Decline of live births in Europe

25.08.2022, state of data retrieval

Human mortality is an inescapable fact

Content

German version: www.initiative-corona.info/fileadmin/dokumente/Geburtenrueckgang-Europe-DE.pdf
English version: www.initiative-corona.info/fileadmin/dokumente/Geburtenrueckgang-Europe-EN.pdf
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Introduction

For some time there has been a large emphasis of reporting on death figures, dramatic individual images and predictions in the mainstream media. Usually, however, death figures are considered in the overall context of births to give a picture of a country's population growth or decline. But the statistical birth figures are published only very slowly. For instance, the monthly live births in the European Eurostat database are not even complete for the year 2021 yet.

I therefore searched for the latest official figures from the statistical offices of the federal states and was able to gather the birth figures of 18 different countries, mostly up to June 2022. Some statistically very important countries such as the United Kingdom and Italy cannot yet be taken into account due to a lack of current data (UK: 2021, Italy: 2020). It must be assumed that the gathered data is still provisional reports. In some countries it can be shown that the data of the previous months is successively adjusted without any drastic change in the overall picture. Whether individual countries do not update the data of the previous months in current reports, but leave it at the reference to their provisional nature, will be shown in future final data reports. A comparison between the preliminary reports of previous years in Switzerland and the final reports submitted each year in november shows considerable discrepancies. In the recently published monthly reports of the Federal Statistical Office, the data of the previous months always remains at the level of their initial reporting. This practice is different in many countries, so that the reliability of a country's data for the final assessment must always be subjected to critical examination. However, when such clear signals appear as could be shown in my analysis, one cannot wait for the final data.

My analysis puts the monthly birth figures in relation to the average of the last three years. In advance it should be noted that every single examined european country shows a monthly decline in birth rates of up to more than 10% compared to the last three years. It can be shown that this very alarming signal cannot be explained by infections with Covid-19. However, one can establish a clear temporal correlation to Covid vaccinations incidence in the age group of men and women between 18 and 49 years. Therefore, in-depth statistical and medical analyses have to be demanded.

Despite careful review of the data, the selection of suitable visualisations and the statistical evaluation, this compilation does not claim to be able to present the final proof of causality for the influence of vaccination on fertility or a significant change in mind set on the decision to have children. The aim of this work is to review, present and comment on a broad data base. The study results obtained urgently require a new fact-based benefit-risk assessment of vaccines. Nebulous explanations speculate that the decline in births in 2022 is a response to increased births in 2021, a presumed consequence of time spent at home in 2020 due to home office and lockdown measures. The opposite can be proven in the countries with particularly drastic lockdown measures, because in France, Belgium, Portugal and Spain there is a real birth gap at the turn of the year 2020/21 nine months after the lockdown. Also, in contrast to the decline in births in 2022, the increase in births in the previous year 2021 is only found very sporadically, and therefore cannot serve to explain the global phenomenon. But more details can be found in the following detailed analyses.

Notes on methodology

Vaccination frequency – Vaccination rate

Vaccination frequency refers to the percentage of the age group 18-49 years that got their primary vaccination. This is calculated from the number of persons vaccinated in the respective month (total male+female). Divided by the total number of the age group according to Eurostat population data, this results in the monthly **vaccination frequency** for the group of 18-49 year-olds relevant here. The vaccination frequency makes it possible to compare the direct temporal relationship between vaccination events and birth rates on a monthly basis.

In the final evaluation, the **vaccination rate** is the percentage of the age group that was primary vaccinated at the end of August (week 34/2021). It shows the comparison of the vaccination activities of the individual countries and makes it possible to examine a correlation of the countries' birth declines to the respective **vaccination rate**.

Note: Since the vaccination data from ECDC is only available in a weekly breakdown, but the birth figures are provided in a monthly format, the vaccination data was converted to months. Weeks exceeding one month were distributed proportionally to the months concerned.

Standardization of birth rates

When analyzing the birth rates of the individual european countries, some changes were noticeable that are caused by significant changes in the number of women aged 18-49. In addition, differences in the number of days per months resulting differences of 10% between the months counting 28 and 31 days.

Therefore, we decided to convert the monthly births into births per calendar day. Thus, we eliminate the monthly variations. Additionally, we provided compensation in leap years. The birth report recently received from Statistics Austria also uses the same method. Furthermore, we adjusted the data to the changed number of women aged 18-49 by normalizing [VKG2] the daily birth figures to one million women per calendar year. This way, migration and emigration are balanced out, and at the same time birth rates of different countries become comparable.

Spearman's rank correlation coefficient[1]

„The rank correlation coefficient according to Spearman is used to determine the correlation between at least two ordinally scaled variables. [For justification, see Discussion of methods].
Using the rank correlation coefficient, we can make statements about whether two variables are related, and if so, how strong the relationship is and in which direction it exists.
The rank correlation coefficient according to Spearman is also called Spearman's ρ (rho)."

Calculation of ρ (rho): Where: n = number of months, i the running variable from 1 to n, R_{xi} the ranks of the percentage monthly declines in births from the previous year's mean 2019 to 2022

$$R_{xi} = \text{Births}_{2022} - \varnothing\ \text{Births}_{(2019-2021)}$$

R_{yi} the monthly vaccination frequency

$$R_{yi} = \frac{\text{Number of persons vaccinated per month, age group 20-49 years}}{\text{Population, age group 20-49}}$$

For $n = 10$ months from October 2021 (vaccination rate = 0) to June for $i = 1$ to 10 the difference of the ranks R_{xi} of the percentage monthly birth declines and the ranks R_{yi} of the monthly vaccination frequencies is formed. According to the following formula, Spearman's rho is calculated from the squares of the rank differences:

$$\rho\ (\text{rho}) = 1 - \frac{6 \sum_{i=1}^{n} (R_{xi} - R_{yi})^2}{n(n^2 - 1)}$$

[1] Scribbr: Determine and interpret Spearman's rank correlation coefficients. URL: https://www.scribbr.de/statistik/rangkorrelationskoeffizient/, Stand: 20.06.2022

Interpretation of Spearman's ρ (rho) according to Cohen[2]

The interpretation of the calculated rank correlation coefficients is carried out according to Cohen (1988) in the levels:

weak correlation: $0.1 \leq |\rho| < 0.3$ [note the difference between Greek ρ (rho) and English p]
medium correlation: $0.3 \leq |\rho| < 0.5$
strong correlation: $|\rho| > 0.5$

Statistical significance

In the hypothesis test performed, the p-value indicates the probability of drawing the present random sample from a basic population whose true correlation is zero or positive (null hypothesis). If the p-value is small, the null hypothesis is very unlikely and one decides in favour of the alternative hypothesis (true correlation is less than zero). The smaller the p-value, the better confirmed is the decision in favour of the tested alternative hypothesis that increasing vaccination frequencies cause decreasing birth rates.
Interpretation according to Jürgen Bortz:[3]

- With a p-value of ≤ 0.05, Jürgen Bortz, for example, speaks of a significant,
- a value of ≤ 0.01 (2.3 standard deviations) is called very significant and
- a value of ≤ 0.001 (3.1 standard deviations) is a highly significant result.

Discussion of methods

Spearman's rho versus Pearson correlation: With p-values of 4.9E-14, 2.2E-16 and 0.0003, an examination of the normal distribution of the total data (Shapiro-Wilk test) revealed only negligible probabilities for the existence of normal distributions of the vaccination frequency, the vaccination rate and the birth changes,, respectively. This circumstance could not be remedied by log transformation.

For all correlation calculations, Spearman's rho (rank correlation) was therefore used, where normally distributed data do not have to be assumed.

In evaluating the hypothesis tests with the help of the p-values, I apply Jürgen Bortz's suggestions for prospective studies. In April 2018, Prof. Ioannidis criticized the practice of choosing a threshold value of 0.05 to determine significance and suggested reducing it to 0.005.[4]

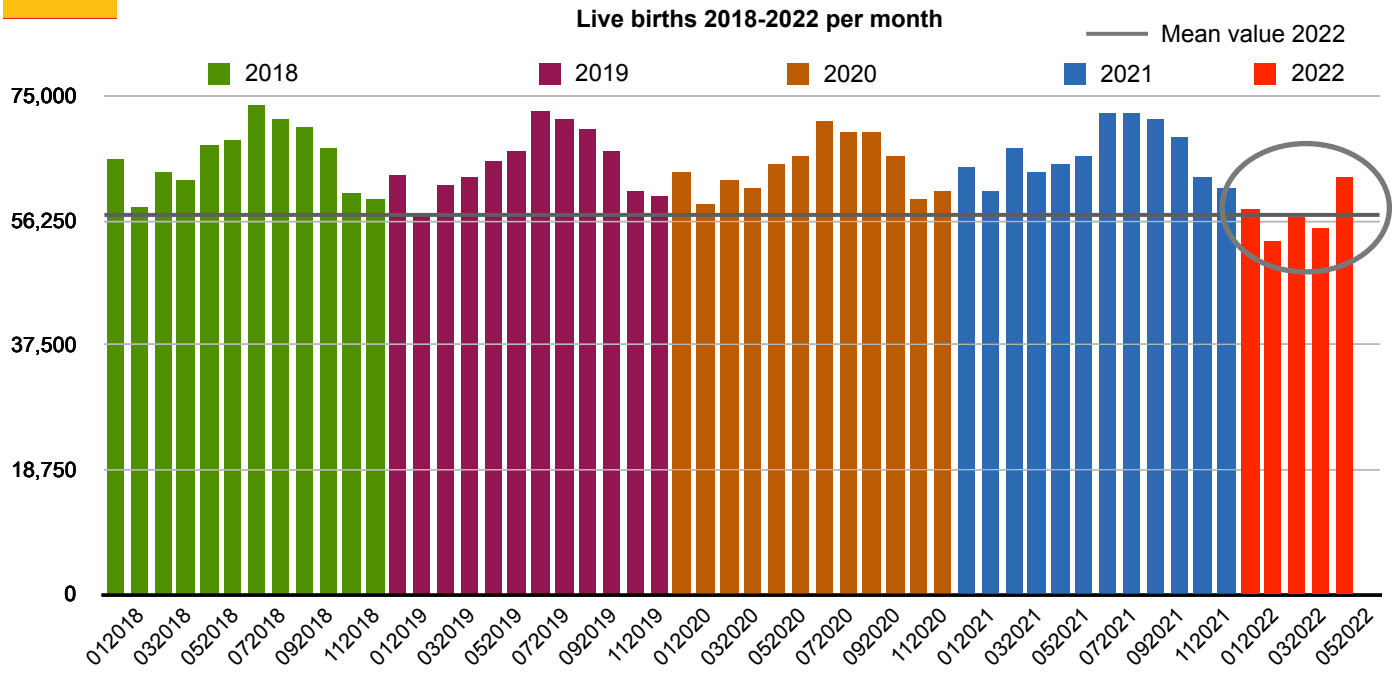
[2] Statistic Guru: Spearman-Correlation, URL: https://statistikguru.de/spss/spearman-korrelation/ergebnisse-interpretieren-2.html

[3] Jürgen Bortz, according to Wikipedia – Statistical significance, URL: https://de.wikipedia.org/wiki/Statistische_Signifikanz

[4] John. P.A. Ioannidis: The Proposal to Lower P Value Thresholds to .005, URL: https://jamanetwork.com/journals/jama/article-abstract/2676503

Analysis of the individual countries

Development of monthly live births in Germany



The course of monthly live births in Germany shows a regular periodic pattern of repetition, with the months of January to April 2022 clearly falling short of the previous year's values, with an approximation to the previous year's level in May (-2.3%). The mean value of the five provisional monthly data reported so far is clearly below the previous year's level of all individual months throughout, so that the decline in births is to be regarded as a strong signal.

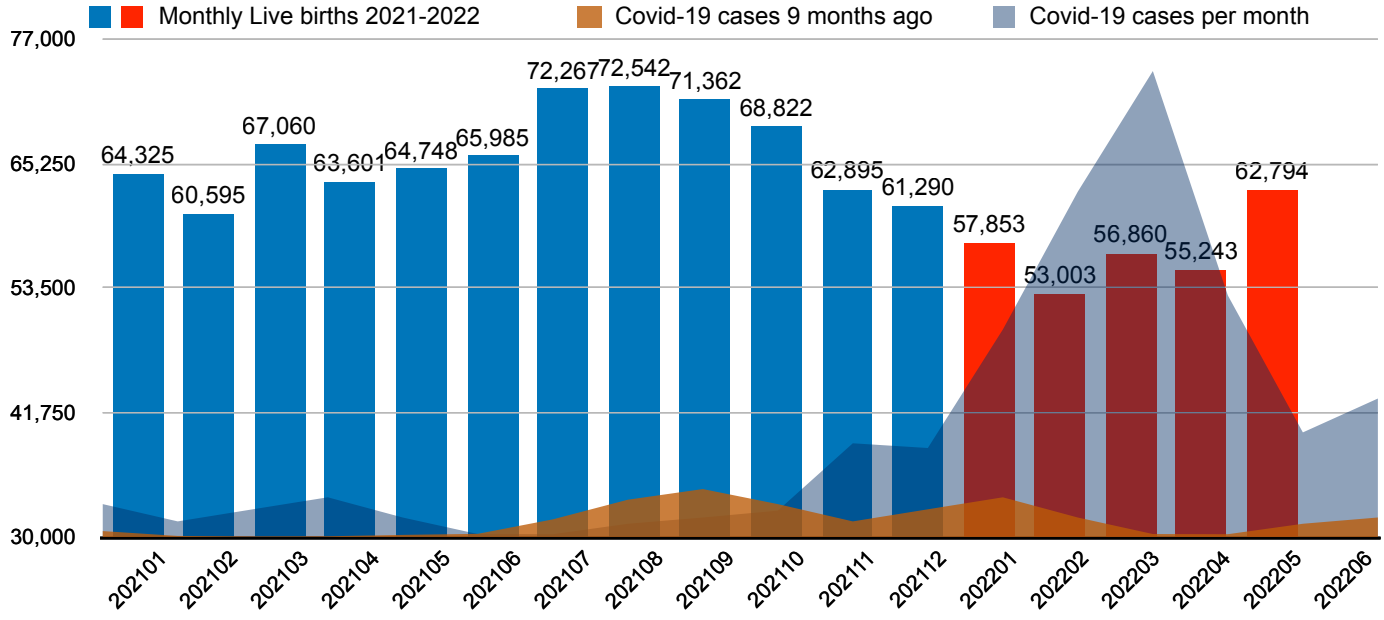


Fig. DE 2

In the time section from 2021 to May 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram in an area diagramm. A connection between the decline in births and the explosion of positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on already existing pregnancies, that could be proven by an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were declining. Thus, a correlation cannot be justified. (ρ (rho) = 0.454, p = 0.1869 - no significance).

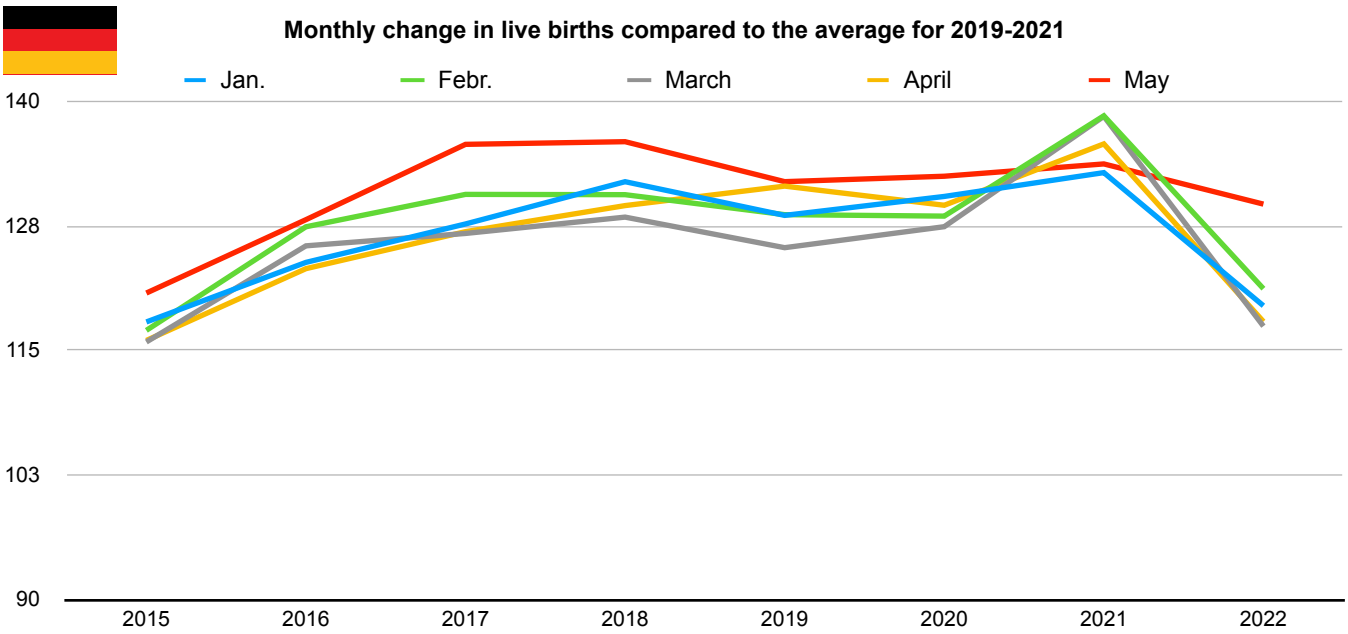


Fig. DE 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- A clear increase from 2015 to 2017, which could be related to refugee migration.
- A noticeable increase in the five months shown in 2021, which is above previous years,
- A clear decrease in the months of January to April, sustained over four months as a clear signal.

DE – Average monthly live births / day per million women, 18-59 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	120.9	113.9	113.5	117.8	117.0	115.8	116.0	120.7	129.9	135.1
2015-16	126.4	119.6	117.9	123.8	127.4	125.5	123.2	128.1	136.8	144.9
2016-17	135.7	129.7	128.8	127.7	130.6	126.7	126.9	135.7	136.8	143.7
2017-18	133.4	128.4	123.6	131.9	130.6	128.4	129.5	135.9	142.4	148.4
2018-19	135.4	125.3	120.4	128.5	128.6	125.3	131.5	131.9	140.0	147.6
2019-20	135.8	127.1	121.9	130.4	128.5	127.4	129.5	132.5	139.9	145.5
2020-21	135.2	125.9	124.3	132.8	138.5	138.5	135.7	133.7	140.8	149.2
2021-22	142.1	134.2	126.6	119.5	121.2	117.4	117.9	129.7		
Difference to Ø 19-21	6.68	8.10	4.37	-11.14	-10.69	-12.98	-14.37	-3.03		
Difference [%]	**4.9%**	**6.4%**	**3.6%**	**-8.5%**	**-8.1%**	**-10.0%**	**-10.9%**	**-2.3%**		
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**		
Vacc./month	**1.7%**	**2.0%**	**5.4%**	**10.7%**	**18.8%**	**16.3%**	**8.5%**	**4.2%**		

Statistical analysis	Spearman's ρ (rho)	-0.770	strong negative relationship
Interpretation (Cohen)	p-value	0.00461	medium effect

Table DE 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a statistically very significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

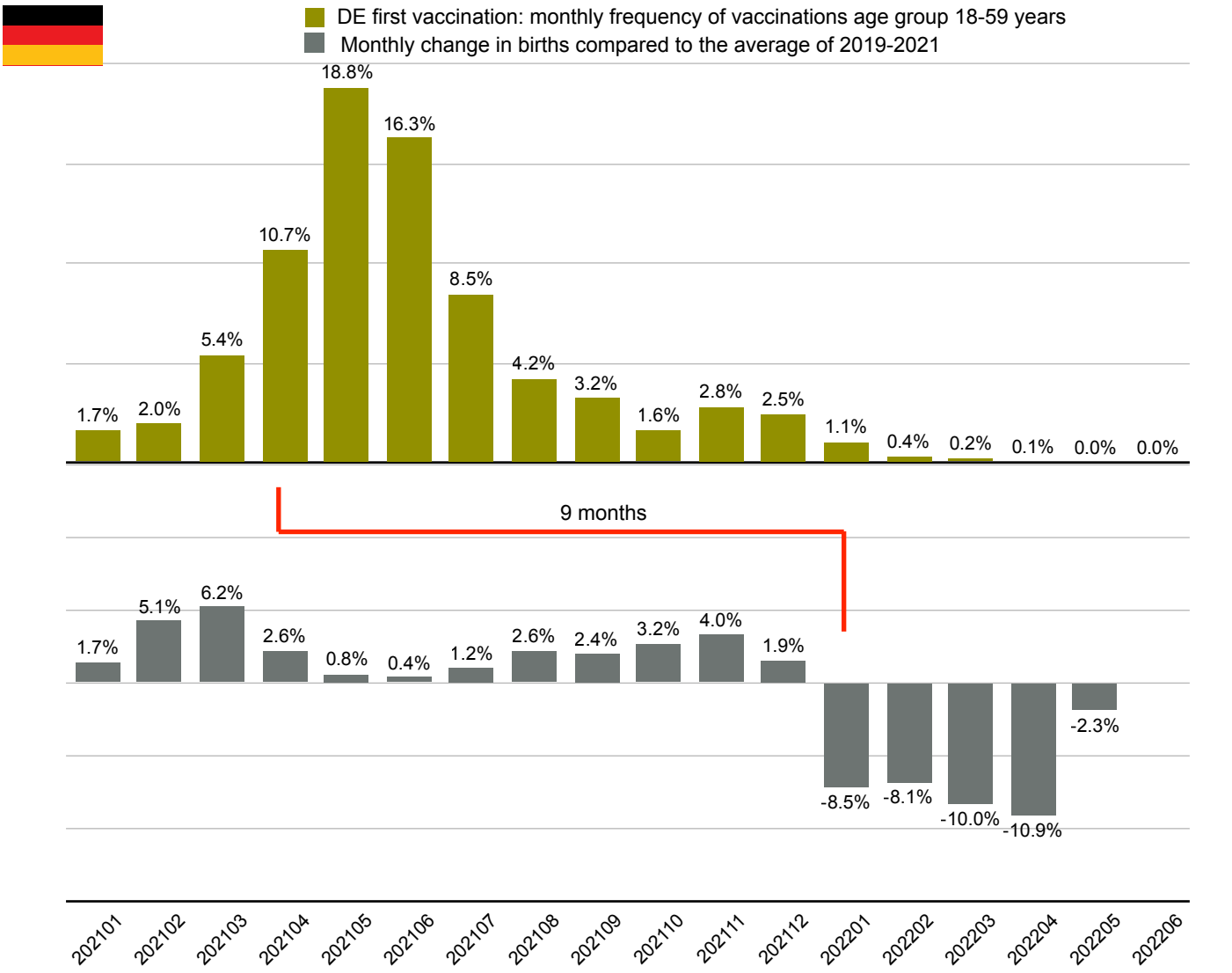
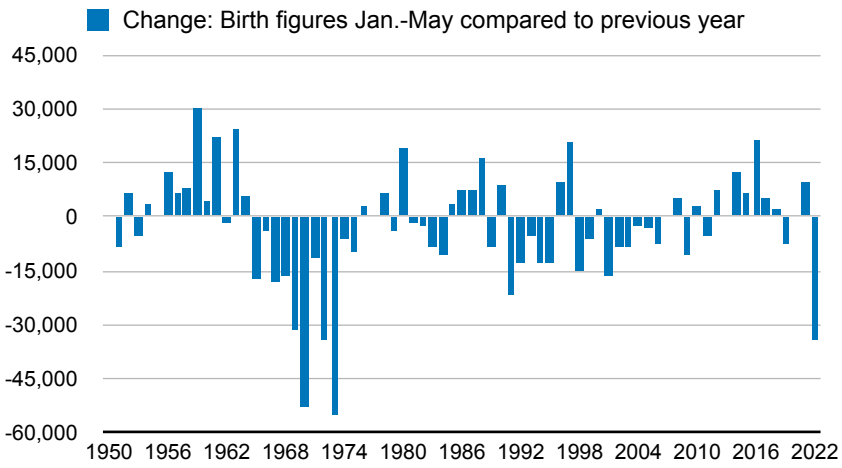


Fig. DE 4, 5

* Vaccination frequency, for definition see page 3; the vaccination age group reported by the RKI includes the cohorts 18-59 years.

The two diagrams show the statistically significant strong negative correlation between monthly vaccination frequency of the age group 18-59 years reported by the RKI in Germany and the decline in births nine months later (normalised to the change in the number of women capable of giving birth) between 8 and 11 percent. Also the month of May, contrary to the continuing increase in the number of births in 2021, continues to be in the red with -2.3 per cent. Such an abrupt decline in the number of births cannot be explained as a "saturation effect" of completed family planning due to the increased number of births in 2021. Moreover, in 2021 there was only a plus of 13,250 births compared to the previous year's average for the entire year; in the months of January to May alone, the decline in births compared to the previous year's average amounts to –34.576 births according to the current reporting status. The following aspects speak for a possible causal connection between the decline in births and the vaccination campaign:

- Temporal coincidence of birth rate decline and high vaccination activity nine months earlier in the age group of women and men aged 18-59.
- Strong negative correlation between vaccination and fertility decline,
- Exclusion of a correlation with Covid-19 infection incidence.
- Historic decline in the number of births in the period from January to May compared to the previous year, which, apart from two years during the "pill bust" of the 1960s and 1970s, has never been observed before.



Comparison with the previous year limited to the period under review, January to May 2022

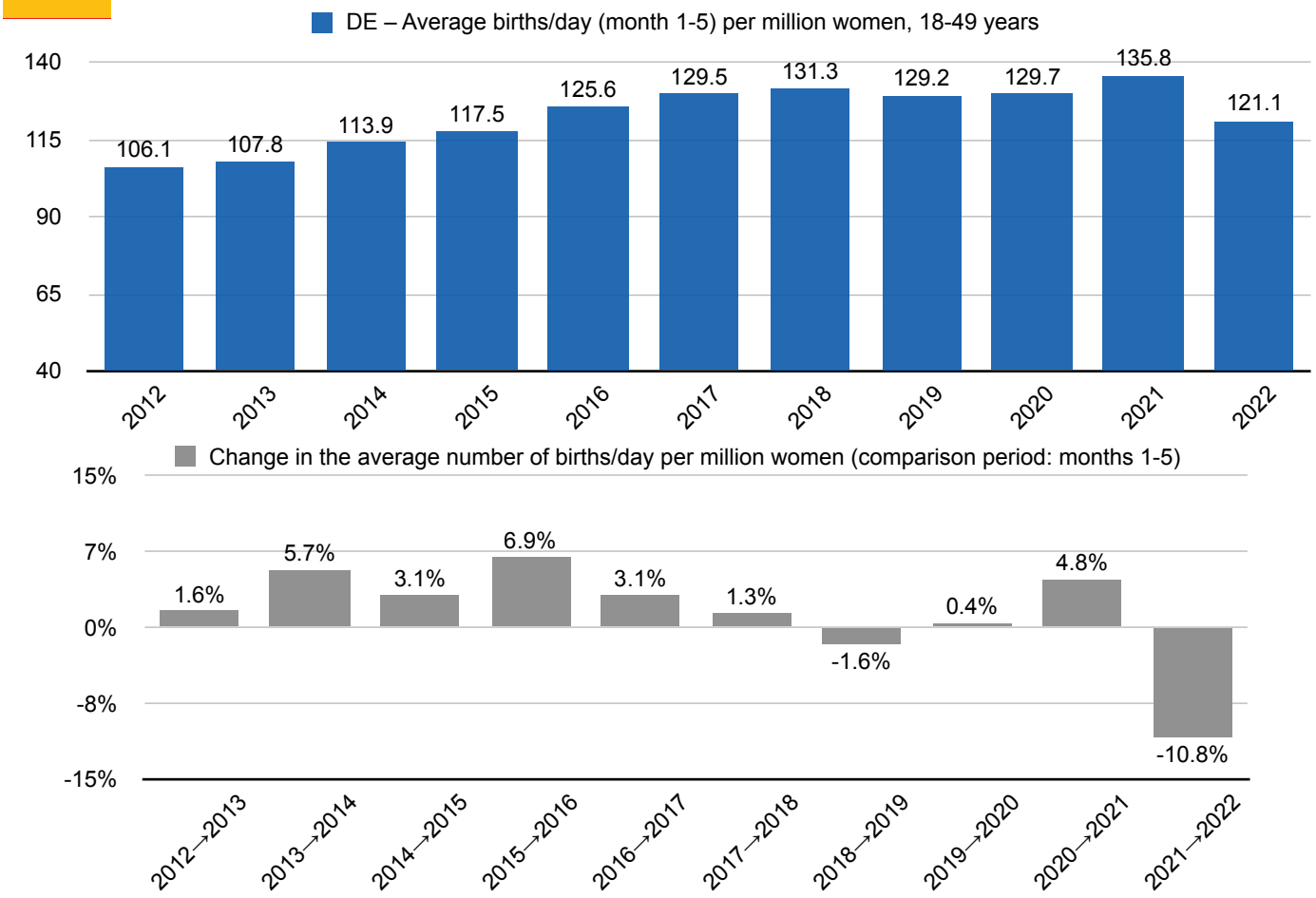


Fig. DE 6, 7

Despite normalization to the population group of women between 18 and 49 years of age, which has grown significantly due to migration, the upper figure DE 6 also shows a clear increase in births per 1 million women in the period from January to May, with a peak in 2021. The decline in 2022 is clearly below the level of 2016, i.e. before the start of the migration wave.

The annual change in the normalised daily average in the period January to May in the respective calendar year is shown by the grey columns in the lower figure DE 7. After annually increasing births per calendar day and 1 million women (18-49 years), a "historic" decline of -10.8% in Germany is also confirmed here.

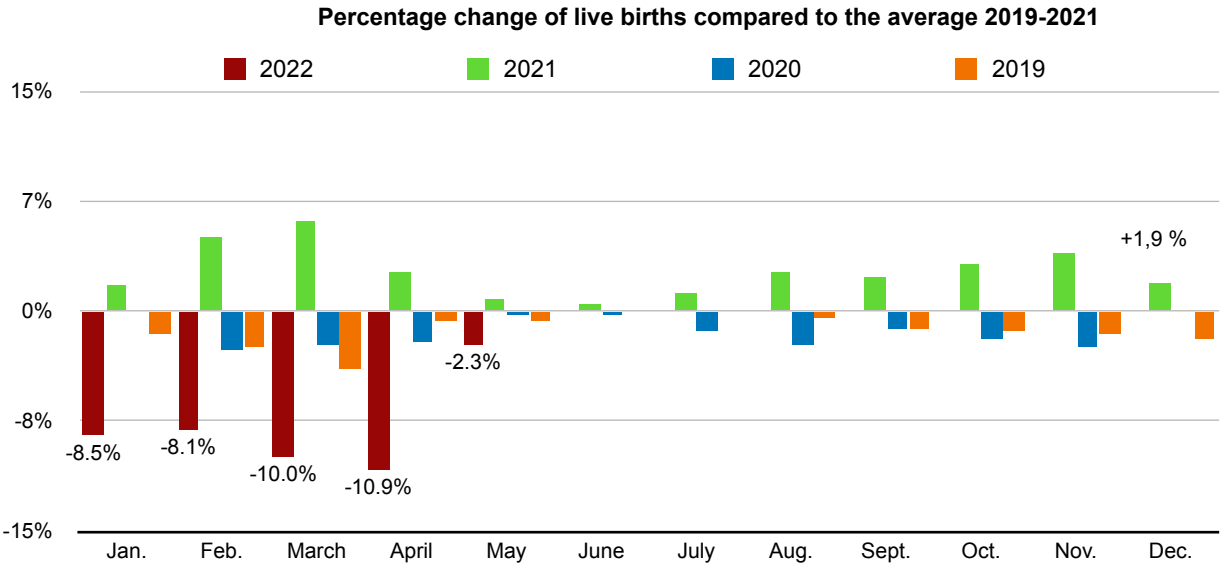
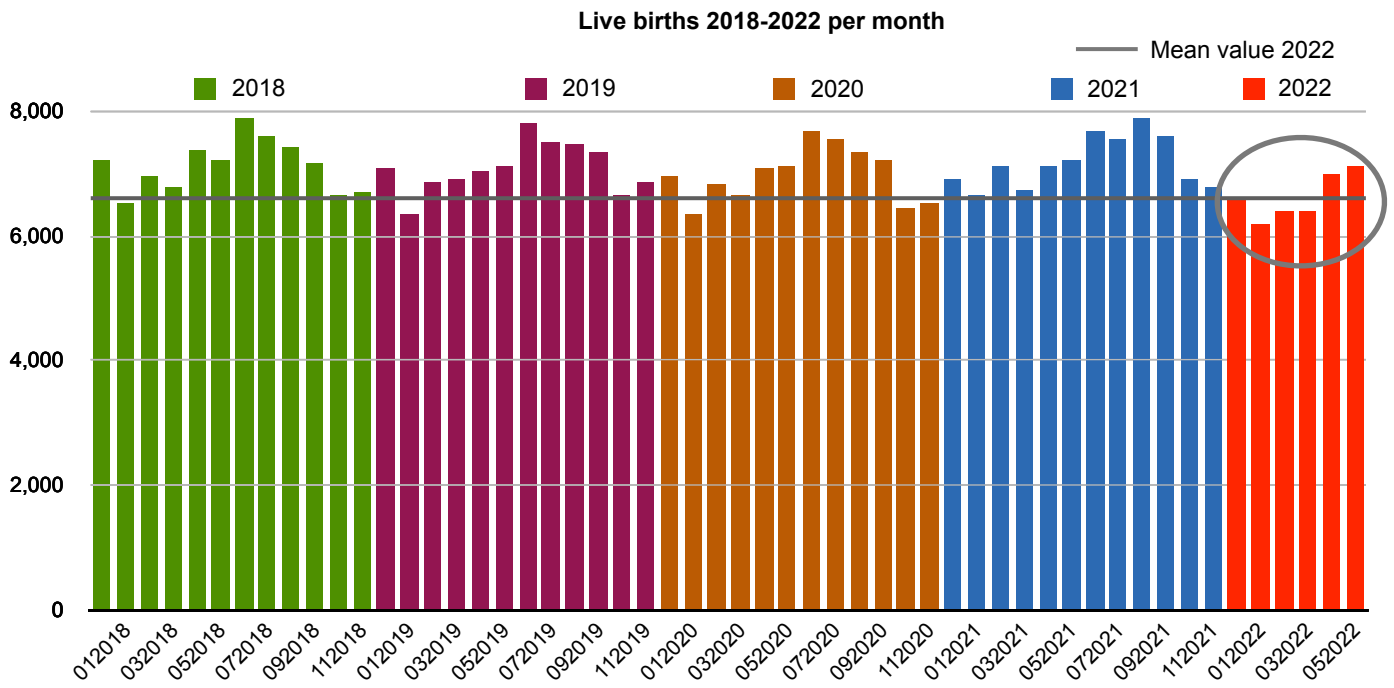


Fig. DE 8

The monthly changes compared to the previous year's average impressively show the abrupt onset and long-lasting change in birth rates, after a kind of mild "lockdown catch-up effect" had been evident before (green columns).

Development of monthly live births in Austria



The course of monthly live births in Austria shows a regular periodic repetition pattern, with the months of January to April 2022 clearly falling short of the previous year's values, with an approximation to the previous year's level in May and June. The mean value of the five provisional monthly data reported so far is clearly below the previous year's level of all individual months (exceptions: 02/2018, 02/2019, 02,11,12/2020), so that the decline in births must be regarded as a strong signal.

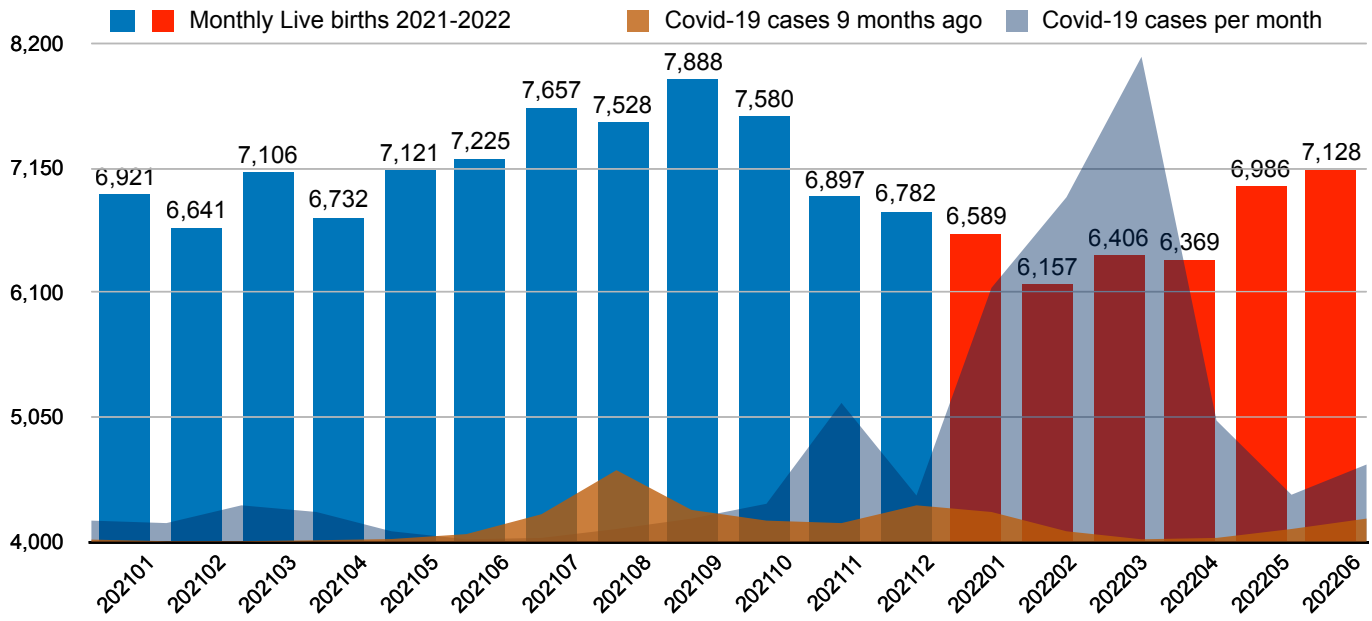


Fig. AT 2

In the time section from 2021 to May 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosive increase in positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on existing pregnancies, that could be proven in an increase in stillbirths, which cannot be determined. The data on stillbirths and abortions are not available for 2022.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were declining. Thus, a correlation cannot be justified. (ρ (rho) = 0.6091, p = 0.0467 - significant).

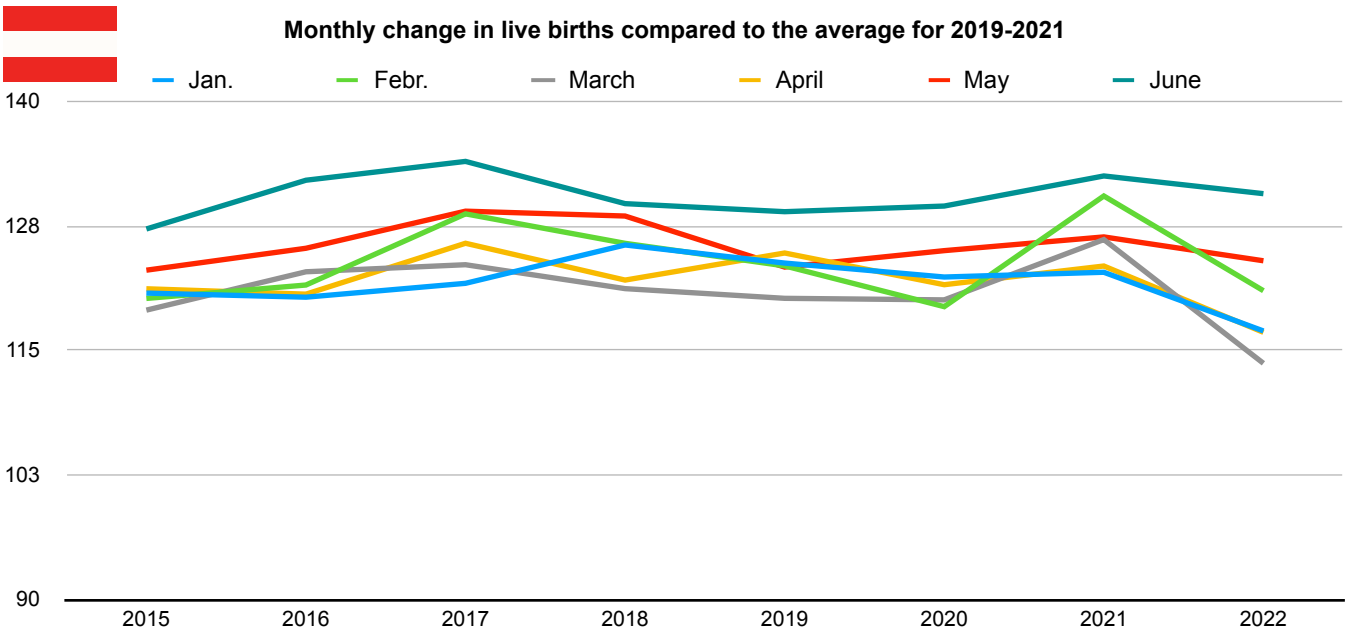


Fig. AT 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- A relatively steady course with a bump in births in February 2020.
- A noticeable increase from February to April 2021, which exceeds previous years and points back to the summer of 2020,
- A clear decline in the months of January to April, which can be seen as a clear signal lasting over four months.

