

Модели ARIMA, использованные для прогнозирования значений главных компонент (натуральных логарифмов) числа родившихся от женщин 7 возрастных групп – все население

Исходные данные:

Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
23 1998	189012	515114	324910	164201	72619	14234	602
24 1999	167765	488888	317817	154625	68187	14167	672
25 2000	162997	505997	343148	167240	69327	15251	719
26 2001	165600	510846	363803	181209	71576	15674	723
27 2002	169919	535066	393863	202149	76774	16457	739
28 2003	170308	546779	415211	217696	79474	17093	774
29 2004	171940	557843	434067	232411	85038	18073	837
30 2005	162053	529001	426627	234060	84994	17558	979
31 2006	160424	531018	434309	244383	89420	17253	929
32 2007	151837	549262	487804	287605	110780	20099	1049
33 2008	145459	561633	530160	322789	128645	22707	1224
34 2009	131442	552829	563014	346388	140558	25025	1334

```
> Btotf = pcafcast(Btot, 2012 )
```

```
===== 1 =====
```

```
Series: pc$scores[, j]
ARIMA(0,1,0) with drift
```

Coefficients:

```
drift
-0.1396
s.e. 0.0301
```

```
sigma^2 estimated as 0.009992: log likelihood=9.72
```

```
AIC=-15.45 AICc=-13.95 BIC=-14.65
```

```
===== 2 =====
```

```
Series: pc$scores[, j]
ARIMA(0,0,0) with zero mean
```

```
sigma^2 estimated as 0.004439: log likelihood=15.48
```

```
AIC=-28.95 AICc=-28.55 BIC=-28.47
```

```
===== 3 =====
```

```
Series: pc$scores[, j]
ARIMA(0,0,1) with zero mean
```

Coefficients:

```
ma1
0.6146
s.e. 0.2200
```

```
sigma^2 estimated as 0.002019: log likelihood=19.97
```

```
AIC=-35.94 AICc=-34.6 BIC=-34.97
```

```
===== 4 =====
```

```
Series: pc$scores[, j]
ARIMA(2,0,0) with zero mean
```

Coefficients:
 ar1 ar2
 0.9428 -0.5850
 s.e. 0.2767 0.2492

sigma^2 estimated as 0.0005159: log likelihood=27.75
 AIC=-49.51 AICc=-46.51 BIC=-48.05
 ===== 5 =====
 Series: pc\$scores[, j]
 ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.0002804: log likelihood=32.05
 AIC=-62.1 AICc=-61.7 BIC=-61.61
 ===== 6 =====
 Series: pc\$scores[, j]
 ARIMA(0,0,0) with zero mean

sigma^2 estimated as 1.88e-05: log likelihood=48.26
 AIC=-94.52 AICc=-94.12 BIC=-94.04
 ===== 7 =====
 Series: pc\$scores[, j]
 ARIMA(1,0,0) with zero mean

Coefficients:
 ar1
 -0.5734
 s.e. 0.2387

sigma^2 estimated as 9.815e-07: log likelihood=65.78
 AIC=-127.56 AICc=-126.22 BIC=-126.59

Модели ARIMA, использованные для прогнозирования значений главных компонент (натуральных логарифмов) числа родившихся от женщин 7 возрастных групп – городское население

Исходные данные:

Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
23 1998	120190	360521	231350	114598	49204	9200	354
24 1999	105339	342101	228500	108749	46375	8989	425
25 2000	101799	354952	250243	119587	47953	10072	449
26 2001	104393	361135	268198	131929	50126	10510	448
27 2002	108209	379423	293077	149652	54418	11089	463
28 2003	108293	386246	311620	163310	57055	11782	510
29 2004	107114	389798	325418	175507	61502	12340	559
30 2005	99048	364109	319065	177771	62211	12165	649
31 2006	96086	358582	323074	186161	66283	12018	625
32 2007	89142	362273	356865	215116	81150	13990	718
33 2008	84198	368364	388472	241292	94614	15870	858
34 2009	74219	359789	415922	262559	105162	18029	977

> Bgorf = pcafcast(Bgor, 2012)
 ===== 1 =====
 Series: pc\$scores[, j]

ARIMA(0,1,0) with drift

Coefficients:

drift

0.165

s.e. 0.028

sigma^2 estimated as 0.008602: log likelihood=10.55

AIC=-17.1 AICc=-15.6 BIC=-16.3

===== 2 =====

Series: pc\$scores[, j]

ARIMA(0,0,1) with zero mean

Coefficients:

ma1

0.5258

s.e. 0.2082

sigma^2 estimated as 0.005327: log likelihood=14.22

AIC=-24.44 AICc=-23.11 BIC=-23.47

===== 3 =====

Series: pc\$scores[, j]

ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.002904: log likelihood=18.02

AIC=-34.05 AICc=-33.65 BIC=-33.56

===== 4 =====

Series: pc\$scores[, j]

ARIMA(1,0,0) with zero mean

Coefficients:

ar1

0.5297

s.e. 0.2574

sigma^2 estimated as 0.000905: log likelihood=24.85

AIC=-45.71 AICc=-44.37 BIC=-44.74

===== 5 =====

Series: pc\$scores[, j]

ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.0003438: log likelihood=30.83

AIC=-59.65 AICc=-59.25 BIC=-59.17

===== 6 =====

Series: pc\$scores[, j]

ARIMA(0,0,0) with zero mean

sigma^2 estimated as 3.995e-05: log likelihood=43.74

AIC=-85.48 AICc=-85.08 BIC=-84.99

===== 7 =====

Series: pc\$scores[, j]

ARIMA(1,0,0) with zero mean

Coefficients:

ar1
-0.5923
s.e. 0.2104

sigma^2 estimated as 1.758e-06: log likelihood=62.26
AIC=-120.53 AICc=-119.19 BIC=-119.56

Модели ARIMA, использованные для прогнозирования значений главных компонент (натуральных логарифмов) числа родившихся от женщин 7 возрастных групп – сельское население

Исходные данные:

Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
23 1998	68822	154593	93560	49603	23415	5034	248
24 1999	62426	146787	89316	45876	21812	5178	247
25 2000	61198	151045	92905	47653	21374	5179	270
26 2001	61207	149711	95605	49280	21450	5164	275
27 2002	61710	155643	100786	52497	22356	5368	276
28 2003	62015	160533	103591	54386	22419	5311	264
29 2004	64826	168045	108649	56904	23536	5733	278
30 2005	63005	164892	107562	56289	22783	5393	330
31 2006	64338	172436	111235	58222	23137	5235	304
32 2007	62695	186989	130939	72489	29630	6109	331
33 2008	61261	193269	141688	81497	34031	6837	366
34 2009	57223	193040	147092	83829	35396	6996	357

> Bself = pcafcast(Bsel, 2012)

==== 1 =====

Series: pc\$scores[, j]

ARIMA(0,1,0) with drift

Coefficients:

drift

-0.0887

s.e. 0.0387

sigma^2 estimated as 0.01651: log likelihood=6.96

AIC=-9.93 AICc=-8.43 BIC=-9.13

==== 2 =====

Series: pc\$scores[, j]

ARIMA(0,0,1) with zero mean

Coefficients:

ma1

0.7221

s.e. 0.2404

sigma^2 estimated as 0.00267: log likelihood=18.16

AIC=-32.32 AICc=-30.98 BIC=-31.35

==== 3 =====

Series: pc\$scores[, j]

ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.002018: log likelihood=20.21
 AIC=-38.41 AICc=-38.01 BIC=-37.93
 ===== 4 =====
 Series: pc\$scores[, j]
 ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.0009469: log likelihood=24.75
 AIC=-47.49 AICc=-47.09 BIC=-47.01
 ===== 5 =====
 Series: pc\$scores[, j]
 ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.0003413: log likelihood=30.87
 AIC=-59.74 AICc=-59.34 BIC=-59.25
 ===== 6 =====
 Series: pc\$scores[, j]
 ARIMA(0,0,0) with zero mean

sigma^2 estimated as 5.981e-05: log likelihood=41.32
 AIC=-80.64 AICc=-80.24 BIC=-80.15
 ===== 7 =====
 Series: pc\$scores[, j]
 ARIMA(2,0,0) with zero mean

Coefficients:
 ar1 ar2
 -0.7729 -0.5848
 s.e. 0.2305 0.2411

sigma^2 estimated as 3.265e-06: log likelihood=58.21
 AIC=-110.43 AICc=-107.43 BIC=-108.97

Модели ARIMA, использованные для прогнозирования значений главных компонент (натуральных логарифмов) средних возрастных коэффициентов рождаемости от женщин 7 возрастных групп – все население

Исходные данные:

Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
23 1998	33.13500	97.06458	65.86117	32.67996	11.35515	2.251262	0.1051782
24 1999	28.53785	90.82036	62.99496	31.83392	11.00115	2.213693	0.1148293
25 2000	27.13254	92.70304	66.67767	34.84790	11.73736	2.363978	0.1209155
26 2001	26.96616	92.20926	69.52019	37.62783	12.80932	2.411763	0.1196705
27 2002	27.14128	94.71680	74.37459	41.33366	14.51882	2.543583	0.1208485
28 2003	27.28191	94.05282	77.53269	43.65001	15.81490	2.689553	0.1246575
29 2004	28.16793	93.21237	80.07013	45.81031	17.53550	2.939243	0.1333314
30 2005	27.41395	86.71925	77.74836	45.42009	17.76371	3.003014	0.1547376
31 2006	28.54021	85.67209	78.11544	46.77631	18.65684	3.124707	0.1457397
32 2007	29.09397	87.40846	86.18795	54.42450	22.78364	3.846080	0.1651809
33 2008	30.51274	89.74738	90.97676	60.31523	25.91975	4.566592	0.1959095
34 2009	30.24710	90.22327	93.66071	63.79586	27.77677	5.204902	0.2202881

> brtotf = pcafcst(brtot, 2012)

===== 1 =====

Series: pc\$scores[, j]
ARIMA(0,1,0) with drift

Coefficients:
drift
-0.1468
s.e. 0.0306

sigma^2 estimated as 0.01031: log likelihood=9.55
AIC=-15.11 AICc=-13.61 BIC=-14.31

===== 2 =====

Series: pc\$scores[, j]
ARIMA(2,0,0) with zero mean

Coefficients:
ar1 ar2
1.3569 -0.7241
s.e. 0.1955 0.1901

sigma^2 estimated as 0.001076: log likelihood=22.75
AIC=-39.51 AICc=-36.51 BIC=-38.05

===== 3 =====

Series: pc\$scores[, j]
ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.003469: log likelihood=16.96
AIC=-31.91 AICc=-31.51 BIC=-31.43

===== 4 =====

Series: pc\$scores[, j]
ARIMA(0,0,1) with zero mean

Coefficients:
ma1
0.6617
s.e. 0.2774

sigma^2 estimated as 0.0006503: log likelihood=26.71
AIC=-49.43 AICc=-48.09 BIC=-48.46

===== 5 =====

Series: pc\$scores[, j]
ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.0001808: log likelihood=34.68
AIC=-67.36 AICc=-66.96 BIC=-66.87

===== 6 =====

Series: pc\$scores[, j]
ARIMA(0,0,0) with zero mean

sigma^2 estimated as 3.189e-05: log likelihood=45.09
AIC=-88.19 AICc=-87.79 BIC=-87.7

===== 7 =====

Series: pc\$scores[, j]
ARIMA(1,0,0) with zero mean

Coefficients:

ar1
-0.5569
s.e. 0.2216

sigma^2 estimated as 4.278e-06: log likelihood=56.96
AIC=-109.92 AICc=-108.58 BIC=-108.95

Модели ARIMA, использованные для прогнозирования значений главных компонент (натуральных логарифмов) средних возрастных коэффициентов рождаемости от женщин 7 возрастных групп – городское население

Исходные данные:

Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
23 1998	27.93774	88.04616	61.25908	30.56938	10.189934	1.893752	0.07876711
24 1999	23.63701	82.37649	58.94354	30.01939	9.947566	1.839865	0.09304528
25 2000	22.21201	84.24223	63.22033	33.31105	10.835279	2.057693	0.09734653
26 2001	22.19218	84.16481	66.53272	36.37248	12.004063	2.140132	0.09613089
27 2002	22.64808	86.36105	71.69499	40.33519	13.800124	2.274115	0.09869688
28 2003	23.06358	85.08884	75.19550	42.87356	15.236174	2.464797	0.10758976
29 2004	23.94146	83.24263	77.60531	45.18786	17.041314	2.681351	0.11751952
30 2005	23.49871	76.30081	75.25864	45.05938	17.456960	2.795910	0.13645252
31 2006	24.39356	74.42544	75.04699	46.43255	18.461151	2.933580	0.13094336
32 2007	24.58968	75.10472	81.11098	52.87414	22.116034	3.614438	0.15126918
33 2008	25.57604	77.90210	85.31360	58.38277	25.092834	4.312966	0.18409996
34 2009	24.83025	79.26823	87.99221	62.45567	27.234552	5.063225	0.21687082

```
> brgorf = pcafcast( brgor, 2012 )
```

```
===== 1 =====
```

```
Series: pc$scores[, j]
```

```
ARIMA(0,1,0) with drift
```

Coefficients:

drift
0.1721
s.e. 0.0275

sigma^2 estimated as 0.008328: log likelihood=10.73

AIC=-17.45 AICc=-15.95 BIC=-16.66

```
===== 2 =====
```

```
Series: pc$scores[, j]
```

```
ARIMA(0,0,1) with zero mean
```

