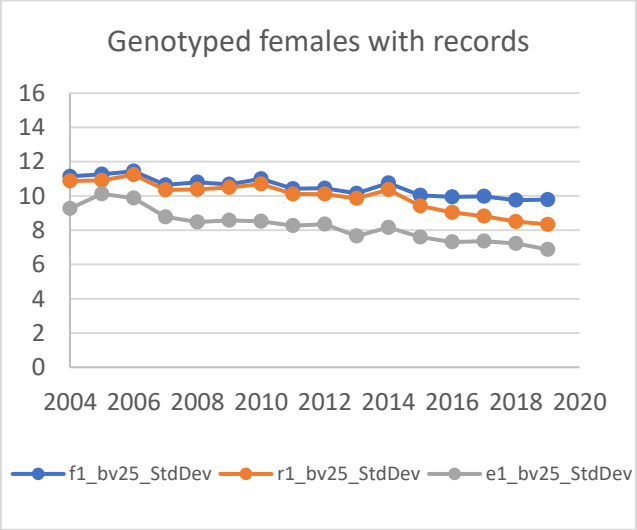

Genotyped females with records
16
14
12
10
8
6
4
2
0
2004 2006 2008 2010 2012 2014 2016 2018 2020
f1_bv24_StdDev
r1_bv24_StdDev
e1_bv24_StdDev

***bv25***



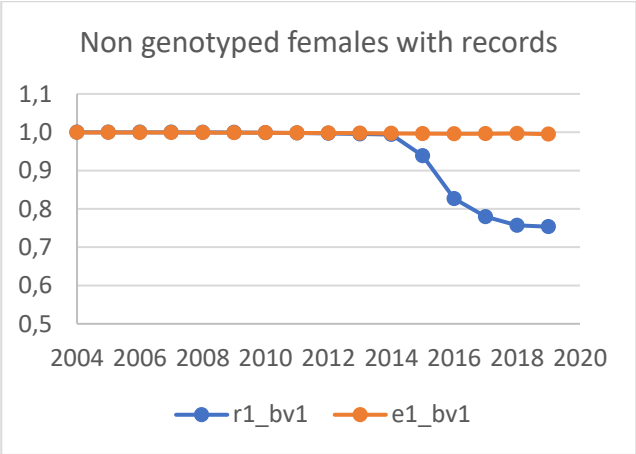



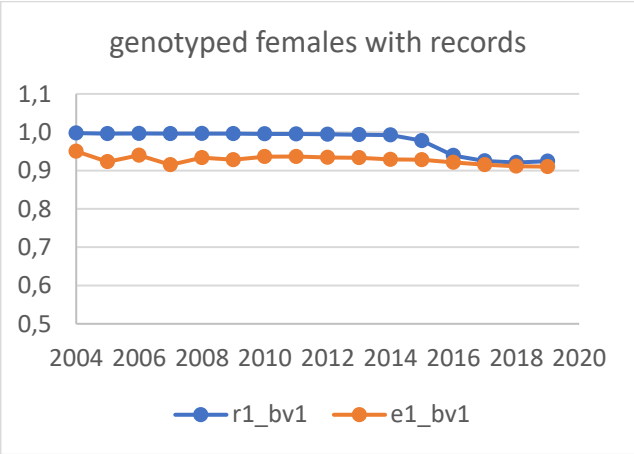



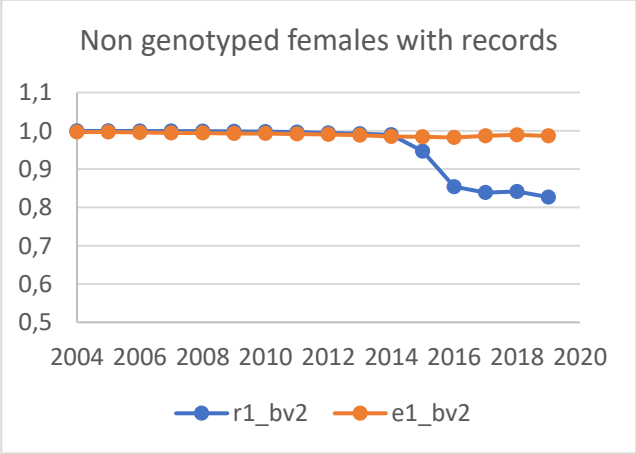

## Correlations

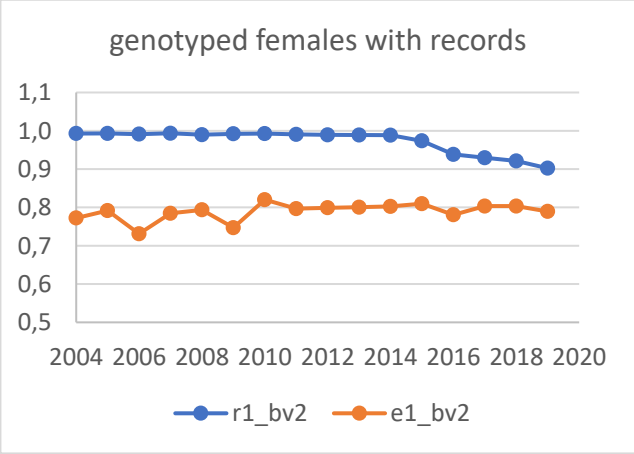
***bv1***


Non genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv1
e1_bv1

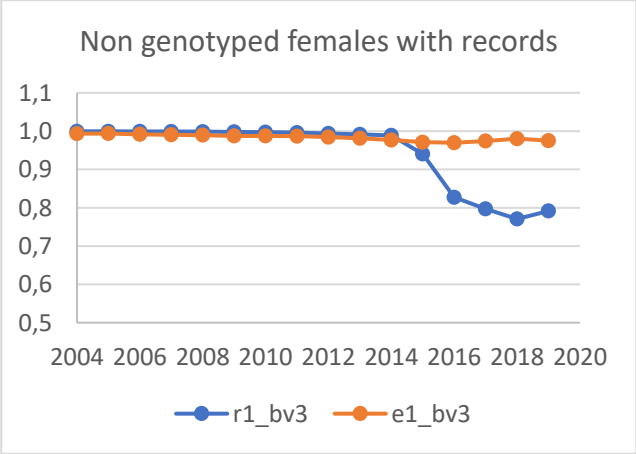

genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv1
e1_bv1

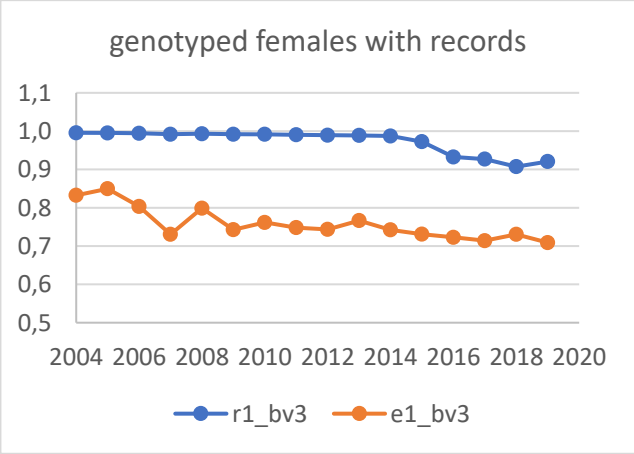
***bv2***


Non genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv2
e1_bv2

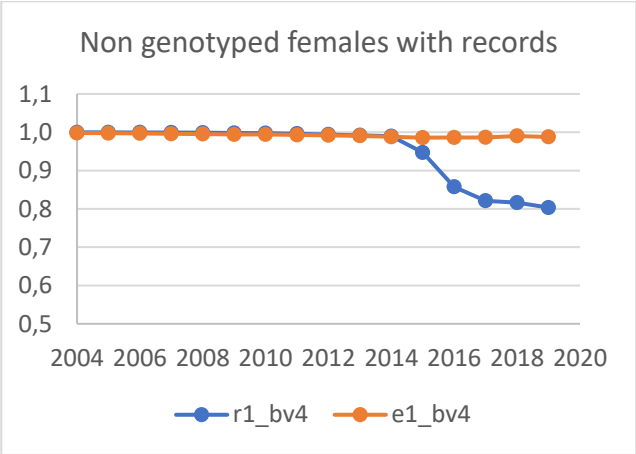

genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv2
e1_bv2

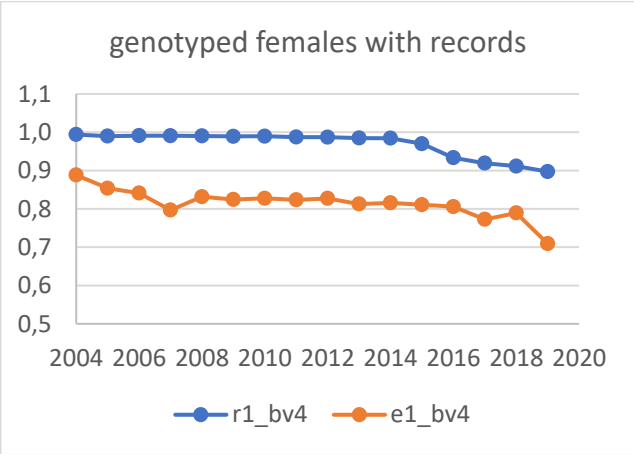
***bv3***


Non genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv3
e1_bv3

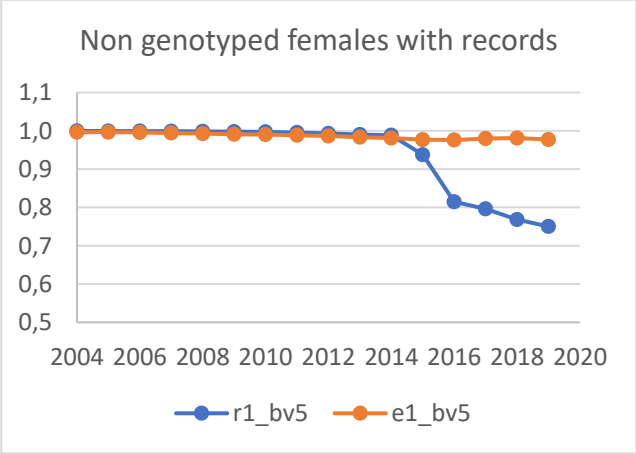

genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv3
e1_bv3

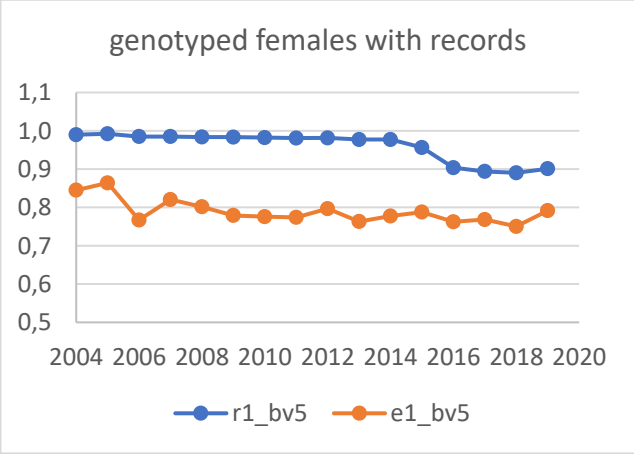
***bv4***


Non genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv4
e1_bv4

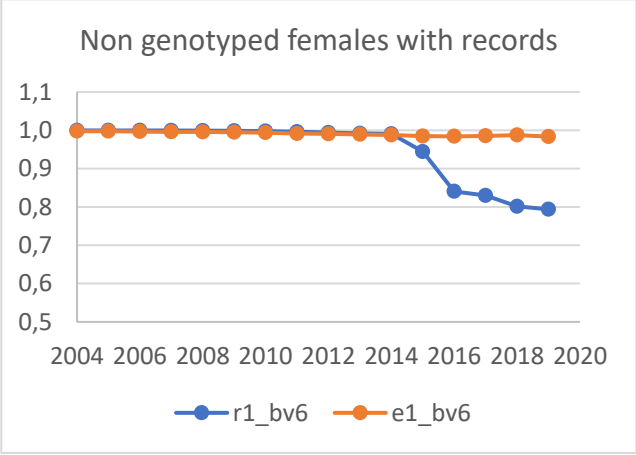

genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv4
e1_bv4

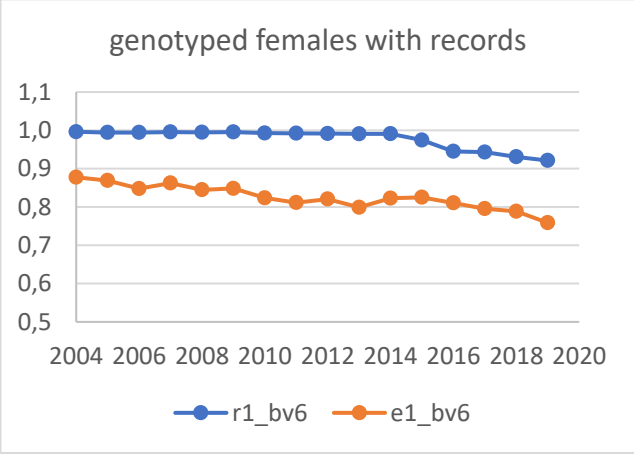
***bv5***


Non genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv5
e1_bv5

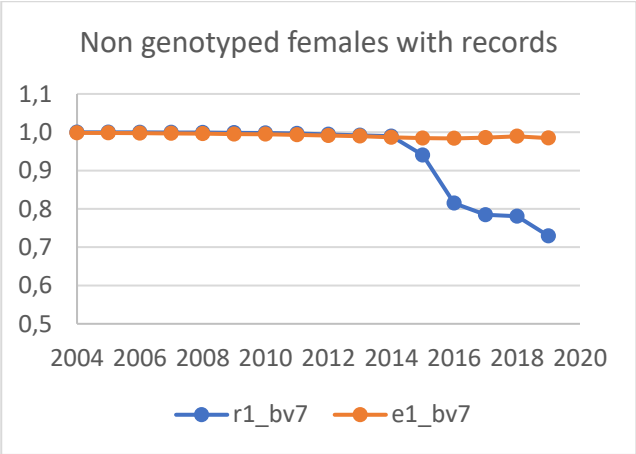

genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv5
e1_bv5

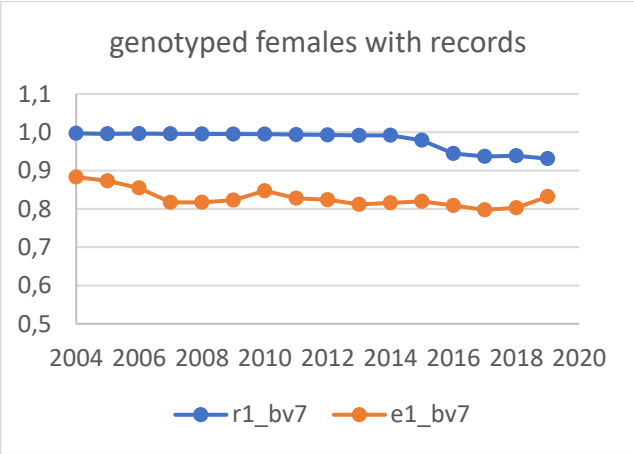
***bv6***


Non genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv6
e1_bv6

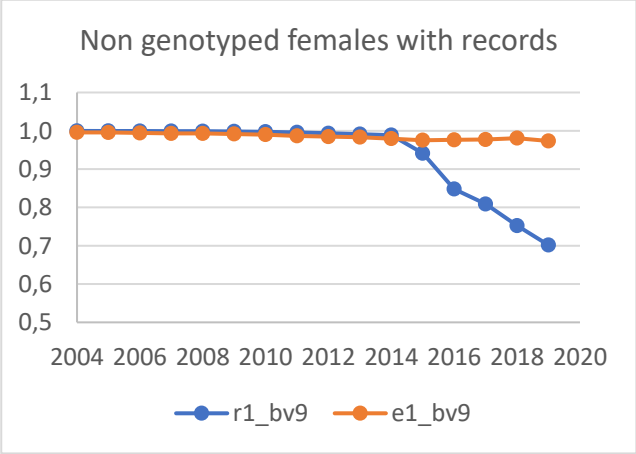

genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv6
e1_bv6

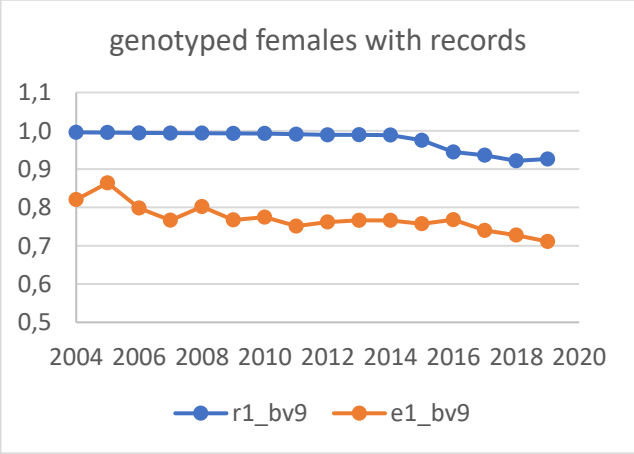
***bv7***


Non genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv7
e1_bv7

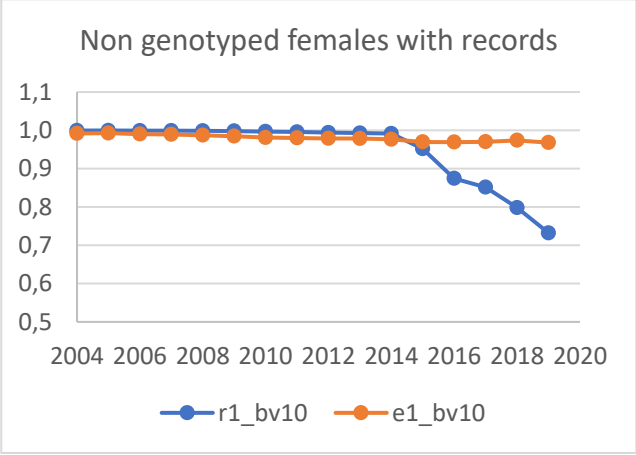

genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv7
e1_bv7

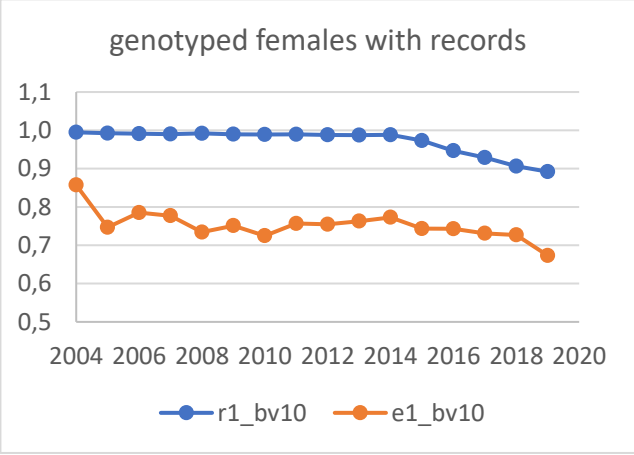
***bv9***


Non genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv9
e1_bv9

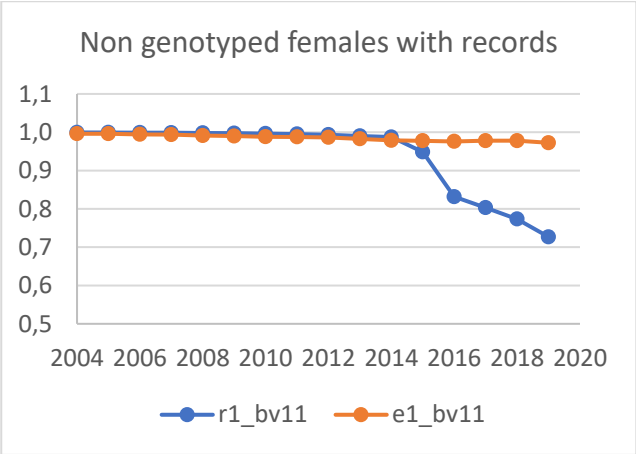

genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv9
e1_bv9

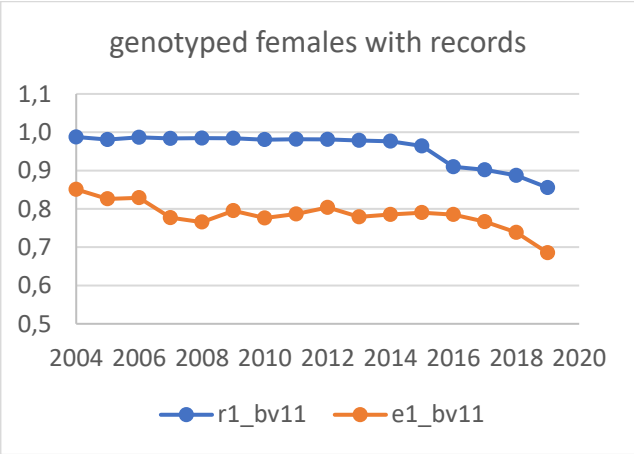
***bv10***


Non genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv10
e1_bv10

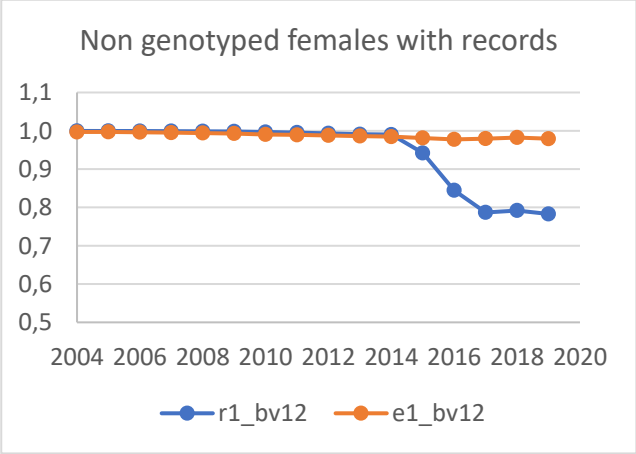

genotyped females with records
1,1
1,0
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv10
e1_bv10

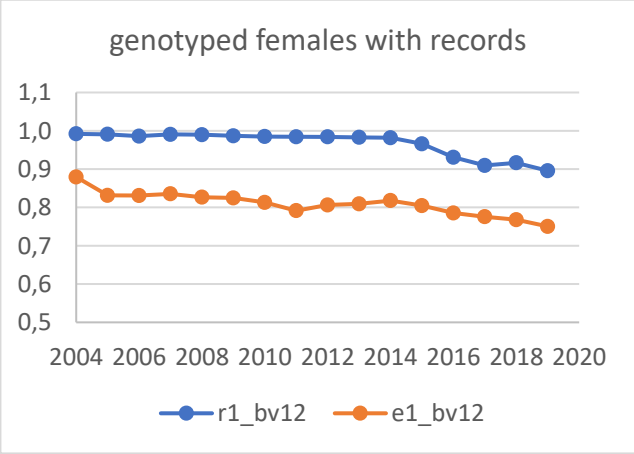
***bv11***



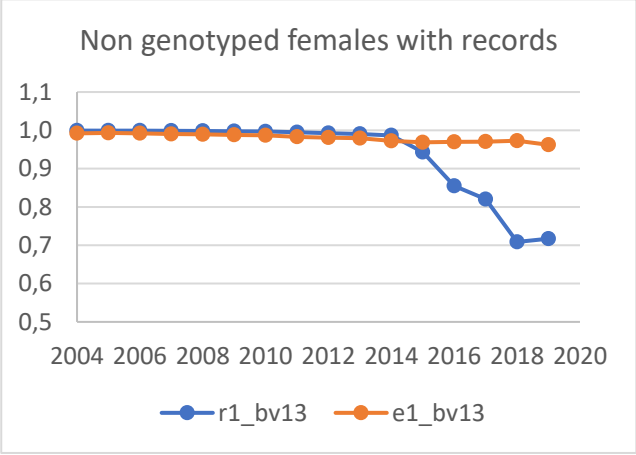



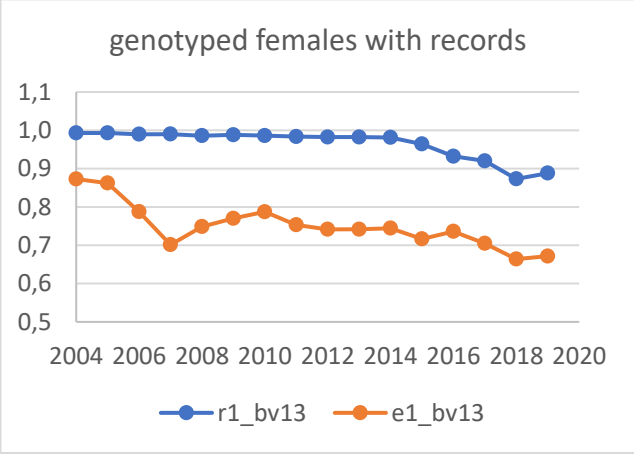

***bv12***



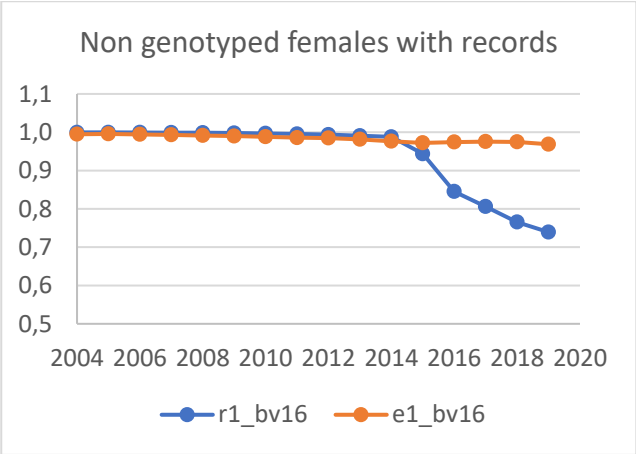



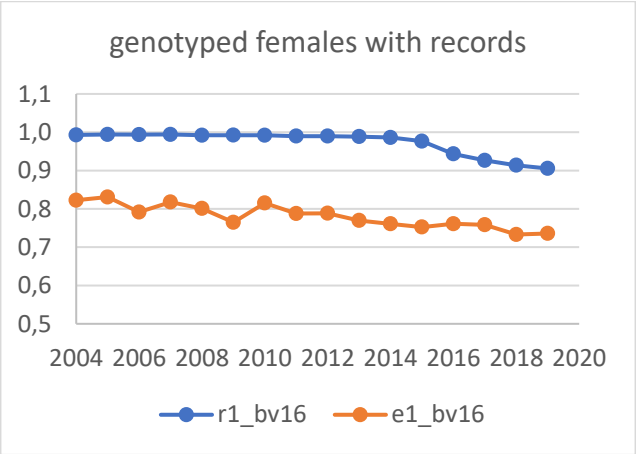

***bv13***



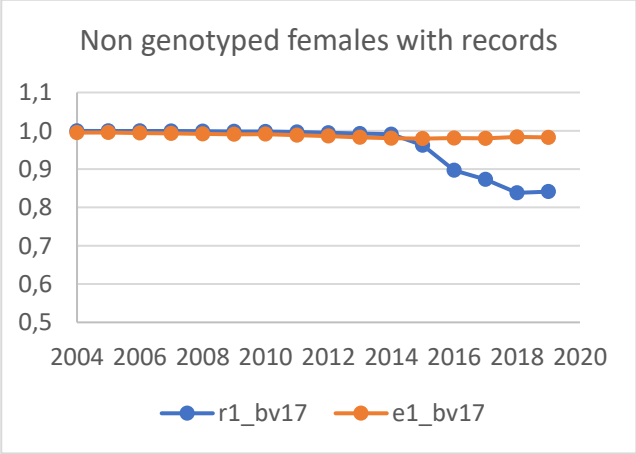



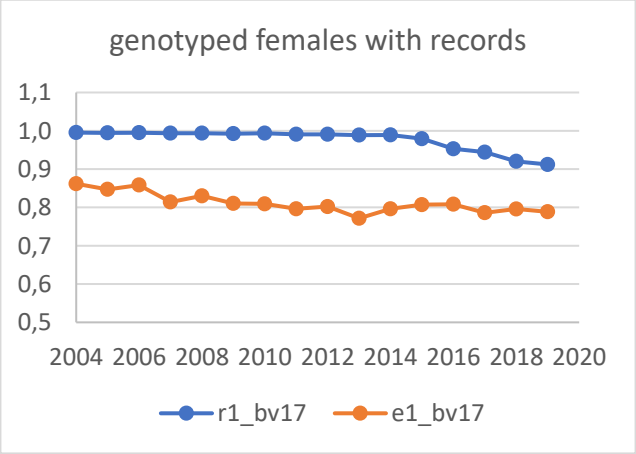
***bv16***



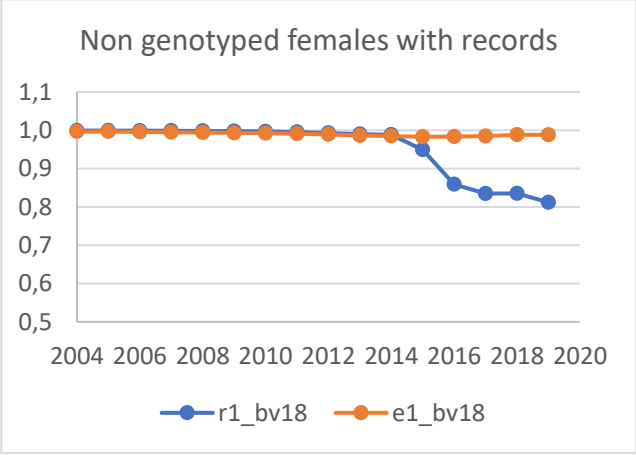



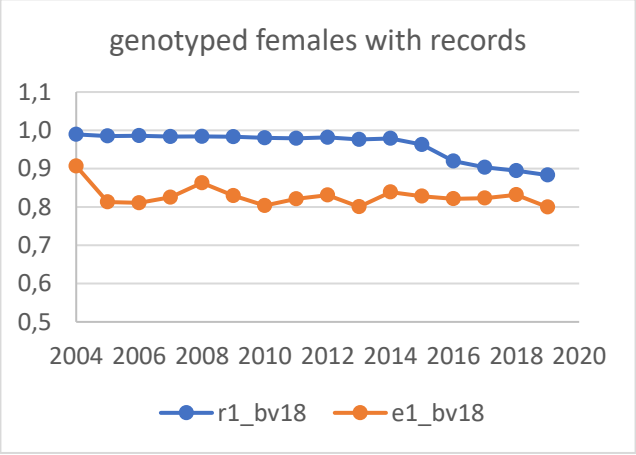

***bv17***



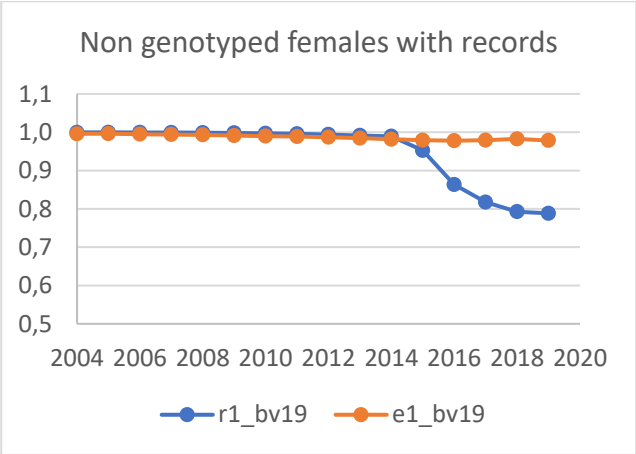



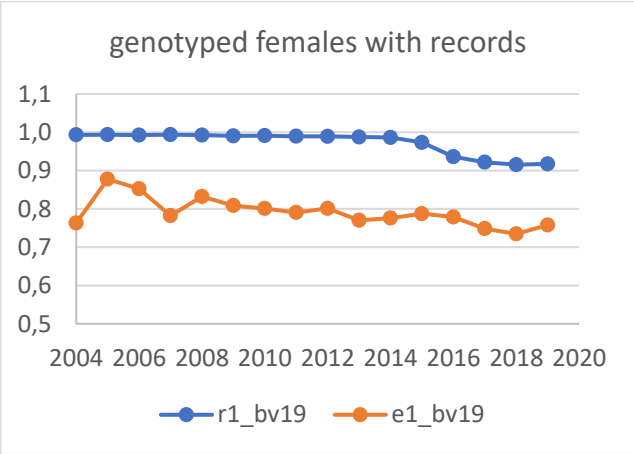

***bv18***



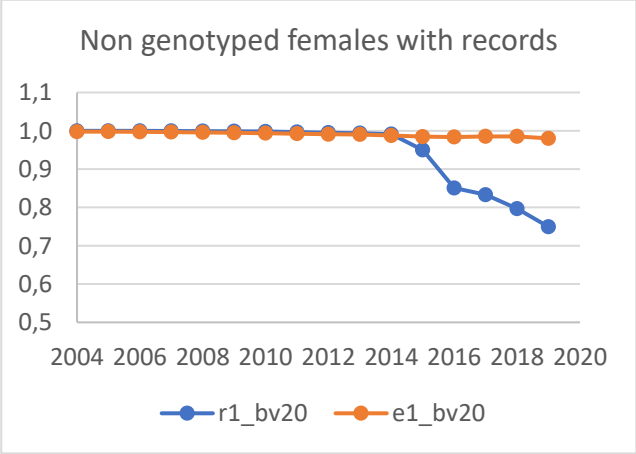



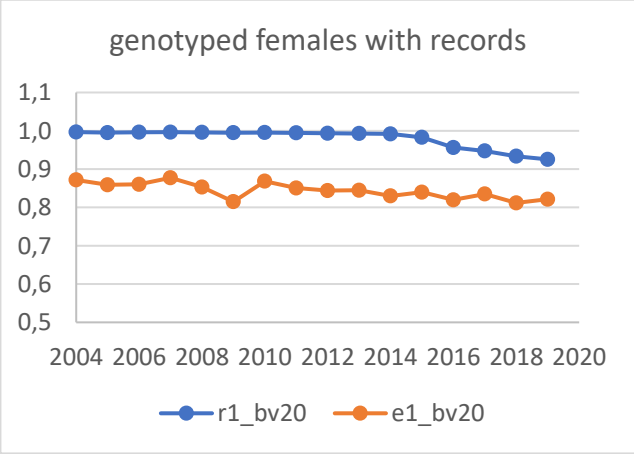
***bv19***



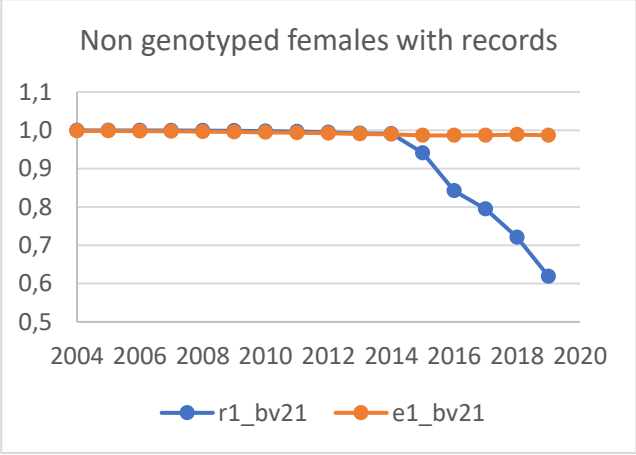



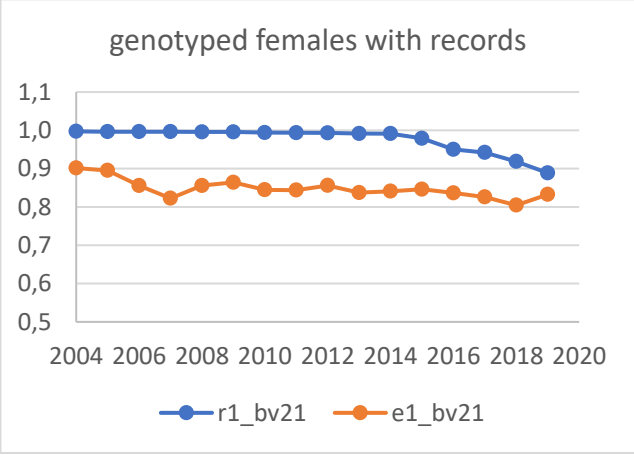

***bv20***



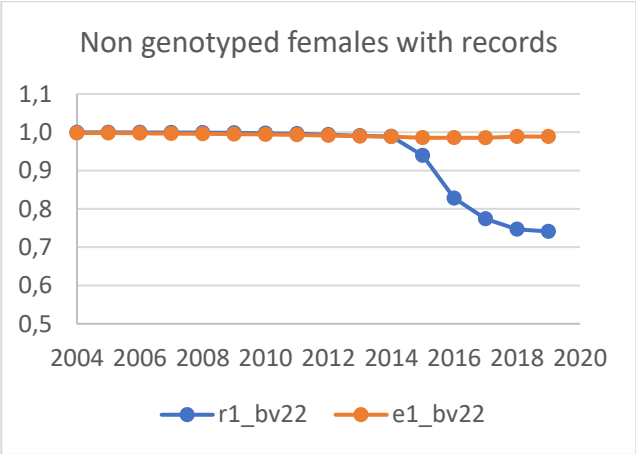



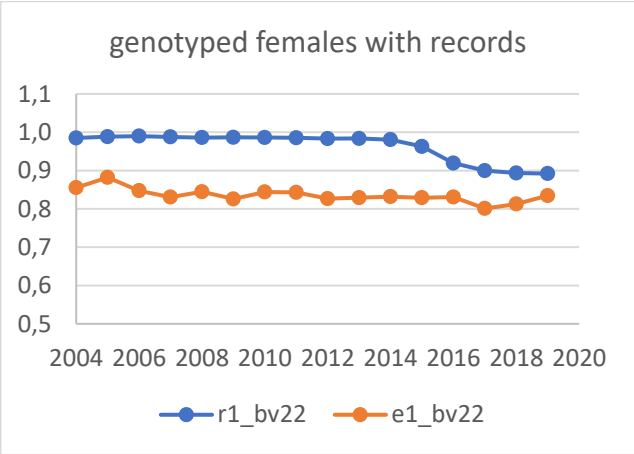

***bv21***



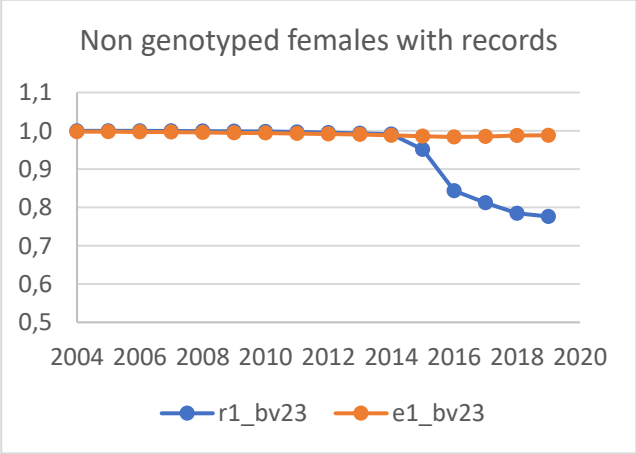



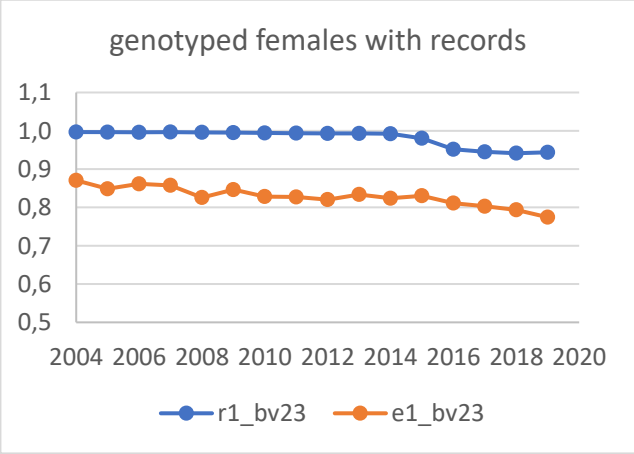
***bv22***



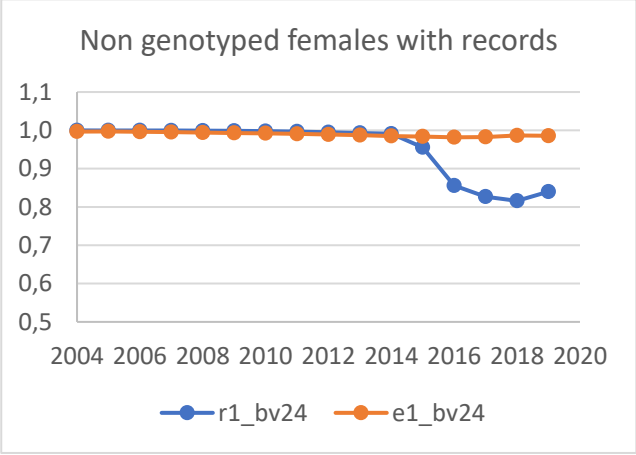



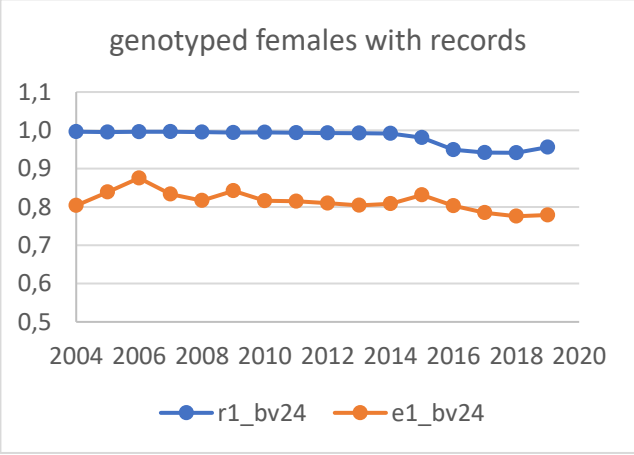

***bv23***



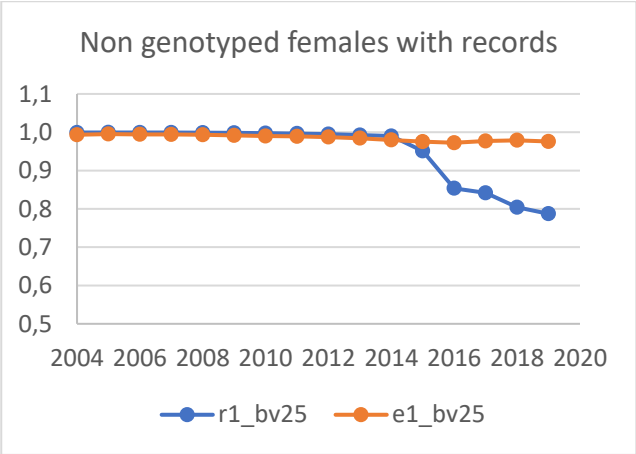



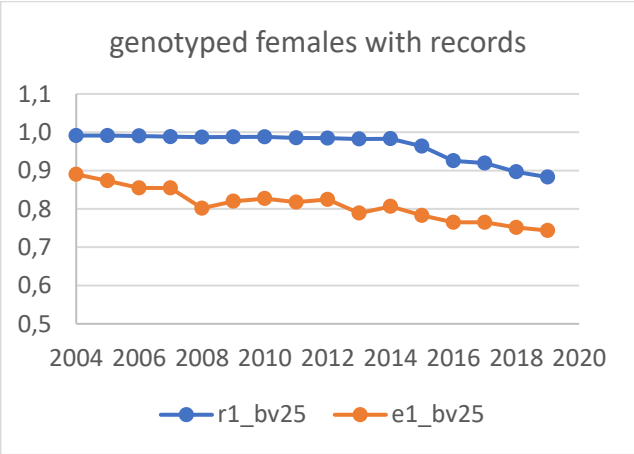

***bv24***



***bv25***



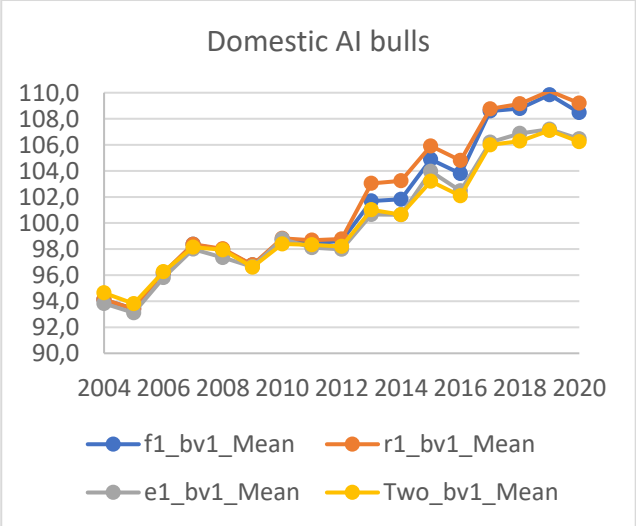



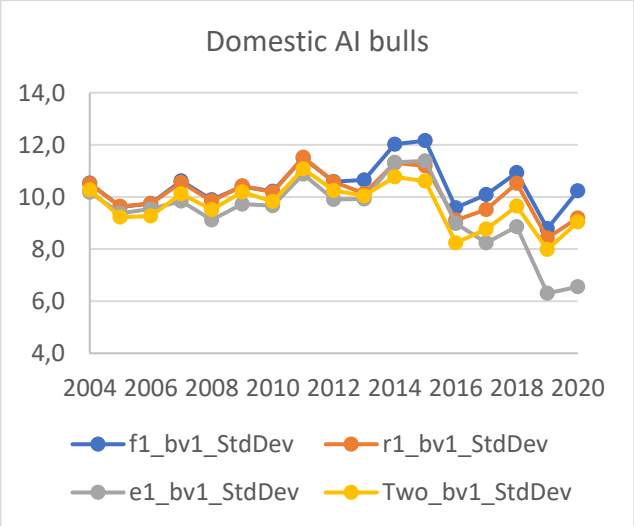

# Bulls

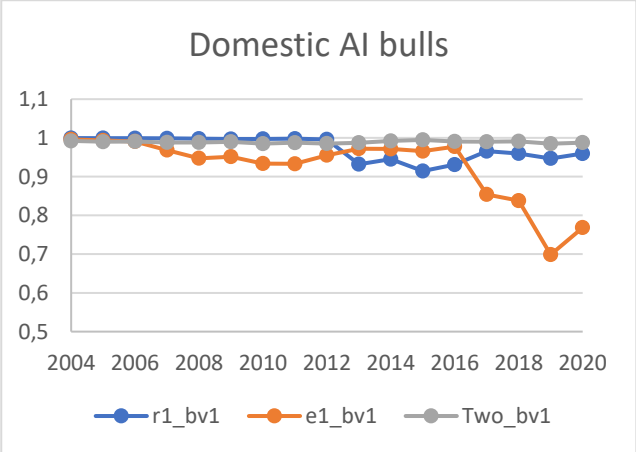
## Trend (mean and SD) and correlations

***bv1***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 94.1 | 94.1 | 93.8 | 94.6 | 10.5 | 10.5 | 10.2 | 10.3 | 1.00 | 1.00 | 0.99 |
| 2005 | 334 | 93.4 | 93.4 | 93.1 | 93.8 | 9.6 | 9.6 | 9.4 | 9.2 | 1.00 | 0.99 | 0.99 |
| 2006 | 383 | 96.1 | 96.2 | 95.8 | 96.3 | 9.7 | 9.7 | 9.5 | 9.3 | 1.00 | 0.99 | 0.99 |
| 2007 | 334 | 98.4 | 98.4 | 98.0 | 98.1 | 10.6 | 10.6 | 9.8 | 10.1 | 1.00 | 0.97 | 0.99 |
| 2008 | 293 | 97.9 | 98.0 | 97.3 | 97.9 | 9.9 | 9.8 | 9.1 | 9.5 | 1.00 | 0.95 | 0.99 |
| 2009 | 269 | 96.8 | 96.8 | 96.6 | 96.6 | 10.4 | 10.4 | 9.7 | 10.2 | 1.00 | 0.95 | 0.99 |
| 2010 | 226 | 98.6 | 98.8 | 98.8 | 98.4 | 10.2 | 10.2 | 9.7 | 9.8 | 1.00 | 0.93 | 0.99 |
| 2011 | 167 | 98.4 | 98.7 | 98.1 | 98.3 | 11.5 | 11.5 | 10.9 | 11.1 | 1.00 | 0.93 | 0.99 |
| 2012 | 172 | 98.6 | 98.8 | 98.0 | 98.2 | 10.6 | 10.6 | 9.9 | 10.2 | 1.00 | 0.96 | 0.99 |
| 2013 | 120 | 101.7 | 103.0 | 100.7 | 101.0 | 10.7 | 10.1 | 9.9 | 10.0 | 0.93 | 0.97 | 0.99 |
| 2014 | 104 | 101.8 | 103.2 | 100.6 | 100.6 | 12.0 | 11.3 | 11.3 | 10.8 | 0.95 | 0.97 | 0.99 |
| 2015 | 80 | 104.9 | 105.9 | 104.0 | 103.2 | 12.2 | 11.2 | 11.4 | 10.6 | 0.91 | 0.97 | 0.99 |
| 2016 | 66 | 103.8 | 104.8 | 102.5 | 102.1 | 9.6 | 9.1 | 9.0 | 8.2 | 0.93 | 0.98 | 0.99 |
| 2017 | 65 | 108.6 | 108.8 | 106.2 | 106.0 | 10.1 | 9.5 | 8.2 | 8.8 | 0.97 | 0.85 | 0.99 |
| 2018 | 89 | 108.8 | 109.1 | 106.9 | 106.3 | 10.9 | 10.5 | 8.9 | 9.6 | 0.96 | 0.84 | 0.99 |
| 2019 | 60 | 109.8 | 110.1 | 107.2 | 107.1 | 8.8 | 8.4 | 6.3 | 8.0 | 0.95 | 0.70 | 0.99 |
| 2020 | 27 | 108.5 | 109.2 | 106.5 | 106.2 | 10.2 | 9.2 | 6.6 | 9.0 | 0.96 | 0.77 | 0.99 |

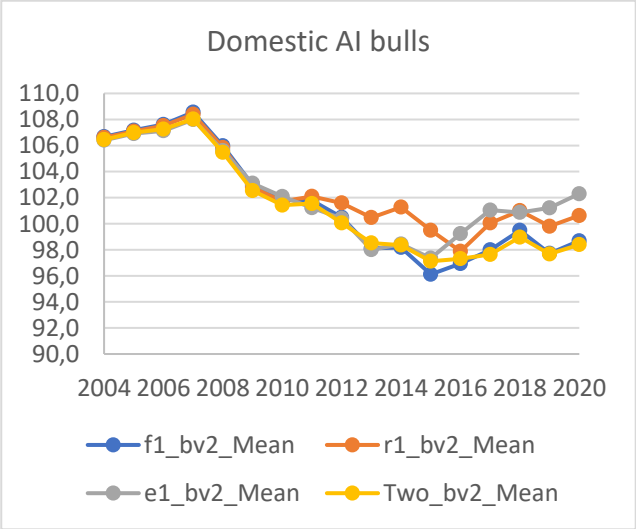


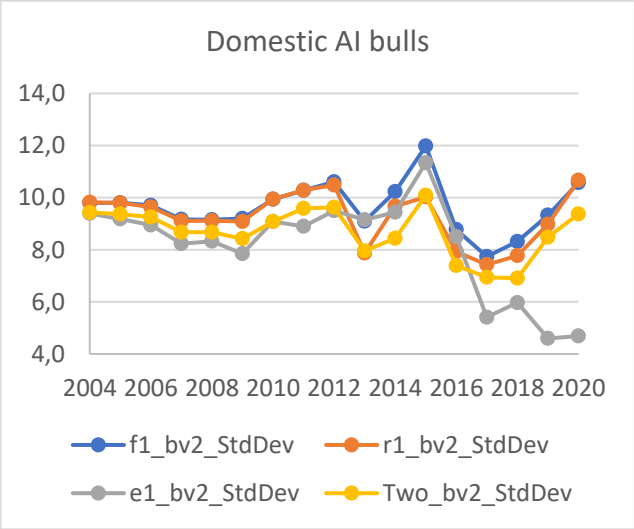



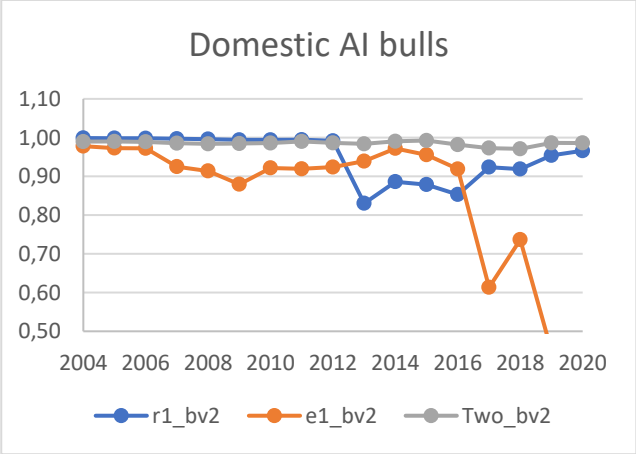



***bv2***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 106.7 | 106.6 | 106.4 | 106.5 | 9.8 | 9.8 | 9.4 | 9.4 | 1.00 | 0.98 | 0.99 |
| 2005 | 334 | 107.2 | 107.1 | 106.9 | 107.0 | 9.8 | 9.8 | 9.2 | 9.4 | 1.00 | 0.97 | 0.99 |
| 2006 | 383 | 107.6 | 107.5 | 107.1 | 107.3 | 9.7 | 9.6 | 8.9 | 9.3 | 1.00 | 0.97 | 0.99 |
| 2007 | 334 | 108.6 | 108.4 | 108.0 | 108.0 | 9.2 | 9.1 | 8.2 | 8.7 | 1.00 | 0.92 | 0.99 |
| 2008 | 293 | 106.0 | 105.8 | 105.6 | 105.5 | 9.1 | 9.1 | 8.3 | 8.7 | 1.00 | 0.91 | 0.98 |
| 2009 | 269 | 103.0 | 102.8 | 103.1 | 102.5 | 9.2 | 9.1 | 7.9 | 8.4 | 0.99 | 0.88 | 0.98 |
| 2010 | 226 | 101.8 | 101.7 | 102.1 | 101.4 | 9.9 | 9.9 | 9.1 | 9.1 | 0.99 | 0.92 | 0.99 |
| 2011 | 167 | 101.8 | 102.1 | 101.2 | 101.5 | 10.3 | 10.3 | 8.9 | 9.6 | 0.99 | 0.92 | 0.99 |
| 2012 | 172 | 100.5 | 101.6 | 100.4 | 100.1 | 10.6 | 10.5 | 9.5 | 9.6 | 0.99 | 0.92 | 0.99 |
| 2013 | 120 | 98.1 | 100.5 | 98.0 | 98.5 | 9.1 | 7.9 | 9.2 | 8.0 | 0.83 | 0.94 | 0.98 |
| 2014 | 104 | 98.2 | 101.3 | 98.4 | 98.4 | 10.2 | 9.7 | 9.4 | 8.4 | 0.89 | 0.97 | 0.99 |
| 2015 | 80 | 96.1 | 99.5 | 97.4 | 97.1 | 12.0 | 10.0 | 11.3 | 10.1 | 0.88 | 0.96 | 0.99 |
| 2016 | 66 | 96.9 | 97.9 | 99.2 | 97.3 | 8.8 | 7.9 | 8.5 | 7.4 | 0.85 | 0.92 | 0.98 |
| 2017 | 65 | 98.0 | 100.1 | 101.0 | 97.6 | 7.7 | 7.4 | 5.4 | 6.9 | 0.92 | 0.61 | 0.97 |
| 2018 | 89 | 99.5 | 101.0 | 100.9 | 99.0 | 8.3 | 7.8 | 6.0 | 6.9 | 0.92 | 0.74 | 0.97 |
| 2019 | 60 | 97.7 | 99.8 | 101.2 | 97.7 | 9.3 | 9.0 | 4.6 | 8.5 | 0.95 | 0.45 | 0.99 |
| 2020 | 27 | 98.7 | 100.6 | 102.3 | 98.4 | 10.6 | 10.7 | 4.7 | 9.4 | 0.97 | 0.36 | 0.99 |

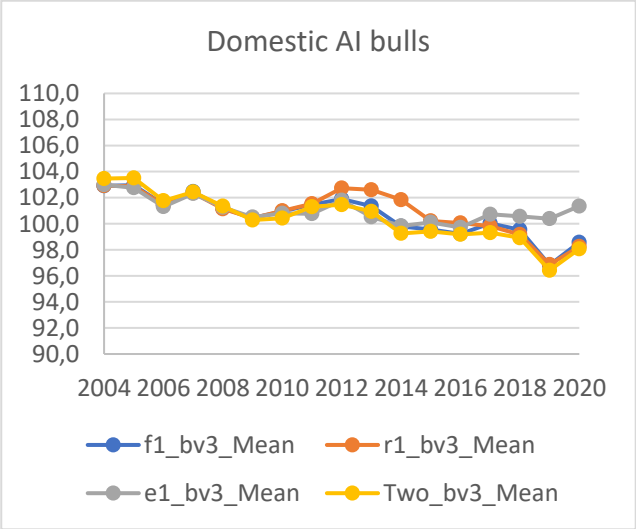


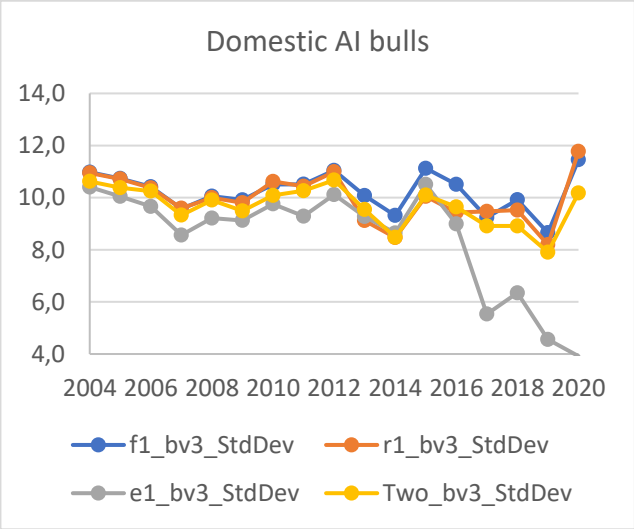



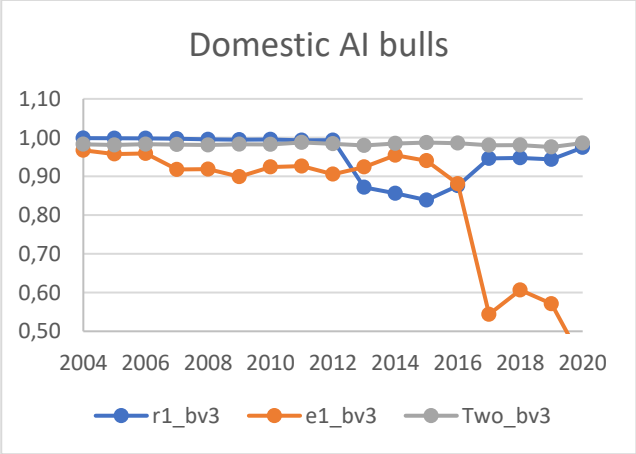



***bv3***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 102.9 | 102.9 | 103.0 | 103.5 | 11.0 | 10.9 | 10.4 | 10.6 | 1.00 | 0.97 | 0.98 |
| 2005 | 334 | 103.0 | 102.9 | 102.8 | 103.5 | 10.7 | 10.7 | 10.0 | 10.4 | 1.00 | 0.96 | 0.98 |
| 2006 | 383 | 101.5 | 101.4 | 101.3 | 101.8 | 10.4 | 10.4 | 9.7 | 10.2 | 1.00 | 0.96 | 0.98 |
| 2007 | 334 | 102.5 | 102.4 | 102.3 | 102.4 | 9.6 | 9.6 | 8.6 | 9.3 | 1.00 | 0.92 | 0.98 |
| 2008 | 293 | 101.2 | 101.1 | 101.3 | 101.3 | 10.1 | 10.0 | 9.2 | 9.9 | 1.00 | 0.92 | 0.98 |
| 2009 | 269 | 100.4 | 100.4 | 100.5 | 100.3 | 9.9 | 9.8 | 9.1 | 9.5 | 0.99 | 0.90 | 0.98 |
| 2010 | 226 | 100.9 | 101.0 | 100.8 | 100.4 | 10.5 | 10.6 | 9.8 | 10.1 | 1.00 | 0.92 | 0.98 |
| 2011 | 167 | 101.5 | 101.5 | 100.8 | 101.3 | 10.5 | 10.4 | 9.3 | 10.3 | 0.99 | 0.93 | 0.99 |
| 2012 | 172 | 101.9 | 102.7 | 101.8 | 101.5 | 11.0 | 11.0 | 10.1 | 10.7 | 0.99 | 0.91 | 0.98 |
| 2013 | 120 | 101.4 | 102.6 | 100.5 | 100.9 | 10.1 | 9.1 | 9.3 | 9.5 | 0.87 | 0.92 | 0.98 |
| 2014 | 104 | 99.8 | 101.8 | 99.8 | 99.3 | 9.3 | 8.5 | 8.6 | 8.5 | 0.86 | 0.95 | 0.98 |
| 2015 | 80 | 99.6 | 100.2 | 100.1 | 99.4 | 11.1 | 10.0 | 10.5 | 10.1 | 0.84 | 0.94 | 0.99 |
| 2016 | 66 | 99.2 | 100.1 | 99.7 | 99.2 | 10.5 | 9.4 | 9.0 | 9.6 | 0.88 | 0.88 | 0.99 |
| 2017 | 65 | 100.0 | 99.8 | 100.7 | 99.3 | 9.2 | 9.5 | 5.5 | 8.9 | 0.95 | 0.54 | 0.98 |
| 2018 | 89 | 99.5 | 99.2 | 100.6 | 98.9 | 9.9 | 9.5 | 6.3 | 8.9 | 0.95 | 0.61 | 0.98 |
| 2019 | 60 | 96.8 | 96.9 | 100.4 | 96.4 | 8.7 | 8.2 | 4.6 | 7.9 | 0.94 | 0.57 | 0.98 |
| 2020 | 27 | 98.6 | 98.2 | 101.3 | 98.1 | 11.5 | 11.8 | 3.9 | 10.2 | 0.97 | 0.42 | 0.99 |

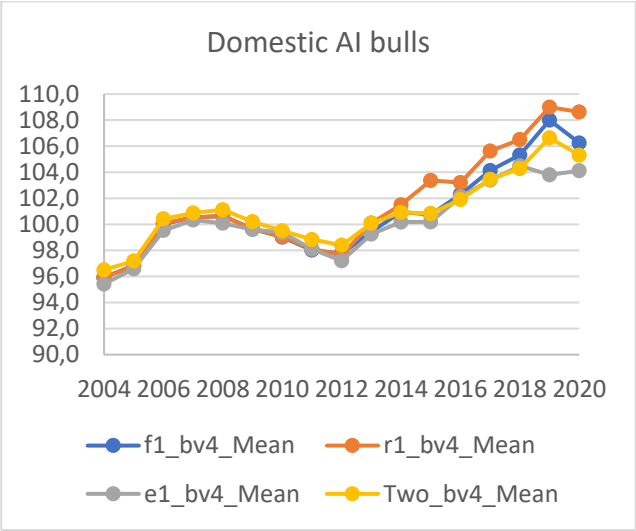


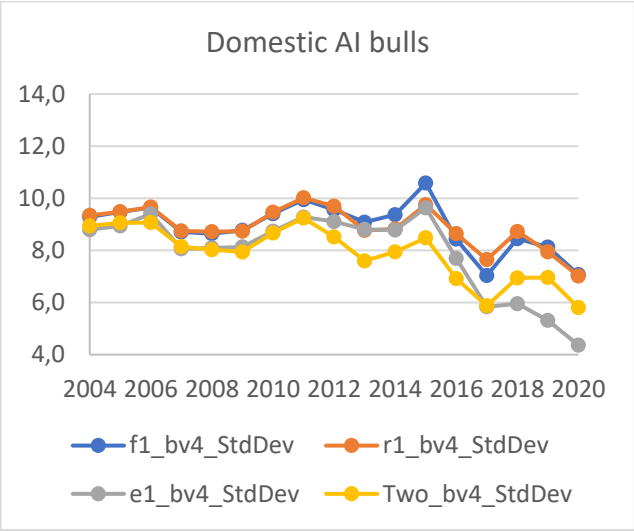



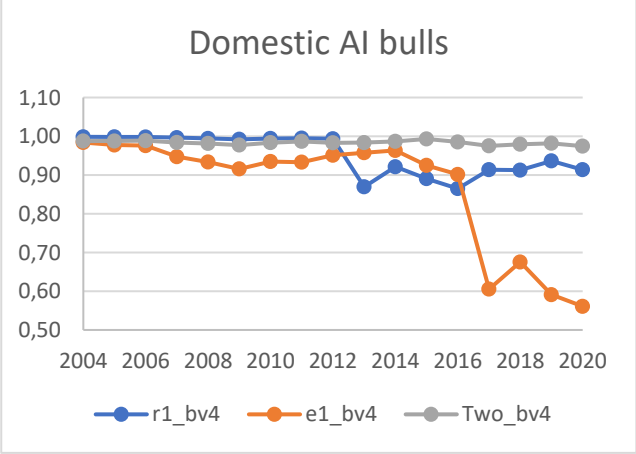



***bv4***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 95.9 | 95.9 | 95.4 | 96.5 | 9.3 | 9.3 | 8.8 | 8.9 | 1.00 | 0.98 | 0.99 |
| 2005 | 334 | 96.9 | 96.8 | 96.6 | 97.2 | 9.5 | 9.5 | 8.9 | 9.1 | 1.00 | 0.98 | 0.99 |
| 2006 | 383 | 100.0 | 100.1 | 99.5 | 100.4 | 9.6 | 9.7 | 9.4 | 9.1 | 1.00 | 0.98 | 0.99 |
| 2007 | 334 | 100.5 | 100.5 | 100.3 | 100.9 | 8.7 | 8.7 | 8.1 | 8.1 | 1.00 | 0.95 | 0.98 |
| 2008 | 293 | 100.6 | 100.6 | 100.1 | 101.1 | 8.6 | 8.7 | 8.1 | 8.0 | 0.99 | 0.93 | 0.98 |
| 2009 | 269 | 99.6 | 99.7 | 99.6 | 100.2 | 8.8 | 8.7 | 8.1 | 7.9 | 0.99 | 0.92 | 0.98 |
| 2010 | 226 | 99.0 | 99.1 | 99.4 | 99.5 | 9.4 | 9.5 | 8.7 | 8.7 | 0.99 | 0.93 | 0.98 |
| 2011 | 167 | 98.0 | 98.1 | 98.1 | 98.8 | 9.9 | 10.0 | 9.3 | 9.2 | 0.99 | 0.93 | 0.99 |
| 2012 | 172 | 97.8 | 97.6 | 97.2 | 98.4 | 9.6 | 9.7 | 9.1 | 8.5 | 0.99 | 0.95 | 0.98 |
| 2013 | 120 | 99.4 | 100.1 | 99.2 | 100.1 | 9.1 | 8.8 | 8.8 | 7.6 | 0.87 | 0.96 | 0.98 |
| 2014 | 104 | 100.9 | 101.5 | 100.2 | 100.9 | 9.4 | 8.8 | 8.8 | 7.9 | 0.92 | 0.96 | 0.99 |
| 2015 | 80 | 100.8 | 103.4 | 100.2 | 100.8 | 10.6 | 9.8 | 9.6 | 8.5 | 0.89 | 0.92 | 0.99 |
| 2016 | 66 | 102.3 | 103.2 | 102.1 | 101.9 | 8.4 | 8.6 | 7.7 | 6.9 | 0.86 | 0.90 | 0.99 |
| 2017 | 65 | 104.1 | 105.6 | 103.4 | 103.5 | 7.0 | 7.6 | 5.8 | 5.9 | 0.91 | 0.61 | 0.98 |
| 2018 | 89 | 105.3 | 106.5 | 104.5 | 104.3 | 8.5 | 8.7 | 6.0 | 6.9 | 0.91 | 0.68 | 0.98 |
| 2019 | 60 | 108.0 | 109.0 | 103.8 | 106.6 | 8.1 | 7.9 | 5.3 | 7.0 | 0.94 | 0.59 | 0.98 |
| 2020 | 27 | 106.2 | 108.6 | 104.1 | 105.3 | 7.1 | 7.0 | 4.4 | 5.8 | 0.91 | 0.56 | 0.97 |

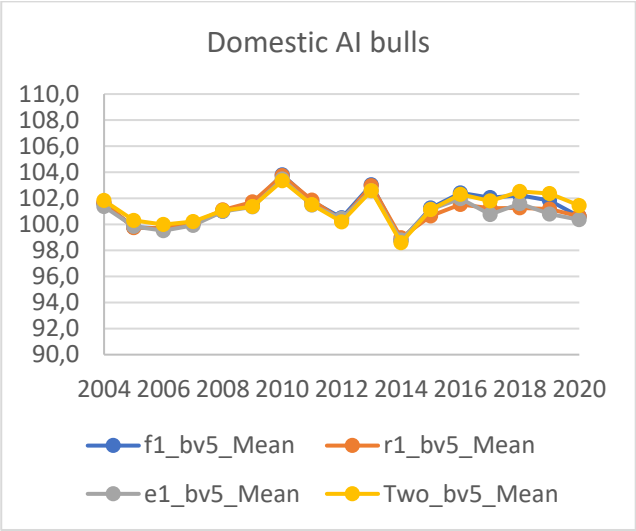


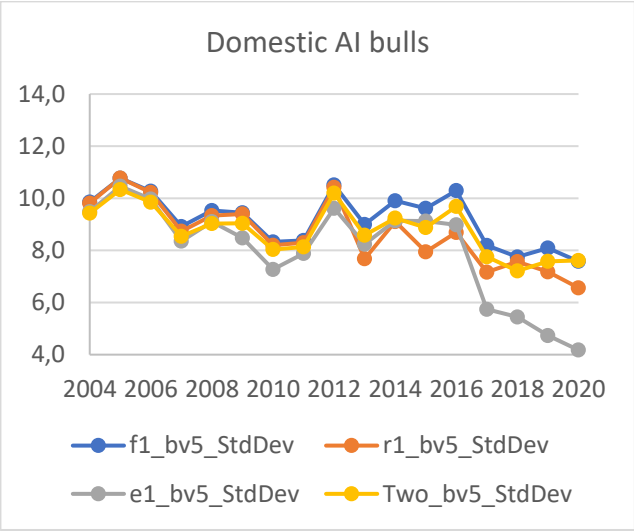



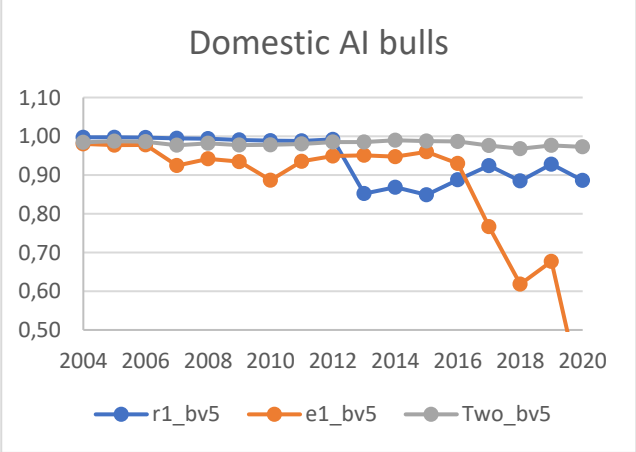



***bv5***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 101.6 | 101.7 | 101.4 | 101.8 | 9.9 | 9.8 | 9.5 | 9.4 | 1.00 | 0.98 | 0.98 |
| 2005 | 334 | 99.8 | 99.7 | 99.8 | 100.3 | 10.8 | 10.8 | 10.5 | 10.3 | 1.00 | 0.98 | 0.99 |
| 2006 | 383 | 99.7 | 99.7 | 99.5 | 100.0 | 10.3 | 10.2 | 10.0 | 9.9 | 1.00 | 0.98 | 0.99 |
| 2007 | 334 | 100.0 | 100.1 | 99.9 | 100.2 | 8.9 | 8.7 | 8.4 | 8.5 | 0.99 | 0.92 | 0.98 |
| 2008 | 293 | 101.0 | 101.1 | 101.0 | 101.1 | 9.5 | 9.3 | 9.1 | 9.0 | 0.99 | 0.94 | 0.98 |
| 2009 | 269 | 101.5 | 101.7 | 101.3 | 101.4 | 9.4 | 9.4 | 8.5 | 9.0 | 0.99 | 0.93 | 0.98 |
| 2010 | 226 | 103.8 | 103.7 | 103.5 | 103.3 | 8.3 | 8.2 | 7.3 | 8.0 | 0.99 | 0.89 | 0.98 |
| 2011 | 167 | 101.8 | 101.9 | 101.5 | 101.5 | 8.4 | 8.3 | 7.9 | 8.1 | 0.99 | 0.94 | 0.98 |
| 2012 | 172 | 100.5 | 100.3 | 100.5 | 100.2 | 10.5 | 10.4 | 9.6 | 10.2 | 0.99 | 0.95 | 0.99 |
| 2013 | 120 | 103.0 | 103.0 | 102.6 | 102.6 | 9.0 | 7.7 | 8.2 | 8.6 | 0.85 | 0.95 | 0.99 |
| 2014 | 104 | 98.8 | 99.0 | 98.8 | 98.6 | 9.9 | 9.1 | 9.1 | 9.2 | 0.87 | 0.95 | 0.99 |
| 2015 | 80 | 101.3 | 100.6 | 101.2 | 101.1 | 9.6 | 7.9 | 9.1 | 8.9 | 0.85 | 0.96 | 0.99 |
| 2016 | 66 | 102.4 | 101.5 | 102.0 | 102.3 | 10.3 | 8.7 | 9.0 | 9.7 | 0.89 | 0.93 | 0.99 |
| 2017 | 65 | 102.0 | 101.2 | 100.8 | 101.8 | 8.2 | 7.2 | 5.7 | 7.8 | 0.92 | 0.77 | 0.98 |
| 2018 | 89 | 102.2 | 101.3 | 101.6 | 102.5 | 7.8 | 7.6 | 5.4 | 7.2 | 0.88 | 0.62 | 0.97 |
| 2019 | 60 | 101.8 | 101.2 | 100.8 | 102.4 | 8.1 | 7.2 | 4.7 | 7.6 | 0.93 | 0.68 | 0.98 |
| 2020 | 27 | 100.6 | 100.6 | 100.4 | 101.4 | 7.6 | 6.6 | 4.2 | 7.6 | 0.89 | 0.32 | 0.97 |

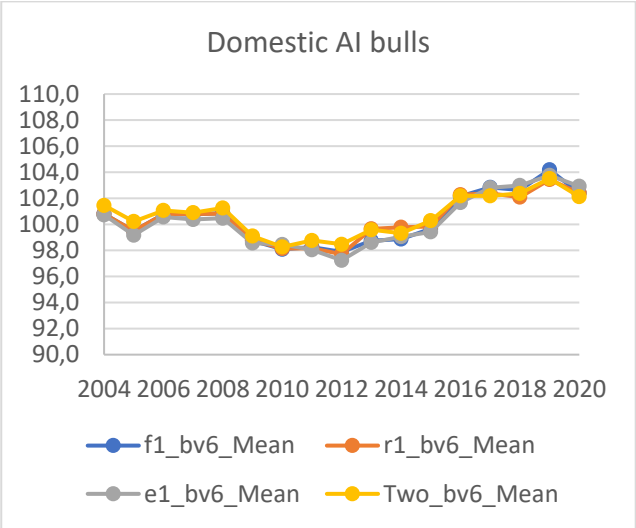


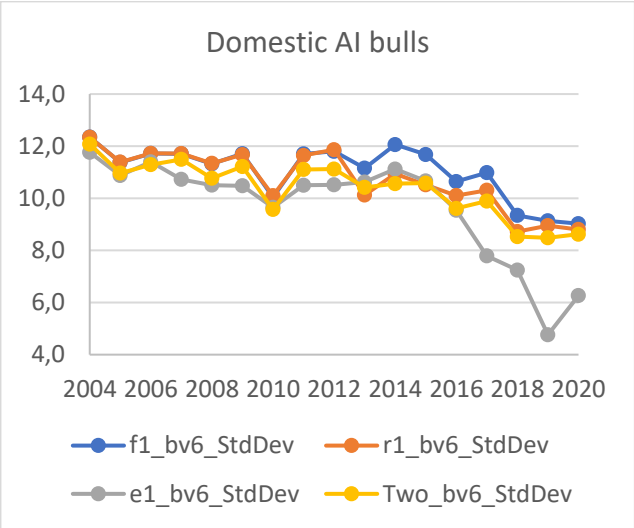



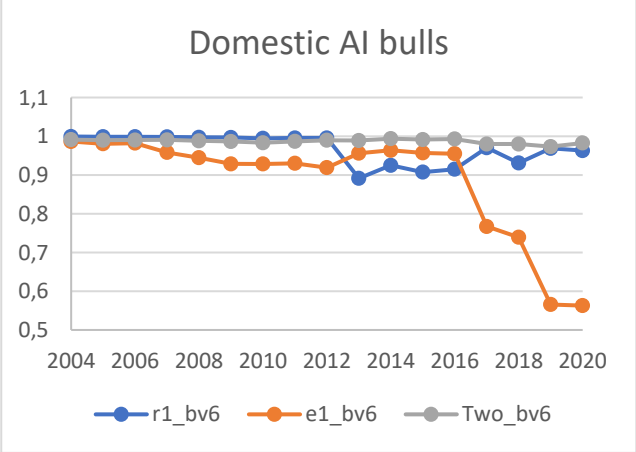



***bv6***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 100.8 | 100.8 | 100.7 | 101.5 | 12.3 | 12.3 | 11.8 | 12.1 | 1.00 | 0.99 | 0.99 |
| 2005 | 334 | 99.5 | 99.5 | 99.2 | 100.2 | 11.4 | 11.4 | 10.9 | 11.0 | 1.00 | 0.98 | 0.99 |
| 2006 | 383 | 100.8 | 100.8 | 100.6 | 101.1 | 11.7 | 11.7 | 11.4 | 11.3 | 1.00 | 0.98 | 0.99 |
| 2007 | 334 | 100.8 | 100.8 | 100.4 | 100.9 | 11.7 | 11.7 | 10.7 | 11.5 | 1.00 | 0.96 | 0.99 |
| 2008 | 293 | 100.9 | 100.8 | 100.5 | 101.3 | 11.3 | 11.3 | 10.5 | 10.8 | 1.00 | 0.94 | 0.99 |
| 2009 | 269 | 98.7 | 98.8 | 98.6 | 99.1 | 11.7 | 11.7 | 10.5 | 11.2 | 1.00 | 0.93 | 0.99 |
| 2010 | 226 | 98.1 | 98.1 | 98.5 | 98.3 | 10.0 | 10.1 | 9.7 | 9.6 | 0.99 | 0.93 | 0.98 |
| 2011 | 167 | 98.3 | 98.2 | 98.0 | 98.8 | 11.7 | 11.6 | 10.5 | 11.1 | 1.00 | 0.93 | 0.99 |
| 2012 | 172 | 97.9 | 97.7 | 97.2 | 98.5 | 11.8 | 11.9 | 10.5 | 11.1 | 1.00 | 0.92 | 0.99 |
| 2013 | 120 | 98.7 | 99.7 | 98.6 | 99.6 | 11.2 | 10.1 | 10.6 | 10.4 | 0.89 | 0.96 | 0.99 |
| 2014 | 104 | 98.9 | 99.8 | 99.1 | 99.3 | 12.1 | 10.9 | 11.1 | 10.6 | 0.92 | 0.96 | 0.99 |
| 2015 | 80 | 99.7 | 99.8 | 99.4 | 100.3 | 11.7 | 10.5 | 10.7 | 10.6 | 0.91 | 0.96 | 0.99 |
| 2016 | 66 | 102.2 | 102.3 | 101.7 | 102.2 | 10.6 | 10.1 | 9.5 | 9.6 | 0.91 | 0.96 | 0.99 |
| 2017 | 65 | 102.8 | 102.4 | 102.8 | 102.2 | 11.0 | 10.3 | 7.8 | 9.9 | 0.97 | 0.77 | 0.98 |
| 2018 | 89 | 102.6 | 102.1 | 103.0 | 102.4 | 9.3 | 8.7 | 7.2 | 8.5 | 0.93 | 0.74 | 0.98 |
| 2019 | 60 | 104.2 | 103.4 | 103.8 | 103.5 | 9.1 | 9.0 | 4.8 | 8.5 | 0.97 | 0.57 | 0.97 |
| 2020 | 27 | 102.4 | 102.4 | 102.9 | 102.1 | 9.0 | 8.8 | 6.3 | 8.6 | 0.96 | 0.56 | 0.98 |

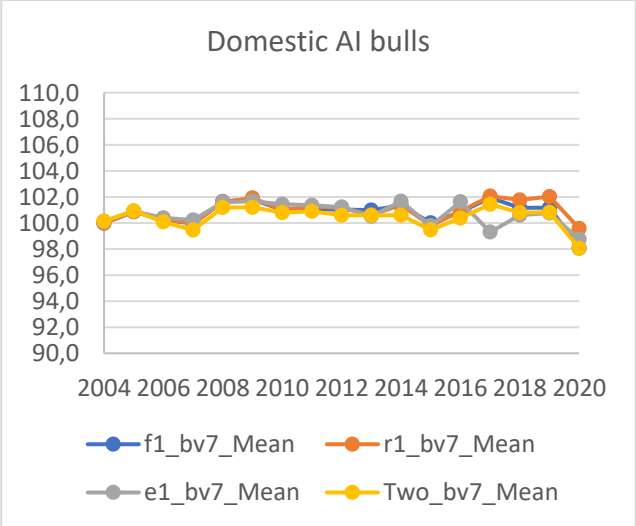


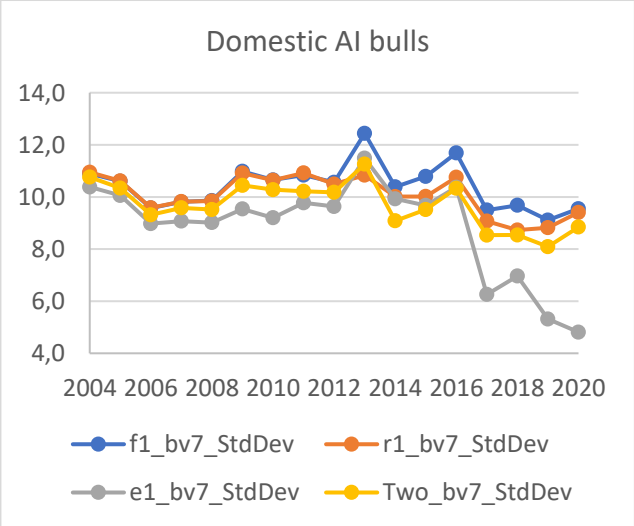



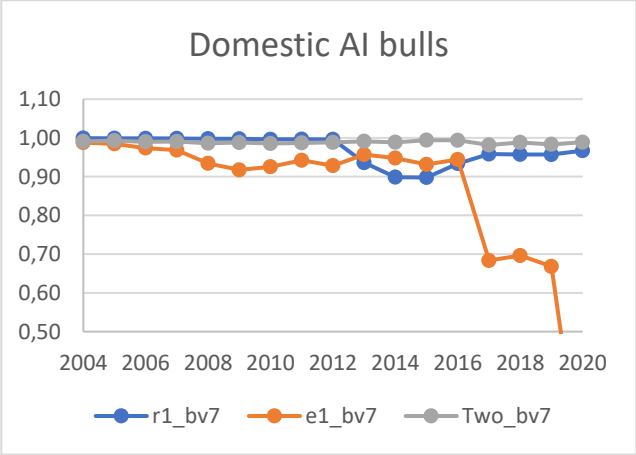



***bv7***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 100.0 | 100.0 | 100.1 | 100.1 | 10.9 | 10.9 | 10.4 | 10.8 | 1.00 | 0.99 | 0.99 |
| 2005 | 334 | 100.9 | 100.9 | 100.9 | 100.9 | 10.6 | 10.6 | 10.1 | 10.3 | 1.00 | 0.98 | 0.99 |
| 2006 | 383 | 100.2 | 100.3 | 100.4 | 100.1 | 9.6 | 9.6 | 9.0 | 9.3 | 1.00 | 0.97 | 0.99 |
| 2007 | 334 | 100.0 | 99.9 | 100.2 | 99.5 | 9.8 | 9.8 | 9.1 | 9.6 | 1.00 | 0.97 | 0.99 |
| 2008 | 293 | 101.6 | 101.6 | 101.6 | 101.2 | 9.9 | 9.8 | 9.0 | 9.5 | 1.00 | 0.93 | 0.99 |
| 2009 | 269 | 101.8 | 101.9 | 101.7 | 101.2 | 11.0 | 10.9 | 9.5 | 10.4 | 1.00 | 0.92 | 0.99 |
| 2010 | 226 | 101.0 | 101.0 | 101.4 | 100.8 | 10.7 | 10.6 | 9.2 | 10.3 | 1.00 | 0.93 | 0.99 |
| 2011 | 167 | 101.1 | 101.3 | 101.4 | 100.9 | 10.8 | 10.9 | 9.8 | 10.2 | 1.00 | 0.94 | 0.99 |
| 2012 | 172 | 101.0 | 101.2 | 101.2 | 100.6 | 10.6 | 10.5 | 9.6 | 10.2 | 1.00 | 0.93 | 0.99 |
| 2013 | 120 | 101.0 | 100.6 | 100.5 | 100.6 | 12.4 | 10.8 | 11.5 | 11.3 | 0.94 | 0.96 | 0.99 |
| 2014 | 104 | 101.3 | 101.4 | 101.7 | 100.6 | 10.4 | 10.0 | 9.9 | 9.1 | 0.90 | 0.95 | 0.99 |
| 2015 | 80 | 100.0 | 99.8 | 99.8 | 99.5 | 10.8 | 10.0 | 9.7 | 9.5 | 0.90 | 0.93 | 0.99 |
| 2016 | 66 | 100.8 | 100.9 | 101.6 | 100.4 | 11.7 | 10.8 | 10.4 | 10.3 | 0.93 | 0.94 | 0.99 |
| 2017 | 65 | 101.9 | 102.1 | 99.3 | 101.4 | 9.5 | 9.1 | 6.3 | 8.5 | 0.96 | 0.68 | 0.98 |
| 2018 | 89 | 101.2 | 101.8 | 100.6 | 100.8 | 9.7 | 8.7 | 7.0 | 8.5 | 0.96 | 0.70 | 0.99 |
| 2019 | 60 | 101.2 | 102.0 | 100.8 | 100.8 | 9.1 | 8.8 | 5.3 | 8.1 | 0.96 | 0.67 | 0.98 |
| 2020 | 27 | 98.1 | 99.6 | 98.8 | 98.1 | 9.5 | 9.4 | 4.8 | 8.8 | 0.97 | 0.10 | 0.99 |

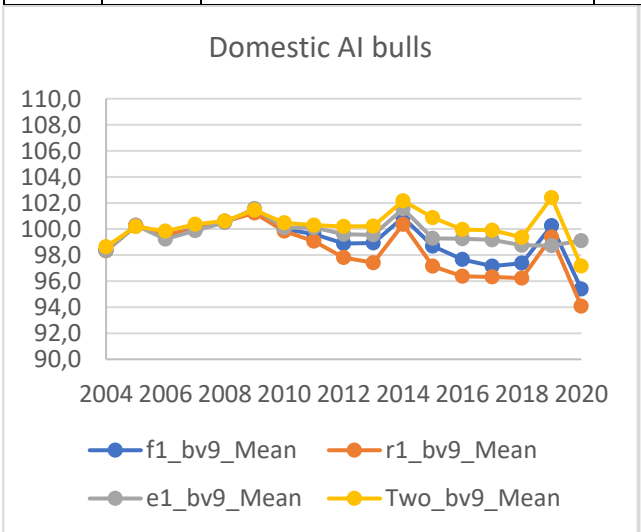


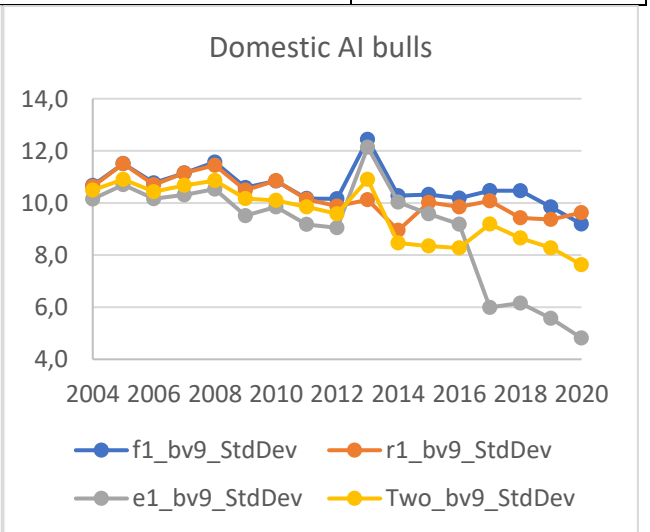



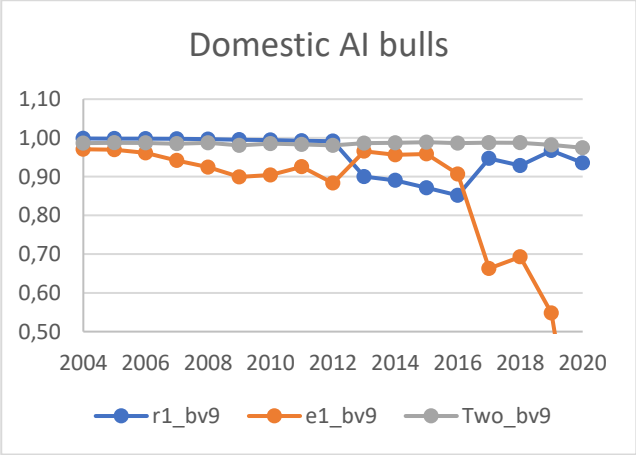



***bv9***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 98.3 | 98.3 | 98.4 | 98.6 | 10.7 | 10.6 | 10.1 | 10.5 | 1.00 | 0.97 | 0.99 |
| 2005 | 334 | 100.2 | 100.3 | 100.3 | 100.2 | 11.5 | 11.5 | 10.7 | 10.9 | 1.00 | 0.97 | 0.99 |
| 2006 | 383 | 99.6 | 99.6 | 99.2 | 99.8 | 10.8 | 10.7 | 10.2 | 10.4 | 1.00 | 0.96 | 0.99 |
| 2007 | 334 | 100.0 | 99.9 | 99.9 | 100.4 | 11.1 | 11.1 | 10.3 | 10.7 | 1.00 | 0.94 | 0.99 |
| 2008 | 293 | 100.6 | 100.6 | 100.5 | 100.6 | 11.6 | 11.4 | 10.5 | 10.9 | 1.00 | 0.92 | 0.99 |
| 2009 | 269 | 101.3 | 101.2 | 101.6 | 101.5 | 10.6 | 10.5 | 9.5 | 10.2 | 1.00 | 0.90 | 0.98 |
| 2010 | 226 | 100.0 | 99.8 | 100.1 | 100.5 | 10.8 | 10.9 | 9.8 | 10.1 | 0.99 | 0.90 | 0.99 |
| 2011 | 167 | 99.6 | 99.1 | 100.1 | 100.3 | 10.2 | 10.1 | 9.2 | 9.8 | 0.99 | 0.93 | 0.98 |
| 2012 | 172 | 98.9 | 97.8 | 99.6 | 100.2 | 10.2 | 9.9 | 9.0 | 9.6 | 0.99 | 0.88 | 0.98 |
| 2013 | 120 | 98.9 | 97.4 | 99.6 | 100.2 | 12.4 | 10.1 | 12.1 | 10.9 | 0.90 | 0.97 | 0.99 |
| 2014 | 104 | 100.9 | 100.4 | 101.6 | 102.2 | 10.3 | 8.9 | 10.0 | 8.5 | 0.89 | 0.96 | 0.99 |
| 2015 | 80 | 98.7 | 97.1 | 99.3 | 100.9 | 10.3 | 10.0 | 9.6 | 8.3 | 0.87 | 0.96 | 0.99 |
| 2016 | 66 | 97.7 | 96.4 | 99.3 | 100.0 | 10.2 | 9.8 | 9.2 | 8.3 | 0.85 | 0.91 | 0.99 |
| 2017 | 65 | 97.2 | 96.3 | 99.2 | 99.9 | 10.5 | 10.1 | 6.0 | 9.2 | 0.95 | 0.66 | 0.99 |
| 2018 | 89 | 97.4 | 96.2 | 98.7 | 99.4 | 10.5 | 9.4 | 6.2 | 8.7 | 0.93 | 0.69 | 0.99 |
| 2019 | 60 | 100.3 | 99.4 | 98.7 | 102.4 | 9.8 | 9.4 | 5.6 | 8.3 | 0.97 | 0.55 | 0.98 |
| 2020 | 27 | 95.4 | 94.1 | 99.1 | 97.2 | 9.2 | 9.6 | 4.8 | 7.6 | 0.94 | 0.05 | 0.97 |

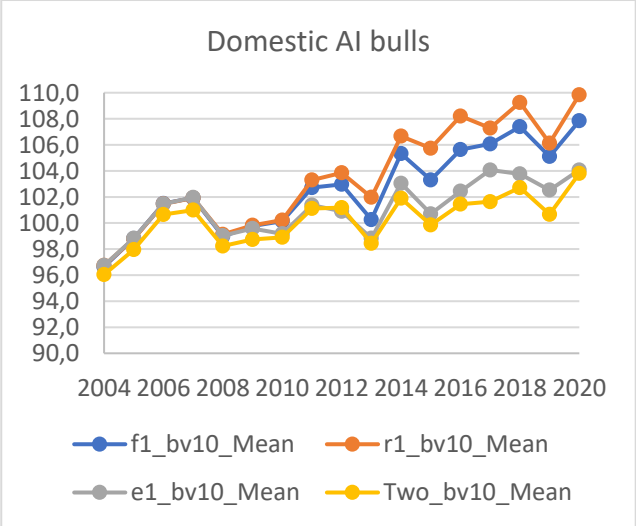


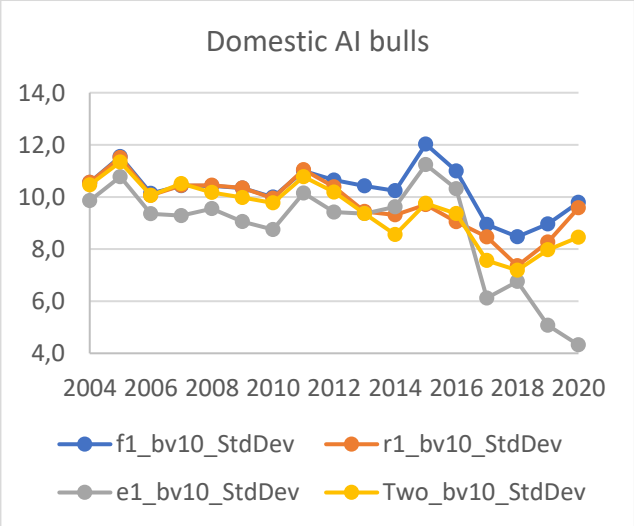



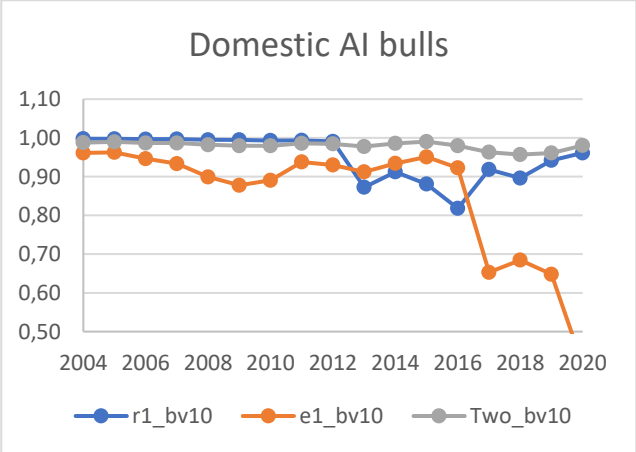



***bv10***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 96.6 | 96.7 | 96.7 | 96.0 | 10.6 | 10.6 | 9.9 | 10.5 | 1.00 | 0.96 | 0.99 |
| 2005 | 334 | 98.8 | 98.8 | 98.8 | 98.0 | 11.6 | 11.5 | 10.8 | 11.3 | 1.00 | 0.96 | 0.99 |
| 2006 | 383 | 101.5 | 101.5 | 101.5 | 100.7 | 10.1 | 10.1 | 9.4 | 10.1 | 1.00 | 0.95 | 0.99 |
| 2007 | 334 | 101.9 | 101.9 | 102.0 | 101.0 | 10.4 | 10.4 | 9.3 | 10.5 | 1.00 | 0.93 | 0.99 |
| 2008 | 293 | 99.0 | 99.1 | 99.0 | 98.2 | 10.4 | 10.4 | 9.5 | 10.2 | 1.00 | 0.90 | 0.98 |
| 2009 | 269 | 99.8 | 99.8 | 99.6 | 98.7 | 10.3 | 10.3 | 9.1 | 10.0 | 0.99 | 0.88 | 0.98 |
| 2010 | 226 | 100.1 | 100.2 | 99.2 | 98.9 | 10.0 | 10.0 | 8.7 | 9.8 | 0.99 | 0.89 | 0.98 |
| 2011 | 167 | 102.7 | 103.3 | 101.4 | 101.1 | 11.0 | 11.0 | 10.2 | 10.8 | 0.99 | 0.94 | 0.99 |
| 2012 | 172 | 103.0 | 103.9 | 100.9 | 101.2 | 10.6 | 10.4 | 9.4 | 10.2 | 0.99 | 0.93 | 0.98 |
| 2013 | 120 | 100.3 | 102.0 | 98.8 | 98.4 | 10.4 | 9.4 | 9.4 | 9.4 | 0.87 | 0.91 | 0.98 |
| 2014 | 104 | 105.3 | 106.7 | 103.0 | 101.9 | 10.2 | 9.3 | 9.6 | 8.6 | 0.91 | 0.93 | 0.99 |
| 2015 | 80 | 103.3 | 105.7 | 100.7 | 99.9 | 12.0 | 9.7 | 11.2 | 9.8 | 0.88 | 0.95 | 0.99 |
| 2016 | 66 | 105.6 | 108.2 | 102.4 | 101.4 | 11.0 | 9.0 | 10.3 | 9.4 | 0.82 | 0.92 | 0.98 |
| 2017 | 65 | 106.1 | 107.3 | 104.1 | 101.6 | 8.9 | 8.5 | 6.1 | 7.6 | 0.92 | 0.65 | 0.96 |
| 2018 | 89 | 107.4 | 109.3 | 103.8 | 102.7 | 8.5 | 7.4 | 6.8 | 7.2 | 0.90 | 0.68 | 0.96 |
| 2019 | 60 | 105.1 | 106.1 | 102.5 | 100.7 | 9.0 | 8.3 | 5.1 | 8.0 | 0.94 | 0.65 | 0.96 |
| 2020 | 27 | 107.8 | 109.8 | 104.1 | 103.8 | 9.8 | 9.6 | 4.3 | 8.5 | 0.96 | 0.41 | 0.98 |

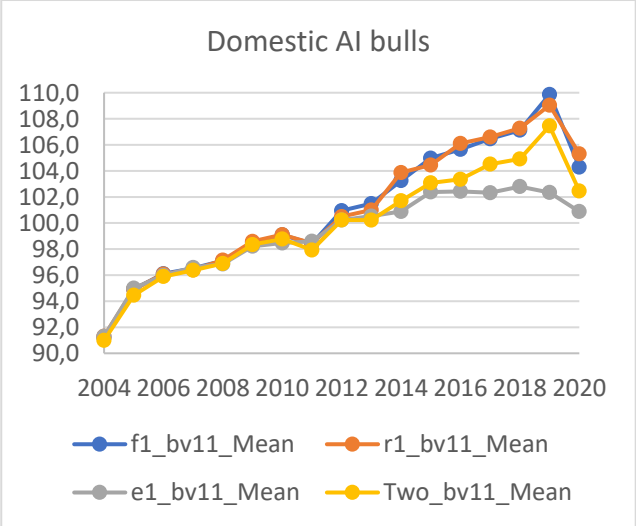


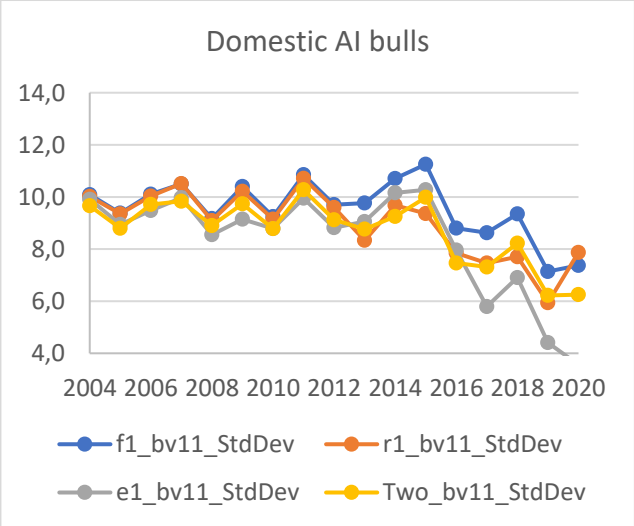



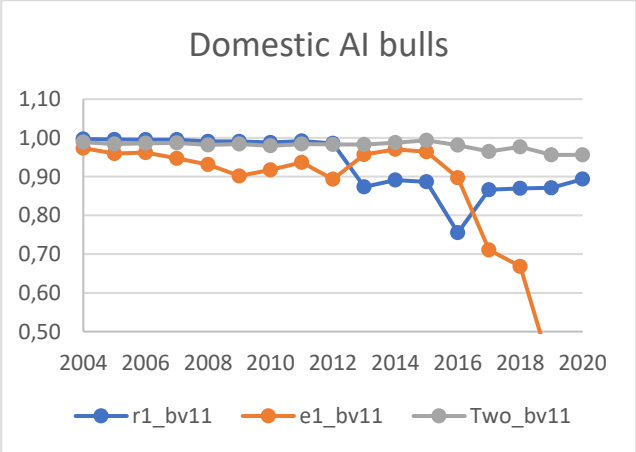



***bv11***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 91.2 | 91.3 | 91.3 | 91.0 | 10.1 | 10.0 | 9.9 | 9.7 | 1.00 | 0.97 | 0.99 |
| 2005 | 334 | 94.9 | 94.9 | 95.0 | 94.5 | 9.4 | 9.3 | 8.9 | 8.8 | 1.00 | 0.96 | 0.98 |
| 2006 | 383 | 96.1 | 96.1 | 96.0 | 95.9 | 10.1 | 10.0 | 9.5 | 9.7 | 1.00 | 0.96 | 0.99 |
| 2007 | 334 | 96.5 | 96.4 | 96.6 | 96.4 | 10.5 | 10.5 | 10.0 | 9.8 | 1.00 | 0.95 | 0.99 |
| 2008 | 293 | 97.1 | 97.1 | 96.9 | 96.9 | 9.2 | 9.1 | 8.6 | 8.9 | 0.99 | 0.93 | 0.98 |
| 2009 | 269 | 98.5 | 98.6 | 98.2 | 98.3 | 10.4 | 10.2 | 9.1 | 9.7 | 0.99 | 0.90 | 0.98 |
| 2010 | 226 | 99.1 | 99.1 | 98.5 | 98.8 | 9.2 | 9.1 | 8.8 | 8.8 | 0.99 | 0.92 | 0.98 |
| 2011 | 167 | 98.4 | 98.4 | 98.6 | 97.9 | 10.9 | 10.7 | 9.9 | 10.3 | 0.99 | 0.94 | 0.98 |
| 2012 | 172 | 100.9 | 100.5 | 100.2 | 100.2 | 9.7 | 9.6 | 8.8 | 9.1 | 0.99 | 0.89 | 0.98 |
| 2013 | 120 | 101.5 | 101.0 | 100.5 | 100.2 | 9.8 | 8.3 | 9.1 | 8.8 | 0.87 | 0.96 | 0.98 |
| 2014 | 104 | 103.2 | 103.9 | 100.9 | 101.7 | 10.7 | 9.7 | 10.2 | 9.3 | 0.89 | 0.97 | 0.99 |
| 2015 | 80 | 105.0 | 104.4 | 102.4 | 103.1 | 11.3 | 9.4 | 10.3 | 10.0 | 0.89 | 0.96 | 0.99 |
| 2016 | 66 | 105.7 | 106.1 | 102.4 | 103.4 | 8.8 | 7.9 | 8.0 | 7.5 | 0.76 | 0.90 | 0.98 |
| 2017 | 65 | 106.5 | 106.6 | 102.3 | 104.5 | 8.6 | 7.5 | 5.8 | 7.3 | 0.87 | 0.71 | 0.96 |
| 2018 | 89 | 107.1 | 107.3 | 102.8 | 104.9 | 9.3 | 7.7 | 6.9 | 8.2 | 0.87 | 0.67 | 0.98 |
| 2019 | 60 | 109.9 | 109.0 | 102.3 | 107.4 | 7.1 | 5.9 | 4.4 | 6.2 | 0.87 | 0.40 | 0.96 |
| 2020 | 27 | 104.3 | 105.3 | 100.9 | 102.5 | 7.4 | 7.9 | 3.6 | 6.3 | 0.89 | 0.06 | 0.96 |

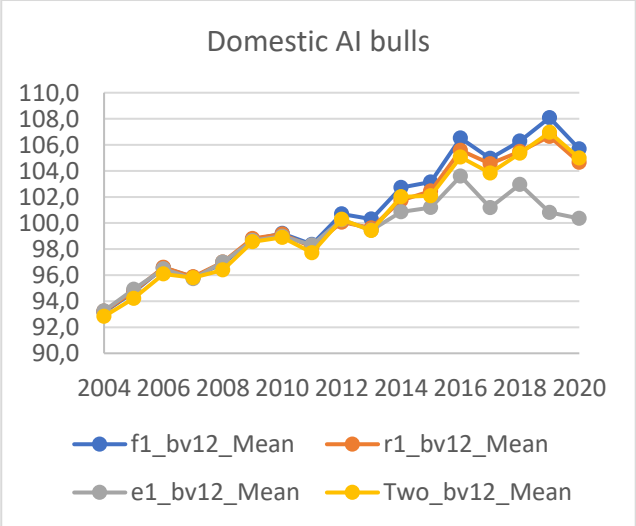


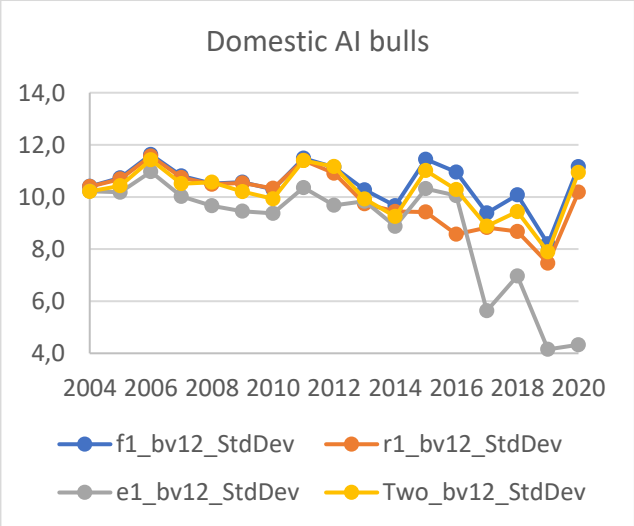



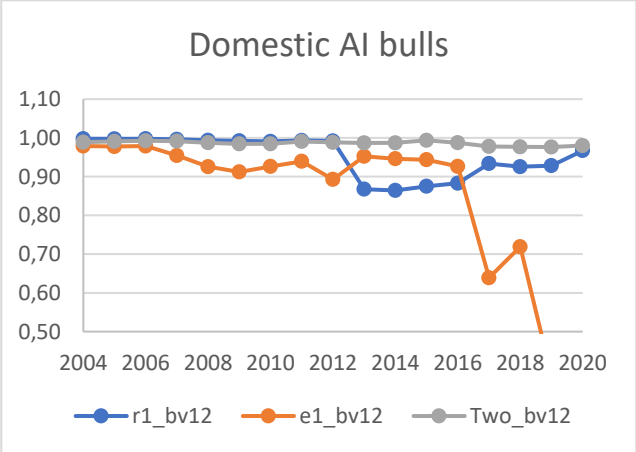



***bv12***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 93.2 | 93.2 | 93.3 | 92.8 | 10.4 | 10.4 | 10.2 | 10.2 | 1.00 | 0.98 | 0.99 |
| 2005 | 334 | 94.7 | 94.8 | 94.9 | 94.2 | 10.7 | 10.7 | 10.2 | 10.4 | 1.00 | 0.98 | 0.99 |
| 2006 | 383 | 96.6 | 96.6 | 96.5 | 96.1 | 11.6 | 11.6 | 11.0 | 11.4 | 1.00 | 0.98 | 0.99 |
| 2007 | 334 | 95.8 | 95.9 | 95.7 | 95.8 | 10.8 | 10.7 | 10.0 | 10.5 | 1.00 | 0.95 | 0.99 |
| 2008 | 293 | 96.9 | 97.0 | 97.0 | 96.4 | 10.5 | 10.5 | 9.7 | 10.6 | 0.99 | 0.93 | 0.99 |
| 2009 | 269 | 98.7 | 98.8 | 98.7 | 98.6 | 10.6 | 10.5 | 9.5 | 10.2 | 0.99 | 0.91 | 0.98 |
| 2010 | 226 | 99.2 | 99.1 | 99.0 | 98.9 | 10.3 | 10.3 | 9.4 | 9.9 | 0.99 | 0.93 | 0.98 |
| 2011 | 167 | 98.4 | 98.2 | 98.3 | 97.7 | 11.5 | 11.4 | 10.4 | 11.4 | 0.99 | 0.94 | 0.99 |
| 2012 | 172 | 100.7 | 100.1 | 100.2 | 100.3 | 11.1 | 10.9 | 9.7 | 11.2 | 0.99 | 0.89 | 0.99 |
| 2013 | 120 | 100.3 | 99.6 | 99.5 | 99.4 | 10.3 | 9.7 | 9.8 | 9.9 | 0.87 | 0.95 | 0.99 |
| 2014 | 104 | 102.7 | 101.7 | 100.9 | 102.0 | 9.7 | 9.4 | 8.9 | 9.2 | 0.86 | 0.95 | 0.99 |
| 2015 | 80 | 103.1 | 102.5 | 101.2 | 102.1 | 11.4 | 9.4 | 10.3 | 11.0 | 0.88 | 0.94 | 0.99 |
| 2016 | 66 | 106.5 | 105.6 | 103.6 | 105.1 | 11.0 | 8.6 | 10.1 | 10.3 | 0.88 | 0.93 | 0.99 |
| 2017 | 65 | 105.0 | 104.5 | 101.2 | 103.8 | 9.4 | 8.8 | 5.6 | 8.9 | 0.93 | 0.64 | 0.98 |
| 2018 | 89 | 106.3 | 105.5 | 103.0 | 105.4 | 10.1 | 8.7 | 7.0 | 9.4 | 0.93 | 0.72 | 0.98 |
| 2019 | 60 | 108.1 | 106.6 | 100.8 | 107.0 | 8.2 | 7.5 | 4.2 | 7.9 | 0.93 | 0.39 | 0.98 |
| 2020 | 27 | 105.7 | 104.7 | 100.4 | 105.0 | 11.2 | 10.2 | 4.3 | 10.9 | 0.97 | 0.07 | 0.98 |

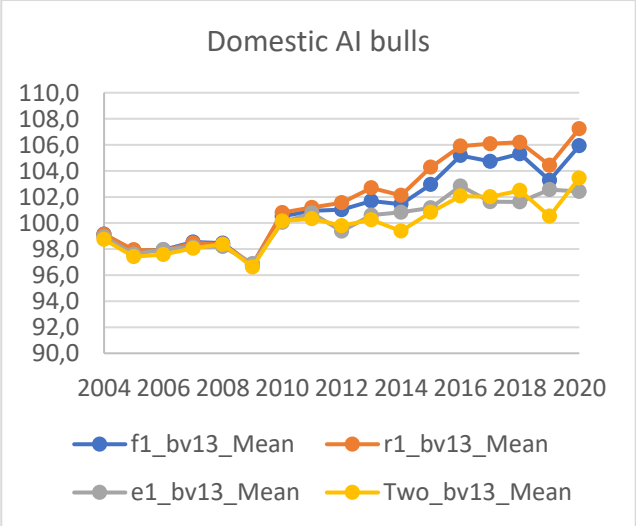


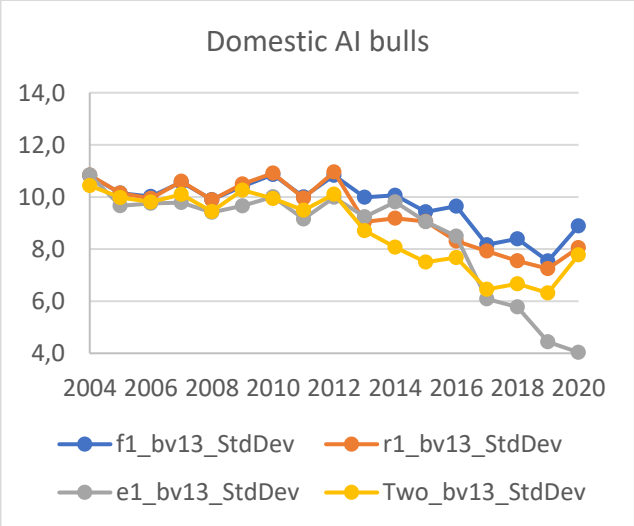



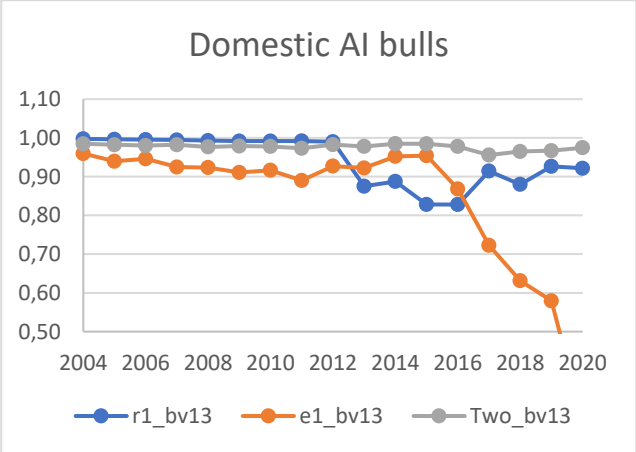



***bv13***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 99.1 | 99.1 | 98.9 | 98.7 | 10.8 | 10.8 | 10.8 | 10.4 | 1.00 | 0.96 | 0.98 |
| 2005 | 334 | 97.9 | 97.9 | 97.6 | 97.4 | 10.1 | 10.1 | 9.7 | 10.0 | 1.00 | 0.94 | 0.98 |
| 2006 | 383 | 97.9 | 97.9 | 98.0 | 97.6 | 10.0 | 9.9 | 9.8 | 9.8 | 1.00 | 0.95 | 0.98 |
| 2007 | 334 | 98.5 | 98.5 | 98.2 | 98.1 | 10.6 | 10.6 | 9.8 | 10.1 | 0.99 | 0.92 | 0.98 |
| 2008 | 293 | 98.5 | 98.4 | 98.2 | 98.4 | 9.9 | 9.9 | 9.4 | 9.4 | 0.99 | 0.92 | 0.98 |
| 2009 | 269 | 96.8 | 96.8 | 96.9 | 96.6 | 10.4 | 10.5 | 9.7 | 10.3 | 0.99 | 0.91 | 0.98 |
| 2010 | 226 | 100.5 | 100.8 | 100.0 | 100.1 | 10.9 | 10.9 | 10.0 | 9.9 | 0.99 | 0.92 | 0.98 |
| 2011 | 167 | 100.9 | 101.2 | 100.8 | 100.3 | 10.0 | 10.0 | 9.2 | 9.5 | 0.99 | 0.89 | 0.97 |
| 2012 | 172 | 101.0 | 101.6 | 99.4 | 99.8 | 10.8 | 11.0 | 10.0 | 10.1 | 0.99 | 0.93 | 0.98 |
| 2013 | 120 | 101.7 | 102.7 | 100.6 | 100.2 | 10.0 | 9.0 | 9.2 | 8.7 | 0.88 | 0.92 | 0.98 |
| 2014 | 104 | 101.4 | 102.1 | 100.8 | 99.4 | 10.1 | 9.2 | 9.8 | 8.1 | 0.89 | 0.95 | 0.98 |
| 2015 | 80 | 103.0 | 104.3 | 101.2 | 100.8 | 9.4 | 9.1 | 9.0 | 7.5 | 0.83 | 0.95 | 0.98 |
| 2016 | 66 | 105.2 | 105.9 | 102.8 | 102.1 | 9.6 | 8.3 | 8.5 | 7.7 | 0.83 | 0.87 | 0.98 |
| 2017 | 65 | 104.7 | 106.1 | 101.6 | 102.0 | 8.2 | 7.9 | 6.1 | 6.5 | 0.91 | 0.72 | 0.96 |
| 2018 | 89 | 105.3 | 106.2 | 101.6 | 102.5 | 8.4 | 7.5 | 5.8 | 6.7 | 0.88 | 0.63 | 0.96 |
| 2019 | 60 | 103.3 | 104.4 | 102.6 | 100.5 | 7.5 | 7.2 | 4.4 | 6.3 | 0.93 | 0.58 | 0.97 |
| 2020 | 27 | 105.9 | 107.2 | 102.4 | 103.5 | 8.9 | 8.1 | 4.0 | 7.8 | 0.92 | 0.27 | 0.97 |

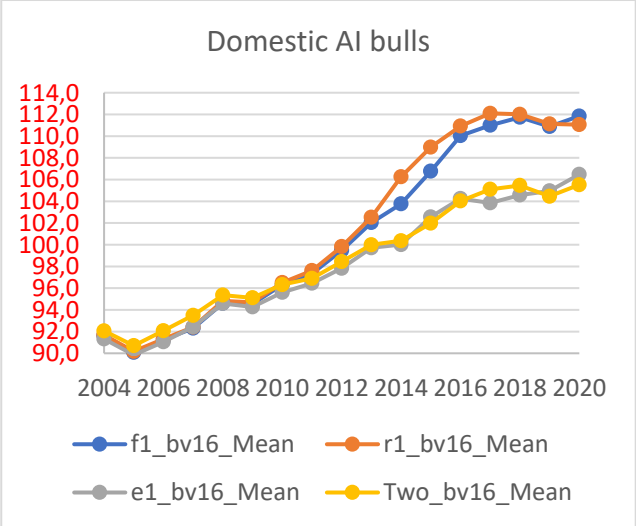


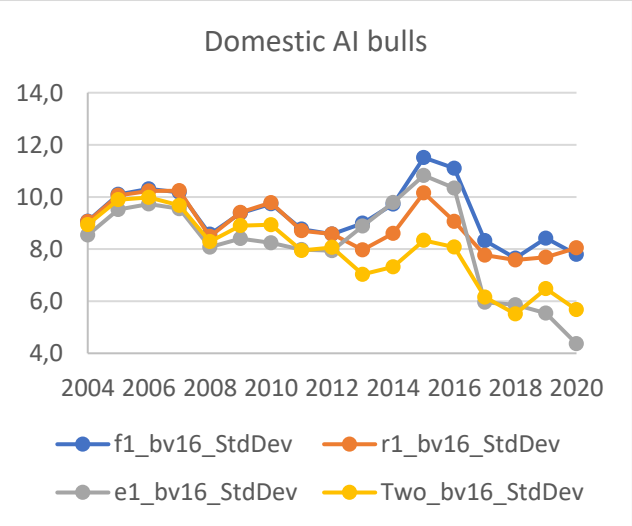



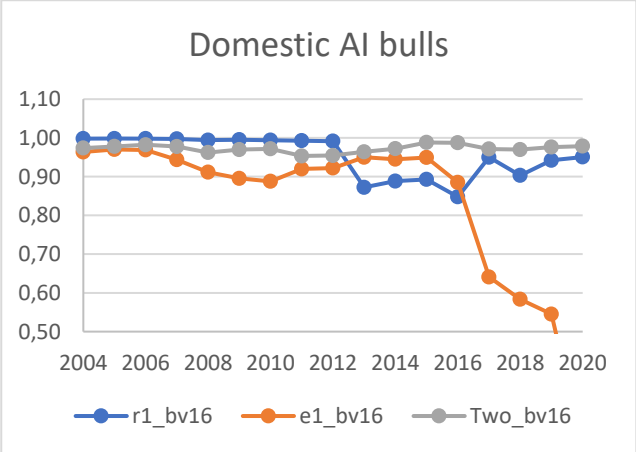



***bv16***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 91.6 | 91.7 | 91.3 | 92.1 | 9.1 | 9.1 | 8.5 | 8.9 | 1.00 | 0.96 | 0.97 |
| 2005 | 334 | 90.1 | 90.2 | 89.9 | 90.7 | 10.1 | 10.1 | 9.5 | 9.9 | 1.00 | 0.97 | 0.98 |
| 2006 | 383 | 91.2 | 91.3 | 91.1 | 92.1 | 10.3 | 10.2 | 9.7 | 10.0 | 1.00 | 0.97 | 0.98 |
| 2007 | 334 | 92.3 | 92.4 | 92.4 | 93.5 | 10.2 | 10.2 | 9.5 | 9.7 | 1.00 | 0.94 | 0.98 |
| 2008 | 293 | 94.6 | 94.8 | 94.6 | 95.4 | 8.6 | 8.5 | 8.1 | 8.3 | 0.99 | 0.91 | 0.96 |
| 2009 | 269 | 94.5 | 94.7 | 94.3 | 95.1 | 9.4 | 9.4 | 8.4 | 8.9 | 1.00 | 0.90 | 0.97 |
| 2010 | 226 | 96.3 | 96.5 | 95.6 | 96.3 | 9.7 | 9.8 | 8.2 | 8.9 | 0.99 | 0.89 | 0.97 |
| 2011 | 167 | 97.3 | 97.6 | 96.4 | 96.9 | 8.8 | 8.7 | 8.0 | 7.9 | 0.99 | 0.92 | 0.95 |
| 2012 | 172 | 99.5 | 99.8 | 97.8 | 98.4 | 8.6 | 8.6 | 7.9 | 8.1 | 0.99 | 0.92 | 0.95 |
| 2013 | 120 | 102.0 | 102.5 | 99.7 | 100.0 | 9.0 | 8.0 | 8.9 | 7.0 | 0.87 | 0.95 | 0.96 |
| 2014 | 104 | 103.8 | 106.3 | 100.0 | 100.4 | 9.7 | 8.6 | 9.8 | 7.3 | 0.89 | 0.94 | 0.97 |
| 2015 | 80 | 106.8 | 109.0 | 102.6 | 102.0 | 11.5 | 10.2 | 10.8 | 8.3 | 0.89 | 0.95 | 0.99 |
| 2016 | 66 | 110.0 | 110.9 | 104.2 | 104.0 | 11.1 | 9.1 | 10.3 | 8.1 | 0.85 | 0.88 | 0.99 |
| 2017 | 65 | 111.0 | 112.1 | 103.8 | 105.1 | 8.3 | 7.8 | 6.0 | 6.2 | 0.95 | 0.64 | 0.97 |
| 2018 | 89 | 111.7 | 112.0 | 104.6 | 105.5 | 7.7 | 7.6 | 5.9 | 5.5 | 0.90 | 0.58 | 0.97 |
| 2019 | 60 | 110.9 | 111.1 | 105.0 | 104.5 | 8.4 | 7.7 | 5.5 | 6.5 | 0.94 | 0.55 | 0.98 |
| 2020 | 27 | 111.8 | 111.1 | 106.5 | 105.5 | 7.8 | 8.0 | 4.4 | 5.7 | 0.95 | 0.20 | 0.98 |

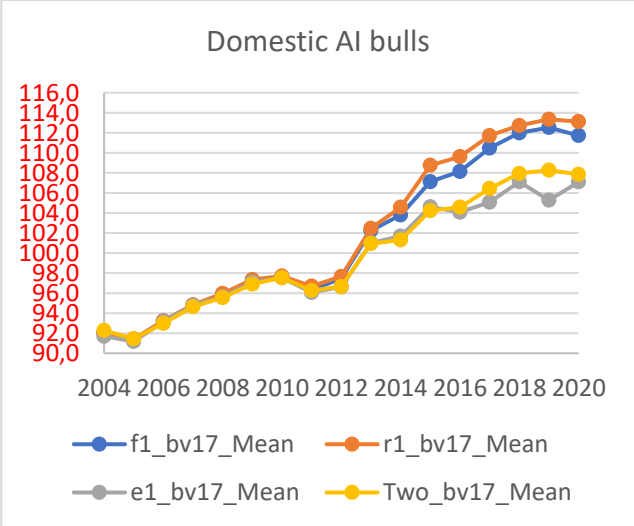


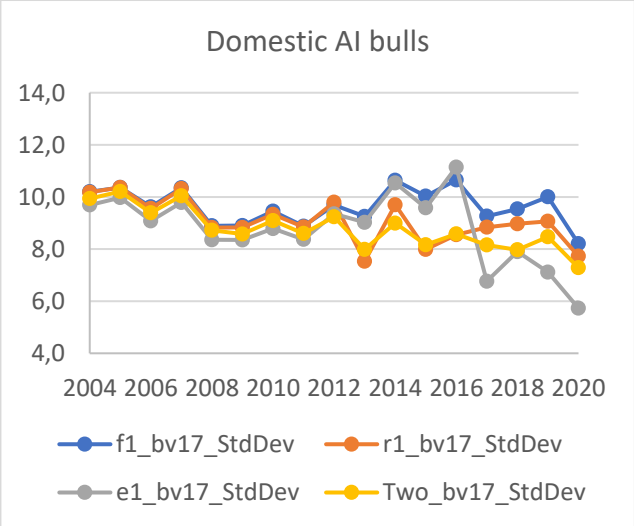



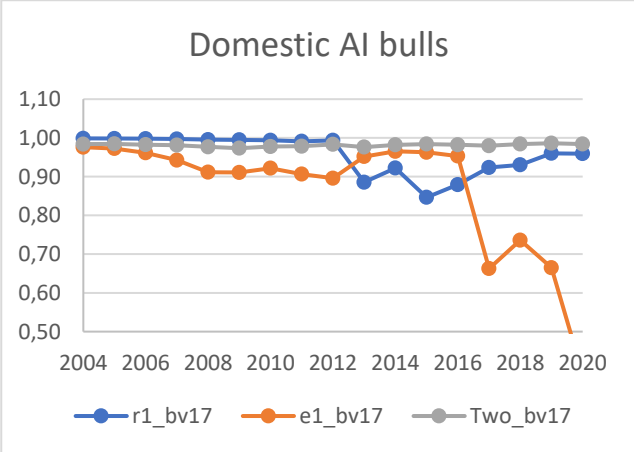



***bv17***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 92.0 | 92.0 | 91.7 | 92.3 | 10.2 | 10.2 | 9.7 | 9.9 | 1.00 | 0.98 | 0.98 |
| 2005 | 334 | 91.4 | 91.4 | 91.2 | 91.5 | 10.4 | 10.4 | 10.0 | 10.2 | 1.00 | 0.97 | 0.98 |
| 2006 | 383 | 93.2 | 93.2 | 93.2 | 93.0 | 9.6 | 9.6 | 9.1 | 9.4 | 1.00 | 0.96 | 0.98 |
| 2007 | 334 | 94.8 | 94.8 | 94.8 | 94.6 | 10.4 | 10.3 | 9.8 | 10.0 | 1.00 | 0.94 | 0.98 |
| 2008 | 293 | 95.8 | 96.0 | 95.6 | 95.6 | 8.9 | 8.8 | 8.4 | 8.7 | 1.00 | 0.91 | 0.98 |
| 2009 | 269 | 97.2 | 97.4 | 97.1 | 96.9 | 8.9 | 8.8 | 8.3 | 8.6 | 0.99 | 0.91 | 0.97 |
| 2010 | 226 | 97.6 | 97.7 | 97.5 | 97.5 | 9.5 | 9.3 | 8.8 | 9.1 | 0.99 | 0.92 | 0.98 |
| 2011 | 167 | 96.3 | 96.7 | 96.1 | 96.3 | 8.9 | 8.8 | 8.4 | 8.6 | 0.99 | 0.91 | 0.98 |
| 2012 | 172 | 97.5 | 97.7 | 96.6 | 96.7 | 9.7 | 9.8 | 9.4 | 9.2 | 0.99 | 0.90 | 0.98 |
| 2013 | 120 | 102.2 | 102.5 | 101.0 | 100.9 | 9.3 | 7.5 | 9.0 | 8.0 | 0.89 | 0.95 | 0.98 |
| 2014 | 104 | 103.8 | 104.6 | 101.7 | 101.3 | 10.6 | 9.7 | 10.5 | 9.0 | 0.92 | 0.97 | 0.98 |
| 2015 | 80 | 107.1 | 108.8 | 104.6 | 104.2 | 10.0 | 8.0 | 9.6 | 8.2 | 0.85 | 0.96 | 0.98 |
| 2016 | 66 | 108.1 | 109.6 | 104.1 | 104.6 | 10.7 | 8.5 | 11.1 | 8.6 | 0.88 | 0.95 | 0.98 |
| 2017 | 65 | 110.5 | 111.7 | 105.1 | 106.4 | 9.3 | 8.8 | 6.8 | 8.2 | 0.92 | 0.66 | 0.98 |
| 2018 | 89 | 112.0 | 112.7 | 107.1 | 108.0 | 9.5 | 9.0 | 7.9 | 8.0 | 0.93 | 0.74 | 0.98 |
| 2019 | 60 | 112.5 | 113.3 | 105.3 | 108.3 | 10.0 | 9.1 | 7.1 | 8.5 | 0.96 | 0.67 | 0.99 |
| 2020 | 27 | 111.7 | 113.1 | 107.1 | 107.9 | 8.2 | 7.7 | 5.7 | 7.3 | 0.96 | 0.39 | 0.98 |

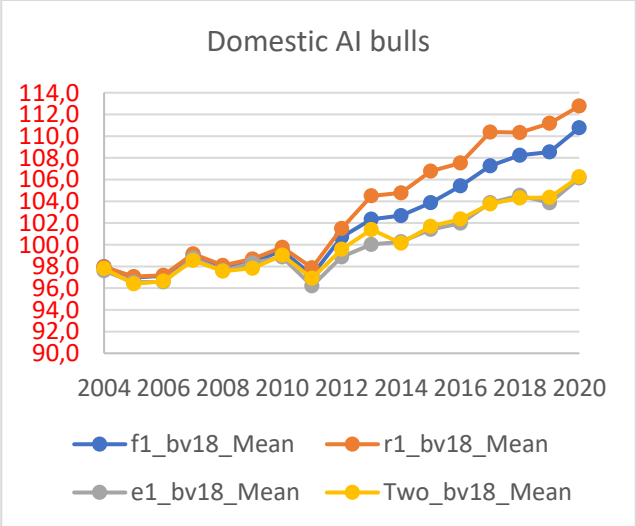


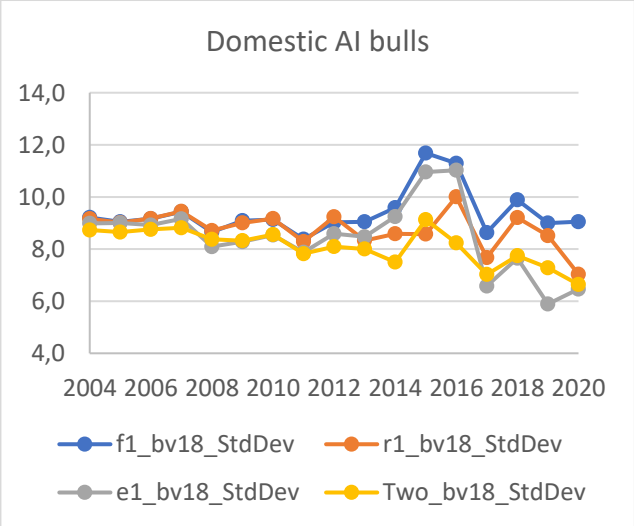



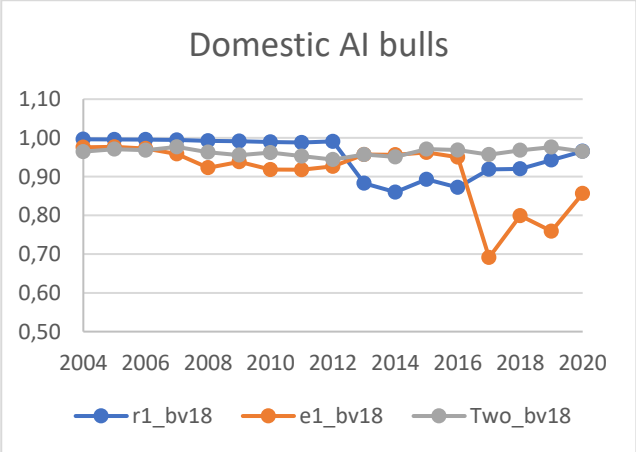



***bv18***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 98.0 | 97.9 | 97.6 | 97.8 | 9.2 | 9.2 | 9.0 | 8.7 | 1.00 | 0.98 | 0.96 |
| 2005 | 334 | 97.0 | 97.1 | 96.5 | 96.4 | 9.0 | 9.0 | 9.0 | 8.7 | 1.00 | 0.98 | 0.97 |
| 2006 | 383 | 97.1 | 97.2 | 96.6 | 96.6 | 9.2 | 9.2 | 8.9 | 8.8 | 1.00 | 0.97 | 0.97 |
| 2007 | 334 | 99.0 | 99.2 | 98.8 | 98.5 | 9.4 | 9.4 | 9.2 | 8.8 | 0.99 | 0.96 | 0.98 |
| 2008 | 293 | 97.9 | 98.1 | 97.6 | 97.6 | 8.7 | 8.7 | 8.1 | 8.4 | 0.99 | 0.92 | 0.96 |
| 2009 | 269 | 98.4 | 98.7 | 98.3 | 97.8 | 9.1 | 9.0 | 8.3 | 8.3 | 0.99 | 0.94 | 0.96 |
| 2010 | 226 | 99.4 | 99.8 | 98.9 | 99.0 | 9.1 | 9.2 | 8.5 | 8.6 | 0.99 | 0.92 | 0.96 |
| 2011 | 167 | 97.2 | 97.9 | 96.2 | 96.9 | 8.4 | 8.3 | 7.9 | 7.8 | 0.99 | 0.92 | 0.95 |
| 2012 | 172 | 100.7 | 101.5 | 98.9 | 99.6 | 9.0 | 9.2 | 8.6 | 8.1 | 0.99 | 0.93 | 0.94 |
| 2013 | 120 | 102.3 | 104.5 | 100.0 | 101.4 | 9.0 | 8.3 | 8.5 | 8.0 | 0.88 | 0.96 | 0.96 |
| 2014 | 104 | 102.7 | 104.8 | 100.3 | 100.1 | 9.6 | 8.6 | 9.2 | 7.5 | 0.86 | 0.96 | 0.95 |
| 2015 | 80 | 103.9 | 106.8 | 101.4 | 101.7 | 11.7 | 8.6 | 11.0 | 9.1 | 0.89 | 0.96 | 0.97 |
| 2016 | 66 | 105.4 | 107.5 | 102.0 | 102.4 | 11.3 | 10.0 | 11.0 | 8.2 | 0.87 | 0.95 | 0.97 |
| 2017 | 65 | 107.3 | 110.4 | 103.9 | 103.8 | 8.6 | 7.7 | 6.6 | 7.0 | 0.92 | 0.69 | 0.96 |
| 2018 | 89 | 108.2 | 110.3 | 104.5 | 104.3 | 9.9 | 9.2 | 7.6 | 7.7 | 0.92 | 0.80 | 0.97 |
| 2019 | 60 | 108.5 | 111.2 | 103.9 | 104.3 | 9.0 | 8.5 | 5.9 | 7.3 | 0.94 | 0.76 | 0.98 |
| 2020 | 27 | 110.8 | 112.8 | 106.1 | 106.3 | 9.0 | 7.0 | 6.5 | 6.6 | 0.97 | 0.86 | 0.96 |

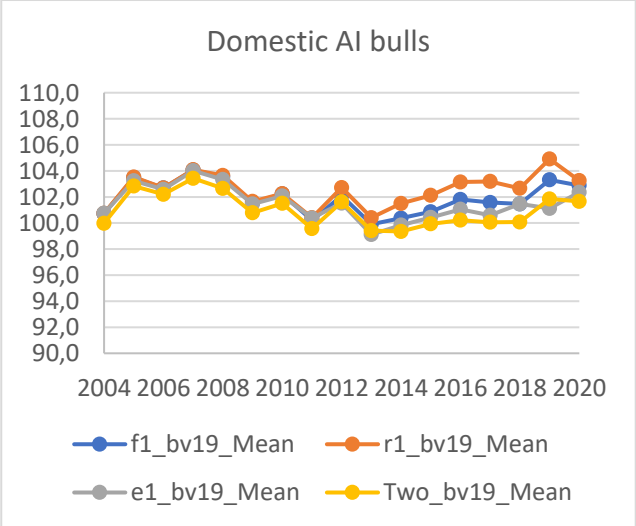


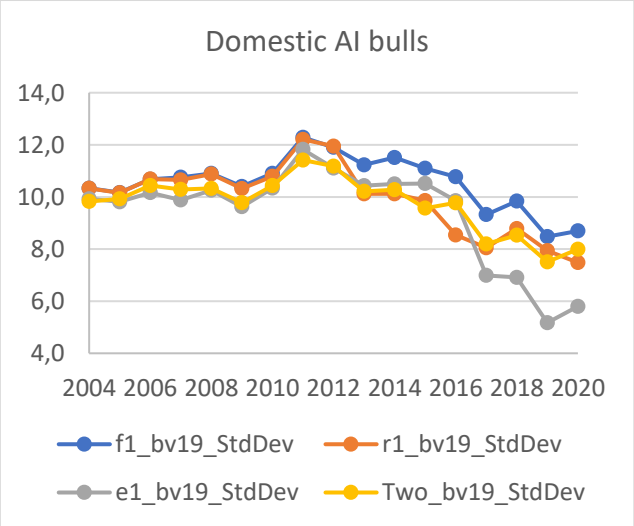



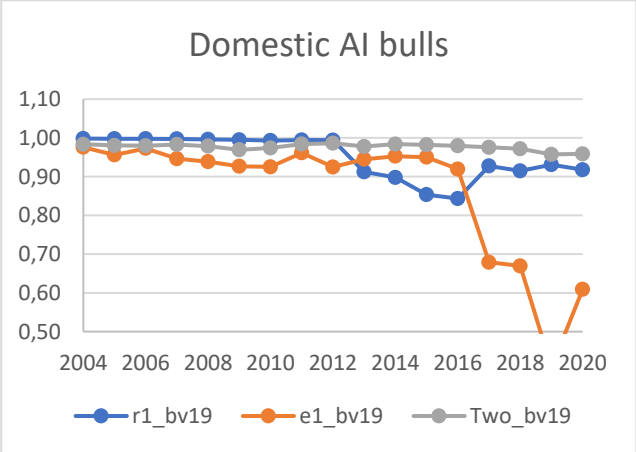



***bv19***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 100.7 | 100.7 | 100.8 | 100.0 | 10.3 | 10.3 | 9.9 | 9.8 | 1.00 | 0.98 | 0.98 |
| 2005 | 334 | 103.5 | 103.5 | 103.2 | 102.8 | 10.2 | 10.2 | 9.8 | 9.9 | 1.00 | 0.96 | 0.98 |
| 2006 | 383 | 102.7 | 102.7 | 102.6 | 102.2 | 10.7 | 10.7 | 10.2 | 10.4 | 1.00 | 0.97 | 0.98 |
| 2007 | 334 | 104.1 | 104.1 | 104.0 | 103.4 | 10.8 | 10.7 | 9.9 | 10.3 | 1.00 | 0.95 | 0.98 |
| 2008 | 293 | 103.6 | 103.7 | 103.3 | 102.7 | 10.9 | 10.9 | 10.3 | 10.3 | 1.00 | 0.94 | 0.98 |
| 2009 | 269 | 101.6 | 101.7 | 101.5 | 100.8 | 10.4 | 10.3 | 9.6 | 9.8 | 1.00 | 0.93 | 0.97 |
| 2010 | 226 | 102.2 | 102.3 | 102.1 | 101.5 | 10.9 | 10.8 | 10.3 | 10.4 | 0.99 | 0.93 | 0.97 |
| 2011 | 167 | 100.2 | 100.4 | 100.4 | 99.6 | 12.3 | 12.2 | 11.8 | 11.4 | 0.99 | 0.96 | 0.98 |
| 2012 | 172 | 102.1 | 102.7 | 101.5 | 101.6 | 11.9 | 12.0 | 11.1 | 11.2 | 0.99 | 0.92 | 0.99 |
| 2013 | 120 | 99.9 | 100.4 | 99.1 | 99.4 | 11.2 | 10.1 | 10.4 | 10.2 | 0.91 | 0.94 | 0.98 |
| 2014 | 104 | 100.4 | 101.5 | 99.8 | 99.4 | 11.5 | 10.1 | 10.5 | 10.3 | 0.90 | 0.95 | 0.98 |
| 2015 | 80 | 100.9 | 102.1 | 100.4 | 99.9 | 11.1 | 9.9 | 10.5 | 9.6 | 0.85 | 0.95 | 0.98 |
| 2016 | 66 | 101.8 | 103.1 | 101.0 | 100.2 | 10.8 | 8.5 | 9.9 | 9.8 | 0.84 | 0.92 | 0.98 |
| 2017 | 65 | 101.6 | 103.2 | 100.6 | 100.1 | 9.3 | 8.0 | 7.0 | 8.2 | 0.93 | 0.68 | 0.98 |
| 2018 | 89 | 101.5 | 102.7 | 101.5 | 100.1 | 9.8 | 8.8 | 6.9 | 8.5 | 0.92 | 0.67 | 0.97 |
| 2019 | 60 | 103.3 | 104.9 | 101.1 | 101.8 | 8.5 | 7.9 | 5.2 | 7.5 | 0.93 | 0.41 | 0.96 |
| 2020 | 27 | 102.9 | 103.3 | 102.4 | 101.7 | 8.7 | 7.5 | 5.8 | 8.0 | 0.92 | 0.61 | 0.96 |

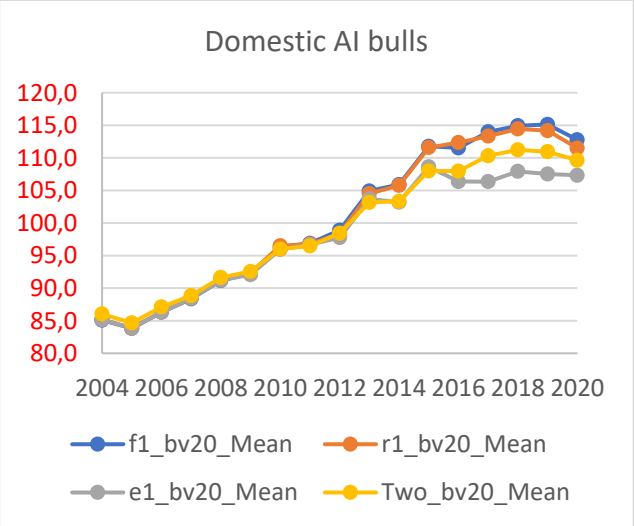


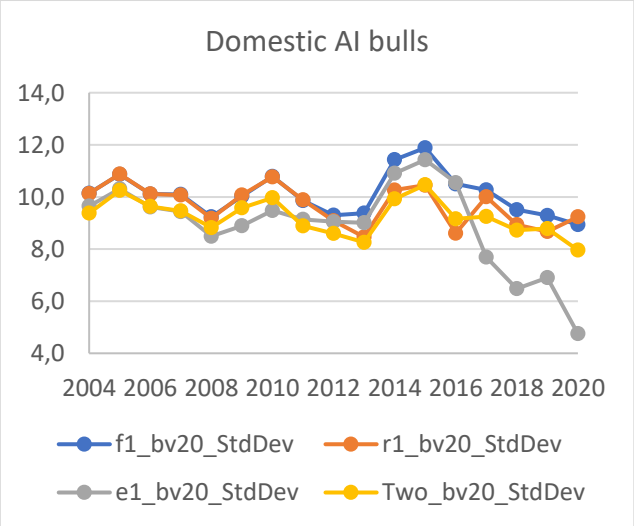



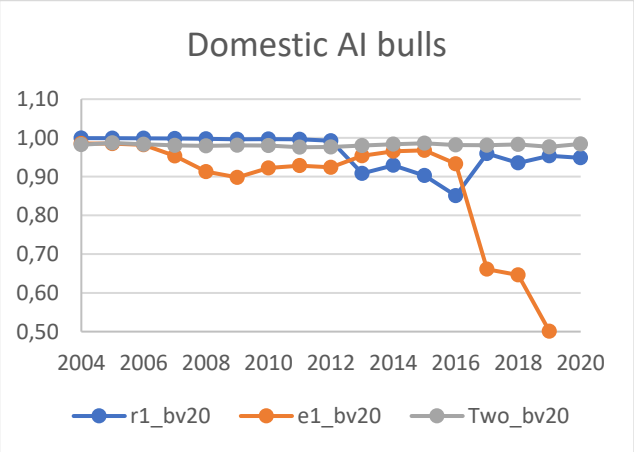



***bv20***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 85.1 | 85.2 | 85.2 | 86.0 | 10.1 | 10.1 | 9.6 | 9.4 | 1.00 | 0.99 | 0.98 |
| 2005 | 334 | 83.8 | 83.9 | 83.9 | 84.7 | 10.9 | 10.9 | 10.3 | 10.3 | 1.00 | 0.99 | 0.99 |
| 2006 | 383 | 86.3 | 86.3 | 86.3 | 87.1 | 10.1 | 10.1 | 9.6 | 9.6 | 1.00 | 0.98 | 0.98 |
| 2007 | 334 | 88.4 | 88.4 | 88.5 | 88.9 | 10.1 | 10.1 | 9.4 | 9.5 | 1.00 | 0.95 | 0.98 |
| 2008 | 293 | 91.2 | 91.2 | 91.2 | 91.6 | 9.2 | 9.2 | 8.5 | 8.8 | 1.00 | 0.91 | 0.98 |
| 2009 | 269 | 92.2 | 92.4 | 92.1 | 92.6 | 10.0 | 10.1 | 8.9 | 9.6 | 1.00 | 0.90 | 0.98 |
| 2010 | 226 | 96.3 | 96.5 | 96.0 | 96.0 | 10.8 | 10.8 | 9.5 | 10.0 | 1.00 | 0.92 | 0.98 |
| 2011 | 167 | 96.9 | 96.8 | 96.7 | 96.5 | 9.9 | 9.9 | 9.1 | 8.9 | 1.00 | 0.93 | 0.98 |
| 2012 | 172 | 98.9 | 98.4 | 97.8 | 98.4 | 9.3 | 9.1 | 9.1 | 8.6 | 0.99 | 0.92 | 0.98 |
| 2013 | 120 | 104.9 | 104.5 | 103.7 | 103.2 | 9.4 | 8.5 | 9.0 | 8.3 | 0.91 | 0.95 | 0.98 |
| 2014 | 104 | 105.9 | 105.8 | 103.2 | 103.3 | 11.4 | 10.3 | 10.9 | 9.9 | 0.93 | 0.97 | 0.98 |
| 2015 | 80 | 111.8 | 111.6 | 108.6 | 108.0 | 11.9 | 10.4 | 11.4 | 10.5 | 0.90 | 0.97 | 0.99 |
| 2016 | 66 | 111.5 | 112.3 | 106.4 | 108.0 | 10.5 | 8.6 | 10.5 | 9.2 | 0.85 | 0.93 | 0.98 |
| 2017 | 65 | 114.0 | 113.3 | 106.4 | 110.3 | 10.3 | 10.0 | 7.7 | 9.3 | 0.96 | 0.66 | 0.98 |
| 2018 | 89 | 114.9 | 114.4 | 107.9 | 111.2 | 9.5 | 8.9 | 6.5 | 8.7 | 0.94 | 0.65 | 0.98 |
| 2019 | 60 | 115.1 | 114.2 | 107.5 | 111.0 | 9.3 | 8.7 | 6.9 | 8.8 | 0.95 | 0.50 | 0.98 |
| 2020 | 27 | 112.8 | 111.5 | 107.3 | 109.6 | 8.9 | 9.2 | 4.8 | 8.0 | 0.95 | 0.32 | 0.98 |

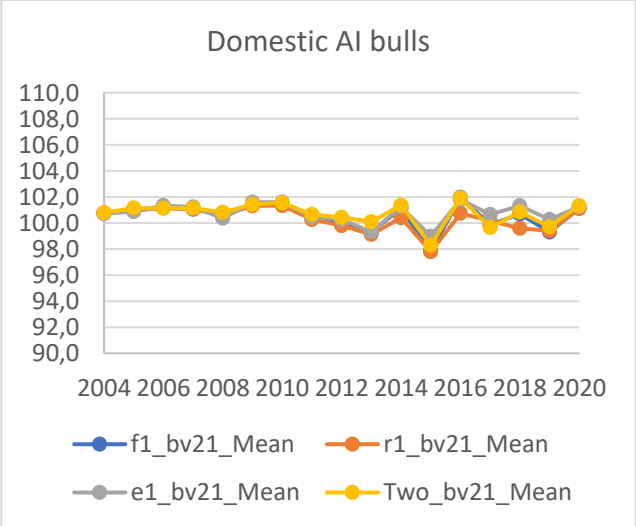


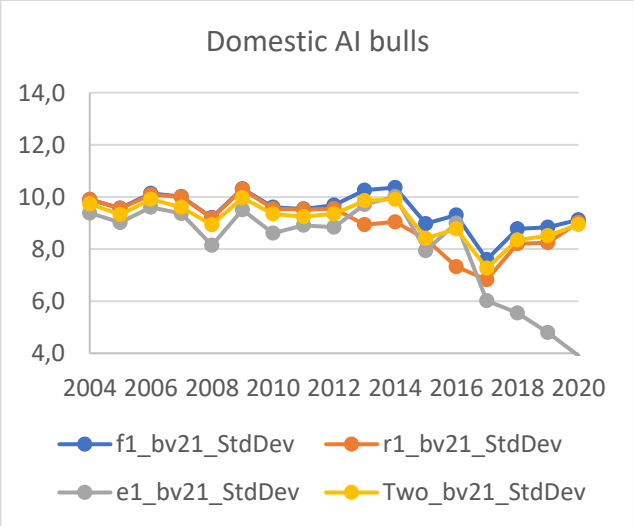



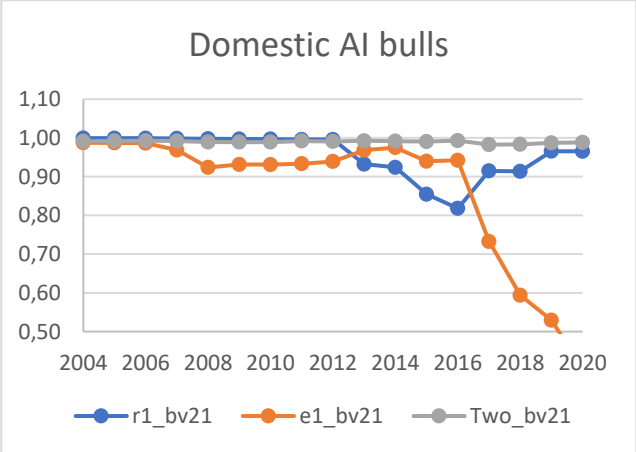



***bv21***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 100.8 | 100.7 | 100.7 | 100.8 | 9.9 | 9.9 | 9.4 | 9.7 | 1.00 | 0.99 | 0.99 |
| 2005 | 334 | 101.0 | 101.0 | 100.9 | 101.2 | 9.6 | 9.6 | 9.0 | 9.3 | 1.00 | 0.99 | 0.99 |
| 2006 | 383 | 101.2 | 101.2 | 101.3 | 101.1 | 10.1 | 10.1 | 9.6 | 9.9 | 1.00 | 0.99 | 0.99 |
| 2007 | 334 | 101.1 | 101.1 | 101.2 | 101.1 | 10.0 | 10.0 | 9.4 | 9.6 | 1.00 | 0.97 | 0.99 |
| 2008 | 293 | 100.6 | 100.6 | 100.4 | 100.8 | 9.2 | 9.2 | 8.1 | 8.9 | 1.00 | 0.92 | 0.99 |
| 2009 | 269 | 101.4 | 101.3 | 101.6 | 101.4 | 10.3 | 10.3 | 9.5 | 10.0 | 1.00 | 0.93 | 0.99 |
| 2010 | 226 | 101.4 | 101.3 | 101.6 | 101.5 | 9.6 | 9.5 | 8.6 | 9.3 | 1.00 | 0.93 | 0.99 |
| 2011 | 167 | 100.4 | 100.3 | 100.5 | 100.7 | 9.5 | 9.5 | 8.9 | 9.2 | 1.00 | 0.93 | 0.99 |
| 2012 | 172 | 100.0 | 99.8 | 100.3 | 100.4 | 9.7 | 9.6 | 8.8 | 9.4 | 1.00 | 0.94 | 0.99 |
| 2013 | 120 | 99.3 | 99.1 | 99.3 | 100.1 | 10.3 | 8.9 | 9.7 | 9.9 | 0.93 | 0.97 | 0.99 |
| 2014 | 104 | 101.1 | 100.4 | 101.2 | 101.4 | 10.4 | 9.0 | 10.0 | 9.9 | 0.92 | 0.98 | 0.99 |
| 2015 | 80 | 97.9 | 97.8 | 99.0 | 98.3 | 9.0 | 8.4 | 7.9 | 8.4 | 0.85 | 0.94 | 0.99 |
| 2016 | 66 | 102.0 | 100.7 | 101.8 | 101.9 | 9.3 | 7.3 | 9.0 | 8.8 | 0.82 | 0.94 | 0.99 |
| 2017 | 65 | 99.9 | 100.2 | 100.7 | 99.7 | 7.6 | 6.8 | 6.0 | 7.3 | 0.91 | 0.73 | 0.98 |
| 2018 | 89 | 100.7 | 99.6 | 101.3 | 100.8 | 8.8 | 8.2 | 5.5 | 8.3 | 0.91 | 0.59 | 0.98 |
| 2019 | 60 | 99.3 | 99.4 | 100.3 | 99.7 | 8.8 | 8.2 | 4.8 | 8.5 | 0.97 | 0.53 | 0.99 |
| 2020 | 27 | 101.1 | 101.1 | 101.2 | 101.3 | 9.1 | 9.0 | 3.9 | 8.9 | 0.97 | 0.40 | 0.99 |

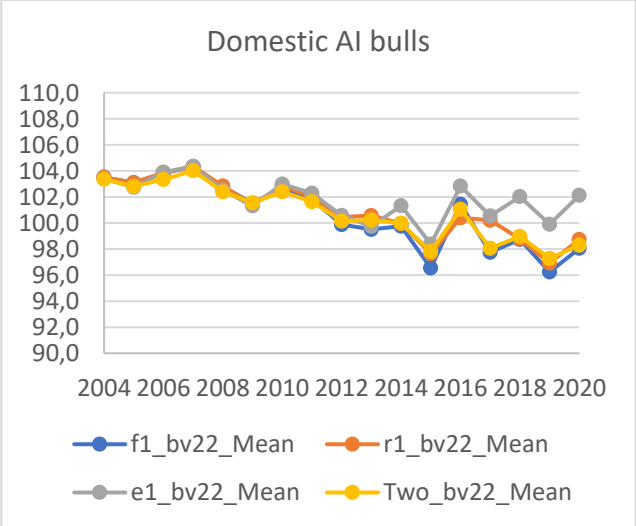


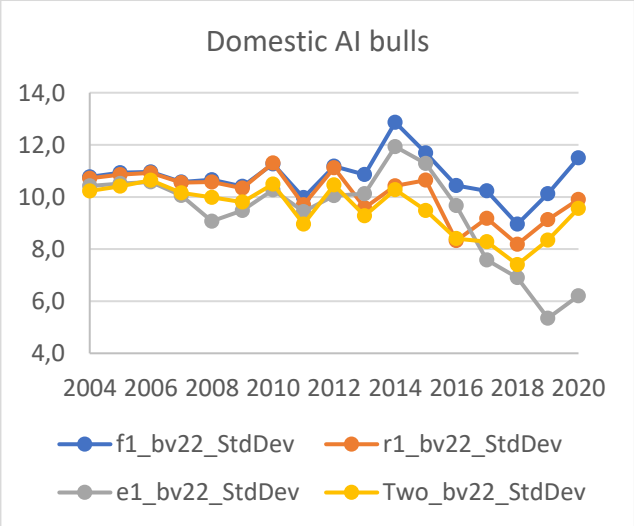



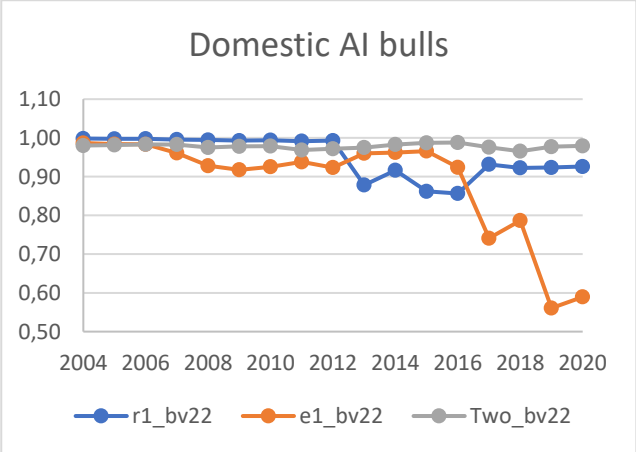



***bv22***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 103.5 | 103.5 | 103.4 | 103.4 | 10.8 | 10.7 | 10.4 | 10.2 | 1.00 | 0.99 | 0.98 |
| 2005 | 334 | 103.1 | 103.1 | 102.7 | 102.8 | 10.9 | 10.9 | 10.5 | 10.4 | 1.00 | 0.98 | 0.98 |
| 2006 | 383 | 103.8 | 103.9 | 103.9 | 103.3 | 11.0 | 10.9 | 10.6 | 10.6 | 1.00 | 0.98 | 0.98 |
| 2007 | 334 | 104.3 | 104.3 | 104.4 | 104.0 | 10.6 | 10.5 | 10.1 | 10.2 | 1.00 | 0.96 | 0.98 |
| 2008 | 293 | 102.8 | 102.8 | 102.5 | 102.4 | 10.7 | 10.6 | 9.1 | 10.0 | 0.99 | 0.93 | 0.98 |
| 2009 | 269 | 101.5 | 101.4 | 101.3 | 101.6 | 10.4 | 10.3 | 9.5 | 9.8 | 0.99 | 0.92 | 0.98 |
| 2010 | 226 | 102.7 | 102.8 | 103.0 | 102.4 | 11.3 | 11.3 | 10.3 | 10.5 | 0.99 | 0.93 | 0.98 |
| 2011 | 167 | 101.8 | 102.0 | 102.3 | 101.6 | 10.0 | 9.7 | 9.4 | 9.0 | 0.99 | 0.94 | 0.97 |
| 2012 | 172 | 99.9 | 100.5 | 100.6 | 100.2 | 11.2 | 11.1 | 10.0 | 10.5 | 0.99 | 0.92 | 0.97 |
| 2013 | 120 | 99.5 | 100.6 | 99.7 | 100.2 | 10.9 | 9.6 | 10.1 | 9.3 | 0.88 | 0.96 | 0.98 |
| 2014 | 104 | 99.8 | 100.0 | 101.3 | 100.0 | 12.9 | 10.4 | 11.9 | 10.3 | 0.92 | 0.96 | 0.98 |
| 2015 | 80 | 96.6 | 97.6 | 98.4 | 97.8 | 11.7 | 10.6 | 11.3 | 9.5 | 0.86 | 0.97 | 0.99 |
| 2016 | 66 | 101.4 | 100.4 | 102.8 | 101.1 | 10.4 | 8.3 | 9.7 | 8.4 | 0.86 | 0.92 | 0.99 |
| 2017 | 65 | 97.7 | 100.2 | 100.5 | 98.1 | 10.2 | 9.2 | 7.6 | 8.3 | 0.93 | 0.74 | 0.98 |
| 2018 | 89 | 98.7 | 98.8 | 102.0 | 99.0 | 9.0 | 8.2 | 6.9 | 7.4 | 0.92 | 0.79 | 0.97 |
| 2019 | 60 | 96.2 | 96.9 | 99.9 | 97.3 | 10.1 | 9.1 | 5.3 | 8.3 | 0.92 | 0.56 | 0.98 |
| 2020 | 27 | 98.1 | 98.7 | 102.1 | 98.3 | 11.5 | 9.9 | 6.2 | 9.6 | 0.93 | 0.59 | 0.98 |