AT – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	122.6	114.6	115.0	120.7	120.2	119.0	121.2	123.0	127.2	128.1
2015-16	125.7	119.7	117.5	120.3	121.5	122.9	120.6	125.2	132.1	138.0
2016-17	128.7	123.7	123.6	121.7	128.7	123.6	125.7	129.0	134.0	137.3
2017-18	127.3	125.8	121.8	125.6	125.7	121.2	122.0	128.5	129.7	137.0
2018-19	124.9	119.5	116.6	123.7	123.5	120.2	124.8	123.3	128.9	136.8
2019-20	128.8	120.4	120.2	122.3	119.4	120.1	121.6	125.0	129.5	135.5
2020-21	127.0	117.0	115.3	122.8	130.5	126.1	123.5	126.4	132.5	135.9
2021-22	134.5	126.5	120.4	116.9	121.0	113.7	116.8	124.0	130.7	
Difference to Ø 19-21	7.62	7.55	2.96	-6.04	-3.47	-8.44	-6.47	-0.93	0.42	
Difference [%]	**6.0%**	**6.3%**	**2.5%**	**-4.9%**	**-2.8%**	**-6.9%**	**-5.2%**	**-0.7%**	**0.3%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**2.2%**	**2.3%**	**5.6%**	**4.8%**	**16.4%**	**20.4%**	**8.9%**	**3.2%**	**3.6%**	

Statistical analysis	Spearman's ρ (rho)	-0.773	strong negative relationship
Interpretation (Cohen)	p-value	0.00265	medium effect

Table AT 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a statistically very significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

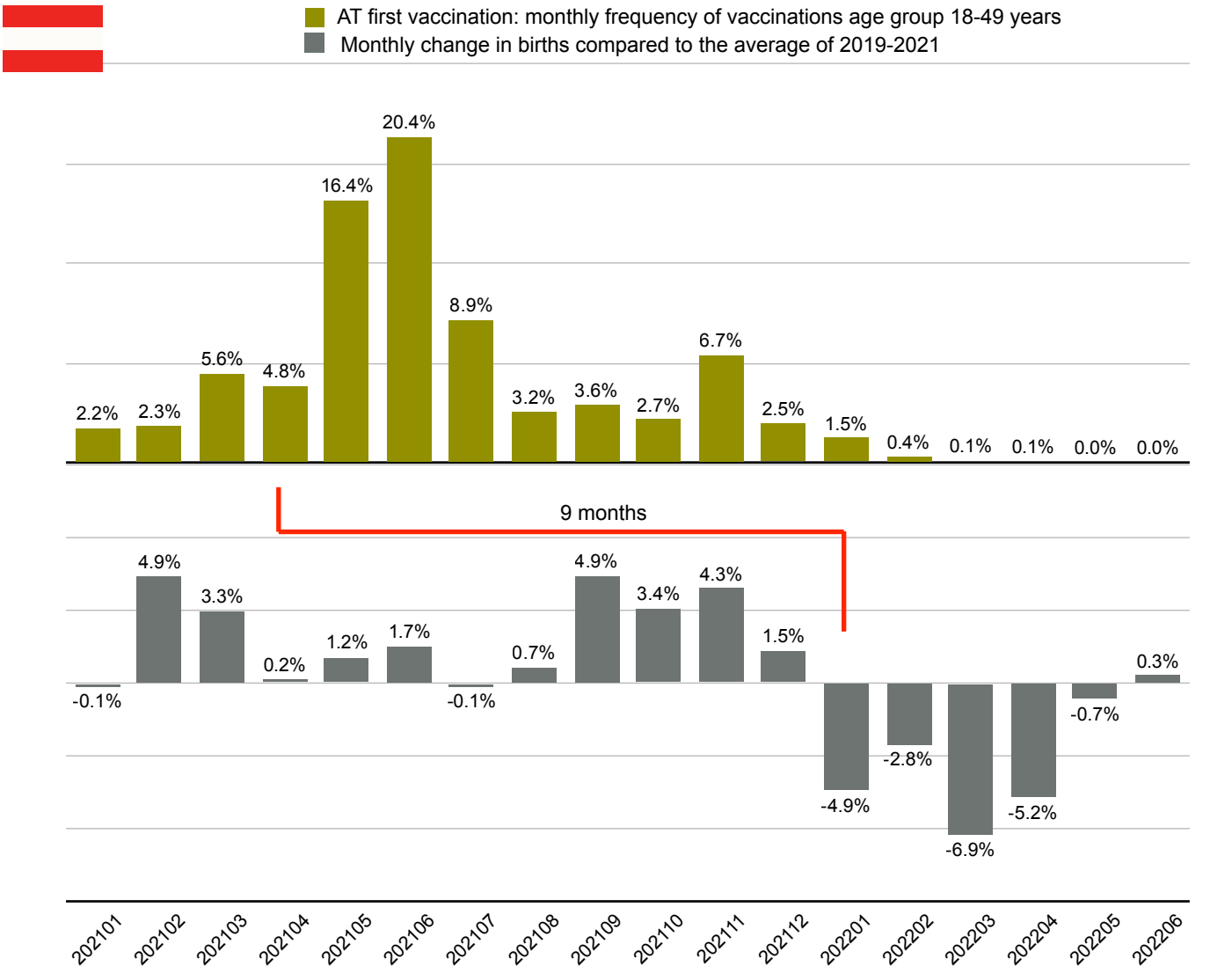
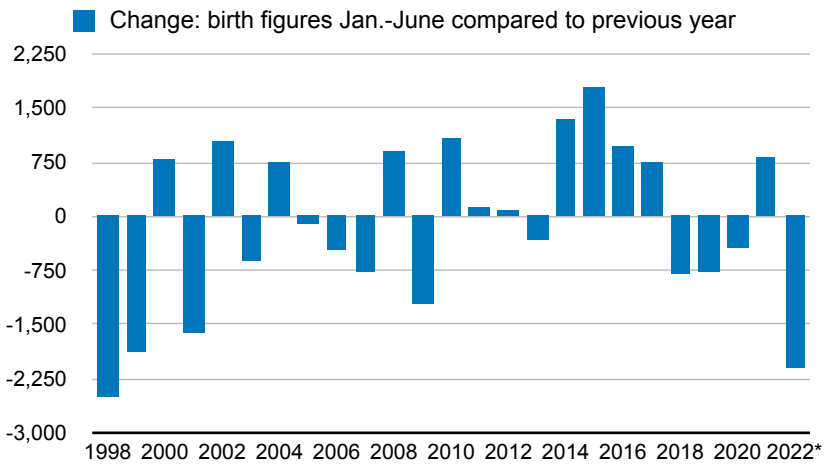


Fig. AT 4, 5

The two diagrams show the statistically significant strong negative correlation between monthly vaccination frequency of the 18-49 age group reported in Austria by ECDC and the decline in births (normalised to change in the number of women able to give birth) nine months later, between 3 and 7 per cent. The trend seems to settle down in May and June. The abrupt decline in the number of births can clearly be temporally attributed to the vaccination event 9 months earlier. The following aspects speak for a possible causal connection between the decline in births and the vaccination campaign:

- Temporal coincidence of birth rate decline and high vaccination activity nine months earlier in the age group of women and men aged 18-49.
- Strong negative correlation between vaccination and fertility decline,
- Exclusion of a correlation with Covid-19 infection incidence
- Most significant decline in births in year-on-year comparison (Jan.-June) since 1999.



Comparison with the previous year limited to the period under review, January to June 2022

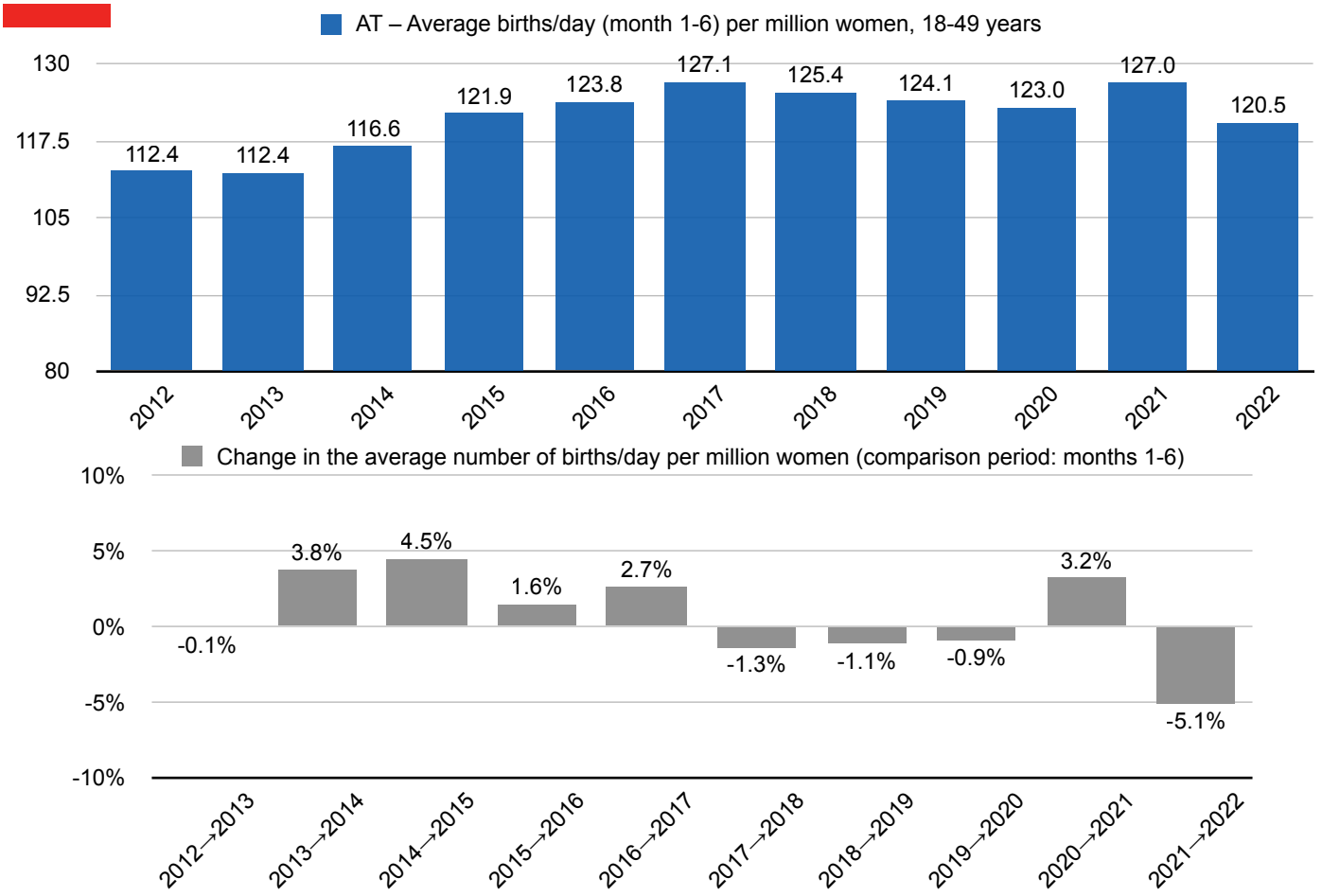


Fig. AT 6, 7

Despite normalization to the population group of women between 18 and 49 years of age, which has grown significantly due to migration, the upper figure AT 6 also shows a clear increase in births per 1 million women from 2014 to 2017, which could be related to the migration wave.

The annual change in the normalised daily average value in the period from January to June in the respective calendar year is shown by the grey columns in Figure AT 7 below. After a long period of constancy and an increase in 2021, there is a clear decline in births of -5.1% per 1 million women (18-49 years) in Austria in 2022.

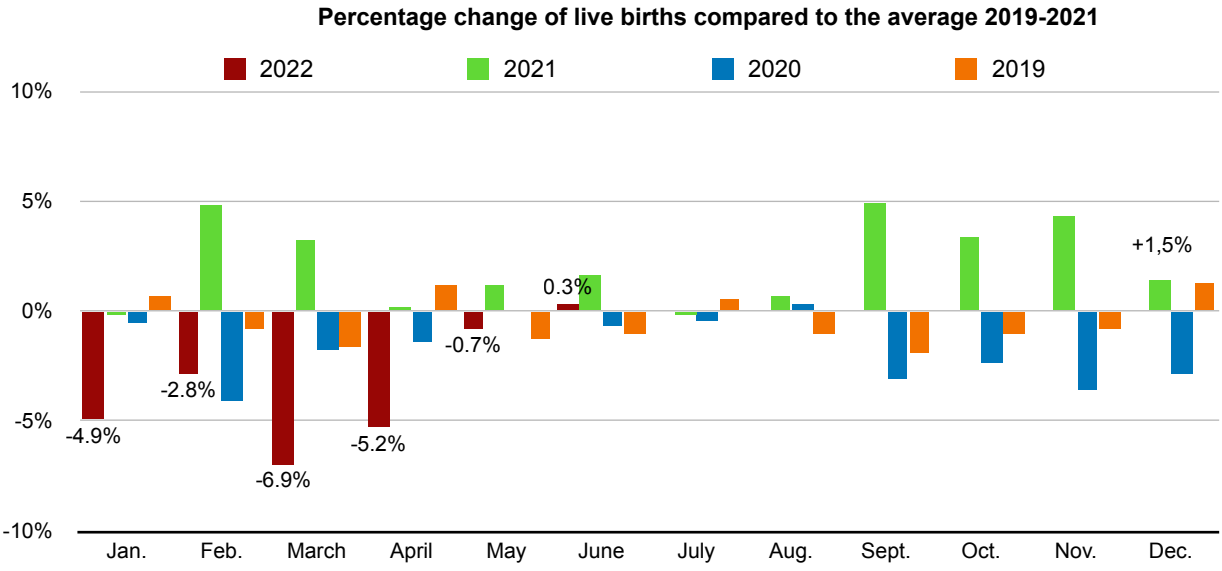


Fig. AT 8

The monthly changes compared to the previous year's average impressively show the abrupt onset of the change in the number of births, which lasted for 4 months, after an upward trend had been shown previously (green columns).

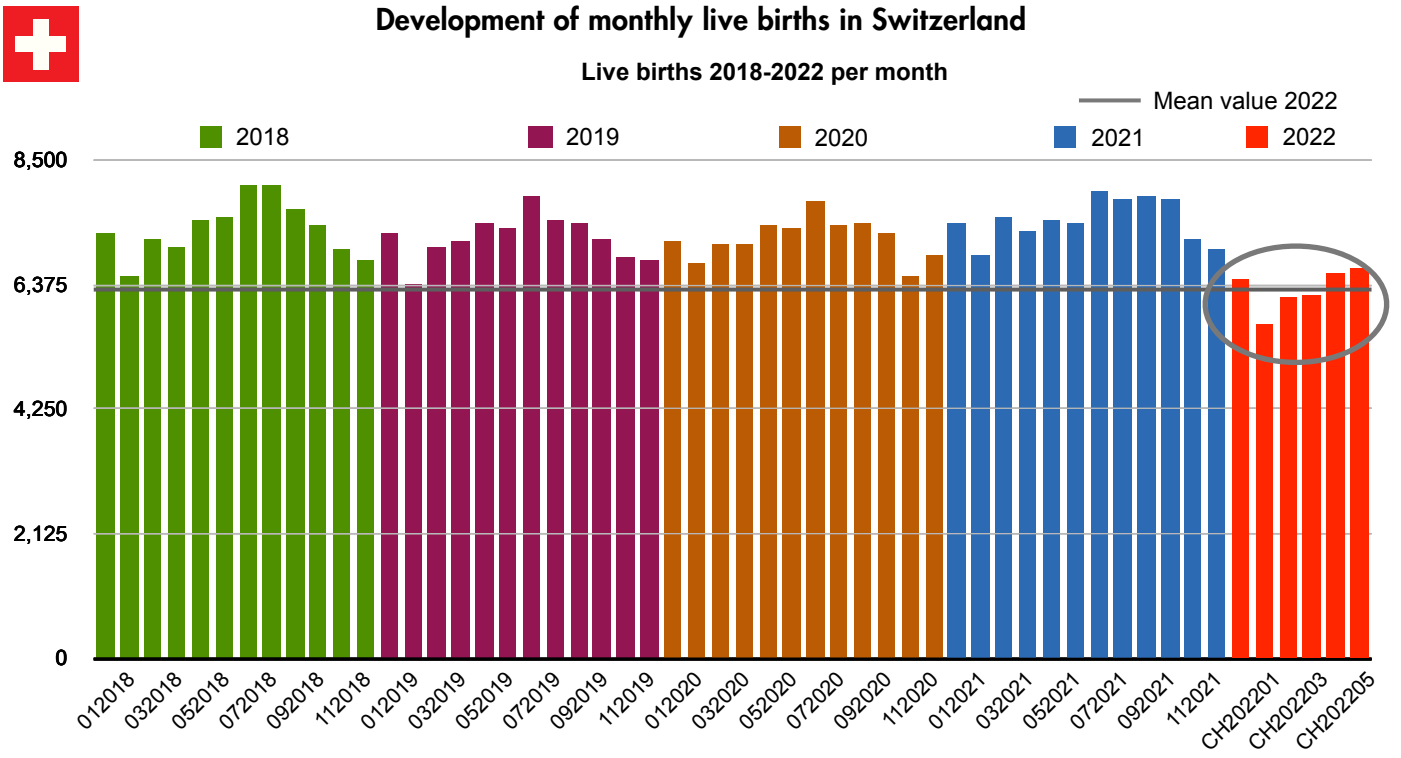


Fig. CH 1

The course of monthly live births in Switzerland shows a regular periodic repetition pattern, with the months of January to June 2022 clearly falling below the previous year's values. The mean value of the six provisional monthly data reported so far is clearly below the previous year's level for all individual months, so that the decline in births in Switzerland must be regarded as a very strong signal.

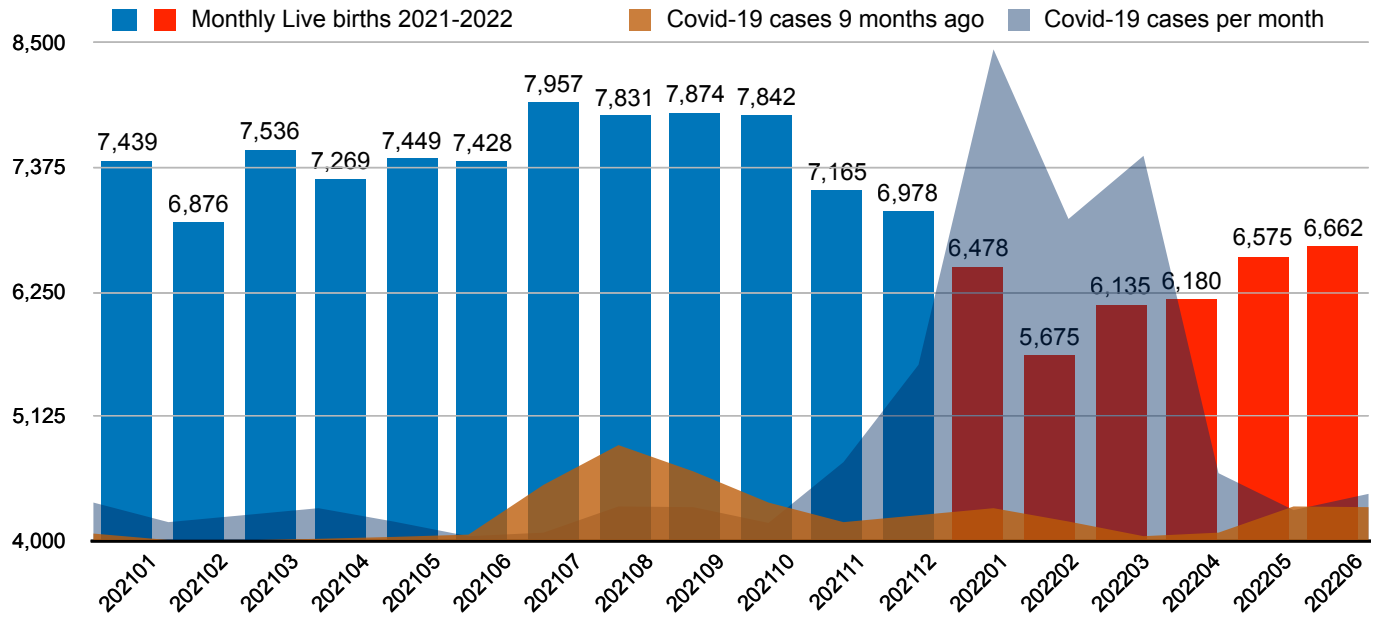


Fig. CH 2

In the time section from 2021 to June 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers nine months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosion of positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on already existing pregnancies, which could be proven by an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows Covid-19 case numbers in the conception period 9 months ago, where case numbers were declining. Thus, a correlation with the decline in births cannot be justified. (ρ (rho) = 0.6, p = 0.06669 - no significance)

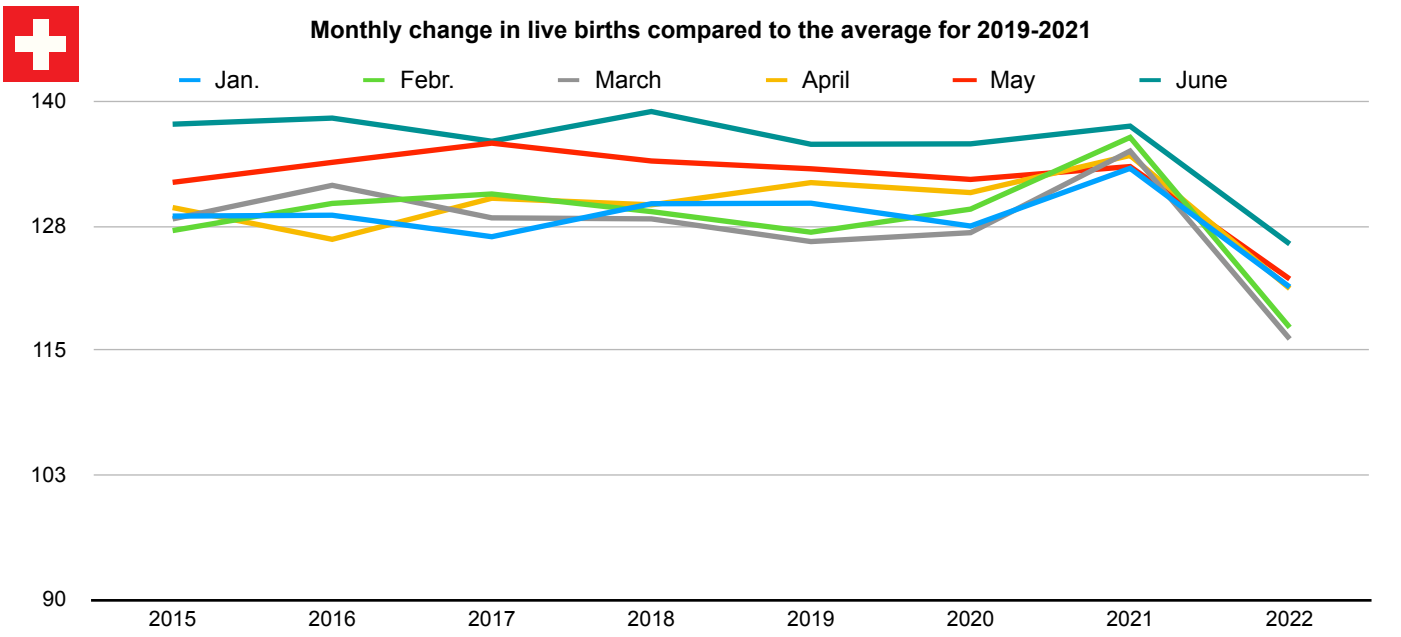


Fig. CH 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- A very even monthly pattern from 2015 to 2017.
- A noticeable increase in the five months shown in 2021, which is higher than in previous years,
- A clear decline in the months of January to June, which can be seen as a clear signal lasting over six months.

CH – Average monthly live births / day per million women, 20-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	132.6	126.8	123.1	128.5	127.0	128.2	129.3	131.8	137.7	136.1
2015-16	130.8	127.0	124.9	128.5	129.7	131.6	126.1	133.9	138.3	142.6
2016-17	131.4	125.5	124.5	126.4	130.7	128.3	130.3	135.8	136.0	139.3
2017-18	133.0	129.2	126.1	129.7	128.9	128.2	129.6	134.0	139.0	144.3
2018-19	131.7	128.6	121.4	129.8	126.8	125.9	131.8	133.2	135.7	141.5
2019-20	128.4	126.3	121.8	127.5	129.2	126.8	130.8	132.1	135.7	140.1
2020-21	130.0	120.3	123.3	133.3	136.4	135.0	134.5	133.4	137.5	142.5
2021-22	140.5	132.6	125.0	121.3	117.3	116.1	121.2	122.1	125.7	
Difference to Ø 19-21	10.46	7.53	2.82	-8.81	-13.50	-13.10	-11.21	-10.78	-10.63	
Difference [%]	**8.0%**	**6.0%**	**2.3%**	**-6.8%**	**-10.3%**	**-10.1%**	**-8.5%**	**-8.1%**	**-7.8%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**1.0%**	**0.9%**	**1.5%**	**3.7%**	**16.0%**	**23.0%**	**5.5%**	**4.6%**	**7.9%**	

Statistical analysis	Spearman's ρ (rho)	-0.8727	strong negative relationship
Interpretation (Cohen)	p-value	0.00023	large effect

Table CH 1

* the vaccination age group reported by the FSO includes the cohorts 20-49 years.

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a highly statistically significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

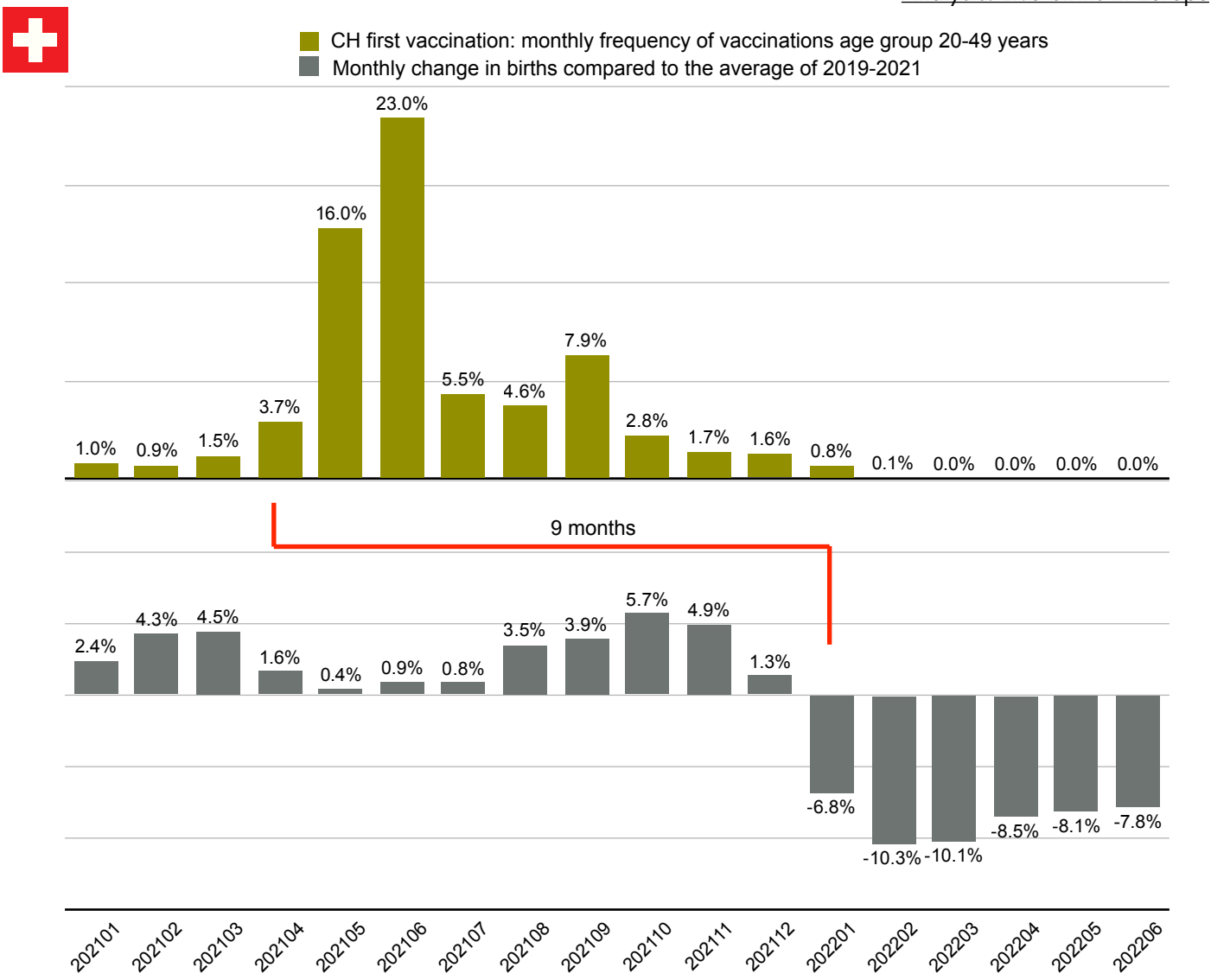
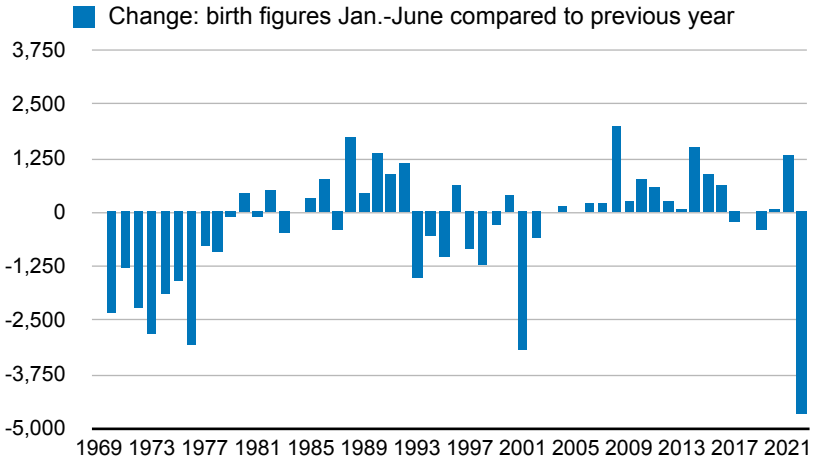


Fig. CH 4, 5

From January 2021 to May 2022, the two diagrams show the statistically significant correlation between monthly vaccination frequency of the age group 20-49 and the decline in births (normalised to the change in the number of childbearing women) between 10 and 15 per cent that started nine months later. Such an abrupt decline in the number of births cannot be explained as a "saturation effect" of completed family planning due to the somewhat increased number of births in 2021. Moreover, in 2021 there was only a plus of 2,400 births compared to the previous year's average for the whole year, whereas in the months of January to June alone the decline in births compared to the previous year's average is -6,292 births according to the current reporting status. The following aspects speak for a possible causal connection between the decline in births and the vaccination campaign:

- Temporal coincidence of birth rate decline and high vaccination activity nine months earlier in the age group of women and men aged 20-49.
- Strong negative correlation between vaccination activity and birth rate decline,
- the statistically very high significance of the strong negative correlation,
- Exclusion of a correlation with Covid-19 infection incidence.
- Historic decline in the number of births in the period from January to May compared to the previous year, which has never occurred to this extent in Switzerland since 1969 (see graph on the right).



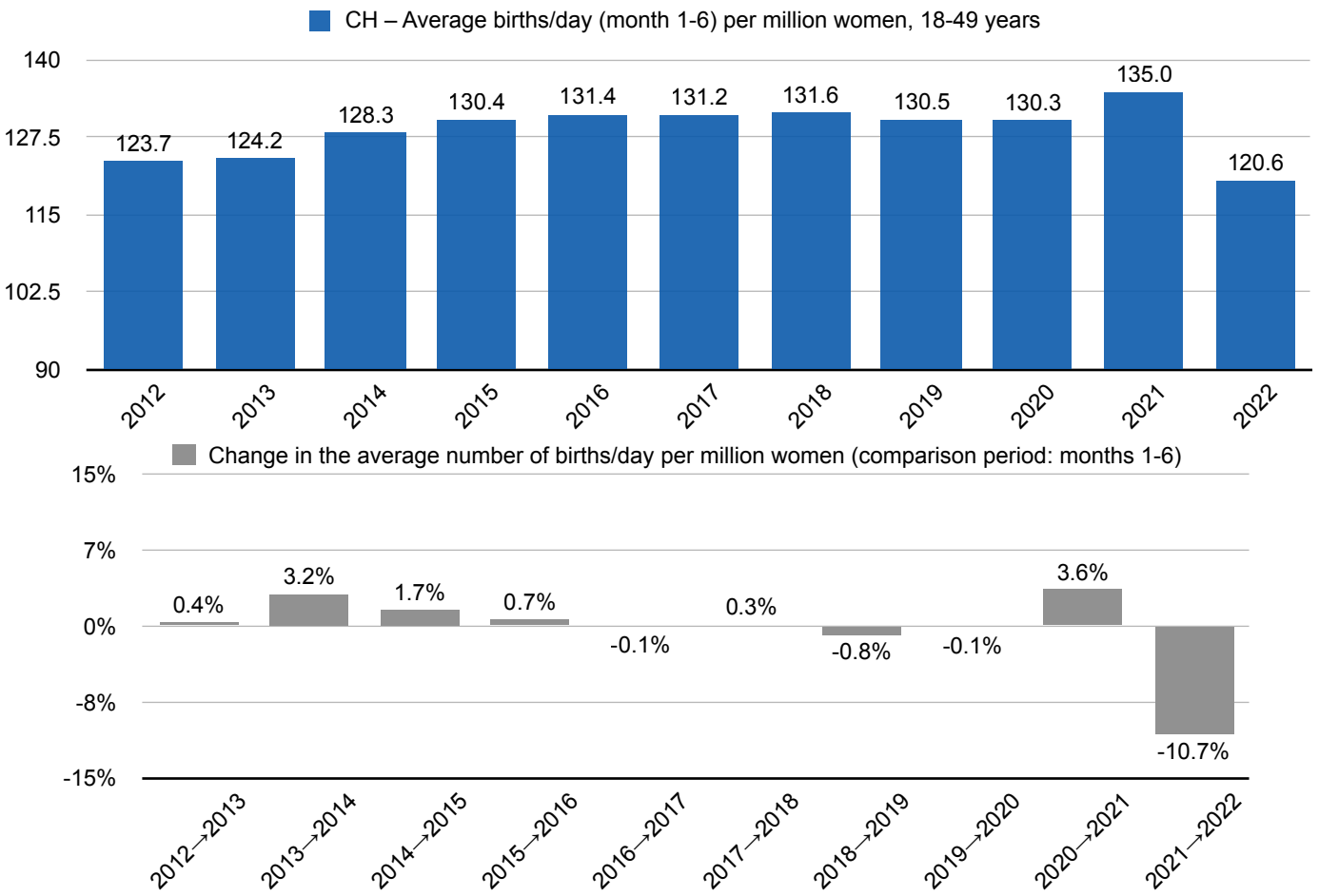


Fig. CH 6,7

The upper figure CH 6 shows a very constant number of average daily births per 1 million women from 2014 to 2020. In 2021, there is a clear increase, although I have no information about possible changes, e.g. due to migration. The decline in 2022 is far below the previous low in 2012.

The annual change in the normalised daily average in each case in the period January to June is shown by the grey columns in the lower figure CH 7. After the unchanged birth figures per calendar day and 1 million women (20-49 years), the "historic" decline of -10.1%, which is unique in Switzerland, is also confirmed here.

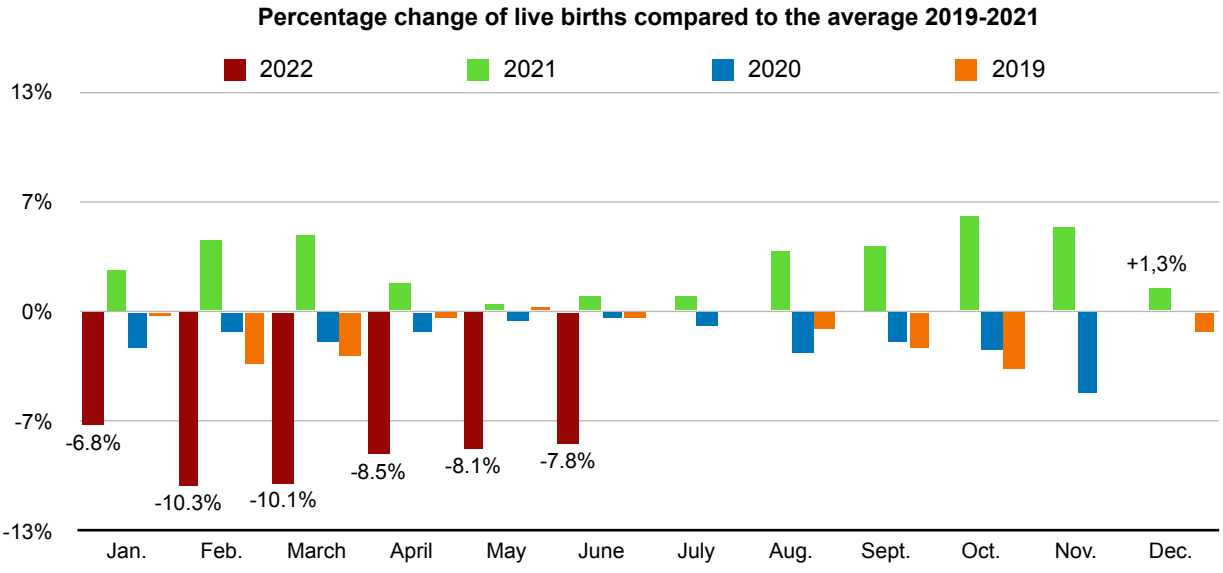


Fig. CH 8

The monthly changes compared to the previous year's average impressively show the abrupt onset and long-lasting change in birth rates, after a kind of mild "catch-up effect" had been evident before (green columns).

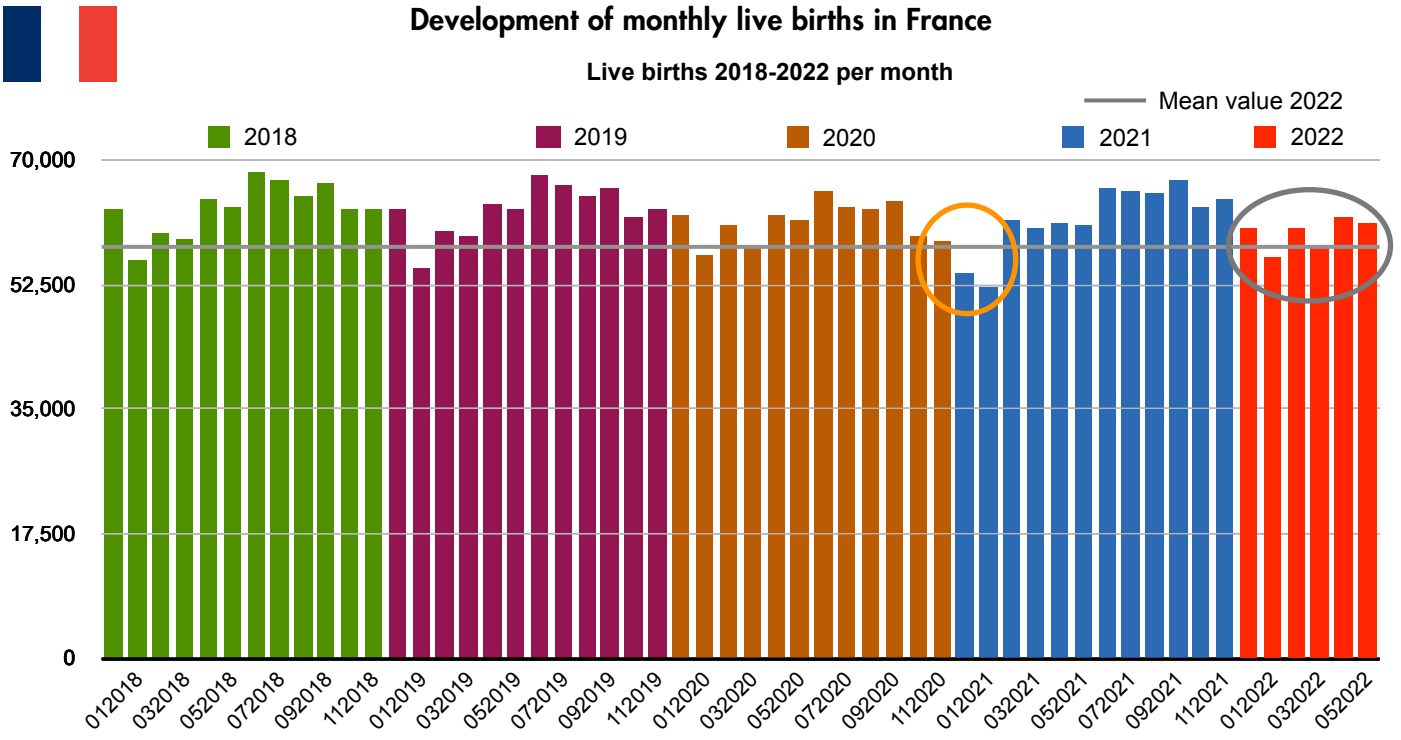


Fig. FR 1

The course of monthly live births in France initially shows a regular periodic pattern of repetition. Three conspicuous features emerge from the turn of the year 2020/21 onwards. Marked by an orange ellipse, from December 2020 to February 2021 there is a conspicuous decline in births to a low point, backdated by 9 months to the period of the very hard lockdown from March to May 2020. This is followed by a normalization slightly above the previous year's level. The live births at the beginning of 2022 differ little from the previous years.