Coefficients:

ma1
0.6065
s.e. 0.1829

sigma^2 estimated as 0.003783: log likelihood=16.21

AIC=-28.41 AICc=-27.08 BIC=-27.44

```
===== 3 =====
```

Series: pc\$scores[, j]
ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.004319: log likelihood=15.64
AIC=-29.28 AICc=-28.88 BIC=-28.8

===== 4 =====

Series: pc\$scores[, j]
ARIMA(0,0,1) with zero mean

Coefficients:

ma1
0.6486
s.e. 0.2600

sigma^2 estimated as 0.001307: log likelihood=22.54
AIC=-41.08 AICc=-39.74 BIC=-40.11

===== 5 =====

Series: pc\$scores[, j]
ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.000354: log likelihood=30.65
AIC=-59.3 AICc=-58.9 BIC=-58.82

===== 6 =====

Series: pc\$scores[, j]
ARIMA(0,0,0) with zero mean

sigma^2 estimated as 1.92e-05: log likelihood=48.14
AIC=-94.27 AICc=-93.87 BIC=-93.79

===== 7 =====

Series: pc\$scores[, j]
ARIMA(0,0,0) with zero mean

sigma^2 estimated as 1.281e-05: log likelihood=50.57
AIC=-99.13 AICc=-98.73 BIC=-98.65

Модели ARIMA, использованные для прогнозирования значений главных компонент (натуральных логарифмов) средних возрастных коэффициентов рождаемости от женщин 7 возрастных групп – сельское население

Исходные данные:

	Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
23	1998	49.08022	127.5268	80.88720	38.88199	14.94676	3.437129	0.2017317
24	1999	43.89533	119.3268	76.43472	37.15811	14.19845	3.420015	0.1922929
25	2000	42.96485	121.3419	78.19612	39.41093	14.43322	3.327096	0.2024124
26	2001	42.59406	119.8393	79.53920	41.45848	15.19065	3.251745	0.1990911
27	2002	41.62017	123.9528	83.44352	44.47189	16.62652	3.367997	0.1938253
28	2003	40.08432	125.9868	85.52959	46.16028	17.50727	3.371590	0.1797405
29	2004	39.76789	129.0695	88.48784	47.84293	18.97325	3.706594	0.1827824
30	2005	37.14277	124.1529	86.20822	46.59817	18.65897	3.605443	0.2101098
31	2006	38.25107	124.9302	88.64198	47.91045	19.24114	3.674260	0.1898431
32	2007	39.34006	128.0499	103.91510	59.61156	24.83700	4.507644	0.2063451
33	2008	41.53036	126.3707	111.21830	66.86832	28.53403	5.288458	0.2305844

34 2009 42.18271 121.5262 114.52169 68.39245 29.52307 5.609392 0.2302156

> brself = pcafcast(brsel, 2012)

===== 1 =====

Series: pc\$scores[, j]
ARIMA(0,1,0) with drift

Coefficients:

drift
-0.0984
s.e. 0.0399

sigma^2 estimated as 0.01754: log likelihood=6.63
AIC=-9.26 AICc=-7.76 BIC=-8.46

===== 2 =====

Series: pc\$scores[, j]
ARIMA(1,0,0) with zero mean

Coefficients:

ar1
0.8322
s.e. 0.1691

sigma^2 estimated as 0.003031: log likelihood=17.18
AIC=-30.35 AICc=-29.02 BIC=-29.38

===== 3 =====

Series: pc\$scores[, j]
ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.001955: log likelihood=20.4
AIC=-38.8 AICc=-38.4 BIC=-38.31

===== 4 =====

Series: pc\$scores[, j]
ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.0007161: log likelihood=26.42
AIC=-50.85 AICc=-50.45 BIC=-50.36

===== 5 =====

Series: pc\$scores[, j]
ARIMA(0,0,0) with zero mean

sigma^2 estimated as 0.0003814: log likelihood=30.2
AIC=-58.4 AICc=-58 BIC=-57.92

===== 6 =====

Series: pc\$scores[, j]
ARIMA(0,0,1) with zero mean

Coefficients:

ma1
-0.7427
s.e. 0.3572

sigma^2 estimated as 3.641e-05: log likelihood=43.9
AIC=-83.79 AICc=-82.46 BIC=-82.82

==== 7 =====

Series: pc\$scores[, j]

ARIMA(0,0,1) with zero mean

Coefficients:

ma1

-0.9069

s.e. 0.5106

sigma^2 estimated as 1.131e-05: log likelihood=50.49

AIC=-96.98 AICc=-95.65 BIC=-96.01