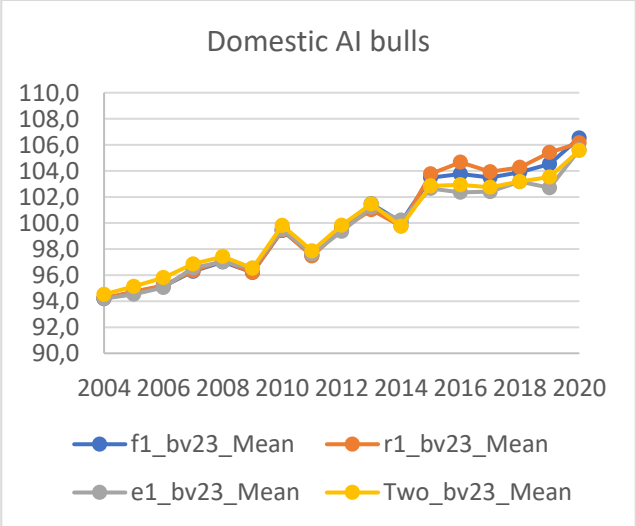


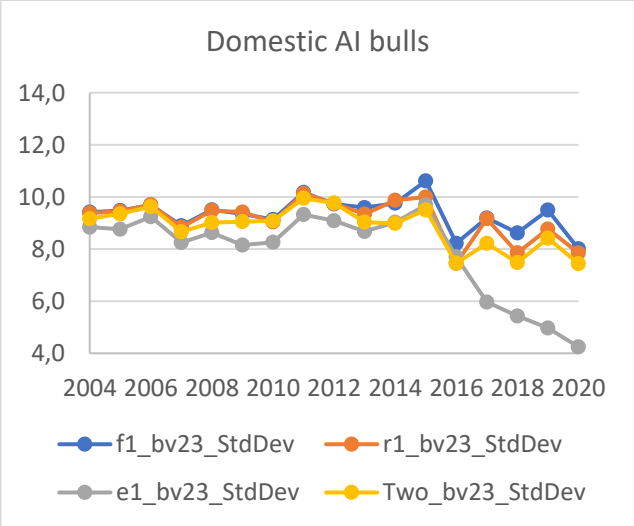



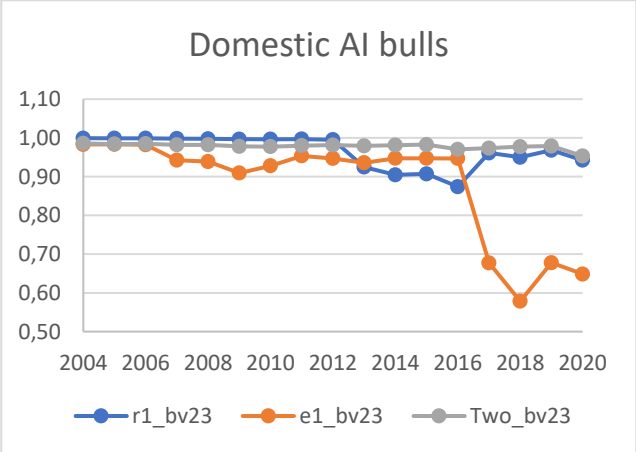



***bv23***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 94.2 | 94.2 | 94.2 | 94.5 | 9.4 | 9.4 | 8.8 | 9.2 | 1.00 | 0.98 | 0.99 |
| 2005 | 334 | 94.7 | 94.7 | 94.5 | 95.1 | 9.5 | 9.4 | 8.8 | 9.4 | 1.00 | 0.98 | 0.98 |
| 2006 | 383 | 95.1 | 95.2 | 95.1 | 95.8 | 9.7 | 9.7 | 9.2 | 9.6 | 1.00 | 0.98 | 0.98 |
| 2007 | 334 | 96.3 | 96.3 | 96.6 | 96.9 | 8.9 | 8.8 | 8.3 | 8.7 | 1.00 | 0.94 | 0.98 |
| 2008 | 293 | 97.0 | 97.1 | 97.0 | 97.4 | 9.5 | 9.5 | 8.6 | 9.0 | 1.00 | 0.94 | 0.98 |
| 2009 | 269 | 96.2 | 96.2 | 96.5 | 96.5 | 9.4 | 9.4 | 8.2 | 9.1 | 1.00 | 0.91 | 0.98 |
| 2010 | 226 | 99.4 | 99.5 | 99.5 | 99.8 | 9.1 | 9.0 | 8.3 | 9.1 | 1.00 | 0.93 | 0.98 |
| 2011 | 167 | 97.5 | 97.5 | 97.6 | 97.9 | 10.2 | 10.1 | 9.3 | 9.9 | 1.00 | 0.95 | 0.98 |
| 2012 | 172 | 99.7 | 99.5 | 99.4 | 99.8 | 9.7 | 9.7 | 9.1 | 9.8 | 1.00 | 0.95 | 0.98 |
| 2013 | 120 | 101.5 | 101.0 | 101.2 | 101.5 | 9.6 | 9.3 | 8.7 | 9.0 | 0.92 | 0.94 | 0.98 |
| 2014 | 104 | 100.1 | 99.8 | 100.2 | 99.7 | 9.8 | 9.9 | 9.0 | 9.0 | 0.90 | 0.95 | 0.98 |
| 2015 | 80 | 103.5 | 103.8 | 102.6 | 102.8 | 10.6 | 10.0 | 9.7 | 9.5 | 0.91 | 0.95 | 0.98 |
| 2016 | 66 | 103.8 | 104.7 | 102.4 | 102.9 | 8.2 | 7.5 | 7.7 | 7.5 | 0.87 | 0.95 | 0.97 |
| 2017 | 65 | 103.5 | 103.9 | 102.4 | 102.7 | 9.2 | 9.2 | 6.0 | 8.2 | 0.96 | 0.68 | 0.97 |
| 2018 | 89 | 103.9 | 104.3 | 103.2 | 103.2 | 8.6 | 7.9 | 5.4 | 7.5 | 0.95 | 0.58 | 0.98 |
| 2019 | 60 | 104.5 | 105.4 | 102.7 | 103.5 | 9.5 | 8.8 | 5.0 | 8.4 | 0.97 | 0.68 | 0.98 |
| 2020 | 27 | 106.5 | 106.1 | 105.6 | 105.6 | 8.0 | 7.9 | 4.2 | 7.4 | 0.94 | 0.65 | 0.95 |

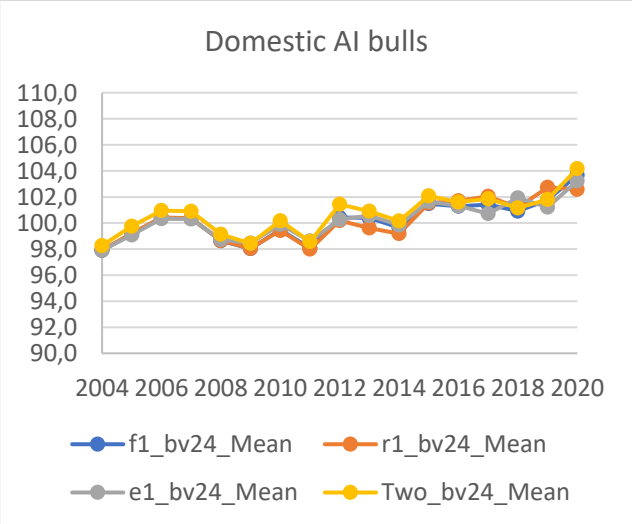


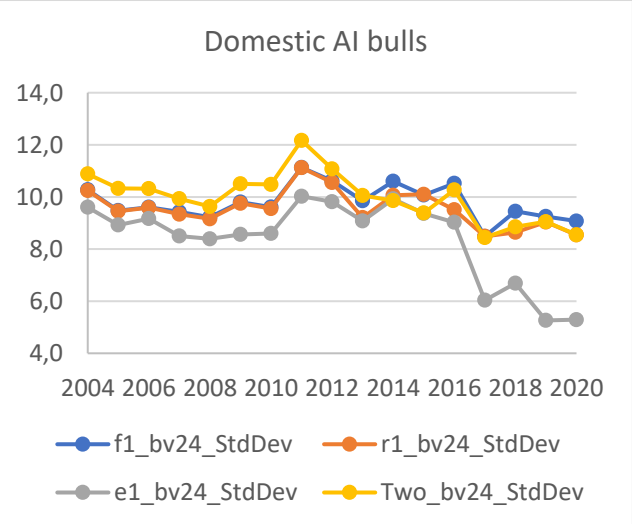



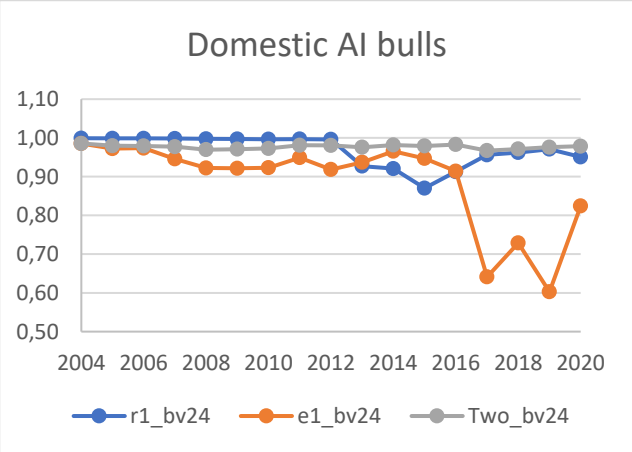



***bv24***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 97.9 | 97.9 | 97.9 | 98.3 | 10.3 | 10.2 | 9.6 | 10.9 | 1.00 | 0.99 | 0.99 |
| 2005 | 334 | 99.2 | 99.2 | 99.1 | 99.8 | 9.5 | 9.5 | 8.9 | 10.3 | 1.00 | 0.97 | 0.98 |
| 2006 | 383 | 100.4 | 100.4 | 100.3 | 101.0 | 9.6 | 9.6 | 9.2 | 10.3 | 1.00 | 0.97 | 0.98 |
| 2007 | 334 | 100.3 | 100.4 | 100.3 | 100.9 | 9.4 | 9.3 | 8.5 | 9.9 | 1.00 | 0.95 | 0.98 |
| 2008 | 293 | 98.6 | 98.6 | 98.7 | 99.1 | 9.2 | 9.2 | 8.4 | 9.6 | 1.00 | 0.92 | 0.97 |
| 2009 | 269 | 98.0 | 98.0 | 98.5 | 98.4 | 9.8 | 9.8 | 8.6 | 10.5 | 1.00 | 0.92 | 0.97 |
| 2010 | 226 | 99.5 | 99.4 | 99.9 | 100.2 | 9.6 | 9.6 | 8.6 | 10.5 | 1.00 | 0.92 | 0.97 |
| 2011 | 167 | 98.1 | 98.0 | 98.6 | 98.6 | 11.1 | 11.1 | 10.0 | 12.2 | 1.00 | 0.95 | 0.98 |
| 2012 | 172 | 100.4 | 100.2 | 100.3 | 101.4 | 10.6 | 10.6 | 9.8 | 11.1 | 1.00 | 0.92 | 0.98 |
| 2013 | 120 | 100.4 | 99.6 | 100.6 | 100.9 | 9.9 | 9.2 | 9.1 | 10.1 | 0.93 | 0.94 | 0.98 |
| 2014 | 104 | 99.6 | 99.2 | 99.8 | 100.2 | 10.6 | 10.1 | 9.9 | 9.9 | 0.92 | 0.97 | 0.98 |
| 2015 | 80 | 101.5 | 101.5 | 101.6 | 102.1 | 10.1 | 10.1 | 9.4 | 9.4 | 0.87 | 0.95 | 0.98 |
| 2016 | 66 | 101.3 | 101.7 | 101.3 | 101.6 | 10.5 | 9.5 | 9.0 | 10.3 | 0.91 | 0.91 | 0.98 |
| 2017 | 65 | 101.4 | 102.0 | 100.7 | 101.9 | 8.5 | 8.5 | 6.0 | 8.4 | 0.96 | 0.64 | 0.97 |
| 2018 | 89 | 100.9 | 101.2 | 101.9 | 101.2 | 9.4 | 8.6 | 6.7 | 8.9 | 0.96 | 0.73 | 0.97 |
| 2019 | 60 | 101.8 | 102.7 | 101.2 | 101.8 | 9.3 | 9.0 | 5.3 | 9.0 | 0.97 | 0.60 | 0.98 |
| 2020 | 27 | 103.7 | 102.6 | 103.2 | 104.2 | 9.1 | 8.5 | 5.3 | 8.5 | 0.95 | 0.82 | 0.98 |

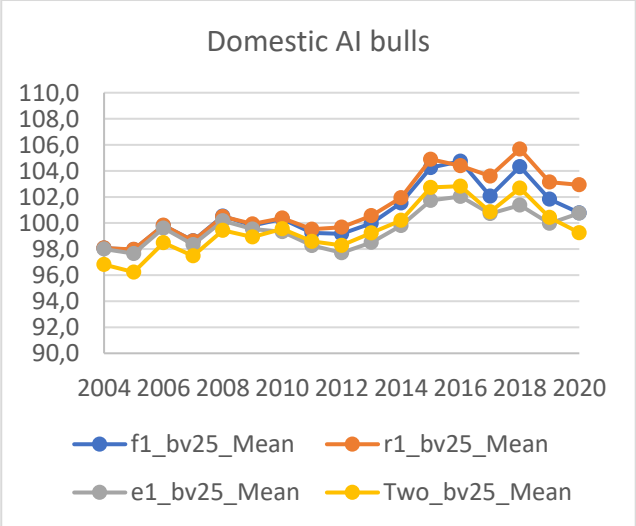


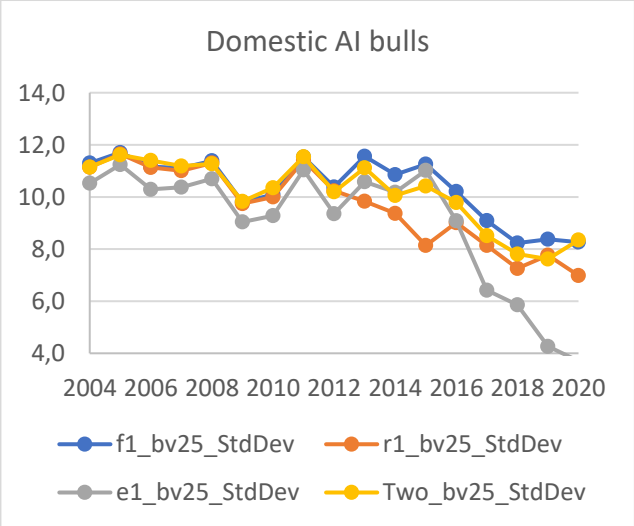



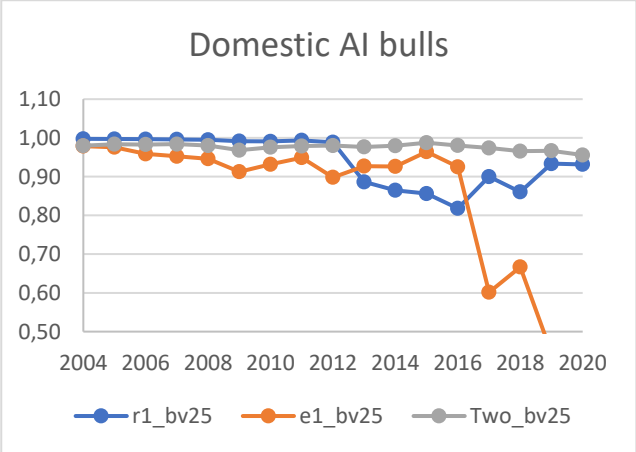



***bv25***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 307 | 98.1 | 98.1 | 98.0 | 96.8 | 11.3 | 11.1 | 10.5 | 11.1 | 1.00 | 0.98 | 0.98 |
| 2005 | 334 | 98.0 | 98.0 | 97.7 | 96.2 | 11.7 | 11.6 | 11.2 | 11.6 | 1.00 | 0.98 | 0.98 |
| 2006 | 383 | 99.8 | 99.8 | 99.6 | 98.5 | 11.2 | 11.1 | 10.3 | 11.4 | 1.00 | 0.96 | 0.98 |
| 2007 | 334 | 98.6 | 98.6 | 98.3 | 97.5 | 11.1 | 11.0 | 10.4 | 11.2 | 1.00 | 0.95 | 0.98 |
| 2008 | 293 | 100.5 | 100.5 | 100.2 | 99.4 | 11.4 | 11.3 | 10.7 | 11.3 | 1.00 | 0.95 | 0.98 |
| 2009 | 269 | 99.8 | 99.9 | 99.5 | 98.9 | 9.8 | 9.7 | 9.0 | 9.8 | 0.99 | 0.91 | 0.97 |
| 2010 | 226 | 100.3 | 100.4 | 99.3 | 99.6 | 10.1 | 10.0 | 9.3 | 10.4 | 0.99 | 0.93 | 0.98 |
| 2011 | 167 | 99.2 | 99.5 | 98.3 | 98.6 | 11.5 | 11.4 | 11.0 | 11.5 | 0.99 | 0.95 | 0.98 |
| 2012 | 172 | 99.2 | 99.7 | 97.7 | 98.3 | 10.4 | 10.2 | 9.4 | 10.2 | 0.99 | 0.90 | 0.98 |
| 2013 | 120 | 100.0 | 100.6 | 98.5 | 99.2 | 11.6 | 9.8 | 10.6 | 11.1 | 0.89 | 0.93 | 0.98 |
| 2014 | 104 | 101.5 | 101.9 | 99.8 | 100.2 | 10.9 | 9.4 | 10.2 | 10.1 | 0.86 | 0.93 | 0.98 |
| 2015 | 80 | 104.3 | 104.9 | 101.7 | 102.7 | 11.3 | 8.1 | 11.0 | 10.4 | 0.86 | 0.96 | 0.99 |
| 2016 | 66 | 104.7 | 104.4 | 102.0 | 102.8 | 10.2 | 9.0 | 9.1 | 9.8 | 0.82 | 0.93 | 0.98 |
| 2017 | 65 | 102.1 | 103.6 | 100.7 | 100.9 | 9.1 | 8.1 | 6.4 | 8.5 | 0.90 | 0.60 | 0.97 |
| 2018 | 89 | 104.3 | 105.7 | 101.4 | 102.7 | 8.2 | 7.3 | 5.9 | 7.8 | 0.86 | 0.67 | 0.97 |
| 2019 | 60 | 101.8 | 103.1 | 100.0 | 100.4 | 8.4 | 7.8 | 4.3 | 7.6 | 0.93 | 0.44 | 0.97 |
| 2020 | 27 | 100.8 | 102.9 | 100.8 | 99.3 | 8.3 | 7.0 | 3.7 | 8.3 | 0.93 | 0.48 | 0.96 |

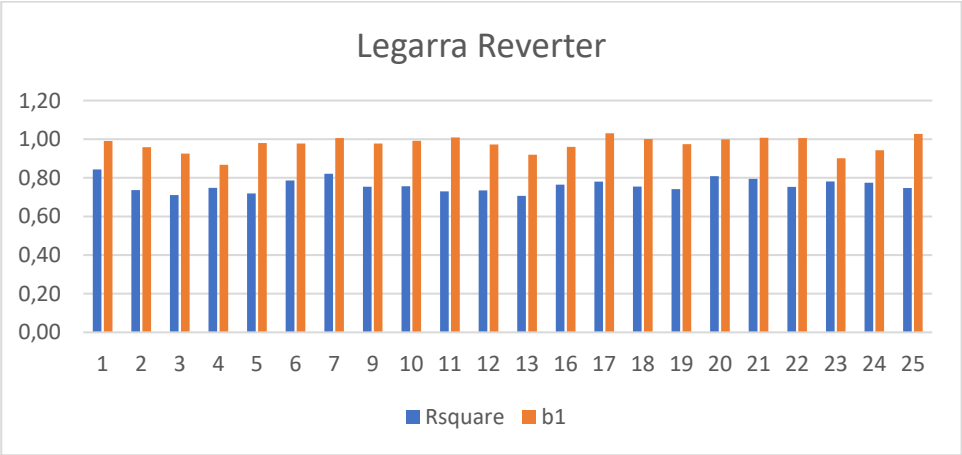


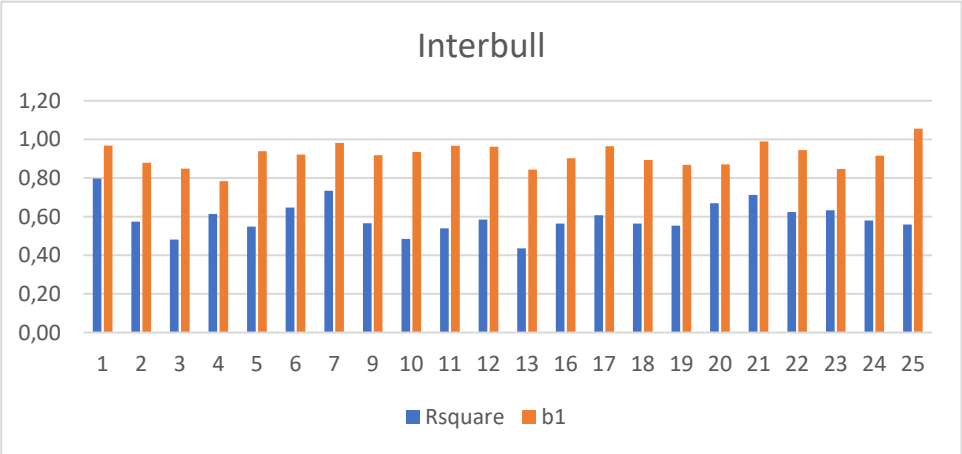



# HOL Interbull validation and Legarra Reverter regression

| | LR | | Interbull | | Interbull pedigree | |
|---|---|---|---|---|---|---|
| Trait nr | Rsquare | b1 | Rsquare | b1 | Rsquare | b1 |
| 1 | 0.84 | 0.99 | 0.80 | 0.97 | 0.35 | 0.98 |
| 2 | 0.74 | 0.96 | 0.57 | 0.88 | 0.23 | 0.96 |
| 3 | 0.71 | 0.93 | 0.48 | 0.85 | 0.19 | 0.89 |
| 4 | 0.75 | 0.87 | 0.61 | 0.78 | 0.31 | 0.94 |
| 5 | 0.72 | 0.98 | 0.55 | 0.94 | 0.26 | 1.08 |
| 6 | 0.79 | 0.98 | 0.65 | 0.92 | 0.23 | 0.88 |
| 7 | 0.82 | 1.01 | 0.73 | 0.98 | 0.23 | 0.99 |
| 9 | 0.75 | 0.98 | 0.57 | 0.92 | 0.18 | 0.86 |
| 10 | 0.76 | 0.99 | 0.48 | 0.93 | 0.22 | 0.99 |
| 11 | 0.73 | 1.01 | 0.54 | 0.97 | 0.26 | 1.05 |
| 12 | 0.74 | 0.97 | 0.59 | 0.96 | 0.33 | 1.13 |
| 13 | 0.71 | 0.92 | 0.44 | 0.84 | 0.18 | 0.99 |
| 16 | 0.76 | 0.96 | 0.56 | 0.90 | 0.23 | 1.05 |
| 17 | 0.78 | 1.03 | 0.61 | 0.96 | 0.27 | 1.02 |
| 18 | 0.75 | 1.00 | 0.56 | 0.89 | 0.32 | 1.13 |
| 19 | 0.74 | 0.97 | 0.55 | 0.87 | 0.27 | 0.98 |
| 20 | 0.81 | 1.00 | 0.67 | 0.87 | 0.18 | 0.81 |
| 21 | 0.79 | 1.01 | 0.71 | 0.99 | 0.31 | 1.10 |
| 22 | 0.75 | 1.01 | 0.62 | 0.94 | 0.30 | 1.11 |
| 23 | 0.78 | 0.90 | 0.63 | 0.85 | 0.23 | 0.80 |
| 24 | 0.77 | 0.94 | 0.58 | 0.92 | 0.24 | 0.88 |
| 25 | 0.75 | 1.03 | 0.56 | 1.06 | 0.19 | 0.95 |



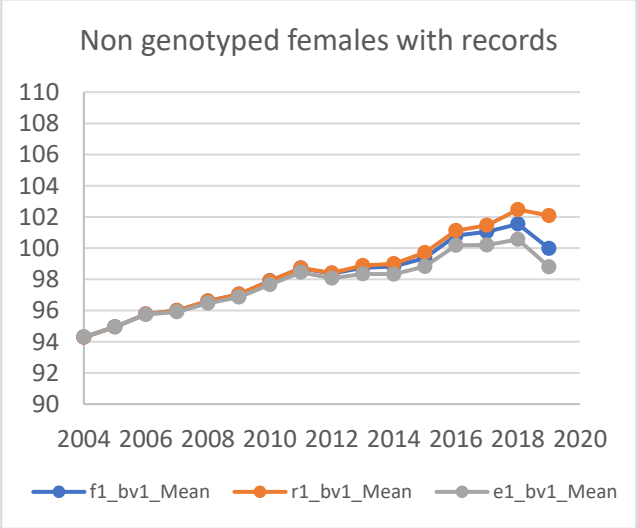



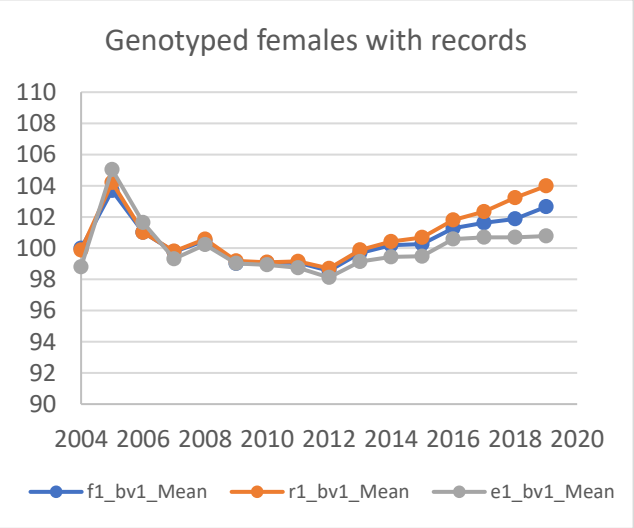
# RDC
## Cows

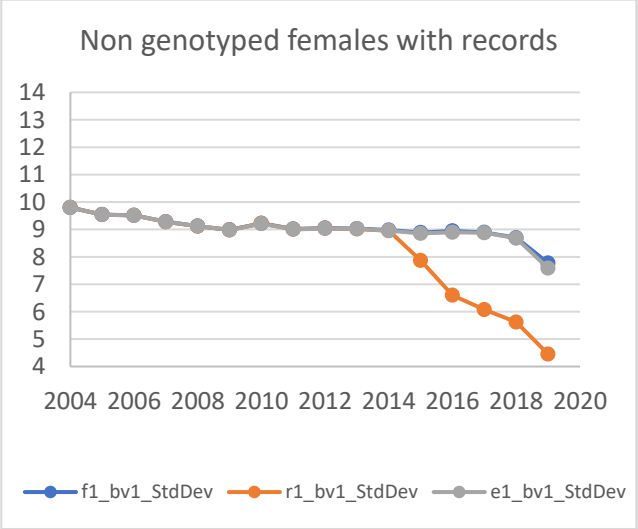
### Trend (mean and SD)

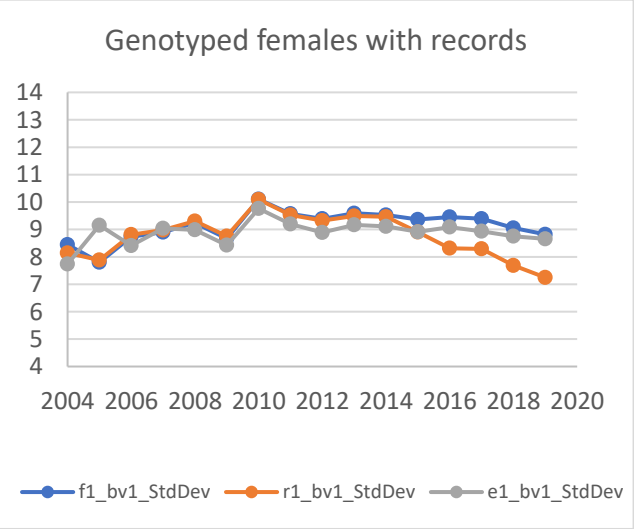
## *bv1*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27480 | 94.3 | 94.3 | 94.3 | 9.8 | 9.8 | 9.8 | 8 | 100.0 | 99.9 | 98.8 | 8.4 | 8.1 | 7.7 |
| 2005 | 26457 | 95.0 | 94.9 | 95.0 | 9.5 | 9.5 | 9.5 | 34 | 103.7 | 104.2 | 105.0 | 7.8 | 7.9 | 9.2 |
| 2006 | 26693 | 95.8 | 95.8 | 95.7 | 9.5 | 9.5 | 9.5 | 52 | 101.0 | 101.0 | 101.6 | 8.7 | 8.8 | 8.4 |
| 2007 | 25227 | 96.0 | 96.0 | 95.9 | 9.3 | 9.3 | 9.3 | 101 | 99.8 | 99.8 | 99.3 | 8.9 | 9.0 | 9.0 |
| 2008 | 26501 | 96.6 | 96.6 | 96.5 | 9.1 | 9.1 | 9.1 | 166 | 100.5 | 100.6 | 100.2 | 9.2 | 9.3 | 9.0 |
| 2009 | 27328 | 97.0 | 97.0 | 96.9 | 9.0 | 9.0 | 9.0 | 292 | 99.0 | 99.2 | 99.0 | 8.7 | 8.8 | 8.4 |
| 2010 | 23363 | 97.9 | 97.9 | 97.7 | 9.2 | 9.2 | 9.2 | 2203 | 99.1 | 99.1 | 98.9 | 10.1 | 10.1 | 9.8 |
| 2011 | 21872 | 98.7 | 98.7 | 98.4 | 9.0 | 9.0 | 9.0 | 3405 | 99.1 | 99.1 | 98.7 | 9.6 | 9.5 | 9.2 |
| 2012 | 19392 | 98.4 | 98.4 | 98.1 | 9.1 | 9.0 | 9.0 | 3457 | 98.5 | 98.7 | 98.1 | 9.4 | 9.3 | 8.9 |
| 2013 | 21079 | 98.7 | 98.9 | 98.3 | 9.0 | 9.0 | 9.0 | 3744 | 99.7 | 99.9 | 99.1 | 9.6 | 9.5 | 9.2 |
| 2014 | 20086 | 98.8 | 99.0 | 98.3 | 9.0 | 9.0 | 9.0 | 3941 | 100.2 | 100.4 | 99.4 | 9.5 | 9.5 | 9.1 |
| 2015 | 17002 | 99.4 | 99.7 | 98.8 | 8.9 | 7.9 | 8.9 | 4965 | 100.3 | 100.7 | 99.5 | 9.4 | 8.9 | 8.9 |
| 2016 | 14023 | 100.8 | 101.1 | 100.2 | 8.9 | 6.6 | 8.9 | 6708 | 101.3 | 101.8 | 100.6 | 9.5 | 8.3 | 9.1 |
| 2017 | 10877 | 101.1 | 101.5 | 100.2 | 8.9 | 6.1 | 8.9 | 6834 | 101.6 | 102.3 | 100.7 | 9.4 | 8.3 | 8.9 |
| 2018 | 6028 | 101.5 | 102.5 | 100.6 | 8.7 | 5.6 | 8.7 | 5448 | 101.9 | 103.2 | 100.7 | 9.1 | 7.7 | 8.8 |
| 2019 | 115 | 100.0 | 102.1 | 98.8 | 7.8 | 4.5 | 7.6 | 172 | 102.7 | 104.0 | 100.8 | 8.8 | 7.2 | 8.7 |



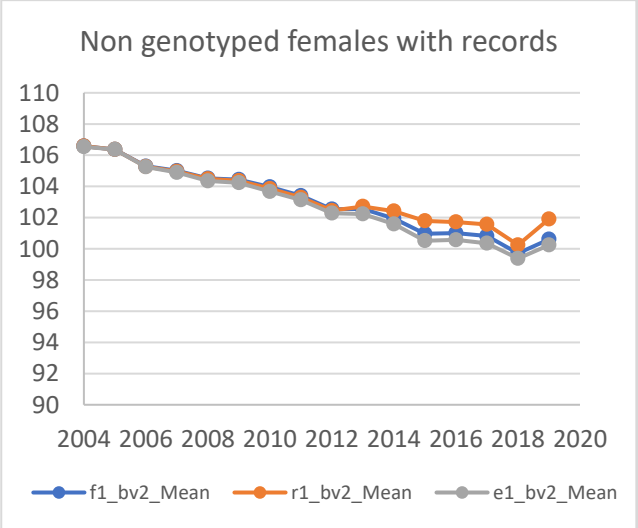



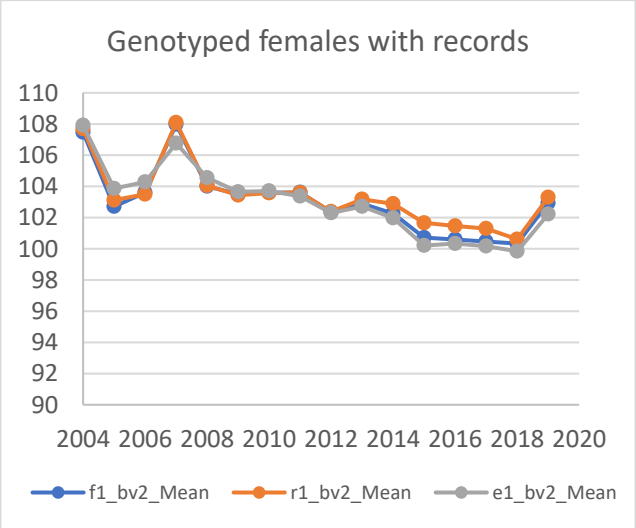



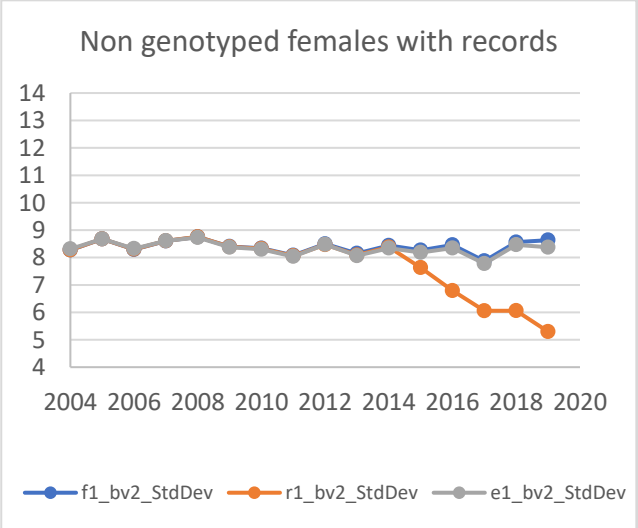



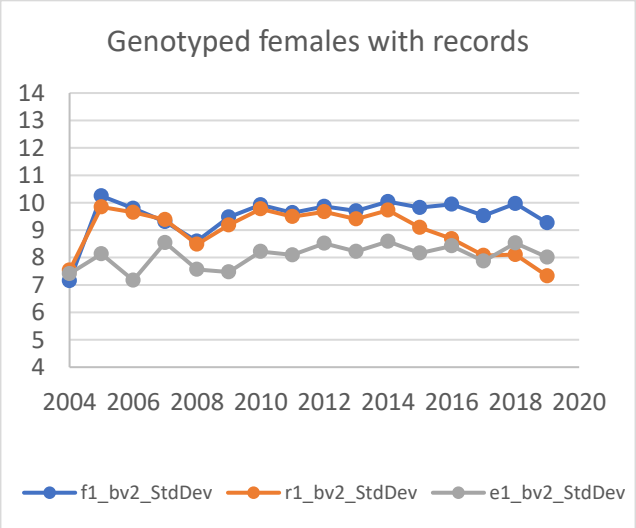
## *bv2*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27489 | 106.6 | 106.6 | 106.5 | 8.3 | 8.3 | 8.3 | 8 | 107.5 | 107.7 | 107.9 | 7.2 | 7.5 | 7.4 |
| 2005 | 26460 | 106.4 | 106.4 | 106.4 | 8.7 | 8.7 | 8.7 | 34 | 102.7 | 103.1 | 103.9 | 10.2 | 9.8 | 8.1 |
| 2006 | 26696 | 105.3 | 105.3 | 105.2 | 8.3 | 8.3 | 8.3 | 52 | 103.6 | 103.5 | 104.3 | 9.8 | 9.6 | 7.2 |
| 2007 | 25229 | 105.0 | 105.0 | 104.9 | 8.6 | 8.6 | 8.6 | 101 | 108.0 | 108.1 | 106.8 | 9.3 | 9.4 | 8.5 |
| 2008 | 26502 | 104.5 | 104.5 | 104.3 | 8.8 | 8.8 | 8.7 | 166 | 104.0 | 104.1 | 104.6 | 8.6 | 8.5 | 7.6 |
| 2009 | 27329 | 104.4 | 104.4 | 104.2 | 8.4 | 8.4 | 8.4 | 292 | 103.5 | 103.4 | 103.7 | 9.5 | 9.2 | 7.5 |
| 2010 | 23364 | 104.0 | 103.9 | 103.7 | 8.3 | 8.3 | 8.3 | 2203 | 103.6 | 103.6 | 103.7 | 9.9 | 9.8 | 8.2 |
| 2011 | 21871 | 103.4 | 103.3 | 103.1 | 8.1 | 8.1 | 8.0 | 3405 | 103.6 | 103.6 | 103.4 | 9.6 | 9.5 | 8.1 |
| 2012 | 19392 | 102.5 | 102.5 | 102.3 | 8.5 | 8.5 | 8.5 | 3458 | 102.3 | 102.4 | 102.3 | 9.9 | 9.7 | 8.5 |
| 2013 | 21083 | 102.6 | 102.7 | 102.2 | 8.1 | 8.1 | 8.1 | 3744 | 102.9 | 103.2 | 102.7 | 9.7 | 9.4 | 8.2 |
| 2014 | 20090 | 101.9 | 102.4 | 101.6 | 8.4 | 8.4 | 8.3 | 3941 | 102.3 | 102.9 | 102.0 | 10.0 | 9.7 | 8.6 |
| 2015 | 17004 | 101.0 | 101.8 | 100.5 | 8.3 | 7.6 | 8.2 | 4966 | 100.7 | 101.7 | 100.2 | 9.8 | 9.1 | 8.2 |
| 2016 | 14022 | 101.0 | 101.7 | 100.6 | 8.5 | 6.8 | 8.3 | 6708 | 100.6 | 101.5 | 100.3 | 9.9 | 8.7 | 8.4 |
| 2017 | 10879 | 100.8 | 101.6 | 100.4 | 7.9 | 6.1 | 7.8 | 6834 | 100.5 | 101.3 | 100.2 | 9.5 | 8.1 | 7.9 |
| 2018 | 6028 | 99.7 | 100.2 | 99.4 | 8.6 | 6.1 | 8.5 | 5448 | 100.3 | 100.6 | 99.8 | 10.0 | 8.1 | 8.5 |
| 2019 | 115 | 100.6 | 101.9 | 100.2 | 8.6 | 5.3 | 8.4 | 172 | 102.9 | 103.3 | 102.2 | 9.3 | 7.3 | 8.0 |



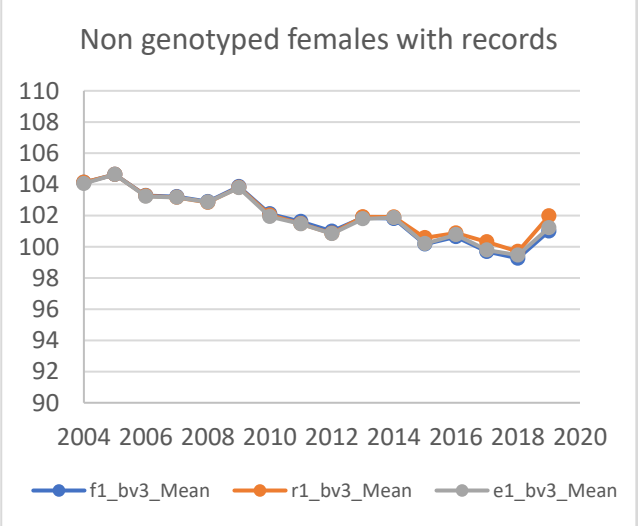



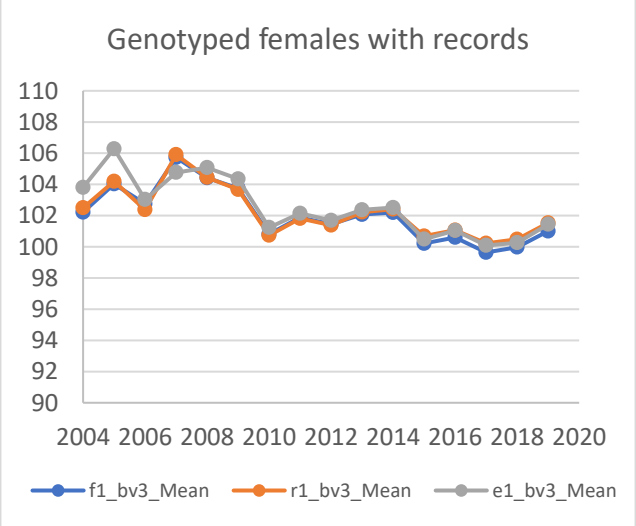



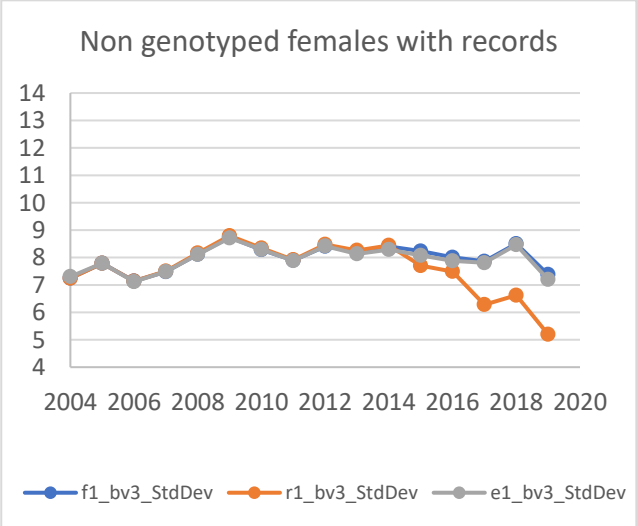



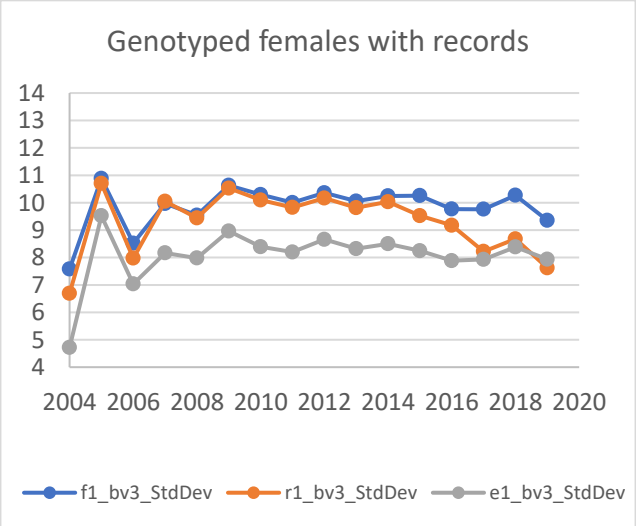
## *bv3*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27489 | 104.1 | 104.1 | 104.1 | 7.2 | 7.2 | 7.3 | 8 | 102.2 | 102.5 | 103.8 | 7.6 | 6.7 | 4.7 |
| 2005 | 26459 | 104.6 | 104.6 | 104.6 | 7.8 | 7.8 | 7.8 | 34 | 104.0 | 104.2 | 106.3 | 10.9 | 10.7 | 9.5 |
| 2006 | 26695 | 103.3 | 103.3 | 103.2 | 7.1 | 7.1 | 7.1 | 52 | 102.7 | 102.4 | 103.0 | 8.5 | 8.0 | 7.0 |
| 2007 | 25229 | 103.2 | 103.2 | 103.2 | 7.5 | 7.5 | 7.5 | 101 | 105.7 | 105.9 | 104.8 | 10.0 | 10.0 | 8.2 |
| 2008 | 26503 | 102.9 | 102.8 | 102.9 | 8.1 | 8.2 | 8.1 | 166 | 104.4 | 104.4 | 105.1 | 9.5 | 9.4 | 8.0 |
| 2009 | 27329 | 103.9 | 103.8 | 103.8 | 8.7 | 8.8 | 8.7 | 292 | 103.8 | 103.7 | 104.4 | 10.6 | 10.5 | 9.0 |
| 2010 | 23363 | 102.1 | 102.0 | 101.9 | 8.3 | 8.3 | 8.3 | 2203 | 100.8 | 100.7 | 101.2 | 10.3 | 10.1 | 8.4 |
| 2011 | 21871 | 101.6 | 101.5 | 101.5 | 7.9 | 7.9 | 7.9 | 3405 | 101.9 | 101.8 | 102.1 | 10.0 | 9.8 | 8.2 |
| 2012 | 19392 | 101.0 | 100.9 | 100.8 | 8.4 | 8.5 | 8.4 | 3458 | 101.4 | 101.4 | 101.7 | 10.4 | 10.2 | 8.7 |
| 2013 | 21083 | 101.9 | 101.9 | 101.8 | 8.2 | 8.3 | 8.1 | 3744 | 102.1 | 102.2 | 102.4 | 10.1 | 9.8 | 8.3 |
| 2014 | 20090 | 101.8 | 101.9 | 101.9 | 8.4 | 8.4 | 8.3 | 3941 | 102.2 | 102.4 | 102.5 | 10.2 | 10.0 | 8.5 |
| 2015 | 17004 | 100.2 | 100.6 | 100.2 | 8.2 | 7.7 | 8.1 | 4966 | 100.2 | 100.7 | 100.5 | 10.3 | 9.5 | 8.2 |
| 2016 | 14022 | 100.6 | 100.9 | 100.8 | 8.0 | 7.5 | 7.9 | 6708 | 100.6 | 101.1 | 101.0 | 9.8 | 9.2 | 7.9 |
| 2017 | 10878 | 99.7 | 100.3 | 99.8 | 7.9 | 6.3 | 7.8 | 6834 | 99.6 | 100.2 | 100.1 | 9.8 | 8.2 | 7.9 |
| 2018 | 6027 | 99.3 | 99.7 | 99.5 | 8.5 | 6.6 | 8.5 | 5448 | 100.0 | 100.5 | 100.3 | 10.3 | 8.7 | 8.4 |
| 2019 | 115 | 101.0 | 102.0 | 101.2 | 7.4 | 5.2 | 7.2 | 172 | 101.0 | 101.5 | 101.4 | 9.4 | 7.6 | 7.9 |



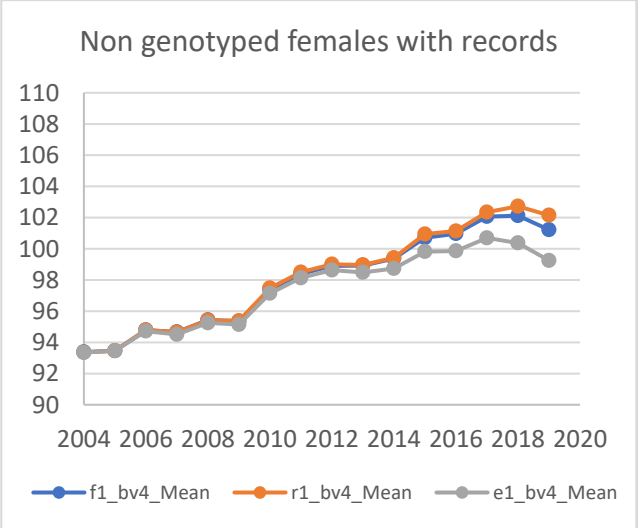



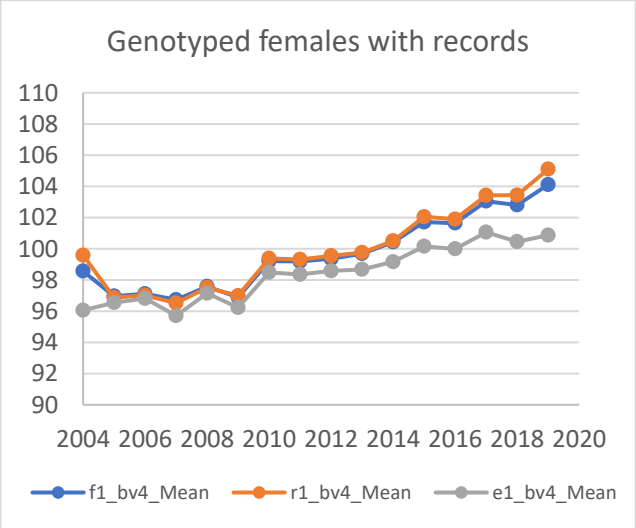



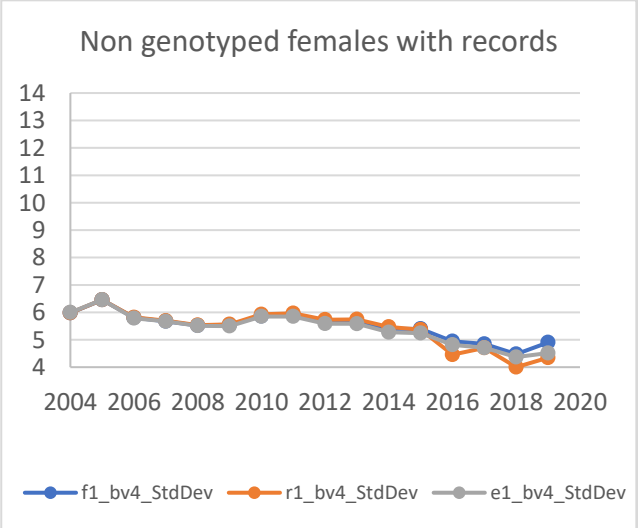



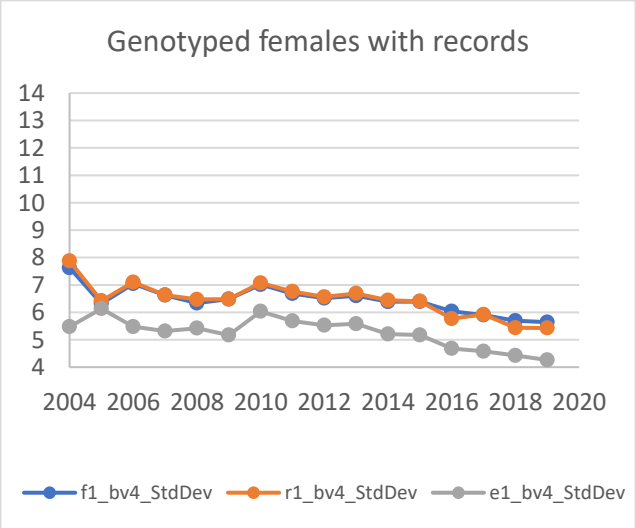
## *bv4*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27487 | 93.4 | 93.4 | 93.3 | 6.0 | 6.0 | 6.0 | 8 | 98.6 | 99.6 | 96.1 | 7.6 | 7.9 | 5.5 |
| 2005 | 26457 | 93.5 | 93.5 | 93.5 | 6.5 | 6.5 | 6.5 | 34 | 97.0 | 96.9 | 96.5 | 6.3 | 6.4 | 6.1 |
| 2006 | 26695 | 94.8 | 94.8 | 94.7 | 5.8 | 5.8 | 5.8 | 52 | 97.1 | 97.0 | 96.8 | 7.0 | 7.1 | 5.5 |
| 2007 | 25227 | 94.7 | 94.6 | 94.5 | 5.7 | 5.7 | 5.7 | 101 | 96.7 | 96.5 | 95.7 | 6.6 | 6.6 | 5.3 |
| 2008 | 26502 | 95.4 | 95.4 | 95.2 | 5.5 | 5.5 | 5.5 | 166 | 97.6 | 97.5 | 97.1 | 6.3 | 6.5 | 5.4 |
| 2009 | 27329 | 95.4 | 95.4 | 95.1 | 5.5 | 5.6 | 5.5 | 292 | 96.9 | 97.0 | 96.2 | 6.5 | 6.5 | 5.2 |
| 2010 | 23364 | 97.4 | 97.5 | 97.1 | 5.9 | 5.9 | 5.8 | 2203 | 99.2 | 99.4 | 98.5 | 7.0 | 7.1 | 6.0 |
| 2011 | 21871 | 98.4 | 98.5 | 98.1 | 5.9 | 6.0 | 5.8 | 3405 | 99.2 | 99.3 | 98.4 | 6.7 | 6.8 | 5.7 |
| 2012 | 19392 | 98.9 | 99.0 | 98.6 | 5.7 | 5.7 | 5.6 | 3458 | 99.4 | 99.6 | 98.6 | 6.5 | 6.6 | 5.5 |
| 2013 | 21083 | 98.9 | 99.0 | 98.5 | 5.7 | 5.7 | 5.6 | 3744 | 99.7 | 99.8 | 98.7 | 6.6 | 6.7 | 5.6 |
| 2014 | 20090 | 99.4 | 99.4 | 98.7 | 5.4 | 5.5 | 5.3 | 3941 | 100.4 | 100.5 | 99.2 | 6.4 | 6.4 | 5.2 |
| 2015 | 17004 | 100.7 | 100.9 | 99.8 | 5.4 | 5.4 | 5.2 | 4966 | 101.7 | 102.1 | 100.2 | 6.4 | 6.4 | 5.2 |
| 2016 | 14022 | 101.0 | 101.1 | 99.9 | 4.9 | 4.5 | 4.8 | 6708 | 101.6 | 101.9 | 100.0 | 6.0 | 5.8 | 4.7 |
| 2017 | 10878 | 102.1 | 102.3 | 100.7 | 4.8 | 4.7 | 4.7 | 6834 | 103.1 | 103.4 | 101.1 | 5.9 | 5.9 | 4.6 |
| 2018 | 6027 | 102.1 | 102.7 | 100.4 | 4.5 | 4.0 | 4.4 | 5447 | 102.8 | 103.4 | 100.5 | 5.7 | 5.4 | 4.4 |
| 2019 | 115 | 101.2 | 102.2 | 99.3 | 4.9 | 4.3 | 4.5 | 172 | 104.1 | 105.1 | 100.9 | 5.6 | 5.4 | 4.3 |



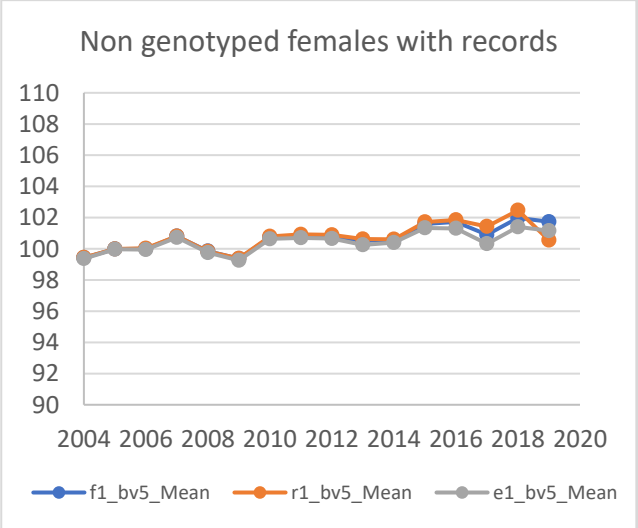



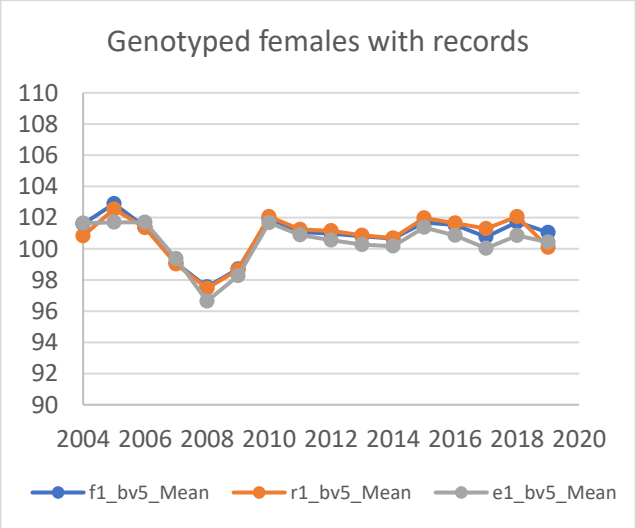



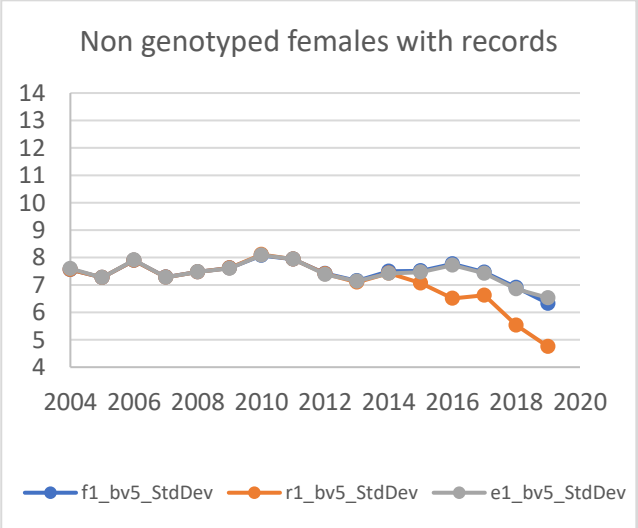



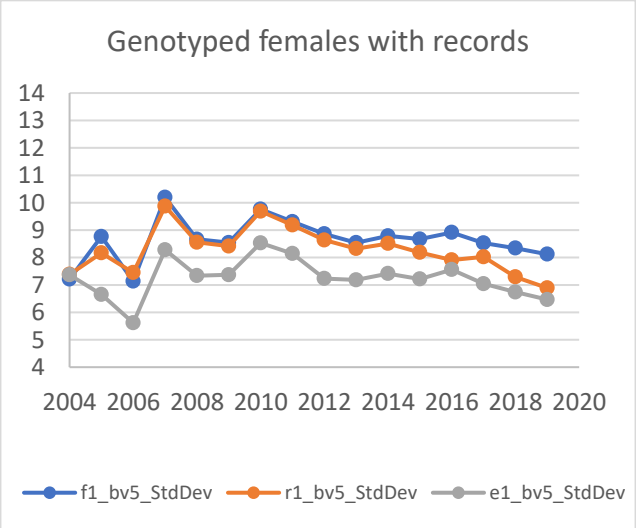
## *bv5*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27483 | 99.4 | 99.4 | 99.4 | 7.6 | 7.6 | 7.6 | 8 | 101.6 | 100.8 | 101.6 | 7.2 | 7.4 | 7.4 |
| 2005 | 26458 | 100.0 | 100.0 | 100.0 | 7.3 | 7.3 | 7.3 | 34 | 102.9 | 102.5 | 101.7 | 8.8 | 8.2 | 6.7 |
| 2006 | 26695 | 100.0 | 100.0 | 99.9 | 7.9 | 7.9 | 7.9 | 52 | 101.4 | 101.3 | 101.7 | 7.1 | 7.4 | 5.6 |
| 2007 | 25229 | 100.8 | 100.8 | 100.7 | 7.3 | 7.3 | 7.3 | 101 | 99.1 | 99.0 | 99.4 | 10.2 | 9.9 | 8.3 |
| 2008 | 26503 | 99.9 | 99.8 | 99.8 | 7.5 | 7.5 | 7.5 | 166 | 97.6 | 97.5 | 96.6 | 8.7 | 8.6 | 7.3 |
| 2009 | 27329 | 99.4 | 99.4 | 99.3 | 7.6 | 7.6 | 7.6 | 292 | 98.7 | 98.7 | 98.3 | 8.5 | 8.4 | 7.4 |
| 2010 | 23363 | 100.7 | 100.8 | 100.6 | 8.1 | 8.1 | 8.1 | 2203 | 101.9 | 102.1 | 101.7 | 9.8 | 9.7 | 8.5 |
| 2011 | 21871 | 100.8 | 100.9 | 100.7 | 7.9 | 7.9 | 7.9 | 3405 | 101.1 | 101.2 | 100.9 | 9.3 | 9.2 | 8.1 |
| 2012 | 19393 | 100.8 | 100.9 | 100.7 | 7.4 | 7.4 | 7.4 | 3458 | 101.0 | 101.2 | 100.6 | 8.9 | 8.6 | 7.2 |
| 2013 | 21083 | 100.5 | 100.6 | 100.3 | 7.2 | 7.1 | 7.1 | 3744 | 100.8 | 100.9 | 100.3 | 8.5 | 8.3 | 7.2 |
| 2014 | 20090 | 100.6 | 100.6 | 100.4 | 7.5 | 7.4 | 7.4 | 3941 | 100.7 | 100.7 | 100.2 | 8.8 | 8.5 | 7.4 |
| 2015 | 17004 | 101.6 | 101.7 | 101.3 | 7.5 | 7.1 | 7.5 | 4966 | 101.7 | 102.0 | 101.4 | 8.7 | 8.2 | 7.2 |
| 2016 | 14021 | 101.7 | 101.9 | 101.3 | 7.8 | 6.5 | 7.7 | 6708 | 101.5 | 101.6 | 100.9 | 8.9 | 7.9 | 7.6 |
| 2017 | 10878 | 100.9 | 101.4 | 100.3 | 7.5 | 6.6 | 7.4 | 6834 | 100.8 | 101.3 | 100.0 | 8.5 | 8.0 | 7.0 |
| 2018 | 6027 | 102.0 | 102.5 | 101.4 | 6.9 | 5.5 | 6.9 | 5447 | 101.7 | 102.1 | 100.9 | 8.3 | 7.3 | 6.7 |
| 2019 | 115 | 101.7 | 100.5 | 101.2 | 6.3 | 4.7 | 6.5 | 172 | 101.0 | 100.1 | 100.4 | 8.1 | 6.9 | 6.5 |



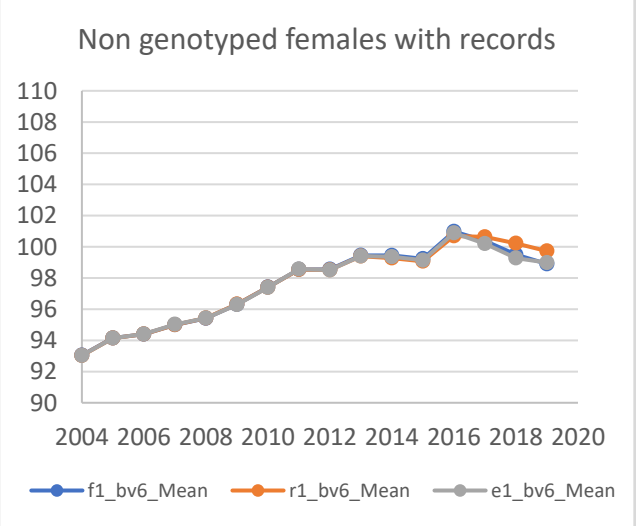



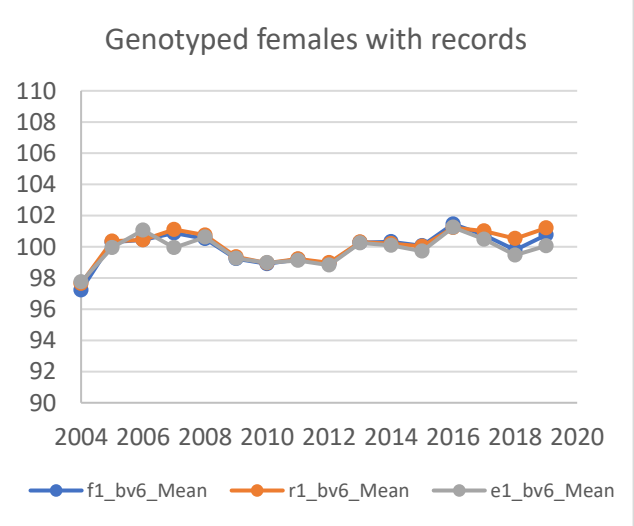



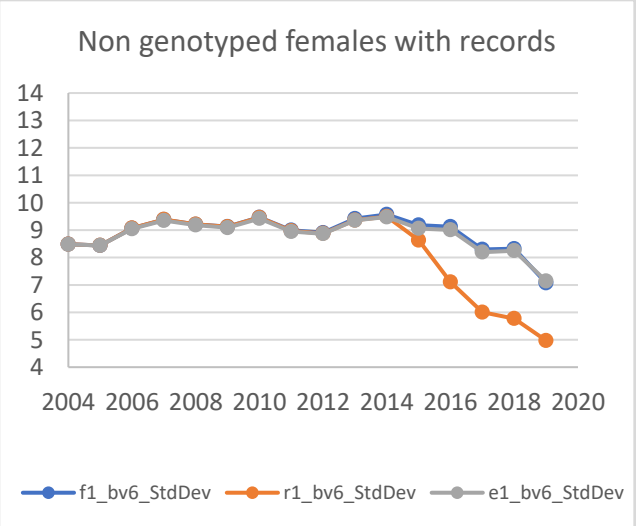



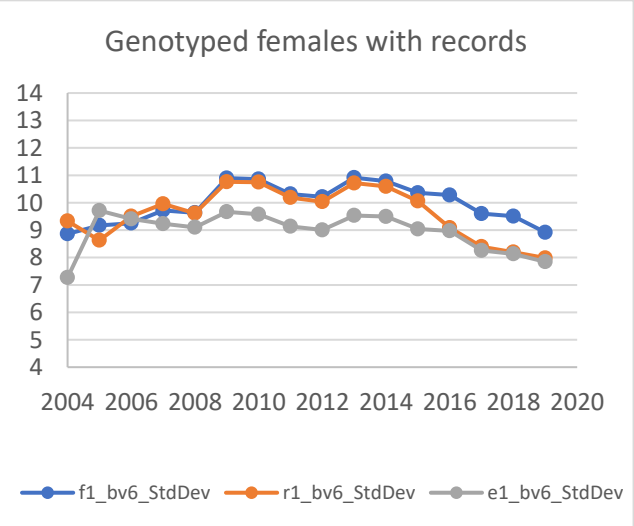
## *bv6*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27480 | 93.0 | 93.0 | 93.0 | 8.5 | 8.5 | 8.5 | 8 | 97.2 | 97.6 | 97.7 | 8.9 | 9.3 | 7.3 |
| 2005 | 26456 | 94.1 | 94.1 | 94.1 | 8.4 | 8.4 | 8.4 | 34 | 100.3 | 100.4 | 99.9 | 9.2 | 8.6 | 9.7 |
| 2006 | 26692 | 94.4 | 94.4 | 94.4 | 9.1 | 9.1 | 9.0 | 52 | 100.4 | 100.4 | 101.1 | 9.3 | 9.5 | 9.4 |
| 2007 | 25222 | 95.0 | 95.0 | 95.0 | 9.4 | 9.4 | 9.4 | 101 | 100.9 | 101.1 | 99.9 | 9.7 | 10.0 | 9.2 |
| 2008 | 26500 | 95.4 | 95.4 | 95.4 | 9.2 | 9.2 | 9.2 | 166 | 100.5 | 100.7 | 100.6 | 9.6 | 9.6 | 9.1 |
| 2009 | 27329 | 96.3 | 96.3 | 96.3 | 9.1 | 9.1 | 9.1 | 292 | 99.2 | 99.4 | 99.3 | 10.9 | 10.8 | 9.7 |
| 2010 | 23363 | 97.4 | 97.4 | 97.4 | 9.5 | 9.5 | 9.4 | 2203 | 98.9 | 99.0 | 99.0 | 10.9 | 10.7 | 9.6 |
| 2011 | 21870 | 98.5 | 98.5 | 98.6 | 9.0 | 9.0 | 8.9 | 3405 | 99.2 | 99.2 | 99.1 | 10.3 | 10.2 | 9.1 |
| 2012 | 19392 | 98.6 | 98.5 | 98.5 | 8.9 | 8.9 | 8.9 | 3458 | 98.9 | 99.0 | 98.8 | 10.2 | 10.0 | 9.0 |
| 2013 | 21083 | 99.4 | 99.4 | 99.4 | 9.4 | 9.4 | 9.4 | 3744 | 100.3 | 100.3 | 100.2 | 10.9 | 10.7 | 9.5 |
| 2014 | 20090 | 99.4 | 99.3 | 99.4 | 9.6 | 9.5 | 9.5 | 3941 | 100.3 | 100.2 | 100.1 | 10.8 | 10.6 | 9.5 |
| 2015 | 17004 | 99.2 | 99.1 | 99.1 | 9.2 | 8.6 | 9.1 | 4966 | 100.1 | 100.0 | 99.7 | 10.4 | 10.1 | 9.0 |
| 2016 | 14022 | 101.0 | 100.7 | 100.9 | 9.1 | 7.1 | 9.0 | 6708 | 101.5 | 101.2 | 101.2 | 10.3 | 9.1 | 9.0 |
| 2017 | 10878 | 100.4 | 100.6 | 100.2 | 8.3 | 6.0 | 8.2 | 6834 | 100.7 | 101.0 | 100.5 | 9.6 | 8.4 | 8.3 |
| 2018 | 6026 | 99.5 | 100.2 | 99.3 | 8.3 | 5.8 | 8.2 | 5447 | 99.8 | 100.5 | 99.5 | 9.5 | 8.2 | 8.1 |
| 2019 | 115 | 98.9 | 99.7 | 99.0 | 7.1 | 5.0 | 7.1 | 172 | 100.8 | 101.2 | 100.1 | 8.9 | 8.0 | 7.8 |



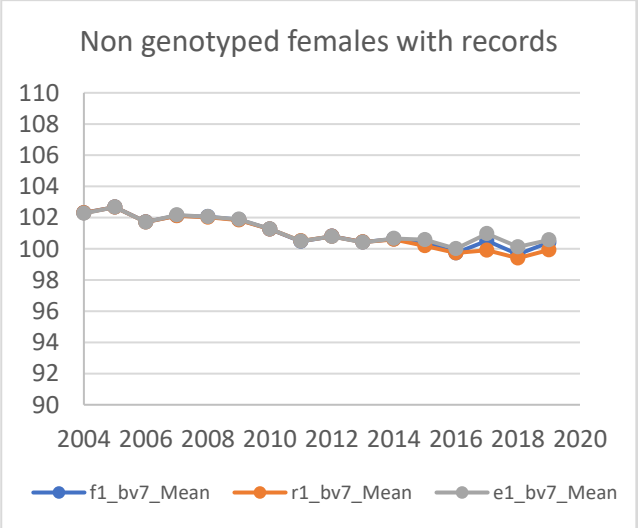



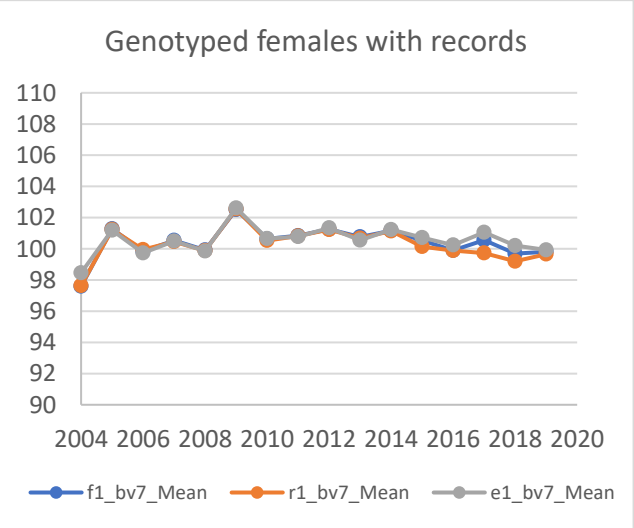



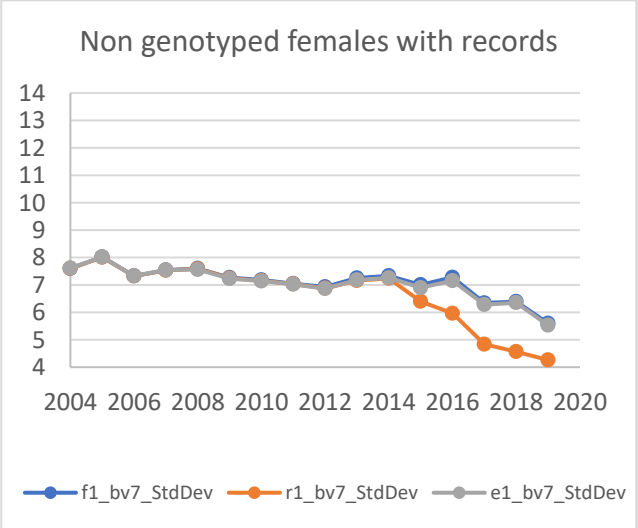



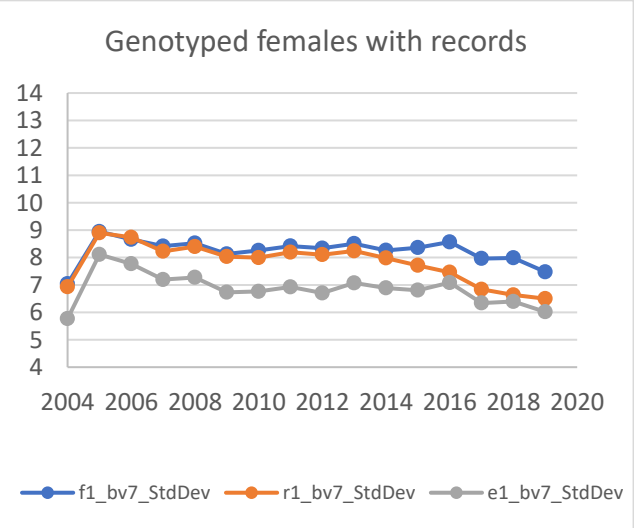
## *bv7*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27490 | 102.3 | 102.3 | 102.3 | 7.6 | 7.6 | 7.6 | 8 | 97.6 | 97.6 | 98.5 | 7.0 | 6.9 | 5.8 |
| 2005 | 26459 | 102.7 | 102.7 | 102.7 | 8.0 | 8.0 | 8.0 | 34 | 101.3 | 101.2 | 101.2 | 8.9 | 8.9 | 8.1 |
| 2006 | 26696 | 101.7 | 101.7 | 101.7 | 7.3 | 7.3 | 7.3 | 52 | 99.8 | 99.9 | 99.7 | 8.7 | 8.7 | 7.8 |
| 2007 | 25228 | 102.1 | 102.1 | 102.2 | 7.5 | 7.5 | 7.5 | 101 | 100.5 | 100.5 | 100.5 | 8.4 | 8.2 | 7.2 |
| 2008 | 26502 | 102.1 | 102.0 | 102.1 | 7.6 | 7.6 | 7.6 | 166 | 99.9 | 99.9 | 99.9 | 8.5 | 8.4 | 7.3 |
| 2009 | 27329 | 101.9 | 101.8 | 101.9 | 7.3 | 7.2 | 7.2 | 292 | 102.5 | 102.6 | 102.6 | 8.1 | 8.0 | 6.7 |
| 2010 | 23364 | 101.3 | 101.3 | 101.3 | 7.2 | 7.2 | 7.1 | 2203 | 100.6 | 100.5 | 100.7 | 8.3 | 8.0 | 6.8 |
| 2011 | 21870 | 100.5 | 100.5 | 100.5 | 7.0 | 7.0 | 7.0 | 3405 | 100.8 | 100.8 | 100.8 | 8.4 | 8.2 | 6.9 |
| 2012 | 19392 | 100.8 | 100.8 | 100.8 | 6.9 | 6.9 | 6.9 | 3458 | 101.2 | 101.2 | 101.3 | 8.3 | 8.1 | 6.7 |
| 2013 | 21083 | 100.4 | 100.4 | 100.4 | 7.3 | 7.2 | 7.2 | 3744 | 100.8 | 100.7 | 100.5 | 8.5 | 8.2 | 7.1 |
| 2014 | 20090 | 100.6 | 100.6 | 100.7 | 7.3 | 7.2 | 7.3 | 3941 | 101.2 | 101.1 | 101.2 | 8.3 | 8.0 | 6.9 |
| 2015 | 17004 | 100.4 | 100.2 | 100.6 | 7.0 | 6.4 | 6.9 | 4966 | 100.5 | 100.1 | 100.7 | 8.4 | 7.7 | 6.8 |
| 2016 | 14022 | 99.7 | 99.7 | 100.0 | 7.3 | 6.0 | 7.2 | 6708 | 99.9 | 99.9 | 100.2 | 8.6 | 7.5 | 7.1 |
| 2017 | 10879 | 100.5 | 99.9 | 101.0 | 6.3 | 4.8 | 6.3 | 6834 | 100.6 | 99.7 | 101.1 | 8.0 | 6.8 | 6.3 |
| 2018 | 6027 | 99.6 | 99.4 | 100.1 | 6.4 | 4.6 | 6.4 | 5447 | 99.7 | 99.2 | 100.2 | 8.0 | 6.6 | 6.4 |
| 2019 | 115 | 100.4 | 99.9 | 100.6 | 5.6 | 4.3 | 5.5 | 172 | 99.8 | 99.7 | 99.9 | 7.5 | 6.5 | 6.0 |



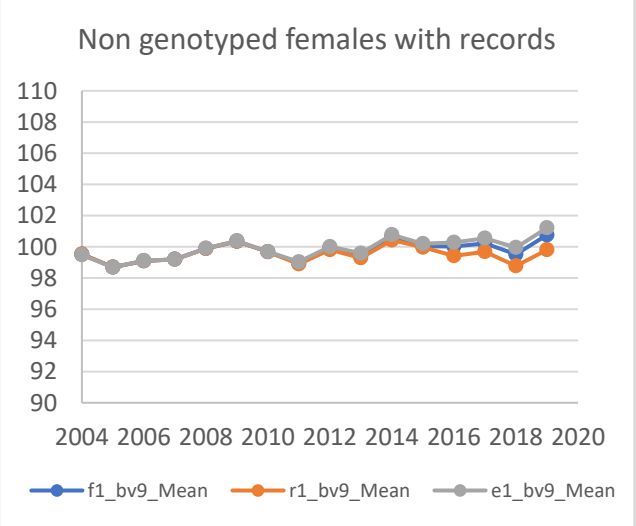



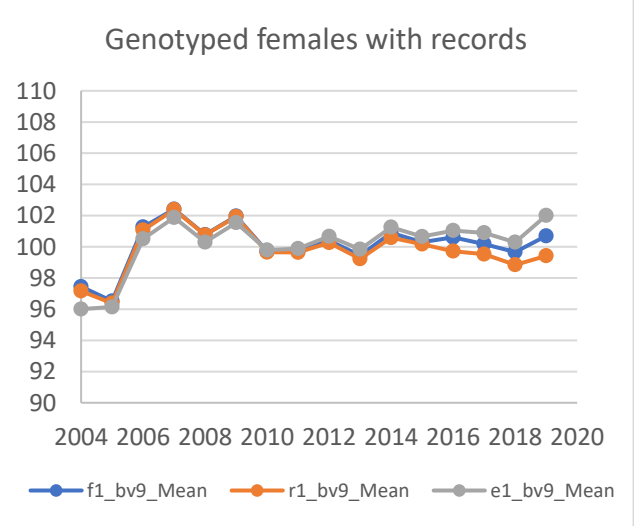



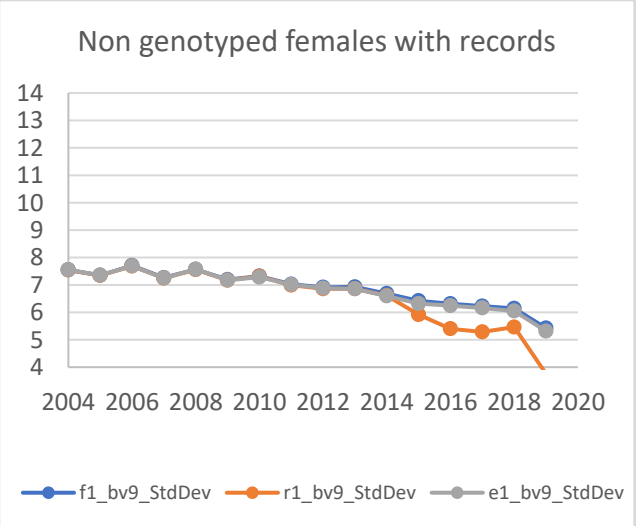



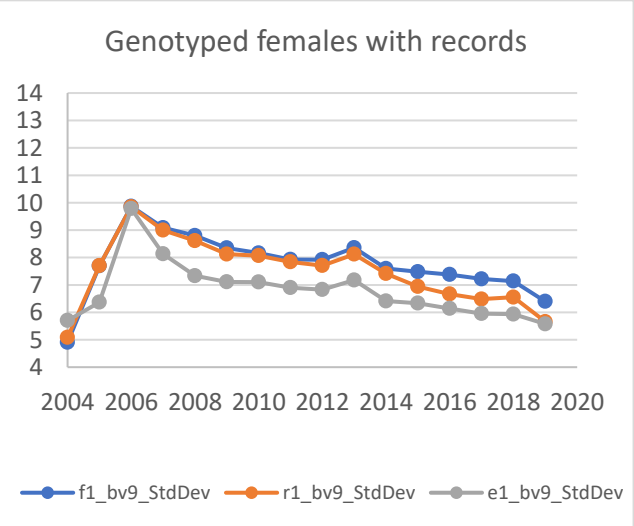
## *bv9*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27490 | 99.5 | 99.5 | 99.5 | 7.5 | 7.5 | 7.6 | 8 | 97.4 | 97.2 | 96.0 | 4.9 | 5.1 | 5.7 |
| 2005 | 26460 | 98.7 | 98.7 | 98.7 | 7.3 | 7.3 | 7.4 | 34 | 96.5 | 96.4 | 96.1 | 7.7 | 7.7 | 6.4 |
| 2006 | 26694 | 99.1 | 99.1 | 99.1 | 7.7 | 7.7 | 7.7 | 52 | 101.3 | 101.1 | 100.5 | 9.9 | 9.9 | 9.8 |
| 2007 | 25229 | 99.2 | 99.2 | 99.2 | 7.3 | 7.2 | 7.2 | 101 | 102.4 | 102.4 | 101.9 | 9.1 | 9.0 | 8.1 |
| 2008 | 26503 | 99.9 | 99.9 | 99.9 | 7.6 | 7.6 | 7.6 | 166 | 100.8 | 100.8 | 100.3 | 8.8 | 8.6 | 7.3 |
| 2009 | 27329 | 100.3 | 100.4 | 100.4 | 7.2 | 7.2 | 7.2 | 292 | 102.0 | 101.9 | 101.5 | 8.3 | 8.1 | 7.1 |
| 2010 | 23364 | 99.7 | 99.7 | 99.7 | 7.3 | 7.3 | 7.3 | 2203 | 99.7 | 99.6 | 99.8 | 8.2 | 8.1 | 7.1 |
| 2011 | 21871 | 99.0 | 98.9 | 99.0 | 7.0 | 7.0 | 7.0 | 3405 | 99.7 | 99.6 | 99.9 | 7.9 | 7.8 | 6.9 |
| 2012 | 19392 | 99.9 | 99.8 | 100.0 | 6.9 | 6.9 | 6.9 | 3458 | 100.4 | 100.3 | 100.7 | 7.9 | 7.7 | 6.8 |
| 2013 | 21083 | 99.4 | 99.3 | 99.6 | 6.9 | 6.9 | 6.9 | 3744 | 99.5 | 99.2 | 99.8 | 8.4 | 8.1 | 7.2 |
| 2014 | 20090 | 100.7 | 100.4 | 100.8 | 6.7 | 6.6 | 6.6 | 3941 | 100.9 | 100.6 | 101.3 | 7.6 | 7.4 | 6.4 |
| 2015 | 17005 | 100.0 | 100.0 | 100.2 | 6.4 | 5.9 | 6.3 | 4966 | 100.3 | 100.2 | 100.7 | 7.5 | 6.9 | 6.3 |
| 2016 | 14023 | 100.0 | 99.4 | 100.3 | 6.3 | 5.4 | 6.2 | 6708 | 100.6 | 99.7 | 101.0 | 7.4 | 6.7 | 6.1 |
| 2017 | 10879 | 100.2 | 99.7 | 100.5 | 6.2 | 5.3 | 6.2 | 6835 | 100.2 | 99.5 | 100.9 | 7.2 | 6.5 | 6.0 |
| 2018 | 6027 | 99.5 | 98.8 | 100.0 | 6.1 | 5.5 | 6.0 | 5448 | 99.7 | 98.8 | 100.3 | 7.1 | 6.6 | 5.9 |
| 2019 | 115 | 100.8 | 99.8 | 101.2 | 5.4 | 3.8 | 5.3 | 172 | 100.7 | 99.4 | 102.0 | 6.4 | 5.7 | 5.6 |



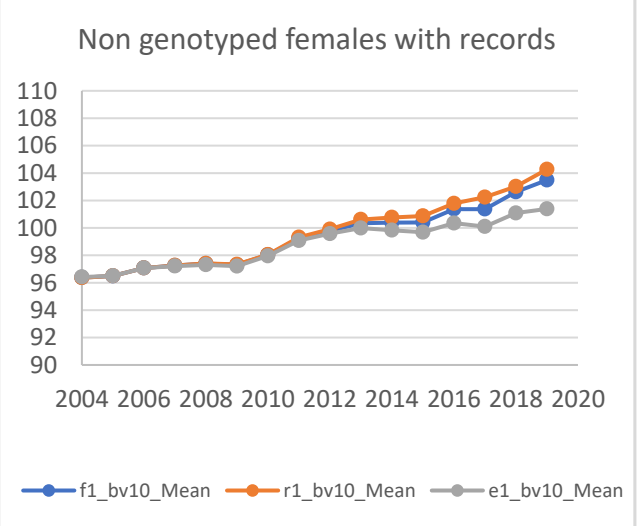



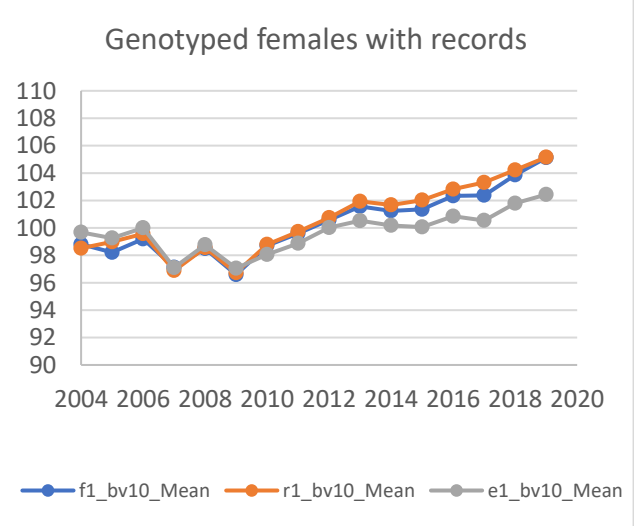



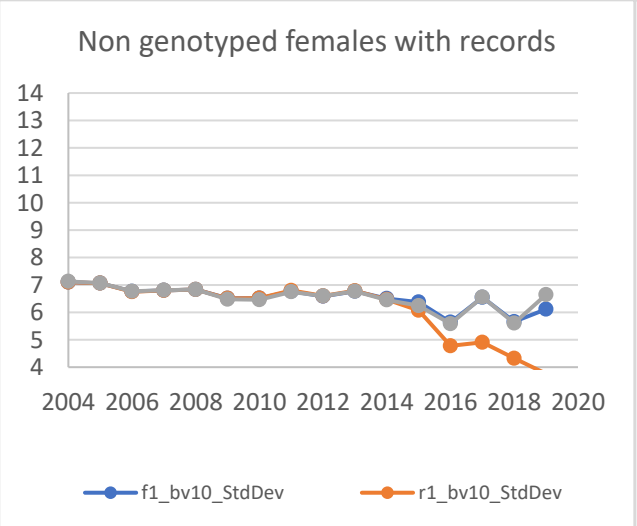



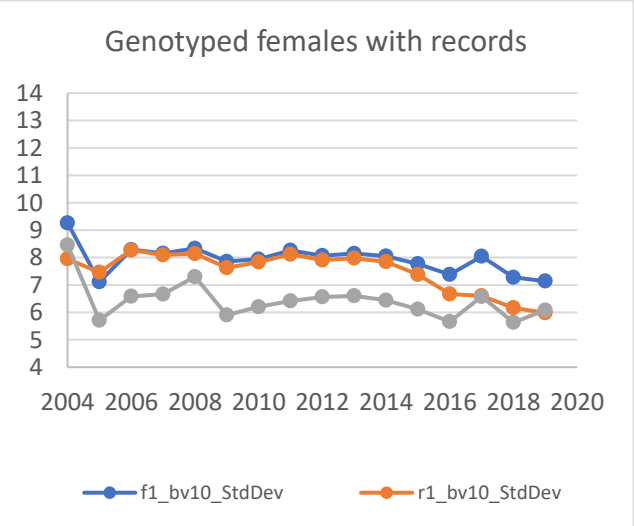
## *bv10*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27483 | 94.0 | 94.0 | 94.0 | 7.6 | 7.5 | 7.6 | 8 | 98.3 | 98.4 | 98.2 | 8.1 | 8.8 | 6.0 |
| 2005 | 26458 | 93.8 | 93.8 | 93.8 | 7.4 | 7.4 | 7.4 | 34 | 95.5 | 95.0 | 94.5 | 8.0 | 8.0 | 7.0 |
| 2006 | 26693 | 93.9 | 93.9 | 93.9 | 7.7 | 7.6 | 7.7 | 52 | 95.1 | 95.5 | 95.1 | 9.0 | 8.9 | 7.6 |
| 2007 | 25228 | 94.4 | 94.4 | 94.3 | 7.5 | 7.5 | 7.5 | 101 | 94.6 | 94.8 | 95.0 | 8.5 | 8.5 | 7.2 |
| 2008 | 26503 | 95.2 | 95.2 | 95.1 | 7.4 | 7.4 | 7.4 | 166 | 95.6 | 95.8 | 94.9 | 8.6 | 8.5 | 7.9 |
| 2009 | 27328 | 95.4 | 95.4 | 95.3 | 7.3 | 7.3 | 7.3 | 292 | 96.6 | 96.8 | 96.6 | 9.5 | 9.3 | 7.8 |
| 2010 | 23364 | 95.9 | 96.0 | 95.8 | 7.4 | 7.4 | 7.4 | 2203 | 97.0 | 97.2 | 96.1 | 8.9 | 8.7 | 7.4 |
| 2011 | 21871 | 96.4 | 96.5 | 96.2 | 7.3 | 7.2 | 7.3 | 3405 | 97.4 | 97.5 | 96.4 | 9.0 | 8.8 | 7.6 |
| 2012 | 19392 | 97.8 | 97.9 | 97.6 | 7.3 | 7.3 | 7.3 | 3458 | 98.6 | 98.8 | 97.8 | 8.9 | 8.8 | 7.6 |
| 2013 | 21083 | 98.0 | 98.0 | 97.6 | 7.3 | 7.3 | 7.3 | 3744 | 98.7 | 98.8 | 97.6 | 8.7 | 8.6 | 7.3 |
| 2014 | 20089 | 98.5 | 98.5 | 97.9 | 7.4 | 7.4 | 7.4 | 3941 | 99.4 | 99.3 | 98.0 | 9.1 | 8.9 | 7.6 |
| 2015 | 17004 | 100.4 | 100.2 | 99.6 | 7.2 | 6.6 | 7.1 | 4966 | 101.3 | 101.3 | 99.8 | 8.7 | 8.2 | 7.3 |
| 2016 | 14023 | 100.7 | 100.7 | 99.7 | 7.4 | 5.9 | 7.3 | 6708 | 101.6 | 101.6 | 99.8 | 8.9 | 8.0 | 7.4 |
| 2017 | 10877 | 101.9 | 101.9 | 100.6 | 7.6 | 5.2 | 7.5 | 6835 | 102.9 | 103.1 | 100.6 | 8.9 | 7.6 | 7.6 |
| 2018 | 6026 | 102.9 | 103.7 | 101.2 | 7.6 | 5.0 | 7.5 | 5448 | 103.8 | 104.7 | 101.3 | 8.9 | 7.4 | 7.6 |
| 2019 | 115 | 102.0 | 102.8 | 100.1 | 8.0 | 4.7 | 8.0 | 172 | 102.7 | 103.3 | 100.9 | 8.5 | 7.2 | 7.1 |



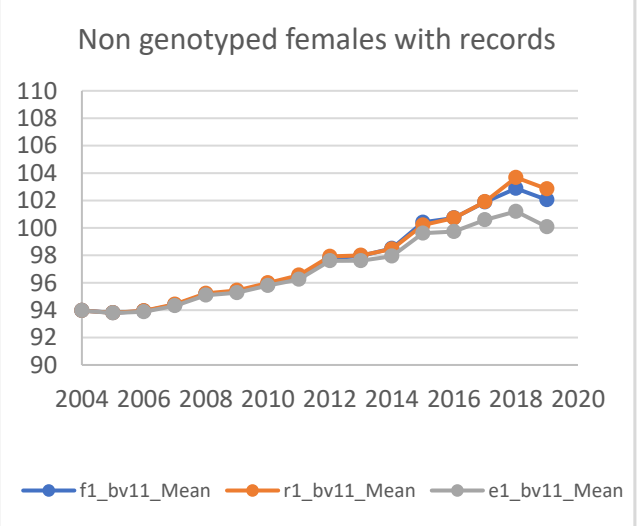



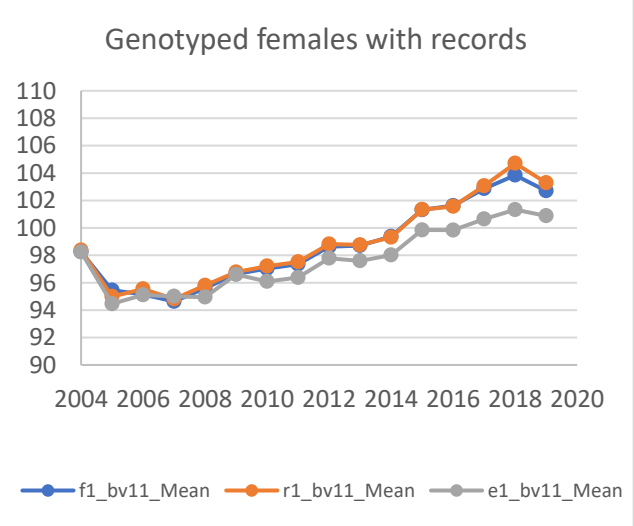



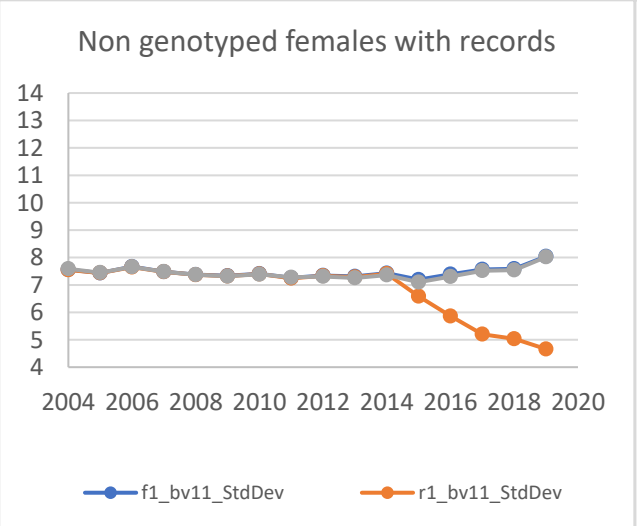



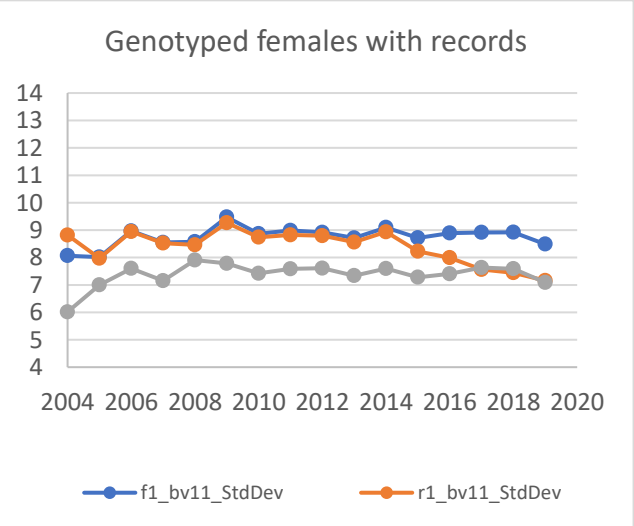
## *bv11*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27483 | 94.0 | 94.0 | 94.0 | 7.6 | 7.5 | 7.6 | 8 | 98.3 | 98.4 | 98.2 | 8.1 | 8.8 | 6.0 |
| 2005 | 26458 | 93.8 | 93.8 | 93.8 | 7.4 | 7.4 | 7.4 | 34 | 95.5 | 95.0 | 94.5 | 8.0 | 8.0 | 7.0 |
| 2006 | 26693 | 93.9 | 93.9 | 93.9 | 7.7 | 7.6 | 7.7 | 52 | 95.1 | 95.5 | 95.1 | 9.0 | 8.9 | 7.6 |
| 2007 | 25228 | 94.4 | 94.4 | 94.3 | 7.5 | 7.5 | 7.5 | 101 | 94.6 | 94.8 | 95.0 | 8.5 | 8.5 | 7.2 |
| 2008 | 26503 | 95.2 | 95.2 | 95.1 | 7.4 | 7.4 | 7.4 | 166 | 95.6 | 95.8 | 94.9 | 8.6 | 8.5 | 7.9 |
| 2009 | 27328 | 95.4 | 95.4 | 95.3 | 7.3 | 7.3 | 7.3 | 292 | 96.6 | 96.8 | 96.6 | 9.5 | 9.3 | 7.8 |
| 2010 | 23364 | 95.9 | 96.0 | 95.8 | 7.4 | 7.4 | 7.4 | 2203 | 97.0 | 97.2 | 96.1 | 8.9 | 8.7 | 7.4 |
| 2011 | 21871 | 96.4 | 96.5 | 96.2 | 7.3 | 7.2 | 7.3 | 3405 | 97.4 | 97.5 | 96.4 | 9.0 | 8.8 | 7.6 |
| 2012 | 19392 | 97.8 | 97.9 | 97.6 | 7.3 | 7.3 | 7.3 | 3458 | 98.6 | 98.8 | 97.8 | 8.9 | 8.8 | 7.6 |
| 2013 | 21083 | 98.0 | 98.0 | 97.6 | 7.3 | 7.3 | 7.3 | 3744 | 98.7 | 98.8 | 97.6 | 8.7 | 8.6 | 7.3 |
| 2014 | 20089 | 98.5 | 98.5 | 97.9 | 7.4 | 7.4 | 7.4 | 3941 | 99.4 | 99.3 | 98.0 | 9.1 | 8.9 | 7.6 |
| 2015 | 17004 | 100.4 | 100.2 | 99.6 | 7.2 | 6.6 | 7.1 | 4966 | 101.3 | 101.3 | 99.8 | 8.7 | 8.2 | 7.3 |
| 2016 | 14023 | 100.7 | 100.7 | 99.7 | 7.4 | 5.9 | 7.3 | 6708 | 101.6 | 101.6 | 99.8 | 8.9 | 8.0 | 7.4 |
| 2017 | 10877 | 101.9 | 101.9 | 100.6 | 7.6 | 5.2 | 7.5 | 6835 | 102.9 | 103.1 | 100.6 | 8.9 | 7.6 | 7.6 |
| 2018 | 6026 | 102.9 | 103.7 | 101.2 | 7.6 | 5.0 | 7.5 | 5448 | 103.8 | 104.7 | 101.3 | 8.9 | 7.4 | 7.6 |
| 2019 | 115 | 102.0 | 102.8 | 100.1 | 8.0 | 4.7 | 8.0 | 172 | 102.7 | 103.3 | 100.9 | 8.5 | 7.2 | 7.1 |



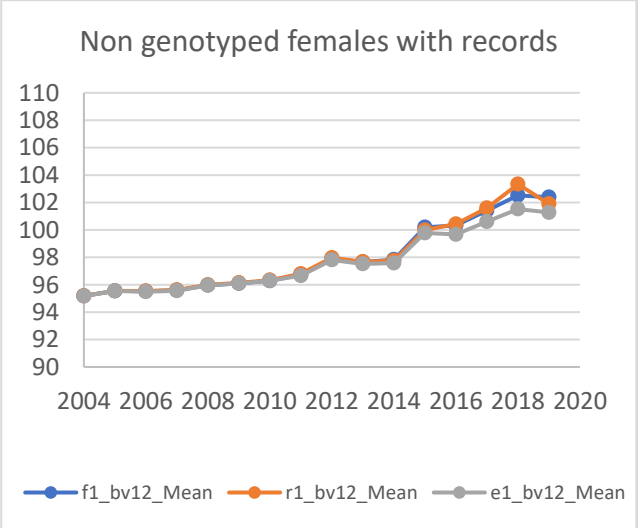



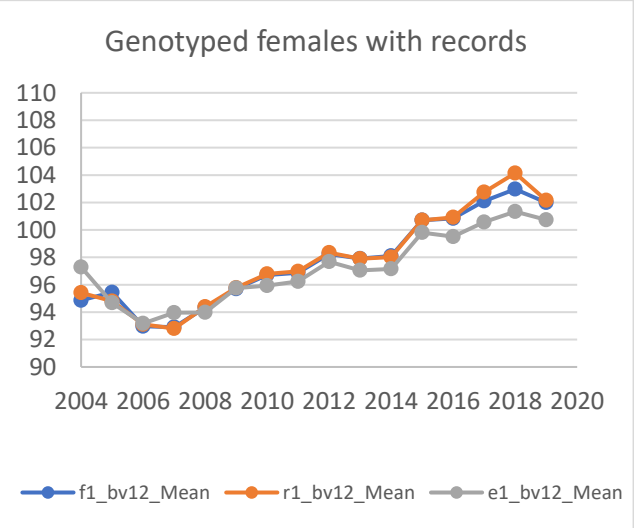



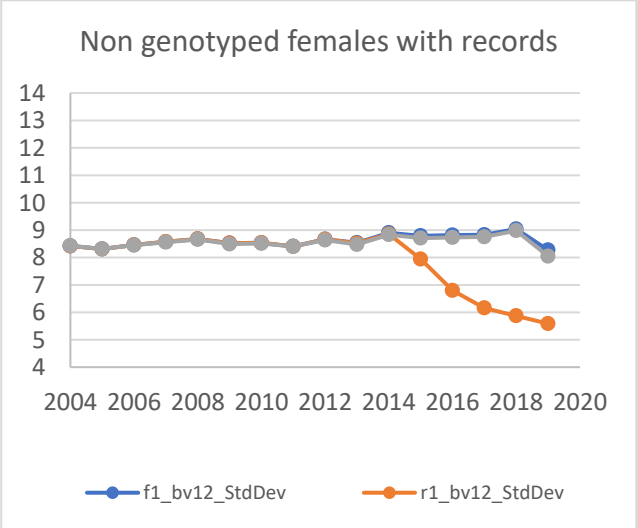



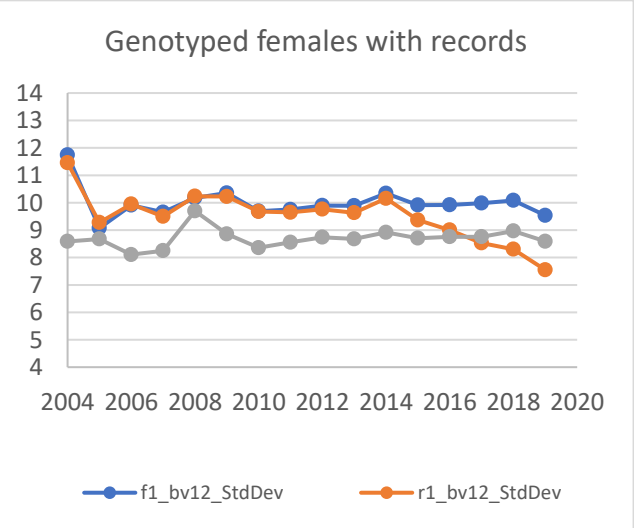
## *bv12*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27484 | 95.2 | 95.2 | 95.2 | 8.4 | 8.4 | 8.4 | 8 | 94.9 | 95.4 | 97.3 | 11.7 | 11.5 | 8.6 |
| 2005 | 26459 | 95.5 | 95.6 | 95.5 | 8.3 | 8.3 | 8.3 | 34 | 95.4 | 94.8 | 94.7 | 9.1 | 9.3 | 8.7 |
| 2006 | 26694 | 95.5 | 95.5 | 95.5 | 8.5 | 8.5 | 8.5 | 52 | 93.0 | 93.1 | 93.2 | 9.9 | 9.9 | 8.1 |
| 2007 | 25227 | 95.6 | 95.6 | 95.6 | 8.6 | 8.6 | 8.6 | 101 | 92.9 | 92.8 | 94.0 | 9.7 | 9.5 | 8.2 |
| 2008 | 26501 | 96.0 | 96.0 | 96.0 | 8.7 | 8.7 | 8.7 | 166 | 94.3 | 94.4 | 94.0 | 10.2 | 10.2 | 9.7 |
| 2009 | 27329 | 96.1 | 96.1 | 96.1 | 8.5 | 8.5 | 8.5 | 292 | 95.7 | 95.8 | 95.8 | 10.4 | 10.2 | 8.9 |
| 2010 | 23364 | 96.3 | 96.3 | 96.3 | 8.5 | 8.5 | 8.5 | 2203 | 96.7 | 96.8 | 95.9 | 9.7 | 9.7 | 8.4 |
| 2011 | 21871 | 96.7 | 96.8 | 96.7 | 8.4 | 8.4 | 8.4 | 3405 | 96.9 | 97.0 | 96.2 | 9.8 | 9.6 | 8.6 |
| 2012 | 19392 | 97.9 | 98.0 | 97.8 | 8.7 | 8.7 | 8.6 | 3458 | 98.2 | 98.3 | 97.7 | 9.9 | 9.8 | 8.7 |
| 2013 | 21083 | 97.7 | 97.7 | 97.5 | 8.5 | 8.5 | 8.5 | 3744 | 97.9 | 97.9 | 97.1 | 9.9 | 9.6 | 8.7 |
| 2014 | 20088 | 97.8 | 97.8 | 97.6 | 8.9 | 8.9 | 8.8 | 3941 | 98.1 | 98.0 | 97.2 | 10.3 | 10.2 | 8.9 |
| 2015 | 17004 | 100.2 | 100.0 | 99.8 | 8.8 | 7.9 | 8.7 | 4966 | 100.7 | 100.7 | 99.8 | 9.9 | 9.4 | 8.7 |
| 2016 | 14023 | 100.3 | 100.4 | 99.7 | 8.8 | 6.8 | 8.7 | 6708 | 100.8 | 100.9 | 99.5 | 9.9 | 9.0 | 8.8 |
| 2017 | 10877 | 101.4 | 101.6 | 100.6 | 8.8 | 6.2 | 8.8 | 6835 | 102.1 | 102.8 | 100.6 | 10.0 | 8.5 | 8.8 |
| 2018 | 6026 | 102.5 | 103.3 | 101.5 | 9.0 | 5.9 | 9.0 | 5448 | 103.0 | 104.1 | 101.3 | 10.1 | 8.3 | 9.0 |
| 2019 | 115 | 102.4 | 101.9 | 101.3 | 8.3 | 5.6 | 8.0 | 172 | 102.0 | 102.2 | 100.7 | 9.5 | 7.5 | 8.6 |



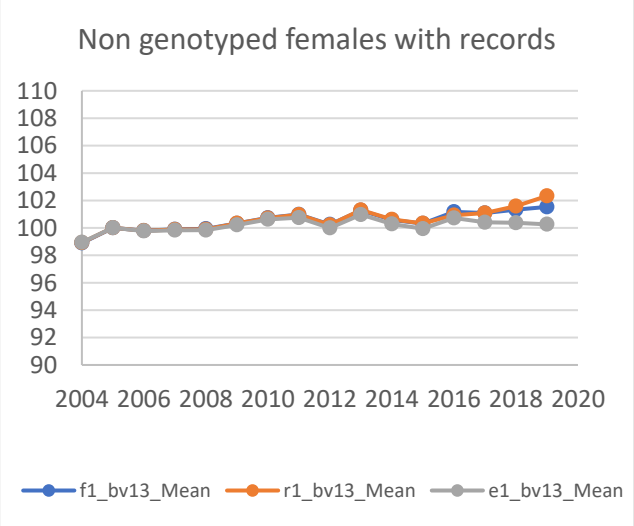



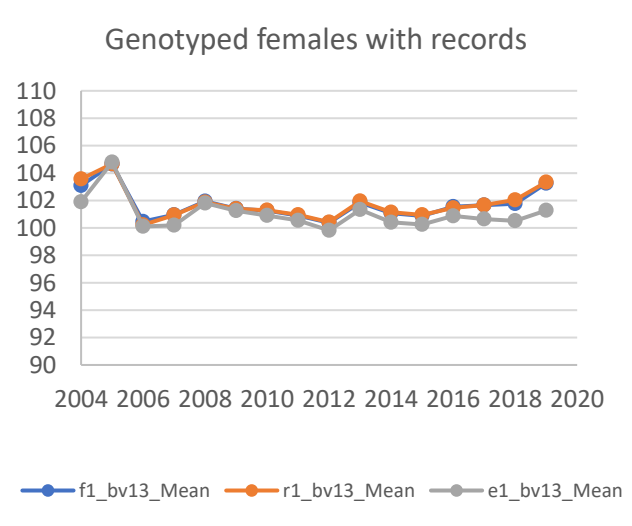



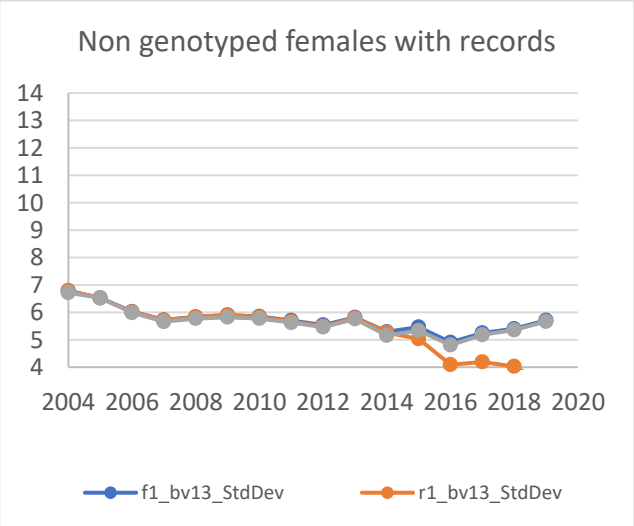



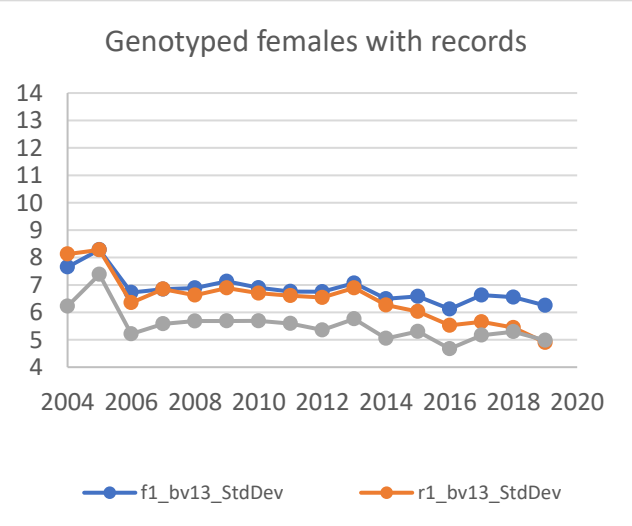
## *bv13*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27483 | 98.9 | 98.9 | 98.9 | 6.8 | 6.8 | 6.7 | 8 | 103.1 | 103.6 | 101.9 | 7.7 | 8.1 | 6.2 |
| 2005 | 26450 | 100.0 | 100.0 | 100.0 | 6.5 | 6.5 | 6.5 | 34 | 104.7 | 104.7 | 104.8 | 8.3 | 8.3 | 7.4 |
| 2006 | 26692 | 99.8 | 99.8 | 99.8 | 6.0 | 6.0 | 6.0 | 52 | 100.5 | 100.2 | 100.1 | 6.7 | 6.4 | 5.2 |
| 2007 | 25227 | 99.9 | 99.9 | 99.8 | 5.7 | 5.7 | 5.7 | 100 | 101.0 | 100.9 | 100.2 | 6.8 | 6.8 | 5.6 |
| 2008 | 26502 | 99.9 | 99.9 | 99.8 | 5.8 | 5.8 | 5.8 | 166 | 101.9 | 101.9 | 101.8 | 6.9 | 6.6 | 5.7 |
| 2009 | 27328 | 100.3 | 100.3 | 100.2 | 5.9 | 5.9 | 5.8 | 292 | 101.4 | 101.4 | 101.3 | 7.1 | 6.9 | 5.7 |
| 2010 | 23363 | 100.7 | 100.7 | 100.6 | 5.8 | 5.8 | 5.8 | 2203 | 101.3 | 101.3 | 100.9 | 6.9 | 6.7 | 5.7 |
| 2011 | 21870 | 101.0 | 101.0 | 100.7 | 5.7 | 5.7 | 5.6 | 3405 | 100.9 | 101.0 | 100.5 | 6.8 | 6.6 | 5.6 |
| 2012 | 19392 | 100.2 | 100.2 | 100.0 | 5.5 | 5.5 | 5.5 | 3458 | 100.4 | 100.4 | 99.8 | 6.8 | 6.5 | 5.4 |
| 2013 | 21083 | 101.3 | 101.3 | 101.0 | 5.8 | 5.8 | 5.8 | 3744 | 101.8 | 102.0 | 101.3 | 7.1 | 6.9 | 5.8 |
| 2014 | 20089 | 100.6 | 100.6 | 100.3 | 5.3 | 5.3 | 5.2 | 3941 | 101.1 | 101.1 | 100.4 | 6.5 | 6.3 | 5.0 |
| 2015 | 17004 | 100.3 | 100.3 | 99.9 | 5.5 | 5.0 | 5.3 | 4966 | 100.9 | 100.9 | 100.3 | 6.6 | 6.0 | 5.3 |
| 2016 | 14023 | 101.2 | 100.9 | 100.7 | 4.9 | 4.1 | 4.8 | 6708 | 101.5 | 101.5 | 100.9 | 6.1 | 5.5 | 4.7 |
| 2017 | 10878 | 101.1 | 101.1 | 100.4 | 5.2 | 4.2 | 5.2 | 6835 | 101.7 | 101.7 | 100.6 | 6.6 | 5.7 | 5.2 |
| 2018 | 6026 | 101.3 | 101.6 | 100.4 | 5.4 | 4.0 | 5.4 | 5448 | 101.8 | 102.0 | 100.5 | 6.6 | 5.4 | 5.3 |
| 2019 | 115 | 101.5 | 102.3 | 100.3 | 5.7 | 3.4 | 5.7 | 172 | 103.3 | 103.3 | 101.3 | 6.3 | 4.9 | 5.0 |



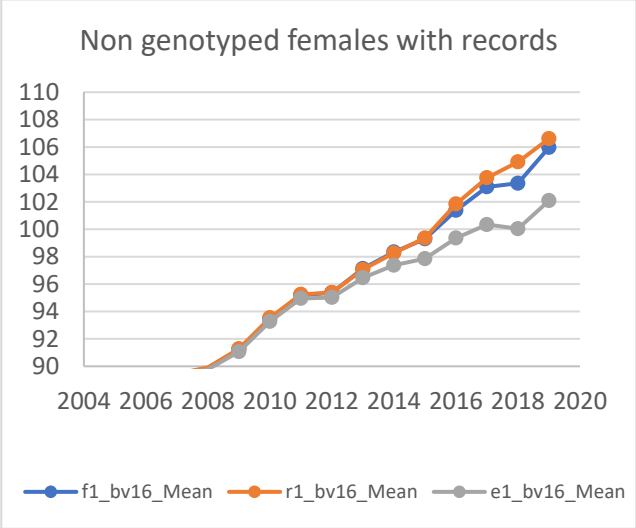



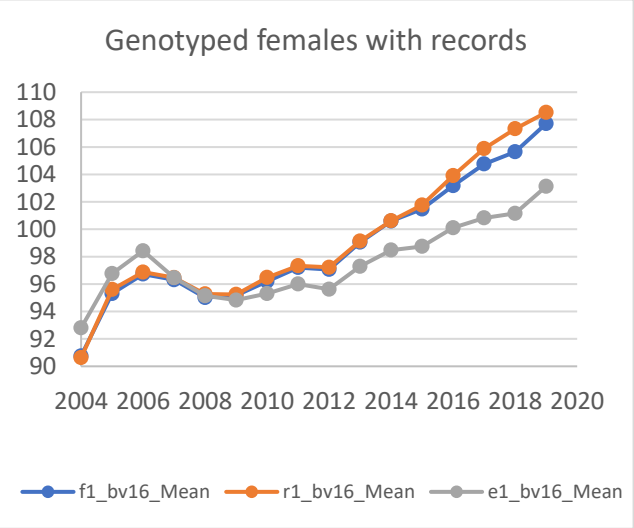



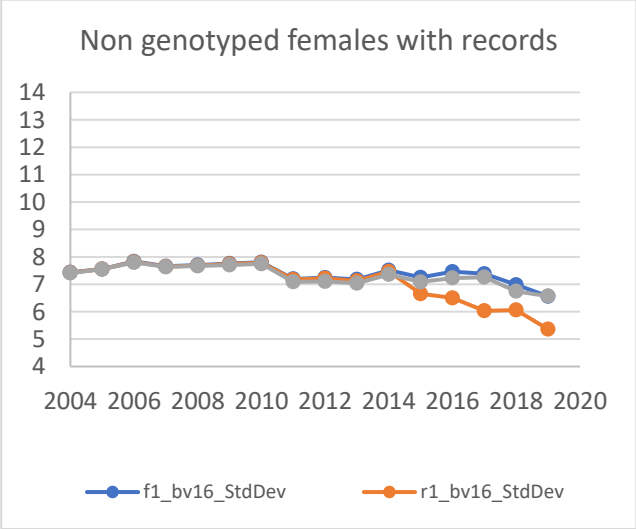



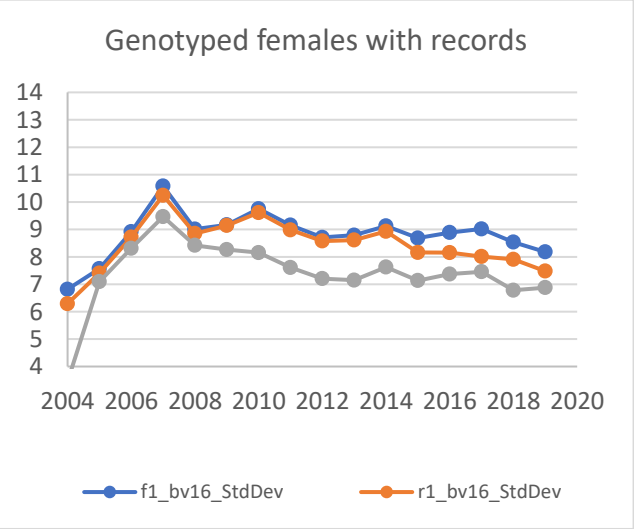
## *bv16*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27486 | 85.2 | 85.2 | 85.2 | 7.4 | 7.4 | 7.4 | 8 | 90.8 | 90.6 | 92.8 | 6.8 | 6.3 | 3.5 |
| 2005 | 26460 | 86.7 | 86.7 | 86.7 | 7.6 | 7.6 | 7.6 | 34 | 95.3 | 95.6 | 96.8 | 7.6 | 7.4 | 7.1 |
| 2006 | 26695 | 88.7 | 88.7 | 88.6 | 7.8 | 7.8 | 7.8 | 52 | 96.7 | 96.9 | 98.4 | 8.9 | 8.7 | 8.3 |
| 2007 | 25229 | 89.4 | 89.5 | 89.4 | 7.7 | 7.6 | 7.6 | 101 | 96.3 | 96.5 | 96.5 | 10.6 | 10.2 | 9.5 |
| 2008 | 26502 | 89.9 | 89.9 | 89.8 | 7.7 | 7.7 | 7.7 | 166 | 95.0 | 95.3 | 95.1 | 9.0 | 8.9 | 8.4 |
| 2009 | 27329 | 91.2 | 91.3 | 91.1 | 7.8 | 7.7 | 7.7 | 292 | 95.2 | 95.2 | 94.8 | 9.2 | 9.1 | 8.3 |
| 2010 | 23364 | 93.5 | 93.5 | 93.3 | 7.8 | 7.8 | 7.7 | 2203 | 96.2 | 96.5 | 95.3 | 9.8 | 9.6 | 8.2 |
| 2011 | 21869 | 95.2 | 95.2 | 94.9 | 7.2 | 7.2 | 7.1 | 3405 | 97.2 | 97.3 | 96.0 | 9.2 | 9.0 | 7.6 |
| 2012 | 19391 | 95.4 | 95.4 | 95.0 | 7.2 | 7.2 | 7.1 | 3458 | 97.1 | 97.2 | 95.6 | 8.7 | 8.6 | 7.2 |
| 2013 | 21082 | 97.1 | 97.1 | 96.5 | 7.2 | 7.1 | 7.0 | 3744 | 99.0 | 99.1 | 97.3 | 8.8 | 8.6 | 7.2 |
| 2014 | 20088 | 98.3 | 98.3 | 97.4 | 7.5 | 7.5 | 7.4 | 3941 | 100.6 | 100.6 | 98.5 | 9.1 | 8.9 | 7.6 |
| 2015 | 17002 | 99.3 | 99.4 | 97.9 | 7.3 | 6.7 | 7.1 | 4966 | 101.5 | 101.8 | 98.7 | 8.7 | 8.2 | 7.1 |
| 2016 | 14021 | 101.4 | 101.8 | 99.4 | 7.5 | 6.5 | 7.2 | 6708 | 103.2 | 103.9 | 100.1 | 8.9 | 8.2 | 7.4 |
| 2017 | 10876 | 103.1 | 103.8 | 100.3 | 7.4 | 6.0 | 7.3 | 6834 | 104.8 | 105.9 | 100.8 | 9.0 | 8.0 | 7.5 |
| 2018 | 6024 | 103.4 | 104.9 | 100.0 | 7.0 | 6.1 | 6.7 | 5447 | 105.6 | 107.3 | 101.2 | 8.5 | 7.9 | 6.8 |
| 2019 | 115 | 106.0 | 106.6 | 102.1 | 6.6 | 5.4 | 6.6 | 172 | 107.7 | 108.5 | 103.1 | 8.2 | 7.5 | 6.9 |



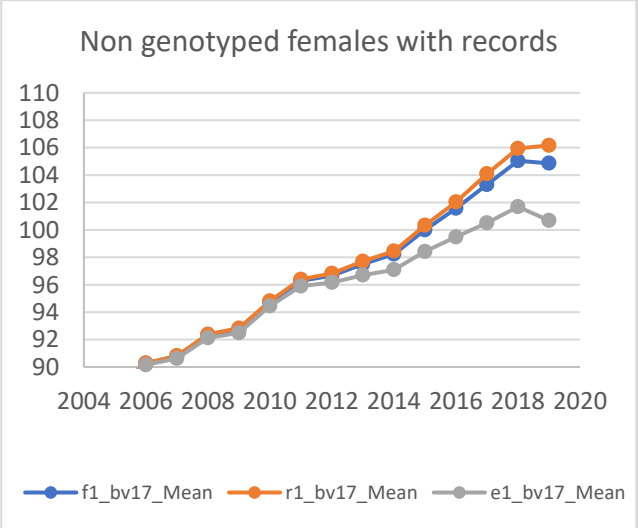



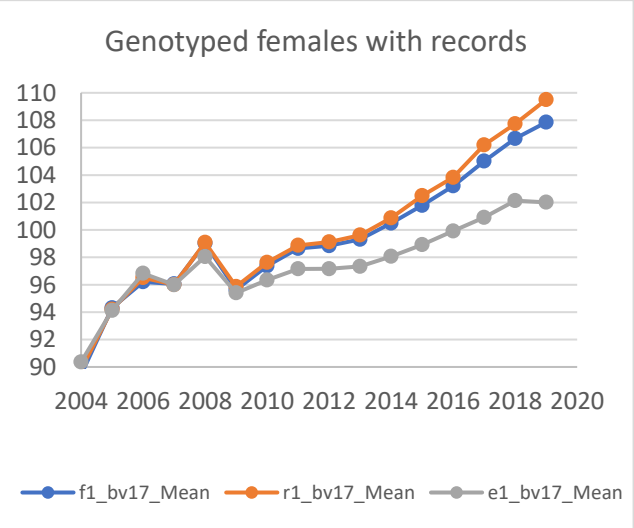



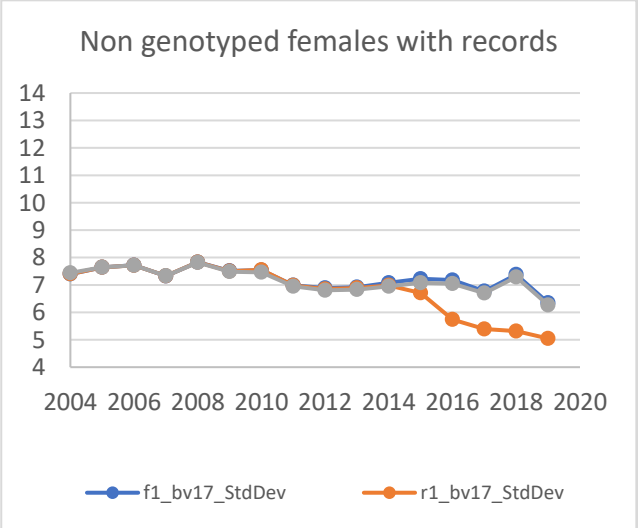



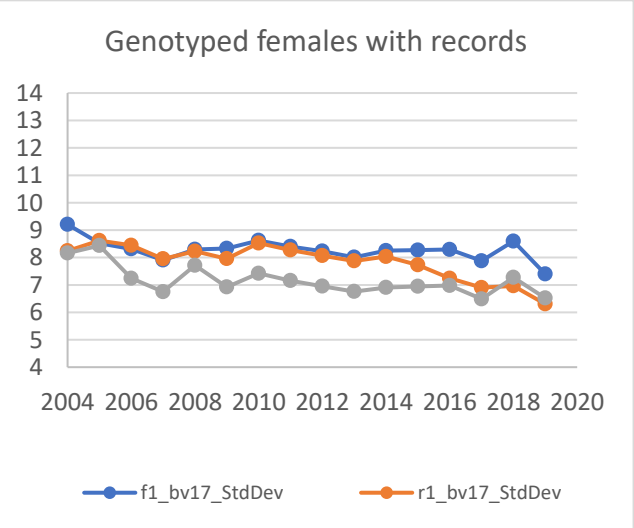
## *bv17*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27487 | 87.8 | 87.8 | 87.8 | 7.4 | 7.4 | 7.4 | 8 | 89.4 | 89.8 | 90.4 | 9.2 | 8.2 | 8.2 |
| 2005 | 26460 | 88.3 | 88.3 | 88.3 | 7.6 | 7.6 | 7.6 | 34 | 94.3 | 94.2 | 94.1 | 8.5 | 8.6 | 8.4 |
| 2006 | 26695 | 90.3 | 90.3 | 90.2 | 7.7 | 7.7 | 7.7 | 52 | 96.2 | 96.5 | 96.8 | 8.3 | 8.4 | 7.2 |
| 2007 | 25229 | 90.8 | 90.8 | 90.6 | 7.3 | 7.3 | 7.3 | 101 | 96.1 | 96.0 | 96.0 | 7.9 | 8.0 | 6.7 |
| 2008 | 26502 | 92.3 | 92.4 | 92.1 | 7.8 | 7.8 | 7.8 | 166 | 99.0 | 99.1 | 98.0 | 8.3 | 8.2 | 7.7 |
| 2009 | 27329 | 92.8 | 92.8 | 92.5 | 7.5 | 7.5 | 7.5 | 292 | 95.6 | 95.9 | 95.4 | 8.3 | 8.0 | 6.9 |
| 2010 | 23364 | 94.7 | 94.8 | 94.4 | 7.5 | 7.6 | 7.5 | 2203 | 97.4 | 97.6 | 96.3 | 8.6 | 8.5 | 7.4 |
| 2011 | 21868 | 96.3 | 96.4 | 95.9 | 7.0 | 7.0 | 6.9 | 3405 | 98.6 | 98.9 | 97.2 | 8.4 | 8.3 | 7.2 |
| 2012 | 19391 | 96.7 | 96.8 | 96.2 | 6.9 | 6.9 | 6.8 | 3458 | 98.8 | 99.1 | 97.2 | 8.2 | 8.1 | 7.0 |
| 2013 | 21082 | 97.5 | 97.7 | 96.7 | 6.9 | 6.9 | 6.8 | 3744 | 99.3 | 99.6 | 97.3 | 8.0 | 7.9 | 6.8 |
| 2014 | 20087 | 98.2 | 98.4 | 97.1 | 7.1 | 7.0 | 6.9 | 3941 | 100.5 | 100.9 | 98.1 | 8.3 | 8.0 | 6.9 |
| 2015 | 17002 | 100.0 | 100.3 | 98.4 | 7.2 | 6.7 | 7.1 | 4966 | 101.8 | 102.5 | 98.9 | 8.3 | 7.7 | 6.9 |
| 2016 | 14021 | 101.6 | 102.0 | 99.5 | 7.2 | 5.7 | 7.0 | 6708 | 103.2 | 103.8 | 99.9 | 8.3 | 7.2 | 7.0 |
| 2017 | 10875 | 103.3 | 104.1 | 100.5 | 6.8 | 5.4 | 6.7 | 6834 | 105.0 | 106.2 | 100.9 | 7.9 | 6.9 | 6.5 |
| 2018 | 6024 | 105.0 | 105.9 | 101.7 | 7.4 | 5.3 | 7.3 | 5447 | 106.7 | 107.7 | 102.1 | 8.6 | 7.0 | 7.3 |
| 2019 | 115 | 104.9 | 106.2 | 100.7 | 6.3 | 5.0 | 6.3 | 172 | 107.8 | 109.5 | 102.0 | 7.4 | 6.3 | 6.5 |



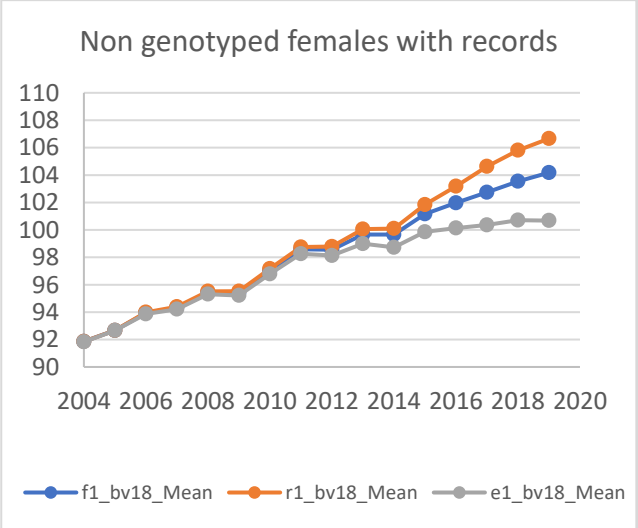



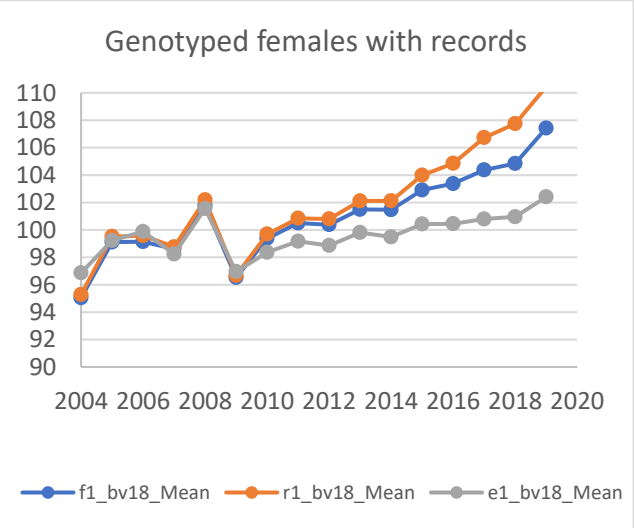



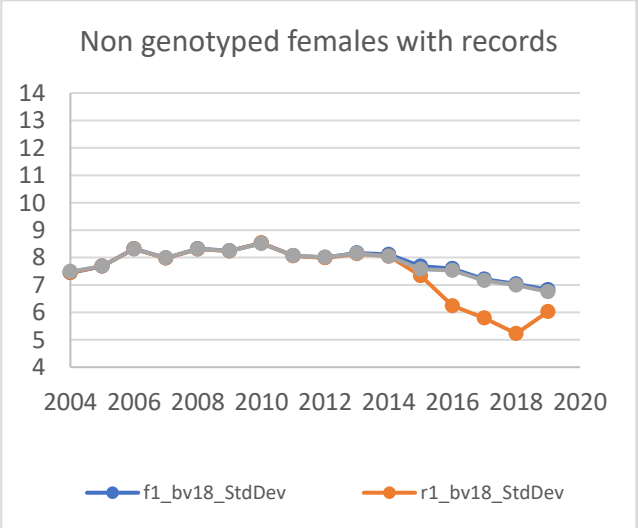



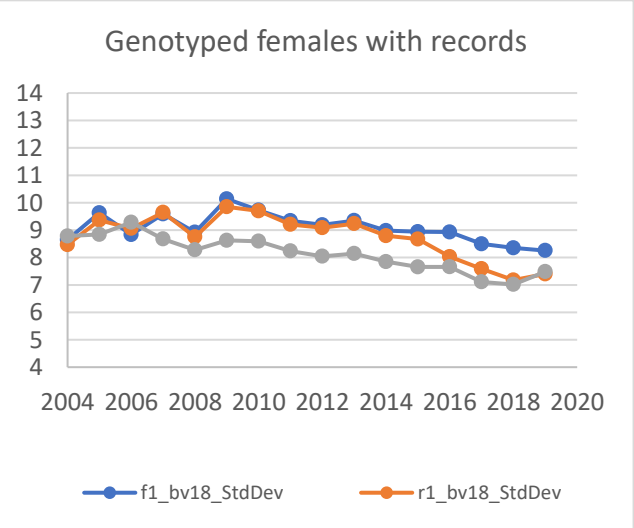
## *bv18*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27487 | 91.9 | 91.9 | 91.8 | 7.4 | 7.4 | 7.5 | 8 | 95.0 | 95.3 | 96.9 | 8.6 | 8.5 | 8.8 |
| 2005 | 26459 | 92.7 | 92.7 | 92.7 | 7.7 | 7.7 | 7.7 | 34 | 99.1 | 99.5 | 99.2 | 9.6 | 9.4 | 8.8 |
| 2006 | 26694 | 93.9 | 94.0 | 93.9 | 8.3 | 8.3 | 8.3 | 52 | 99.1 | 99.6 | 99.9 | 8.8 | 9.1 | 9.3 |
| 2007 | 25229 | 94.3 | 94.4 | 94.2 | 8.0 | 8.0 | 8.0 | 101 | 98.6 | 98.8 | 98.2 | 9.6 | 9.6 | 8.7 |
| 2008 | 26500 | 95.4 | 95.5 | 95.3 | 8.3 | 8.3 | 8.3 | 166 | 101.8 | 102.2 | 101.6 | 8.9 | 8.8 | 8.3 |
| 2009 | 27329 | 95.4 | 95.5 | 95.2 | 8.2 | 8.2 | 8.2 | 292 | 96.5 | 96.7 | 97.0 | 10.1 | 9.8 | 8.6 |
| 2010 | 23364 | 97.0 | 97.2 | 96.8 | 8.5 | 8.5 | 8.5 | 2203 | 99.4 | 99.7 | 98.4 | 9.7 | 9.7 | 8.6 |
| 2011 | 21869 | 98.6 | 98.7 | 98.3 | 8.1 | 8.1 | 8.1 | 3405 | 100.5 | 100.8 | 99.2 | 9.3 | 9.2 | 8.2 |
| 2012 | 19391 | 98.5 | 98.8 | 98.1 | 8.0 | 8.0 | 8.0 | 3458 | 100.4 | 100.8 | 98.9 | 9.2 | 9.1 | 8.0 |
| 2013 | 21082 | 99.7 | 100.1 | 99.0 | 8.2 | 8.1 | 8.1 | 3744 | 101.5 | 102.1 | 99.8 | 9.3 | 9.2 | 8.1 |
| 2014 | 20087 | 99.7 | 100.1 | 98.7 | 8.1 | 8.0 | 8.0 | 3941 | 101.5 | 102.1 | 99.5 | 9.0 | 8.8 | 7.8 |
| 2015 | 17002 | 101.2 | 101.8 | 99.9 | 7.7 | 7.3 | 7.6 | 4966 | 102.9 | 104.0 | 100.4 | 8.9 | 8.7 | 7.7 |
| 2016 | 14021 | 102.0 | 103.2 | 100.1 | 7.6 | 6.2 | 7.5 | 6708 | 103.4 | 104.8 | 100.4 | 8.9 | 8.0 | 7.7 |
| 2017 | 10875 | 102.7 | 104.6 | 100.4 | 7.2 | 5.8 | 7.2 | 6834 | 104.4 | 106.7 | 100.8 | 8.5 | 7.6 | 7.1 |
| 2018 | 6024 | 103.5 | 105.8 | 100.7 | 7.0 | 5.2 | 7.0 | 5447 | 104.8 | 107.7 | 101.0 | 8.4 | 7.2 | 7.0 |
| 2019 | 115 | 104.2 | 106.7 | 100.7 | 6.8 | 6.0 | 6.7 | 172 | 107.4 | 110.4 | 102.4 | 8.3 | 7.4 | 7.5 |



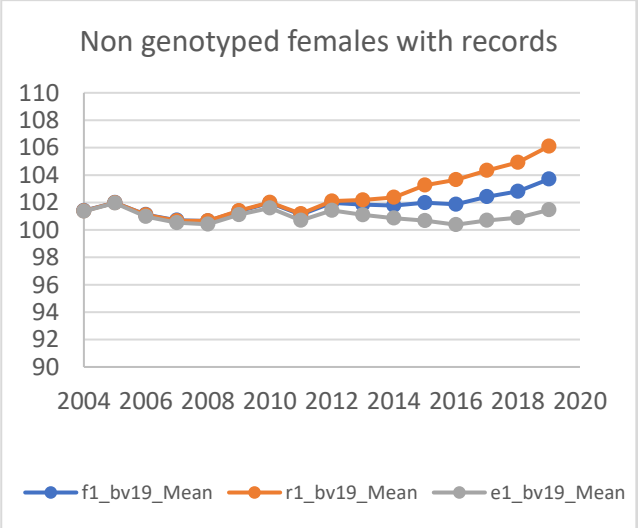



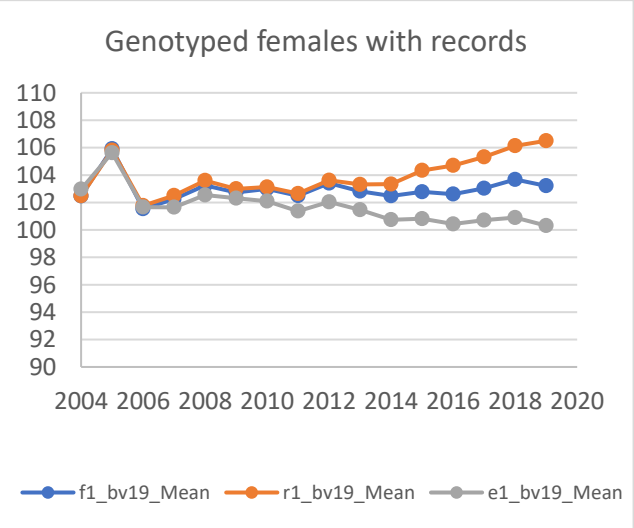



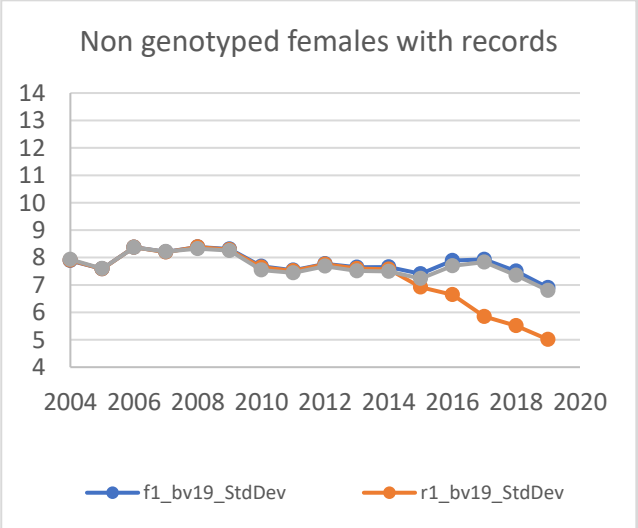



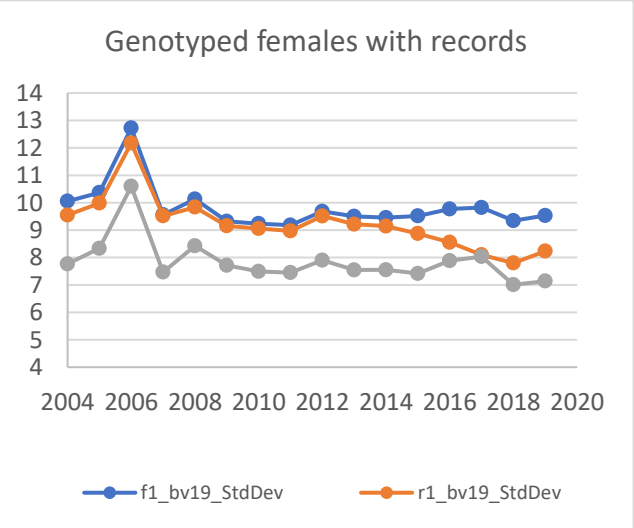
***bv19***

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27485 | 101.4 | 101.4 | 101.4 | 7.9 | 7.9 | 7.9 | 8 | 102.5 | 102.5 | 103.0 | 10.1 | 9.5 | 7.8 |
| 2005 | 26458 | 102.0 | 102.0 | 102.0 | 7.6 | 7.6 | 7.6 | 34 | 105.9 | 105.8 | 105.6 | 10.4 | 10.0 | 8.3 |
| 2006 | 26689 | 101.1 | 101.1 | 101.0 | 8.4 | 8.4 | 8.4 | 52 | 101.5 | 101.8 | 101.7 | 12.7 | 12.2 | 10.6 |
| 2007 | 25228 | 100.7 | 100.7 | 100.5 | 8.2 | 8.2 | 8.2 | 101 | 102.3 | 102.5 | 101.7 | 9.6 | 9.5 | 7.5 |
| 2008 | 26502 | 100.7 | 100.7 | 100.4 | 8.4 | 8.4 | 8.3 | 166 | 103.2 | 103.6 | 102.5 | 10.1 | 9.8 | 8.4 |
| 2009 | 27329 | 101.4 | 101.4 | 101.1 | 8.3 | 8.3 | 8.3 | 292 | 102.7 | 103.0 | 102.3 | 9.3 | 9.2 | 7.7 |
| 2010 | 23363 | 102.0 | 102.0 | 101.6 | 7.7 | 7.6 | 7.5 | 2203 | 103.0 | 103.1 | 102.1 | 9.2 | 9.1 | 7.5 |
| 2011 | 21868 | 101.1 | 101.2 | 100.7 | 7.5 | 7.5 | 7.4 | 3405 | 102.5 | 102.6 | 101.4 | 9.2 | 9.0 | 7.5 |
| 2012 | 19390 | 102.0 | 102.1 | 101.4 | 7.8 | 7.8 | 7.7 | 3458 | 103.4 | 103.6 | 102.0 | 9.7 | 9.5 | 7.9 |
| 2013 | 21082 | 101.8 | 102.2 | 101.1 | 7.6 | 7.6 | 7.5 | 3744 | 102.8 | 103.3 | 101.5 | 9.5 | 9.2 | 7.5 |
| 2014 | 20087 | 101.8 | 102.4 | 100.9 | 7.7 | 7.6 | 7.5 | 3941 | 102.5 | 103.3 | 100.7 | 9.5 | 9.1 | 7.6 |
| 2015 | 17001 | 102.0 | 103.3 | 100.7 | 7.4 | 6.9 | 7.2 | 4966 | 102.8 | 104.3 | 100.8 | 9.5 | 8.9 | 7.4 |
| 2016 | 14020 | 101.9 | 103.7 | 100.4 | 7.9 | 6.6 | 7.7 | 6708 | 102.6 | 104.7 | 100.4 | 9.8 | 8.6 | 7.9 |
| 2017 | 10875 | 102.4 | 104.3 | 100.7 | 7.9 | 5.8 | 7.8 | 6834 | 103.0 | 105.3 | 100.7 | 9.8 | 8.1 | 8.0 |
| 2018 | 6024 | 102.8 | 104.9 | 100.9 | 7.5 | 5.5 | 7.3 | 5447 | 103.7 | 106.1 | 100.9 | 9.3 | 7.8 | 7.0 |
| 2019 | 115 | 103.7 | 106.1 | 101.5 | 6.9 | 5.0 | 6.8 | 172 | 103.2 | 106.5 | 100.3 | 9.5 | 8.2 | 7.1 |



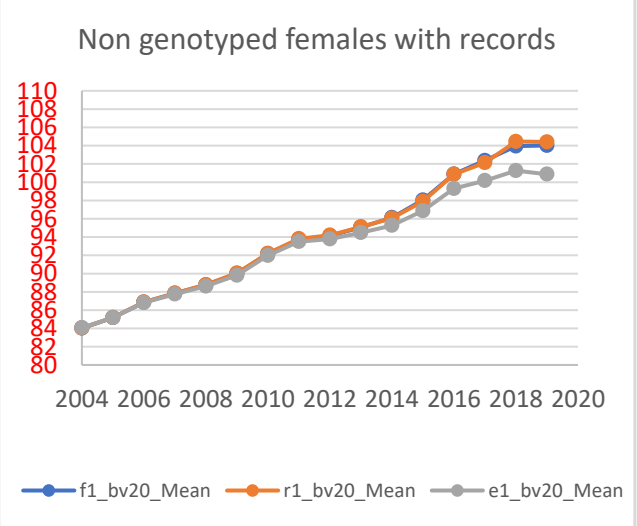



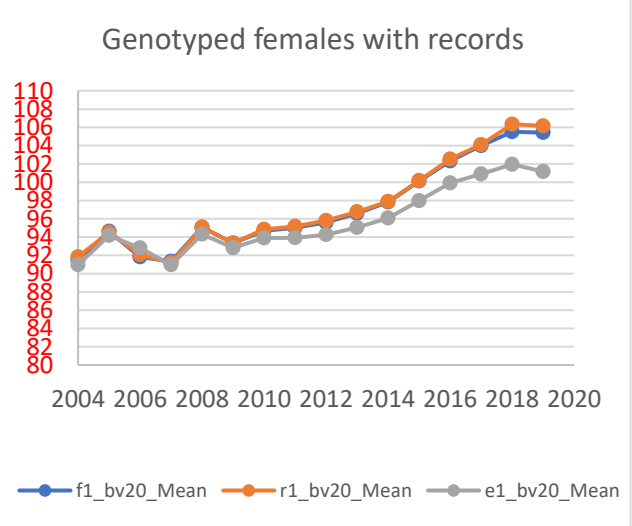



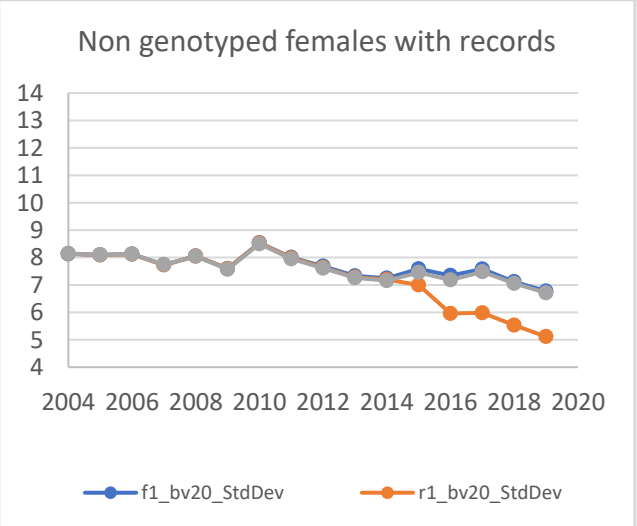



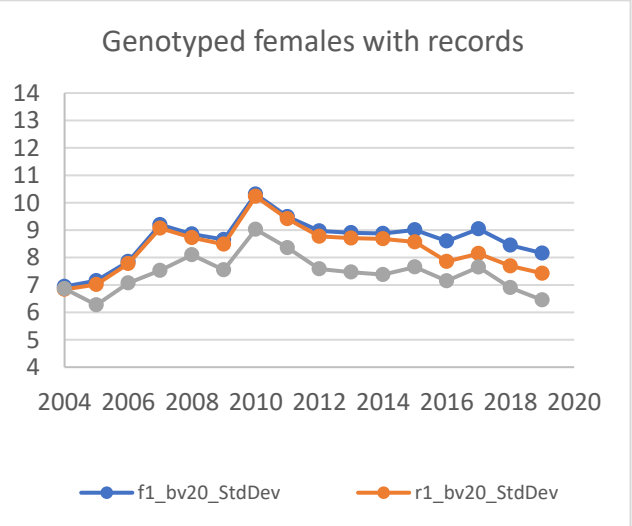
## *bv20*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27486 | 84.0 | 84.0 | 84.1 | 8.1 | 8.1 | 8.1 | 8 | 91.5 | 91.8 | 91.0 | 6.9 | 6.8 | 6.9 |
| 2005 | 26458 | 85.2 | 85.2 | 85.2 | 8.1 | 8.1 | 8.1 | 34 | 94.6 | 94.5 | 94.2 | 7.2 | 7.0 | 6.3 |
| 2006 | 26694 | 86.9 | 86.9 | 86.8 | 8.1 | 8.1 | 8.1 | 52 | 91.8 | 92.1 | 92.8 | 7.9 | 7.8 | 7.1 |
| 2007 | 25229 | 87.8 | 87.9 | 87.8 | 7.7 | 7.7 | 7.7 | 101 | 91.3 | 91.2 | 91.0 | 9.2 | 9.1 | 7.5 |
| 2008 | 26502 | 88.8 | 88.8 | 88.6 | 8.1 | 8.1 | 8.0 | 166 | 95.1 | 95.1 | 94.3 | 8.9 | 8.7 | 8.1 |
| 2009 | 27328 | 90.0 | 90.0 | 89.8 | 7.6 | 7.6 | 7.6 | 292 | 93.3 | 93.3 | 92.8 | 8.7 | 8.5 | 7.5 |
| 2010 | 23362 | 92.2 | 92.2 | 92.0 | 8.5 | 8.5 | 8.5 | 2203 | 94.7 | 94.8 | 93.9 | 10.3 | 10.2 | 9.0 |
| 2011 | 21868 | 93.7 | 93.8 | 93.5 | 8.0 | 8.0 | 7.9 | 3405 | 95.0 | 95.2 | 93.9 | 9.5 | 9.4 | 8.4 |
| 2012 | 19391 | 94.1 | 94.2 | 93.8 | 7.7 | 7.6 | 7.6 | 3458 | 95.6 | 95.8 | 94.3 | 9.0 | 8.8 | 7.6 |
| 2013 | 21082 | 95.1 | 95.1 | 94.5 | 7.3 | 7.3 | 7.3 | 3743 | 96.6 | 96.8 | 95.0 | 8.9 | 8.7 | 7.5 |
| 2014 | 20088 | 96.1 | 96.1 | 95.3 | 7.2 | 7.2 | 7.2 | 3941 | 97.8 | 97.9 | 96.1 | 8.9 | 8.7 | 7.4 |
| 2015 | 17001 | 98.0 | 97.9 | 96.9 | 7.6 | 7.0 | 7.5 | 4966 | 100.1 | 100.2 | 98.0 | 9.0 | 8.6 | 7.7 |
| 2016 | 14018 | 100.9 | 100.9 | 99.3 | 7.3 | 6.0 | 7.2 | 6708 | 102.3 | 102.5 | 99.9 | 8.6 | 7.9 | 7.1 |
| 2017 | 10876 | 102.4 | 102.1 | 100.2 | 7.6 | 6.0 | 7.5 | 6834 | 104.0 | 104.1 | 100.9 | 9.0 | 8.1 | 7.6 |
| 2018 | 6024 | 103.9 | 104.5 | 101.3 | 7.1 | 5.5 | 7.1 | 5447 | 105.5 | 106.3 | 102.0 | 8.4 | 7.7 | 6.9 |
| 2019 | 115 | 104.0 | 104.4 | 100.9 | 6.8 | 5.1 | 6.7 | 172 | 105.4 | 106.2 | 101.2 | 8.2 | 7.4 | 6.5 |



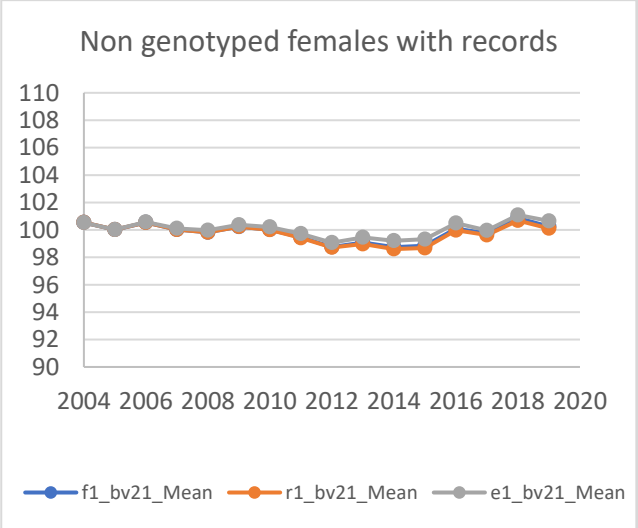



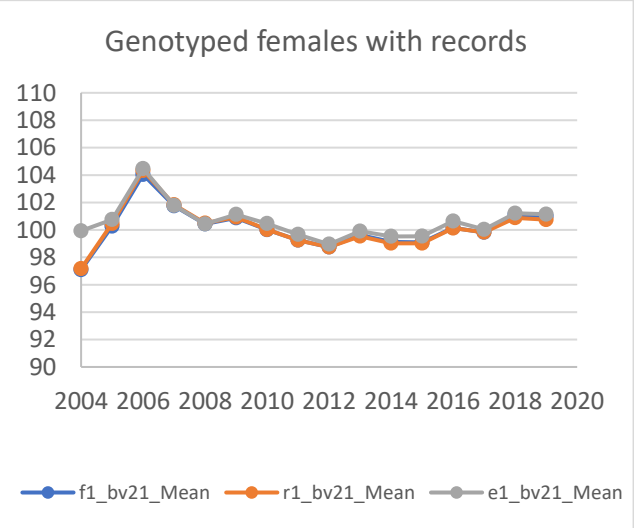



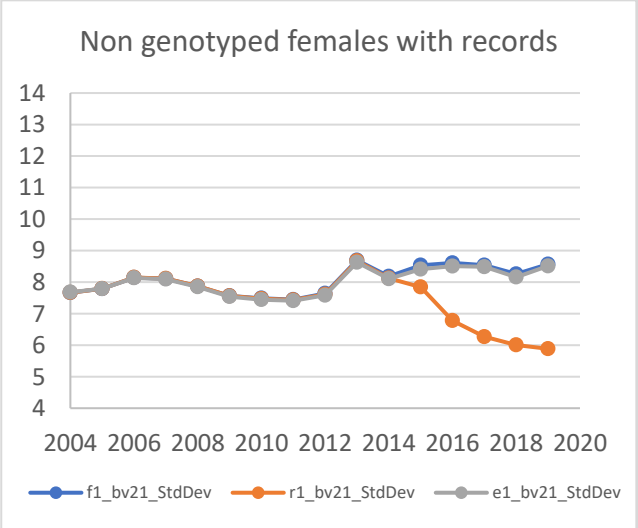



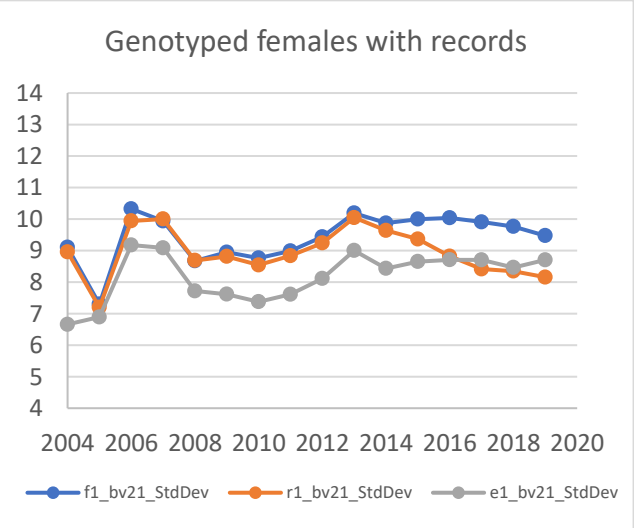
## *bv21*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27481 | 100.5 | 100.5 | 100.5 | 7.7 | 7.7 | 7.7 | 8 | 97.1 | 97.2 | 99.9 | 9.1 | 9.0 | 6.7 |
| 2005 | 26457 | 100.0 | 100.0 | 100.0 | 7.8 | 7.8 | 7.8 | 34 | 100.3 | 100.5 | 100.7 | 7.3 | 7.2 | 6.9 |
| 2006 | 26695 | 100.5 | 100.5 | 100.6 | 8.1 | 8.2 | 8.1 | 52 | 104.0 | 104.3 | 104.5 | 10.3 | 9.9 | 9.2 |
| 2007 | 25229 | 100.0 | 100.0 | 100.1 | 8.1 | 8.1 | 8.1 | 101 | 101.8 | 101.8 | 101.8 | 9.9 | 10.0 | 9.1 |
| 2008 | 26502 | 99.8 | 99.8 | 100.0 | 7.9 | 7.9 | 7.8 | 166 | 100.4 | 100.5 | 100.4 | 8.7 | 8.7 | 7.7 |
| 2009 | 27326 | 100.2 | 100.2 | 100.4 | 7.6 | 7.6 | 7.5 | 292 | 100.9 | 100.9 | 101.1 | 8.9 | 8.8 | 7.6 |
| 2010 | 23363 | 100.0 | 100.0 | 100.2 | 7.5 | 7.5 | 7.4 | 2203 | 100.0 | 100.0 | 100.5 | 8.8 | 8.5 | 7.4 |
| 2011 | 21868 | 99.5 | 99.4 | 99.7 | 7.4 | 7.4 | 7.4 | 3405 | 99.3 | 99.2 | 99.7 | 9.0 | 8.8 | 7.6 |
| 2012 | 19391 | 98.8 | 98.7 | 99.1 | 7.6 | 7.6 | 7.6 | 3458 | 98.7 | 98.7 | 99.0 | 9.4 | 9.2 | 8.1 |
| 2013 | 21082 | 99.1 | 99.0 | 99.5 | 8.7 | 8.7 | 8.6 | 3743 | 99.6 | 99.5 | 99.9 | 10.2 | 10.0 | 9.0 |
| 2014 | 20088 | 98.7 | 98.6 | 99.2 | 8.2 | 8.1 | 8.1 | 3941 | 99.1 | 99.0 | 99.5 | 9.9 | 9.6 | 8.4 |
| 2015 | 17001 | 98.8 | 98.7 | 99.3 | 8.5 | 7.8 | 8.4 | 4966 | 99.1 | 99.0 | 99.5 | 10.0 | 9.4 | 8.7 |
| 2016 | 14018 | 100.1 | 100.0 | 100.5 | 8.6 | 6.8 | 8.5 | 6708 | 100.2 | 100.1 | 100.6 | 10.0 | 8.8 | 8.7 |
| 2017 | 10876 | 99.7 | 99.6 | 100.0 | 8.5 | 6.3 | 8.5 | 6834 | 99.8 | 99.8 | 100.0 | 9.9 | 8.4 | 8.7 |
| 2018 | 6024 | 100.9 | 100.7 | 101.1 | 8.3 | 6.0 | 8.2 | 5447 | 101.1 | 100.9 | 101.2 | 9.8 | 8.3 | 8.5 |
| 2019 | 115 | 100.3 | 100.1 | 100.7 | 8.6 | 5.9 | 8.5 | 172 | 101.0 | 100.7 | 101.1 | 9.5 | 8.2 | 8.7 |