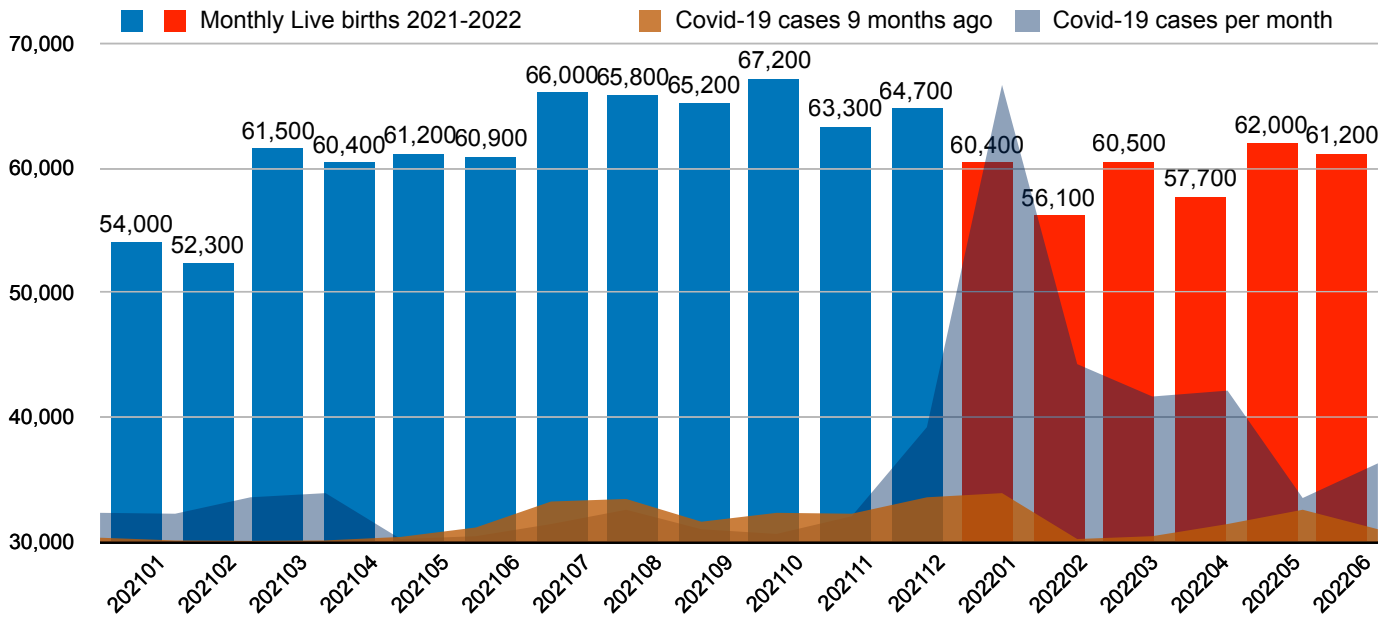


Fig. FR 2

In the time section from 2021 to June 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue as an area diagram, and the Covid-19 case numbers nine months in the past are shown in brown. An assessment of the birth figures in 2022 compared to the previous year is not possible due to the possible negative lockdown effect described above. In 2022, the values appear distorted in the first two months with a plus.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago with no discernible effect on the birth numbers. (ρ (rho) = 0.2, p = 0.5554 - no significance).

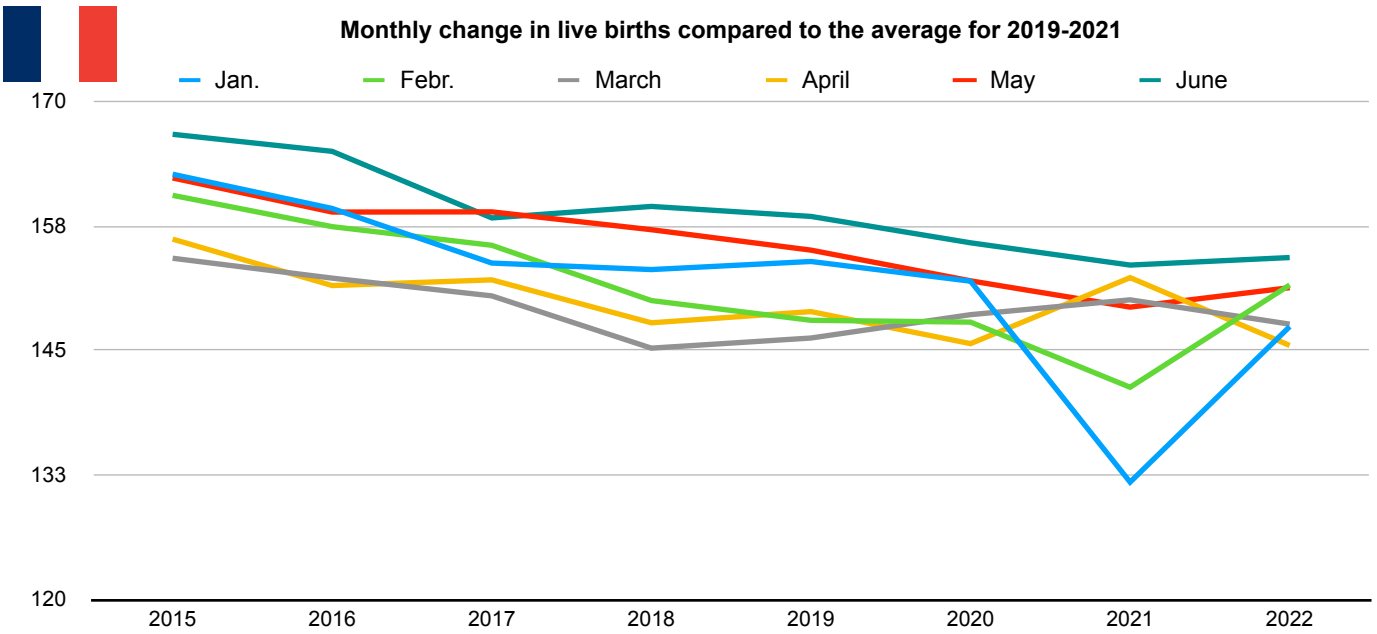


Fig. FR 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- The daily average of births per woman has been falling steadily since 2015.
- January and February 2021: clear downward bend in the curve shows a decline in births resulting from the lockdown phase.
- In 2022, the months remain at a low level towards which the previous years were heading.

FR – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	169.3	163.5	164.1	162.7	160.5	154.2	156.2	162.3	166.7	167.9
2015-16	166.2	161.2	160.7	159.2	157.4	152.2	151.5	158.9	165.0	170.1
2016-17	163.1	158.4	155.2	153.7	155.5	150.5	152.1	158.9	158.3	166.0
2017-18	163.4	160.5	155.6	153.1	150.0	145.2	147.7	157.1	159.4	165.7
2018-19	162.6	158.4	153.5	153.9	148.0	146.2	148.9	155.0	158.4	165.3
2019-20	160.5	155.7	153.4	151.9	147.8	148.6	145.7	152.0	155.8	160.7
2020-21	156.5	149.4	142.6	131.8	141.3	150.1	152.3	149.3	153.5	161.0
2021-22	164.0	159.6	157.9	147.4	151.5	147.6	145.5	151.3	154.3	
Difference to Ø 19-20*	2.45	2.56	4.42	-5.54	3.64	0.22	-1.79	-2.23	-2.80	
Difference [%]	**1.5%**	**1.6%**	**2.9%**	**-3.6%**	**2.5%**	**0.2%**	**-1.2%**	**-1.5%**	**-1.8%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**0.8%**	**1.0%**	**2.4%**	**4.1%**	**21.3%**	**21.8%**	**20.7%**	**15.1%**	**4.2%**	

Statistical analysis	Spearman's ρ (rho)	-0.355	moderate negative relationship
Interpretation (Cohen)	p-value	0.14230	no effect

Table FR 1

* Due to the "lockdown trough" in 2021, the reference period is limited to 2 years (2019/20)!

The statistical analysis examines the correlation between the percentage decline in births and the vaccination frequency nine months earlier. The clear negative effect of the previous year prevents a statistically credible assessment.

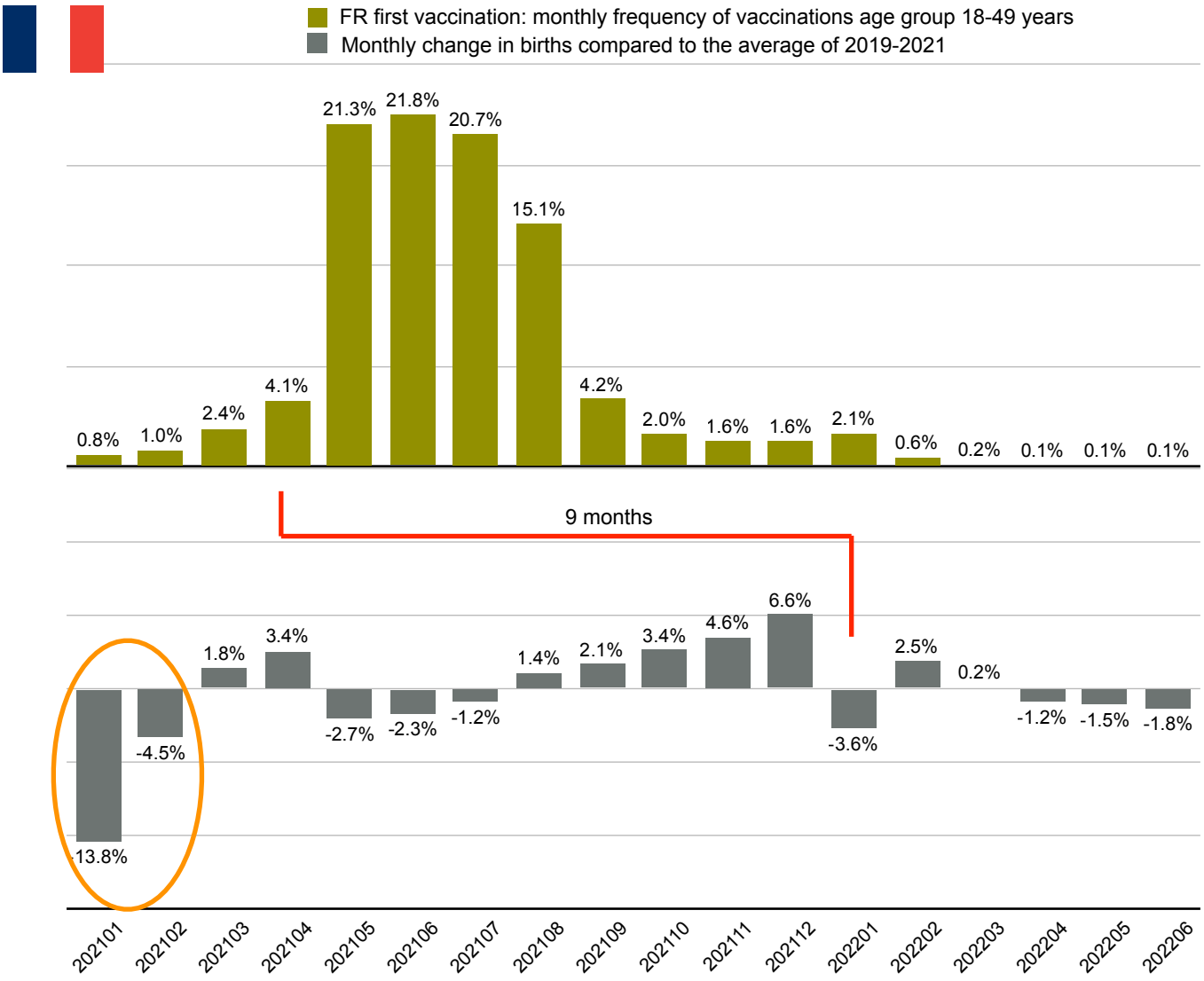


Fig. FR 4, 5

Due to the "lockdown trough" in January and February 2021 shown in Figures FR 1 to 3, the year 2021 is excluded from the calculation of the previous year's mean. While the upper diagram shows the monthly vaccination frequencies, the lower diagram FR 6 shows the percentage comparison to this previous year's average. Marked with an orange ellipse is the decline in births as a result of the lockdown month of April 2020, in which the conception of births in January 2021 fall. The decline in births continues at a lower level in February and until July the negative values still seem to indicate a permanent impairment of the decision to have a child. This then seems to ease in a discreet "catch-up effect" in 2021. Against this background, the renewed jump into negative figures from December to January represents a change. However, there are no new measures to be mentioned here, but only the vaccination campaign in the age group 18-49 that started nine months earlier as a new criterion. Given the low numbers, a connection to the only just beginning vaccination campaign may seem speculative, but the question remains open as to whether young couples who wish to have children may have considered vaccination as a safety measure for themselves or the growing child.

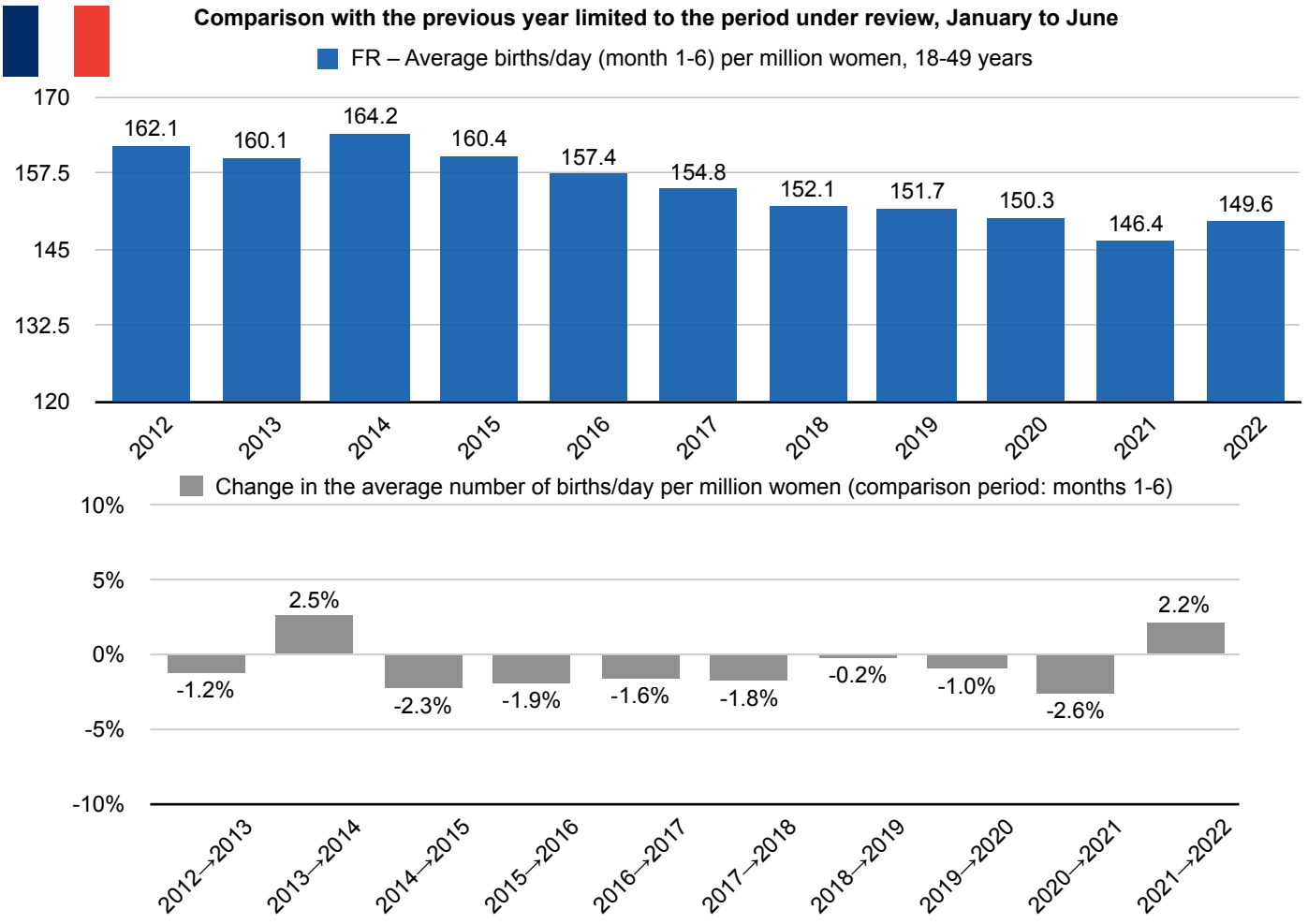


Fig. FR 6, 7

The upper figure FR 6 only captures the mean value of daily births in the period January to June of the respective year. Due to the decline in births in the context of the lockdown measures, 2021 falls very significantly compared to 2020. Thus, although births in 2022 increase by 2.2% compared to the previous year, they are at an all-time low compared to previous years.

The annual percentage changes from the previous year thus illustrate the particular decline in births in January and February 2021 ("lockdown trough") rather than the further reduction in births in 2022 to the low point in relation to the previous years 2012-2020.

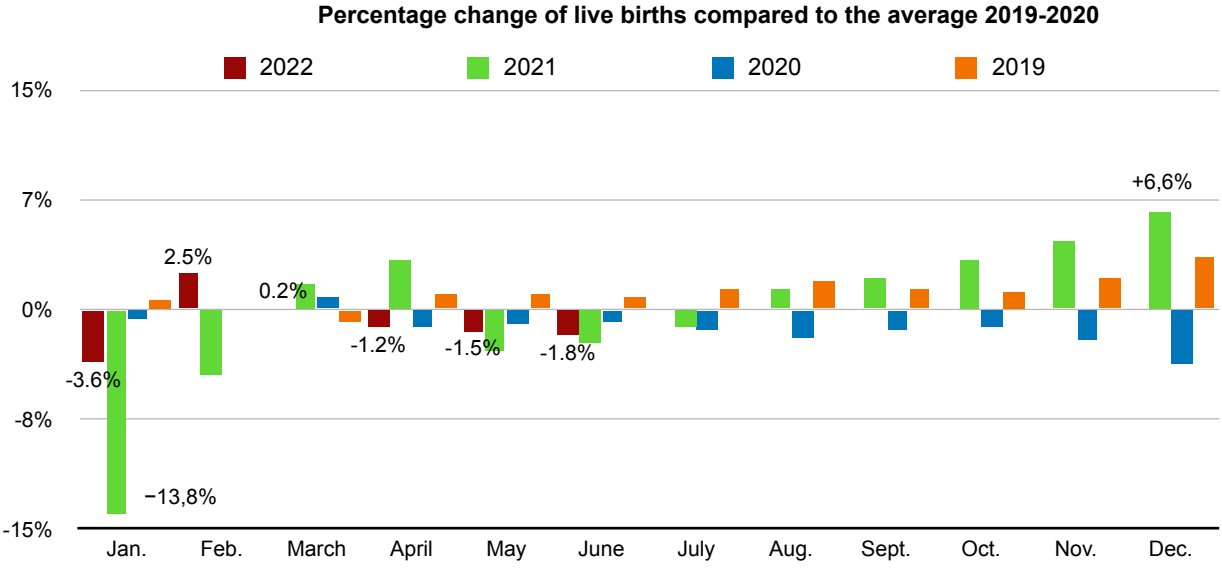


Fig. FR 8

The monthly changes compared to the previous year's average impressively show the abrupt change from rising birth rates at the end of 2021 to −3,6% in January 2022.

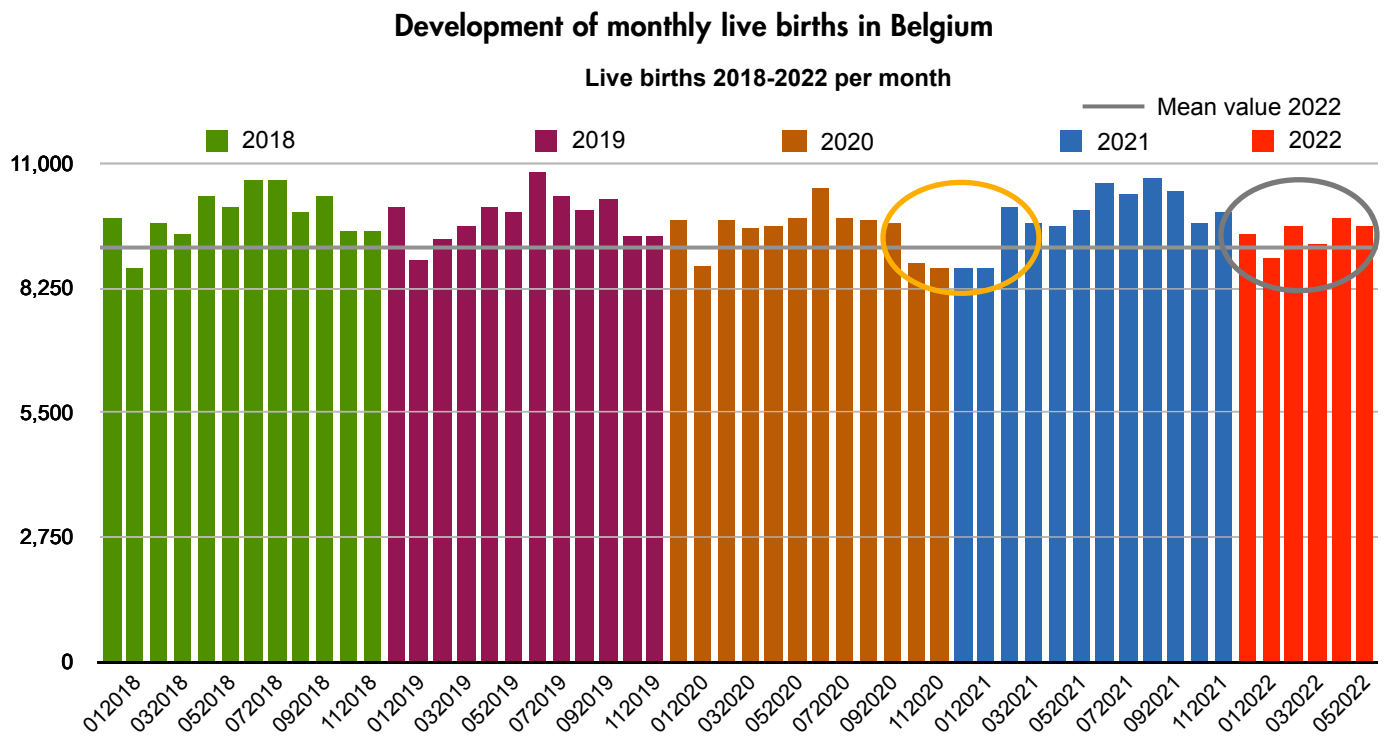


Fig. BE 1

The course of monthly live births in Belgium initially shows a regular periodic repetition pattern. Three conspicuous features emerge from the turn of the year 2020/21 onwards. Marked by an orange ellipse, from November 2020 to February 2021 there is a conspicuous drop in births to a low point, backdated by 9 months to the period of the very hard lockdown from March to May 2020. This is followed by an increase in the following months slightly above the previous year's level ("catch-up effect"?). The live births at the beginning of 2022 differ little from the previous years.

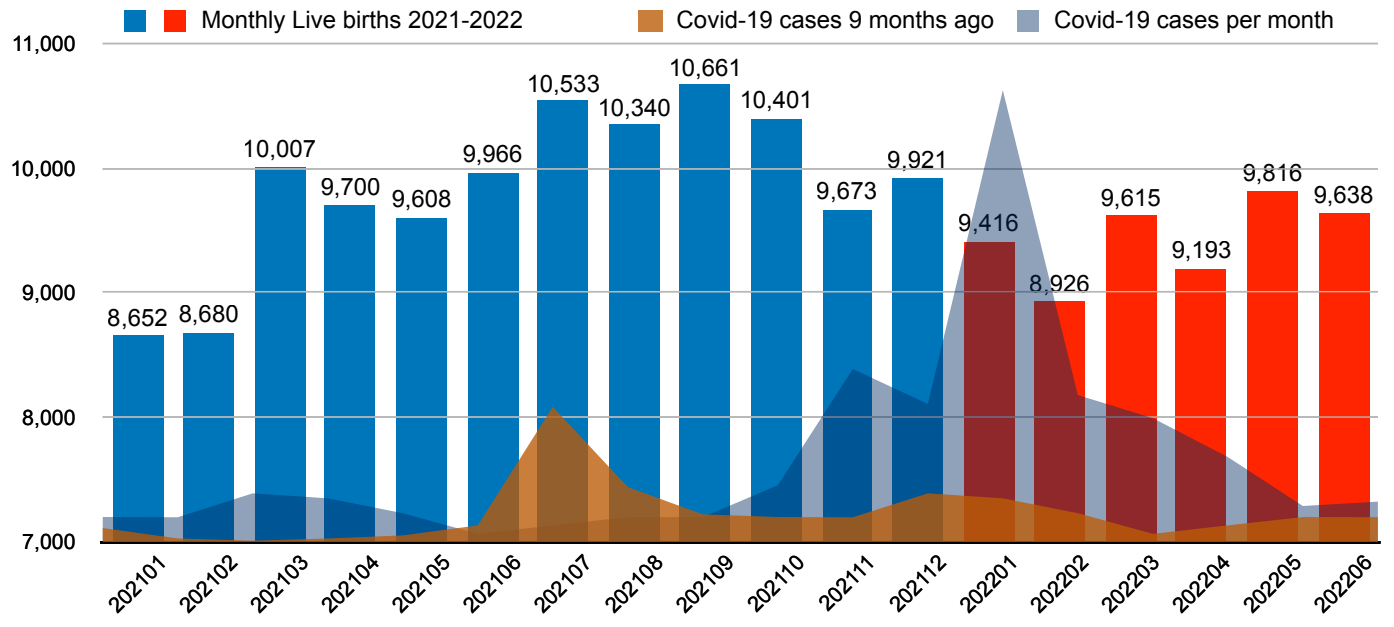


Fig. BE 2

In the time section from 2021 to May 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue as an area diagram, and the Covid-19 case numbers nine months in the past are shown in brown. An assessment of the decline in births compared to the previous year is not possible due to the described negative lockdown effect, as this decline in 2022 leads to an apparent increase in a year-on-year comparison, which is to be interpreted statistically as a distortion.

The brown area shows Covid-19 case numbers in the conception phase 9 months ago with no discernible effect on birth rates. (ρ (rho) = 0.518, p = 0.1025 - no significance).

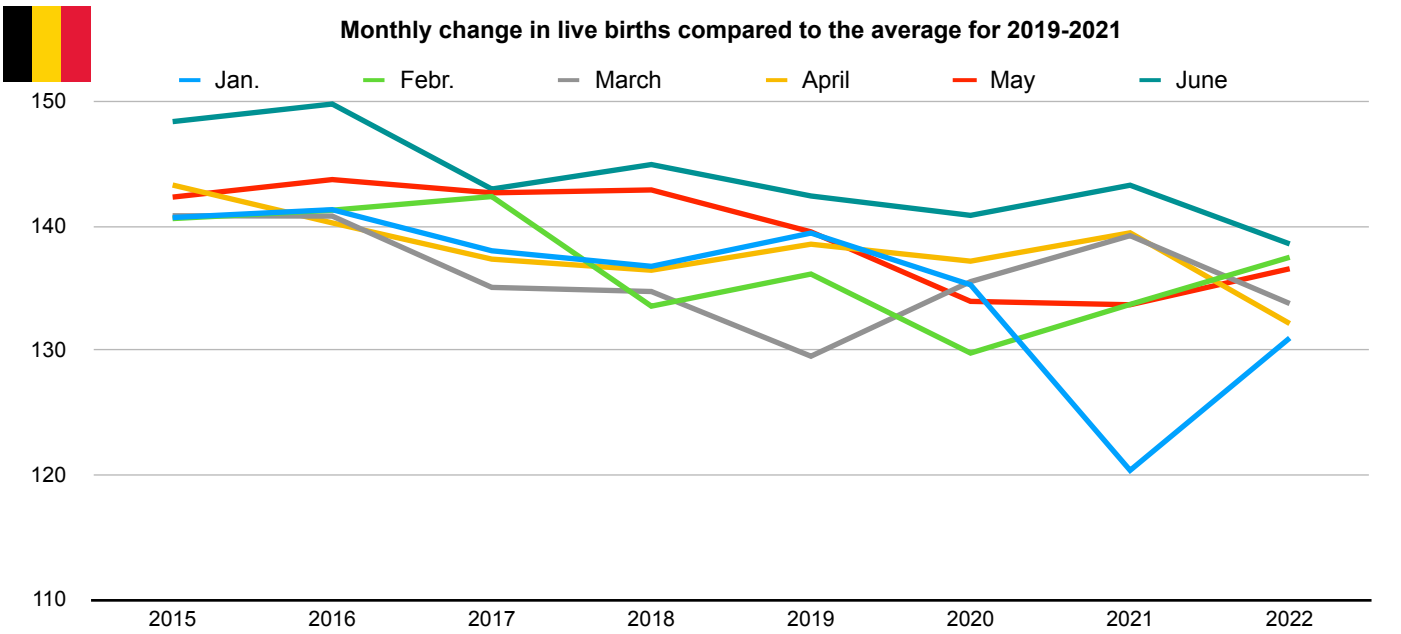


Fig. BE 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- The daily average of births per woman shows a downward trend despite normalization to the number of women.
- January: clear downward bend in the curve shows the significant decline in births resulting from the lockdown phase.
- In 2022, the months remain at a low level towards which the previous years were heading. The month of June in particular reaches a new low.

BE – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	145.1	137.9	138.3	140.7	140.6	140.8	143.3	142.3	148.4	151.3
2015-16	147.2	137.0	141.4	141.3	141.2	140.8	140.2	143.7	149.8	149.9
2016-17	142.4	135.6	139.0	138.0	142.3	135.0	137.3	142.6	142.9	144.0
2017-18	145.6	137.0	137.1	136.7	133.5	134.7	136.4	142.9	144.9	148.5
2018-19	143.4	136.5	132.4	139.4	136.1	129.5	138.5	139.5	142.4	150.6
2019-20	141.8	135.0	130.6	135.3	129.8	135.5	137.1	133.9	140.8	145.5
2020-21	134.4	126.1	120.7	120.4	133.7	139.2	139.4	133.6	143.2	146.5
2021-22	144.7	139.0	138.0	131.0	137.5	133.7	132.1	136.5	138.5	
Difference to Ø 19-20*	2.06	3.29	6.46	-6.35	4.52	1.23	-5.69	-0.17	-3.07	
Difference [%]	**1.4%**	**2.4%**	**4.9%**	**-4.6%**	**3.4%**	**0.9%**	**-4.1%**	**-0.1%**	**-2.2%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**2.2%**	**2.6%**	**4.9%**	**2.2%**	**11.3%**	**40.3%**	**12.2%**	**3.0%**	**2.0%**	

Statistical analysis	Spearman's ρ (rho)	-0.145	no negative relationship
Interpretation (Cohen)	p-value	0.33480	no effect

Table BE 1

* Due to the "lockdown trough" in 2021, the reference period is limited to 2 years (2019/20)! The statistical analysis examines the correlation between the percentage decline in births and the vaccination frequency nine months earlier. The clear negative previous year effect prevents a statistically credible assessment.

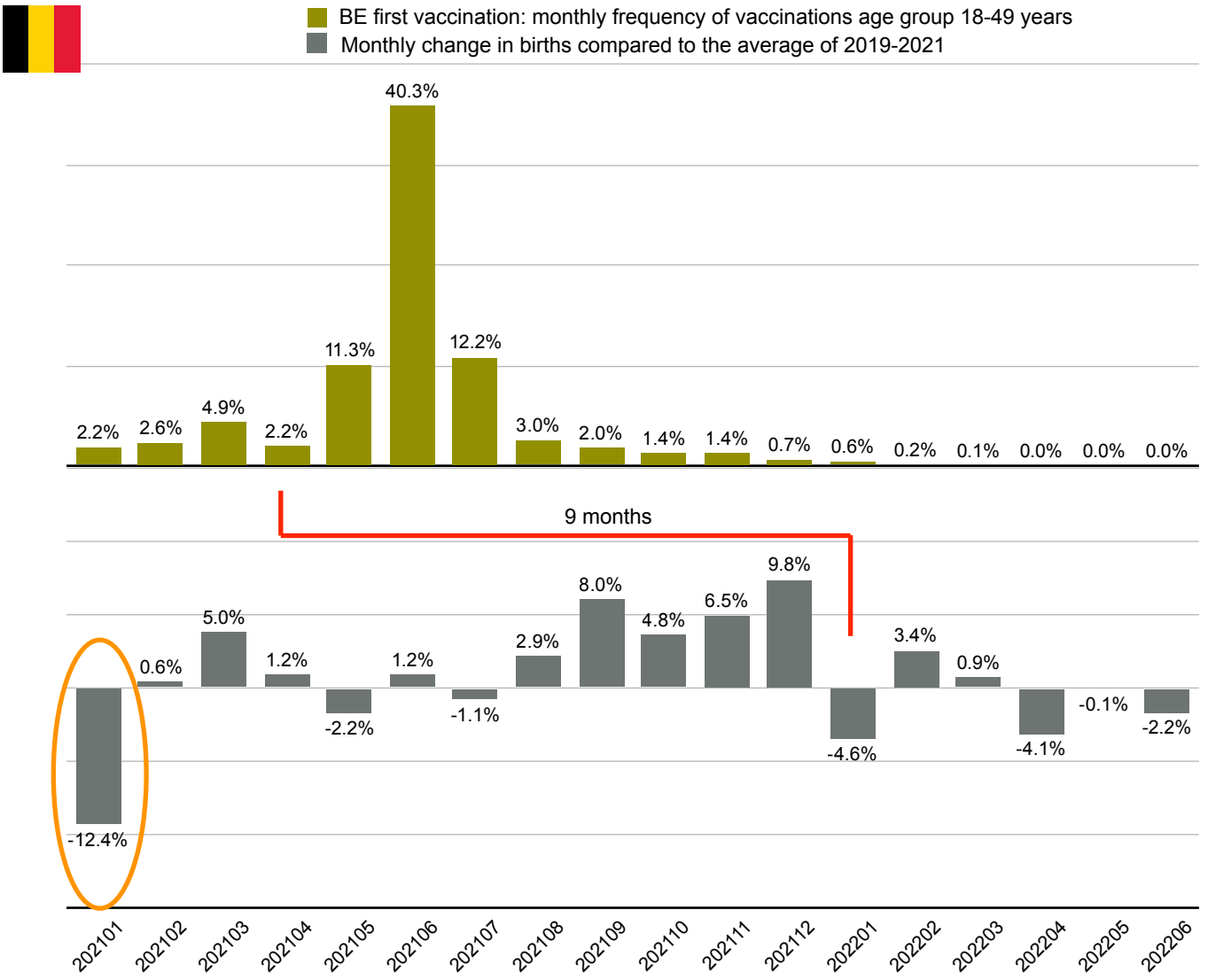


Fig. BE 4, 5

- Due to the "lockdown trough" in January 2021 shown in figures BE 1 to 3, the year 2021 is excluded from the calculation of the previous year's average. While the upper diagram shows the monthly vaccination frequencies, the lower diagram BE 5 shows the percentage comparison to this previous year's average. Marked with an orange ellipse is the decline in births as a result of the lockdown month of April 2020, into which the conception of January 2021 births fall. Until July, the desire to have children seems to have been postponed, before a certain "catch-up effect" can be observed. Against this background, the renewed jump into clearly negative figures from December to January represents a change. However, here no new measures but only the vaccination campaign in the age group 18-49, which started nine months earlier, are to be cited as a new criterion for the change. The question arises as to whether the vaccination possibly caused a decision to have children to be postponed or whether the vaccination itself had an influence on fertility. The former would have to show up again relatively soon in an opposite development, the latter could develop into a longer-term effect that would be strengthened by follow-up vaccinations.

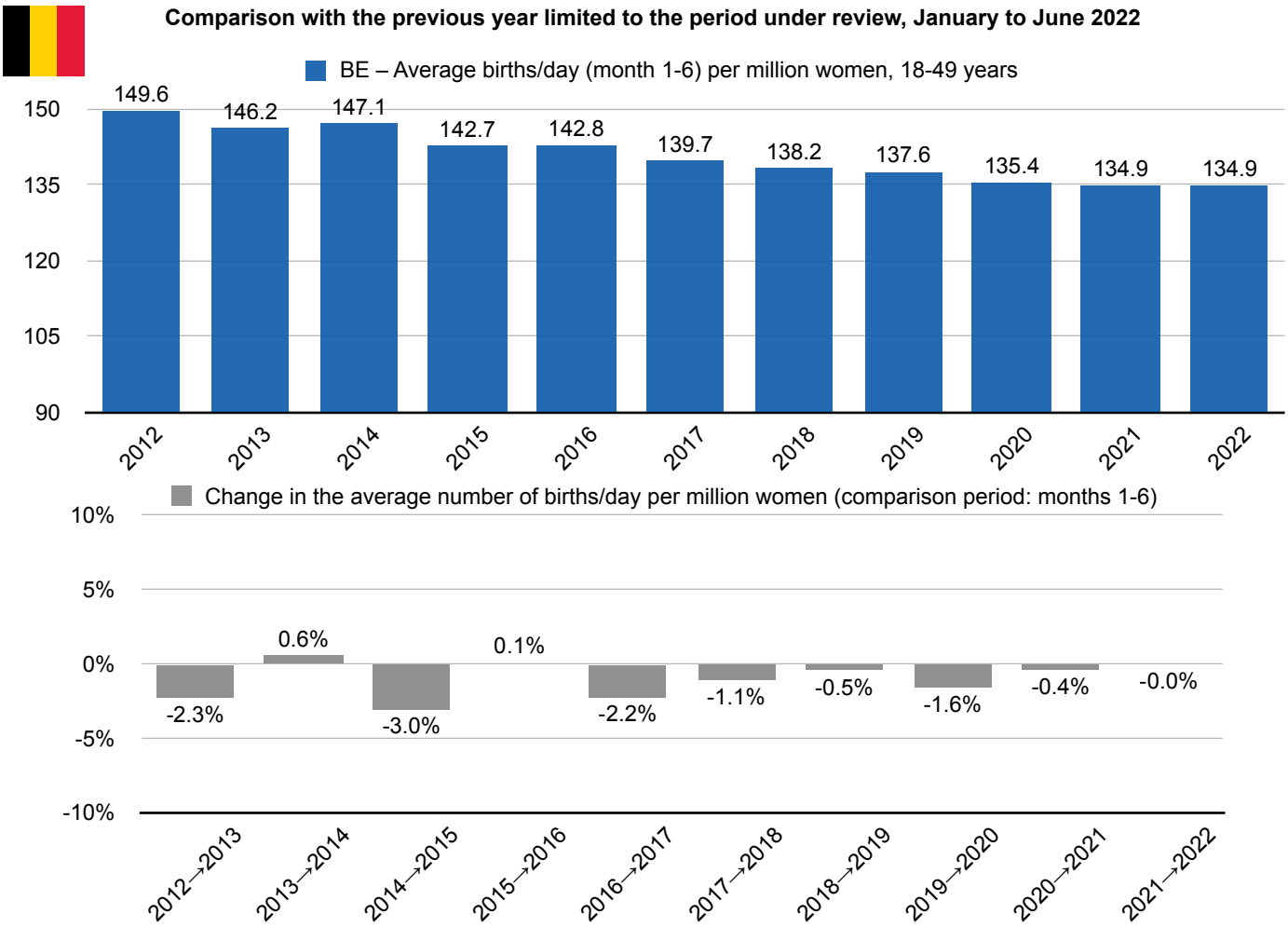


Fig. BE 6, 7

The upper figure BE 6 only records the mean value of daily births in the period January to June of the respective year. Due to the decline in births in the context of the lockdown measures, 2021 falls further compared to 2020. In 2022, birth rates remain at the previous year's low.

The annual percentage changes compared to the previous year thus illustrate on the one hand the decline in births in January and February 2021 ("lockdown trough") and prove that the conditions for fulfilling a wish to have a child have not improved.