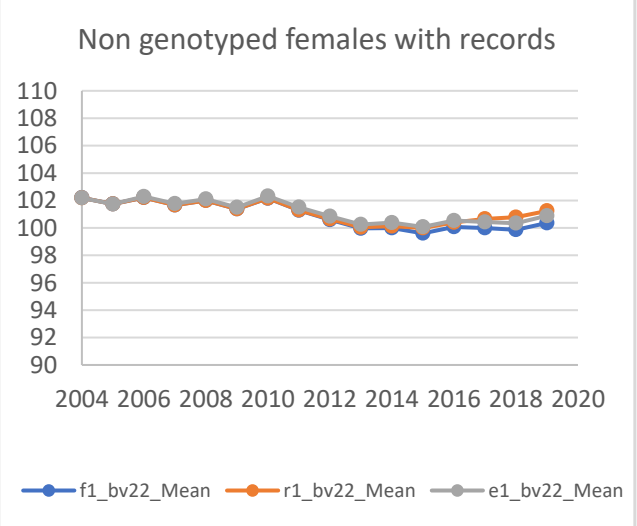



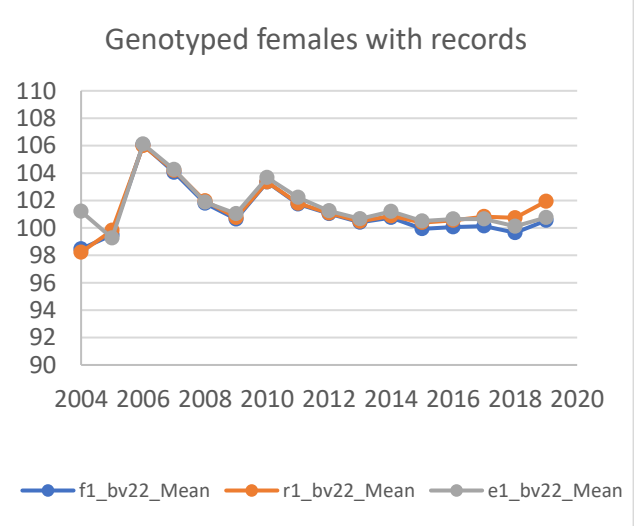



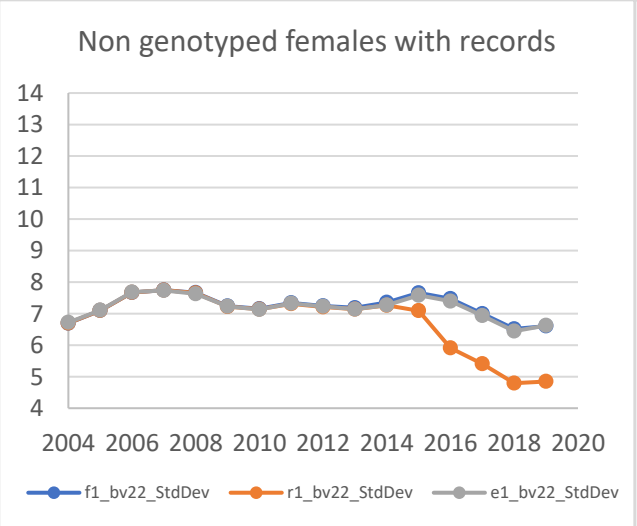



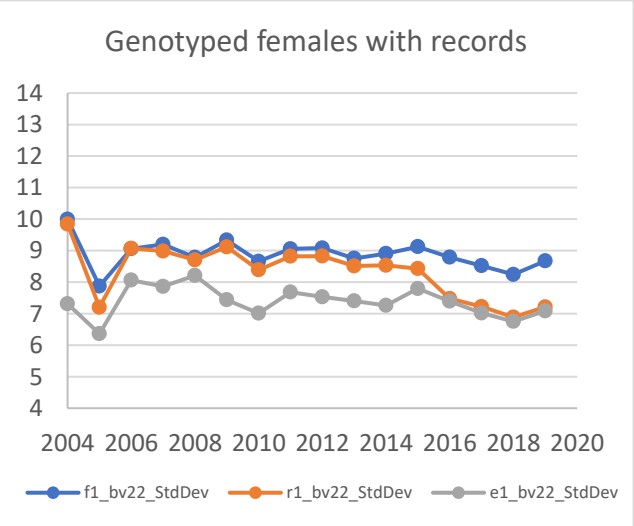
## *bv22*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27481 | 102.2 | 102.2 | 102.2 | 6.7 | 6.7 | 6.7 | 8 | 98.5 | 98.2 | 101.2 | 10.0 | 9.8 | 7.3 |
| 2005 | 26460 | 101.7 | 101.7 | 101.7 | 7.1 | 7.1 | 7.1 | 34 | 99.5 | 99.8 | 99.3 | 7.9 | 7.2 | 6.4 |
| 2006 | 26692 | 102.2 | 102.2 | 102.3 | 7.7 | 7.7 | 7.7 | 52 | 106.1 | 106.0 | 106.1 | 9.1 | 9.1 | 8.1 |
| 2007 | 25229 | 101.7 | 101.7 | 101.8 | 7.7 | 7.7 | 7.7 | 101 | 104.0 | 104.2 | 104.3 | 9.2 | 9.0 | 7.9 |
| 2008 | 26502 | 102.0 | 102.0 | 102.1 | 7.7 | 7.7 | 7.6 | 166 | 101.8 | 102.0 | 101.9 | 8.8 | 8.7 | 8.2 |
| 2009 | 27329 | 101.4 | 101.4 | 101.5 | 7.2 | 7.2 | 7.2 | 292 | 100.6 | 100.8 | 101.0 | 9.3 | 9.1 | 7.4 |
| 2010 | 23364 | 102.2 | 102.2 | 102.3 | 7.2 | 7.1 | 7.1 | 2203 | 103.3 | 103.4 | 103.7 | 8.7 | 8.4 | 7.0 |
| 2011 | 21868 | 101.3 | 101.3 | 101.5 | 7.3 | 7.3 | 7.3 | 3405 | 101.7 | 101.8 | 102.2 | 9.1 | 8.8 | 7.7 |
| 2012 | 19390 | 100.6 | 100.6 | 100.8 | 7.2 | 7.2 | 7.2 | 3458 | 101.0 | 101.1 | 101.2 | 9.1 | 8.8 | 7.5 |
| 2013 | 21082 | 100.0 | 100.0 | 100.2 | 7.2 | 7.1 | 7.1 | 3743 | 100.4 | 100.5 | 100.7 | 8.8 | 8.5 | 7.4 |
| 2014 | 20087 | 100.0 | 100.1 | 100.4 | 7.4 | 7.3 | 7.3 | 3941 | 100.7 | 100.9 | 101.2 | 8.9 | 8.5 | 7.3 |
| 2015 | 17001 | 99.6 | 100.0 | 100.1 | 7.7 | 7.1 | 7.6 | 4966 | 99.9 | 100.4 | 100.5 | 9.1 | 8.4 | 7.8 |
| 2016 | 14019 | 100.1 | 100.4 | 100.5 | 7.5 | 5.9 | 7.4 | 6708 | 100.1 | 100.5 | 100.6 | 8.8 | 7.5 | 7.4 |
| 2017 | 10874 | 100.0 | 100.7 | 100.4 | 7.0 | 5.4 | 6.9 | 6834 | 100.1 | 100.8 | 100.6 | 8.5 | 7.2 | 7.0 |
| 2018 | 6024 | 99.9 | 100.8 | 100.3 | 6.5 | 4.8 | 6.4 | 5447 | 99.6 | 100.7 | 100.1 | 8.2 | 6.9 | 6.8 |
| 2019 | 115 | 100.4 | 101.2 | 100.9 | 6.6 | 4.8 | 6.6 | 172 | 100.5 | 101.9 | 100.8 | 8.7 | 7.2 | 7.1 |



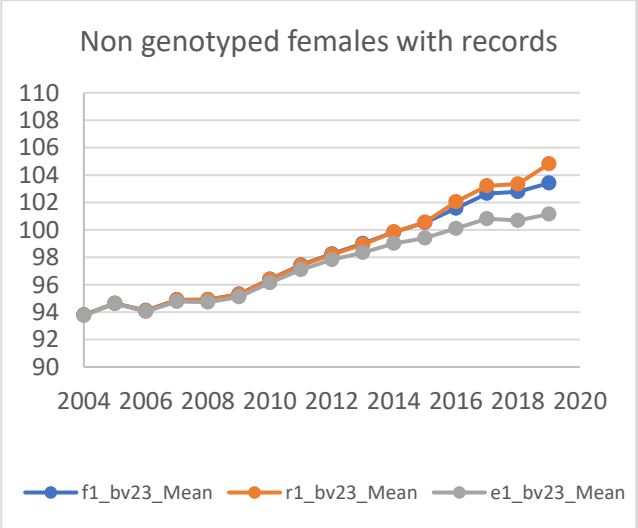



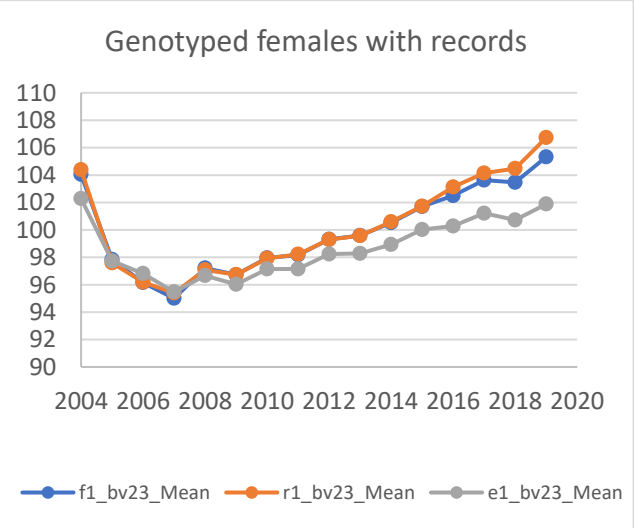



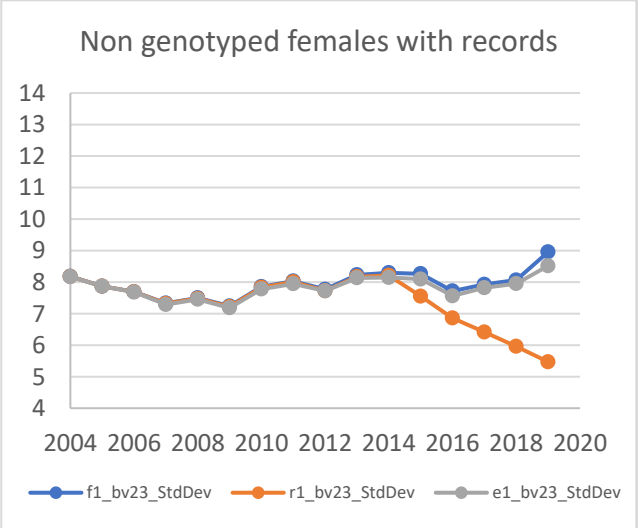



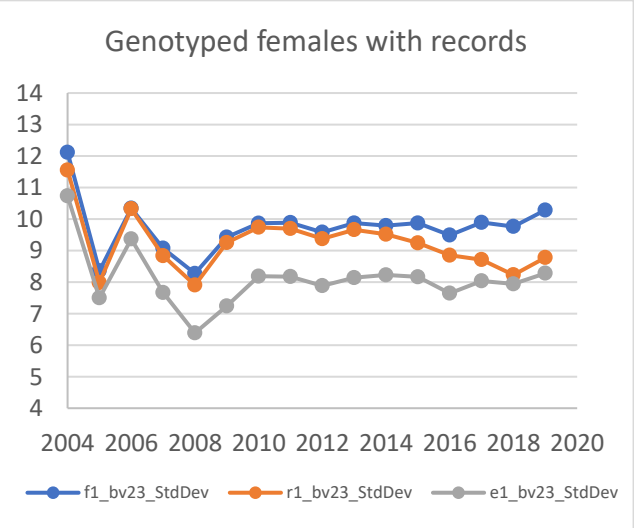
## *bv23*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27486 | 93.8 | 93.8 | 93.8 | 8.2 | 8.2 | 8.2 | 8 | 104.0 | 104.4 | 102.3 | 12.1 | 11.6 | 10.7 |
| 2005 | 26456 | 94.6 | 94.6 | 94.6 | 7.9 | 7.9 | 7.9 | 34 | 97.8 | 97.6 | 97.7 | 8.4 | 8.0 | 7.5 |
| 2006 | 26689 | 94.1 | 94.1 | 94.0 | 7.7 | 7.7 | 7.7 | 52 | 96.2 | 96.2 | 96.8 | 10.3 | 10.3 | 9.4 |
| 2007 | 25228 | 94.9 | 94.9 | 94.8 | 7.3 | 7.3 | 7.3 | 101 | 95.0 | 95.4 | 95.5 | 9.1 | 8.8 | 7.7 |
| 2008 | 26503 | 94.9 | 94.9 | 94.7 | 7.5 | 7.5 | 7.5 | 166 | 97.2 | 97.1 | 96.7 | 8.3 | 7.9 | 6.4 |
| 2009 | 27324 | 95.3 | 95.3 | 95.1 | 7.2 | 7.2 | 7.2 | 292 | 96.7 | 96.7 | 96.0 | 9.4 | 9.3 | 7.2 |
| 2010 | 23363 | 96.4 | 96.4 | 96.1 | 7.9 | 7.8 | 7.8 | 2203 | 98.0 | 97.9 | 97.1 | 9.9 | 9.7 | 8.2 |
| 2011 | 21868 | 97.4 | 97.4 | 97.1 | 8.0 | 8.0 | 7.9 | 3405 | 98.2 | 98.2 | 97.1 | 9.9 | 9.7 | 8.2 |
| 2012 | 19391 | 98.2 | 98.2 | 97.8 | 7.8 | 7.7 | 7.7 | 3458 | 99.3 | 99.3 | 98.2 | 9.6 | 9.4 | 7.9 |
| 2013 | 21082 | 99.0 | 98.9 | 98.3 | 8.2 | 8.2 | 8.1 | 3743 | 99.6 | 99.6 | 98.3 | 9.9 | 9.7 | 8.1 |
| 2014 | 20087 | 99.8 | 99.8 | 99.0 | 8.3 | 8.2 | 8.1 | 3941 | 100.5 | 100.6 | 98.9 | 9.8 | 9.5 | 8.2 |
| 2015 | 17001 | 100.5 | 100.6 | 99.4 | 8.3 | 7.6 | 8.1 | 4966 | 101.7 | 101.7 | 100.0 | 9.9 | 9.2 | 8.2 |
| 2016 | 14018 | 101.6 | 102.0 | 100.1 | 7.7 | 6.9 | 7.6 | 6708 | 102.5 | 103.1 | 100.3 | 9.5 | 8.9 | 7.6 |
| 2017 | 10875 | 102.7 | 103.2 | 100.8 | 7.9 | 6.4 | 7.8 | 6834 | 103.6 | 104.1 | 101.2 | 9.9 | 8.7 | 8.0 |
| 2018 | 6024 | 102.8 | 103.3 | 100.7 | 8.1 | 6.0 | 8.0 | 5447 | 103.5 | 104.5 | 100.7 | 9.8 | 8.2 | 7.9 |
| 2019 | 115 | 103.4 | 104.8 | 101.2 | 9.0 | 5.5 | 8.5 | 172 | 105.3 | 106.7 | 101.9 | 10.3 | 8.8 | 8.3 |



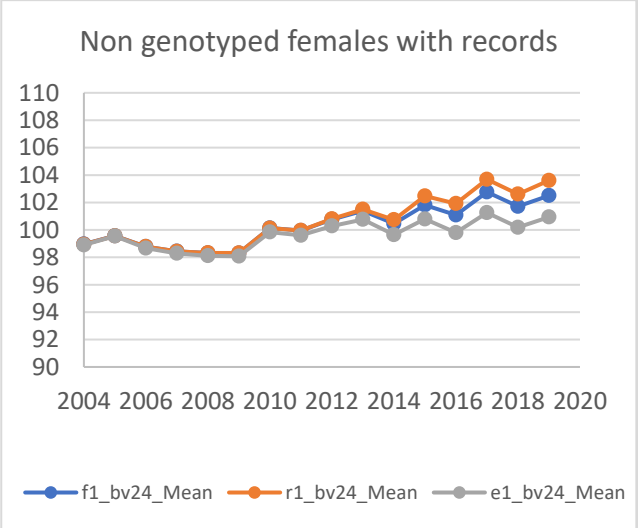



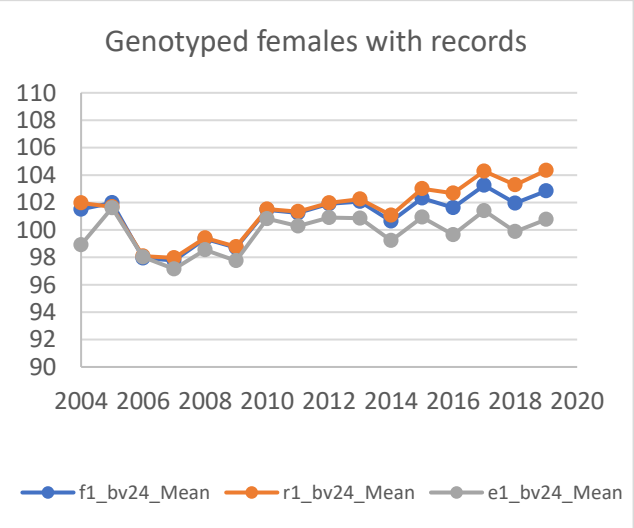



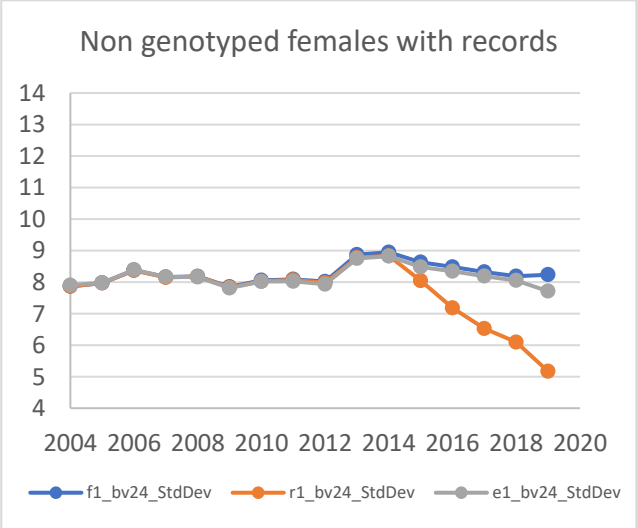



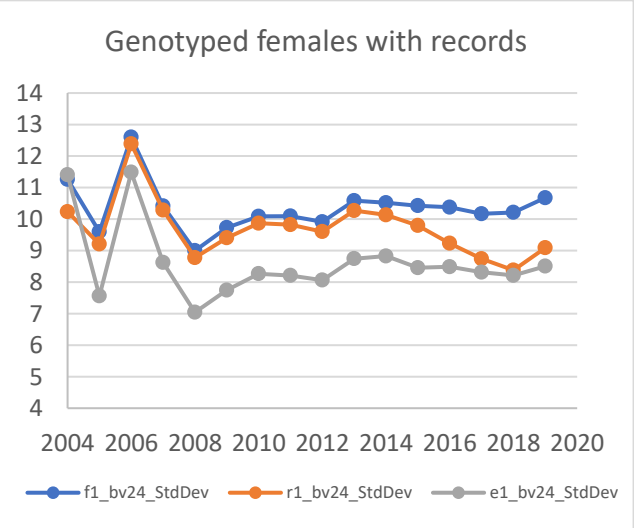
## *bv24*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 27488 | 99.0 | 98.9 | 98.9 | 7.9 | 7.9 | 7.9 | 8 | 101.5 | 102.0 | 98.9 | 11.3 | 10.2 | 11.4 |
| 2005 | 26454 | 99.6 | 99.6 | 99.6 | 8.0 | 8.0 | 8.0 | 34 | 102.0 | 101.7 | 101.6 | 9.6 | 9.2 | 7.6 |
| 2006 | 26692 | 98.8 | 98.8 | 98.7 | 8.4 | 8.4 | 8.4 | 52 | 97.9 | 98.1 | 98.0 | 12.6 | 12.4 | 11.5 |
| 2007 | 25228 | 98.4 | 98.4 | 98.3 | 8.2 | 8.1 | 8.2 | 101 | 97.8 | 98.0 | 97.1 | 10.4 | 10.3 | 8.6 |
| 2008 | 26503 | 98.3 | 98.3 | 98.1 | 8.2 | 8.2 | 8.2 | 166 | 99.3 | 99.4 | 98.5 | 9.0 | 8.8 | 7.0 |
| 2009 | 27324 | 98.3 | 98.3 | 98.1 | 7.9 | 7.8 | 7.8 | 292 | 98.7 | 98.8 | 97.7 | 9.7 | 9.4 | 7.7 |
| 2010 | 23362 | 100.1 | 100.1 | 99.8 | 8.1 | 8.0 | 8.0 | 2203 | 101.5 | 101.5 | 100.8 | 10.1 | 9.9 | 8.3 |
| 2011 | 21868 | 100.0 | 100.0 | 99.6 | 8.1 | 8.1 | 8.0 | 3405 | 101.2 | 101.3 | 100.3 | 10.1 | 9.8 | 8.2 |
| 2012 | 19390 | 100.8 | 100.8 | 100.3 | 8.0 | 8.0 | 7.9 | 3458 | 101.9 | 102.0 | 100.9 | 9.9 | 9.6 | 8.1 |
| 2013 | 21082 | 101.4 | 101.5 | 100.8 | 8.9 | 8.8 | 8.8 | 3743 | 102.1 | 102.2 | 100.8 | 10.6 | 10.3 | 8.7 |
| 2014 | 20086 | 100.5 | 100.7 | 99.6 | 8.9 | 8.8 | 8.8 | 3941 | 100.6 | 101.1 | 99.2 | 10.5 | 10.1 | 8.8 |
| 2015 | 17001 | 101.8 | 102.5 | 100.8 | 8.6 | 8.0 | 8.5 | 4966 | 102.3 | 103.0 | 100.9 | 10.4 | 9.8 | 8.5 |
| 2016 | 14018 | 101.1 | 101.9 | 99.8 | 8.5 | 7.2 | 8.3 | 6708 | 101.6 | 102.7 | 99.6 | 10.4 | 9.2 | 8.5 |
| 2017 | 10875 | 102.8 | 103.7 | 101.3 | 8.3 | 6.5 | 8.2 | 6834 | 103.2 | 104.3 | 101.4 | 10.2 | 8.7 | 8.3 |
| 2018 | 6024 | 101.7 | 102.6 | 100.2 | 8.2 | 6.1 | 8.1 | 5447 | 101.9 | 103.3 | 99.9 | 10.2 | 8.4 | 8.2 |
| 2019 | 115 | 102.5 | 103.6 | 100.9 | 8.2 | 5.2 | 7.7 | 172 | 102.8 | 104.3 | 100.8 | 10.7 | 9.1 | 8.5 |



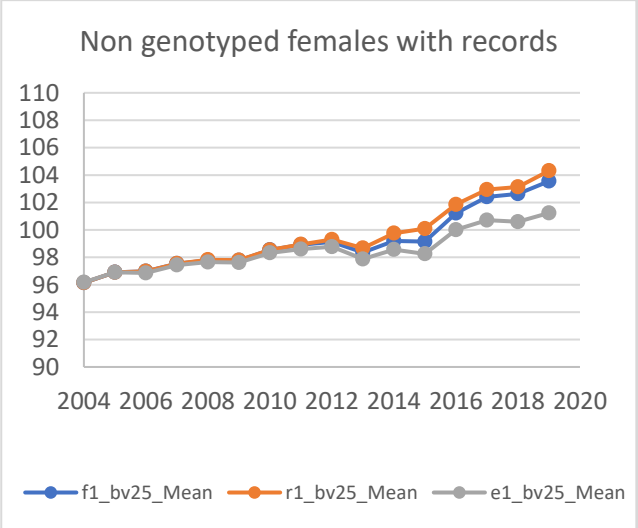



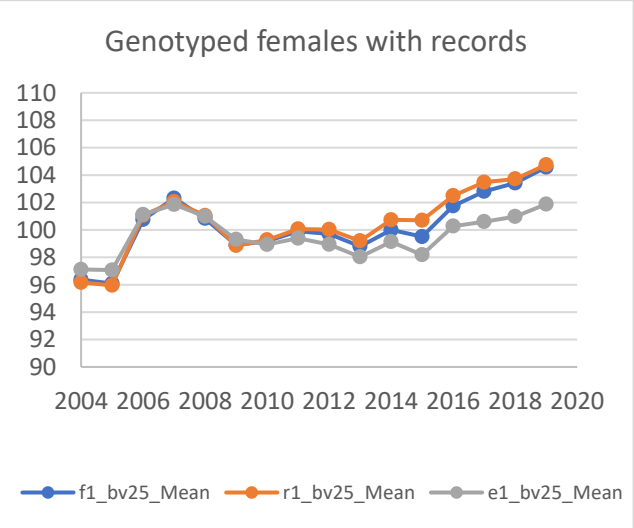



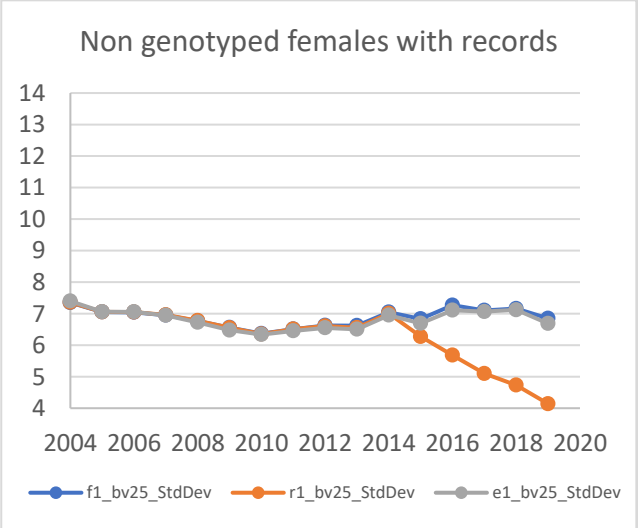



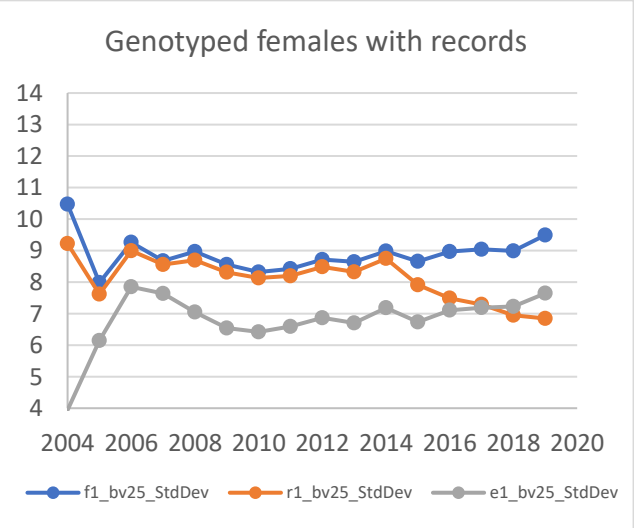
## *bv25*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 26662 | 96.1 | 96.1 | 96.2 | 7.3 | 7.4 | 7.4 | 8 | 96.4 | 96.2 | 97.1 | 10.5 | 9.2 | 3.9 |
| 2005 | 26460 | 96.9 | 96.9 | 96.9 | 7.1 | 7.1 | 7.1 | 34 | 96.1 | 96.0 | 97.1 | 8.0 | 7.6 | 6.1 |
| 2006 | 26693 | 97.0 | 97.0 | 96.9 | 7.0 | 7.1 | 7.1 | 52 | 100.8 | 101.1 | 101.1 | 9.3 | 9.0 | 7.9 |
| 2007 | 25229 | 97.5 | 97.5 | 97.4 | 7.0 | 7.0 | 6.9 | 101 | 102.3 | 102.1 | 101.9 | 8.7 | 8.6 | 7.6 |
| 2008 | 26503 | 97.8 | 97.8 | 97.7 | 6.8 | 6.8 | 6.7 | 166 | 100.8 | 101.0 | 101.0 | 9.0 | 8.7 | 7.0 |
| 2009 | 27329 | 97.8 | 97.8 | 97.6 | 6.6 | 6.6 | 6.5 | 292 | 98.9 | 98.9 | 99.3 | 8.6 | 8.3 | 6.5 |
| 2010 | 23364 | 98.5 | 98.5 | 98.3 | 6.4 | 6.4 | 6.3 | 2203 | 99.2 | 99.3 | 98.9 | 8.3 | 8.1 | 6.4 |
| 2011 | 21866 | 98.9 | 98.9 | 98.6 | 6.5 | 6.5 | 6.5 | 3405 | 99.9 | 100.1 | 99.4 | 8.4 | 8.2 | 6.6 |
| 2012 | 19391 | 99.1 | 99.3 | 98.8 | 6.6 | 6.6 | 6.5 | 3458 | 99.7 | 100.0 | 98.9 | 8.7 | 8.5 | 6.9 |
| 2013 | 21082 | 98.4 | 98.7 | 97.9 | 6.6 | 6.6 | 6.5 | 3743 | 98.8 | 99.2 | 98.0 | 8.6 | 8.3 | 6.7 |
| 2014 | 20087 | 99.2 | 99.8 | 98.6 | 7.0 | 7.0 | 6.9 | 3941 | 100.0 | 100.7 | 99.1 | 9.0 | 8.7 | 7.2 |
| 2015 | 17001 | 99.1 | 100.1 | 98.2 | 6.8 | 6.3 | 6.7 | 4966 | 99.5 | 100.7 | 98.2 | 8.7 | 7.9 | 6.7 |
| 2016 | 14018 | 101.2 | 101.9 | 100.0 | 7.3 | 5.7 | 7.1 | 6708 | 101.7 | 102.5 | 100.3 | 9.0 | 7.5 | 7.1 |
| 2017 | 10875 | 102.4 | 102.9 | 100.7 | 7.1 | 5.1 | 7.1 | 6834 | 102.8 | 103.5 | 100.6 | 9.0 | 7.3 | 7.2 |
| 2018 | 6024 | 102.6 | 103.1 | 100.6 | 7.2 | 4.7 | 7.1 | 5447 | 103.4 | 103.7 | 101.0 | 9.0 | 6.9 | 7.2 |
| 2019 | 115 | 103.6 | 104.3 | 101.2 | 6.8 | 4.1 | 6.7 | 172 | 104.6 | 104.7 | 101.9 | 9.5 | 6.8 | 7.6 |



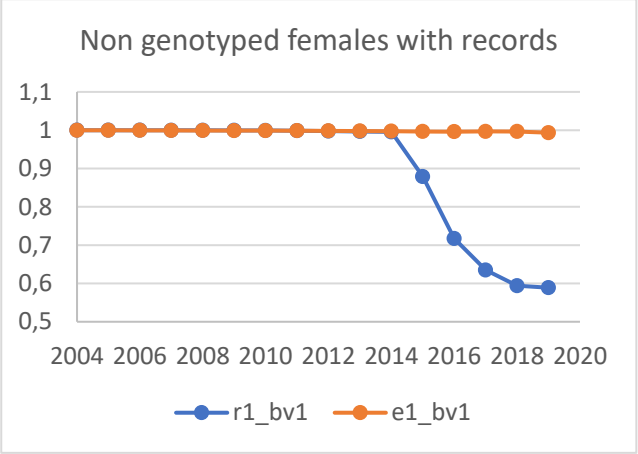



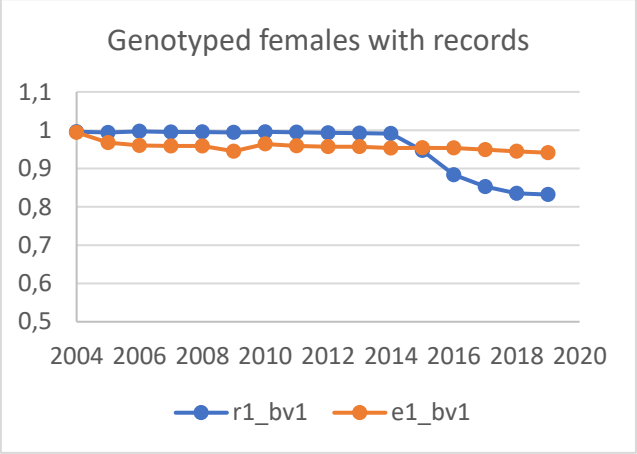



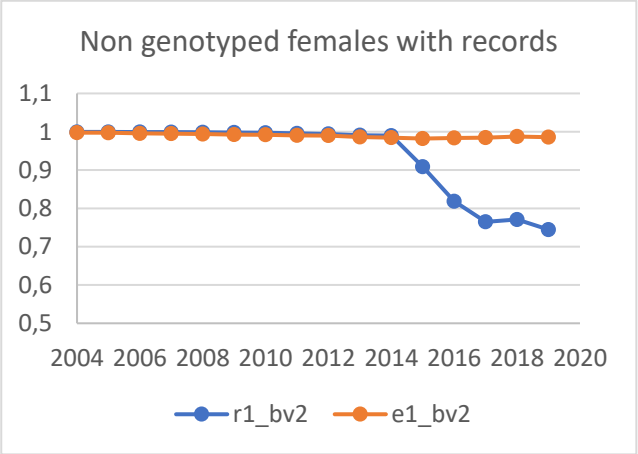
## Correlations

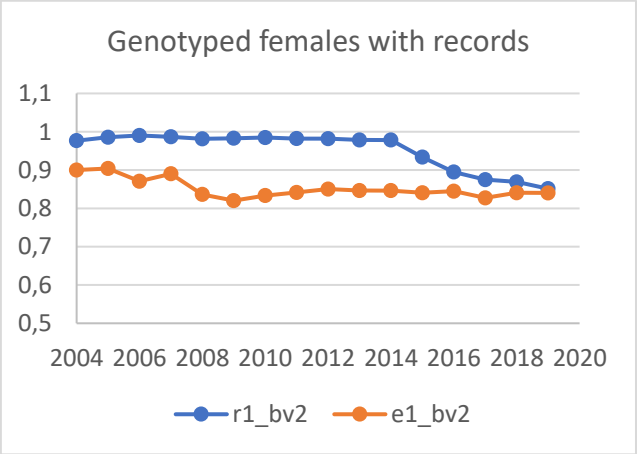
### *bv1*



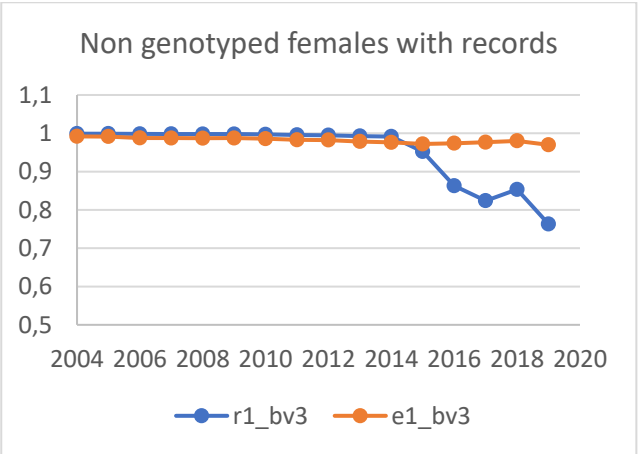



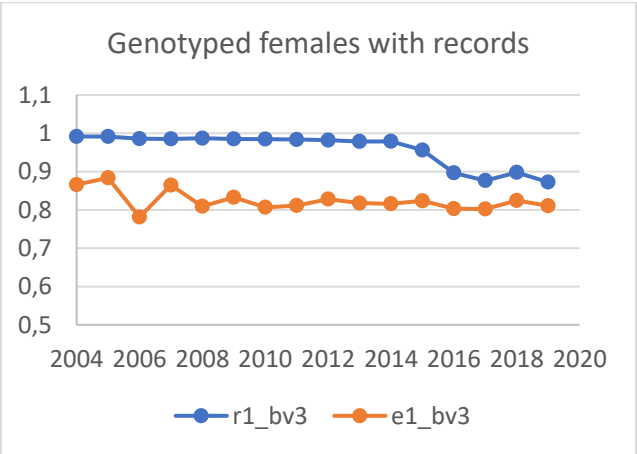

### *bv2*



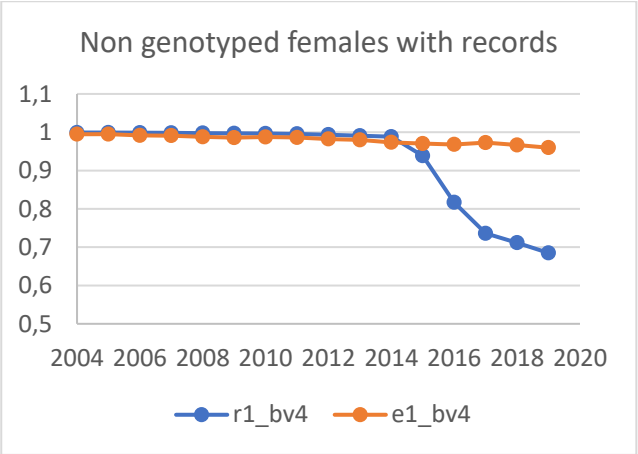



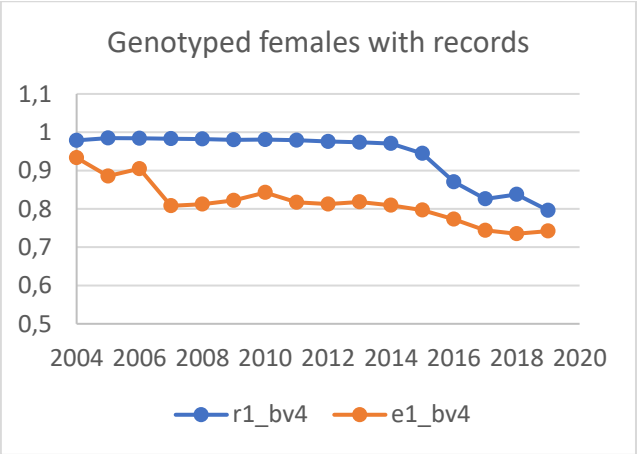

### *bv3*



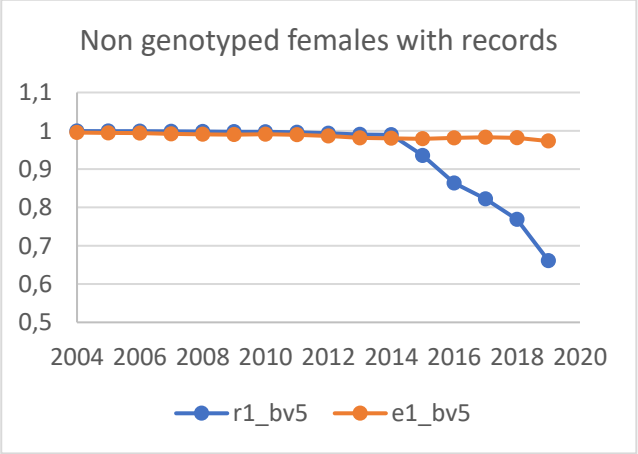



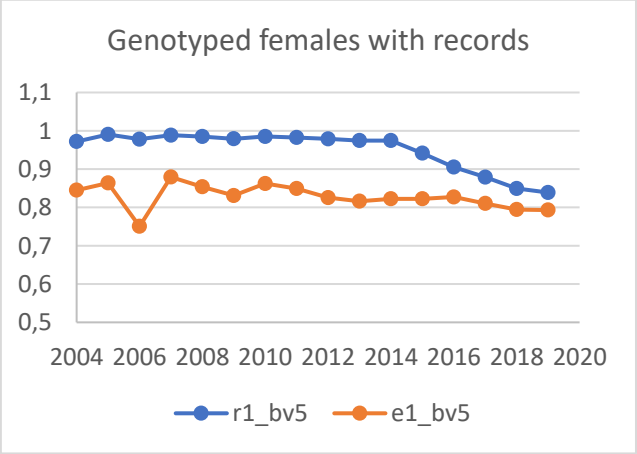
***bv4***


Non genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv4
e1_bv4

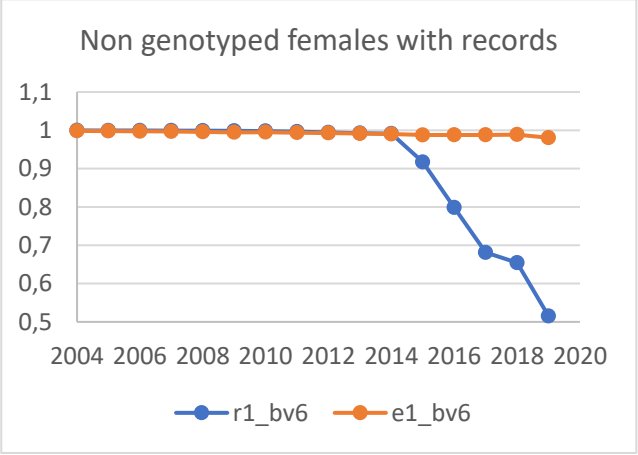

Genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv4
e1_bv4

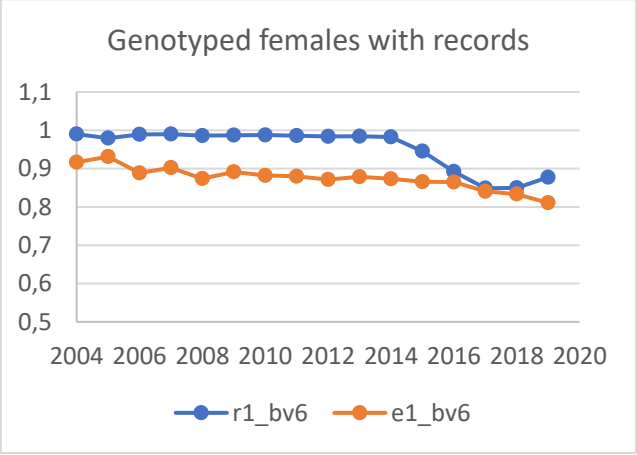
***bv5***


Non genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv5
e1_bv5

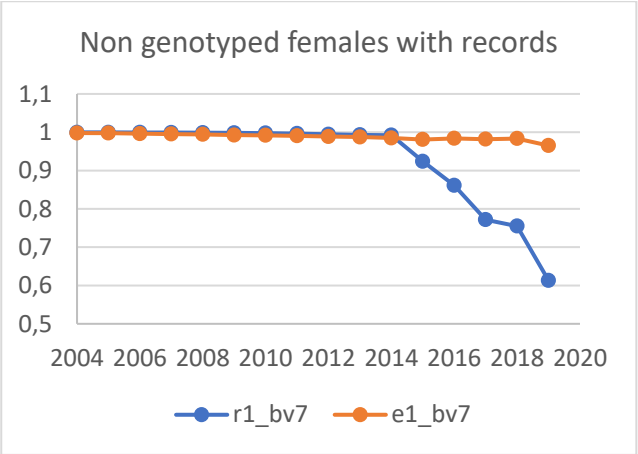

Genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv5
e1_bv5

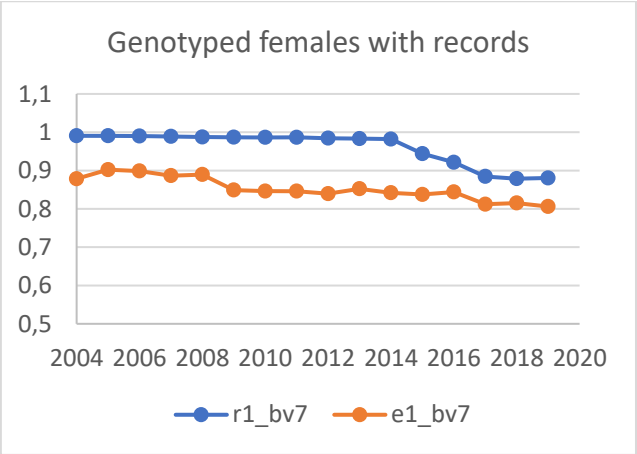
***bv6***


Non genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv6
e1_bv6

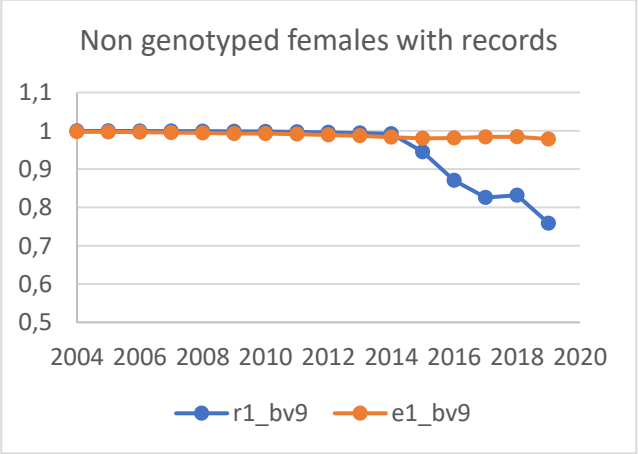

Genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv6
e1_bv6

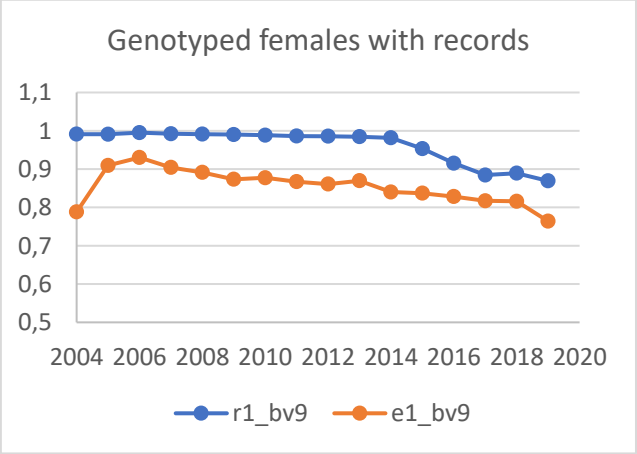
***bv7***


Non genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv7
e1_bv7

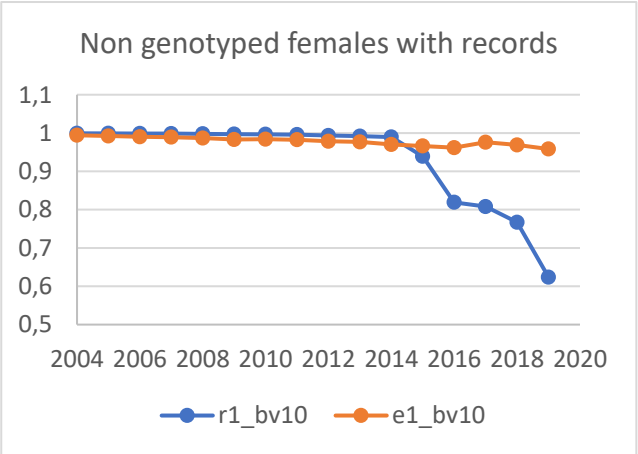

Genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv7
e1_bv7

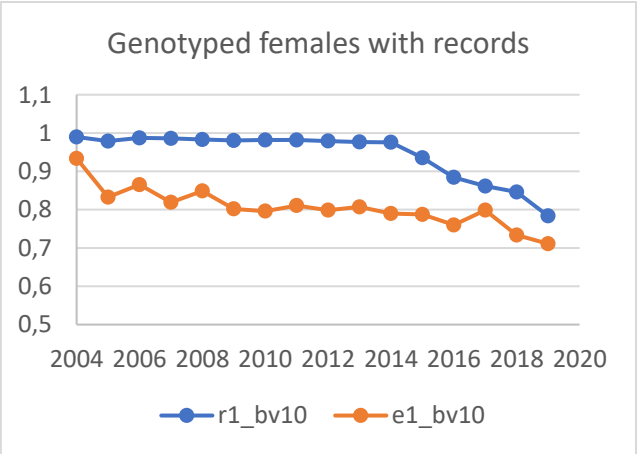
***bv9***


Non genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv9
e1_bv9

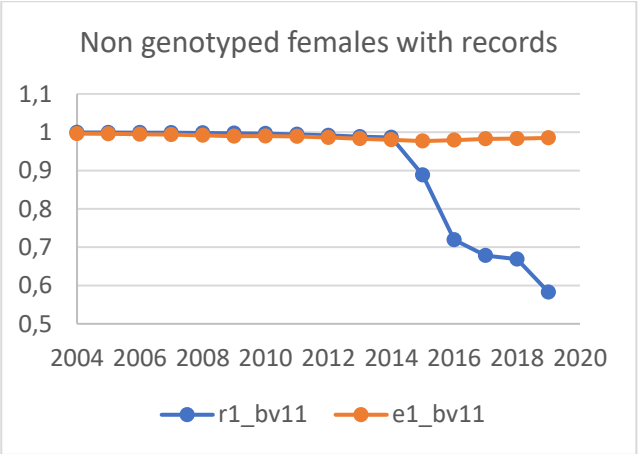

Genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv9
e1_bv9

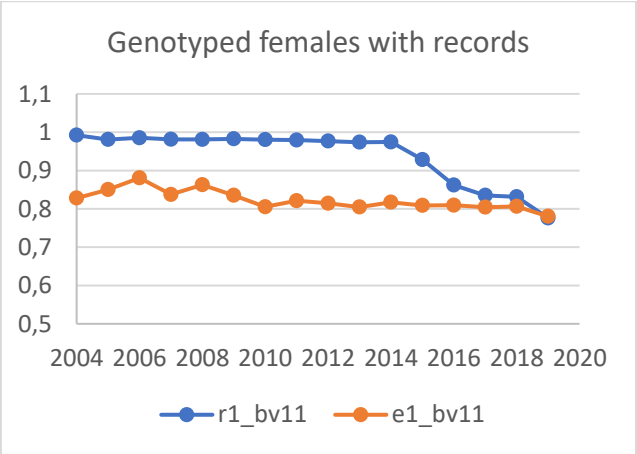
***bv10***


Non genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv10
e1_bv10

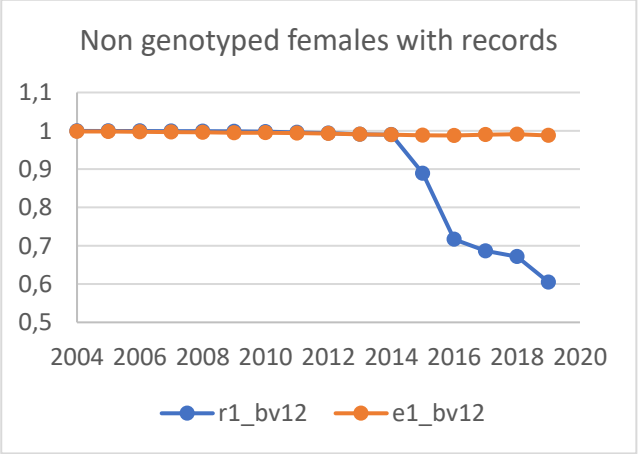

Genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv10
e1_bv10

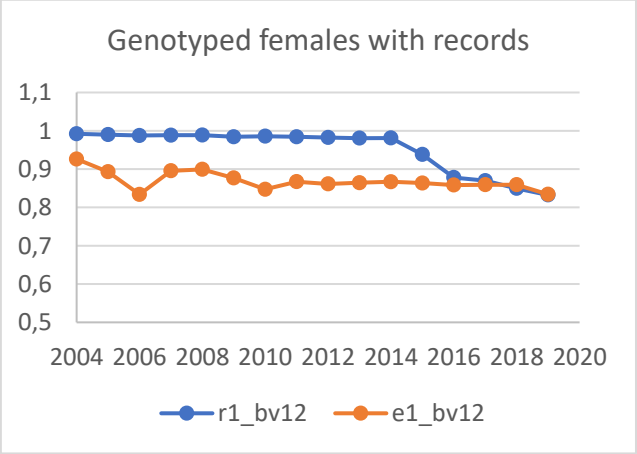
***bv11***



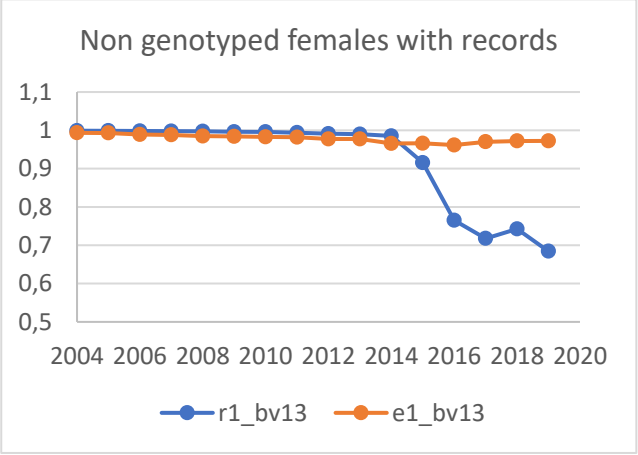



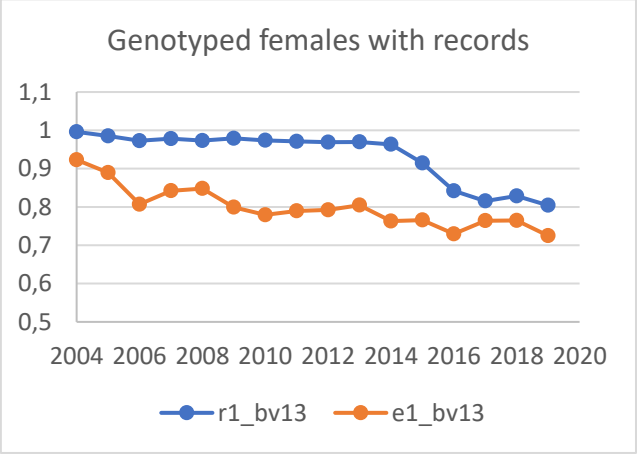

***bv12***



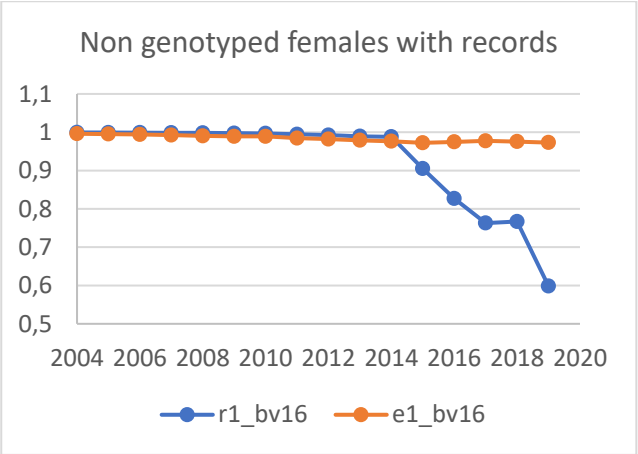



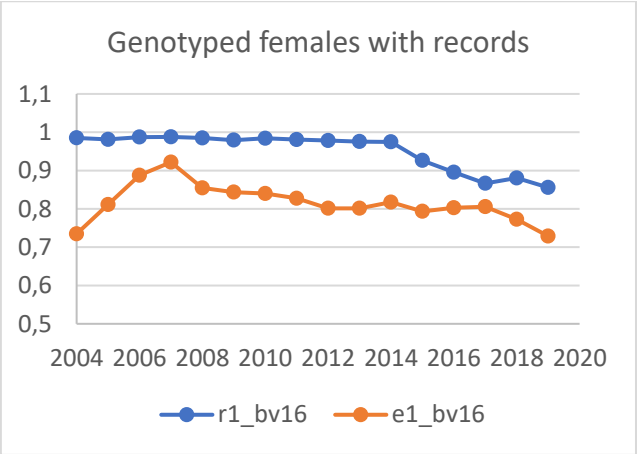

***bv13***



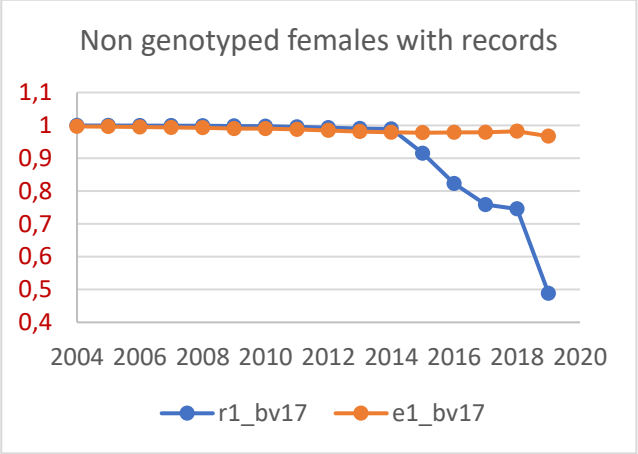



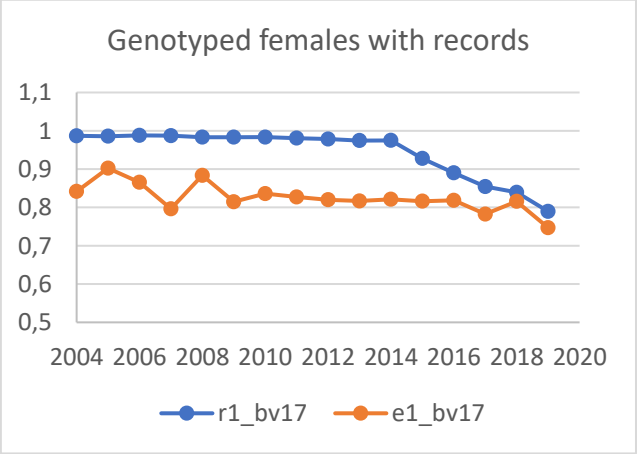
***bv16***



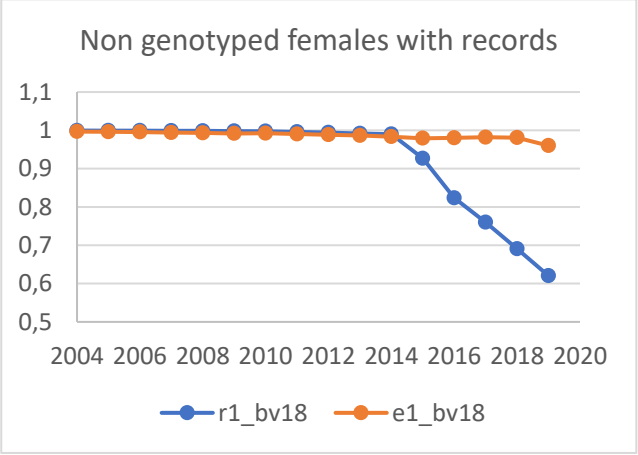



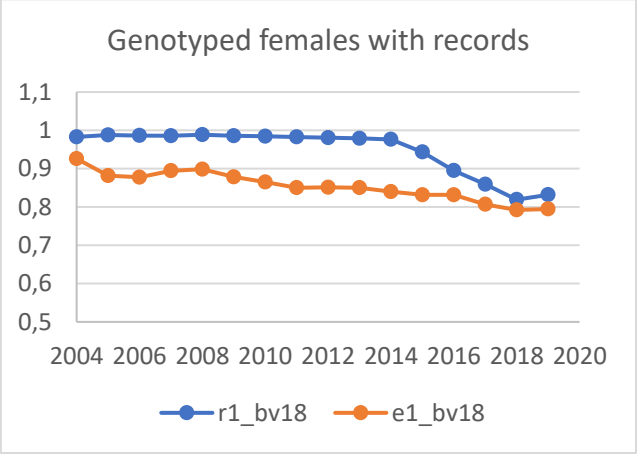

***bv17***



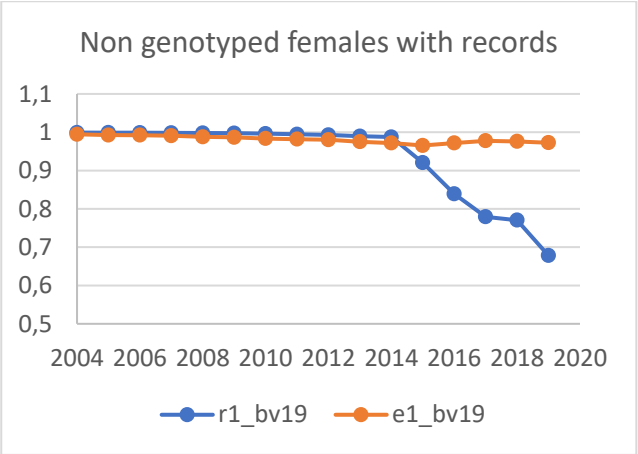



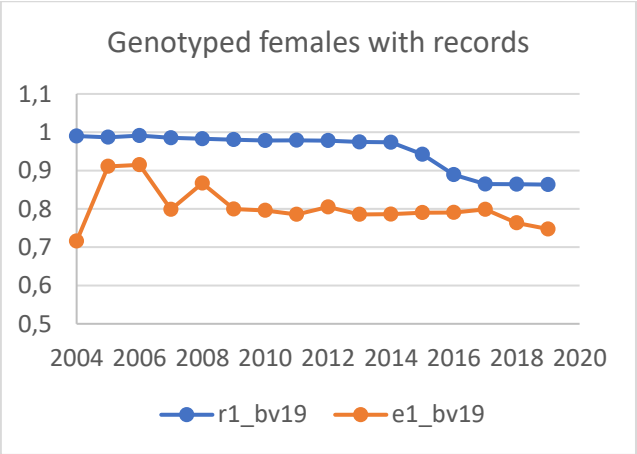

***bv18***



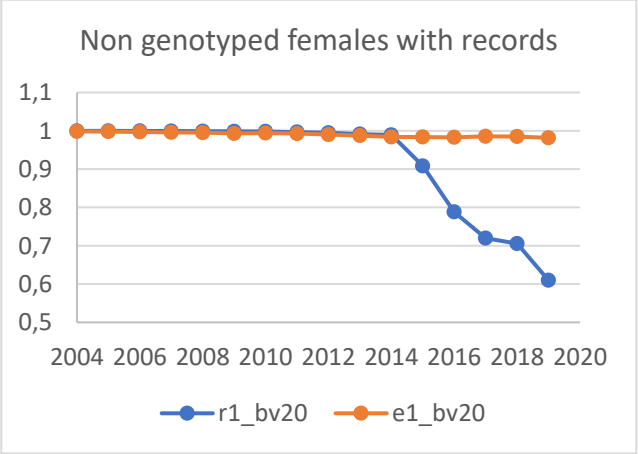



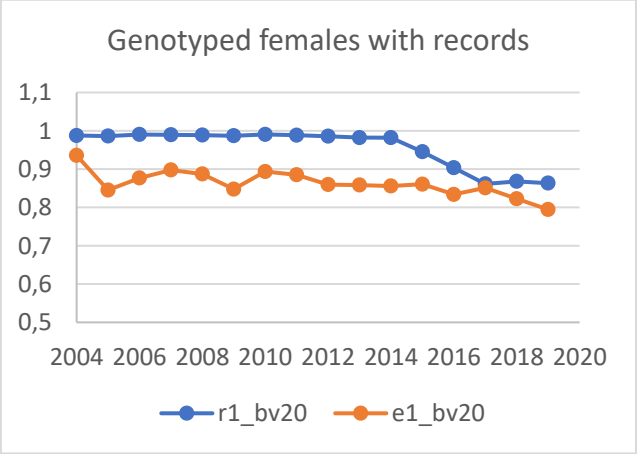
***bv19***



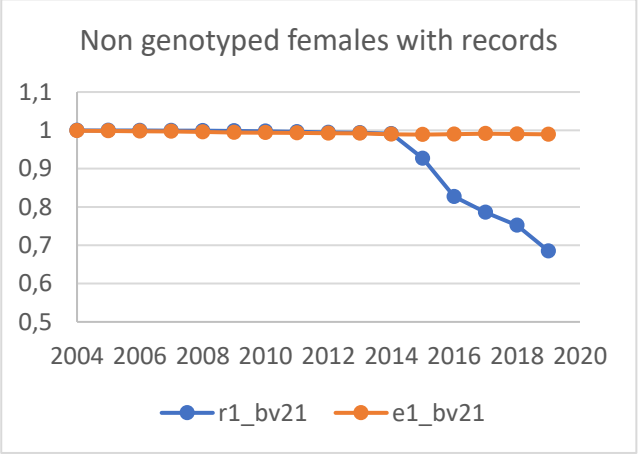



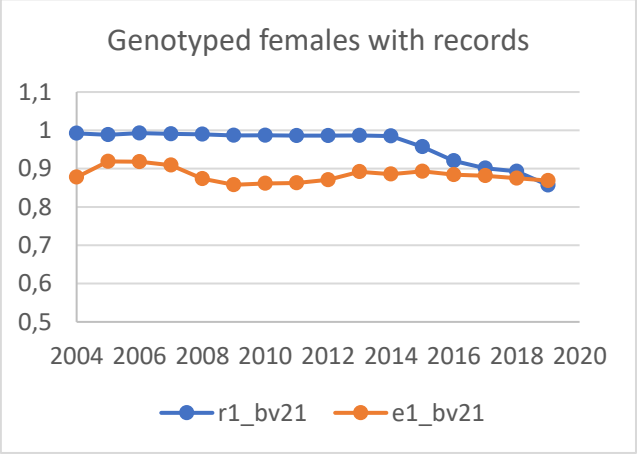

***bv20***



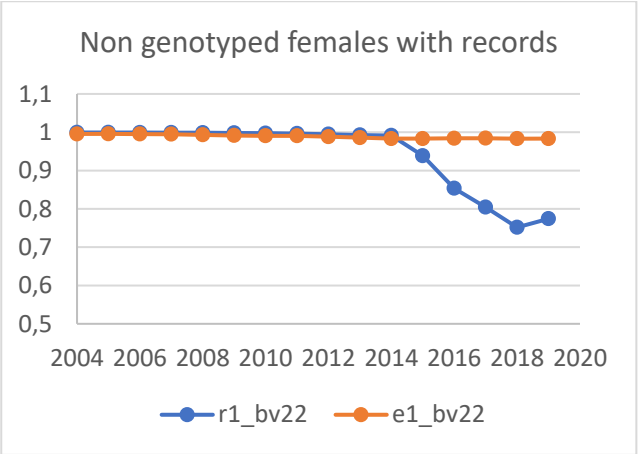



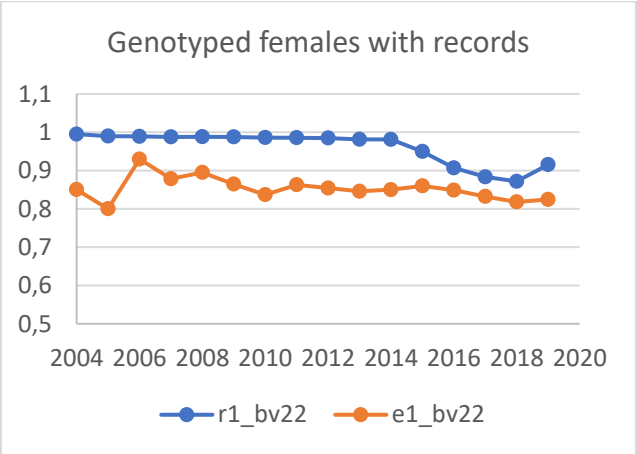

***bv21***



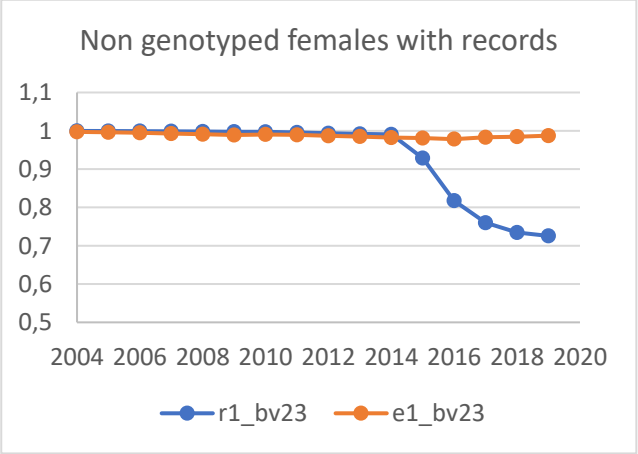



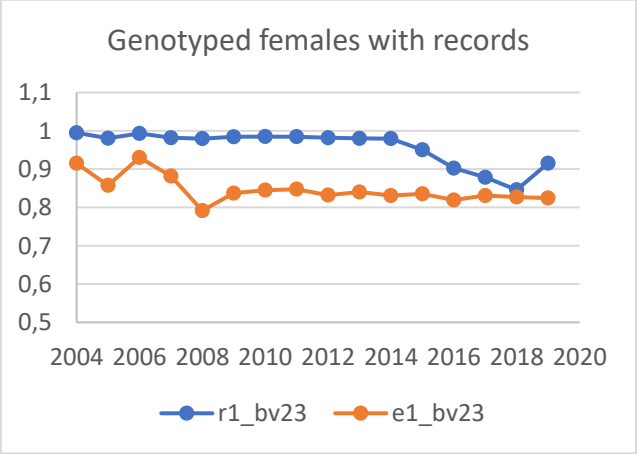
***bv22***



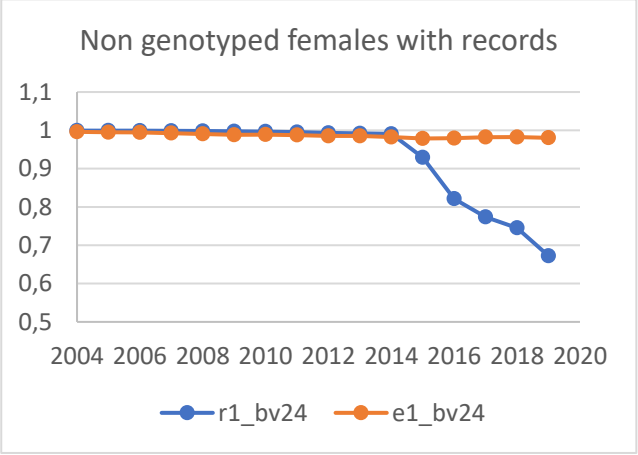



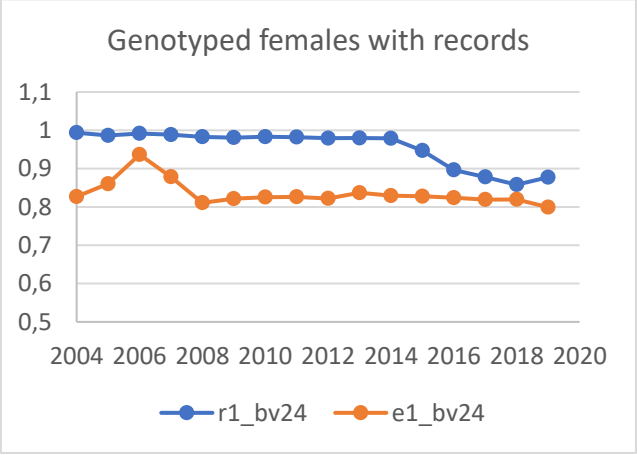

***bv23***



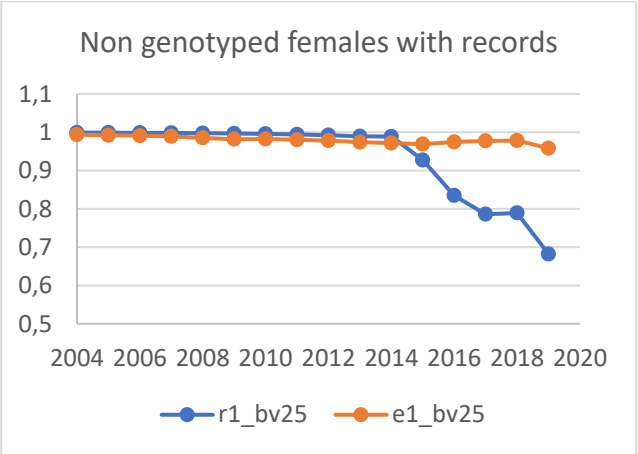



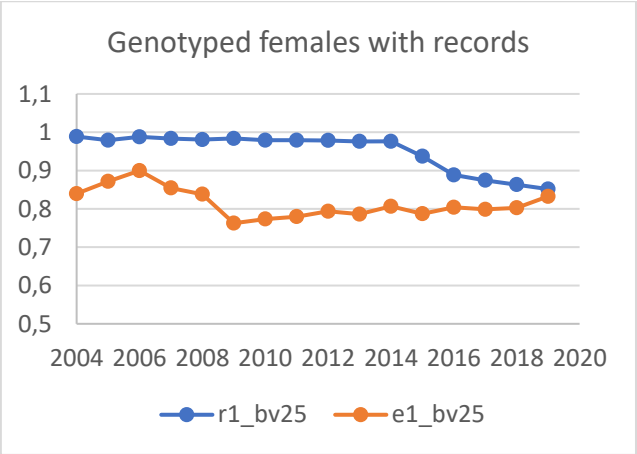

***bv24***



***bv25***



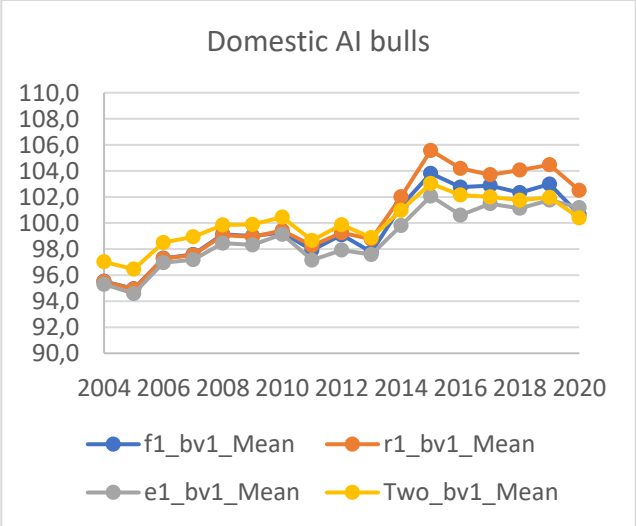



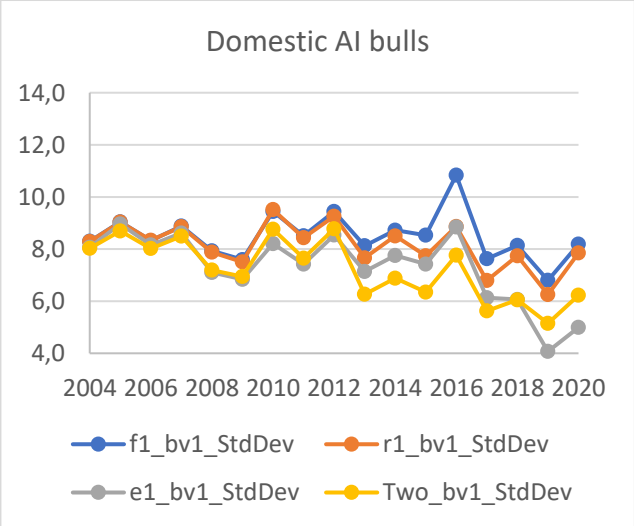

# Bulls

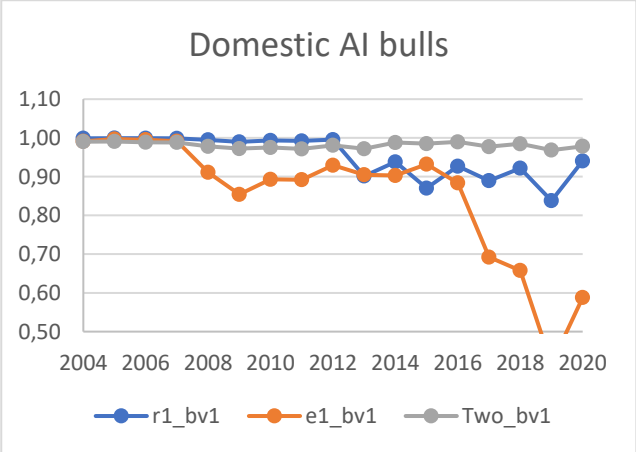
## Trend (mean and SD) and correlations

***bv1***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 95.5 | 95.5 | 95.3 | 97.0 | 8.3 | 8.3 | 8.1 | 8.0 | 1.00 | 0.99 | 0.99 |
| 2005 | 200 | 95.0 | 94.9 | 94.6 | 96.5 | 9.0 | 9.0 | 9.0 | 8.7 | 1.00 | 1.00 | 0.99 |
| 2006 | 194 | 97.3 | 97.3 | 97.0 | 98.5 | 8.3 | 8.3 | 8.2 | 8.0 | 1.00 | 1.00 | 0.99 |
| 2007 | 184 | 97.6 | 97.5 | 97.2 | 98.9 | 8.9 | 8.9 | 8.6 | 8.5 | 1.00 | 0.99 | 0.99 |
| 2008 | 236 | 99.1 | 99.1 | 98.5 | 99.8 | 7.9 | 7.9 | 7.1 | 7.2 | 0.99 | 0.91 | 0.98 |
| 2009 | 216 | 99.0 | 98.9 | 98.3 | 99.9 | 7.6 | 7.5 | 6.8 | 6.9 | 0.99 | 0.85 | 0.97 |
| 2010 | 230 | 99.3 | 99.4 | 99.1 | 100.4 | 9.4 | 9.5 | 8.2 | 8.8 | 0.99 | 0.89 | 0.98 |
| 2011 | 215 | 97.9 | 98.3 | 97.2 | 98.7 | 8.5 | 8.4 | 7.4 | 7.6 | 0.99 | 0.89 | 0.97 |
| 2012 | 151 | 99.1 | 99.3 | 97.9 | 99.9 | 9.4 | 9.3 | 8.5 | 8.8 | 1.00 | 0.93 | 0.98 |
| 2013 | 119 | 97.8 | 98.8 | 97.6 | 98.9 | 8.1 | 7.7 | 7.1 | 6.3 | 0.90 | 0.90 | 0.97 |
| 2014 | 73 | 101.3 | 102.0 | 99.8 | 101.0 | 8.7 | 8.5 | 7.8 | 6.9 | 0.94 | 0.90 | 0.99 |
| 2015 | 50 | 103.8 | 105.6 | 102.1 | 103.0 | 8.5 | 7.7 | 7.4 | 6.3 | 0.87 | 0.93 | 0.99 |
| 2016 | 47 | 102.8 | 104.2 | 100.6 | 102.1 | 10.8 | 8.9 | 8.8 | 7.8 | 0.93 | 0.88 | 0.99 |
| 2017 | 79 | 102.9 | 103.7 | 101.5 | 102.0 | 7.6 | 6.8 | 6.1 | 5.6 | 0.89 | 0.69 | 0.98 |
| 2018 | 63 | 102.3 | 104.1 | 101.1 | 101.7 | 8.1 | 7.7 | 6.1 | 6.1 | 0.92 | 0.66 | 0.98 |
| 2019 | 49 | 103.0 | 104.5 | 101.8 | 102.0 | 6.8 | 6.3 | 4.1 | 5.1 | 0.84 | 0.42 | 0.97 |
| 2020 | 43 | 100.6 | 102.5 | 101.2 | 100.4 | 8.2 | 7.8 | 5.0 | 6.2 | 0.94 | 0.59 | 0.98 |

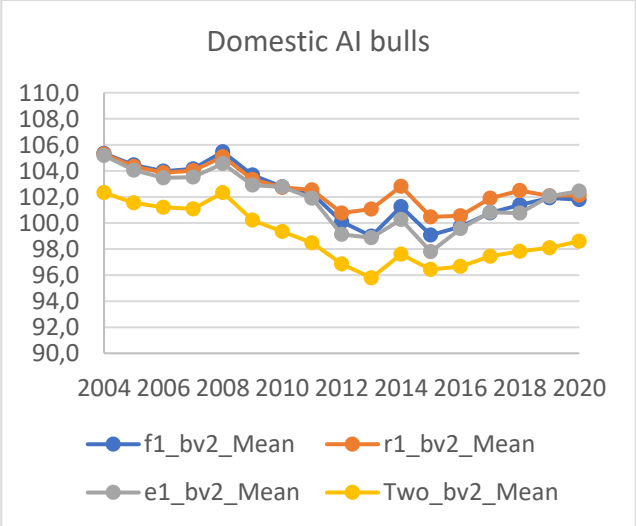


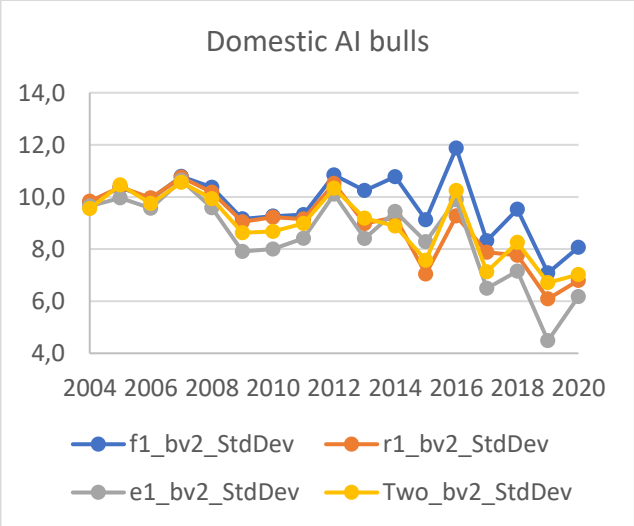



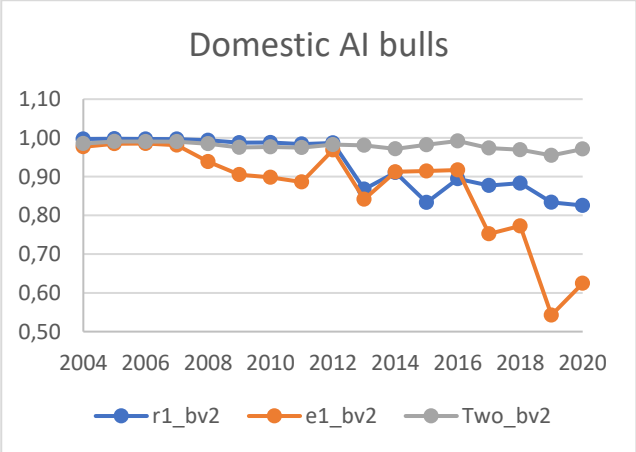



***bv2***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 105.3 | 105.3 | 105.2 | 102.3 | 9.8 | 9.8 | 9.7 | 9.6 | 1.00 | 0.98 | 0.99 |
| 2005 | 200 | 104.5 | 104.3 | 104.1 | 101.5 | 10.4 | 10.4 | 10.0 | 10.5 | 1.00 | 0.98 | 0.99 |
| 2006 | 194 | 104.0 | 103.9 | 103.5 | 101.2 | 9.9 | 10.0 | 9.6 | 9.7 | 1.00 | 0.99 | 0.99 |
| 2007 | 184 | 104.2 | 104.0 | 103.5 | 101.1 | 10.8 | 10.8 | 10.6 | 10.6 | 1.00 | 0.98 | 0.99 |
| 2008 | 236 | 105.5 | 105.1 | 104.6 | 102.3 | 10.4 | 10.2 | 9.6 | 9.9 | 0.99 | 0.94 | 0.98 |
| 2009 | 216 | 103.7 | 103.3 | 102.9 | 100.2 | 9.2 | 9.0 | 7.9 | 8.6 | 0.99 | 0.91 | 0.98 |
| 2010 | 230 | 102.8 | 102.7 | 102.8 | 99.3 | 9.3 | 9.2 | 8.0 | 8.7 | 0.99 | 0.90 | 0.98 |
| 2011 | 215 | 102.3 | 102.5 | 101.9 | 98.5 | 9.3 | 9.2 | 8.4 | 9.0 | 0.98 | 0.89 | 0.97 |
| 2012 | 151 | 100.1 | 100.8 | 99.1 | 96.9 | 10.8 | 10.5 | 10.1 | 10.3 | 0.99 | 0.97 | 0.98 |
| 2013 | 119 | 99.0 | 101.1 | 98.9 | 95.8 | 10.2 | 9.0 | 8.4 | 9.2 | 0.87 | 0.84 | 0.98 |
| 2014 | 73 | 101.3 | 102.8 | 100.3 | 97.6 | 10.8 | 9.2 | 9.4 | 8.9 | 0.91 | 0.91 | 0.97 |
| 2015 | 50 | 99.1 | 100.5 | 97.8 | 96.4 | 9.1 | 7.0 | 8.3 | 7.6 | 0.83 | 0.91 | 0.98 |
| 2016 | 47 | 99.7 | 100.6 | 99.6 | 96.7 | 11.9 | 9.3 | 9.9 | 10.2 | 0.89 | 0.92 | 0.99 |
| 2017 | 79 | 100.8 | 101.9 | 100.8 | 97.4 | 8.3 | 7.9 | 6.5 | 7.1 | 0.88 | 0.75 | 0.97 |
| 2018 | 63 | 101.4 | 102.5 | 100.8 | 97.8 | 9.5 | 7.8 | 7.2 | 8.3 | 0.88 | 0.77 | 0.97 |
| 2019 | 49 | 101.9 | 102.1 | 102.1 | 98.1 | 7.1 | 6.1 | 4.5 | 6.7 | 0.83 | 0.54 | 0.95 |
| 2020 | 43 | 101.8 | 102.1 | 102.4 | 98.6 | 8.1 | 6.8 | 6.2 | 7.0 | 0.83 | 0.62 | 0.97 |

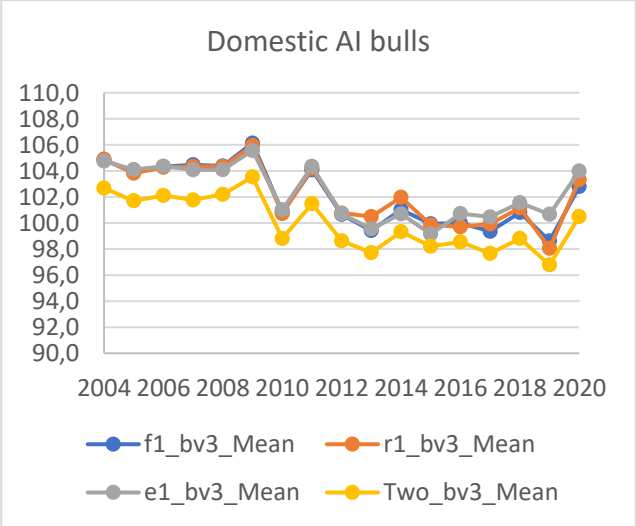


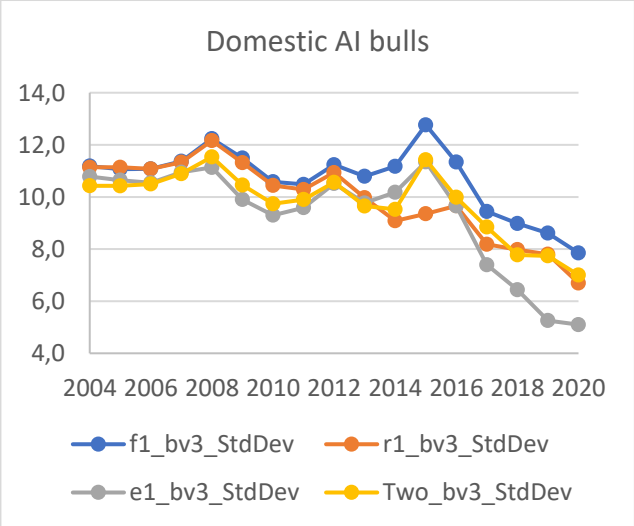



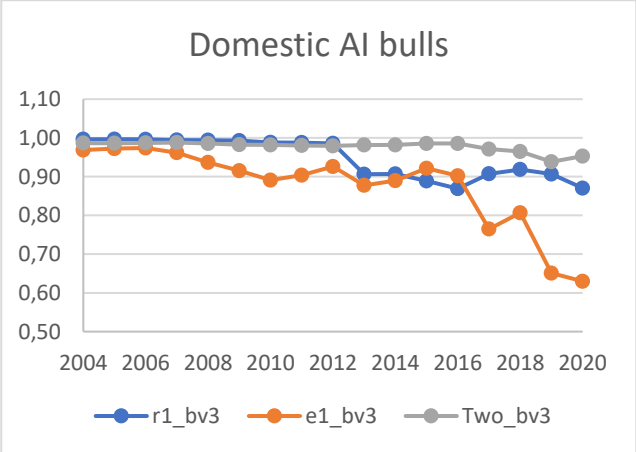



***bv3***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 104.8 | 104.9 | 104.8 | 102.7 | 11.2 | 11.1 | 10.8 | 10.4 | 1.00 | 0.97 | 0.99 |
| 2005 | 200 | 103.9 | 103.8 | 104.1 | 101.7 | 11.1 | 11.1 | 10.6 | 10.4 | 1.00 | 0.97 | 0.99 |
| 2006 | 194 | 104.3 | 104.3 | 104.4 | 102.1 | 11.1 | 11.1 | 10.5 | 10.5 | 1.00 | 0.97 | 0.99 |
| 2007 | 184 | 104.5 | 104.3 | 104.1 | 101.8 | 11.4 | 11.3 | 10.9 | 10.9 | 0.99 | 0.96 | 0.99 |
| 2008 | 236 | 104.4 | 104.3 | 104.1 | 102.2 | 12.2 | 12.2 | 11.1 | 11.5 | 0.99 | 0.94 | 0.99 |
| 2009 | 216 | 106.1 | 105.9 | 105.6 | 103.5 | 11.5 | 11.3 | 9.9 | 10.5 | 0.99 | 0.92 | 0.98 |
| 2010 | 230 | 100.8 | 100.7 | 101.0 | 98.8 | 10.6 | 10.4 | 9.3 | 9.7 | 0.99 | 0.89 | 0.98 |
| 2011 | 215 | 104.1 | 104.2 | 104.3 | 101.5 | 10.5 | 10.3 | 9.6 | 9.9 | 0.99 | 0.90 | 0.98 |
| 2012 | 151 | 100.7 | 100.8 | 100.7 | 98.6 | 11.2 | 10.9 | 10.5 | 10.6 | 0.99 | 0.93 | 0.98 |
| 2013 | 119 | 99.4 | 100.5 | 99.6 | 97.7 | 10.8 | 10.0 | 9.8 | 9.7 | 0.91 | 0.88 | 0.98 |
| 2014 | 73 | 101.0 | 102.0 | 100.7 | 99.3 | 11.2 | 9.1 | 10.2 | 9.5 | 0.91 | 0.89 | 0.98 |
| 2015 | 50 | 99.9 | 99.9 | 99.1 | 98.2 | 12.8 | 9.4 | 11.3 | 11.4 | 0.89 | 0.92 | 0.99 |
| 2016 | 47 | 100.0 | 99.7 | 100.7 | 98.5 | 11.3 | 9.7 | 9.7 | 10.0 | 0.87 | 0.90 | 0.99 |
| 2017 | 79 | 99.4 | 99.9 | 100.5 | 97.7 | 9.4 | 8.2 | 7.4 | 8.8 | 0.91 | 0.76 | 0.97 |
| 2018 | 63 | 100.8 | 101.2 | 101.6 | 98.8 | 9.0 | 8.0 | 6.4 | 7.8 | 0.92 | 0.81 | 0.96 |
| 2019 | 49 | 98.6 | 98.1 | 100.7 | 96.8 | 8.6 | 7.8 | 5.3 | 7.7 | 0.91 | 0.65 | 0.94 |
| 2020 | 43 | 102.8 | 103.3 | 104.0 | 100.5 | 7.9 | 6.7 | 5.1 | 7.0 | 0.87 | 0.63 | 0.95 |

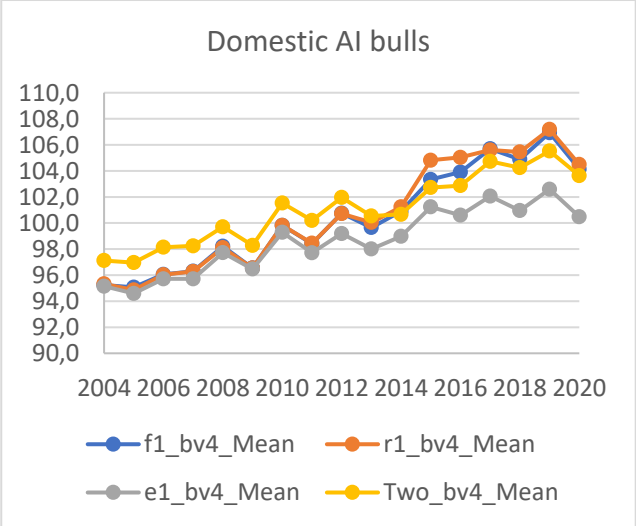


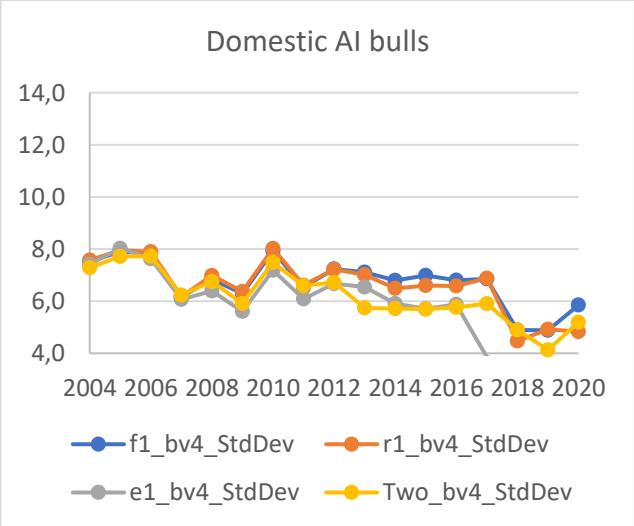



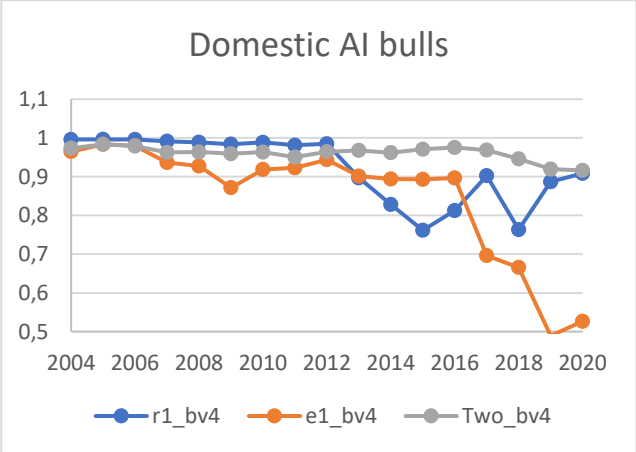



***bv4***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 95.2 | 95.3 | 95.1 | 97.1 | 7.5 | 7.6 | 7.4 | 7.3 | 1.00 | 0.96 | 0.97 |
| 2005 | 200 | 95.1 | 94.9 | 94.6 | 97.0 | 7.9 | 8.0 | 8.0 | 7.7 | 1.00 | 0.98 | 0.98 |
| 2006 | 194 | 96.1 | 96.0 | 95.7 | 98.1 | 7.8 | 7.9 | 7.6 | 7.7 | 1.00 | 0.98 | 0.98 |
| 2007 | 184 | 96.3 | 96.3 | 95.7 | 98.2 | 6.2 | 6.2 | 6.1 | 6.2 | 0.99 | 0.94 | 0.96 |
| 2008 | 236 | 98.2 | 98.1 | 97.7 | 99.7 | 6.8 | 7.0 | 6.4 | 6.8 | 0.99 | 0.93 | 0.96 |
| 2009 | 216 | 96.5 | 96.5 | 96.5 | 98.3 | 6.3 | 6.4 | 5.6 | 5.9 | 0.98 | 0.87 | 0.96 |
| 2010 | 230 | 99.8 | 99.8 | 99.3 | 101.5 | 7.9 | 8.0 | 7.2 | 7.5 | 0.99 | 0.92 | 0.96 |
| 2011 | 215 | 98.4 | 98.4 | 97.7 | 100.2 | 6.5 | 6.6 | 6.1 | 6.6 | 0.98 | 0.92 | 0.95 |
| 2012 | 151 | 100.8 | 100.7 | 99.2 | 102.0 | 7.2 | 7.2 | 6.7 | 6.7 | 0.98 | 0.94 | 0.96 |
| 2013 | 119 | 99.7 | 100.0 | 98.0 | 100.5 | 7.1 | 7.0 | 6.5 | 5.7 | 0.90 | 0.90 | 0.97 |
| 2014 | 73 | 100.9 | 101.2 | 99.0 | 100.7 | 6.8 | 6.5 | 5.9 | 5.7 | 0.83 | 0.89 | 0.96 |
| 2015 | 50 | 103.3 | 104.8 | 101.2 | 102.7 | 7.0 | 6.6 | 5.7 | 5.7 | 0.76 | 0.89 | 0.97 |
| 2016 | 47 | 103.9 | 105.0 | 100.6 | 102.9 | 6.8 | 6.6 | 5.9 | 5.8 | 0.81 | 0.90 | 0.98 |
| 2017 | 79 | 105.7 | 105.6 | 102.1 | 104.7 | 6.9 | 6.9 | 3.9 | 5.9 | 0.90 | 0.70 | 0.97 |
| 2018 | 63 | 104.9 | 105.5 | 101.0 | 104.2 | 4.9 | 4.5 | 3.5 | 4.9 | 0.76 | 0.67 | 0.95 |
| 2019 | 49 | 106.9 | 107.2 | 102.6 | 105.5 | 4.9 | 4.9 | 3.0 | 4.1 | 0.89 | 0.49 | 0.92 |
| 2020 | 43 | 104.1 | 104.5 | 100.5 | 103.6 | 5.9 | 4.8 | 2.8 | 5.2 | 0.91 | 0.53 | 0.92 |

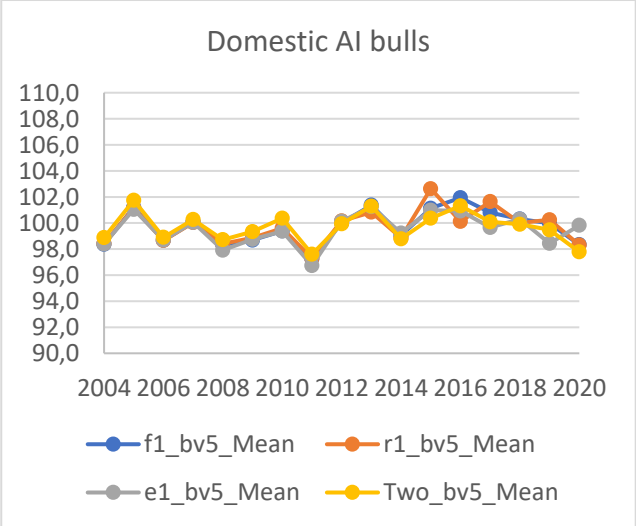


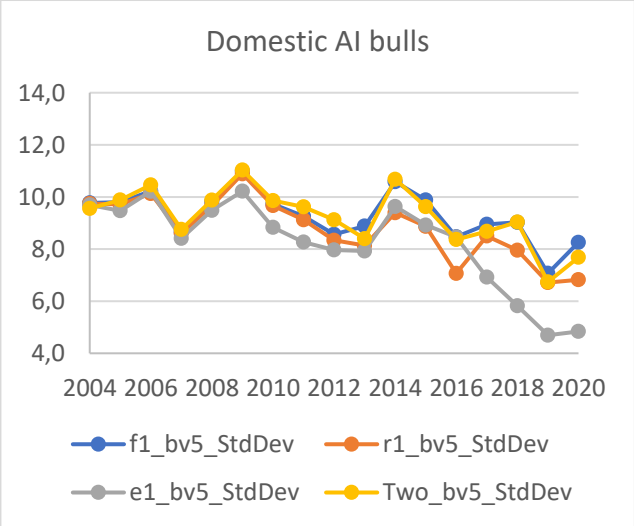



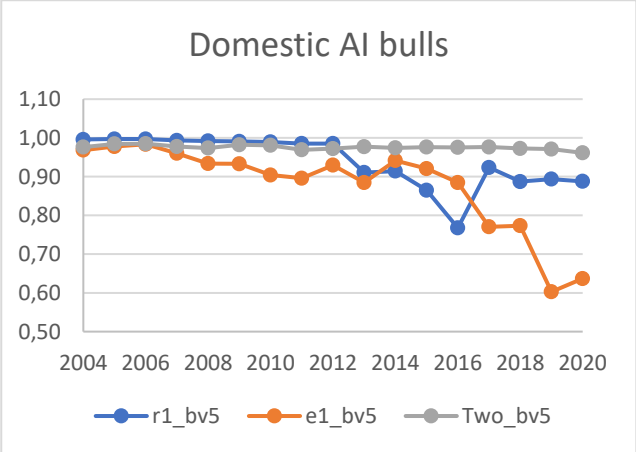



***bv5***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 98.4 | 98.4 | 98.4 | 98.9 | 9.8 | 9.7 | 9.7 | 9.6 | 1.00 | 0.97 | 0.98 |
| 2005 | 200 | 101.2 | 101.1 | 101.0 | 101.7 | 9.8 | 9.7 | 9.5 | 9.9 | 1.00 | 0.98 | 0.98 |
| 2006 | 194 | 98.7 | 98.7 | 98.7 | 98.9 | 10.2 | 10.1 | 10.2 | 10.5 | 1.00 | 0.98 | 0.98 |
| 2007 | 184 | 100.1 | 100.0 | 100.0 | 100.3 | 8.7 | 8.6 | 8.4 | 8.8 | 0.99 | 0.96 | 0.98 |
| 2008 | 236 | 98.3 | 98.4 | 97.9 | 98.7 | 9.8 | 9.7 | 9.5 | 9.9 | 0.99 | 0.93 | 0.97 |
| 2009 | 216 | 98.7 | 98.9 | 98.7 | 99.3 | 11.0 | 10.9 | 10.2 | 11.0 | 0.99 | 0.93 | 0.98 |
| 2010 | 230 | 99.4 | 99.6 | 99.4 | 100.4 | 9.7 | 9.7 | 8.8 | 9.9 | 0.99 | 0.90 | 0.98 |
| 2011 | 215 | 97.3 | 97.3 | 96.7 | 97.6 | 9.3 | 9.1 | 8.3 | 9.6 | 0.99 | 0.90 | 0.97 |
| 2012 | 151 | 100.0 | 100.2 | 100.1 | 99.9 | 8.6 | 8.3 | 8.0 | 9.1 | 0.99 | 0.93 | 0.97 |
| 2013 | 119 | 101.4 | 100.8 | 101.2 | 101.3 | 8.9 | 8.1 | 7.9 | 8.4 | 0.91 | 0.88 | 0.98 |
| 2014 | 73 | 99.1 | 98.9 | 99.2 | 98.8 | 10.6 | 9.4 | 9.6 | 10.7 | 0.91 | 0.94 | 0.97 |
| 2015 | 50 | 101.1 | 102.6 | 101.0 | 100.4 | 9.9 | 8.9 | 8.9 | 9.6 | 0.86 | 0.92 | 0.98 |
| 2016 | 47 | 101.9 | 100.1 | 100.9 | 101.3 | 8.5 | 7.1 | 8.5 | 8.4 | 0.77 | 0.88 | 0.98 |
| 2017 | 79 | 100.8 | 101.6 | 99.7 | 100.1 | 8.9 | 8.5 | 6.9 | 8.7 | 0.92 | 0.77 | 0.98 |
| 2018 | 63 | 100.3 | 100.0 | 100.3 | 99.9 | 9.0 | 8.0 | 5.8 | 9.0 | 0.89 | 0.77 | 0.97 |
| 2019 | 49 | 100.0 | 100.2 | 98.4 | 99.5 | 7.1 | 6.7 | 4.7 | 6.7 | 0.89 | 0.60 | 0.97 |
| 2020 | 43 | 98.3 | 98.3 | 99.8 | 97.8 | 8.3 | 6.8 | 4.8 | 7.7 | 0.89 | 0.64 | 0.96 |

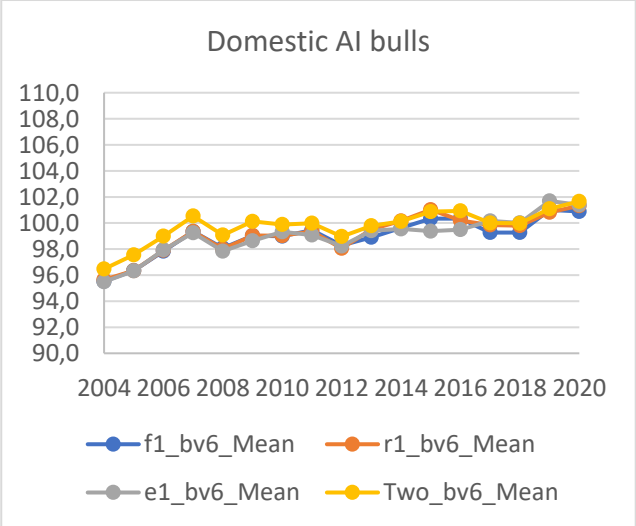


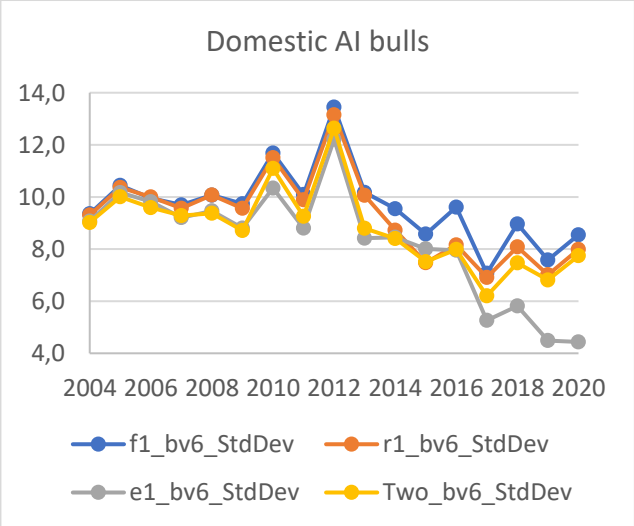



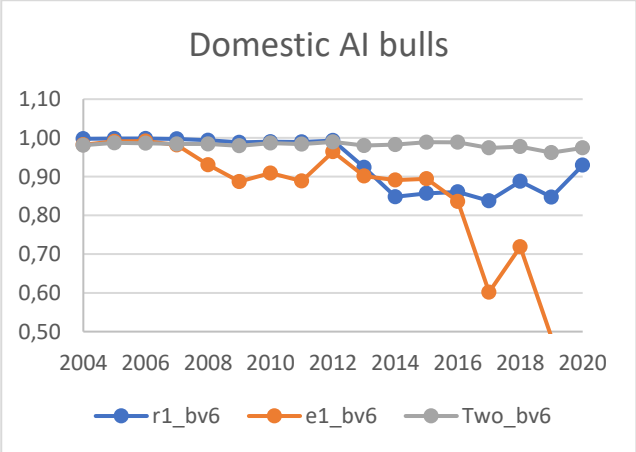



***bv6***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 95.5 | 95.6 | 95.5 | 96.5 | 9.4 | 9.3 | 9.1 | 9.0 | 1.00 | 0.98 | 0.98 |
| 2005 | 200 | 96.3 | 96.3 | 96.3 | 97.6 | 10.4 | 10.4 | 10.2 | 10.0 | 1.00 | 0.99 | 0.99 |
| 2006 | 194 | 97.8 | 97.9 | 97.9 | 99.0 | 10.0 | 10.0 | 9.8 | 9.6 | 1.00 | 0.99 | 0.99 |
| 2007 | 184 | 99.4 | 99.4 | 99.2 | 100.5 | 9.7 | 9.6 | 9.2 | 9.3 | 1.00 | 0.98 | 0.98 |
| 2008 | 236 | 98.1 | 98.0 | 97.8 | 99.1 | 10.1 | 10.1 | 9.5 | 9.4 | 0.99 | 0.93 | 0.98 |
| 2009 | 216 | 99.0 | 99.0 | 98.6 | 100.1 | 9.7 | 9.6 | 8.8 | 8.7 | 0.99 | 0.89 | 0.98 |
| 2010 | 230 | 99.0 | 99.0 | 99.3 | 99.9 | 11.7 | 11.5 | 10.3 | 11.1 | 0.99 | 0.91 | 0.99 |
| 2011 | 215 | 99.5 | 99.4 | 99.1 | 100.0 | 10.1 | 9.9 | 8.8 | 9.3 | 0.99 | 0.89 | 0.98 |
| 2012 | 151 | 98.3 | 98.1 | 98.2 | 99.0 | 13.4 | 13.1 | 12.2 | 12.6 | 0.99 | 0.96 | 0.99 |
| 2013 | 119 | 98.9 | 99.5 | 99.4 | 99.8 | 10.2 | 10.1 | 8.4 | 8.8 | 0.92 | 0.90 | 0.98 |
| 2014 | 73 | 99.6 | 100.2 | 99.5 | 100.1 | 9.5 | 8.7 | 8.5 | 8.4 | 0.85 | 0.89 | 0.98 |
| 2015 | 50 | 100.3 | 101.0 | 99.4 | 100.9 | 8.6 | 7.5 | 8.0 | 7.5 | 0.86 | 0.89 | 0.99 |
| 2016 | 47 | 100.3 | 100.2 | 99.5 | 100.9 | 9.6 | 8.2 | 8.0 | 8.0 | 0.86 | 0.84 | 0.99 |
| 2017 | 79 | 99.3 | 99.8 | 100.2 | 100.0 | 7.1 | 6.9 | 5.3 | 6.2 | 0.84 | 0.60 | 0.97 |
| 2018 | 63 | 99.3 | 99.8 | 100.0 | 100.0 | 9.0 | 8.1 | 5.8 | 7.5 | 0.89 | 0.72 | 0.98 |
| 2019 | 49 | 101.0 | 100.8 | 101.7 | 101.1 | 7.6 | 7.0 | 4.5 | 6.8 | 0.85 | 0.49 | 0.96 |
| 2020 | 43 | 100.9 | 101.3 | 101.4 | 101.7 | 8.5 | 8.0 | 4.4 | 7.7 | 0.93 | 0.46 | 0.97 |

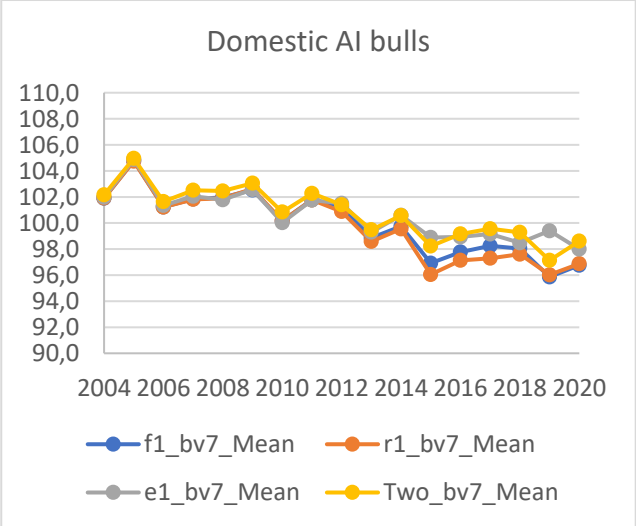


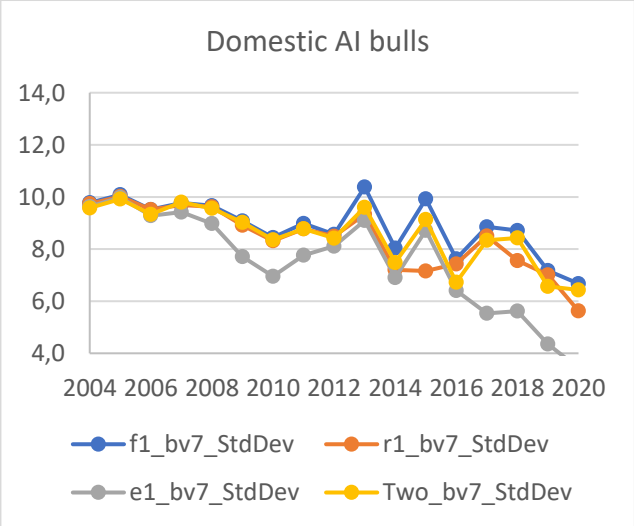



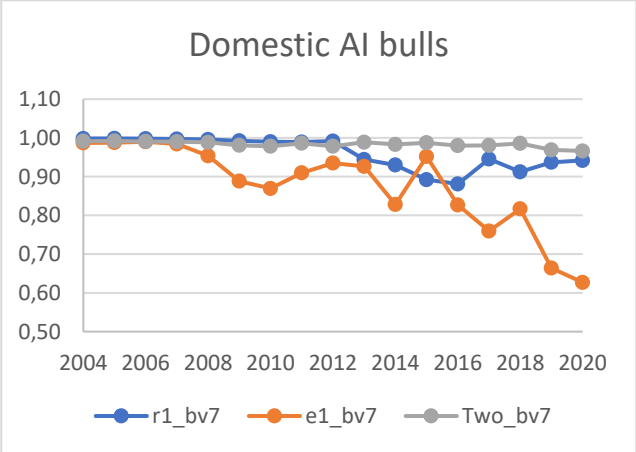



***bv7***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 101.9 | 101.9 | 102.0 | 102.2 | 9.8 | 9.7 | 9.6 | 9.6 | 1.00 | 0.99 | 0.99 |
| 2005 | 200 | 104.8 | 104.7 | 104.9 | 105.0 | 10.1 | 10.0 | 10.0 | 9.9 | 1.00 | 0.99 | 0.99 |
| 2006 | 194 | 101.2 | 101.2 | 101.3 | 101.6 | 9.5 | 9.5 | 9.3 | 9.3 | 1.00 | 0.99 | 0.99 |
| 2007 | 184 | 101.8 | 101.8 | 102.1 | 102.5 | 9.8 | 9.7 | 9.4 | 9.8 | 1.00 | 0.98 | 0.99 |
| 2008 | 236 | 102.0 | 101.9 | 101.8 | 102.5 | 9.7 | 9.6 | 9.0 | 9.6 | 1.00 | 0.95 | 0.99 |
| 2009 | 216 | 102.5 | 102.6 | 102.6 | 103.1 | 9.1 | 8.9 | 7.7 | 9.0 | 0.99 | 0.89 | 0.98 |
| 2010 | 230 | 100.2 | 100.2 | 100.0 | 100.8 | 8.4 | 8.3 | 7.0 | 8.4 | 0.99 | 0.87 | 0.98 |
| 2011 | 215 | 101.8 | 101.8 | 101.8 | 102.3 | 9.0 | 8.8 | 7.8 | 8.8 | 0.99 | 0.91 | 0.99 |
| 2012 | 151 | 101.3 | 100.9 | 101.5 | 101.4 | 8.6 | 8.5 | 8.1 | 8.4 | 0.99 | 0.94 | 0.98 |
| 2013 | 119 | 98.9 | 98.6 | 99.3 | 99.5 | 10.4 | 9.3 | 9.1 | 9.6 | 0.94 | 0.93 | 0.99 |
| 2014 | 73 | 99.7 | 99.5 | 100.6 | 100.6 | 8.0 | 7.2 | 6.9 | 7.5 | 0.93 | 0.83 | 0.98 |
| 2015 | 50 | 96.9 | 96.0 | 98.9 | 98.2 | 9.9 | 7.2 | 8.7 | 9.1 | 0.89 | 0.95 | 0.99 |
| 2016 | 47 | 97.8 | 97.1 | 98.9 | 99.2 | 7.6 | 7.4 | 6.4 | 6.7 | 0.88 | 0.83 | 0.98 |
| 2017 | 79 | 98.2 | 97.3 | 99.2 | 99.6 | 8.9 | 8.5 | 5.5 | 8.3 | 0.95 | 0.76 | 0.98 |
| 2018 | 63 | 98.0 | 97.6 | 98.5 | 99.3 | 8.7 | 7.6 | 5.6 | 8.4 | 0.91 | 0.82 | 0.99 |
| 2019 | 49 | 95.9 | 96.0 | 99.4 | 97.1 | 7.2 | 7.0 | 4.4 | 6.6 | 0.94 | 0.66 | 0.97 |
| 2020 | 43 | 96.8 | 96.9 | 98.0 | 98.6 | 6.7 | 5.6 | 3.4 | 6.4 | 0.94 | 0.63 | 0.97 |

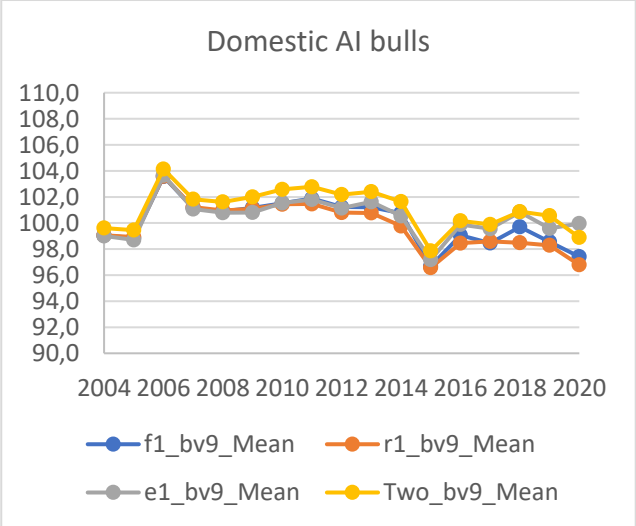


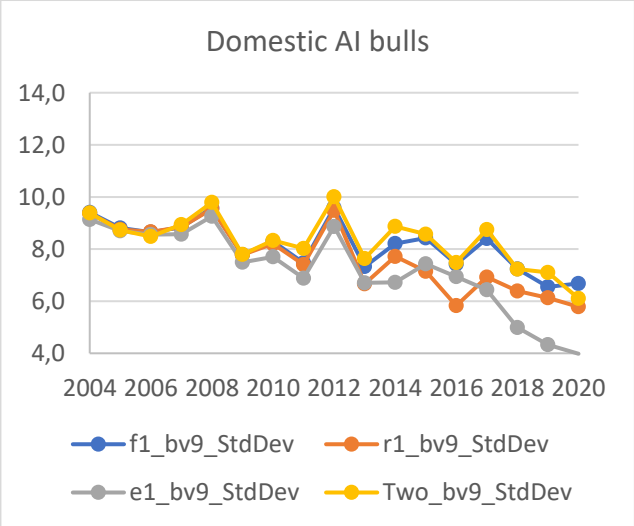



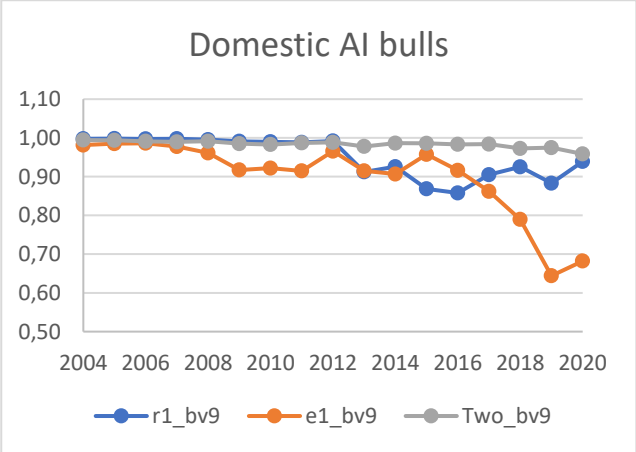



***bv9***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 99.1 | 99.1 | 99.0 | 99.6 | 9.4 | 9.4 | 9.1 | 9.4 | 1.00 | 0.98 | 0.99 |
| 2005 | 200 | 98.8 | 98.9 | 98.7 | 99.5 | 8.8 | 8.8 | 8.7 | 8.7 | 1.00 | 0.99 | 0.99 |
| 2006 | 194 | 103.6 | 103.6 | 103.7 | 104.1 | 8.6 | 8.7 | 8.6 | 8.5 | 1.00 | 0.99 | 0.99 |
| 2007 | 184 | 101.2 | 101.2 | 101.1 | 101.8 | 8.8 | 8.9 | 8.6 | 8.9 | 1.00 | 0.98 | 0.99 |
| 2008 | 236 | 100.9 | 101.0 | 100.8 | 101.6 | 9.6 | 9.5 | 9.3 | 9.8 | 1.00 | 0.96 | 0.99 |
| 2009 | 216 | 101.2 | 101.1 | 100.8 | 102.0 | 7.8 | 7.8 | 7.5 | 7.8 | 0.99 | 0.92 | 0.99 |
| 2010 | 230 | 101.5 | 101.4 | 101.5 | 102.6 | 8.3 | 8.2 | 7.7 | 8.3 | 0.99 | 0.92 | 0.98 |
| 2011 | 215 | 101.9 | 101.5 | 101.8 | 102.8 | 7.5 | 7.4 | 6.9 | 8.0 | 0.99 | 0.91 | 0.99 |
| 2012 | 151 | 101.2 | 100.8 | 101.1 | 102.2 | 9.6 | 9.5 | 8.9 | 10.0 | 0.99 | 0.97 | 0.99 |
| 2013 | 119 | 101.2 | 100.8 | 101.6 | 102.4 | 7.3 | 6.7 | 6.7 | 7.6 | 0.91 | 0.91 | 0.98 |
| 2014 | 73 | 100.8 | 99.8 | 100.5 | 101.6 | 8.2 | 7.7 | 6.7 | 8.9 | 0.93 | 0.91 | 0.99 |
| 2015 | 50 | 96.7 | 96.6 | 97.2 | 97.9 | 8.4 | 7.1 | 7.4 | 8.6 | 0.87 | 0.96 | 0.99 |
| 2016 | 47 | 99.1 | 98.5 | 99.9 | 100.2 | 7.4 | 5.8 | 6.9 | 7.5 | 0.86 | 0.92 | 0.98 |
| 2017 | 79 | 98.5 | 98.6 | 99.6 | 99.9 | 8.4 | 6.9 | 6.4 | 8.7 | 0.91 | 0.86 | 0.98 |
| 2018 | 63 | 99.7 | 98.5 | 100.8 | 100.9 | 7.2 | 6.4 | 5.0 | 7.2 | 0.93 | 0.79 | 0.97 |
| 2019 | 49 | 98.6 | 98.3 | 99.6 | 100.6 | 6.5 | 6.1 | 4.3 | 7.1 | 0.88 | 0.64 | 0.97 |
| 2020 | 43 | 97.4 | 96.8 | 100.0 | 98.9 | 6.7 | 5.8 | 4.0 | 6.1 | 0.94 | 0.68 | 0.96 |

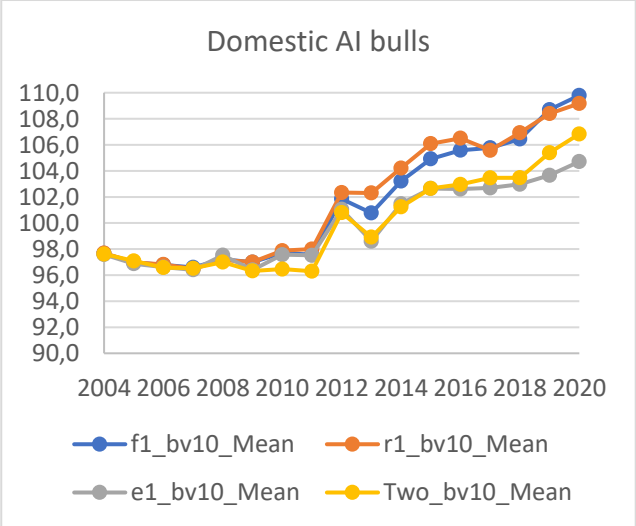


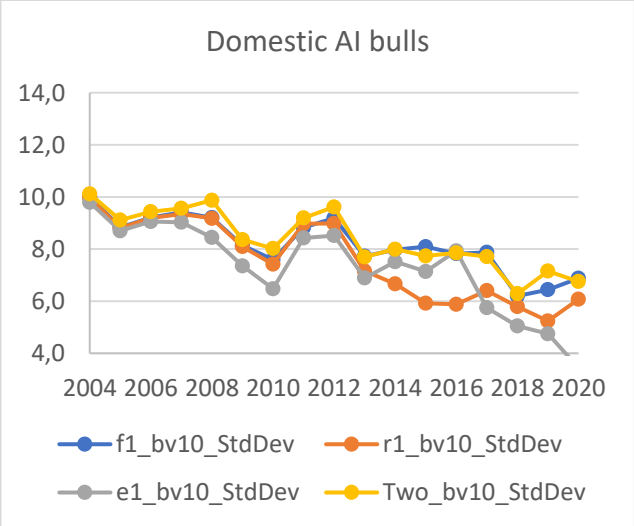



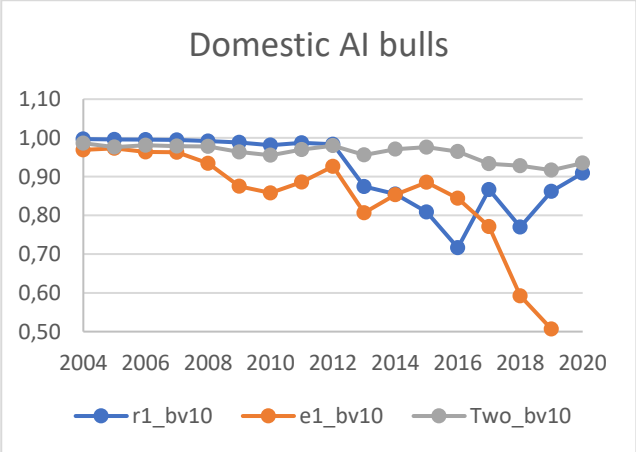



***bv10***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 97.7 | 97.7 | 97.6 | 97.6 | 10.0 | 10.0 | 9.8 | 10.1 | 1.00 | 0.97 | 0.99 |
| 2005 | 200 | 97.0 | 97.0 | 96.9 | 97.1 | 8.8 | 8.8 | 8.7 | 9.1 | 1.00 | 0.97 | 0.98 |
| 2006 | 194 | 96.8 | 96.8 | 96.6 | 96.6 | 9.2 | 9.2 | 9.1 | 9.4 | 1.00 | 0.96 | 0.98 |
| 2007 | 184 | 96.6 | 96.5 | 96.4 | 96.5 | 9.4 | 9.3 | 9.0 | 9.6 | 0.99 | 0.96 | 0.98 |
| 2008 | 236 | 97.2 | 97.2 | 97.5 | 97.0 | 9.2 | 9.2 | 8.4 | 9.9 | 0.99 | 0.93 | 0.98 |
| 2009 | 216 | 97.0 | 97.0 | 96.4 | 96.3 | 8.1 | 8.1 | 7.4 | 8.4 | 0.99 | 0.88 | 0.96 |
| 2010 | 230 | 97.7 | 97.9 | 97.6 | 96.5 | 7.6 | 7.4 | 6.5 | 8.0 | 0.98 | 0.86 | 0.96 |
| 2011 | 215 | 97.6 | 98.0 | 97.5 | 96.3 | 8.8 | 9.0 | 8.4 | 9.2 | 0.99 | 0.89 | 0.97 |
| 2012 | 151 | 101.9 | 102.3 | 101.0 | 100.8 | 9.2 | 9.0 | 8.5 | 9.6 | 0.98 | 0.93 | 0.98 |
| 2013 | 119 | 100.8 | 102.3 | 98.6 | 98.9 | 7.7 | 7.2 | 6.9 | 7.7 | 0.87 | 0.81 | 0.96 |
| 2014 | 73 | 103.2 | 104.2 | 101.5 | 101.2 | 8.0 | 6.7 | 7.5 | 8.0 | 0.85 | 0.85 | 0.97 |
| 2015 | 50 | 104.9 | 106.1 | 102.7 | 102.7 | 8.1 | 5.9 | 7.1 | 7.7 | 0.81 | 0.89 | 0.98 |
| 2016 | 47 | 105.6 | 106.5 | 102.6 | 103.0 | 7.8 | 5.9 | 7.9 | 7.9 | 0.72 | 0.84 | 0.96 |
| 2017 | 79 | 105.8 | 105.6 | 102.7 | 103.5 | 7.9 | 6.4 | 5.7 | 7.7 | 0.87 | 0.77 | 0.93 |
| 2018 | 63 | 106.4 | 106.9 | 103.0 | 103.5 | 6.2 | 5.8 | 5.0 | 6.3 | 0.77 | 0.59 | 0.93 |
| 2019 | 49 | 108.7 | 108.4 | 103.7 | 105.4 | 6.4 | 5.2 | 4.8 | 7.2 | 0.86 | 0.51 | 0.92 |
| 2020 | 43 | 109.8 | 109.2 | 104.7 | 106.8 | 6.9 | 6.1 | 3.4 | 6.8 | 0.91 | 0.37 | 0.93 |

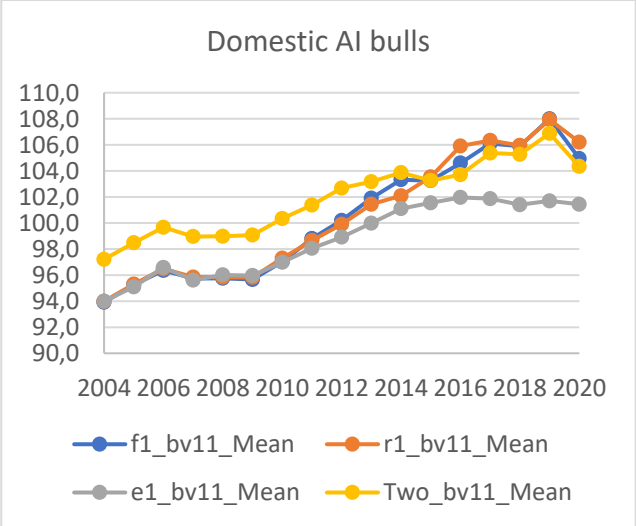


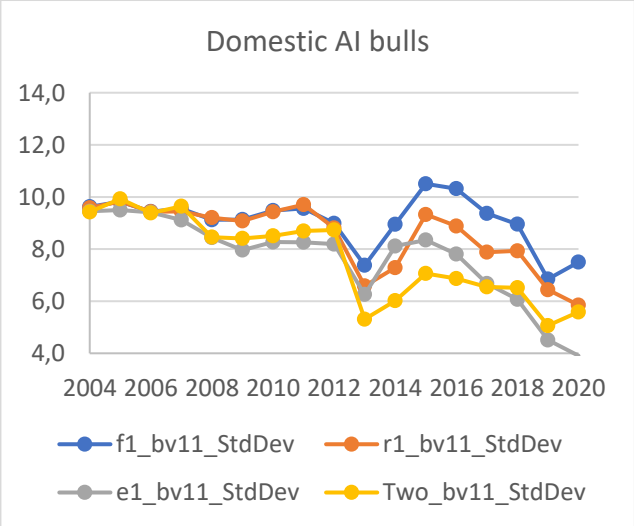



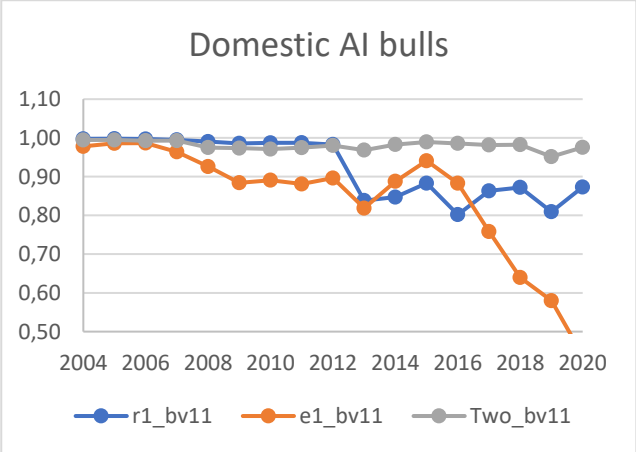



***bv11***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 93.9 | 94.0 | 94.0 | 97.2 | 9.6 | 9.6 | 9.5 | 9.4 | 1.00 | 0.98 | 0.99 |
| 2005 | 200 | 95.3 | 95.3 | 95.1 | 98.5 | 9.8 | 9.8 | 9.5 | 9.9 | 1.00 | 0.99 | 0.99 |
| 2006 | 194 | 96.4 | 96.5 | 96.6 | 99.7 | 9.4 | 9.4 | 9.4 | 9.4 | 1.00 | 0.99 | 0.99 |
| 2007 | 184 | 95.7 | 95.8 | 95.6 | 99.0 | 9.5 | 9.4 | 9.1 | 9.6 | 0.99 | 0.96 | 0.99 |
| 2008 | 236 | 95.8 | 95.8 | 96.0 | 99.0 | 9.1 | 9.2 | 8.4 | 8.5 | 0.99 | 0.93 | 0.98 |
| 2009 | 216 | 95.7 | 95.8 | 96.0 | 99.1 | 9.1 | 9.1 | 8.0 | 8.4 | 0.99 | 0.88 | 0.97 |
| 2010 | 230 | 97.0 | 97.3 | 97.0 | 100.3 | 9.5 | 9.4 | 8.3 | 8.5 | 0.99 | 0.89 | 0.97 |
| 2011 | 215 | 98.8 | 98.7 | 98.1 | 101.4 | 9.6 | 9.7 | 8.3 | 8.7 | 0.99 | 0.88 | 0.97 |
| 2012 | 151 | 100.2 | 99.9 | 98.9 | 102.7 | 9.0 | 8.8 | 8.2 | 8.7 | 0.98 | 0.90 | 0.98 |
| 2013 | 119 | 101.9 | 101.4 | 100.0 | 103.2 | 7.4 | 6.6 | 6.3 | 5.3 | 0.84 | 0.82 | 0.97 |
| 2014 | 73 | 103.3 | 102.1 | 101.1 | 103.9 | 9.0 | 7.3 | 8.1 | 6.0 | 0.85 | 0.89 | 0.98 |
| 2015 | 50 | 103.2 | 103.5 | 101.5 | 103.3 | 10.5 | 9.3 | 8.3 | 7.1 | 0.88 | 0.94 | 0.99 |
| 2016 | 47 | 104.6 | 105.9 | 102.0 | 103.7 | 10.3 | 8.9 | 7.8 | 6.9 | 0.80 | 0.88 | 0.99 |
| 2017 | 79 | 106.1 | 106.3 | 101.9 | 105.4 | 9.4 | 7.9 | 6.7 | 6.5 | 0.86 | 0.76 | 0.98 |
| 2018 | 63 | 105.9 | 106.0 | 101.4 | 105.3 | 9.0 | 7.9 | 6.1 | 6.5 | 0.87 | 0.64 | 0.98 |
| 2019 | 49 | 108.0 | 107.9 | 101.7 | 106.9 | 6.8 | 6.4 | 4.5 | 5.1 | 0.81 | 0.58 | 0.95 |
| 2020 | 43 | 105.0 | 106.2 | 101.4 | 104.3 | 7.5 | 5.9 | 3.9 | 5.6 | 0.87 | 0.44 | 0.98 |

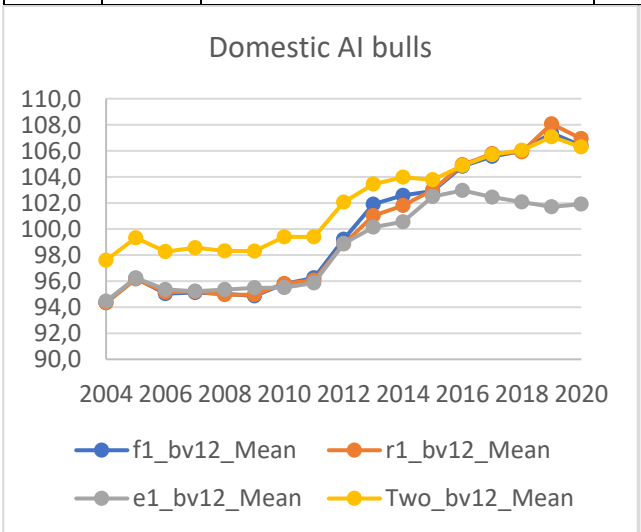


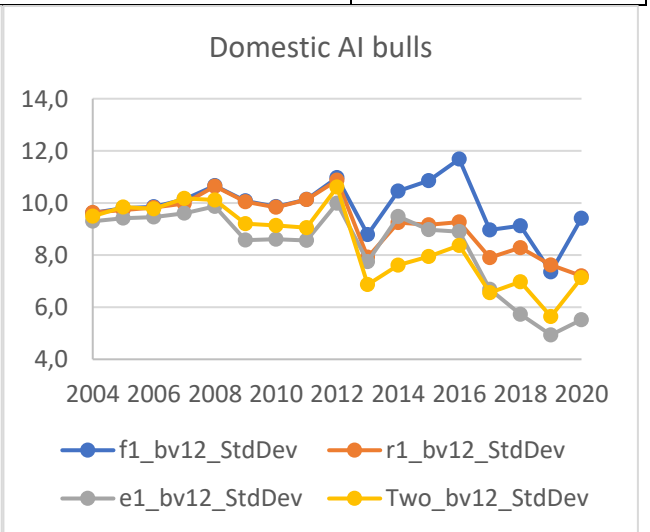



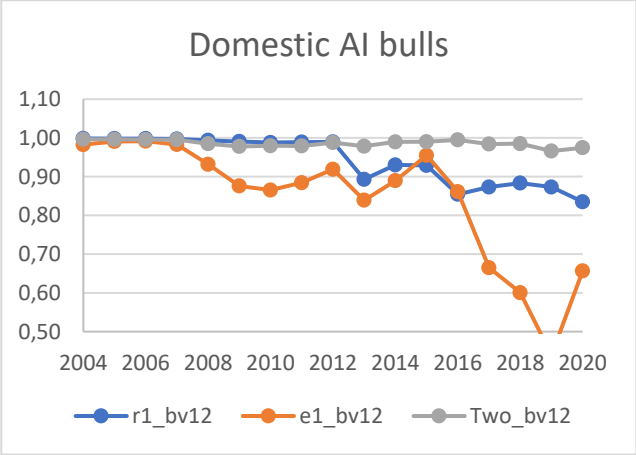



***bv12***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 94.3 | 94.3 | 94.5 | 97.6 | 9.6 | 9.6 | 9.3 | 9.5 | 1.00 | 0.98 | 1.00 |
| 2005 | 200 | 96.2 | 96.2 | 96.2 | 99.3 | 9.8 | 9.7 | 9.4 | 9.8 | 1.00 | 0.99 | 1.00 |
| 2006 | 194 | 95.0 | 95.1 | 95.4 | 98.3 | 9.9 | 9.8 | 9.5 | 9.8 | 1.00 | 0.99 | 1.00 |
| 2007 | 184 | 95.1 | 95.2 | 95.2 | 98.6 | 10.1 | 10.0 | 9.6 | 10.2 | 1.00 | 0.98 | 1.00 |
| 2008 | 236 | 95.0 | 95.0 | 95.4 | 98.3 | 10.7 | 10.6 | 9.9 | 10.1 | 0.99 | 0.93 | 0.98 |
| 2009 | 216 | 94.9 | 95.0 | 95.5 | 98.3 | 10.1 | 10.0 | 8.6 | 9.2 | 0.99 | 0.88 | 0.98 |
| 2010 | 230 | 95.8 | 95.8 | 95.5 | 99.4 | 9.9 | 9.8 | 8.6 | 9.1 | 0.99 | 0.87 | 0.98 |
| 2011 | 215 | 96.3 | 96.1 | 95.9 | 99.4 | 10.1 | 10.1 | 8.6 | 9.1 | 0.99 | 0.88 | 0.98 |
| 2012 | 151 | 99.2 | 98.8 | 98.9 | 102.1 | 11.0 | 10.9 | 10.0 | 10.6 | 0.99 | 0.92 | 0.99 |
| 2013 | 119 | 101.9 | 101.0 | 100.1 | 103.4 | 8.8 | 7.9 | 7.7 | 6.9 | 0.89 | 0.84 | 0.98 |
| 2014 | 73 | 102.6 | 101.8 | 100.6 | 104.0 | 10.5 | 9.2 | 9.5 | 7.6 | 0.93 | 0.89 | 0.99 |
| 2015 | 50 | 102.9 | 103.0 | 102.5 | 103.8 | 10.9 | 9.2 | 9.0 | 7.9 | 0.93 | 0.96 | 0.99 |
| 2016 | 47 | 104.8 | 104.9 | 103.0 | 104.9 | 11.7 | 9.3 | 8.9 | 8.4 | 0.85 | 0.86 | 0.99 |
| 2017 | 79 | 105.6 | 105.8 | 102.4 | 105.7 | 9.0 | 7.9 | 6.7 | 6.6 | 0.87 | 0.66 | 0.98 |
| 2018 | 63 | 106.0 | 105.9 | 102.1 | 106.0 | 9.1 | 8.3 | 5.7 | 7.0 | 0.88 | 0.60 | 0.99 |
| 2019 | 49 | 107.4 | 108.1 | 101.7 | 107.1 | 7.4 | 7.6 | 4.9 | 5.6 | 0.87 | 0.44 | 0.97 |
| 2020 | 43 | 106.4 | 106.9 | 101.9 | 106.3 | 9.4 | 7.2 | 5.5 | 7.1 | 0.83 | 0.66 | 0.97 |

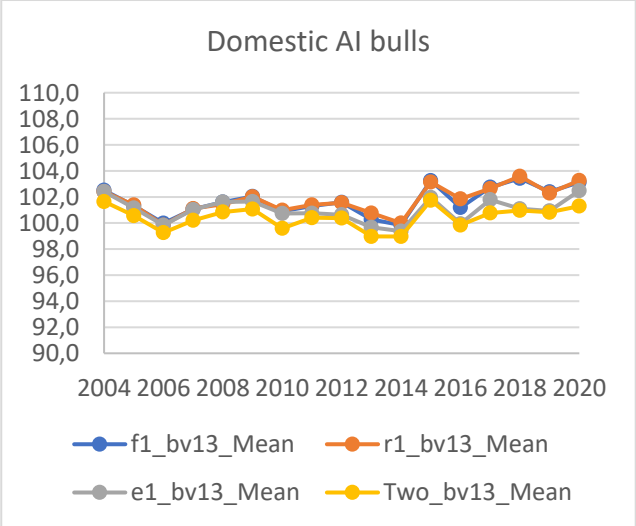


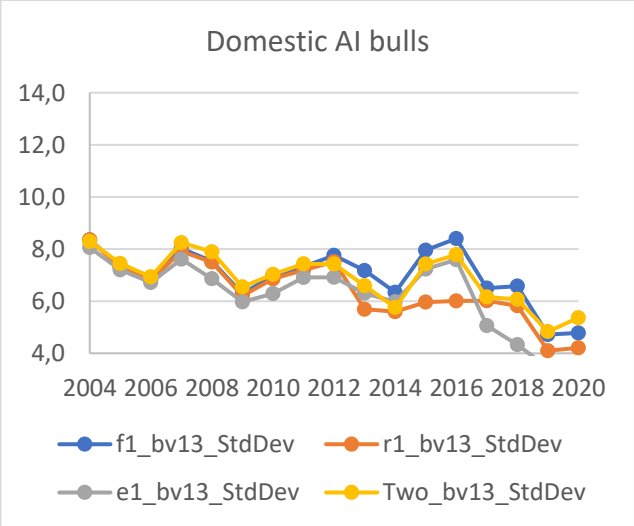



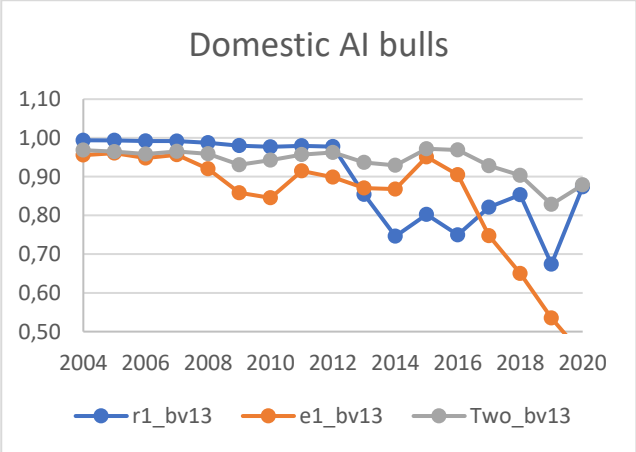



***bv13***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 102.5 | 102.4 | 102.4 | 101.6 | 8.3 | 8.4 | 8.1 | 8.3 | 0.99 | 0.96 | 0.97 |
| 2005 | 200 | 101.3 | 101.4 | 101.2 | 100.6 | 7.3 | 7.3 | 7.2 | 7.4 | 0.99 | 0.96 | 0.96 |
| 2006 | 194 | 100.0 | 99.8 | 99.8 | 99.3 | 6.9 | 6.8 | 6.7 | 6.9 | 0.99 | 0.95 | 0.96 |
| 2007 | 184 | 101.1 | 101.1 | 101.0 | 100.2 | 8.0 | 7.9 | 7.6 | 8.2 | 0.99 | 0.96 | 0.97 |
| 2008 | 236 | 101.6 | 101.4 | 101.6 | 100.8 | 7.5 | 7.5 | 6.9 | 7.9 | 0.99 | 0.92 | 0.96 |
| 2009 | 216 | 102.0 | 102.0 | 101.6 | 101.1 | 6.3 | 6.2 | 6.0 | 6.5 | 0.98 | 0.86 | 0.93 |
| 2010 | 230 | 100.9 | 101.0 | 100.7 | 99.6 | 7.0 | 6.9 | 6.3 | 7.0 | 0.98 | 0.85 | 0.94 |
| 2011 | 215 | 101.3 | 101.4 | 100.7 | 100.4 | 7.3 | 7.2 | 6.9 | 7.4 | 0.98 | 0.91 | 0.96 |
| 2012 | 151 | 101.6 | 101.6 | 100.6 | 100.4 | 7.8 | 7.5 | 6.9 | 7.4 | 0.98 | 0.90 | 0.96 |
| 2013 | 119 | 100.3 | 100.8 | 99.7 | 99.0 | 7.2 | 5.7 | 6.3 | 6.6 | 0.85 | 0.87 | 0.94 |
| 2014 | 73 | 99.8 | 100.0 | 99.4 | 99.0 | 6.3 | 5.6 | 6.0 | 5.8 | 0.75 | 0.87 | 0.93 |
| 2015 | 50 | 103.3 | 103.1 | 102.0 | 101.7 | 8.0 | 6.0 | 7.2 | 7.4 | 0.80 | 0.95 | 0.97 |
| 2016 | 47 | 101.2 | 101.8 | 99.9 | 99.8 | 8.4 | 6.0 | 7.6 | 7.8 | 0.75 | 0.90 | 0.97 |
| 2017 | 79 | 102.7 | 102.6 | 101.8 | 100.8 | 6.5 | 6.0 | 5.1 | 6.2 | 0.82 | 0.75 | 0.93 |
| 2018 | 63 | 103.4 | 103.6 | 101.1 | 101.0 | 6.6 | 5.8 | 4.3 | 6.1 | 0.85 | 0.65 | 0.90 |
| 2019 | 49 | 102.4 | 102.3 | 100.9 | 100.8 | 4.7 | 4.1 | 3.5 | 4.8 | 0.67 | 0.54 | 0.83 |
| 2020 | 43 | 103.1 | 103.3 | 102.5 | 101.3 | 4.8 | 4.2 | 3.1 | 5.4 | 0.87 | 0.44 | 0.88 |

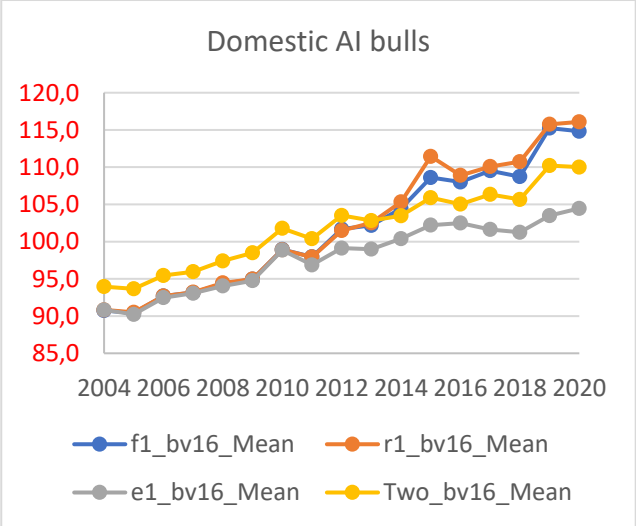


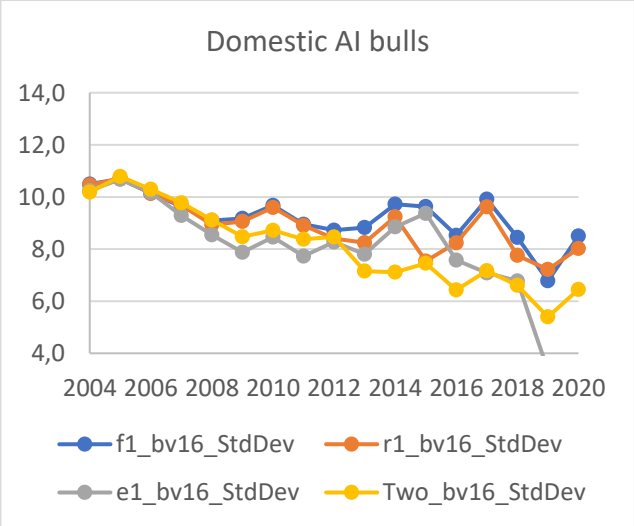



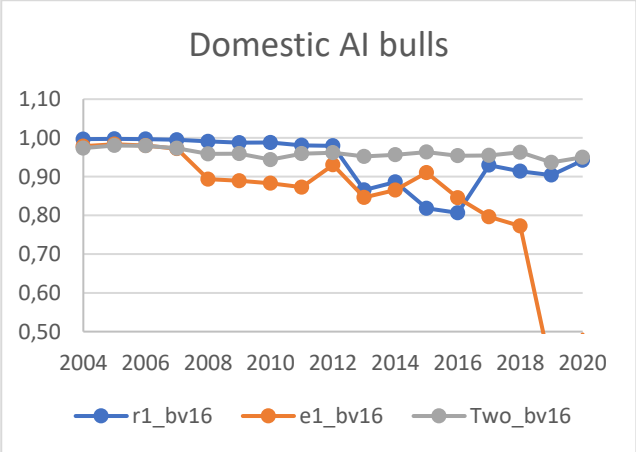



***bv16***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 90.7 | 90.8 | 90.8 | 94.0 | 10.5 | 10.5 | 10.2 | 10.2 | 1.00 | 0.98 | 0.97 |
| 2005 | 200 | 90.4 | 90.5 | 90.2 | 93.7 | 10.7 | 10.7 | 10.7 | 10.8 | 1.00 | 0.98 | 0.98 |
| 2006 | 194 | 92.7 | 92.7 | 92.5 | 95.5 | 10.1 | 10.1 | 10.2 | 10.3 | 1.00 | 0.98 | 0.98 |
| 2007 | 184 | 93.1 | 93.2 | 93.1 | 96.0 | 9.6 | 9.7 | 9.3 | 9.8 | 1.00 | 0.97 | 0.97 |
| 2008 | 236 | 94.3 | 94.5 | 94.0 | 97.4 | 9.1 | 8.9 | 8.5 | 9.1 | 0.99 | 0.89 | 0.96 |
| 2009 | 216 | 94.9 | 95.0 | 94.7 | 98.5 | 9.2 | 9.1 | 7.9 | 8.5 | 0.99 | 0.89 | 0.96 |
| 2010 | 230 | 98.9 | 98.9 | 98.9 | 101.8 | 9.7 | 9.6 | 8.5 | 8.7 | 0.99 | 0.88 | 0.94 |
| 2011 | 215 | 98.0 | 97.9 | 96.9 | 100.4 | 9.0 | 8.9 | 7.7 | 8.4 | 0.98 | 0.87 | 0.96 |
| 2012 | 151 | 101.7 | 101.5 | 99.1 | 103.5 | 8.7 | 8.4 | 8.3 | 8.5 | 0.98 | 0.93 | 0.96 |
| 2013 | 119 | 102.2 | 102.5 | 99.0 | 102.8 | 8.8 | 8.2 | 7.8 | 7.2 | 0.87 | 0.85 | 0.95 |
| 2014 | 73 | 104.4 | 105.3 | 100.4 | 103.5 | 9.7 | 9.2 | 8.9 | 7.1 | 0.89 | 0.87 | 0.96 |
| 2015 | 50 | 108.6 | 111.4 | 102.2 | 105.9 | 9.6 | 7.5 | 9.4 | 7.5 | 0.82 | 0.91 | 0.96 |
| 2016 | 47 | 108.0 | 108.9 | 102.5 | 105.0 | 8.5 | 8.2 | 7.6 | 6.4 | 0.81 | 0.85 | 0.95 |
| 2017 | 79 | 109.5 | 110.1 | 101.6 | 106.3 | 9.9 | 9.6 | 7.1 | 7.2 | 0.93 | 0.80 | 0.95 |
| 2018 | 63 | 108.7 | 110.7 | 101.3 | 105.7 | 8.4 | 7.8 | 6.8 | 6.6 | 0.91 | 0.77 | 0.96 |
| 2019 | 49 | 115.2 | 115.8 | 103.5 | 110.2 | 6.8 | 7.2 | 3.3 | 5.4 | 0.90 | 0.40 | 0.94 |
| 2020 | 43 | 114.8 | 116.1 | 104.5 | 110.0 | 8.5 | 8.0 | 3.7 | 6.5 | 0.94 | 0.49 | 0.95 |

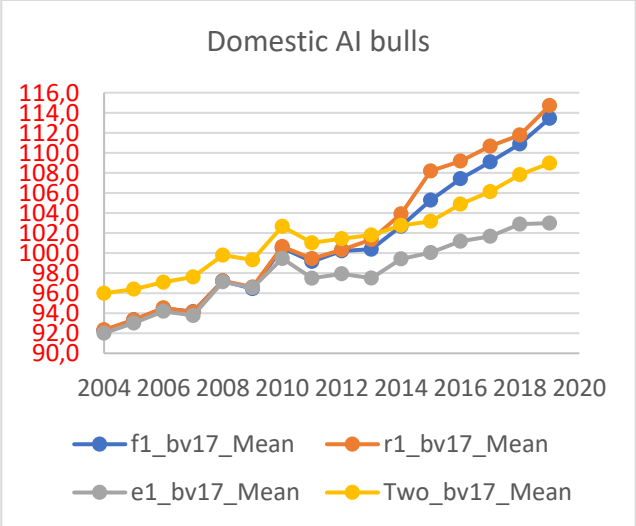


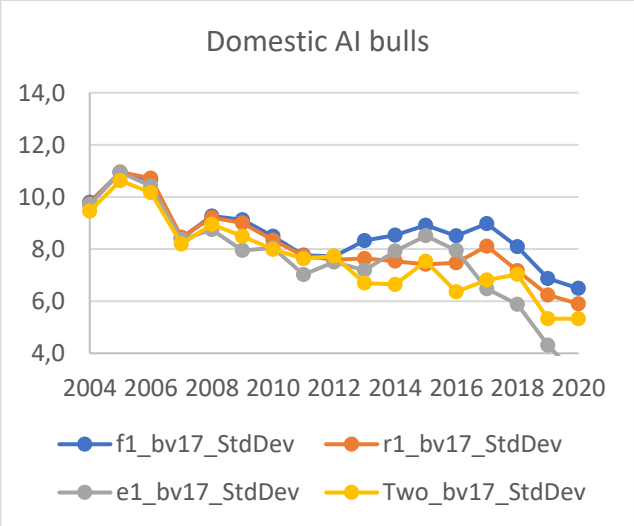



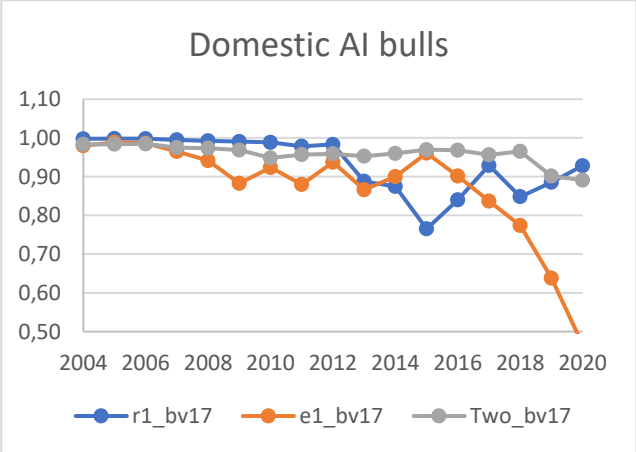



***bv17***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 92.3 | 92.3 | 92.0 | 96.0 | 9.8 | 9.7 | 9.7 | 9.5 | 1.00 | 0.98 | 0.98 |
| 2005 | 200 | 93.3 | 93.3 | 93.0 | 96.4 | 10.9 | 11.0 | 10.9 | 10.6 | 1.00 | 0.99 | 0.98 |
| 2006 | 194 | 94.5 | 94.5 | 94.2 | 97.1 | 10.7 | 10.7 | 10.4 | 10.2 | 1.00 | 0.99 | 0.98 |
| 2007 | 184 | 94.2 | 94.1 | 93.8 | 97.6 | 8.4 | 8.5 | 8.4 | 8.2 | 0.99 | 0.96 | 0.97 |
| 2008 | 236 | 97.2 | 97.2 | 97.1 | 99.8 | 9.3 | 9.2 | 8.7 | 8.9 | 0.99 | 0.94 | 0.97 |
| 2009 | 216 | 96.4 | 96.6 | 96.5 | 99.3 | 9.1 | 9.0 | 7.9 | 8.5 | 0.99 | 0.88 | 0.97 |
| 2010 | 230 | 100.5 | 100.6 | 99.5 | 102.7 | 8.5 | 8.3 | 8.0 | 8.0 | 0.99 | 0.92 | 0.95 |
| 2011 | 215 | 99.2 | 99.4 | 97.5 | 101.0 | 7.8 | 7.7 | 7.0 | 7.6 | 0.98 | 0.88 | 0.96 |
| 2012 | 151 | 100.2 | 100.3 | 97.9 | 101.4 | 7.7 | 7.6 | 7.5 | 7.7 | 0.98 | 0.94 | 0.96 |
| 2013 | 119 | 100.4 | 101.3 | 97.5 | 101.8 | 8.3 | 7.6 | 7.2 | 6.7 | 0.89 | 0.87 | 0.95 |
| 2014 | 73 | 102.7 | 103.9 | 99.4 | 102.8 | 8.5 | 7.5 | 7.9 | 6.6 | 0.87 | 0.90 | 0.96 |
| 2015 | 50 | 105.3 | 108.2 | 100.1 | 103.2 | 8.9 | 7.4 | 8.5 | 7.5 | 0.77 | 0.96 | 0.97 |
| 2016 | 47 | 107.4 | 109.2 | 101.2 | 104.9 | 8.5 | 7.5 | 7.9 | 6.4 | 0.84 | 0.90 | 0.97 |
| 2017 | 79 | 109.1 | 110.7 | 101.7 | 106.1 | 9.0 | 8.1 | 6.5 | 6.8 | 0.93 | 0.84 | 0.96 |
| 2018 | 63 | 110.9 | 111.8 | 102.9 | 107.8 | 8.1 | 7.2 | 5.9 | 7.0 | 0.85 | 0.77 | 0.97 |
| 2019 | 49 | 113.4 | 114.7 | 103.0 | 109.0 | 6.9 | 6.2 | 4.3 | 5.3 | 0.89 | 0.64 | 0.90 |
| 2020 | 43 | 113.9 | 114.8 | 103.9 | 109.5 | 6.5 | 5.9 | 3.1 | 5.3 | 0.93 | 0.47 | 0.89 |

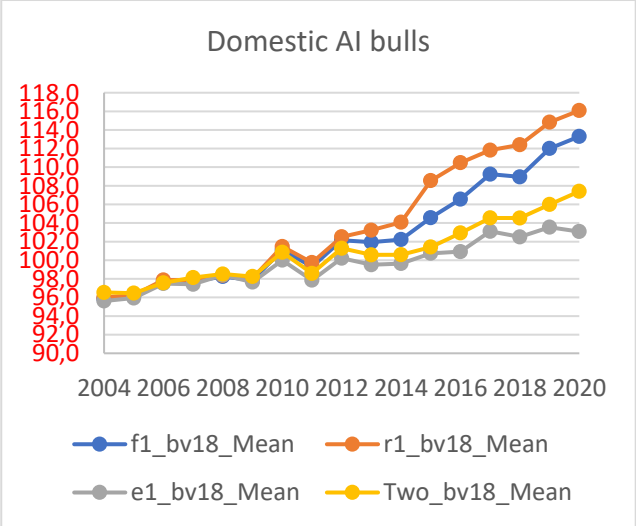


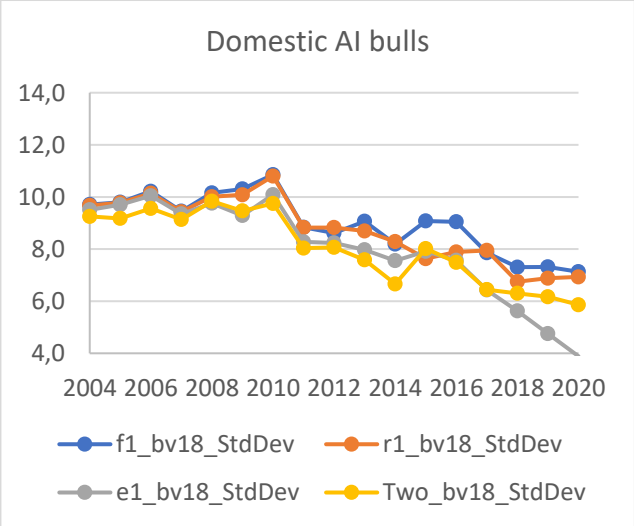



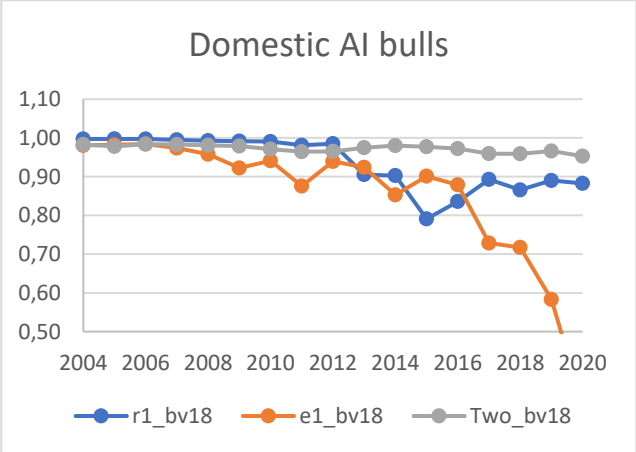



***bv18***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 95.8 | 96.0 | 95.6 | 96.5 | 9.7 | 9.7 | 9.5 | 9.3 | 1.00 | 0.98 | 0.98 |
| 2005 | 200 | 96.2 | 96.2 | 95.9 | 96.5 | 9.8 | 9.8 | 9.7 | 9.2 | 1.00 | 0.98 | 0.98 |
| 2006 | 194 | 97.7 | 97.9 | 97.5 | 97.6 | 10.2 | 10.1 | 10.0 | 9.6 | 1.00 | 0.98 | 0.98 |
| 2007 | 184 | 97.7 | 97.8 | 97.4 | 98.1 | 9.5 | 9.4 | 9.3 | 9.1 | 0.99 | 0.97 | 0.98 |
| 2008 | 236 | 98.3 | 98.4 | 98.4 | 98.5 | 10.2 | 10.0 | 9.8 | 9.8 | 0.99 | 0.96 | 0.98 |
| 2009 | 216 | 97.9 | 98.1 | 97.6 | 98.2 | 10.3 | 10.1 | 9.3 | 9.5 | 0.99 | 0.92 | 0.98 |
| 2010 | 230 | 101.1 | 101.5 | 100.0 | 100.9 | 10.9 | 10.8 | 10.1 | 9.7 | 0.99 | 0.94 | 0.97 |
| 2011 | 215 | 99.3 | 99.7 | 97.9 | 98.6 | 8.8 | 8.8 | 8.3 | 8.0 | 0.98 | 0.88 | 0.96 |
| 2012 | 151 | 102.1 | 102.5 | 100.2 | 101.3 | 8.6 | 8.8 | 8.2 | 8.1 | 0.98 | 0.94 | 0.97 |
| 2013 | 119 | 101.9 | 103.2 | 99.5 | 100.6 | 9.1 | 8.7 | 8.0 | 7.6 | 0.91 | 0.92 | 0.97 |
| 2014 | 73 | 102.2 | 104.1 | 99.6 | 100.6 | 8.2 | 8.3 | 7.6 | 6.7 | 0.90 | 0.85 | 0.98 |
| 2015 | 50 | 104.6 | 108.6 | 100.7 | 101.4 | 9.1 | 7.6 | 7.9 | 8.0 | 0.79 | 0.90 | 0.98 |
| 2016 | 47 | 106.6 | 110.5 | 100.9 | 102.9 | 9.0 | 7.9 | 7.6 | 7.5 | 0.84 | 0.88 | 0.97 |
| 2017 | 79 | 109.2 | 111.8 | 103.1 | 104.5 | 7.9 | 7.9 | 6.4 | 6.4 | 0.89 | 0.73 | 0.96 |
| 2018 | 63 | 109.0 | 112.4 | 102.5 | 104.5 | 7.3 | 6.7 | 5.6 | 6.3 | 0.87 | 0.72 | 0.96 |
| 2019 | 49 | 112.0 | 114.8 | 103.5 | 106.0 | 7.3 | 6.9 | 4.8 | 6.2 | 0.89 | 0.58 | 0.97 |
| 2020 | 43 | 113.3 | 116.1 | 103.1 | 107.4 | 7.1 | 6.9 | 3.9 | 5.9 | 0.88 | 0.31 | 0.95 |

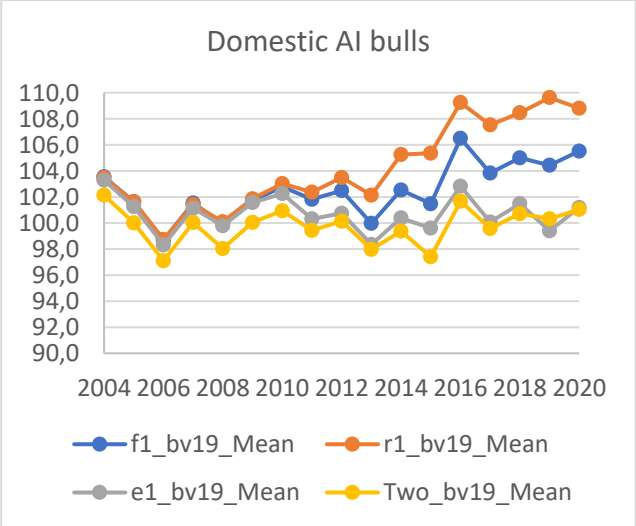


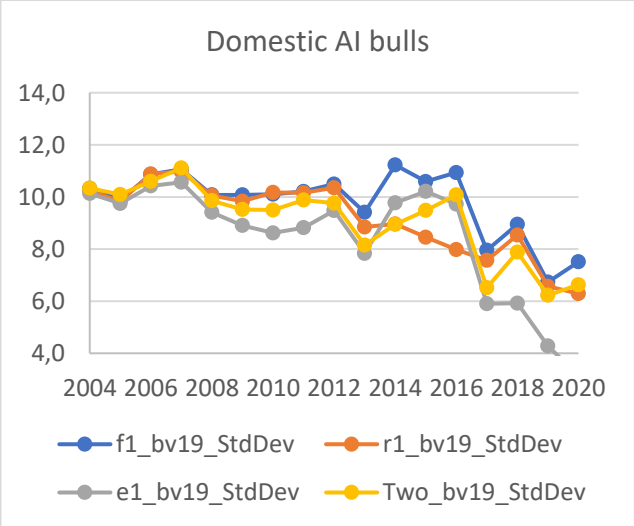



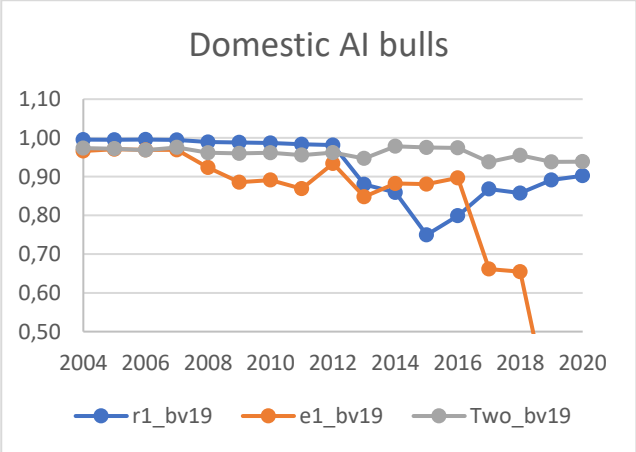



***bv19***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 103.5 | 103.5 | 103.3 | 102.1 | 10.3 | 10.2 | 10.1 | 10.3 | 1.00 | 0.97 | 0.97 |
| 2005 | 200 | 101.6 | 101.6 | 101.3 | 100.0 | 9.9 | 9.8 | 9.7 | 10.1 | 1.00 | 0.97 | 0.97 |
| 2006 | 194 | 98.7 | 98.7 | 98.3 | 97.1 | 10.9 | 10.9 | 10.4 | 10.6 | 1.00 | 0.97 | 0.97 |
| 2007 | 184 | 101.5 | 101.4 | 101.1 | 100.0 | 11.1 | 11.0 | 10.6 | 11.1 | 0.99 | 0.97 | 0.98 |
| 2008 | 236 | 99.9 | 100.1 | 99.8 | 98.0 | 10.1 | 10.1 | 9.4 | 9.9 | 0.99 | 0.92 | 0.96 |
| 2009 | 216 | 101.7 | 101.9 | 101.6 | 100.0 | 10.1 | 9.8 | 8.9 | 9.5 | 0.99 | 0.89 | 0.96 |
| 2010 | 230 | 102.8 | 103.0 | 102.3 | 100.9 | 10.1 | 10.2 | 8.6 | 9.5 | 0.99 | 0.89 | 0.96 |
| 2011 | 215 | 101.8 | 102.4 | 100.3 | 99.4 | 10.2 | 10.2 | 8.8 | 9.9 | 0.98 | 0.87 | 0.96 |
| 2012 | 151 | 102.5 | 103.5 | 100.8 | 100.1 | 10.5 | 10.4 | 9.5 | 9.8 | 0.98 | 0.93 | 0.96 |
| 2013 | 119 | 100.0 | 102.1 | 98.4 | 98.0 | 9.4 | 8.8 | 7.8 | 8.2 | 0.88 | 0.85 | 0.95 |
| 2014 | 73 | 102.5 | 105.3 | 100.4 | 99.4 | 11.2 | 9.0 | 9.8 | 8.9 | 0.86 | 0.88 | 0.98 |
| 2015 | 50 | 101.5 | 105.4 | 99.6 | 97.4 | 10.6 | 8.5 | 10.2 | 9.5 | 0.75 | 0.88 | 0.98 |
| 2016 | 47 | 106.5 | 109.2 | 102.8 | 101.7 | 10.9 | 8.0 | 9.7 | 10.1 | 0.80 | 0.90 | 0.97 |
| 2017 | 79 | 103.8 | 107.5 | 100.1 | 99.6 | 8.0 | 7.6 | 5.9 | 6.5 | 0.87 | 0.66 | 0.94 |
| 2018 | 63 | 105.0 | 108.5 | 101.5 | 100.7 | 8.9 | 8.5 | 5.9 | 7.9 | 0.86 | 0.65 | 0.95 |
| 2019 | 49 | 104.4 | 109.6 | 99.4 | 100.3 | 6.7 | 6.6 | 4.3 | 6.2 | 0.89 | 0.28 | 0.94 |
| 2020 | 43 | 105.5 | 108.8 | 101.2 | 101.0 | 7.5 | 6.3 | 3.1 | 6.6 | 0.90 | 0.47 | 0.94 |

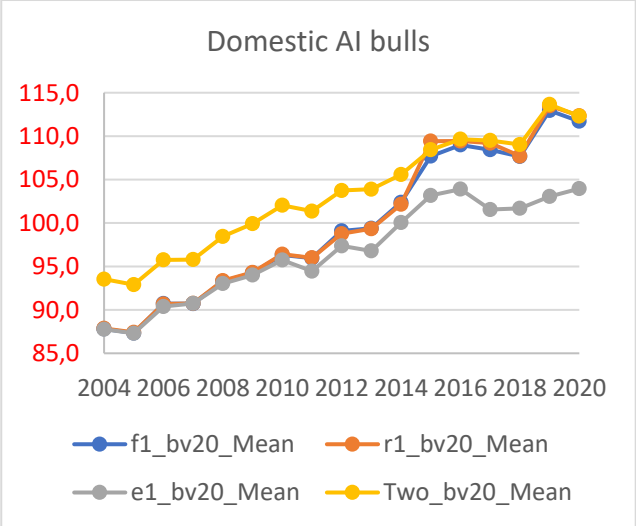


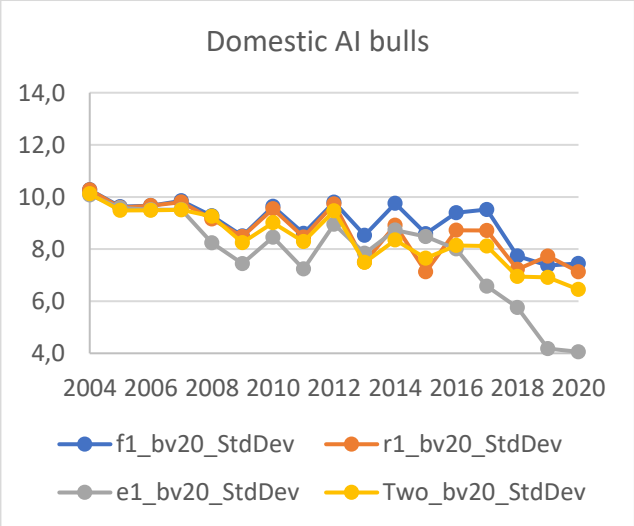



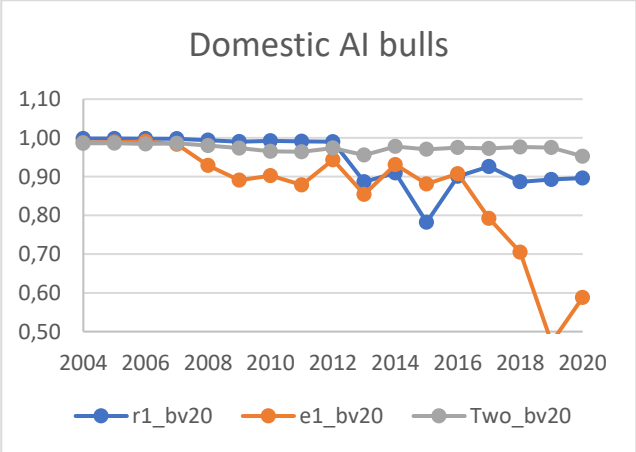



***bv20***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 87.8 | 87.9 | 87.8 | 93.5 | 10.3 | 10.3 | 10.1 | 10.1 | 1.00 | 0.99 | 0.99 |
| 2005 | 200 | 87.3 | 87.4 | 87.3 | 92.9 | 9.6 | 9.6 | 9.6 | 9.5 | 1.00 | 0.99 | 0.99 |
| 2006 | 194 | 90.7 | 90.7 | 90.4 | 95.8 | 9.7 | 9.7 | 9.5 | 9.5 | 1.00 | 0.99 | 0.98 |
| 2007 | 184 | 90.7 | 90.7 | 90.7 | 95.8 | 9.9 | 9.8 | 9.5 | 9.5 | 1.00 | 0.98 | 0.99 |
| 2008 | 236 | 93.3 | 93.4 | 93.0 | 98.5 | 9.3 | 9.2 | 8.2 | 9.3 | 0.99 | 0.93 | 0.98 |
| 2009 | 216 | 94.3 | 94.3 | 94.0 | 99.9 | 8.5 | 8.5 | 7.4 | 8.2 | 0.99 | 0.89 | 0.97 |
| 2010 | 230 | 96.3 | 96.4 | 95.7 | 102.0 | 9.6 | 9.5 | 8.5 | 9.0 | 0.99 | 0.90 | 0.97 |
| 2011 | 215 | 96.0 | 96.0 | 94.5 | 101.4 | 8.6 | 8.5 | 7.2 | 8.3 | 0.99 | 0.88 | 0.96 |
| 2012 | 151 | 99.1 | 98.8 | 97.4 | 103.7 | 9.8 | 9.7 | 9.0 | 9.5 | 0.99 | 0.94 | 0.97 |
| 2013 | 119 | 99.4 | 99.3 | 96.8 | 103.9 | 8.5 | 7.5 | 7.8 | 7.5 | 0.89 | 0.85 | 0.96 |
| 2014 | 73 | 102.4 | 102.2 | 100.0 | 105.6 | 9.8 | 8.9 | 8.7 | 8.3 | 0.91 | 0.93 | 0.98 |
| 2015 | 50 | 107.7 | 109.4 | 103.2 | 108.4 | 8.6 | 7.1 | 8.5 | 7.7 | 0.78 | 0.88 | 0.97 |
| 2016 | 47 | 109.0 | 109.4 | 103.9 | 109.6 | 9.4 | 8.7 | 8.0 | 8.1 | 0.90 | 0.91 | 0.98 |
| 2017 | 79 | 108.4 | 109.2 | 101.5 | 109.5 | 9.5 | 8.7 | 6.6 | 8.1 | 0.93 | 0.79 | 0.97 |
| 2018 | 63 | 107.7 | 107.7 | 101.7 | 109.0 | 7.7 | 7.2 | 5.8 | 6.9 | 0.89 | 0.70 | 0.98 |
| 2019 | 49 | 112.9 | 113.5 | 103.0 | 113.6 | 7.4 | 7.7 | 4.2 | 6.9 | 0.89 | 0.47 | 0.98 |
| 2020 | 43 | 111.7 | 112.4 | 104.0 | 112.3 | 7.4 | 7.1 | 4.1 | 6.4 | 0.90 | 0.59 | 0.95 |

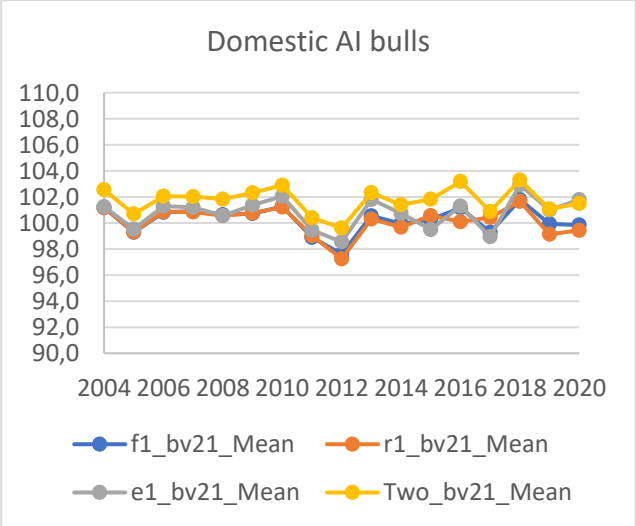


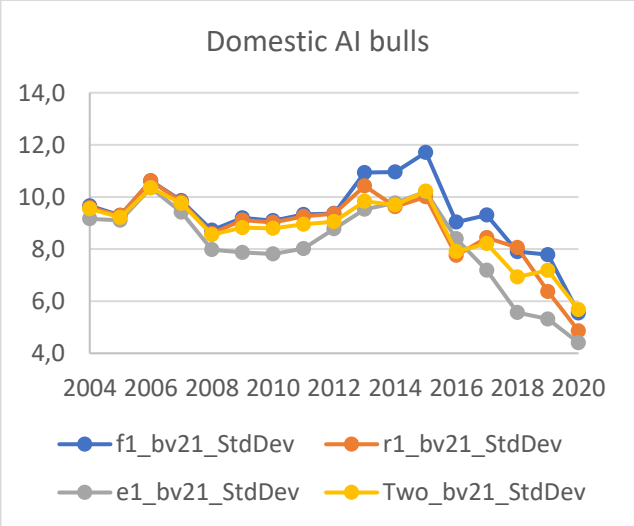



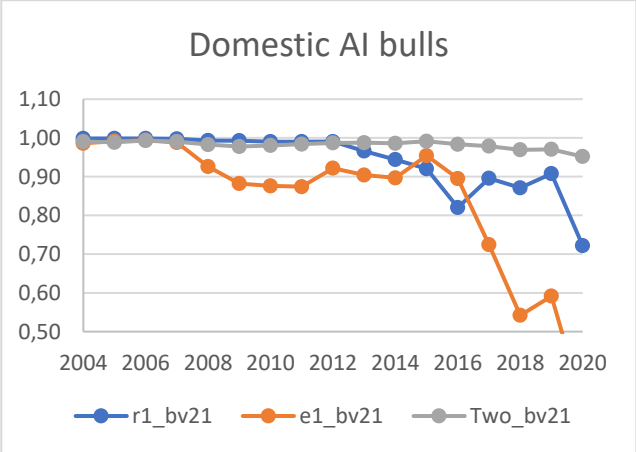



***bv21***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 101.2 | 101.2 | 101.3 | 102.6 | 9.7 | 9.6 | 9.2 | 9.5 | 1.00 | 0.99 | 0.99 |
| 2005 | 200 | 99.3 | 99.3 | 99.5 | 100.7 | 9.3 | 9.3 | 9.1 | 9.2 | 1.00 | 0.99 | 0.99 |
| 2006 | 194 | 100.8 | 100.9 | 101.3 | 102.1 | 10.6 | 10.6 | 10.3 | 10.3 | 1.00 | 0.99 | 0.99 |
| 2007 | 184 | 100.9 | 100.8 | 101.2 | 102.0 | 9.9 | 9.8 | 9.4 | 9.8 | 1.00 | 0.99 | 0.99 |
| 2008 | 236 | 100.6 | 100.6 | 100.6 | 101.8 | 8.7 | 8.6 | 8.0 | 8.6 | 0.99 | 0.93 | 0.98 |
| 2009 | 216 | 100.7 | 100.8 | 101.4 | 102.3 | 9.2 | 9.1 | 7.9 | 8.8 | 0.99 | 0.88 | 0.98 |
| 2010 | 230 | 101.3 | 101.2 | 102.1 | 102.9 | 9.1 | 9.0 | 7.8 | 8.8 | 0.99 | 0.88 | 0.98 |
| 2011 | 215 | 98.9 | 99.0 | 99.4 | 100.4 | 9.3 | 9.3 | 8.0 | 9.0 | 0.99 | 0.87 | 0.98 |
| 2012 | 151 | 97.6 | 97.2 | 98.6 | 99.6 | 9.4 | 9.4 | 8.8 | 9.1 | 0.99 | 0.92 | 0.99 |
| 2013 | 119 | 100.6 | 100.3 | 101.8 | 102.3 | 10.9 | 10.4 | 9.5 | 9.8 | 0.97 | 0.90 | 0.99 |
| 2014 | 73 | 99.9 | 99.7 | 100.7 | 101.4 | 11.0 | 9.6 | 9.8 | 9.7 | 0.94 | 0.90 | 0.99 |
| 2015 | 50 | 100.3 | 100.6 | 99.5 | 101.8 | 11.7 | 10.0 | 10.2 | 10.2 | 0.92 | 0.95 | 0.99 |
| 2016 | 47 | 101.2 | 100.1 | 101.3 | 103.2 | 9.0 | 7.8 | 8.4 | 7.9 | 0.82 | 0.90 | 0.98 |
| 2017 | 79 | 99.3 | 100.4 | 98.9 | 100.9 | 9.3 | 8.4 | 7.2 | 8.2 | 0.90 | 0.72 | 0.98 |
| 2018 | 63 | 101.8 | 101.7 | 102.9 | 103.3 | 7.9 | 8.1 | 5.6 | 6.9 | 0.87 | 0.54 | 0.97 |
| 2019 | 49 | 99.9 | 99.1 | 101.0 | 101.1 | 7.8 | 6.4 | 5.3 | 7.2 | 0.91 | 0.59 | 0.97 |
| 2020 | 43 | 99.8 | 99.4 | 101.8 | 101.5 | 5.5 | 4.9 | 4.4 | 5.7 | 0.72 | 0.31 | 0.95 |

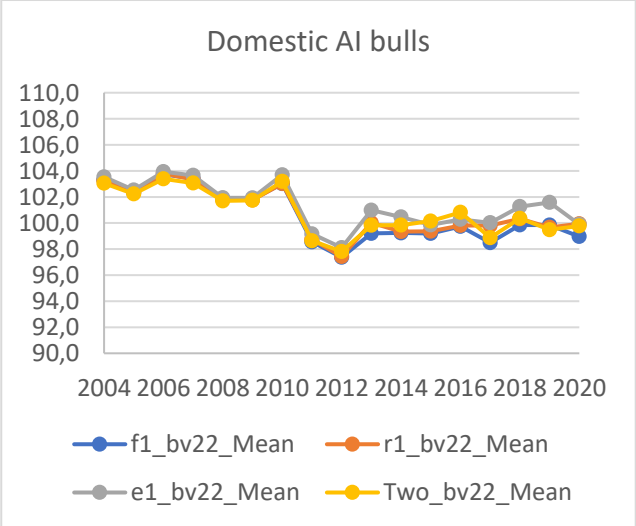


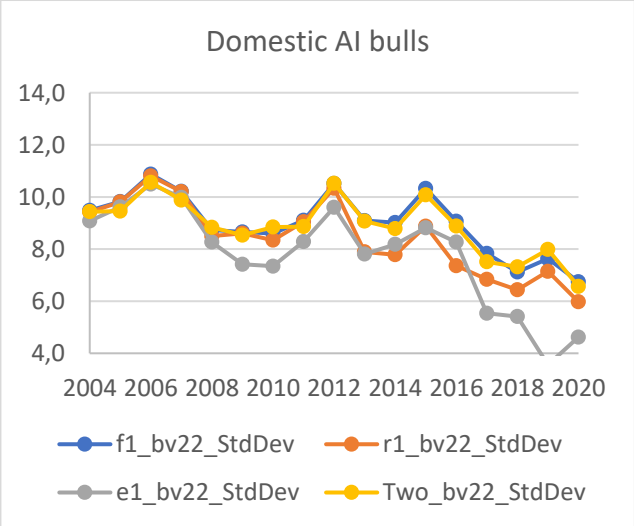



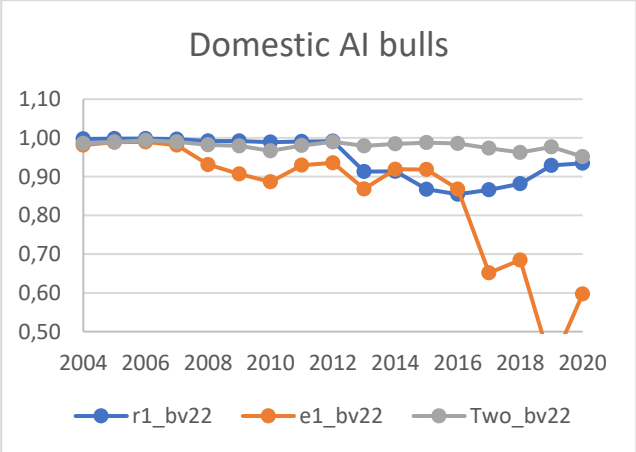



***bv22***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 103.3 | 103.3 | 103.5 | 103.1 | 9.5 | 9.4 | 9.1 | 9.4 | 1.00 | 0.98 | 0.99 |
| 2005 | 200 | 102.3 | 102.4 | 102.5 | 102.2 | 9.8 | 9.8 | 9.6 | 9.5 | 1.00 | 0.99 | 0.99 |
| 2006 | 194 | 103.7 | 103.8 | 103.9 | 103.4 | 10.9 | 10.8 | 10.5 | 10.6 | 1.00 | 0.99 | 0.99 |
| 2007 | 184 | 103.4 | 103.3 | 103.7 | 103.1 | 10.2 | 10.2 | 10.0 | 9.9 | 1.00 | 0.98 | 0.99 |
| 2008 | 236 | 101.9 | 101.8 | 101.9 | 101.7 | 8.7 | 8.5 | 8.3 | 8.8 | 0.99 | 0.93 | 0.98 |
| 2009 | 216 | 101.8 | 101.8 | 101.9 | 101.7 | 8.7 | 8.6 | 7.4 | 8.5 | 0.99 | 0.91 | 0.98 |
| 2010 | 230 | 103.0 | 103.0 | 103.7 | 103.2 | 8.6 | 8.3 | 7.3 | 8.8 | 0.99 | 0.89 | 0.97 |
| 2011 | 215 | 98.6 | 98.7 | 99.2 | 98.6 | 9.1 | 9.0 | 8.3 | 8.9 | 0.99 | 0.93 | 0.98 |
| 2012 | 151 | 97.4 | 97.4 | 98.1 | 97.8 | 10.5 | 10.3 | 9.6 | 10.5 | 0.99 | 0.94 | 0.99 |
| 2013 | 119 | 99.2 | 100.0 | 101.0 | 99.8 | 9.1 | 7.9 | 7.8 | 9.1 | 0.91 | 0.87 | 0.98 |
| 2014 | 73 | 99.2 | 99.3 | 100.5 | 99.8 | 9.0 | 7.8 | 8.2 | 8.8 | 0.91 | 0.92 | 0.98 |
| 2015 | 50 | 99.2 | 99.4 | 99.9 | 100.1 | 10.3 | 8.9 | 8.8 | 10.1 | 0.87 | 0.92 | 0.99 |
| 2016 | 47 | 99.7 | 99.8 | 100.3 | 100.8 | 9.1 | 7.4 | 8.3 | 8.9 | 0.85 | 0.87 | 0.99 |
| 2017 | 79 | 98.5 | 99.8 | 100.0 | 98.9 | 7.8 | 6.8 | 5.5 | 7.5 | 0.87 | 0.65 | 0.97 |
| 2018 | 63 | 99.8 | 100.3 | 101.3 | 100.4 | 7.1 | 6.4 | 5.4 | 7.3 | 0.88 | 0.68 | 0.96 |
| 2019 | 49 | 99.8 | 99.7 | 101.6 | 99.5 | 7.6 | 7.1 | 3.6 | 8.0 | 0.93 | 0.41 | 0.98 |
| 2020 | 43 | 99.0 | 99.9 | 99.9 | 99.8 | 6.7 | 6.0 | 4.6 | 6.6 | 0.93 | 0.60 | 0.95 |

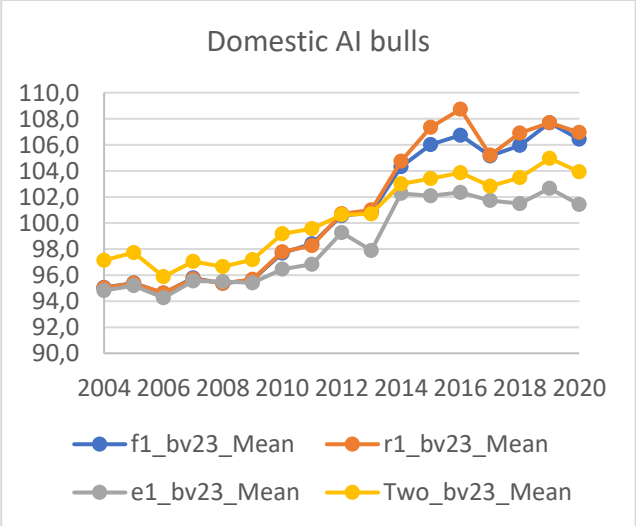


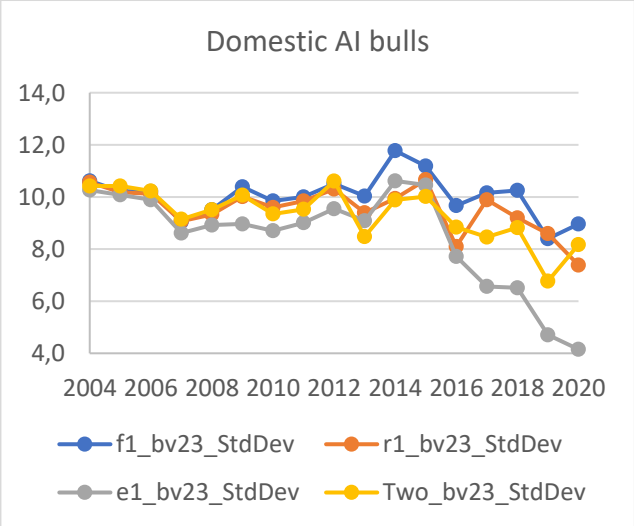



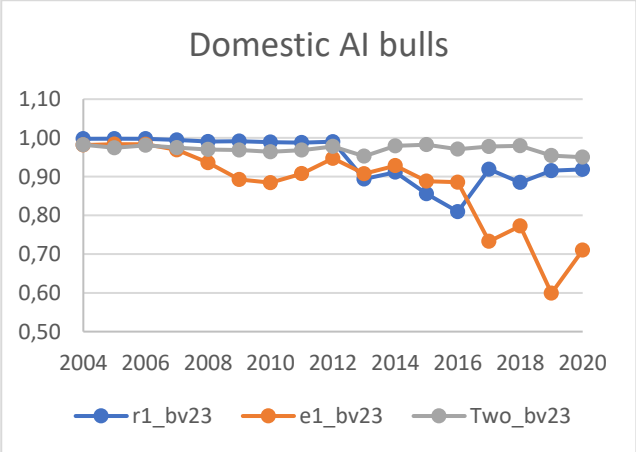



***bv23***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 95.0 | 95.0 | 94.8 | 97.1 | 10.6 | 10.6 | 10.3 | 10.4 | 1.00 | 0.98 | 0.98 |
| 2005 | 200 | 95.4 | 95.4 | 95.2 | 97.7 | 10.2 | 10.2 | 10.1 | 10.4 | 1.00 | 0.98 | 0.97 |
| 2006 | 194 | 94.6 | 94.6 | 94.3 | 95.9 | 10.2 | 10.1 | 9.9 | 10.2 | 1.00 | 0.98 | 0.98 |
| 2007 | 184 | 95.8 | 95.7 | 95.5 | 97.0 | 9.0 | 9.1 | 8.6 | 9.1 | 0.99 | 0.97 | 0.97 |
| 2008 | 236 | 95.4 | 95.4 | 95.5 | 96.7 | 9.5 | 9.3 | 8.9 | 9.5 | 0.99 | 0.94 | 0.97 |
| 2009 | 216 | 95.6 | 95.7 | 95.4 | 97.2 | 10.4 | 10.0 | 9.0 | 10.1 | 0.99 | 0.89 | 0.97 |
| 2010 | 230 | 97.7 | 97.8 | 96.5 | 99.2 | 9.8 | 9.6 | 8.7 | 9.3 | 0.99 | 0.88 | 0.96 |
| 2011 | 215 | 98.4 | 98.3 | 96.8 | 99.6 | 10.0 | 9.8 | 9.0 | 9.5 | 0.99 | 0.91 | 0.97 |
| 2012 | 151 | 100.6 | 100.7 | 99.3 | 100.6 | 10.5 | 10.3 | 9.5 | 10.6 | 0.99 | 0.95 | 0.98 |
| 2013 | 119 | 100.8 | 101.0 | 97.9 | 100.7 | 10.0 | 9.4 | 9.1 | 8.5 | 0.89 | 0.91 | 0.95 |
| 2014 | 73 | 104.3 | 104.7 | 102.3 | 103.0 | 11.8 | 9.9 | 10.6 | 9.9 | 0.91 | 0.93 | 0.98 |
| 2015 | 50 | 106.0 | 107.3 | 102.1 | 103.4 | 11.2 | 10.7 | 10.5 | 10.0 | 0.86 | 0.89 | 0.98 |
| 2016 | 47 | 106.7 | 108.7 | 102.4 | 103.9 | 9.7 | 8.1 | 7.7 | 8.8 | 0.81 | 0.89 | 0.97 |
| 2017 | 79 | 105.1 | 105.2 | 101.7 | 102.8 | 10.2 | 9.9 | 6.6 | 8.5 | 0.92 | 0.73 | 0.98 |
| 2018 | 63 | 106.0 | 106.9 | 101.5 | 103.5 | 10.2 | 9.2 | 6.5 | 8.8 | 0.88 | 0.77 | 0.98 |
| 2019 | 49 | 107.7 | 107.7 | 102.7 | 105.0 | 8.4 | 8.6 | 4.7 | 6.8 | 0.92 | 0.60 | 0.95 |
| 2020 | 43 | 106.4 | 106.9 | 101.4 | 103.9 | 9.0 | 7.4 | 4.2 | 8.2 | 0.92 | 0.71 | 0.95 |

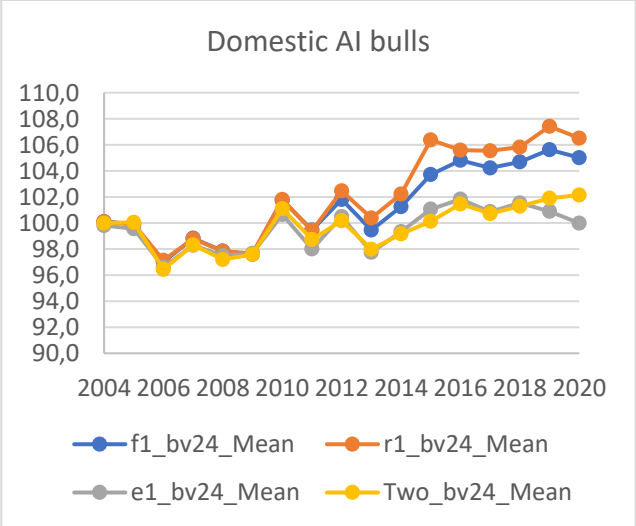


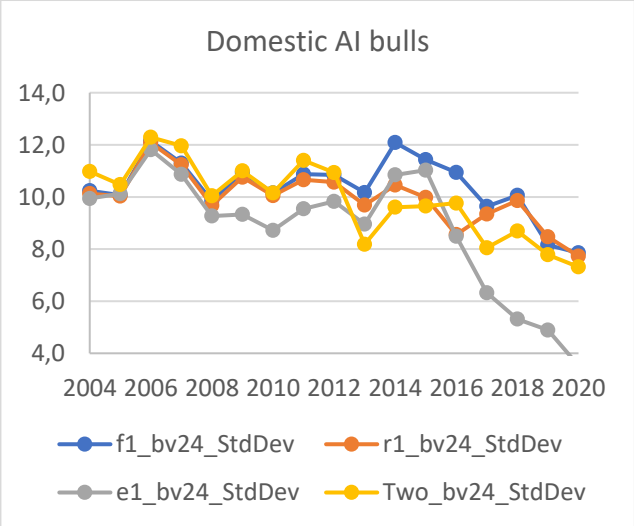



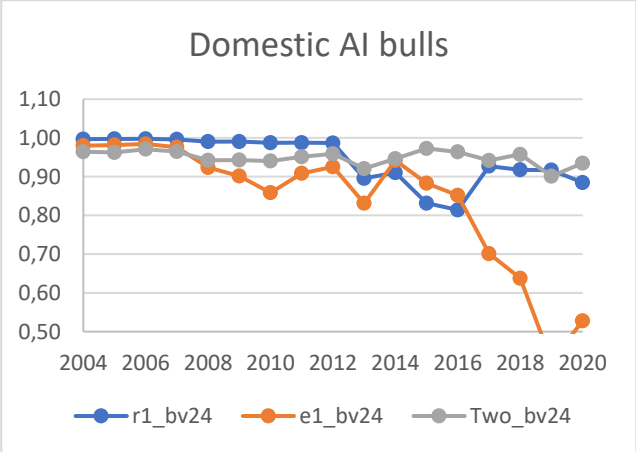



***bv24***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 100.1 | 100.1 | 99.8 | 100.0 | 10.2 | 10.1 | 9.9 | 11.0 | 1.00 | 0.98 | 0.96 |
| 2005 | 200 | 99.9 | 99.9 | 99.6 | 100.1 | 10.1 | 10.0 | 10.1 | 10.5 | 1.00 | 0.98 | 0.96 |
| 2006 | 194 | 97.0 | 97.1 | 96.6 | 96.4 | 12.1 | 12.1 | 11.8 | 12.3 | 1.00 | 0.98 | 0.97 |
| 2007 | 184 | 98.8 | 98.8 | 98.3 | 98.3 | 11.3 | 11.2 | 10.9 | 12.0 | 1.00 | 0.98 | 0.96 |
| 2008 | 236 | 97.8 | 97.8 | 97.5 | 97.2 | 9.9 | 9.7 | 9.3 | 10.0 | 0.99 | 0.92 | 0.94 |
| 2009 | 216 | 97.6 | 97.7 | 97.7 | 97.6 | 10.9 | 10.8 | 9.3 | 11.0 | 0.99 | 0.90 | 0.94 |
| 2010 | 230 | 101.7 | 101.8 | 100.7 | 101.1 | 10.2 | 10.1 | 8.7 | 10.2 | 0.99 | 0.86 | 0.94 |
| 2011 | 215 | 99.5 | 99.4 | 98.0 | 98.7 | 10.9 | 10.7 | 9.5 | 11.4 | 0.99 | 0.91 | 0.95 |
| 2012 | 151 | 101.8 | 102.5 | 100.5 | 100.2 | 10.8 | 10.6 | 9.8 | 10.9 | 0.99 | 0.93 | 0.96 |
| 2013 | 119 | 99.5 | 100.4 | 97.8 | 98.0 | 10.2 | 9.7 | 9.0 | 8.2 | 0.90 | 0.83 | 0.92 |
| 2014 | 73 | 101.3 | 102.2 | 99.3 | 99.2 | 12.1 | 10.5 | 10.8 | 9.6 | 0.91 | 0.94 | 0.95 |
| 2015 | 50 | 103.7 | 106.4 | 101.1 | 100.1 | 11.4 | 10.0 | 11.0 | 9.6 | 0.83 | 0.88 | 0.97 |
| 2016 | 47 | 104.8 | 105.6 | 101.8 | 101.5 | 10.9 | 8.6 | 8.5 | 9.8 | 0.81 | 0.85 | 0.96 |
| 2017 | 79 | 104.2 | 105.5 | 100.9 | 100.7 | 9.6 | 9.3 | 6.3 | 8.0 | 0.93 | 0.70 | 0.94 |
| 2018 | 63 | 104.7 | 105.8 | 101.5 | 101.3 | 10.1 | 9.9 | 5.3 | 8.7 | 0.92 | 0.64 | 0.96 |
| 2019 | 49 | 105.6 | 107.4 | 100.9 | 101.9 | 8.2 | 8.5 | 4.9 | 7.8 | 0.92 | 0.42 | 0.90 |
| 2020 | 43 | 105.0 | 106.5 | 100.0 | 102.1 | 7.9 | 7.7 | 3.5 | 7.3 | 0.88 | 0.53 | 0.93 |

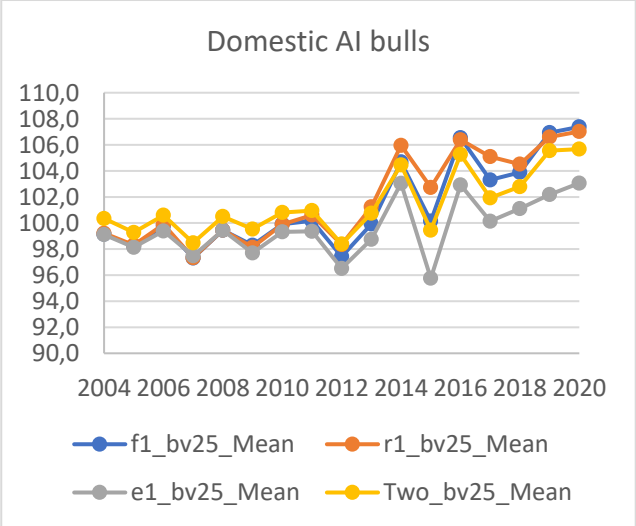


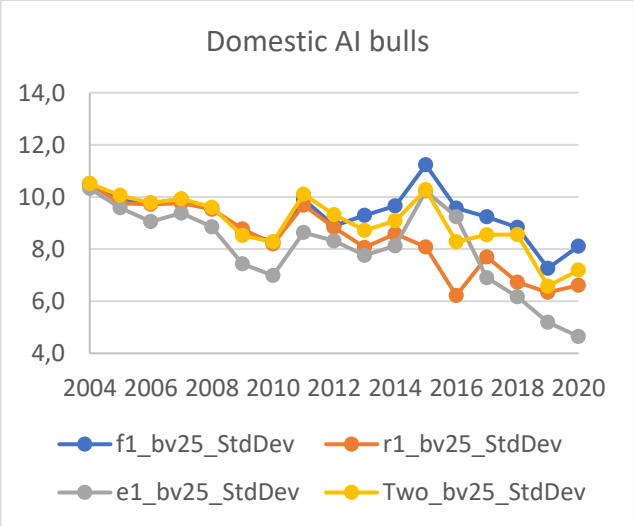



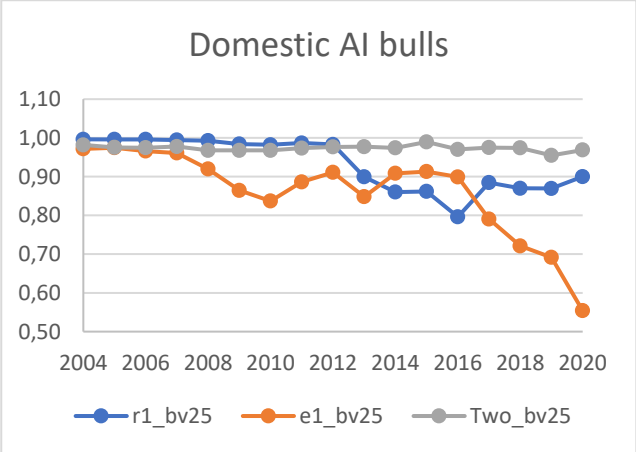



***bv25***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 212 | 99.1 | 99.2 | 99.1 | 100.3 | 10.5 | 10.5 | 10.3 | 10.5 | 1.00 | 0.97 | 0.98 |
| 2005 | 200 | 98.2 | 98.3 | 98.1 | 99.3 | 9.9 | 9.8 | 9.6 | 10.1 | 1.00 | 0.97 | 0.98 |
| 2006 | 194 | 99.8 | 99.9 | 99.4 | 100.6 | 9.8 | 9.7 | 9.1 | 9.8 | 1.00 | 0.97 | 0.97 |
| 2007 | 184 | 97.3 | 97.3 | 97.5 | 98.5 | 9.9 | 9.8 | 9.4 | 9.9 | 0.99 | 0.96 | 0.98 |
| 2008 | 236 | 99.4 | 99.5 | 99.4 | 100.5 | 9.6 | 9.5 | 8.9 | 9.6 | 0.99 | 0.92 | 0.97 |
| 2009 | 216 | 98.3 | 98.1 | 97.7 | 99.5 | 8.7 | 8.8 | 7.4 | 8.5 | 0.98 | 0.86 | 0.97 |
| 2010 | 230 | 99.9 | 99.9 | 99.3 | 100.8 | 8.3 | 8.2 | 7.0 | 8.3 | 0.98 | 0.84 | 0.97 |
| 2011 | 215 | 100.2 | 100.6 | 99.4 | 101.0 | 9.9 | 9.7 | 8.6 | 10.1 | 0.99 | 0.89 | 0.97 |
| 2012 | 151 | 97.4 | 98.3 | 96.5 | 98.4 | 8.9 | 8.8 | 8.3 | 9.3 | 0.98 | 0.91 | 0.98 |
| 2013 | 119 | 99.9 | 101.2 | 98.7 | 100.8 | 9.3 | 8.1 | 7.8 | 8.7 | 0.90 | 0.85 | 0.98 |
| 2014 | 73 | 104.7 | 106.0 | 103.0 | 104.5 | 9.7 | 8.6 | 8.1 | 9.1 | 0.86 | 0.91 | 0.97 |
| 2015 | 50 | 100.1 | 102.7 | 95.8 | 99.4 | 11.2 | 8.1 | 10.2 | 10.3 | 0.86 | 0.91 | 0.99 |
| 2016 | 47 | 106.5 | 106.4 | 102.9 | 105.3 | 9.6 | 6.2 | 9.2 | 8.3 | 0.80 | 0.90 | 0.97 |
| 2017 | 79 | 103.3 | 105.1 | 100.1 | 101.9 | 9.2 | 7.7 | 6.9 | 8.5 | 0.88 | 0.79 | 0.98 |
| 2018 | 63 | 103.9 | 104.5 | 101.1 | 102.8 | 8.8 | 6.7 | 6.2 | 8.6 | 0.87 | 0.72 | 0.97 |
| 2019 | 49 | 106.9 | 106.6 | 102.2 | 105.6 | 7.3 | 6.3 | 5.2 | 6.6 | 0.87 | 0.69 | 0.95 |
| 2020 | 43 | 107.4 | 107.0 | 103.1 | 105.7 | 8.1 | 6.6 | 4.6 | 7.2 | 0.90 | 0.55 | 0.97 |

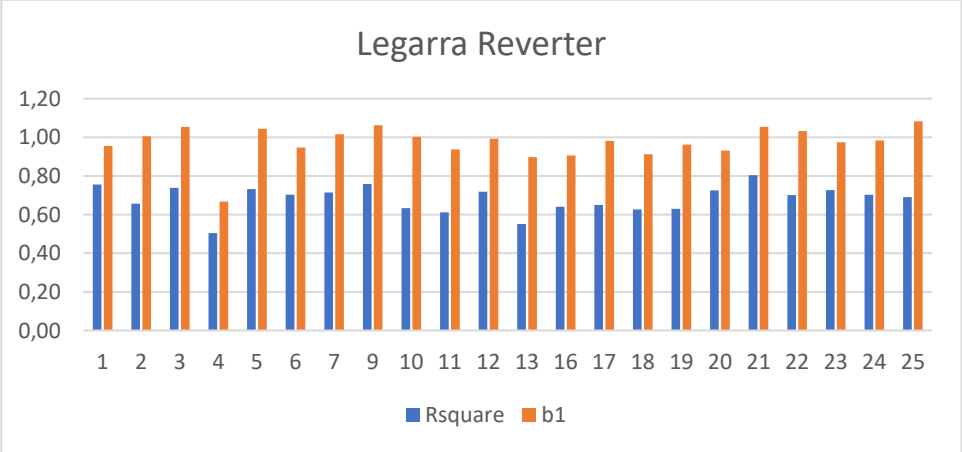


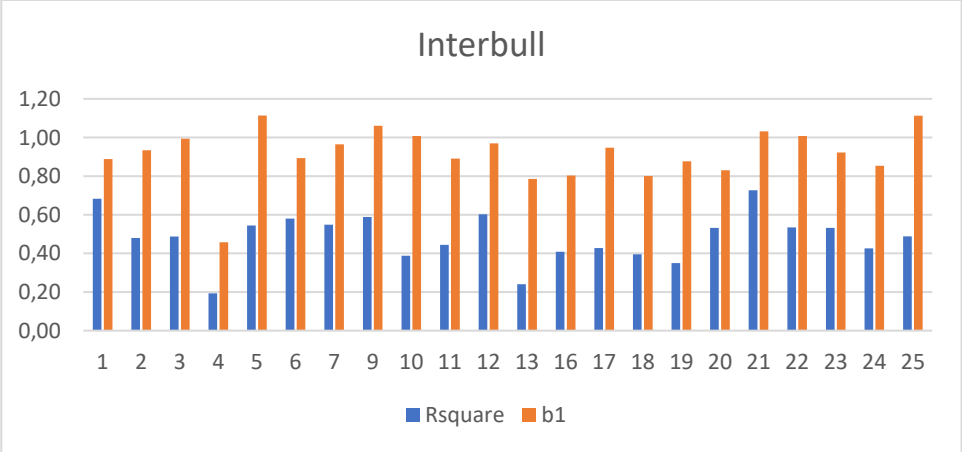



# RDC Interbull validation and Legarra Reverter regression

| | LR | | Interbull | | Interbull pedigree | |
|---|---|---|---|---|---|---|
| | Rsquare | b1 | Rsquare | b1 | Rsquare | b1 |
| 1 | 0.76 | 0.96 | 0.68 | 0.89 | 0.23 | 0.83 |
| 2 | 0.66 | 1.01 | 0.48 | 0.93 | 0.17 | 0.85 |
| 3 | 0.74 | 1.05 | 0.49 | 0.99 | 0.24 | 0.93 |
| 4 | 0.50 | 0.67 | 0.19 | 0.46 | 0.08 | 0.50 |
| 5 | 0.73 | 1.04 | 0.54 | 1.11 | 0.29 | 1.13 |
| 6 | 0.70 | 0.95 | 0.58 | 0.89 | 0.21 | 0.80 |
| 7 | 0.71 | 1.02 | 0.55 | 0.96 | 0.20 | 0.85 |
| 9 | 0.76 | 1.06 | 0.59 | 1.06 | 0.28 | 0.98 |
| 10 | 0.63 | 1.00 | 0.39 | 1.01 | 0.18 | 1.01 |
| 11 | 0.61 | 0.94 | 0.44 | 0.89 | 0.16 | 0.90 |
| 12 | 0.72 | 0.99 | 0.60 | 0.97 | 0.18 | 0.88 |
| 13 | 0.55 | 0.90 | 0.24 | 0.79 | 0.15 | 0.97 |
| 16 | 0.64 | 0.91 | 0.41 | 0.80 | 0.20 | 0.96 |
| 17 | 0.65 | 0.98 | 0.43 | 0.95 | 0.21 | 1.13 |
| 18 | 0.63 | 0.91 | 0.40 | 0.80 | 0.19 | 0.92 |
| 19 | 0.63 | 0.96 | 0.35 | 0.88 | 0.16 | 1.15 |
| 20 | 0.72 | 0.93 | 0.53 | 0.83 | 0.19 | 0.90 |
| 21 | 0.80 | 1.05 | 0.73 | 1.03 | 0.40 | 1.03 |
| 22 | 0.70 | 1.03 | 0.53 | 1.01 | 0.15 | 0.71 |
| 23 | 0.73 | 0.97 | 0.53 | 0.92 | 0.25 | 1.12 |
| 24 | 0.70 | 0.98 | 0.43 | 0.85 | 0.17 | 0.95 |
| 25 | 0.69 | 1.08 | 0.49 | 1.11 | 0.23 | 1.04 |



# RDC Bulls Noforeign

Domestic AI bulls:
For BV9, BV10, BV11, BV12, BV13, BV16 , BV17, BV18, BV19, BV21, BV22 the singlestep procedure is done for the same dataset as earlier shown, besides now the foreign information is excluded.

For these traits, the mean breeding value with foreign and without foreign information are at similar level. When looking at individual bulls the difference between breeding values with noforeign and foreign is less than +- 2 indices and most are less than +-1 indices.

Therefor the problems seen for BV18 and BV19 is still pronounced when foreign information is excluded, thus the difference between full and reduced are still existing when no foreign information is included in the evaluation.

In the tables below, the mean and the standard deviation for evaluations with foreign (F) and without foreign (NF) information is shown.

## *Bv9*

| | | mean | | | | | | STD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYR | N | full | | Reduc | | ebv | Two | full | | Reduc | | ebv | Two |
| | | NF | F | NF | F | | | NF | F | NF | F | | |
| 2004 | 212 | 99.1 | 99.1 | 99.1 | 99.1 | 99.0 | 99.6 | 9.4 | 9.4 | 9.4 | 9.4 | 9.1 | 9.4 |
| 2005 | 200 | 98.9 | 98.8 | 98.9 | 98.9 | 98.7 | 99.5 | 8.8 | 8.8 | 8.8 | 8.8 | 8.7 | 8.7 |
| 2006 | 194 | 103.6 | 103.6 | 103.6 | 103.6 | 103.7 | 104.1 | 8.7 | 8.6 | 8.7 | 8.7 | 8.6 | 8.5 |
| 2007 | 184 | 101.2 | 101.2 | 101.3 | 101.2 | 101.1 | 101.8 | 8.9 | 8.8 | 8.9 | 8.9 | 8.6 | 8.9 |
| 2008 | 236 | 100.9 | 100.9 | 101.0 | 101.0 | 100.8 | 101.6 | 9.6 | 9.6 | 9.6 | 9.5 | 9.3 | 9.8 |
| 2009 | 216 | 101.2 | 101.2 | 101.2 | 101.1 | 100.8 | 102.0 | 7.8 | 7.8 | 7.8 | 7.8 | 7.5 | 7.8 |
| 2010 | 230 | 101.6 | 101.5 | 101.5 | 101.4 | 101.5 | 102.6 | 8.3 | 8.3 | 8.2 | 8.2 | 7.7 | 8.3 |
| 2011 | 215 | 101.9 | 101.9 | 101.5 | 101.5 | 101.8 | 102.8 | 7.5 | 7.5 | 7.4 | 7.4 | 6.9 | 8.0 |
| 2012 | 151 | 101.3 | 101.2 | 100.9 | 100.8 | 101.1 | 102.2 | 9.6 | 9.6 | 9.5 | 9.5 | 8.9 | 10.0 |
| 2013 | 119 | 101.2 | 101.2 | 100.8 | 100.8 | 101.6 | 102.4 | 7.3 | 7.3 | 6.7 | 6.7 | 6.7 | 7.6 |
| 2014 | 73 | 100.8 | 100.8 | 99.8 | 99.8 | 100.5 | 101.6 | 8.2 | 8.2 | 7.7 | 7.7 | 6.7 | 8.9 |
| 2015 | 50 | 96.8 | 96.7 | 96.6 | 96.6 | 97.2 | 97.9 | 8.5 | 8.4 | 7.2 | 7.1 | 7.4 | 8.6 |
| 2016 | 47 | 99.2 | 99.1 | 98.6 | 98.5 | 99.9 | 100.2 | 7.4 | 7.4 | 5.8 | 5.8 | 6.9 | 7.5 |
| 2017 | 79 | 98.5 | 98.5 | 98.6 | 98.6 | 99.6 | 99.9 | 8.4 | 8.4 | 7.0 | 6.9 | 6.4 | 8.7 |
| 2018 | 63 | 99.8 | 99.7 | 98.5 | 98.5 | 100.8 | 100.9 | 7.3 | 7.2 | 6.4 | 6.4 | 5.0 | 7.2 |
| 2019 | 49 | 98.7 | 98.6 | 98.5 | 98.3 | 99.6 | 100.6 | 6.6 | 6.5 | 6.1 | 6.1 | 4.3 | 7.1 |
| 2020 | 43 | 97.7 | 97.4 | 97.1 | 96.8 | 100.0 | 98.9 | 6.8 | 6.7 | 5.9 | 5.8 | 4.0 | 6.1 |

## *bv10*

| | | mean | | | | | | STD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYR | N | full | | Reduc | | ebv | Two | full | | Reduc | | ebv | Two |
| | | NF | F | NF | F | | | NF | F | NF | F | | |
| 2004 | 212 | 97.6 | 97.7 | 97.7 | 97.7 | 97.6 | 97.6 | 10.0 | 10.0 | 10.0 | 10.0 | 9.8 | 10.1 |
| 2005 | 200 | 97.0 | 97.0 | 97.0 | 97.0 | 96.9 | 97.1 | 8.8 | 8.8 | 8.8 | 8.8 | 8.7 | 9.1 |
| 2006 | 194 | 96.8 | 96.8 | 96.8 | 96.8 | 96.6 | 96.6 | 9.3 | 9.2 | 9.3 | 9.2 | 9.1 | 9.4 |
| 2007 | 184 | 96.5 | 96.6 | 96.4 | 96.5 | 96.4 | 96.5 | 9.4 | 9.4 | 9.3 | 9.3 | 9.0 | 9.6 |
| 2008 | 236 | 97.2 | 97.2 | 97.2 | 97.2 | 97.5 | 97.0 | 9.2 | 9.2 | 9.2 | 9.2 | 8.4 | 9.9 |
| 2009 | 216 | 96.9 | 97.0 | 97.0 | 97.0 | 96.4 | 96.3 | 8.2 | 8.1 | 8.1 | 8.1 | 7.4 | 8.4 |
| 2010 | 230 | 97.6 | 97.7 | 97.8 | 97.9 | 97.6 | 96.5 | 7.6 | 7.6 | 7.5 | 7.4 | 6.5 | 8.0 |
| 2011 | 215 | 97.5 | 97.6 | 98.0 | 98.0 | 97.5 | 96.3 | 8.9 | 8.8 | 9.0 | 9.0 | 8.4 | 9.2 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2012 | 151 | 101.7 | 101.9 | 102.2 | 102.3 | 101.0 | 100.8 | 9.2 | 9.2 | 9.0 | 9.0 | 8.5 | 9.6 |
| 2013 | 119 | 100.7 | 100.8 | 102.3 | 102.3 | 98.6 | 98.9 | 7.8 | 7.7 | 7.2 | 7.2 | 6.9 | 7.7 |
| 2014 | 73 | 103.2 | 103.2 | 104.2 | 104.2 | 101.5 | 101.2 | 8.0 | 8.0 | 6.8 | 6.7 | 7.5 | 8.0 |
| 2015 | 50 | 104.9 | 104.9 | 106.1 | 106.1 | 102.7 | 102.7 | 8.1 | 8.1 | 5.9 | 5.9 | 7.1 | 7.7 |
| 2016 | 47 | 105.6 | 105.6 | 106.6 | 106.5 | 102.6 | 103.0 | 7.8 | 7.8 | 5.9 | 5.9 | 7.9 | 7.9 |
| 2017 | 79 | 105.7 | 105.8 | 105.6 | 105.6 | 102.7 | 103.5 | 7.9 | 7.9 | 6.4 | 6.4 | 5.7 | 7.7 |
| 2018 | 63 | 106.4 | 106.4 | 107.0 | 106.9 | 103.0 | 103.5 | 6.3 | 6.2 | 5.8 | 5.8 | 5.0 | 6.3 |
| 2019 | 49 | 108.7 | 108.7 | 108.4 | 108.4 | 103.7 | 105.4 | 6.4 | 6.4 | 5.2 | 5.2 | 4.8 | 7.2 |
| 2020 | 43 | 109.8 | 109.8 | 109.2 | 109.2 | 104.7 | 106.8 | 6.9 | 6.9 | 6.1 | 6.1 | 3.4 | 6.8 |

## *bv11*

| | | mean | | | | | | STD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYR | N | full | | Reduc | | ebv | Two | full | | Reduc | | ebv | Two |
| | | NF | F | NF | F | | | NF | F | NF | F | | |
| 2004 | 212 | 93.9 | 93.9 | 94.0 | 94.0 | 94.0 | 97.2 | 9.6 | 9.6 | 9.6 | 9.6 | 9.5 | 9.4 |
| 2005 | 200 | 95.3 | 95.3 | 95.3 | 95.3 | 95.1 | 98.5 | 9.8 | 9.8 | 9.8 | 9.8 | 9.5 | 9.9 |
| 2006 | 194 | 96.4 | 96.4 | 96.5 | 96.5 | 96.6 | 99.7 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 |
| 2007 | 184 | 95.7 | 95.7 | 95.8 | 95.8 | 95.6 | 99.0 | 9.5 | 9.5 | 9.4 | 9.4 | 9.1 | 9.6 |
| 2008 | 236 | 95.8 | 95.8 | 95.8 | 95.8 | 96.0 | 99.0 | 9.1 | 9.1 | 9.2 | 9.2 | 8.4 | 8.5 |
| 2009 | 216 | 95.7 | 95.7 | 95.8 | 95.8 | 96.0 | 99.1 | 9.1 | 9.1 | 9.1 | 9.1 | 8.0 | 8.4 |
| 2010 | 230 | 97.0 | 97.0 | 97.3 | 97.3 | 97.0 | 100.3 | 9.5 | 9.5 | 9.4 | 9.4 | 8.3 | 8.5 |
| 2011 | 215 | 98.8 | 98.8 | 98.7 | 98.7 | 98.1 | 101.4 | 9.6 | 9.6 | 9.7 | 9.7 | 8.3 | 8.7 |
| 2012 | 151 | 100.2 | 100.2 | 99.9 | 99.9 | 98.9 | 102.7 | 9.0 | 9.0 | 8.8 | 8.8 | 8.2 | 8.7 |
| 2013 | 119 | 101.9 | 101.9 | 101.4 | 101.4 | 100.0 | 103.2 | 7.4 | 7.4 | 6.6 | 6.6 | 6.3 | 5.3 |
| 2014 | 73 | 103.3 | 103.3 | 102.1 | 102.1 | 101.1 | 103.9 | 9.0 | 9.0 | 7.3 | 7.3 | 8.1 | 6.0 |
| 2015 | 50 | 103.2 | 103.2 | 103.5 | 103.5 | 101.5 | 103.3 | 10.5 | 10.5 | 9.3 | 9.3 | 8.3 | 7.1 |
| 2016 | 47 | 104.6 | 104.6 | 105.9 | 105.9 | 102.0 | 103.7 | 10.3 | 10.3 | 8.9 | 8.9 | 7.8 | 6.9 |
| 2017 | 79 | 106.1 | 106.1 | 106.3 | 106.3 | 101.9 | 105.4 | 9.4 | 9.4 | 7.9 | 7.9 | 6.7 | 6.5 |
| 2018 | 63 | 105.9 | 105.9 | 105.9 | 106.0 | 101.4 | 105.3 | 9.0 | 9.0 | 7.9 | 7.9 | 6.1 | 6.5 |
| 2019 | 49 | 108.0 | 108.0 | 107.9 | 107.9 | 101.7 | 106.9 | 6.8 | 6.8 | 6.4 | 6.4 | 4.5 | 5.1 |
| 2020 | 43 | 104.9 | 105.0 | 106.2 | 106.2 | 101.4 | 104.3 | 7.5 | 7.5 | 5.9 | 5.9 | 3.9 | 5.6 |

## *bv12*

| | | mean | | | | | | STD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYR | N | full | | Reduc | | ebv | Two | full | | Reduc | | ebv | Two |
| | | NF | F | NF | F | | | NF | F | NF | F | | |
| 2004 | 212 | 94.3 | 94.3 | 94.3 | 94.3 | 94.5 | 97.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.3 | 9.5 |
| 2005 | 200 | 96.2 | 96.2 | 96.2 | 96.2 | 96.2 | 99.3 | 9.8 | 9.8 | 9.7 | 9.7 | 9.4 | 9.8 |
| 2006 | 194 | 95.0 | 95.0 | 95.1 | 95.1 | 95.4 | 98.3 | 9.9 | 9.9 | 9.8 | 9.8 | 9.5 | 9.8 |
| 2007 | 184 | 95.1 | 95.1 | 95.2 | 95.2 | 95.2 | 98.6 | 10.1 | 10.1 | 10.0 | 10.0 | 9.6 | 10.2 |
| 2008 | 236 | 95.0 | 95.0 | 95.0 | 95.0 | 95.4 | 98.3 | 10.7 | 10.7 | 10.6 | 10.6 | 9.9 | 10.1 |
| 2009 | 216 | 94.9 | 94.9 | 95.0 | 95.0 | 95.5 | 98.3 | 10.1 | 10.1 | 10.0 | 10.0 | 8.6 | 9.2 |
| 2010 | 230 | 95.8 | 95.8 | 95.8 | 95.8 | 95.5 | 99.4 | 9.9 | 9.9 | 9.8 | 9.8 | 8.6 | 9.1 |
| 2011 | 215 | 96.2 | 96.3 | 96.1 | 96.1 | 95.9 | 99.4 | 10.1 | 10.1 | 10.1 | 10.1 | 8.6 | 9.1 |
| 2012 | 151 | 99.2 | 99.2 | 98.8 | 98.8 | 98.9 | 102.1 | 11.0 | 11.0 | 10.9 | 10.9 | 10.0 | 10.6 |
| 2013 | 119 | 101.9 | 101.9 | 101.0 | 101.0 | 100.1 | 103.4 | 8.8 | 8.8 | 7.9 | 7.9 | 7.7 | 6.9 |
| 2014 | 73 | 102.6 | 102.6 | 101.8 | 101.8 | 100.6 | 104.0 | 10.5 | 10.5 | 9.2 | 9.2 | 9.5 | 7.6 |
| 2015 | 50 | 102.9 | 102.9 | 103.0 | 103.0 | 102.5 | 103.8 | 10.9 | 10.9 | 9.2 | 9.2 | 9.0 | 7.9 |
| 2016 | 47 | 104.8 | 104.8 | 104.9 | 104.9 | 103.0 | 104.9 | 11.7 | 11.7 | 9.3 | 9.3 | 8.9 | 8.4 |
| 2017 | 79 | 105.6 | 105.6 | 105.8 | 105.8 | 102.4 | 105.7 | 9.0 | 9.0 | 7.9 | 7.9 | 6.7 | 6.6 |
| 2018 | 63 | 106.0 | 106.0 | 105.9 | 105.9 | 102.1 | 106.0 | 9.1 | 9.1 | 8.3 | 8.3 | 5.7 | 7.0 |
| 2019 | 49 | 107.4 | 107.4 | 108.1 | 108.1 | 101.7 | 107.1 | 7.3 | 7.4 | 7.6 | 7.6 | 4.9 | 5.6 |
| 2020 | 43 | 106.4 | 106.4 | 106.9 | 106.9 | 101.9 | 106.3 | 9.4 | 9.4 | 7.2 | 7.2 | 5.5 | 7.1 |

### *bv13*

| | | mean | | | | | | STD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYR | N | full | | Reduc | | ebv | Two | full | | Reduc | | ebv | Two |
| | | NF | F | NF | F | | | NF | F | NF | F | | |
| 2004 | 212 | 102.6 | 102.5 | 102.5 | 102.4 | 102.4 | 101.6 | 8.3 | 8.3 | 8.3 | 8.4 | 8.1 | 8.3 |
| 2005 | 200 | 101.4 | 101.3 | 101.4 | 101.4 | 101.2 | 100.6 | 7.3 | 7.3 | 7.3 | 7.3 | 7.2 | 7.4 |
| 2006 | 194 | 99.9 | 100.0 | 99.8 | 99.8 | 99.8 | 99.3 | 6.9 | 6.9 | 6.8 | 6.8 | 6.7 | 6.9 |
| 2007 | 184 | 101.0 | 101.1 | 101.1 | 101.1 | 101.0 | 100.2 | 8.0 | 8.0 | 7.9 | 7.9 | 7.6 | 8.2 |
| 2008 | 236 | 101.6 | 101.6 | 101.4 | 101.4 | 101.6 | 100.8 | 7.5 | 7.5 | 7.5 | 7.5 | 6.9 | 7.9 |
| 2009 | 216 | 102.0 | 102.0 | 102.0 | 102.0 | 101.6 | 101.1 | 6.3 | 6.3 | 6.2 | 6.2 | 6.0 | 6.5 |
| 2010 | 230 | 100.8 | 100.9 | 100.9 | 101.0 | 100.7 | 99.6 | 7.0 | 7.0 | 6.9 | 6.9 | 6.3 | 7.0 |
| 2011 | 215 | 101.2 | 101.3 | 101.3 | 101.4 | 100.7 | 100.4 | 7.3 | 7.3 | 7.2 | 7.2 | 6.9 | 7.4 |
| 2012 | 151 | 101.5 | 101.6 | 101.5 | 101.6 | 100.6 | 100.4 | 7.7 | 7.8 | 7.5 | 7.5 | 6.9 | 7.4 |
| 2013 | 119 | 100.2 | 100.3 | 100.7 | 100.8 | 99.7 | 99.0 | 7.2 | 7.2 | 5.7 | 5.7 | 6.3 | 6.6 |
| 2014 | 73 | 99.7 | 99.8 | 99.8 | 100.0 | 99.4 | 99.0 | 6.4 | 6.3 | 5.6 | 5.6 | 6.0 | 5.8 |
| 2015 | 50 | 103.2 | 103.3 | 103.0 | 103.1 | 102.0 | 101.7 | 8.0 | 8.0 | 6.0 | 6.0 | 7.2 | 7.4 |
| 2016 | 47 | 101.1 | 101.2 | 101.7 | 101.8 | 99.9 | 99.8 | 8.4 | 8.4 | 6.0 | 6.0 | 7.6 | 7.8 |
| 2017 | 79 | 102.7 | 102.7 | 102.6 | 102.6 | 101.8 | 100.8 | 6.5 | 6.5 | 6.0 | 6.0 | 5.1 | 6.2 |
| 2018 | 63 | 103.3 | 103.4 | 103.5 | 103.6 | 101.1 | 101.0 | 6.6 | 6.6 | 5.9 | 5.8 | 4.3 | 6.1 |
| 2019 | 49 | 102.4 | 102.4 | 102.3 | 102.3 | 100.9 | 100.8 | 4.7 | 4.7 | 4.1 | 4.1 | 3.5 | 4.8 |
| 2020 | 43 | 103.0 | 103.1 | 103.1 | 103.3 | 102.5 | 101.3 | 4.7 | 4.8 | 4.3 | 4.2 | 3.1 | 5.4 |

### *bv16*

| | | mean | | | | | | STD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYR | N | full | | Reduc | | ebv | Two | full | | Reduc | | ebv | Two |
| | | NF | F | NF | F | | | NF | F | NF | F | | |
| 2004 | 212 | 90.7 | 90.7 | 90.8 | 90.8 | 90.8 | 94.0 | 10.5 | 10.5 | 10.5 | 10.5 | 10.2 | 10.2 |
| 2005 | 200 | 90.4 | 90.4 | 90.5 | 90.5 | 90.2 | 93.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.8 |
| 2006 | 194 | 92.7 | 92.7 | 92.7 | 92.7 | 92.5 | 95.5 | 10.2 | 10.1 | 10.2 | 10.1 | 10.2 | 10.3 |
| 2007 | 184 | 93.1 | 93.1 | 93.2 | 93.2 | 93.1 | 96.0 | 9.6 | 9.6 | 9.7 | 9.7 | 9.3 | 9.8 |
| 2008 | 236 | 94.3 | 94.3 | 94.4 | 94.5 | 94.0 | 97.4 | 9.1 | 9.1 | 8.9 | 8.9 | 8.5 | 9.1 |
| 2009 | 216 | 95.0 | 94.9 | 95.0 | 95.0 | 94.7 | 98.5 | 9.2 | 9.2 | 9.1 | 9.1 | 7.9 | 8.5 |
| 2010 | 230 | 99.0 | 98.9 | 98.9 | 98.9 | 98.9 | 101.8 | 9.7 | 9.7 | 9.6 | 9.6 | 8.5 | 8.7 |
| 2011 | 215 | 97.9 | 98.0 | 97.9 | 97.9 | 96.9 | 100.4 | 9.0 | 9.0 | 8.9 | 8.9 | 7.7 | 8.4 |
| 2012 | 151 | 101.6 | 101.7 | 101.4 | 101.5 | 99.1 | 103.5 | 8.8 | 8.7 | 8.4 | 8.4 | 8.3 | 8.5 |
| 2013 | 119 | 102.1 | 102.2 | 102.5 | 102.5 | 99.0 | 102.8 | 8.8 | 8.8 | 8.3 | 8.2 | 7.8 | 7.2 |
| 2014 | 73 | 104.4 | 104.4 | 105.3 | 105.3 | 100.4 | 103.5 | 9.7 | 9.7 | 9.3 | 9.2 | 8.9 | 7.1 |
| 2015 | 50 | 108.5 | 108.6 | 111.3 | 111.4 | 102.2 | 105.9 | 9.6 | 9.6 | 7.6 | 7.5 | 9.4 | 7.5 |
| 2016 | 47 | 108.0 | 108.0 | 108.9 | 108.9 | 102.5 | 105.0 | 8.6 | 8.5 | 8.3 | 8.2 | 7.6 | 6.4 |
| 2017 | 79 | 109.5 | 109.5 | 110.1 | 110.1 | 101.6 | 106.3 | 9.9 | 9.9 | 9.6 | 9.6 | 7.1 | 7.2 |
| 2018 | 63 | 108.7 | 108.7 | 110.7 | 110.7 | 101.3 | 105.7 | 8.4 | 8.4 | 7.7 | 7.8 | 6.8 | 6.6 |
| 2019 | 49 | 115.2 | 115.2 | 115.8 | 115.8 | 103.5 | 110.2 | 6.9 | 6.8 | 7.3 | 7.2 | 3.3 | 5.4 |
| 2020 | 43 | 114.7 | 114.8 | 116.1 | 116.1 | 104.5 | 110.0 | 8.4 | 8.5 | 7.9 | 8.0 | 3.7 | 6.5 |

### *bv17*

| | | mean | | | | | | STD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYR | N | full | | Reduc | | ebv | Two | full | | Reduc | | ebv | Two |
| | | NF | F | NF | F | | | NF | F | NF | F | | |
| 2004 | 212 | 92.2 | 92.3 | 92.3 | 92.3 | 92.0 | 96.0 | 9.8 | 9.8 | 9.7 | 9.7 | 9.7 | 9.5 |
| 2005 | 200 | 93.3 | 93.3 | 93.3 | 93.3 | 93.0 | 96.4 | 11.0 | 10.9 | 11.0 | 11.0 | 10.9 | 10.6 |
| 2006 | 194 | 94.4 | 94.5 | 94.5 | 94.5 | 94.2 | 97.1 | 10.7 | 10.7 | 10.7 | 10.7 | 10.4 | 10.2 |
| 2007 | 184 | 94.0 | 94.2 | 94.0 | 94.1 | 93.8 | 97.6 | 8.4 | 8.4 | 8.5 | 8.5 | 8.4 | 8.2 |
| 2008 | 236 | 97.1 | 97.2 | 97.2 | 97.2 | 97.1 | 99.8 | 9.3 | 9.3 | 9.2 | 9.2 | 8.7 | 8.9 |
| 2009 | 216 | 96.4 | 96.4 | 96.6 | 96.6 | 96.5 | 99.3 | 9.1 | 9.1 | 9.0 | 9.0 | 7.9 | 8.5 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2010 | 230 | 100.4 | 100.5 | 100.6 | 100.6 | 99.5 | 102.7 | 8.5 | 8.5 | 8.3 | 8.3 | 8.0 | 8.0 |
| 2011 | 215 | 99.1 | 99.2 | 99.4 | 99.4 | 97.5 | 101.0 | 7.8 | 7.8 | 7.8 | 7.7 | 7.0 | 7.6 |
| 2012 | 151 | 100.1 | 100.2 | 100.2 | 100.3 | 97.9 | 101.4 | 7.7 | 7.7 | 7.6 | 7.6 | 7.5 | 7.7 |
| 2013 | 119 | 100.3 | 100.4 | 101.2 | 101.3 | 97.5 | 101.8 | 8.3 | 8.3 | 7.6 | 7.6 | 7.2 | 6.7 |
| 2014 | 73 | 102.5 | 102.7 | 103.8 | 103.9 | 99.4 | 102.8 | 8.5 | 8.5 | 7.6 | 7.5 | 7.9 | 6.6 |
| 2015 | 50 | 105.2 | 105.3 | 108.2 | 108.2 | 100.1 | 103.2 | 8.9 | 8.9 | 7.3 | 7.4 | 8.5 | 7.5 |
| 2016 | 47 | 107.3 | 107.4 | 109.1 | 109.2 | 101.2 | 104.9 | 8.6 | 8.5 | 7.5 | 7.5 | 7.9 | 6.4 |
| 2017 | 79 | 108.9 | 109.1 | 110.6 | 110.7 | 101.7 | 106.1 | 9.0 | 9.0 | 8.1 | 8.1 | 6.5 | 6.8 |
| 2018 | 63 | 110.7 | 110.9 | 111.7 | 111.8 | 102.9 | 107.8 | 8.1 | 8.1 | 7.2 | 7.2 | 5.9 | 7.0 |
| 2019 | 49 | 113.4 | 113.4 | 114.8 | 114.7 | 103.0 | 109.0 | 6.9 | 6.9 | 6.3 | 6.2 | 4.3 | 5.3 |
| 2020 | 43 | 113.7 | 113.9 | 114.6 | 114.8 | 103.9 | 109.5 | 6.4 | 6.5 | 5.8 | 5.9 | 3.1 | 5.3 |

### *bv18*

| | | mean | | | | | | STD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYR | N | full | | Reduc | | ebv | Two | full | | Reduc | | ebv | Two |
| | | NF | F | NF | F | | | NF | F | NF | F | | |
| 2004 | 212 | 95.8 | 95.8 | 96.0 | 96.0 | 95.6 | 96.5 | 9.7 | 9.7 | 9.7 | 9.7 | 9.5 | 9.3 |
| 2005 | 200 | 96.2 | 96.2 | 96.2 | 96.2 | 95.9 | 96.5 | 9.8 | 9.8 | 9.8 | 9.8 | 9.7 | 9.2 |
| 2006 | 194 | 97.7 | 97.7 | 97.9 | 97.9 | 97.5 | 97.6 | 10.2 | 10.2 | 10.1 | 10.1 | 10.0 | 9.6 |
| 2007 | 184 | 97.7 | 97.7 | 97.8 | 97.8 | 97.4 | 98.1 | 9.5 | 9.5 | 9.4 | 9.4 | 9.3 | 9.1 |
| 2008 | 236 | 98.3 | 98.3 | 98.4 | 98.4 | 98.4 | 98.5 | 10.2 | 10.2 | 10.0 | 10.0 | 9.8 | 9.8 |
| 2009 | 216 | 97.9 | 97.9 | 98.1 | 98.1 | 97.6 | 98.2 | 10.3 | 10.3 | 10.1 | 10.1 | 9.3 | 9.5 |
| 2010 | 230 | 101.1 | 101.1 | 101.5 | 101.5 | 100.0 | 100.9 | 10.9 | 10.9 | 10.8 | 10.8 | 10.1 | 9.7 |
| 2011 | 215 | 99.3 | 99.3 | 99.7 | 99.7 | 97.9 | 98.6 | 8.8 | 8.8 | 8.8 | 8.8 | 8.3 | 8.0 |
| 2012 | 151 | 102.1 | 102.1 | 102.5 | 102.5 | 100.2 | 101.3 | 8.6 | 8.6 | 8.8 | 8.8 | 8.2 | 8.1 |
| 2013 | 119 | 101.9 | 101.9 | 103.2 | 103.2 | 99.5 | 100.6 | 9.1 | 9.1 | 8.7 | 8.7 | 8.0 | 7.6 |
| 2014 | 73 | 102.2 | 102.2 | 104.1 | 104.1 | 99.6 | 100.6 | 8.2 | 8.2 | 8.3 | 8.3 | 7.6 | 6.7 |
| 2015 | 50 | 104.6 | 104.6 | 108.6 | 108.6 | 100.7 | 101.4 | 9.1 | 9.1 | 7.6 | 7.6 | 7.9 | 8.0 |
| 2016 | 47 | 106.6 | 106.6 | 110.5 | 110.5 | 100.9 | 102.9 | 9.0 | 9.0 | 7.9 | 7.9 | 7.6 | 7.5 |
| 2017 | 79 | 109.2 | 109.2 | 111.8 | 111.8 | 103.1 | 104.5 | 7.9 | 7.9 | 7.9 | 7.9 | 6.4 | 6.4 |
| 2018 | 63 | 108.9 | 109.0 | 112.4 | 112.4 | 102.5 | 104.5 | 7.3 | 7.3 | 6.7 | 6.7 | 5.6 | 6.3 |
| 2019 | 49 | 112.0 | 112.0 | 114.8 | 114.8 | 103.5 | 106.0 | 7.3 | 7.3 | 6.9 | 6.9 | 4.8 | 6.2 |
| 2020 | 43 | 113.3 | 113.3 | 116.1 | 116.1 | 103.1 | 107.4 | 7.1 | 7.1 | 6.9 | 6.9 | 3.9 | 5.9 |

### *bv19*

| | | mean | | | | | | STD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYR | N | full | | Reduc | | ebv | Two | full | | Reduc | | ebv | Two |
| | | NF | F | NF | F | | | NF | F | NF | F | | |
| 2004 | 212 | 103.5 | 103.5 | 103.5 | 103.5 | 103.3 | 102.1 | 10.4 | 10.3 | 10.3 | 10.2 | 10.1 | 10.3 |
| 2005 | 200 | 101.6 | 101.6 | 101.6 | 101.6 | 101.3 | 100.0 | 9.9 | 9.9 | 9.9 | 9.8 | 9.7 | 10.1 |
| 2006 | 194 | 98.7 | 98.7 | 98.7 | 98.7 | 98.3 | 97.1 | 10.9 | 10.9 | 10.9 | 10.9 | 10.4 | 10.6 |
| 2007 | 184 | 101.5 | 101.5 | 101.4 | 101.4 | 101.1 | 100.0 | 11.1 | 11.1 | 11.0 | 11.0 | 10.6 | 11.1 |
| 2008 | 236 | 99.9 | 99.9 | 100.1 | 100.1 | 99.8 | 98.0 | 10.1 | 10.1 | 10.1 | 10.1 | 9.4 | 9.9 |
| 2009 | 216 | 101.7 | 101.7 | 101.8 | 101.9 | 101.6 | 100.0 | 10.1 | 10.1 | 9.8 | 9.8 | 8.9 | 9.5 |
| 2010 | 230 | 102.7 | 102.8 | 103.0 | 103.0 | 102.3 | 100.9 | 10.1 | 10.1 | 10.2 | 10.2 | 8.6 | 9.5 |
| 2011 | 215 | 101.8 | 101.8 | 102.3 | 102.4 | 100.3 | 99.4 | 10.3 | 10.2 | 10.2 | 10.2 | 8.8 | 9.9 |
| 2012 | 151 | 102.5 | 102.5 | 103.5 | 103.5 | 100.8 | 100.1 | 10.5 | 10.5 | 10.4 | 10.4 | 9.5 | 9.8 |
| 2013 | 119 | 100.0 | 100.0 | 102.2 | 102.1 | 98.4 | 98.0 | 9.4 | 9.4 | 8.9 | 8.8 | 7.8 | 8.2 |
| 2014 | 73 | 102.5 | 102.5 | 105.2 | 105.3 | 100.4 | 99.4 | 11.2 | 11.2 | 8.9 | 9.0 | 9.8 | 8.9 |
| 2015 | 50 | 101.5 | 101.5 | 105.6 | 105.4 | 99.6 | 97.4 | 10.7 | 10.6 | 8.6 | 8.5 | 10.2 | 9.5 |
| 2016 | 47 | 106.6 | 106.5 | 109.3 | 109.2 | 102.8 | 101.7 | 10.9 | 10.9 | 8.0 | 8.0 | 9.7 | 10.1 |
| 2017 | 79 | 103.9 | 103.8 | 107.6 | 107.5 | 100.1 | 99.6 | 8.0 | 8.0 | 7.7 | 7.6 | 5.9 | 6.5 |
| 2018 | 63 | 105.0 | 105.0 | 108.4 | 108.5 | 101.5 | 100.7 | 8.9 | 8.9 | 8.5 | 8.5 | 5.9 | 7.9 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | 49 | 104.5 | 104.4 | 109.7 | 109.6 | 99.4 | 100.3 | 6.7 | 6.7 | 6.6 | 6.6 | 4.3 | 6.2 |
| 2020 | 43 | 105.5 | 105.5 | 108.8 | 108.8 | 101.2 | 101.0 | 7.4 | 7.5 | 6.2 | 6.3 | 3.1 | 6.6 |

## *bv21*

| | | mean | | | | | | STD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYR | N | full | | Reduc | | ebv | Two | full | | Reduc | | ebv | Two |
| | | NF | F | NF | F | | | NF | F | NF | F | | |
| 2004 | 212 | 101.2 | 101.2 | 101.2 | 101.2 | 101.3 | 102.6 | 9.7 | 9.7 | 9.6 | 9.6 | 9.2 | 9.5 |
| 2005 | 200 | 99.3 | 99.3 | 99.4 | 99.3 | 99.5 | 100.7 | 9.3 | 9.3 | 9.3 | 9.3 | 9.1 | 9.2 |
| 2006 | 194 | 100.9 | 100.8 | 100.9 | 100.9 | 101.3 | 102.1 | 10.6 | 10.6 | 10.6 | 10.6 | 10.3 | 10.3 |
| 2007 | 184 | 100.9 | 100.9 | 100.9 | 100.8 | 101.2 | 102.0 | 9.9 | 9.9 | 9.8 | 9.8 | 9.4 | 9.8 |
| 2008 | 236 | 100.7 | 100.6 | 100.6 | 100.6 | 100.6 | 101.8 | 8.7 | 8.7 | 8.6 | 8.6 | 8.0 | 8.6 |
| 2009 | 216 | 100.8 | 100.7 | 100.8 | 100.8 | 101.4 | 102.3 | 9.2 | 9.2 | 9.1 | 9.1 | 7.9 | 8.8 |
| 2010 | 230 | 101.3 | 101.3 | 101.3 | 101.2 | 102.1 | 102.9 | 9.1 | 9.1 | 9.0 | 9.0 | 7.8 | 8.8 |
| 2011 | 215 | 99.0 | 98.9 | 99.1 | 99.0 | 99.4 | 100.4 | 9.3 | 9.3 | 9.2 | 9.3 | 8.0 | 9.0 |
| 2012 | 151 | 97.7 | 97.6 | 97.3 | 97.2 | 98.6 | 99.6 | 9.4 | 9.4 | 9.4 | 9.4 | 8.8 | 9.1 |
| 2013 | 119 | 100.6 | 100.6 | 100.4 | 100.3 | 101.8 | 102.3 | 11.0 | 10.9 | 10.5 | 10.4 | 9.5 | 9.8 |
| 2014 | 73 | 100.0 | 99.9 | 99.7 | 99.7 | 100.7 | 101.4 | 10.9 | 11.0 | 9.6 | 9.6 | 9.8 | 9.7 |
| 2015 | 50 | 100.4 | 100.3 | 100.6 | 100.6 | 99.5 | 101.8 | 11.7 | 11.7 | 10.0 | 10.0 | 10.2 | 10.2 |
| 2016 | 47 | 101.3 | 101.2 | 100.2 | 100.1 | 101.3 | 103.2 | 9.1 | 9.0 | 7.8 | 7.8 | 8.4 | 7.9 |
| 2017 | 79 | 99.5 | 99.3 | 100.6 | 100.4 | 98.9 | 100.9 | 9.3 | 9.3 | 8.4 | 8.4 | 7.2 | 8.2 |
| 2018 | 63 | 102.0 | 101.8 | 101.8 | 101.7 | 102.9 | 103.3 | 7.9 | 7.9 | 8.0 | 8.1 | 5.6 | 6.9 |
| 2019 | 49 | 100.0 | 99.9 | 99.2 | 99.1 | 101.0 | 101.1 | 7.8 | 7.8 | 6.5 | 6.4 | 5.3 | 7.2 |
| 2020 | 43 | 100.0 | 99.8 | 99.6 | 99.4 | 101.8 | 101.5 | 5.6 | 5.5 | 4.8 | 4.9 | 4.4 | 5.7 |

## *bv22*

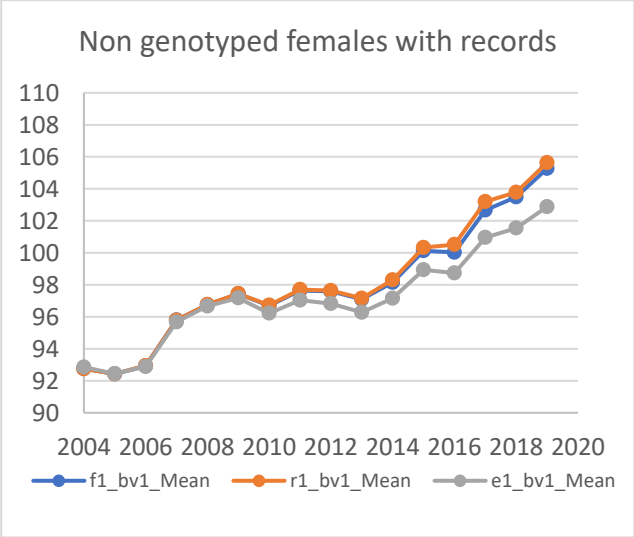
| | | mean | | | | | | STD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYR | N | full | | Reduc | | ebv | Two | full | | Reduc | | ebv | Two |
| | | NF | F | NF | F | | | NF | F | NF | F | | |
| 2004 | 212 | 103.3 | 103.3 | 103.3 | 103.3 | 103.5 | 103.1 | 9.5 | 9.5 | 9.4 | 9.4 | 9.1 | 9.4 |
| 2005 | 200 | 102.3 | 102.3 | 102.4 | 102.4 | 102.5 | 102.2 | 9.8 | 9.8 | 9.8 | 9.8 | 9.6 | 9.5 |
| 2006 | 194 | 103.7 | 103.7 | 103.8 | 103.8 | 103.9 | 103.4 | 10.9 | 10.9 | 10.8 | 10.8 | 10.5 | 10.6 |
| 2007 | 184 | 103.4 | 103.4 | 103.3 | 103.3 | 103.7 | 103.1 | 10.2 | 10.2 | 10.2 | 10.2 | 10.0 | 9.9 |
| 2008 | 236 | 101.9 | 101.9 | 101.8 | 101.8 | 101.9 | 101.7 | 8.7 | 8.7 | 8.5 | 8.5 | 8.3 | 8.8 |
| 2009 | 216 | 101.8 | 101.8 | 101.8 | 101.8 | 101.9 | 101.7 | 8.7 | 8.7 | 8.6 | 8.6 | 7.4 | 8.5 |
| 2010 | 230 | 103.0 | 103.0 | 103.0 | 103.0 | 103.7 | 103.2 | 8.6 | 8.6 | 8.3 | 8.3 | 7.3 | 8.8 |
| 2011 | 215 | 98.6 | 98.6 | 98.7 | 98.7 | 99.2 | 98.6 | 9.1 | 9.1 | 9.0 | 9.0 | 8.3 | 8.9 |
| 2012 | 151 | 97.4 | 97.4 | 97.4 | 97.4 | 98.1 | 97.8 | 10.5 | 10.5 | 10.3 | 10.3 | 9.6 | 10.5 |
| 2013 | 119 | 99.2 | 99.2 | 100.0 | 100.0 | 101.0 | 99.8 | 9.1 | 9.1 | 7.9 | 7.9 | 7.8 | 9.1 |
| 2014 | 73 | 99.2 | 99.2 | 99.3 | 99.3 | 100.5 | 99.8 | 9.0 | 9.0 | 7.8 | 7.8 | 8.2 | 8.8 |
| 2015 | 50 | 99.2 | 99.2 | 99.4 | 99.4 | 99.9 | 100.1 | 10.3 | 10.3 | 8.9 | 8.9 | 8.8 | 10.1 |
| 2016 | 47 | 99.7 | 99.7 | 99.8 | 99.8 | 100.3 | 100.8 | 9.1 | 9.1 | 7.4 | 7.4 | 8.3 | 8.9 |
| 2017 | 79 | 98.5 | 98.5 | 99.8 | 99.8 | 100.0 | 98.9 | 7.8 | 7.8 | 6.8 | 6.8 | 5.5 | 7.5 |
| 2018 | 63 | 99.8 | 99.8 | 100.3 | 100.3 | 101.3 | 100.4 | 7.1 | 7.1 | 6.4 | 6.4 | 5.4 | 7.3 |
| 2019 | 49 | 99.8 | 99.8 | 99.7 | 99.7 | 101.6 | 99.5 | 7.6 | 7.6 | 7.1 | 7.1 | 3.6 | 8.0 |
| 2020 | 43 | 99.0 | 99.0 | 99.9 | 99.9 | 99.9 | 99.8 | 6.7 | 6.7 | 6.0 | 6.0 | 4.6 | 6.6 |

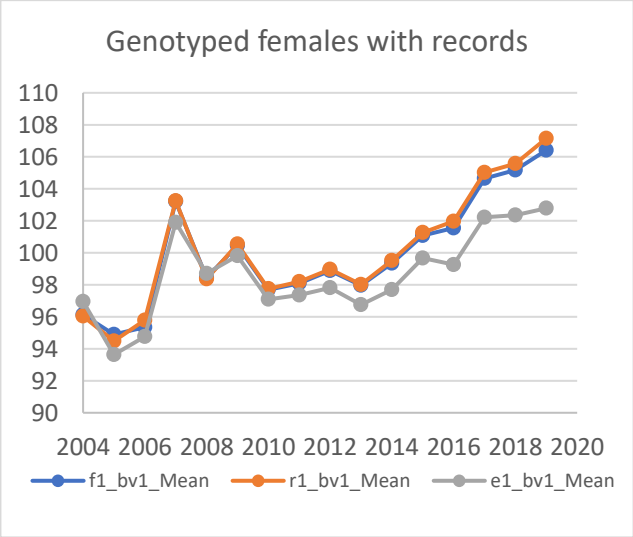
# Jersey
## Cows

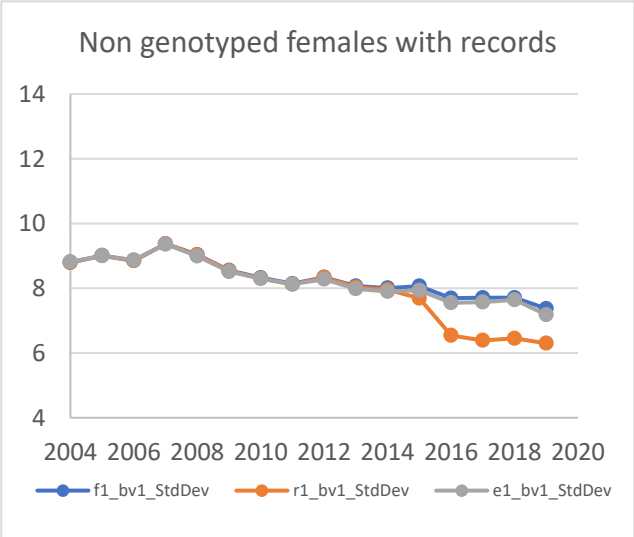
### Trend (mean and SD)

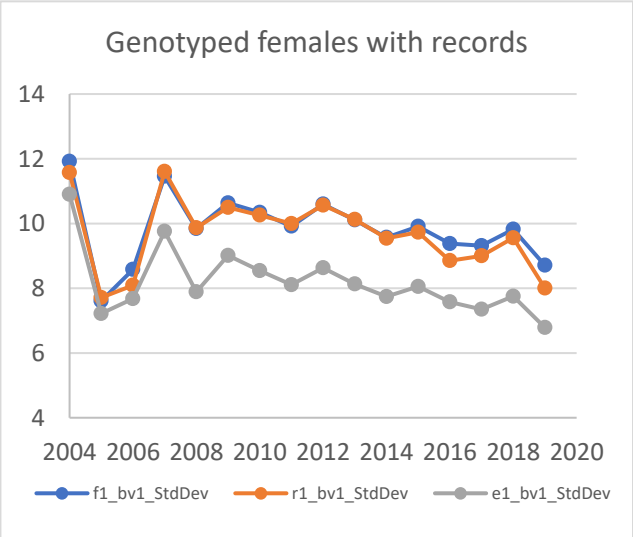
## *bv1*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6531 | 92.8 | 92.7 | 92.9 | 8.8 | 8.8 | 8.8 | 17 | 96.1 | 96.0 | 97.0 | 11.9 | 11.6 | 10.9 |
| 2005 | 6806 | 92.4 | 92.4 | 92.4 | 9.0 | 9.0 | 9.0 | 18 | 94.9 | 94.5 | 93.6 | 7.6 | 7.7 | 7.2 |
| 2006 | 7437 | 92.9 | 92.9 | 92.9 | 8.9 | 8.8 | 8.9 | 32 | 95.3 | 95.8 | 94.8 | 8.6 | 8.1 | 7.7 |
| 2007 | 7734 | 95.8 | 95.8 | 95.7 | 9.4 | 9.4 | 9.4 | 54 | 103.2 | 103.3 | 101.9 | 11.5 | 11.6 | 9.8 |
| 2008 | 8124 | 96.7 | 96.8 | 96.7 | 9.0 | 9.0 | 9.0 | 66 | 98.4 | 98.4 | 98.7 | 9.8 | 9.9 | 7.9 |
| 2009 | 8737 | 97.4 | 97.4 | 97.2 | 8.6 | 8.5 | 8.5 | 100 | 100.5 | 100.5 | 99.8 | 10.6 | 10.5 | 9.0 |
| 2010 | 7277 | 96.7 | 96.7 | 96.2 | 8.3 | 8.3 | 8.3 | 1169 | 97.7 | 97.8 | 97.1 | 10.3 | 10.3 | 8.5 |
| 2011 | 6792 | 97.6 | 97.7 | 97.0 | 8.1 | 8.1 | 8.1 | 1921 | 98.1 | 98.2 | 97.4 | 9.9 | 10.0 | 8.1 |
| 2012 | 6662 | 97.6 | 97.6 | 96.8 | 8.3 | 8.3 | 8.3 | 1930 | 98.9 | 99.0 | 97.8 | 10.6 | 10.6 | 8.6 |
| 2013 | 5860 | 97.1 | 97.2 | 96.3 | 8.1 | 8.0 | 8.0 | 1332 | 98.0 | 98.0 | 96.8 | 10.1 | 10.1 | 8.1 |
| 2014 | 5739 | 98.1 | 98.3 | 97.2 | 8.0 | 8.0 | 7.9 | 1584 | 99.3 | 99.5 | 97.7 | 9.6 | 9.5 | 7.7 |
| 2015 | 5352 | 100.1 | 100.3 | 98.9 | 8.1 | 7.7 | 7.9 | 1610 | 101.1 | 101.3 | 99.7 | 9.9 | 9.7 | 8.1 |
| 2016 | 4706 | 100.0 | 100.5 | 98.7 | 7.7 | 6.5 | 7.6 | 1716 | 101.5 | 102.0 | 99.3 | 9.4 | 8.9 | 7.6 |
| 2017 | 4066 | 102.7 | 103.2 | 101.0 | 7.7 | 6.4 | 7.6 | 2061 | 104.6 | 105.0 | 102.2 | 9.3 | 9.0 | 7.3 |
| 2018 | 3437 | 103.5 | 103.8 | 101.5 | 7.7 | 6.5 | 7.6 | 2081 | 105.2 | 105.6 | 102.4 | 9.8 | 9.6 | 7.8 |
| 2019 | 283 | 105.3 | 105.6 | 102.9 | 7.4 | 6.3 | 7.2 | 226 | 106.4 | 107.2 | 102.8 | 8.7 | 8.0 | 6.8 |



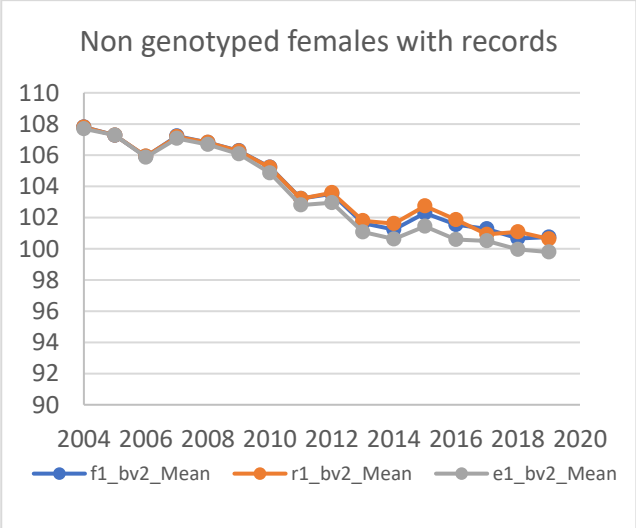



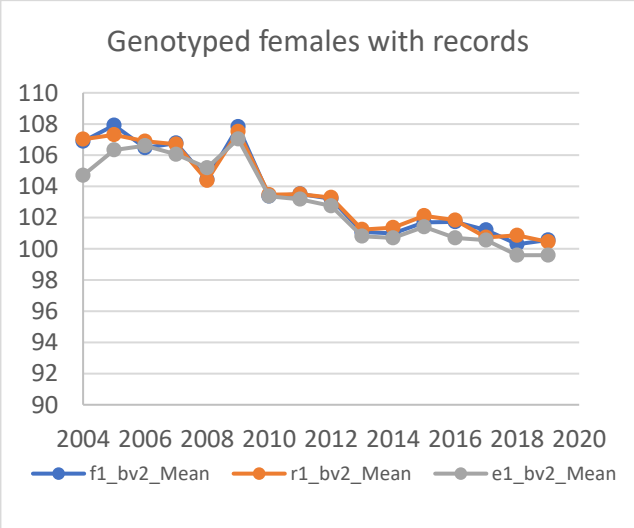



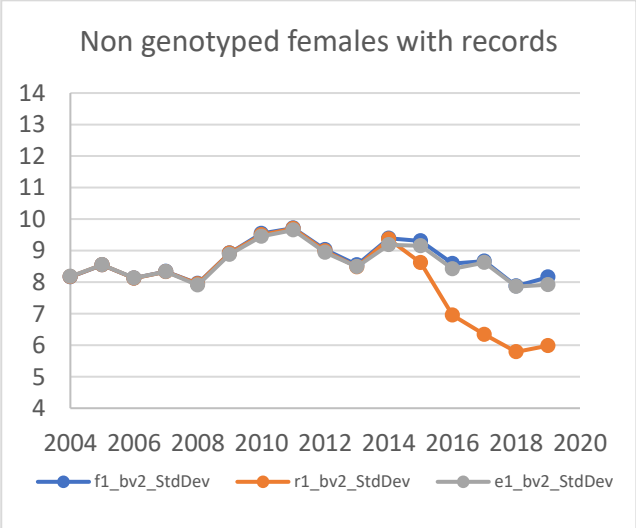



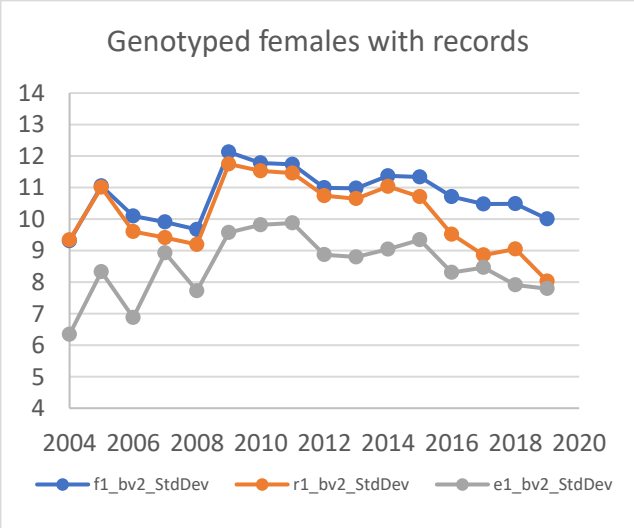
## *bv2*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 107.8 | 107.8 | 107.7 | 8.2 | 8.2 | 8.2 | 17 | 106.9 | 107.0 | 104.7 | 9.3 | 9.3 | 6.3 |
| 2005 | 6905 | 107.3 | 107.3 | 107.3 | 8.5 | 8.5 | 8.5 | 18 | 107.9 | 107.3 | 106.3 | 11.0 | 11.0 | 8.3 |
| 2006 | 7496 | 105.9 | 105.9 | 105.9 | 8.1 | 8.1 | 8.1 | 32 | 106.5 | 106.9 | 106.6 | 10.1 | 9.6 | 6.9 |
| 2007 | 7781 | 107.2 | 107.2 | 107.1 | 8.3 | 8.3 | 8.3 | 54 | 106.8 | 106.7 | 106.1 | 9.9 | 9.4 | 8.9 |
| 2008 | 8183 | 106.8 | 106.8 | 106.7 | 8.0 | 7.9 | 7.9 | 66 | 104.4 | 104.4 | 105.2 | 9.7 | 9.2 | 7.7 |
| 2009 | 8830 | 106.3 | 106.3 | 106.1 | 8.9 | 8.9 | 8.9 | 100 | 107.8 | 107.5 | 107.0 | 12.1 | 11.7 | 9.6 |
| 2010 | 7346 | 105.2 | 105.2 | 104.9 | 9.5 | 9.5 | 9.5 | 1171 | 103.4 | 103.5 | 103.4 | 11.8 | 11.5 | 9.8 |
| 2011 | 6838 | 103.2 | 103.2 | 102.8 | 9.7 | 9.7 | 9.7 | 1923 | 103.5 | 103.5 | 103.2 | 11.7 | 11.5 | 9.9 |
| 2012 | 6709 | 103.5 | 103.6 | 103.0 | 9.0 | 9.0 | 8.9 | 1936 | 103.2 | 103.3 | 102.8 | 11.0 | 10.7 | 8.9 |
| 2013 | 5889 | 101.6 | 101.8 | 101.1 | 8.5 | 8.5 | 8.5 | 1335 | 101.1 | 101.2 | 100.8 | 11.0 | 10.6 | 8.8 |
| 2014 | 5777 | 101.2 | 101.6 | 100.6 | 9.4 | 9.4 | 9.2 | 1585 | 101.0 | 101.4 | 100.7 | 11.4 | 11.0 | 9.0 |
| 2015 | 5368 | 102.3 | 102.7 | 101.4 | 9.3 | 8.6 | 9.2 | 1611 | 101.7 | 102.1 | 101.4 | 11.3 | 10.7 | 9.3 |
| 2016 | 4734 | 101.5 | 101.9 | 100.6 | 8.6 | 6.9 | 8.4 | 1725 | 101.7 | 101.8 | 100.7 | 10.7 | 9.5 | 8.3 |
| 2017 | 4076 | 101.3 | 100.9 | 100.5 | 8.7 | 6.3 | 8.6 | 2064 | 101.2 | 100.7 | 100.6 | 10.5 | 8.9 | 8.5 |
| 2018 | 3445 | 100.7 | 101.1 | 100.0 | 7.9 | 5.8 | 7.9 | 2087 | 100.3 | 100.9 | 99.6 | 10.5 | 9.1 | 7.9 |
| 2019 | 283 | 100.7 | 100.6 | 99.8 | 8.2 | 6.0 | 7.9 | 226 | 100.6 | 100.4 | 99.6 | 10.0 | 8.0 | 7.8 |



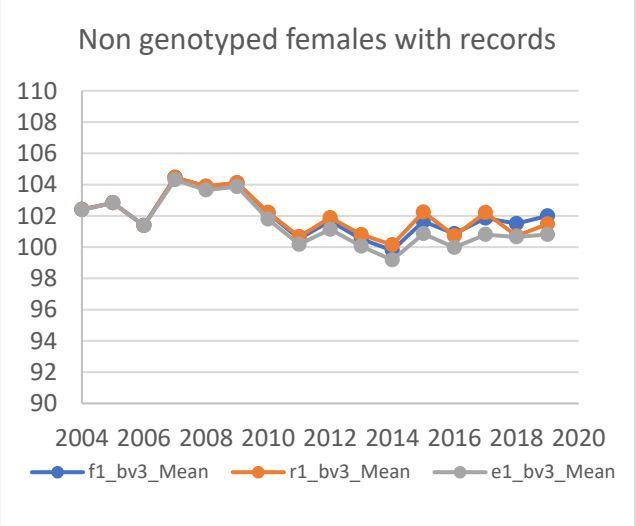



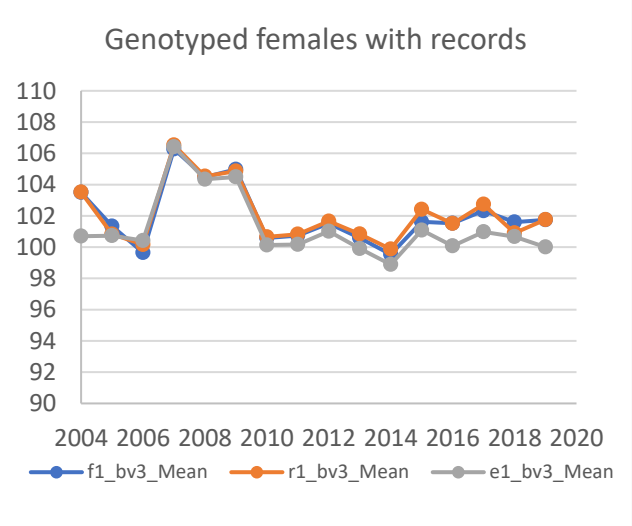



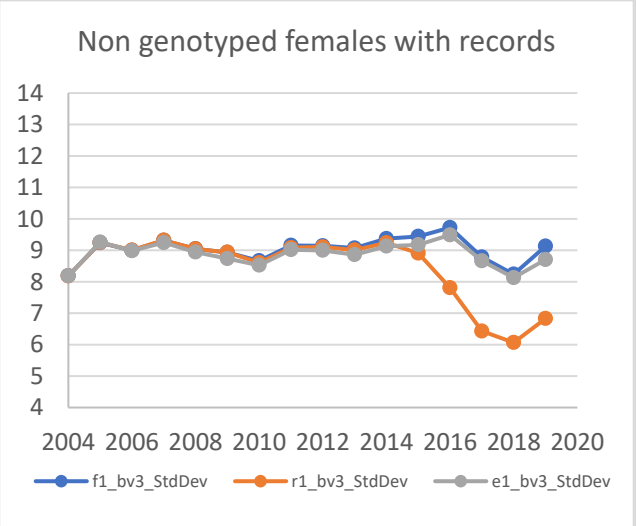



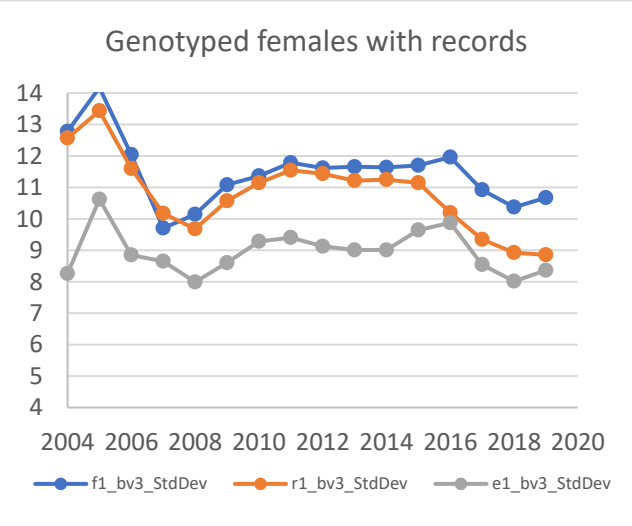
## *bv3*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 102.4 | 102.4 | 102.4 | 8.2 | 8.2 | 8.2 | 17 | 103.5 | 103.5 | 100.7 | 12.8 | 12.6 | 8.3 |
| 2005 | 6905 | 102.8 | 102.8 | 102.8 | 9.2 | 9.2 | 9.3 | 18 | 101.3 | 100.8 | 100.7 | 14.2 | 13.4 | 10.6 |
| 2006 | 7496 | 101.4 | 101.4 | 101.4 | 9.0 | 9.0 | 9.0 | 32 | 99.6 | 100.2 | 100.4 | 12.0 | 11.6 | 8.8 |
| 2007 | 7781 | 104.5 | 104.4 | 104.3 | 9.3 | 9.3 | 9.2 | 54 | 106.3 | 106.5 | 106.4 | 9.7 | 10.2 | 8.7 |
| 2008 | 8183 | 103.9 | 103.9 | 103.6 | 9.0 | 9.0 | 8.9 | 66 | 104.5 | 104.5 | 104.3 | 10.1 | 9.7 | 8.0 |
| 2009 | 8830 | 104.1 | 104.1 | 103.9 | 8.9 | 8.9 | 8.7 | 100 | 105.0 | 104.9 | 104.5 | 11.1 | 10.6 | 8.6 |
| 2010 | 7346 | 102.2 | 102.2 | 101.8 | 8.7 | 8.6 | 8.5 | 1171 | 100.6 | 100.7 | 100.1 | 11.4 | 11.1 | 9.3 |
| 2011 | 6838 | 100.5 | 100.7 | 100.2 | 9.2 | 9.1 | 9.0 | 1923 | 100.7 | 100.8 | 100.2 | 11.8 | 11.5 | 9.4 |
| 2012 | 6709 | 101.7 | 101.9 | 101.1 | 9.1 | 9.1 | 9.0 | 1936 | 101.5 | 101.7 | 101.0 | 11.6 | 11.4 | 9.1 |
| 2013 | 5889 | 100.5 | 100.8 | 100.1 | 9.1 | 9.0 | 8.9 | 1335 | 100.6 | 100.8 | 99.9 | 11.7 | 11.2 | 9.0 |
| 2014 | 5777 | 99.8 | 100.1 | 99.2 | 9.4 | 9.2 | 9.1 | 1585 | 99.5 | 99.9 | 98.9 | 11.6 | 11.2 | 9.0 |
| 2015 | 5368 | 101.6 | 102.2 | 100.9 | 9.4 | 8.9 | 9.2 | 1611 | 101.6 | 102.4 | 101.1 | 11.7 | 11.1 | 9.6 |
| 2016 | 4734 | 100.9 | 100.7 | 100.0 | 9.7 | 7.8 | 9.5 | 1725 | 101.5 | 101.5 | 100.1 | 12.0 | 10.2 | 9.9 |
| 2017 | 4076 | 101.9 | 102.2 | 100.8 | 8.8 | 6.4 | 8.7 | 2064 | 102.3 | 102.7 | 101.0 | 10.9 | 9.3 | 8.5 |
| 2018 | 3445 | 101.5 | 100.7 | 100.7 | 8.2 | 6.1 | 8.1 | 2087 | 101.6 | 100.9 | 100.7 | 10.4 | 8.9 | 8.0 |
| 2019 | 283 | 102.0 | 101.5 | 100.8 | 9.1 | 6.8 | 8.7 | 226 | 101.7 | 101.8 | 100.0 | 10.7 | 8.9 | 8.4 |



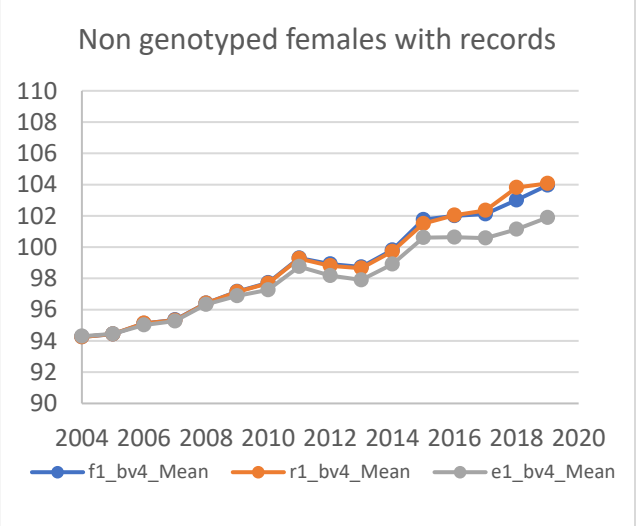



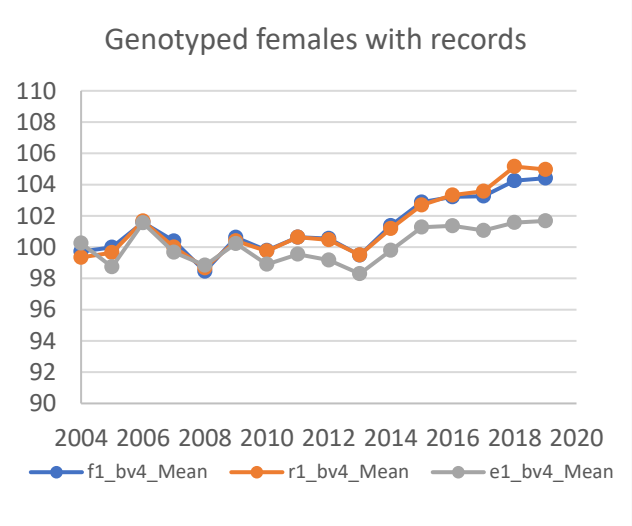



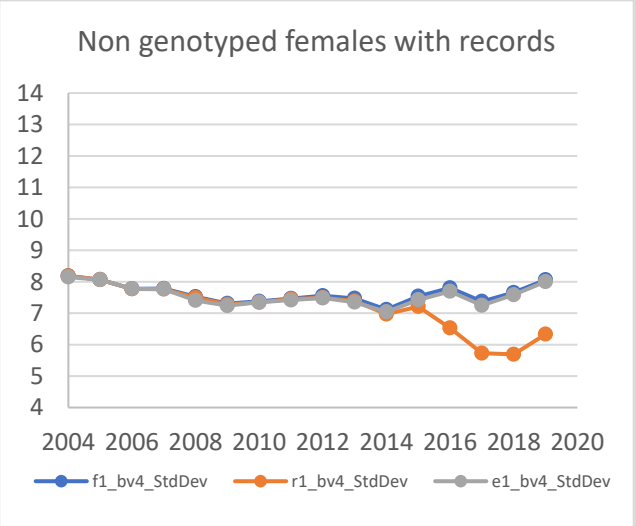



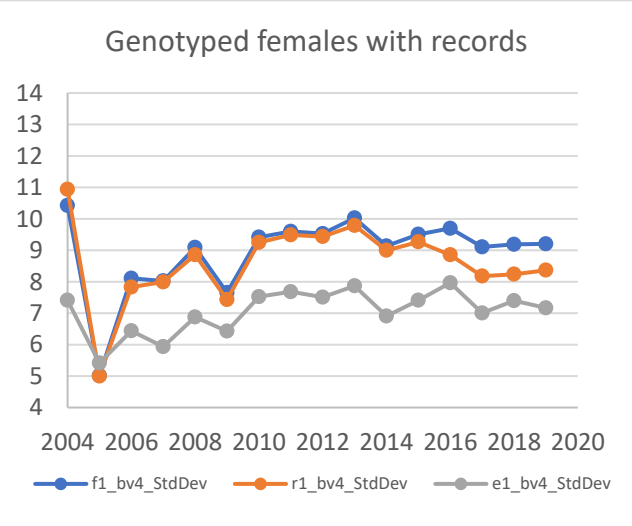
## *bv4*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 94.3 | 94.2 | 94.3 | 8.2 | 8.2 | 8.1 | 17 | 99.7 | 99.3 | 100.2 | 10.4 | 10.9 | 7.4 |
| 2005 | 6905 | 94.4 | 94.4 | 94.4 | 8.1 | 8.1 | 8.1 | 18 | 100.0 | 99.6 | 98.7 | 5.0 | 5.0 | 5.4 |
| 2006 | 7496 | 95.1 | 95.1 | 95.0 | 7.8 | 7.8 | 7.8 | 32 | 101.6 | 101.7 | 101.6 | 8.1 | 7.8 | 6.4 |
| 2007 | 7781 | 95.3 | 95.3 | 95.3 | 7.8 | 7.8 | 7.8 | 54 | 100.4 | 100.0 | 99.7 | 8.0 | 8.0 | 5.9 |
| 2008 | 8183 | 96.4 | 96.4 | 96.3 | 7.5 | 7.5 | 7.4 | 66 | 98.4 | 98.7 | 98.8 | 9.1 | 8.9 | 6.9 |
| 2009 | 8830 | 97.2 | 97.1 | 96.9 | 7.3 | 7.3 | 7.2 | 100 | 100.6 | 100.4 | 100.2 | 7.7 | 7.4 | 6.4 |
| 2010 | 7346 | 97.7 | 97.7 | 97.3 | 7.4 | 7.3 | 7.3 | 1171 | 99.8 | 99.7 | 98.9 | 9.4 | 9.2 | 7.5 |
| 2011 | 6838 | 99.3 | 99.3 | 98.8 | 7.5 | 7.5 | 7.4 | 1923 | 100.6 | 100.6 | 99.5 | 9.6 | 9.5 | 7.7 |
| 2012 | 6709 | 98.9 | 98.8 | 98.2 | 7.6 | 7.5 | 7.5 | 1936 | 100.5 | 100.5 | 99.2 | 9.5 | 9.4 | 7.5 |
| 2013 | 5889 | 98.7 | 98.7 | 97.9 | 7.5 | 7.4 | 7.3 | 1335 | 99.5 | 99.5 | 98.3 | 10.0 | 9.8 | 7.9 |
| 2014 | 5777 | 99.8 | 99.7 | 98.9 | 7.1 | 7.0 | 7.0 | 1585 | 101.4 | 101.2 | 99.8 | 9.1 | 9.0 | 6.9 |
| 2015 | 5368 | 101.8 | 101.5 | 100.6 | 7.5 | 7.2 | 7.4 | 1611 | 102.9 | 102.7 | 101.3 | 9.5 | 9.3 | 7.4 |
| 2016 | 4734 | 102.0 | 102.0 | 100.6 | 7.8 | 6.5 | 7.7 | 1725 | 103.2 | 103.3 | 101.4 | 9.7 | 8.9 | 8.0 |
| 2017 | 4076 | 102.1 | 102.4 | 100.6 | 7.4 | 5.7 | 7.2 | 2064 | 103.3 | 103.6 | 101.1 | 9.1 | 8.2 | 7.0 |
| 2018 | 3445 | 103.0 | 103.8 | 101.1 | 7.7 | 5.7 | 7.6 | 2087 | 104.2 | 105.2 | 101.6 | 9.2 | 8.2 | 7.4 |
| 2019 | 283 | 104.0 | 104.1 | 101.9 | 8.1 | 6.3 | 8.0 | 226 | 104.4 | 105.0 | 101.7 | 9.2 | 8.4 | 7.2 |



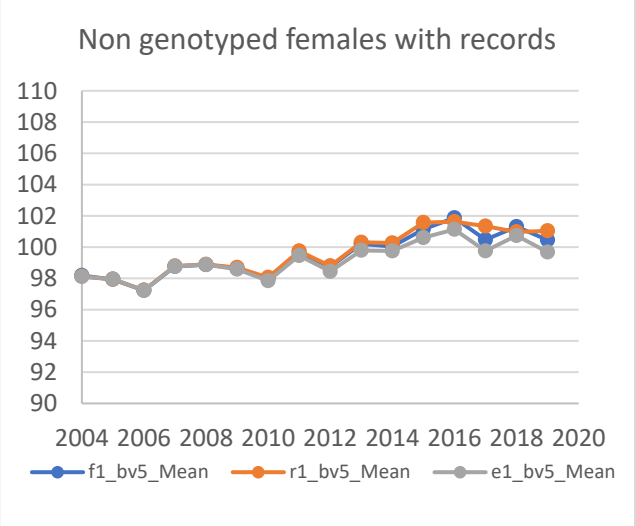



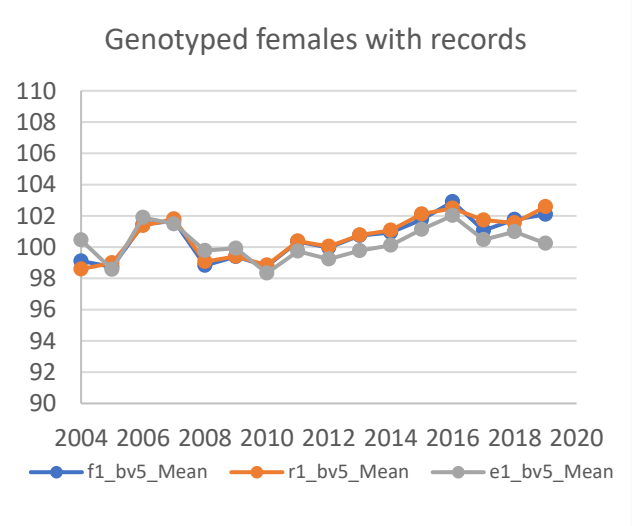



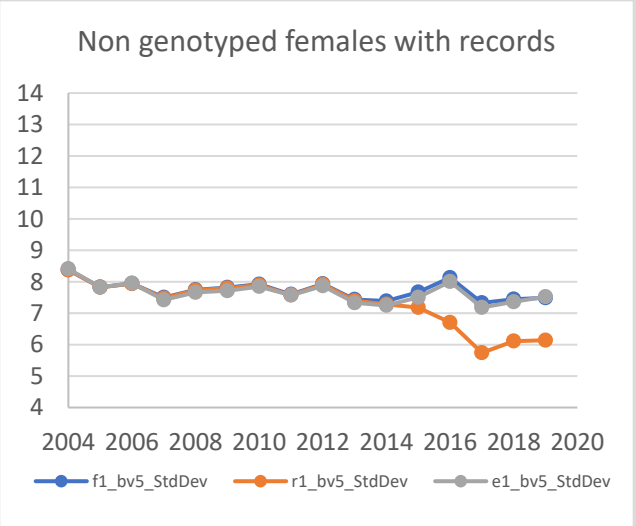



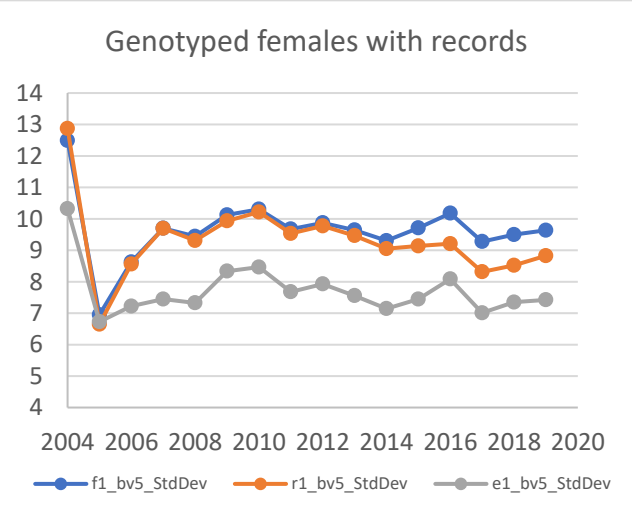
## *bv5*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 98.2 | 98.1 | 98.1 | 8.4 | 8.4 | 8.4 | 17 | 99.1 | 98.6 | 100.5 | 12.5 | 12.9 | 10.3 |
| 2005 | 6905 | 97.9 | 97.9 | 98.0 | 7.8 | 7.8 | 7.8 | 18 | 98.7 | 99.0 | 98.6 | 6.9 | 6.6 | 6.7 |
| 2006 | 7496 | 97.2 | 97.2 | 97.2 | 7.9 | 7.9 | 8.0 | 32 | 101.5 | 101.4 | 101.9 | 8.6 | 8.6 | 7.2 |
| 2007 | 7781 | 98.8 | 98.8 | 98.8 | 7.5 | 7.5 | 7.4 | 54 | 101.7 | 101.8 | 101.5 | 9.7 | 9.7 | 7.4 |
| 2008 | 8183 | 98.9 | 98.9 | 98.9 | 7.7 | 7.7 | 7.7 | 66 | 98.8 | 99.1 | 99.8 | 9.4 | 9.3 | 7.3 |
| 2009 | 8830 | 98.6 | 98.7 | 98.6 | 7.8 | 7.8 | 7.7 | 100 | 99.4 | 99.4 | 99.9 | 10.1 | 9.9 | 8.3 |
| 2010 | 7346 | 98.0 | 98.1 | 97.8 | 7.9 | 7.9 | 7.8 | 1171 | 98.8 | 98.8 | 98.3 | 10.3 | 10.2 | 8.5 |
| 2011 | 6838 | 99.6 | 99.7 | 99.5 | 7.6 | 7.6 | 7.6 | 1923 | 100.4 | 100.4 | 99.7 | 9.7 | 9.5 | 7.7 |
| 2012 | 6709 | 98.7 | 98.8 | 98.4 | 7.9 | 7.9 | 7.9 | 1936 | 100.0 | 100.0 | 99.2 | 9.9 | 9.8 | 7.9 |
| 2013 | 5889 | 100.2 | 100.3 | 99.8 | 7.4 | 7.4 | 7.3 | 1335 | 100.7 | 100.8 | 99.8 | 9.6 | 9.5 | 7.6 |
| 2014 | 5777 | 100.0 | 100.3 | 99.8 | 7.4 | 7.3 | 7.2 | 1585 | 100.9 | 101.1 | 100.1 | 9.3 | 9.1 | 7.1 |
| 2015 | 5368 | 101.1 | 101.6 | 100.6 | 7.7 | 7.2 | 7.5 | 1611 | 101.8 | 102.1 | 101.1 | 9.7 | 9.1 | 7.4 |
| 2016 | 4734 | 101.9 | 101.6 | 101.1 | 8.1 | 6.7 | 8.0 | 1725 | 102.9 | 102.5 | 102.0 | 10.2 | 9.2 | 8.1 |
| 2017 | 4076 | 100.5 | 101.3 | 99.8 | 7.3 | 5.7 | 7.2 | 2064 | 101.1 | 101.7 | 100.5 | 9.3 | 8.3 | 7.0 |
| 2018 | 3445 | 101.3 | 101.0 | 100.7 | 7.4 | 6.1 | 7.4 | 2087 | 101.8 | 101.6 | 101.0 | 9.5 | 8.5 | 7.3 |
| 2019 | 283 | 100.5 | 101.0 | 99.7 | 7.5 | 6.1 | 7.5 | 226 | 102.1 | 102.6 | 100.2 | 9.6 | 8.8 | 7.4 |



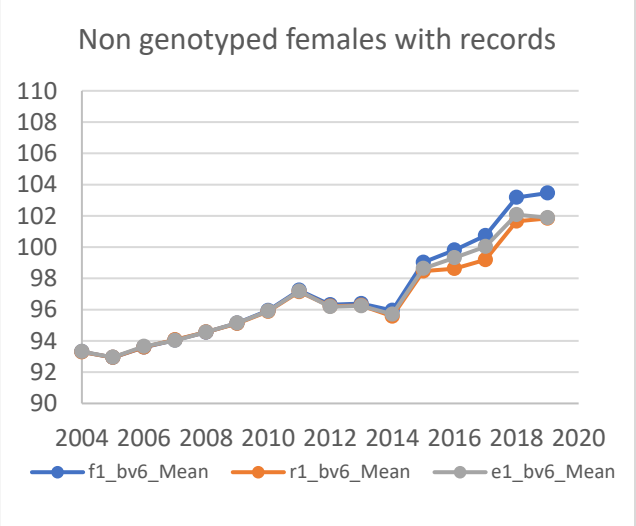



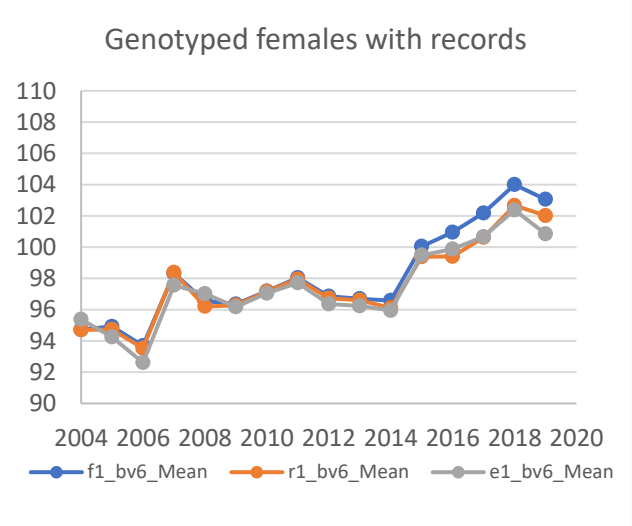



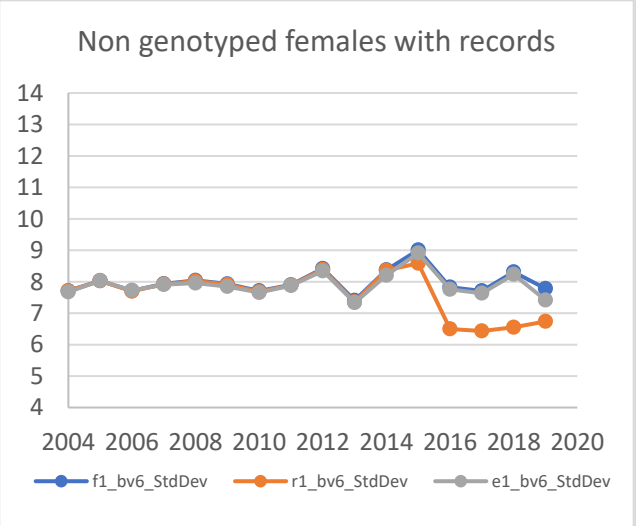



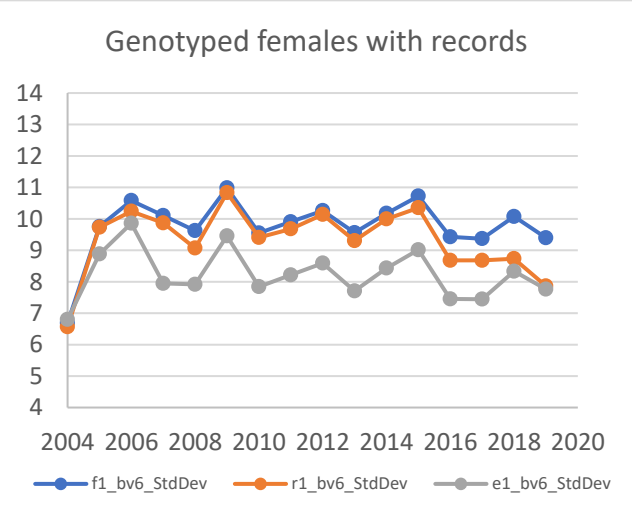
## *bv6*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6656 | 93.3 | 93.3 | 93.3 | 7.7 | 7.7 | 7.7 | 17 | 94.7 | 94.7 | 95.4 | 6.7 | 6.6 | 6.8 |
| 2005 | 6883 | 92.9 | 92.9 | 93.0 | 8.0 | 8.0 | 8.0 | 18 | 94.9 | 94.7 | 94.3 | 9.8 | 9.7 | 8.9 |
| 2006 | 7496 | 93.6 | 93.6 | 93.7 | 7.7 | 7.7 | 7.7 | 32 | 93.7 | 93.5 | 92.6 | 10.6 | 10.2 | 9.9 |
| 2007 | 7781 | 94.1 | 94.1 | 94.0 | 7.9 | 7.9 | 7.9 | 54 | 98.3 | 98.4 | 97.6 | 10.1 | 9.9 | 7.9 |
| 2008 | 8144 | 94.6 | 94.6 | 94.6 | 8.0 | 8.0 | 8.0 | 66 | 96.5 | 96.2 | 97.0 | 9.6 | 9.1 | 7.9 |
| 2009 | 8804 | 95.1 | 95.1 | 95.1 | 7.9 | 7.9 | 7.8 | 100 | 96.4 | 96.3 | 96.2 | 11.0 | 10.8 | 9.5 |
| 2010 | 7304 | 95.9 | 95.9 | 95.9 | 7.7 | 7.7 | 7.7 | 1171 | 97.2 | 97.2 | 97.1 | 9.5 | 9.4 | 7.8 |
| 2011 | 6823 | 97.2 | 97.1 | 97.2 | 7.9 | 7.9 | 7.9 | 1922 | 98.0 | 98.0 | 97.7 | 9.9 | 9.7 | 8.2 |
| 2012 | 6611 | 96.3 | 96.2 | 96.2 | 8.4 | 8.4 | 8.3 | 1908 | 96.9 | 96.7 | 96.4 | 10.3 | 10.1 | 8.6 |
| 2013 | 5833 | 96.4 | 96.3 | 96.2 | 7.4 | 7.4 | 7.3 | 1325 | 96.7 | 96.6 | 96.2 | 9.6 | 9.3 | 7.7 |
| 2014 | 5699 | 96.0 | 95.6 | 95.7 | 8.4 | 8.4 | 8.2 | 1579 | 96.6 | 96.1 | 95.9 | 10.2 | 10.0 | 8.4 |
| 2015 | 5212 | 99.0 | 98.5 | 98.6 | 9.0 | 8.6 | 8.9 | 1604 | 100.0 | 99.4 | 99.5 | 10.7 | 10.4 | 9.0 |
| 2016 | 4734 | 99.8 | 98.6 | 99.3 | 7.8 | 6.5 | 7.8 | 1724 | 101.0 | 99.4 | 99.9 | 9.4 | 8.7 | 7.5 |
| 2017 | 4076 | 100.7 | 99.2 | 100.0 | 7.7 | 6.4 | 7.6 | 2064 | 102.2 | 100.6 | 100.7 | 9.4 | 8.7 | 7.4 |
| 2018 | 3445 | 103.2 | 101.7 | 102.1 | 8.3 | 6.6 | 8.2 | 2087 | 104.0 | 102.7 | 102.4 | 10.1 | 8.7 | 8.3 |
| 2019 | 283 | 103.5 | 101.8 | 101.9 | 7.8 | 6.7 | 7.4 | 226 | 103.1 | 102.0 | 100.9 | 9.4 | 7.9 | 7.8 |



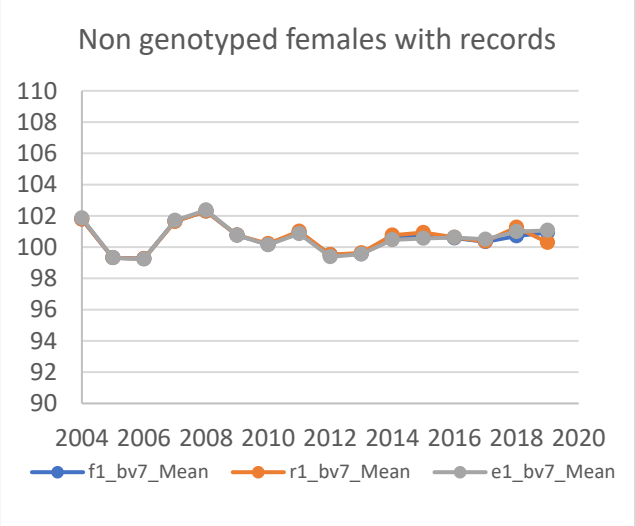



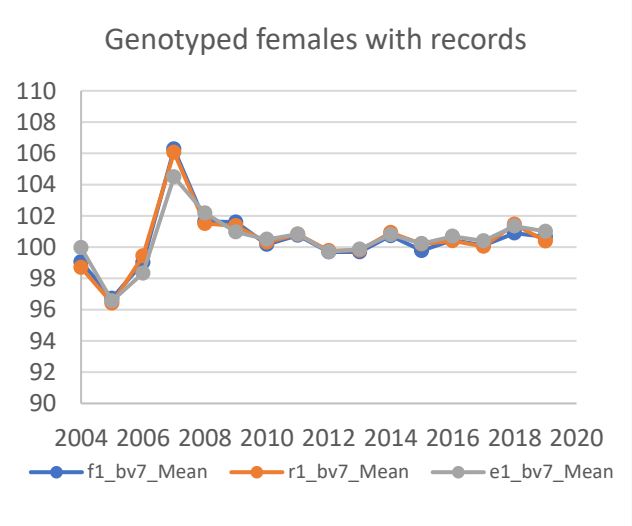



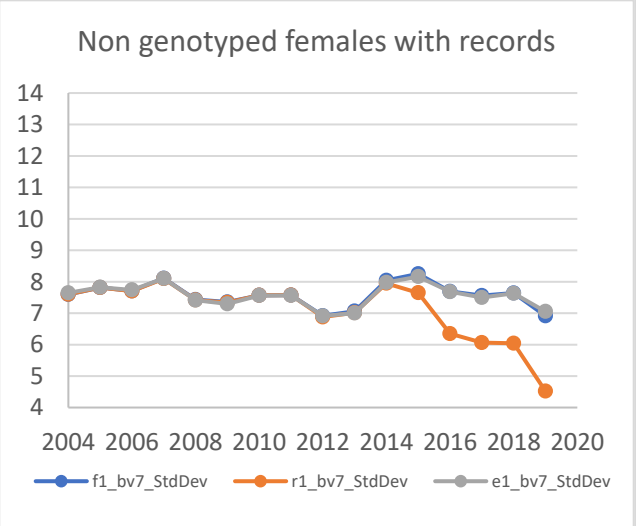



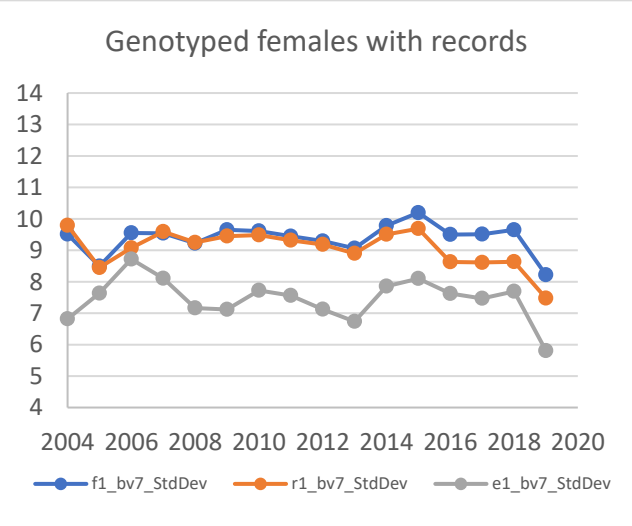
## *bv7*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 101.8 | 101.8 | 101.9 | 7.6 | 7.6 | 7.6 | 17 | 99.1 | 98.7 | 100.0 | 9.5 | 9.8 | 6.8 |
| 2005 | 6905 | 99.3 | 99.3 | 99.3 | 7.8 | 7.8 | 7.8 | 18 | 96.7 | 96.4 | 96.6 | 8.5 | 8.4 | 7.6 |
| 2006 | 7496 | 99.3 | 99.3 | 99.2 | 7.7 | 7.7 | 7.7 | 32 | 99.0 | 99.4 | 98.3 | 9.6 | 9.1 | 8.7 |
| 2007 | 7781 | 101.7 | 101.6 | 101.7 | 8.1 | 8.1 | 8.1 | 54 | 106.3 | 106.1 | 104.5 | 9.5 | 9.6 | 8.1 |
| 2008 | 8183 | 102.3 | 102.3 | 102.4 | 7.4 | 7.4 | 7.4 | 66 | 101.6 | 101.5 | 102.2 | 9.2 | 9.2 | 7.2 |
| 2009 | 8830 | 100.8 | 100.8 | 100.8 | 7.4 | 7.3 | 7.3 | 100 | 101.6 | 101.4 | 101.0 | 9.7 | 9.5 | 7.1 |
| 2010 | 7346 | 100.2 | 100.2 | 100.1 | 7.6 | 7.6 | 7.6 | 1171 | 100.2 | 100.3 | 100.5 | 9.6 | 9.5 | 7.7 |
| 2011 | 6838 | 100.9 | 101.0 | 100.9 | 7.6 | 7.6 | 7.6 | 1923 | 100.8 | 100.8 | 100.8 | 9.4 | 9.3 | 7.6 |
| 2012 | 6709 | 99.5 | 99.5 | 99.4 | 6.9 | 6.9 | 6.9 | 1936 | 99.7 | 99.8 | 99.7 | 9.3 | 9.2 | 7.1 |
| 2013 | 5889 | 99.6 | 99.6 | 99.5 | 7.1 | 7.0 | 7.0 | 1335 | 99.7 | 99.8 | 99.9 | 9.1 | 8.9 | 6.7 |
| 2014 | 5777 | 100.6 | 100.8 | 100.5 | 8.0 | 7.9 | 8.0 | 1585 | 100.7 | 100.9 | 100.8 | 9.8 | 9.5 | 7.9 |
| 2015 | 5368 | 100.7 | 100.9 | 100.6 | 8.3 | 7.6 | 8.2 | 1611 | 99.8 | 100.2 | 100.2 | 10.2 | 9.7 | 8.1 |
| 2016 | 4734 | 100.6 | 100.6 | 100.6 | 7.7 | 6.3 | 7.7 | 1725 | 100.5 | 100.4 | 100.7 | 9.5 | 8.6 | 7.6 |
| 2017 | 4076 | 100.3 | 100.4 | 100.5 | 7.6 | 6.1 | 7.5 | 2064 | 100.1 | 100.0 | 100.4 | 9.5 | 8.6 | 7.5 |
| 2018 | 3445 | 100.7 | 101.3 | 101.0 | 7.6 | 6.0 | 7.6 | 2087 | 100.9 | 101.5 | 101.3 | 9.7 | 8.6 | 7.7 |
| 2019 | 283 | 100.9 | 100.3 | 101.1 | 6.9 | 4.5 | 7.1 | 226 | 100.7 | 100.4 | 101.0 | 8.2 | 7.5 | 5.8 |



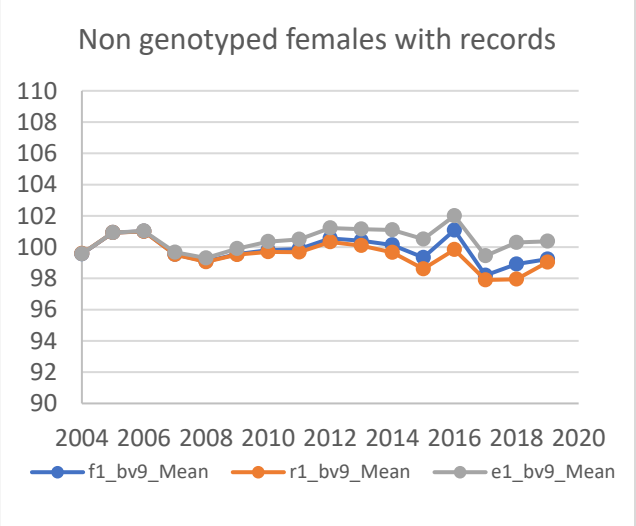



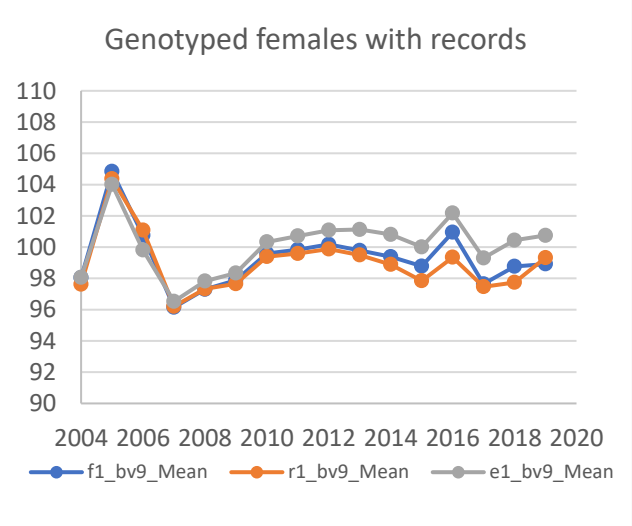



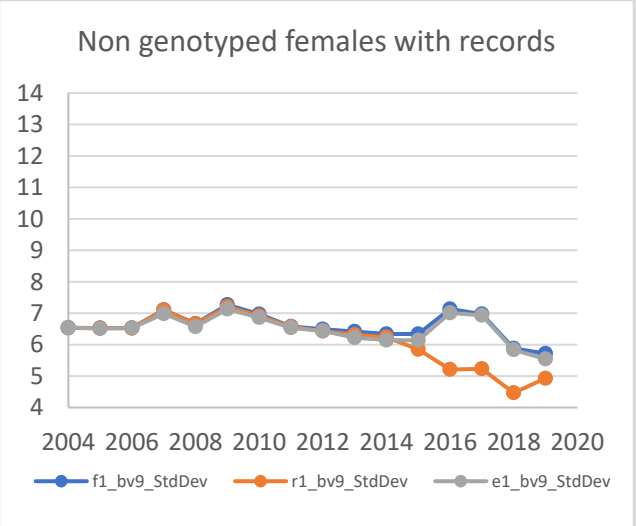



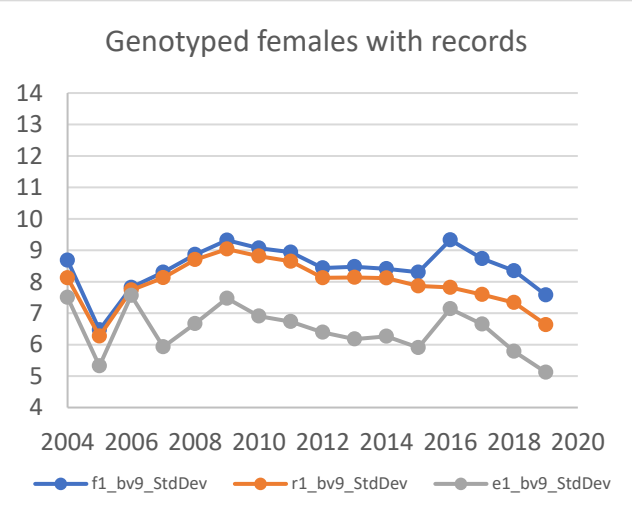
## *bv9*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 99.6 | 99.6 | 99.6 | 6.5 | 6.5 | 6.5 | 17 | 98.0 | 97.6 | 98.1 | 8.7 | 8.1 | 7.5 |
| 2005 | 6905 | 100.9 | 100.9 | 100.9 | 6.5 | 6.5 | 6.5 | 18 | 104.8 | 104.4 | 104.0 | 6.5 | 6.3 | 5.3 |
| 2006 | 7496 | 101.0 | 101.0 | 101.0 | 6.5 | 6.5 | 6.5 | 32 | 100.8 | 101.1 | 99.8 | 7.8 | 7.7 | 7.6 |
| 2007 | 7781 | 99.5 | 99.5 | 99.7 | 7.1 | 7.1 | 7.0 | 54 | 96.1 | 96.2 | 96.5 | 8.3 | 8.1 | 5.9 |
| 2008 | 8183 | 99.1 | 99.1 | 99.3 | 6.7 | 6.7 | 6.6 | 66 | 97.3 | 97.3 | 97.8 | 8.9 | 8.7 | 6.7 |
| 2009 | 8830 | 99.5 | 99.5 | 99.9 | 7.3 | 7.2 | 7.1 | 100 | 97.9 | 97.7 | 98.3 | 9.3 | 9.0 | 7.5 |
| 2010 | 7346 | 99.8 | 99.7 | 100.4 | 7.0 | 6.9 | 6.9 | 1171 | 99.6 | 99.4 | 100.3 | 9.1 | 8.8 | 6.9 |
| 2011 | 6838 | 99.9 | 99.7 | 100.5 | 6.6 | 6.6 | 6.5 | 1923 | 99.8 | 99.6 | 100.7 | 8.9 | 8.6 | 6.7 |
| 2012 | 6709 | 100.6 | 100.3 | 101.2 | 6.5 | 6.4 | 6.4 | 1936 | 100.2 | 99.9 | 101.1 | 8.4 | 8.1 | 6.4 |
| 2013 | 5889 | 100.4 | 100.1 | 101.1 | 6.4 | 6.3 | 6.2 | 1335 | 99.8 | 99.5 | 101.1 | 8.5 | 8.1 | 6.2 |
| 2014 | 5777 | 100.1 | 99.7 | 101.1 | 6.3 | 6.2 | 6.1 | 1585 | 99.4 | 98.9 | 100.8 | 8.4 | 8.1 | 6.3 |
| 2015 | 5368 | 99.3 | 98.6 | 100.5 | 6.3 | 5.8 | 6.1 | 1611 | 98.8 | 97.8 | 100.0 | 8.3 | 7.9 | 5.9 |
| 2016 | 4734 | 101.1 | 99.8 | 102.0 | 7.1 | 5.2 | 7.0 | 1725 | 100.9 | 99.4 | 102.2 | 9.3 | 7.8 | 7.1 |
| 2017 | 4076 | 98.2 | 97.9 | 99.4 | 7.0 | 5.2 | 6.9 | 2064 | 97.6 | 97.5 | 99.3 | 8.7 | 7.6 | 6.6 |
| 2018 | 3445 | 98.9 | 97.9 | 100.3 | 5.9 | 4.5 | 5.8 | 2087 | 98.8 | 97.7 | 100.4 | 8.3 | 7.3 | 5.8 |
| 2019 | 283 | 99.2 | 99.0 | 100.4 | 5.7 | 4.9 | 5.5 | 226 | 98.9 | 99.3 | 100.7 | 7.6 | 6.6 | 5.1 |



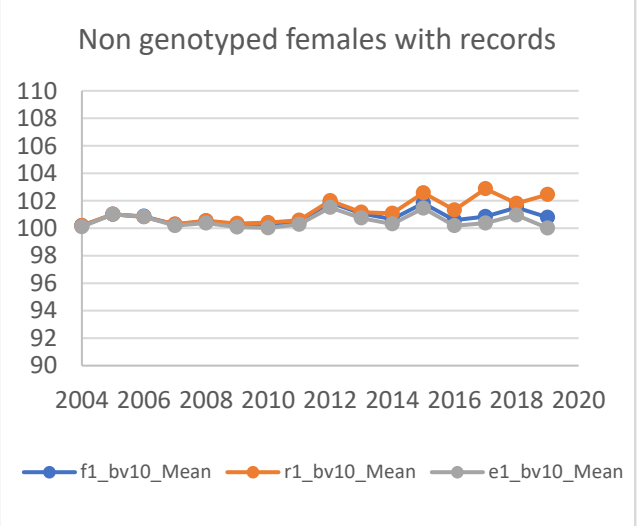



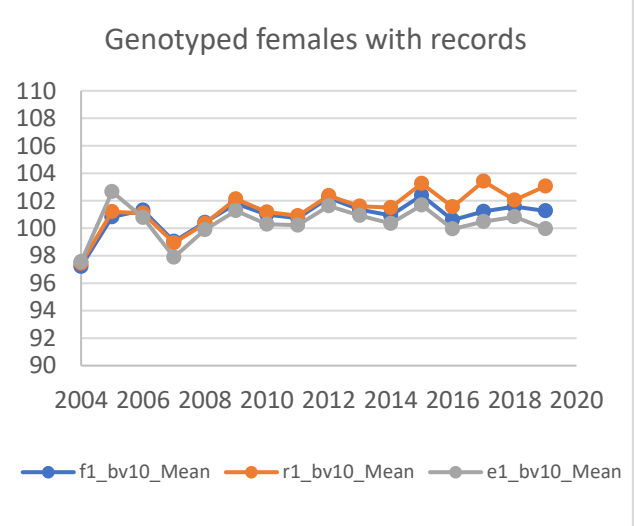



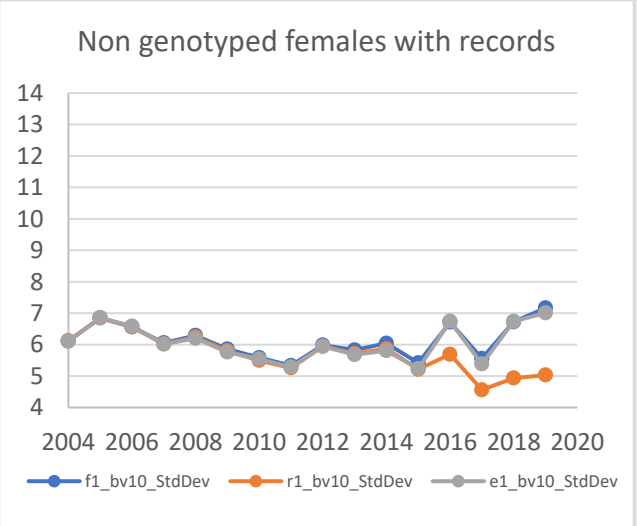



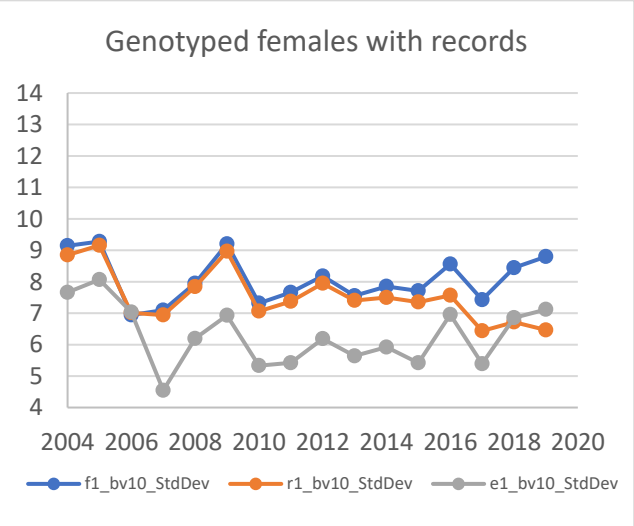
## *bv10*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6656 | 100.2 | 100.2 | 100.1 | 6.1 | 6.1 | 6.1 | 17 | 97.2 | 97.4 | 97.6 | 9.1 | 8.8 | 7.7 |
| 2005 | 6883 | 101.0 | 101.0 | 101.0 | 6.8 | 6.8 | 6.9 | 18 | 100.8 | 101.2 | 102.7 | 9.3 | 9.2 | 8.1 |
| 2006 | 7496 | 100.9 | 100.8 | 100.8 | 6.6 | 6.6 | 6.6 | 32 | 101.3 | 101.1 | 100.8 | 6.9 | 7.0 | 7.0 |
| 2007 | 7781 | 100.3 | 100.3 | 100.2 | 6.1 | 6.0 | 6.0 | 54 | 99.0 | 98.9 | 97.9 | 7.1 | 6.9 | 4.5 |
| 2008 | 8144 | 100.5 | 100.5 | 100.4 | 6.3 | 6.2 | 6.2 | 66 | 100.4 | 100.3 | 99.9 | 8.0 | 7.8 | 6.2 |
| 2009 | 8804 | 100.3 | 100.3 | 100.1 | 5.9 | 5.8 | 5.8 | 100 | 101.8 | 102.1 | 101.3 | 9.2 | 9.0 | 6.9 |
| 2010 | 7304 | 100.3 | 100.4 | 100.0 | 5.6 | 5.5 | 5.5 | 1171 | 101.0 | 101.2 | 100.3 | 7.3 | 7.1 | 5.3 |
| 2011 | 6823 | 100.5 | 100.6 | 100.3 | 5.3 | 5.3 | 5.3 | 1922 | 100.7 | 100.9 | 100.2 | 7.7 | 7.4 | 5.4 |
| 2012 | 6611 | 101.9 | 102.0 | 101.5 | 6.0 | 5.9 | 5.9 | 1908 | 102.2 | 102.4 | 101.6 | 8.2 | 7.9 | 6.2 |
| 2013 | 5833 | 101.1 | 101.2 | 100.7 | 5.8 | 5.7 | 5.7 | 1325 | 101.4 | 101.6 | 100.9 | 7.6 | 7.4 | 5.6 |
| 2014 | 5699 | 100.7 | 101.1 | 100.3 | 6.0 | 5.9 | 5.8 | 1579 | 100.9 | 101.5 | 100.3 | 7.9 | 7.5 | 5.9 |
| 2015 | 5212 | 101.8 | 102.6 | 101.5 | 5.4 | 5.2 | 5.2 | 1604 | 102.4 | 103.3 | 101.7 | 7.7 | 7.4 | 5.4 |
| 2016 | 4734 | 100.6 | 101.3 | 100.2 | 6.7 | 5.7 | 6.7 | 1724 | 100.6 | 101.6 | 99.9 | 8.6 | 7.6 | 7.0 |
| 2017 | 4076 | 100.9 | 102.9 | 100.4 | 5.6 | 4.6 | 5.4 | 2064 | 101.2 | 103.4 | 100.5 | 7.4 | 6.4 | 5.4 |
| 2018 | 3445 | 101.5 | 101.8 | 101.0 | 6.7 | 4.9 | 6.7 | 2087 | 101.6 | 102.0 | 100.8 | 8.4 | 6.7 | 6.9 |
| 2019 | 283 | 100.8 | 102.4 | 100.0 | 7.2 | 5.0 | 7.0 | 226 | 101.3 | 103.1 | 100.0 | 8.8 | 6.5 | 7.1 |



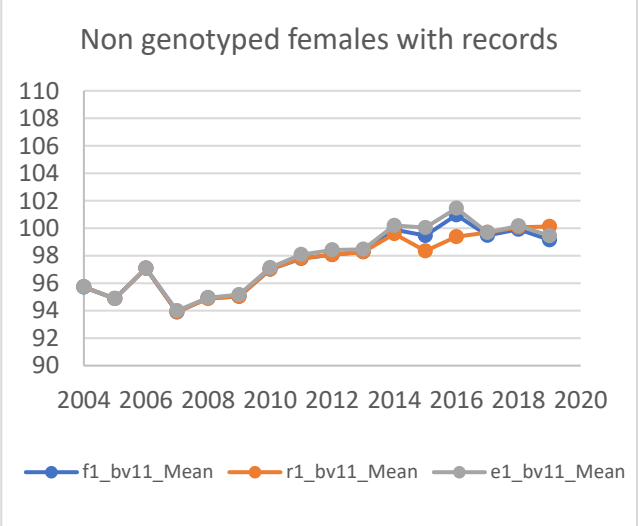



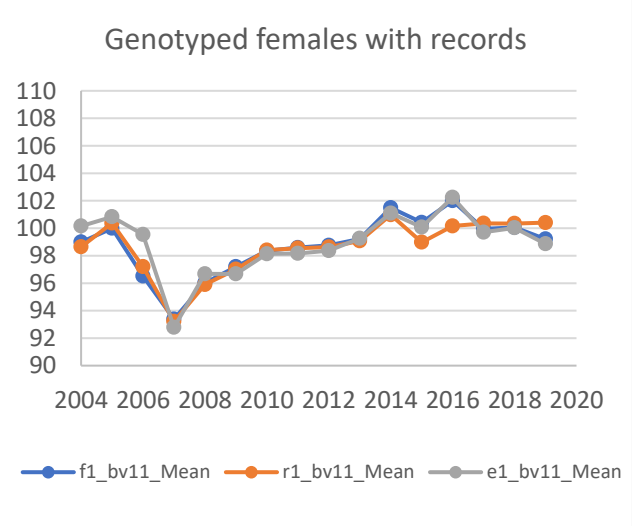



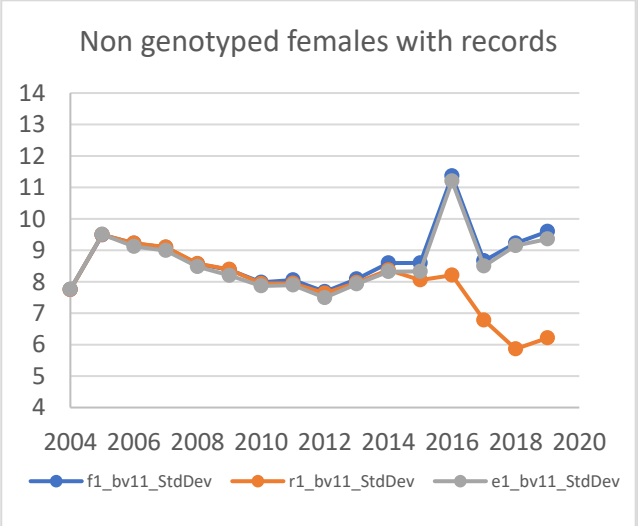



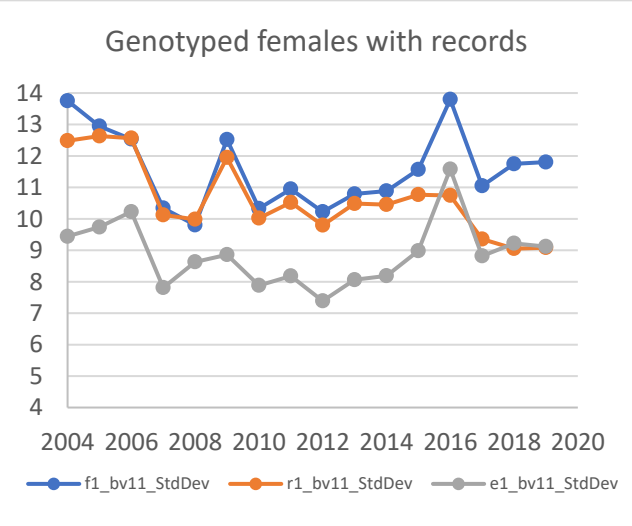
## *bv11*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6656 | 95.7 | 95.7 | 95.7 | 7.8 | 7.7 | 7.8 | 17 | 99.0 | 98.6 | 100.2 | 13.8 | 12.5 | 9.4 |
| 2005 | 6883 | 94.9 | 94.9 | 94.9 | 9.5 | 9.5 | 9.5 | 18 | 100.0 | 100.4 | 100.8 | 12.9 | 12.6 | 9.7 |
| 2006 | 7496 | 97.1 | 97.1 | 97.1 | 9.2 | 9.2 | 9.1 | 32 | 96.5 | 97.2 | 99.5 | 12.5 | 12.6 | 10.2 |
| 2007 | 7781 | 93.9 | 93.9 | 94.0 | 9.1 | 9.1 | 9.0 | 54 | 93.4 | 93.2 | 92.8 | 10.3 | 10.1 | 7.8 |
| 2008 | 8144 | 94.9 | 94.9 | 94.9 | 8.6 | 8.6 | 8.5 | 66 | 96.0 | 95.9 | 96.7 | 9.8 | 10.0 | 8.6 |
| 2009 | 8804 | 95.0 | 95.0 | 95.2 | 8.4 | 8.4 | 8.2 | 100 | 97.2 | 97.0 | 96.7 | 12.5 | 11.9 | 8.9 |
| 2010 | 7304 | 97.0 | 97.0 | 97.1 | 8.0 | 7.9 | 7.9 | 1171 | 98.4 | 98.4 | 98.1 | 10.3 | 10.0 | 7.9 |
| 2011 | 6823 | 97.8 | 97.8 | 98.1 | 8.1 | 7.9 | 7.9 | 1922 | 98.6 | 98.5 | 98.2 | 10.9 | 10.5 | 8.2 |
| 2012 | 6611 | 98.1 | 98.1 | 98.4 | 7.7 | 7.6 | 7.5 | 1908 | 98.8 | 98.6 | 98.4 | 10.2 | 9.8 | 7.4 |
| 2013 | 5833 | 98.3 | 98.3 | 98.5 | 8.1 | 8.0 | 7.9 | 1325 | 99.2 | 99.1 | 99.3 | 10.8 | 10.5 | 8.1 |
| 2014 | 5699 | 99.9 | 99.6 | 100.2 | 8.6 | 8.4 | 8.3 | 1579 | 101.5 | 101.0 | 101.1 | 10.9 | 10.5 | 8.2 |
| 2015 | 5212 | 99.5 | 98.3 | 100.0 | 8.6 | 8.1 | 8.3 | 1604 | 100.4 | 99.0 | 100.1 | 11.6 | 10.8 | 9.0 |
| 2016 | 4734 | 101.0 | 99.4 | 101.4 | 11.4 | 8.2 | 11.2 | 1724 | 102.0 | 100.2 | 102.2 | 13.8 | 10.7 | 11.6 |
| 2017 | 4076 | 99.5 | 99.7 | 99.7 | 8.7 | 6.8 | 8.5 | 2064 | 100.0 | 100.4 | 99.7 | 11.0 | 9.4 | 8.8 |
| 2018 | 3445 | 99.9 | 100.1 | 100.2 | 9.2 | 5.9 | 9.1 | 2087 | 100.1 | 100.3 | 100.0 | 11.7 | 9.1 | 9.2 |
| 2019 | 283 | 99.1 | 100.1 | 99.5 | 9.6 | 6.2 | 9.4 | 226 | 99.2 | 100.4 | 98.9 | 11.8 | 9.1 | 9.1 |