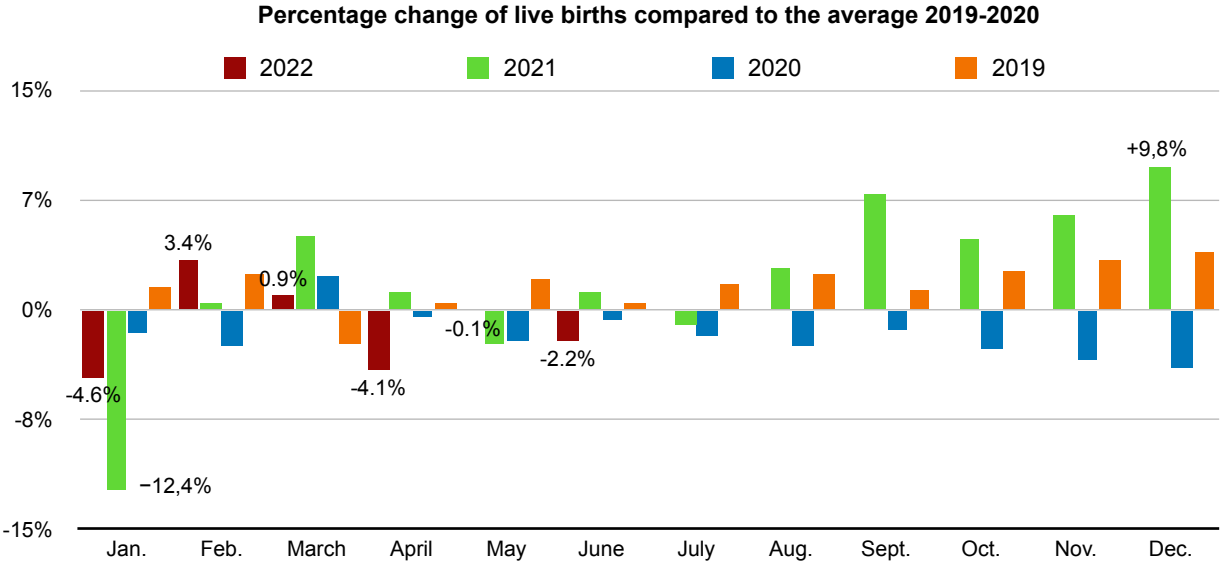


Fig. BE 8

The monthly changes compared to the previous year's average impressively show the effect of the lockdown in January 2021. The abrupt change from rising birth rates at the end of 2021 to −4,6% in January 2022 is 9 months to the vaccination campaign.

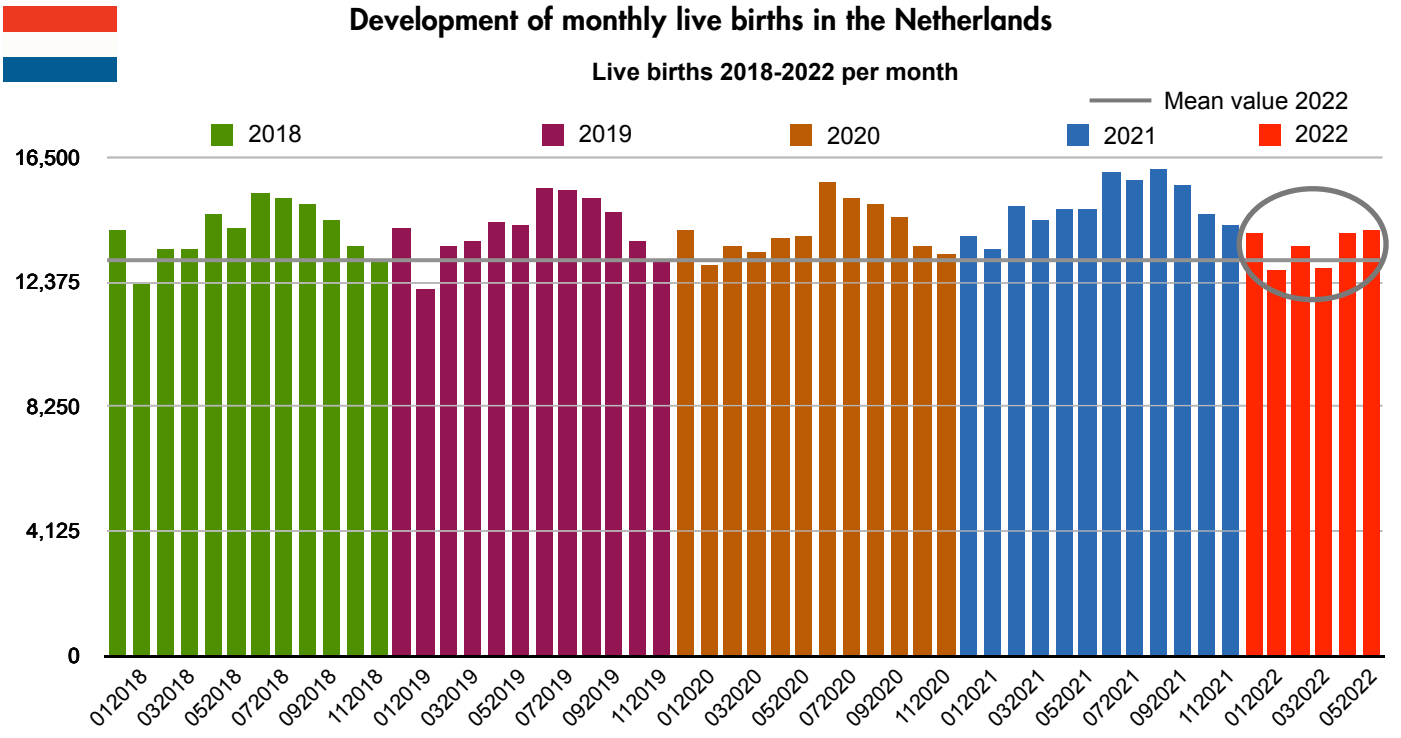


Fig. NL 1

The trend in monthly live births in the Netherlands shows a regular periodic pattern of repetition, with the months of January to June 2022 noticeably falling short of the previous year's values. With the exception of two even lower February values in 2018 and 2019, the mean value of the six provisional monthly data reported so far is below the previous year's level of the individual months, so that the decline in births in the Netherlands is to be regarded as a clear signal.

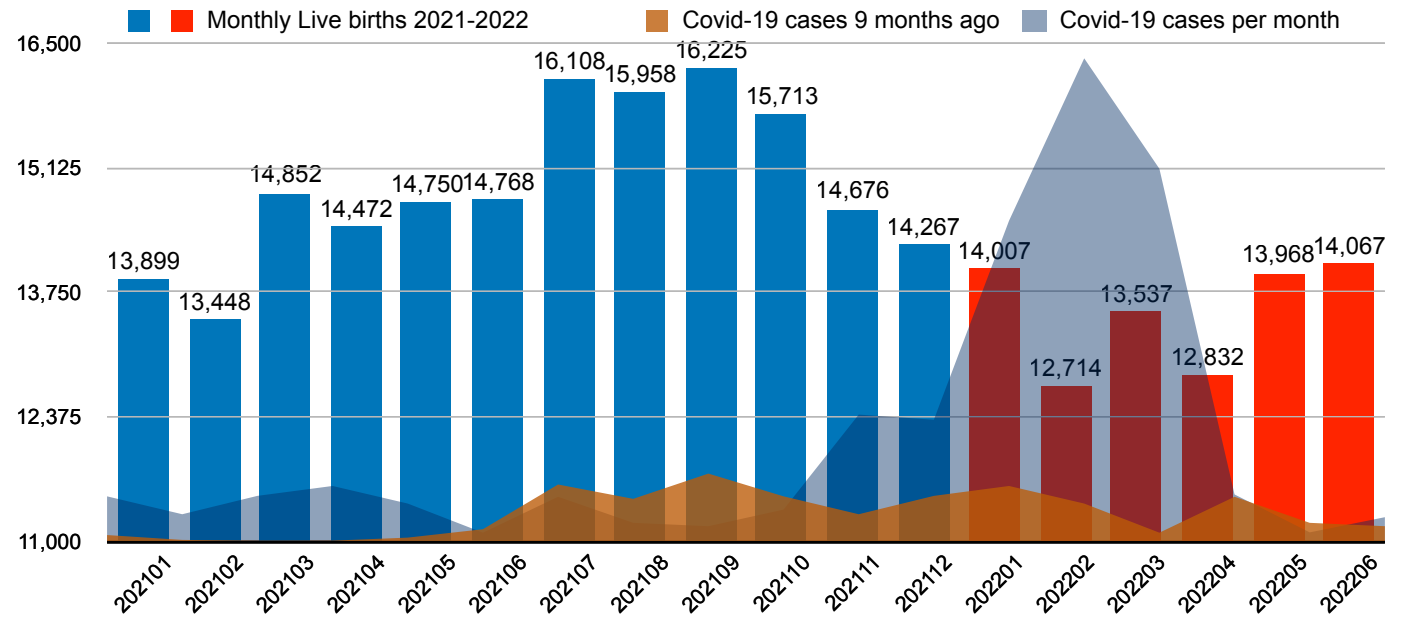


Fig. NL 2

In the time section from 2021 to June 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers nine months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosion of positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on already existing pregnancies, which could be proven by an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows Covid-19 case numbers in the conception period 9 months ago, where case numbers were declining. Thus, a correlation with the decline in births cannot be justified. (ρ (rho) = 0.688, p = 0.019 positive correlation does not explain the decline in births and is to be considered random)

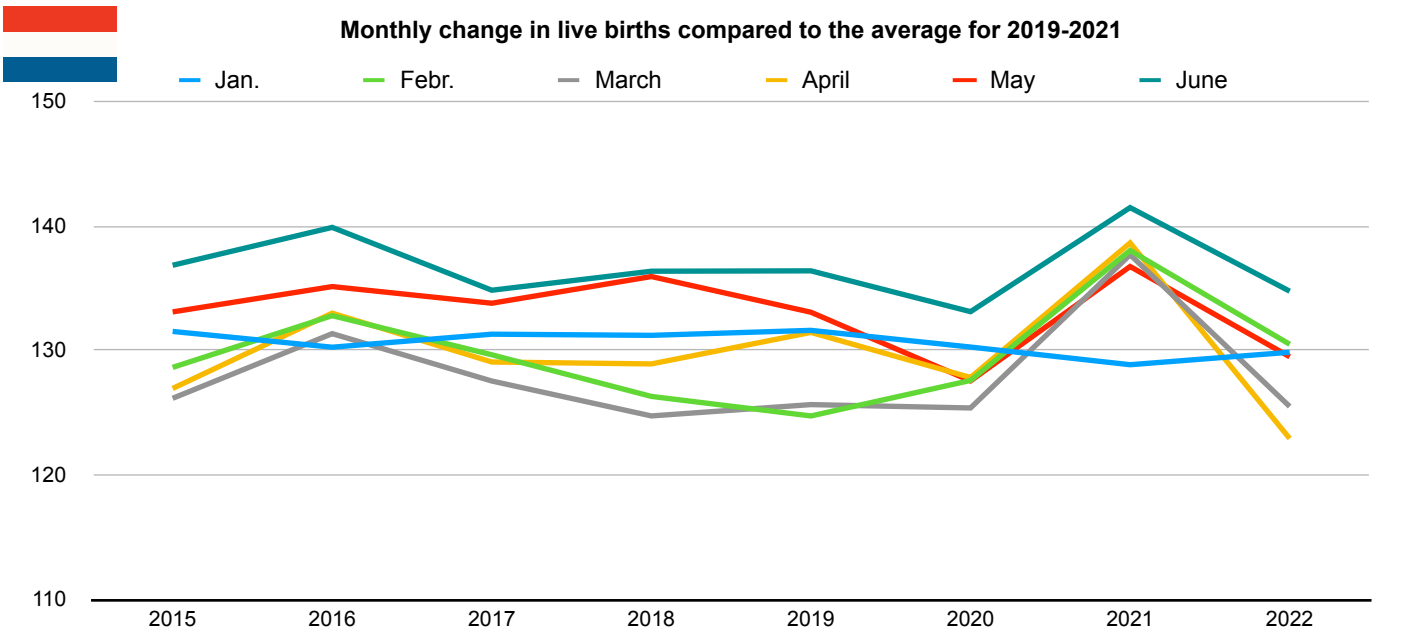


Fig. NL 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- The daily average of births per woman is relatively constant from 2015 to 2020, with a drop in the month of May 2020.
- In 2021, all months except January show a steep increase in the average daily birth rate.
- In 2022, there is an even steeper drop to very low values.

NL – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	140.3	132.5	129.9	131.5	128.6	126.1	126.9	133.1	136.8	142.0
2015-16	135.5	132.8	129.0	130.2	132.8	131.3	133.0	135.1	139.9	146.0
2016-17	135.4	130.1	127.4	131.3	129.6	127.5	129.1	133.8	134.8	140.1
2017-18	136.3	134.7	127.7	131.2	126.3	124.7	128.9	135.9	136.3	142.2
2018-19	134.1	130.5	121.9	131.6	124.7	125.6	131.4	133.0	136.4	143.5
2019-20	136.4	131.1	121.0	130.3	127.6	125.4	127.8	127.5	133.1	144.5
2020-21	134.2	129.5	122.8	128.8	138.0	137.7	138.6	136.7	141.5	149.3
2021-22	145.6	140.6	132.2	129.8	130.5	125.5	122.9	129.5	134.7	
Difference to Ø 19-21	10.76	10.19	10.36	-0.39	0.38	-4.07	-9.71	-2.96	-2.24	
Difference [%]	**8.0%**	**7.8%**	**8.5%**	**-0.3%**	**0.3%**	**-3.1%**	**-7.3%**	**-2.2%**	**-1.6%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**1.8%**	**1.5%**	**1.4%**	**1.5%**	**8.5%**	**33.8%**	**19.2%**	**2.3%**	**2.0%**	

Statistical analysis	Spearman's ρ (rho)	-0.802	strong negative relationship
Interpretation (Cohen)	p-value	0.00150	medium effect

Table NL 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months earlier: There is a statistically very significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

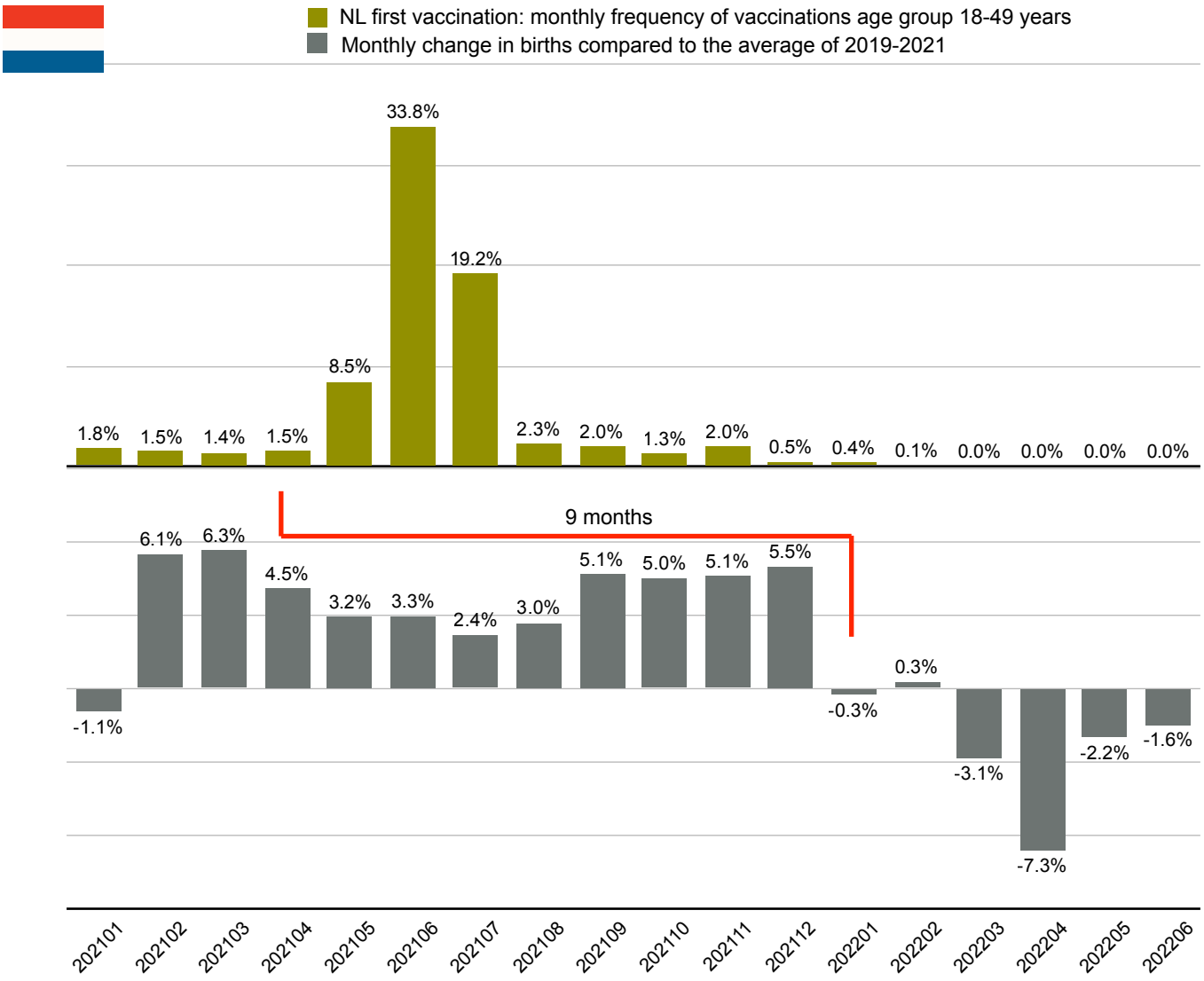


Fig. NL 4, 5

From January 2021 to June 2022, the two charts show the statistically very significant correlation between monthly vaccination frequency of the age group 18-49 and the decline in births (normalised to the change in the number of childbearing women) between 3 and 7 per cent that started nine months later. Such an abrupt decline in the number of births after a permanent increase in 2021 cannot be explained as a "saturation effect" of completed family planning due to the increased number of births in 2021. The following aspects speak for a possible causal connection between the decline in births and the vaccination campaign:

- Temporal coincidence of birth rate decline and high vaccination activity nine months earlier in the age group of women and men aged 18-49.
- Strong negative correlation between vaccination activity and birth rate decline,
- the statistically very high significance of the strong negative correlation,
- Exclusion of a correlation with Covid-19 infection incidence.

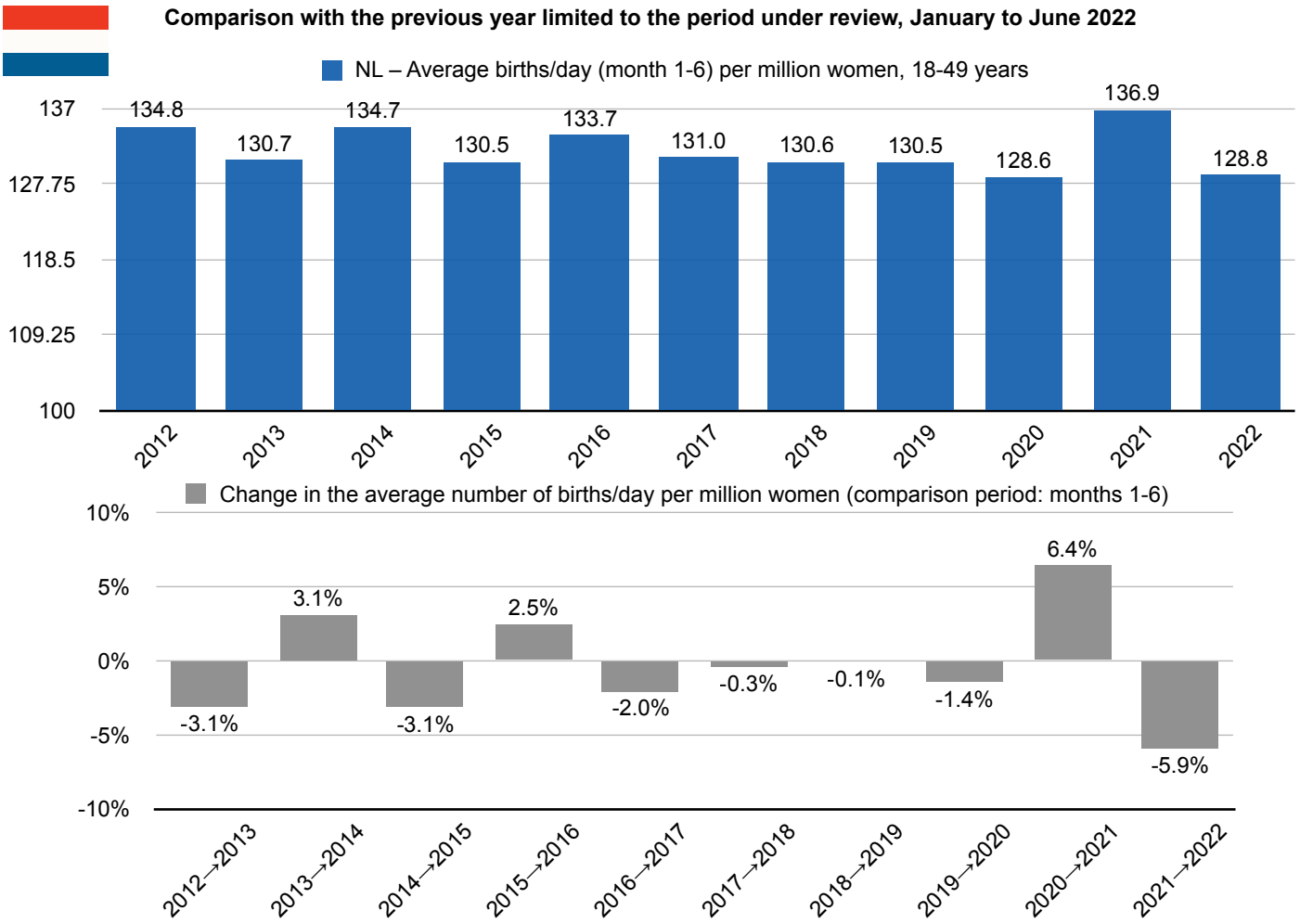


Fig. NL 6, 7

From the upper figure NL 6, a decreasing number of average daily births per 1 million women can be seen from 2012 to 2020. In 2021, there is a significant increase, although I do not have any information about possible changes, e.g. due to migration. The decline in 2022 goes down to near the previous low from 2020.

The annual change in the normalised daily average value in the period from January to June is shown by the grey columns in the lower figure NL 7. After the constant number of births per calendar day and 1 million women (18-49 years), the decline in births already observed in Germany and Switzerland is also confirmed in the Netherlands in the temporal context of vaccination.

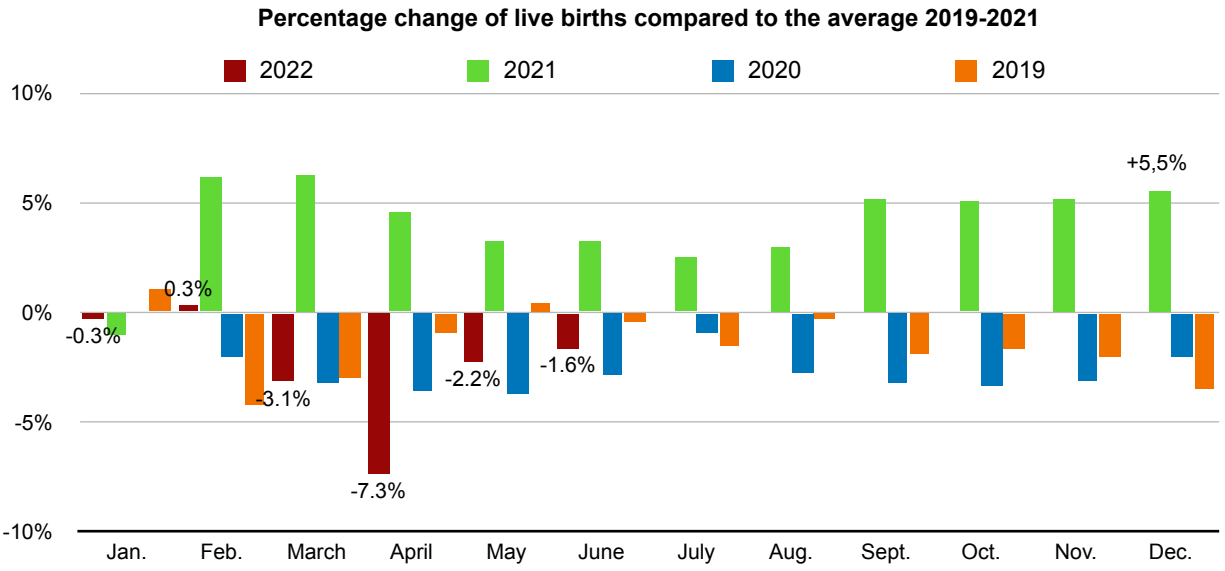


Fig. NL 8

The monthly changes compared to the previous year's average impressively show the abrupt change from rising birth rates until December 2021 to -0.3% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

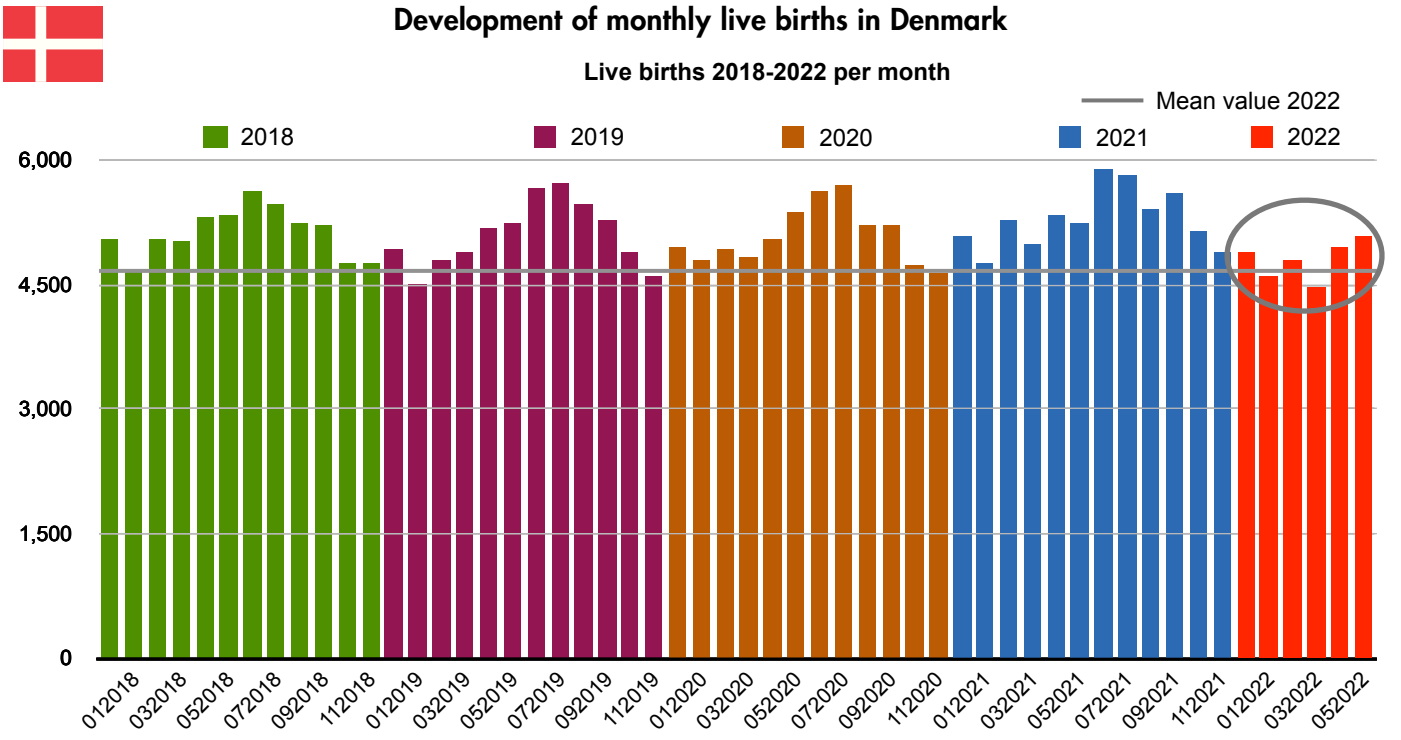


Fig. DK 1

The pattern of monthly live births in Denmark shows a regular periodic pattern of recurrence, with the months of January to June 2022 noticeably falling below the previous year's levels. The mean value of the six provisional monthly data reported so far is below the previous year's level of the individual months, with the exception of two lower February and December values in 2019, so that the decline in births in Denmark is to be regarded as a clear signal.

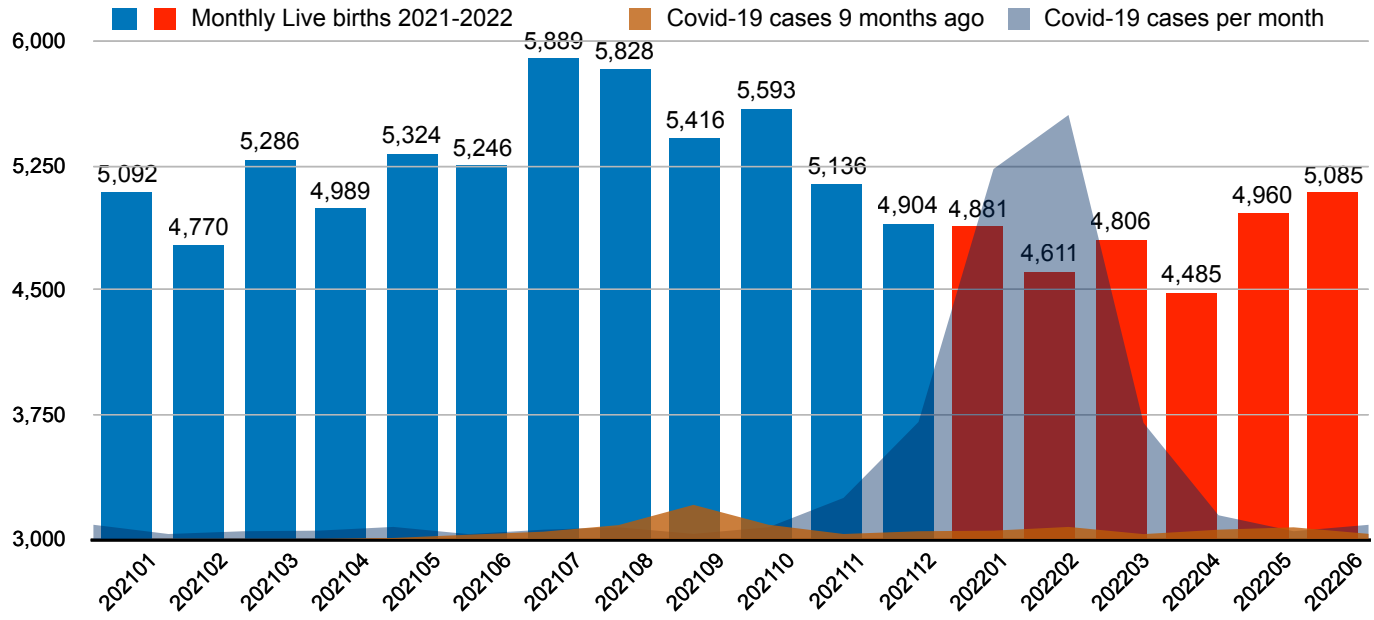


Fig. DK 2

In the time section from 2021 to May 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosion of positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on already existing pregnancies, which could be proven by an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a very low level. Thus, a correlation cannot be justified. (ρ (rho) = 0.173, p = 0.6115 - no significance).

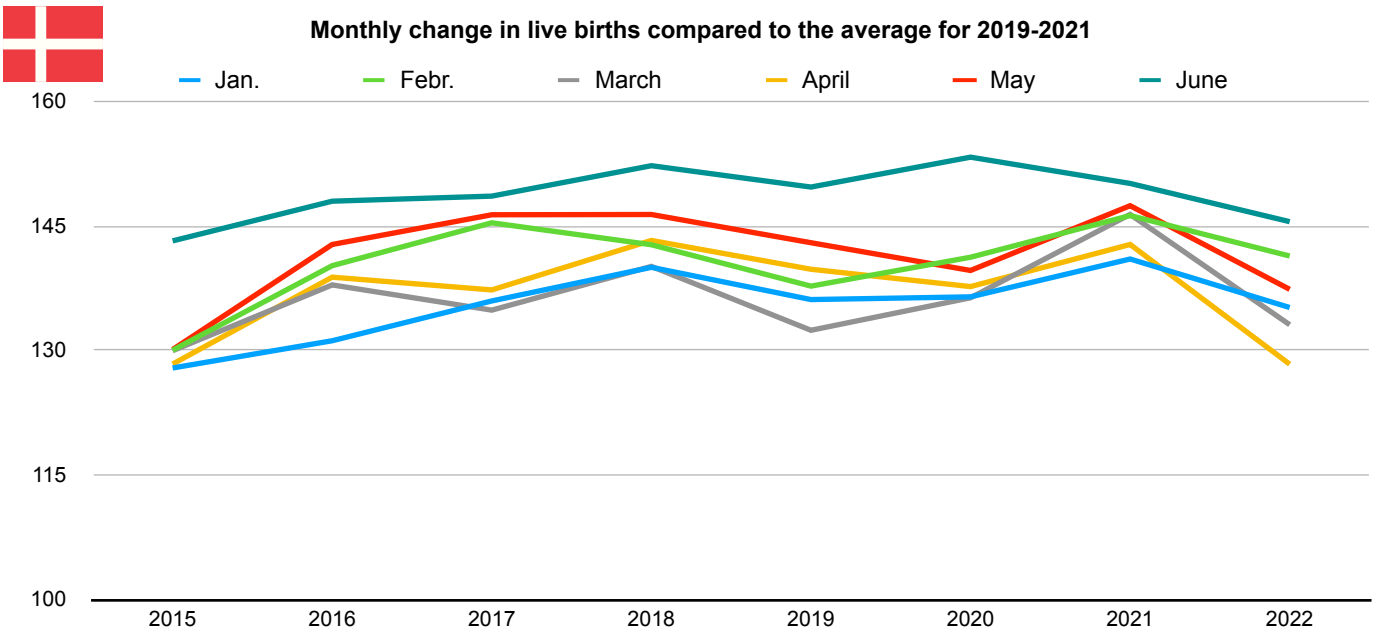


Fig. DK 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- A significant increase from 2015 to 2017, no evidence is known about changes in the population structure.
- A noticeable increase in the five months shown in 2021, which is above previous years.
- A significant decrease in the months of January to June, which can be seen as a clear signal lasting over six months.

DK – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	136.5	131.4	121.7	127.9	130.0	129.9	128.3	130.1	143.2	145.0
2015-16	144.4	138.5	128.7	131.1	140.2	137.9	138.8	142.7	148.0	159.6
2016-17	147.9	139.9	129.5	135.9	145.3	134.8	137.3	146.3	148.6	149.5
2017-18	149.5	142.6	134.4	140.0	142.7	140.1	143.2	146.3	152.2	155.9
2018-19	144.2	135.9	131.5	136.1	137.7	132.4	139.8	142.9	149.7	156.7
2019-20	145.7	139.2	127.3	136.4	141.2	136.3	137.7	139.6	153.3	155.4
2020-21	143.7	134.7	127.9	141.0	146.2	146.4	142.7	147.4	150.1	163.1
2021-22	154.9	146.9	135.8	135.1	141.3	133.1	128.3	137.3	145.5	
Difference to Ø 19-21	10.33	10.32	6.87	-2.69	-0.37	-5.29	-11.73	-5.99	-5.51	
Difference [%]	**7.2%**	**7.6%**	**5.3%**	**-2.0%**	**-0.3%**	**-3.8%**	**-8.4%**	**-4.2%**	**-3.7%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**1.6%**	**2.6%**	**2.8%**	**0.8%**	**1.6%**	**33.0%**	**31.3%**	**5.1%**	**1.3%**	

Statistical analysis	Spearman's ρ (rho)	-0.427	moderate negative relationship
Interpretation (Cohen)	p-value	0.09497	no effect

Table DK 1

The statistical analysis shows a non-significant mean negative correlation between the level of the vaccination rate and the decline in the number of births occurring nine months later! This numerical evaluation contradicts the phenomenological effect shown in Figures DK 4-7 and is probably due to the inconsistent development of the 3 previous years.

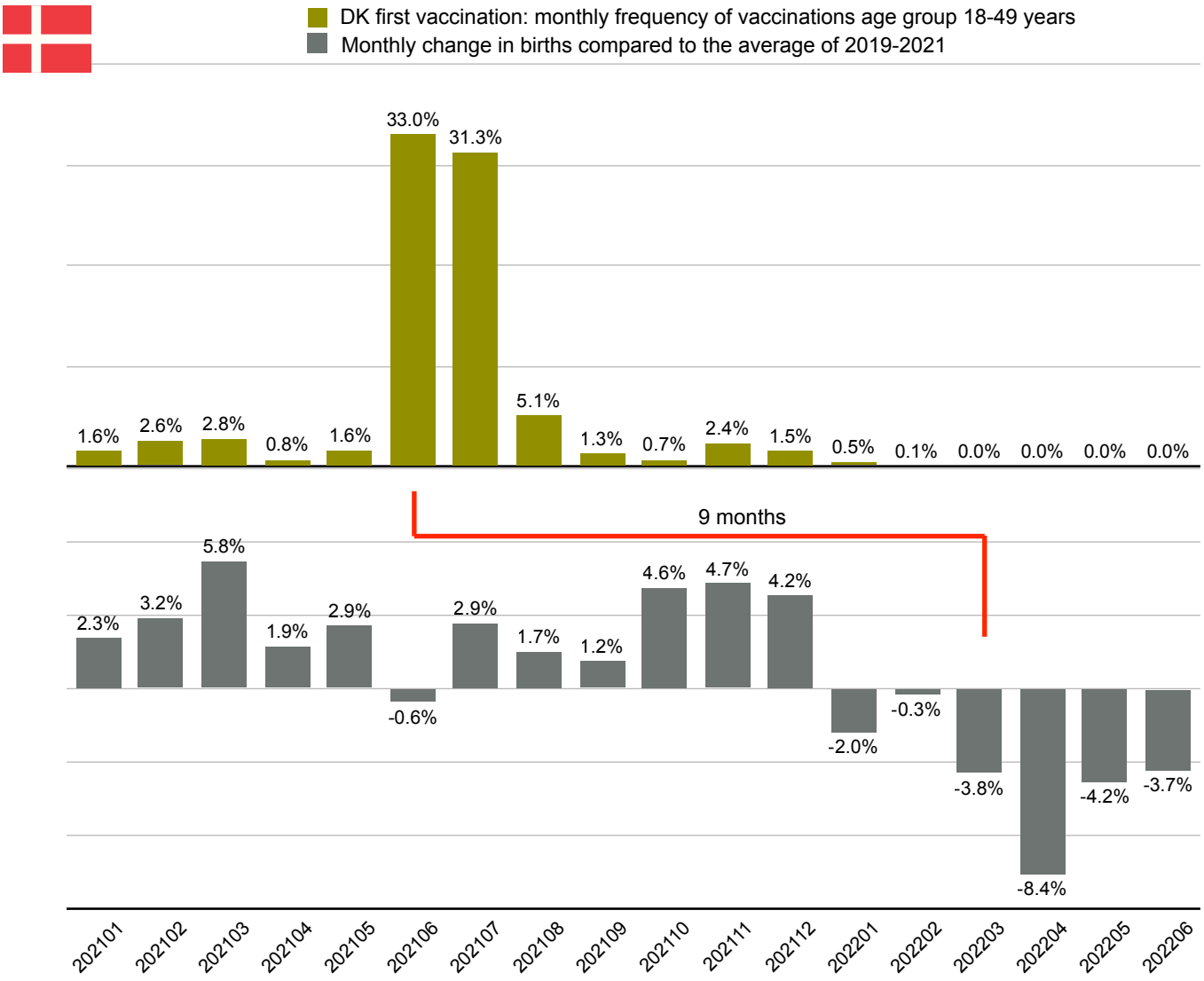


Fig. DK 4, 5

From January to June 2022, the two graphs show the temporal relationship between the nine-month monthly vaccination frequencies and the birth trend, which in Denmark shows a temporal relationship between the late but very rapid vaccination campaign in the 18-49 age group in June and July 2021 and the decline in births from January 2022 onwards. The following details should be noted in this context:

- The strong short-term vaccination frequencies in June and July 2021 can be attributed to the decline in births in March and April 2022.
- The unusually fast action is probably one reason why no correlation can be shown with the slower reacting birth declines.