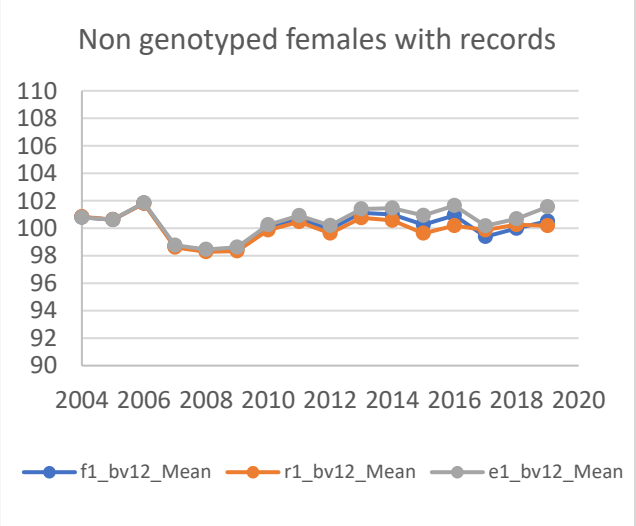



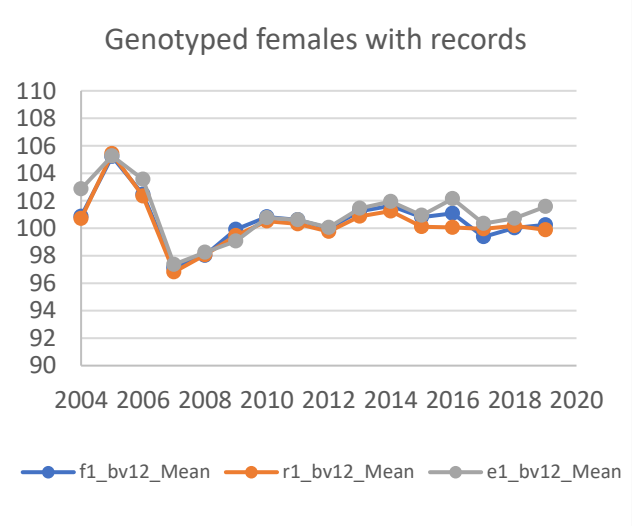



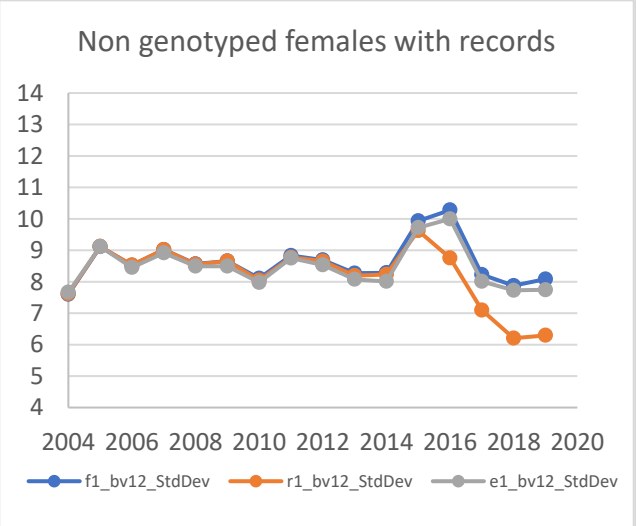



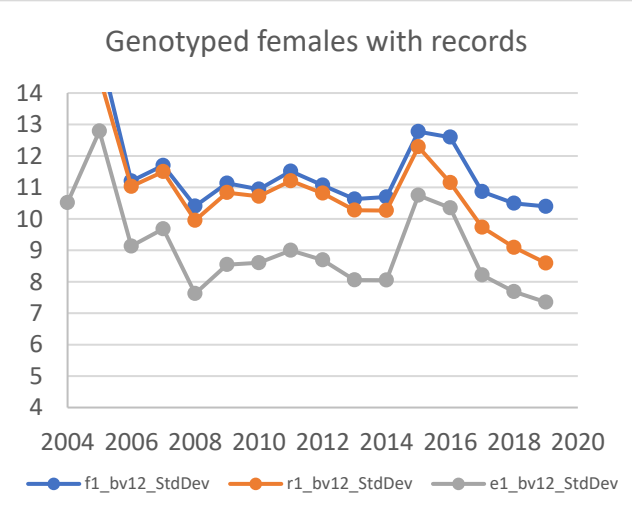
## *bv12*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6656 | 100.8 | 100.8 | 100.8 | 7.6 | 7.6 | 7.7 | 17 | 100.9 | 100.7 | 102.9 | 15.0 | 14.6 | 10.5 |
| 2005 | 6883 | 100.6 | 100.6 | 100.6 | 9.1 | 9.1 | 9.1 | 18 | 105.2 | 105.4 | 105.3 | 15.4 | 14.5 | 12.8 |
| 2006 | 7496 | 101.8 | 101.8 | 101.9 | 8.5 | 8.5 | 8.5 | 32 | 102.5 | 102.3 | 103.6 | 11.2 | 11.0 | 9.1 |
| 2007 | 7781 | 98.7 | 98.6 | 98.8 | 9.0 | 9.0 | 8.9 | 54 | 97.1 | 96.8 | 97.4 | 11.7 | 11.5 | 9.7 |
| 2008 | 8144 | 98.4 | 98.3 | 98.5 | 8.6 | 8.6 | 8.5 | 66 | 98.0 | 98.1 | 98.2 | 10.4 | 10.0 | 7.6 |
| 2009 | 8804 | 98.5 | 98.3 | 98.6 | 8.7 | 8.7 | 8.5 | 100 | 99.9 | 99.5 | 99.1 | 11.1 | 10.8 | 8.5 |
| 2010 | 7304 | 100.1 | 99.9 | 100.2 | 8.1 | 8.0 | 8.0 | 1171 | 100.8 | 100.5 | 100.8 | 10.9 | 10.7 | 8.6 |
| 2011 | 6823 | 100.7 | 100.5 | 100.9 | 8.8 | 8.8 | 8.7 | 1922 | 100.6 | 100.3 | 100.6 | 11.5 | 11.2 | 9.0 |
| 2012 | 6611 | 99.9 | 99.6 | 100.2 | 8.7 | 8.7 | 8.5 | 1908 | 100.0 | 99.8 | 100.1 | 11.1 | 10.8 | 8.7 |
| 2013 | 5833 | 101.1 | 100.8 | 101.4 | 8.3 | 8.2 | 8.1 | 1325 | 101.2 | 100.9 | 101.4 | 10.6 | 10.3 | 8.1 |
| 2014 | 5699 | 101.0 | 100.6 | 101.5 | 8.3 | 8.2 | 8.0 | 1579 | 101.6 | 101.2 | 101.9 | 10.7 | 10.3 | 8.0 |
| 2015 | 5212 | 100.3 | 99.6 | 100.9 | 9.9 | 9.6 | 9.7 | 1604 | 100.8 | 100.1 | 100.9 | 12.8 | 12.3 | 10.7 |
| 2016 | 4734 | 100.9 | 100.2 | 101.6 | 10.3 | 8.8 | 10.0 | 1724 | 101.1 | 100.1 | 102.2 | 12.6 | 11.1 | 10.3 |
| 2017 | 4076 | 99.4 | 99.9 | 100.2 | 8.2 | 7.1 | 8.0 | 2064 | 99.4 | 99.9 | 100.3 | 10.9 | 9.7 | 8.2 |
| 2018 | 3445 | 100.0 | 100.3 | 100.7 | 7.9 | 6.2 | 7.7 | 2087 | 100.0 | 100.2 | 100.7 | 10.5 | 9.1 | 7.7 |
| 2019 | 283 | 100.5 | 100.2 | 101.6 | 8.1 | 6.3 | 7.7 | 226 | 100.2 | 99.9 | 101.6 | 10.4 | 8.6 | 7.3 |



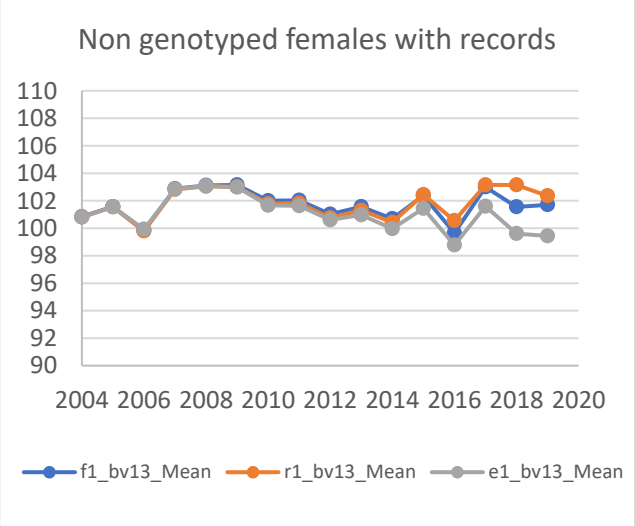



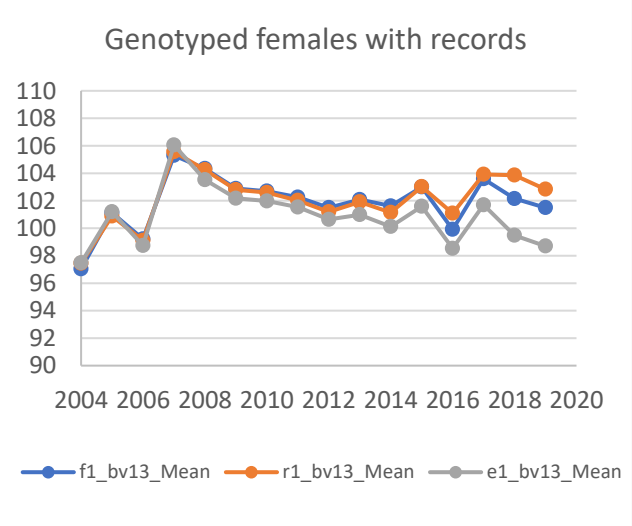



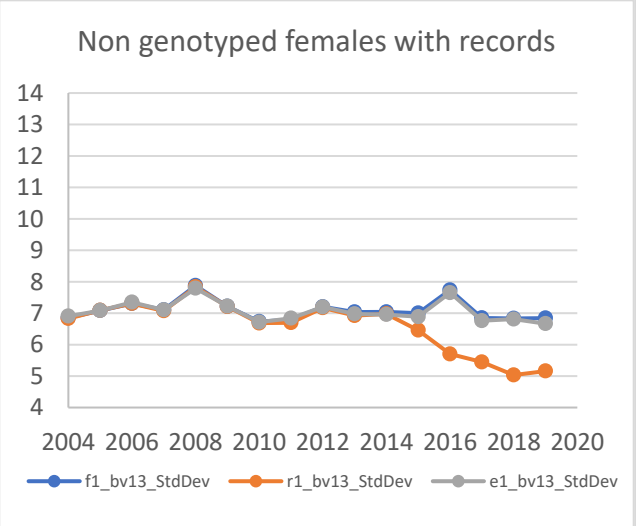



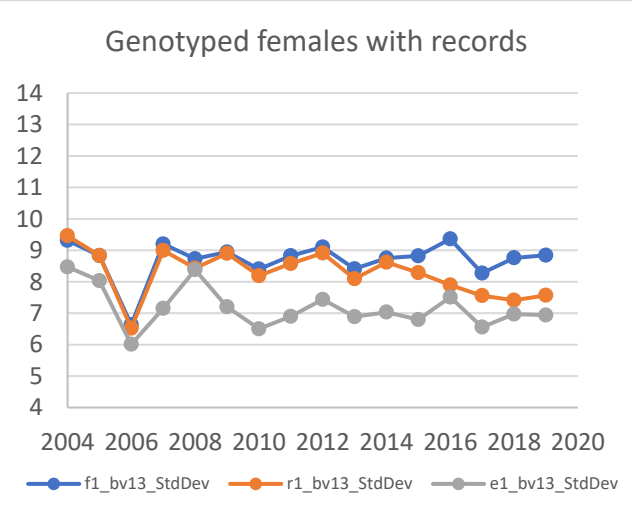
## *bv13*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 100.8 | 100.8 | 100.8 | 6.9 | 6.8 | 6.9 | 17 | 97.0 | 97.4 | 97.5 | 9.3 | 9.5 | 8.5 |
| 2005 | 6905 | 101.6 | 101.6 | 101.6 | 7.1 | 7.1 | 7.1 | 18 | 101.1 | 100.9 | 101.2 | 8.8 | 8.8 | 8.0 |
| 2006 | 7496 | 99.8 | 99.8 | 99.9 | 7.3 | 7.3 | 7.3 | 32 | 99.2 | 99.1 | 98.7 | 6.6 | 6.5 | 6.0 |
| 2007 | 7781 | 102.9 | 102.8 | 102.8 | 7.1 | 7.1 | 7.1 | 54 | 105.3 | 105.6 | 106.1 | 9.2 | 9.0 | 7.2 |
| 2008 | 8183 | 103.1 | 103.0 | 103.1 | 7.9 | 7.8 | 7.8 | 66 | 104.3 | 104.3 | 103.5 | 8.7 | 8.4 | 8.4 |
| 2009 | 8830 | 103.2 | 103.0 | 103.0 | 7.2 | 7.2 | 7.2 | 100 | 102.9 | 102.8 | 102.2 | 8.9 | 8.9 | 7.2 |
| 2010 | 7346 | 102.0 | 101.8 | 101.7 | 6.7 | 6.7 | 6.7 | 1171 | 102.7 | 102.6 | 102.0 | 8.4 | 8.2 | 6.5 |
| 2011 | 6838 | 102.0 | 101.8 | 101.6 | 6.8 | 6.7 | 6.8 | 1923 | 102.3 | 102.0 | 101.5 | 8.8 | 8.6 | 6.9 |
| 2012 | 6709 | 101.0 | 100.8 | 100.6 | 7.2 | 7.2 | 7.2 | 1936 | 101.5 | 101.2 | 100.6 | 9.1 | 8.9 | 7.4 |
| 2013 | 5889 | 101.6 | 101.3 | 101.0 | 7.0 | 6.9 | 7.0 | 1335 | 102.1 | 101.9 | 101.0 | 8.4 | 8.1 | 6.9 |
| 2014 | 5777 | 100.7 | 100.4 | 100.0 | 7.0 | 7.0 | 7.0 | 1585 | 101.6 | 101.1 | 100.1 | 8.7 | 8.6 | 7.0 |
| 2015 | 5368 | 102.4 | 102.4 | 101.4 | 7.0 | 6.5 | 6.9 | 1611 | 103.0 | 103.0 | 101.6 | 8.8 | 8.3 | 6.8 |
| 2016 | 4734 | 99.6 | 100.6 | 98.8 | 7.7 | 5.7 | 7.7 | 1725 | 99.9 | 101.1 | 98.5 | 9.4 | 7.9 | 7.5 |
| 2017 | 4076 | 103.0 | 103.2 | 101.6 | 6.8 | 5.4 | 6.8 | 2064 | 103.6 | 103.9 | 101.7 | 8.3 | 7.6 | 6.6 |
| 2018 | 3445 | 101.6 | 103.1 | 99.6 | 6.8 | 5.0 | 6.8 | 2087 | 102.2 | 103.9 | 99.5 | 8.8 | 7.4 | 7.0 |
| 2019 | 283 | 101.7 | 102.4 | 99.4 | 6.8 | 5.2 | 6.7 | 226 | 101.5 | 102.8 | 98.7 | 8.8 | 7.6 | 6.9 |



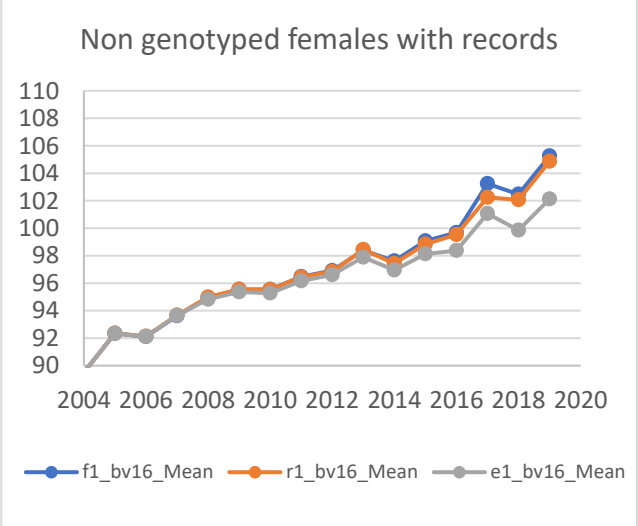



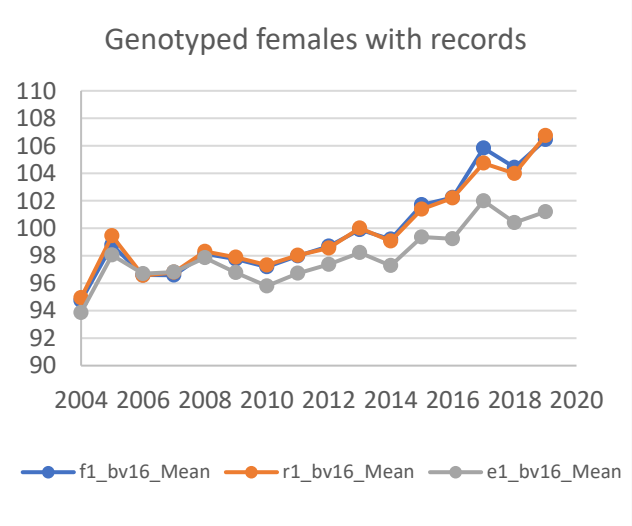



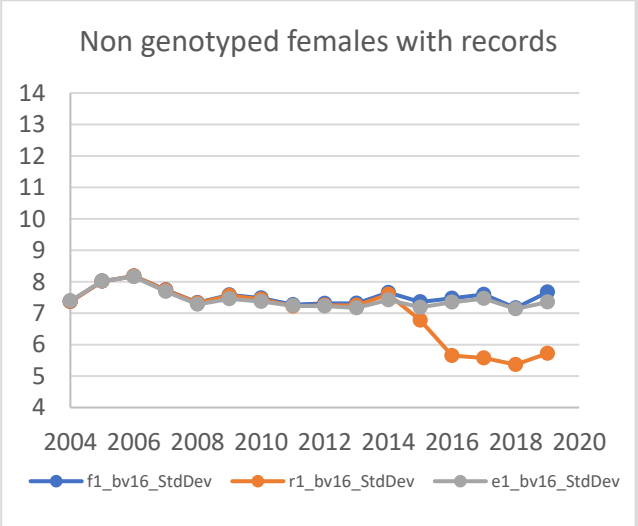



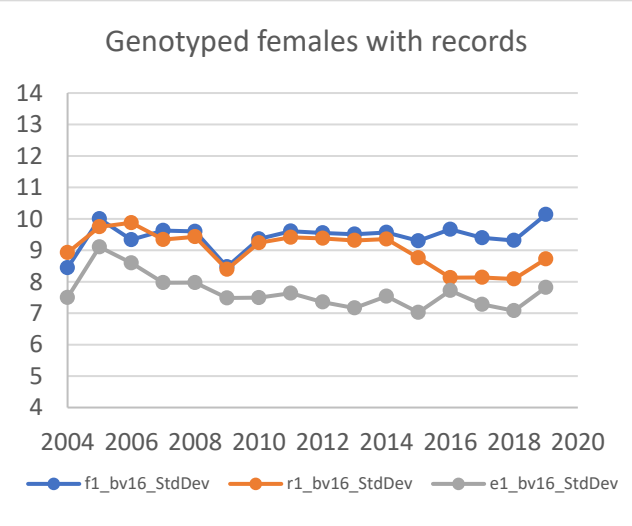
## *bv16*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 89.5 | 89.5 | 89.5 | 7.4 | 7.4 | 7.4 | 17 | 94.7 | 94.9 | 93.9 | 8.4 | 8.9 | 7.5 |
| 2005 | 6905 | 92.3 | 92.4 | 92.3 | 8.0 | 8.0 | 8.0 | 18 | 98.8 | 99.4 | 98.0 | 10.0 | 9.7 | 9.1 |
| 2006 | 7496 | 92.1 | 92.1 | 92.1 | 8.2 | 8.2 | 8.2 | 32 | 96.6 | 96.6 | 96.7 | 9.3 | 9.9 | 8.6 |
| 2007 | 7781 | 93.6 | 93.7 | 93.7 | 7.7 | 7.7 | 7.7 | 54 | 96.6 | 96.8 | 96.8 | 9.6 | 9.3 | 8.0 |
| 2008 | 8183 | 94.9 | 95.0 | 94.8 | 7.3 | 7.3 | 7.3 | 66 | 98.1 | 98.3 | 97.9 | 9.6 | 9.4 | 8.0 |
| 2009 | 8830 | 95.5 | 95.6 | 95.4 | 7.6 | 7.6 | 7.5 | 100 | 97.8 | 97.9 | 96.8 | 8.5 | 8.4 | 7.5 |
| 2010 | 7346 | 95.5 | 95.5 | 95.3 | 7.5 | 7.4 | 7.4 | 1171 | 97.2 | 97.3 | 95.8 | 9.4 | 9.2 | 7.5 |
| 2011 | 6838 | 96.5 | 96.4 | 96.2 | 7.3 | 7.2 | 7.2 | 1923 | 98.0 | 98.0 | 96.7 | 9.6 | 9.4 | 7.6 |
| 2012 | 6709 | 96.9 | 96.8 | 96.6 | 7.3 | 7.3 | 7.2 | 1936 | 98.7 | 98.6 | 97.4 | 9.6 | 9.4 | 7.4 |
| 2013 | 5889 | 98.4 | 98.4 | 97.9 | 7.3 | 7.2 | 7.2 | 1335 | 99.9 | 100.0 | 98.2 | 9.5 | 9.3 | 7.2 |
| 2014 | 5777 | 97.6 | 97.4 | 97.0 | 7.7 | 7.6 | 7.4 | 1585 | 99.2 | 99.1 | 97.3 | 9.6 | 9.4 | 7.5 |
| 2015 | 5368 | 99.1 | 98.8 | 98.1 | 7.4 | 6.8 | 7.2 | 1610 | 101.7 | 101.4 | 99.4 | 9.3 | 8.8 | 7.0 |
| 2016 | 4734 | 99.7 | 99.5 | 98.4 | 7.5 | 5.7 | 7.3 | 1725 | 102.2 | 102.2 | 99.2 | 9.7 | 8.1 | 7.7 |
| 2017 | 4076 | 103.2 | 102.2 | 101.1 | 7.6 | 5.6 | 7.5 | 2064 | 105.8 | 104.7 | 102.0 | 9.4 | 8.1 | 7.3 |
| 2018 | 3445 | 102.5 | 102.1 | 99.9 | 7.2 | 5.4 | 7.1 | 2087 | 104.4 | 104.0 | 100.4 | 9.3 | 8.1 | 7.1 |
| 2019 | 283 | 105.3 | 104.9 | 102.1 | 7.7 | 5.7 | 7.4 | 226 | 106.4 | 106.7 | 101.2 | 10.1 | 8.7 | 7.8 |



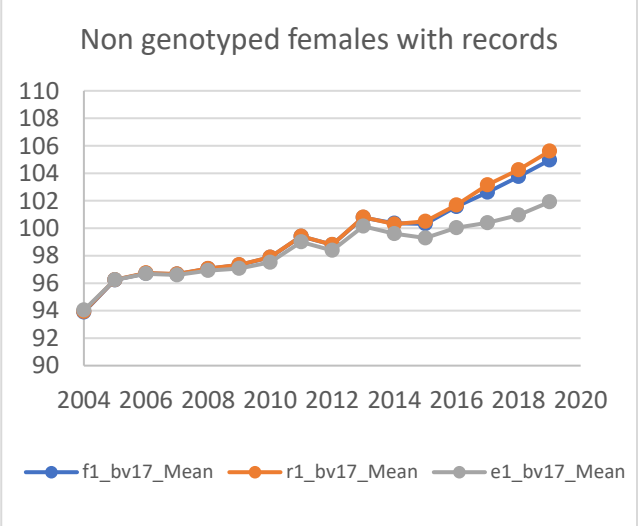



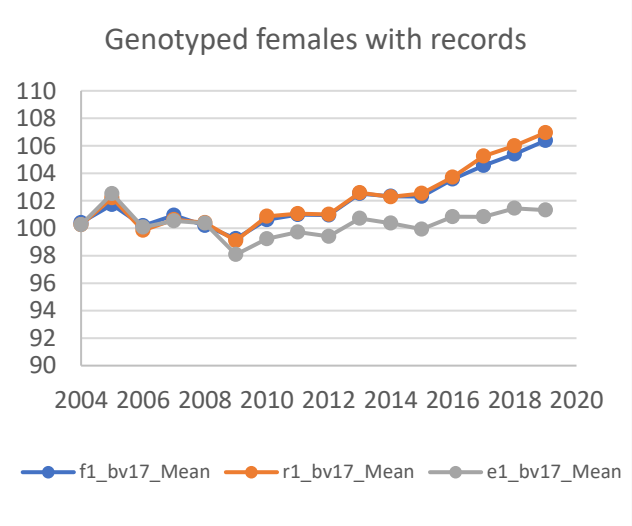



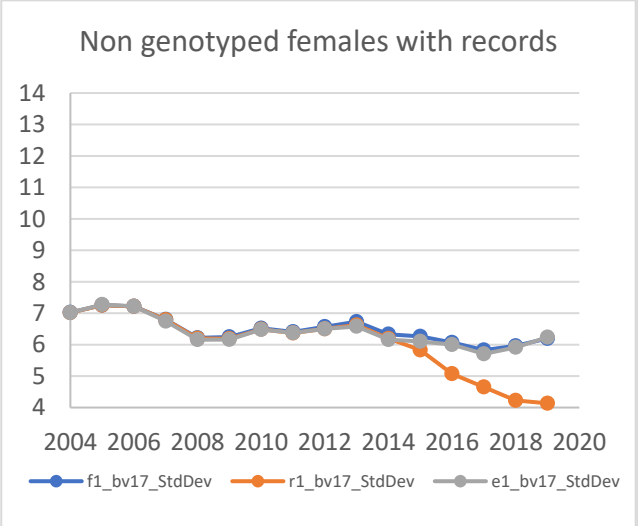



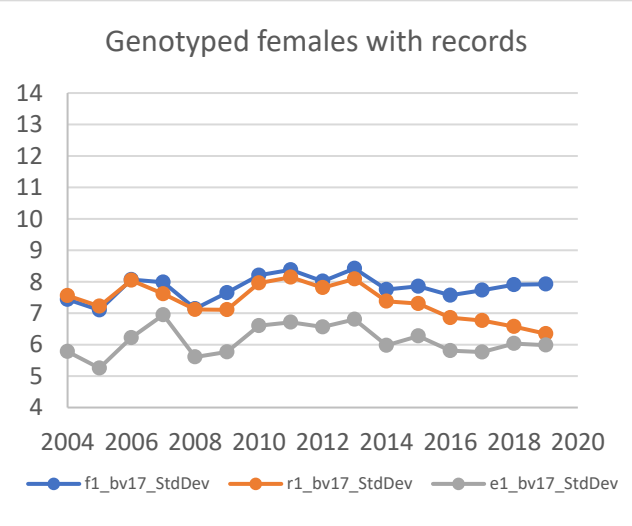
## *bv17*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 93.9 | 93.9 | 94.0 | 7.0 | 7.0 | 7.0 | 17 | 100.4 | 100.3 | 100.3 | 7.4 | 7.6 | 5.8 |
| 2005 | 6905 | 96.2 | 96.2 | 96.2 | 7.3 | 7.3 | 7.3 | 18 | 101.7 | 102.2 | 102.5 | 7.1 | 7.2 | 5.3 |
| 2006 | 7496 | 96.7 | 96.7 | 96.7 | 7.2 | 7.2 | 7.2 | 32 | 100.2 | 99.8 | 100.1 | 8.1 | 8.0 | 6.2 |
| 2007 | 7781 | 96.7 | 96.7 | 96.6 | 6.8 | 6.8 | 6.7 | 54 | 100.9 | 100.6 | 100.5 | 8.0 | 7.6 | 6.9 |
| 2008 | 8183 | 97.1 | 97.1 | 96.9 | 6.2 | 6.2 | 6.2 | 66 | 100.2 | 100.4 | 100.4 | 7.1 | 7.1 | 5.6 |
| 2009 | 8830 | 97.3 | 97.3 | 97.1 | 6.2 | 6.2 | 6.2 | 100 | 99.2 | 99.1 | 98.1 | 7.7 | 7.1 | 5.8 |
| 2010 | 7346 | 97.9 | 97.9 | 97.5 | 6.5 | 6.5 | 6.5 | 1171 | 100.6 | 100.9 | 99.2 | 8.2 | 8.0 | 6.6 |
| 2011 | 6838 | 99.4 | 99.4 | 99.0 | 6.4 | 6.4 | 6.4 | 1923 | 101.0 | 101.1 | 99.7 | 8.4 | 8.1 | 6.7 |
| 2012 | 6709 | 98.8 | 98.8 | 98.4 | 6.6 | 6.5 | 6.5 | 1936 | 101.0 | 101.0 | 99.4 | 8.0 | 7.8 | 6.6 |
| 2013 | 5889 | 100.8 | 100.8 | 100.1 | 6.7 | 6.6 | 6.6 | 1335 | 102.5 | 102.6 | 100.7 | 8.4 | 8.1 | 6.8 |
| 2014 | 5777 | 100.4 | 100.3 | 99.6 | 6.3 | 6.2 | 6.2 | 1585 | 102.3 | 102.3 | 100.4 | 7.8 | 7.4 | 6.0 |
| 2015 | 5368 | 100.3 | 100.5 | 99.3 | 6.3 | 5.8 | 6.1 | 1610 | 102.3 | 102.5 | 99.9 | 7.9 | 7.3 | 6.3 |
| 2016 | 4734 | 101.6 | 101.7 | 100.0 | 6.1 | 5.1 | 6.0 | 1725 | 103.6 | 103.7 | 100.8 | 7.6 | 6.9 | 5.8 |
| 2017 | 4076 | 102.6 | 103.2 | 100.4 | 5.8 | 4.7 | 5.7 | 2064 | 104.6 | 105.2 | 100.8 | 7.7 | 6.8 | 5.8 |
| 2018 | 3445 | 103.8 | 104.3 | 101.0 | 6.0 | 4.2 | 5.9 | 2087 | 105.4 | 106.0 | 101.4 | 7.9 | 6.6 | 6.0 |
| 2019 | 283 | 105.0 | 105.6 | 101.9 | 6.2 | 4.1 | 6.2 | 226 | 106.4 | 107.0 | 101.3 | 7.9 | 6.3 | 6.0 |



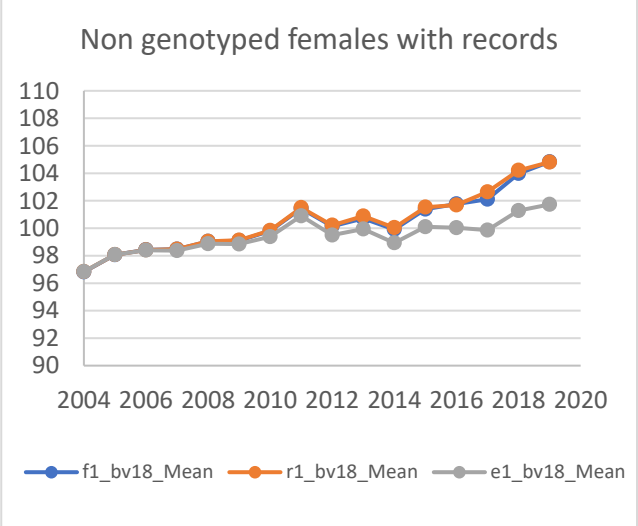



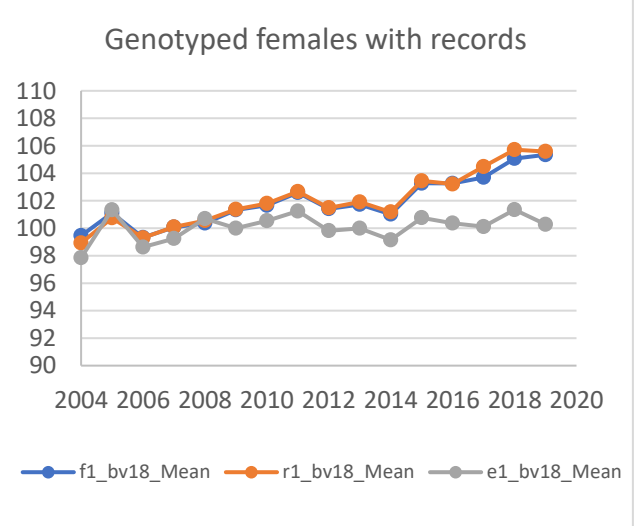



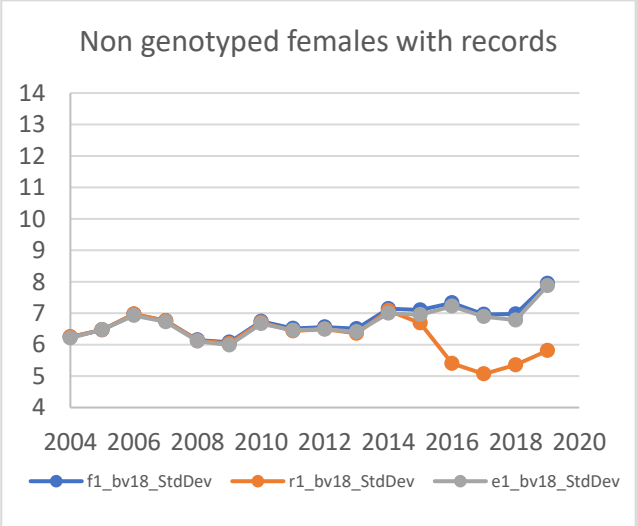



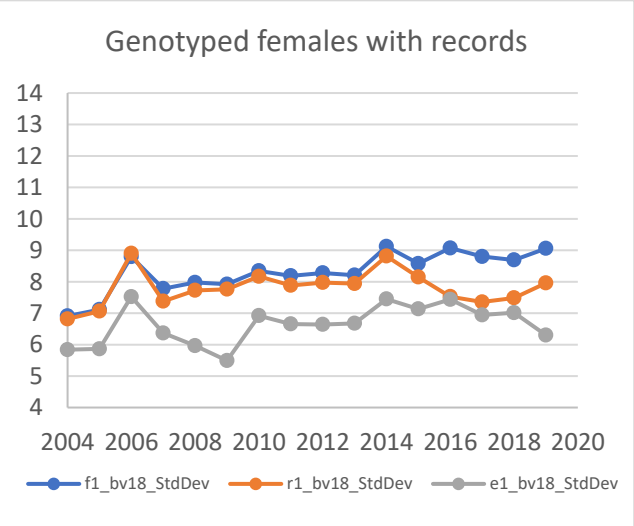
## *bv18*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6656 | 96.8 | 96.8 | 96.8 | 6.2 | 6.2 | 6.2 | 17 | 99.5 | 98.9 | 97.8 | 6.9 | 6.8 | 5.8 |
| 2005 | 6883 | 98.1 | 98.1 | 98.1 | 6.5 | 6.5 | 6.5 | 18 | 101.1 | 100.8 | 101.3 | 7.1 | 7.1 | 5.9 |
| 2006 | 7496 | 98.4 | 98.4 | 98.4 | 7.0 | 7.0 | 6.9 | 32 | 99.3 | 99.3 | 98.6 | 8.8 | 8.9 | 7.5 |
| 2007 | 7781 | 98.5 | 98.5 | 98.4 | 6.8 | 6.8 | 6.7 | 54 | 100.1 | 100.1 | 99.2 | 7.8 | 7.4 | 6.4 |
| 2008 | 8144 | 99.0 | 99.0 | 98.9 | 6.1 | 6.1 | 6.1 | 66 | 100.4 | 100.5 | 100.7 | 8.0 | 7.7 | 6.0 |
| 2009 | 8804 | 99.1 | 99.1 | 98.8 | 6.1 | 6.0 | 6.0 | 100 | 101.3 | 101.4 | 100.0 | 7.9 | 7.8 | 5.5 |
| 2010 | 7304 | 99.8 | 99.8 | 99.4 | 6.7 | 6.7 | 6.7 | 1171 | 101.7 | 101.8 | 100.5 | 8.3 | 8.2 | 6.9 |
| 2011 | 6823 | 101.4 | 101.5 | 100.9 | 6.5 | 6.4 | 6.5 | 1922 | 102.6 | 102.7 | 101.2 | 8.2 | 7.9 | 6.7 |
| 2012 | 6611 | 100.1 | 100.2 | 99.5 | 6.6 | 6.5 | 6.5 | 1908 | 101.4 | 101.5 | 99.8 | 8.3 | 8.0 | 6.6 |
| 2013 | 5833 | 100.7 | 100.9 | 99.9 | 6.5 | 6.4 | 6.4 | 1325 | 101.7 | 101.9 | 100.0 | 8.2 | 7.9 | 6.7 |
| 2014 | 5699 | 99.9 | 100.0 | 98.9 | 7.1 | 7.1 | 7.0 | 1579 | 101.0 | 101.2 | 99.1 | 9.1 | 8.8 | 7.4 |
| 2015 | 5212 | 101.4 | 101.5 | 100.1 | 7.1 | 6.7 | 7.0 | 1603 | 103.3 | 103.4 | 100.8 | 8.6 | 8.1 | 7.1 |
| 2016 | 4734 | 101.8 | 101.7 | 100.0 | 7.3 | 5.4 | 7.2 | 1724 | 103.3 | 103.2 | 100.4 | 9.1 | 7.5 | 7.4 |
| 2017 | 4076 | 102.1 | 102.6 | 99.9 | 7.0 | 5.1 | 6.9 | 2064 | 103.7 | 104.5 | 100.1 | 8.8 | 7.4 | 6.9 |
| 2018 | 3445 | 104.0 | 104.2 | 101.3 | 7.0 | 5.4 | 6.8 | 2087 | 105.1 | 105.7 | 101.3 | 8.7 | 7.5 | 7.0 |
| 2019 | 283 | 104.8 | 104.8 | 101.7 | 7.9 | 5.8 | 7.9 | 226 | 105.3 | 105.6 | 100.3 | 9.1 | 8.0 | 6.3 |



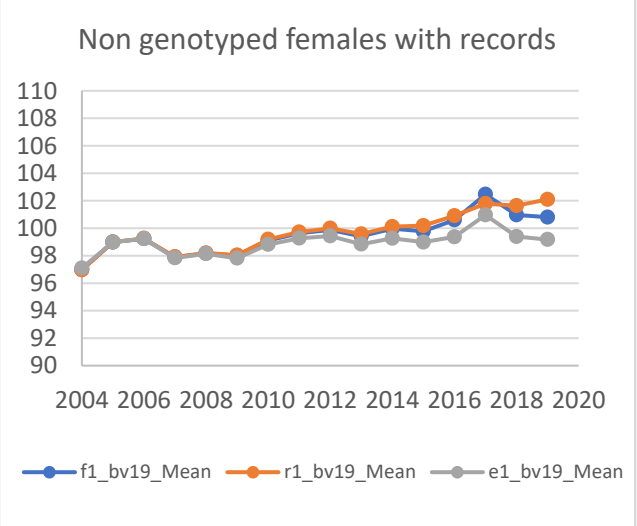



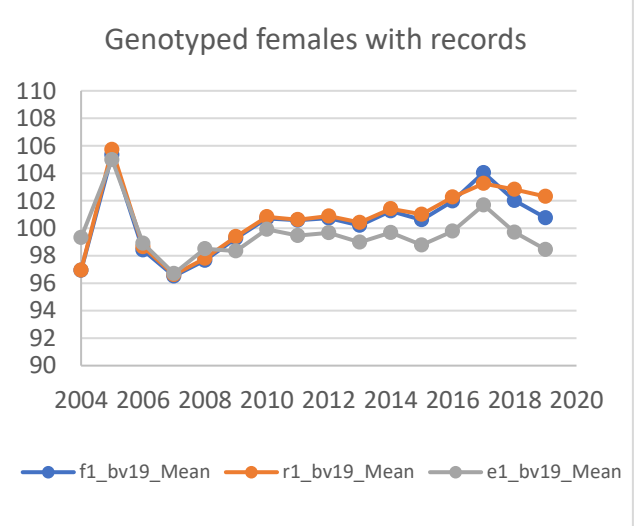



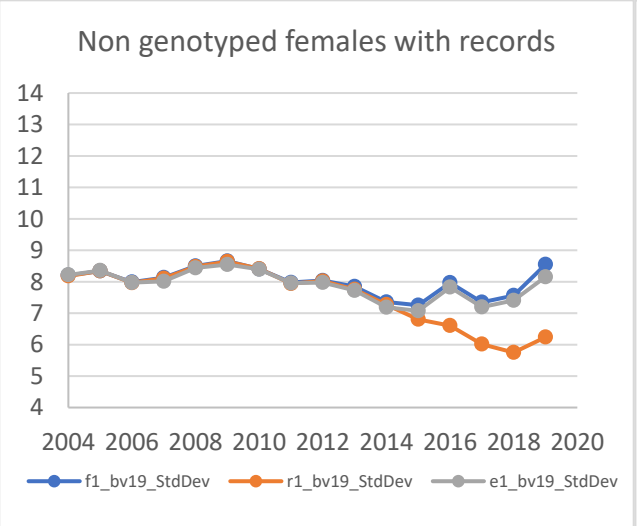



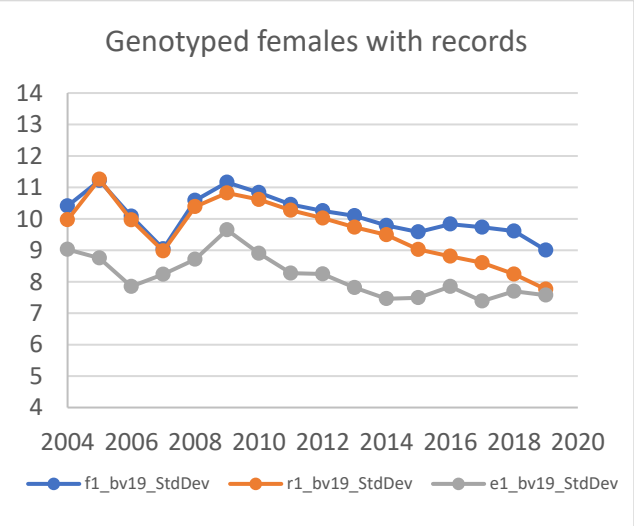
## *bv19*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 97.0 | 97.0 | 97.1 | 8.2 | 8.2 | 8.2 | 17 | 96.9 | 96.9 | 99.3 | 10.4 | 10.0 | 9.0 |
| 2005 | 6905 | 99.0 | 99.0 | 99.0 | 8.3 | 8.3 | 8.4 | 18 | 105.3 | 105.7 | 105.0 | 11.2 | 11.3 | 8.8 |
| 2006 | 7496 | 99.2 | 99.3 | 99.2 | 8.0 | 8.0 | 8.0 | 32 | 98.4 | 98.6 | 98.9 | 10.1 | 10.0 | 7.8 |
| 2007 | 7781 | 97.9 | 97.9 | 97.8 | 8.1 | 8.1 | 8.0 | 54 | 96.5 | 96.6 | 96.7 | 9.0 | 9.0 | 8.2 |
| 2008 | 8183 | 98.2 | 98.2 | 98.1 | 8.5 | 8.5 | 8.4 | 66 | 97.7 | 97.8 | 98.5 | 10.6 | 10.4 | 8.7 |
| 2009 | 8830 | 98.0 | 98.0 | 97.8 | 8.7 | 8.6 | 8.5 | 100 | 99.3 | 99.4 | 98.3 | 11.2 | 10.8 | 9.6 |
| 2010 | 7346 | 99.1 | 99.2 | 98.8 | 8.4 | 8.4 | 8.4 | 1171 | 100.7 | 100.8 | 99.9 | 10.8 | 10.6 | 8.9 |
| 2011 | 6838 | 99.6 | 99.7 | 99.3 | 8.0 | 7.9 | 8.0 | 1923 | 100.6 | 100.6 | 99.5 | 10.5 | 10.3 | 8.3 |
| 2012 | 6709 | 99.9 | 100.0 | 99.4 | 8.0 | 8.0 | 8.0 | 1936 | 100.7 | 100.9 | 99.7 | 10.3 | 10.0 | 8.2 |
| 2013 | 5889 | 99.4 | 99.6 | 98.8 | 7.8 | 7.8 | 7.7 | 1335 | 100.2 | 100.4 | 99.0 | 10.1 | 9.7 | 7.8 |
| 2014 | 5777 | 100.0 | 100.1 | 99.3 | 7.4 | 7.3 | 7.2 | 1585 | 101.3 | 101.4 | 99.7 | 9.8 | 9.5 | 7.5 |
| 2015 | 5368 | 99.8 | 100.2 | 99.0 | 7.3 | 6.8 | 7.1 | 1610 | 100.6 | 101.0 | 98.8 | 9.6 | 9.0 | 7.5 |
| 2016 | 4734 | 100.6 | 100.9 | 99.4 | 8.0 | 6.6 | 7.8 | 1725 | 102.0 | 102.3 | 99.8 | 9.8 | 8.8 | 7.8 |
| 2017 | 4076 | 102.5 | 101.8 | 101.0 | 7.3 | 6.0 | 7.2 | 2064 | 104.0 | 103.3 | 101.7 | 9.7 | 8.6 | 7.4 |
| 2018 | 3445 | 101.0 | 101.6 | 99.4 | 7.6 | 5.7 | 7.4 | 2087 | 102.0 | 102.8 | 99.7 | 9.6 | 8.2 | 7.7 |
| 2019 | 283 | 100.8 | 102.1 | 99.2 | 8.5 | 6.2 | 8.2 | 226 | 100.8 | 102.3 | 98.4 | 9.0 | 7.8 | 7.6 |



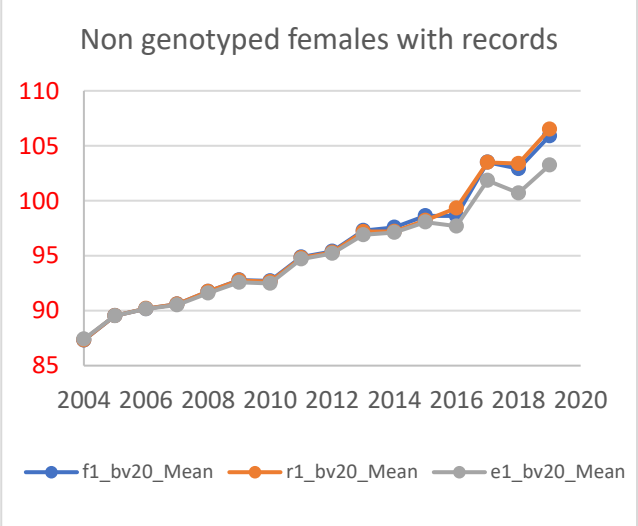



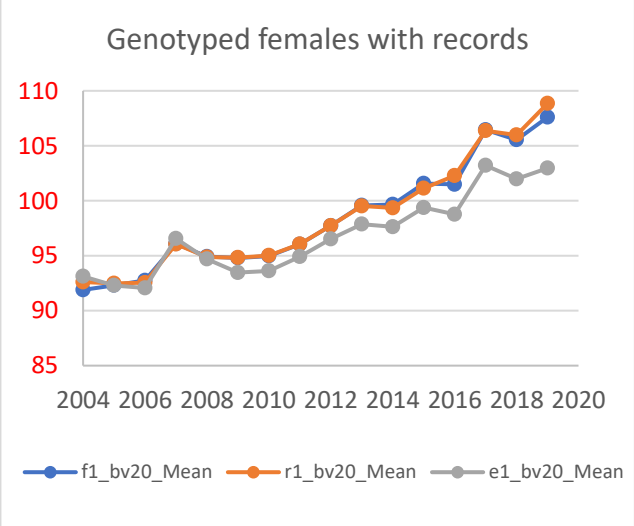



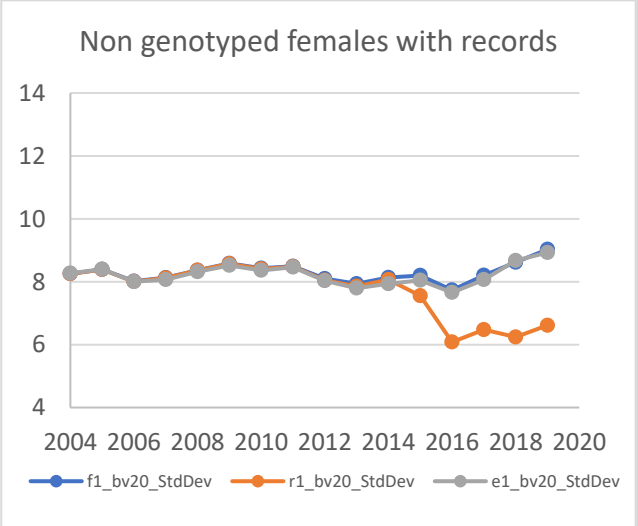



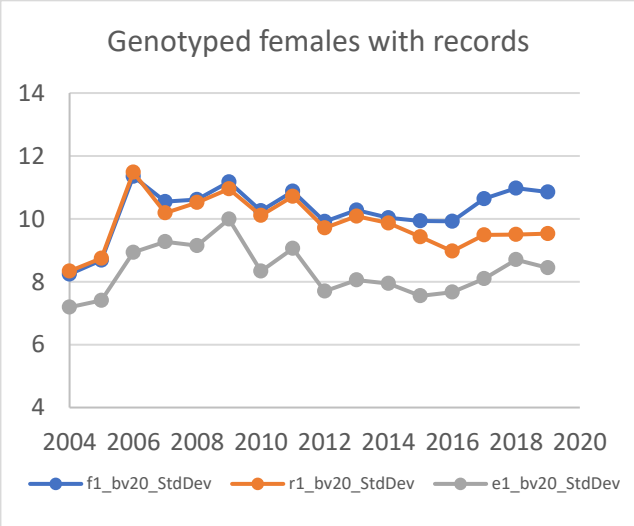
## *bv20*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 87.3 | 87.3 | 87.4 | 8.3 | 8.3 | 8.3 | 17 | 91.9 | 92.6 | 93.1 | 8.2 | 8.3 | 7.2 |
| 2005 | 6905 | 89.5 | 89.5 | 89.5 | 8.4 | 8.4 | 8.4 | 18 | 92.3 | 92.5 | 92.3 | 8.7 | 8.7 | 7.4 |
| 2006 | 7496 | 90.2 | 90.2 | 90.2 | 8.0 | 8.0 | 8.0 | 32 | 92.8 | 92.5 | 92.1 | 11.4 | 11.5 | 8.9 |
| 2007 | 7781 | 90.6 | 90.6 | 90.5 | 8.1 | 8.1 | 8.1 | 54 | 96.1 | 96.1 | 96.6 | 10.5 | 10.2 | 9.3 |
| 2008 | 8183 | 91.7 | 91.7 | 91.6 | 8.4 | 8.4 | 8.3 | 66 | 94.9 | 94.9 | 94.7 | 10.6 | 10.5 | 9.1 |
| 2009 | 8830 | 92.8 | 92.8 | 92.6 | 8.6 | 8.6 | 8.5 | 100 | 94.8 | 94.8 | 93.5 | 11.2 | 11.0 | 10.0 |
| 2010 | 7346 | 92.7 | 92.6 | 92.5 | 8.4 | 8.4 | 8.4 | 1171 | 95.0 | 95.0 | 93.6 | 10.3 | 10.1 | 8.3 |
| 2011 | 6838 | 94.9 | 94.8 | 94.7 | 8.5 | 8.5 | 8.5 | 1923 | 96.0 | 96.1 | 94.9 | 10.9 | 10.7 | 9.1 |
| 2012 | 6709 | 95.4 | 95.3 | 95.2 | 8.1 | 8.0 | 8.0 | 1936 | 97.7 | 97.7 | 96.5 | 9.9 | 9.7 | 7.7 |
| 2013 | 5889 | 97.3 | 97.2 | 96.9 | 7.9 | 7.9 | 7.8 | 1335 | 99.6 | 99.5 | 97.9 | 10.3 | 10.1 | 8.1 |
| 2014 | 5777 | 97.6 | 97.2 | 97.1 | 8.1 | 8.1 | 7.9 | 1585 | 99.7 | 99.4 | 97.6 | 10.0 | 9.9 | 7.9 |
| 2015 | 5368 | 98.6 | 98.2 | 98.1 | 8.2 | 7.6 | 8.0 | 1610 | 101.6 | 101.1 | 99.4 | 9.9 | 9.4 | 7.6 |
| 2016 | 4734 | 98.6 | 99.3 | 97.7 | 7.7 | 6.1 | 7.7 | 1725 | 101.5 | 102.3 | 98.8 | 9.9 | 9.0 | 7.7 |
| 2017 | 4076 | 103.5 | 103.5 | 101.8 | 8.2 | 6.5 | 8.1 | 2064 | 106.5 | 106.4 | 103.2 | 10.6 | 9.5 | 8.1 |
| 2018 | 3445 | 102.9 | 103.4 | 100.7 | 8.6 | 6.2 | 8.7 | 2087 | 105.5 | 106.0 | 102.0 | 11.0 | 9.5 | 8.7 |
| 2019 | 283 | 105.9 | 106.5 | 103.2 | 9.0 | 6.6 | 8.9 | 226 | 107.6 | 108.8 | 103.0 | 10.9 | 9.5 | 8.4 |



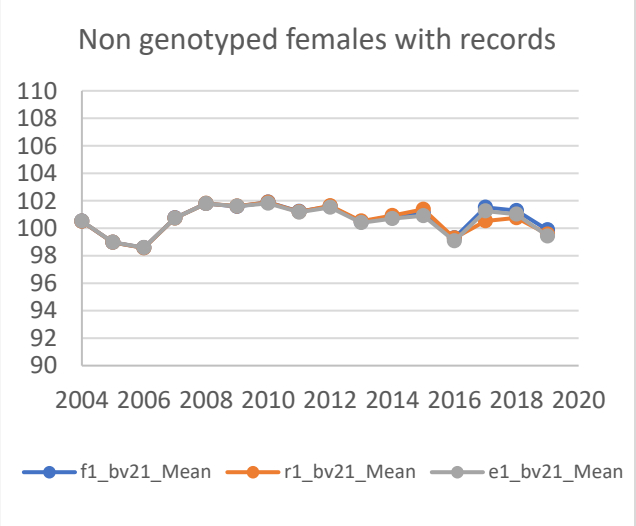



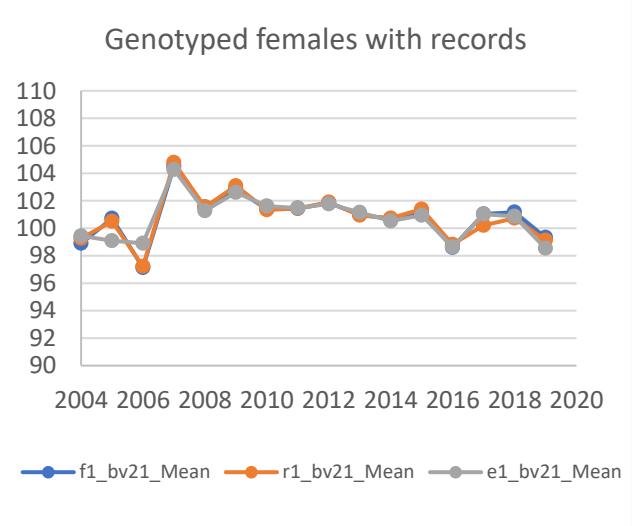



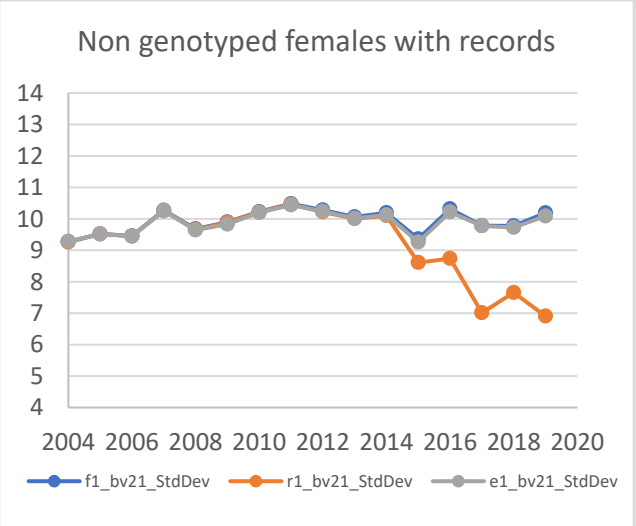



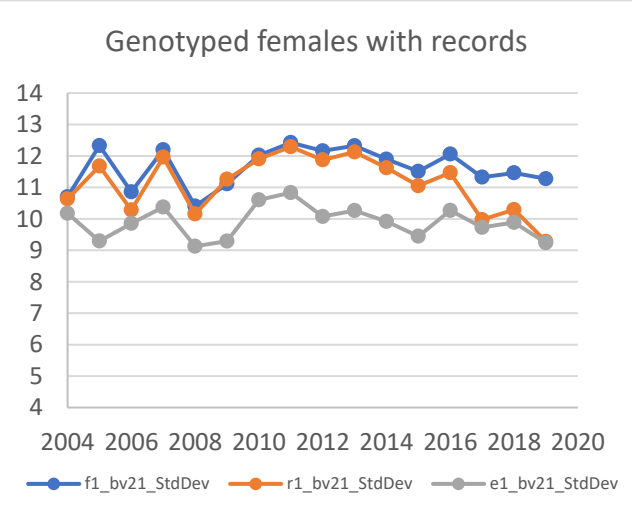
## *bv21*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6655 | 100.5 | 100.5 | 100.5 | 9.3 | 9.3 | 9.3 | 17 | 98.9 | 99.3 | 99.4 | 10.7 | 10.6 | 10.2 |
| 2005 | 6883 | 99.0 | 99.0 | 99.0 | 9.5 | 9.5 | 9.5 | 18 | 100.7 | 100.5 | 99.1 | 12.3 | 11.7 | 9.3 |
| 2006 | 7496 | 98.6 | 98.6 | 98.6 | 9.5 | 9.4 | 9.5 | 32 | 97.1 | 97.2 | 98.9 | 10.9 | 10.3 | 9.9 |
| 2007 | 7781 | 100.7 | 100.7 | 100.7 | 10.3 | 10.3 | 10.3 | 54 | 104.5 | 104.8 | 104.3 | 12.2 | 12.0 | 10.4 |
| 2008 | 8144 | 101.8 | 101.8 | 101.8 | 9.7 | 9.7 | 9.6 | 66 | 101.5 | 101.5 | 101.3 | 10.4 | 10.2 | 9.1 |
| 2009 | 8804 | 101.6 | 101.6 | 101.6 | 9.9 | 9.9 | 9.8 | 100 | 102.8 | 103.1 | 102.6 | 11.1 | 11.3 | 9.3 |
| 2010 | 7304 | 101.9 | 101.9 | 101.8 | 10.2 | 10.2 | 10.2 | 1171 | 101.4 | 101.3 | 101.6 | 12.0 | 11.9 | 10.6 |
| 2011 | 6823 | 101.2 | 101.2 | 101.2 | 10.5 | 10.5 | 10.4 | 1922 | 101.4 | 101.4 | 101.5 | 12.4 | 12.3 | 10.8 |
| 2012 | 6611 | 101.6 | 101.6 | 101.5 | 10.3 | 10.2 | 10.2 | 1908 | 101.8 | 101.9 | 101.8 | 12.2 | 11.9 | 10.1 |
| 2013 | 5833 | 100.5 | 100.5 | 100.4 | 10.1 | 10.0 | 10.0 | 1325 | 101.0 | 100.9 | 101.2 | 12.3 | 12.1 | 10.3 |
| 2014 | 5699 | 100.8 | 100.9 | 100.7 | 10.2 | 10.1 | 10.1 | 1579 | 100.7 | 100.7 | 100.5 | 11.9 | 11.6 | 9.9 |
| 2015 | 5212 | 101.1 | 101.4 | 100.9 | 9.4 | 8.6 | 9.3 | 1603 | 101.1 | 101.4 | 100.9 | 11.5 | 11.0 | 9.4 |
| 2016 | 4734 | 99.3 | 99.3 | 99.1 | 10.3 | 8.7 | 10.2 | 1724 | 98.6 | 98.8 | 98.6 | 12.1 | 11.5 | 10.3 |
| 2017 | 4076 | 101.5 | 100.5 | 101.3 | 9.8 | 7.0 | 9.8 | 2064 | 101.0 | 100.2 | 101.0 | 11.3 | 10.0 | 9.7 |
| 2018 | 3445 | 101.3 | 100.8 | 101.0 | 9.8 | 7.7 | 9.7 | 2087 | 101.2 | 100.7 | 100.9 | 11.5 | 10.3 | 9.9 |
| 2019 | 283 | 99.9 | 99.6 | 99.4 | 10.2 | 6.9 | 10.1 | 226 | 99.3 | 99.1 | 98.5 | 11.3 | 9.3 | 9.2 |



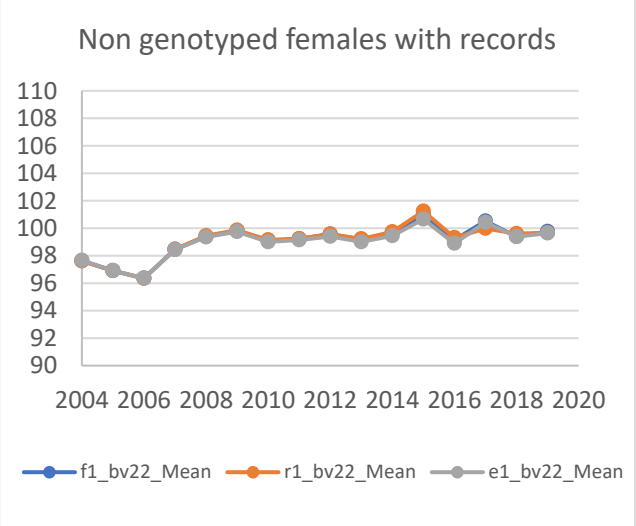



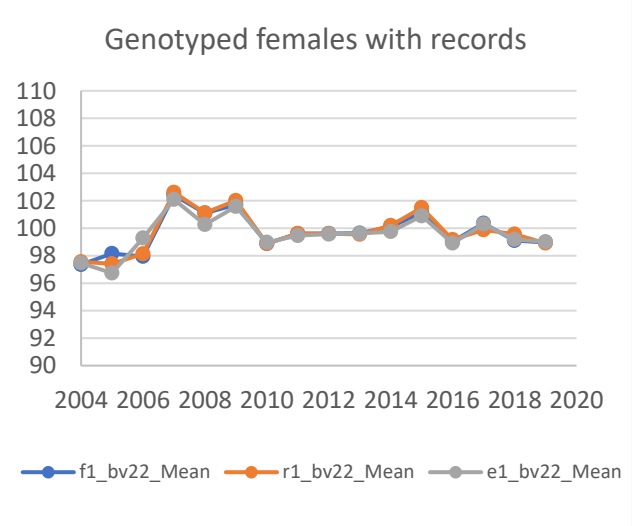



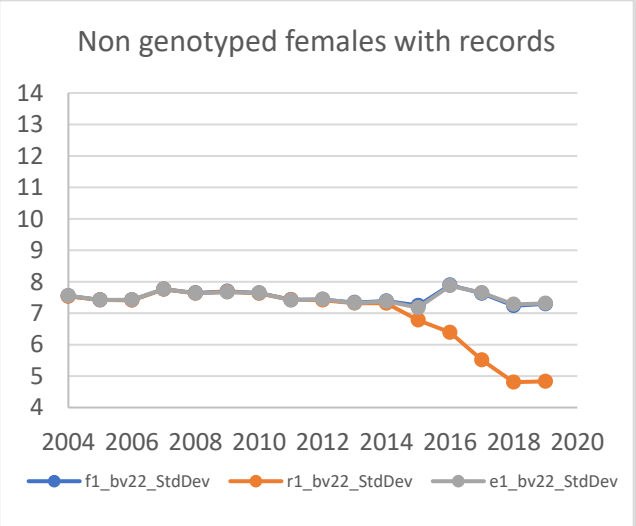



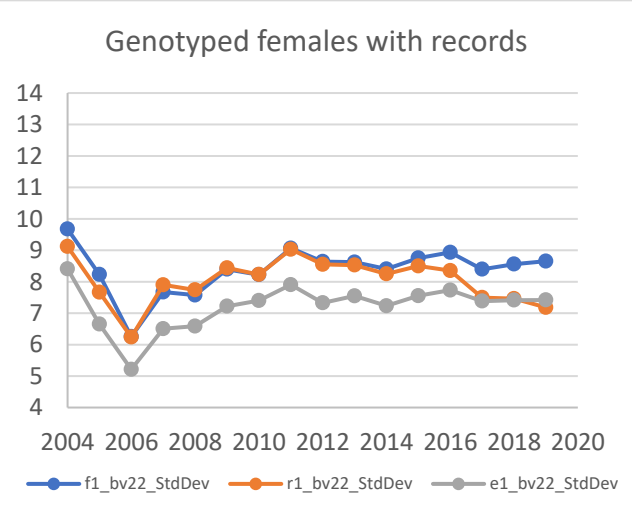
## *bv22*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 97.6 | 97.6 | 97.7 | 7.5 | 7.5 | 7.6 | 17 | 97.4 | 97.5 | 97.5 | 9.7 | 9.1 | 8.4 |
| 2005 | 6905 | 96.9 | 96.9 | 96.9 | 7.4 | 7.4 | 7.4 | 18 | 98.2 | 97.4 | 96.7 | 8.2 | 7.7 | 6.7 |
| 2006 | 7496 | 96.4 | 96.3 | 96.4 | 7.4 | 7.4 | 7.4 | 32 | 97.9 | 98.1 | 99.3 | 6.3 | 6.2 | 5.2 |
| 2007 | 7781 | 98.5 | 98.5 | 98.4 | 7.8 | 7.8 | 7.8 | 54 | 102.4 | 102.6 | 102.1 | 7.7 | 7.9 | 6.5 |
| 2008 | 8183 | 99.4 | 99.4 | 99.4 | 7.6 | 7.6 | 7.6 | 66 | 101.1 | 101.1 | 100.3 | 7.6 | 7.7 | 6.6 |
| 2009 | 8830 | 99.8 | 99.9 | 99.7 | 7.7 | 7.7 | 7.7 | 100 | 101.7 | 102.0 | 101.6 | 8.4 | 8.4 | 7.2 |
| 2010 | 7346 | 99.1 | 99.2 | 99.0 | 7.6 | 7.6 | 7.6 | 1171 | 98.9 | 98.9 | 99.0 | 8.2 | 8.2 | 7.4 |
| 2011 | 6838 | 99.2 | 99.2 | 99.1 | 7.4 | 7.4 | 7.4 | 1923 | 99.6 | 99.6 | 99.5 | 9.1 | 9.0 | 7.9 |
| 2012 | 6709 | 99.6 | 99.6 | 99.4 | 7.4 | 7.4 | 7.4 | 1936 | 99.6 | 99.6 | 99.6 | 8.6 | 8.6 | 7.3 |
| 2013 | 5889 | 99.2 | 99.2 | 99.0 | 7.3 | 7.3 | 7.3 | 1335 | 99.6 | 99.6 | 99.6 | 8.6 | 8.5 | 7.5 |
| 2014 | 5777 | 99.7 | 99.7 | 99.4 | 7.4 | 7.3 | 7.4 | 1585 | 100.1 | 100.2 | 99.7 | 8.4 | 8.2 | 7.2 |
| 2015 | 5368 | 101.0 | 101.2 | 100.7 | 7.2 | 6.8 | 7.2 | 1610 | 101.1 | 101.5 | 100.9 | 8.8 | 8.5 | 7.6 |
| 2016 | 4734 | 99.2 | 99.3 | 98.9 | 7.9 | 6.4 | 7.9 | 1725 | 99.0 | 99.2 | 98.9 | 8.9 | 8.4 | 7.7 |
| 2017 | 4076 | 100.5 | 100.0 | 100.4 | 7.6 | 5.5 | 7.7 | 2064 | 100.4 | 99.9 | 100.3 | 8.4 | 7.5 | 7.4 |
| 2018 | 3445 | 99.4 | 99.6 | 99.4 | 7.2 | 4.8 | 7.3 | 2087 | 99.1 | 99.6 | 99.2 | 8.6 | 7.5 | 7.4 |
| 2019 | 283 | 99.8 | 99.7 | 99.6 | 7.3 | 4.8 | 7.3 | 226 | 99.0 | 98.9 | 99.0 | 8.7 | 7.2 | 7.4 |



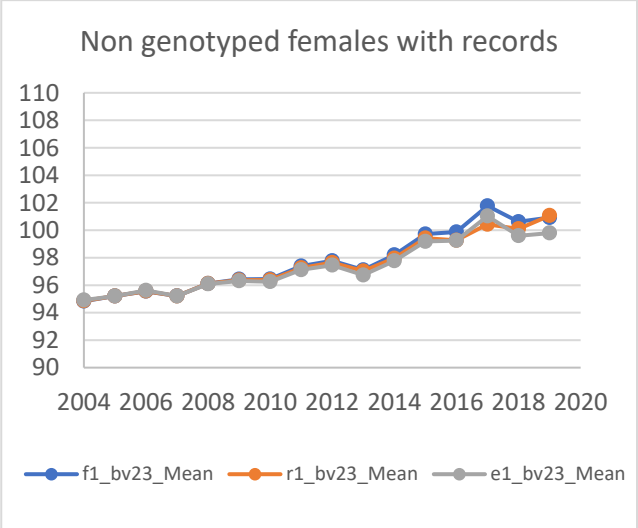



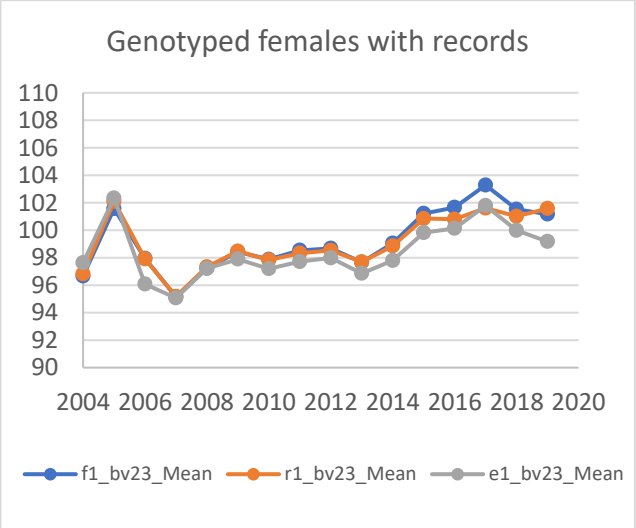



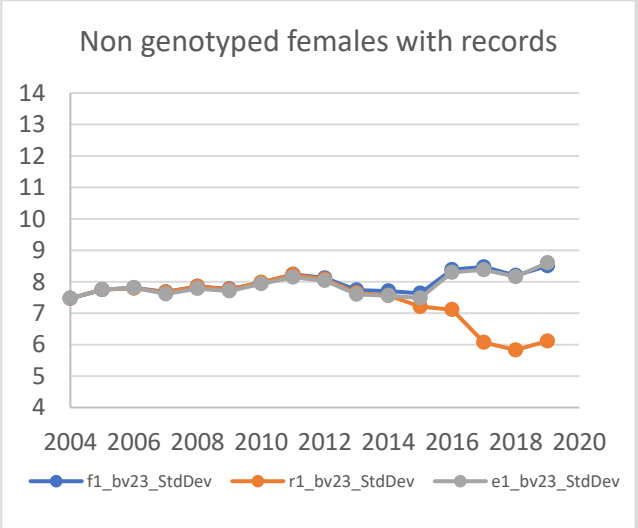



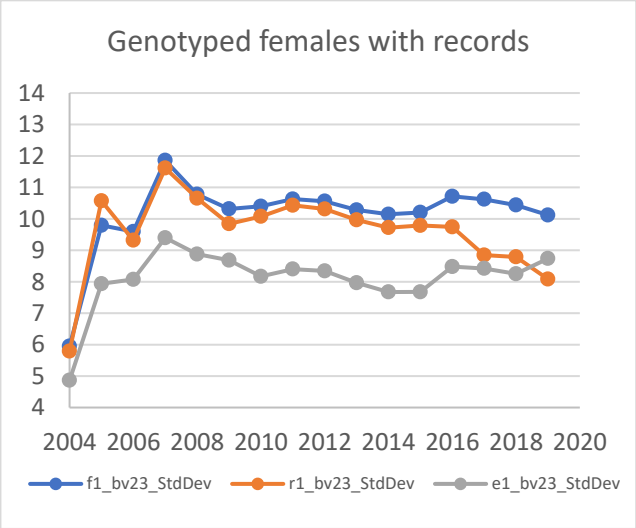
## *bv23*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6658 | 94.8 | 94.9 | 94.9 | 7.5 | 7.5 | 7.5 | 17 | 96.7 | 96.8 | 97.6 | 5.9 | 5.8 | 4.9 |
| 2005 | 6905 | 95.2 | 95.2 | 95.2 | 7.7 | 7.7 | 7.7 | 18 | 101.6 | 102.1 | 102.3 | 9.8 | 10.6 | 7.9 |
| 2006 | 7496 | 95.6 | 95.6 | 95.6 | 7.8 | 7.8 | 7.8 | 32 | 98.0 | 97.9 | 96.1 | 9.6 | 9.3 | 8.1 |
| 2007 | 7781 | 95.2 | 95.2 | 95.2 | 7.7 | 7.7 | 7.6 | 54 | 95.2 | 95.2 | 95.1 | 11.9 | 11.6 | 9.4 |
| 2008 | 8183 | 96.1 | 96.1 | 96.1 | 7.9 | 7.9 | 7.8 | 66 | 97.2 | 97.3 | 97.2 | 10.8 | 10.7 | 8.9 |
| 2009 | 8830 | 96.4 | 96.4 | 96.3 | 7.8 | 7.8 | 7.7 | 100 | 98.4 | 98.5 | 97.9 | 10.3 | 9.8 | 8.7 |
| 2010 | 7346 | 96.4 | 96.4 | 96.3 | 8.0 | 8.0 | 7.9 | 1171 | 97.9 | 97.8 | 97.2 | 10.4 | 10.1 | 8.2 |
| 2011 | 6838 | 97.4 | 97.3 | 97.1 | 8.2 | 8.2 | 8.1 | 1923 | 98.5 | 98.3 | 97.7 | 10.6 | 10.4 | 8.4 |
| 2012 | 6709 | 97.8 | 97.6 | 97.5 | 8.1 | 8.1 | 8.0 | 1936 | 98.7 | 98.5 | 98.0 | 10.6 | 10.3 | 8.3 |
| 2013 | 5889 | 97.1 | 97.0 | 96.7 | 7.7 | 7.6 | 7.6 | 1335 | 97.7 | 97.7 | 96.9 | 10.3 | 10.0 | 8.0 |
| 2014 | 5777 | 98.2 | 98.0 | 97.8 | 7.7 | 7.6 | 7.6 | 1585 | 99.0 | 98.9 | 97.8 | 10.1 | 9.7 | 7.7 |
| 2015 | 5368 | 99.7 | 99.4 | 99.2 | 7.6 | 7.2 | 7.5 | 1610 | 101.2 | 100.8 | 99.8 | 10.2 | 9.8 | 7.7 |
| 2016 | 4734 | 99.9 | 99.3 | 99.2 | 8.4 | 7.1 | 8.3 | 1725 | 101.7 | 100.8 | 100.1 | 10.7 | 9.7 | 8.5 |
| 2017 | 4076 | 101.8 | 100.4 | 101.0 | 8.5 | 6.1 | 8.4 | 2064 | 103.3 | 101.6 | 101.8 | 10.6 | 8.8 | 8.4 |
| 2018 | 3445 | 100.6 | 100.1 | 99.6 | 8.2 | 5.8 | 8.2 | 2087 | 101.5 | 101.0 | 100.0 | 10.4 | 8.8 | 8.2 |
| 2019 | 283 | 100.9 | 101.1 | 99.8 | 8.5 | 6.1 | 8.6 | 226 | 101.2 | 101.6 | 99.2 | 10.1 | 8.1 | 8.7 |



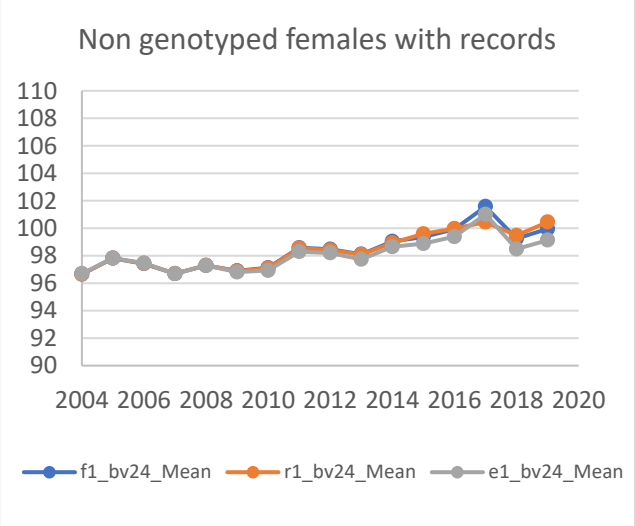



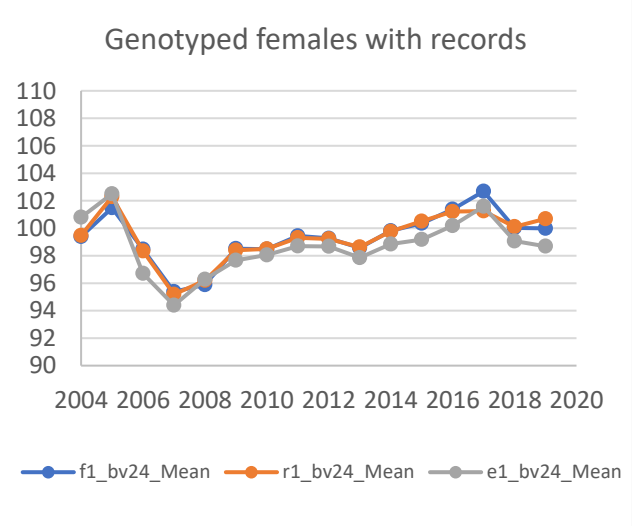



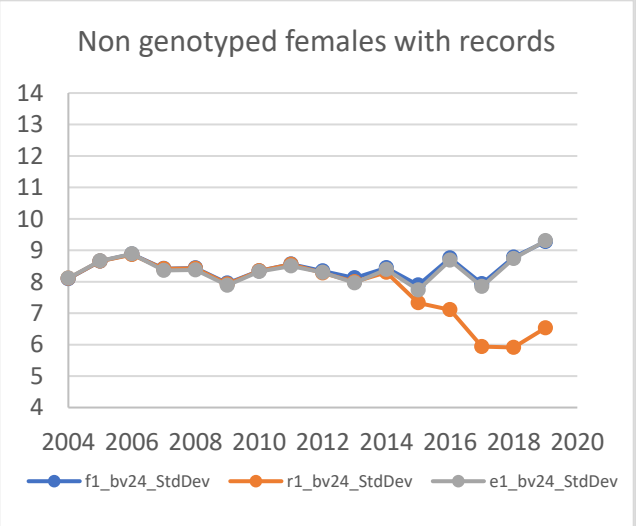



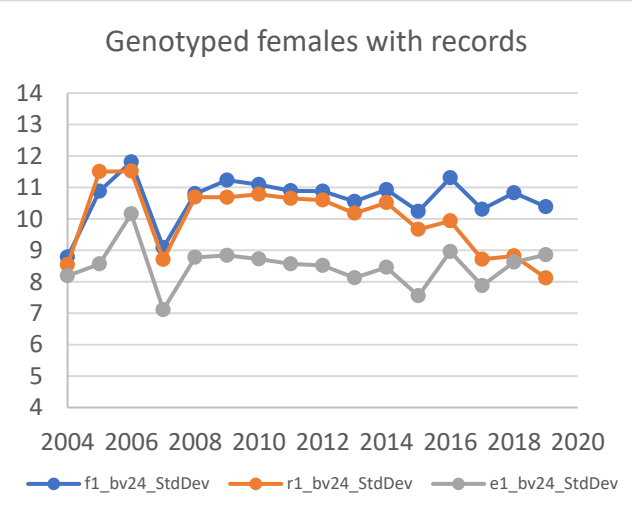
## *bv24*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 6655 | 96.7 | 96.7 | 96.7 | 8.1 | 8.1 | 8.1 | 17 | 99.4 | 99.5 | 100.8 | 8.8 | 8.5 | 8.2 |
| 2005 | 6883 | 97.8 | 97.8 | 97.8 | 8.7 | 8.7 | 8.7 | 18 | 101.5 | 102.3 | 102.5 | 10.9 | 11.5 | 8.6 |
| 2006 | 7496 | 97.4 | 97.4 | 97.5 | 8.9 | 8.9 | 8.9 | 32 | 98.5 | 98.3 | 96.7 | 11.8 | 11.5 | 10.2 |
| 2007 | 7781 | 96.7 | 96.7 | 96.7 | 8.4 | 8.4 | 8.4 | 54 | 95.4 | 95.2 | 94.4 | 9.1 | 8.7 | 7.1 |
| 2008 | 8144 | 97.3 | 97.3 | 97.3 | 8.4 | 8.4 | 8.4 | 66 | 95.9 | 96.2 | 96.3 | 10.8 | 10.7 | 8.8 |
| 2009 | 8804 | 96.9 | 96.9 | 96.8 | 8.0 | 7.9 | 7.9 | 100 | 98.5 | 98.4 | 97.7 | 11.2 | 10.7 | 8.8 |
| 2010 | 7304 | 97.1 | 97.1 | 96.9 | 8.3 | 8.3 | 8.3 | 1171 | 98.5 | 98.5 | 98.1 | 11.1 | 10.8 | 8.7 |
| 2011 | 6823 | 98.6 | 98.5 | 98.3 | 8.6 | 8.6 | 8.5 | 1922 | 99.4 | 99.3 | 98.7 | 10.9 | 10.6 | 8.6 |
| 2012 | 6611 | 98.5 | 98.4 | 98.2 | 8.3 | 8.3 | 8.3 | 1908 | 99.3 | 99.2 | 98.7 | 10.9 | 10.6 | 8.5 |
| 2013 | 5833 | 98.1 | 98.1 | 97.7 | 8.1 | 8.0 | 8.0 | 1325 | 98.6 | 98.6 | 97.9 | 10.6 | 10.2 | 8.1 |
| 2014 | 5699 | 99.0 | 98.9 | 98.6 | 8.4 | 8.3 | 8.4 | 1579 | 99.8 | 99.8 | 98.8 | 10.9 | 10.5 | 8.5 |
| 2015 | 5212 | 99.4 | 99.6 | 98.9 | 7.9 | 7.3 | 7.7 | 1603 | 100.4 | 100.5 | 99.2 | 10.2 | 9.7 | 7.6 |
| 2016 | 4734 | 99.9 | 100.0 | 99.4 | 8.8 | 7.1 | 8.7 | 1724 | 101.4 | 101.2 | 100.2 | 11.3 | 9.9 | 9.0 |
| 2017 | 4076 | 101.6 | 100.4 | 101.0 | 7.9 | 5.9 | 7.8 | 2064 | 102.7 | 101.2 | 101.6 | 10.3 | 8.7 | 7.9 |
| 2018 | 3445 | 99.2 | 99.5 | 98.5 | 8.8 | 5.9 | 8.7 | 2087 | 100.0 | 100.1 | 99.1 | 10.8 | 8.8 | 8.6 |
| 2019 | 283 | 99.9 | 100.4 | 99.1 | 9.3 | 6.5 | 9.3 | 226 | 100.0 | 100.7 | 98.7 | 10.4 | 8.1 | 8.9 |



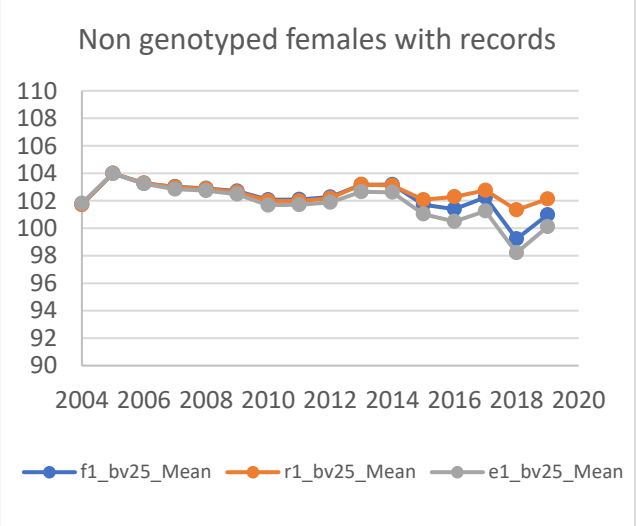



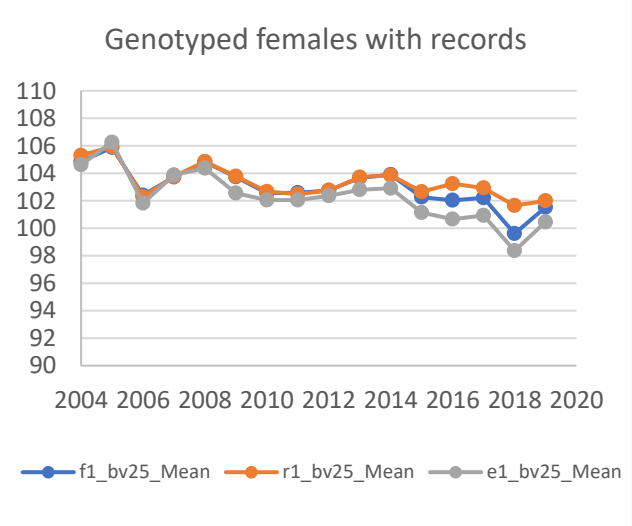



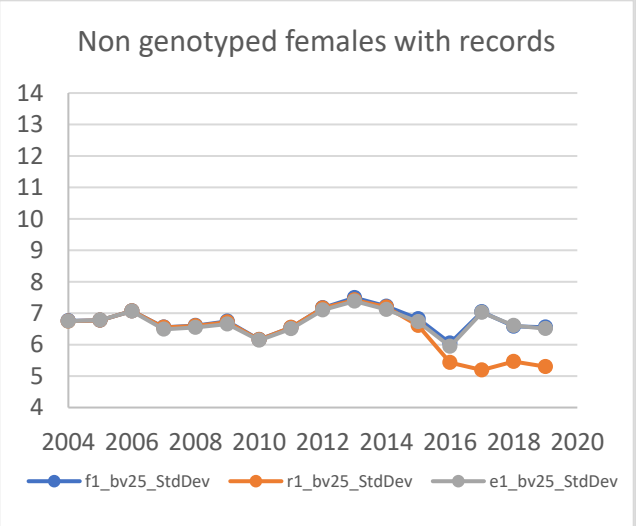



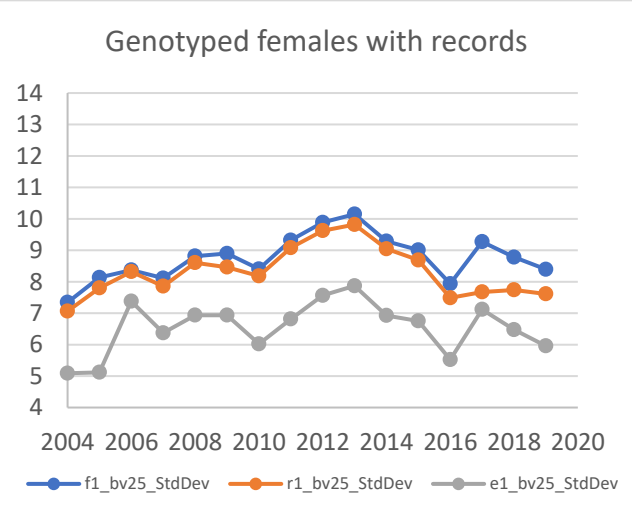
## *bv25*

| | Non genotyped females with records | | | | | | | Genotyped females with records | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | f1 | r1 | e1 | f1 | r1 | e1 | N | f1 | r1 | e1 | f1 | r1 | e1 |
| 2004 | 5136 | 101.7 | 101.7 | 101.8 | 6.8 | 6.7 | 6.7 | 16 | 104.9 | 105.3 | 104.6 | 7.3 | 7.1 | 5.1 |
| 2005 | 6883 | 104.0 | 104.0 | 104.0 | 6.8 | 6.8 | 6.8 | 18 | 105.9 | 105.9 | 106.3 | 8.1 | 7.8 | 5.1 |
| 2006 | 7496 | 103.3 | 103.3 | 103.2 | 7.1 | 7.1 | 7.1 | 32 | 102.4 | 102.3 | 101.8 | 8.4 | 8.3 | 7.4 |
| 2007 | 7781 | 103.0 | 103.0 | 102.8 | 6.6 | 6.5 | 6.5 | 54 | 103.7 | 103.8 | 103.9 | 8.1 | 7.9 | 6.4 |
| 2008 | 8143 | 102.9 | 102.9 | 102.7 | 6.6 | 6.6 | 6.5 | 66 | 104.8 | 104.8 | 104.4 | 8.8 | 8.6 | 6.9 |
| 2009 | 8804 | 102.7 | 102.6 | 102.5 | 6.7 | 6.7 | 6.7 | 100 | 103.7 | 103.8 | 102.6 | 8.9 | 8.5 | 6.9 |
| 2010 | 7304 | 102.1 | 102.0 | 101.7 | 6.2 | 6.2 | 6.1 | 1171 | 102.6 | 102.7 | 102.0 | 8.4 | 8.2 | 6.0 |
| 2011 | 6823 | 102.1 | 102.0 | 101.7 | 6.5 | 6.5 | 6.5 | 1922 | 102.6 | 102.5 | 102.1 | 9.3 | 9.1 | 6.8 |
| 2012 | 6611 | 102.3 | 102.2 | 101.9 | 7.2 | 7.2 | 7.1 | 1908 | 102.8 | 102.7 | 102.4 | 9.9 | 9.6 | 7.6 |
| 2013 | 5833 | 103.2 | 103.2 | 102.7 | 7.5 | 7.4 | 7.4 | 1325 | 103.7 | 103.7 | 102.8 | 10.1 | 9.8 | 7.9 |
| 2014 | 5699 | 103.2 | 103.1 | 102.6 | 7.2 | 7.2 | 7.1 | 1579 | 103.9 | 103.9 | 102.9 | 9.3 | 9.0 | 6.9 |
| 2015 | 5212 | 101.7 | 102.1 | 101.0 | 6.8 | 6.6 | 6.7 | 1603 | 102.3 | 102.7 | 101.1 | 9.0 | 8.7 | 6.8 |
| 2016 | 4734 | 101.4 | 102.3 | 100.5 | 6.0 | 5.4 | 5.9 | 1724 | 102.0 | 103.2 | 100.7 | 7.9 | 7.5 | 5.5 |
| 2017 | 4076 | 102.3 | 102.8 | 101.2 | 7.0 | 5.2 | 7.0 | 2064 | 102.2 | 102.9 | 100.9 | 9.3 | 7.7 | 7.1 |
| 2018 | 3445 | 99.2 | 101.3 | 98.2 | 6.6 | 5.5 | 6.6 | 2087 | 99.6 | 101.7 | 98.4 | 8.8 | 7.7 | 6.5 |
| 2019 | 283 | 101.0 | 102.1 | 100.1 | 6.6 | 5.3 | 6.5 | 226 | 101.5 | 102.0 | 100.5 | 8.4 | 7.6 | 6.0 |



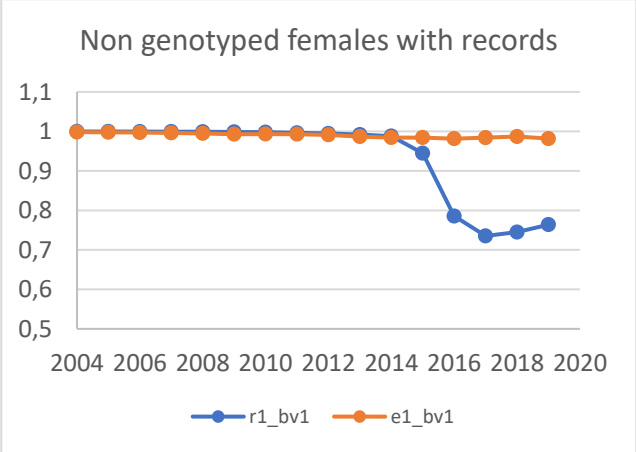



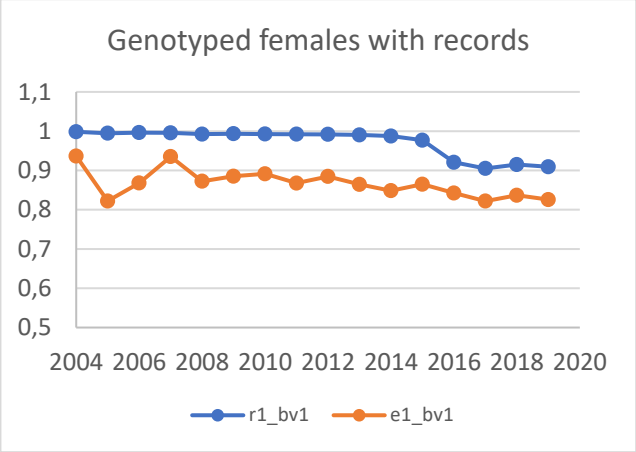



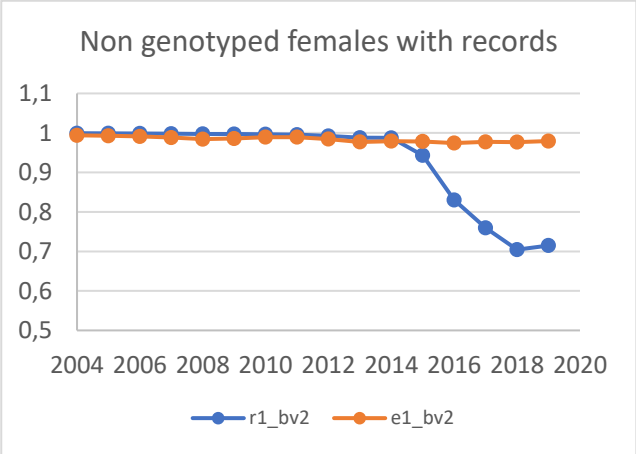
## Correlations

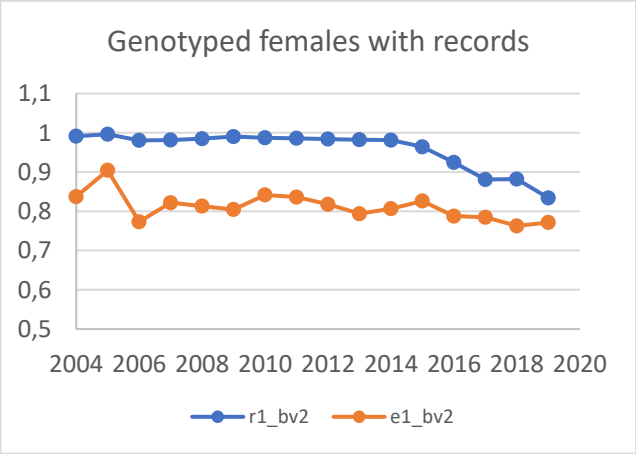
### *bv1*



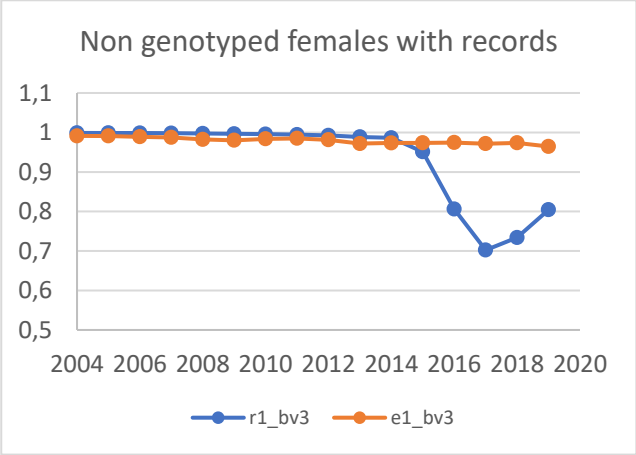



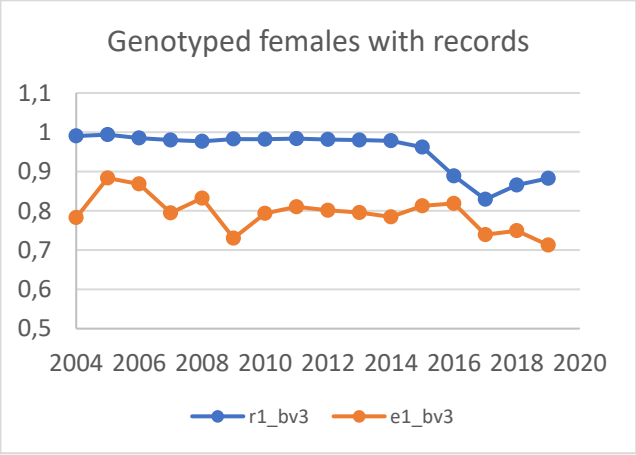

### *bv2*



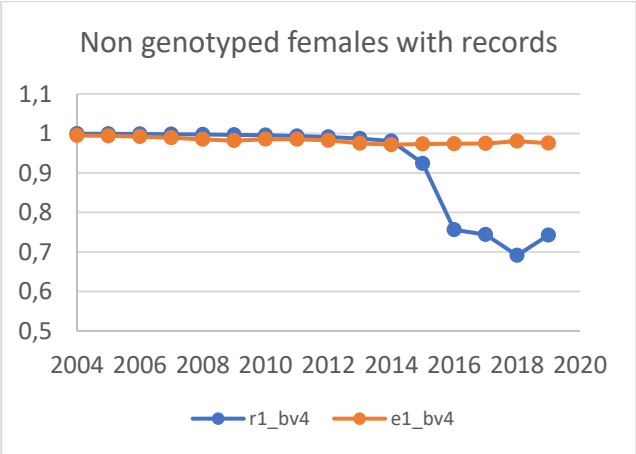



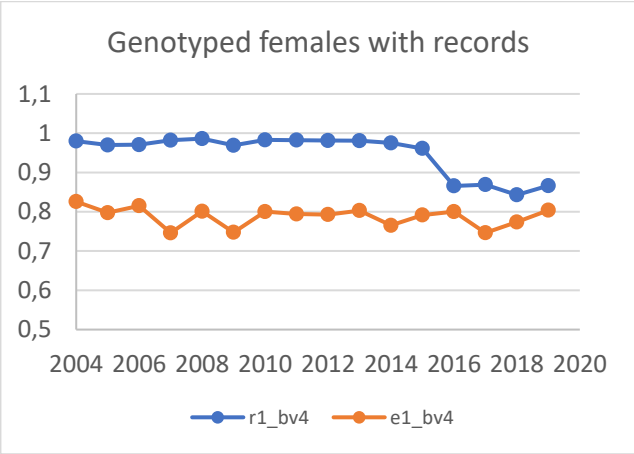

### *bv3*



***bv4***


Non genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv4
e1_bv4


Genotyped females with records
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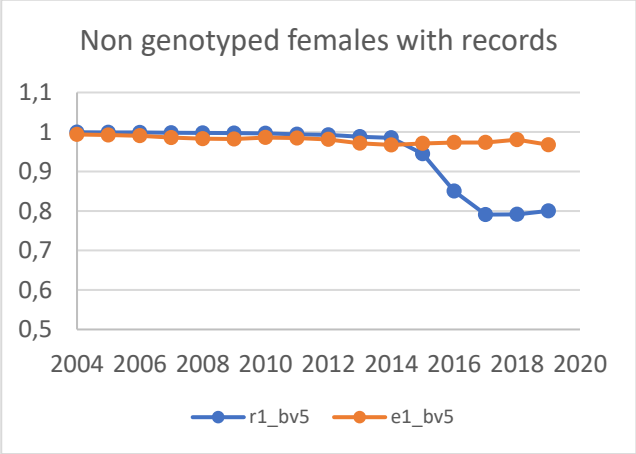
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv4
e1_bv4

***bv5***


Non genotyped females with records
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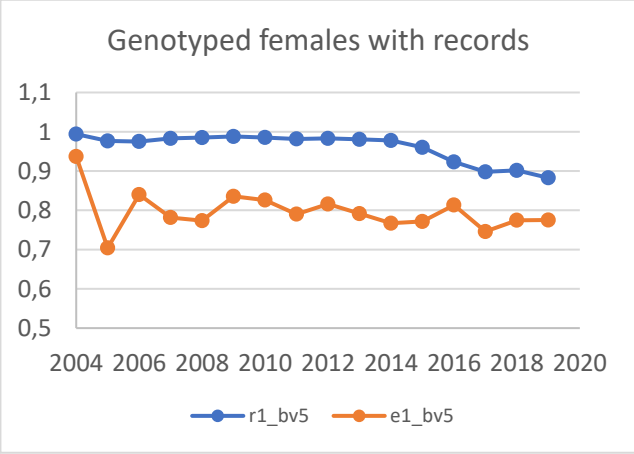
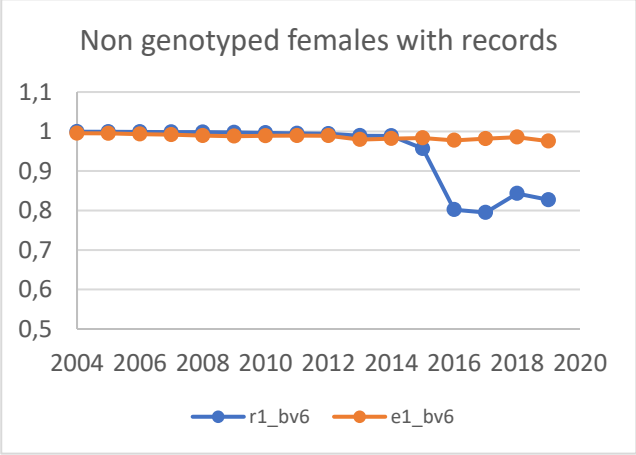
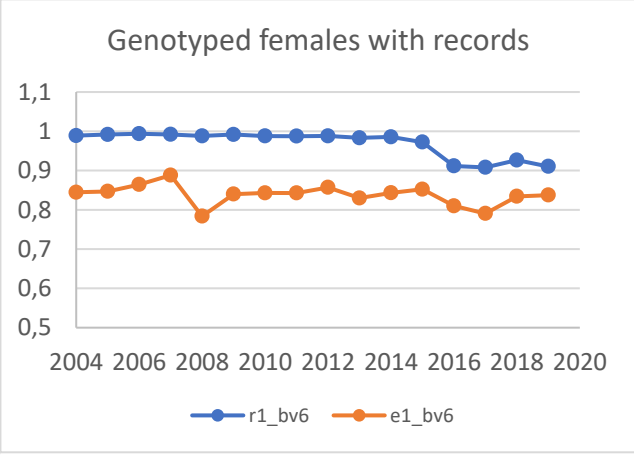
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv5
e1_bv5

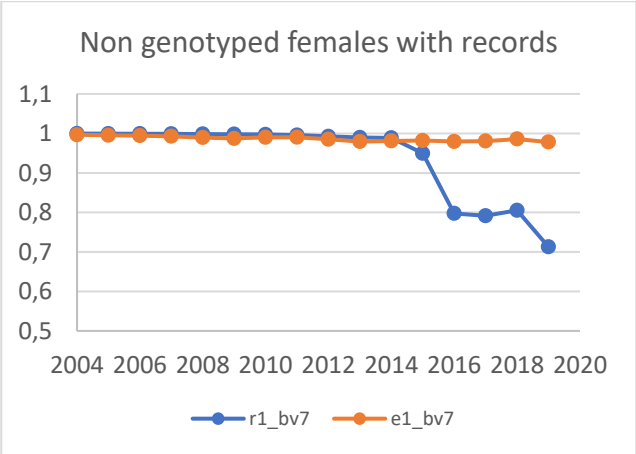

Genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv5
e1_bv5

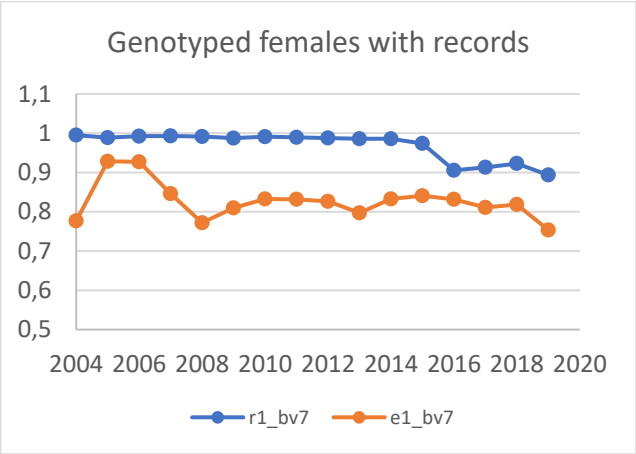
***bv6***


Non genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv6
e1_bv6

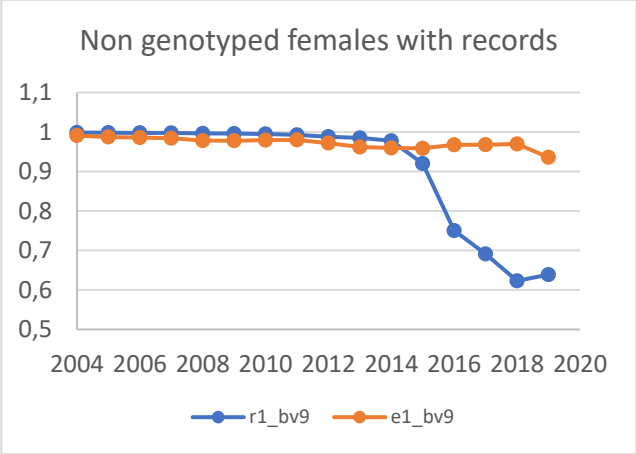

Genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv6
e1_bv6

***bv7***


Non genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv7
e1_bv7


Genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv7
e1_bv7

***bv9***


Non genotyped females with records
1,1
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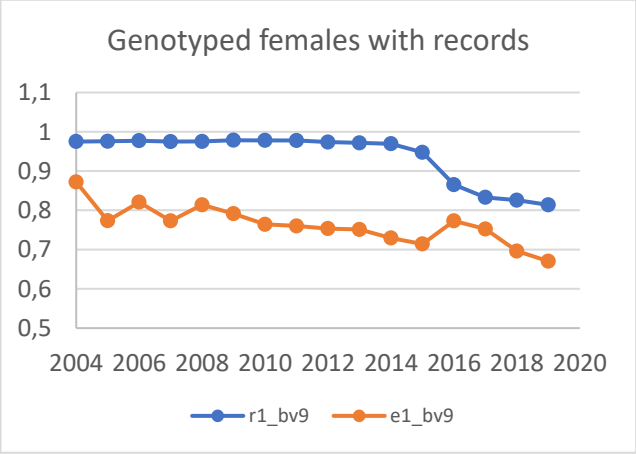
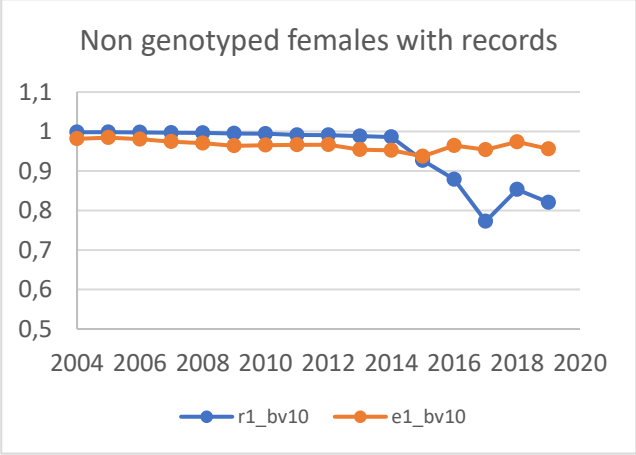
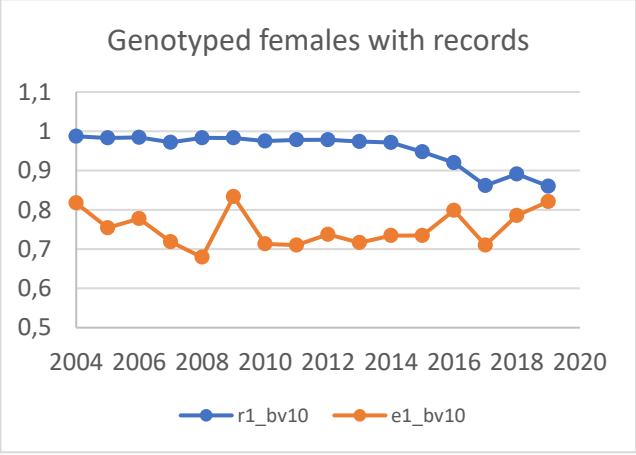
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv9
e1_bv9

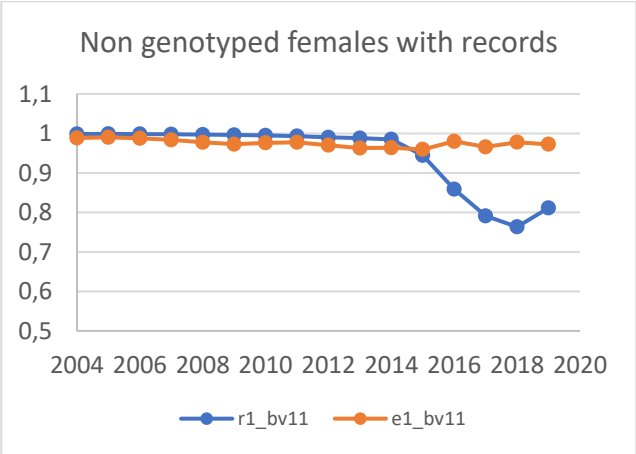

Genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv9
e1_bv9

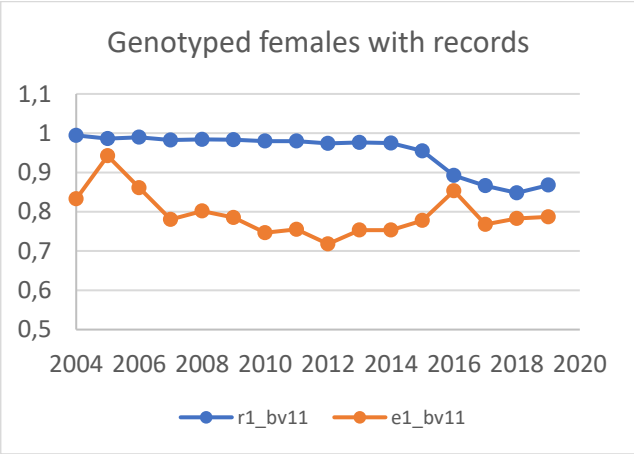
***bv10***


Non genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv10
e1_bv10

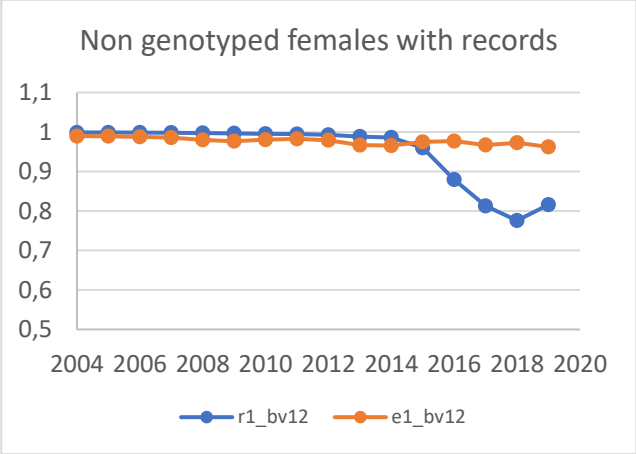

Genotyped females with records
1,1
1
0,9
0,8
0,7
0,6
0,5
2004 2006 2008 2010 2012 2014 2016 2018 2020
r1_bv10
e1_bv10

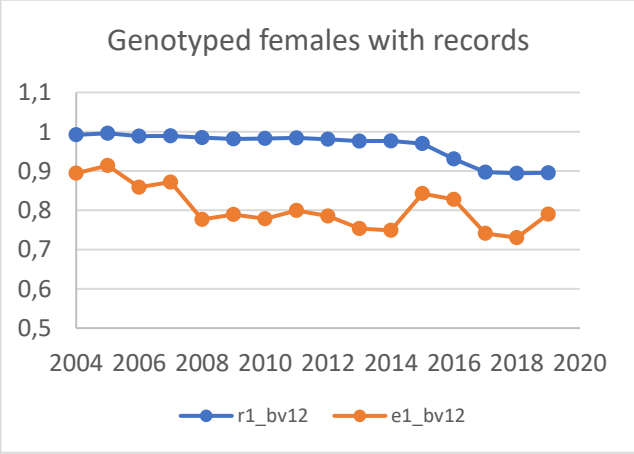
***bv11***



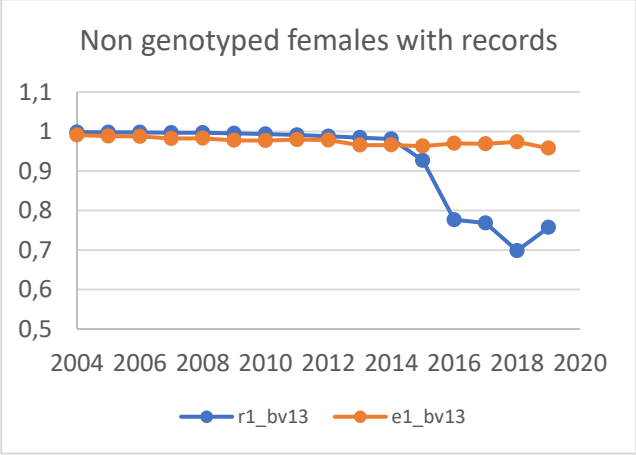



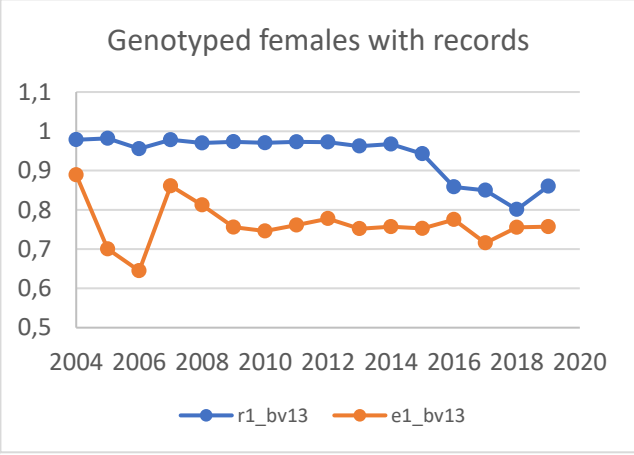

***bv12***



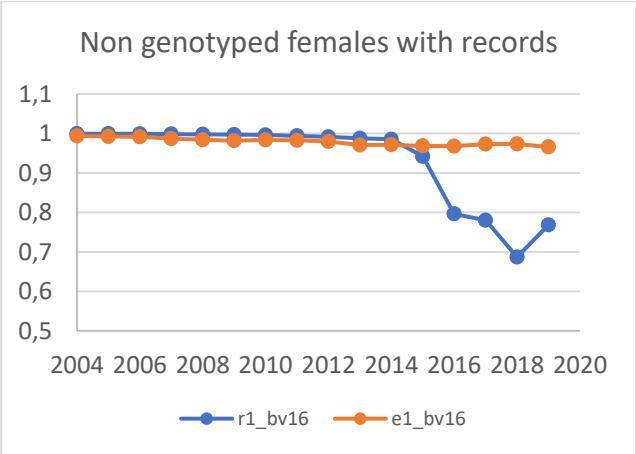



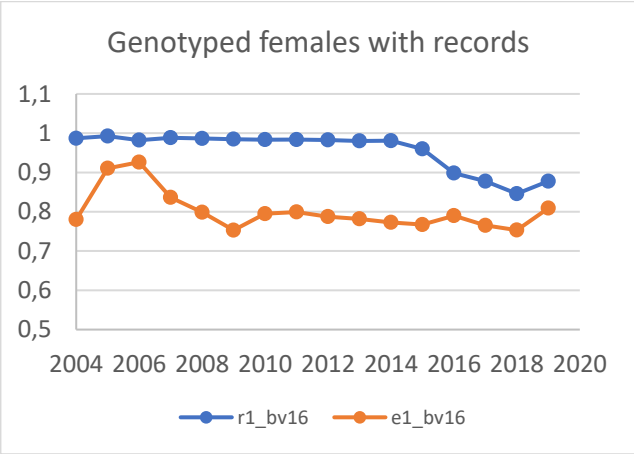

***bv13***



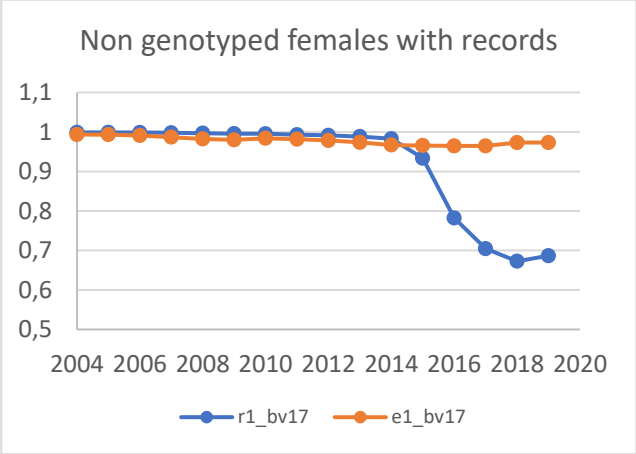



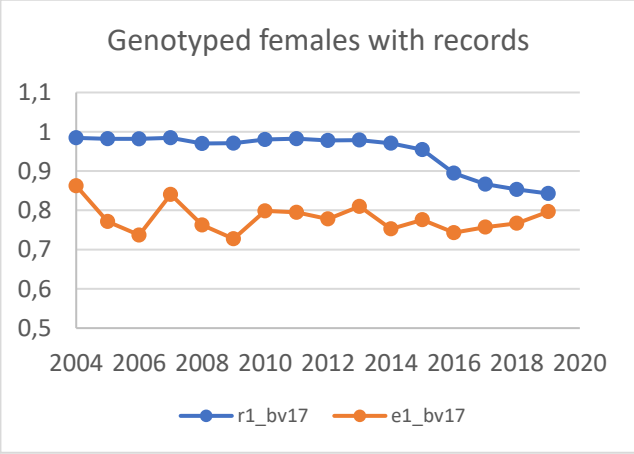
***bv16***



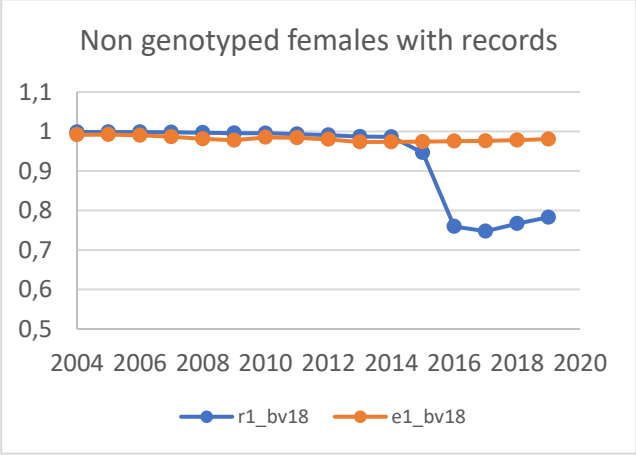



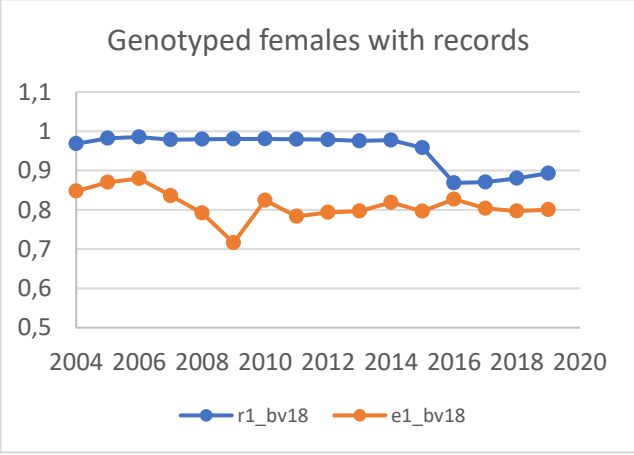

***bv17***



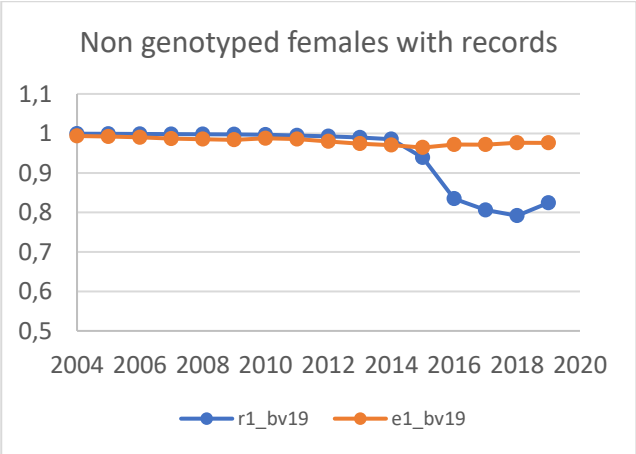



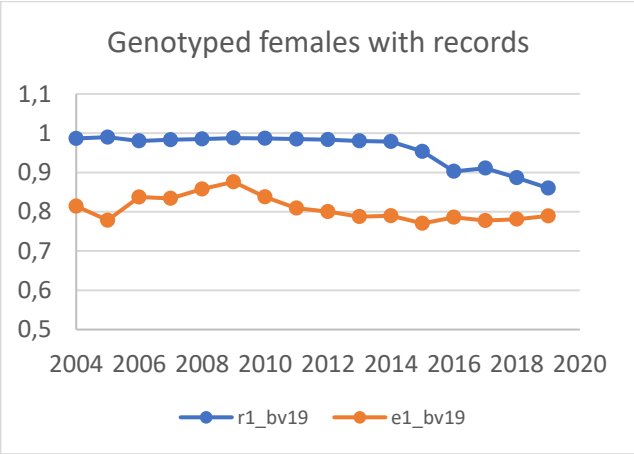

***bv18***



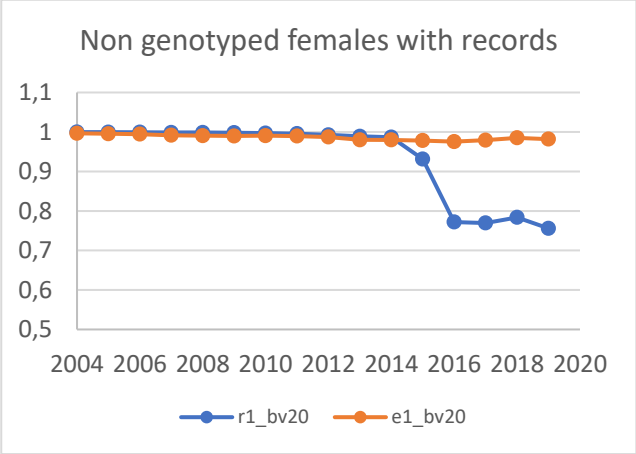



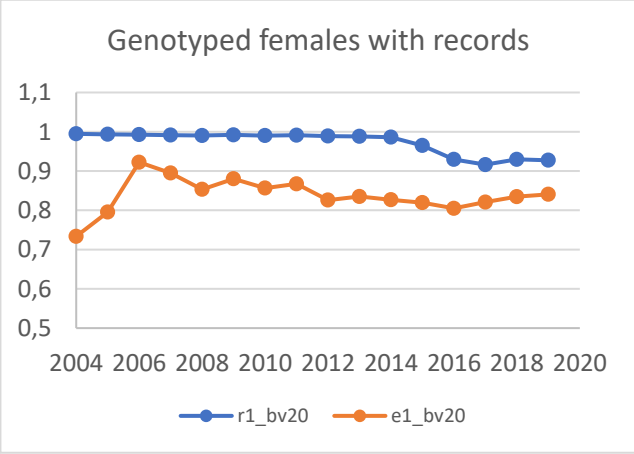
***bv19***



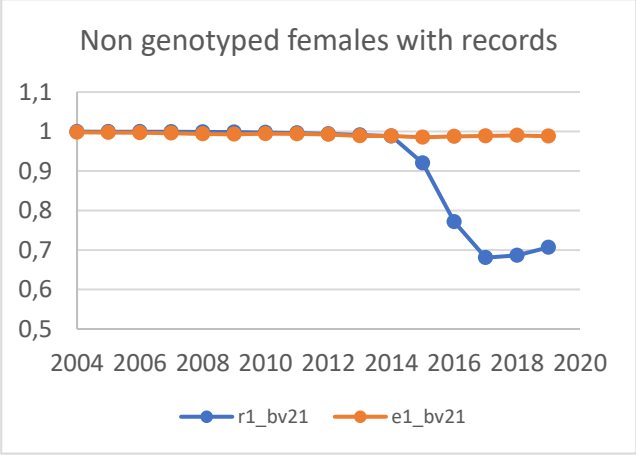



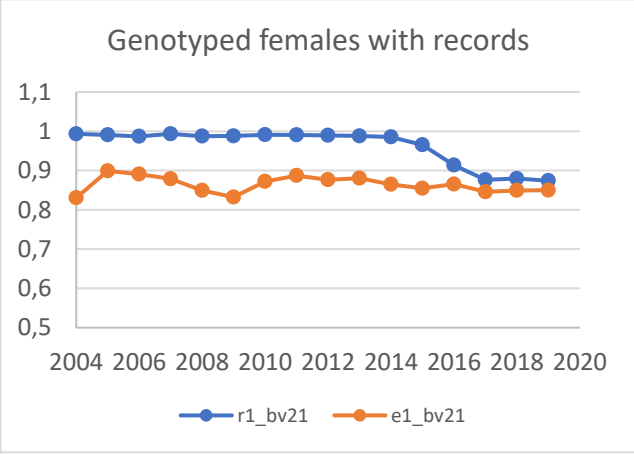

***bv20***



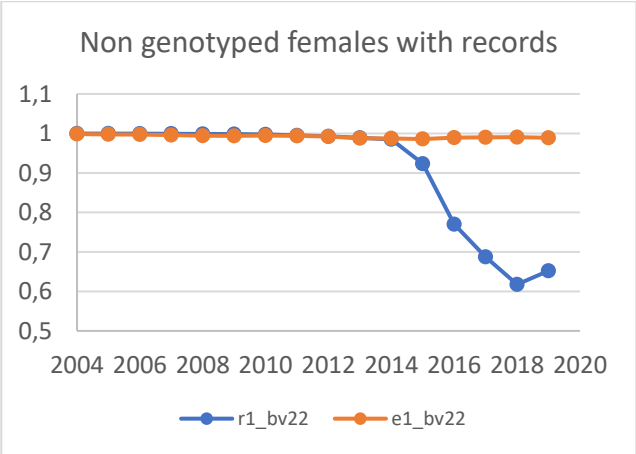



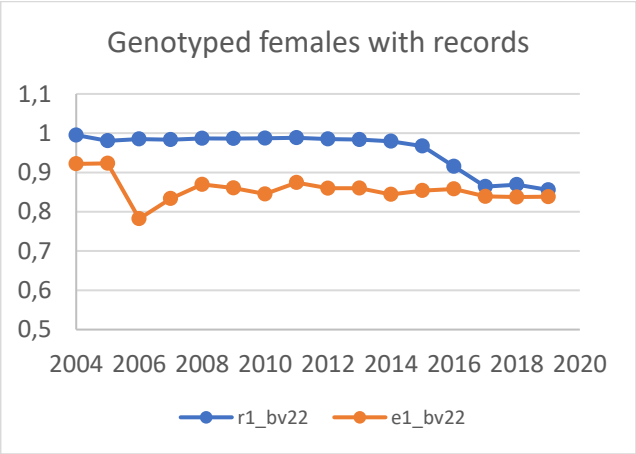

***bv21***



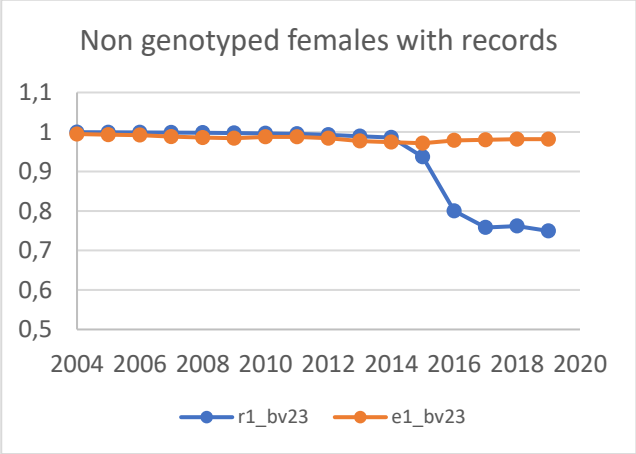



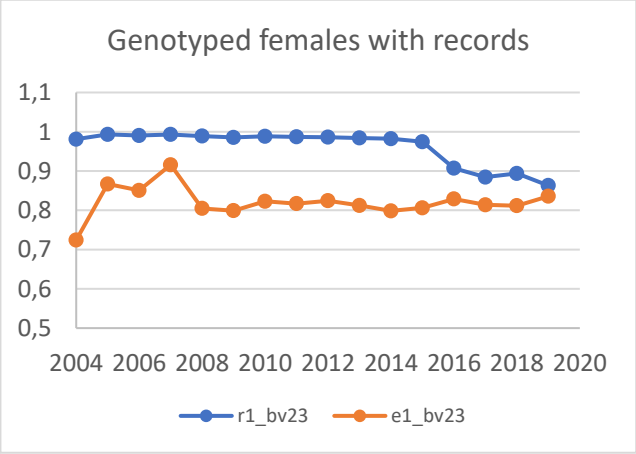
***bv22***



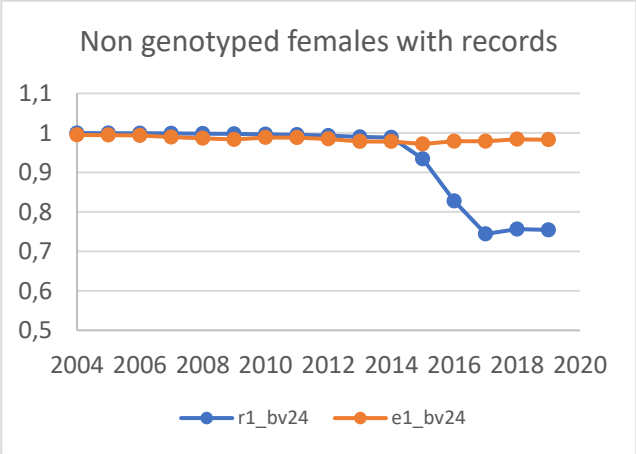



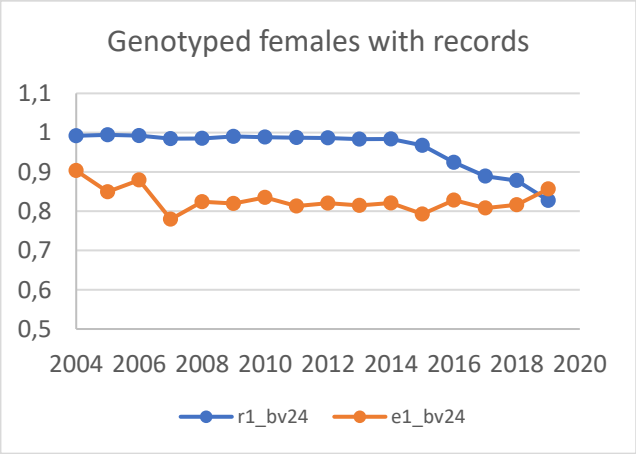

***bv23***



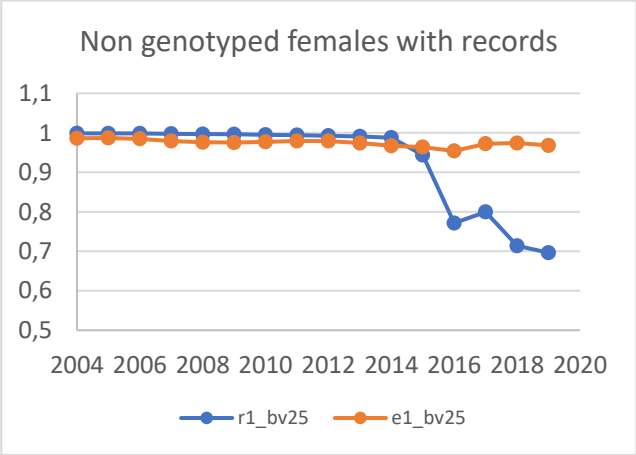



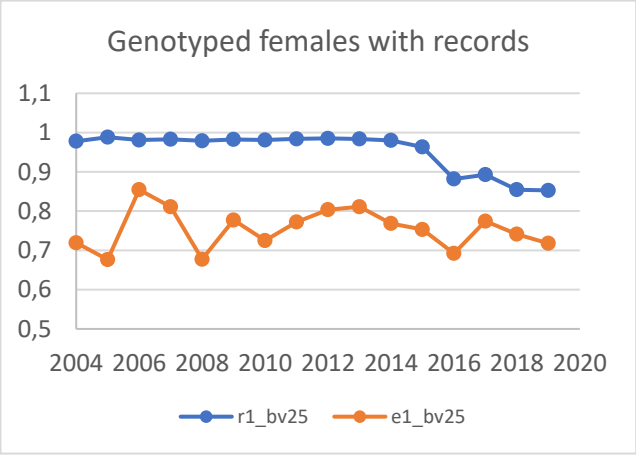

***bv24***



***bv25***



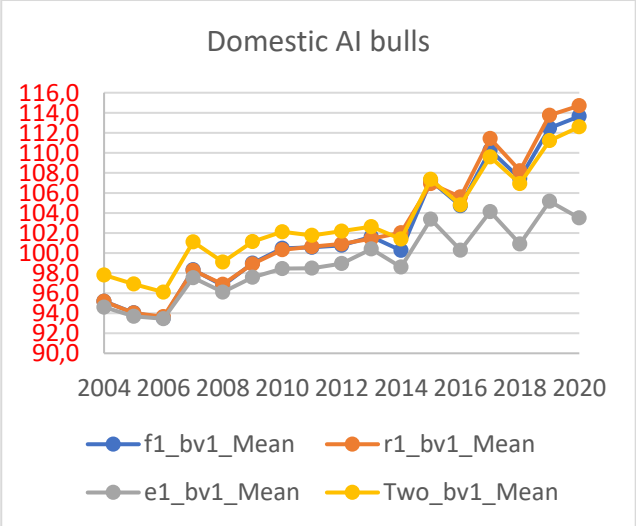



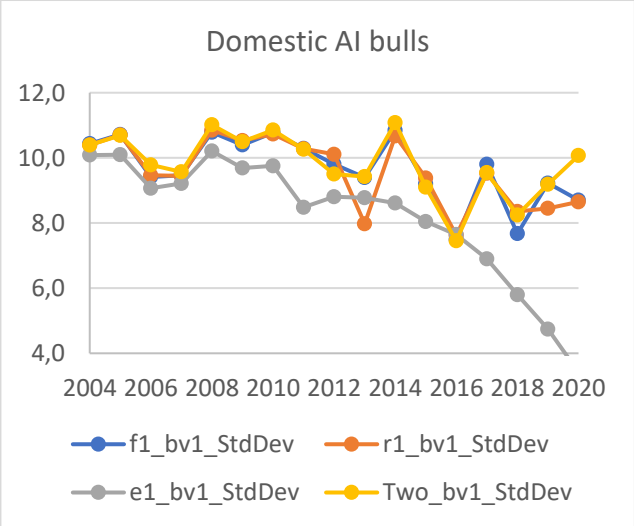

# Bulls

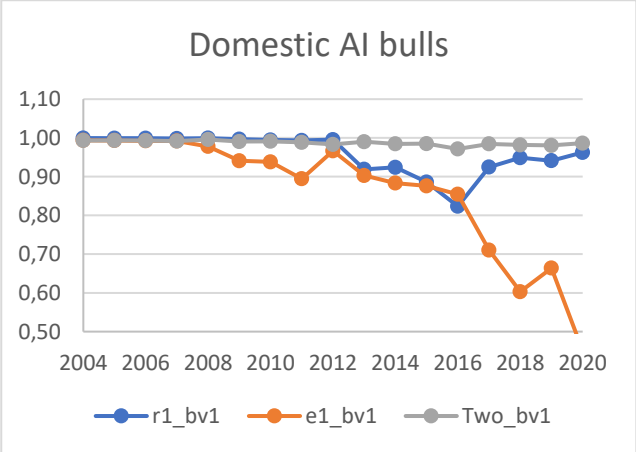
## Trend (mean and SD) and correlations

***bv1***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 95.2 | 95.2 | 94.6 | 97.8 | 10.4 | 10.4 | 10.1 | 10.4 | 1.00 | 0.99 | 0.99 |
| 2005 | 45 | 94.0 | 94.0 | 93.7 | 96.9 | 10.7 | 10.7 | 10.1 | 10.7 | 1.00 | 0.99 | 0.99 |
| 2006 | 49 | 93.5 | 93.6 | 93.4 | 96.1 | 9.4 | 9.5 | 9.1 | 9.8 | 1.00 | 0.99 | 0.99 |
| 2007 | 55 | 98.3 | 98.3 | 97.5 | 101.1 | 9.5 | 9.4 | 9.2 | 9.6 | 1.00 | 0.99 | 0.99 |
| 2008 | 47 | 96.8 | 96.9 | 96.1 | 99.1 | 10.8 | 10.9 | 10.2 | 11.0 | 1.00 | 0.98 | 1.00 |
| 2009 | 58 | 99.0 | 98.9 | 97.6 | 101.1 | 10.4 | 10.5 | 9.7 | 10.5 | 1.00 | 0.94 | 0.99 |
| 2010 | 73 | 100.5 | 100.3 | 98.4 | 102.1 | 10.8 | 10.7 | 9.8 | 10.9 | 0.99 | 0.94 | 0.99 |
| 2011 | 75 | 100.6 | 100.6 | 98.5 | 101.8 | 10.3 | 10.3 | 8.5 | 10.3 | 0.99 | 0.89 | 0.99 |
| 2012 | 58 | 100.8 | 100.9 | 99.0 | 102.2 | 9.8 | 10.1 | 8.8 | 9.5 | 1.00 | 0.97 | 0.98 |
| 2013 | 67 | 101.6 | 101.4 | 100.4 | 102.6 | 9.4 | 8.0 | 8.8 | 9.4 | 0.92 | 0.90 | 0.99 |
| 2014 | 64 | 100.3 | 102.0 | 98.6 | 101.4 | 10.8 | 10.7 | 8.6 | 11.1 | 0.92 | 0.88 | 0.98 |
| 2015 | 52 | 107.2 | 106.9 | 103.4 | 107.4 | 9.2 | 9.4 | 8.0 | 9.1 | 0.89 | 0.88 | 0.99 |
| 2016 | 32 | 104.7 | 105.6 | 100.3 | 104.8 | 7.5 | 7.6 | 7.6 | 7.5 | 0.82 | 0.85 | 0.97 |
| 2017 | 38 | 110.3 | 111.4 | 104.1 | 109.6 | 9.8 | 9.5 | 6.9 | 9.5 | 0.92 | 0.71 | 0.98 |
| 2018 | 24 | 107.4 | 108.2 | 100.9 | 106.9 | 7.7 | 8.4 | 5.8 | 8.2 | 0.95 | 0.60 | 0.98 |
| 2019 | 51 | 112.5 | 113.7 | 105.2 | 111.2 | 9.2 | 8.4 | 4.7 | 9.2 | 0.94 | 0.66 | 0.98 |
| 2020 | 15 | 113.6 | 114.7 | 103.5 | 112.6 | 8.7 | 8.6 | 3.4 | 10.1 | 0.96 | 0.45 | 0.99 |

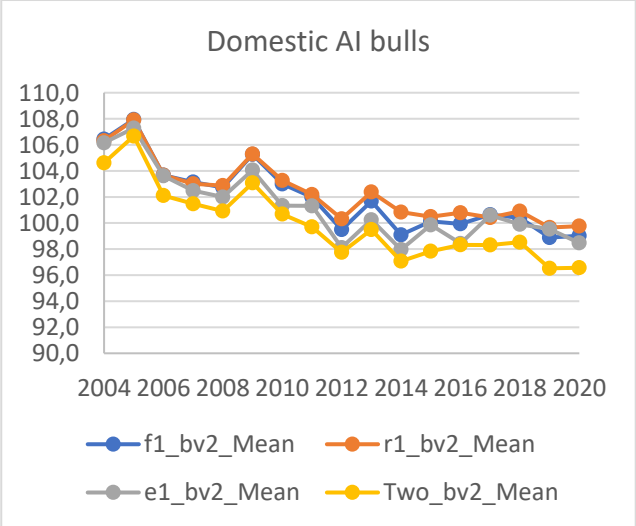


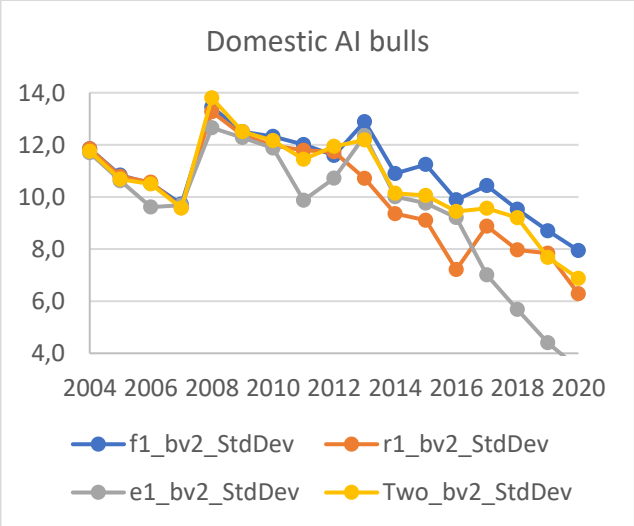



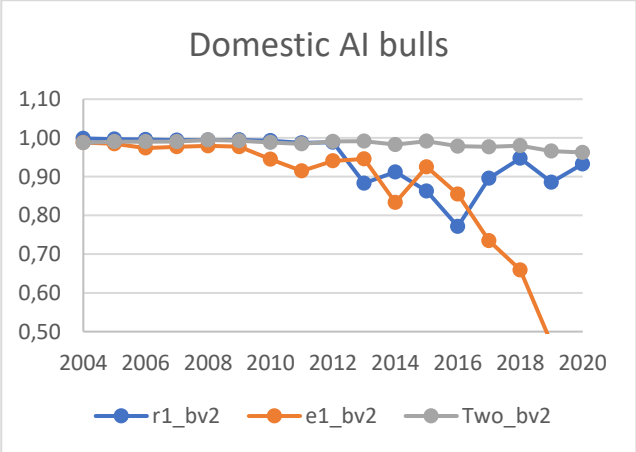



***bv2***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 106.4 | 106.3 | 106.2 | 104.6 | 11.9 | 11.9 | 11.7 | 11.8 | 1.00 | 0.99 | 0.99 |
| 2005 | 45 | 107.9 | 107.9 | 107.3 | 106.7 | 10.8 | 10.8 | 10.6 | 10.7 | 1.00 | 0.98 | 0.99 |
| 2006 | 49 | 103.7 | 103.7 | 103.6 | 102.1 | 10.5 | 10.6 | 9.6 | 10.5 | 1.00 | 0.97 | 0.99 |
| 2007 | 55 | 103.1 | 103.0 | 102.5 | 101.5 | 9.7 | 9.6 | 9.7 | 9.6 | 0.99 | 0.98 | 0.99 |
| 2008 | 47 | 102.7 | 102.9 | 102.0 | 100.9 | 13.5 | 13.3 | 12.7 | 13.8 | 0.99 | 0.98 | 0.99 |
| 2009 | 58 | 105.3 | 105.3 | 104.1 | 103.1 | 12.5 | 12.4 | 12.3 | 12.5 | 0.99 | 0.98 | 0.99 |
| 2010 | 73 | 103.0 | 103.3 | 101.3 | 100.7 | 12.3 | 12.0 | 11.9 | 12.2 | 0.99 | 0.94 | 0.99 |
| 2011 | 75 | 102.0 | 102.2 | 101.3 | 99.7 | 12.0 | 11.8 | 9.9 | 11.4 | 0.99 | 0.91 | 0.98 |
| 2012 | 58 | 99.5 | 100.3 | 98.1 | 97.7 | 11.6 | 11.7 | 10.7 | 11.9 | 0.99 | 0.94 | 0.99 |
| 2013 | 67 | 101.7 | 102.4 | 100.2 | 99.5 | 12.9 | 10.7 | 12.4 | 12.2 | 0.88 | 0.95 | 0.99 |
| 2014 | 64 | 99.1 | 100.8 | 98.0 | 97.1 | 10.9 | 9.4 | 10.0 | 10.1 | 0.91 | 0.83 | 0.98 |
| 2015 | 52 | 100.1 | 100.5 | 99.9 | 97.8 | 11.2 | 9.1 | 9.8 | 10.1 | 0.86 | 0.93 | 0.99 |
| 2016 | 32 | 99.9 | 100.8 | 98.4 | 98.3 | 9.9 | 7.2 | 9.2 | 9.4 | 0.77 | 0.85 | 0.98 |
| 2017 | 38 | 100.6 | 100.4 | 100.6 | 98.3 | 10.4 | 8.9 | 7.0 | 9.6 | 0.90 | 0.73 | 0.98 |
| 2018 | 24 | 100.4 | 100.9 | 99.9 | 98.5 | 9.5 | 8.0 | 5.7 | 9.2 | 0.95 | 0.66 | 0.98 |
| 2019 | 51 | 98.9 | 99.7 | 99.5 | 96.5 | 8.7 | 7.8 | 4.4 | 7.7 | 0.89 | 0.47 | 0.97 |
| 2020 | 15 | 99.0 | 99.8 | 98.5 | 96.6 | 7.9 | 6.3 | 3.4 | 6.9 | 0.93 | 0.21 | 0.96 |

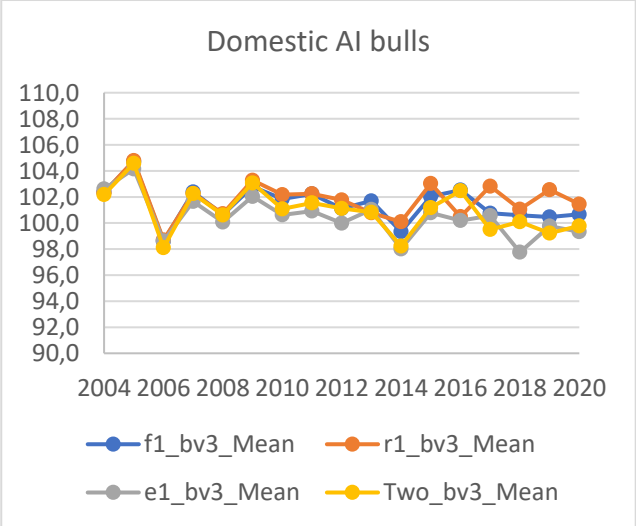


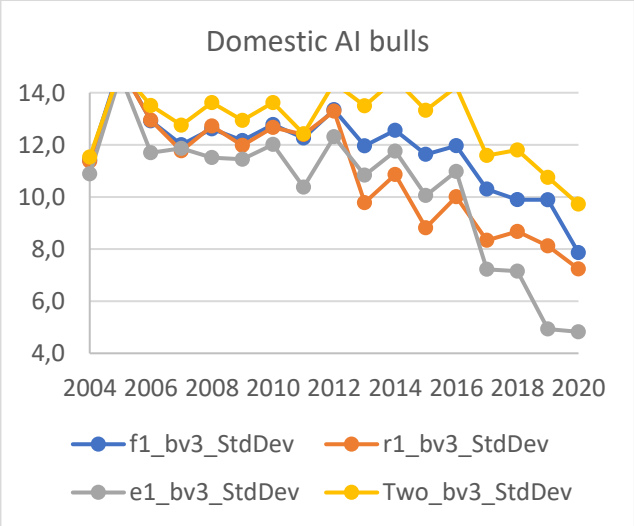



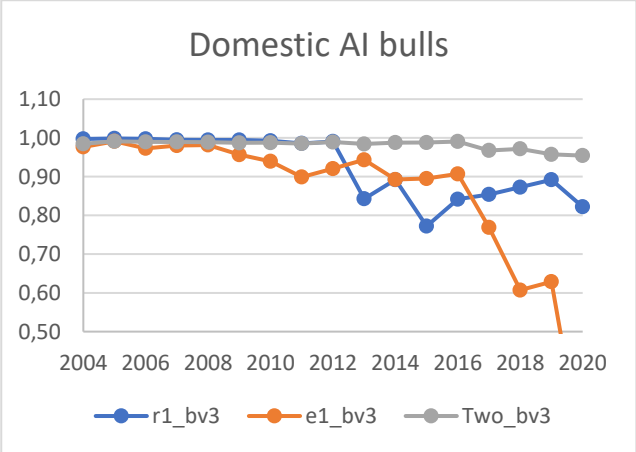



***bv3***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 102.4 | 102.3 | 102.6 | 102.2 | 11.4 | 11.4 | 10.9 | 11.5 | 1.00 | 0.98 | 0.98 |
| 2005 | 45 | 104.7 | 104.8 | 104.1 | 104.6 | 15.0 | 15.0 | 14.7 | 14.9 | 1.00 | 0.99 | 0.99 |
| 2006 | 49 | 98.6 | 98.7 | 98.6 | 98.1 | 12.9 | 12.9 | 11.7 | 13.5 | 1.00 | 0.97 | 0.99 |
| 2007 | 55 | 102.4 | 102.3 | 101.7 | 102.3 | 12.0 | 11.8 | 11.9 | 12.8 | 1.00 | 0.98 | 0.99 |
| 2008 | 47 | 100.6 | 100.7 | 100.1 | 100.6 | 12.6 | 12.7 | 11.5 | 13.6 | 0.99 | 0.98 | 0.99 |
| 2009 | 58 | 102.8 | 103.3 | 102.0 | 103.1 | 12.2 | 12.0 | 11.4 | 12.9 | 0.99 | 0.96 | 0.99 |
| 2010 | 73 | 101.8 | 102.2 | 100.6 | 101.1 | 12.8 | 12.7 | 12.0 | 13.6 | 0.99 | 0.94 | 0.99 |
| 2011 | 75 | 102.2 | 102.2 | 100.9 | 101.5 | 12.3 | 12.4 | 10.4 | 12.4 | 0.99 | 0.90 | 0.99 |
| 2012 | 58 | 101.1 | 101.8 | 100.0 | 101.1 | 13.3 | 13.3 | 12.3 | 14.4 | 0.99 | 0.92 | 0.99 |
| 2013 | 67 | 101.7 | 100.8 | 101.0 | 100.8 | 12.0 | 9.8 | 10.8 | 13.5 | 0.84 | 0.94 | 0.98 |
| 2014 | 64 | 99.3 | 100.1 | 98.0 | 98.2 | 12.6 | 10.9 | 11.8 | 14.5 | 0.89 | 0.89 | 0.99 |
| 2015 | 52 | 102.0 | 103.0 | 100.8 | 101.2 | 11.6 | 8.8 | 10.1 | 13.3 | 0.77 | 0.90 | 0.99 |
| 2016 | 32 | 102.5 | 100.5 | 100.2 | 102.5 | 12.0 | 10.0 | 11.0 | 14.2 | 0.84 | 0.91 | 0.99 |
| 2017 | 38 | 100.7 | 102.8 | 100.6 | 99.5 | 10.3 | 8.3 | 7.2 | 11.6 | 0.85 | 0.77 | 0.97 |
| 2018 | 24 | 100.6 | 101.1 | 97.8 | 100.1 | 9.9 | 8.7 | 7.2 | 11.8 | 0.87 | 0.61 | 0.97 |
| 2019 | 51 | 100.5 | 102.6 | 99.8 | 99.2 | 9.9 | 8.1 | 4.9 | 10.8 | 0.89 | 0.63 | 0.96 |
| 2020 | 15 | 100.7 | 101.5 | 99.3 | 99.8 | 7.9 | 7.2 | 4.8 | 9.7 | 0.82 | 0.17 | 0.95 |

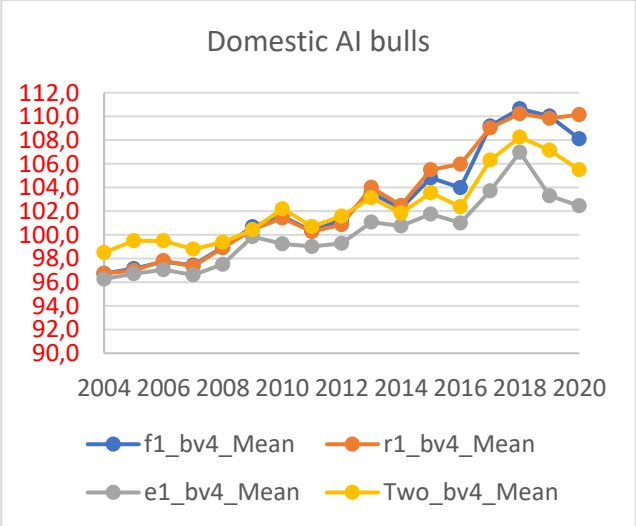


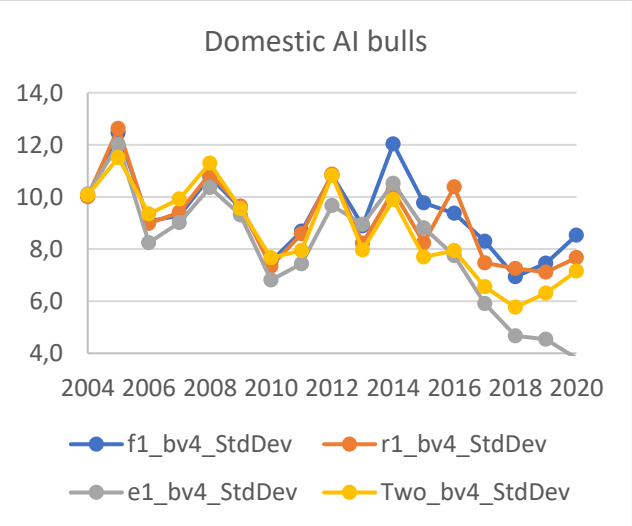



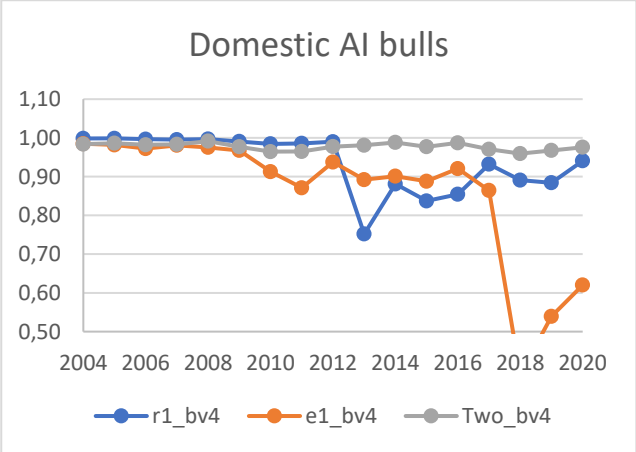



***bv4***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 96.7 | 96.7 | 96.3 | 98.5 | 10.0 | 10.0 | 10.1 | 10.1 | 1.00 | 0.99 | 0.98 |
| 2005 | 45 | 97.1 | 97.0 | 96.7 | 99.5 | 12.5 | 12.6 | 12.0 | 11.5 | 1.00 | 0.98 | 0.99 |
| 2006 | 49 | 97.7 | 97.8 | 97.1 | 99.5 | 9.1 | 9.0 | 8.2 | 9.3 | 1.00 | 0.97 | 0.98 |
| 2007 | 55 | 97.4 | 97.3 | 96.6 | 98.8 | 9.3 | 9.4 | 9.0 | 9.9 | 1.00 | 0.98 | 0.98 |
| 2008 | 47 | 99.0 | 98.9 | 97.5 | 99.4 | 10.8 | 10.9 | 10.4 | 11.3 | 1.00 | 0.98 | 0.99 |
| 2009 | 58 | 100.7 | 100.4 | 99.8 | 100.4 | 9.6 | 9.7 | 9.3 | 9.6 | 0.99 | 0.97 | 0.98 |
| 2010 | 73 | 101.6 | 101.4 | 99.2 | 102.2 | 7.5 | 7.3 | 6.8 | 7.7 | 0.98 | 0.91 | 0.96 |
| 2011 | 75 | 100.3 | 100.3 | 99.0 | 100.7 | 8.7 | 8.6 | 7.4 | 7.9 | 0.99 | 0.87 | 0.96 |
| 2012 | 58 | 101.3 | 100.9 | 99.3 | 101.6 | 10.8 | 10.9 | 9.7 | 10.8 | 0.99 | 0.94 | 0.98 |
| 2013 | 67 | 103.5 | 104.0 | 101.1 | 103.1 | 8.9 | 8.2 | 9.0 | 8.0 | 0.75 | 0.89 | 0.98 |
| 2014 | 64 | 102.2 | 102.5 | 100.7 | 101.8 | 12.0 | 10.2 | 10.5 | 9.9 | 0.88 | 0.90 | 0.99 |
| 2015 | 52 | 104.8 | 105.5 | 101.8 | 103.6 | 9.8 | 8.2 | 8.8 | 7.7 | 0.84 | 0.89 | 0.98 |
| 2016 | 32 | 104.0 | 106.0 | 101.0 | 102.4 | 9.4 | 10.4 | 7.7 | 7.9 | 0.85 | 0.92 | 0.99 |
| 2017 | 38 | 109.2 | 109.0 | 103.7 | 106.3 | 8.3 | 7.5 | 5.9 | 6.6 | 0.93 | 0.86 | 0.97 |
| 2018 | 24 | 110.6 | 110.2 | 107.0 | 108.2 | 6.9 | 7.3 | 4.7 | 5.8 | 0.89 | 0.39 | 0.96 |
| 2019 | 51 | 110.0 | 109.8 | 103.3 | 107.1 | 7.5 | 7.1 | 4.5 | 6.3 | 0.88 | 0.54 | 0.97 |
| 2020 | 15 | 108.1 | 110.1 | 102.5 | 105.5 | 8.5 | 7.7 | 3.8 | 7.2 | 0.94 | 0.62 | 0.98 |

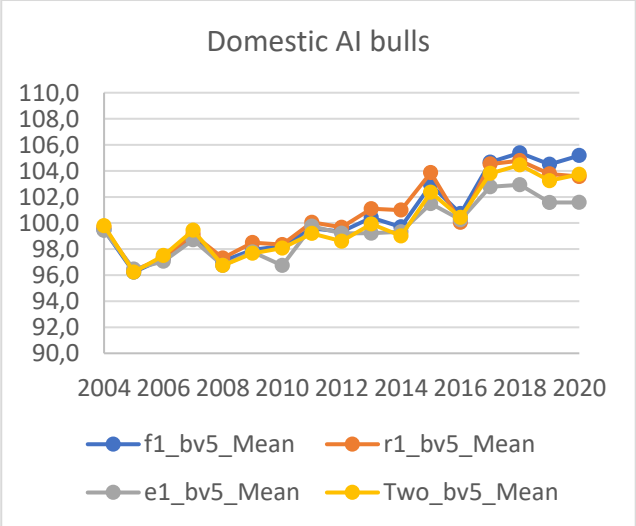


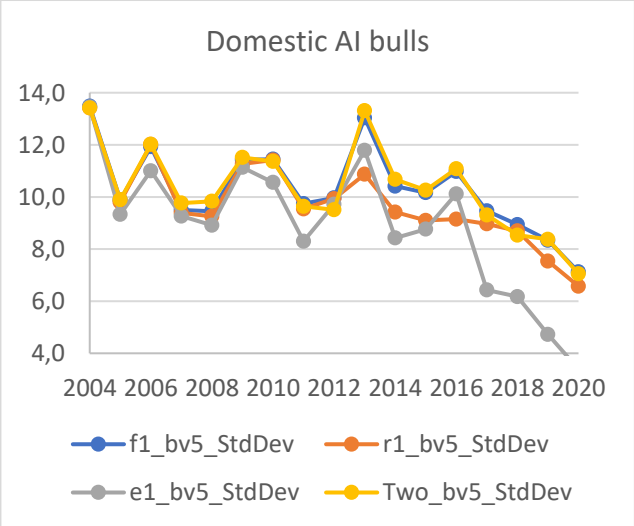



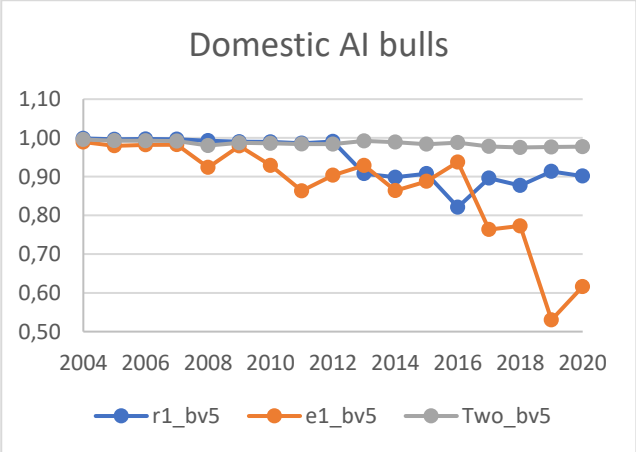



***bv5***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 99.5 | 99.7 | 99.4 | 99.8 | 13.5 | 13.4 | 13.5 | 13.4 | 1.00 | 0.99 | 1.00 |
| 2005 | 45 | 96.2 | 96.3 | 96.5 | 96.2 | 9.9 | 9.8 | 9.3 | 9.9 | 1.00 | 0.98 | 0.99 |
| 2006 | 49 | 97.3 | 97.3 | 97.1 | 97.5 | 11.9 | 12.0 | 11.0 | 12.0 | 1.00 | 0.98 | 0.99 |
| 2007 | 55 | 98.8 | 99.1 | 98.7 | 99.4 | 9.5 | 9.4 | 9.3 | 9.8 | 1.00 | 0.98 | 0.99 |
| 2008 | 47 | 97.1 | 97.3 | 96.7 | 96.7 | 9.5 | 9.3 | 8.9 | 9.8 | 0.99 | 0.92 | 0.98 |
| 2009 | 58 | 97.9 | 98.5 | 97.8 | 97.7 | 11.4 | 11.3 | 11.1 | 11.5 | 0.99 | 0.98 | 0.99 |
| 2010 | 73 | 98.2 | 98.3 | 96.7 | 98.1 | 11.4 | 11.4 | 10.6 | 11.4 | 0.99 | 0.93 | 0.99 |
| 2011 | 75 | 99.6 | 100.1 | 99.7 | 99.2 | 9.7 | 9.5 | 8.3 | 9.6 | 0.99 | 0.86 | 0.98 |
| 2012 | 58 | 99.3 | 99.7 | 99.2 | 98.6 | 10.0 | 9.9 | 9.7 | 9.5 | 0.99 | 0.90 | 0.98 |
| 2013 | 67 | 100.4 | 101.1 | 99.2 | 99.9 | 13.0 | 10.9 | 11.8 | 13.3 | 0.91 | 0.93 | 0.99 |
| 2014 | 64 | 99.7 | 101.0 | 99.3 | 99.0 | 10.4 | 9.4 | 8.4 | 10.7 | 0.90 | 0.86 | 0.99 |
| 2015 | 52 | 102.9 | 103.9 | 101.5 | 102.4 | 10.2 | 9.1 | 8.8 | 10.3 | 0.91 | 0.89 | 0.98 |
| 2016 | 32 | 100.7 | 100.1 | 100.2 | 100.4 | 11.0 | 9.1 | 10.1 | 11.1 | 0.82 | 0.94 | 0.99 |
| 2017 | 38 | 104.7 | 104.5 | 102.8 | 103.8 | 9.5 | 9.0 | 6.4 | 9.3 | 0.90 | 0.76 | 0.98 |
| 2018 | 24 | 105.4 | 104.8 | 102.9 | 104.5 | 8.9 | 8.7 | 6.2 | 8.5 | 0.88 | 0.77 | 0.98 |
| 2019 | 51 | 104.5 | 103.8 | 101.6 | 103.2 | 8.3 | 7.5 | 4.7 | 8.4 | 0.91 | 0.53 | 0.98 |
| 2020 | 15 | 105.2 | 103.6 | 101.6 | 103.7 | 7.1 | 6.6 | 3.4 | 7.1 | 0.90 | 0.62 | 0.98 |