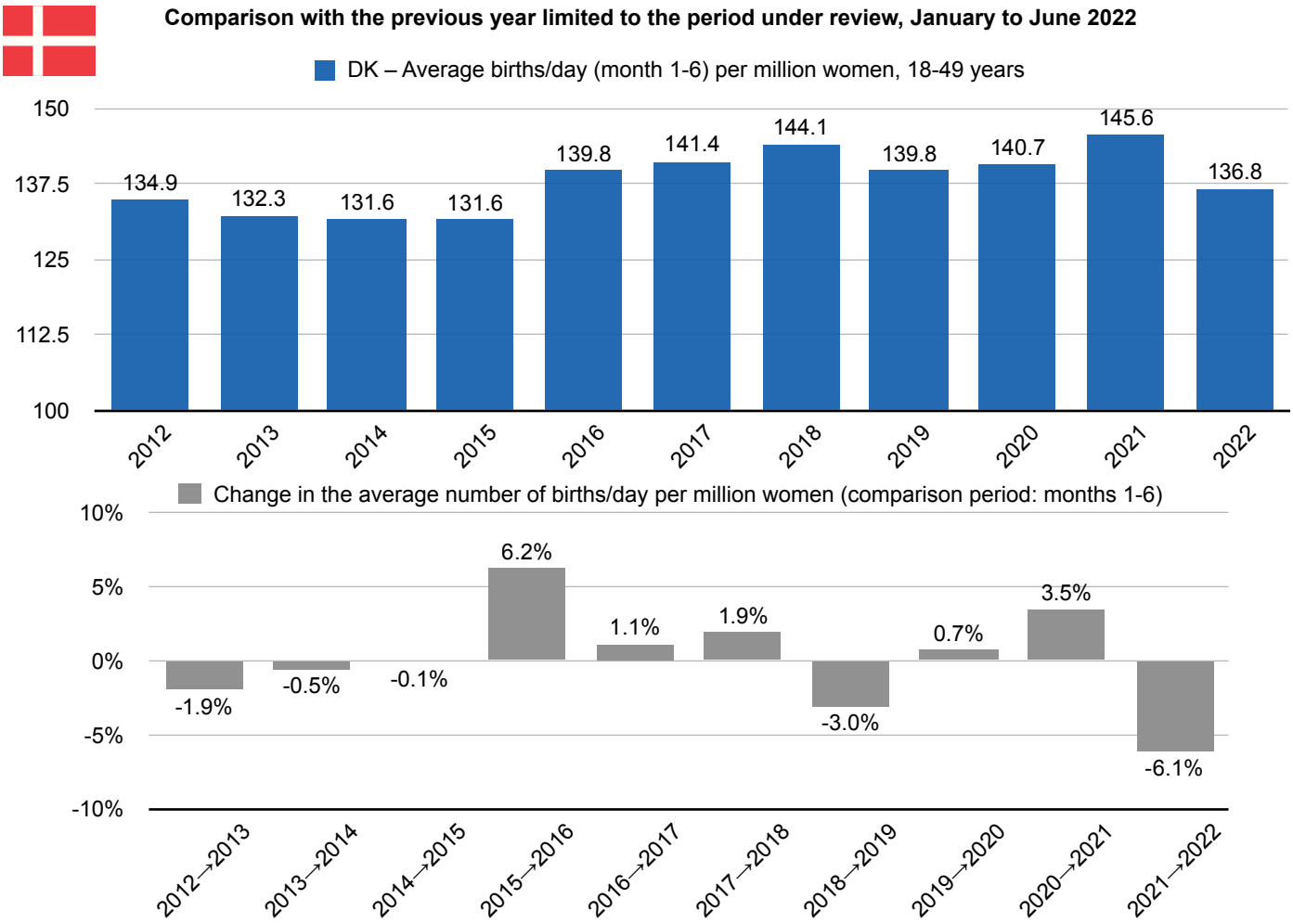


Fig. DK 6, 7

Figure DK 6 above shows a decreasing number of average daily births per 1 million women from 2012 to 2015. Possibly in connection with migration movements, the figure rises significantly in 2016. After a trend decline, a new record value occurs in 2021, followed by a significant decline of 6.1% in 2022 . The decline in 2022 goes back to before the 2016 level.

The annual change in the normalised daily average value in each case in the period from January to June is shown by the grey columns in Figure DK 7 below. Despite normalization to the population change, the clear plus in 2016 can also be seen here, and the change of year from 2021 to 2022 stands out with a clear minus.

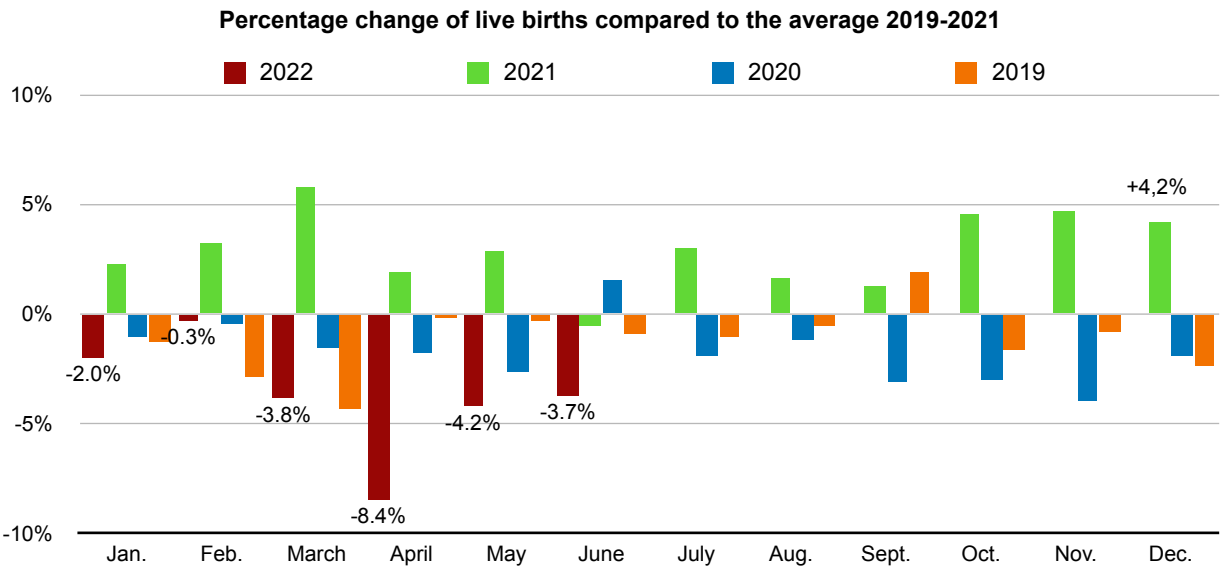


Fig. DK 8

The monthly changes compared to the previous year's average impressively show the abrupt change from rising birth rates until December 2021 to -2.0% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

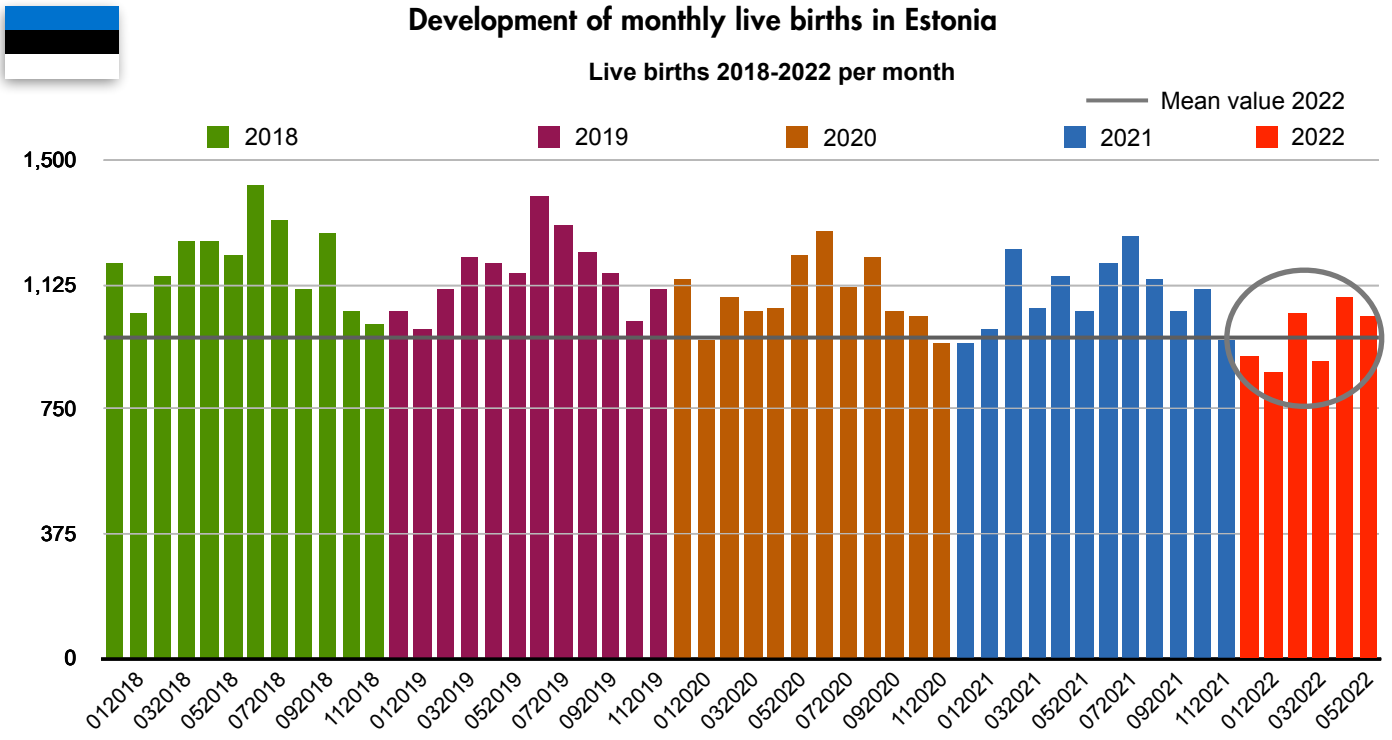


Fig. EE 1

The course of monthly live births in Estonia shows a regular periodic repetition pattern with a slight downward trend, whereby in the months January to June 2022 the previous year's values are noticeably undercut. The mean value of the six provisional monthly data reported so far is below the previous year's level of the individual months with minimal underruns (12/2020, 01/2021, 12/2021), so that the decline in births in Estonia is to be regarded as a very clear signal.

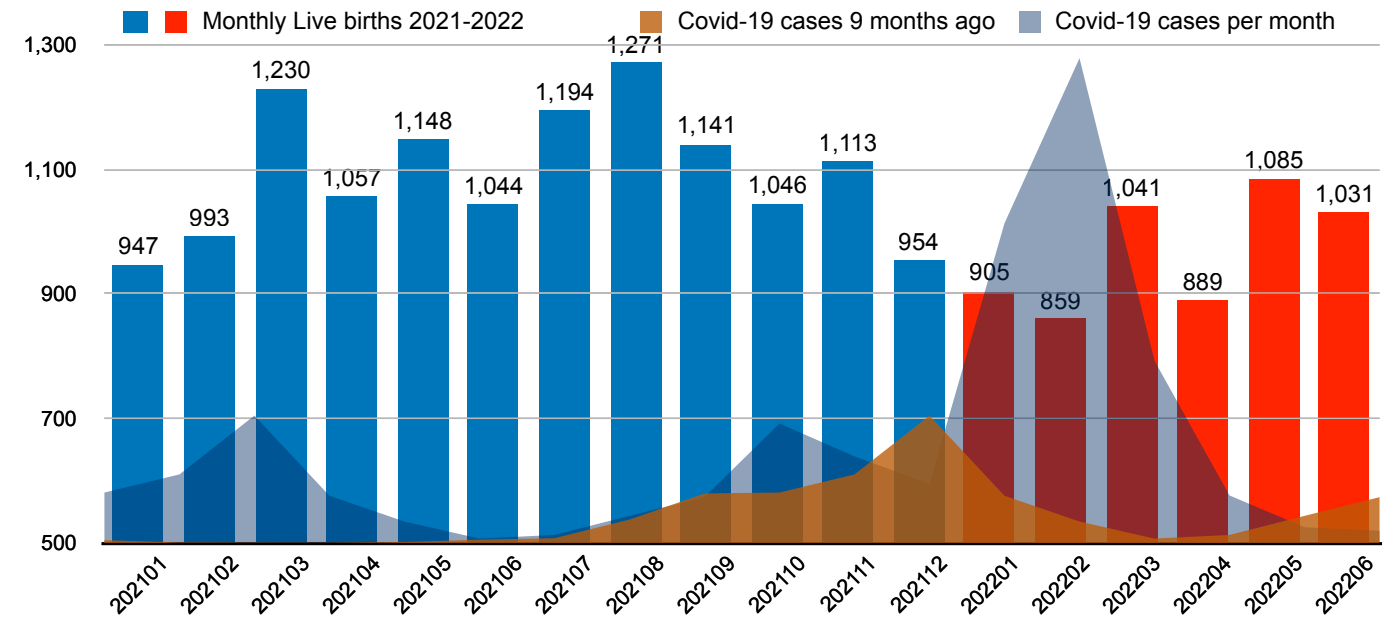


Fig. EE 2

In the time section from 2021 to May 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosive increase in positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on existing pregnancies, that could be proven in an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. Thus, a correlation cannot be justified. (ρ (rho) = 0.464, p = 0.4841 - no significance)

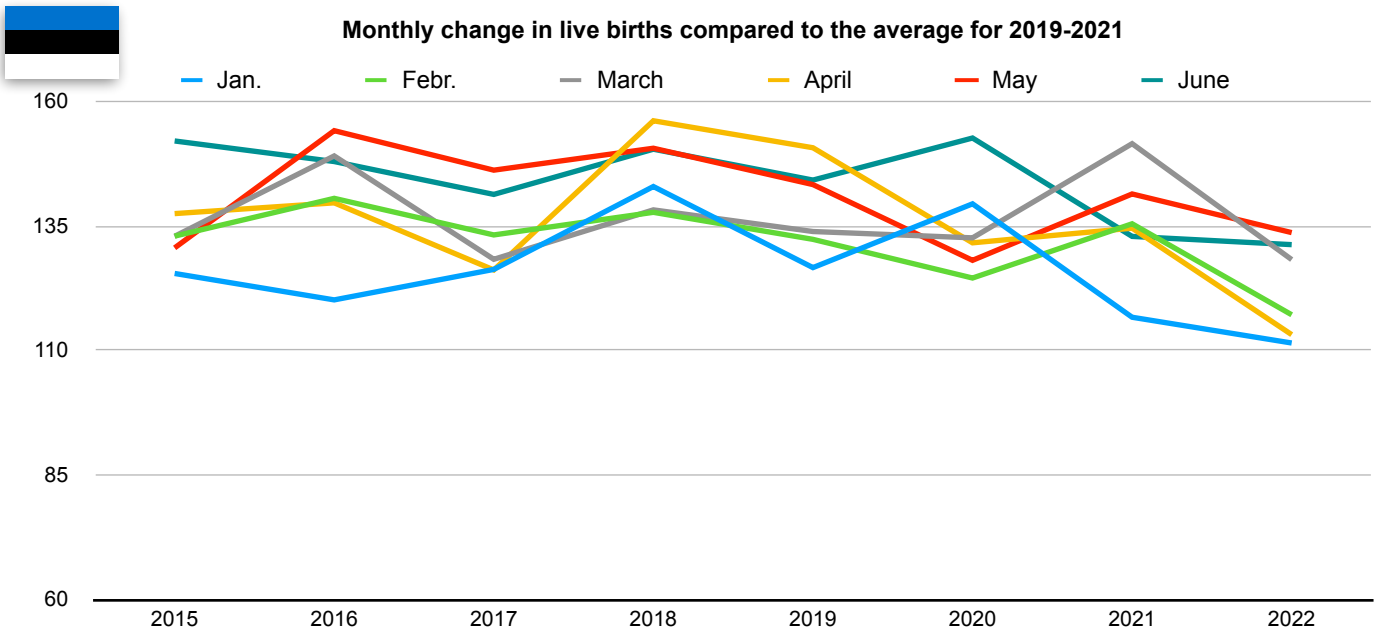


Fig. EE 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Two phenomena can be seen:

- A choppy course from 2015 to 2021 at a constant level until 2021.
- A clear decline in the months of January to June 2022, persisting over six months as a clear signal.

EE – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	130.8	112.8	125.7	125.4	132.9	132.9	137.4	130.5	152.0	159.8
2015-16	134.5	132.8	127.9	120.1	140.5	149.0	139.6	154.1	147.9	138.3
2016-17	129.8	132.3	116.6	126.2	133.1	128.3	126.1	146.1	141.3	147.9
2017-18	136.1	137.2	119.1	142.9	137.7	138.2	156.1	150.5	150.4	170.5
2018-19	154.0	129.9	120.5	126.6	132.3	133.8	150.6	143.2	144.2	168.0
2019-20	139.5	126.9	134.2	139.4	124.5	132.6	131.6	128.0	152.6	156.9
2020-21	127.3	129.9	115.8	116.6	135.4	151.5	134.5	141.4	132.8	147.0
2021-22	128.8	141.6	117.5	111.4	117.1	128.2	113.1	133.6	131.2	
Difference to Ø 19-21	-11.48	12.72	-6.04	-16.08	-13.60	-11.09	-25.78	-3.94	-12.01	
Difference [%]	**-8.2%**	**9.9%**	**-4.9%**	**-12.6%**	**-10.4%**	**-8.0%**	**-18.6%**	**-2.9%**	**-8.4%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**1.7%**	**2.5%**	**5.1%**	**4.1%**	**15.3%**	**11.2%**	**8.1%**	**9.2%**	**3.3%**	

Statistical analysis	Spearman's ρ (rho)	-0.582	strong negative relationship
Interpretation (Cohen)	p-value	0.03021	small effect

Table EE 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a statistically significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

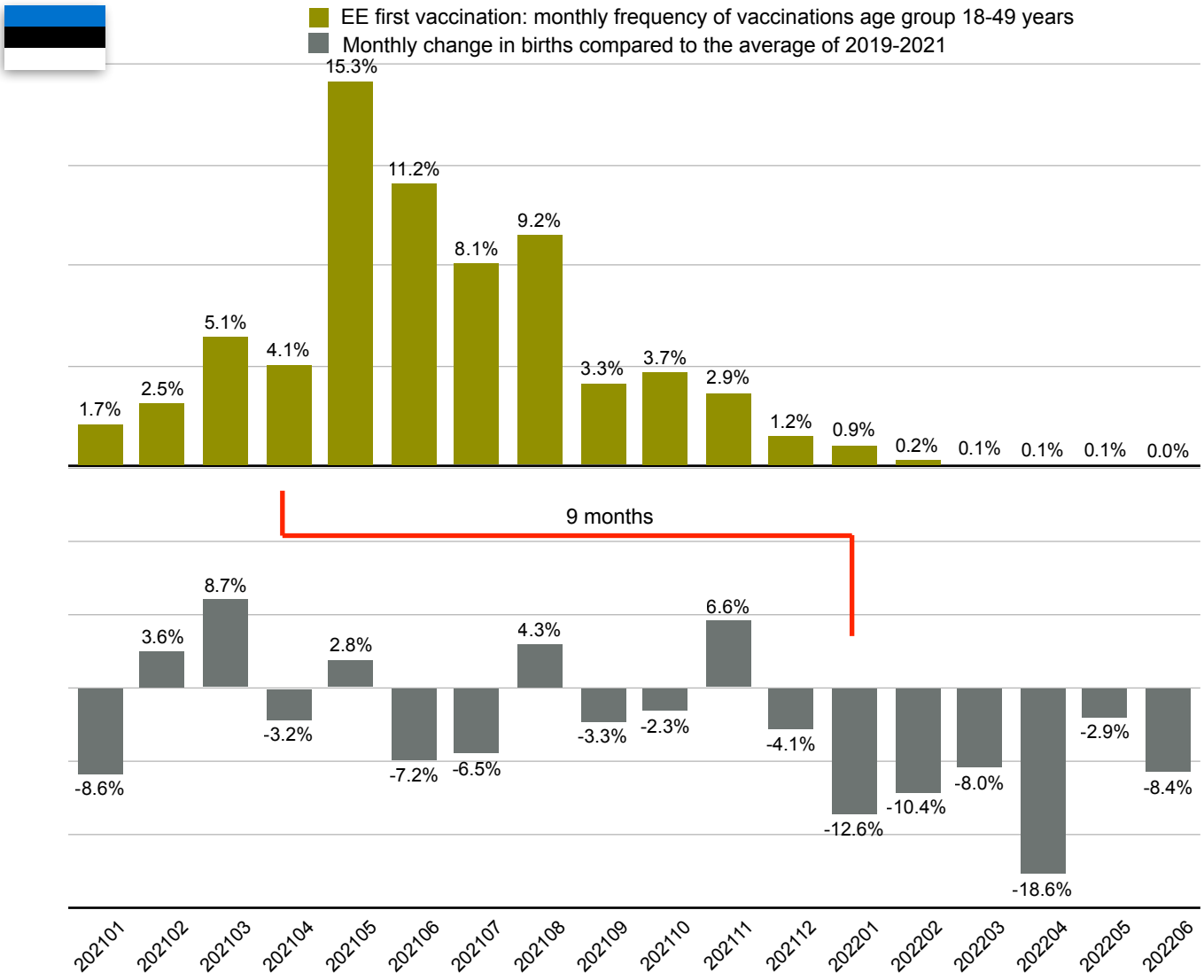


Fig. EE 4, 5

From January 2021 to June 2022, the two graphs show the temporal relationship between the nine-month monthly vaccination frequencies and the decline in births in Estonia from January 2022 onwards, with the following details.:

- The unsettled picture of months with increasing and decreasing changes in 2022 to permanently decreasing numbers between 8 and 18.6%.
- A temporal correlation between vaccination and declining births can be shown.

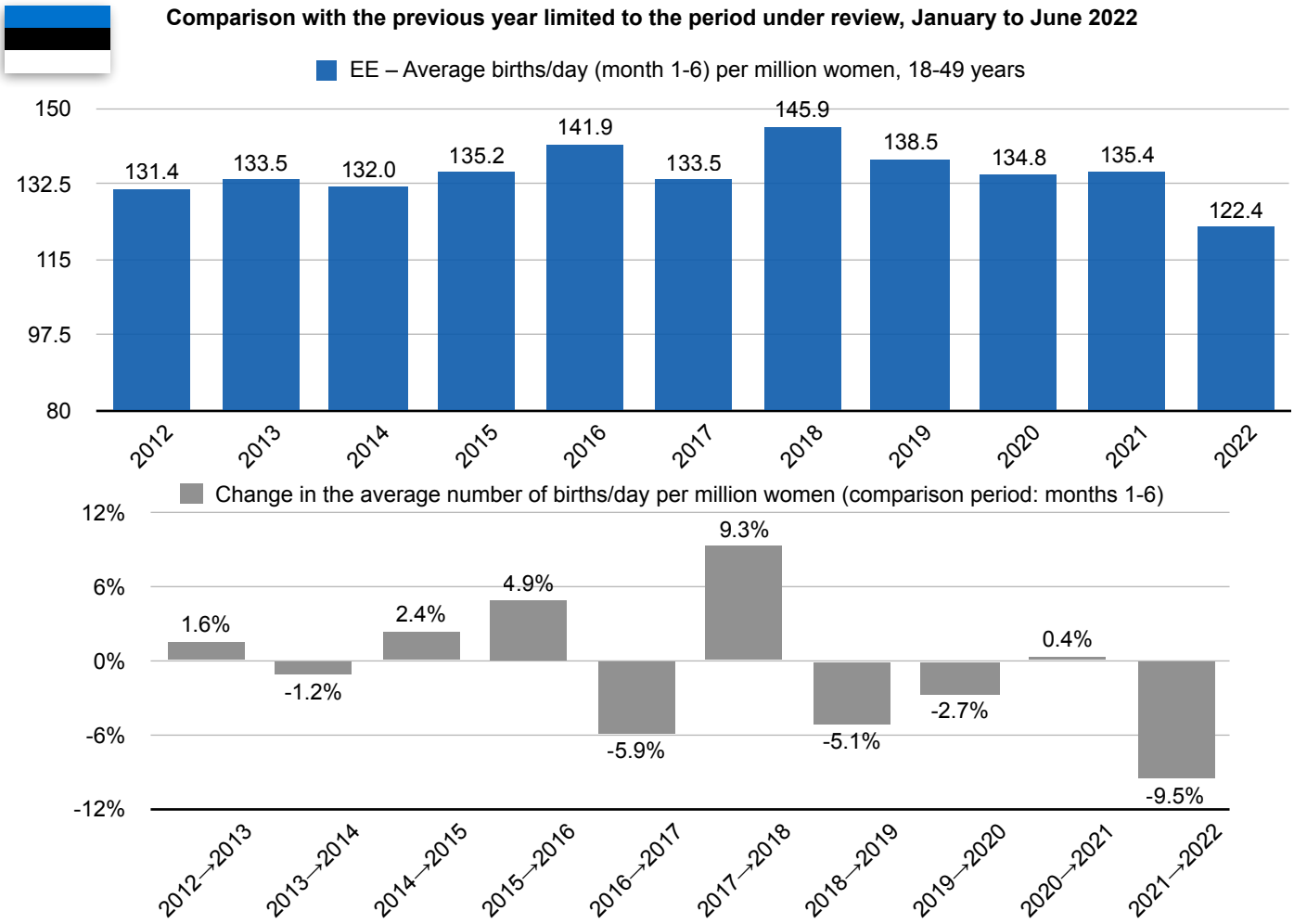


Fig. EE 6, 7

From the upper figure EE 6, a slightly increasing number of average daily births per 1 million women can be seen from 2012 to 2021 with two outliers in 2016 and 2018. A connection with migration movements and a higher birth rate of migrants would have to be discussed in this regard. A significant decline to 122.4 births per day standardised to one million women shows a low that falls below the previous minimum from 2012 by 6.8%.

The annual change in the normalised daily average in each case in the period from January to June is shown by the grey columns in Figure EE 7 below. Despite normalization to the population change, the clear plus in 2016 and 2018 can also be seen here, and the turn of the year from 2021 to 2022 stands out with a clear minus of -9.5%.

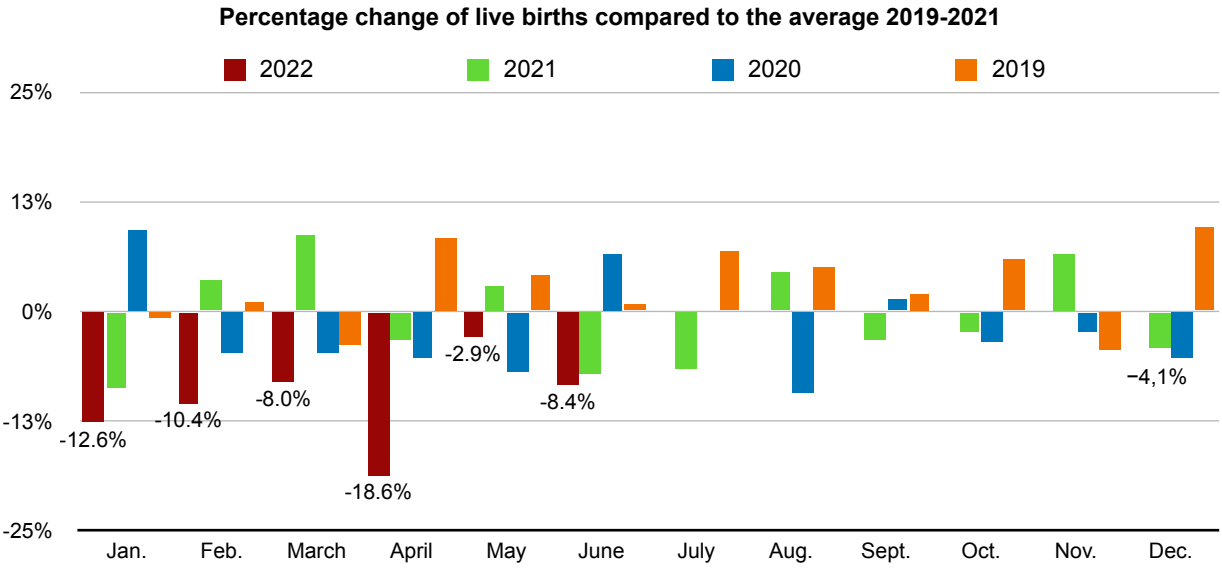


Fig. EE 8

The monthly changes compared to the previous year's average clearly show the abrupt change from fluctuating birth rates until December 2021 to -12.6% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

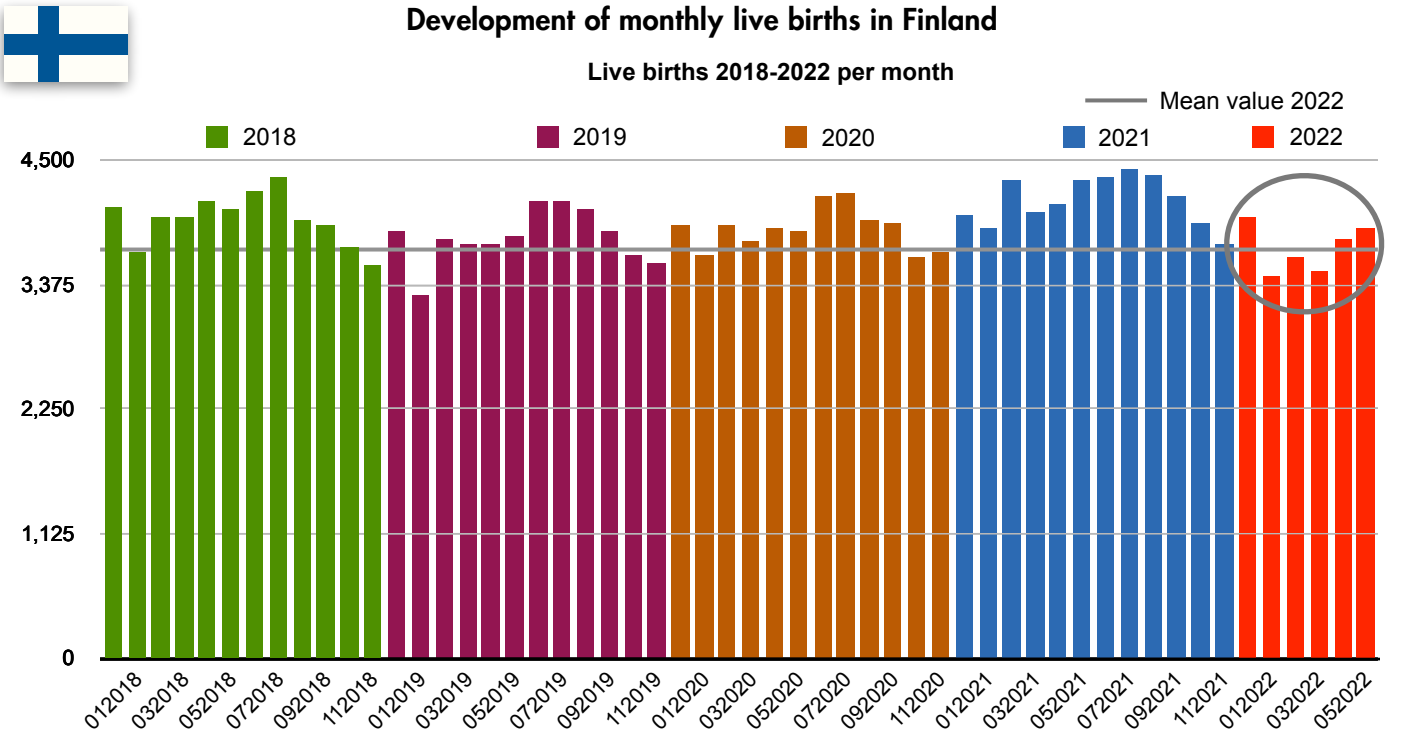


Fig. FI 1

The years 2018 and 2021 show higher birth rates than 2019 and 2020, with the course of monthly live births in Finland showing a regular monthly repetition pattern. In 2021 there is a noticeable increase, whereas in the months February to June 2022 the previous year's values are clearly undercut. The mean value of the six provisional monthly data reported so far is below the previous year's level of the individual months with minimal undershoots (12/2018, 02,11,12/2019, 11,12/2021), so that the decline in births in Finland, which starts one month later than in the countries considered so far, is to be regarded as a very clear signal.

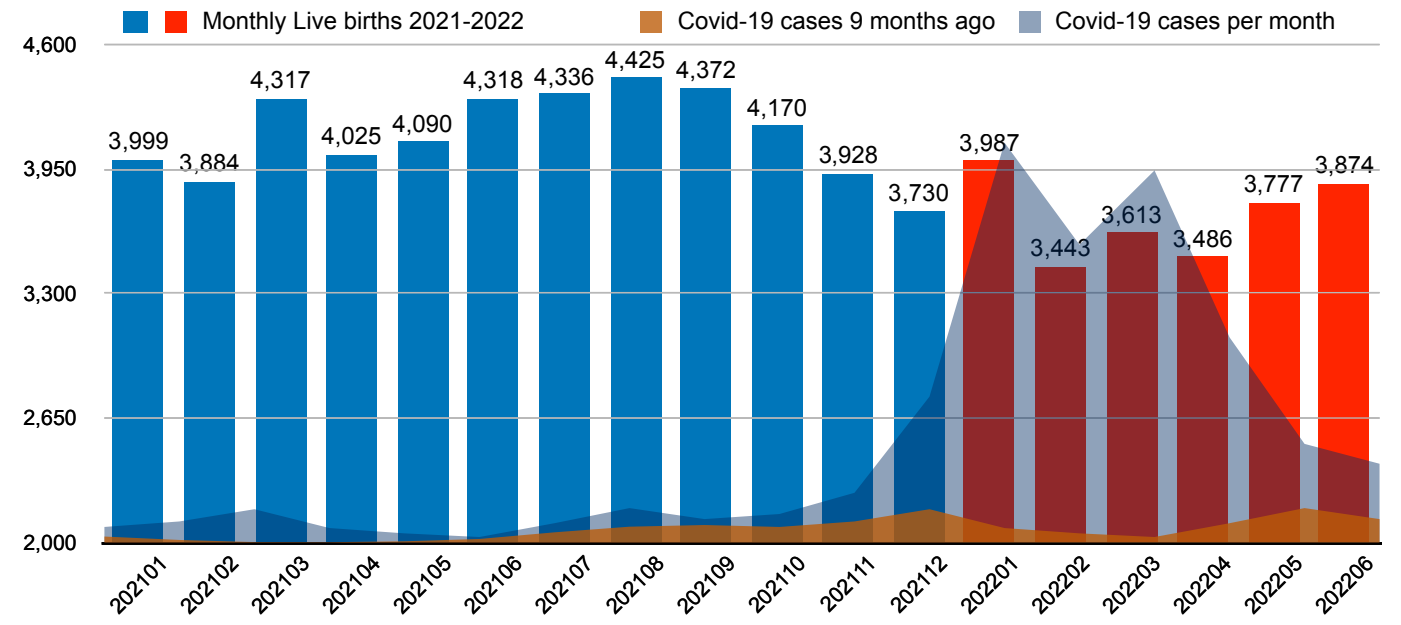


Fig. FI 2

In the time section from 2021 to May 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosive increase in positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on existing pregnancies, that could be proven in an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. Thus, a correlation cannot be justified. (ρ (rho) = 0.218, p = 0.5182 - no significance).

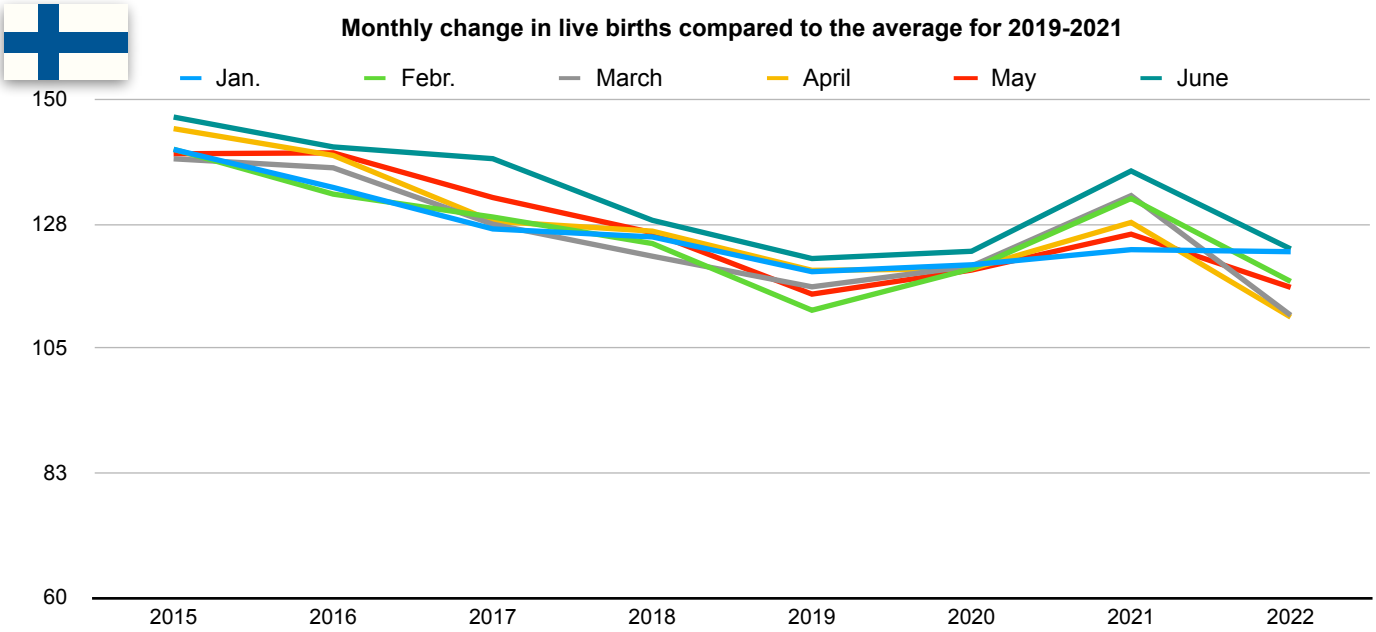


Fig. FI 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- With a relatively constant number of women from 18 to 49, a clear drop in average daily births from 2015 to 2020 is surprising, which can only be explained by general changes in family planning without further background.
- A noticeable increase in the six months shown in 2021, which clearly contrasts with the previous development.
- A clear decline in the months of January to June, which can be seen as a clear signal lasting over a period of six months.

FI – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	144.3	131.9	132.0	140.9	140.9	139.2	144.7	140.1	146.8	151.5
2015-16	139.6	140.6	129.5	134.0	132.8	137.6	139.8	140.3	141.4	140.2
2016-17	133.9	125.0	116.5	126.6	128.7	127.4	127.9	132.2	139.2	140.7
2017-18	130.3	122.1	116.5	125.1	123.9	121.6	126.1	125.9	128.1	129.2
2018-19	119.8	117.6	108.8	118.8	111.9	116.1	119.1	114.8	121.2	126.8
2019-20	118.2	115.9	110.0	120.1	119.3	119.8	119.3	119.1	122.5	128.6
2020-21	120.7	114.6	112.7	122.8	132.1	132.6	127.7	125.6	137.0	133.2
2021-22	128.1	124.6	114.5	122.4	117.1	111.0	110.6	116.0	122.9	
Difference to Ø 19-21	8.49	8.63	4.08	1.87	-4.03	-11.88	-11.42	-3.84	-3.98	
Difference [%]	**7.1%**	**7.4%**	**3.7%**	**1.6%**	**-3.3%**	**-9.7%**	**-9.4%**	**-3.2%**	**-3.1%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**2.5%**	**1.0%**	**1.4%**	**5.6%**	**13.8%**	**31.4%**	**14.1%**	**6.6%**	**2.6%**	

Statistical analysis	Spearman's ρ (rho)	-0.9182	strong negative relationship
Interpretation (Cohen)	p-value	0.000033	large effect

Table FI 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months earlier: There is a highly statistically significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

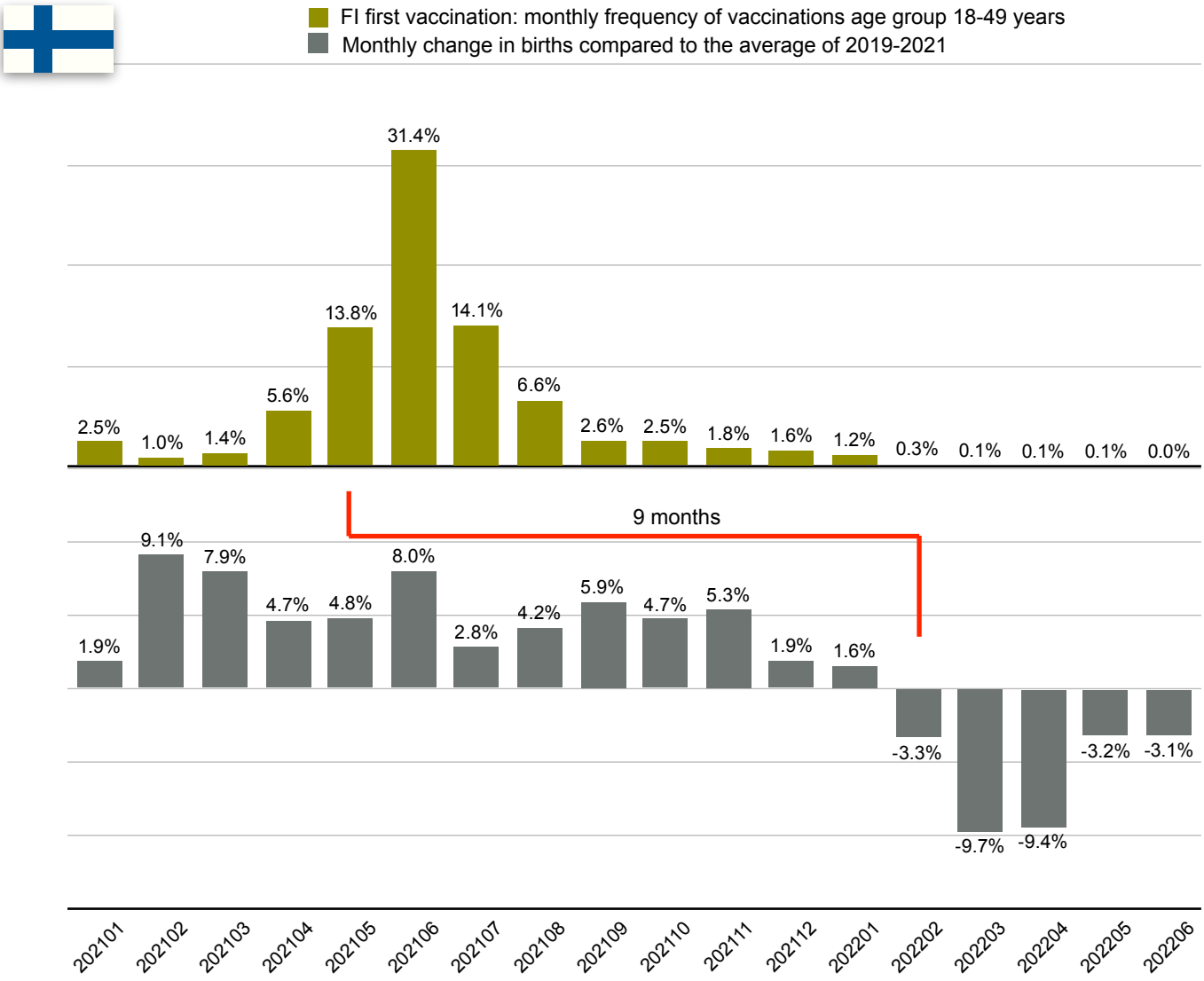


Fig. FI 4, 5

From January 2021 to June 2022, the two graphs show the temporal relationship between the nine-month monthly vaccination frequencies and the decline in births in Finland as of January 2022. The following details should be noted here:

- With the peak of the vaccination campaign, a permanent percentage decline in the number of births begins recognisably nine months later.
- The abrupt change from rising to falling birth rates cannot be interpreted as a saturation effect. This would certainly not occur so suddenly.

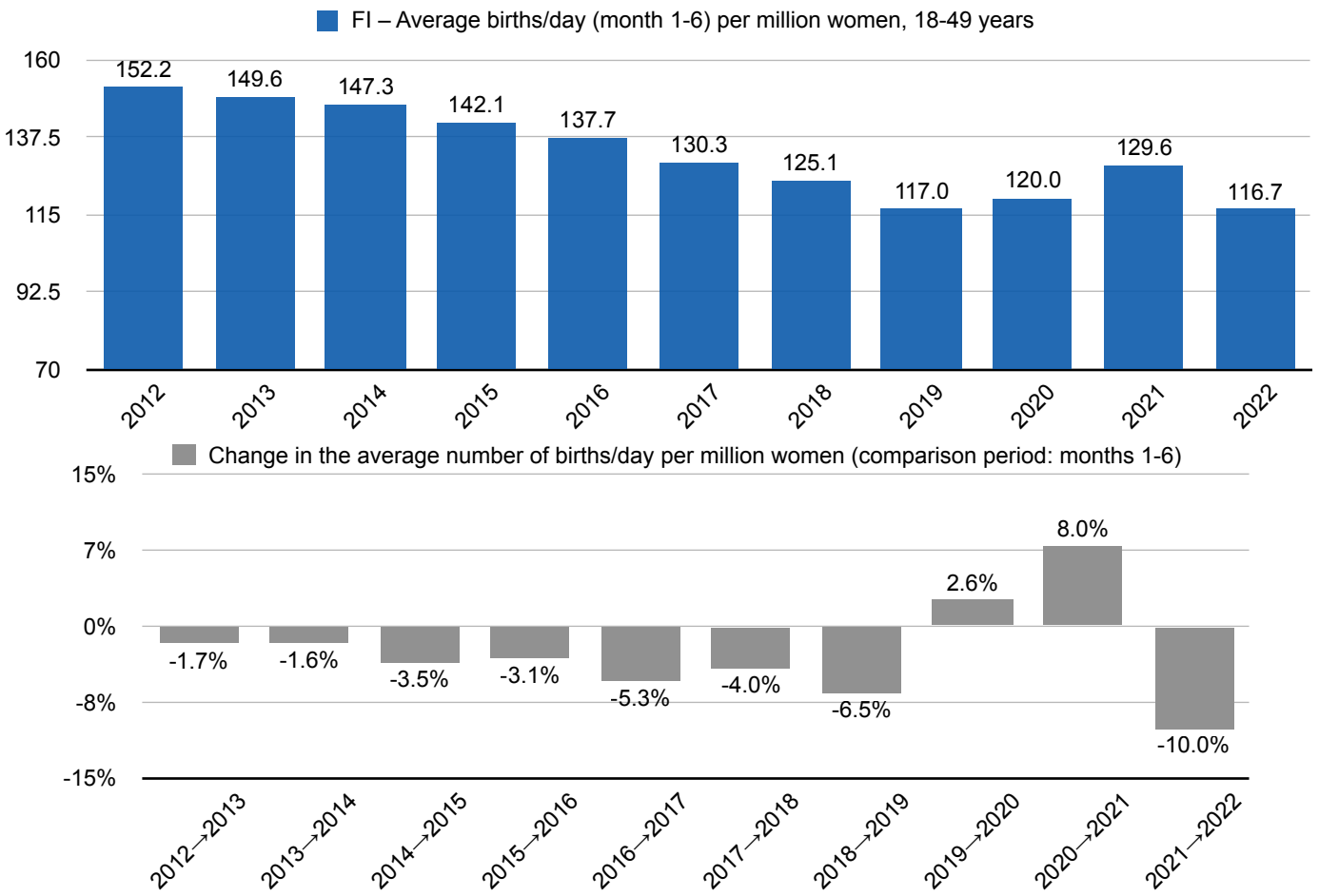


Fig. FI 6, 7

From the upper figure FI 6, a clear decline in daily births can be seen from 2012 to 2019, despite demographic normalization. After this had stabilised in 2020, there is a surprising plus in 2021 and a significant crash in daily births to a new record low in 2022.

The annual change in the normalised daily average in each case in the period from January to June is shown by the grey columns in the lower figure FI 7. Despite normalization to the population change, the clear decline from 2012 to 2019 can also be seen here. The trend reversal with a plus of 8% in 2021 is immediately followed by the highest decline of 10% in the entire period.

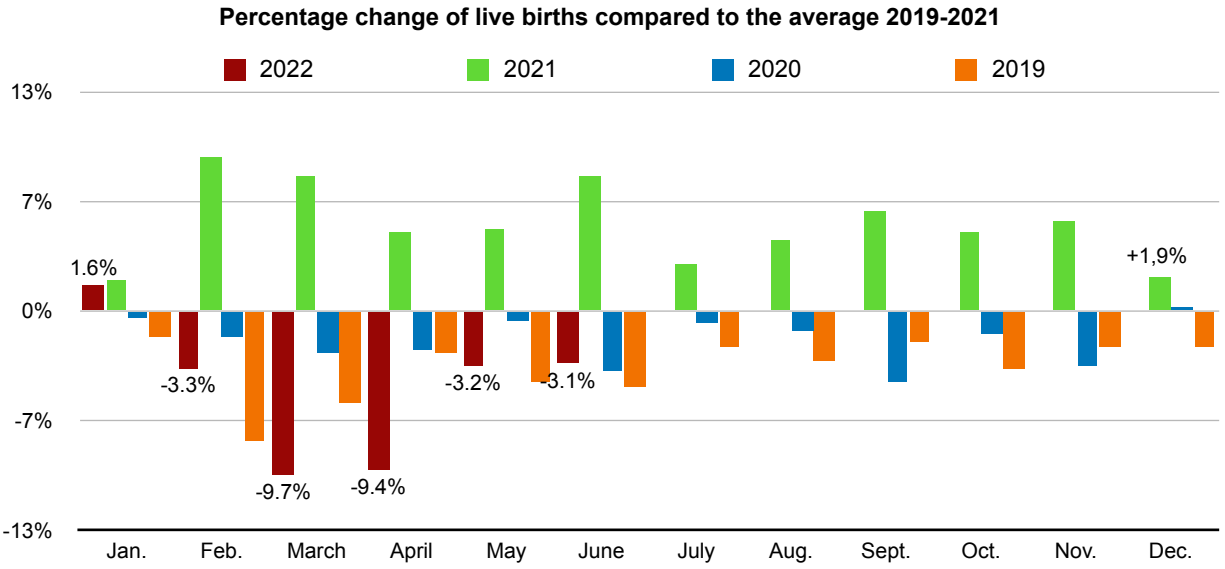


Fig. FI 8

The monthly changes compared to the previous year's average impressively show the abrupt change from rising birth rates until December 2021 to -3.3% in February 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

Development of monthly live births in Latvia

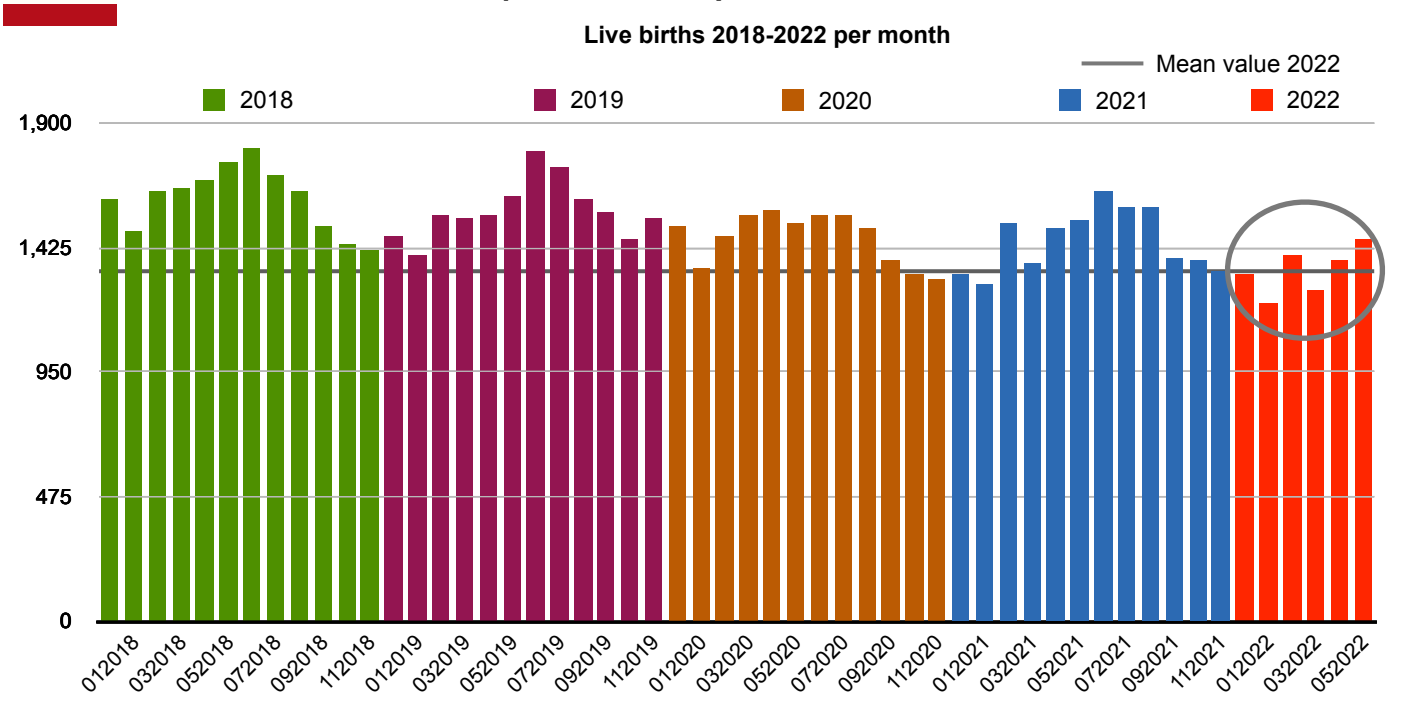


Fig. LV 1

The course of monthly live births in Latvia shows a regular, clearly falling periodic recurrence pattern. This is due to the significant decline in the number of women aged 18-49 from 453,512 to 367,109 (2012→2021), which makes the normalization of daily births imperative. In the months January to June 2022, the previous year's values are further undercut. The mean value of the six provisional monthly data reported so far is below the previous year's level of the individual months with minimal underruns (11.12/2020, 01.02/2021 - Lockdown effect?), so that the decline in births in 2022 in Latvia must be regarded as a very clear signal.

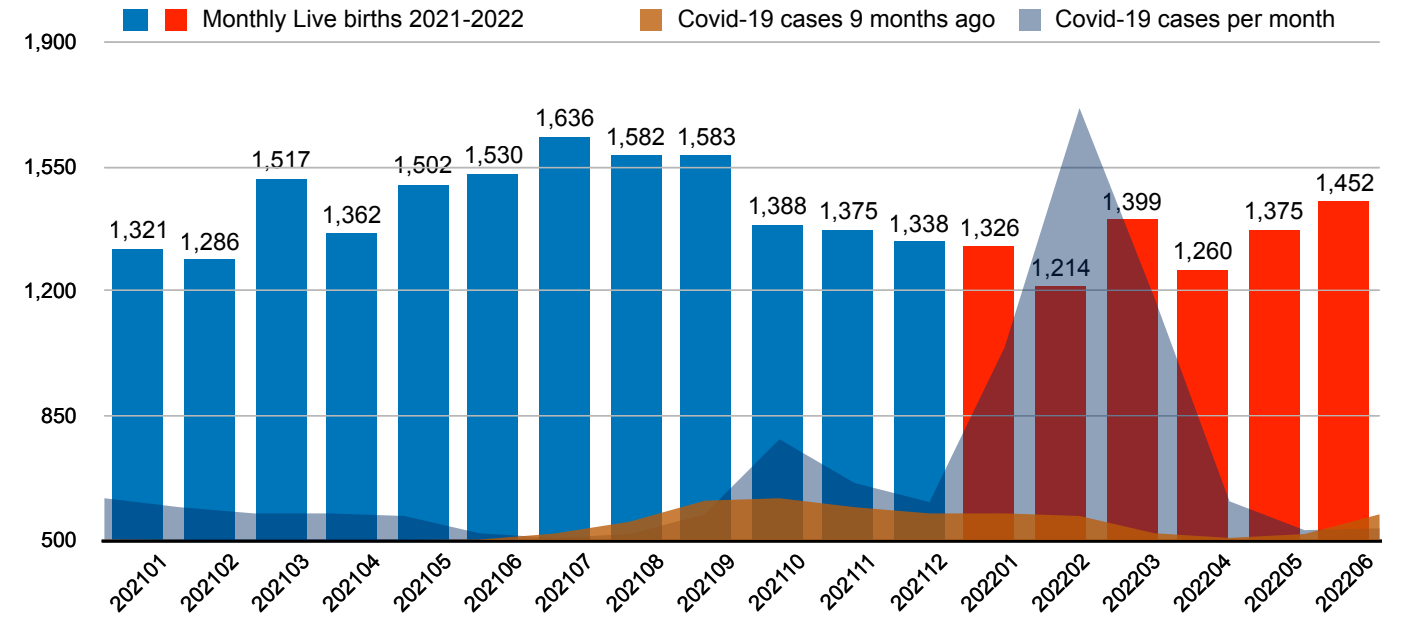


Fig. LV 2

In the time section from 2021 to July 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosive increase in positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on existing pregnancies, that could be proven in an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. Thus, a correlation cannot be justified. (ρ (rho) = 0.773, p = 0.0053 - a positive correlation does not justify a decline in births and is to be classified as random).

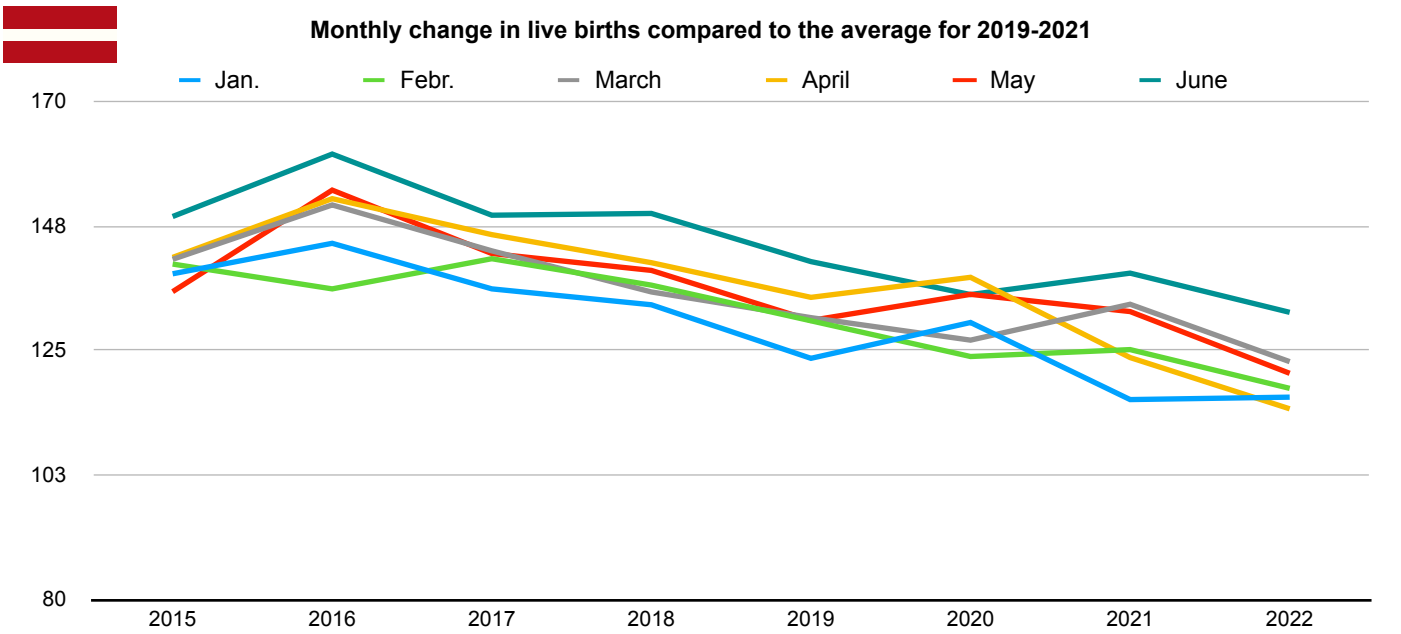


Fig. LV 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- Normalised to the population development, a continuous decline in daily births is also evident.
- An increase in the months of February, March and June in 2021, which contrasts with the previous development.
- A decline in the months of January to June, which can be seen as a clear signal lasting over six months.

LV – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	132.2	129.3	131.6	138.8	140.6	141.4	141.8	135.6	149.2	160.0
2015-16	146.5	134.6	136.0	144.3	136.1	151.2	152.4	153.9	160.4	153.7
2016-17	143.1	134.2	131.2	136.1	141.5	143.0	145.9	142.5	149.4	158.2
2017-18	141.7	130.3	126.9	133.2	136.8	135.5	140.8	139.4	149.7	149.6
2018-19	124.7	122.8	117.1	123.5	130.3	130.9	134.5	130.4	141.0	151.2
2019-20	131.8	127.0	130.0	130.0	123.9	126.8	138.2	135.1	135.1	133.2
2020-21	118.6	117.9	112.6	116.1	125.1	133.3	123.7	132.0	138.9	143.8
2021-22	122.0	124.8	117.6	116.5	118.1	122.9	114.4	120.8	131.8	
Difference to Ø 19-21	-3.08	2.27	-2.33	-6.69	-8.32	-7.40	-17.72	-11.66	-6.49	
Difference [%]	**-2.5%**	**1.8%**	**-1.9%**	**-5.4%**	**-6.6%**	**-5.7%**	**-13.4%**	**-8.8%**	**-4.7%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**1.0%**	**0.8%**	**0.8%**	**6.8%**	**19.6%**	**8.1%**	**7.4%**	**5.5%**	**5.6%**	

Statistical analysis	Spearman's ρ (rho)	-0.8000	strong negative relationship
Interpretation (Cohen)	p-value	0.00156	medium effect

Table LV 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a statistically very significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

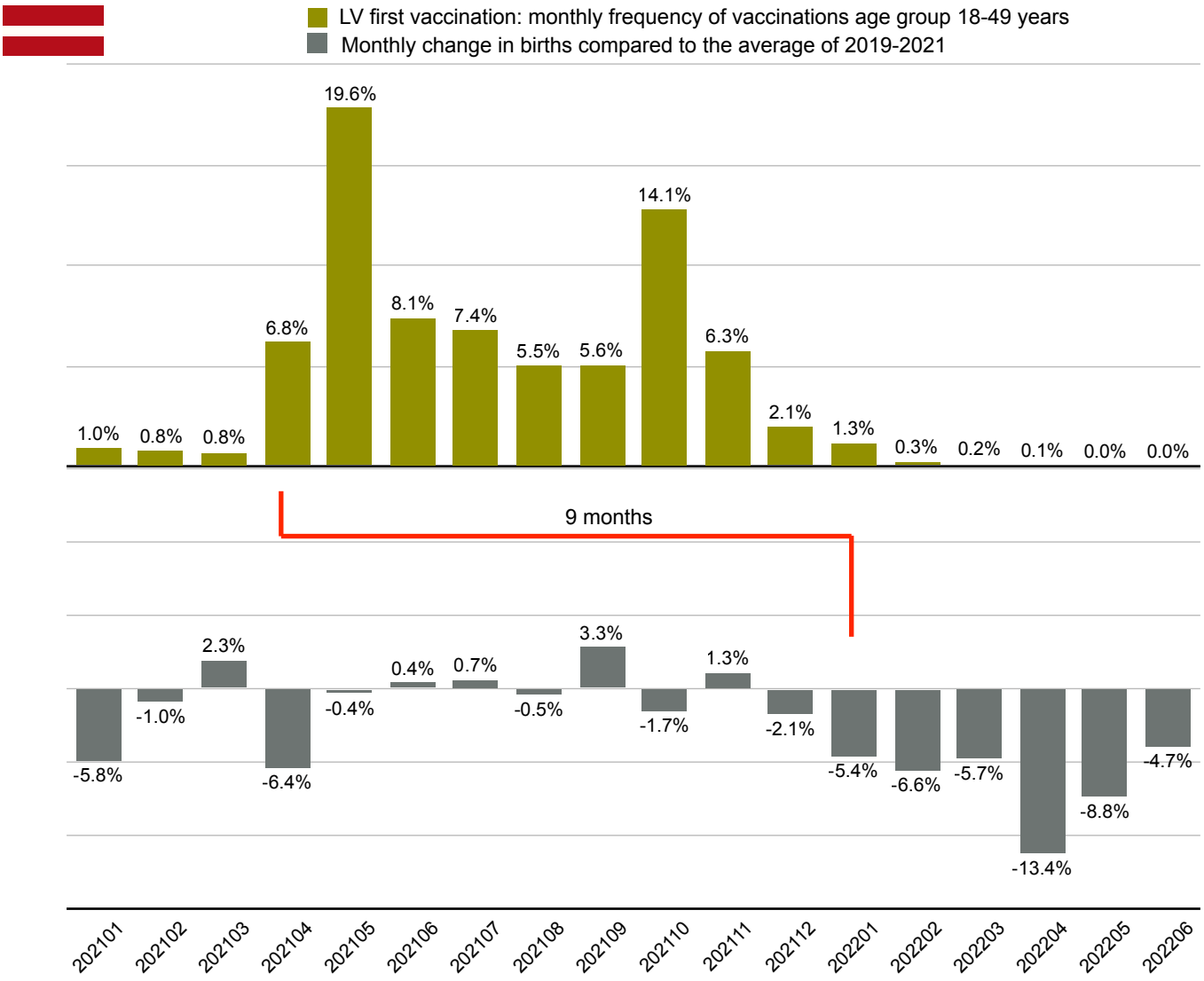


Fig. LV 4, 5

From January 2021 to June 2022, the two charts show a very clear temporal relationship between the monthly vaccination frequencies nine months before and the decline in births in Latvia from January 2022 onwards, which can be considered substantial, with rates ranging from 5 to 13.4 per cent.

Comparison with the previous year limited to the period under review, January to June 2022

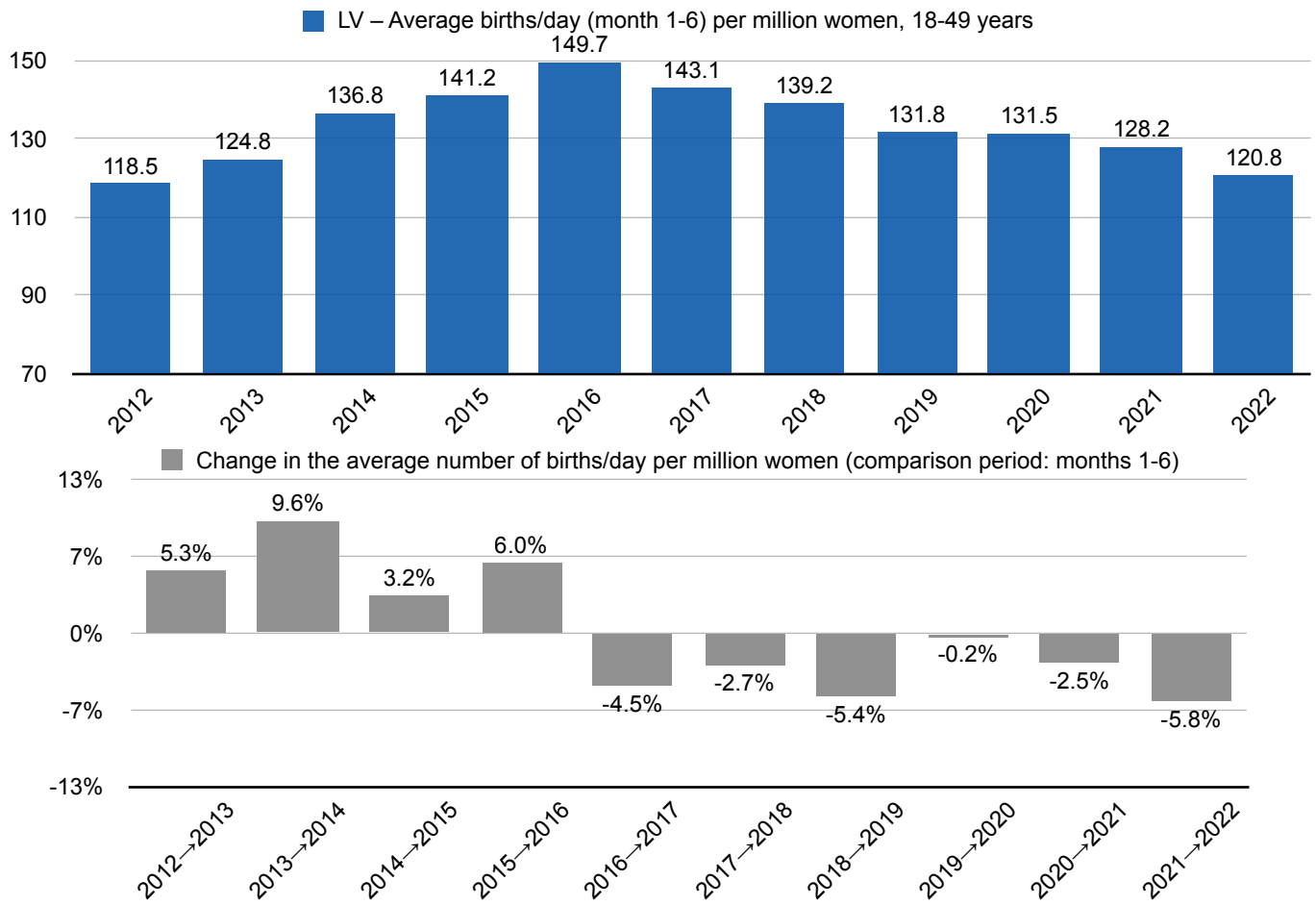


Fig. LV 6, 7

From the upper figure LV 6, despite demographic normalization, two phases of change can be seen with the increase from 2012 to 2016 followed by the decline in daily births until 2021. A clear minus can then be seen in 2022 with the second lowest value in the entire period under consideration.

The annual change in the normalised daily average value in each case in the period from January to June is shown by the grey columns in Figure LV 7 below. Despite normalization to the population change, the clear rise and fall in the number of births can also be seen here. A decrease of -5.8% represents the highest declining change in the period.

Percentage change of live births compared to the average 2019-2021

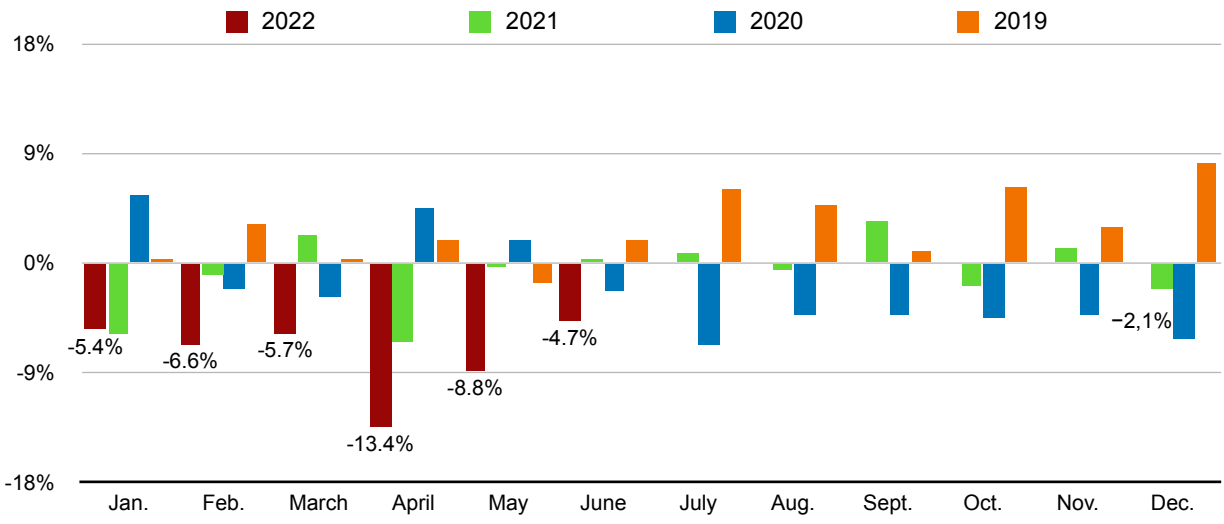


Fig. LV 8

The monthly changes compared to the previous year's average impressively show the abrupt change from low changes until December 2021 to -5.4% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

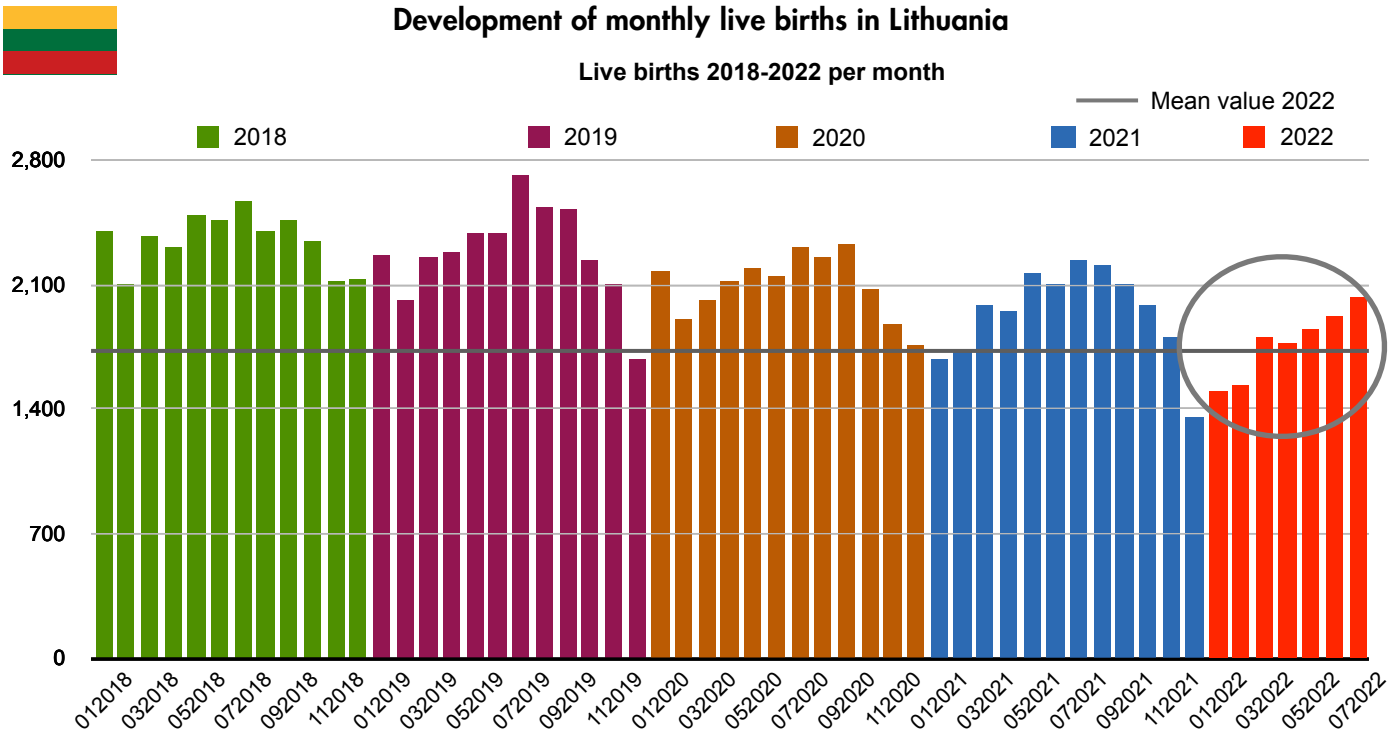


Fig. LT 1

The course of monthly live births in Lithuania shows a relatively regular, clearly falling periodic recurrence pattern. This is due to the significant decline in the number of women aged 18-49 from 662,544 to 537,722 (2012→2021), which makes the normalization of daily births imperative. Particularly in the months December 2021 to February 2022, the previous year's figures are very strongly undercut. The low birth rates continue with a slightly calmer trend. The mean value of the seven provisional monthly data reported so far is below the previous year's level of the individual months with minimal underruns (12/2019, 01/2021), so that the decline in births in 2022 in Lithuania is to be regarded as a very clear signal.

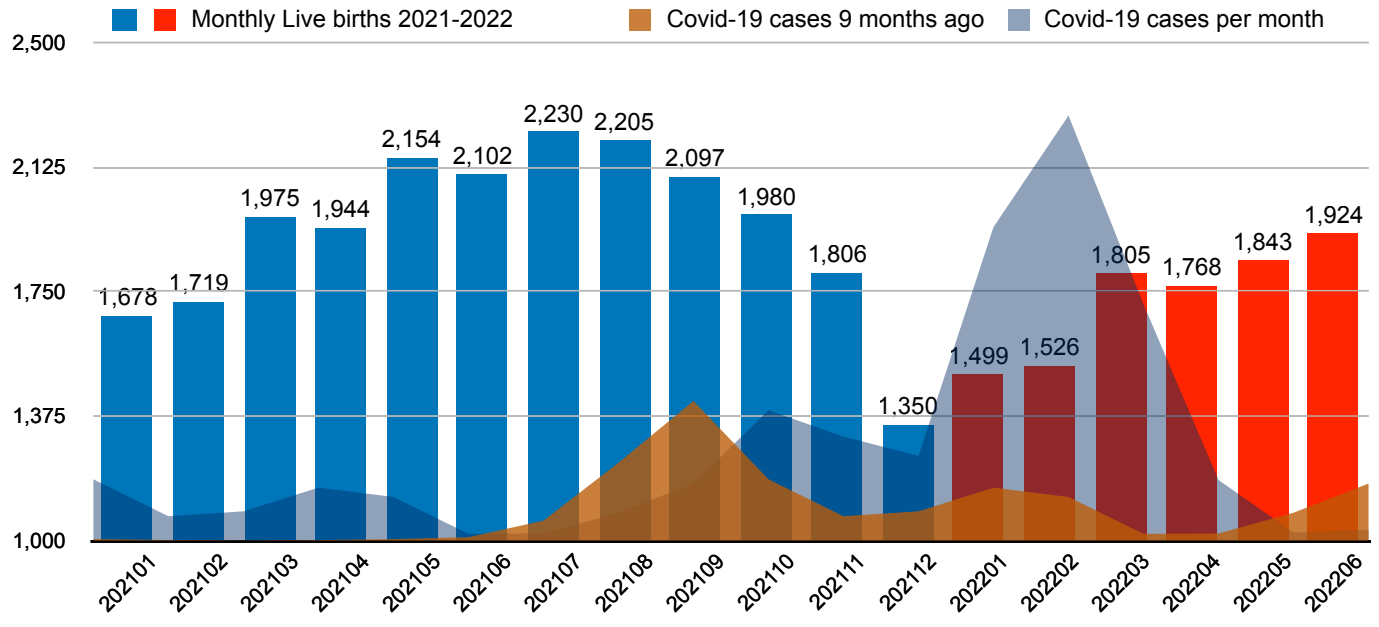


Fig. LT 2

In the time section from 2021 to May 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosive increase in positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on existing pregnancies, that could be proven in an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. Thus, a correlation cannot be justified. (ρ (rho) = 00.336, p = 0.2861 - no significance).

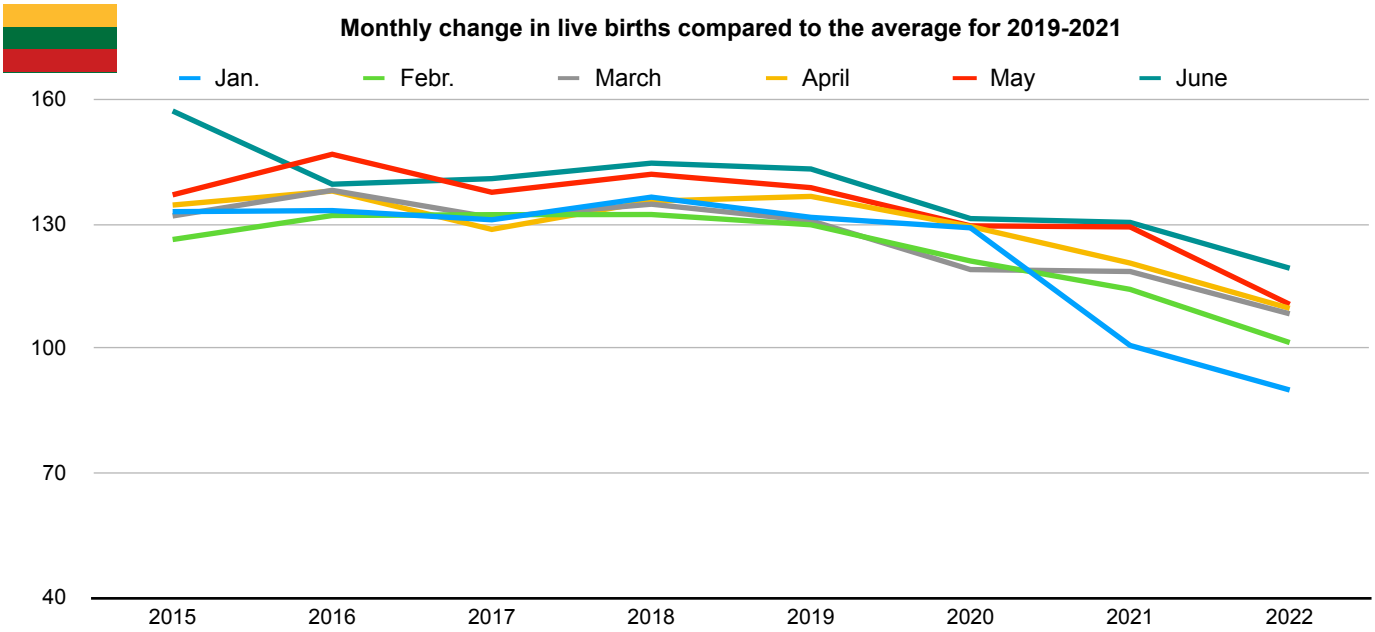


Fig. LT 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- A slight downward trend from 2015 to 2019 with a breakout in the month of July 2019.
- In 2020 and 2021, the downward trend intensifies.
- A sharp decline in the months of January to June, sustained over six months as a clear signal.