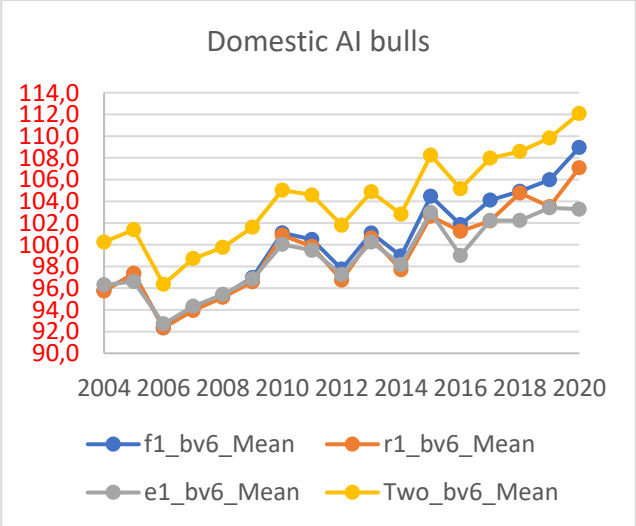


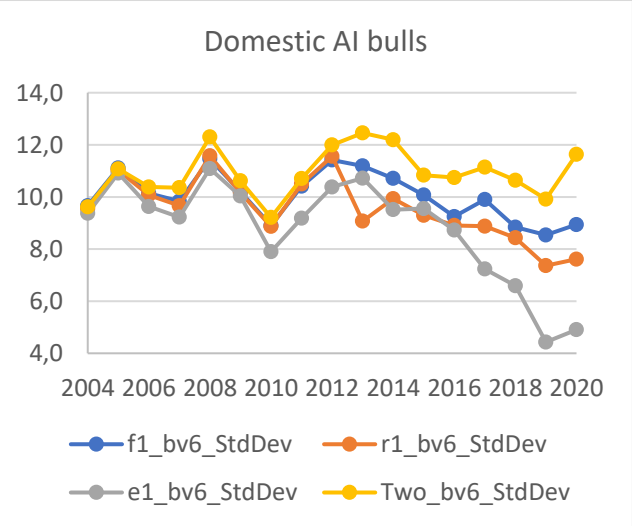



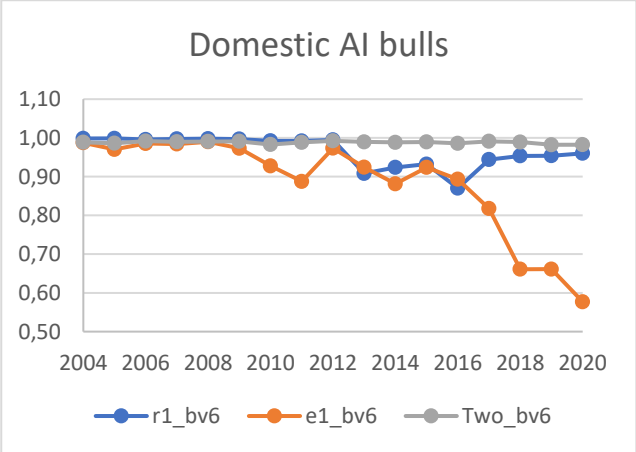



***bv6 maybe problem here***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 95.8 | 95.7 | 96.3 | 100.2 | 9.7 | 9.5 | 9.4 | 9.6 | 1.00 | 0.99 | 0.99 |
| 2005 | 45 | 97.3 | 97.4 | 96.6 | 101.4 | 11.1 | 11.0 | 10.9 | 11.1 | 1.00 | 0.97 | 0.99 |
| 2006 | 49 | 92.3 | 92.3 | 92.7 | 96.3 | 10.1 | 10.1 | 9.6 | 10.4 | 1.00 | 0.99 | 0.99 |
| 2007 | 55 | 94.2 | 93.9 | 94.3 | 98.7 | 9.8 | 9.7 | 9.2 | 10.4 | 1.00 | 0.98 | 0.99 |
| 2008 | 47 | 95.3 | 95.2 | 95.4 | 99.8 | 11.5 | 11.6 | 11.1 | 12.3 | 1.00 | 0.99 | 0.99 |
| 2009 | 58 | 97.0 | 96.6 | 96.9 | 101.6 | 10.2 | 10.2 | 10.0 | 10.6 | 1.00 | 0.97 | 0.99 |
| 2010 | 73 | 101.1 | 100.9 | 100.0 | 105.0 | 8.9 | 8.9 | 7.9 | 9.2 | 0.99 | 0.93 | 0.98 |
| 2011 | 75 | 100.5 | 99.8 | 99.5 | 104.6 | 10.4 | 10.5 | 9.2 | 10.7 | 0.99 | 0.89 | 0.99 |
| 2012 | 58 | 97.8 | 96.7 | 97.3 | 101.8 | 11.4 | 11.6 | 10.4 | 12.0 | 0.99 | 0.97 | 0.99 |
| 2013 | 67 | 101.1 | 100.6 | 100.2 | 104.9 | 11.2 | 9.1 | 10.7 | 12.5 | 0.91 | 0.92 | 0.99 |
| 2014 | 64 | 99.0 | 97.7 | 98.2 | 102.8 | 10.7 | 9.9 | 9.5 | 12.2 | 0.92 | 0.88 | 0.99 |
| 2015 | 52 | 104.5 | 102.6 | 103.0 | 108.2 | 10.1 | 9.3 | 9.6 | 10.8 | 0.93 | 0.92 | 0.99 |
| 2016 | 32 | 101.8 | 101.2 | 99.0 | 105.2 | 9.2 | 8.9 | 8.7 | 10.7 | 0.87 | 0.89 | 0.99 |
| 2017 | 38 | 104.1 | 102.2 | 102.2 | 108.0 | 9.9 | 8.9 | 7.2 | 11.1 | 0.94 | 0.82 | 0.99 |
| 2018 | 24 | 104.9 | 104.8 | 102.2 | 108.6 | 8.8 | 8.4 | 6.6 | 10.6 | 0.95 | 0.66 | 0.99 |
| 2019 | 51 | 106.0 | 103.5 | 103.4 | 109.8 | 8.5 | 7.4 | 4.4 | 9.9 | 0.95 | 0.66 | 0.98 |
| 2020 | 15 | 109.0 | 107.1 | 103.3 | 112.1 | 8.9 | 7.6 | 4.9 | 11.6 | 0.96 | 0.58 | 0.98 |

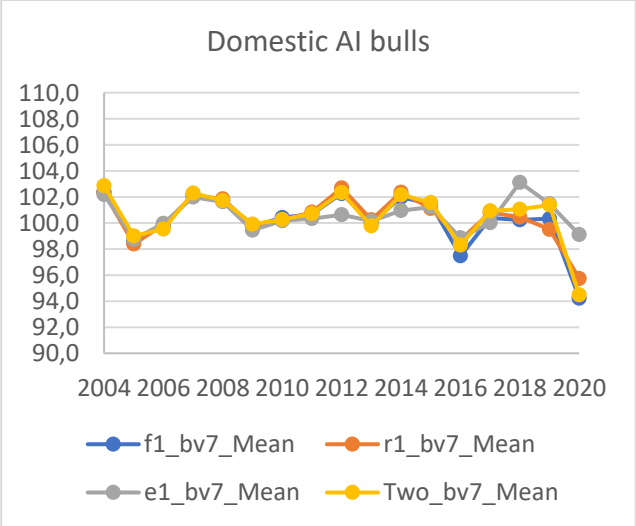


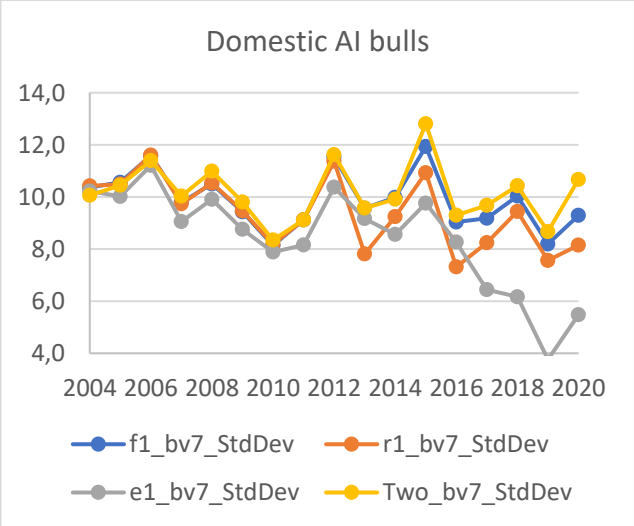



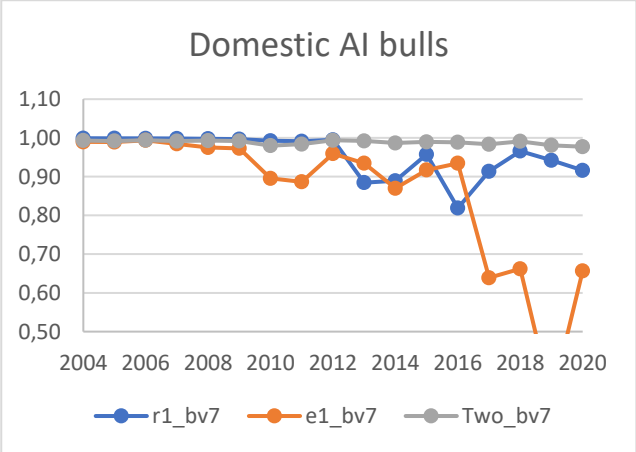



***bv7***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 102.4 | 102.3 | 102.2 | 102.9 | 10.4 | 10.4 | 10.2 | 10.1 | 1.00 | 0.99 | 0.99 |
| 2005 | 45 | 98.5 | 98.4 | 98.7 | 99.0 | 10.6 | 10.5 | 10.0 | 10.4 | 1.00 | 0.99 | 0.99 |
| 2006 | 49 | 99.8 | 99.9 | 100.0 | 99.5 | 11.6 | 11.6 | 11.2 | 11.4 | 1.00 | 0.99 | 0.99 |
| 2007 | 55 | 102.1 | 102.1 | 102.0 | 102.3 | 9.8 | 9.7 | 9.1 | 10.0 | 1.00 | 0.98 | 0.99 |
| 2008 | 47 | 101.8 | 101.9 | 101.6 | 101.7 | 10.5 | 10.5 | 9.9 | 11.0 | 1.00 | 0.98 | 0.99 |
| 2009 | 58 | 99.7 | 99.8 | 99.4 | 99.9 | 9.4 | 9.5 | 8.8 | 9.8 | 1.00 | 0.97 | 0.99 |
| 2010 | 73 | 100.4 | 100.2 | 100.2 | 100.3 | 8.1 | 8.2 | 7.9 | 8.3 | 0.99 | 0.90 | 0.98 |
| 2011 | 75 | 100.7 | 100.8 | 100.3 | 100.7 | 9.1 | 9.1 | 8.2 | 9.1 | 0.99 | 0.89 | 0.98 |
| 2012 | 58 | 102.3 | 102.7 | 100.6 | 102.3 | 11.5 | 11.4 | 10.4 | 11.6 | 1.00 | 0.96 | 0.99 |
| 2013 | 67 | 100.0 | 100.2 | 100.1 | 99.8 | 9.6 | 7.8 | 9.2 | 9.6 | 0.88 | 0.93 | 0.99 |
| 2014 | 64 | 102.0 | 102.4 | 101.0 | 102.2 | 10.0 | 9.2 | 8.6 | 9.9 | 0.89 | 0.87 | 0.99 |
| 2015 | 52 | 101.5 | 101.1 | 101.2 | 101.6 | 11.9 | 10.9 | 9.8 | 12.8 | 0.96 | 0.92 | 0.99 |
| 2016 | 32 | 97.5 | 98.7 | 98.9 | 98.3 | 9.0 | 7.3 | 8.3 | 9.3 | 0.82 | 0.93 | 0.99 |
| 2017 | 38 | 100.4 | 100.8 | 100.0 | 100.9 | 9.2 | 8.2 | 6.4 | 9.7 | 0.91 | 0.64 | 0.98 |
| 2018 | 24 | 100.2 | 100.5 | 103.1 | 101.1 | 10.0 | 9.4 | 6.2 | 10.4 | 0.97 | 0.66 | 0.99 |
| 2019 | 51 | 100.3 | 99.5 | 101.5 | 101.4 | 8.2 | 7.6 | 3.8 | 8.7 | 0.94 | 0.32 | 0.98 |
| 2020 | 15 | 94.2 | 95.7 | 99.1 | 94.5 | 9.3 | 8.2 | 5.5 | 10.7 | 0.92 | 0.66 | 0.98 |

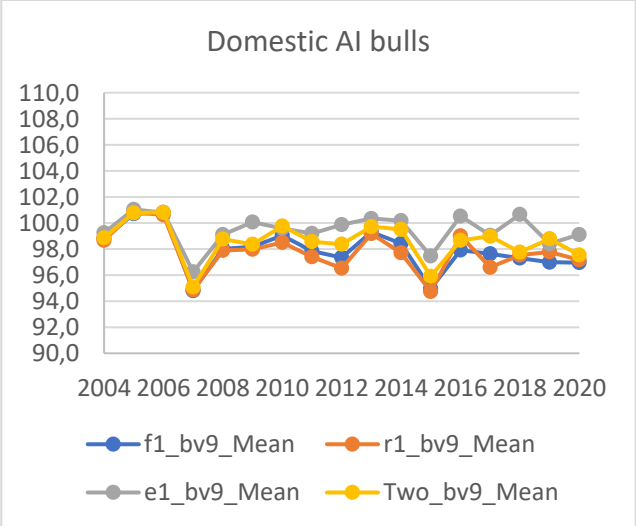


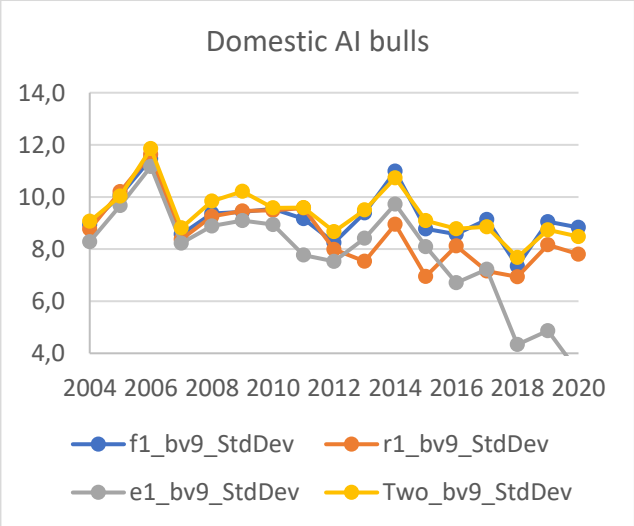



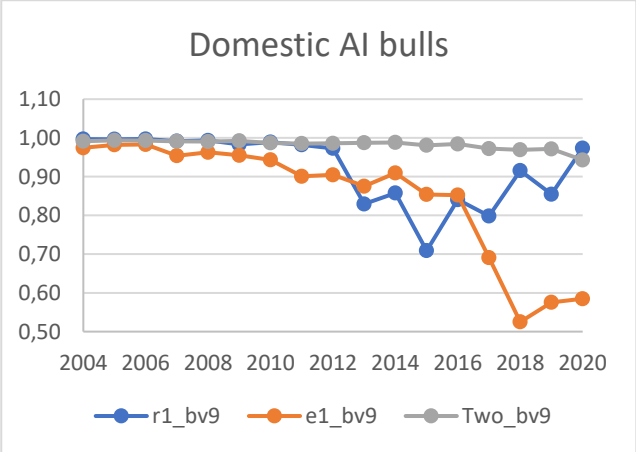



***bv9***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 98.8 | 98.7 | 99.2 | 98.9 | 8.9 | 8.8 | 8.3 | 9.1 | 1.00 | 0.97 | 0.99 |
| 2005 | 45 | 100.7 | 100.8 | 101.0 | 100.8 | 10.1 | 10.2 | 9.7 | 10.0 | 1.00 | 0.98 | 0.99 |
| 2006 | 49 | 100.8 | 100.6 | 100.8 | 100.8 | 11.5 | 11.6 | 11.2 | 11.9 | 1.00 | 0.98 | 0.99 |
| 2007 | 55 | 94.8 | 94.9 | 96.2 | 95.1 | 8.6 | 8.4 | 8.2 | 8.8 | 0.99 | 0.95 | 0.99 |
| 2008 | 47 | 98.0 | 97.9 | 99.1 | 98.8 | 9.4 | 9.3 | 8.9 | 9.8 | 0.99 | 0.96 | 0.99 |
| 2009 | 58 | 98.2 | 98.0 | 100.1 | 98.4 | 9.4 | 9.5 | 9.1 | 10.2 | 0.98 | 0.96 | 0.99 |
| 2010 | 73 | 99.1 | 98.5 | 99.6 | 99.8 | 9.5 | 9.5 | 8.9 | 9.6 | 0.99 | 0.94 | 0.99 |
| 2011 | 75 | 97.8 | 97.4 | 99.2 | 98.6 | 9.2 | 9.6 | 7.8 | 9.6 | 0.98 | 0.90 | 0.99 |
| 2012 | 58 | 97.4 | 96.5 | 99.9 | 98.4 | 8.2 | 8.0 | 7.5 | 8.7 | 0.97 | 0.90 | 0.99 |
| 2013 | 67 | 99.3 | 99.2 | 100.3 | 99.7 | 9.4 | 7.5 | 8.4 | 9.5 | 0.83 | 0.88 | 0.99 |
| 2014 | 64 | 98.4 | 97.7 | 100.2 | 99.5 | 11.0 | 8.9 | 9.7 | 10.7 | 0.86 | 0.91 | 0.99 |
| 2015 | 52 | 95.0 | 94.7 | 97.5 | 95.9 | 8.8 | 6.9 | 8.1 | 9.1 | 0.71 | 0.85 | 0.98 |
| 2016 | 32 | 97.9 | 99.0 | 100.5 | 98.7 | 8.6 | 8.1 | 6.7 | 8.8 | 0.84 | 0.85 | 0.98 |
| 2017 | 38 | 97.6 | 96.6 | 99.1 | 99.0 | 9.1 | 7.2 | 7.2 | 8.9 | 0.80 | 0.69 | 0.97 |
| 2018 | 24 | 97.3 | 97.5 | 100.7 | 97.8 | 7.3 | 6.9 | 4.3 | 7.7 | 0.92 | 0.53 | 0.97 |
| 2019 | 51 | 97.0 | 97.8 | 98.4 | 98.8 | 9.1 | 8.2 | 4.9 | 8.7 | 0.85 | 0.58 | 0.97 |
| 2020 | 15 | 97.0 | 97.2 | 99.1 | 97.5 | 8.8 | 7.8 | 3.3 | 8.5 | 0.97 | 0.58 | 0.94 |

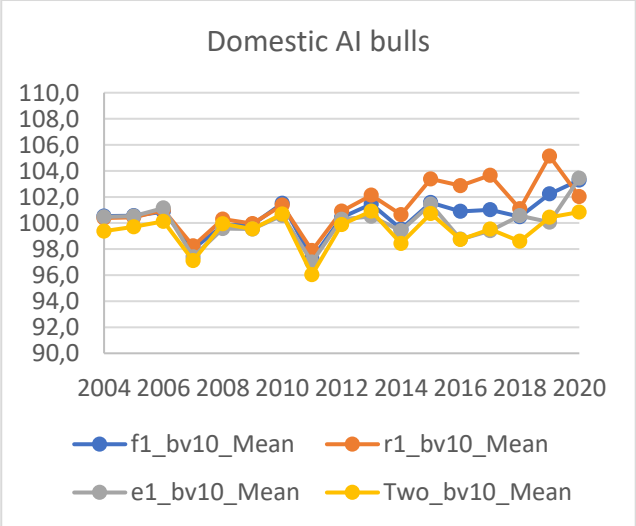


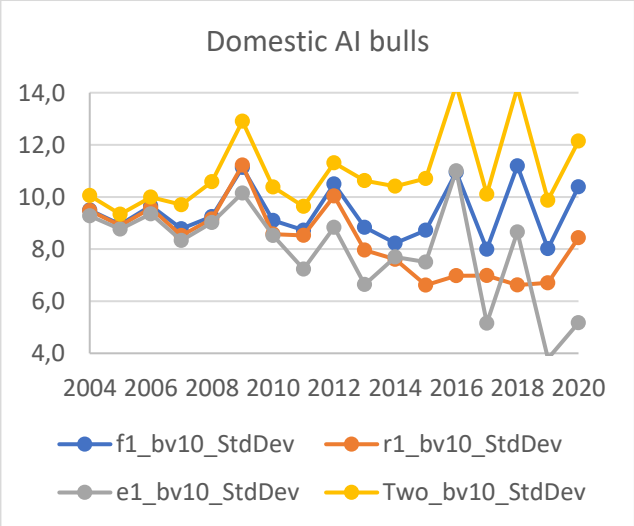



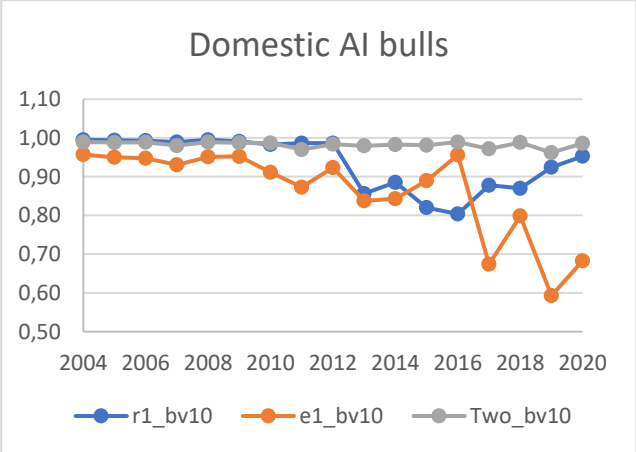



***bv10***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 100.5 | 100.4 | 100.5 | 99.4 | 9.5 | 9.5 | 9.3 | 10.1 | 1.00 | 0.96 | 0.99 |
| 2005 | 45 | 100.6 | 100.4 | 100.5 | 99.7 | 8.9 | 8.9 | 8.8 | 9.3 | 0.99 | 0.95 | 0.99 |
| 2006 | 49 | 100.9 | 101.0 | 101.2 | 100.1 | 9.7 | 9.6 | 9.3 | 10.0 | 0.99 | 0.95 | 0.99 |
| 2007 | 55 | 98.0 | 98.2 | 97.4 | 97.1 | 8.8 | 8.5 | 8.3 | 9.7 | 0.99 | 0.93 | 0.98 |
| 2008 | 47 | 99.8 | 100.3 | 99.6 | 99.9 | 9.2 | 9.2 | 9.0 | 10.6 | 1.00 | 0.95 | 0.99 |
| 2009 | 58 | 99.9 | 100.0 | 99.5 | 99.5 | 11.1 | 11.2 | 10.1 | 12.9 | 0.99 | 0.95 | 0.99 |
| 2010 | 73 | 101.5 | 101.4 | 100.6 | 100.7 | 9.1 | 8.6 | 8.5 | 10.4 | 0.98 | 0.91 | 0.99 |
| 2011 | 75 | 97.3 | 97.9 | 97.0 | 96.0 | 8.7 | 8.5 | 7.2 | 9.6 | 0.99 | 0.87 | 0.97 |
| 2012 | 58 | 100.4 | 100.9 | 100.3 | 99.9 | 10.5 | 10.0 | 8.8 | 11.3 | 0.99 | 0.92 | 0.98 |
| 2013 | 67 | 101.5 | 102.1 | 100.5 | 100.9 | 8.8 | 8.0 | 6.6 | 10.6 | 0.86 | 0.84 | 0.98 |
| 2014 | 64 | 99.5 | 100.6 | 99.4 | 98.4 | 8.2 | 7.6 | 7.7 | 10.4 | 0.89 | 0.84 | 0.98 |
| 2015 | 52 | 101.6 | 103.4 | 101.4 | 100.7 | 8.7 | 6.6 | 7.5 | 10.7 | 0.82 | 0.89 | 0.98 |
| 2016 | 32 | 100.9 | 102.9 | 98.8 | 98.7 | 10.9 | 7.0 | 11.0 | 14.3 | 0.80 | 0.96 | 0.99 |
| 2017 | 38 | 101.0 | 103.7 | 99.4 | 99.5 | 8.0 | 7.0 | 5.2 | 10.1 | 0.88 | 0.67 | 0.97 |
| 2018 | 24 | 100.5 | 101.1 | 100.6 | 98.6 | 11.2 | 6.6 | 8.7 | 14.2 | 0.87 | 0.80 | 0.99 |
| 2019 | 51 | 102.2 | 105.1 | 100.1 | 100.4 | 8.0 | 6.7 | 3.8 | 9.9 | 0.92 | 0.59 | 0.96 |
| 2020 | 15 | 103.3 | 102.0 | 103.4 | 100.8 | 10.4 | 8.4 | 5.2 | 12.1 | 0.95 | 0.68 | 0.99 |

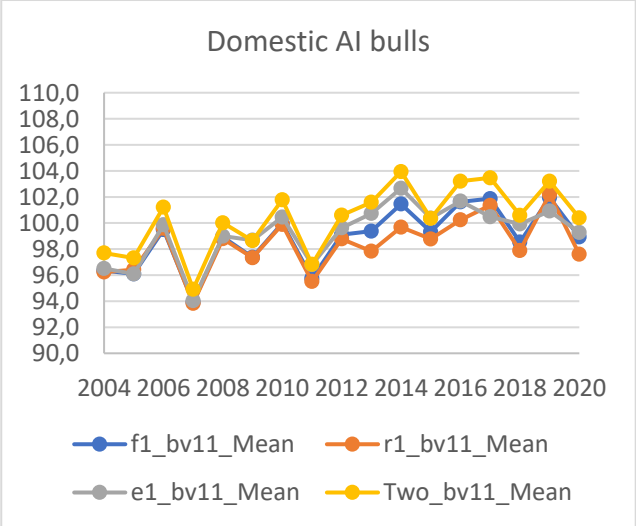


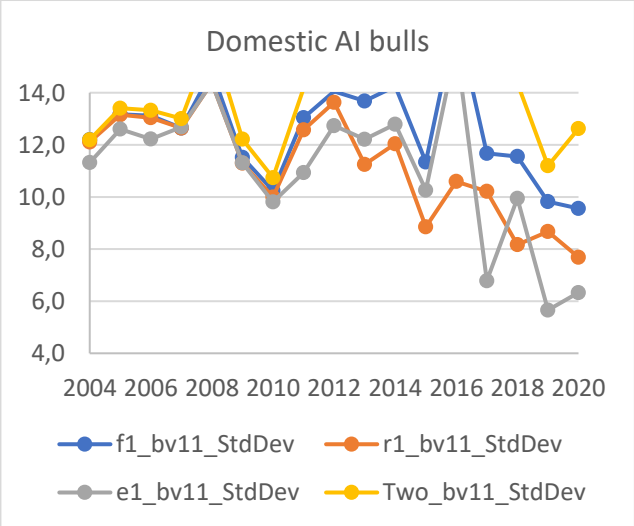



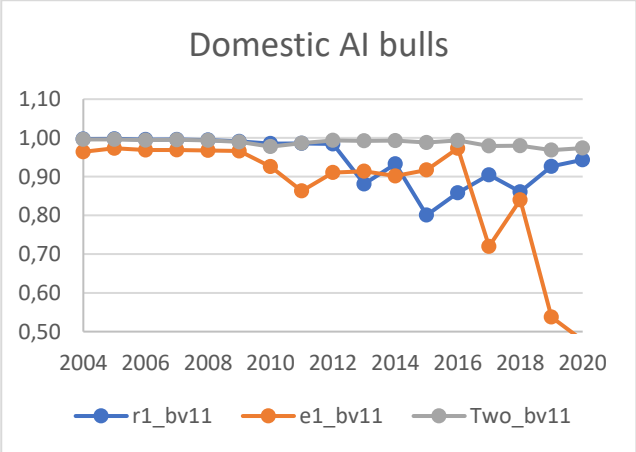



***bv11***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 96.3 | 96.2 | 96.5 | 97.7 | 12.2 | 12.1 | 11.3 | 12.2 | 1.00 | 0.96 | 1.00 |
| 2005 | 45 | 96.1 | 96.4 | 96.1 | 97.3 | 13.2 | 13.2 | 12.6 | 13.4 | 1.00 | 0.97 | 1.00 |
| 2006 | 49 | 99.5 | 99.6 | 99.9 | 101.2 | 13.1 | 13.0 | 12.2 | 13.3 | 1.00 | 0.97 | 0.99 |
| 2007 | 55 | 93.9 | 93.8 | 94.0 | 94.9 | 12.6 | 12.6 | 12.7 | 13.0 | 1.00 | 0.97 | 1.00 |
| 2008 | 47 | 98.9 | 98.8 | 99.0 | 100.0 | 14.8 | 14.4 | 14.4 | 16.1 | 0.99 | 0.97 | 0.99 |
| 2009 | 58 | 97.4 | 97.3 | 98.7 | 98.6 | 11.5 | 11.3 | 11.3 | 12.2 | 0.99 | 0.97 | 0.99 |
| 2010 | 73 | 100.0 | 99.9 | 100.5 | 101.8 | 10.2 | 10.0 | 9.8 | 10.7 | 0.99 | 0.93 | 0.98 |
| 2011 | 75 | 95.7 | 95.5 | 96.8 | 96.8 | 13.0 | 12.6 | 10.9 | 14.2 | 0.99 | 0.86 | 0.99 |
| 2012 | 58 | 99.1 | 98.8 | 99.6 | 100.6 | 14.1 | 13.6 | 12.7 | 15.0 | 0.98 | 0.91 | 0.99 |
| 2013 | 67 | 99.4 | 97.8 | 100.7 | 101.6 | 13.7 | 11.2 | 12.2 | 16.9 | 0.88 | 0.91 | 0.99 |
| 2014 | 64 | 101.5 | 99.7 | 102.7 | 103.9 | 14.2 | 12.0 | 12.8 | 18.1 | 0.93 | 0.90 | 0.99 |
| 2015 | 52 | 99.3 | 98.8 | 100.4 | 100.3 | 11.3 | 8.9 | 10.3 | 14.8 | 0.80 | 0.92 | 0.99 |
| 2016 | 32 | 101.6 | 100.2 | 101.7 | 103.2 | 16.9 | 10.6 | 15.8 | 21.5 | 0.86 | 0.97 | 0.99 |
| 2017 | 38 | 101.9 | 101.4 | 100.5 | 103.5 | 11.7 | 10.2 | 6.8 | 14.6 | 0.90 | 0.72 | 0.98 |
| 2018 | 24 | 98.5 | 97.9 | 99.9 | 100.6 | 11.6 | 8.2 | 9.9 | 14.4 | 0.86 | 0.84 | 0.98 |
| 2019 | 51 | 101.9 | 102.2 | 100.9 | 103.2 | 9.8 | 8.7 | 5.7 | 11.2 | 0.93 | 0.54 | 0.97 |
| 2020 | 15 | 98.9 | 97.6 | 99.3 | 100.4 | 9.6 | 7.7 | 6.3 | 12.6 | 0.94 | 0.48 | 0.97 |

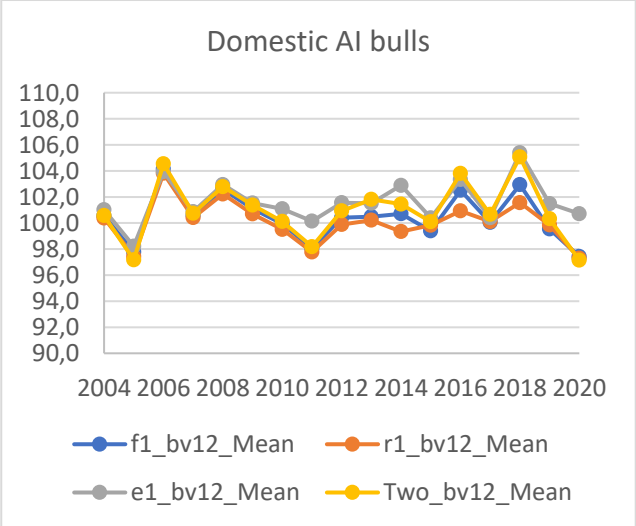


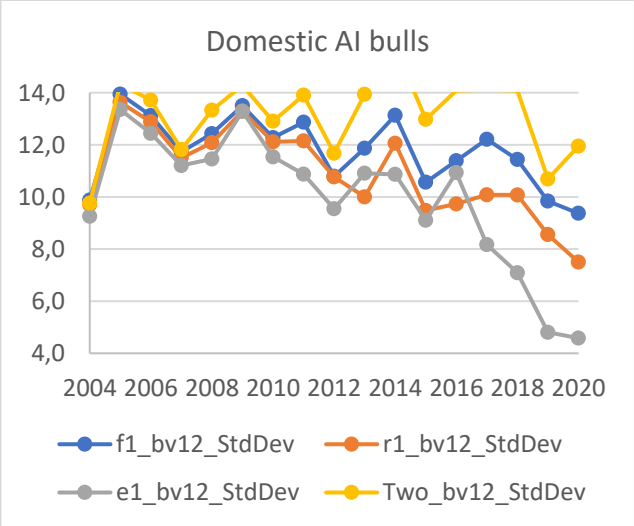



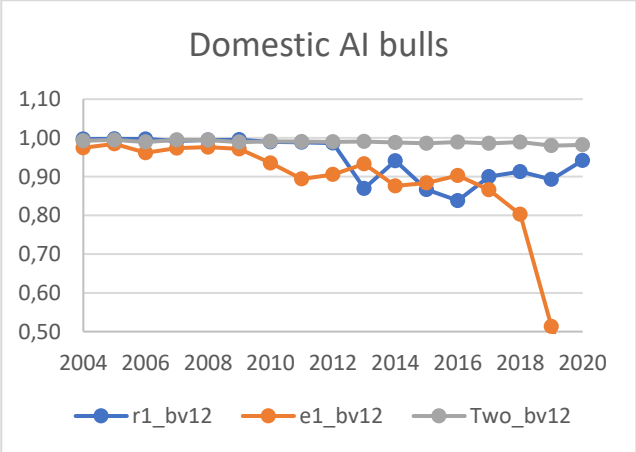



***bv12***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 100.6 | 100.4 | 101.0 | 100.6 | 9.9 | 9.7 | 9.3 | 9.8 | 1.00 | 0.97 | 0.99 |
| 2005 | 45 | 97.8 | 97.4 | 98.2 | 97.2 | 13.9 | 13.6 | 13.4 | 14.3 | 1.00 | 0.98 | 0.99 |
| 2006 | 49 | 104.1 | 103.8 | 103.9 | 104.5 | 13.1 | 12.9 | 12.4 | 13.7 | 1.00 | 0.96 | 0.99 |
| 2007 | 55 | 100.6 | 100.4 | 100.9 | 100.7 | 11.7 | 11.5 | 11.2 | 11.8 | 0.99 | 0.97 | 0.99 |
| 2008 | 47 | 102.6 | 102.2 | 103.0 | 102.8 | 12.4 | 12.1 | 11.5 | 13.3 | 0.99 | 0.98 | 0.99 |
| 2009 | 58 | 101.1 | 100.7 | 101.5 | 101.4 | 13.5 | 13.3 | 13.3 | 14.3 | 1.00 | 0.97 | 0.99 |
| 2010 | 73 | 99.9 | 99.5 | 101.1 | 100.1 | 12.3 | 12.1 | 11.5 | 12.9 | 0.99 | 0.94 | 0.99 |
| 2011 | 75 | 98.1 | 97.8 | 100.1 | 98.2 | 12.9 | 12.1 | 10.9 | 13.9 | 0.99 | 0.89 | 0.99 |
| 2012 | 58 | 100.4 | 99.9 | 101.6 | 100.9 | 10.8 | 10.8 | 9.5 | 11.7 | 0.99 | 0.91 | 0.99 |
| 2013 | 67 | 100.5 | 100.2 | 101.5 | 101.8 | 11.9 | 10.0 | 10.9 | 13.9 | 0.87 | 0.93 | 0.99 |
| 2014 | 64 | 100.7 | 99.3 | 102.9 | 101.5 | 13.1 | 12.1 | 10.9 | 15.8 | 0.94 | 0.88 | 0.99 |
| 2015 | 52 | 99.4 | 99.8 | 100.4 | 100.1 | 10.6 | 9.5 | 9.1 | 13.0 | 0.87 | 0.88 | 0.99 |
| 2016 | 32 | 102.5 | 100.9 | 103.3 | 103.8 | 11.4 | 9.7 | 10.9 | 14.1 | 0.84 | 0.90 | 0.99 |
| 2017 | 38 | 100.0 | 100.1 | 100.4 | 100.7 | 12.2 | 10.1 | 8.2 | 14.1 | 0.90 | 0.87 | 0.99 |
| 2018 | 24 | 102.9 | 101.6 | 105.4 | 105.1 | 11.4 | 10.1 | 7.1 | 14.1 | 0.91 | 0.80 | 0.99 |
| 2019 | 51 | 99.5 | 99.8 | 101.5 | 100.3 | 9.8 | 8.6 | 4.8 | 10.7 | 0.89 | 0.51 | 0.98 |
| 2020 | 15 | 97.4 | 97.3 | 100.7 | 97.1 | 9.4 | 7.5 | 4.6 | 11.9 | 0.94 | 0.31 | 0.98 |

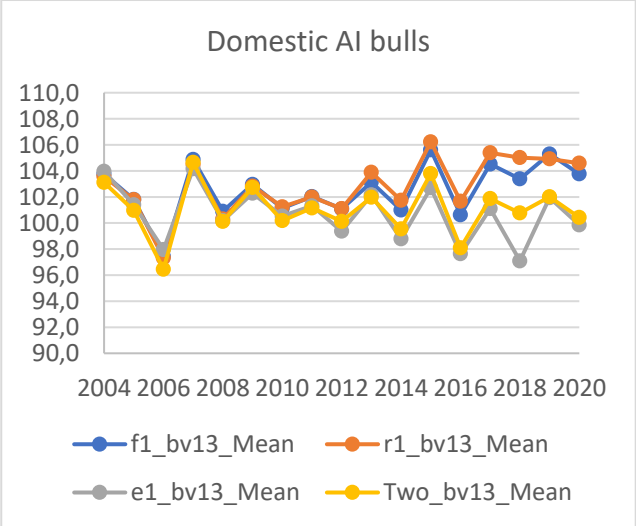


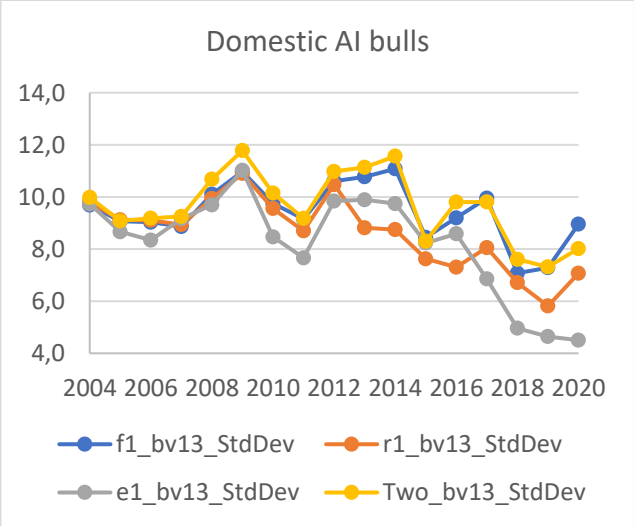



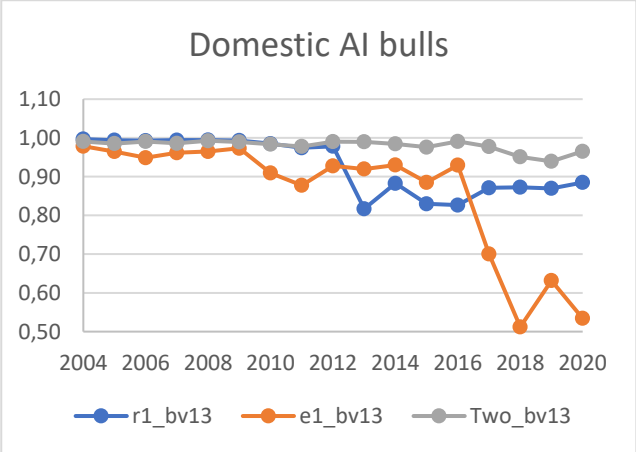



***bv13***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 103.8 | 103.6 | 104.0 | 103.1 | 9.7 | 9.8 | 9.7 | 10.0 | 1.00 | 0.98 | 0.99 |
| 2005 | 45 | 101.8 | 101.8 | 101.4 | 101.0 | 9.1 | 9.1 | 8.7 | 9.1 | 0.99 | 0.96 | 0.99 |
| 2006 | 49 | 97.4 | 97.3 | 98.0 | 96.5 | 9.0 | 9.1 | 8.3 | 9.2 | 0.99 | 0.95 | 0.99 |
| 2007 | 55 | 104.9 | 104.5 | 104.2 | 104.7 | 8.9 | 8.9 | 9.2 | 9.3 | 0.99 | 0.96 | 0.99 |
| 2008 | 47 | 100.9 | 100.3 | 100.2 | 100.1 | 10.1 | 9.9 | 9.7 | 10.7 | 0.99 | 0.96 | 0.99 |
| 2009 | 58 | 103.0 | 102.8 | 102.3 | 102.7 | 11.0 | 10.9 | 11.0 | 11.8 | 0.99 | 0.97 | 0.99 |
| 2010 | 73 | 101.1 | 101.2 | 100.5 | 100.2 | 9.8 | 9.6 | 8.5 | 10.1 | 0.99 | 0.91 | 0.98 |
| 2011 | 75 | 102.0 | 102.0 | 101.3 | 101.2 | 9.2 | 8.7 | 7.7 | 9.2 | 0.97 | 0.88 | 0.98 |
| 2012 | 58 | 101.1 | 101.1 | 99.4 | 100.1 | 10.6 | 10.5 | 9.8 | 11.0 | 0.98 | 0.93 | 0.99 |
| 2013 | 67 | 103.1 | 103.9 | 102.2 | 102.0 | 10.8 | 8.8 | 9.9 | 11.1 | 0.82 | 0.92 | 0.99 |
| 2014 | 64 | 101.0 | 101.7 | 98.8 | 99.5 | 11.1 | 8.7 | 9.7 | 11.6 | 0.88 | 0.93 | 0.98 |
| 2015 | 52 | 105.6 | 106.2 | 102.7 | 103.8 | 8.4 | 7.6 | 8.2 | 8.3 | 0.83 | 0.89 | 0.98 |
| 2016 | 32 | 100.6 | 101.7 | 97.6 | 98.1 | 9.2 | 7.3 | 8.6 | 9.8 | 0.83 | 0.93 | 0.99 |
| 2017 | 38 | 104.5 | 105.4 | 101.1 | 101.9 | 10.0 | 8.1 | 6.9 | 9.8 | 0.87 | 0.70 | 0.98 |
| 2018 | 24 | 103.4 | 105.0 | 97.1 | 100.8 | 7.1 | 6.7 | 5.0 | 7.6 | 0.87 | 0.51 | 0.95 |
| 2019 | 51 | 105.3 | 104.9 | 101.9 | 102.0 | 7.3 | 5.8 | 4.6 | 7.3 | 0.87 | 0.63 | 0.94 |
| 2020 | 15 | 103.8 | 104.6 | 99.9 | 100.4 | 9.0 | 7.1 | 4.5 | 8.0 | 0.89 | 0.53 | 0.97 |

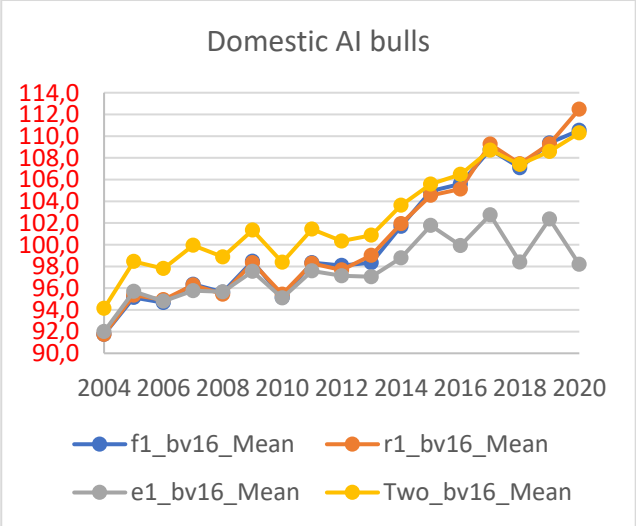


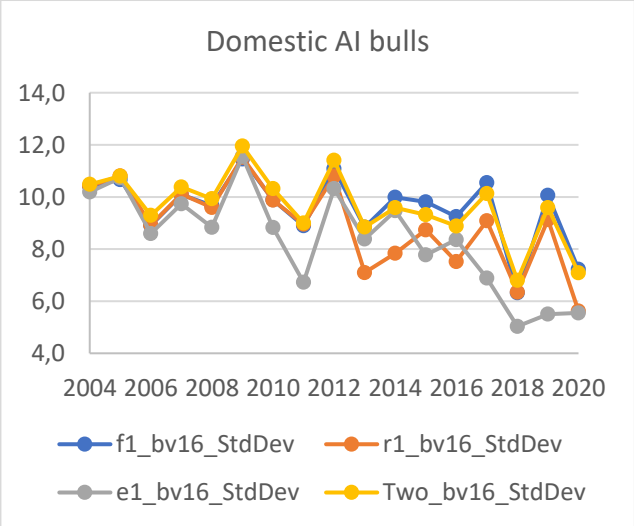



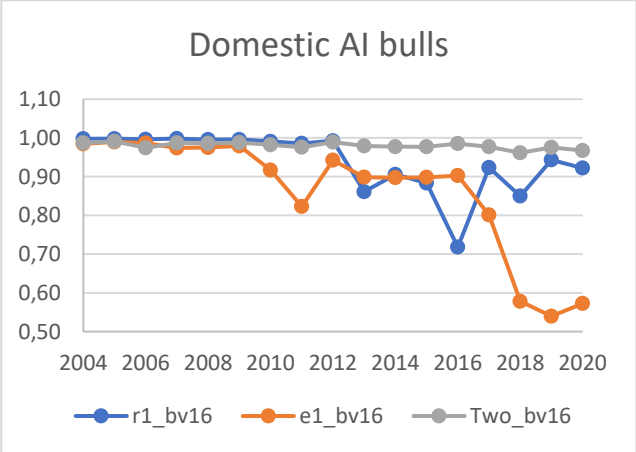



***bv16***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 91.7 | 91.7 | 92.0 | 94.1 | 10.4 | 10.4 | 10.2 | 10.5 | 1.00 | 0.98 | 0.99 |
| 2005 | 45 | 95.1 | 95.4 | 95.7 | 98.5 | 10.7 | 10.8 | 10.7 | 10.8 | 1.00 | 0.99 | 0.99 |
| 2006 | 49 | 94.7 | 94.9 | 94.8 | 97.8 | 8.9 | 8.9 | 8.6 | 9.3 | 1.00 | 0.99 | 0.97 |
| 2007 | 55 | 96.4 | 96.3 | 95.8 | 99.9 | 10.1 | 10.1 | 9.7 | 10.4 | 1.00 | 0.97 | 0.99 |
| 2008 | 47 | 95.6 | 95.4 | 95.7 | 98.9 | 9.7 | 9.6 | 8.8 | 9.9 | 1.00 | 0.98 | 0.99 |
| 2009 | 58 | 98.5 | 98.3 | 97.5 | 101.3 | 11.5 | 11.5 | 11.6 | 12.0 | 1.00 | 0.98 | 0.99 |
| 2010 | 73 | 95.1 | 95.4 | 95.1 | 98.4 | 9.9 | 9.9 | 8.8 | 10.3 | 0.99 | 0.92 | 0.98 |
| 2011 | 75 | 98.3 | 98.3 | 97.6 | 101.4 | 8.9 | 9.0 | 6.7 | 9.0 | 0.99 | 0.82 | 0.98 |
| 2012 | 58 | 98.1 | 97.7 | 97.1 | 100.3 | 11.1 | 10.8 | 10.3 | 11.4 | 0.99 | 0.94 | 0.99 |
| 2013 | 67 | 98.3 | 99.0 | 97.1 | 100.9 | 8.8 | 7.1 | 8.4 | 8.8 | 0.86 | 0.90 | 0.98 |
| 2014 | 64 | 101.7 | 101.9 | 98.8 | 103.6 | 10.0 | 7.8 | 9.5 | 9.6 | 0.91 | 0.90 | 0.98 |
| 2015 | 52 | 104.9 | 104.5 | 101.8 | 105.6 | 9.8 | 8.7 | 7.8 | 9.3 | 0.88 | 0.90 | 0.98 |
| 2016 | 32 | 105.6 | 105.1 | 99.9 | 106.5 | 9.2 | 7.5 | 8.4 | 8.9 | 0.72 | 0.90 | 0.99 |
| 2017 | 38 | 108.8 | 109.3 | 102.8 | 108.7 | 10.5 | 9.1 | 6.9 | 10.1 | 0.92 | 0.80 | 0.98 |
| 2018 | 24 | 107.1 | 107.5 | 98.4 | 107.4 | 6.3 | 6.3 | 5.0 | 6.8 | 0.85 | 0.58 | 0.96 |
| 2019 | 51 | 109.4 | 109.3 | 102.4 | 108.6 | 10.1 | 9.1 | 5.5 | 9.6 | 0.94 | 0.54 | 0.98 |
| 2020 | 15 | 110.5 | 112.5 | 98.2 | 110.3 | 7.2 | 5.6 | 5.5 | 7.1 | 0.92 | 0.57 | 0.97 |

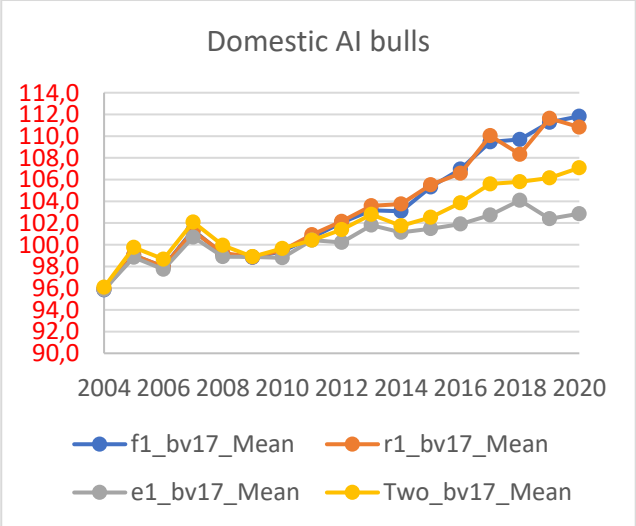


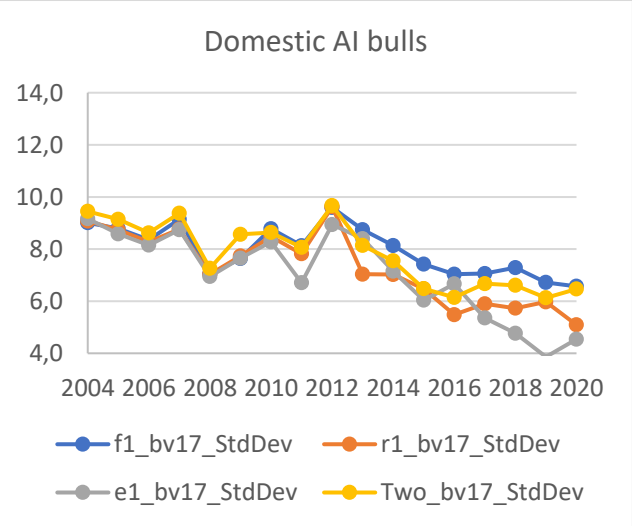



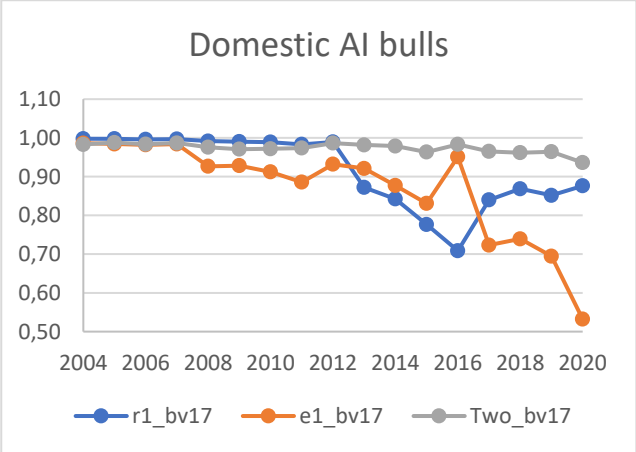



***bv17 maybe problem here***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 95.8 | 95.9 | 95.9 | 96.1 | 9.0 | 9.1 | 9.2 | 9.4 | 1.00 | 0.99 | 0.98 |
| 2005 | 45 | 99.0 | 99.0 | 98.8 | 99.8 | 8.8 | 8.7 | 8.6 | 9.1 | 1.00 | 0.98 | 0.99 |
| 2006 | 49 | 98.0 | 98.0 | 97.7 | 98.7 | 8.4 | 8.3 | 8.1 | 8.6 | 1.00 | 0.98 | 0.98 |
| 2007 | 55 | 101.3 | 101.3 | 100.7 | 102.1 | 9.1 | 8.8 | 8.7 | 9.4 | 1.00 | 0.98 | 0.99 |
| 2008 | 47 | 99.2 | 99.2 | 98.9 | 99.9 | 7.0 | 7.0 | 6.9 | 7.3 | 0.99 | 0.93 | 0.98 |
| 2009 | 58 | 98.8 | 98.9 | 98.9 | 98.9 | 7.6 | 7.7 | 7.6 | 8.6 | 0.99 | 0.93 | 0.97 |
| 2010 | 73 | 99.4 | 99.5 | 98.8 | 99.7 | 8.8 | 8.5 | 8.3 | 8.6 | 0.99 | 0.91 | 0.97 |
| 2011 | 75 | 100.7 | 100.9 | 100.4 | 100.4 | 8.1 | 7.8 | 6.7 | 8.1 | 0.98 | 0.89 | 0.97 |
| 2012 | 58 | 102.0 | 102.1 | 100.2 | 101.4 | 9.6 | 9.6 | 8.9 | 9.7 | 0.99 | 0.93 | 0.99 |
| 2013 | 67 | 103.2 | 103.6 | 101.8 | 102.8 | 8.7 | 7.0 | 8.4 | 8.1 | 0.87 | 0.92 | 0.98 |
| 2014 | 64 | 103.1 | 103.8 | 101.1 | 101.7 | 8.1 | 7.0 | 7.1 | 7.5 | 0.84 | 0.88 | 0.98 |
| 2015 | 52 | 105.3 | 105.5 | 101.5 | 102.5 | 7.4 | 6.5 | 6.0 | 6.5 | 0.78 | 0.83 | 0.96 |
| 2016 | 32 | 107.0 | 106.6 | 101.9 | 103.9 | 7.0 | 5.5 | 6.7 | 6.1 | 0.71 | 0.95 | 0.98 |
| 2017 | 38 | 109.5 | 110.0 | 102.7 | 105.6 | 7.1 | 5.9 | 5.4 | 6.7 | 0.84 | 0.72 | 0.97 |
| 2018 | 24 | 109.7 | 108.3 | 104.1 | 105.8 | 7.3 | 5.7 | 4.8 | 6.6 | 0.87 | 0.74 | 0.96 |
| 2019 | 51 | 111.3 | 111.6 | 102.4 | 106.2 | 6.7 | 6.0 | 3.9 | 6.1 | 0.85 | 0.69 | 0.96 |
| 2020 | 15 | 111.8 | 110.8 | 102.9 | 107.1 | 6.6 | 5.1 | 4.5 | 6.5 | 0.88 | 0.53 | 0.94 |

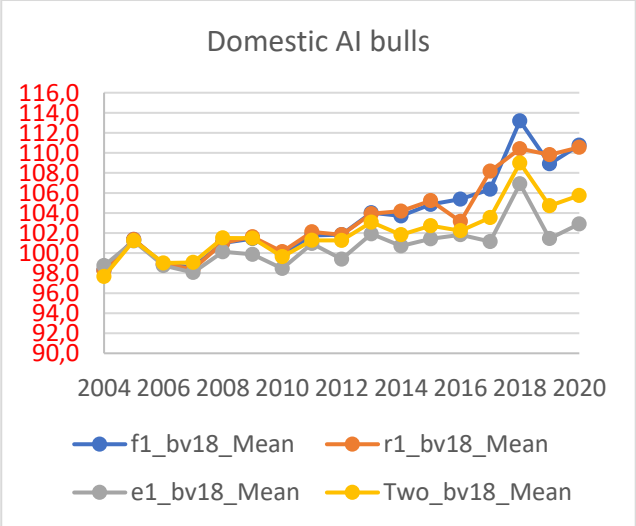


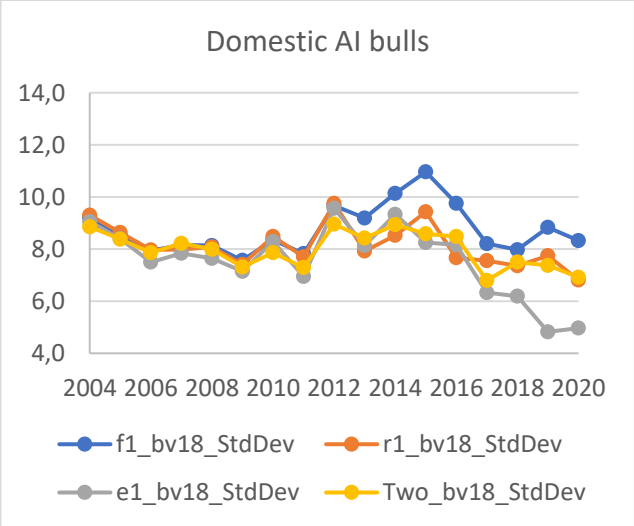



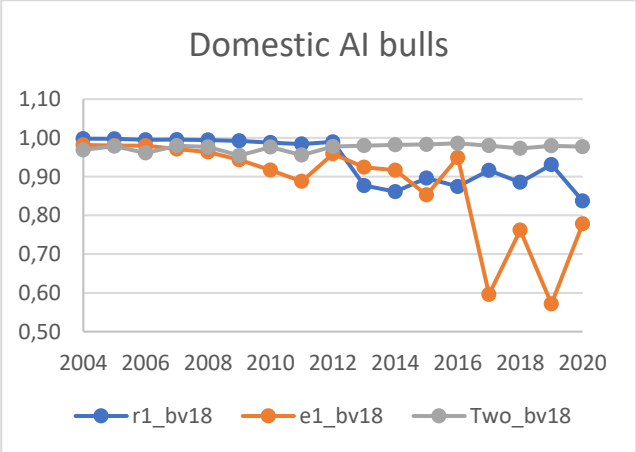



***bv18***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 98.3 | 98.3 | 98.7 | 97.7 | 9.2 | 9.3 | 9.0 | 8.9 | 1.00 | 0.98 | 0.97 |
| 2005 | 45 | 101.3 | 101.4 | 101.2 | 101.2 | 8.5 | 8.6 | 8.4 | 8.4 | 1.00 | 0.98 | 0.98 |
| 2006 | 49 | 98.9 | 98.9 | 98.8 | 99.0 | 7.9 | 8.0 | 7.5 | 7.9 | 1.00 | 0.98 | 0.96 |
| 2007 | 55 | 98.6 | 98.4 | 98.1 | 99.1 | 8.2 | 8.0 | 7.8 | 8.2 | 1.00 | 0.97 | 0.98 |
| 2008 | 47 | 101.0 | 101.0 | 100.1 | 101.5 | 8.1 | 8.1 | 7.6 | 8.0 | 0.99 | 0.96 | 0.98 |
| 2009 | 58 | 101.4 | 101.6 | 99.9 | 101.5 | 7.6 | 7.4 | 7.1 | 7.3 | 0.99 | 0.94 | 0.95 |
| 2010 | 73 | 99.9 | 100.1 | 98.5 | 99.6 | 8.4 | 8.5 | 8.3 | 7.9 | 0.99 | 0.92 | 0.98 |
| 2011 | 75 | 101.8 | 102.1 | 100.9 | 101.3 | 7.8 | 7.7 | 6.9 | 7.3 | 0.98 | 0.89 | 0.96 |
| 2012 | 58 | 101.8 | 101.8 | 99.4 | 101.3 | 9.7 | 9.8 | 9.6 | 9.0 | 0.99 | 0.96 | 0.98 |
| 2013 | 67 | 104.0 | 103.9 | 101.9 | 103.1 | 9.2 | 7.9 | 8.1 | 8.4 | 0.88 | 0.92 | 0.98 |
| 2014 | 64 | 103.7 | 104.2 | 100.7 | 101.8 | 10.1 | 8.5 | 9.3 | 8.9 | 0.86 | 0.92 | 0.98 |
| 2015 | 52 | 104.9 | 105.2 | 101.4 | 102.7 | 11.0 | 9.4 | 8.3 | 8.6 | 0.90 | 0.85 | 0.98 |
| 2016 | 32 | 105.4 | 103.2 | 101.8 | 102.2 | 9.8 | 7.7 | 8.2 | 8.5 | 0.87 | 0.95 | 0.99 |
| 2017 | 38 | 106.4 | 108.2 | 101.2 | 103.5 | 8.2 | 7.6 | 6.3 | 6.8 | 0.92 | 0.60 | 0.98 |
| 2018 | 24 | 113.2 | 110.4 | 106.9 | 109.0 | 8.0 | 7.4 | 6.2 | 7.5 | 0.89 | 0.76 | 0.97 |
| 2019 | 51 | 108.9 | 109.8 | 101.4 | 104.7 | 8.8 | 7.7 | 4.8 | 7.4 | 0.93 | 0.57 | 0.98 |
| 2020 | 15 | 110.8 | 110.5 | 102.9 | 105.7 | 8.3 | 6.8 | 5.0 | 6.9 | 0.84 | 0.78 | 0.98 |

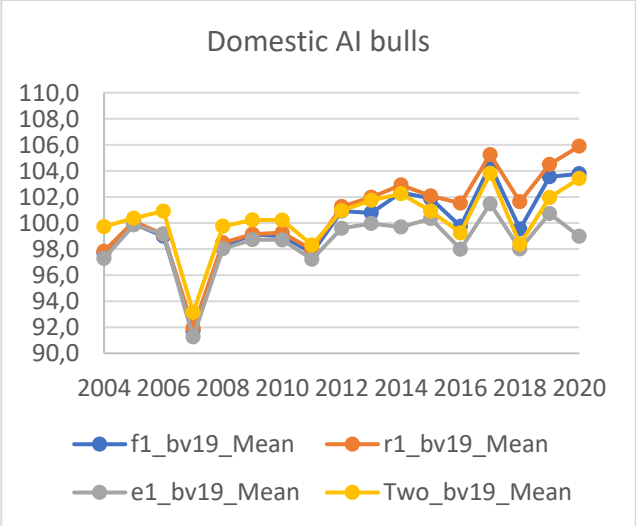


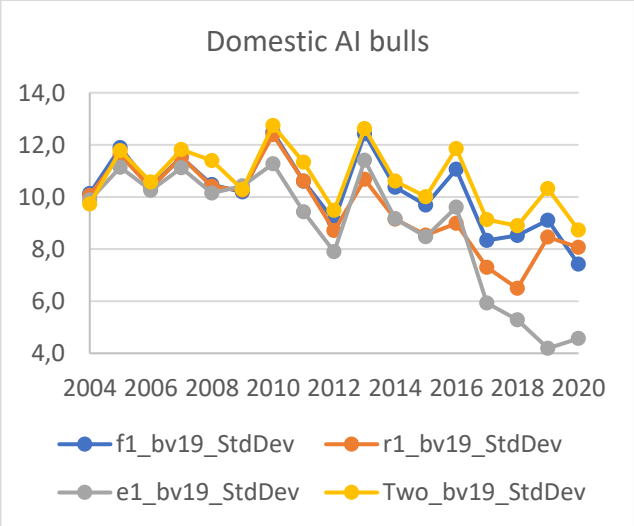



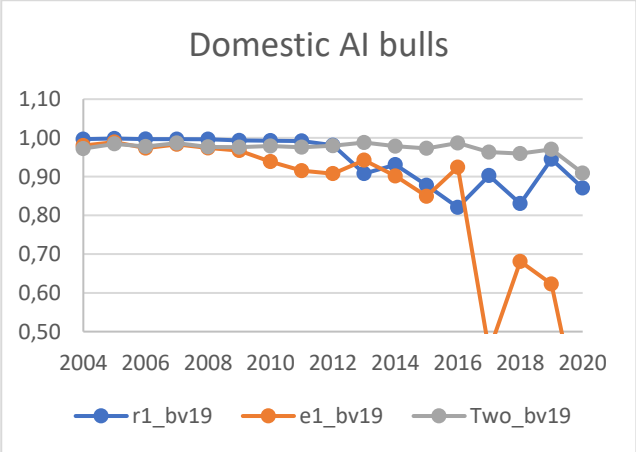



***bv19***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 97.7 | 97.8 | 97.3 | 99.7 | 10.1 | 10.1 | 9.9 | 9.7 | 1.00 | 0.98 | 0.97 |
| 2005 | 45 | 99.9 | 100.1 | 99.9 | 100.4 | 11.9 | 11.6 | 11.1 | 11.8 | 1.00 | 0.99 | 0.98 |
| 2006 | 49 | 99.0 | 99.1 | 99.2 | 100.9 | 10.4 | 10.3 | 10.3 | 10.6 | 1.00 | 0.97 | 0.98 |
| 2007 | 55 | 91.7 | 91.9 | 91.3 | 93.1 | 11.5 | 11.5 | 11.1 | 11.8 | 1.00 | 0.98 | 0.99 |
| 2008 | 47 | 98.2 | 98.5 | 98.0 | 99.8 | 10.5 | 10.4 | 10.1 | 11.4 | 1.00 | 0.97 | 0.98 |
| 2009 | 58 | 99.1 | 99.1 | 98.7 | 100.2 | 10.2 | 10.3 | 10.4 | 10.3 | 0.99 | 0.97 | 0.98 |
| 2010 | 73 | 99.0 | 99.2 | 98.7 | 100.2 | 12.5 | 12.4 | 11.3 | 12.7 | 0.99 | 0.94 | 0.98 |
| 2011 | 75 | 97.7 | 98.0 | 97.2 | 98.3 | 10.6 | 10.6 | 9.4 | 11.3 | 0.99 | 0.92 | 0.98 |
| 2012 | 58 | 100.9 | 101.3 | 99.6 | 100.9 | 9.1 | 8.7 | 7.9 | 9.5 | 0.98 | 0.91 | 0.98 |
| 2013 | 67 | 100.8 | 102.0 | 100.0 | 101.7 | 12.4 | 10.7 | 11.4 | 12.6 | 0.91 | 0.94 | 0.99 |
| 2014 | 64 | 102.3 | 102.9 | 99.7 | 102.2 | 10.4 | 9.1 | 9.2 | 10.6 | 0.93 | 0.90 | 0.98 |
| 2015 | 52 | 101.9 | 102.1 | 100.3 | 100.9 | 9.7 | 8.5 | 8.5 | 10.0 | 0.88 | 0.85 | 0.97 |
| 2016 | 32 | 99.7 | 101.5 | 98.0 | 99.2 | 11.1 | 9.0 | 9.6 | 11.9 | 0.82 | 0.92 | 0.99 |
| 2017 | 38 | 104.4 | 105.2 | 101.5 | 103.8 | 8.3 | 7.3 | 5.9 | 9.1 | 0.90 | 0.45 | 0.96 |
| 2018 | 24 | 99.5 | 101.6 | 98.0 | 98.4 | 8.5 | 6.5 | 5.3 | 8.9 | 0.83 | 0.68 | 0.96 |
| 2019 | 51 | 103.5 | 104.5 | 100.7 | 102.0 | 9.1 | 8.5 | 4.2 | 10.3 | 0.95 | 0.62 | 0.97 |
| 2020 | 15 | 103.8 | 105.9 | 99.0 | 103.4 | 7.4 | 8.1 | 4.6 | 8.7 | 0.87 | 0.24 | 0.91 |

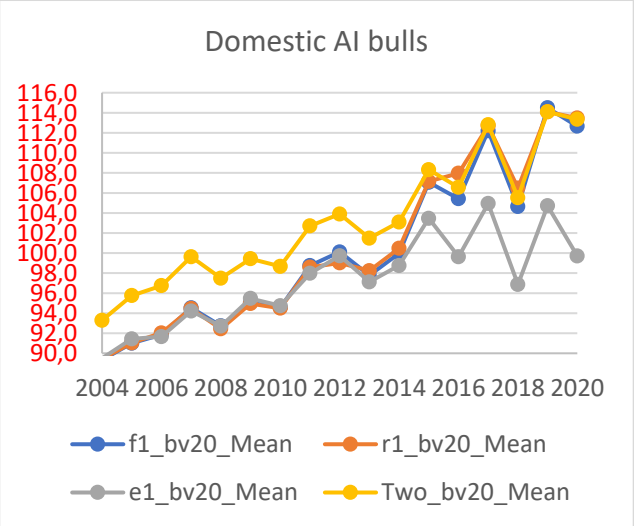


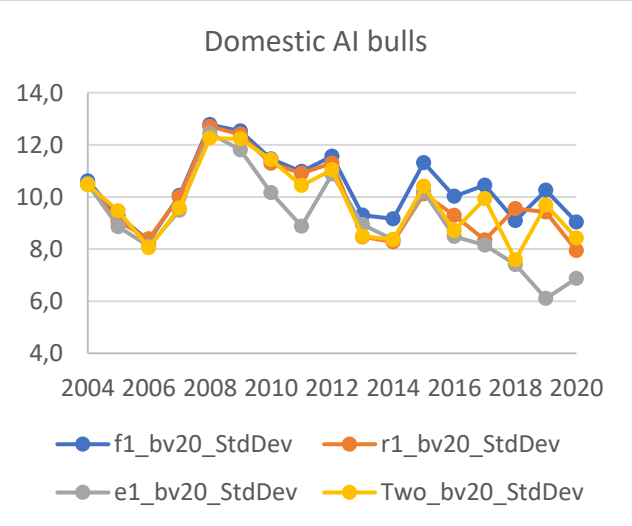



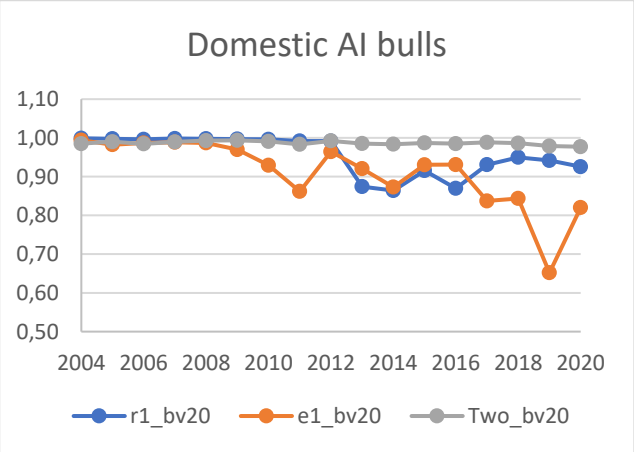



***bv20***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 89.3 | 89.4 | 89.5 | 93.3 | 10.6 | 10.5 | 10.5 | 10.5 | 1.00 | 0.99 | 0.99 |
| 2005 | 45 | 91.0 | 91.0 | 91.4 | 95.8 | 9.3 | 9.1 | 8.9 | 9.5 | 1.00 | 0.98 | 0.99 |
| 2006 | 49 | 91.9 | 92.0 | 91.7 | 96.8 | 8.3 | 8.4 | 8.1 | 8.1 | 1.00 | 0.99 | 0.98 |
| 2007 | 55 | 94.5 | 94.5 | 94.2 | 99.6 | 10.1 | 10.0 | 9.5 | 9.6 | 1.00 | 0.99 | 0.99 |
| 2008 | 47 | 92.7 | 92.4 | 92.7 | 97.5 | 12.8 | 12.7 | 12.4 | 12.3 | 1.00 | 0.99 | 0.99 |
| 2009 | 58 | 95.1 | 95.0 | 95.5 | 99.4 | 12.5 | 12.4 | 11.8 | 12.2 | 1.00 | 0.97 | 0.99 |
| 2010 | 73 | 94.6 | 94.5 | 94.7 | 98.7 | 11.5 | 11.3 | 10.2 | 11.4 | 1.00 | 0.93 | 0.99 |
| 2011 | 75 | 98.7 | 98.6 | 98.0 | 102.7 | 11.0 | 10.9 | 8.9 | 10.4 | 0.99 | 0.86 | 0.98 |
| 2012 | 58 | 100.1 | 99.0 | 99.7 | 103.9 | 11.6 | 11.3 | 10.9 | 11.0 | 0.99 | 0.96 | 0.99 |
| 2013 | 67 | 97.8 | 98.2 | 97.1 | 101.5 | 9.3 | 8.5 | 8.9 | 8.5 | 0.87 | 0.92 | 0.99 |
| 2014 | 64 | 100.0 | 100.5 | 98.8 | 103.1 | 9.2 | 8.3 | 8.4 | 8.4 | 0.86 | 0.87 | 0.98 |
| 2015 | 52 | 107.1 | 107.2 | 103.5 | 108.3 | 11.3 | 10.1 | 10.2 | 10.4 | 0.92 | 0.93 | 0.99 |
| 2016 | 32 | 105.4 | 108.0 | 99.6 | 106.6 | 10.0 | 9.3 | 8.5 | 8.7 | 0.87 | 0.93 | 0.99 |
| 2017 | 38 | 112.2 | 112.7 | 104.9 | 112.8 | 10.5 | 8.3 | 8.2 | 9.9 | 0.93 | 0.84 | 0.99 |
| 2018 | 24 | 104.7 | 106.5 | 96.9 | 105.5 | 9.1 | 9.6 | 7.4 | 7.6 | 0.95 | 0.84 | 0.99 |
| 2019 | 51 | 114.5 | 114.1 | 104.7 | 114.1 | 10.3 | 9.4 | 6.1 | 9.7 | 0.94 | 0.65 | 0.98 |
| 2020 | 15 | 112.7 | 113.5 | 99.7 | 113.3 | 9.0 | 7.9 | 6.9 | 8.4 | 0.93 | 0.82 | 0.98 |

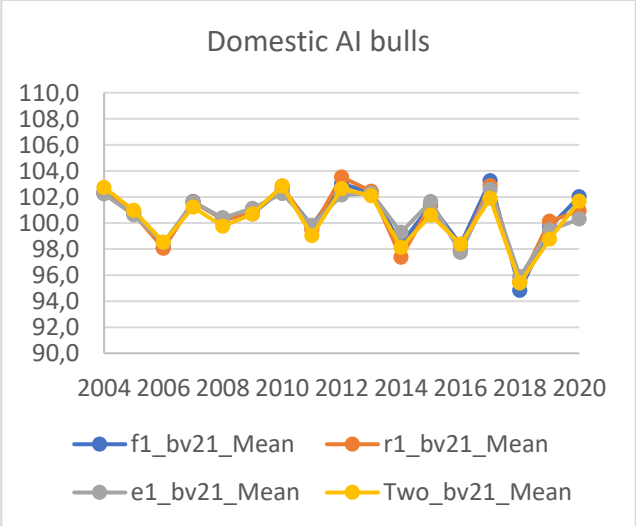


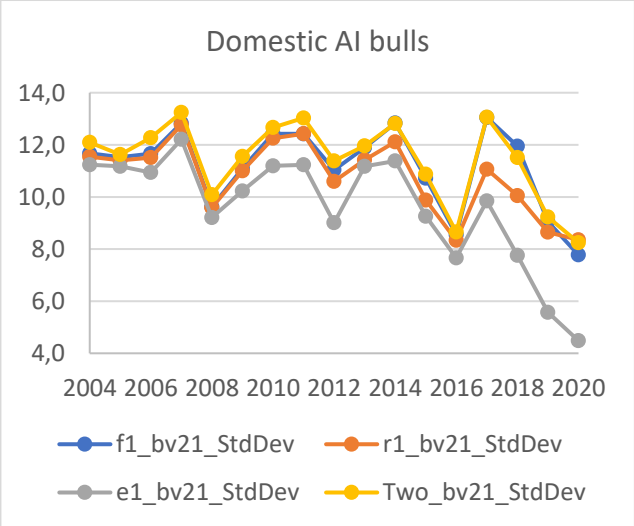



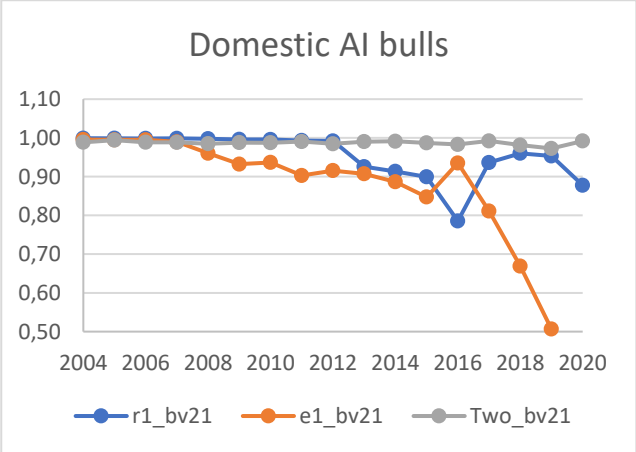



***bv21***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 102.3 | 102.3 | 102.2 | 102.7 | 11.7 | 11.5 | 11.2 | 12.1 | 1.00 | 1.00 | 0.99 |
| 2005 | 45 | 100.9 | 100.7 | 100.6 | 101.0 | 11.5 | 11.4 | 11.2 | 11.6 | 1.00 | 0.99 | 0.99 |
| 2006 | 49 | 98.1 | 98.1 | 98.5 | 98.5 | 11.7 | 11.5 | 10.9 | 12.3 | 1.00 | 1.00 | 0.99 |
| 2007 | 55 | 101.6 | 101.6 | 101.6 | 101.2 | 12.8 | 12.8 | 12.2 | 13.2 | 1.00 | 0.99 | 0.99 |
| 2008 | 47 | 100.3 | 100.3 | 100.4 | 99.8 | 9.6 | 9.6 | 9.2 | 10.1 | 1.00 | 0.96 | 0.98 |
| 2009 | 58 | 100.7 | 100.7 | 101.1 | 100.7 | 11.1 | 11.0 | 10.2 | 11.6 | 1.00 | 0.93 | 0.99 |
| 2010 | 73 | 102.6 | 102.8 | 102.3 | 102.8 | 12.4 | 12.3 | 11.2 | 12.7 | 1.00 | 0.94 | 0.99 |
| 2011 | 75 | 99.8 | 99.5 | 99.8 | 99.0 | 12.4 | 12.4 | 11.2 | 13.0 | 0.99 | 0.90 | 0.99 |
| 2012 | 58 | 103.0 | 103.5 | 102.1 | 102.6 | 11.0 | 10.6 | 9.0 | 11.4 | 0.99 | 0.92 | 0.98 |
| 2013 | 67 | 102.3 | 102.4 | 102.3 | 102.1 | 11.9 | 11.4 | 11.2 | 12.0 | 0.93 | 0.91 | 0.99 |
| 2014 | 64 | 98.4 | 97.4 | 99.3 | 98.1 | 12.8 | 12.1 | 11.4 | 12.8 | 0.91 | 0.89 | 0.99 |
| 2015 | 52 | 101.4 | 101.4 | 101.6 | 100.6 | 10.7 | 9.9 | 9.3 | 10.9 | 0.90 | 0.85 | 0.99 |
| 2016 | 32 | 98.3 | 97.9 | 97.7 | 98.4 | 8.6 | 8.3 | 7.7 | 8.7 | 0.79 | 0.94 | 0.98 |
| 2017 | 38 | 103.2 | 102.9 | 102.6 | 101.9 | 13.0 | 11.1 | 9.8 | 13.1 | 0.94 | 0.81 | 0.99 |
| 2018 | 24 | 94.8 | 95.5 | 95.9 | 95.4 | 11.9 | 10.1 | 7.8 | 11.5 | 0.96 | 0.67 | 0.98 |
| 2019 | 51 | 99.7 | 100.1 | 99.5 | 98.8 | 9.1 | 8.6 | 5.6 | 9.2 | 0.95 | 0.51 | 0.97 |
| 2020 | 15 | 102.0 | 100.9 | 100.3 | 101.7 | 7.8 | 8.4 | 4.5 | 8.2 | 0.88 | 0.15 | 0.99 |

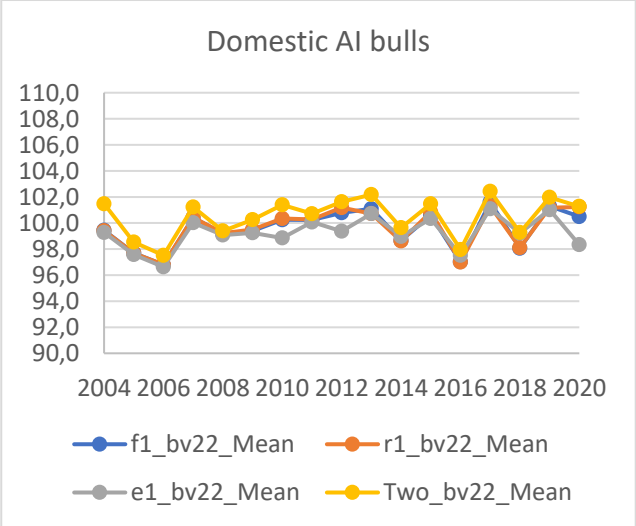


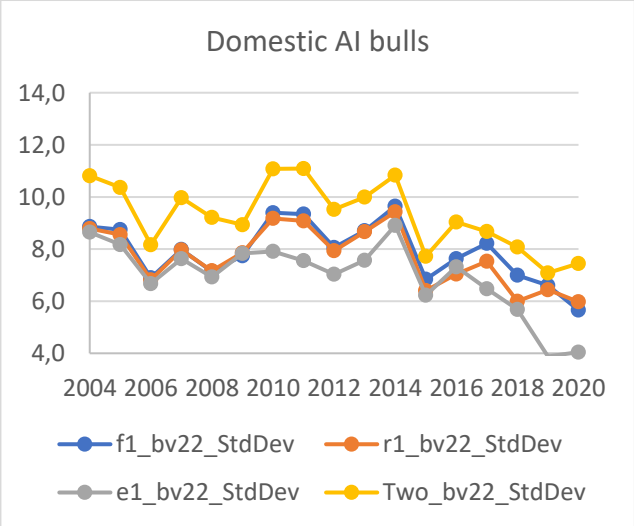



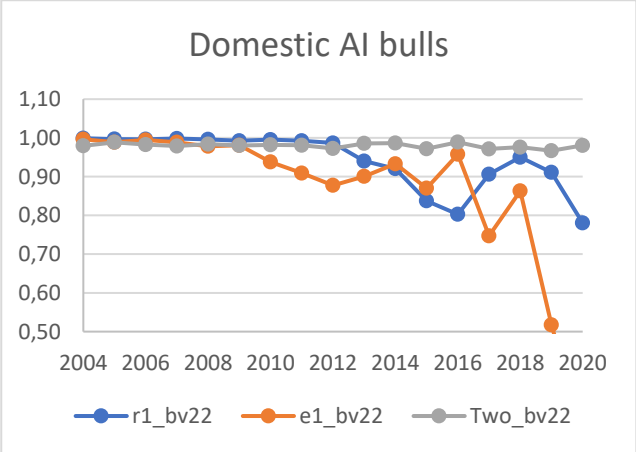



***bv22***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 99.4 | 99.4 | 99.3 | 101.5 | 8.9 | 8.8 | 8.6 | 10.8 | 1.00 | 1.00 | 0.98 |
| 2005 | 45 | 97.7 | 97.7 | 97.6 | 98.5 | 8.7 | 8.6 | 8.2 | 10.4 | 1.00 | 0.99 | 0.99 |
| 2006 | 49 | 96.8 | 96.8 | 96.6 | 97.5 | 6.9 | 6.8 | 6.7 | 8.2 | 1.00 | 0.99 | 0.98 |
| 2007 | 55 | 100.4 | 100.4 | 100.0 | 101.2 | 8.0 | 8.0 | 7.6 | 10.0 | 1.00 | 0.99 | 0.98 |
| 2008 | 47 | 99.2 | 99.2 | 99.1 | 99.4 | 7.1 | 7.2 | 6.9 | 9.2 | 1.00 | 0.98 | 0.98 |
| 2009 | 58 | 99.4 | 99.5 | 99.2 | 100.3 | 7.7 | 7.9 | 7.8 | 8.9 | 0.99 | 0.98 | 0.98 |
| 2010 | 73 | 100.2 | 100.3 | 98.9 | 101.4 | 9.4 | 9.2 | 7.9 | 11.1 | 1.00 | 0.94 | 0.98 |
| 2011 | 75 | 100.2 | 100.3 | 100.1 | 100.7 | 9.3 | 9.1 | 7.6 | 11.1 | 0.99 | 0.91 | 0.98 |
| 2012 | 58 | 100.8 | 101.2 | 99.4 | 101.6 | 8.1 | 7.9 | 7.0 | 9.5 | 0.99 | 0.88 | 0.97 |
| 2013 | 67 | 101.1 | 100.7 | 100.7 | 102.2 | 8.7 | 8.7 | 7.6 | 10.0 | 0.94 | 0.90 | 0.99 |
| 2014 | 64 | 98.7 | 98.6 | 99.0 | 99.6 | 9.6 | 9.4 | 8.9 | 10.8 | 0.92 | 0.93 | 0.99 |
| 2015 | 52 | 100.6 | 100.8 | 100.3 | 101.5 | 6.8 | 6.4 | 6.2 | 7.7 | 0.84 | 0.87 | 0.97 |
| 2016 | 32 | 97.0 | 97.0 | 97.5 | 98.0 | 7.6 | 7.0 | 7.3 | 9.0 | 0.80 | 0.96 | 0.99 |
| 2017 | 38 | 101.6 | 101.3 | 101.1 | 102.4 | 8.2 | 7.5 | 6.5 | 8.7 | 0.91 | 0.75 | 0.97 |
| 2018 | 24 | 98.1 | 98.1 | 99.2 | 99.3 | 7.0 | 6.0 | 5.7 | 8.1 | 0.95 | 0.86 | 0.98 |
| 2019 | 51 | 101.3 | 101.2 | 101.0 | 102.0 | 6.6 | 6.4 | 3.9 | 7.1 | 0.91 | 0.52 | 0.97 |
| 2020 | 15 | 100.5 | 101.2 | 98.3 | 101.3 | 5.7 | 6.0 | 4.0 | 7.4 | 0.78 | 0.23 | 0.98 |

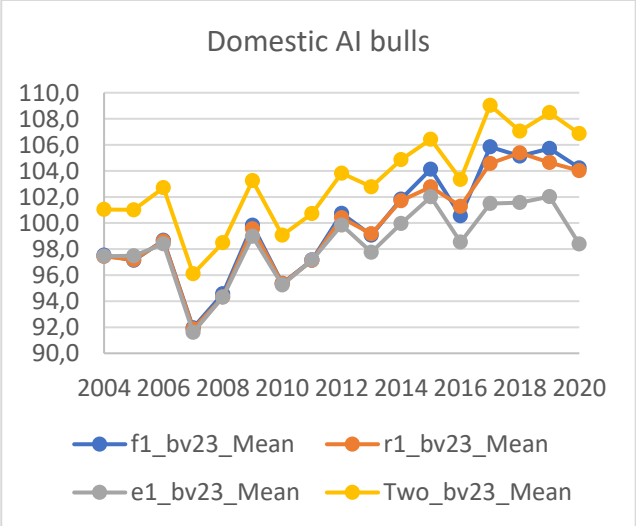


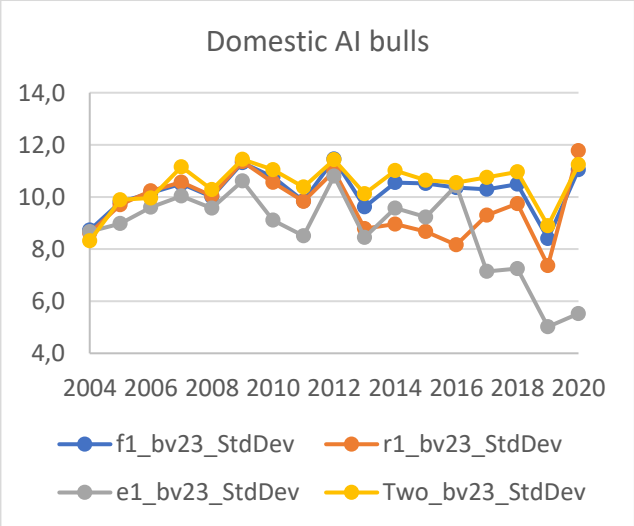



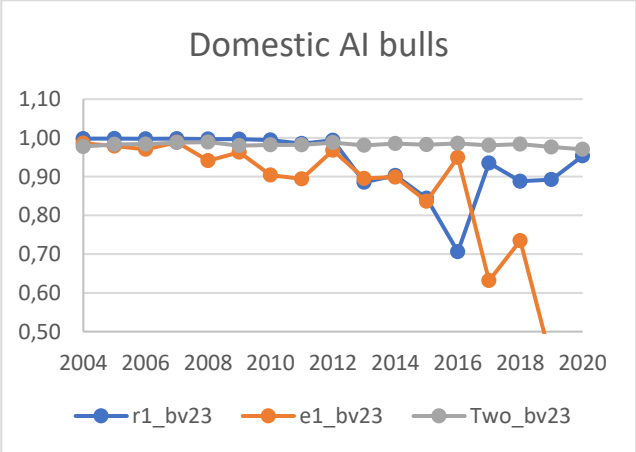



***bv23 maybe problem here***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 97.5 | 97.4 | 97.5 | 101.0 | 8.7 | 8.6 | 8.7 | 8.3 | 1.00 | 0.99 | 0.98 |
| 2005 | 45 | 97.1 | 97.2 | 97.5 | 101.0 | 9.8 | 9.7 | 9.0 | 9.9 | 1.00 | 0.98 | 0.98 |
| 2006 | 49 | 98.7 | 98.6 | 98.4 | 102.7 | 10.2 | 10.2 | 9.6 | 10.0 | 1.00 | 0.97 | 0.98 |
| 2007 | 55 | 92.0 | 91.9 | 91.6 | 96.1 | 10.5 | 10.6 | 10.0 | 11.2 | 1.00 | 0.99 | 0.99 |
| 2008 | 47 | 94.6 | 94.3 | 94.3 | 98.5 | 10.0 | 10.0 | 9.6 | 10.3 | 1.00 | 0.94 | 0.99 |
| 2009 | 58 | 99.8 | 99.5 | 99.0 | 103.3 | 11.3 | 11.4 | 10.6 | 11.4 | 1.00 | 0.96 | 0.98 |
| 2010 | 73 | 95.4 | 95.3 | 95.2 | 99.1 | 10.8 | 10.6 | 9.1 | 11.0 | 0.99 | 0.90 | 0.98 |
| 2011 | 75 | 97.2 | 97.1 | 97.2 | 100.7 | 9.8 | 9.8 | 8.5 | 10.4 | 0.99 | 0.89 | 0.98 |
| 2012 | 58 | 100.7 | 100.4 | 99.8 | 103.8 | 11.5 | 11.0 | 10.8 | 11.4 | 0.99 | 0.97 | 0.99 |
| 2013 | 67 | 99.1 | 99.2 | 97.8 | 102.8 | 9.6 | 8.8 | 8.4 | 10.1 | 0.89 | 0.90 | 0.98 |
| 2014 | 64 | 101.8 | 101.7 | 100.0 | 104.9 | 10.6 | 9.0 | 9.6 | 11.0 | 0.90 | 0.90 | 0.99 |
| 2015 | 52 | 104.1 | 102.8 | 102.0 | 106.4 | 10.5 | 8.7 | 9.2 | 10.6 | 0.84 | 0.84 | 0.98 |
| 2016 | 32 | 100.5 | 101.3 | 98.5 | 103.3 | 10.4 | 8.2 | 10.4 | 10.5 | 0.71 | 0.95 | 0.99 |
| 2017 | 38 | 105.8 | 104.6 | 101.5 | 109.0 | 10.3 | 9.3 | 7.1 | 10.8 | 0.94 | 0.63 | 0.98 |
| 2018 | 24 | 105.1 | 105.4 | 101.6 | 107.1 | 10.5 | 9.7 | 7.3 | 11.0 | 0.89 | 0.73 | 0.98 |
| 2019 | 51 | 105.7 | 104.6 | 102.0 | 108.5 | 8.4 | 7.4 | 5.0 | 8.9 | 0.89 | 0.42 | 0.98 |
| 2020 | 15 | 104.2 | 104.0 | 98.4 | 106.9 | 11.0 | 11.8 | 5.5 | 11.2 | 0.95 | 0.20 | 0.97 |

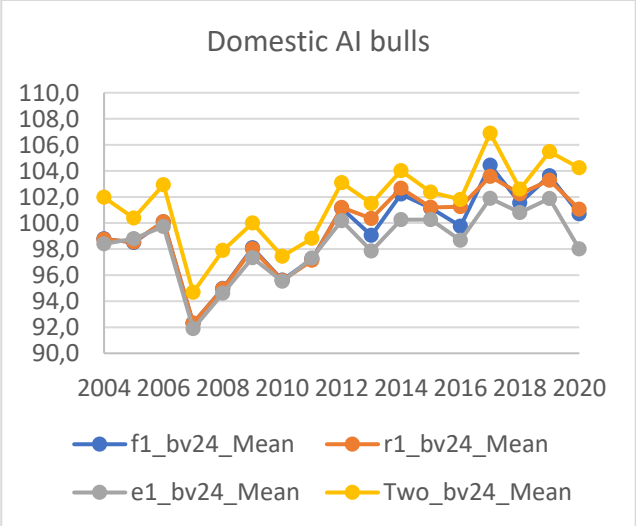


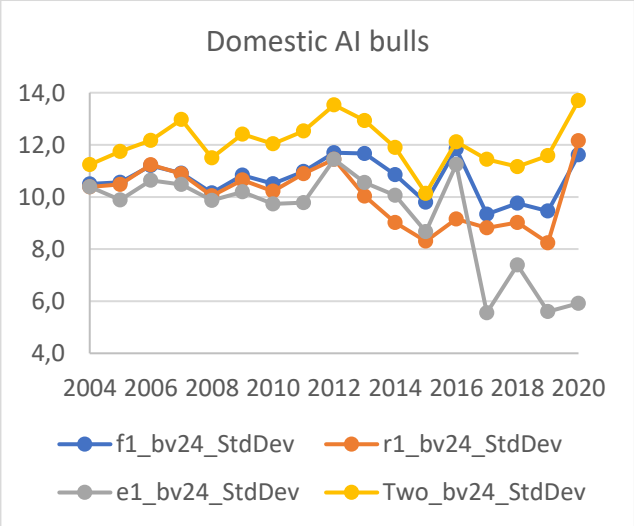



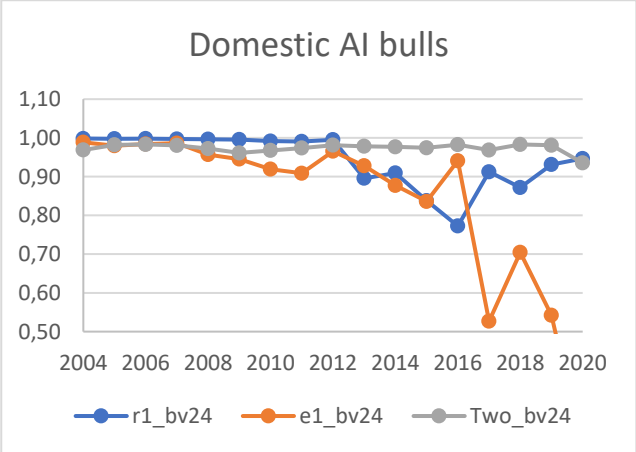



***bv24***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 98.8 | 98.7 | 98.4 | 102.0 | 10.5 | 10.4 | 10.4 | 11.2 | 1.00 | 0.99 | 0.97 |
| 2005 | 45 | 98.5 | 98.5 | 98.8 | 100.4 | 10.6 | 10.5 | 9.9 | 11.7 | 1.00 | 0.98 | 0.98 |
| 2006 | 49 | 100.1 | 100.1 | 99.7 | 102.9 | 11.2 | 11.2 | 10.6 | 12.2 | 1.00 | 0.98 | 0.98 |
| 2007 | 55 | 92.3 | 92.3 | 91.9 | 94.7 | 10.9 | 10.9 | 10.5 | 13.0 | 1.00 | 0.99 | 0.98 |
| 2008 | 47 | 95.0 | 94.9 | 94.6 | 97.9 | 10.2 | 10.0 | 9.9 | 11.5 | 1.00 | 0.96 | 0.97 |
| 2009 | 58 | 98.1 | 98.0 | 97.3 | 100.0 | 10.8 | 10.6 | 10.2 | 12.4 | 1.00 | 0.95 | 0.96 |
| 2010 | 73 | 95.6 | 95.6 | 95.5 | 97.4 | 10.5 | 10.2 | 9.7 | 12.0 | 0.99 | 0.92 | 0.97 |
| 2011 | 75 | 97.2 | 97.1 | 97.3 | 98.8 | 11.0 | 10.9 | 9.8 | 12.5 | 0.99 | 0.91 | 0.97 |
| 2012 | 58 | 101.1 | 101.2 | 100.2 | 103.1 | 11.7 | 11.4 | 11.4 | 13.5 | 1.00 | 0.97 | 0.98 |
| 2013 | 67 | 99.0 | 100.3 | 97.9 | 101.5 | 11.7 | 10.0 | 10.6 | 12.9 | 0.90 | 0.93 | 0.98 |
| 2014 | 64 | 102.2 | 102.7 | 100.3 | 104.0 | 10.9 | 9.0 | 10.1 | 11.9 | 0.91 | 0.88 | 0.98 |
| 2015 | 52 | 101.1 | 101.2 | 100.3 | 102.4 | 9.8 | 8.3 | 8.7 | 10.1 | 0.84 | 0.84 | 0.97 |
| 2016 | 32 | 99.8 | 101.2 | 98.7 | 101.8 | 11.8 | 9.2 | 11.2 | 12.1 | 0.77 | 0.94 | 0.98 |
| 2017 | 38 | 104.4 | 103.6 | 101.9 | 106.9 | 9.3 | 8.8 | 5.6 | 11.4 | 0.91 | 0.53 | 0.97 |
| 2018 | 24 | 101.5 | 102.2 | 100.8 | 102.6 | 9.8 | 9.0 | 7.4 | 11.2 | 0.87 | 0.70 | 0.98 |
| 2019 | 51 | 103.6 | 103.3 | 101.9 | 105.5 | 9.5 | 8.2 | 5.6 | 11.6 | 0.93 | 0.54 | 0.98 |
| 2020 | 15 | 100.7 | 101.1 | 98.0 | 104.2 | 11.6 | 12.2 | 5.9 | 13.7 | 0.95 | 0.19 | 0.94 |

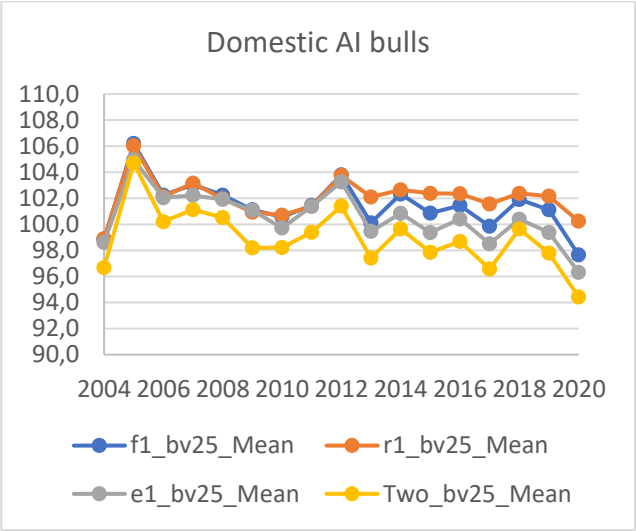


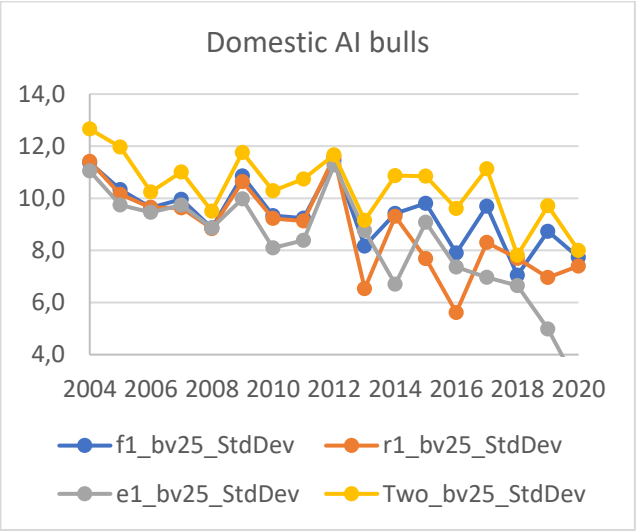



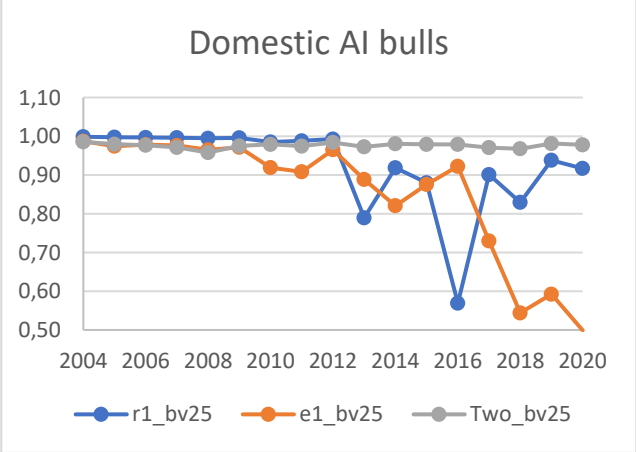



***bv25***

| | | Mean | | | | SD | | | | corr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth year | N | f1 | r1 | e1 | Two | f1 | r1 | e1 | Two | r1 | e1 | Two |
| 2004 | 48 | 98.8 | 98.9 | 98.6 | 96.7 | 11.4 | 11.4 | 11.1 | 12.7 | 1.00 | 0.99 | 0.99 |
| 2005 | 45 | 106.2 | 106.0 | 105.0 | 104.7 | 10.3 | 10.2 | 9.7 | 12.0 | 1.00 | 0.97 | 0.98 |
| 2006 | 49 | 102.2 | 102.1 | 102.0 | 100.2 | 9.6 | 9.6 | 9.5 | 10.2 | 1.00 | 0.98 | 0.98 |
| 2007 | 55 | 103.0 | 103.2 | 102.2 | 101.1 | 10.0 | 9.6 | 9.7 | 11.0 | 1.00 | 0.98 | 0.97 |
| 2008 | 47 | 102.2 | 102.0 | 101.9 | 100.5 | 8.9 | 8.8 | 8.9 | 9.5 | 0.99 | 0.97 | 0.96 |
| 2009 | 58 | 101.1 | 100.9 | 101.1 | 98.2 | 10.9 | 10.6 | 10.0 | 11.8 | 1.00 | 0.97 | 0.97 |
| 2010 | 73 | 100.6 | 100.7 | 99.7 | 98.2 | 9.3 | 9.2 | 8.1 | 10.3 | 0.99 | 0.92 | 0.98 |
| 2011 | 75 | 101.5 | 101.4 | 101.4 | 99.4 | 9.2 | 9.1 | 8.4 | 10.7 | 0.99 | 0.91 | 0.97 |
| 2012 | 58 | 103.8 | 103.8 | 103.3 | 101.4 | 11.5 | 11.6 | 11.3 | 11.7 | 0.99 | 0.97 | 0.98 |
| 2013 | 67 | 100.1 | 102.1 | 99.5 | 97.4 | 8.2 | 6.5 | 8.8 | 9.2 | 0.79 | 0.89 | 0.97 |
| 2014 | 64 | 102.3 | 102.6 | 100.8 | 99.7 | 9.4 | 9.3 | 6.7 | 10.9 | 0.92 | 0.82 | 0.98 |
| 2015 | 52 | 100.9 | 102.4 | 99.4 | 97.9 | 9.8 | 7.7 | 9.1 | 10.8 | 0.88 | 0.88 | 0.98 |
| 2016 | 32 | 101.4 | 102.4 | 100.4 | 98.7 | 7.9 | 5.6 | 7.4 | 9.6 | 0.57 | 0.92 | 0.98 |
| 2017 | 38 | 99.9 | 101.6 | 98.5 | 96.6 | 9.7 | 8.3 | 7.0 | 11.1 | 0.90 | 0.73 | 0.97 |
| 2018 | 24 | 101.9 | 102.4 | 100.4 | 99.6 | 7.0 | 7.7 | 6.6 | 7.8 | 0.83 | 0.54 | 0.97 |
| 2019 | 51 | 101.1 | 102.2 | 99.4 | 97.8 | 8.7 | 7.0 | 5.0 | 9.7 | 0.94 | 0.59 | 0.98 |
| 2020 | 15 | 97.7 | 100.2 | 96.3 | 94.4 | 7.7 | 7.4 | 2.8 | 8.0 | 0.92 | 0.50 | 0.98 |

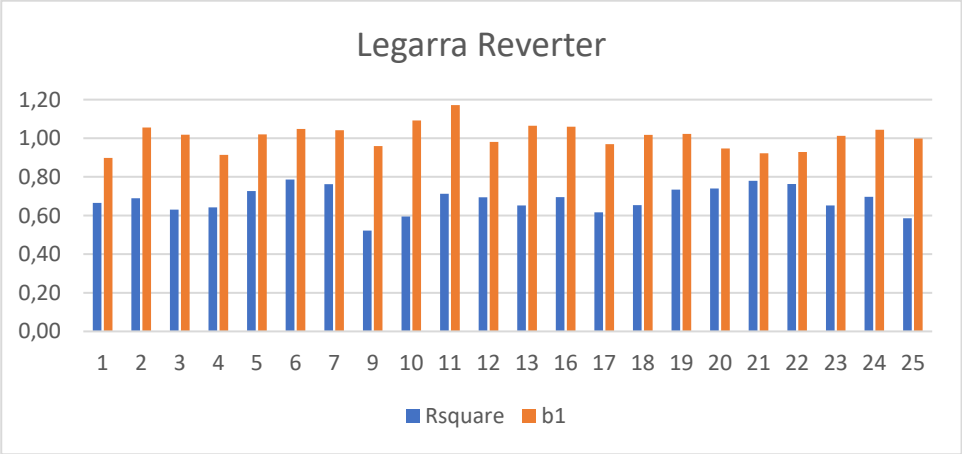


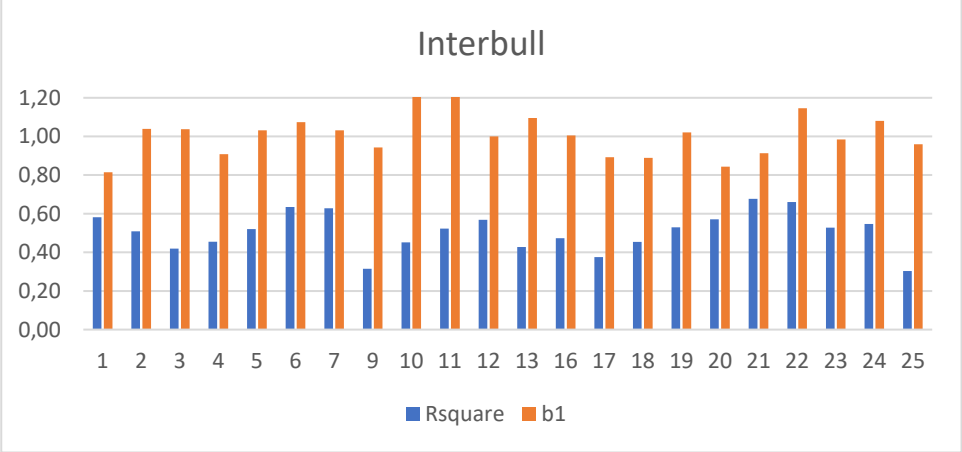



# JER Interbull validation and Legarra Reverter regression

| | LR | | Interbull | | Interbull pedigree | |
|---|---|---|---|---|---|---|
| | Rsquare | b1 | Rsquare | b1 | Rsquare | b1 |
| 1 | 0.67 | 0.90 | 0.58 | 0.81 | 0.19 | 0.82 |
| 2 | 0.69 | 1.06 | 0.51 | 1.04 | 0.29 | 1.13 |
| 3 | 0.63 | 1.02 | 0.42 | 1.04 | 0.18 | 0.98 |
| 4 | 0.64 | 0.91 | 0.45 | 0.91 | 0.31 | 1.37 |
| 5 | 0.73 | 1.02 | 0.52 | 1.03 | 0.24 | 1.09 |
| 6 | 0.79 | 1.05 | 0.63 | 1.07 | 0.41 | 1.28 |
| 7 | 0.76 | 1.04 | 0.63 | 1.03 | 0.24 | 1.03 |
| 9 | 0.52 | 0.96 | 0.31 | 0.94 | 0.11 | 0.87 |
| 10 | 0.60 | 1.09 | 0.45 | 1.25 | 0.31 | 1.40 |
| 11 | 0.71 | 1.17 | 0.52 | 1.23 | 0.32 | 1.29 |
| 12 | 0.69 | 0.98 | 0.57 | 1.00 | 0.29 | 1.00 |
| 13 | 0.65 | 1.06 | 0.43 | 1.10 | 0.18 | 1.13 |
| 16 | 0.70 | 1.06 | 0.47 | 1.01 | 0.20 | 0.99 |
| 17 | 0.62 | 0.97 | 0.38 | 0.89 | 0.28 | 1.20 |
| 18 | 0.65 | 1.02 | 0.45 | 0.89 | 0.26 | 0.91 |
| 19 | 0.73 | 1.02 | 0.53 | 1.02 | 0.36 | 1.37 |
| 20 | 0.74 | 0.95 | 0.57 | 0.84 | 0.31 | 1.14 |
| 21 | 0.78 | 0.92 | 0.68 | 0.91 | 0.26 | 0.91 |
| 22 | 0.76 | 0.93 | 0.66 | 1.15 | 0.27 | 0.98 |
| 23 | 0.65 | 1.01 | 0.53 | 0.98 | 0.12 | 0.79 |
| 24 | 0.70 | 1.04 | 0.55 | 1.08 | 0.18 | 1.04 |
| 25 | 0.59 | 1.00 | 0.30 | 0.96 | 0.15 | 0.83 |



# Appendix 2

## Stability Holstein

For Holstein the November run are compared with the May run to check stability of the single step GEBV's

## Cows

For Nordic Holstein cows with phenotypes in May run. Both genotyped and nongenotyped females are included.

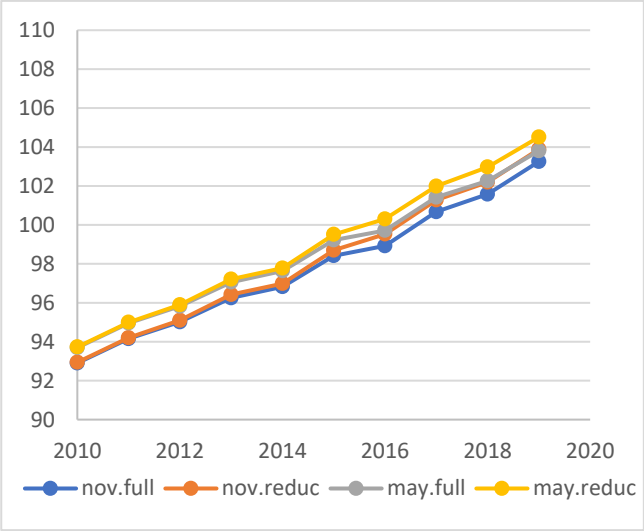
### *bv1*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62816 | 0.999 | 0.999 | 1.000 |
| 2011 | 56881 | 0.998 | 0.998 | 1.000 |
| 2012 | 54731 | 0.997 | 0.997 | 1.000 |
| 2013 | 55101 | 0.995 | 0.995 | 0.999 |
| 2014 | 53877 | 0.993 | 0.994 | 0.999 |
| 2015 | 49431 | 0.943 | 0.943 | 0.998 |
| 2016 | 46539 | 0.846 | 0.847 | 0.997 |
| 2017 | 42187 | 0.823 | 0.819 | 0.996 |
| 2018 | 30844 | 0.822 | 0.817 | 0.995 |
| 2019 | 1119 | 0.837 | 0.831 | 0.995 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62816 | 92.9 | 92.9 | 93.7 | 93.7 |
| 2011 | 56881 | 94.2 | 94.2 | 95.0 | 95.0 |
| 2012 | 54731 | 95.0 | 95.1 | 95.8 | 95.9 |
| 2013 | 55101 | 96.3 | 96.4 | 97.1 | 97.2 |
| 2014 | 53877 | 96.8 | 97.0 | 97.6 | 97.8 |
| 2015 | 49431 | 98.4 | 98.7 | 99.2 | 99.5 |
| 2016 | 46539 | 98.9 | 99.5 | 99.7 | 100.3 |
| 2017 | 42187 | 100.7 | 101.3 | 101.4 | 102.0 |
| 2018 | 30844 | 101.6 | 102.2 | 102.3 | 103.0 |
| 2019 | 1119 | 103.3 | 103.9 | 103.8 | 104.5 |



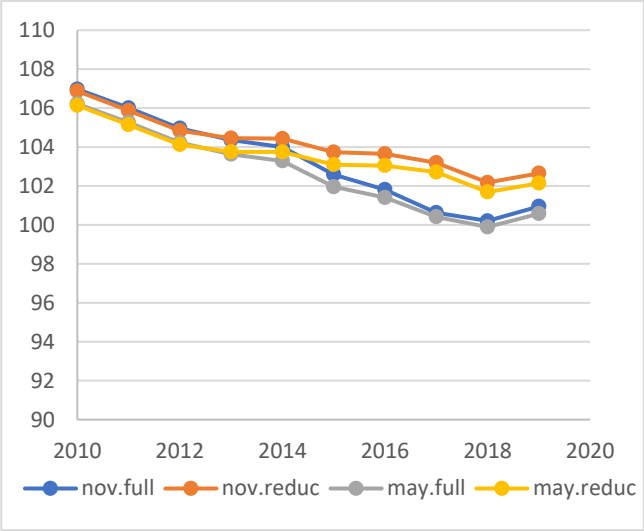

## *bv2*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.997 | 0.997 | 0.999 |
| 2011 | 56880 | 0.996 | 0.996 | 0.999 |
| 2012 | 54730 | 0.994 | 0.994 | 0.999 |
| 2013 | 55097 | 0.991 | 0.992 | 0.998 |
| 2014 | 53874 | 0.988 | 0.989 | 0.997 |
| 2015 | 49431 | 0.950 | 0.951 | 0.997 |
| 2016 | 46539 | 0.869 | 0.873 | 0.994 |
| 2017 | 42185 | 0.865 | 0.867 | 0.993 |
| 2018 | 30844 | 0.872 | 0.872 | 0.992 |
| 2019 | 1119 | 0.859 | 0.860 | 0.990 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 107.0 | 106.9 | 106.2 | 106.1 |
| 2011 | 56880 | 106.0 | 105.9 | 105.3 | 105.1 |
| 2012 | 54730 | 105.0 | 104.8 | 104.2 | 104.1 |
| 2013 | 55097 | 104.4 | 104.5 | 103.6 | 103.8 |
| 2014 | 53874 | 104.0 | 104.4 | 103.3 | 103.7 |
| 2015 | 49431 | 102.6 | 103.7 | 102.0 | 103.1 |
| 2016 | 46539 | 101.8 | 103.6 | 101.4 | 103.0 |
| 2017 | 42185 | 100.6 | 103.2 | 100.4 | 102.7 |
| 2018 | 30844 | 100.2 | 102.2 | 99.9 | 101.7 |
| 2019 | 1119 | 100.9 | 102.7 | 100.6 | 102.1 |



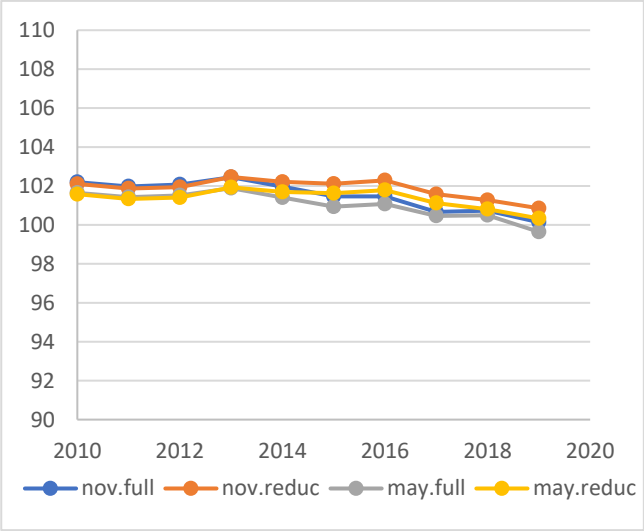

## *bv3*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.997 | 0.997 | 0.999 |
| 2011 | 56880 | 0.996 | 0.996 | 0.999 |
| 2012 | 54730 | 0.993 | 0.994 | 0.998 |
| 2013 | 55097 | 0.990 | 0.991 | 0.998 |
| 2014 | 53874 | 0.987 | 0.989 | 0.997 |
| 2015 | 49431 | 0.945 | 0.946 | 0.995 |
| 2016 | 46538 | 0.851 | 0.855 | 0.991 |
| 2017 | 42186 | 0.842 | 0.845 | 0.989 |
| 2018 | 30844 | 0.837 | 0.834 | 0.988 |
| 2019 | 1119 | 0.858 | 0.862 | 0.984 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 102.2 | 102.1 | 101.6 | 101.6 |
| 2011 | 56880 | 102.0 | 101.9 | 101.4 | 101.3 |
| 2012 | 54730 | 102.1 | 101.9 | 101.5 | 101.4 |
| 2013 | 55097 | 102.5 | 102.5 | 101.9 | 101.9 |
| 2014 | 53874 | 102.0 | 102.2 | 101.4 | 101.7 |
| 2015 | 49431 | 101.5 | 102.1 | 100.9 | 101.6 |
| 2016 | 46538 | 101.5 | 102.3 | 101.1 | 101.8 |
| 2017 | 42186 | 100.7 | 101.6 | 100.5 | 101.1 |
| 2018 | 30844 | 100.7 | 101.3 | 100.5 | 100.8 |
| 2019 | 1119 | 100.1 | 100.9 | 99.6 | 100.3 |



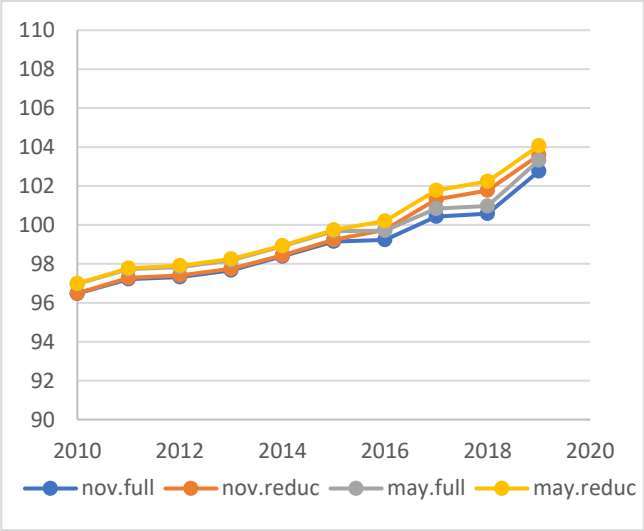

## *bv4*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62814 | 0.997 | 0.997 | 1.000 |
| 2011 | 56880 | 0.995 | 0.996 | 0.999 |
| 2012 | 54730 | 0.993 | 0.994 | 0.999 |
| 2013 | 55097 | 0.990 | 0.991 | 0.998 |
| 2014 | 53874 | 0.988 | 0.989 | 0.997 |
| 2015 | 49431 | 0.948 | 0.950 | 0.997 |
| 2016 | 46538 | 0.870 | 0.872 | 0.994 |
| 2017 | 42186 | 0.847 | 0.848 | 0.992 |
| 2018 | 30844 | 0.850 | 0.851 | 0.991 |
| 2019 | 1119 | 0.841 | 0.842 | 0.986 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62814 | 96.5 | 96.5 | 97.0 | 97.0 |
| 2011 | 56880 | 97.2 | 97.3 | 97.7 | 97.8 |
| 2012 | 54730 | 97.3 | 97.4 | 97.8 | 97.9 |
| 2013 | 55097 | 97.7 | 97.7 | 98.2 | 98.3 |
| 2014 | 53874 | 98.4 | 98.4 | 98.9 | 98.9 |
| 2015 | 49431 | 99.1 | 99.2 | 99.7 | 99.7 |
| 2016 | 46538 | 99.2 | 99.7 | 99.7 | 100.2 |
| 2017 | 42186 | 100.4 | 101.3 | 100.8 | 101.8 |
| 2018 | 30844 | 100.6 | 101.8 | 101.0 | 102.2 |
| 2019 | 1119 | 102.8 | 103.6 | 103.3 | 104.1 |



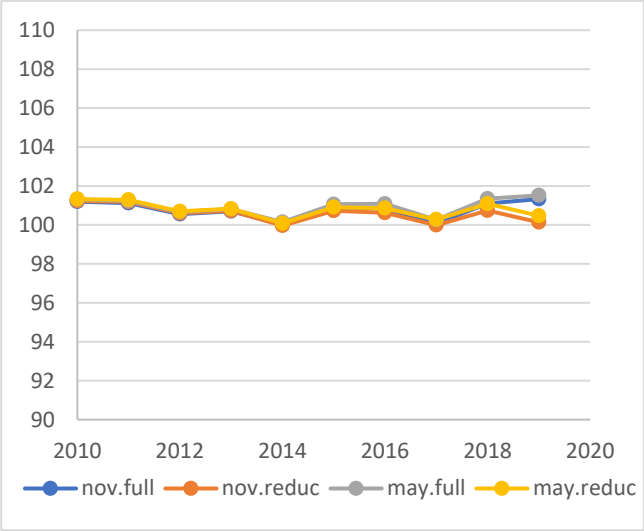

## *bv5*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.996 | 0.997 | 0.999 |
| 2011 | 56880 | 0.994 | 0.995 | 0.999 |
| 2012 | 54730 | 0.991 | 0.992 | 0.998 |
| 2013 | 55097 | 0.988 | 0.989 | 0.997 |
| 2014 | 53874 | 0.985 | 0.987 | 0.997 |
| 2015 | 49431 | 0.942 | 0.941 | 0.995 |
| 2016 | 46538 | 0.840 | 0.837 | 0.992 |
| 2017 | 42185 | 0.833 | 0.829 | 0.990 |
| 2018 | 30844 | 0.822 | 0.825 | 0.986 |
| 2019 | 1119 | 0.825 | 0.835 | 0.984 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 101.2 | 101.2 | 101.3 | 101.3 |
| 2011 | 56880 | 101.1 | 101.2 | 101.2 | 101.3 |
| 2012 | 54730 | 100.6 | 100.6 | 100.7 | 100.7 |
| 2013 | 55097 | 100.7 | 100.7 | 100.8 | 100.8 |
| 2014 | 53874 | 100.0 | 100.0 | 100.1 | 100.1 |
| 2015 | 49431 | 100.9 | 100.7 | 101.1 | 100.9 |
| 2016 | 46538 | 100.8 | 100.6 | 101.1 | 100.9 |
| 2017 | 42185 | 100.1 | 100.0 | 100.3 | 100.3 |
| 2018 | 30844 | 101.1 | 100.7 | 101.3 | 101.1 |
| 2019 | 1119 | 101.3 | 100.1 | 101.5 | 100.5 |



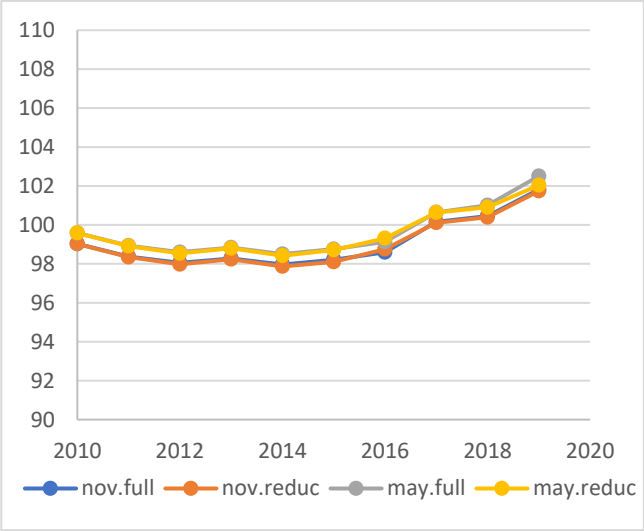

## *bv6*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.998 | 0.998 | 1.000 |
| 2011 | 56880 | 0.996 | 0.996 | 0.999 |
| 2012 | 54730 | 0.993 | 0.994 | 0.999 |
| 2013 | 55097 | 0.991 | 0.992 | 0.998 |
| 2014 | 53874 | 0.990 | 0.991 | 0.998 |
| 2015 | 49431 | 0.947 | 0.949 | 0.997 |
| 2016 | 46538 | 0.863 | 0.865 | 0.994 |
| 2017 | 42183 | 0.863 | 0.866 | 0.992 |
| 2018 | 30844 | 0.860 | 0.857 | 0.990 |
| 2019 | 1119 | 0.852 | 0.855 | 0.986 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 99.0 | 99.0 | 99.6 | 99.6 |
| 2011 | 56880 | 98.4 | 98.3 | 98.9 | 98.9 |
| 2012 | 54730 | 98.1 | 98.0 | 98.6 | 98.5 |
| 2013 | 55097 | 98.3 | 98.2 | 98.8 | 98.8 |
| 2014 | 53874 | 98.0 | 97.9 | 98.5 | 98.4 |
| 2015 | 49431 | 98.2 | 98.1 | 98.8 | 98.7 |
| 2016 | 46538 | 98.6 | 98.8 | 99.1 | 99.3 |
| 2017 | 42183 | 100.2 | 100.1 | 100.6 | 100.6 |
| 2018 | 30844 | 100.5 | 100.4 | 101.0 | 100.9 |
| 2019 | 1119 | 101.8 | 101.7 | 102.5 | 102.0 |



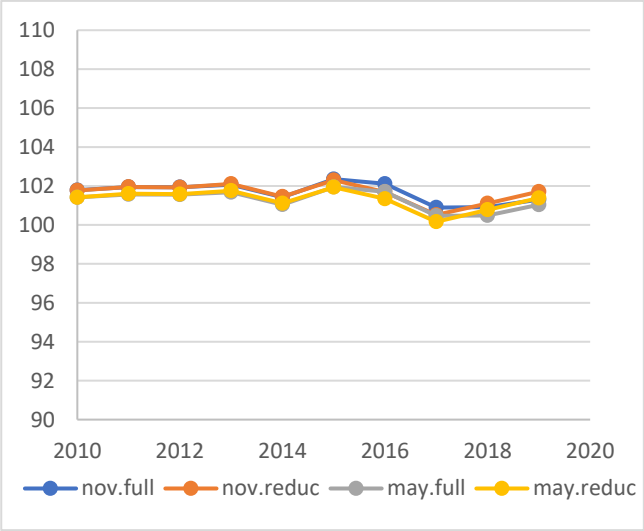

## *bv7*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.998 | 0.998 | 1.000 |
| 2011 | 56880 | 0.996 | 0.997 | 0.999 |
| 2012 | 54729 | 0.994 | 0.994 | 0.999 |
| 2013 | 55097 | 0.991 | 0.992 | 0.998 |
| 2014 | 53874 | 0.989 | 0.990 | 0.997 |
| 2015 | 49431 | 0.944 | 0.946 | 0.996 |
| 2016 | 46538 | 0.843 | 0.847 | 0.994 |
| 2017 | 42183 | 0.837 | 0.837 | 0.992 |
| 2018 | 30844 | 0.855 | 0.852 | 0.992 |
| 2019 | 1119 | 0.847 | 0.845 | 0.991 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 101.8 | 101.8 | 101.4 | 101.4 |
| 2011 | 56880 | 101.9 | 102.0 | 101.6 | 101.6 |
| 2012 | 54729 | 101.9 | 101.9 | 101.6 | 101.6 |
| 2013 | 55097 | 102.1 | 102.1 | 101.7 | 101.8 |
| 2014 | 53874 | 101.4 | 101.5 | 101.0 | 101.1 |
| 2015 | 49431 | 102.4 | 102.3 | 101.9 | 101.9 |
| 2016 | 46538 | 102.1 | 101.7 | 101.7 | 101.3 |
| 2017 | 42183 | 100.9 | 100.5 | 100.5 | 100.2 |
| 2018 | 30844 | 100.9 | 101.1 | 100.5 | 100.8 |
| 2019 | 1119 | 101.3 | 101.7 | 101.0 | 101.4 |



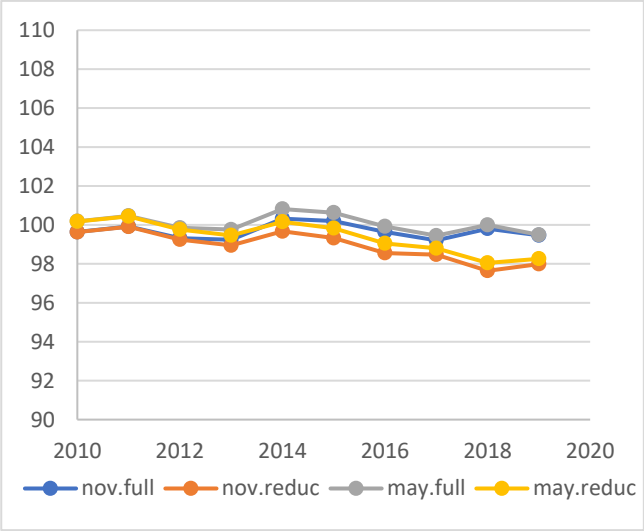

## *bv9*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.997 | 0.997 | 0.999 |
| 2011 | 56881 | 0.995 | 0.996 | 0.999 |
| 2012 | 54729 | 0.993 | 0.993 | 0.998 |
| 2013 | 55097 | 0.990 | 0.991 | 0.998 |
| 2014 | 53875 | 0.988 | 0.989 | 0.997 |
| 2015 | 49431 | 0.945 | 0.947 | 0.996 |
| 2016 | 46538 | 0.872 | 0.873 | 0.992 |
| 2017 | 42186 | 0.855 | 0.856 | 0.989 |
| 2018 | 30844 | 0.829 | 0.835 | 0.988 |
| 2019 | 1119 | 0.839 | 0.834 | 0.986 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 99.6 | 99.6 | 100.2 | 100.2 |
| 2011 | 56881 | 99.9 | 99.9 | 100.5 | 100.4 |
| 2012 | 54729 | 99.3 | 99.2 | 99.9 | 99.8 |
| 2013 | 55097 | 99.2 | 98.9 | 99.8 | 99.5 |
| 2014 | 53875 | 100.3 | 99.7 | 100.8 | 100.2 |
| 2015 | 49431 | 100.2 | 99.3 | 100.6 | 99.8 |
| 2016 | 46538 | 99.6 | 98.6 | 99.9 | 99.1 |
| 2017 | 42186 | 99.2 | 98.5 | 99.4 | 98.8 |
| 2018 | 30844 | 99.8 | 97.6 | 100.0 | 98.0 |
| 2019 | 1119 | 99.5 | 98.0 | 99.5 | 98.3 |



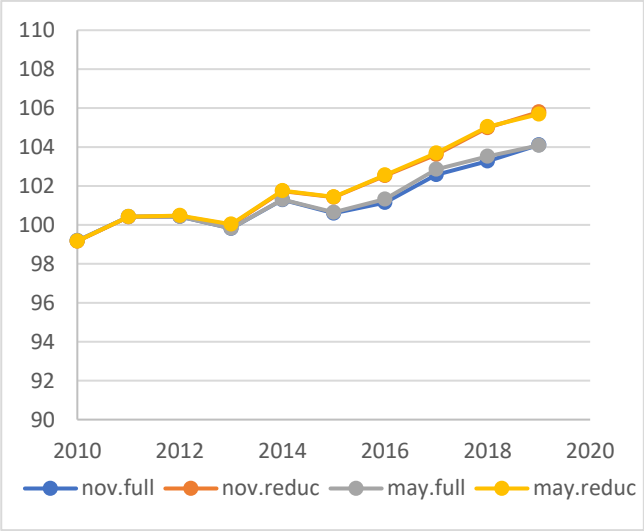

## *bv10*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62816 | 0.996 | 0.997 | 0.999 |
| 2011 | 56881 | 0.995 | 0.995 | 0.999 |
| 2012 | 54729 | 0.993 | 0.994 | 0.998 |
| 2013 | 55097 | 0.991 | 0.992 | 0.997 |
| 2014 | 53874 | 0.990 | 0.991 | 0.997 |
| 2015 | 49431 | 0.956 | 0.955 | 0.995 |
| 2016 | 46538 | 0.894 | 0.894 | 0.992 |
| 2017 | 42186 | 0.883 | 0.880 | 0.990 |
| 2018 | 30843 | 0.856 | 0.849 | 0.987 |
| 2019 | 1119 | 0.836 | 0.822 | 0.981 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62816 | 99.2 | 99.2 | 99.2 | 99.2 |
| 2011 | 56881 | 100.4 | 100.4 | 100.4 | 100.4 |
| 2012 | 54729 | 100.4 | 100.5 | 100.4 | 100.5 |
| 2013 | 55097 | 99.8 | 100.0 | 99.8 | 100.0 |
| 2014 | 53874 | 101.3 | 101.7 | 101.3 | 101.8 |
| 2015 | 49431 | 100.6 | 101.4 | 100.6 | 101.4 |
| 2016 | 46538 | 101.1 | 102.5 | 101.3 | 102.6 |
| 2017 | 42186 | 102.6 | 103.6 | 102.9 | 103.7 |
| 2018 | 30843 | 103.3 | 105.0 | 103.5 | 105.0 |
| 2019 | 1119 | 104.1 | 105.8 | 104.1 | 105.7 |



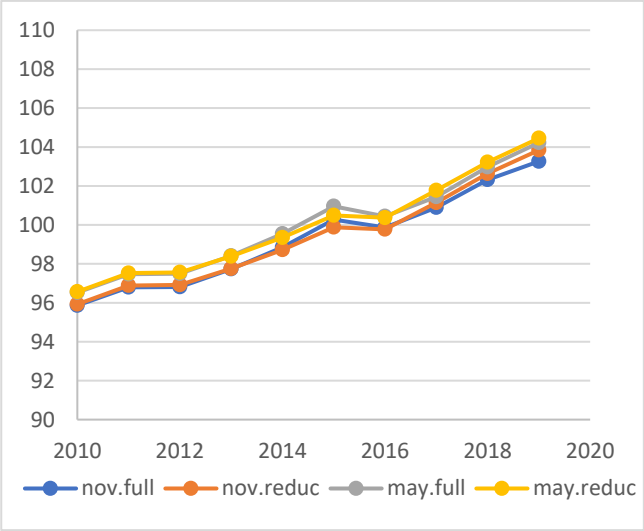

## *bv11*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.996 | 0.996 | 0.999 |
| 2011 | 56881 | 0.994 | 0.995 | 0.999 |
| 2012 | 54729 | 0.992 | 0.993 | 0.998 |
| 2013 | 55097 | 0.988 | 0.989 | 0.997 |
| 2014 | 53874 | 0.984 | 0.986 | 0.996 |
| 2015 | 49431 | 0.950 | 0.951 | 0.996 |
| 2016 | 46538 | 0.852 | 0.852 | 0.991 |
| 2017 | 42185 | 0.842 | 0.838 | 0.989 |
| 2018 | 30843 | 0.824 | 0.827 | 0.987 |
| 2019 | 1119 | 0.800 | 0.798 | 0.978 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 95.9 | 95.9 | 96.5 | 96.6 |
| 2011 | 56881 | 96.8 | 96.9 | 97.5 | 97.5 |
| 2012 | 54729 | 96.8 | 96.9 | 97.5 | 97.6 |
| 2013 | 55097 | 97.7 | 97.8 | 98.4 | 98.4 |
| 2014 | 53874 | 98.9 | 98.7 | 99.5 | 99.4 |
| 2015 | 49431 | 100.3 | 99.9 | 101.0 | 100.5 |
| 2016 | 46538 | 99.9 | 99.8 | 100.4 | 100.4 |
| 2017 | 42185 | 100.9 | 101.1 | 101.4 | 101.8 |
| 2018 | 30843 | 102.3 | 102.6 | 103.0 | 103.2 |
| 2019 | 1119 | 103.3 | 103.8 | 104.2 | 104.5 |



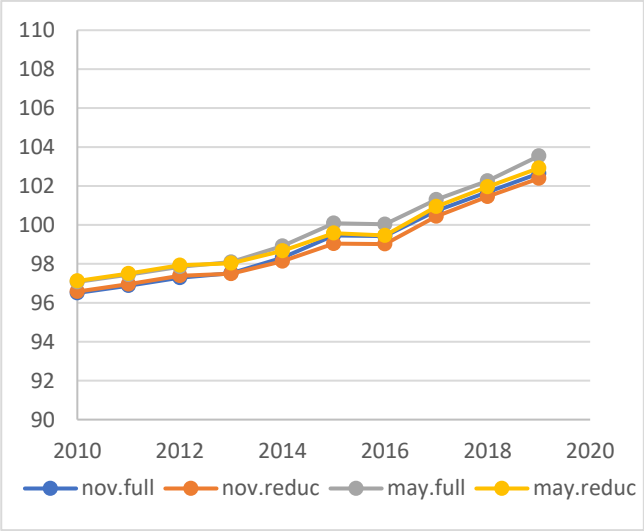

## *bv12*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62816 | 0.996 | 0.997 | 0.999 |
| 2011 | 56881 | 0.994 | 0.995 | 0.999 |
| 2012 | 54729 | 0.992 | 0.993 | 0.998 |
| 2013 | 55097 | 0.989 | 0.990 | 0.998 |
| 2014 | 53874 | 0.988 | 0.989 | 0.997 |
| 2015 | 49431 | 0.945 | 0.946 | 0.996 |
| 2016 | 46538 | 0.861 | 0.867 | 0.991 |
| 2017 | 42185 | 0.827 | 0.831 | 0.989 |
| 2018 | 30843 | 0.849 | 0.850 | 0.987 |
| 2019 | 1119 | 0.849 | 0.840 | 0.987 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62816 | 96.5 | 96.6 | 97.1 | 97.1 |
| 2011 | 56881 | 96.9 | 97.0 | 97.4 | 97.5 |
| 2012 | 54729 | 97.3 | 97.4 | 97.8 | 97.9 |
| 2013 | 55097 | 97.5 | 97.5 | 98.1 | 98.0 |
| 2014 | 53874 | 98.3 | 98.1 | 98.9 | 98.7 |
| 2015 | 49431 | 99.5 | 99.0 | 100.1 | 99.6 |
| 2016 | 46538 | 99.4 | 99.0 | 100.0 | 99.5 |
| 2017 | 42185 | 100.7 | 100.4 | 101.3 | 100.9 |
| 2018 | 30843 | 101.7 | 101.5 | 102.3 | 102.0 |
| 2019 | 1119 | 102.6 | 102.4 | 103.5 | 102.9 |



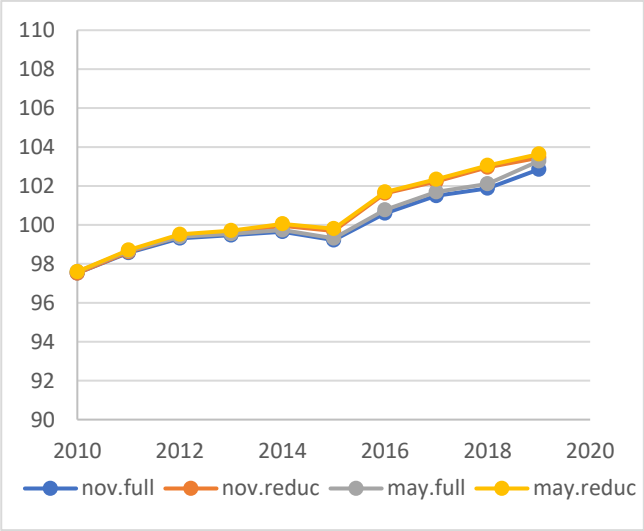

## *bv13*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.996 | 0.997 | 0.999 |
| 2011 | 56881 | 0.994 | 0.994 | 0.999 |
| 2012 | 54729 | 0.991 | 0.992 | 0.998 |
| 2013 | 55097 | 0.988 | 0.990 | 0.997 |
| 2014 | 53874 | 0.984 | 0.986 | 0.996 |
| 2015 | 49431 | 0.943 | 0.947 | 0.994 |
| 2016 | 46538 | 0.869 | 0.875 | 0.991 |
| 2017 | 42184 | 0.850 | 0.855 | 0.986 |
| 2018 | 30842 | 0.784 | 0.786 | 0.983 |
| 2019 | 1119 | 0.826 | 0.817 | 0.971 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 97.5 | 97.5 | 97.6 | 97.6 |
| 2011 | 56881 | 98.6 | 98.6 | 98.7 | 98.7 |
| 2012 | 54729 | 99.3 | 99.4 | 99.4 | 99.5 |
| 2013 | 55097 | 99.5 | 99.6 | 99.5 | 99.7 |
| 2014 | 53874 | 99.7 | 100.0 | 99.7 | 100.1 |
| 2015 | 49431 | 99.2 | 99.7 | 99.3 | 99.8 |
| 2016 | 46538 | 100.6 | 101.6 | 100.8 | 101.7 |
| 2017 | 42184 | 101.5 | 102.2 | 101.7 | 102.3 |
| 2018 | 30842 | 101.9 | 103.0 | 102.1 | 103.1 |
| 2019 | 1119 | 102.9 | 103.5 | 103.3 | 103.6 |



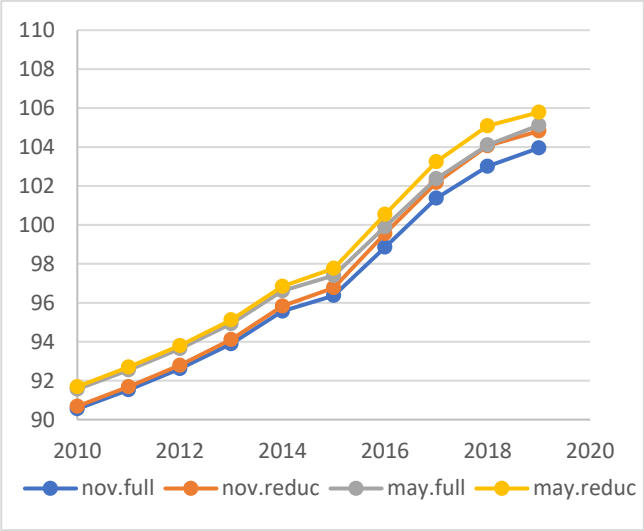

## *bv16*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.997 | 0.997 | 0.999 |
| 2011 | 56880 | 0.995 | 0.995 | 0.999 |
| 2012 | 54729 | 0.993 | 0.994 | 0.998 |
| 2013 | 55093 | 0.990 | 0.991 | 0.997 |
| 2014 | 53872 | 0.986 | 0.988 | 0.996 |
| 2015 | 49431 | 0.948 | 0.950 | 0.995 |
| 2016 | 46537 | 0.873 | 0.871 | 0.993 |
| 2017 | 42182 | 0.852 | 0.851 | 0.991 |
| 2018 | 30840 | 0.833 | 0.838 | 0.989 |
| 2019 | 1119 | 0.815 | 0.834 | 0.988 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 90.5 | 90.7 | 91.6 | 91.7 |
| 2011 | 56880 | 91.5 | 91.7 | 92.5 | 92.7 |
| 2012 | 54729 | 92.6 | 92.8 | 93.6 | 93.8 |
| 2013 | 55093 | 93.9 | 94.1 | 94.9 | 95.1 |
| 2014 | 53872 | 95.6 | 95.8 | 96.6 | 96.8 |
| 2015 | 49431 | 96.4 | 96.8 | 97.4 | 97.8 |
| 2016 | 46537 | 98.9 | 99.6 | 99.9 | 100.5 |
| 2017 | 42182 | 101.4 | 102.2 | 102.4 | 103.2 |
| 2018 | 30840 | 103.0 | 104.1 | 104.1 | 105.1 |
| 2019 | 1119 | 104.0 | 104.8 | 105.1 | 105.8 |



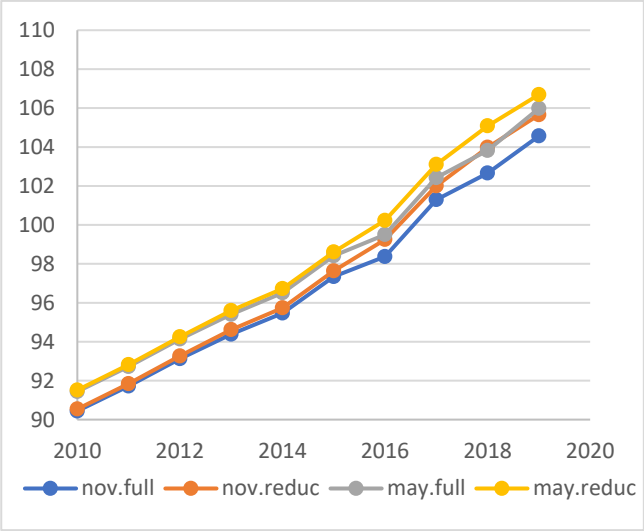

## *bv17*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.998 | 0.998 | 0.999 |
| 2011 | 56880 | 0.996 | 0.997 | 0.999 |
| 2012 | 54729 | 0.994 | 0.994 | 0.999 |
| 2013 | 55093 | 0.992 | 0.992 | 0.998 |
| 2014 | 53872 | 0.990 | 0.991 | 0.997 |
| 2015 | 49431 | 0.965 | 0.965 | 0.997 |
| 2016 | 46537 | 0.911 | 0.909 | 0.994 |
| 2017 | 42182 | 0.895 | 0.896 | 0.993 |
| 2018 | 30839 | 0.877 | 0.873 | 0.991 |
| 2019 | 1119 | 0.878 | 0.874 | 0.988 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 90.4 | 90.5 | 91.4 | 91.5 |
| 2011 | 56880 | 91.7 | 91.8 | 92.7 | 92.8 |
| 2012 | 54729 | 93.1 | 93.3 | 94.1 | 94.2 |
| 2013 | 55093 | 94.4 | 94.6 | 95.4 | 95.6 |
| 2014 | 53872 | 95.5 | 95.7 | 96.5 | 96.7 |
| 2015 | 49431 | 97.3 | 97.6 | 98.4 | 98.6 |
| 2016 | 46537 | 98.4 | 99.2 | 99.5 | 100.2 |
| 2017 | 42182 | 101.3 | 102.0 | 102.4 | 103.1 |
| 2018 | 30839 | 102.7 | 104.0 | 103.8 | 105.1 |
| 2019 | 1119 | 104.6 | 105.7 | 106.0 | 106.7 |



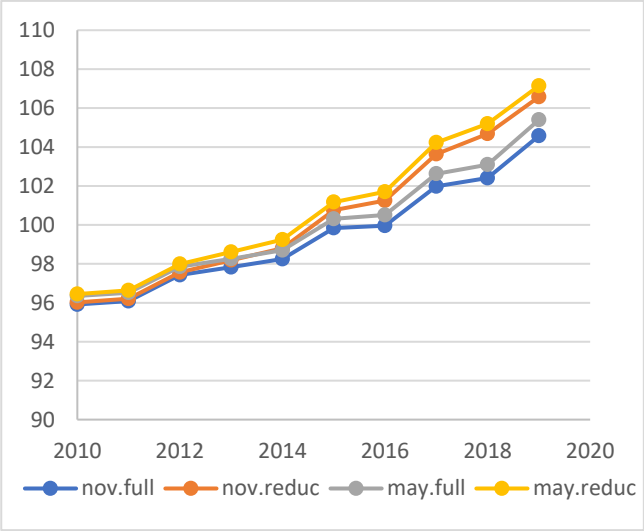

## *bv18*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.996 | 0.997 | 0.999 |
| 2011 | 56880 | 0.994 | 0.995 | 0.999 |
| 2012 | 54729 | 0.992 | 0.992 | 0.999 |
| 2013 | 55093 | 0.988 | 0.989 | 0.998 |
| 2014 | 53872 | 0.986 | 0.987 | 0.997 |
| 2015 | 49431 | 0.950 | 0.951 | 0.996 |
| 2016 | 46537 | 0.871 | 0.872 | 0.993 |
| 2017 | 42182 | 0.857 | 0.856 | 0.992 |
| 2018 | 30838 | 0.856 | 0.858 | 0.991 |
| 2019 | 1119 | 0.832 | 0.843 | 0.984 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 95.9 | 96.0 | 96.4 | 96.4 |
| 2011 | 56880 | 96.1 | 96.2 | 96.5 | 96.6 |
| 2012 | 54729 | 97.4 | 97.6 | 97.9 | 98.0 |
| 2013 | 55093 | 97.8 | 98.2 | 98.3 | 98.6 |
| 2014 | 53872 | 98.2 | 98.8 | 98.7 | 99.2 |
| 2015 | 49431 | 99.8 | 100.8 | 100.3 | 101.2 |
| 2016 | 46537 | 100.0 | 101.2 | 100.5 | 101.7 |
| 2017 | 42182 | 102.0 | 103.6 | 102.6 | 104.2 |
| 2018 | 30838 | 102.4 | 104.7 | 103.1 | 105.2 |
| 2019 | 1119 | 104.6 | 106.6 | 105.4 | 107.1 |



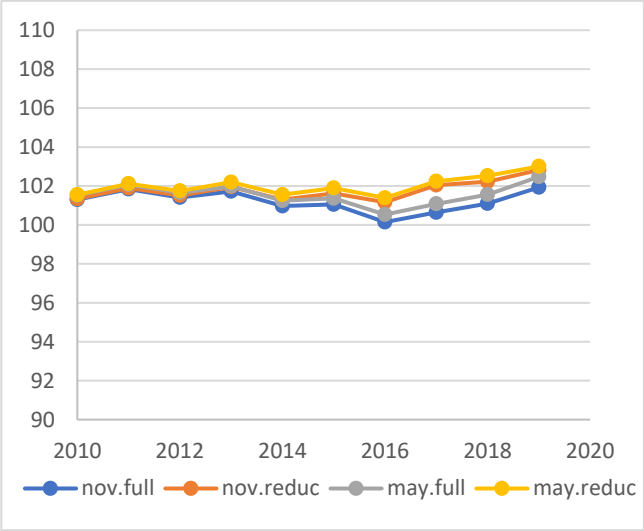

## *bv19*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.997 | 0.997 | 0.999 |
| 2011 | 56880 | 0.995 | 0.996 | 0.999 |
| 2012 | 54729 | 0.993 | 0.994 | 0.999 |
| 2013 | 55093 | 0.990 | 0.991 | 0.998 |
| 2014 | 53872 | 0.988 | 0.989 | 0.997 |
| 2015 | 49431 | 0.954 | 0.956 | 0.996 |
| 2016 | 46537 | 0.879 | 0.881 | 0.993 |
| 2017 | 42182 | 0.853 | 0.853 | 0.991 |
| 2018 | 30839 | 0.853 | 0.848 | 0.990 |
| 2019 | 1119 | 0.855 | 0.853 | 0.987 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 101.3 | 101.3 | 101.5 | 101.6 |
| 2011 | 56880 | 101.8 | 101.9 | 102.1 | 102.1 |
| 2012 | 54729 | 101.4 | 101.5 | 101.7 | 101.7 |
| 2013 | 55093 | 101.7 | 102.0 | 102.0 | 102.2 |
| 2014 | 53872 | 101.0 | 101.3 | 101.2 | 101.6 |
| 2015 | 49431 | 101.1 | 101.6 | 101.4 | 101.9 |
| 2016 | 46537 | 100.1 | 101.2 | 100.5 | 101.4 |
| 2017 | 42182 | 100.6 | 102.0 | 101.1 | 102.2 |
| 2018 | 30839 | 101.1 | 102.2 | 101.6 | 102.5 |
| 2019 | 1119 | 101.9 | 102.8 | 102.5 | 103.0 |



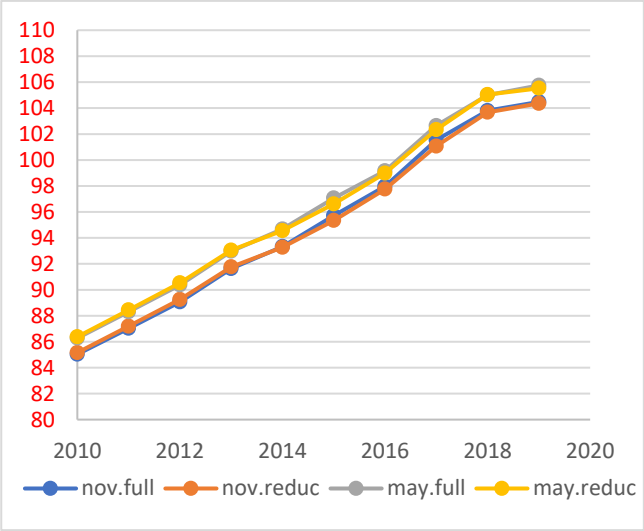

## *bv20*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.998 | 0.998 | 0.998 |
| 2011 | 56880 | 0.996 | 0.997 | 0.997 |
| 2012 | 54729 | 0.994 | 0.995 | 0.997 |
| 2013 | 55093 | 0.993 | 0.994 | 0.997 |
| 2014 | 53872 | 0.990 | 0.991 | 0.996 |
| 2015 | 49431 | 0.955 | 0.956 | 0.995 |
| 2016 | 46537 | 0.876 | 0.877 | 0.991 |
| 2017 | 42182 | 0.874 | 0.874 | 0.991 |
| 2018 | 30839 | 0.861 | 0.859 | 0.990 |
| 2019 | 1119 | 0.849 | 0.848 | 0.989 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 85.0 | 85.2 | 86.3 | 86.4 |
| 2011 | 56880 | 87.0 | 87.2 | 88.3 | 88.4 |
| 2012 | 54729 | 89.1 | 89.3 | 90.4 | 90.5 |
| 2013 | 55093 | 91.6 | 91.8 | 93.0 | 93.0 |
| 2014 | 53872 | 93.3 | 93.3 | 94.7 | 94.6 |
| 2015 | 49431 | 95.7 | 95.3 | 97.1 | 96.6 |
| 2016 | 46537 | 98.0 | 97.8 | 99.2 | 99.0 |
| 2017 | 42182 | 101.5 | 101.1 | 102.6 | 102.3 |
| 2018 | 30839 | 103.8 | 103.7 | 105.0 | 105.0 |
| 2019 | 1119 | 104.5 | 104.4 | 105.8 | 105.5 |



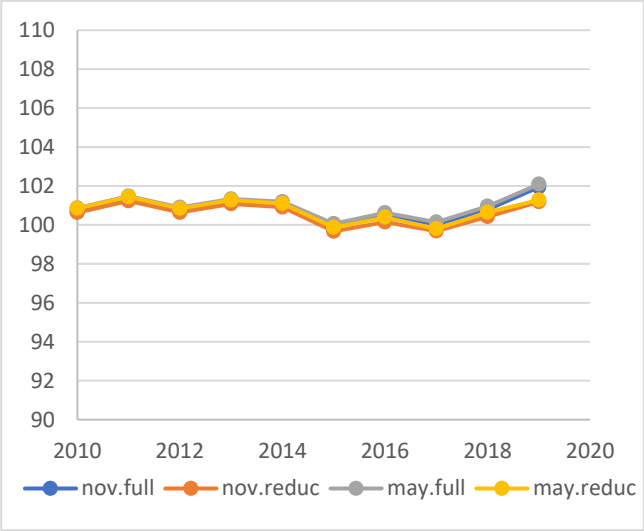

## *bv21*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.998 | 0.998 | 1.000 |
| 2011 | 56880 | 0.996 | 0.997 | 0.999 |
| 2012 | 54729 | 0.994 | 0.995 | 0.999 |
| 2013 | 55093 | 0.992 | 0.992 | 0.998 |
| 2014 | 53872 | 0.990 | 0.991 | 0.998 |
| 2015 | 49431 | 0.946 | 0.947 | 0.997 |
| 2016 | 46536 | 0.864 | 0.868 | 0.995 |
| 2017 | 42183 | 0.844 | 0.846 | 0.993 |
| 2018 | 30839 | 0.818 | 0.815 | 0.991 |
| 2019 | 1119 | 0.777 | 0.769 | 0.991 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 100.7 | 100.6 | 100.9 | 100.8 |
| 2011 | 56880 | 101.3 | 101.2 | 101.5 | 101.4 |
| 2012 | 54729 | 100.7 | 100.6 | 100.9 | 100.8 |
| 2013 | 55093 | 101.1 | 101.1 | 101.3 | 101.3 |
| 2014 | 53872 | 101.0 | 100.9 | 101.2 | 101.1 |
| 2015 | 49431 | 99.9 | 99.7 | 100.1 | 99.9 |
| 2016 | 46536 | 100.5 | 100.1 | 100.6 | 100.4 |
| 2017 | 42183 | 100.0 | 99.7 | 100.1 | 99.8 |
| 2018 | 30839 | 100.8 | 100.4 | 101.0 | 100.6 |
| 2019 | 1119 | 101.9 | 101.2 | 102.1 | 101.3 |



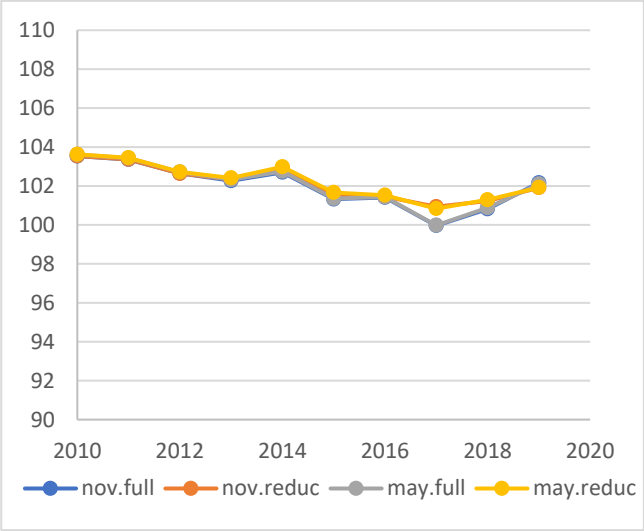

## *bv22*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62815 | 0.997 | 0.997 | 0.999 |
| 2011 | 56880 | 0.995 | 0.996 | 0.999 |
| 2012 | 54729 | 0.992 | 0.993 | 0.999 |
| 2013 | 55093 | 0.989 | 0.990 | 0.998 |
| 2014 | 53872 | 0.987 | 0.988 | 0.997 |
| 2015 | 49431 | 0.941 | 0.943 | 0.996 |
| 2016 | 46536 | 0.847 | 0.849 | 0.993 |
| 2017 | 42183 | 0.812 | 0.816 | 0.991 |
| 2018 | 30839 | 0.810 | 0.812 | 0.991 |
| 2019 | 1119 | 0.821 | 0.819 | 0.988 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62815 | 103.5 | 103.5 | 103.6 | 103.6 |
| 2011 | 56880 | 103.4 | 103.4 | 103.4 | 103.5 |
| 2012 | 54729 | 102.7 | 102.6 | 102.7 | 102.7 |
| 2013 | 55093 | 102.3 | 102.3 | 102.3 | 102.4 |
| 2014 | 53872 | 102.7 | 102.9 | 102.8 | 103.0 |
| 2015 | 49431 | 101.3 | 101.6 | 101.4 | 101.7 |
| 2016 | 46536 | 101.4 | 101.4 | 101.4 | 101.5 |
| 2017 | 42183 | 100.0 | 100.9 | 100.0 | 100.8 |
| 2018 | 30839 | 100.8 | 101.2 | 100.9 | 101.3 |
| 2019 | 1119 | 102.2 | 101.9 | 102.1 | 101.9 |