LT – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	126.8	126.4	119.1	132.9	126.2	131.9	134.5	136.9	157.2	147.3
2015-16	137.4	125.1	128.8	133.2	132.0	138.0	137.9	146.7	139.5	150.9
2016-17	131.2	126.5	122.6	130.9	132.2	131.5	128.6	137.6	140.9	146.2
2017-18	126.8	124.1	120.6	136.4	132.2	134.7	135.4	141.9	144.6	145.6
2018-19	132.7	124.2	120.8	131.5	129.7	130.7	136.6	138.7	143.2	158.1
2019-20	130.1	126.4	97.9	129.0	121.0	118.9	129.3	129.5	131.2	136.8
2020-21	122.6	114.7	104.1	100.7	114.2	118.5	120.5	129.2	130.3	133.8
2021-22	118.8	112.0	81.0	89.9	101.4	108.3	109.6	110.6	119.3	121.6
Difference to Ø 19-21	-9.70	-9.79	-26.64	-30.47	-20.28	-14.43	-19.20	-21.89	-15.63	-21.27
Difference [%]	**-7.6%**	**-8.0%**	**-24.8%**	**-25.3%**	**-16.7%**	**-11.8%**	**-14.9%**	**-16.5%**	**-11.6%**	**-14.9%**
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	**Oct. 2021**
Vacc./month	**2.2%**	**1.6%**	**1.6%**	**10.0%**	**17.4%**	**12.7%**	**8.4%**	**12.5%**	**4.7%**	**3.2%**

Statistical analysis	Spearman's ρ (rho)	-0.7413	strong negative relationship
Interpretation (Cohen)	p-value	0.00290	medium effect

Table LT 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a statistically very significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

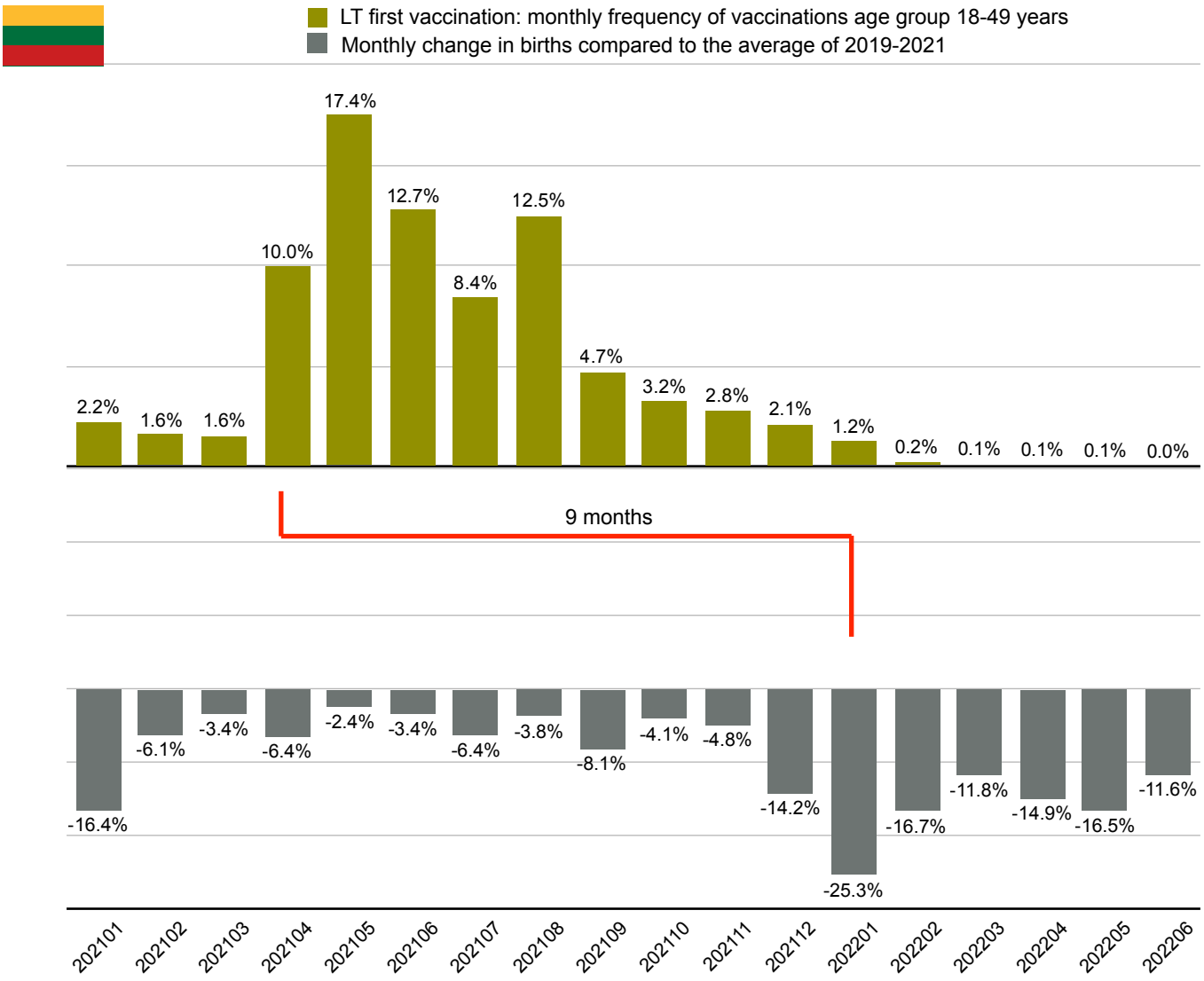


Fig. LT 4, 5

From January 2021 to July 2022, the two graphs show a very clear temporal correlation between the monthly vaccination rates nine months before and the decline in births in Lithuania from January 2022 onwards, which, with rates between 11 and 25%, is to be regarded as very substantial and goes far beyond the changed demographic situation.

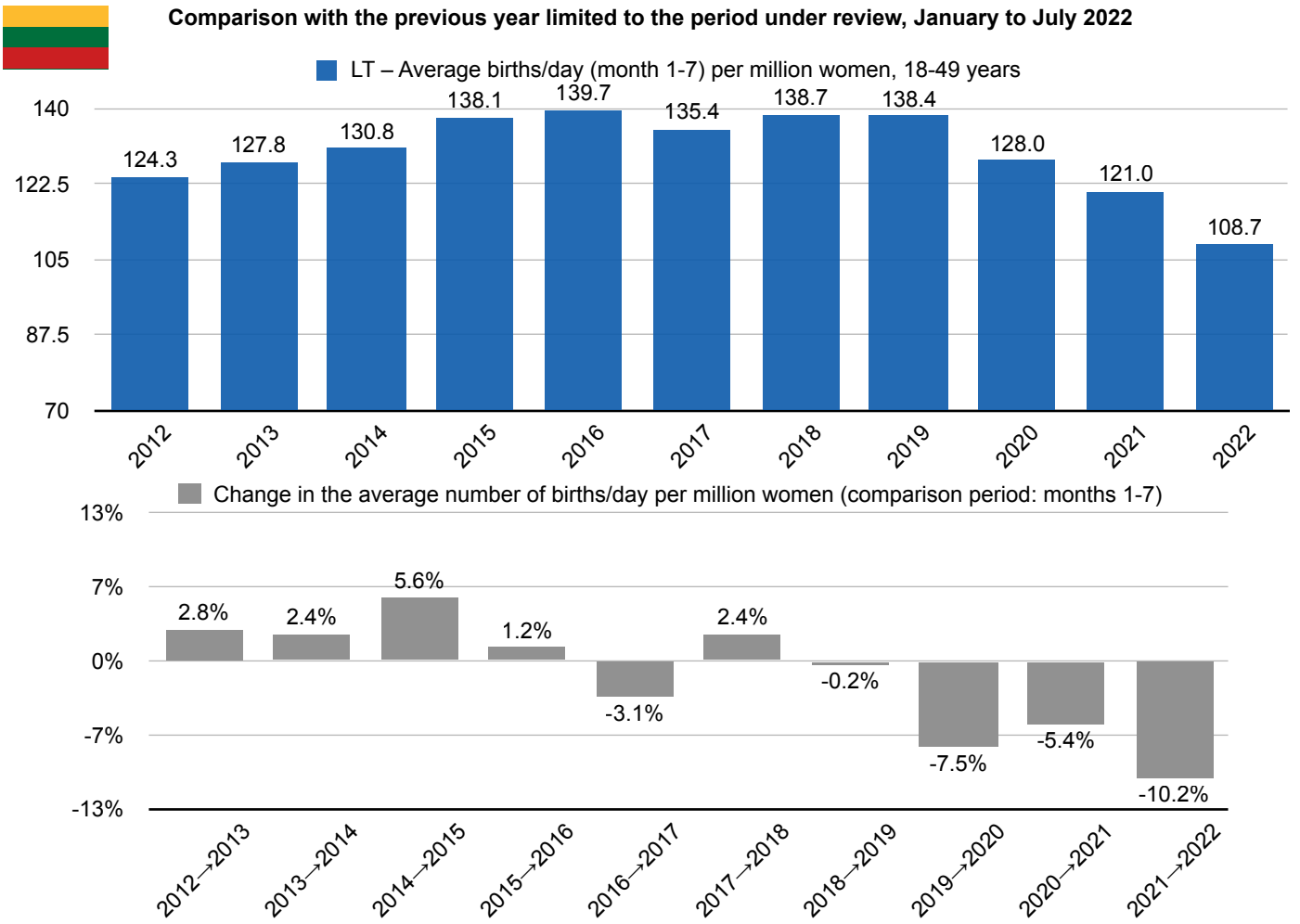


Fig. LT 6, 7

From the upper figure LT 6, two opposing trends can be seen despite demographic normalization. The largest annual change is the decline in 2022 to a new record low, but the two pandemic years before that also led to declines in births.

The annual change in the normalised daily average in each case in the period from January to July is shown by the grey columns in Figure LT 7 below. Despite normalization to the population change, the phases of increase and decrease in the number of births can also be seen here. At -10.2%, the transition from 2021 to 2022 sends a strong signal.

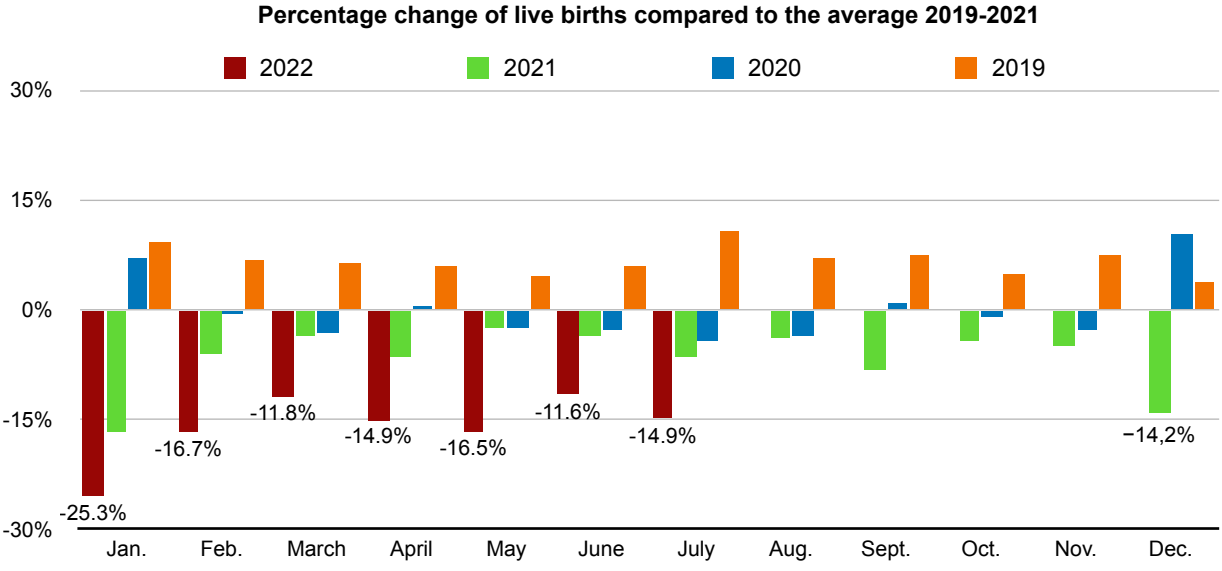


Fig. LV 8

The monthly changes compared to the previous year's average impressively show the abrupt change from low changes until December 2021 to -5.4% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

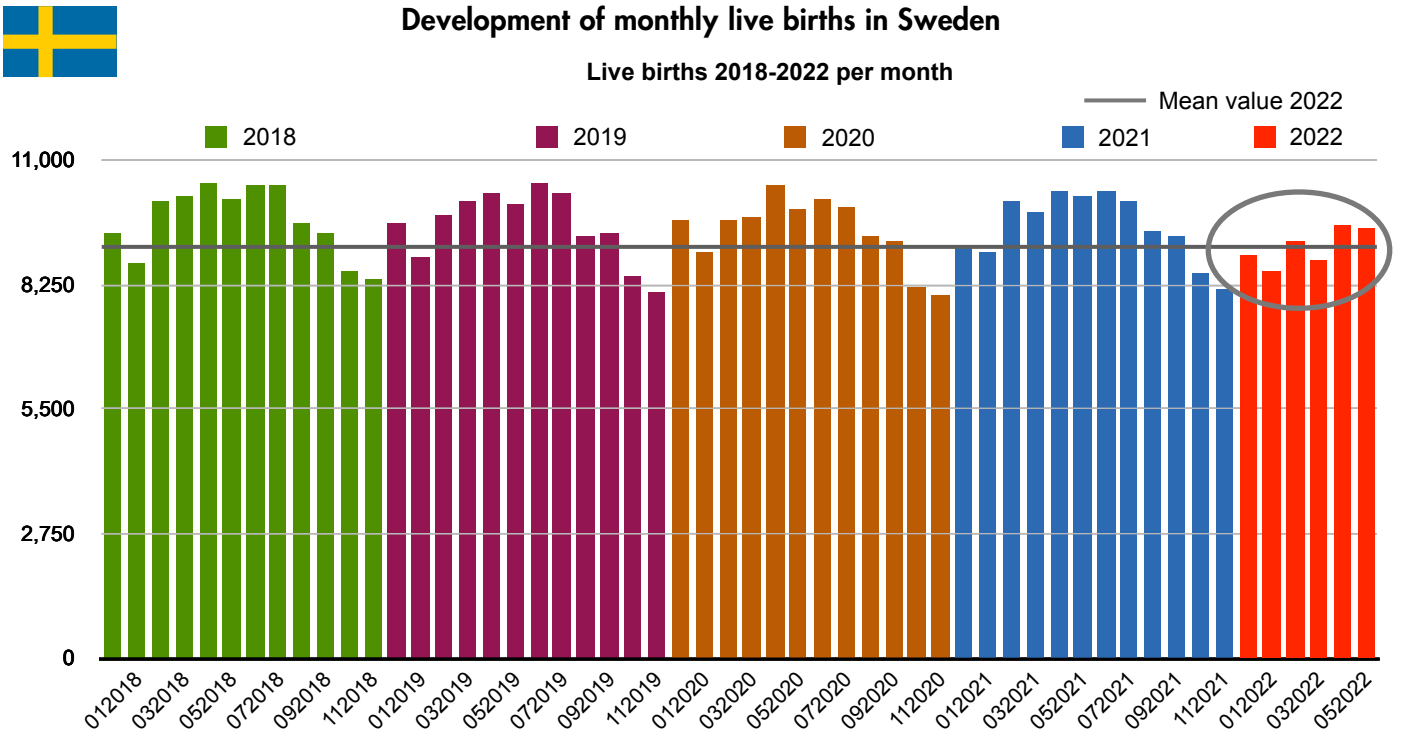


Fig. SE 1

The course of monthly live births in Sweden shows a regular periodic pattern of recurrence, with an undershoot in 2022 births to be considered conspicuous. The mean value of the six provisional monthly data reported so far is below the previous year's level of the individual months, with minimal undershoots in November and December of the previous years, so that the decline in births in Sweden in 2022 must be regarded as a clear signal.

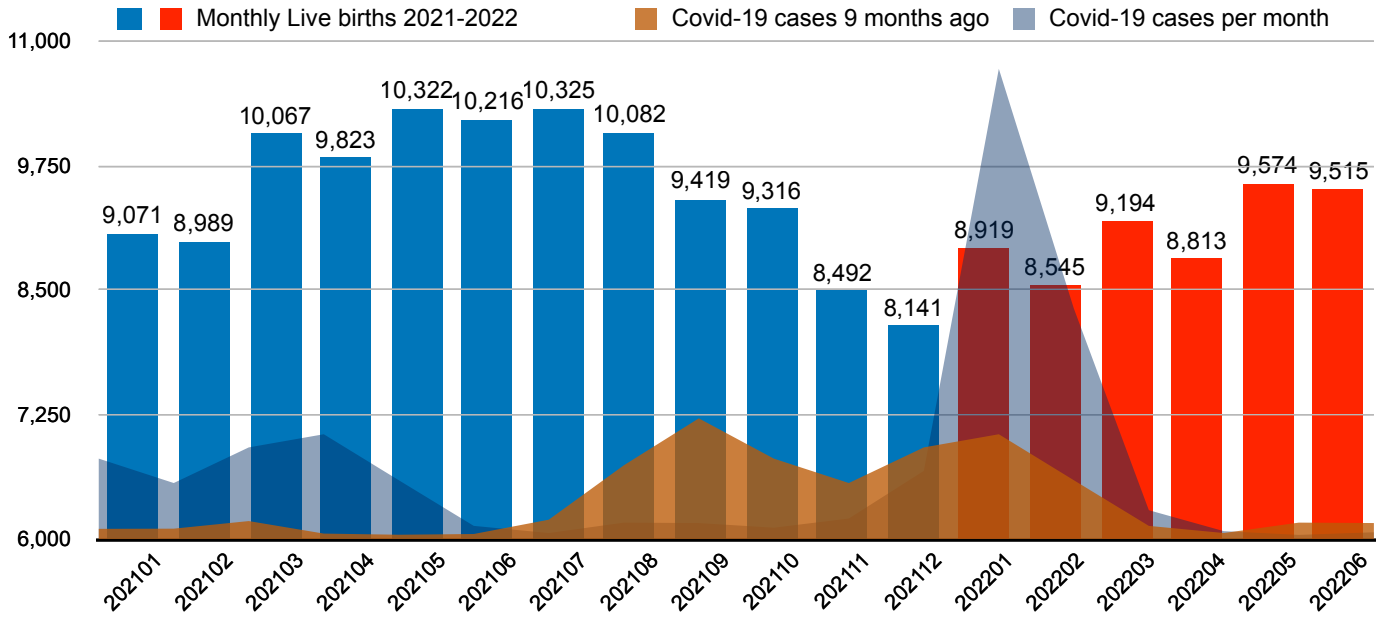


Fig. SE 2

In the time section from 2021 to May 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosive increase in positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on existing pregnancies, that could be proven in an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. Thus, a correlation cannot be justified. (ρ (rho) = 0.609, p = 0.0467 - no significance).

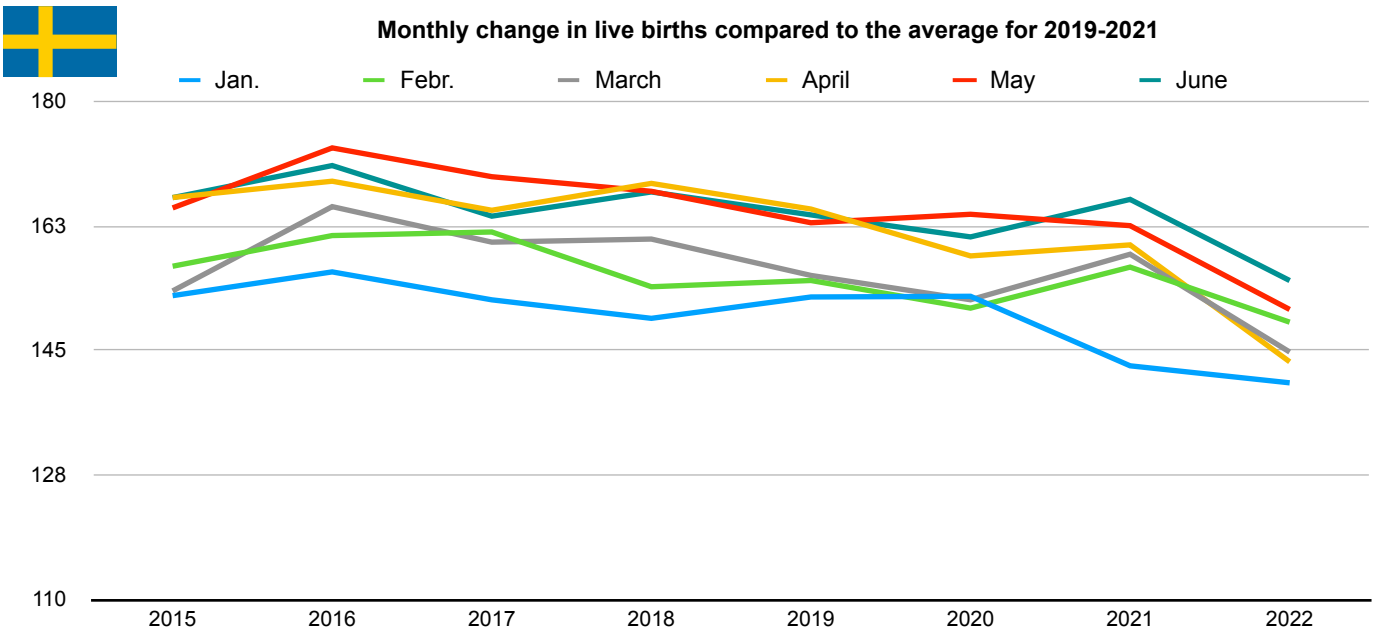


Fig. SE 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- A slight downward trend from 2015 to 2020 contrasts with a slight increase of 4% in the number of women.
- 2021 shows the increase in births already observed in some countries against the previous year's trend.
- A strong decline in the months of January to June 2022, sustained over six months as a clear signal.

SE – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	150.5	140.4	132.1	152.7	156.8	153.3	166.5	165.0	166.4	168.7
2015-16	155.2	142.8	135.8	156.0	161.1	165.2	168.8	173.4	170.9	168.5
2016-17	151.0	142.2	137.1	152.1	161.6	160.2	164.7	169.4	163.8	168.3
2017-18	150.3	142.1	132.0	149.5	153.9	160.6	168.4	167.3	167.2	166.3
2018-19	149.8	140.8	133.1	152.5	154.8	155.5	164.8	162.9	164.0	166.1
2019-20	148.2	138.1	128.0	152.6	150.9	152.1	158.2	164.1	160.9	159.5
2020-21	144.6	133.5	126.7	142.8	156.7	158.5	159.8	162.5	166.2	162.5
2021-22	146.7	138.1	128.2	140.4	148.9	144.7	143.4	150.7	154.8	
Difference to Ø 19-21	-0.91	0.68	-1.10	-8.87	-5.19	-10.62	-17.59	-12.45	-8.92	
Difference [%]	**-0.6%**	**0.5%**	**-0.9%**	**-5.9%**	**-3.4%**	**-6.8%**	**-10.9%**	**-7.6%**	**-5.4%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**1.9%**	**1.7%**	**2.4%**	**1.5%**	**6.8%**	**20.7%**	**29.8%**	**7.7%**	**4.2%**	

Statistical analysis	Spearman's ρ (rho)	-0.6636	strong negative relationship
Interpretation (Cohen)	p-value	0.01299	small effect

Table SE 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a statistically significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

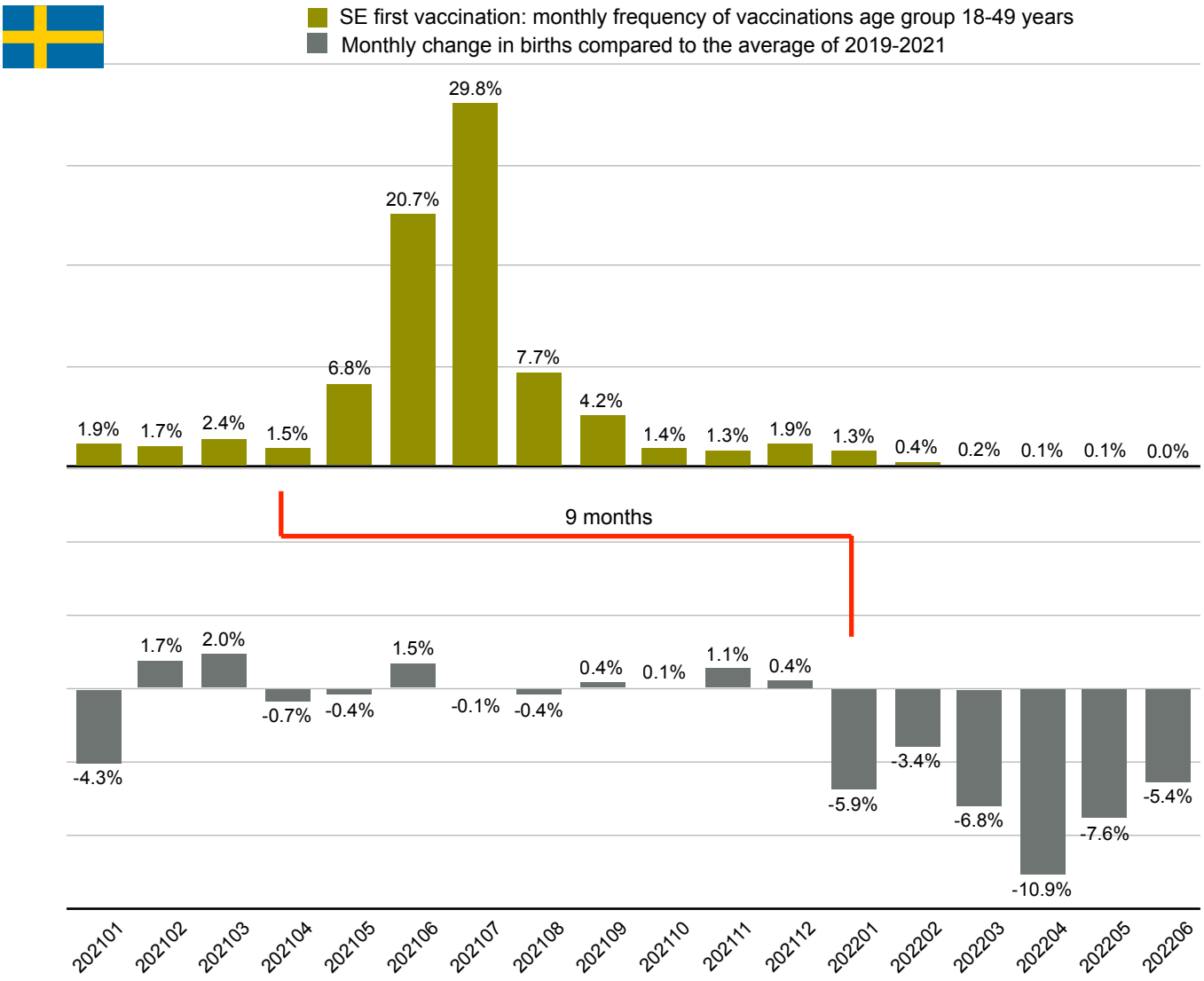


Fig. SE 4, 5

The two diagrams show a very clear temporal relationship between the monthly vaccination rates nine months before and the decline in births in Sweden from January 2022 onwards, with rates between 5% and 11%.

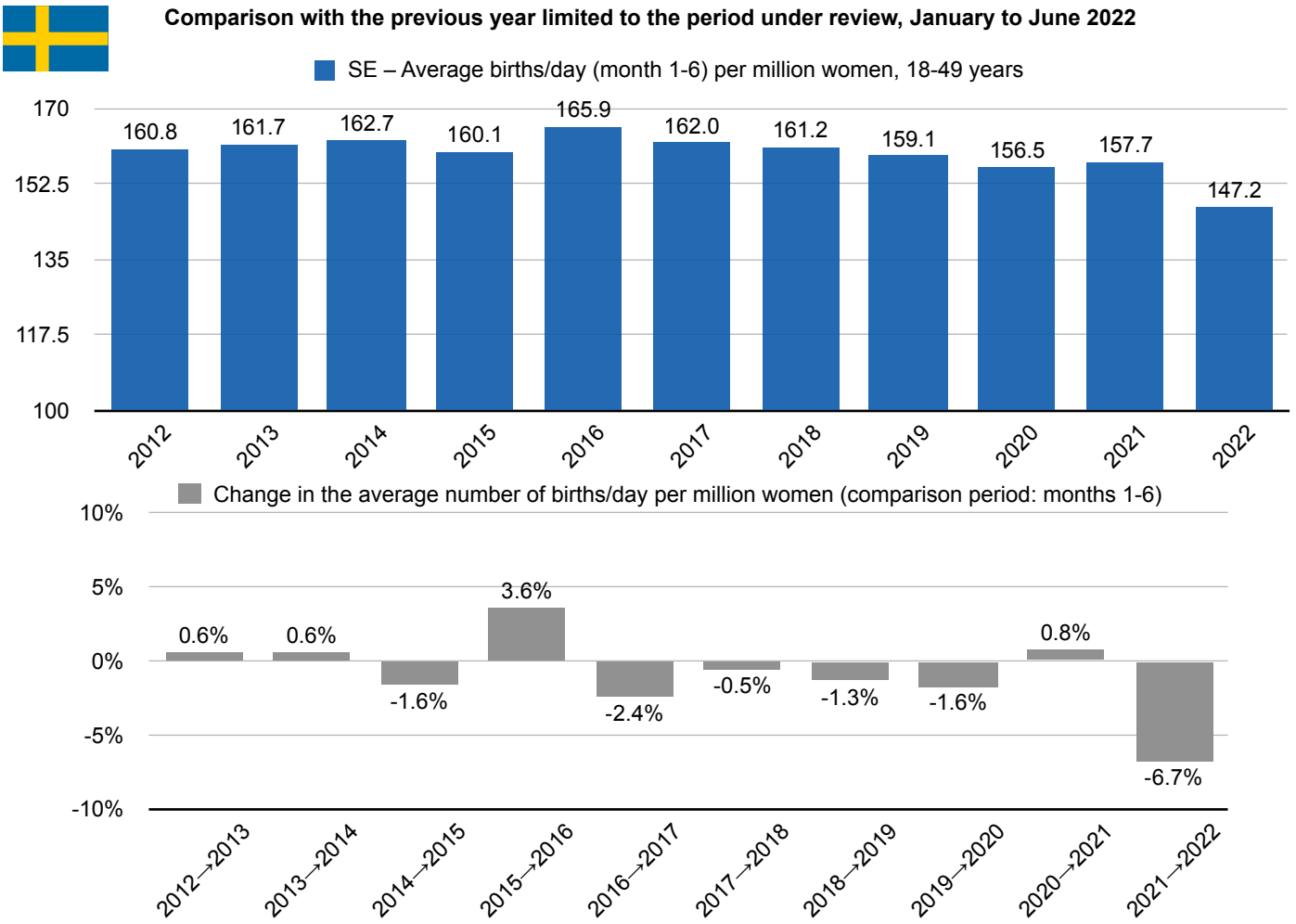


Fig. SE 6, 7

From the upper figure SE 6, a slight downward trend can be seen despite demographic normalization. The largest annual change is the significant decline in 2022 to a new record low.

The annual change in the normalised daily average in each case in the period from January to June is shown by the grey columns in Figure SE 7 below. Despite normalization to the population change, the falling trend is also apparent here, but the decline in the number of births by -6.7% is the strongest signal in the entire period.

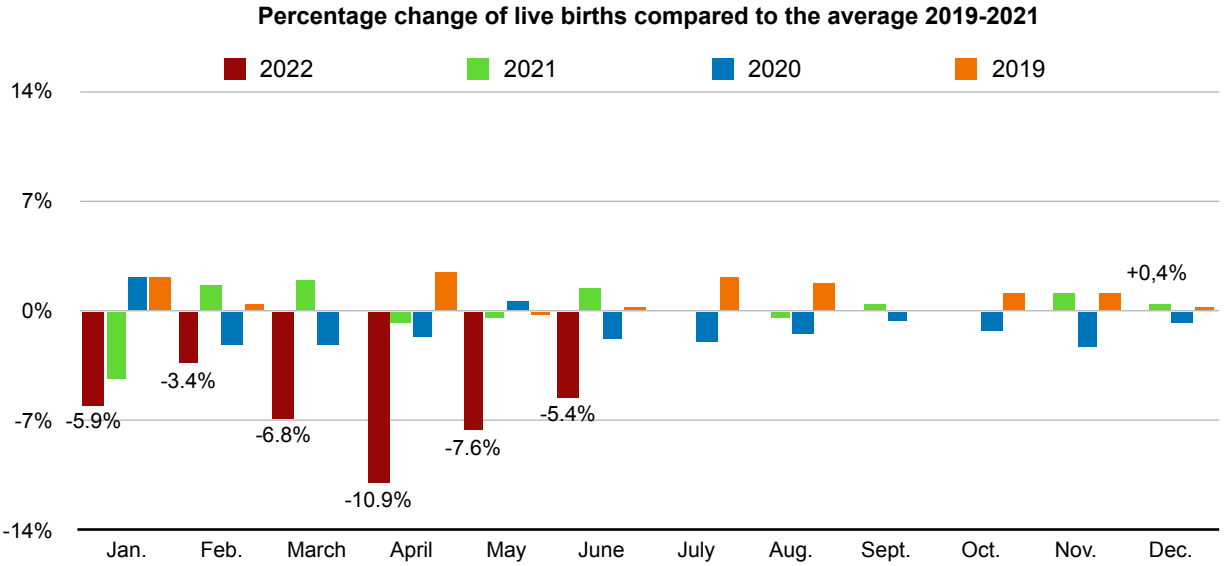


Fig. SE 8

The monthly changes compared to the previous year's average show very impressively the abrupt change from low changes until December 2021 to -5.9% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

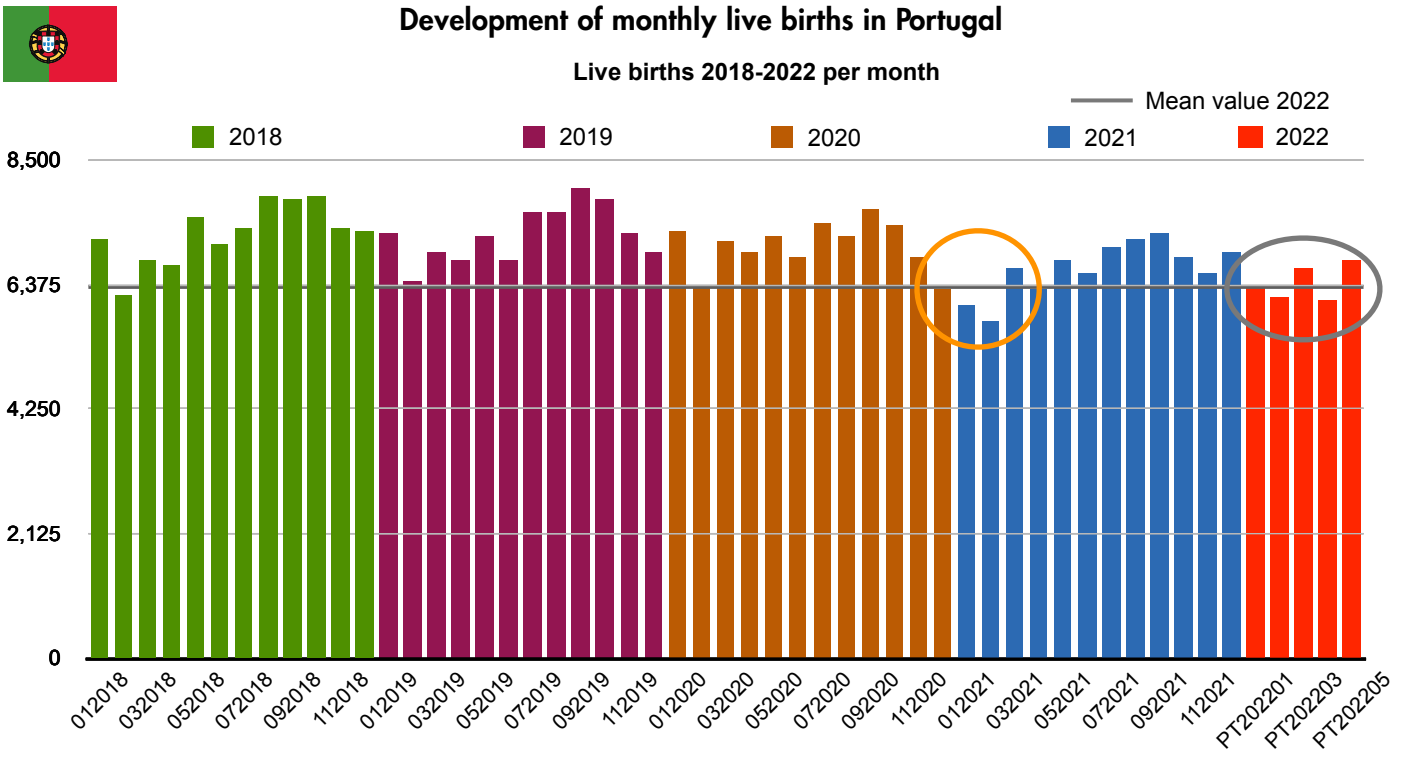


Fig. PT 1

The pattern of monthly live births in Portugal shows a regular, slightly declining periodic recurrence pattern until 2020, owing to a 9.8% decrease in the number of women aged 18-49. In addition to the general decline, there is a strong "birth gap" from December 2020 to February 2021, which correlates in time with the nine-month period of the very hard lockdown from March to May 2020. In addition, an under-reporting of births in 2022 compared to previous years 2018-2020 is also evident in Portugal in the five months reported so far. The mean value of the five provisional monthly data reported so far is below the previous year's level of the individual months with a minimal undershoot (02/2018), so that without taking into account the "lockdown trough" 2021, the decline in births in 2022 can also be seen as a signal in Portugal.

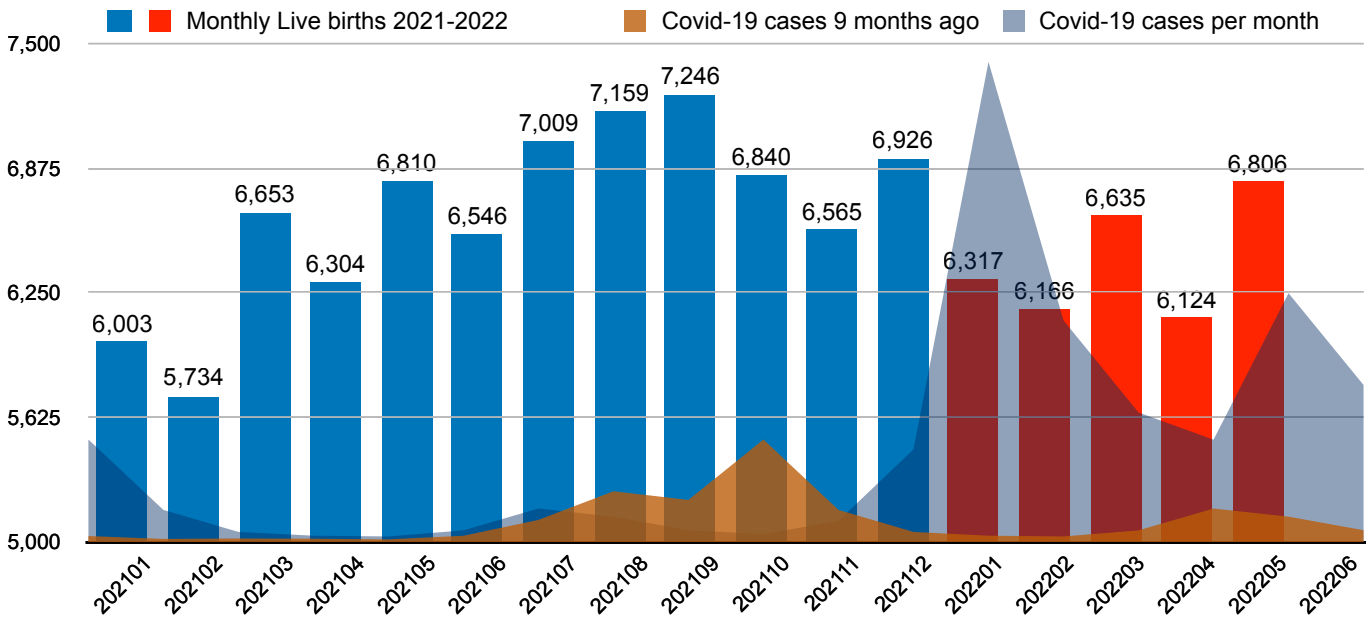


Fig. PT 2

A connection between the decline in births and the explosive increase in positive tests at the beginning of 2022 cannot be deduced here either.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. A correlation can therefore not be justified. (ρ (rho) = -0.286, p = 0.4927 - no significance).