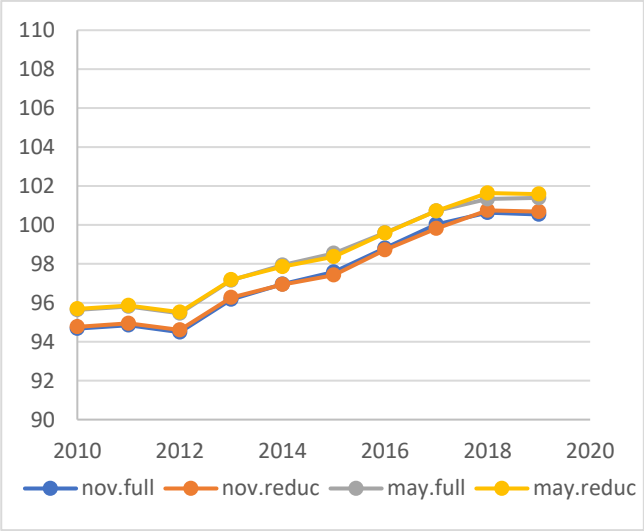

## *bv23*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62813 | 0.997 | 0.998 | 0.996 |
| 2011 | 56880 | 0.996 | 0.997 | 0.995 |
| 2012 | 54729 | 0.994 | 0.995 | 0.994 |
| 2013 | 55093 | 0.992 | 0.993 | 0.994 |
| 2014 | 53872 | 0.989 | 0.991 | 0.991 |
| 2015 | 49431 | 0.952 | 0.956 | 0.989 |
| 2016 | 46536 | 0.866 | 0.870 | 0.984 |
| 2017 | 42183 | 0.855 | 0.858 | 0.982 |
| 2018 | 30839 | 0.849 | 0.856 | 0.982 |
| 2019 | 1119 | 0.856 | 0.868 | 0.976 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62813 | 94.7 | 94.8 | 95.6 | 95.7 |
| 2011 | 56880 | 94.8 | 94.9 | 95.8 | 95.9 |
| 2012 | 54729 | 94.5 | 94.6 | 95.5 | 95.5 |
| 2013 | 55093 | 96.2 | 96.3 | 97.2 | 97.2 |
| 2014 | 53872 | 97.0 | 96.9 | 97.9 | 97.9 |
| 2015 | 49431 | 97.6 | 97.4 | 98.5 | 98.4 |
| 2016 | 46536 | 98.8 | 98.7 | 99.6 | 99.6 |
| 2017 | 42183 | 100.0 | 99.8 | 100.7 | 100.7 |
| 2018 | 30839 | 100.6 | 100.7 | 101.3 | 101.6 |
| 2019 | 1119 | 100.5 | 100.7 | 101.4 | 101.6 |



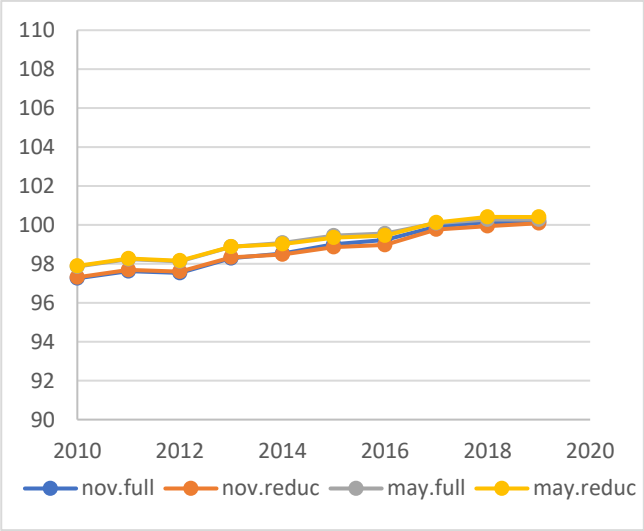

## *bv24*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62814 | 0.997 | 0.998 | 0.996 |
| 2011 | 56880 | 0.996 | 0.997 | 0.994 |
| 2012 | 54729 | 0.994 | 0.995 | 0.992 |
| 2013 | 55094 | 0.992 | 0.993 | 0.991 |
| 2014 | 53872 | 0.990 | 0.991 | 0.991 |
| 2015 | 49431 | 0.956 | 0.959 | 0.990 |
| 2016 | 46536 | 0.870 | 0.879 | 0.983 |
| 2017 | 42183 | 0.857 | 0.867 | 0.979 |
| 2018 | 30839 | 0.863 | 0.873 | 0.977 |
| 2019 | 1119 | 0.890 | 0.900 | 0.972 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62814 | 97.3 | 97.3 | 97.9 | 97.9 |
| 2011 | 56880 | 97.6 | 97.7 | 98.2 | 98.3 |
| 2012 | 54729 | 97.5 | 97.6 | 98.1 | 98.2 |
| 2013 | 55094 | 98.3 | 98.3 | 98.9 | 98.9 |
| 2014 | 53872 | 98.5 | 98.5 | 99.1 | 99.0 |
| 2015 | 49431 | 99.0 | 98.9 | 99.5 | 99.3 |
| 2016 | 46536 | 99.2 | 99.0 | 99.6 | 99.5 |
| 2017 | 42183 | 99.9 | 99.8 | 100.1 | 100.1 |
| 2018 | 30839 | 100.1 | 99.9 | 100.3 | 100.4 |
| 2019 | 1119 | 100.2 | 100.1 | 100.3 | 100.4 |



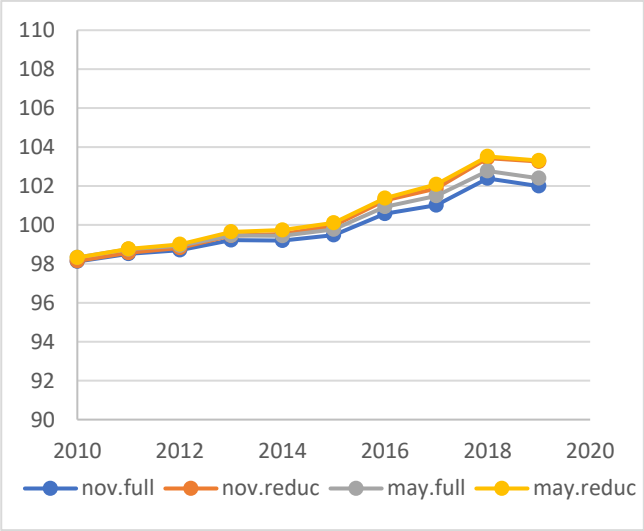

## *bv25*

Correlations

| Birth year | Number of cows | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 62814 | 0.996 | 0.997 | 0.995 |
| 2011 | 56880 | 0.995 | 0.996 | 0.994 |
| 2012 | 54729 | 0.992 | 0.994 | 0.992 |
| 2013 | 55093 | 0.988 | 0.991 | 0.991 |
| 2014 | 53872 | 0.985 | 0.989 | 0.989 |
| 2015 | 49431 | 0.948 | 0.953 | 0.983 |
| 2016 | 46536 | 0.857 | 0.873 | 0.977 |
| 2017 | 42182 | 0.855 | 0.870 | 0.975 |
| 2018 | 30839 | 0.831 | 0.847 | 0.972 |
| 2019 | 1119 | 0.828 | 0.836 | 0.968 |

Mean GEBV

| Birth year | Number of cows | nov.full | nov.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 62814 | 98.1 | 98.1 | 98.3 | 98.3 |
| 2011 | 56880 | 98.5 | 98.6 | 98.7 | 98.8 |
| 2012 | 54729 | 98.7 | 98.8 | 98.9 | 99.0 |
| 2013 | 55093 | 99.2 | 99.5 | 99.5 | 99.6 |
| 2014 | 53872 | 99.2 | 99.5 | 99.4 | 99.7 |
| 2015 | 49431 | 99.5 | 100.0 | 99.8 | 100.1 |
| 2016 | 46536 | 100.6 | 101.3 | 100.9 | 101.4 |
| 2017 | 42182 | 101.0 | 101.9 | 101.5 | 102.1 |
| 2018 | 30839 | 102.4 | 103.4 | 102.8 | 103.5 |
| 2019 | 1119 | 102.0 | 103.3 | 102.4 | 103.3 |




# Bulls

Domestic AI Holstein bulls with genotype in May

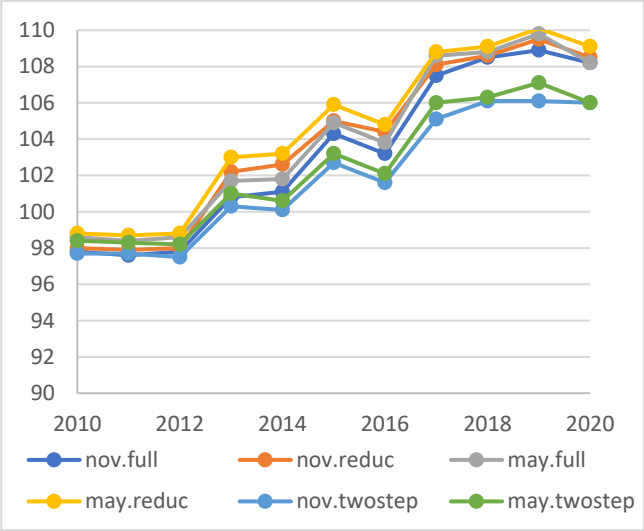
## *bv1*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.997 | 0.997 | 0.999 |
| 2011 | 167 | 0.998 | 0.998 | 0.999 |
| 2012 | 172 | 0.995 | 0.996 | 0.999 |
| 2013 | 120 | 0.932 | 0.932 | 0.999 |
| 2014 | 104 | 0.943 | 0.945 | 1.000 |
| 2015 | 80 | 0.925 | 0.914 | 0.999 |
| 2016 | 66 | 0.925 | 0.931 | 0.981 |
| 2017 | 65 | 0.936 | 0.966 | 0.965 |
| 2018 | 89 | 0.961 | 0.960 | 0.995 |
| 2019 | 60 | 0.920 | 0.947 | 0.979 |
| 2020 | 26 | 0.971 | 0.963 | 0.997 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 97.8 | 98.0 | 98.6 | 98.8 | 97.7 | 98.4 |
| 2011 | 167 | 97.6 | 97.9 | 98.4 | 98.7 | 97.7 | 98.3 |
| 2012 | 172 | 97.8 | 98.0 | 98.6 | 98.8 | 97.5 | 98.2 |
| 2013 | 120 | 100.8 | 102.2 | 101.7 | 103.0 | 100.3 | 101.0 |
| 2014 | 104 | 101.1 | 102.6 | 101.8 | 103.2 | 100.1 | 100.6 |
| 2015 | 80 | 104.3 | 105.0 | 104.9 | 105.9 | 102.7 | 103.2 |
| 2016 | 66 | 103.2 | 104.4 | 103.8 | 104.8 | 101.6 | 102.1 |
| 2017 | 65 | 107.5 | 108.1 | 108.6 | 108.8 | 105.1 | 106.0 |
| 2018 | 89 | 108.5 | 108.6 | 108.8 | 109.1 | 106.1 | 106.3 |
| 2019 | 60 | 108.9 | 109.5 | 109.8 | 110.1 | 106.1 | 107.1 |
| 2020 | 26 | 108.2 | 108.5 | 108.2 | 109.1 | 106.0 | 106.0 |



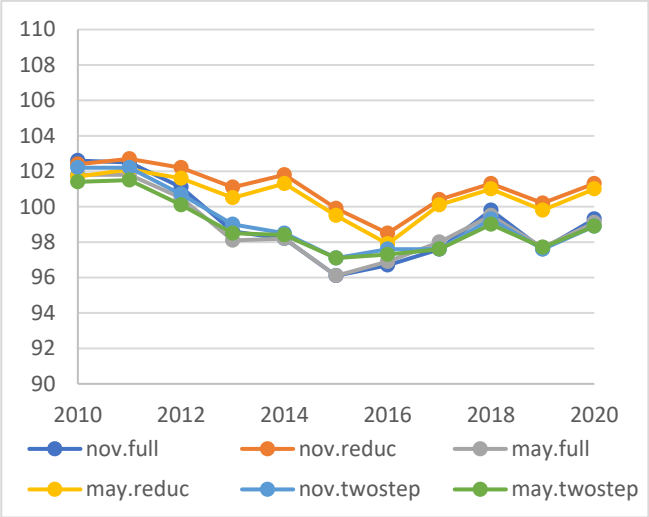

## *bv2*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.993 | 0.994 | 0.999 |
| 2011 | 167 | 0.994 | 0.994 | 0.999 |
| 2012 | 172 | 0.991 | 0.992 | 0.999 |
| 2013 | 120 | 0.823 | 0.830 | 0.998 |
| 2014 | 104 | 0.880 | 0.886 | 0.998 |
| 2015 | 80 | 0.885 | 0.879 | 0.997 |
| 2016 | 66 | 0.831 | 0.853 | 0.964 |
| 2017 | 65 | 0.869 | 0.924 | 0.947 |
| 2018 | 89 | 0.901 | 0.919 | 0.987 |
| 2019 | 60 | 0.939 | 0.954 | 0.983 |
| 2020 | 26 | 0.970 | 0.965 | 0.995 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 102.6 | 102.4 | 101.8 | 101.7 | 102.2 | 101.4 |
| 2011 | 167 | 102.5 | 102.7 | 101.8 | 102.1 | 102.2 | 101.5 |
| 2012 | 172 | 101.1 | 102.2 | 100.5 | 101.6 | 100.7 | 100.1 |
| 2013 | 120 | 98.6 | 101.1 | 98.1 | 100.5 | 99.0 | 98.5 |
| 2014 | 104 | 98.2 | 101.8 | 98.2 | 101.3 | 98.5 | 98.4 |
| 2015 | 80 | 96.1 | 99.9 | 96.1 | 99.5 | 97.1 | 97.1 |
| 2016 | 66 | 96.7 | 98.5 | 96.9 | 97.9 | 97.6 | 97.3 |
| 2017 | 65 | 97.6 | 100.4 | 98.0 | 100.1 | 97.6 | 97.6 |
| 2018 | 89 | 99.8 | 101.3 | 99.5 | 101.0 | 99.3 | 99.0 |
| 2019 | 60 | 97.6 | 100.2 | 97.7 | 99.8 | 97.6 | 97.7 |
| 2020 | 26 | 99.3 | 101.3 | 99.1 | 101.0 | 98.9 | 98.9 |



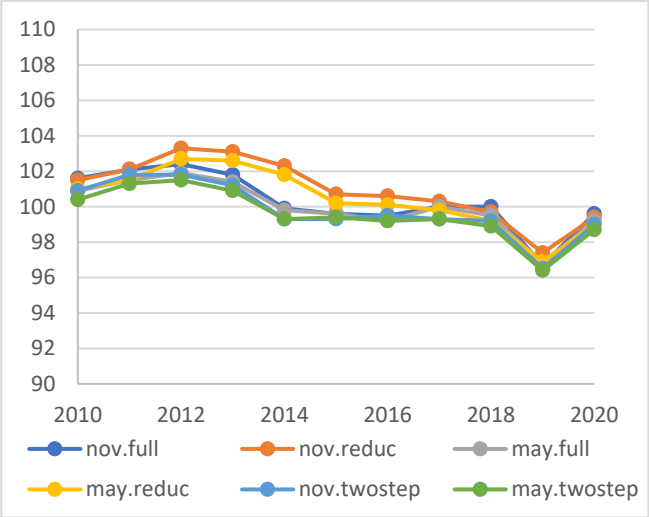

## *bv3*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.994 | 0.995 | 0.999 |
| 2011 | 167 | 0.993 | 0.993 | 0.999 |
| 2012 | 172 | 0.993 | 0.993 | 0.999 |
| 2013 | 120 | 0.872 | 0.872 | 0.998 |
| 2014 | 104 | 0.847 | 0.856 | 0.997 |
| 2015 | 80 | 0.851 | 0.839 | 0.995 |
| 2016 | 66 | 0.878 | 0.876 | 0.975 |
| 2017 | 65 | 0.883 | 0.946 | 0.948 |
| 2018 | 89 | 0.941 | 0.948 | 0.993 |
| 2019 | 60 | 0.910 | 0.944 | 0.976 |
| 2020 | 26 | 0.976 | 0.975 | 0.991 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 101.6 | 101.5 | 100.9 | 101.0 | 100.9 | 100.4 |
| 2011 | 167 | 102.1 | 102.1 | 101.5 | 101.5 | 101.8 | 101.3 |
| 2012 | 172 | 102.4 | 103.3 | 101.9 | 102.7 | 101.8 | 101.5 |
| 2013 | 120 | 101.8 | 103.1 | 101.4 | 102.6 | 101.2 | 100.9 |
| 2014 | 104 | 99.9 | 102.3 | 99.8 | 101.8 | 99.3 | 99.3 |
| 2015 | 80 | 99.6 | 100.7 | 99.6 | 100.2 | 99.3 | 99.4 |
| 2016 | 66 | 99.5 | 100.6 | 99.2 | 100.1 | 99.5 | 99.2 |
| 2017 | 65 | 100.0 | 100.3 | 100.0 | 99.8 | 99.3 | 99.3 |
| 2018 | 89 | 100.0 | 99.7 | 99.5 | 99.2 | 99.2 | 98.9 |
| 2019 | 60 | 96.7 | 97.4 | 96.8 | 96.9 | 96.5 | 96.4 |
| 2020 | 26 | 99.6 | 99.4 | 99.2 | 99.0 | 99.0 | 98.7 |



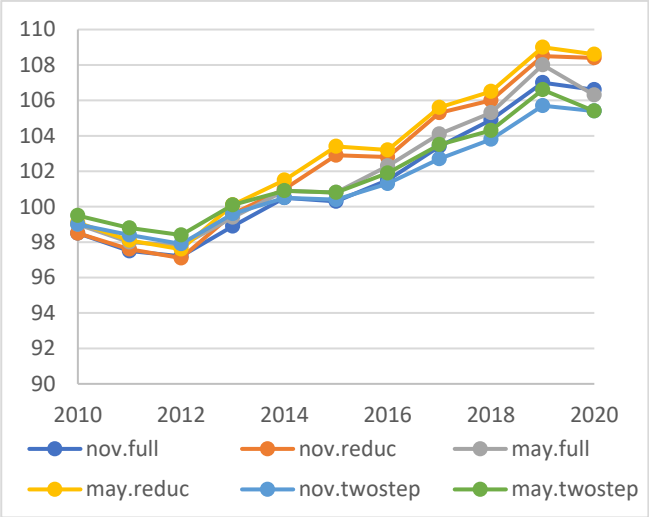

## *bv4*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.993 | 0.994 | 0.999 |
| 2011 | 167 | 0.994 | 0.995 | 0.999 |
| 2012 | 172 | 0.992 | 0.993 | 0.999 |
| 2013 | 120 | 0.865 | 0.870 | 0.998 |
| 2014 | 104 | 0.919 | 0.921 | 0.998 |
| 2015 | 80 | 0.892 | 0.891 | 0.998 |
| 2016 | 66 | 0.839 | 0.865 | 0.966 |
| 2017 | 65 | 0.872 | 0.914 | 0.927 |
| 2018 | 89 | 0.911 | 0.913 | 0.990 |
| 2019 | 60 | 0.918 | 0.936 | 0.964 |
| 2020 | 26 | 0.905 | 0.918 | 0.984 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 98.5 | 98.5 | 99.0 | 99.1 | 99.0 | 99.5 |
| 2011 | 167 | 97.5 | 97.6 | 98.0 | 98.1 | 98.4 | 98.8 |
| 2012 | 172 | 97.2 | 97.1 | 97.8 | 97.6 | 97.9 | 98.4 |
| 2013 | 120 | 98.9 | 99.6 | 99.4 | 100.1 | 99.6 | 100.1 |
| 2014 | 104 | 100.5 | 101.0 | 100.9 | 101.5 | 100.5 | 100.9 |
| 2015 | 80 | 100.3 | 102.9 | 100.8 | 103.4 | 100.4 | 100.8 |
| 2016 | 66 | 101.5 | 102.8 | 102.3 | 103.2 | 101.3 | 101.9 |
| 2017 | 65 | 103.4 | 105.3 | 104.1 | 105.6 | 102.7 | 103.5 |
| 2018 | 89 | 104.9 | 106.0 | 105.3 | 106.5 | 103.8 | 104.3 |
| 2019 | 60 | 107.0 | 108.5 | 108.0 | 109.0 | 105.7 | 106.6 |
| 2020 | 26 | 106.6 | 108.4 | 106.3 | 108.6 | 105.4 | 105.4 |



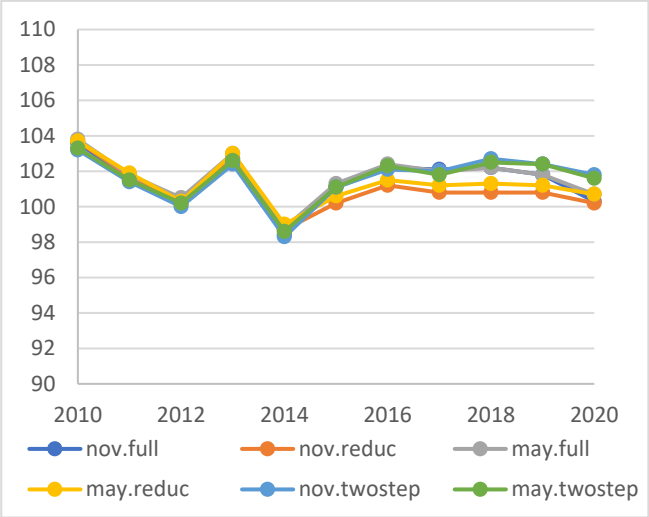

## *bv5*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.986 | 0.989 | 0.998 |
| 2011 | 167 | 0.987 | 0.988 | 0.997 |
| 2012 | 172 | 0.992 | 0.992 | 0.999 |
| 2013 | 120 | 0.862 | 0.852 | 0.998 |
| 2014 | 104 | 0.876 | 0.868 | 0.998 |
| 2015 | 80 | 0.845 | 0.849 | 0.997 |
| 2016 | 66 | 0.846 | 0.888 | 0.976 |
| 2017 | 65 | 0.887 | 0.924 | 0.963 |
| 2018 | 89 | 0.863 | 0.885 | 0.982 |
| 2019 | 60 | 0.899 | 0.928 | 0.979 |
| 2020 | 26 | 0.881 | 0.886 | 0.992 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 103.6 | 103.7 | 103.8 | 103.7 | 103.2 | 103.3 |
| 2011 | 167 | 101.6 | 101.7 | 101.8 | 101.9 | 101.4 | 101.5 |
| 2012 | 172 | 100.3 | 100.2 | 100.5 | 100.3 | 100.0 | 100.2 |
| 2013 | 120 | 102.7 | 102.7 | 103.0 | 103.0 | 102.4 | 102.6 |
| 2014 | 104 | 98.4 | 98.7 | 98.8 | 99.0 | 98.3 | 98.6 |
| 2015 | 80 | 101.1 | 100.2 | 101.3 | 100.6 | 101.1 | 101.1 |
| 2016 | 66 | 102.2 | 101.2 | 102.4 | 101.5 | 102.1 | 102.3 |
| 2017 | 65 | 102.1 | 100.8 | 102.0 | 101.2 | 102.0 | 101.8 |
| 2018 | 89 | 102.2 | 100.8 | 102.2 | 101.3 | 102.7 | 102.5 |
| 2019 | 60 | 101.8 | 100.8 | 101.8 | 101.2 | 102.4 | 102.4 |
| 2020 | 26 | 100.3 | 100.2 | 100.7 | 100.7 | 101.8 | 101.6 |



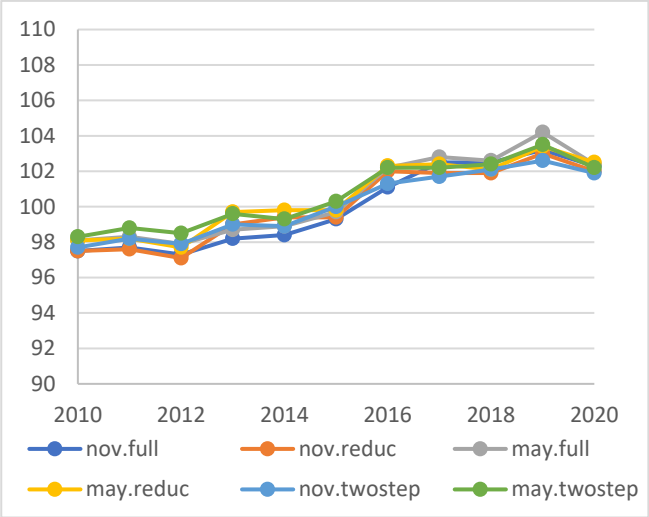

## *bv6*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.994 | 0.995 | 0.999 |
| 2011 | 167 | 0.995 | 0.996 | 0.999 |
| 2012 | 172 | 0.995 | 0.996 | 0.999 |
| 2013 | 120 | 0.890 | 0.891 | 0.999 |
| 2014 | 104 | 0.923 | 0.925 | 0.999 |
| 2015 | 80 | 0.904 | 0.907 | 0.997 |
| 2016 | 66 | 0.888 | 0.915 | 0.971 |
| 2017 | 65 | 0.947 | 0.970 | 0.969 |
| 2018 | 89 | 0.940 | 0.931 | 0.992 |
| 2019 | 60 | 0.932 | 0.969 | 0.970 |
| 2020 | 26 | 0.969 | 0.965 | 0.990 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 97.5 | 97.5 | 98.1 | 98.1 | 97.7 | 98.3 |
| 2011 | 167 | 97.7 | 97.6 | 98.3 | 98.2 | 98.2 | 98.8 |
| 2012 | 172 | 97.3 | 97.1 | 97.9 | 97.7 | 97.9 | 98.5 |
| 2013 | 120 | 98.2 | 99.0 | 98.7 | 99.7 | 99.0 | 99.6 |
| 2014 | 104 | 98.4 | 99.4 | 98.9 | 99.8 | 98.9 | 99.3 |
| 2015 | 80 | 99.3 | 99.4 | 99.7 | 99.8 | 100.0 | 100.3 |
| 2016 | 66 | 101.1 | 102.0 | 102.2 | 102.3 | 101.3 | 102.2 |
| 2017 | 65 | 102.5 | 101.9 | 102.8 | 102.4 | 101.7 | 102.2 |
| 2018 | 89 | 102.5 | 101.9 | 102.6 | 102.1 | 102.1 | 102.4 |
| 2019 | 60 | 103.2 | 103.0 | 104.2 | 103.4 | 102.6 | 103.5 |
| 2020 | 26 | 102.3 | 102.0 | 102.4 | 102.5 | 101.9 | 102.2 |



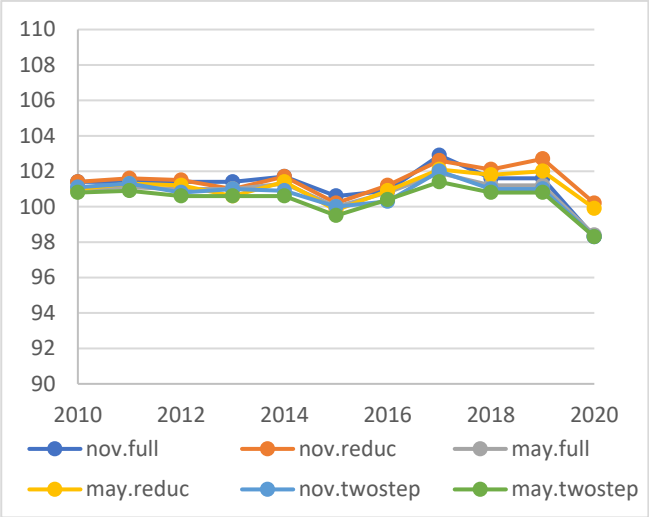

## *bv7*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.996 | 0.996 | 0.999 |
| 2011 | 167 | 0.996 | 0.996 | 0.999 |
| 2012 | 172 | 0.996 | 0.996 | 0.999 |
| 2013 | 120 | 0.930 | 0.936 | 0.999 |
| 2014 | 104 | 0.897 | 0.899 | 0.999 |
| 2015 | 80 | 0.901 | 0.898 | 0.998 |
| 2016 | 66 | 0.925 | 0.934 | 0.986 |
| 2017 | 65 | 0.933 | 0.958 | 0.972 |
| 2018 | 89 | 0.953 | 0.957 | 0.992 |
| 2019 | 60 | 0.957 | 0.957 | 0.983 |
| 2020 | 26 | 0.960 | 0.966 | 0.992 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 101.4 | 101.4 | 101.0 | 101.0 | 101.1 | 100.8 |
| 2011 | 167 | 101.4 | 101.6 | 101.1 | 101.3 | 101.3 | 100.9 |
| 2012 | 172 | 101.4 | 101.5 | 101.0 | 101.2 | 100.8 | 100.6 |
| 2013 | 120 | 101.4 | 101.0 | 101.0 | 100.6 | 101.0 | 100.6 |
| 2014 | 104 | 101.7 | 101.7 | 101.3 | 101.4 | 100.9 | 100.6 |
| 2015 | 80 | 100.6 | 100.2 | 100.0 | 99.8 | 100.0 | 99.5 |
| 2016 | 66 | 100.9 | 101.2 | 100.8 | 100.9 | 100.3 | 100.4 |
| 2017 | 65 | 102.9 | 102.6 | 101.9 | 102.1 | 102.0 | 101.4 |
| 2018 | 89 | 101.6 | 102.1 | 101.2 | 101.8 | 101.0 | 100.8 |
| 2019 | 60 | 101.6 | 102.7 | 101.2 | 102.0 | 101.0 | 100.8 |
| 2020 | 26 | 98.3 | 100.2 | 98.4 | 99.9 | 98.3 | 98.3 |



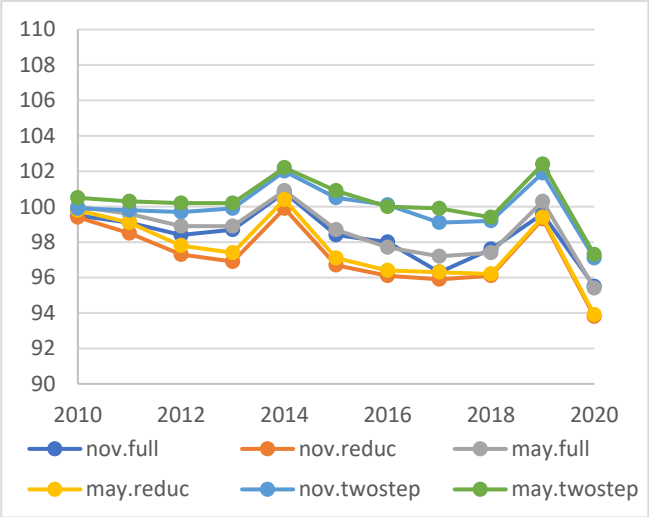

## *bv9*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.993 | 0.994 | 0.999 |
| 2011 | 167 | 0.993 | 0.993 | 0.998 |
| 2012 | 172 | 0.990 | 0.992 | 0.998 |
| 2013 | 120 | 0.900 | 0.900 | 0.999 |
| 2014 | 104 | 0.892 | 0.890 | 0.997 |
| 2015 | 80 | 0.870 | 0.871 | 0.995 |
| 2016 | 66 | 0.838 | 0.852 | 0.979 |
| 2017 | 65 | 0.903 | 0.947 | 0.939 |
| 2018 | 89 | 0.930 | 0.929 | 0.991 |
| 2019 | 60 | 0.949 | 0.967 | 0.976 |
| 2020 | 26 | 0.942 | 0.941 | 0.991 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 99.5 | 99.4 | 100.0 | 99.8 | 99.9 | 100.5 |
| 2011 | 167 | 99.1 | 98.5 | 99.6 | 99.1 | 99.8 | 100.3 |
| 2012 | 172 | 98.4 | 97.3 | 98.9 | 97.8 | 99.7 | 100.2 |
| 2013 | 120 | 98.7 | 96.9 | 98.9 | 97.4 | 99.9 | 100.2 |
| 2014 | 104 | 100.8 | 99.9 | 100.9 | 100.4 | 102.0 | 102.2 |
| 2015 | 80 | 98.4 | 96.7 | 98.7 | 97.1 | 100.5 | 100.9 |
| 2016 | 66 | 98.0 | 96.1 | 97.7 | 96.4 | 100.1 | 100.0 |
| 2017 | 65 | 96.3 | 95.9 | 97.2 | 96.3 | 99.1 | 99.9 |
| 2018 | 89 | 97.6 | 96.1 | 97.4 | 96.2 | 99.2 | 99.4 |
| 2019 | 60 | 99.6 | 99.3 | 100.3 | 99.4 | 101.9 | 102.4 |
| 2020 | 26 | 95.5 | 93.8 | 95.4 | 93.9 | 97.1 | 97.3 |



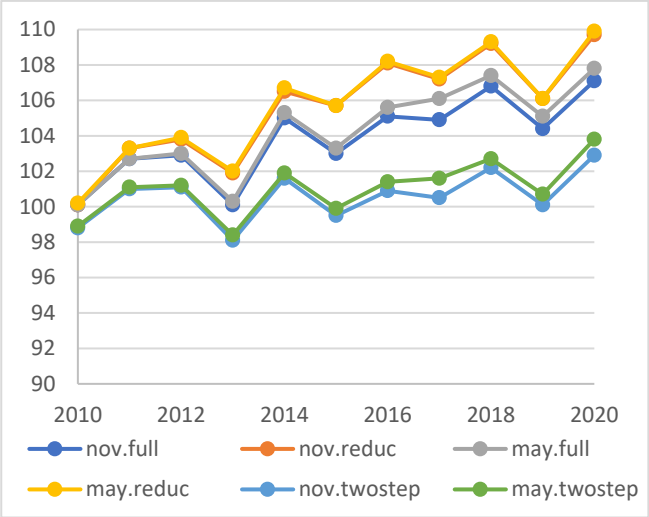

## *bv10*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.992 | 0.993 | 0.998 |
| 2011 | 167 | 0.993 | 0.994 | 0.999 |
| 2012 | 172 | 0.989 | 0.991 | 0.998 |
| 2013 | 120 | 0.872 | 0.873 | 0.998 |
| 2014 | 104 | 0.910 | 0.912 | 0.998 |
| 2015 | 80 | 0.887 | 0.881 | 0.997 |
| 2016 | 66 | 0.825 | 0.818 | 0.968 |
| 2017 | 65 | 0.872 | 0.918 | 0.938 |
| 2018 | 89 | 0.903 | 0.896 | 0.982 |
| 2019 | 60 | 0.920 | 0.942 | 0.954 |
| 2020 | 26 | 0.952 | 0.963 | 0.992 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 100.1 | 100.1 | 100.1 | 100.2 | 98.8 | 98.9 |
| 2011 | 167 | 102.7 | 103.3 | 102.7 | 103.3 | 101.0 | 101.1 |
| 2012 | 172 | 102.9 | 103.8 | 103.0 | 103.9 | 101.1 | 101.2 |
| 2013 | 120 | 100.1 | 101.9 | 100.3 | 102.0 | 98.1 | 98.4 |
| 2014 | 104 | 105.0 | 106.5 | 105.3 | 106.7 | 101.6 | 101.9 |
| 2015 | 80 | 103.0 | 105.7 | 103.3 | 105.7 | 99.5 | 99.9 |
| 2016 | 66 | 105.1 | 108.1 | 105.6 | 108.2 | 100.9 | 101.4 |
| 2017 | 65 | 104.9 | 107.2 | 106.1 | 107.3 | 100.5 | 101.6 |
| 2018 | 89 | 106.8 | 109.2 | 107.4 | 109.3 | 102.2 | 102.7 |
| 2019 | 60 | 104.4 | 106.1 | 105.1 | 106.1 | 100.1 | 100.7 |
| 2020 | 26 | 107.1 | 109.7 | 107.8 | 109.9 | 102.9 | 103.8 |



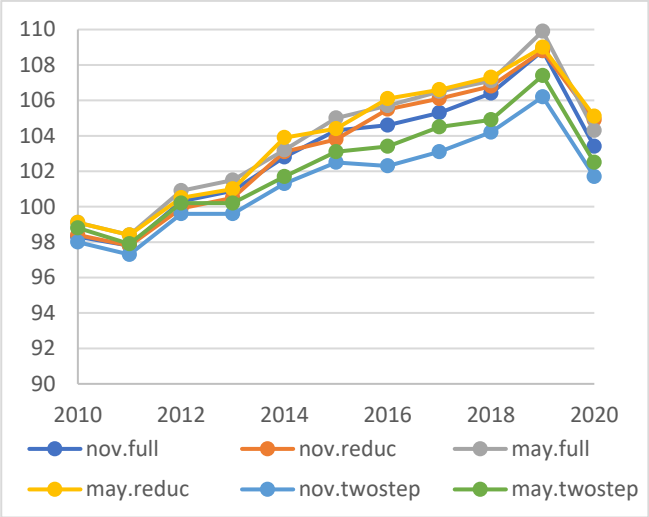

## *bv11*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.985 | 0.988 | 0.997 |
| 2011 | 167 | 0.993 | 0.992 | 0.999 |
| 2012 | 172 | 0.983 | 0.986 | 0.997 |
| 2013 | 120 | 0.878 | 0.874 | 0.998 |
| 2014 | 104 | 0.891 | 0.891 | 0.998 |
| 2015 | 80 | 0.896 | 0.887 | 0.996 |
| 2016 | 66 | 0.730 | 0.755 | 0.961 |
| 2017 | 65 | 0.834 | 0.866 | 0.958 |
| 2018 | 89 | 0.850 | 0.870 | 0.983 |
| 2019 | 60 | 0.870 | 0.871 | 0.975 |
| 2020 | 26 | 0.904 | 0.910 | 0.983 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 98.3 | 98.4 | 99.1 | 99.1 | 98.0 | 98.8 |
| 2011 | 167 | 97.8 | 97.8 | 98.4 | 98.4 | 97.3 | 97.9 |
| 2012 | 172 | 100.3 | 99.9 | 100.9 | 100.5 | 99.6 | 100.2 |
| 2013 | 120 | 100.9 | 100.5 | 101.5 | 101.0 | 99.6 | 100.2 |
| 2014 | 104 | 102.8 | 103.1 | 103.2 | 103.9 | 101.3 | 101.7 |
| 2015 | 80 | 104.3 | 103.8 | 105.0 | 104.4 | 102.5 | 103.1 |
| 2016 | 66 | 104.6 | 105.5 | 105.7 | 106.1 | 102.3 | 103.4 |
| 2017 | 65 | 105.3 | 106.1 | 106.5 | 106.6 | 103.1 | 104.5 |
| 2018 | 89 | 106.4 | 106.8 | 107.1 | 107.3 | 104.2 | 104.9 |
| 2019 | 60 | 108.8 | 108.8 | 109.9 | 109.0 | 106.2 | 107.4 |
| 2020 | 26 | 103.4 | 104.9 | 104.3 | 105.1 | 101.7 | 102.5 |



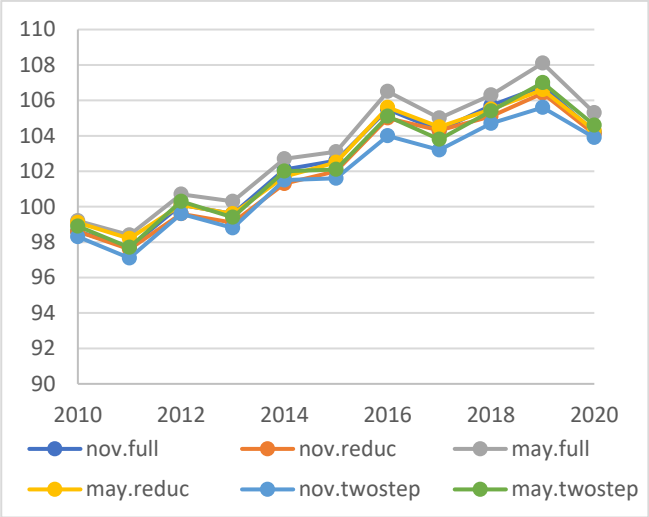

## *bv12*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.990 | 0.991 | 0.998 |
| 2011 | 167 | 0.992 | 0.993 | 0.999 |
| 2012 | 172 | 0.991 | 0.992 | 0.999 |
| 2013 | 120 | 0.869 | 0.868 | 0.998 |
| 2014 | 104 | 0.856 | 0.864 | 0.998 |
| 2015 | 80 | 0.874 | 0.875 | 0.997 |
| 2016 | 66 | 0.894 | 0.883 | 0.976 |
| 2017 | 65 | 0.890 | 0.934 | 0.953 |
| 2018 | 89 | 0.912 | 0.926 | 0.989 |
| 2019 | 60 | 0.911 | 0.928 | 0.974 |
| 2020 | 26 | 0.961 | 0.966 | 0.992 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 98.6 | 98.6 | 99.2 | 99.1 | 98.3 | 98.9 |
| 2011 | 167 | 97.7 | 97.6 | 98.4 | 98.2 | 97.1 | 97.7 |
| 2012 | 172 | 100.1 | 99.6 | 100.7 | 100.1 | 99.6 | 100.3 |
| 2013 | 120 | 99.6 | 99.1 | 100.3 | 99.6 | 98.8 | 99.4 |
| 2014 | 104 | 102.1 | 101.3 | 102.7 | 101.7 | 101.5 | 102.0 |
| 2015 | 80 | 102.6 | 102.0 | 103.1 | 102.5 | 101.6 | 102.1 |
| 2016 | 66 | 105.5 | 105.0 | 106.5 | 105.6 | 104.0 | 105.1 |
| 2017 | 65 | 104.3 | 104.3 | 105.0 | 104.5 | 103.2 | 103.8 |
| 2018 | 89 | 105.7 | 105.1 | 106.3 | 105.5 | 104.7 | 105.4 |
| 2019 | 60 | 106.8 | 106.4 | 108.1 | 106.6 | 105.6 | 107.0 |
| 2020 | 26 | 104.2 | 104.1 | 105.3 | 104.3 | 103.9 | 104.6 |



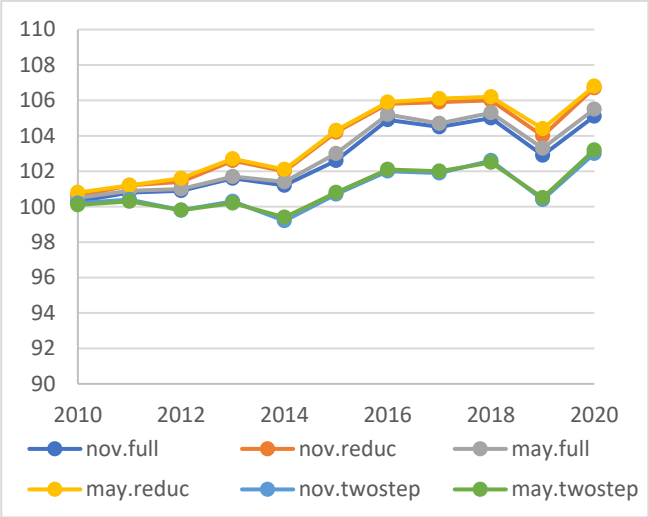

## *bv13*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.990 | 0.992 | 0.998 |
| 2011 | 167 | 0.991 | 0.992 | 0.997 |
| 2012 | 172 | 0.990 | 0.990 | 0.998 |
| 2013 | 120 | 0.876 | 0.875 | 0.997 |
| 2014 | 104 | 0.883 | 0.888 | 0.996 |
| 2015 | 80 | 0.835 | 0.828 | 0.993 |
| 2016 | 66 | 0.809 | 0.828 | 0.944 |
| 2017 | 65 | 0.898 | 0.914 | 0.946 |
| 2018 | 89 | 0.875 | 0.880 | 0.983 |
| 2019 | 60 | 0.916 | 0.926 | 0.963 |
| 2020 | 26 | 0.933 | 0.916 | 0.989 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 100.3 | 100.6 | 100.5 | 100.8 | 100.2 | 100.1 |
| 2011 | 167 | 100.8 | 101.2 | 100.9 | 101.2 | 100.4 | 100.3 |
| 2012 | 172 | 100.9 | 101.4 | 101.0 | 101.6 | 99.8 | 99.8 |
| 2013 | 120 | 101.6 | 102.6 | 101.7 | 102.7 | 100.3 | 100.2 |
| 2014 | 104 | 101.2 | 102.0 | 101.4 | 102.1 | 99.2 | 99.4 |
| 2015 | 80 | 102.6 | 104.2 | 103.0 | 104.3 | 100.7 | 100.8 |
| 2016 | 66 | 104.9 | 105.8 | 105.2 | 105.9 | 102.0 | 102.1 |
| 2017 | 65 | 104.5 | 105.9 | 104.7 | 106.1 | 101.9 | 102.0 |
| 2018 | 89 | 105.0 | 106.0 | 105.3 | 106.2 | 102.6 | 102.5 |
| 2019 | 60 | 102.9 | 104.0 | 103.3 | 104.4 | 100.4 | 100.5 |
| 2020 | 26 | 105.1 | 106.7 | 105.5 | 106.8 | 103.0 | 103.2 |



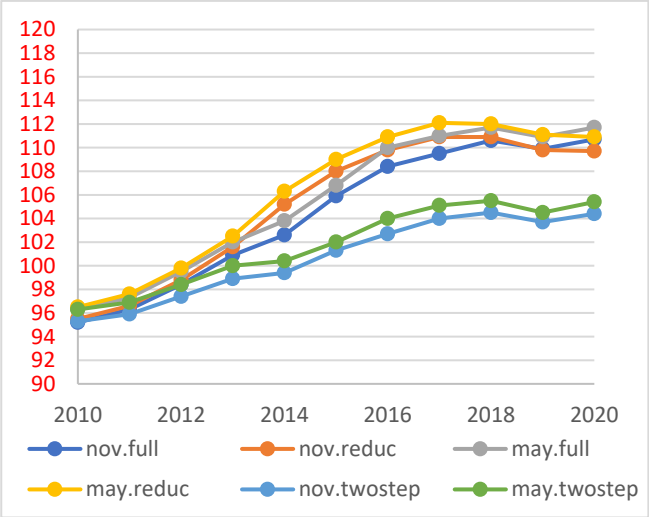

## *bv16*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.993 | 0.994 | 0.999 |
| 2011 | 167 | 0.992 | 0.993 | 0.999 |
| 2012 | 172 | 0.989 | 0.991 | 0.998 |
| 2013 | 120 | 0.879 | 0.872 | 0.998 |
| 2014 | 104 | 0.899 | 0.888 | 0.998 |
| 2015 | 80 | 0.888 | 0.893 | 0.998 |
| 2016 | 66 | 0.825 | 0.848 | 0.986 |
| 2017 | 65 | 0.892 | 0.950 | 0.955 |
| 2018 | 89 | 0.884 | 0.903 | 0.984 |
| 2019 | 60 | 0.907 | 0.942 | 0.978 |
| 2020 | 26 | 0.949 | 0.951 | 0.993 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 95.2 | 95.5 | 96.3 | 96.5 | 95.3 | 96.3 |
| 2011 | 167 | 96.3 | 96.6 | 97.3 | 97.6 | 95.9 | 96.9 |
| 2012 | 172 | 98.4 | 98.8 | 99.5 | 99.8 | 97.4 | 98.4 |
| 2013 | 120 | 100.9 | 101.6 | 102.0 | 102.5 | 98.9 | 100.0 |
| 2014 | 104 | 102.6 | 105.2 | 103.8 | 106.3 | 99.4 | 100.4 |
| 2015 | 80 | 105.9 | 108.0 | 106.8 | 109.0 | 101.3 | 102.0 |
| 2016 | 66 | 108.4 | 109.8 | 110.0 | 110.9 | 102.7 | 104.0 |
| 2017 | 65 | 109.5 | 110.9 | 111.0 | 112.1 | 104.0 | 105.1 |
| 2018 | 89 | 110.6 | 110.9 | 111.7 | 112.0 | 104.5 | 105.5 |
| 2019 | 60 | 109.9 | 109.8 | 110.9 | 111.1 | 103.7 | 104.5 |
| 2020 | 26 | 110.7 | 109.7 | 111.7 | 110.9 | 104.4 | 105.4 |



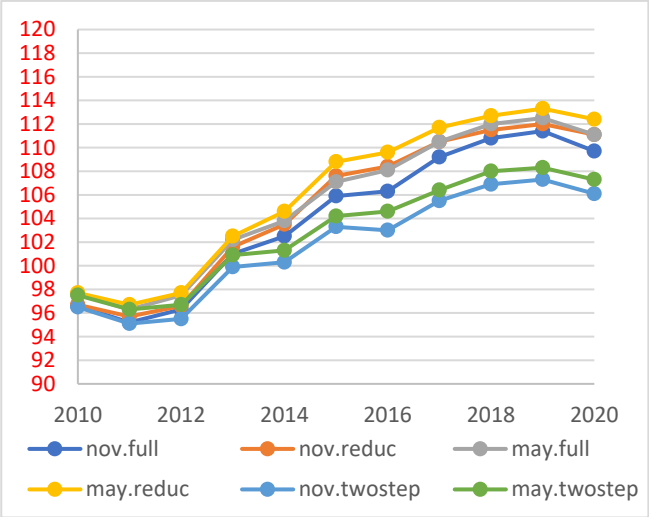

## *bv17*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.993 | 0.994 | 0.999 |
| 2011 | 167 | 0.991 | 0.991 | 0.999 |
| 2012 | 172 | 0.993 | 0.994 | 0.999 |
| 2013 | 120 | 0.892 | 0.886 | 0.999 |
| 2014 | 104 | 0.922 | 0.922 | 0.999 |
| 2015 | 80 | 0.848 | 0.846 | 0.996 |
| 2016 | 66 | 0.866 | 0.879 | 0.970 |
| 2017 | 65 | 0.863 | 0.924 | 0.959 |
| 2018 | 89 | 0.932 | 0.930 | 0.991 |
| 2019 | 60 | 0.949 | 0.960 | 0.987 |
| 2020 | 26 | 0.954 | 0.950 | 0.988 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 96.6 | 96.7 | 97.6 | 97.7 | 96.5 | 97.5 |
| 2011 | 167 | 95.2 | 95.7 | 96.3 | 96.7 | 95.1 | 96.3 |
| 2012 | 172 | 96.3 | 96.6 | 97.5 | 97.7 | 95.5 | 96.7 |
| 2013 | 120 | 101.0 | 101.6 | 102.2 | 102.5 | 99.9 | 100.9 |
| 2014 | 104 | 102.5 | 103.5 | 103.8 | 104.6 | 100.3 | 101.3 |
| 2015 | 80 | 105.9 | 107.6 | 107.1 | 108.8 | 103.3 | 104.2 |
| 2016 | 66 | 106.3 | 108.4 | 108.1 | 109.6 | 103.0 | 104.6 |
| 2017 | 65 | 109.2 | 110.5 | 110.5 | 111.7 | 105.5 | 106.4 |
| 2018 | 89 | 110.8 | 111.5 | 112.0 | 112.7 | 106.9 | 108.0 |
| 2019 | 60 | 111.4 | 112.0 | 112.5 | 113.3 | 107.3 | 108.3 |
| 2020 | 26 | 109.7 | 111.1 | 111.1 | 112.4 | 106.1 | 107.3 |



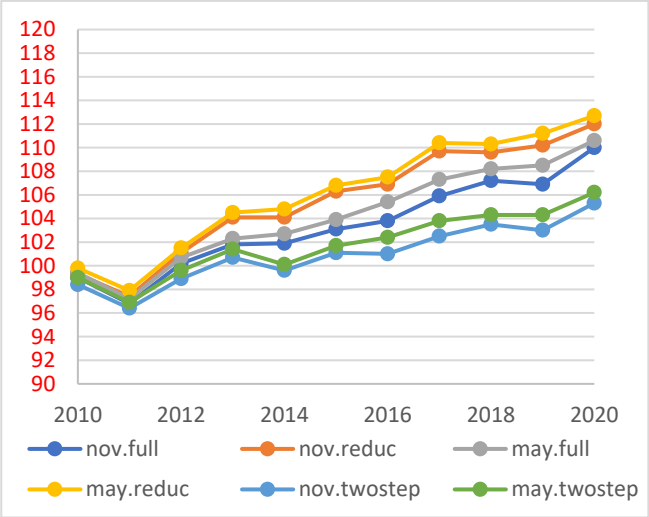

## *bv18*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.989 | 0.989 | 0.998 |
| 2011 | 167 | 0.987 | 0.988 | 0.998 |
| 2012 | 172 | 0.988 | 0.991 | 0.998 |
| 2013 | 120 | 0.885 | 0.883 | 0.998 |
| 2014 | 104 | 0.853 | 0.860 | 0.998 |
| 2015 | 80 | 0.890 | 0.893 | 0.997 |
| 2016 | 66 | 0.837 | 0.872 | 0.973 |
| 2017 | 65 | 0.874 | 0.919 | 0.955 |
| 2018 | 89 | 0.912 | 0.920 | 0.987 |
| 2019 | 60 | 0.908 | 0.943 | 0.966 |
| 2020 | 26 | 0.963 | 0.968 | 0.993 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 99.0 | 99.3 | 99.4 | 99.8 | 98.4 | 99.0 |
| 2011 | 167 | 96.8 | 97.4 | 97.2 | 97.9 | 96.4 | 96.9 |
| 2012 | 172 | 100.2 | 101.1 | 100.7 | 101.5 | 98.9 | 99.6 |
| 2013 | 120 | 101.8 | 104.1 | 102.3 | 104.5 | 100.7 | 101.4 |
| 2014 | 104 | 101.9 | 104.1 | 102.7 | 104.8 | 99.6 | 100.1 |
| 2015 | 80 | 103.1 | 106.3 | 103.9 | 106.8 | 101.1 | 101.7 |
| 2016 | 66 | 103.8 | 106.9 | 105.4 | 107.5 | 101.0 | 102.4 |
| 2017 | 65 | 105.9 | 109.7 | 107.3 | 110.4 | 102.5 | 103.8 |
| 2018 | 89 | 107.2 | 109.6 | 108.2 | 110.3 | 103.5 | 104.3 |
| 2019 | 60 | 106.9 | 110.2 | 108.5 | 111.2 | 103.0 | 104.3 |
| 2020 | 26 | 110.0 | 112.0 | 110.6 | 112.7 | 105.3 | 106.2 |



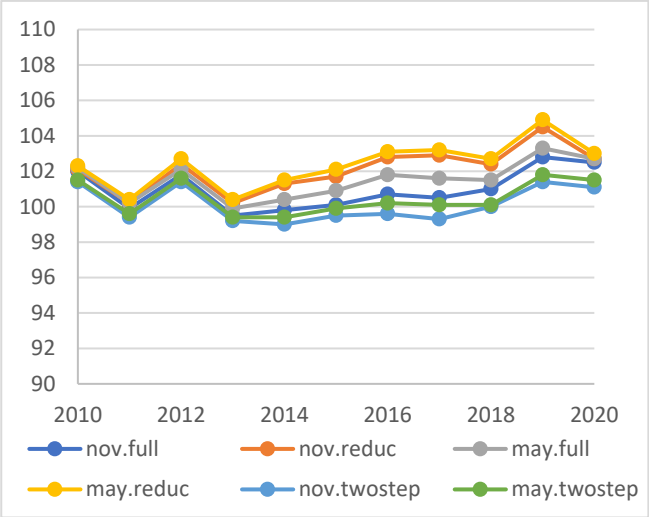

***bv19***

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.993 | 0.993 | 0.999 |
| 2011 | 167 | 0.994 | 0.994 | 0.999 |
| 2012 | 172 | 0.994 | 0.994 | 0.999 |
| 2013 | 120 | 0.911 | 0.912 | 0.998 |
| 2014 | 104 | 0.894 | 0.898 | 0.998 |
| 2015 | 80 | 0.862 | 0.854 | 0.998 |
| 2016 | 66 | 0.833 | 0.843 | 0.980 |
| 2017 | 65 | 0.861 | 0.928 | 0.931 |
| 2018 | 89 | 0.909 | 0.915 | 0.991 |
| 2019 | 60 | 0.903 | 0.931 | 0.963 |
| 2020 | 26 | 0.910 | 0.917 | 0.989 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 102.0 | 102.1 | 102.2 | 102.3 | 101.4 | 101.5 |
| 2011 | 167 | 99.9 | 100.2 | 100.2 | 100.4 | 99.4 | 99.6 |
| 2012 | 172 | 101.8 | 102.4 | 102.1 | 102.7 | 101.4 | 101.6 |
| 2013 | 120 | 99.5 | 100.2 | 99.9 | 100.4 | 99.2 | 99.4 |
| 2014 | 104 | 99.8 | 101.3 | 100.4 | 101.5 | 99.0 | 99.4 |
| 2015 | 80 | 100.1 | 101.7 | 100.9 | 102.1 | 99.5 | 99.9 |
| 2016 | 66 | 100.7 | 102.8 | 101.8 | 103.1 | 99.6 | 100.2 |
| 2017 | 65 | 100.5 | 102.9 | 101.6 | 103.2 | 99.3 | 100.1 |
| 2018 | 89 | 101.0 | 102.4 | 101.5 | 102.7 | 100.0 | 100.1 |
| 2019 | 60 | 102.8 | 104.5 | 103.3 | 104.9 | 101.4 | 101.8 |
| 2020 | 26 | 102.5 | 102.7 | 102.7 | 103.0 | 101.1 | 101.5 |



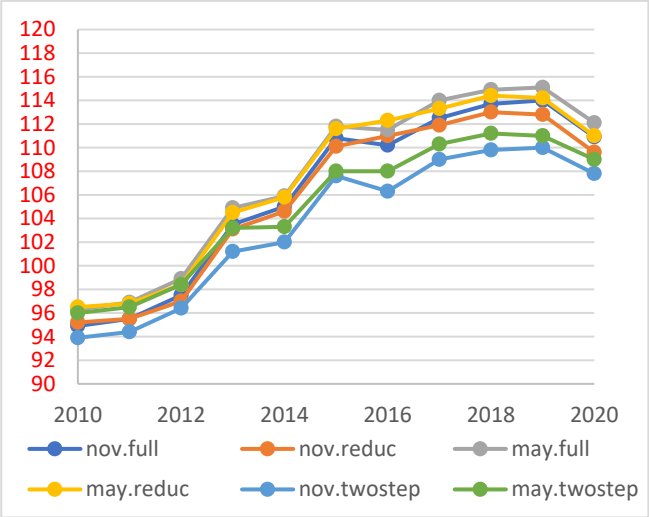

## *bv20*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.997 | 0.997 | 0.999 |
| 2011 | 167 | 0.995 | 0.996 | 0.998 |
| 2012 | 172 | 0.991 | 0.993 | 0.998 |
| 2013 | 120 | 0.906 | 0.908 | 0.997 |
| 2014 | 104 | 0.935 | 0.929 | 0.998 |
| 2015 | 80 | 0.906 | 0.903 | 0.998 |
| 2016 | 66 | 0.842 | 0.851 | 0.984 |
| 2017 | 65 | 0.930 | 0.959 | 0.971 |
| 2018 | 89 | 0.934 | 0.935 | 0.993 |
| 2019 | 60 | 0.948 | 0.954 | 0.976 |
| 2020 | 26 | 0.930 | 0.948 | 0.986 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 94.9 | 95.2 | 96.3 | 96.5 | 93.9 | 96.0 |
| 2011 | 167 | 95.5 | 95.5 | 96.9 | 96.8 | 94.4 | 96.5 |
| 2012 | 172 | 97.5 | 97.0 | 98.9 | 98.4 | 96.4 | 98.4 |
| 2013 | 120 | 103.5 | 103.1 | 104.9 | 104.5 | 101.2 | 103.2 |
| 2014 | 104 | 105.0 | 104.6 | 105.9 | 105.8 | 102.0 | 103.3 |
| 2015 | 80 | 110.8 | 110.1 | 111.8 | 111.6 | 107.6 | 108.0 |
| 2016 | 66 | 110.2 | 111.0 | 111.5 | 112.3 | 106.3 | 108.0 |
| 2017 | 65 | 112.5 | 111.9 | 114.0 | 113.3 | 109.0 | 110.3 |
| 2018 | 89 | 113.7 | 113.0 | 114.9 | 114.4 | 109.8 | 111.2 |
| 2019 | 60 | 114.0 | 112.8 | 115.1 | 114.2 | 110.0 | 111.0 |
| 2020 | 26 | 110.9 | 109.6 | 112.1 | 111.0 | 107.8 | 109.0 |



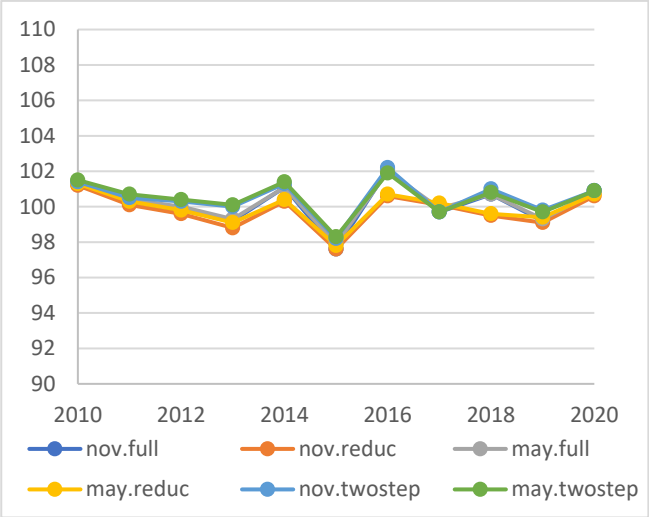

## *bv21*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.997 | 0.997 | 0.999 |
| 2011 | 167 | 0.996 | 0.996 | 0.999 |
| 2012 | 172 | 0.995 | 0.996 | 0.999 |
| 2013 | 120 | 0.932 | 0.932 | 0.999 |
| 2014 | 104 | 0.924 | 0.924 | 0.999 |
| 2015 | 80 | 0.861 | 0.855 | 0.998 |
| 2016 | 66 | 0.819 | 0.818 | 0.977 |
| 2017 | 65 | 0.869 | 0.915 | 0.954 |
| 2018 | 89 | 0.918 | 0.914 | 0.993 |
| 2019 | 60 | 0.951 | 0.965 | 0.986 |
| 2020 | 26 | 0.967 | 0.964 | 0.993 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 101.3 | 101.2 | 101.4 | 101.3 | 101.4 | 101.5 |
| 2011 | 167 | 100.2 | 100.1 | 100.4 | 100.3 | 100.5 | 100.7 |
| 2012 | 172 | 99.8 | 99.6 | 100.0 | 99.8 | 100.3 | 100.4 |
| 2013 | 120 | 99.2 | 98.8 | 99.3 | 99.1 | 100.0 | 100.1 |
| 2014 | 104 | 101.1 | 100.3 | 101.1 | 100.4 | 101.3 | 101.4 |
| 2015 | 80 | 97.6 | 97.6 | 97.9 | 97.8 | 98.2 | 98.3 |
| 2016 | 66 | 102.1 | 100.6 | 102.0 | 100.7 | 102.2 | 101.9 |
| 2017 | 65 | 99.7 | 100.1 | 99.9 | 100.2 | 99.7 | 99.7 |
| 2018 | 89 | 100.7 | 99.5 | 100.7 | 99.6 | 101.0 | 100.8 |
| 2019 | 60 | 99.2 | 99.1 | 99.3 | 99.4 | 99.8 | 99.7 |
| 2020 | 26 | 100.9 | 100.6 | 100.8 | 100.7 | 100.9 | 100.9 |



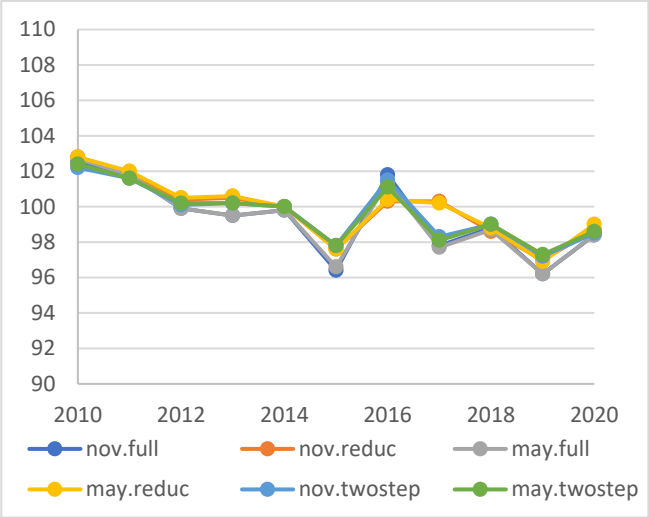

## *bv22*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.993 | 0.994 | 0.998 |
| 2011 | 167 | 0.990 | 0.992 | 0.998 |
| 2012 | 172 | 0.991 | 0.993 | 0.998 |
| 2013 | 120 | 0.879 | 0.878 | 0.999 |
| 2014 | 104 | 0.912 | 0.916 | 0.999 |
| 2015 | 80 | 0.861 | 0.862 | 0.997 |
| 2016 | 66 | 0.834 | 0.857 | 0.978 |
| 2017 | 65 | 0.919 | 0.932 | 0.954 |
| 2018 | 89 | 0.911 | 0.923 | 0.985 |
| 2019 | 60 | 0.914 | 0.924 | 0.975 |
| 2020 | 26 | 0.907 | 0.925 | 0.991 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 102.6 | 102.8 | 102.7 | 102.8 | 102.2 | 102.4 |
| 2011 | 167 | 101.8 | 101.9 | 101.8 | 102.0 | 101.6 | 101.6 |
| 2012 | 172 | 99.9 | 100.4 | 99.9 | 100.5 | 100.1 | 100.2 |
| 2013 | 120 | 99.5 | 100.5 | 99.5 | 100.6 | 100.2 | 100.2 |
| 2014 | 104 | 99.8 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 |
| 2015 | 80 | 96.4 | 97.6 | 96.6 | 97.6 | 97.8 | 97.8 |
| 2016 | 66 | 101.8 | 100.3 | 101.4 | 100.4 | 101.5 | 101.1 |
| 2017 | 65 | 97.8 | 100.3 | 97.7 | 100.2 | 98.3 | 98.1 |
| 2018 | 89 | 98.8 | 98.6 | 98.7 | 98.8 | 99.0 | 99.0 |
| 2019 | 60 | 96.2 | 97.0 | 96.2 | 96.9 | 97.2 | 97.3 |
| 2020 | 26 | 98.4 | 98.7 | 98.4 | 99.0 | 98.5 | 98.6 |



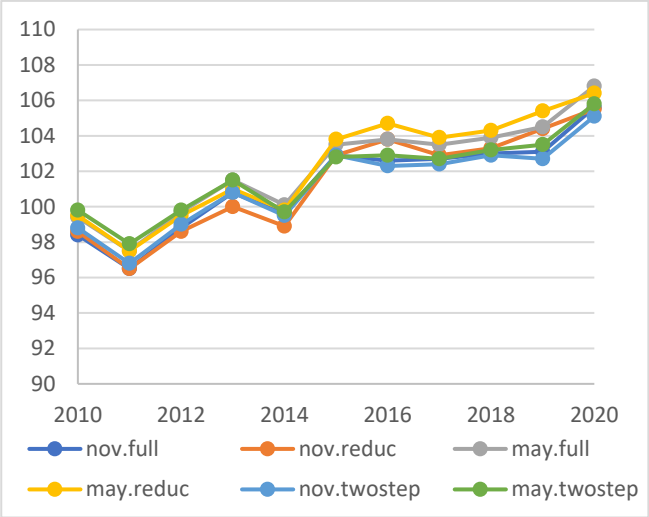

## *bv23*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.995 | 0.997 | 0.997 |
| 2011 | 167 | 0.995 | 0.997 | 0.997 |
| 2012 | 172 | 0.993 | 0.995 | 0.995 |
| 2013 | 120 | 0.924 | 0.925 | 0.992 |
| 2014 | 104 | 0.914 | 0.905 | 0.992 |
| 2015 | 80 | 0.908 | 0.907 | 0.995 |
| 2016 | 66 | 0.851 | 0.874 | 0.963 |
| 2017 | 65 | 0.917 | 0.961 | 0.937 |
| 2018 | 89 | 0.939 | 0.950 | 0.986 |
| 2019 | 60 | 0.941 | 0.968 | 0.976 |
| 2020 | 26 | 0.936 | 0.941 | 0.987 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 98.4 | 98.6 | 99.4 | 99.5 | 98.8 | 99.8 |
| 2011 | 167 | 96.5 | 96.5 | 97.5 | 97.5 | 96.8 | 97.9 |
| 2012 | 172 | 98.8 | 98.6 | 99.7 | 99.5 | 99.0 | 99.8 |
| 2013 | 120 | 100.8 | 100.0 | 101.5 | 101.0 | 100.8 | 101.5 |
| 2014 | 104 | 99.6 | 98.9 | 100.1 | 99.8 | 99.5 | 99.7 |
| 2015 | 80 | 102.9 | 102.9 | 103.5 | 103.8 | 102.9 | 102.8 |
| 2016 | 66 | 102.6 | 103.8 | 103.8 | 104.7 | 102.3 | 102.9 |
| 2017 | 65 | 102.7 | 102.9 | 103.5 | 103.9 | 102.4 | 102.7 |
| 2018 | 89 | 103.0 | 103.3 | 103.9 | 104.3 | 102.9 | 103.2 |
| 2019 | 60 | 103.1 | 104.4 | 104.5 | 105.4 | 102.7 | 103.5 |
| 2020 | 26 | 105.6 | 105.5 | 106.8 | 106.4 | 105.1 | 105.8 |



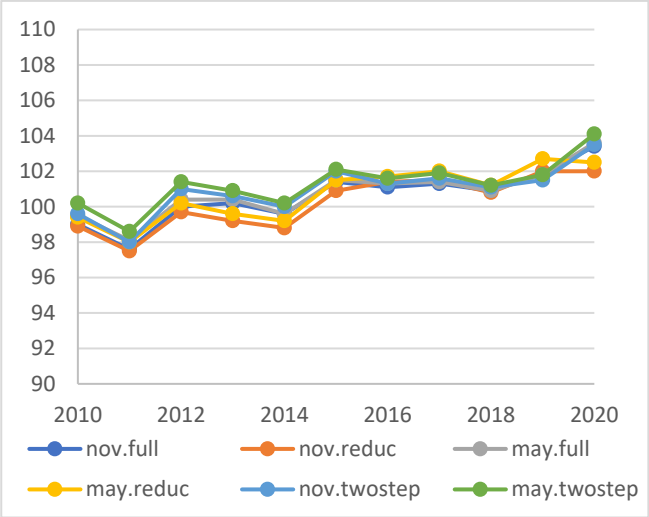

## *bv24*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.996 | 0.997 | 0.997 |
| 2011 | 167 | 0.996 | 0.997 | 0.998 |
| 2012 | 172 | 0.995 | 0.996 | 0.995 |
| 2013 | 120 | 0.927 | 0.927 | 0.993 |
| 2014 | 104 | 0.923 | 0.921 | 0.992 |
| 2015 | 80 | 0.866 | 0.870 | 0.983 |
| 2016 | 66 | 0.862 | 0.913 | 0.968 |
| 2017 | 65 | 0.897 | 0.956 | 0.935 |
| 2018 | 89 | 0.951 | 0.962 | 0.983 |
| 2019 | 60 | 0.938 | 0.971 | 0.967 |
| 2020 | 26 | 0.941 | 0.951 | 0.993 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 99.0 | 98.9 | 99.5 | 99.4 | 99.6 | 100.2 |
| 2011 | 167 | 97.6 | 97.5 | 98.1 | 98.0 | 98.0 | 98.6 |
| 2012 | 172 | 100.0 | 99.7 | 100.4 | 100.2 | 101.0 | 101.4 |
| 2013 | 120 | 100.2 | 99.2 | 100.4 | 99.6 | 100.6 | 100.9 |
| 2014 | 104 | 99.6 | 98.8 | 99.6 | 99.2 | 100.0 | 100.2 |
| 2015 | 80 | 101.4 | 100.9 | 101.5 | 101.5 | 102.0 | 102.1 |
| 2016 | 66 | 101.1 | 101.4 | 101.3 | 101.7 | 101.3 | 101.6 |
| 2017 | 65 | 101.3 | 101.5 | 101.4 | 102.0 | 101.6 | 101.9 |
| 2018 | 89 | 100.9 | 100.8 | 100.9 | 101.2 | 101.1 | 101.2 |
| 2019 | 60 | 101.9 | 102.0 | 101.8 | 102.7 | 101.5 | 101.8 |
| 2020 | 26 | 103.4 | 102.0 | 103.6 | 102.5 | 103.5 | 104.1 |



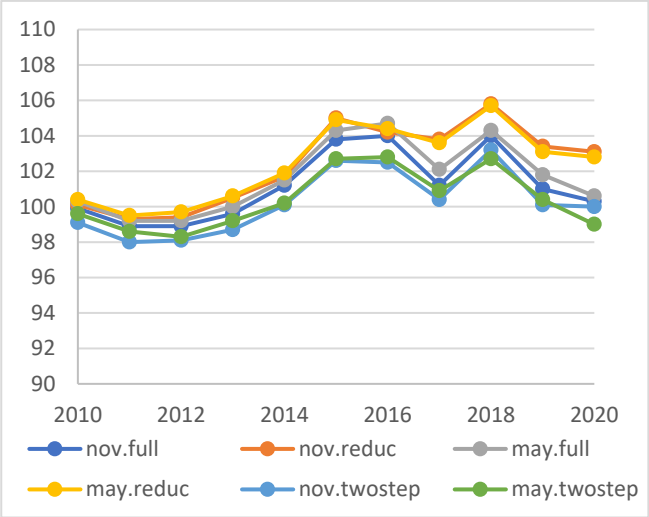

## *bv25*

Correlations

| Birth year | Number of bulls | nov.full_nov.reduc | may.full_may.reduc | nov.full_may.full |
|---|---|---|---|---|
| 2010 | 226 | 0.986 | 0.991 | 0.994 |
| 2011 | 167 | 0.991 | 0.994 | 0.995 |
| 2012 | 172 | 0.985 | 0.989 | 0.992 |
| 2013 | 120 | 0.883 | 0.886 | 0.990 |
| 2014 | 104 | 0.854 | 0.865 | 0.988 |
| 2015 | 80 | 0.838 | 0.856 | 0.990 |
| 2016 | 66 | 0.751 | 0.818 | 0.949 |
| 2017 | 65 | 0.820 | 0.900 | 0.919 |
| 2018 | 89 | 0.843 | 0.861 | 0.963 |
| 2019 | 60 | 0.881 | 0.934 | 0.939 |
| 2020 | 26 | 0.885 | 0.932 | 0.964 |

Mean GEBV

| Birth year | No of bulls | nov.full | nov.reduc | may.full | may.reduc | nov.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 226 | 99.9 | 100.1 | 100.3 | 100.4 | 99.1 | 99.6 |
| 2011 | 167 | 98.9 | 99.3 | 99.2 | 99.5 | 98.0 | 98.6 |
| 2012 | 172 | 98.9 | 99.4 | 99.2 | 99.7 | 98.1 | 98.3 |
| 2013 | 120 | 99.6 | 100.5 | 100.0 | 100.6 | 98.7 | 99.2 |
| 2014 | 104 | 101.2 | 101.7 | 101.5 | 101.9 | 100.1 | 100.2 |
| 2015 | 80 | 103.8 | 105.0 | 104.3 | 104.9 | 102.6 | 102.7 |
| 2016 | 66 | 104.0 | 104.2 | 104.7 | 104.4 | 102.5 | 102.8 |
| 2017 | 65 | 101.2 | 103.8 | 102.1 | 103.6 | 100.4 | 100.9 |
| 2018 | 89 | 104.0 | 105.8 | 104.3 | 105.7 | 103.2 | 102.7 |
| 2019 | 60 | 101.0 | 103.4 | 101.8 | 103.1 | 100.1 | 100.4 |
| 2020 | 26 | 100.3 | 103.1 | 100.6 | 102.8 | 100.0 | 99.0 |




# Stability RDC

For RDC the August run are compared with the May run to check stability of the single step GEBV's

# Cows

For Nordic RDC cows with phenotypes in May run. Both genotyped and nongenotyped females are included.

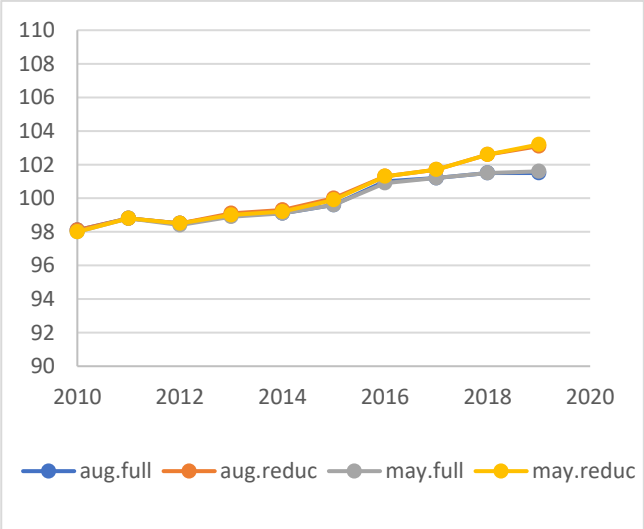
## *bv1*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25546 | 0.999 | 0.999 | 1.000 |
| 2011 | 25253 | 0.998 | 0.998 | 1.000 |
| 2012 | 22822 | 0.997 | 0.997 | 1.000 |
| 2013 | 24752 | 0.996 | 0.996 | 1.000 |
| 2014 | 23937 | 0.994 | 0.995 | 0.999 |
| 2015 | 21819 | 0.895 | 0.896 | 0.999 |
| 2016 | 20246 | 0.778 | 0.780 | 0.998 |
| 2017 | 15781 | 0.735 | 0.735 | 0.998 |
| 2018 | 8688 | 0.721 | 0.721 | 0.997 |
| 2019 | 180 | 0.758 | 0.753 | 0.992 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25546 | 98.1 | 98.1 | 98.0 | 98.0 |
| 2011 | 25253 | 98.8 | 98.8 | 98.8 | 98.8 |
| 2012 | 22822 | 98.5 | 98.5 | 98.4 | 98.5 |
| 2013 | 24752 | 99.0 | 99.1 | 98.9 | 99.0 |
| 2014 | 23937 | 99.1 | 99.3 | 99.1 | 99.2 |
| 2015 | 21819 | 99.6 | 100.0 | 99.6 | 99.9 |
| 2016 | 20246 | 101.0 | 101.3 | 100.9 | 101.3 |
| 2017 | 15781 | 101.2 | 101.7 | 101.2 | 101.7 |
| 2018 | 8688 | 101.5 | 102.6 | 101.5 | 102.6 |
| 2019 | 180 | 101.5 | 103.1 | 101.6 | 103.2 |



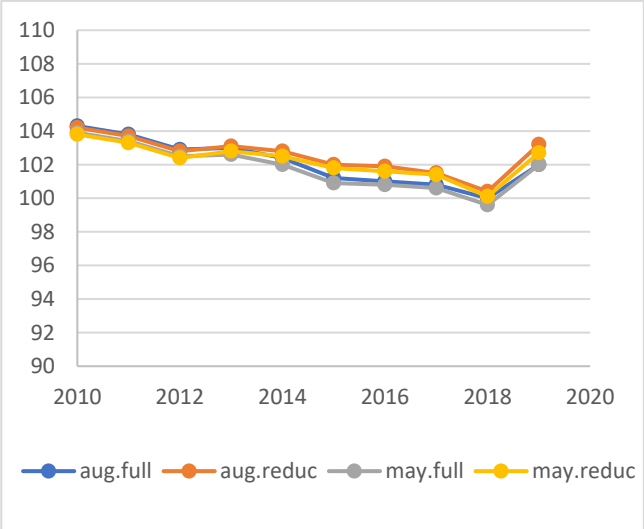

## *bv2*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.995 | 0.996 | 0.999 |
| 2011 | 25252 | 0.992 | 0.993 | 0.999 |
| 2012 | 22823 | 0.990 | 0.992 | 0.999 |
| 2013 | 24755 | 0.986 | 0.988 | 0.998 |
| 2014 | 23941 | 0.985 | 0.987 | 0.998 |
| 2015 | 21822 | 0.912 | 0.916 | 0.997 |
| 2016 | 20245 | 0.844 | 0.850 | 0.996 |
| 2017 | 15783 | 0.811 | 0.818 | 0.996 |
| 2018 | 8688 | 0.817 | 0.829 | 0.995 |
| 2019 | 180 | 0.776 | 0.806 | 0.989 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 104.3 | 104.2 | 103.9 | 103.8 |
| 2011 | 25252 | 103.8 | 103.7 | 103.4 | 103.3 |
| 2012 | 22823 | 102.9 | 102.8 | 102.5 | 102.4 |
| 2013 | 24755 | 103.0 | 103.1 | 102.6 | 102.8 |
| 2014 | 23941 | 102.4 | 102.8 | 102.0 | 102.5 |
| 2015 | 21822 | 101.2 | 102.0 | 100.9 | 101.8 |
| 2016 | 20245 | 101.0 | 101.9 | 100.8 | 101.6 |
| 2017 | 15783 | 100.8 | 101.5 | 100.6 | 101.4 |
| 2018 | 8688 | 100.0 | 100.4 | 99.6 | 100.1 |
| 2019 | 180 | 102.0 | 103.2 | 102.0 | 102.7 |



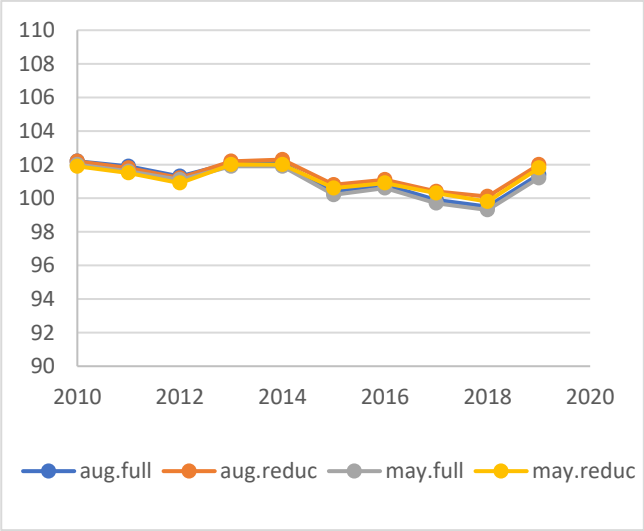

## *bv3*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25546 | 0.994 | 0.996 | 0.999 |
| 2011 | 25252 | 0.992 | 0.993 | 0.999 |
| 2012 | 22823 | 0.990 | 0.992 | 0.999 |
| 2013 | 24755 | 0.988 | 0.990 | 0.998 |
| 2014 | 23941 | 0.986 | 0.989 | 0.998 |
| 2015 | 21822 | 0.951 | 0.953 | 0.997 |
| 2016 | 20245 | 0.876 | 0.878 | 0.996 |
| 2017 | 15783 | 0.851 | 0.850 | 0.995 |
| 2018 | 8687 | 0.877 | 0.881 | 0.994 |
| 2019 | 180 | 0.839 | 0.839 | 0.985 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25546 | 102.2 | 102.2 | 102.0 | 101.9 |
| 2011 | 25252 | 101.9 | 101.8 | 101.6 | 101.5 |
| 2012 | 22823 | 101.3 | 101.2 | 101.1 | 100.9 |
| 2013 | 24755 | 102.1 | 102.2 | 101.9 | 102.0 |
| 2014 | 23941 | 102.1 | 102.3 | 101.9 | 102.0 |
| 2015 | 21822 | 100.4 | 100.8 | 100.2 | 100.6 |
| 2016 | 20245 | 100.8 | 101.1 | 100.6 | 100.9 |
| 2017 | 15783 | 99.9 | 100.4 | 99.7 | 100.3 |
| 2018 | 8687 | 99.5 | 100.1 | 99.3 | 99.8 |
| 2019 | 180 | 101.4 | 102.0 | 101.2 | 101.8 |



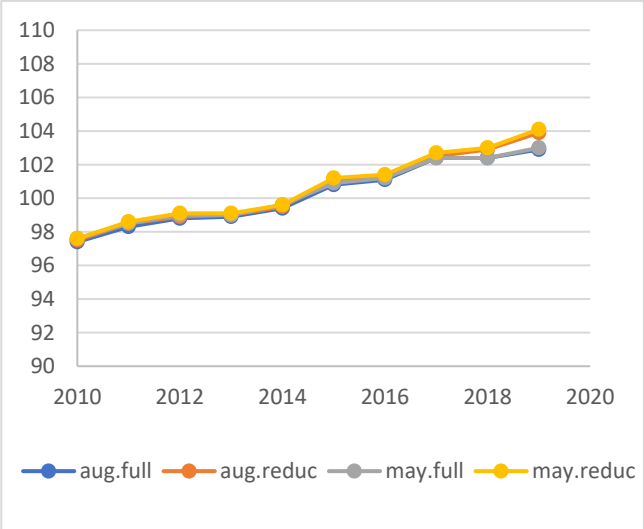

## *bv4*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.993 | 0.995 | 0.999 |
| 2011 | 25252 | 0.991 | 0.993 | 0.999 |
| 2012 | 22823 | 0.988 | 0.990 | 0.998 |
| 2013 | 24755 | 0.985 | 0.988 | 0.998 |
| 2014 | 23941 | 0.981 | 0.985 | 0.997 |
| 2015 | 21822 | 0.937 | 0.941 | 0.997 |
| 2016 | 20245 | 0.844 | 0.841 | 0.994 |
| 2017 | 15783 | 0.785 | 0.780 | 0.993 |
| 2018 | 8686 | 0.779 | 0.787 | 0.988 |
| 2019 | 180 | 0.781 | 0.762 | 0.967 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 97.4 | 97.5 | 97.6 | 97.6 |
| 2011 | 25252 | 98.3 | 98.5 | 98.5 | 98.6 |
| 2012 | 22823 | 98.8 | 98.9 | 99.0 | 99.1 |
| 2013 | 24755 | 98.9 | 99.0 | 99.0 | 99.1 |
| 2014 | 23941 | 99.4 | 99.5 | 99.6 | 99.6 |
| 2015 | 21822 | 100.8 | 101.1 | 100.9 | 101.2 |
| 2016 | 20245 | 101.1 | 101.3 | 101.2 | 101.4 |
| 2017 | 15783 | 102.4 | 102.5 | 102.4 | 102.7 |
| 2018 | 8686 | 102.4 | 102.9 | 102.4 | 103.0 |
| 2019 | 180 | 102.9 | 103.9 | 103.0 | 104.1 |



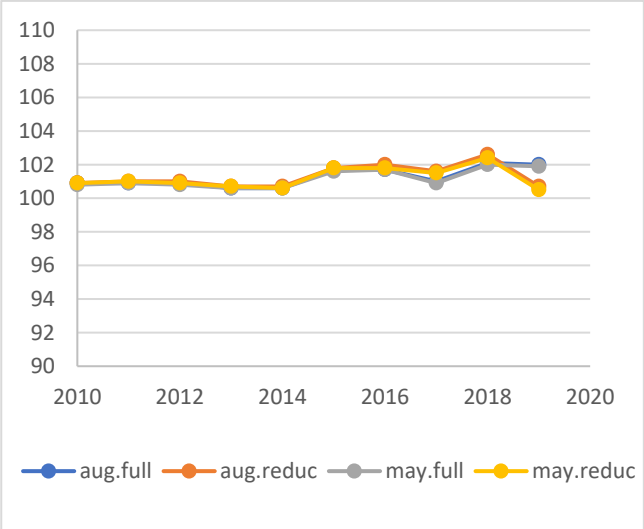

## *bv5*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25546 | 0.995 | 0.996 | 0.999 |
| 2011 | 25252 | 0.993 | 0.994 | 0.999 |
| 2012 | 22824 | 0.989 | 0.991 | 0.999 |
| 2013 | 24755 | 0.986 | 0.987 | 0.998 |
| 2014 | 23941 | 0.985 | 0.986 | 0.998 |
| 2015 | 21822 | 0.936 | 0.937 | 0.997 |
| 2016 | 20244 | 0.878 | 0.880 | 0.996 |
| 2017 | 15783 | 0.848 | 0.847 | 0.995 |
| 2018 | 8686 | 0.819 | 0.816 | 0.992 |
| 2019 | 180 | 0.821 | 0.789 | 0.983 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25546 | 100.9 | 100.9 | 100.8 | 100.9 |
| 2011 | 25252 | 100.9 | 101.0 | 100.9 | 101.0 |
| 2012 | 22824 | 100.9 | 101.0 | 100.8 | 100.9 |
| 2013 | 24755 | 100.6 | 100.7 | 100.6 | 100.7 |
| 2014 | 23941 | 100.6 | 100.7 | 100.6 | 100.6 |
| 2015 | 21822 | 101.7 | 101.8 | 101.6 | 101.8 |
| 2016 | 20244 | 101.7 | 102.0 | 101.7 | 101.8 |
| 2017 | 15783 | 101.0 | 101.6 | 100.9 | 101.5 |
| 2018 | 8686 | 102.1 | 102.6 | 102.0 | 102.4 |
| 2019 | 180 | 102.0 | 100.7 | 101.9 | 100.5 |



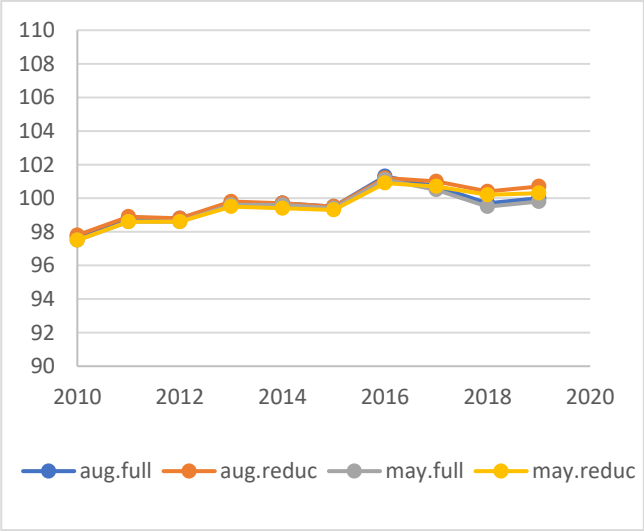

## *bv6*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25546 | 0.996 | 0.997 | 1.000 |
| 2011 | 25251 | 0.994 | 0.995 | 0.999 |
| 2012 | 22823 | 0.992 | 0.993 | 0.999 |
| 2013 | 24755 | 0.990 | 0.991 | 0.999 |
| 2014 | 23941 | 0.988 | 0.990 | 0.999 |
| 2015 | 21822 | 0.925 | 0.925 | 0.998 |
| 2016 | 20245 | 0.838 | 0.836 | 0.997 |
| 2017 | 15783 | 0.774 | 0.763 | 0.996 |
| 2018 | 8686 | 0.776 | 0.768 | 0.994 |
| 2019 | 180 | 0.794 | 0.805 | 0.987 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25546 | 97.7 | 97.8 | 97.5 | 97.5 |
| 2011 | 25251 | 98.8 | 98.9 | 98.6 | 98.6 |
| 2012 | 22823 | 98.8 | 98.8 | 98.6 | 98.6 |
| 2013 | 24755 | 99.7 | 99.8 | 99.6 | 99.5 |
| 2014 | 23941 | 99.7 | 99.7 | 99.6 | 99.4 |
| 2015 | 21822 | 99.5 | 99.5 | 99.4 | 99.3 |
| 2016 | 20245 | 101.3 | 101.2 | 101.1 | 100.9 |
| 2017 | 15783 | 100.7 | 101.0 | 100.5 | 100.7 |
| 2018 | 8686 | 99.7 | 100.4 | 99.5 | 100.2 |
| 2019 | 180 | 100.0 | 100.7 | 99.8 | 100.3 |



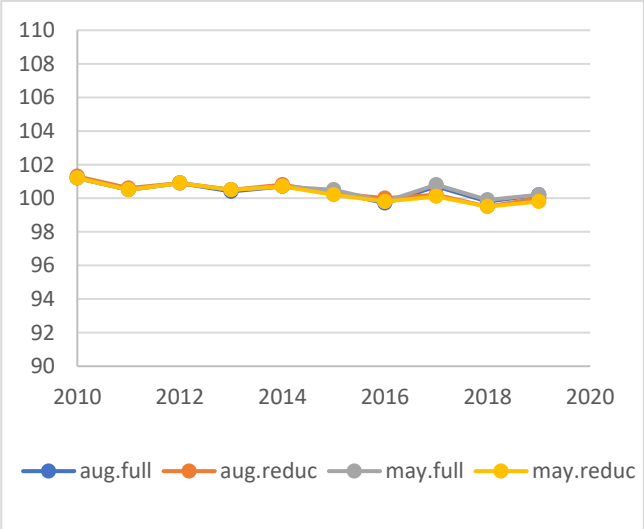

## *bv7*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.995 | 0.997 | 0.999 |
| 2011 | 25251 | 0.993 | 0.995 | 0.999 |
| 2012 | 22823 | 0.990 | 0.993 | 0.999 |
| 2013 | 24755 | 0.989 | 0.991 | 0.999 |
| 2014 | 23941 | 0.988 | 0.990 | 0.998 |
| 2015 | 21822 | 0.930 | 0.930 | 0.997 |
| 2016 | 20245 | 0.887 | 0.885 | 0.996 |
| 2017 | 15784 | 0.835 | 0.830 | 0.995 |
| 2018 | 8686 | 0.834 | 0.829 | 0.994 |
| 2019 | 180 | 0.802 | 0.792 | 0.985 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 101.2 | 101.3 | 101.2 | 101.2 |
| 2011 | 25251 | 100.5 | 100.6 | 100.5 | 100.5 |
| 2012 | 22823 | 100.9 | 100.9 | 100.9 | 100.9 |
| 2013 | 24755 | 100.4 | 100.5 | 100.5 | 100.5 |
| 2014 | 23941 | 100.7 | 100.8 | 100.7 | 100.7 |
| 2015 | 21822 | 100.4 | 100.3 | 100.5 | 100.2 |
| 2016 | 20245 | 99.7 | 100.0 | 99.8 | 99.8 |
| 2017 | 15784 | 100.7 | 100.2 | 100.8 | 100.1 |
| 2018 | 8686 | 99.8 | 99.5 | 99.9 | 99.5 |
| 2019 | 180 | 100.2 | 100.0 | 100.2 | 99.8 |



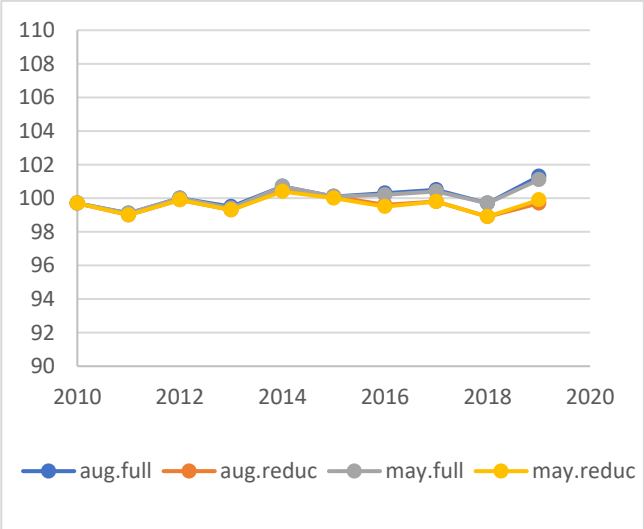

## *bv9*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.996 | 0.997 | 0.999 |
| 2011 | 25252 | 0.994 | 0.995 | 0.999 |
| 2012 | 22823 | 0.992 | 0.994 | 0.999 |
| 2013 | 24755 | 0.990 | 0.992 | 0.999 |
| 2014 | 23941 | 0.988 | 0.990 | 0.998 |
| 2015 | 21823 | 0.943 | 0.947 | 0.997 |
| 2016 | 20246 | 0.882 | 0.889 | 0.996 |
| 2017 | 15784 | 0.849 | 0.851 | 0.995 |
| 2018 | 8686 | 0.862 | 0.863 | 0.993 |
| 2019 | 180 | 0.844 | 0.836 | 0.977 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 99.7 | 99.7 | 99.7 | 99.7 |
| 2011 | 25252 | 99.1 | 99.0 | 99.1 | 99.0 |
| 2012 | 22823 | 100.0 | 99.9 | 100.0 | 99.9 |
| 2013 | 24755 | 99.5 | 99.3 | 99.4 | 99.3 |
| 2014 | 23941 | 100.7 | 100.5 | 100.7 | 100.4 |
| 2015 | 21823 | 100.1 | 100.1 | 100.1 | 100.0 |
| 2016 | 20246 | 100.3 | 99.6 | 100.2 | 99.5 |
| 2017 | 15784 | 100.5 | 99.8 | 100.4 | 99.8 |
| 2018 | 8686 | 99.7 | 98.9 | 99.7 | 98.9 |
| 2019 | 180 | 101.3 | 99.7 | 101.1 | 99.9 |



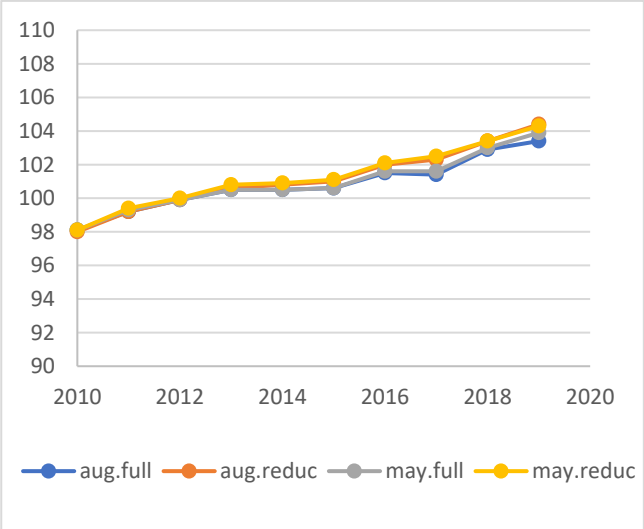

## *bv10*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.992 | 0.995 | 0.999 |
| 2011 | 25252 | 0.990 | 0.993 | 0.999 |
| 2012 | 22823 | 0.987 | 0.991 | 0.998 |
| 2013 | 24756 | 0.985 | 0.989 | 0.998 |
| 2014 | 23940 | 0.982 | 0.986 | 0.997 |
| 2015 | 21822 | 0.931 | 0.938 | 0.997 |
| 2016 | 20246 | 0.836 | 0.849 | 0.993 |
| 2017 | 15782 | 0.817 | 0.834 | 0.994 |
| 2018 | 8686 | 0.807 | 0.819 | 0.989 |
| 2019 | 180 | 0.724 | 0.712 | 0.978 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 98.1 | 98.0 | 98.1 | 98.1 |
| 2011 | 25252 | 99.2 | 99.2 | 99.3 | 99.4 |
| 2012 | 22823 | 99.9 | 99.9 | 99.9 | 100.0 |
| 2013 | 24756 | 100.5 | 100.6 | 100.5 | 100.8 |
| 2014 | 23940 | 100.5 | 100.8 | 100.5 | 100.9 |
| 2015 | 21822 | 100.6 | 101.0 | 100.6 | 101.1 |
| 2016 | 20246 | 101.5 | 102.0 | 101.6 | 102.1 |
| 2017 | 15782 | 101.4 | 102.3 | 101.6 | 102.5 |
| 2018 | 8686 | 102.9 | 103.4 | 103.0 | 103.4 |
| 2019 | 180 | 103.4 | 104.4 | 103.9 | 104.3 |



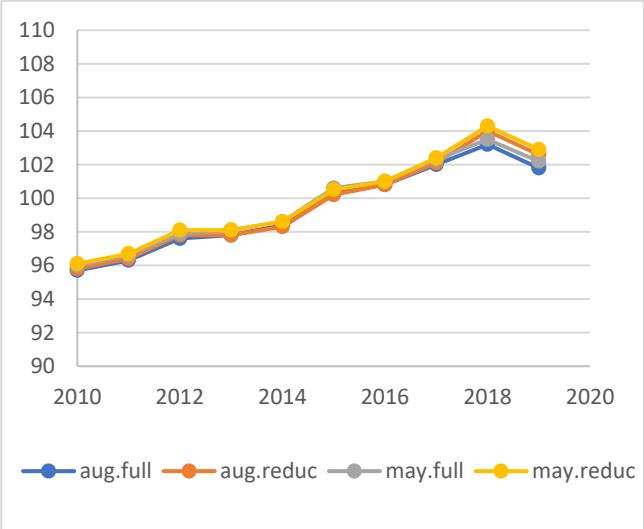

## *bv11*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.994 | 0.995 | 0.999 |
| 2011 | 25252 | 0.990 | 0.992 | 0.999 |
| 2012 | 22823 | 0.988 | 0.989 | 0.998 |
| 2013 | 24755 | 0.984 | 0.985 | 0.998 |
| 2014 | 23940 | 0.982 | 0.984 | 0.998 |
| 2015 | 21822 | 0.897 | 0.901 | 0.996 |
| 2016 | 20246 | 0.776 | 0.781 | 0.995 |
| 2017 | 15782 | 0.751 | 0.756 | 0.995 |
| 2018 | 8686 | 0.761 | 0.766 | 0.993 |
| 2019 | 180 | 0.755 | 0.743 | 0.988 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 95.7 | 95.8 | 96.0 | 96.1 |
| 2011 | 25252 | 96.3 | 96.4 | 96.6 | 96.7 |
| 2012 | 22823 | 97.6 | 97.8 | 97.9 | 98.1 |
| 2013 | 24755 | 97.8 | 97.8 | 98.1 | 98.1 |
| 2014 | 23940 | 98.4 | 98.3 | 98.6 | 98.6 |
| 2015 | 21822 | 100.4 | 100.2 | 100.6 | 100.5 |
| 2016 | 20246 | 100.8 | 100.8 | 101.0 | 101.0 |
| 2017 | 15782 | 102.0 | 102.1 | 102.3 | 102.4 |
| 2018 | 8686 | 103.2 | 104.0 | 103.5 | 104.3 |
| 2019 | 180 | 101.8 | 102.6 | 102.2 | 102.9 |



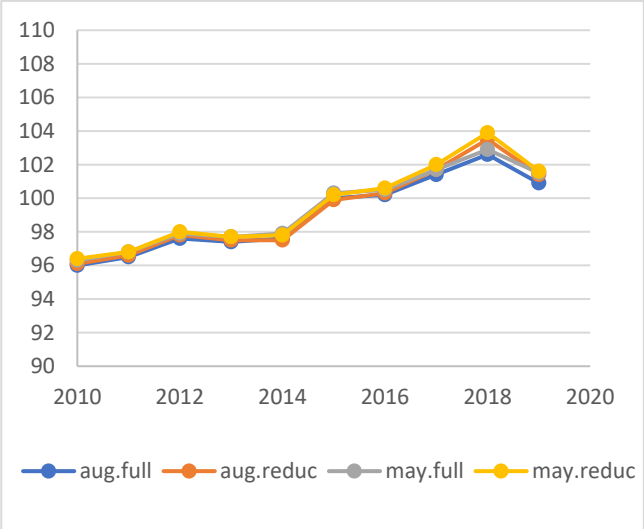

## *bv12*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.996 | 0.996 | 0.999 |
| 2011 | 25252 | 0.993 | 0.994 | 0.999 |
| 2012 | 22823 | 0.991 | 0.992 | 0.999 |
| 2013 | 24755 | 0.988 | 0.989 | 0.999 |
| 2014 | 23939 | 0.987 | 0.988 | 0.998 |
| 2015 | 21822 | 0.899 | 0.903 | 0.998 |
| 2016 | 20246 | 0.778 | 0.782 | 0.996 |
| 2017 | 15782 | 0.771 | 0.772 | 0.996 |
| 2018 | 8686 | 0.767 | 0.772 | 0.995 |
| 2019 | 180 | 0.766 | 0.781 | 0.984 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 96.0 | 96.1 | 96.3 | 96.4 |
| 2011 | 25252 | 96.5 | 96.6 | 96.8 | 96.8 |
| 2012 | 22823 | 97.6 | 97.8 | 97.9 | 98.0 |
| 2013 | 24755 | 97.4 | 97.5 | 97.7 | 97.7 |
| 2014 | 23939 | 97.6 | 97.5 | 97.9 | 97.8 |
| 2015 | 21822 | 100.0 | 99.9 | 100.3 | 100.2 |
| 2016 | 20246 | 100.2 | 100.3 | 100.5 | 100.6 |
| 2017 | 15782 | 101.4 | 101.7 | 101.7 | 102.0 |
| 2018 | 8686 | 102.6 | 103.5 | 102.9 | 103.9 |
| 2019 | 180 | 100.9 | 101.4 | 101.5 | 101.6 |



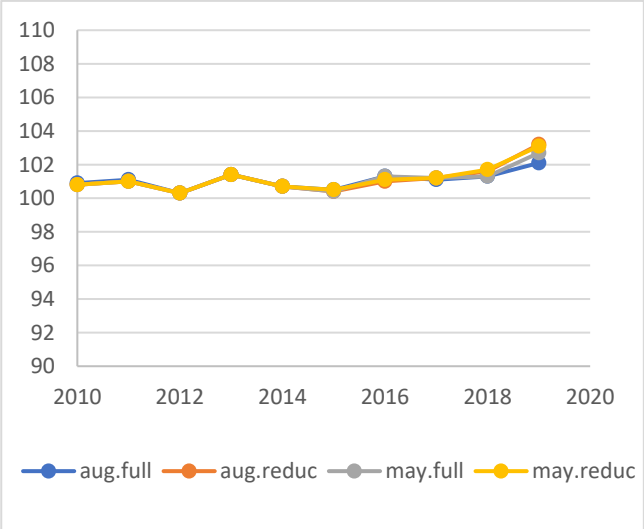

## *bv13*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25546 | 0.990 | 0.993 | 0.999 |
| 2011 | 25251 | 0.986 | 0.990 | 0.998 |
| 2012 | 22823 | 0.982 | 0.986 | 0.998 |
| 2013 | 24755 | 0.980 | 0.986 | 0.998 |
| 2014 | 23940 | 0.974 | 0.980 | 0.996 |
| 2015 | 21822 | 0.913 | 0.916 | 0.996 |
| 2016 | 20246 | 0.798 | 0.798 | 0.993 |
| 2017 | 15783 | 0.754 | 0.767 | 0.993 |
| 2018 | 8686 | 0.772 | 0.789 | 0.989 |
| 2019 | 180 | 0.749 | 0.746 | 0.978 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25546 | 100.9 | 100.8 | 100.8 | 100.8 |
| 2011 | 25251 | 101.1 | 101.0 | 101.0 | 101.0 |
| 2012 | 22823 | 100.3 | 100.3 | 100.3 | 100.3 |
| 2013 | 24755 | 101.4 | 101.4 | 101.4 | 101.4 |
| 2014 | 23940 | 100.7 | 100.7 | 100.7 | 100.7 |
| 2015 | 21822 | 100.5 | 100.4 | 100.4 | 100.5 |
| 2016 | 20246 | 101.3 | 101.0 | 101.3 | 101.1 |
| 2017 | 15783 | 101.1 | 101.2 | 101.2 | 101.2 |
| 2018 | 8686 | 101.3 | 101.6 | 101.3 | 101.7 |
| 2019 | 180 | 102.1 | 103.2 | 102.7 | 103.1 |



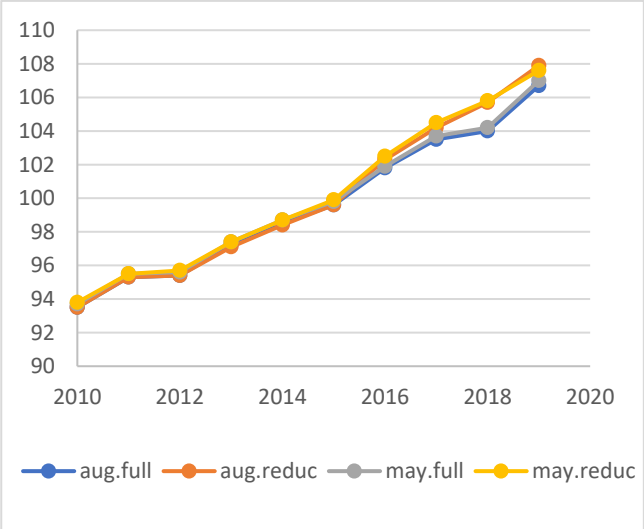

## *bv16*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.993 | 0.995 | 0.999 |
| 2011 | 25250 | 0.989 | 0.992 | 0.998 |
| 2012 | 22822 | 0.987 | 0.990 | 0.998 |
| 2013 | 24754 | 0.983 | 0.987 | 0.998 |
| 2014 | 23939 | 0.981 | 0.985 | 0.998 |
| 2015 | 21820 | 0.910 | 0.912 | 0.996 |
| 2016 | 20244 | 0.852 | 0.857 | 0.995 |
| 2017 | 15781 | 0.812 | 0.815 | 0.994 |
| 2018 | 8685 | 0.824 | 0.837 | 0.992 |
| 2019 | 180 | 0.734 | 0.755 | 0.975 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 93.5 | 93.5 | 93.7 | 93.8 |
| 2011 | 25250 | 95.3 | 95.3 | 95.5 | 95.5 |
| 2012 | 22822 | 95.4 | 95.4 | 95.6 | 95.7 |
| 2013 | 24754 | 97.2 | 97.1 | 97.4 | 97.4 |
| 2014 | 23939 | 98.5 | 98.4 | 98.7 | 98.7 |
| 2015 | 21820 | 99.6 | 99.6 | 99.8 | 99.9 |
| 2016 | 20244 | 101.8 | 102.3 | 101.9 | 102.5 |
| 2017 | 15781 | 103.5 | 104.2 | 103.7 | 104.5 |
| 2018 | 8685 | 104.0 | 105.7 | 104.2 | 105.8 |
| 2019 | 180 | 106.7 | 107.9 | 107.0 | 107.6 |



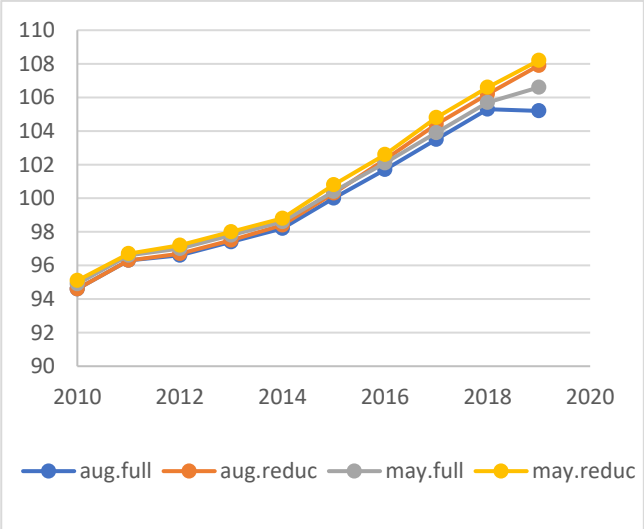

## *bv17*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.994 | 0.996 | 0.999 |
| 2011 | 25249 | 0.991 | 0.993 | 0.999 |
| 2012 | 22822 | 0.988 | 0.99 | 0.998 |
| 2013 | 24754 | 0.984 | 0.987 | 0.998 |
| 2014 | 23938 | 0.983 | 0.986 | 0.998 |
| 2015 | 21820 | 0.915 | 0.919 | 0.997 |
| 2016 | 20244 | 0.844 | 0.851 | 0.995 |
| 2017 | 15780 | 0.806 | 0.807 | 0.994 |
| 2018 | 8685 | 0.813 | 0.803 | 0.993 |
| 2019 | 180 | 0.729 | 0.721 | 0.983 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 94.6 | 94.6 | 94.9 | 95.1 |
| 2011 | 25249 | 96.3 | 96.3 | 96.6 | 96.7 |
| 2012 | 22822 | 96.6 | 96.7 | 97.0 | 97.2 |
| 2013 | 24754 | 97.4 | 97.5 | 97.8 | 98.0 |
| 2014 | 23938 | 98.2 | 98.4 | 98.6 | 98.8 |
| 2015 | 21820 | 100.0 | 100.3 | 100.4 | 100.8 |
| 2016 | 20244 | 101.7 | 102.3 | 102.1 | 102.6 |
| 2017 | 15780 | 103.5 | 104.4 | 103.9 | 104.8 |
| 2018 | 8685 | 105.3 | 106.2 | 105.7 | 106.6 |
| 2019 | 180 | 105.2 | 107.9 | 106.6 | 108.2 |



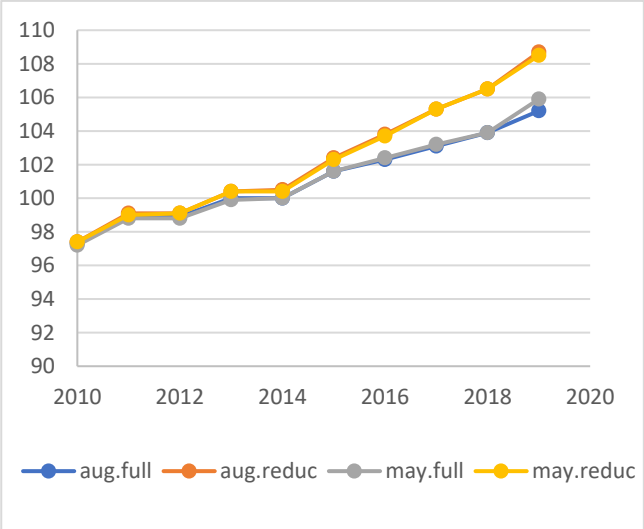

## *bv18*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.996 | 0.996 | 0.999 |
| 2011 | 25250 | 0.993 | 0.994 | 0.999 |
| 2012 | 22822 | 0.991 | 0.992 | 0.999 |
| 2013 | 24754 | 0.988 | 0.989 | 0.999 |
| 2014 | 23938 | 0.986 | 0.987 | 0.998 |
| 2015 | 21820 | 0.930 | 0.932 | 0.997 |
| 2016 | 20244 | 0.855 | 0.854 | 0.996 |
| 2017 | 15780 | 0.810 | 0.810 | 0.995 |
| 2018 | 8685 | 0.773 | 0.769 | 0.993 |
| 2019 | 180 | 0.793 | 0.807 | 0.987 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 97.3 | 97.4 | 97.2 | 97.4 |
| 2011 | 25250 | 98.9 | 99.1 | 98.8 | 99.0 |
| 2012 | 22822 | 98.9 | 99.1 | 98.8 | 99.1 |
| 2013 | 24754 | 100.0 | 100.4 | 99.9 | 100.4 |
| 2014 | 23938 | 100.0 | 100.5 | 100.0 | 100.4 |
| 2015 | 21820 | 101.6 | 102.4 | 101.6 | 102.3 |
| 2016 | 20244 | 102.3 | 103.8 | 102.4 | 103.7 |
| 2017 | 15780 | 103.1 | 105.3 | 103.2 | 105.3 |
| 2018 | 8685 | 103.9 | 106.5 | 103.9 | 106.5 |
| 2019 | 180 | 105.2 | 108.7 | 105.9 | 108.5 |



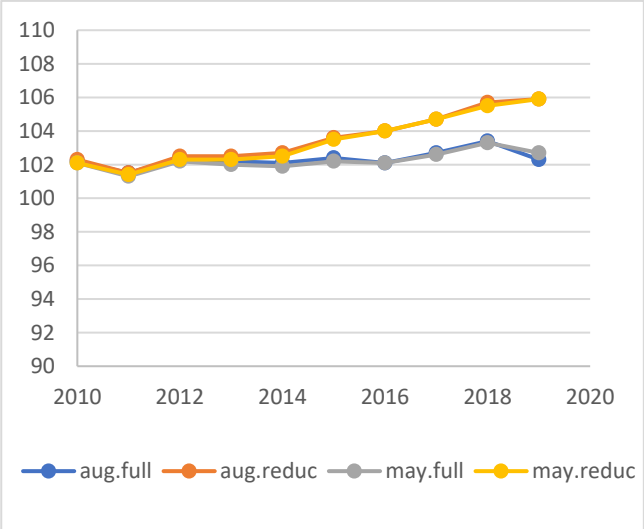

## *bv19*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25546 | 0.992 | 0.994 | 0.999 |
| 2011 | 25249 | 0.988 | 0.992 | 0.998 |
| 2012 | 22821 | 0.987 | 0.990 | 0.998 |
| 2013 | 24754 | 0.983 | 0.986 | 0.998 |
| 2014 | 23938 | 0.980 | 0.984 | 0.998 |
| 2015 | 21819 | 0.924 | 0.928 | 0.996 |
| 2016 | 20243 | 0.855 | 0.862 | 0.995 |
| 2017 | 15780 | 0.816 | 0.823 | 0.995 |
| 2018 | 8685 | 0.812 | 0.825 | 0.992 |
| 2019 | 180 | 0.808 | 0.840 | 0.982 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25546 | 102.2 | 102.3 | 102.1 | 102.1 |
| 2011 | 25249 | 101.5 | 101.5 | 101.3 | 101.4 |
| 2012 | 22821 | 102.4 | 102.5 | 102.2 | 102.3 |
| 2013 | 24754 | 102.2 | 102.5 | 102.0 | 102.3 |
| 2014 | 23938 | 102.1 | 102.7 | 101.9 | 102.5 |
| 2015 | 21819 | 102.4 | 103.6 | 102.2 | 103.5 |
| 2016 | 20243 | 102.1 | 104.0 | 102.1 | 104.0 |
| 2017 | 15780 | 102.7 | 104.7 | 102.6 | 104.7 |
| 2018 | 8685 | 103.4 | 105.7 | 103.3 | 105.5 |
| 2019 | 180 | 102.3 | 105.9 | 102.7 | 105.9 |



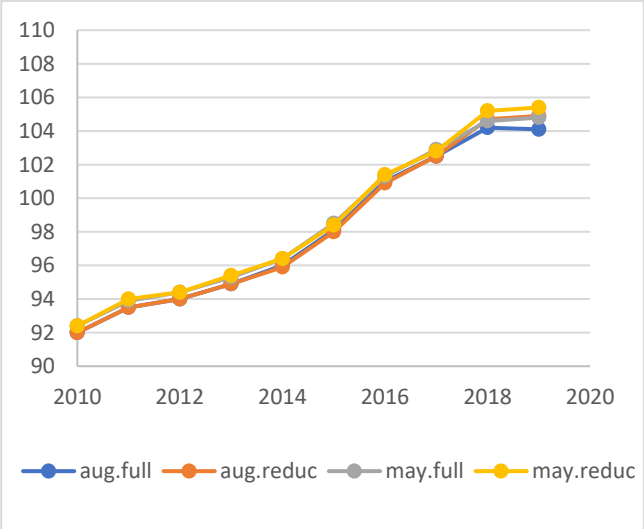

## *bv20*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.996 | 0.997 | 0.999 |
| 2011 | 25249 | 0.994 | 0.995 | 0.999 |
| 2012 | 22821 | 0.991 | 0.993 | 0.999 |
| 2013 | 24753 | 0.987 | 0.989 | 0.998 |
| 2014 | 23938 | 0.985 | 0.988 | 0.998 |
| 2015 | 21819 | 0.918 | 0.920 | 0.997 |
| 2016 | 20242 | 0.832 | 0.837 | 0.996 |
| 2017 | 15779 | 0.785 | 0.791 | 0.995 |
| 2018 | 8685 | 0.797 | 0.802 | 0.994 |
| 2019 | 180 | 0.780 | 0.787 | 0.981 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 92.0 | 92.0 | 92.4 | 92.4 |
| 2011 | 25249 | 93.5 | 93.5 | 93.9 | 94.0 |
| 2012 | 22821 | 94.0 | 94.0 | 94.4 | 94.4 |
| 2013 | 24753 | 94.9 | 94.9 | 95.3 | 95.4 |
| 2014 | 23938 | 96.0 | 95.9 | 96.4 | 96.4 |
| 2015 | 21819 | 98.1 | 98.0 | 98.5 | 98.4 |
| 2016 | 20242 | 101.0 | 100.9 | 101.3 | 101.4 |
| 2017 | 15779 | 102.5 | 102.5 | 102.9 | 102.8 |
| 2018 | 8685 | 104.2 | 104.7 | 104.6 | 105.2 |
| 2019 | 180 | 104.1 | 104.9 | 104.8 | 105.4 |



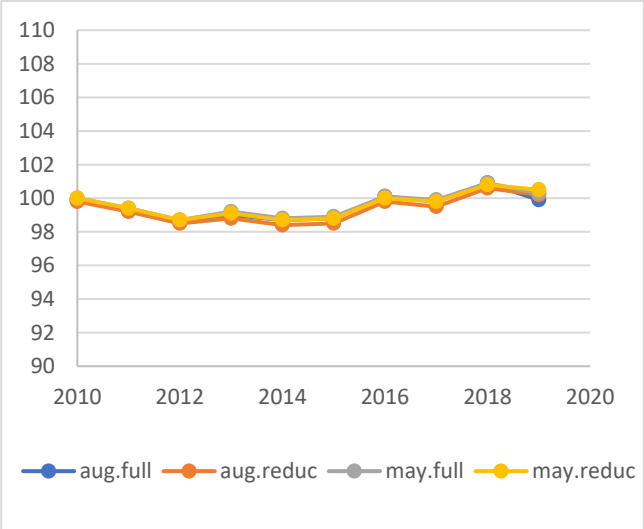

## *bv21*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25545 | 0.995 | 0.996 | 0.999 |
| 2011 | 25249 | 0.993 | 0.994 | 0.999 |
| 2012 | 22822 | 0.991 | 0.993 | 0.999 |
| 2013 | 24753 | 0.991 | 0.992 | 0.999 |
| 2014 | 23939 | 0.988 | 0.990 | 0.999 |
| 2015 | 21819 | 0.932 | 0.935 | 0.998 |
| 2016 | 20241 | 0.861 | 0.865 | 0.997 |
| 2017 | 15781 | 0.840 | 0.841 | 0.997 |
| 2018 | 8685 | 0.833 | 0.835 | 0.996 |
| 2019 | 180 | 0.802 | 0.809 | 0.992 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25545 | 99.9 | 99.8 | 100.0 | 100.0 |
| 2011 | 25249 | 99.3 | 99.2 | 99.4 | 99.4 |
| 2012 | 22822 | 98.6 | 98.5 | 98.7 | 98.7 |
| 2013 | 24753 | 99.0 | 98.8 | 99.2 | 99.1 |
| 2014 | 23939 | 98.7 | 98.4 | 98.8 | 98.7 |
| 2015 | 21819 | 98.8 | 98.5 | 98.9 | 98.8 |
| 2016 | 20241 | 100.1 | 99.8 | 100.1 | 100.0 |
| 2017 | 15781 | 99.8 | 99.5 | 99.9 | 99.8 |
| 2018 | 8685 | 100.9 | 100.6 | 100.9 | 100.8 |
| 2019 | 180 | 99.9 | 100.2 | 100.3 | 100.5 |



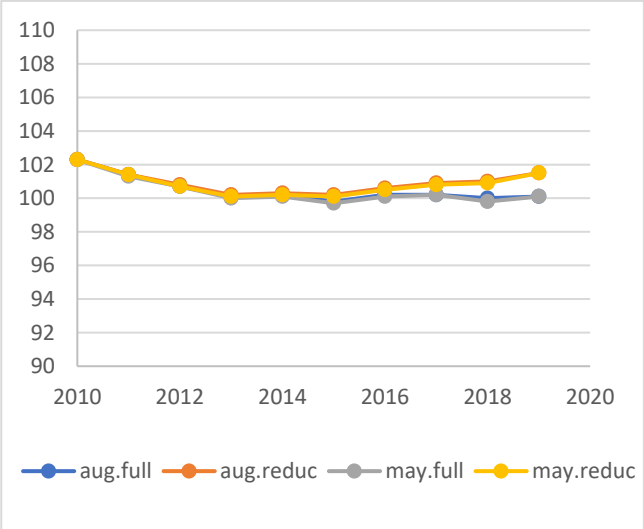

## *bv22*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25546 | 0.996 | 0.996 | 0.999 |
| 2011 | 25249 | 0.994 | 0.994 | 0.999 |
| 2012 | 22822 | 0.992 | 0.993 | 0.999 |
| 2013 | 24753 | 0.989 | 0.990 | 0.999 |
| 2014 | 23939 | 0.988 | 0.989 | 0.999 |
| 2015 | 21819 | 0.940 | 0.942 | 0.998 |
| 2016 | 20241 | 0.874 | 0.875 | 0.997 |
| 2017 | 15781 | 0.842 | 0.844 | 0.996 |
| 2018 | 8685 | 0.819 | 0.822 | 0.995 |
| 2019 | 180 | 0.882 | 0.894 | 0.991 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25546 | 102.3 | 102.3 | 102.3 | 102.3 |
| 2011 | 25249 | 101.4 | 101.4 | 101.3 | 101.4 |
| 2012 | 22822 | 100.7 | 100.8 | 100.7 | 100.7 |
| 2013 | 24753 | 100.1 | 100.2 | 100.0 | 100.1 |
| 2014 | 23939 | 100.2 | 100.3 | 100.1 | 100.2 |
| 2015 | 21819 | 99.8 | 100.2 | 99.7 | 100.1 |
| 2016 | 20241 | 100.2 | 100.6 | 100.1 | 100.5 |
| 2017 | 15781 | 100.2 | 100.9 | 100.2 | 100.8 |
| 2018 | 8685 | 100.0 | 101.0 | 99.8 | 100.9 |
| 2019 | 180 | 100.1 | 101.5 | 100.1 | 101.5 |



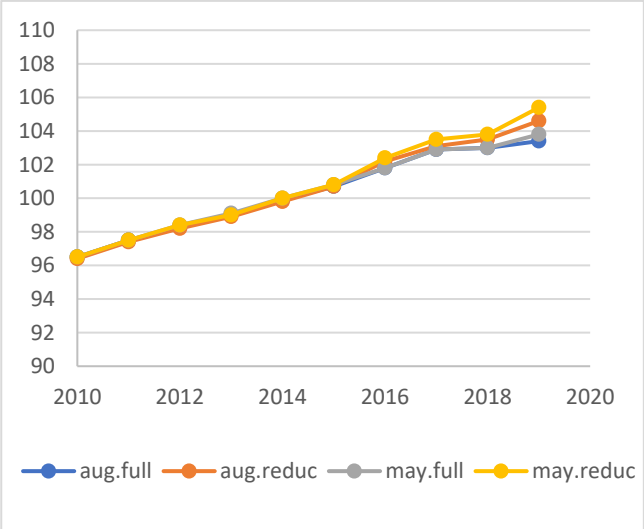

## *bv23*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25546 | 0.993 | 0.996 | 0.999 |
| 2011 | 25249 | 0.990 | 0.994 | 0.999 |
| 2012 | 22822 | 0.987 | 0.991 | 0.998 |
| 2013 | 24753 | 0.985 | 0.989 | 0.998 |
| 2014 | 23938 | 0.984 | 0.988 | 0.998 |
| 2015 | 21819 | 0.929 | 0.935 | 0.997 |
| 2016 | 20241 | 0.845 | 0.855 | 0.995 |
| 2017 | 15780 | 0.817 | 0.825 | 0.996 |
| 2018 | 8685 | 0.796 | 0.803 | 0.994 |
| 2019 | 180 | 0.784 | 0.820 | 0.989 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25546 | 96.5 | 96.4 | 96.5 | 96.5 |
| 2011 | 25249 | 97.5 | 97.4 | 97.5 | 97.5 |
| 2012 | 22822 | 98.3 | 98.2 | 98.4 | 98.4 |
| 2013 | 24753 | 99.0 | 98.9 | 99.1 | 99.0 |
| 2014 | 23938 | 99.9 | 99.8 | 100.0 | 100.0 |
| 2015 | 21819 | 100.7 | 100.7 | 100.8 | 100.8 |
| 2016 | 20241 | 101.8 | 102.2 | 101.8 | 102.4 |
| 2017 | 15780 | 102.9 | 103.1 | 102.9 | 103.5 |
| 2018 | 8685 | 103.0 | 103.5 | 103.0 | 103.8 |
| 2019 | 180 | 103.4 | 104.6 | 103.8 | 105.4 |



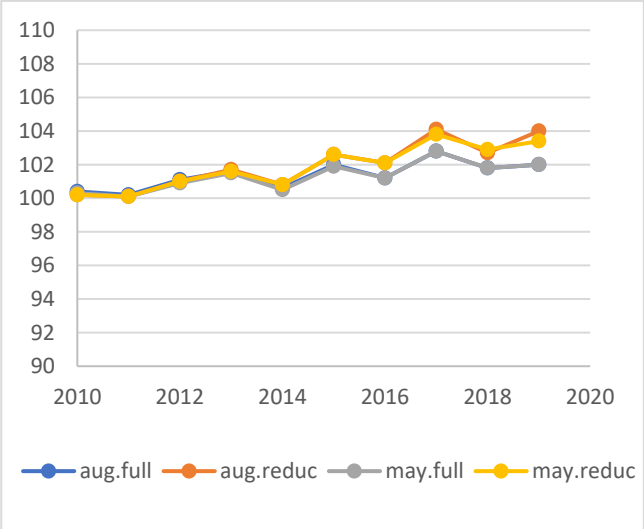

## *bv24*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25545 | 0.988 | 0.995 | 0.999 |
| 2011 | 25249 | 0.984 | 0.993 | 0.999 |
| 2012 | 22821 | 0.981 | 0.990 | 0.998 |
| 2013 | 24753 | 0.981 | 0.990 | 0.998 |
| 2014 | 23937 | 0.978 | 0.988 | 0.998 |
| 2015 | 21819 | 0.914 | 0.934 | 0.997 |
| 2016 | 20241 | 0.827 | 0.854 | 0.996 |
| 2017 | 15780 | 0.800 | 0.829 | 0.996 |
| 2018 | 8685 | 0.772 | 0.816 | 0.994 |
| 2019 | 180 | 0.790 | 0.820 | 0.990 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25545 | 100.4 | 100.2 | 100.3 | 100.2 |
| 2011 | 25249 | 100.2 | 100.1 | 100.1 | 100.1 |
| 2012 | 22821 | 101.1 | 101.0 | 100.9 | 101.0 |
| 2013 | 24753 | 101.6 | 101.7 | 101.5 | 101.6 |
| 2014 | 23937 | 100.6 | 100.8 | 100.5 | 100.8 |
| 2015 | 21819 | 102.0 | 102.6 | 101.9 | 102.6 |
| 2016 | 20241 | 101.2 | 102.1 | 101.2 | 102.1 |
| 2017 | 15780 | 102.8 | 104.1 | 102.8 | 103.8 |
| 2018 | 8685 | 101.8 | 102.7 | 101.8 | 102.9 |
| 2019 | 180 | 102.0 | 104.0 | 102.0 | 103.4 |



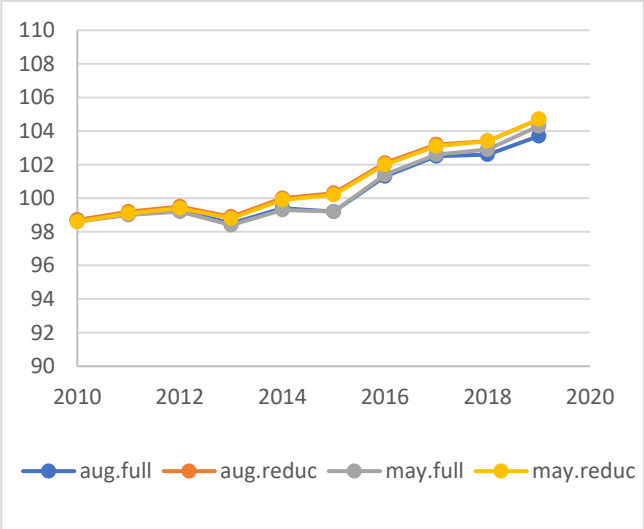

## *bv25*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 25547 | 0.993 | 0.993 | 0.999 |
| 2011 | 25247 | 0.990 | 0.991 | 0.999 |
| 2012 | 22822 | 0.988 | 0.989 | 0.999 |
| 2013 | 24753 | 0.985 | 0.986 | 0.998 |
| 2014 | 23938 | 0.984 | 0.986 | 0.998 |
| 2015 | 21819 | 0.927 | 0.930 | 0.997 |
| 2016 | 20241 | 0.851 | 0.859 | 0.996 |
| 2017 | 15780 | 0.828 | 0.833 | 0.996 |
| 2018 | 8685 | 0.826 | 0.835 | 0.994 |
| 2019 | 180 | 0.791 | 0.799 | 0.990 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 25547 | 98.7 | 98.7 | 98.6 | 98.6 |
| 2011 | 25247 | 99.1 | 99.2 | 99.0 | 99.1 |
| 2012 | 22822 | 99.3 | 99.5 | 99.2 | 99.4 |
| 2013 | 24753 | 98.5 | 98.9 | 98.4 | 98.8 |
| 2014 | 23938 | 99.4 | 100.0 | 99.3 | 99.9 |
| 2015 | 21819 | 99.2 | 100.3 | 99.2 | 100.2 |
| 2016 | 20241 | 101.3 | 102.1 | 101.4 | 102.0 |
| 2017 | 15780 | 102.5 | 103.2 | 102.6 | 103.1 |
| 2018 | 8685 | 102.6 | 103.4 | 102.9 | 103.4 |
| 2019 | 180 | 103.7 | 104.7 | 104.3 | 104.7 |




# Bulls

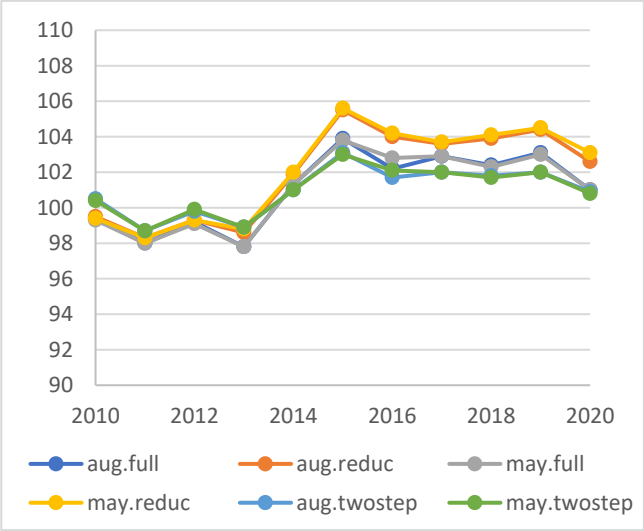
## *bv1*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | | 0.991 | 0.994 | 0.999 |
| 2011 | | 0.990 | 0.992 | 0.999 |
| 2012 | | 0.995 | 0.996 | 0.999 |
| 2013 | | 0.898 | 0.902 | 0.998 |
| 2014 | | 0.941 | 0.938 | 0.999 |
| 2015 | | 0.865 | 0.870 | 0.999 |
| 2016 | | 0.933 | 0.927 | 0.986 |
| 2017 | | 0.880 | 0.890 | 0.980 |
| 2018 | | 0.910 | 0.922 | 0.994 |
| 2019 | | 0.828 | 0.838 | 0.990 |
| 2020 | | 0.930 | 0.941 | 0.991 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 99.4 | 99.5 | 99.3 | 99.4 | 100.5 | 100.4 |
| 2011 | 214 | 98.0 | 98.3 | 98.0 | 98.3 | 98.7 | 98.7 |
| 2012 | 151 | 99.2 | 99.3 | 99.1 | 99.3 | 99.8 | 99.9 |
| 2013 | 119 | 97.8 | 98.6 | 97.8 | 98.8 | 98.9 | 98.9 |
| 2014 | 73 | 101.3 | 101.9 | 101.3 | 102.0 | 101.0 | 101.0 |
| 2015 | 50 | 103.9 | 105.5 | 103.8 | 105.6 | 103.1 | 103.0 |
| 2016 | 47 | 102.2 | 104.0 | 102.8 | 104.2 | 101.7 | 102.1 |
| 2017 | 79 | 102.9 | 103.6 | 102.9 | 103.7 | 102.0 | 102.0 |
| 2018 | 63 | 102.4 | 103.9 | 102.3 | 104.1 | 101.8 | 101.7 |
| 2019 | 49 | 103.1 | 104.4 | 103.0 | 104.5 | 102.0 | 102.0 |
| 2020 | 29 | 101.0 | 102.6 | 101.0 | 103.1 | 100.9 | 100.8 |



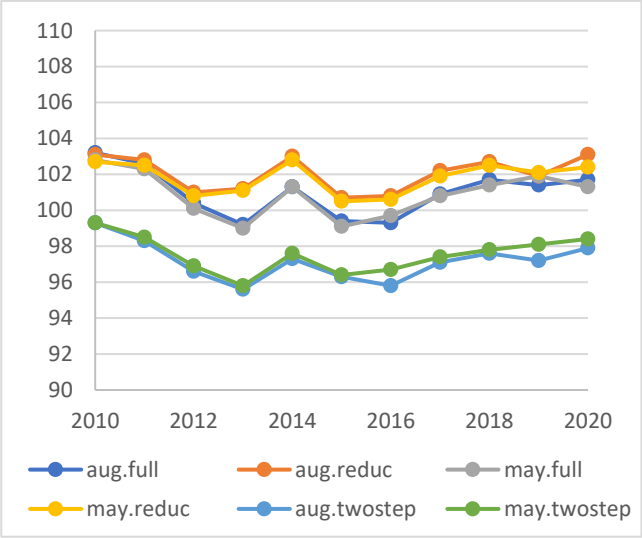

## *bv2*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.985 | 0.988 | 0.998 |
| 2011 | 214 | 0.982 | 0.984 | 0.998 |
| 2012 | 151 | 0.986 | 0.987 | 0.999 |
| 2013 | 119 | 0.869 | 0.868 | 0.998 |
| 2014 | 73 | 0.895 | 0.911 | 0.998 |
| 2015 | 50 | 0.813 | 0.833 | 0.997 |
| 2016 | 47 | 0.840 | 0.894 | 0.970 |
| 2017 | 79 | 0.878 | 0.877 | 0.991 |
| 2018 | 63 | 0.869 | 0.883 | 0.992 |
| 2019 | 49 | 0.736 | 0.834 | 0.966 |
| 2020 | 29 | 0.833 | 0.845 | 0.990 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 103.2 | 103.1 | 102.8 | 102.7 | 99.3 | 99.3 |
| 2011 | 214 | 102.6 | 102.8 | 102.3 | 102.5 | 98.3 | 98.5 |
| 2012 | 151 | 100.4 | 101.0 | 100.1 | 100.8 | 96.6 | 96.9 |
| 2013 | 119 | 99.2 | 101.2 | 99.0 | 101.1 | 95.6 | 95.8 |
| 2014 | 73 | 101.3 | 103.0 | 101.3 | 102.8 | 97.3 | 97.6 |
| 2015 | 50 | 99.4 | 100.7 | 99.1 | 100.5 | 96.3 | 96.4 |
| 2016 | 47 | 99.3 | 100.8 | 99.7 | 100.6 | 95.8 | 96.7 |
| 2017 | 79 | 100.9 | 102.2 | 100.8 | 101.9 | 97.1 | 97.4 |
| 2018 | 63 | 101.7 | 102.7 | 101.4 | 102.5 | 97.6 | 97.8 |
| 2019 | 49 | 101.4 | 101.9 | 101.9 | 102.1 | 97.2 | 98.1 |
| 2020 | 29 | 101.7 | 103.1 | 101.3 | 102.4 | 97.9 | 98.4 |



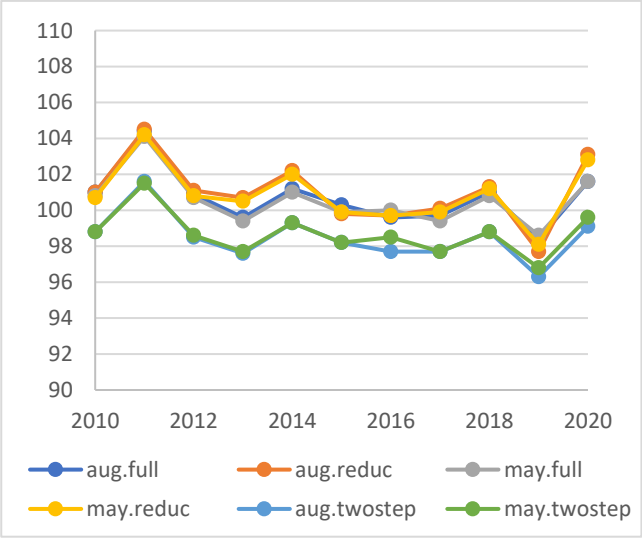

## *bv3*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.986 | 0.988 | 0.999 |
| 2011 | 214 | 0.985 | 0.988 | 0.998 |
| 2012 | 151 | 0.983 | 0.986 | 0.999 |
| 2013 | 119 | 0.897 | 0.906 | 0.998 |
| 2014 | 73 | 0.903 | 0.907 | 0.998 |
| 2015 | 50 | 0.887 | 0.889 | 0.997 |
| 2016 | 47 | 0.843 | 0.869 | 0.969 |
| 2017 | 79 | 0.899 | 0.907 | 0.991 |
| 2018 | 63 | 0.894 | 0.918 | 0.985 |
| 2019 | 49 | 0.882 | 0.907 | 0.984 |
| 2020 | 29 | 0.818 | 0.851 | 0.987 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 101.0 | 101.0 | 100.8 | 100.7 | 98.8 | 98.8 |
| 2011 | 214 | 104.4 | 104.5 | 104.1 | 104.2 | 101.6 | 101.5 |
| 2012 | 151 | 100.9 | 101.1 | 100.7 | 100.8 | 98.5 | 98.6 |
| 2013 | 119 | 99.6 | 100.7 | 99.4 | 100.5 | 97.6 | 97.7 |
| 2014 | 73 | 101.2 | 102.2 | 101.0 | 102.0 | 99.3 | 99.3 |
| 2015 | 50 | 100.3 | 99.8 | 99.9 | 99.9 | 98.2 | 98.2 |
| 2016 | 47 | 99.6 | 99.7 | 100.0 | 99.7 | 97.7 | 98.5 |
| 2017 | 79 | 99.7 | 100.1 | 99.4 | 99.9 | 97.7 | 97.7 |
| 2018 | 63 | 101.0 | 101.3 | 100.8 | 101.2 | 98.8 | 98.8 |
| 2019 | 49 | 98.4 | 97.7 | 98.6 | 98.1 | 96.3 | 96.8 |
| 2020 | 29 | 101.6 | 103.1 | 101.6 | 102.8 | 99.1 | 99.6 |



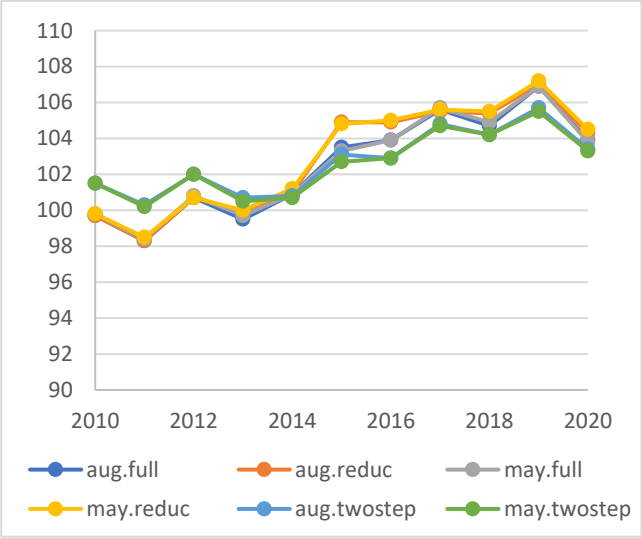

## *bv4*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.984 | 0.988 | 0.998 |
| 2011 | 214 | 0.979 | 0.981 | 0.998 |
| 2012 | 151 | 0.982 | 0.985 | 0.998 |
| 2013 | 119 | 0.891 | 0.897 | 0.997 |
| 2014 | 73 | 0.838 | 0.828 | 0.997 |
| 2015 | 50 | 0.743 | 0.761 | 0.995 |
| 2016 | 47 | 0.845 | 0.812 | 0.950 |
| 2017 | 79 | 0.888 | 0.902 | 0.987 |
| 2018 | 63 | 0.806 | 0.763 | 0.971 |
| 2019 | 49 | 0.848 | 0.887 | 0.978 |
| 2020 | 29 | 0.861 | 0.881 | 0.986 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 99.7 | 99.7 | 99.8 | 99.8 | 101.5 | 101.5 |
| 2011 | 214 | 98.3 | 98.3 | 98.4 | 98.5 | 100.3 | 100.2 |
| 2012 | 151 | 100.7 | 100.7 | 100.8 | 100.7 | 102.0 | 102.0 |
| 2013 | 119 | 99.5 | 99.9 | 99.7 | 100.0 | 100.7 | 100.5 |
| 2014 | 73 | 100.9 | 101.0 | 100.9 | 101.2 | 100.8 | 100.7 |
| 2015 | 50 | 103.5 | 104.9 | 103.3 | 104.8 | 103.1 | 102.7 |
| 2016 | 47 | 103.9 | 104.9 | 103.9 | 105.0 | 102.9 | 102.9 |
| 2017 | 79 | 105.6 | 105.5 | 105.7 | 105.6 | 104.8 | 104.7 |
| 2018 | 63 | 104.7 | 105.4 | 104.9 | 105.5 | 104.2 | 104.2 |
| 2019 | 49 | 106.9 | 107.0 | 106.9 | 107.2 | 105.7 | 105.5 |
| 2020 | 29 | 103.9 | 104.3 | 103.8 | 104.5 | 103.4 | 103.3 |



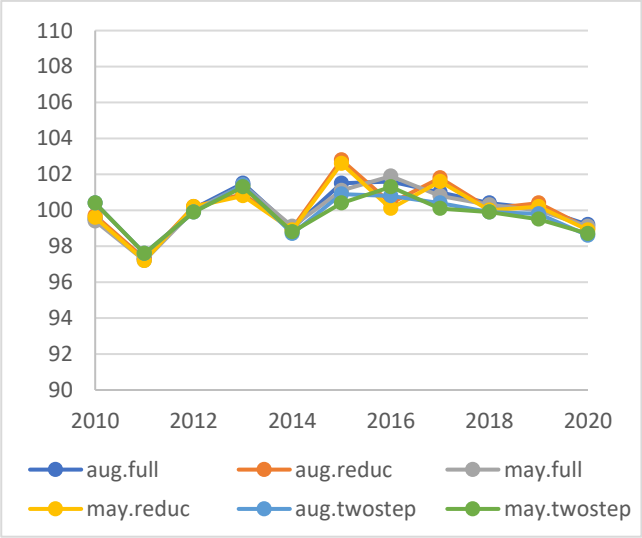

## *bv5*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.989 | 0.990 | 0.998 |
| 2011 | 214 | 0.983 | 0.985 | 0.998 |
| 2012 | 151 | 0.983 | 0.985 | 0.998 |
| 2013 | 119 | 0.912 | 0.911 | 0.998 |
| 2014 | 73 | 0.918 | 0.914 | 0.998 |
| 2015 | 50 | 0.861 | 0.865 | 0.996 |
| 2016 | 47 | 0.802 | 0.768 | 0.963 |
| 2017 | 79 | 0.914 | 0.924 | 0.989 |
| 2018 | 63 | 0.904 | 0.887 | 0.990 |
| 2019 | 49 | 0.894 | 0.894 | 0.991 |
| 2020 | 29 | 0.900 | 0.880 | 0.992 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 99.5 | 99.7 | 99.4 | 99.6 | 100.4 | 100.4 |
| 2011 | 214 | 97.3 | 97.3 | 97.2 | 97.2 | 97.6 | 97.6 |
| 2012 | 151 | 100.1 | 100.2 | 100.0 | 100.2 | 99.9 | 99.9 |
| 2013 | 119 | 101.5 | 100.9 | 101.4 | 100.8 | 101.4 | 101.3 |
| 2014 | 73 | 99.0 | 99.0 | 99.1 | 98.9 | 98.7 | 98.8 |
| 2015 | 50 | 101.5 | 102.8 | 101.1 | 102.6 | 100.9 | 100.4 |
| 2016 | 47 | 101.6 | 100.4 | 101.9 | 100.1 | 100.8 | 101.3 |
| 2017 | 79 | 101.0 | 101.8 | 100.8 | 101.6 | 100.4 | 100.1 |
| 2018 | 63 | 100.4 | 100.1 | 100.3 | 100.0 | 99.9 | 99.9 |
| 2019 | 49 | 100.1 | 100.4 | 100.0 | 100.2 | 99.8 | 99.5 |
| 2020 | 29 | 99.2 | 99.0 | 99.1 | 98.9 | 98.6 | 98.7 |



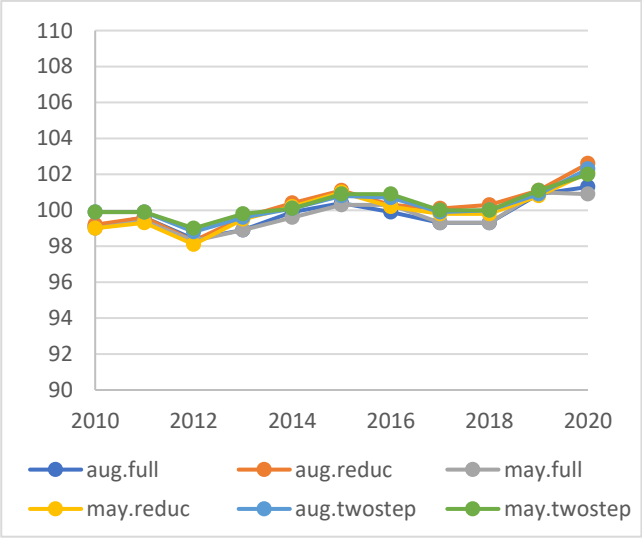

## *bv6*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.989 | 0.990 | 0.999 |
| 2011 | 214 | 0.988 | 0.989 | 0.999 |
| 2012 | 151 | 0.993 | 0.993 | 0.999 |
| 2013 | 119 | 0.920 | 0.924 | 0.998 |
| 2014 | 73 | 0.850 | 0.848 | 0.998 |
| 2015 | 50 | 0.863 | 0.857 | 0.997 |
| 2016 | 47 | 0.841 | 0.861 | 0.971 |
| 2017 | 79 | 0.851 | 0.838 | 0.978 |
| 2018 | 63 | 0.902 | 0.888 | 0.989 |
| 2019 | 49 | 0.835 | 0.847 | 0.982 |
| 2020 | 29 | 0.923 | 0.934 | 0.993 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 99.1 | 99.2 | 99.0 | 99.0 | 99.9 | 99.9 |
| 2011 | 214 | 99.6 | 99.6 | 99.4 | 99.3 | 99.9 | 99.9 |
| 2012 | 151 | 98.4 | 98.3 | 98.3 | 98.1 | 98.8 | 99.0 |
| 2013 | 119 | 98.9 | 99.6 | 98.9 | 99.5 | 99.6 | 99.8 |
| 2014 | 73 | 99.9 | 100.4 | 99.6 | 100.2 | 100.1 | 100.1 |
| 2015 | 50 | 100.4 | 101.1 | 100.3 | 101.0 | 100.8 | 100.9 |
| 2016 | 47 | 99.9 | 100.3 | 100.3 | 100.2 | 100.7 | 100.9 |
| 2017 | 79 | 99.3 | 100.1 | 99.3 | 99.8 | 99.9 | 100.0 |
| 2018 | 63 | 99.3 | 100.3 | 99.3 | 99.8 | 100.0 | 100.0 |
| 2019 | 49 | 100.9 | 101.1 | 101.0 | 100.8 | 100.9 | 101.1 |
| 2020 | 29 | 101.3 | 102.6 | 100.9 | 102.1 | 102.3 | 102.0 |



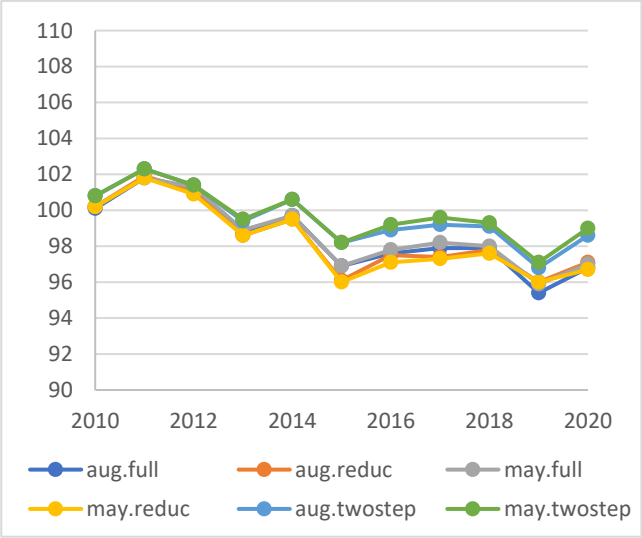

## *bv7*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.988 | 0.990 | 0.999 |
| 2011 | 214 | 0.986 | 0.989 | 0.999 |
| 2012 | 151 | 0.987 | 0.992 | 0.999 |
| 2013 | 119 | 0.944 | 0.944 | 0.998 |
| 2014 | 73 | 0.929 | 0.930 | 0.999 |
| 2015 | 50 | 0.903 | 0.892 | 0.998 |
| 2016 | 47 | 0.851 | 0.881 | 0.959 |
| 2017 | 79 | 0.927 | 0.945 | 0.980 |
| 2018 | 63 | 0.893 | 0.912 | 0.987 |
| 2019 | 49 | 0.893 | 0.937 | 0.975 |
| 2020 | 29 | 0.911 | 0.946 | 0.994 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 100.1 | 100.2 | 100.2 | 100.2 | 100.8 | 100.8 |
| 2011 | 214 | 101.8 | 101.9 | 101.8 | 101.8 | 102.3 | 102.3 |
| 2012 | 151 | 101.2 | 101.1 | 101.3 | 100.9 | 101.4 | 101.4 |
| 2013 | 119 | 98.7 | 98.6 | 98.9 | 98.6 | 99.4 | 99.5 |
| 2014 | 73 | 99.7 | 99.5 | 99.7 | 99.5 | 100.6 | 100.6 |
| 2015 | 50 | 96.9 | 96.1 | 96.9 | 96.0 | 98.2 | 98.2 |
| 2016 | 47 | 97.6 | 97.5 | 97.8 | 97.1 | 98.9 | 99.2 |
| 2017 | 79 | 97.9 | 97.4 | 98.2 | 97.3 | 99.2 | 99.6 |
| 2018 | 63 | 97.9 | 97.8 | 98.0 | 97.6 | 99.1 | 99.3 |
| 2019 | 49 | 95.4 | 96.0 | 95.9 | 96.0 | 96.8 | 97.1 |
| 2020 | 29 | 96.8 | 97.1 | 97.0 | 96.7 | 98.6 | 99.0 |



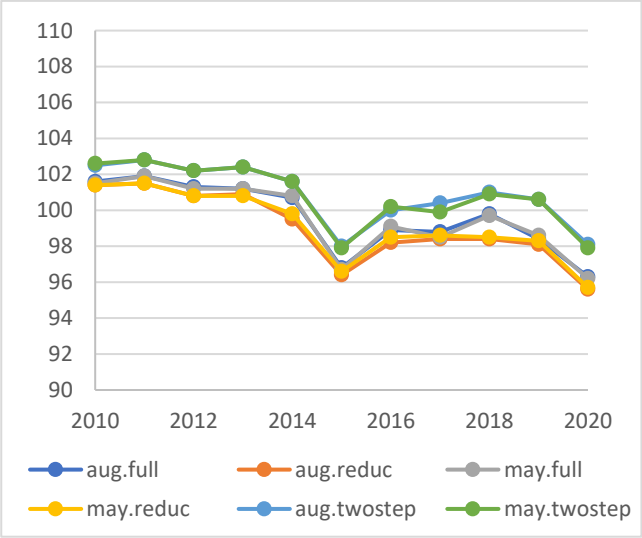

## *bv9*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.986 | 0.990 | 0.998 |
| 2011 | 214 | 0.983 | 0.989 | 0.998 |
| 2012 | 151 | 0.990 | 0.992 | 0.999 |
| 2013 | 119 | 0.917 | 0.912 | 0.997 |
| 2014 | 73 | 0.918 | 0.926 | 0.997 |
| 2015 | 50 | 0.890 | 0.869 | 0.998 |
| 2016 | 47 | 0.826 | 0.858 | 0.967 |
| 2017 | 79 | 0.884 | 0.905 | 0.990 |
| 2018 | 63 | 0.907 | 0.925 | 0.990 |
| 2019 | 49 | 0.899 | 0.883 | 0.988 |
| 2020 | 29 | 0.936 | 0.951 | 0.987 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 101.6 | 101.4 | 101.5 | 101.4 | 102.5 | 102.6 |
| 2011 | 214 | 101.9 | 101.5 | 101.9 | 101.5 | 102.8 | 102.8 |
| 2012 | 151 | 101.3 | 100.8 | 101.2 | 100.8 | 102.2 | 102.2 |
| 2013 | 119 | 101.2 | 100.9 | 101.2 | 100.8 | 102.4 | 102.4 |
| 2014 | 73 | 100.7 | 99.5 | 100.8 | 99.8 | 101.6 | 101.6 |
| 2015 | 50 | 96.8 | 96.4 | 96.7 | 96.6 | 98.0 | 97.9 |
| 2016 | 47 | 98.9 | 98.2 | 99.1 | 98.5 | 100.0 | 100.2 |
| 2017 | 79 | 98.8 | 98.4 | 98.5 | 98.6 | 100.4 | 99.9 |
| 2018 | 63 | 99.8 | 98.4 | 99.7 | 98.5 | 101.0 | 100.9 |
| 2019 | 49 | 98.4 | 98.1 | 98.6 | 98.3 | 100.6 | 100.6 |
| 2020 | 29 | 96.3 | 95.6 | 96.2 | 95.7 | 98.1 | 97.9 |



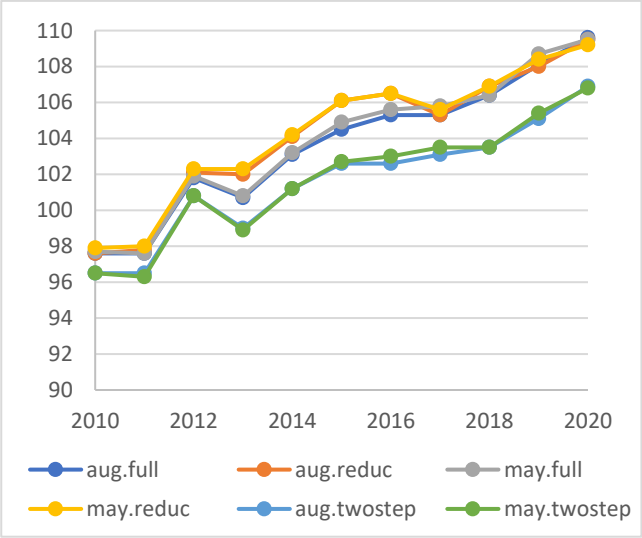

## *bv10*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.976 | 0.981 | 0.997 |
| 2011 | 214 | 0.983 | 0.987 | 0.997 |
| 2012 | 151 | 0.979 | 0.983 | 0.998 |
| 2013 | 119 | 0.862 | 0.874 | 0.995 |
| 2014 | 73 | 0.850 | 0.855 | 0.995 |
| 2015 | 50 | 0.768 | 0.809 | 0.994 |
| 2016 | 47 | 0.680 | 0.716 | 0.961 |
| 2017 | 79 | 0.838 | 0.867 | 0.990 |
| 2018 | 63 | 0.771 | 0.770 | 0.971 |
| 2019 | 49 | 0.833 | 0.862 | 0.985 |
| 2020 | 29 | 0.885 | 0.915 | 0.993 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 97.6 | 97.6 | 97.7 | 97.9 | 96.5 | 96.5 |
| 2011 | 214 | 97.6 | 97.8 | 97.6 | 98.0 | 96.5 | 96.3 |
| 2012 | 151 | 101.8 | 102.1 | 101.9 | 102.3 | 100.8 | 100.8 |
| 2013 | 119 | 100.7 | 102.0 | 100.8 | 102.3 | 99.0 | 98.9 |
| 2014 | 73 | 103.1 | 104.1 | 103.2 | 104.2 | 101.2 | 101.2 |
| 2015 | 50 | 104.5 | 106.1 | 104.9 | 106.1 | 102.6 | 102.7 |
| 2016 | 47 | 105.3 | 106.5 | 105.6 | 106.5 | 102.6 | 103.0 |
| 2017 | 79 | 105.3 | 105.3 | 105.8 | 105.6 | 103.1 | 103.5 |
| 2018 | 63 | 106.4 | 106.9 | 106.4 | 106.9 | 103.5 | 103.5 |
| 2019 | 49 | 108.1 | 108.0 | 108.7 | 108.4 | 105.1 | 105.4 |
| 2020 | 29 | 109.6 | 109.5 | 109.5 | 109.2 | 106.9 | 106.8 |



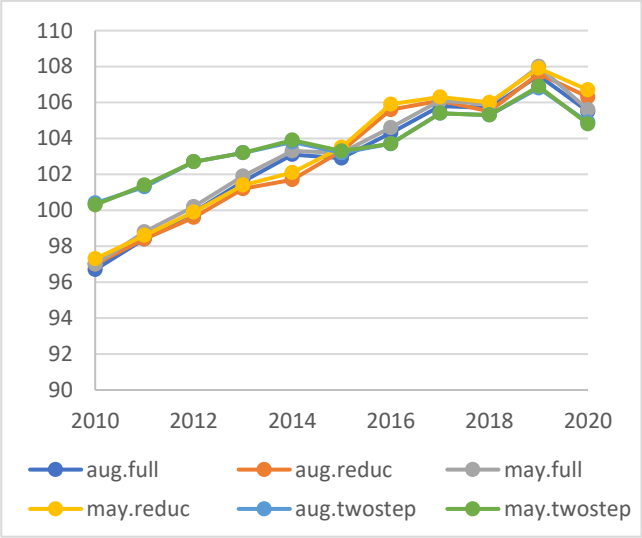

## *bv11*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.986 | 0.987 | 0.998 |
| 2011 | 214 | 0.987 | 0.987 | 0.998 |
| 2012 | 151 | 0.981 | 0.983 | 0.998 |
| 2013 | 119 | 0.844 | 0.838 | 0.996 |
| 2014 | 73 | 0.839 | 0.847 | 0.998 |
| 2015 | 50 | 0.864 | 0.883 | 0.995 |
| 2016 | 47 | 0.816 | 0.802 | 0.981 |
| 2017 | 79 | 0.860 | 0.863 | 0.991 |
| 2018 | 63 | 0.859 | 0.872 | 0.988 |
| 2019 | 49 | 0.802 | 0.809 | 0.986 |
| 2020 | 29 | 0.874 | 0.873 | 0.992 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 96.7 | 97.0 | 97.0 | 97.3 | 100.4 | 100.3 |
| 2011 | 214 | 98.4 | 98.4 | 98.8 | 98.6 | 101.3 | 101.4 |
| 2012 | 151 | 99.9 | 99.6 | 100.2 | 99.9 | 102.7 | 102.7 |
| 2013 | 119 | 101.6 | 101.2 | 101.9 | 101.4 | 103.2 | 103.2 |
| 2014 | 73 | 103.1 | 101.7 | 103.3 | 102.1 | 103.8 | 103.9 |
| 2015 | 50 | 102.9 | 103.3 | 103.2 | 103.5 | 103.2 | 103.3 |
| 2016 | 47 | 104.3 | 105.6 | 104.6 | 105.9 | 103.7 | 103.7 |
| 2017 | 79 | 105.8 | 106.1 | 106.1 | 106.3 | 105.4 | 105.4 |
| 2018 | 63 | 105.7 | 105.5 | 105.9 | 106.0 | 105.3 | 105.3 |
| 2019 | 49 | 107.5 | 107.6 | 108.0 | 107.9 | 106.8 | 106.9 |
| 2020 | 29 | 105.5 | 106.3 | 105.6 | 106.7 | 104.9 | 104.8 |



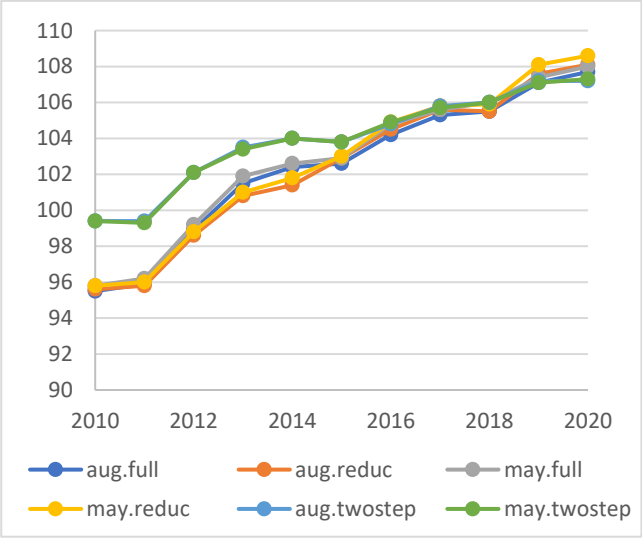

## *bv12*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.987 | 0.988 | 0.999 |
| 2011 | 214 | 0.988 | 0.989 | 0.999 |
| 2012 | 151 | 0.989 | 0.990 | 0.999 |
| 2013 | 119 | 0.892 | 0.893 | 0.997 |
| 2014 | 73 | 0.917 | 0.930 | 0.998 |
| 2015 | 50 | 0.923 | 0.929 | 0.997 |
| 2016 | 47 | 0.835 | 0.854 | 0.961 |
| 2017 | 79 | 0.873 | 0.873 | 0.987 |
| 2018 | 63 | 0.872 | 0.883 | 0.985 |
| 2019 | 49 | 0.879 | 0.873 | 0.979 |
| 2020 | 29 | 0.808 | 0.818 | 0.990 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 95.5 | 95.6 | 95.8 | 95.8 | 99.4 | 99.4 |
| 2011 | 214 | 95.9 | 95.8 | 96.2 | 96.0 | 99.4 | 99.3 |
| 2012 | 151 | 98.9 | 98.6 | 99.2 | 98.8 | 102.1 | 102.1 |
| 2013 | 119 | 101.5 | 100.8 | 101.9 | 101.0 | 103.5 | 103.4 |
| 2014 | 73 | 102.4 | 101.4 | 102.6 | 101.8 | 104.0 | 104.0 |
| 2015 | 50 | 102.6 | 102.9 | 102.9 | 103.0 | 103.8 | 103.8 |
| 2016 | 47 | 104.2 | 104.5 | 104.8 | 104.9 | 104.8 | 104.9 |
| 2017 | 79 | 105.3 | 105.6 | 105.6 | 105.8 | 105.8 | 105.7 |
| 2018 | 63 | 105.5 | 105.5 | 106.0 | 105.9 | 106.0 | 106.0 |
| 2019 | 49 | 107.1 | 107.6 | 107.4 | 108.1 | 107.2 | 107.1 |
| 2020 | 29 | 107.7 | 108.1 | 108.0 | 108.6 | 107.2 | 107.3 |



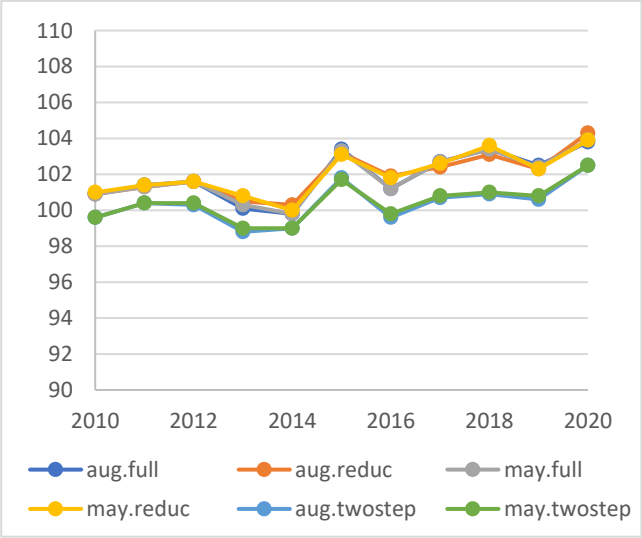

## *bv13*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.966 | 0.977 | 0.997 |
| 2011 | 214 | 0.975 | 0.980 | 0.997 |
| 2012 | 151 | 0.972 | 0.977 | 0.997 |
| 2013 | 119 | 0.854 | 0.854 | 0.996 |
| 2014 | 73 | 0.751 | 0.746 | 0.994 |
| 2015 | 50 | 0.798 | 0.802 | 0.994 |
| 2016 | 47 | 0.754 | 0.750 | 0.962 |
| 2017 | 79 | 0.821 | 0.821 | 0.988 |
| 2018 | 63 | 0.849 | 0.853 | 0.986 |
| 2019 | 49 | 0.672 | 0.674 | 0.981 |
| 2020 | 29 | 0.809 | 0.875 | 0.985 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 100.9 | 100.9 | 100.9 | 101.0 | 99.6 | 99.6 |
| 2011 | 214 | 101.4 | 101.3 | 101.3 | 101.4 | 100.4 | 100.4 |
| 2012 | 151 | 101.6 | 101.6 | 101.6 | 101.6 | 100.3 | 100.4 |
| 2013 | 119 | 100.1 | 100.5 | 100.3 | 100.8 | 98.8 | 99.0 |
| 2014 | 73 | 99.8 | 100.3 | 99.8 | 100.0 | 99.0 | 99.0 |
| 2015 | 50 | 103.4 | 103.2 | 103.3 | 103.1 | 101.8 | 101.7 |
| 2016 | 47 | 101.2 | 101.9 | 101.2 | 101.8 | 99.6 | 99.8 |
| 2017 | 79 | 102.7 | 102.4 | 102.7 | 102.6 | 100.7 | 100.8 |
| 2018 | 63 | 103.4 | 103.1 | 103.4 | 103.6 | 100.9 | 101.0 |
| 2019 | 49 | 102.5 | 102.3 | 102.4 | 102.3 | 100.6 | 100.8 |
| 2020 | 29 | 103.8 | 104.3 | 103.9 | 103.9 | 102.5 | 102.5 |



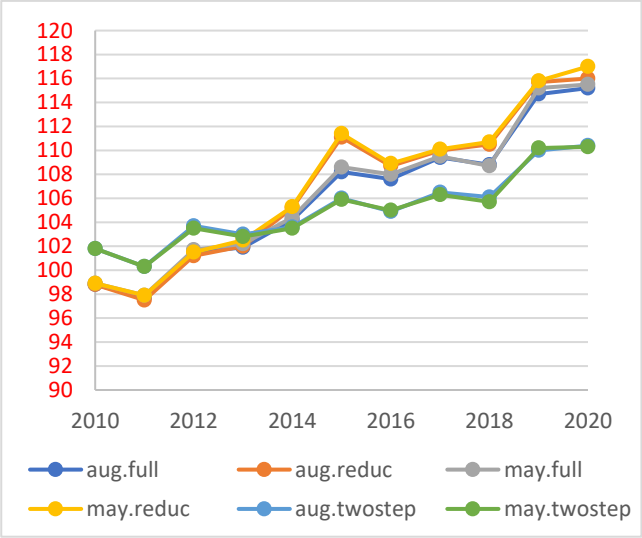

## *bv16*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.981 | 0.988 | 0.998 |
| 2011 | 214 | 0.977 | 0.981 | 0.997 |
| 2012 | 151 | 0.975 | 0.980 | 0.997 |
| 2013 | 119 | 0.849 | 0.866 | 0.997 |
| 2014 | 73 | 0.875 | 0.886 | 0.997 |
| 2015 | 50 | 0.829 | 0.818 | 0.995 |
| 2016 | 47 | 0.739 | 0.807 | 0.968 |
| 2017 | 79 | 0.931 | 0.930 | 0.990 |
| 2018 | 63 | 0.898 | 0.914 | 0.990 |
| 2019 | 49 | 0.871 | 0.904 | 0.982 |
| 2020 | 29 | 0.883 | 0.934 | 0.988 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 98.8 | 98.8 | 98.9 | 98.9 | 101.8 | 101.8 |
| 2011 | 214 | 97.7 | 97.5 | 97.9 | 97.9 | 100.3 | 100.3 |
| 2012 | 151 | 101.5 | 101.2 | 101.7 | 101.5 | 103.7 | 103.5 |
| 2013 | 119 | 101.9 | 102.0 | 102.2 | 102.5 | 103.0 | 102.8 |
| 2014 | 73 | 104.2 | 105.2 | 104.4 | 105.3 | 103.6 | 103.5 |
| 2015 | 50 | 108.2 | 111.1 | 108.6 | 111.4 | 106.0 | 105.9 |
| 2016 | 47 | 107.6 | 108.7 | 108.0 | 108.9 | 104.9 | 105.0 |
| 2017 | 79 | 109.4 | 110.0 | 109.5 | 110.1 | 106.5 | 106.3 |
| 2018 | 63 | 108.8 | 110.5 | 108.7 | 110.7 | 106.1 | 105.7 |
| 2019 | 49 | 114.7 | 115.7 | 115.2 | 115.8 | 110.0 | 110.2 |
| 2020 | 29 | 115.2 | 116.0 | 115.5 | 117.0 | 110.4 | 110.3 |



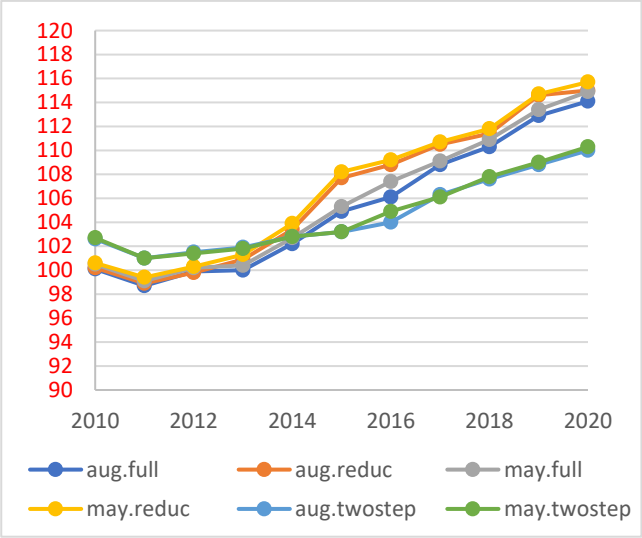

## *bv17*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.984 | 0.989 | 0.998 |
| 2011 | 214 | 0.973 | 0.978 | 0.997 |
| 2012 | 151 | 0.977 | 0.983 | 0.998 |
| 2013 | 119 | 0.878 | 0.888 | 0.998 |
| 2014 | 73 | 0.867 | 0.875 | 0.998 |
| 2015 | 50 | 0.788 | 0.765 | 0.996 |
| 2016 | 47 | 0.808 | 0.840 | 0.960 |
| 2017 | 79 | 0.890 | 0.929 | 0.989 |
| 2018 | 63 | 0.849 | 0.848 | 0.989 |
| 2019 | 49 | 0.864 | 0.885 | 0.986 |
| 2020 | 29 | 0.894 | 0.931 | 0.992 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 100.1 | 100.2 | 100.5 | 100.6 | 102.6 | 102.7 |
| 2011 | 214 | 98.7 | 98.9 | 99.1 | 99.4 | 101.0 | 101.0 |
| 2012 | 151 | 99.9 | 99.8 | 100.2 | 100.3 | 101.5 | 101.4 |
| 2013 | 119 | 100.0 | 100.9 | 100.4 | 101.3 | 101.9 | 101.8 |
| 2014 | 73 | 102.2 | 103.4 | 102.7 | 103.9 | 102.8 | 102.8 |
| 2015 | 50 | 104.9 | 107.7 | 105.3 | 108.2 | 103.2 | 103.2 |
| 2016 | 47 | 106.1 | 108.8 | 107.4 | 109.2 | 104.0 | 104.9 |
| 2017 | 79 | 108.8 | 110.5 | 109.1 | 110.7 | 106.3 | 106.1 |
| 2018 | 63 | 110.3 | 111.4 | 110.9 | 111.8 | 107.6 | 107.8 |
| 2019 | 49 | 112.9 | 114.6 | 113.4 | 114.7 | 108.8 | 109.0 |
| 2020 | 29 | 114.1 | 115.0 | 114.9 | 115.7 | 110.0 | 110.3 |



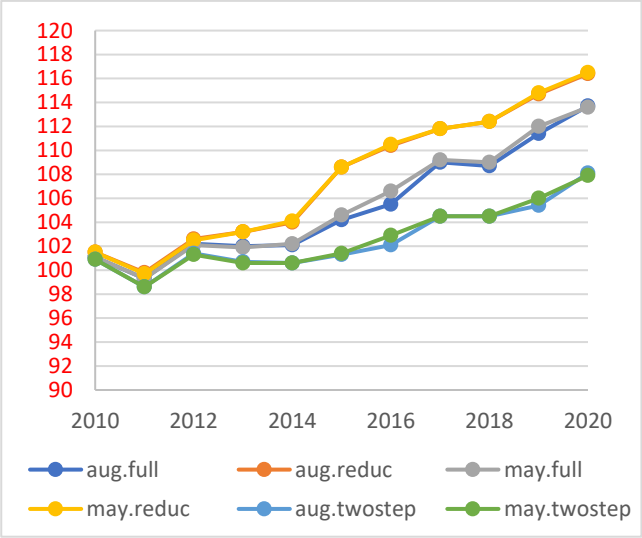

## *bv18*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.989 | 0.990 | 0.999 |
| 2011 | 214 | 0.981 | 0.981 | 0.998 |
| 2012 | 151 | 0.983 | 0.985 | 0.998 |
| 2013 | 119 | 0.900 | 0.905 | 0.998 |
| 2014 | 73 | 0.902 | 0.903 | 0.995 |
| 2015 | 50 | 0.790 | 0.791 | 0.996 |
| 2016 | 47 | 0.791 | 0.836 | 0.959 |
| 2017 | 79 | 0.877 | 0.893 | 0.979 |
| 2018 | 63 | 0.859 | 0.866 | 0.987 |
| 2019 | 49 | 0.882 | 0.890 | 0.984 |
| 2020 | 29 | 0.876 | 0.876 | 0.993 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 101.1 | 101.5 | 101.1 | 101.5 | 100.9 | 100.9 |
| 2011 | 214 | 99.3 | 99.8 | 99.3 | 99.7 | 98.6 | 98.6 |
| 2012 | 151 | 102.2 | 102.6 | 102.1 | 102.5 | 101.4 | 101.3 |
| 2013 | 119 | 102.0 | 103.2 | 101.9 | 103.2 | 100.7 | 100.6 |
| 2014 | 73 | 102.1 | 104.0 | 102.2 | 104.1 | 100.6 | 100.6 |
| 2015 | 50 | 104.2 | 108.6 | 104.6 | 108.6 | 101.3 | 101.4 |
| 2016 | 47 | 105.5 | 110.4 | 106.6 | 110.5 | 102.1 | 102.9 |
| 2017 | 79 | 109.0 | 111.8 | 109.2 | 111.8 | 104.5 | 104.5 |
| 2018 | 63 | 108.7 | 112.4 | 109.0 | 112.4 | 104.5 | 104.5 |
| 2019 | 49 | 111.4 | 114.7 | 112.0 | 114.8 | 105.4 | 106.0 |
| 2020 | 29 | 113.7 | 116.4 | 113.6 | 116.5 | 108.1 | 107.9 |



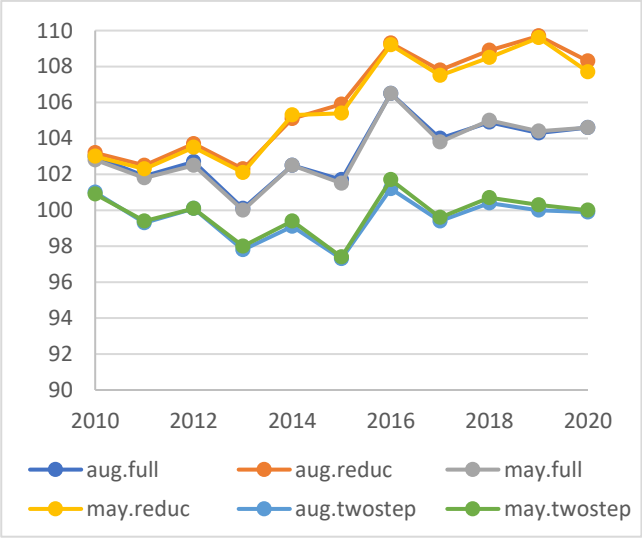

## *bv19*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.983 | 0.987 | 0.998 |
| 2011 | 214 | 0.981 | 0.984 | 0.998 |
| 2012 | 151 | 0.980 | 0.981 | 0.998 |
| 2013 | 119 | 0.879 | 0.880 | 0.997 |
| 2014 | 73 | 0.846 | 0.859 | 0.997 |
| 2015 | 50 | 0.785 | 0.750 | 0.997 |
| 2016 | 47 | 0.778 | 0.799 | 0.975 |
| 2017 | 79 | 0.858 | 0.868 | 0.985 |
| 2018 | 63 | 0.842 | 0.857 | 0.987 |
| 2019 | 49 | 0.876 | 0.891 | 0.979 |
| 2020 | 29 | 0.905 | 0.906 | 0.986 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 103.0 | 103.2 | 102.8 | 103.0 | 101.0 | 100.9 |
| 2011 | 214 | 101.9 | 102.5 | 101.8 | 102.3 | 99.3 | 99.4 |
| 2012 | 151 | 102.7 | 103.7 | 102.5 | 103.5 | 100.1 | 100.1 |
| 2013 | 119 | 100.1 | 102.3 | 100.0 | 102.1 | 97.8 | 98.0 |
| 2014 | 73 | 102.5 | 105.1 | 102.5 | 105.3 | 99.1 | 99.4 |
| 2015 | 50 | 101.7 | 105.9 | 101.5 | 105.4 | 97.3 | 97.4 |
| 2016 | 47 | 106.5 | 109.3 | 106.5 | 109.2 | 101.2 | 101.7 |
| 2017 | 79 | 104.0 | 107.8 | 103.8 | 107.5 | 99.4 | 99.6 |
| 2018 | 63 | 104.9 | 108.9 | 105.0 | 108.5 | 100.4 | 100.7 |
| 2019 | 49 | 104.3 | 109.7 | 104.4 | 109.6 | 100.0 | 100.3 |
| 2020 | 29 | 104.6 | 108.3 | 104.6 | 107.7 | 99.9 | 100.0 |



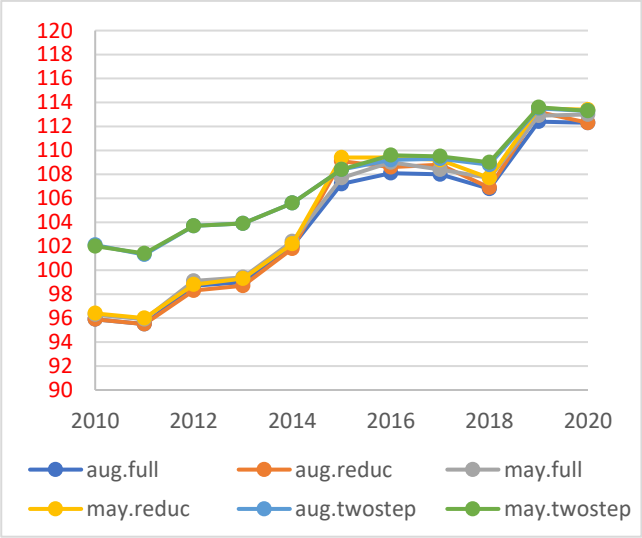

## *bv20*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.988 | 0.992 | 0.999 |
| 2011 | 214 | 0.986 | 0.991 | 0.998 |
| 2012 | 151 | 0.989 | 0.990 | 0.999 |
| 2013 | 119 | 0.880 | 0.887 | 0.998 |
| 2014 | 73 | 0.903 | 0.910 | 0.998 |
| 2015 | 50 | 0.754 | 0.782 | 0.997 |
| 2016 | 47 | 0.873 | 0.901 | 0.973 |
| 2017 | 79 | 0.912 | 0.926 | 0.990 |
| 2018 | 63 | 0.900 | 0.887 | 0.988 |
| 2019 | 49 | 0.816 | 0.893 | 0.983 |
| 2020 | 29 | 0.869 | 0.871 | 0.991 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 95.9 | 95.9 | 96.3 | 96.4 | 102.1 | 102.0 |
| 2011 | 214 | 95.5 | 95.5 | 95.9 | 96.0 | 101.3 | 101.4 |
| 2012 | 151 | 98.7 | 98.3 | 99.1 | 98.8 | 103.7 | 103.7 |
| 2013 | 119 | 99.0 | 98.7 | 99.4 | 99.3 | 103.9 | 103.9 |
| 2014 | 73 | 102.0 | 101.8 | 102.4 | 102.2 | 105.6 | 105.6 |
| 2015 | 50 | 107.2 | 109.1 | 107.7 | 109.4 | 108.4 | 108.4 |
| 2016 | 47 | 108.1 | 108.6 | 109.0 | 109.4 | 109.2 | 109.6 |
| 2017 | 79 | 108.0 | 108.8 | 108.4 | 109.2 | 109.3 | 109.5 |
| 2018 | 63 | 106.8 | 106.9 | 107.7 | 107.7 | 108.8 | 109.0 |
| 2019 | 49 | 112.4 | 113.2 | 112.9 | 113.5 | 113.5 | 113.6 |
| 2020 | 29 | 112.3 | 112.3 | 113.0 | 113.4 | 113.3 | 113.3 |



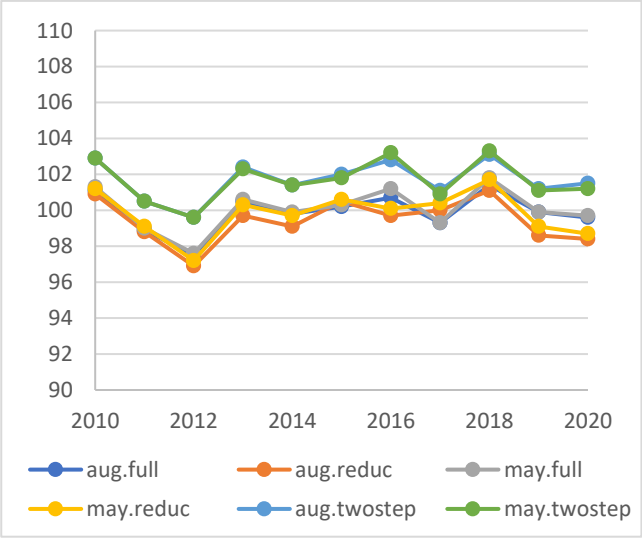

## *bv21*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.987 | 0.990 | 0.998 |
| 2011 | 214 | 0.988 | 0.990 | 0.999 |
| 2012 | 151 | 0.987 | 0.991 | 0.999 |
| 2013 | 119 | 0.963 | 0.966 | 0.999 |
| 2014 | 73 | 0.946 | 0.944 | 0.998 |
| 2015 | 50 | 0.909 | 0.920 | 0.998 |
| 2016 | 47 | 0.773 | 0.820 | 0.978 |
| 2017 | 79 | 0.874 | 0.896 | 0.993 |
| 2018 | 63 | 0.861 | 0.871 | 0.994 |
| 2019 | 49 | 0.897 | 0.908 | 0.993 |
| 2020 | 29 | 0.857 | 0.868 | 0.982 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 101.1 | 100.9 | 101.3 | 101.2 | 102.9 | 102.9 |
| 2011 | 214 | 98.9 | 98.8 | 99.0 | 99.1 | 100.5 | 100.5 |
| 2012 | 151 | 97.5 | 96.9 | 97.6 | 97.2 | 99.6 | 99.6 |
| 2013 | 119 | 100.5 | 99.7 | 100.6 | 100.3 | 102.4 | 102.3 |
| 2014 | 73 | 99.8 | 99.1 | 99.9 | 99.7 | 101.4 | 101.4 |
| 2015 | 50 | 100.2 | 100.5 | 100.3 | 100.6 | 102.0 | 101.8 |
| 2016 | 47 | 100.7 | 99.7 | 101.2 | 100.1 | 102.8 | 103.2 |
| 2017 | 79 | 99.3 | 100.0 | 99.3 | 100.4 | 101.1 | 100.9 |
| 2018 | 63 | 101.4 | 101.1 | 101.8 | 101.7 | 103.1 | 103.3 |
| 2019 | 49 | 99.9 | 98.6 | 99.9 | 99.1 | 101.2 | 101.1 |
| 2020 | 29 | 99.6 | 98.4 | 99.7 | 98.7 | 101.5 | 101.2 |



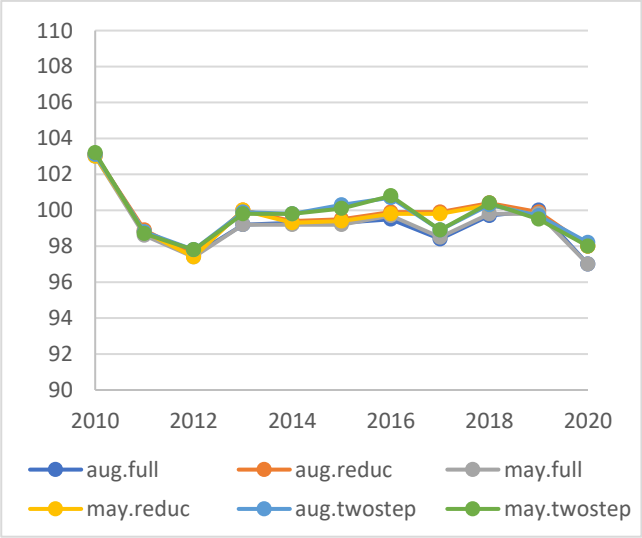

## *bv22*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.989 | 0.989 | 0.999 |
| 2011 | 214 | 0.990 | 0.991 | 0.999 |
| 2012 | 151 | 0.991 | 0.992 | 0.999 |
| 2013 | 119 | 0.908 | 0.913 | 0.998 |
| 2014 | 73 | 0.916 | 0.914 | 0.999 |
| 2015 | 50 | 0.859 | 0.867 | 0.999 |
| 2016 | 47 | 0.826 | 0.855 | 0.976 |
| 2017 | 79 | 0.861 | 0.866 | 0.995 |
| 2018 | 63 | 0.878 | 0.882 | 0.992 |
| 2019 | 49 | 0.909 | 0.929 | 0.993 |
| 2020 | 29 | 0.902 | 0.904 | 0.992 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 103.1 | 103.1 | 103.0 | 103.0 | 103.1 | 103.2 |
| 2011 | 214 | 98.8 | 98.9 | 98.6 | 98.8 | 98.8 | 98.7 |
| 2012 | 151 | 97.5 | 97.5 | 97.4 | 97.4 | 97.8 | 97.8 |
| 2013 | 119 | 99.2 | 100.0 | 99.2 | 100.0 | 99.9 | 99.8 |
| 2014 | 73 | 99.3 | 99.4 | 99.2 | 99.3 | 99.8 | 99.8 |
| 2015 | 50 | 99.3 | 99.5 | 99.2 | 99.4 | 100.3 | 100.1 |
| 2016 | 47 | 99.5 | 99.9 | 99.7 | 99.8 | 100.7 | 100.8 |
| 2017 | 79 | 98.4 | 99.9 | 98.5 | 99.8 | 98.9 | 98.9 |
| 2018 | 63 | 99.7 | 100.4 | 99.8 | 100.3 | 100.3 | 100.4 |
| 2019 | 49 | 100.0 | 99.9 | 99.8 | 99.7 | 99.7 | 99.5 |
| 2020 | 29 | 97.0 | 98.0 | 97.0 | 98.0 | 98.2 | 98.0 |



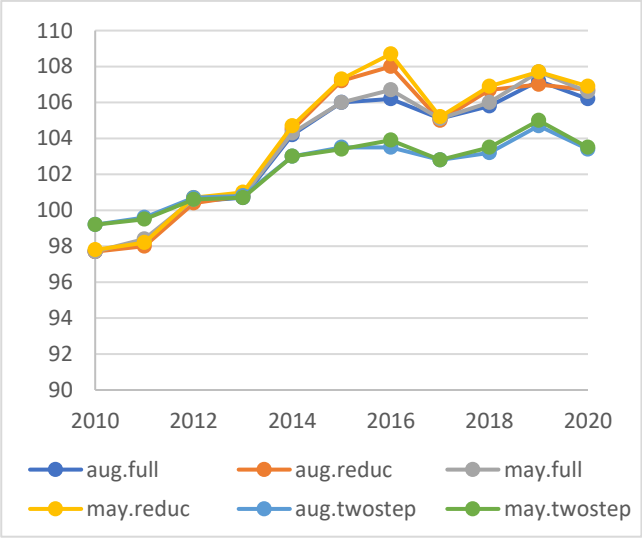

## *bv23*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.981 | 0.989 | 0.998 |
| 2011 | 214 | 0.982 | 0.988 | 0.998 |
| 2012 | 151 | 0.984 | 0.990 | 0.998 |
| 2013 | 119 | 0.883 | 0.894 | 0.998 |
| 2014 | 73 | 0.906 | 0.911 | 0.998 |
| 2015 | 50 | 0.877 | 0.856 | 0.997 |
| 2016 | 47 | 0.818 | 0.810 | 0.964 |
| 2017 | 79 | 0.928 | 0.919 | 0.993 |
| 2018 | 63 | 0.875 | 0.885 | 0.990 |
| 2019 | 49 | 0.894 | 0.915 | 0.986 |
| 2020 | 29 | 0.885 | 0.918 | 0.990 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 97.7 | 97.7 | 97.7 | 97.8 | 99.2 | 99.2 |
| 2011 | 214 | 98.3 | 98.0 | 98.4 | 98.2 | 99.6 | 99.5 |
| 2012 | 151 | 100.5 | 100.4 | 100.6 | 100.7 | 100.7 | 100.6 |
| 2013 | 119 | 100.7 | 100.8 | 100.8 | 101.0 | 100.8 | 100.7 |
| 2014 | 73 | 104.2 | 104.5 | 104.3 | 104.7 | 103.0 | 103.0 |
| 2015 | 50 | 106.0 | 107.2 | 106.0 | 107.3 | 103.5 | 103.4 |
| 2016 | 47 | 106.2 | 108.0 | 106.7 | 108.7 | 103.5 | 103.9 |
| 2017 | 79 | 105.1 | 105.0 | 105.1 | 105.2 | 102.8 | 102.8 |
| 2018 | 63 | 105.8 | 106.7 | 106.0 | 106.9 | 103.2 | 103.5 |
| 2019 | 49 | 107.2 | 107.0 | 107.7 | 107.7 | 104.7 | 105.0 |
| 2020 | 29 | 106.2 | 106.7 | 106.6 | 106.9 | 103.4 | 103.5 |



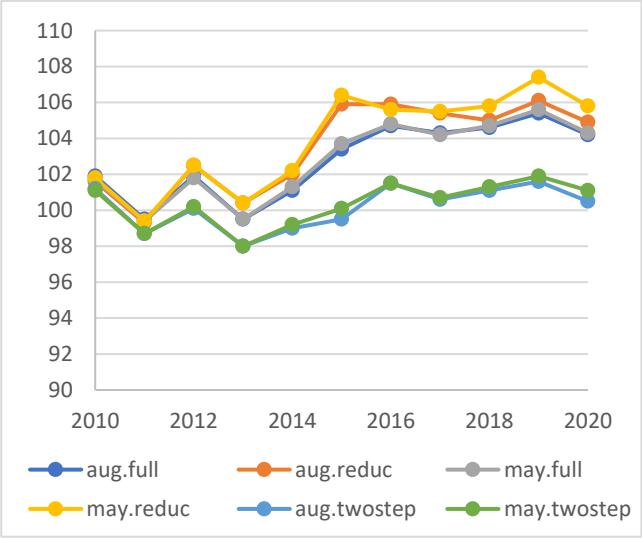

## *bv24*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.971 | 0.987 | 0.998 |
| 2011 | 214 | 0.968 | 0.988 | 0.998 |
| 2012 | 151 | 0.971 | 0.987 | 0.999 |
| 2013 | 119 | 0.852 | 0.895 | 0.998 |
| 2014 | 73 | 0.894 | 0.910 | 0.998 |
| 2015 | 50 | 0.790 | 0.831 | 0.997 |
| 2016 | 47 | 0.746 | 0.814 | 0.978 |
| 2017 | 79 | 0.862 | 0.927 | 0.992 |
| 2018 | 63 | 0.839 | 0.918 | 0.989 |
| 2019 | 49 | 0.843 | 0.917 | 0.985 |
| 2020 | 29 | 0.844 | 0.891 | 0.992 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 101.9 | 101.6 | 101.7 | 101.8 | 101.2 | 101.1 |
| 2011 | 214 | 99.5 | 99.3 | 99.4 | 99.4 | 98.7 | 98.7 |
| 2012 | 151 | 101.9 | 102.5 | 101.8 | 102.5 | 100.1 | 100.2 |
| 2013 | 119 | 99.5 | 100.4 | 99.5 | 100.4 | 98.0 | 98.0 |
| 2014 | 73 | 101.1 | 102.0 | 101.3 | 102.2 | 99.0 | 99.2 |
| 2015 | 50 | 103.4 | 105.9 | 103.7 | 106.4 | 99.5 | 100.1 |
| 2016 | 47 | 104.7 | 105.9 | 104.8 | 105.6 | 101.5 | 101.5 |
| 2017 | 79 | 104.3 | 105.4 | 104.2 | 105.5 | 100.6 | 100.7 |
| 2018 | 63 | 104.6 | 105.0 | 104.7 | 105.8 | 101.1 | 101.3 |
| 2019 | 49 | 105.4 | 106.1 | 105.6 | 107.4 | 101.6 | 101.9 |
| 2020 | 29 | 104.2 | 104.9 | 104.3 | 105.8 | 100.5 | 101.1 |



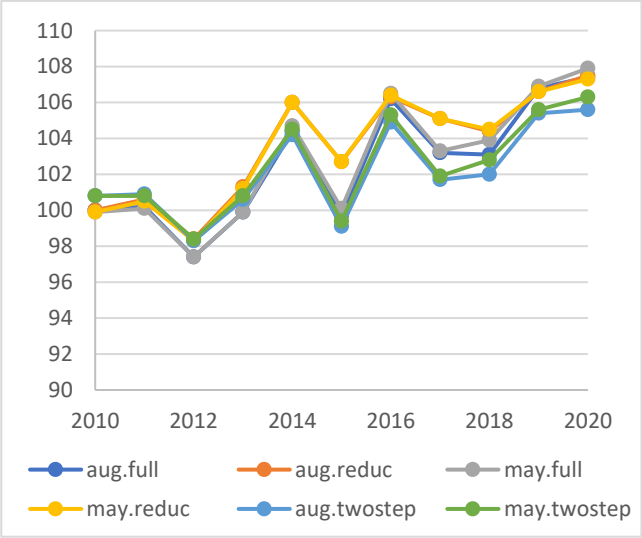

## *bv25*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 230 | 0.981 | 0.982 | 0.998 |
| 2011 | 214 | 0.986 | 0.987 | 0.999 |
| 2012 | 151 | 0.981 | 0.983 | 0.999 |
| 2013 | 119 | 0.895 | 0.899 | 0.998 |
| 2014 | 73 | 0.852 | 0.860 | 0.999 |
| 2015 | 50 | 0.862 | 0.862 | 0.998 |
| 2016 | 47 | 0.779 | 0.796 | 0.975 |
| 2017 | 79 | 0.885 | 0.884 | 0.990 |
| 2018 | 63 | 0.844 | 0.870 | 0.992 |
| 2019 | 49 | 0.852 | 0.869 | 0.989 |
| 2020 | 29 | 0.889 | 0.891 | 0.996 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 230 | 100.0 | 100.0 | 99.9 | 99.9 | 100.8 | 100.8 |
| 2011 | 214 | 100.2 | 100.6 | 100.1 | 100.5 | 100.9 | 100.8 |
| 2012 | 151 | 97.4 | 98.4 | 97.4 | 98.3 | 98.3 | 98.4 |
| 2013 | 119 | 99.9 | 101.3 | 99.9 | 101.2 | 100.6 | 100.8 |
| 2014 | 73 | 104.4 | 106.0 | 104.7 | 106.0 | 104.2 | 104.5 |
| 2015 | 50 | 99.7 | 102.7 | 100.1 | 102.7 | 99.1 | 99.4 |
| 2016 | 47 | 106.2 | 106.3 | 106.5 | 106.4 | 104.9 | 105.3 |
| 2017 | 79 | 103.2 | 105.1 | 103.3 | 105.1 | 101.7 | 101.9 |
| 2018 | 63 | 103.1 | 104.4 | 103.9 | 104.5 | 102.0 | 102.8 |
| 2019 | 49 | 106.8 | 106.6 | 106.9 | 106.6 | 105.4 | 105.6 |
| 2020 | 29 | 107.4 | 107.5 | 107.9 | 107.3 | 105.6 | 106.3 |




# Stability Jersey

For Jersey the August run are compared with the May run to check stability of the single step GEBV's

## Cows

For Nordic Jersey cows with phenotypes in May run. Both genotyped and nongenotyped females are included.

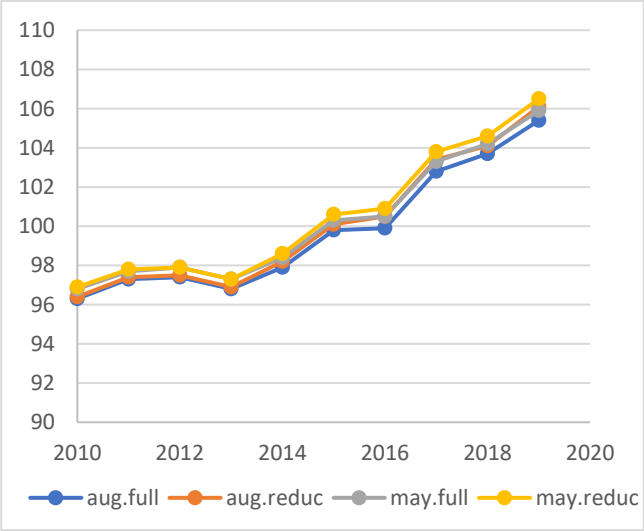
### *bv1*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8445 | 0.996 | 0.997 | 1.000 |
| 2011 | 8713 | 0.994 | 0.995 | 0.999 |
| 2012 | 8592 | 0.993 | 0.994 | 0.999 |
| 2013 | 7192 | 0.990 | 0.991 | 0.999 |
| 2014 | 7323 | 0.986 | 0.988 | 0.998 |
| 2015 | 6934 | 0.954 | 0.955 | 0.998 |
| 2016 | 6100 | 0.836 | 0.835 | 0.997 |
| 2017 | 5129 | 0.819 | 0.815 | 0.996 |
| 2018 | 3447 | 0.831 | 0.833 | 0.997 |
| 2019 | 248 | 0.836 | 0.840 | 0.992 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8445 | 96.3 | 96.4 | 96.8 | 96.9 |
| 2011 | 8713 | 97.3 | 97.4 | 97.7 | 97.8 |
| 2012 | 8592 | 97.4 | 97.5 | 97.9 | 97.9 |
| 2013 | 7192 | 96.8 | 96.9 | 97.3 | 97.3 |
| 2014 | 7323 | 97.9 | 98.2 | 98.4 | 98.6 |
| 2015 | 6934 | 99.8 | 100.1 | 100.3 | 100.6 |
| 2016 | 6100 | 99.9 | 100.5 | 100.5 | 100.9 |
| 2017 | 5129 | 102.8 | 103.4 | 103.3 | 103.8 |
| 2018 | 3447 | 103.7 | 104.1 | 104.2 | 104.6 |
| 2019 | 248 | 105.4 | 106.1 | 105.9 | 106.5 |



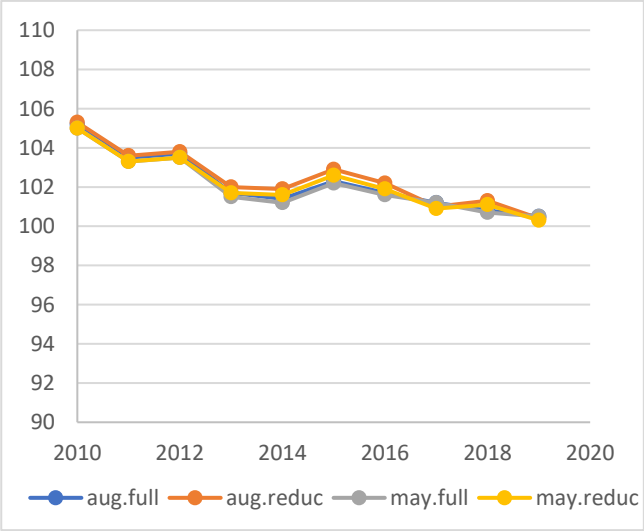

## *bv2*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.994 | 0.995 | 0.999 |
| 2011 | 8761 | 0.991 | 0.993 | 0.999 |
| 2012 | 8645 | 0.988 | 0.990 | 0.999 |
| 2013 | 7224 | 0.984 | 0.986 | 0.998 |
| 2014 | 7362 | 0.983 | 0.986 | 0.998 |
| 2015 | 6951 | 0.947 | 0.949 | 0.997 |
| 2016 | 6137 | 0.860 | 0.866 | 0.996 |
| 2017 | 5142 | 0.816 | 0.816 | 0.996 |
| 2018 | 3458 | 0.817 | 0.801 | 0.995 |
| 2019 | 248 | 0.784 | 0.766 | 0.989 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 105.2 | 105.3 | 105.0 | 105.0 |
| 2011 | 8761 | 103.5 | 103.6 | 103.3 | 103.3 |
| 2012 | 8645 | 103.7 | 103.8 | 103.5 | 103.5 |
| 2013 | 7224 | 101.7 | 102.0 | 101.5 | 101.7 |
| 2014 | 7362 | 101.4 | 101.9 | 101.2 | 101.6 |
| 2015 | 6951 | 102.3 | 102.9 | 102.2 | 102.6 |
| 2016 | 6137 | 101.7 | 102.2 | 101.6 | 101.9 |
| 2017 | 5142 | 101.2 | 101.0 | 101.2 | 100.9 |
| 2018 | 3458 | 100.8 | 101.3 | 100.7 | 101.1 |
| 2019 | 248 | 100.5 | 100.4 | 100.5 | 100.3 |



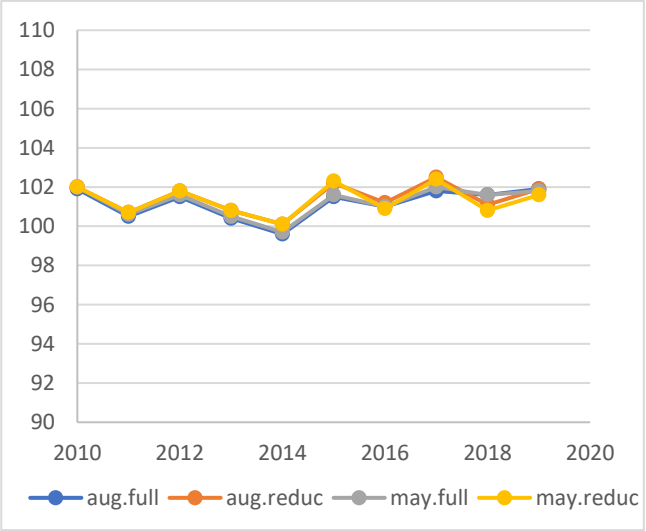

## *bv3*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.991 | 0.993 | 0.999 |
| 2011 | 8761 | 0.988 | 0.991 | 0.999 |
| 2012 | 8645 | 0.986 | 0.989 | 0.999 |
| 2013 | 7224 | 0.983 | 0.986 | 0.998 |
| 2014 | 7362 | 0.980 | 0.984 | 0.998 |
| 2015 | 6951 | 0.952 | 0.954 | 0.998 |
| 2016 | 6137 | 0.827 | 0.836 | 0.997 |
| 2017 | 5142 | 0.767 | 0.767 | 0.996 |
| 2018 | 3458 | 0.796 | 0.786 | 0.993 |
| 2019 | 248 | 0.841 | 0.851 | 0.991 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 101.9 | 102.0 | 102.0 | 102.0 |
| 2011 | 8761 | 100.5 | 100.7 | 100.6 | 100.7 |
| 2012 | 8645 | 101.5 | 101.8 | 101.6 | 101.8 |
| 2013 | 7224 | 100.4 | 100.8 | 100.5 | 100.8 |
| 2014 | 7362 | 99.6 | 100.1 | 99.7 | 100.1 |
| 2015 | 6951 | 101.5 | 102.2 | 101.6 | 102.3 |
| 2016 | 6137 | 101.0 | 101.2 | 101.0 | 100.9 |
| 2017 | 5142 | 101.8 | 102.5 | 102.0 | 102.4 |
| 2018 | 3458 | 101.6 | 101.1 | 101.6 | 100.8 |
| 2019 | 248 | 101.9 | 101.9 | 101.8 | 101.6 |



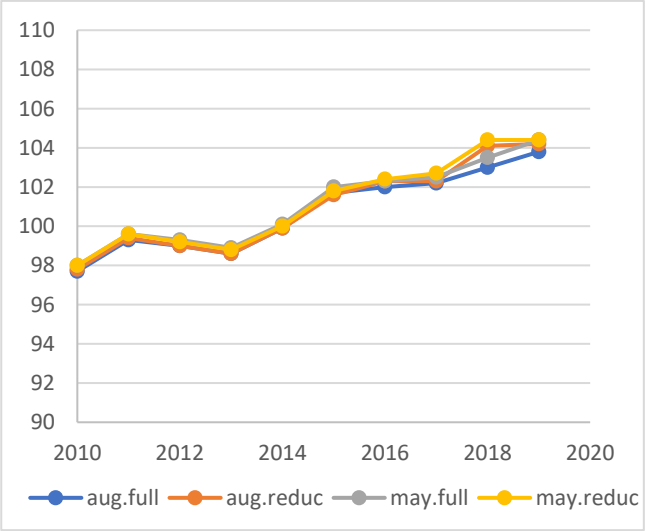

## *bv4*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.992 | 0.993 | 0.999 |
| 2011 | 8761 | 0.988 | 0.990 | 0.998 |
| 2012 | 8645 | 0.986 | 0.988 | 0.998 |
| 2013 | 7224 | 0.983 | 0.985 | 0.998 |
| 2014 | 7362 | 0.976 | 0.979 | 0.997 |
| 2015 | 6951 | 0.934 | 0.936 | 0.997 |
| 2016 | 6137 | 0.794 | 0.797 | 0.996 |
| 2017 | 5142 | 0.796 | 0.805 | 0.995 |
| 2018 | 3458 | 0.779 | 0.772 | 0.995 |
| 2019 | 248 | 0.814 | 0.808 | 0.986 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 97.7 | 97.8 | 98.0 | 98.0 |
| 2011 | 8761 | 99.3 | 99.4 | 99.6 | 99.6 |
| 2012 | 8645 | 99.0 | 99.0 | 99.3 | 99.2 |
| 2013 | 7224 | 98.6 | 98.6 | 98.9 | 98.8 |
| 2014 | 7362 | 99.9 | 99.9 | 100.1 | 100.0 |
| 2015 | 6951 | 101.7 | 101.6 | 102.0 | 101.8 |
| 2016 | 6137 | 102.0 | 102.3 | 102.3 | 102.4 |
| 2017 | 5142 | 102.2 | 102.3 | 102.5 | 102.7 |
| 2018 | 3458 | 103.0 | 104.1 | 103.5 | 104.4 |
| 2019 | 248 | 103.8 | 104.2 | 104.4 | 104.4 |



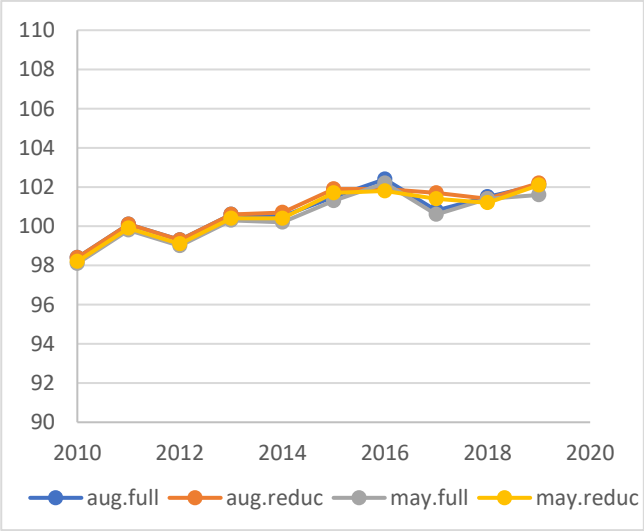

## *bv5*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.993 | 0.994 | 0.999 |
| 2011 | 8761 | 0.989 | 0.990 | 0.999 |
| 2012 | 8645 | 0.988 | 0.990 | 0.999 |
| 2013 | 7224 | 0.983 | 0.986 | 0.998 |
| 2014 | 7362 | 0.981 | 0.983 | 0.998 |
| 2015 | 6951 | 0.947 | 0.950 | 0.997 |
| 2016 | 6137 | 0.871 | 0.876 | 0.997 |
| 2017 | 5142 | 0.831 | 0.839 | 0.996 |
| 2018 | 3458 | 0.851 | 0.849 | 0.995 |
| 2019 | 248 | 0.854 | 0.851 | 0.982 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 98.4 | 98.4 | 98.1 | 98.2 |
| 2011 | 8761 | 100.1 | 100.1 | 99.8 | 99.9 |
| 2012 | 8645 | 99.3 | 99.3 | 99.0 | 99.1 |
| 2013 | 7224 | 100.6 | 100.6 | 100.3 | 100.4 |
| 2014 | 7362 | 100.5 | 100.7 | 100.2 | 100.4 |
| 2015 | 6951 | 101.5 | 101.9 | 101.3 | 101.7 |
| 2016 | 6137 | 102.4 | 101.9 | 102.2 | 101.8 |
| 2017 | 5142 | 100.8 | 101.7 | 100.6 | 101.4 |
| 2018 | 3458 | 101.5 | 101.4 | 101.4 | 101.2 |
| 2019 | 248 | 102.1 | 102.2 | 101.6 | 102.1 |



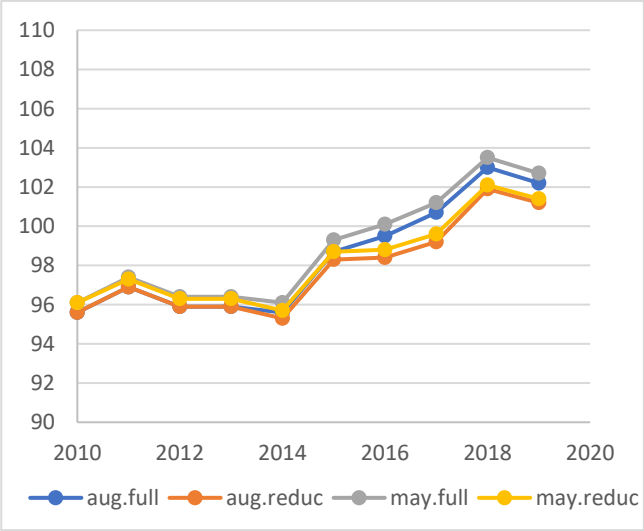

## *bv6*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8474 | 0.994 | 0.995 | 0.999 |
| 2011 | 8745 | 0.991 | 0.993 | 0.999 |
| 2012 | 8519 | 0.991 | 0.993 | 0.999 |
| 2013 | 7158 | 0.985 | 0.988 | 0.999 |
| 2014 | 7278 | 0.986 | 0.988 | 0.998 |
| 2015 | 6790 | 0.959 | 0.962 | 0.998 |
| 2016 | 6136 | 0.843 | 0.843 | 0.997 |
| 2017 | 5142 | 0.843 | 0.846 | 0.996 |
| 2018 | 3458 | 0.884 | 0.884 | 0.997 |
| 2019 | 248 | 0.880 | 0.885 | 0.995 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8474 | 95.6 | 95.6 | 96.1 | 96.1 |
| 2011 | 8745 | 96.9 | 96.9 | 97.4 | 97.3 |
| 2012 | 8519 | 95.9 | 95.9 | 96.4 | 96.3 |
| 2013 | 7158 | 95.9 | 95.9 | 96.4 | 96.3 |
| 2014 | 7278 | 95.6 | 95.3 | 96.1 | 95.7 |
| 2015 | 6790 | 98.7 | 98.3 | 99.3 | 98.7 |
| 2016 | 6136 | 99.5 | 98.4 | 100.1 | 98.8 |
| 2017 | 5142 | 100.7 | 99.2 | 101.2 | 99.6 |
| 2018 | 3458 | 103.0 | 101.9 | 103.5 | 102.1 |
| 2019 | 248 | 102.2 | 101.2 | 102.7 | 101.4 |



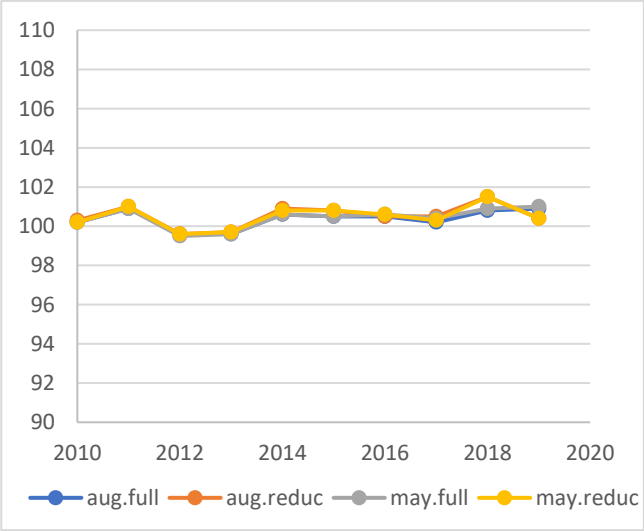

## *bv7*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.995 | 0.996 | 0.999 |
| 2011 | 8761 | 0.992 | 0.994 | 0.999 |
| 2012 | 8645 | 0.989 | 0.991 | 0.999 |
| 2013 | 7224 | 0.987 | 0.989 | 0.999 |
| 2014 | 7362 | 0.986 | 0.988 | 0.998 |
| 2015 | 6951 | 0.956 | 0.957 | 0.998 |
| 2016 | 6137 | 0.839 | 0.837 | 0.997 |
| 2017 | 5142 | 0.846 | 0.848 | 0.996 |
| 2018 | 3458 | 0.867 | 0.867 | 0.997 |
| 2019 | 248 | 0.799 | 0.797 | 0.991 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 100.2 | 100.3 | 100.2 | 100.2 |
| 2011 | 8761 | 100.9 | 101.0 | 100.9 | 101.0 |
| 2012 | 8645 | 99.6 | 99.6 | 99.5 | 99.6 |
| 2013 | 7224 | 99.6 | 99.7 | 99.6 | 99.7 |
| 2014 | 7362 | 100.6 | 100.9 | 100.6 | 100.8 |
| 2015 | 6951 | 100.5 | 100.8 | 100.5 | 100.8 |
| 2016 | 6137 | 100.5 | 100.5 | 100.6 | 100.6 |
| 2017 | 5142 | 100.2 | 100.5 | 100.4 | 100.3 |
| 2018 | 3458 | 100.8 | 101.5 | 100.9 | 101.5 |
| 2019 | 248 | 100.9 | 100.4 | 101.0 | 100.4 |



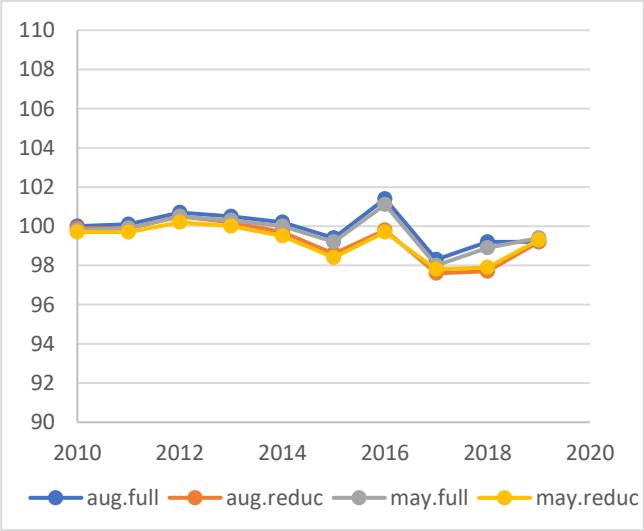

## *bv9*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.989 | 0.991 | 0.999 |
| 2011 | 8761 | 0.985 | 0.988 | 0.998 |
| 2012 | 8645 | 0.980 | 0.983 | 0.998 |
| 2013 | 7224 | 0.978 | 0.981 | 0.998 |
| 2014 | 7362 | 0.971 | 0.975 | 0.997 |
| 2015 | 6951 | 0.923 | 0.929 | 0.996 |
| 2016 | 6137 | 0.791 | 0.795 | 0.996 |
| 2017 | 5142 | 0.761 | 0.760 | 0.995 |
| 2018 | 3458 | 0.736 | 0.732 | 0.993 |
| 2019 | 248 | 0.706 | 0.754 | 0.984 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 100.0 | 99.9 | 99.8 | 99.7 |
| 2011 | 8761 | 100.1 | 99.9 | 99.9 | 99.7 |
| 2012 | 8645 | 100.7 | 100.5 | 100.5 | 100.2 |
| 2013 | 7224 | 100.5 | 100.2 | 100.3 | 100.0 |
| 2014 | 7362 | 100.2 | 99.7 | 100.0 | 99.5 |
| 2015 | 6951 | 99.4 | 98.6 | 99.2 | 98.4 |
| 2016 | 6137 | 101.4 | 99.8 | 101.1 | 99.7 |
| 2017 | 5142 | 98.3 | 97.6 | 98.0 | 97.8 |
| 2018 | 3458 | 99.2 | 97.7 | 98.9 | 97.9 |
| 2019 | 248 | 99.2 | 99.2 | 99.4 | 99.3 |



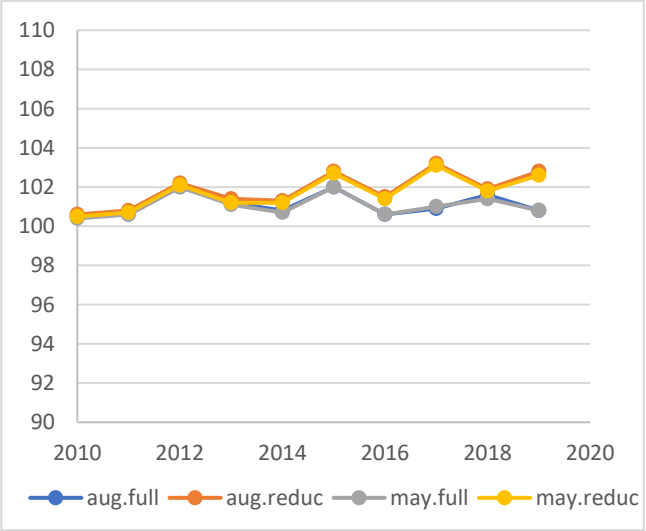

## *bv10*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8474 | 0.989 | 0.990 | 0.999 |
| 2011 | 8745 | 0.985 | 0.986 | 0.998 |
| 2012 | 8519 | 0.984 | 0.987 | 0.998 |
| 2013 | 7158 | 0.981 | 0.984 | 0.998 |
| 2014 | 7278 | 0.978 | 0.981 | 0.998 |
| 2015 | 6790 | 0.932 | 0.935 | 0.996 |
| 2016 | 6136 | 0.889 | 0.895 | 0.997 |
| 2017 | 5142 | 0.807 | 0.813 | 0.994 |
| 2018 | 3458 | 0.862 | 0.873 | 0.994 |
| 2019 | 248 | 0.825 | 0.851 | 0.991 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8474 | 100.5 | 100.6 | 100.4 | 100.5 |
| 2011 | 8745 | 100.6 | 100.8 | 100.6 | 100.7 |
| 2012 | 8519 | 102.0 | 102.2 | 102.0 | 102.1 |
| 2013 | 7158 | 101.2 | 101.4 | 101.1 | 101.2 |
| 2014 | 7278 | 100.8 | 101.3 | 100.7 | 101.2 |
| 2015 | 6790 | 102.0 | 102.8 | 102.0 | 102.7 |
| 2016 | 6136 | 100.6 | 101.5 | 100.6 | 101.4 |
| 2017 | 5142 | 100.9 | 103.2 | 101.0 | 103.1 |
| 2018 | 3458 | 101.6 | 101.9 | 101.4 | 101.8 |
| 2019 | 248 | 100.8 | 102.8 | 100.8 | 102.6 |



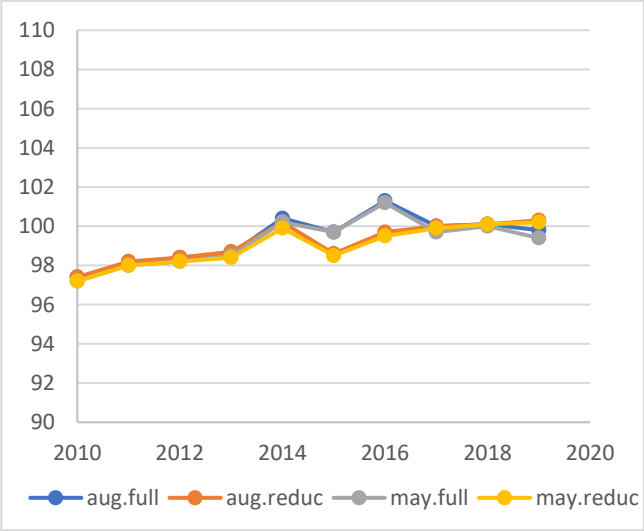

## *bv11*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8474 | 0.991 | 0.992 | 0.998 |
| 2011 | 8745 | 0.988 | 0.989 | 0.998 |
| 2012 | 8519 | 0.983 | 0.985 | 0.998 |
| 2013 | 7158 | 0.982 | 0.985 | 0.998 |
| 2014 | 7278 | 0.980 | 0.982 | 0.998 |
| 2015 | 6790 | 0.945 | 0.948 | 0.997 |
| 2016 | 6136 | 0.873 | 0.871 | 0.998 |
| 2017 | 5142 | 0.833 | 0.828 | 0.996 |
| 2018 | 3458 | 0.811 | 0.806 | 0.995 |
| 2019 | 248 | 0.850 | 0.853 | 0.988 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8474 | 97.4 | 97.4 | 97.2 | 97.2 |
| 2011 | 8745 | 98.1 | 98.2 | 98.0 | 98.0 |
| 2012 | 8519 | 98.4 | 98.4 | 98.2 | 98.2 |
| 2013 | 7158 | 98.6 | 98.7 | 98.5 | 98.4 |
| 2014 | 7278 | 100.4 | 100.2 | 100.2 | 99.9 |
| 2015 | 6790 | 99.7 | 98.6 | 99.7 | 98.5 |
| 2016 | 6136 | 101.3 | 99.7 | 101.2 | 99.5 |
| 2017 | 5142 | 100.0 | 100.0 | 99.7 | 99.9 |
| 2018 | 3458 | 100.1 | 100.1 | 100.0 | 100.1 |
| 2019 | 248 | 99.8 | 100.3 | 99.4 | 100.2 |



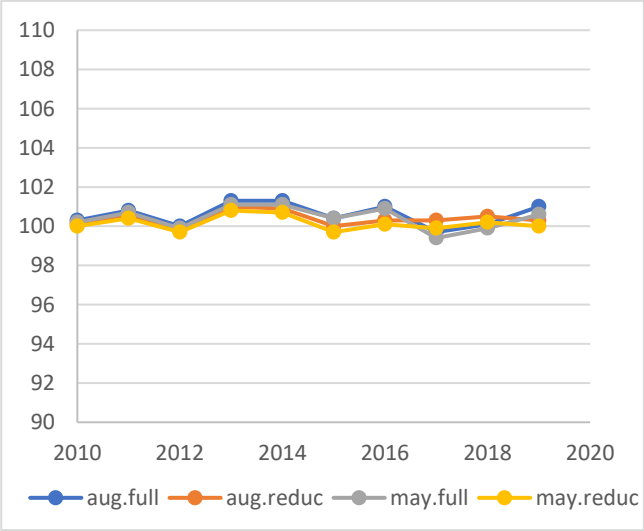

## *bv12*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8474 | 0.991 | 0.993 | 0.999 |
| 2011 | 8745 | 0.990 | 0.991 | 0.999 |
| 2012 | 8519 | 0.987 | 0.989 | 0.999 |
| 2013 | 7158 | 0.983 | 0.985 | 0.998 |
| 2014 | 7278 | 0.981 | 0.983 | 0.998 |
| 2015 | 6790 | 0.959 | 0.963 | 0.998 |
| 2016 | 6136 | 0.893 | 0.898 | 0.998 |
| 2017 | 5142 | 0.846 | 0.851 | 0.996 |
| 2018 | 3458 | 0.833 | 0.838 | 0.995 |
| 2019 | 248 | 0.858 | 0.886 | 0.986 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8474 | 100.3 | 100.1 | 100.2 | 100.0 |
| 2011 | 8745 | 100.8 | 100.6 | 100.7 | 100.4 |
| 2012 | 8519 | 100.0 | 99.8 | 99.9 | 99.7 |
| 2013 | 7158 | 101.3 | 101.0 | 101.1 | 100.8 |
| 2014 | 7278 | 101.3 | 100.9 | 101.1 | 100.7 |
| 2015 | 6790 | 100.4 | 100.0 | 100.4 | 99.7 |
| 2016 | 6136 | 101.0 | 100.3 | 100.9 | 100.1 |
| 2017 | 5142 | 99.7 | 100.3 | 99.4 | 99.9 |
| 2018 | 3458 | 100.1 | 100.5 | 99.9 | 100.2 |
| 2019 | 248 | 101.0 | 100.3 | 100.6 | 100.0 |



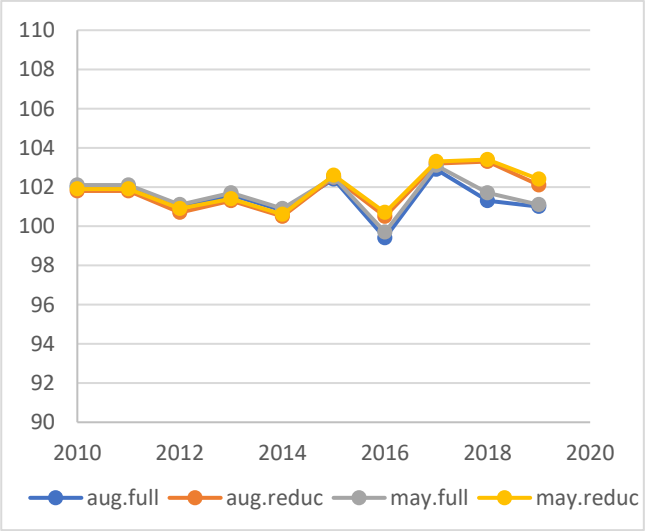

## *bv13*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.987 | 0.989 | 0.999 |
| 2011 | 8761 | 0.983 | 0.985 | 0.998 |
| 2012 | 8645 | 0.981 | 0.983 | 0.998 |
| 2013 | 7224 | 0.976 | 0.979 | 0.998 |
| 2014 | 7362 | 0.974 | 0.977 | 0.997 |
| 2015 | 6951 | 0.929 | 0.932 | 0.996 |
| 2016 | 6137 | 0.805 | 0.805 | 0.996 |
| 2017 | 5142 | 0.795 | 0.804 | 0.993 |
| 2018 | 3458 | 0.752 | 0.752 | 0.993 |
| 2019 | 248 | 0.807 | 0.815 | 0.983 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 102.0 | 101.8 | 102.1 | 101.9 |
| 2011 | 8761 | 102.0 | 101.8 | 102.1 | 101.9 |
| 2012 | 8645 | 101.0 | 100.7 | 101.1 | 100.9 |
| 2013 | 7224 | 101.6 | 101.3 | 101.7 | 101.4 |
| 2014 | 7362 | 100.8 | 100.5 | 100.9 | 100.6 |
| 2015 | 6951 | 102.4 | 102.5 | 102.5 | 102.6 |
| 2016 | 6137 | 99.4 | 100.5 | 99.7 | 100.7 |
| 2017 | 5142 | 102.9 | 103.2 | 103.1 | 103.3 |
| 2018 | 3458 | 101.3 | 103.3 | 101.7 | 103.4 |
| 2019 | 248 | 101.0 | 102.1 | 101.1 | 102.4 |



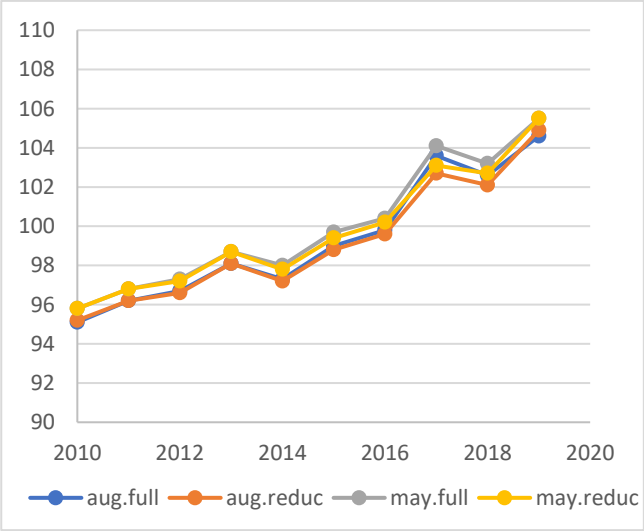

## *bv16*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.992 | 0.994 | 0.999 |
| 2011 | 8761 | 0.988 | 0.991 | 0.999 |
| 2012 | 8645 | 0.987 | 0.989 | 0.998 |
| 2013 | 7224 | 0.983 | 0.986 | 0.998 |
| 2014 | 7362 | 0.981 | 0.984 | 0.998 |
| 2015 | 6950 | 0.947 | 0.949 | 0.997 |
| 2016 | 6137 | 0.838 | 0.839 | 0.997 |
| 2017 | 5142 | 0.822 | 0.827 | 0.996 |
| 2018 | 3458 | 0.775 | 0.778 | 0.994 |
| 2019 | 248 | 0.840 | 0.844 | 0.993 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 95.1 | 95.2 | 95.8 | 95.8 |
| 2011 | 8761 | 96.2 | 96.2 | 96.8 | 96.8 |
| 2012 | 8645 | 96.7 | 96.6 | 97.3 | 97.2 |
| 2013 | 7224 | 98.1 | 98.1 | 98.7 | 98.7 |
| 2014 | 7362 | 97.3 | 97.2 | 98.0 | 97.8 |
| 2015 | 6950 | 99.0 | 98.8 | 99.7 | 99.4 |
| 2016 | 6137 | 99.8 | 99.6 | 100.4 | 100.2 |
| 2017 | 5142 | 103.6 | 102.7 | 104.1 | 103.1 |
| 2018 | 3458 | 102.6 | 102.1 | 103.2 | 102.7 |
| 2019 | 248 | 104.6 | 104.9 | 105.5 | 105.5 |



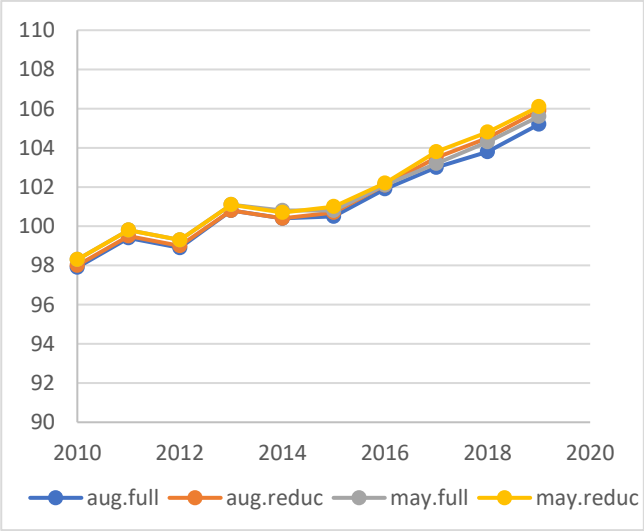

## *bv17*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.992 | 0.993 | 0.999 |
| 2011 | 8761 | 0.988 | 0.990 | 0.998 |
| 2012 | 8645 | 0.986 | 0.988 | 0.998 |
| 2013 | 7224 | 0.984 | 0.986 | 0.998 |
| 2014 | 7362 | 0.977 | 0.980 | 0.997 |
| 2015 | 6950 | 0.938 | 0.941 | 0.996 |
| 2016 | 6137 | 0.830 | 0.829 | 0.996 |
| 2017 | 5142 | 0.798 | 0.790 | 0.995 |
| 2018 | 3458 | 0.785 | 0.777 | 0.994 |
| 2019 | 248 | 0.784 | 0.784 | 0.993 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 97.9 | 98.0 | 98.3 | 98.3 |
| 2011 | 8761 | 99.4 | 99.5 | 99.8 | 99.8 |
| 2012 | 8645 | 98.9 | 99.0 | 99.3 | 99.3 |
| 2013 | 7224 | 100.8 | 100.8 | 101.1 | 101.1 |
| 2014 | 7362 | 100.4 | 100.4 | 100.8 | 100.7 |
| 2015 | 6950 | 100.5 | 100.7 | 100.8 | 101.0 |
| 2016 | 6137 | 101.9 | 102.1 | 102.1 | 102.2 |
| 2017 | 5142 | 103.0 | 103.5 | 103.2 | 103.8 |
| 2018 | 3458 | 103.8 | 104.5 | 104.3 | 104.8 |
| 2019 | 248 | 105.2 | 105.9 | 105.6 | 106.1 |



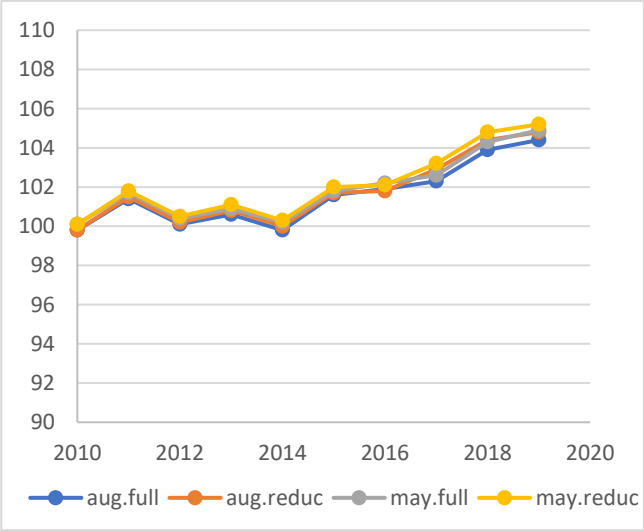

## *bv18*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8474 | 0.992 | 0.993 | 0.999 |
| 2011 | 8745 | 0.988 | 0.989 | 0.999 |
| 2012 | 8519 | 0.986 | 0.987 | 0.998 |
| 2013 | 7158 | 0.982 | 0.984 | 0.998 |
| 2014 | 7278 | 0.982 | 0.984 | 0.998 |
| 2015 | 6789 | 0.948 | 0.951 | 0.997 |
| 2016 | 6136 | 0.806 | 0.803 | 0.997 |
| 2017 | 5142 | 0.807 | 0.807 | 0.996 |
| 2018 | 3458 | 0.827 | 0.823 | 0.996 |
| 2019 | 248 | 0.863 | 0.861 | 0.992 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8474 | 99.8 | 99.8 | 100.1 | 100.1 |
| 2011 | 8745 | 101.4 | 101.5 | 101.7 | 101.8 |
| 2012 | 8519 | 100.1 | 100.2 | 100.4 | 100.5 |
| 2013 | 7158 | 100.6 | 100.8 | 100.9 | 101.1 |
| 2014 | 7278 | 99.8 | 100.0 | 100.2 | 100.3 |
| 2015 | 6789 | 101.6 | 101.7 | 101.8 | 102.0 |
| 2016 | 6136 | 101.9 | 101.8 | 102.2 | 102.1 |
| 2017 | 5142 | 102.3 | 102.9 | 102.6 | 103.2 |
| 2018 | 3458 | 103.9 | 104.4 | 104.3 | 104.8 |
| 2019 | 248 | 104.4 | 104.8 | 104.9 | 105.2 |



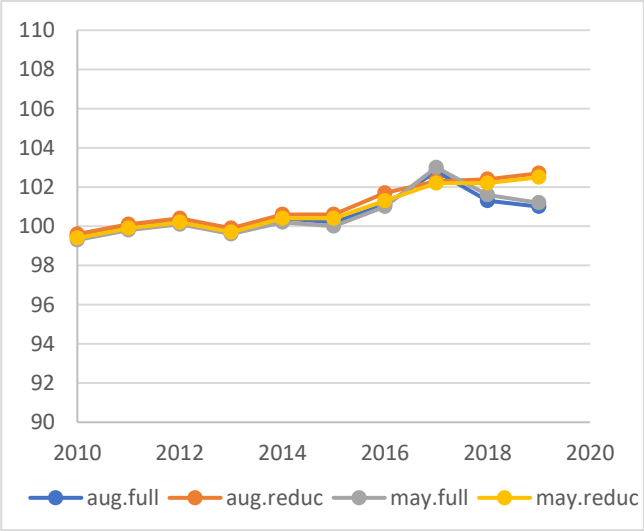

## *bv19*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.994 | 0.995 | 0.999 |
| 2011 | 8761 | 0.990 | 0.992 | 0.999 |
| 2012 | 8645 | 0.988 | 0.990 | 0.999 |
| 2013 | 7224 | 0.985 | 0.987 | 0.998 |
| 2014 | 7362 | 0.980 | 0.983 | 0.997 |
| 2015 | 6950 | 0.940 | 0.944 | 0.997 |
| 2016 | 6137 | 0.856 | 0.860 | 0.997 |
| 2017 | 5142 | 0.857 | 0.858 | 0.996 |
| 2018 | 3458 | 0.839 | 0.843 | 0.995 |
| 2019 | 248 | 0.869 | 0.862 | 0.992 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 99.5 | 99.6 | 99.3 | 99.4 |
| 2011 | 8761 | 100.0 | 100.1 | 99.8 | 99.9 |
| 2012 | 8645 | 100.2 | 100.4 | 100.1 | 100.2 |
| 2013 | 7224 | 99.7 | 99.9 | 99.6 | 99.7 |
| 2014 | 7362 | 100.4 | 100.6 | 100.2 | 100.4 |
| 2015 | 6950 | 100.2 | 100.6 | 100.0 | 100.4 |
| 2016 | 6137 | 101.1 | 101.7 | 101.0 | 101.3 |
| 2017 | 5142 | 102.8 | 102.3 | 103.0 | 102.2 |
| 2018 | 3458 | 101.3 | 102.4 | 101.6 | 102.2 |
| 2019 | 248 | 101.0 | 102.7 | 101.2 | 102.5 |



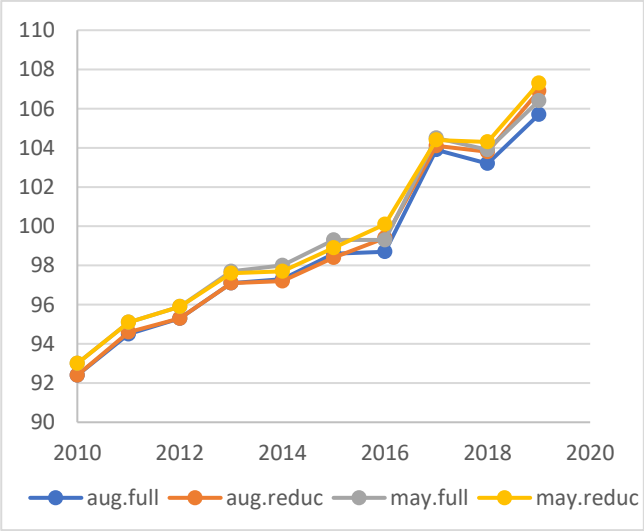

## *bv20*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.995 | 0.996 | 0.999 |
| 2011 | 8761 | 0.993 | 0.994 | 0.999 |
| 2012 | 8645 | 0.990 | 0.992 | 0.999 |
| 2013 | 7224 | 0.987 | 0.989 | 0.999 |
| 2014 | 7362 | 0.984 | 0.987 | 0.998 |
| 2015 | 6950 | 0.942 | 0.943 | 0.998 |
| 2016 | 6137 | 0.838 | 0.837 | 0.996 |
| 2017 | 5142 | 0.849 | 0.844 | 0.996 |
| 2018 | 3458 | 0.862 | 0.860 | 0.997 |
| 2019 | 248 | 0.840 | 0.854 | 0.997 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 92.4 | 92.4 | 93.0 | 93.0 |
| 2011 | 8761 | 94.5 | 94.6 | 95.1 | 95.1 |
| 2012 | 8645 | 95.3 | 95.3 | 95.9 | 95.9 |
| 2013 | 7224 | 97.1 | 97.1 | 97.7 | 97.6 |
| 2014 | 7362 | 97.3 | 97.2 | 98.0 | 97.7 |
| 2015 | 6950 | 98.6 | 98.4 | 99.3 | 98.9 |
| 2016 | 6137 | 98.7 | 99.4 | 99.3 | 100.1 |
| 2017 | 5142 | 103.9 | 104.1 | 104.5 | 104.4 |
| 2018 | 3458 | 103.2 | 103.8 | 103.9 | 104.3 |
| 2019 | 248 | 105.7 | 106.9 | 106.4 | 107.3 |



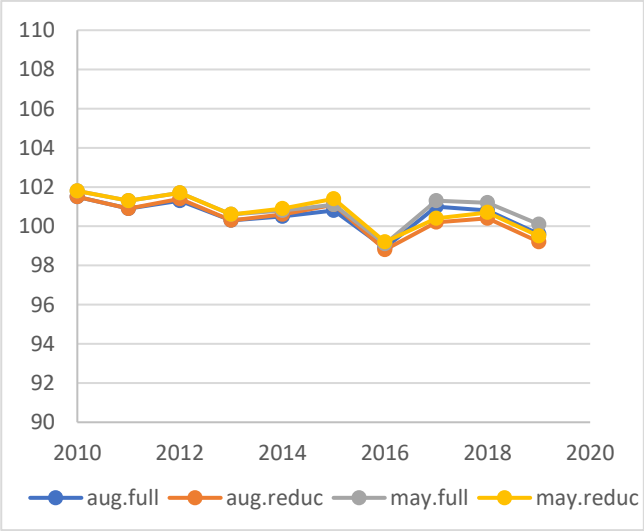

## *bv21*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.996 | 0.996 | 0.999 |
| 2011 | 8761 | 0.994 | 0.995 | 0.999 |
| 2012 | 8645 | 0.992 | 0.993 | 0.999 |
| 2013 | 7224 | 0.989 | 0.990 | 0.999 |
| 2014 | 7362 | 0.986 | 0.987 | 0.999 |
| 2015 | 6950 | 0.934 | 0.936 | 0.998 |
| 2016 | 6137 | 0.825 | 0.821 | 0.997 |
| 2017 | 5142 | 0.770 | 0.765 | 0.997 |
| 2018 | 3458 | 0.784 | 0.777 | 0.997 |
| 2019 | 248 | 0.828 | 0.821 | 0.996 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 101.5 | 101.5 | 101.8 | 101.8 |
| 2011 | 8761 | 100.9 | 100.9 | 101.3 | 101.3 |
| 2012 | 8645 | 101.3 | 101.4 | 101.7 | 101.7 |
| 2013 | 7224 | 100.3 | 100.3 | 100.6 | 100.6 |
| 2014 | 7362 | 100.5 | 100.6 | 100.8 | 100.9 |
| 2015 | 6950 | 100.8 | 101.1 | 101.1 | 101.4 |
| 2016 | 6137 | 98.9 | 98.8 | 99.1 | 99.2 |
| 2017 | 5142 | 101.0 | 100.2 | 101.3 | 100.4 |
| 2018 | 3458 | 100.8 | 100.4 | 101.2 | 100.7 |
| 2019 | 248 | 99.6 | 99.2 | 100.1 | 99.5 |



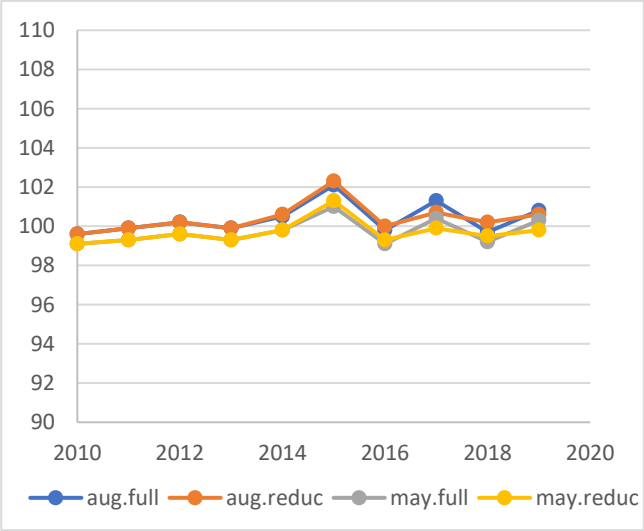

## *bv22*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8474 | 0.995 | 0.996 | 0.972 |
| 2011 | 8745 | 0.992 | 0.993 | 0.974 |
| 2012 | 8519 | 0.990 | 0.991 | 0.973 |
| 2013 | 7158 | 0.987 | 0.988 | 0.973 |
| 2014 | 7278 | 0.984 | 0.984 | 0.973 |
| 2015 | 6789 | 0.953 | 0.936 | 0.972 |
| 2016 | 6136 | 0.889 | 0.818 | 0.973 |
| 2017 | 5142 | 0.838 | 0.764 | 0.973 |
| 2018 | 3458 | 0.818 | 0.748 | 0.973 |
| 2019 | 248 | 0.798 | 0.752 | 0.969 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8474 | 99.6 | 99.6 | 99.1 | 99.1 |
| 2011 | 8745 | 99.9 | 99.9 | 99.3 | 99.3 |
| 2012 | 8519 | 100.2 | 100.2 | 99.6 | 99.6 |
| 2013 | 7158 | 99.9 | 99.9 | 99.3 | 99.3 |
| 2014 | 7278 | 100.5 | 100.6 | 99.8 | 99.8 |
| 2015 | 6789 | 102.1 | 102.3 | 101.0 | 101.3 |
| 2016 | 6136 | 99.8 | 100.0 | 99.1 | 99.3 |
| 2017 | 5142 | 101.3 | 100.7 | 100.4 | 99.9 |
| 2018 | 3458 | 99.7 | 100.2 | 99.2 | 99.5 |
| 2019 | 248 | 100.8 | 100.6 | 100.3 | 99.8 |



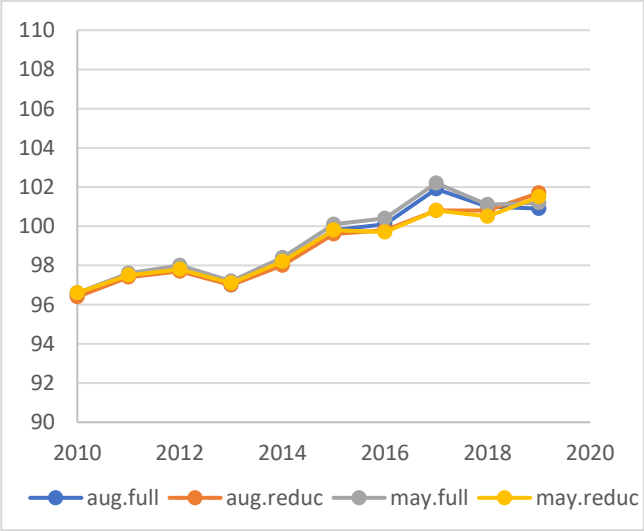

## *bv23*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8516 | 0.993 | 0.995 | 0.999 |
| 2011 | 8761 | 0.990 | 0.993 | 0.999 |
| 2012 | 8645 | 0.988 | 0.991 | 0.999 |
| 2013 | 7224 | 0.985 | 0.988 | 0.998 |
| 2014 | 7362 | 0.981 | 0.985 | 0.998 |
| 2015 | 6950 | 0.945 | 0.950 | 0.997 |
| 2016 | 6137 | 0.848 | 0.844 | 0.997 |
| 2017 | 5142 | 0.833 | 0.820 | 0.995 |
| 2018 | 3458 | 0.827 | 0.830 | 0.996 |
| 2019 | 248 | 0.824 | 0.811 | 0.993 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8516 | 96.5 | 96.4 | 96.6 | 96.6 |
| 2011 | 8761 | 97.5 | 97.4 | 97.6 | 97.5 |
| 2012 | 8645 | 97.8 | 97.7 | 98.0 | 97.8 |
| 2013 | 7224 | 97.0 | 97.0 | 97.2 | 97.1 |
| 2014 | 7362 | 98.2 | 98.0 | 98.4 | 98.2 |
| 2015 | 6950 | 99.8 | 99.6 | 100.1 | 99.8 |
| 2016 | 6137 | 100.1 | 99.8 | 100.4 | 99.7 |
| 2017 | 5142 | 101.9 | 100.8 | 102.2 | 100.8 |
| 2018 | 3458 | 101.0 | 100.8 | 101.1 | 100.5 |
| 2019 | 248 | 100.9 | 101.7 | 101.2 | 101.5 |



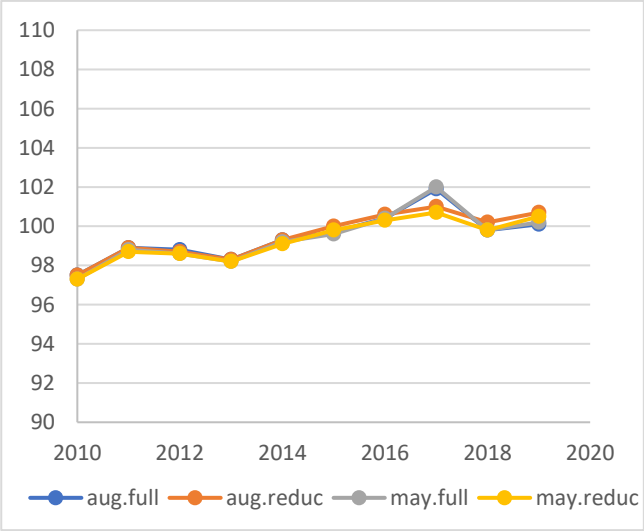

## *bv24*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8474 | 0.993 | 0.995 | 0.999 |
| 2011 | 8745 | 0.990 | 0.993 | 0.999 |
| 2012 | 8519 | 0.988 | 0.991 | 0.999 |
| 2013 | 7158 | 0.985 | 0.988 | 0.999 |
| 2014 | 7278 | 0.983 | 0.987 | 0.998 |
| 2015 | 6789 | 0.940 | 0.946 | 0.997 |
| 2016 | 6136 | 0.864 | 0.868 | 0.997 |
| 2017 | 5142 | 0.820 | 0.818 | 0.995 |
| 2018 | 3458 | 0.811 | 0.815 | 0.997 |
| 2019 | 248 | 0.804 | 0.805 | 0.993 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8474 | 97.5 | 97.5 | 97.3 | 97.3 |
| 2011 | 8745 | 98.9 | 98.9 | 98.8 | 98.7 |
| 2012 | 8519 | 98.8 | 98.7 | 98.6 | 98.6 |
| 2013 | 7158 | 98.3 | 98.3 | 98.2 | 98.2 |
| 2014 | 7278 | 99.3 | 99.3 | 99.2 | 99.1 |
| 2015 | 6789 | 99.7 | 100.0 | 99.6 | 99.8 |
| 2016 | 6136 | 100.4 | 100.6 | 100.4 | 100.3 |
| 2017 | 5142 | 101.9 | 101.0 | 102.0 | 100.7 |
| 2018 | 3458 | 99.8 | 100.2 | 99.8 | 99.8 |
| 2019 | 248 | 100.1 | 100.7 | 100.2 | 100.5 |



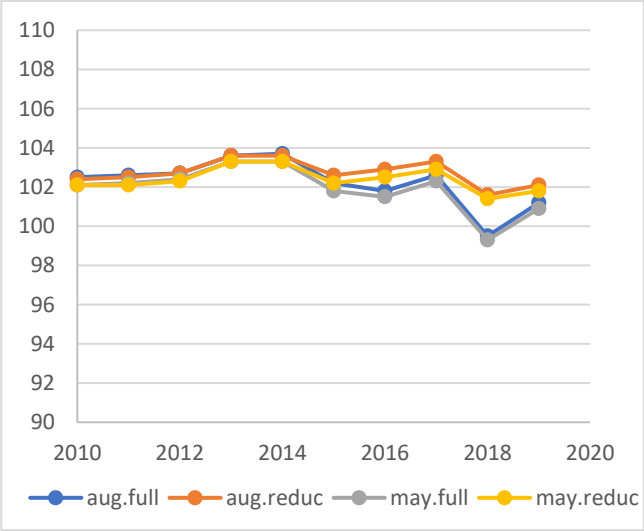

## *bv25*

Correlations

| Birth year | Number of cows | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 8474 | 0.991 | 0.992 | 0.999 |
| 2011 | 8745 | 0.989 | 0.990 | 0.999 |
| 2012 | 8519 | 0.989 | 0.990 | 0.999 |
| 2013 | 7158 | 0.987 | 0.989 | 0.999 |
| 2014 | 7278 | 0.983 | 0.985 | 0.998 |
| 2015 | 6789 | 0.949 | 0.951 | 0.997 |
| 2016 | 6136 | 0.812 | 0.814 | 0.995 |
| 2017 | 5142 | 0.845 | 0.848 | 0.996 |
| 2018 | 3458 | 0.790 | 0.794 | 0.995 |
| 2019 | 248 | 0.787 | 0.794 | 0.991 |

Mean GEBV

| Birth year | Number of cows | aug.full | aug.reduc | may.full | may.reduc |
|---|---|---|---|---|---|
| 2010 | 8474 | 102.5 | 102.4 | 102.1 | 102.1 |
| 2011 | 8745 | 102.6 | 102.5 | 102.2 | 102.1 |
| 2012 | 8519 | 102.7 | 102.7 | 102.4 | 102.3 |
| 2013 | 7158 | 103.6 | 103.6 | 103.3 | 103.3 |
| 2014 | 7278 | 103.7 | 103.6 | 103.3 | 103.3 |
| 2015 | 6789 | 102.2 | 102.6 | 101.8 | 102.2 |
| 2016 | 6136 | 101.8 | 102.9 | 101.5 | 102.5 |
| 2017 | 5142 | 102.6 | 103.3 | 102.3 | 102.9 |
| 2018 | 3458 | 99.5 | 101.6 | 99.3 | 101.4 |
| 2019 | 248 | 101.2 | 102.1 | 100.9 | 101.8 |




# Bulls

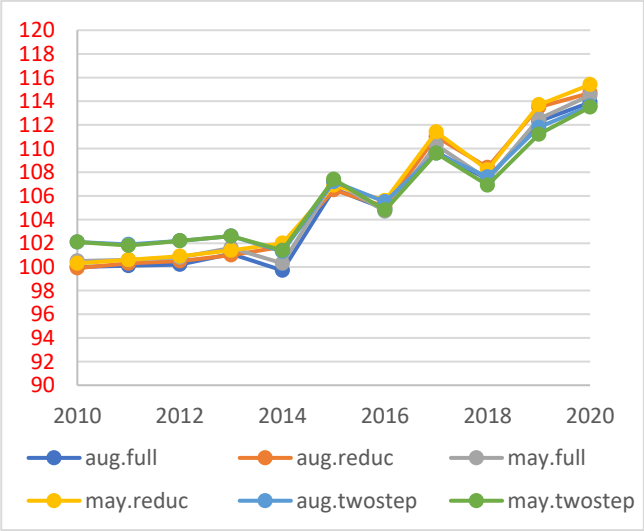
## *bv1*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.994 | 0.995 | 1.000 |
| 2011 | 75 | 0.993 | 0.993 | 0.999 |
| 2012 | 58 | 0.995 | 0.996 | 1.000 |
| 2013 | 67 | 0.917 | 0.919 | 0.999 |
| 2014 | 64 | 0.928 | 0.924 | 0.999 |
| 2015 | 52 | 0.893 | 0.886 | 0.999 |
| 2016 | 32 | 0.827 | 0.823 | 0.982 |
| 2017 | 38 | 0.940 | 0.925 | 0.969 |
| 2018 | 24 | 0.944 | 0.949 | 0.995 |
| 2019 | 51 | 0.935 | 0.941 | 0.974 |
| 2020 | 14 | 0.949 | 0.961 | 0.997 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 100.0 | 99.9 | 100.5 | 100.3 | 102.1 | 102.1 |
| 2011 | 75 | 100.1 | 100.3 | 100.6 | 100.6 | 101.9 | 101.8 |
| 2012 | 58 | 100.2 | 100.5 | 100.8 | 100.9 | 102.2 | 102.2 |
| 2013 | 67 | 101.1 | 101.0 | 101.6 | 101.4 | 102.6 | 102.6 |
| 2014 | 64 | 99.7 | 101.7 | 100.3 | 102.0 | 101.3 | 101.4 |
| 2015 | 52 | 106.6 | 106.5 | 107.2 | 106.9 | 107.2 | 107.4 |
| 2016 | 32 | 104.9 | 105.1 | 104.7 | 105.6 | 105.5 | 104.8 |
| 2017 | 38 | 109.7 | 111.0 | 110.3 | 111.4 | 109.6 | 109.6 |
| 2018 | 24 | 107.4 | 108.4 | 107.4 | 108.2 | 107.6 | 106.9 |
| 2019 | 51 | 112.3 | 113.5 | 112.5 | 113.7 | 111.8 | 111.2 |
| 2020 | 14 | 113.9 | 114.7 | 114.5 | 115.4 | 113.6 | 113.5 |



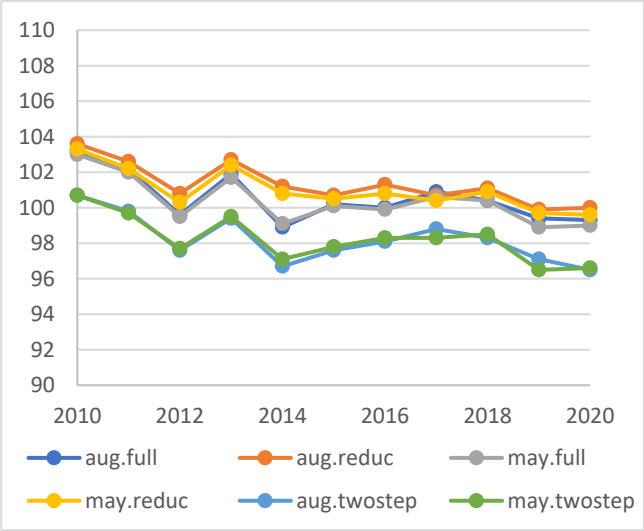

## *bv2*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.991 | 0.993 | 0.999 |
| 2011 | 75 | 0.985 | 0.987 | 0.999 |
| 2012 | 58 | 0.988 | 0.989 | 0.999 |
| 2013 | 67 | 0.878 | 0.883 | 0.999 |
| 2014 | 64 | 0.913 | 0.912 | 0.998 |
| 2015 | 52 | 0.874 | 0.863 | 0.997 |
| 2016 | 32 | 0.799 | 0.771 | 0.984 |
| 2017 | 38 | 0.856 | 0.896 | 0.948 |
| 2018 | 24 | 0.952 | 0.947 | 0.989 |
| 2019 | 51 | 0.795 | 0.886 | 0.952 |
| 2020 | 14 | 0.935 | 0.938 | 0.990 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 103.2 | 103.6 | 103.0 | 103.3 | 100.7 | 100.7 |
| 2011 | 75 | 102.2 | 102.6 | 102.0 | 102.2 | 99.8 | 99.7 |
| 2012 | 58 | 99.6 | 100.8 | 99.5 | 100.3 | 97.6 | 97.7 |
| 2013 | 67 | 101.9 | 102.7 | 101.7 | 102.4 | 99.4 | 99.5 |
| 2014 | 64 | 98.9 | 101.2 | 99.1 | 100.8 | 96.7 | 97.1 |
| 2015 | 52 | 100.2 | 100.7 | 100.1 | 100.5 | 97.6 | 97.8 |
| 2016 | 32 | 100.0 | 101.3 | 99.9 | 100.8 | 98.1 | 98.3 |
| 2017 | 38 | 100.9 | 100.7 | 100.6 | 100.4 | 98.8 | 98.3 |
| 2018 | 24 | 100.4 | 101.1 | 100.4 | 100.9 | 98.3 | 98.5 |
| 2019 | 51 | 99.4 | 99.9 | 98.9 | 99.7 | 97.1 | 96.5 |
| 2020 | 14 | 99.3 | 100.0 | 99.0 | 99.6 | 96.5 | 96.6 |



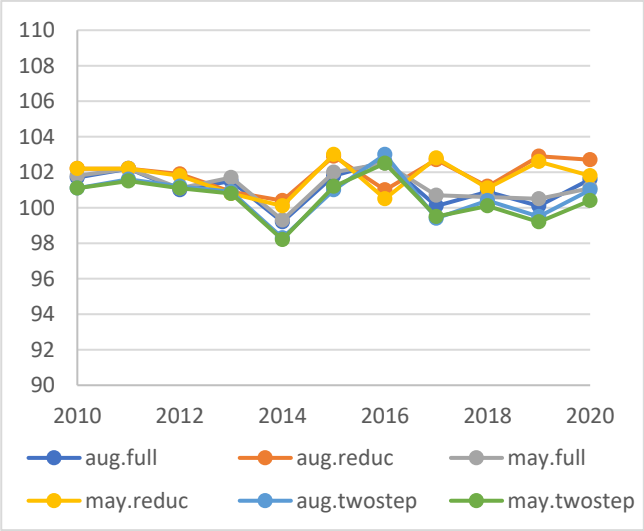

## *bv3*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.991 | 0.993 | 0.999 |
| 2011 | 75 | 0.982 | 0.986 | 0.999 |
| 2012 | 58 | 0.988 | 0.991 | 0.999 |
| 2013 | 67 | 0.842 | 0.843 | 0.998 |
| 2014 | 64 | 0.874 | 0.892 | 0.998 |
| 2015 | 52 | 0.810 | 0.772 | 0.998 |
| 2016 | 32 | 0.803 | 0.842 | 0.991 |
| 2017 | 38 | 0.871 | 0.854 | 0.956 |
| 2018 | 24 | 0.859 | 0.873 | 0.993 |
| 2019 | 51 | 0.901 | 0.892 | 0.974 |
| 2020 | 14 | 0.887 | 0.815 | 0.992 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 101.7 | 102.2 | 101.8 | 102.2 | 101.1 | 101.1 |
| 2011 | 75 | 102.2 | 102.2 | 102.2 | 102.2 | 101.6 | 101.5 |
| 2012 | 58 | 101.0 | 101.9 | 101.1 | 101.8 | 101.2 | 101.1 |
| 2013 | 67 | 101.5 | 100.9 | 101.7 | 100.8 | 100.9 | 100.8 |
| 2014 | 64 | 99.2 | 100.4 | 99.3 | 100.1 | 98.3 | 98.2 |
| 2015 | 52 | 101.8 | 102.9 | 102.0 | 103.0 | 101.0 | 101.2 |
| 2016 | 32 | 102.6 | 101.0 | 102.5 | 100.5 | 103.0 | 102.5 |
| 2017 | 38 | 100.1 | 102.7 | 100.7 | 102.8 | 99.4 | 99.5 |
| 2018 | 24 | 100.9 | 101.2 | 100.6 | 101.1 | 100.4 | 100.1 |
| 2019 | 51 | 100.1 | 102.9 | 100.5 | 102.6 | 99.5 | 99.2 |
| 2020 | 14 | 101.6 | 102.7 | 101.1 | 101.8 | 101.0 | 100.4 |



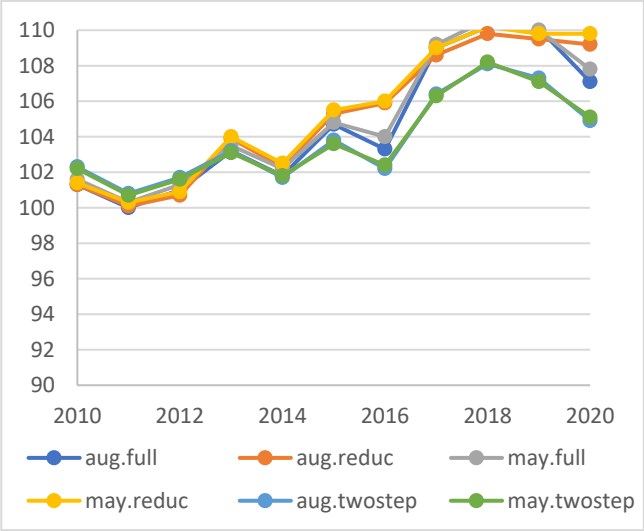

## *bv4*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.981 | 0.985 | 0.998 |
| 2011 | 75 | 0.983 | 0.986 | 0.998 |
| 2012 | 58 | 0.989 | 0.990 | 0.999 |
| 2013 | 67 | 0.746 | 0.752 | 0.996 |
| 2014 | 64 | 0.887 | 0.881 | 0.998 |
| 2015 | 52 | 0.845 | 0.837 | 0.998 |
| 2016 | 32 | 0.869 | 0.854 | 0.982 |
| 2017 | 38 | 0.936 | 0.932 | 0.936 |
| 2018 | 24 | 0.869 | 0.891 | 0.976 |
| 2019 | 51 | 0.894 | 0.884 | 0.963 |
| 2020 | 14 | 0.935 | 0.939 | 0.996 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 101.3 | 101.3 | 101.6 | 101.4 | 102.3 | 102.2 |
| 2011 | 75 | 100.0 | 100.1 | 100.3 | 100.3 | 100.8 | 100.7 |
| 2012 | 58 | 101.0 | 100.7 | 101.3 | 100.9 | 101.7 | 101.6 |
| 2013 | 67 | 103.2 | 103.9 | 103.5 | 104.0 | 103.2 | 103.1 |
| 2014 | 64 | 101.8 | 102.3 | 102.2 | 102.5 | 101.7 | 101.8 |
| 2015 | 52 | 104.7 | 105.3 | 104.8 | 105.5 | 103.8 | 103.6 |
| 2016 | 32 | 103.3 | 105.9 | 104.0 | 106.0 | 102.2 | 102.4 |
| 2017 | 38 | 109.0 | 108.6 | 109.2 | 109.0 | 106.4 | 106.3 |
| 2018 | 24 | 110.2 | 109.8 | 110.6 | 110.2 | 108.1 | 108.2 |
| 2019 | 51 | 110.1 | 109.5 | 110.0 | 109.8 | 107.3 | 107.1 |
| 2020 | 14 | 107.1 | 109.2 | 107.8 | 109.8 | 104.9 | 105.1 |



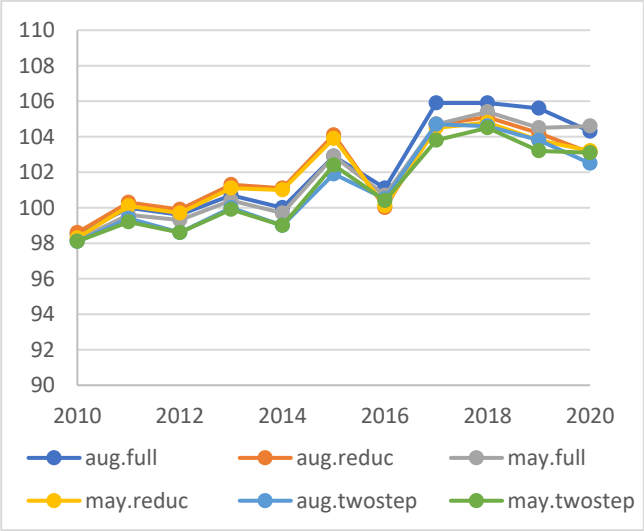

## *bv5*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.988 | 0.990 | 0.999 |
| 2011 | 75 | 0.984 | 0.986 | 0.998 |
| 2012 | 58 | 0.990 | 0.991 | 0.998 |
| 2013 | 67 | 0.905 | 0.908 | 0.999 |
| 2014 | 64 | 0.896 | 0.898 | 0.998 |
| 2015 | 52 | 0.911 | 0.908 | 0.998 |
| 2016 | 32 | 0.846 | 0.821 | 0.985 |
| 2017 | 38 | 0.847 | 0.896 | 0.948 |
| 2018 | 24 | 0.878 | 0.877 | 0.986 |
| 2019 | 51 | 0.875 | 0.914 | 0.967 |
| 2020 | 14 | 0.904 | 0.901 | 0.991 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 98.5 | 98.6 | 98.2 | 98.3 | 98.1 | 98.1 |
| 2011 | 75 | 100.0 | 100.3 | 99.6 | 100.1 | 99.4 | 99.2 |
| 2012 | 58 | 99.6 | 99.9 | 99.3 | 99.7 | 98.6 | 98.6 |
| 2013 | 67 | 100.7 | 101.3 | 100.4 | 101.1 | 100.0 | 99.9 |
| 2014 | 64 | 100.0 | 101.1 | 99.7 | 101.0 | 99.0 | 99.0 |
| 2015 | 52 | 102.9 | 104.1 | 102.9 | 103.9 | 101.9 | 102.4 |
| 2016 | 32 | 101.1 | 100.0 | 100.7 | 100.1 | 100.5 | 100.4 |
| 2017 | 38 | 105.9 | 104.7 | 104.7 | 104.5 | 104.7 | 103.8 |
| 2018 | 24 | 105.9 | 105.1 | 105.4 | 104.8 | 104.6 | 104.5 |
| 2019 | 51 | 105.6 | 104.2 | 104.5 | 103.8 | 103.8 | 103.2 |
| 2020 | 14 | 104.3 | 103.1 | 104.6 | 103.2 | 102.5 | 103.1 |



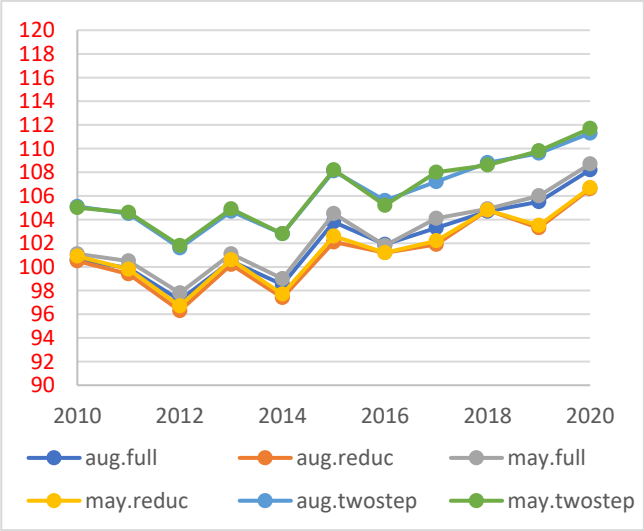

## *bv6*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.992 | 0.992 | 0.999 |
| 2011 | 75 | 0.991 | 0.992 | 0.999 |
| 2012 | 58 | 0.994 | 0.995 | 0.999 |
| 2013 | 67 | 0.907 | 0.908 | 0.999 |
| 2014 | 64 | 0.929 | 0.924 | 0.998 |
| 2015 | 52 | 0.932 | 0.932 | 0.999 |
| 2016 | 32 | 0.865 | 0.870 | 0.984 |
| 2017 | 38 | 0.918 | 0.944 | 0.978 |
| 2018 | 24 | 0.949 | 0.954 | 0.996 |
| 2019 | 51 | 0.916 | 0.954 | 0.983 |
| 2020 | 14 | 0.942 | 0.963 | 0.997 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 100.6 | 100.5 | 101.1 | 100.9 | 105.1 | 105.0 |
| 2011 | 75 | 99.9 | 99.4 | 100.5 | 99.8 | 104.5 | 104.6 |
| 2012 | 58 | 97.2 | 96.3 | 97.8 | 96.7 | 101.6 | 101.8 |
| 2013 | 67 | 100.5 | 100.2 | 101.1 | 100.6 | 104.7 | 104.9 |
| 2014 | 64 | 98.5 | 97.4 | 99.0 | 97.7 | 102.8 | 102.8 |
| 2015 | 52 | 103.8 | 102.1 | 104.5 | 102.6 | 108.1 | 108.2 |
| 2016 | 32 | 101.9 | 101.2 | 101.8 | 101.2 | 105.6 | 105.2 |
| 2017 | 38 | 103.3 | 101.9 | 104.1 | 102.2 | 107.2 | 108.0 |
| 2018 | 24 | 104.7 | 104.8 | 104.9 | 104.8 | 108.8 | 108.6 |
| 2019 | 51 | 105.5 | 103.3 | 106.0 | 103.5 | 109.6 | 109.8 |
| 2020 | 14 | 108.2 | 106.6 | 108.7 | 106.7 | 111.3 | 111.7 |



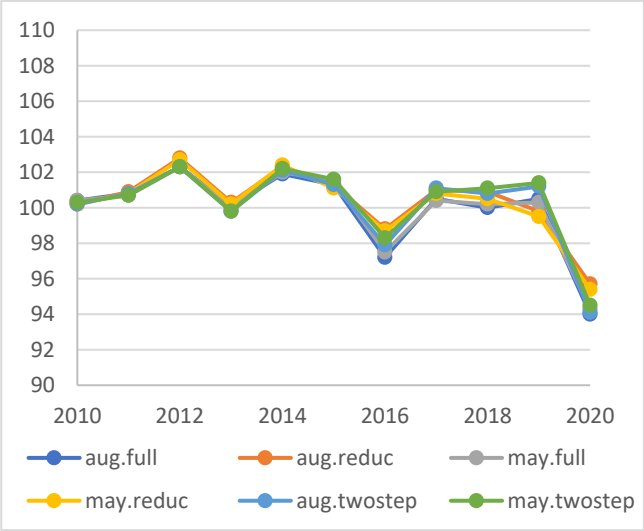

## *bv7*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.991 | 0.993 | 0.999 |
| 2011 | 75 | 0.989 | 0.991 | 0.999 |
| 2012 | 58 | 0.994 | 0.995 | 0.999 |
| 2013 | 67 | 0.881 | 0.885 | 0.999 |
| 2014 | 64 | 0.896 | 0.889 | 0.997 |
| 2015 | 52 | 0.960 | 0.957 | 0.999 |
| 2016 | 32 | 0.823 | 0.819 | 0.972 |
| 2017 | 38 | 0.875 | 0.914 | 0.957 |
| 2018 | 24 | 0.961 | 0.966 | 0.995 |
| 2019 | 51 | 0.920 | 0.942 | 0.982 |
| 2020 | 14 | 0.954 | 0.932 | 0.998 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 100.4 | 100.2 | 100.4 | 100.2 | 100.2 | 100.3 |
| 2011 | 75 | 100.8 | 100.9 | 100.7 | 100.8 | 100.8 | 100.7 |
| 2012 | 58 | 102.3 | 102.8 | 102.3 | 102.7 | 102.3 | 102.3 |
| 2013 | 67 | 100.1 | 100.3 | 100.0 | 100.2 | 99.8 | 99.8 |
| 2014 | 64 | 101.9 | 102.3 | 102.0 | 102.4 | 102.1 | 102.2 |
| 2015 | 52 | 101.3 | 101.3 | 101.5 | 101.1 | 101.3 | 101.6 |
| 2016 | 32 | 97.2 | 98.8 | 97.5 | 98.7 | 97.9 | 98.3 |
| 2017 | 38 | 100.5 | 101.0 | 100.4 | 100.8 | 101.1 | 100.9 |
| 2018 | 24 | 100.0 | 100.9 | 100.2 | 100.5 | 100.8 | 101.1 |
| 2019 | 51 | 100.5 | 99.8 | 100.3 | 99.5 | 101.2 | 101.4 |
| 2020 | 14 | 94.0 | 95.7 | 94.3 | 95.4 | 94.1 | 94.5 |



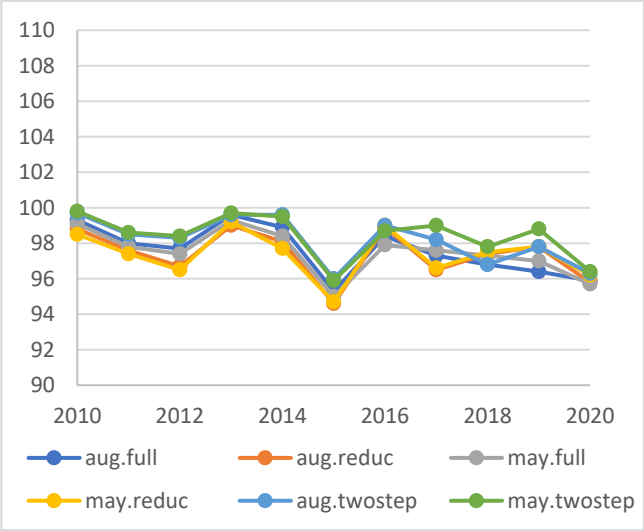

## *bv9*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.988 | 0.989 | 0.998 |
| 2011 | 75 | 0.979 | 0.982 | 0.998 |
| 2012 | 58 | 0.967 | 0.973 | 0.998 |
| 2013 | 67 | 0.829 | 0.829 | 0.998 |
| 2014 | 64 | 0.867 | 0.858 | 0.998 |
| 2015 | 52 | 0.686 | 0.709 | 0.998 |
| 2016 | 32 | 0.735 | 0.840 | 0.958 |
| 2017 | 38 | 0.772 | 0.798 | 0.951 |
| 2018 | 24 | 0.866 | 0.916 | 0.986 |
| 2019 | 51 | 0.844 | 0.854 | 0.973 |
| 2020 | 14 | 0.961 | 0.966 | 0.994 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 99.3 | 98.8 | 99.1 | 98.5 | 99.7 | 99.8 |
| 2011 | 75 | 98.0 | 97.6 | 97.8 | 97.4 | 98.5 | 98.6 |
| 2012 | 58 | 97.7 | 96.7 | 97.4 | 96.5 | 98.3 | 98.4 |
| 2013 | 67 | 99.6 | 99.0 | 99.3 | 99.2 | 99.6 | 99.7 |
| 2014 | 64 | 98.9 | 98.1 | 98.4 | 97.7 | 99.6 | 99.5 |
| 2015 | 52 | 95.3 | 94.6 | 95.0 | 94.7 | 96.0 | 95.9 |
| 2016 | 32 | 98.4 | 98.9 | 97.9 | 99.0 | 99.0 | 98.7 |
| 2017 | 38 | 97.3 | 96.5 | 97.6 | 96.6 | 98.2 | 99.0 |
| 2018 | 24 | 96.8 | 97.4 | 97.3 | 97.5 | 96.8 | 97.8 |
| 2019 | 51 | 96.4 | 97.8 | 97.0 | 97.8 | 97.8 | 98.8 |
| 2020 | 14 | 95.9 | 95.8 | 95.7 | 96.2 | 96.3 | 96.4 |



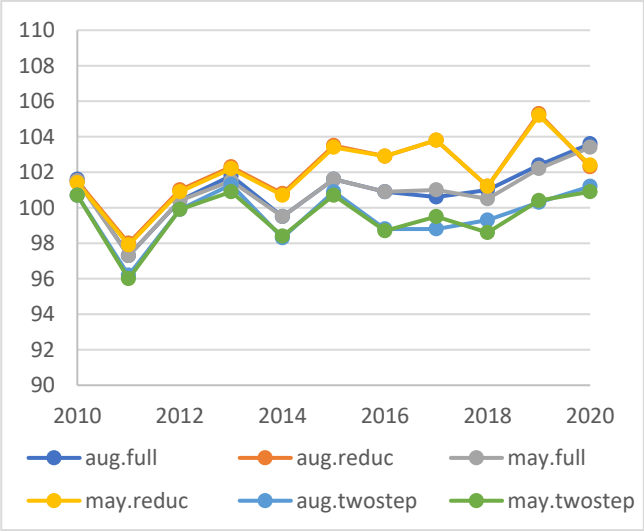

## *bv10*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.982 | 0.983 | 0.999 |
| 2011 | 75 | 0.984 | 0.986 | 0.998 |
| 2012 | 58 | 0.982 | 0.986 | 0.998 |
| 2013 | 67 | 0.856 | 0.856 | 0.998 |
| 2014 | 64 | 0.883 | 0.885 | 0.996 |
| 2015 | 52 | 0.808 | 0.820 | 0.996 |
| 2016 | 32 | 0.770 | 0.803 | 0.989 |
| 2017 | 38 | 0.900 | 0.878 | 0.951 |
| 2018 | 24 | 0.842 | 0.870 | 0.993 |
| 2019 | 51 | 0.918 | 0.924 | 0.980 |
| 2020 | 14 | 0.942 | 0.954 | 0.997 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 101.6 | 101.5 | 101.5 | 101.4 | 100.7 | 100.7 |
| 2011 | 75 | 97.3 | 98.0 | 97.3 | 97.9 | 96.2 | 96.0 |
| 2012 | 58 | 100.4 | 101.0 | 100.4 | 100.9 | 99.9 | 99.9 |
| 2013 | 67 | 101.8 | 102.3 | 101.5 | 102.2 | 101.3 | 100.9 |
| 2014 | 64 | 99.5 | 100.8 | 99.5 | 100.7 | 98.3 | 98.4 |
| 2015 | 52 | 101.6 | 103.5 | 101.6 | 103.4 | 100.9 | 100.7 |
| 2016 | 32 | 100.9 | 102.9 | 100.9 | 102.9 | 98.8 | 98.7 |
| 2017 | 38 | 100.6 | 103.8 | 101.0 | 103.8 | 98.8 | 99.5 |
| 2018 | 24 | 101.0 | 101.2 | 100.5 | 101.2 | 99.3 | 98.6 |
| 2019 | 51 | 102.4 | 105.3 | 102.2 | 105.2 | 100.3 | 100.4 |
| 2020 | 14 | 103.6 | 102.3 | 103.4 | 102.4 | 101.2 | 100.9 |



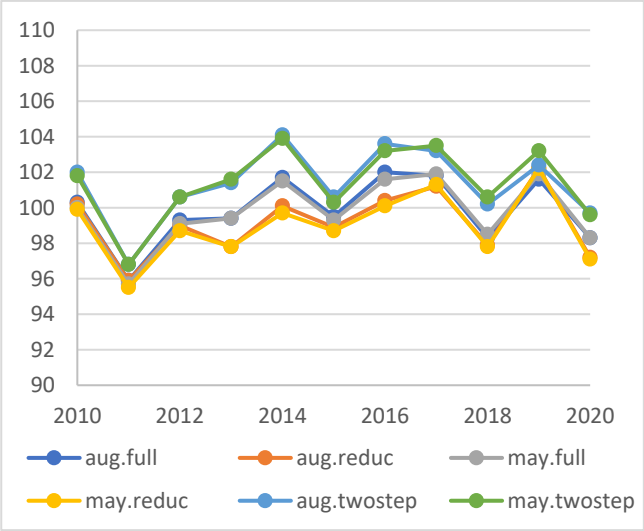

## *bv11*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.983 | 0.985 | 0.999 |
| 2011 | 75 | 0.982 | 0.985 | 0.998 |
| 2012 | 58 | 0.985 | 0.984 | 0.998 |
| 2013 | 67 | 0.876 | 0.880 | 0.999 |
| 2014 | 64 | 0.940 | 0.931 | 0.999 |
| 2015 | 52 | 0.809 | 0.799 | 0.997 |
| 2016 | 32 | 0.867 | 0.855 | 0.994 |
| 2017 | 38 | 0.856 | 0.906 | 0.965 |
| 2018 | 24 | 0.885 | 0.864 | 0.990 |
| 2019 | 51 | 0.884 | 0.927 | 0.969 |
| 2020 | 14 | 0.934 | 0.939 | 0.995 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 100.3 | 100.2 | 100.0 | 99.9 | 102.0 | 101.8 |
| 2011 | 75 | 95.9 | 95.9 | 95.7 | 95.5 | 96.8 | 96.8 |
| 2012 | 58 | 99.3 | 99.0 | 99.1 | 98.7 | 100.6 | 100.6 |
| 2013 | 67 | 99.4 | 97.8 | 99.4 | 97.8 | 101.4 | 101.6 |
| 2014 | 64 | 101.7 | 100.1 | 101.5 | 99.7 | 104.1 | 103.9 |
| 2015 | 52 | 99.5 | 98.9 | 99.3 | 98.7 | 100.6 | 100.3 |
| 2016 | 32 | 102.0 | 100.4 | 101.6 | 100.1 | 103.6 | 103.2 |
| 2017 | 38 | 101.8 | 101.2 | 101.9 | 101.3 | 103.2 | 103.5 |
| 2018 | 24 | 98.3 | 97.9 | 98.5 | 97.8 | 100.2 | 100.6 |
| 2019 | 51 | 101.6 | 102.2 | 101.9 | 102.2 | 102.4 | 103.2 |
| 2020 | 14 | 98.3 | 97.2 | 98.3 | 97.1 | 99.7 | 99.6 |



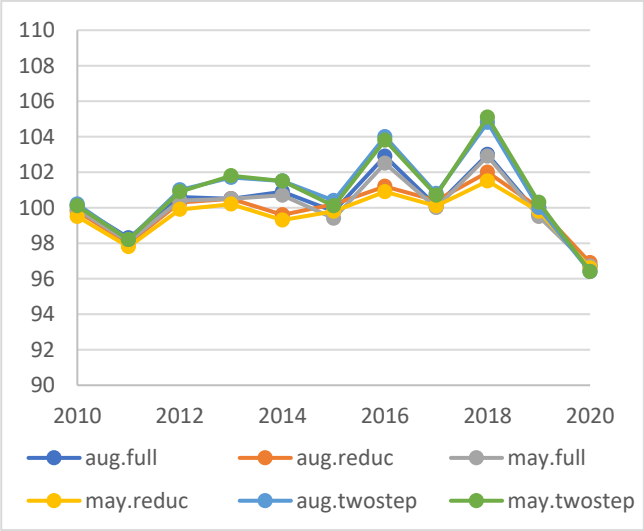

## *bv12*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.988 | 0.990 | 0.999 |
| 2011 | 75 | 0.987 | 0.989 | 0.999 |
| 2012 | 58 | 0.985 | 0.987 | 0.999 |
| 2013 | 67 | 0.851 | 0.870 | 0.998 |
| 2014 | 64 | 0.945 | 0.941 | 0.999 |
| 2015 | 52 | 0.863 | 0.867 | 0.998 |
| 2016 | 32 | 0.820 | 0.838 | 0.989 |
| 2017 | 38 | 0.861 | 0.899 | 0.960 |
| 2018 | 24 | 0.902 | 0.913 | 0.995 |
| 2019 | 51 | 0.824 | 0.893 | 0.958 |
| 2020 | 14 | 0.922 | 0.936 | 0.996 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 100.1 | 99.8 | 99.9 | 99.5 | 100.2 | 100.1 |
| 2011 | 75 | 98.3 | 98.0 | 98.1 | 97.8 | 98.2 | 98.2 |
| 2012 | 58 | 100.6 | 100.3 | 100.4 | 99.9 | 101.0 | 100.9 |
| 2013 | 67 | 100.5 | 100.5 | 100.5 | 100.2 | 101.7 | 101.8 |
| 2014 | 64 | 100.9 | 99.6 | 100.7 | 99.3 | 101.5 | 101.5 |
| 2015 | 52 | 99.8 | 100.2 | 99.4 | 99.8 | 100.4 | 100.1 |
| 2016 | 32 | 102.9 | 101.2 | 102.5 | 100.9 | 104.0 | 103.8 |
| 2017 | 38 | 100.1 | 100.4 | 100.0 | 100.1 | 100.8 | 100.7 |
| 2018 | 24 | 103.0 | 102.0 | 102.9 | 101.5 | 104.8 | 105.1 |
| 2019 | 51 | 99.6 | 100.0 | 99.5 | 99.8 | 100.0 | 100.3 |
| 2020 | 14 | 96.7 | 96.9 | 96.7 | 96.6 | 96.4 | 96.4 |



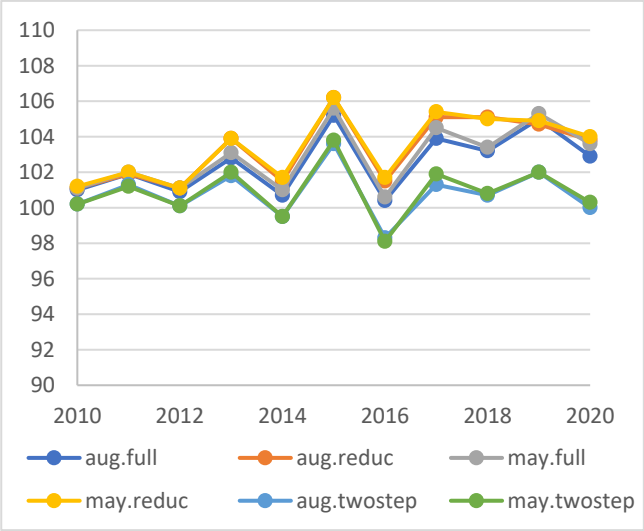

## *bv13*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.985 | 0.985 | 0.998 |
| 2011 | 75 | 0.968 | 0.974 | 0.997 |
| 2012 | 58 | 0.980 | 0.978 | 0.999 |
| 2013 | 67 | 0.819 | 0.817 | 0.998 |
| 2014 | 64 | 0.879 | 0.883 | 0.998 |
| 2015 | 52 | 0.818 | 0.831 | 0.997 |
| 2016 | 32 | 0.805 | 0.826 | 0.979 |
| 2017 | 38 | 0.843 | 0.873 | 0.958 |
| 2018 | 24 | 0.864 | 0.872 | 0.987 |
| 2019 | 51 | 0.822 | 0.870 | 0.948 |
| 2020 | 14 | 0.897 | 0.912 | 0.996 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 101.0 | 101.1 | 101.1 | 101.2 | 100.2 | 100.2 |
| 2011 | 75 | 101.9 | 101.9 | 102.0 | 102.0 | 101.3 | 101.2 |
| 2012 | 58 | 100.9 | 101.1 | 101.1 | 101.1 | 100.1 | 100.1 |
| 2013 | 67 | 102.8 | 103.9 | 103.1 | 103.9 | 101.8 | 102.0 |
| 2014 | 64 | 100.7 | 101.5 | 101.0 | 101.7 | 99.5 | 99.5 |
| 2015 | 52 | 105.2 | 106.2 | 105.6 | 106.2 | 103.6 | 103.8 |
| 2016 | 32 | 100.4 | 101.5 | 100.6 | 101.7 | 98.3 | 98.1 |
| 2017 | 38 | 103.9 | 105.1 | 104.5 | 105.4 | 101.3 | 101.9 |
| 2018 | 24 | 103.2 | 105.1 | 103.4 | 105.0 | 100.7 | 100.8 |
| 2019 | 51 | 105.0 | 104.7 | 105.3 | 104.9 | 102.0 | 102.0 |
| 2020 | 14 | 102.9 | 103.8 | 103.6 | 104.0 | 100.0 | 100.3 |



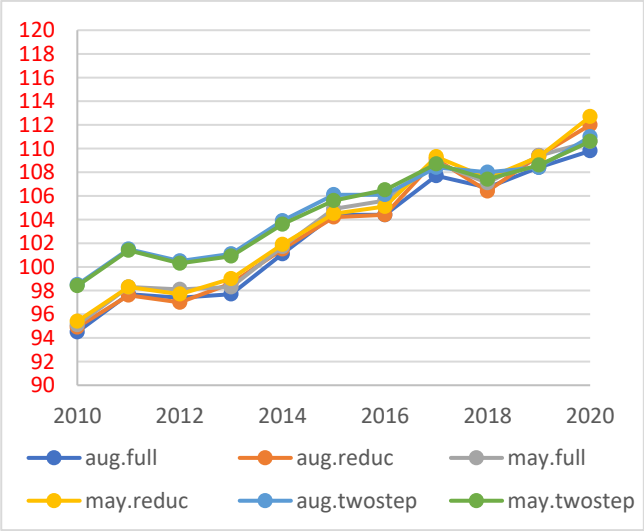

## *bv16*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.990 | 0.991 | 0.999 |
| 2011 | 75 | 0.983 | 0.986 | 0.998 |
| 2012 | 58 | 0.992 | 0.993 | 0.999 |
| 2013 | 67 | 0.862 | 0.861 | 0.998 |
| 2014 | 64 | 0.899 | 0.905 | 0.997 |
| 2015 | 52 | 0.876 | 0.885 | 0.997 |
| 2016 | 32 | 0.646 | 0.718 | 0.966 |
| 2017 | 38 | 0.902 | 0.924 | 0.972 |
| 2018 | 24 | 0.785 | 0.851 | 0.992 |
| 2019 | 51 | 0.945 | 0.943 | 0.986 |
| 2020 | 14 | 0.915 | 0.931 | 0.992 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 94.5 | 94.9 | 95.1 | 95.4 | 98.5 | 98.4 |
| 2011 | 75 | 97.7 | 97.6 | 98.3 | 98.3 | 101.5 | 101.4 |
| 2012 | 58 | 97.4 | 97.0 | 98.1 | 97.7 | 100.5 | 100.3 |
| 2013 | 67 | 97.7 | 98.6 | 98.3 | 99.0 | 101.1 | 100.9 |
| 2014 | 64 | 101.1 | 101.5 | 101.7 | 101.9 | 103.9 | 103.6 |
| 2015 | 52 | 104.4 | 104.2 | 104.9 | 104.5 | 106.1 | 105.6 |
| 2016 | 32 | 104.4 | 104.4 | 105.6 | 105.1 | 106.1 | 106.5 |
| 2017 | 38 | 107.7 | 109.1 | 108.8 | 109.3 | 108.4 | 108.7 |
| 2018 | 24 | 106.7 | 106.4 | 107.1 | 107.5 | 108.0 | 107.4 |
| 2019 | 51 | 108.4 | 109.4 | 109.4 | 109.3 | 108.4 | 108.6 |
| 2020 | 14 | 109.8 | 112.0 | 110.6 | 112.7 | 111.0 | 110.6 |



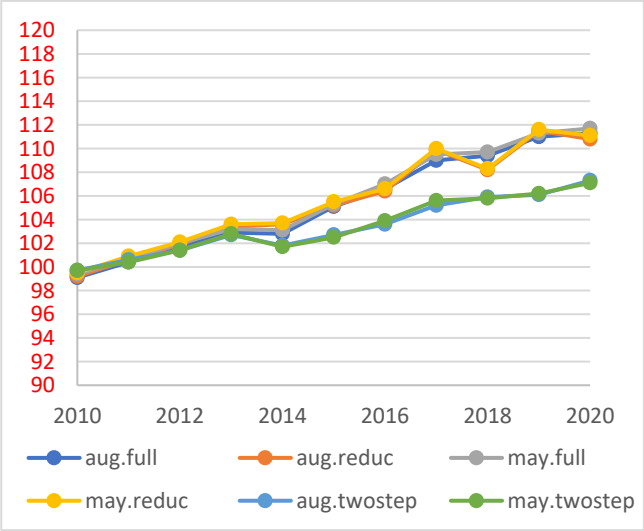

## *bv17*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.987 | 0.989 | 0.999 |
| 2011 | 75 | 0.980 | 0.983 | 0.998 |
| 2012 | 58 | 0.988 | 0.989 | 0.999 |
| 2013 | 67 | 0.875 | 0.872 | 0.998 |
| 2014 | 64 | 0.853 | 0.842 | 0.996 |
| 2015 | 52 | 0.796 | 0.778 | 0.997 |
| 2016 | 32 | 0.716 | 0.707 | 0.981 |
| 2017 | 38 | 0.796 | 0.842 | 0.959 |
| 2018 | 24 | 0.868 | 0.868 | 0.992 |
| 2019 | 51 | 0.835 | 0.853 | 0.981 |
| 2020 | 14 | 0.848 | 0.901 | 0.985 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 99.1 | 99.2 | 99.4 | 99.5 | 99.7 | 99.7 |
| 2011 | 75 | 100.4 | 100.6 | 100.7 | 100.9 | 100.6 | 100.4 |
| 2012 | 58 | 101.7 | 101.9 | 102.0 | 102.1 | 101.4 | 101.4 |
| 2013 | 67 | 102.9 | 103.4 | 103.2 | 103.6 | 102.7 | 102.8 |
| 2014 | 64 | 102.8 | 103.6 | 103.1 | 103.7 | 101.8 | 101.7 |
| 2015 | 52 | 105.1 | 105.2 | 105.3 | 105.5 | 102.7 | 102.5 |
| 2016 | 32 | 106.6 | 106.4 | 107.0 | 106.6 | 103.6 | 103.9 |
| 2017 | 38 | 109.0 | 109.9 | 109.5 | 110.0 | 105.2 | 105.6 |
| 2018 | 24 | 109.4 | 108.2 | 109.7 | 108.3 | 105.9 | 105.8 |
| 2019 | 51 | 111.0 | 111.5 | 111.3 | 111.6 | 106.1 | 106.2 |
| 2020 | 14 | 111.3 | 110.8 | 111.7 | 111.1 | 107.3 | 107.1 |



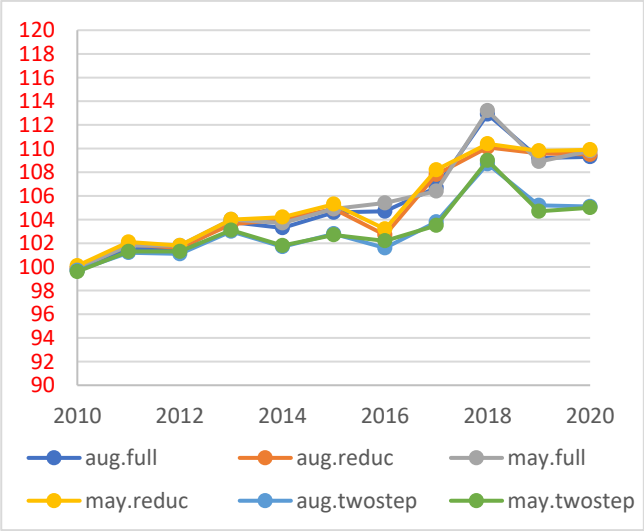

## *bv18*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.987 | 0.988 | 0.999 |
| 2011 | 75 | 0.982 | 0.984 | 0.998 |
| 2012 | 58 | 0.989 | 0.990 | 0.999 |
| 2013 | 67 | 0.868 | 0.877 | 0.998 |
| 2014 | 64 | 0.859 | 0.861 | 0.998 |
| 2015 | 52 | 0.904 | 0.896 | 0.998 |
| 2016 | 32 | 0.858 | 0.874 | 0.990 |
| 2017 | 38 | 0.837 | 0.916 | 0.935 |
| 2018 | 24 | 0.884 | 0.885 | 0.993 |
| 2019 | 51 | 0.883 | 0.931 | 0.969 |
| 2020 | 14 | 0.807 | 0.807 | 0.998 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 99.7 | 99.9 | 99.9 | 100.1 | 99.7 | 99.6 |
| 2011 | 75 | 101.6 | 101.9 | 101.8 | 102.1 | 101.2 | 101.3 |
| 2012 | 58 | 101.5 | 101.6 | 101.8 | 101.8 | 101.1 | 101.3 |
| 2013 | 67 | 103.8 | 103.6 | 104.0 | 104.0 | 103.0 | 103.1 |
| 2014 | 64 | 103.3 | 104.0 | 103.7 | 104.2 | 101.7 | 101.8 |
| 2015 | 52 | 104.6 | 104.9 | 104.9 | 105.3 | 102.8 | 102.7 |
| 2016 | 32 | 104.7 | 102.7 | 105.4 | 103.2 | 101.6 | 102.2 |
| 2017 | 38 | 106.7 | 107.8 | 106.4 | 108.2 | 103.8 | 103.5 |
| 2018 | 24 | 112.9 | 110.1 | 113.2 | 110.4 | 108.7 | 109.0 |
| 2019 | 51 | 109.2 | 109.6 | 108.9 | 109.8 | 105.2 | 104.7 |
| 2020 | 14 | 109.3 | 109.5 | 109.8 | 109.9 | 105.1 | 105.0 |



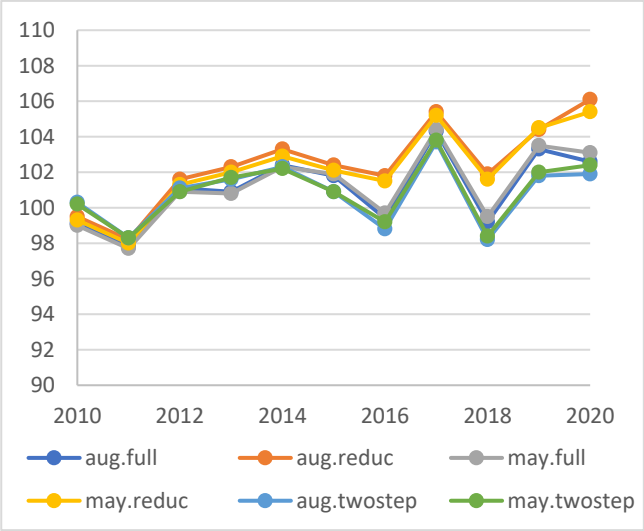

## *bv19*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.992 | 0.993 | 0.999 |
| 2011 | 75 | 0.990 | 0.992 | 0.999 |
| 2012 | 58 | 0.982 | 0.981 | 0.998 |
| 2013 | 67 | 0.904 | 0.908 | 0.999 |
| 2014 | 64 | 0.931 | 0.931 | 0.998 |
| 2015 | 52 | 0.886 | 0.878 | 0.997 |
| 2016 | 32 | 0.805 | 0.821 | 0.975 |
| 2017 | 38 | 0.839 | 0.903 | 0.920 |
| 2018 | 24 | 0.841 | 0.831 | 0.990 |
| 2019 | 51 | 0.896 | 0.945 | 0.971 |
| 2020 | 14 | 0.827 | 0.865 | 0.997 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 99.1 | 99.5 | 99.0 | 99.3 | 100.3 | 100.2 |
| 2011 | 75 | 97.8 | 98.2 | 97.7 | 98.0 | 98.3 | 98.3 |
| 2012 | 58 | 101.1 | 101.6 | 100.9 | 101.3 | 101.1 | 100.9 |
| 2013 | 67 | 100.9 | 102.3 | 100.8 | 102.0 | 101.6 | 101.7 |
| 2014 | 64 | 102.4 | 103.3 | 102.3 | 102.9 | 102.3 | 102.2 |
| 2015 | 52 | 101.8 | 102.4 | 101.9 | 102.1 | 100.9 | 100.9 |
| 2016 | 32 | 99.4 | 101.8 | 99.7 | 101.5 | 98.8 | 99.2 |
| 2017 | 38 | 104.3 | 105.4 | 104.4 | 105.2 | 103.7 | 103.8 |
| 2018 | 24 | 99.2 | 101.9 | 99.5 | 101.6 | 98.2 | 98.4 |
| 2019 | 51 | 103.3 | 104.4 | 103.5 | 104.5 | 101.8 | 102.0 |
| 2020 | 14 | 102.6 | 106.1 | 103.1 | 105.4 | 101.9 | 102.4 |



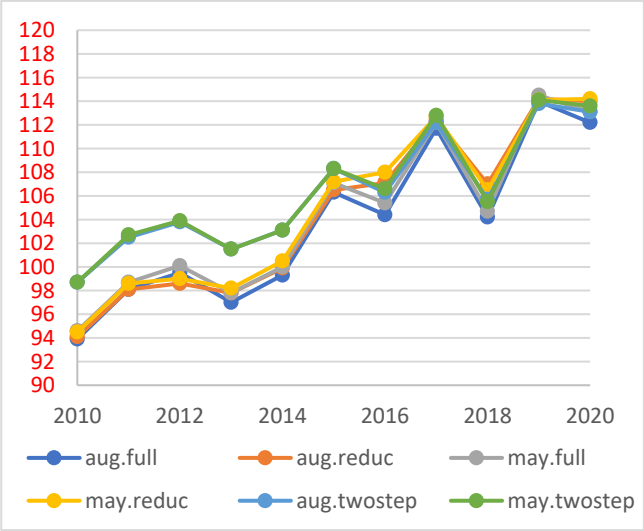

## *bv20*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.994 | 0.996 | 0.999 |
| 2011 | 75 | 0.991 | 0.992 | 0.999 |
| 2012 | 58 | 0.992 | 0.992 | 0.999 |
| 2013 | 67 | 0.888 | 0.874 | 0.998 |
| 2014 | 64 | 0.869 | 0.864 | 0.997 |
| 2015 | 52 | 0.917 | 0.916 | 0.999 |
| 2016 | 32 | 0.865 | 0.870 | 0.989 |
| 2017 | 38 | 0.885 | 0.931 | 0.972 |
| 2018 | 24 | 0.919 | 0.950 | 0.996 |
| 2019 | 51 | 0.921 | 0.942 | 0.987 |
| 2020 | 14 | 0.880 | 0.930 | 0.992 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 93.9 | 94.1 | 94.6 | 94.5 | 98.7 | 98.7 |
| 2011 | 75 | 98.1 | 98.1 | 98.7 | 98.6 | 102.5 | 102.7 |
| 2012 | 58 | 99.5 | 98.6 | 100.1 | 99.0 | 103.8 | 103.9 |
| 2013 | 67 | 97.0 | 97.8 | 97.8 | 98.2 | 101.5 | 101.5 |
| 2014 | 64 | 99.3 | 99.9 | 100.0 | 100.5 | 103.1 | 103.1 |
| 2015 | 52 | 106.3 | 106.5 | 107.1 | 107.2 | 108.3 | 108.3 |
| 2016 | 32 | 104.4 | 107.1 | 105.4 | 108.0 | 106.3 | 106.6 |
| 2017 | 38 | 111.7 | 112.4 | 112.2 | 112.7 | 112.2 | 112.8 |
| 2018 | 24 | 104.2 | 107.0 | 104.7 | 106.5 | 105.7 | 105.5 |
| 2019 | 51 | 114.0 | 114.2 | 114.5 | 114.1 | 113.8 | 114.1 |
| 2020 | 14 | 112.2 | 114.0 | 113.1 | 114.2 | 113.1 | 113.6 |



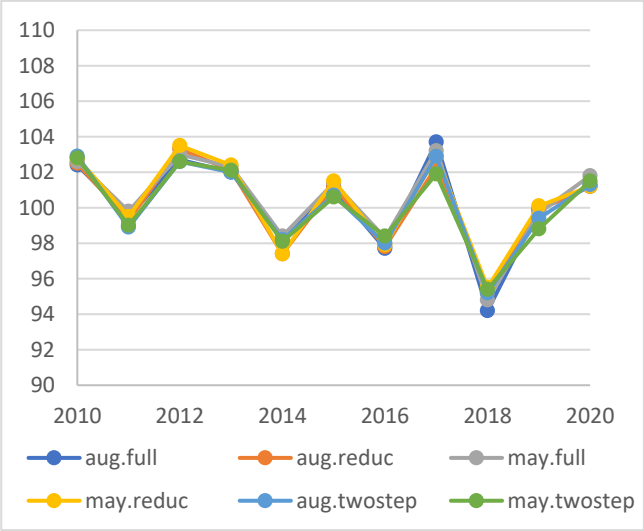

## *bv21*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.995 | 0.996 | 0.999 |
| 2011 | 75 | 0.992 | 0.993 | 0.999 |
| 2012 | 58 | 0.991 | 0.992 | 0.999 |
| 2013 | 67 | 0.935 | 0.926 | 0.999 |
| 2014 | 64 | 0.921 | 0.914 | 0.999 |
| 2015 | 52 | 0.893 | 0.900 | 0.998 |
| 2016 | 32 | 0.770 | 0.786 | 0.979 |
| 2017 | 38 | 0.893 | 0.937 | 0.951 |
| 2018 | 24 | 0.937 | 0.960 | 0.994 |
| 2019 | 51 | 0.896 | 0.953 | 0.959 |
| 2020 | 14 | 0.906 | 0.902 | 0.993 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 102.4 | 102.5 | 102.6 | 102.8 | 102.9 | 102.8 |
| 2011 | 75 | 99.5 | 99.3 | 99.8 | 99.5 | 98.9 | 99.0 |
| 2012 | 58 | 102.7 | 103.3 | 103.0 | 103.5 | 102.6 | 102.6 |
| 2013 | 67 | 102.0 | 102.1 | 102.3 | 102.4 | 102.0 | 102.1 |
| 2014 | 64 | 98.2 | 97.4 | 98.4 | 97.4 | 98.2 | 98.1 |
| 2015 | 52 | 101.1 | 101.2 | 101.4 | 101.5 | 100.7 | 100.6 |
| 2016 | 32 | 97.7 | 97.8 | 98.3 | 97.9 | 98.0 | 98.4 |
| 2017 | 38 | 103.7 | 102.3 | 103.2 | 102.9 | 102.9 | 101.9 |
| 2018 | 24 | 94.2 | 95.2 | 94.8 | 95.5 | 95.2 | 95.4 |
| 2019 | 51 | 99.9 | 99.9 | 99.7 | 100.1 | 99.4 | 98.8 |
| 2020 | 14 | 101.2 | 101.2 | 101.8 | 101.2 | 101.3 | 101.5 |



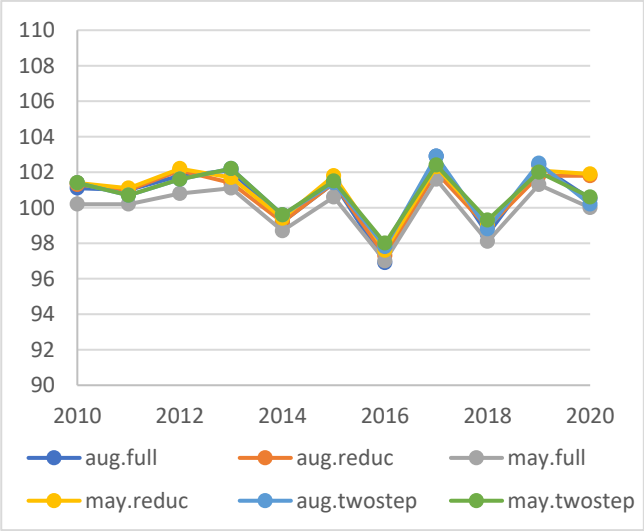

## *bv22*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.996 | 0.993 | 0.996 |
| 2011 | 75 | 0.992 | 0.988 | 0.996 |
| 2012 | 58 | 0.986 | 0.982 | 0.996 |
| 2013 | 67 | 0.949 | 0.929 | 0.995 |
| 2014 | 64 | 0.932 | 0.917 | 0.996 |
| 2015 | 52 | 0.833 | 0.826 | 0.992 |
| 2016 | 32 | 0.814 | 0.806 | 0.979 |
| 2017 | 38 | 0.826 | 0.900 | 0.927 |
| 2018 | 24 | 0.940 | 0.938 | 0.984 |
| 2019 | 51 | 0.852 | 0.907 | 0.938 |
| 2020 | 14 | 0.857 | 0.810 | 0.976 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 101.1 | 101.3 | 100.2 | 101.4 | 101.4 | 101.4 |
| 2011 | 75 | 101.0 | 101.0 | 100.2 | 101.1 | 100.7 | 100.7 |
| 2012 | 58 | 101.8 | 102.1 | 100.8 | 102.2 | 101.6 | 101.6 |
| 2013 | 67 | 102.1 | 101.4 | 101.1 | 101.7 | 102.2 | 102.2 |
| 2014 | 64 | 99.2 | 99.2 | 98.7 | 99.4 | 99.6 | 99.6 |
| 2015 | 52 | 101.4 | 101.4 | 100.6 | 101.8 | 101.4 | 101.5 |
| 2016 | 32 | 96.9 | 97.3 | 97.0 | 97.6 | 97.8 | 98.0 |
| 2017 | 38 | 102.9 | 102.0 | 101.6 | 102.3 | 102.9 | 102.4 |
| 2018 | 24 | 98.5 | 98.9 | 98.1 | 99.1 | 98.8 | 99.3 |
| 2019 | 51 | 102.4 | 101.8 | 101.3 | 102.1 | 102.5 | 102.0 |
| 2020 | 14 | 100.5 | 101.8 | 100.0 | 101.9 | 100.2 | 100.6 |



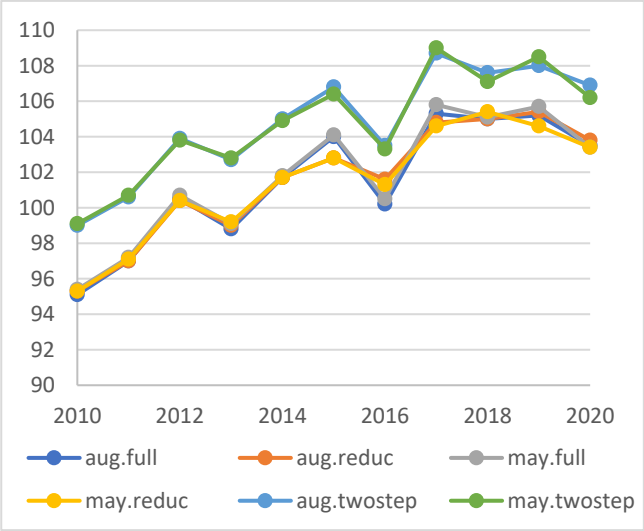

## *bv23*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.992 | 0.994 | 0.999 |
| 2011 | 75 | 0.982 | 0.985 | 0.999 |
| 2012 | 58 | 0.990 | 0.994 | 0.999 |
| 2013 | 67 | 0.868 | 0.886 | 0.998 |
| 2014 | 64 | 0.914 | 0.903 | 0.998 |
| 2015 | 52 | 0.864 | 0.844 | 0.998 |
| 2016 | 32 | 0.691 | 0.706 | 0.988 |
| 2017 | 38 | 0.946 | 0.935 | 0.971 |
| 2018 | 24 | 0.891 | 0.888 | 0.995 |
| 2019 | 51 | 0.902 | 0.892 | 0.986 |
| 2020 | 14 | 0.918 | 0.955 | 0.999 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 95.1 | 95.3 | 95.4 | 95.3 | 99.0 | 99.1 |
| 2011 | 75 | 97.0 | 97.0 | 97.2 | 97.1 | 100.6 | 100.7 |
| 2012 | 58 | 100.5 | 100.4 | 100.7 | 100.4 | 103.9 | 103.8 |
| 2013 | 67 | 98.8 | 99.0 | 99.1 | 99.2 | 102.7 | 102.8 |
| 2014 | 64 | 101.7 | 101.7 | 101.8 | 101.7 | 105.0 | 104.9 |
| 2015 | 52 | 104.0 | 102.8 | 104.1 | 102.8 | 106.8 | 106.4 |
| 2016 | 32 | 100.2 | 101.6 | 100.5 | 101.3 | 103.5 | 103.3 |
| 2017 | 38 | 105.3 | 104.8 | 105.8 | 104.6 | 108.7 | 109.0 |
| 2018 | 24 | 105.0 | 105.0 | 105.1 | 105.4 | 107.6 | 107.1 |
| 2019 | 51 | 105.2 | 105.4 | 105.7 | 104.6 | 108.0 | 108.5 |
| 2020 | 14 | 103.5 | 103.8 | 103.4 | 103.4 | 106.9 | 106.2 |



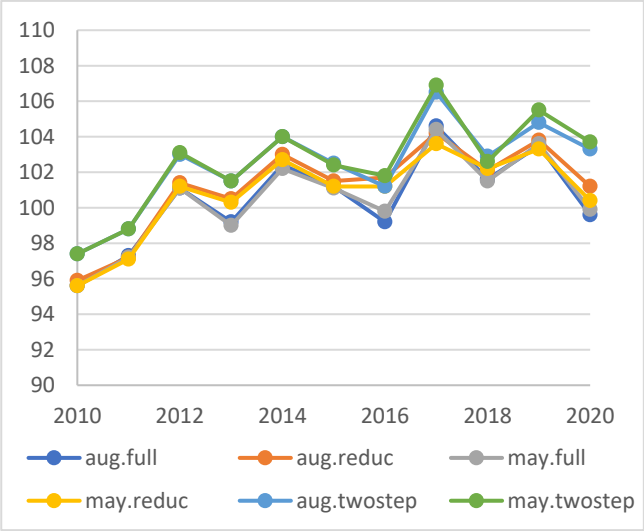

## *bv24*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.987 | 0.992 | 0.999 |
| 2011 | 75 | 0.987 | 0.991 | 0.999 |
| 2012 | 58 | 0.993 | 0.995 | 0.999 |
| 2013 | 67 | 0.877 | 0.896 | 0.999 |
| 2014 | 64 | 0.906 | 0.909 | 0.998 |
| 2015 | 52 | 0.850 | 0.838 | 0.998 |
| 2016 | 32 | 0.755 | 0.773 | 0.983 |
| 2017 | 38 | 0.935 | 0.912 | 0.958 |
| 2018 | 24 | 0.877 | 0.872 | 0.994 |
| 2019 | 51 | 0.923 | 0.931 | 0.982 |
| 2020 | 14 | 0.936 | 0.945 | 0.998 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 95.6 | 95.9 | 95.6 | 95.6 | 97.4 | 97.4 |
| 2011 | 75 | 97.3 | 97.2 | 97.2 | 97.1 | 98.8 | 98.8 |
| 2012 | 58 | 101.1 | 101.4 | 101.1 | 101.2 | 103.0 | 103.1 |
| 2013 | 67 | 99.2 | 100.5 | 99.0 | 100.3 | 101.5 | 101.5 |
| 2014 | 64 | 102.4 | 103.0 | 102.2 | 102.7 | 104.0 | 104.0 |
| 2015 | 52 | 101.2 | 101.5 | 101.1 | 101.2 | 102.5 | 102.4 |
| 2016 | 32 | 99.2 | 101.7 | 99.8 | 101.2 | 101.2 | 101.8 |
| 2017 | 38 | 104.6 | 104.2 | 104.4 | 103.6 | 106.5 | 106.9 |
| 2018 | 24 | 101.6 | 102.1 | 101.5 | 102.2 | 102.9 | 102.6 |
| 2019 | 51 | 103.5 | 103.8 | 103.6 | 103.3 | 104.8 | 105.5 |
| 2020 | 14 | 99.6 | 101.2 | 99.9 | 100.4 | 103.3 | 103.7 |



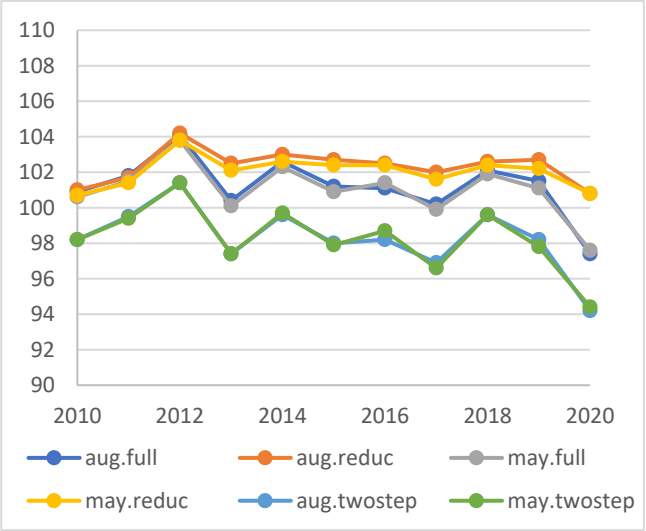

## *bv25*

Correlations

| Birth year | Number of bulls | aug.full_aug.reduc | may.full_may.reduc | aug.full_may.full |
|---|---|---|---|---|
| 2010 | 73 | 0.985 | 0.985 | 0.999 |
| 2011 | 75 | 0.989 | 0.988 | 0.999 |
| 2012 | 58 | 0.992 | 0.993 | 0.999 |
| 2013 | 67 | 0.788 | 0.789 | 0.998 |
| 2014 | 64 | 0.919 | 0.919 | 0.998 |
| 2015 | 52 | 0.878 | 0.880 | 0.998 |
| 2016 | 32 | 0.606 | 0.569 | 0.984 |
| 2017 | 38 | 0.869 | 0.901 | 0.972 |
| 2018 | 24 | 0.861 | 0.829 | 0.991 |
| 2019 | 51 | 0.927 | 0.938 | 0.985 |
| 2020 | 14 | 0.935 | 0.965 | 0.996 |

Mean GEBV

| Birth year | No of bulls | aug.full | aug.reduc | may.full | may.reduc | aug.twostep | may.twostep |
|---|---|---|---|---|---|---|---|
| 2010 | 73 | 100.9 | 101.0 | 100.6 | 100.7 | 98.2 | 98.2 |
| 2011 | 75 | 101.8 | 101.7 | 101.5 | 101.4 | 99.5 | 99.4 |
| 2012 | 58 | 104.1 | 104.2 | 103.8 | 103.8 | 101.4 | 101.4 |
| 2013 | 67 | 100.4 | 102.5 | 100.1 | 102.1 | 97.4 | 97.4 |
| 2014 | 64 | 102.6 | 103.0 | 102.3 | 102.6 | 99.6 | 99.7 |
| 2015 | 52 | 101.2 | 102.7 | 100.9 | 102.4 | 98.0 | 97.9 |
| 2016 | 32 | 101.1 | 102.5 | 101.4 | 102.4 | 98.2 | 98.7 |
| 2017 | 38 | 100.2 | 102.0 | 99.9 | 101.6 | 96.9 | 96.6 |
| 2018 | 24 | 102.1 | 102.6 | 101.9 | 102.4 | 99.6 | 99.6 |
| 2019 | 51 | 101.5 | 102.7 | 101.1 | 102.2 | 98.2 | 97.8 |
| 2020 | 14 | 97.4 | 100.8 | 97.6 | 100.8 | 94.2 | 94.4 |


110
108
106
104
102
100
98
96
94
92
90
2010
2012
2014
2016
2018
2020
aug.full
aug.reduc
may.full
may.reduc
aug.twostep
may.twostep