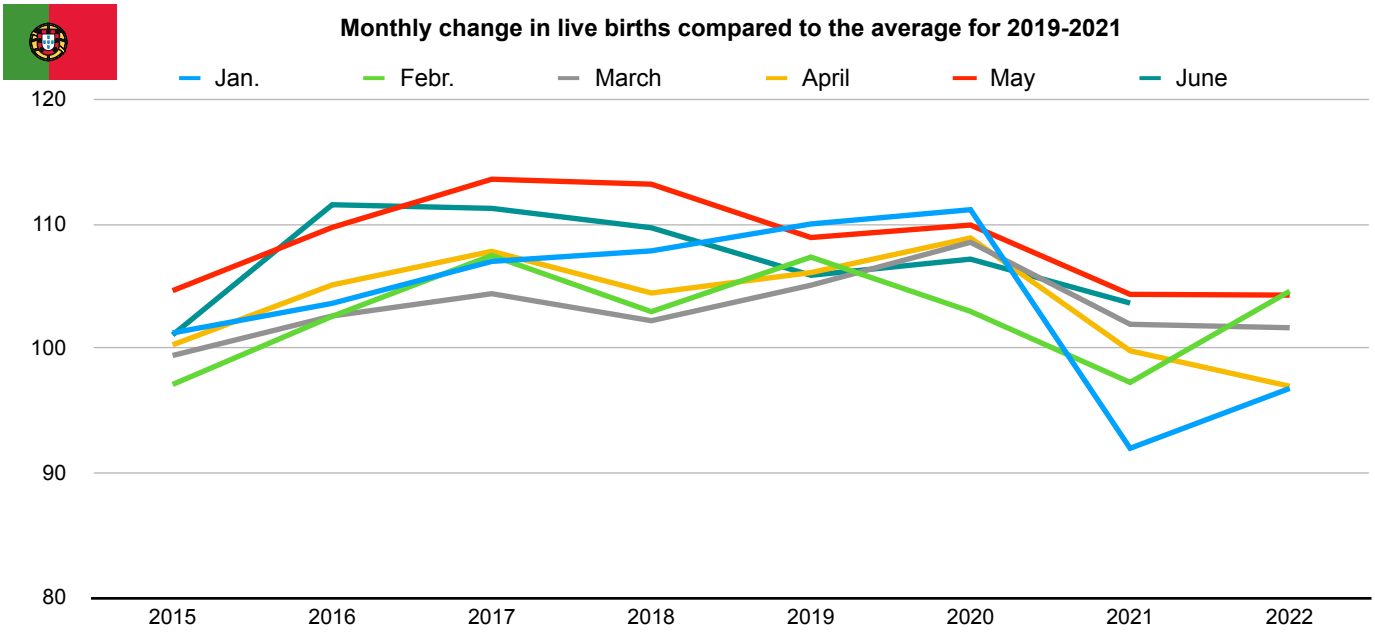


Fig. PT 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- The increase from 2015 to 2017 is followed by a change to declining numbers (population decline 9.8%, women 18-49).
- In 2021, there is an abrupt decline in the number of births in the 5 months due to the "lockdown effect".
- In 2022, births increase slightly compared to the "previous year's gap" in 2021, but very low level compared to previous years.

PT – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	104.2	103.0	100.1	101.2	97.1	99.4	100.3	104.6	101.1	109.0
2015-16	107.5	107.6	107.0	103.6	102.6	102.6	105.1	109.7	111.5	110.4
2016-17	110.4	108.0	103.7	107.0	107.4	104.4	107.8	113.6	111.2	112.1
2017-18	108.9	108.5	105.2	107.8	102.9	102.2	104.4	113.2	109.7	110.6
2018-19	118.3	114.1	109.7	110.0	107.3	105.1	106.1	108.9	105.9	115.0
2019-20	118.5	113.1	105.0	111.1	103.0	108.5	108.9	109.9	107.2	113.1
2020-21	112.4	107.7	95.8	92.0	97.3	101.9	99.8	104.3	103.6	107.4
2021-22	104.8	103.9	106.1	96.8	104.6	101.6	96.9	104.3		
Difference to Ø 19-21*	-13.64	-9.67	-1.25	-13.78	-0.56	-5.14	-10.52	-5.13		
Difference [%]	**-11.5%**	**-8.5%**	**-1.2%**	**-12.5%**	**-0.5%**	**-4.8%**	**-9.8%**	**-4.7%**		
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**		
Vacc./month	**2.6%**	**1.6%**	**2.0%**	**3.2%**	**3.0%**	**21.7%**	**32.0%**	**24.4%**		

Statistical analysis	Spearman's ρ (rho)	-0.2970	no negative relationship
Interpretation (Cohen)	p-value	0.40470	no effect

Table PT 1

* Due to the "lockdown trough" in 2021, the reference period is limited to 2 years (2019/20)!

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a medium negative correlation without statistical significance between the level of vaccination frequency and the decline in births occurring nine months later!

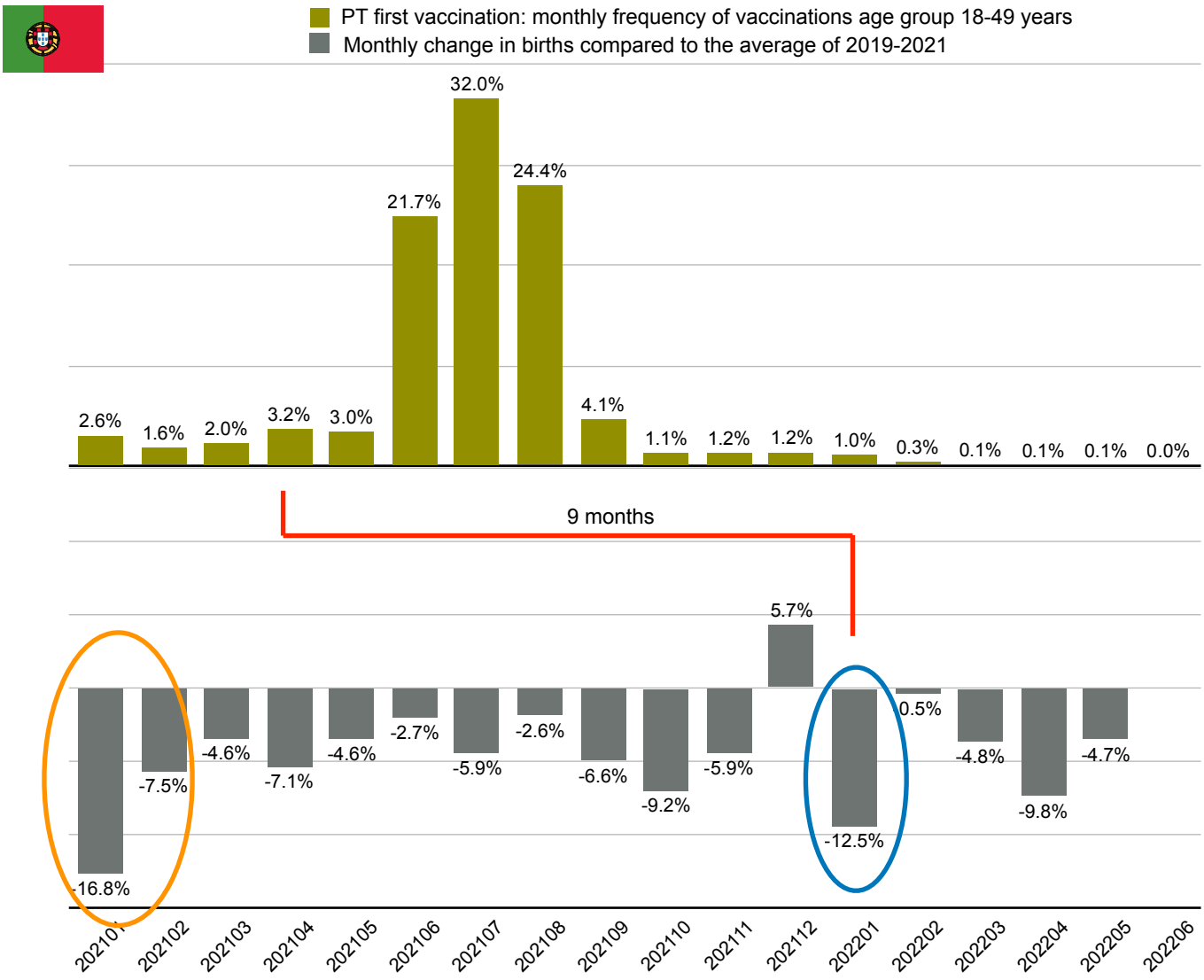


Fig. PT 4, 5

Due to the "lockdown trough" in January and February 2021 shown in figures PT 1 to 3, the year 2021 is excluded from the calculation of the previous year's average. While the upper diagram shows the monthly vaccination frequencies, the lower diagram PT 5 shows the percentage comparison to this previous year's average. Marked with an orange ellipse is the decline in births as a result of the lockdown month of April 2020, in which the conception of births in January 2021 fall. The decline in births continues at a lower level in the following months. For the first time, there is a positive birth trend in December and against this background the jump to -12.5% in January, originally concealed by the "lockdown trough", represents a very striking change. However, no new measures but only the vaccination campaign in the age group 18-49, which started nine months earlier, are to be mentioned as a new criterion.

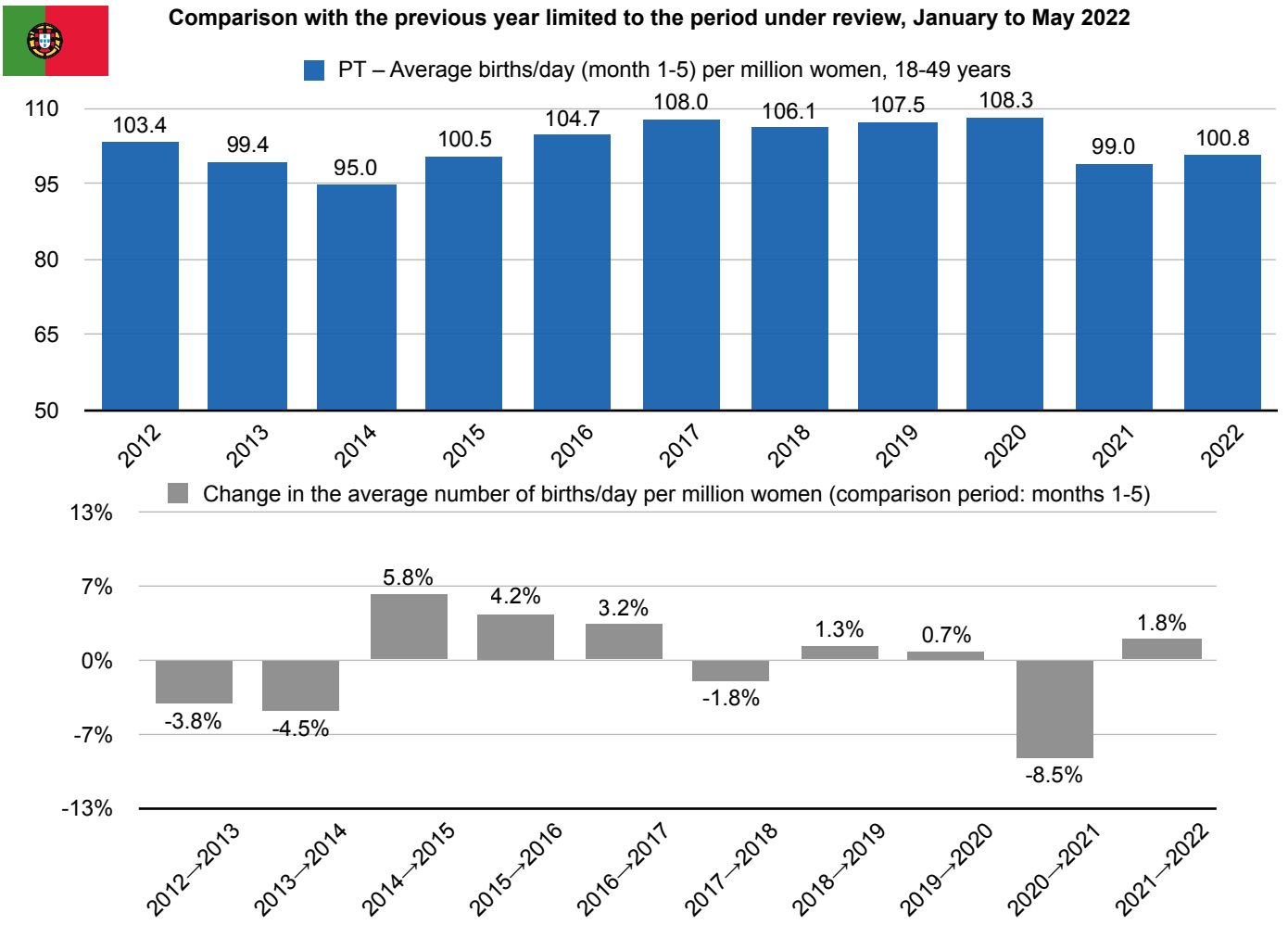


Fig. PT 6, 7

The upper figure PT 6 only captures the mean value of daily births in the period January to May of the respective year. Due to the decline in births in the context of the lockdown measures, 2021 falls very significantly compared to 2020. So although births in 2022 increase by 1.8% compared to the previous year, they are still at a low level compared to previous years.

The annual percentage changes from the previous year thus illustrate the particular decline in births in January and February 2021 ("lockdown trough") rather than the further reduction in births in 2022 to the low point in relation to the previous years 2015-2020.

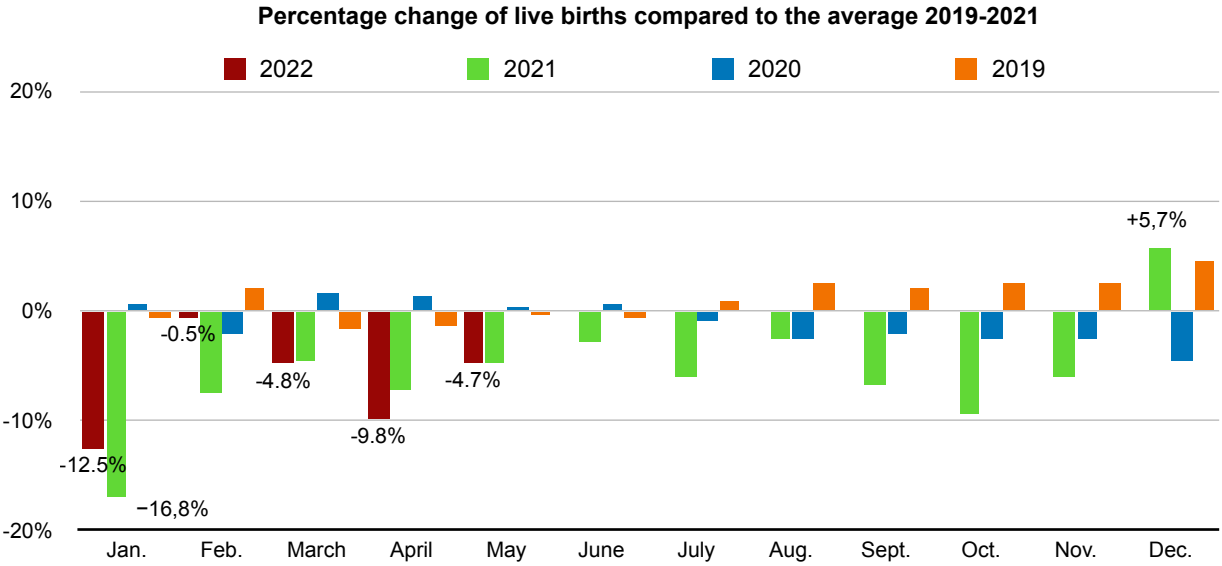


Fig. PT 8

The monthly changes compared to the previous year's average show very impressively the abrupt change from positive changes in 2021 to -12.5% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

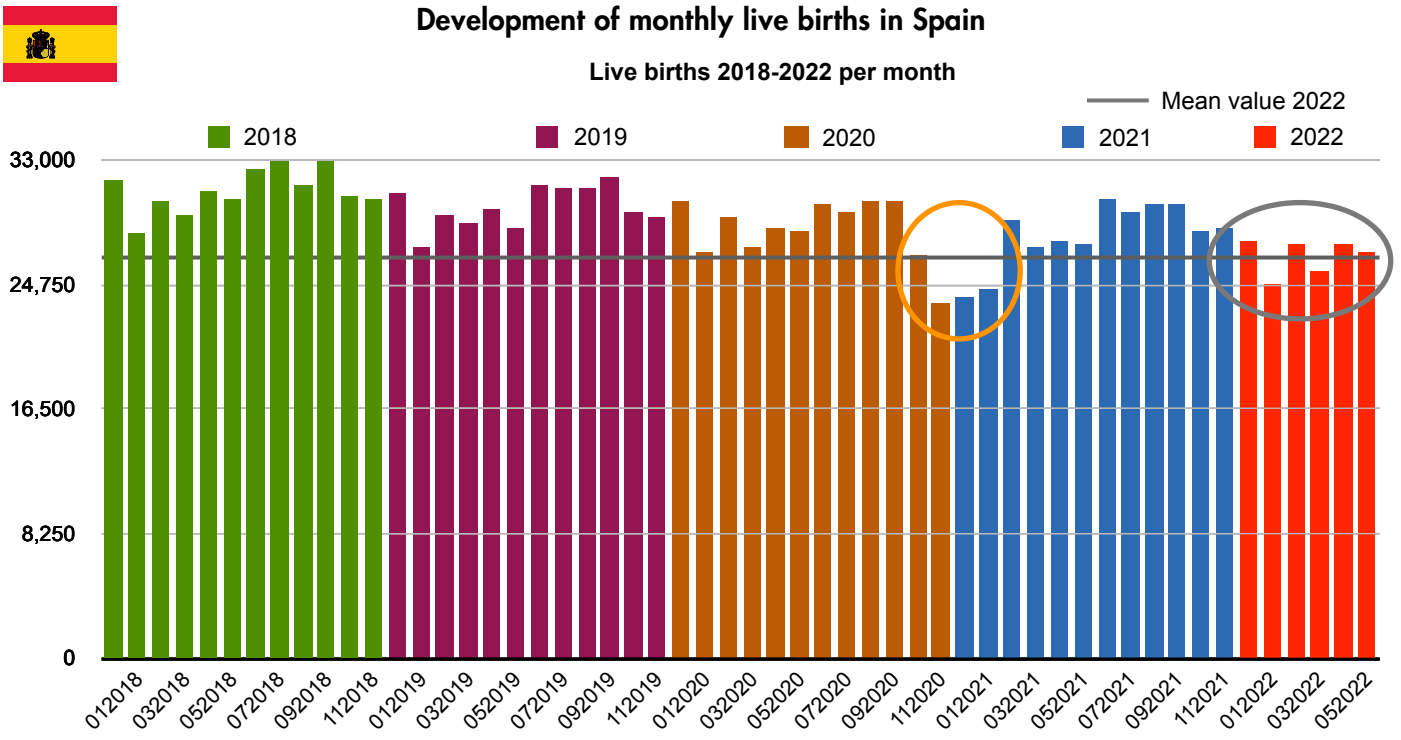


Fig. ES 1

The pattern of monthly live births in Spain, with the exception of the period circled in orange from December 2020 to February 2021, is a regular, falling periodic recurrence pattern until 2021, due to a 9.3% decrease in the number of women aged 18-49 from 10,737,598 to 9,737,096. The very sharp drop in the number of births from December 2020 to February 2021, analogous to Portugal and Belgium, can be attributed to the nine-month period of the very hard lockdown from March to May 2020, which also occurred in Spain. Moreover, also in Spain, with the exception of the mentioned period in the six months reported so far, a persistent undershooting of births in 2022 compared to previous years is to be considered conspicuous, which exceeds the effect of the lockdown. The mean value of the six provisional monthly data reported so far is consistently below the previous year's level of the individual months, so that even without taking into account the "lockdown trough" 2021, the decline in births in 2022 must also be regarded as a clear signal in Spain.

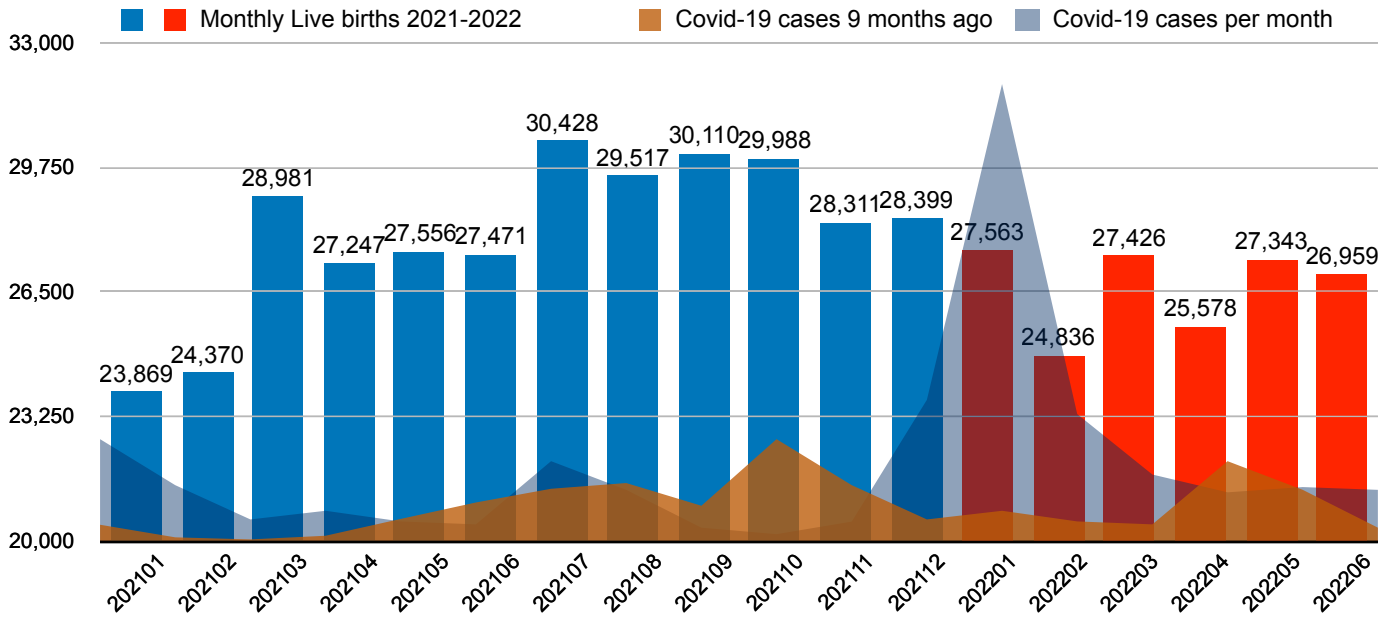


Fig. ES 2

A connection between the decline in births and the explosive increase in positive tests at the beginning of 2022 cannot be deduced here either.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. A correlation can therefore not be justified. (ρ (rho) = 0.118, p = 0.7293 - no significance).

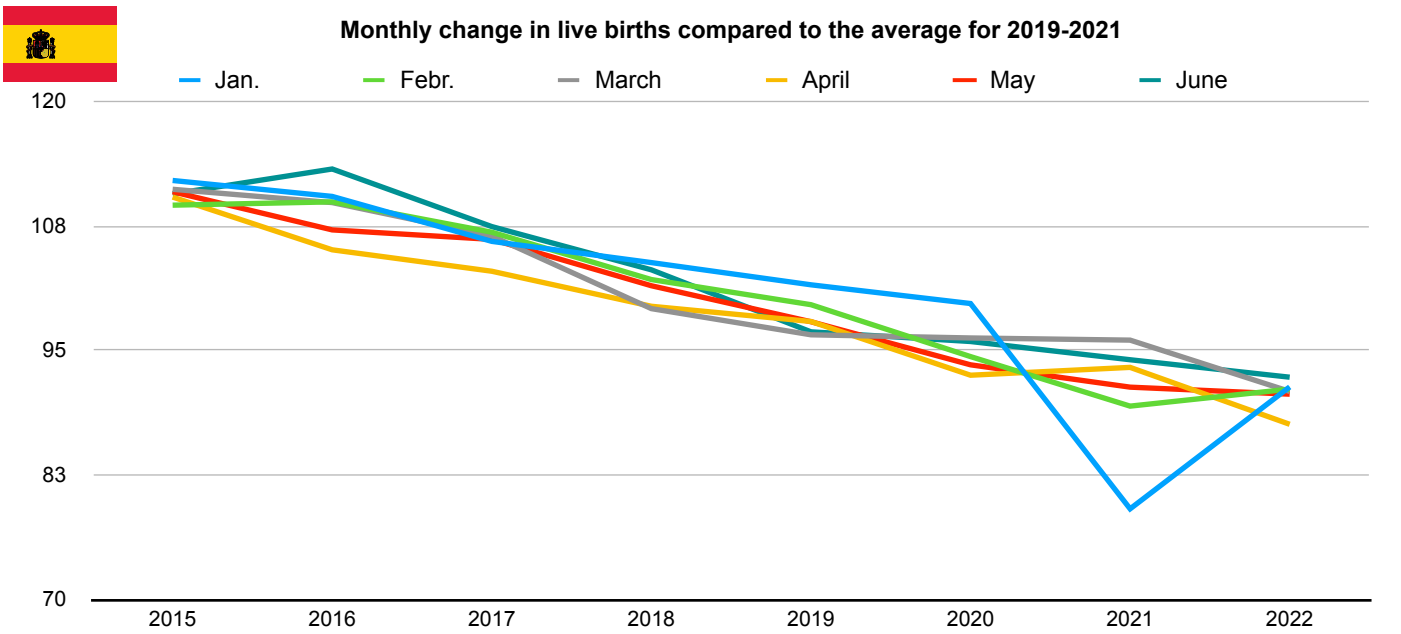


Fig. ES 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- The already population-normalised decline in daily births to very low values below 100 per day is very clear.
- The graph is visually dominated by the "birth gap" in January 2021 caused by the lockdown.
- The further decline in 2022 is visually concealed, but the normalised birth rates fall to a new record low.

ES – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	115.7	112.4	112.2	112.0	109.6	111.2	110.4	110.9	110.7	114.9
2015-16	115.8	114.0	110.9	110.4	109.9	109.8	105.1	107.1	113.2	114.7
2016-17	114.3	110.3	106.0	105.9	106.8	106.5	102.9	106.1	107.4	110.2
2017-18	113.6	111.6	103.6	103.8	102.1	99.2	99.4	101.5	103.1	106.2
2018-19	107.9	103.6	100.1	101.6	99.6	96.5	97.9	97.9	96.8	103.1
2019-20	105.0	100.7	96.1	99.7	94.4	96.2	92.5	93.5	95.9	98.7
2020-21	99.5	90.8	77.1	79.1	89.4	96.0	93.3	91.3	94.0	100.8
2021-22	99.3	96.9	94.1	91.3	91.1	90.9	87.6	90.6	92.3	
Difference to Ø 19-21*	-7.11	-5.25	-4.01	-9.31	-5.87	-5.53	-7.62	-5.11	-4.07	
Difference [%]	**-6.7%**	**-5.1%**	**-4.1%**	**-9.3%**	**-6.1%**	**-5.7%**	**-8.0%**	**-5.3%**	**-4.2%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**2.7%**	**2.8%**	**4.1%**	**1.1%**	**1.9%**	**26.2%**	**29.2%**	**12.5%**	**3.4%**	

Statistical analysis	Spearman's ρ (rho)	-0.2091	no negative relationship
Interpretation (Cohen)	p-value	0.26860	no effect

Table ES 1

* Due to the "lockdown trough" in 2021, the reference period is limited to 2 years (2019/20)!
The statistical analysis examines the correlation between the percentage decline in births and the vaccination frequency nine months earlier. The clear negative effect of the previous year prevents a statistically credible assessment.

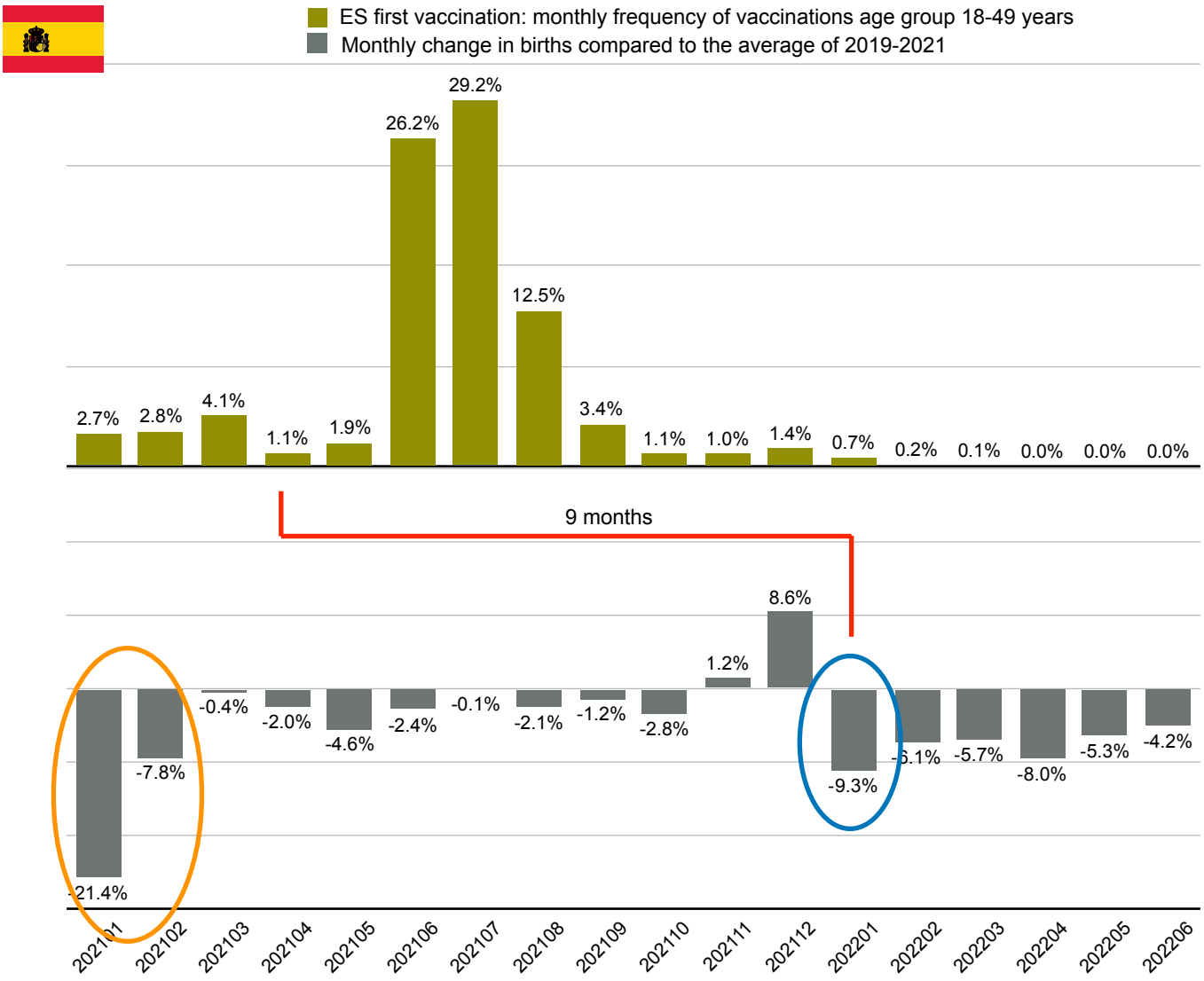


Fig. ES 4, 5

Due to the "lockdown trough" in January and February 2021 shown in figures ES 1 to 3, the year 2021 is excluded from the calculation of the previous year's average. While the upper diagram shows the monthly vaccination frequencies, the lower diagram ES 5 shows the percentage comparison to this previous year's average. Marked with an orange ellipse is the decline in births as a result of the lockdown month of April 2020, in which the conception of births in January 2021 fall. The decline in births continues at a lower level in the following months. In the following months, too, the situation obviously remains in negative territory for family planning in Spain. For the first time there is a positive birth trend in December and against this background the jump to -9.3% in January, originally concealed by the "lockdown trough", represents a very striking change. However, no new measures but only the vaccination campaign in the age group 18-49, which started nine months earlier, are to be mentioned as a new criterion.

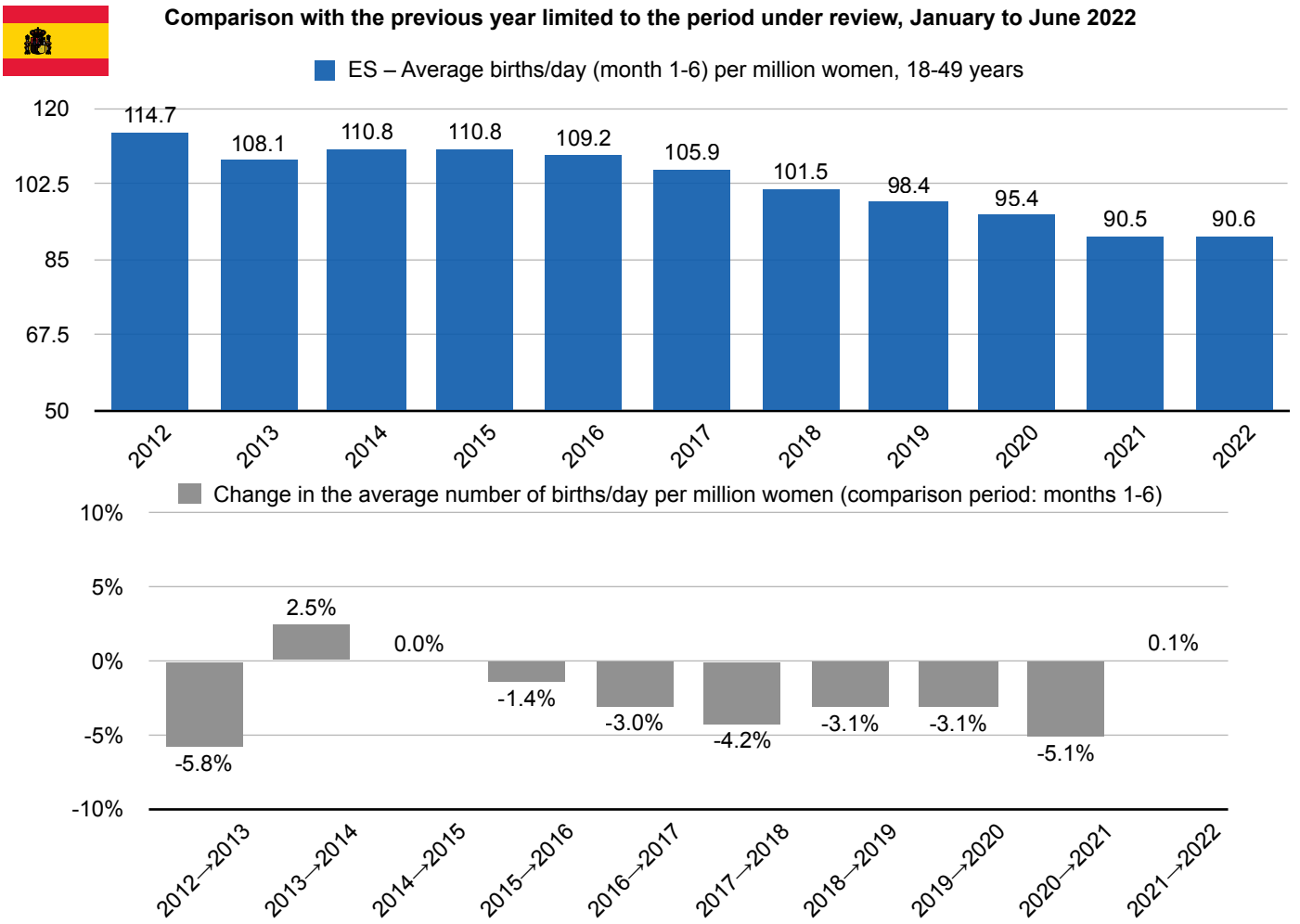


Fig. ES 6, 7

The upper figure ES 6 shows a steady decline in the normalised average daily births to a very low level when demographic normalization is applied. After a record low in 2021, which, as in Portugal, can also be attributed to the lockdown phase in Spain, births in 2022 remain at the second lowest level in the entire period.

The annual change in the normalised daily average in each case in the period from January to June is shown by the grey columns in Figure ES 7 below. Here, too, the "lockdown decline" in 2021 is the strongest signal in recent years, masking the development in 2022.

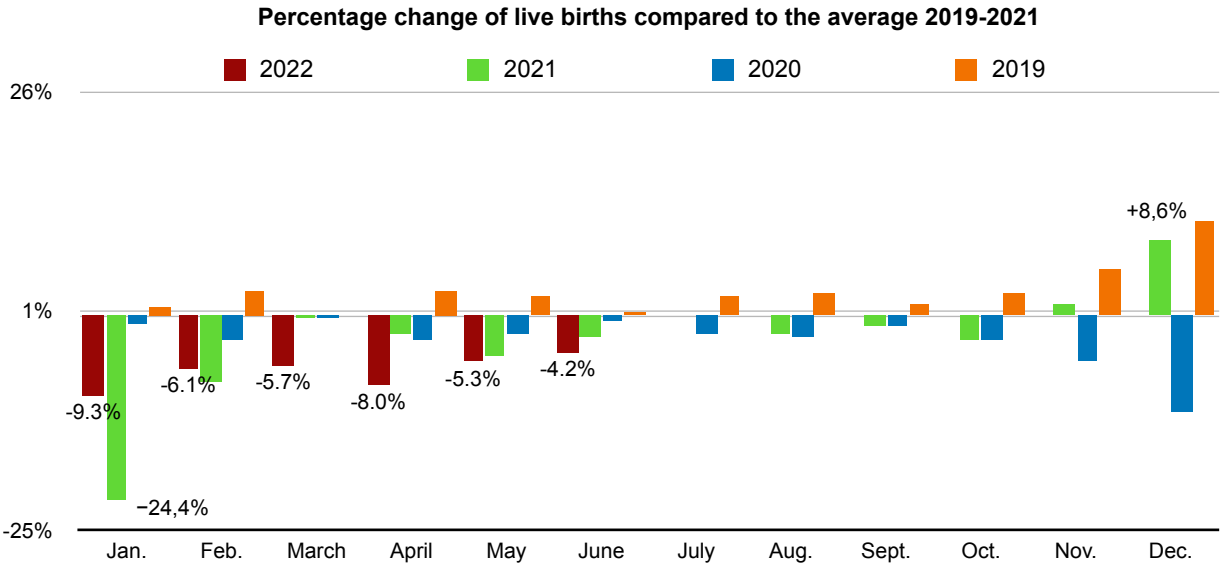


Fig. ES 8

The monthly changes to the previous year's average first show the particularly strong decline in births in January and February 2021 nine months after the lockdown. At the turn of the year 2021/22, there is a very abrupt change from positive changes in 2021 to -9.3% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

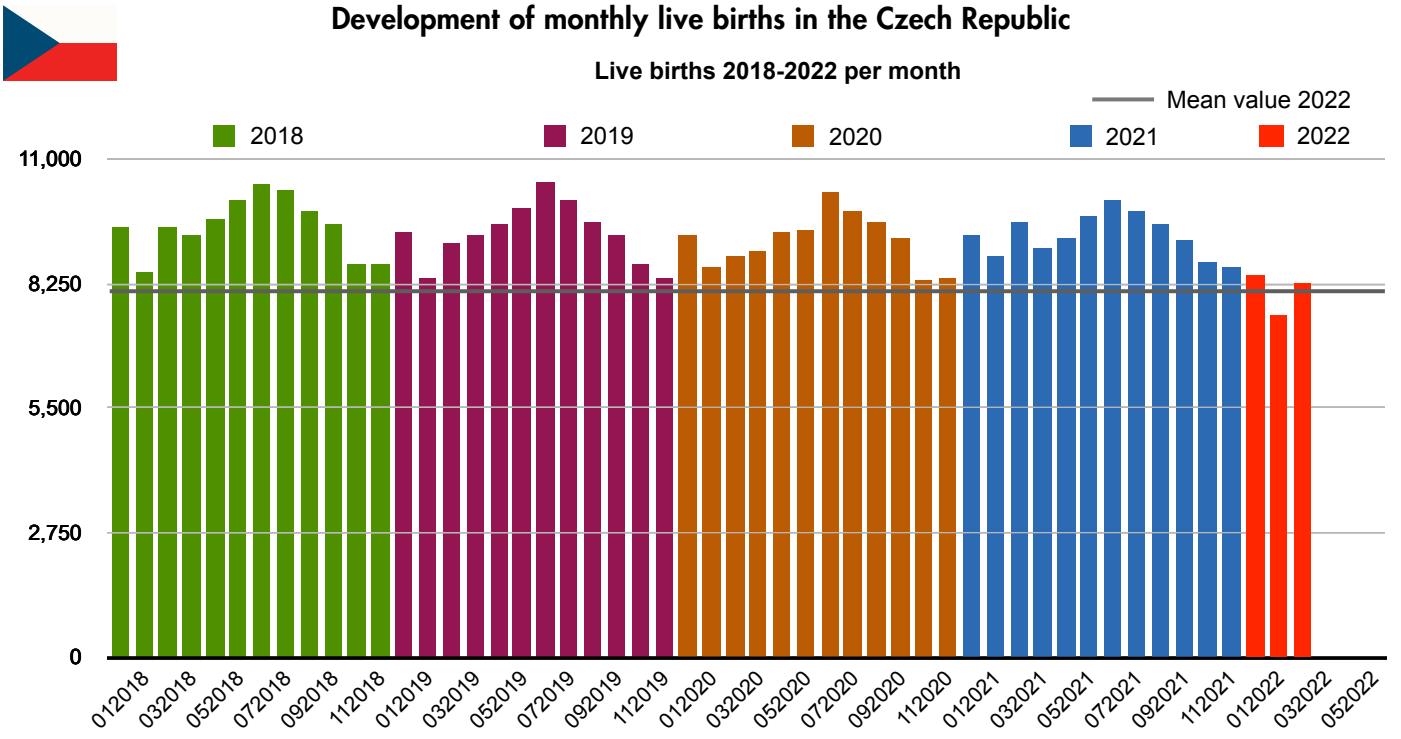


Fig. CZ 1

The course of monthly live births in the Czech Republic shows a regular periodic pattern of repetition, whereby in the first reported quarter of 2022, the birth numbers in 2022 in the Czech Republic also drop very significantly compared to previous years. The mean value of the three provisional monthly data reported so far is consistently below the previous year's level of the individual months, so that the decline in births in 2022 can also be seen as a clear signal in the Czech Republic.

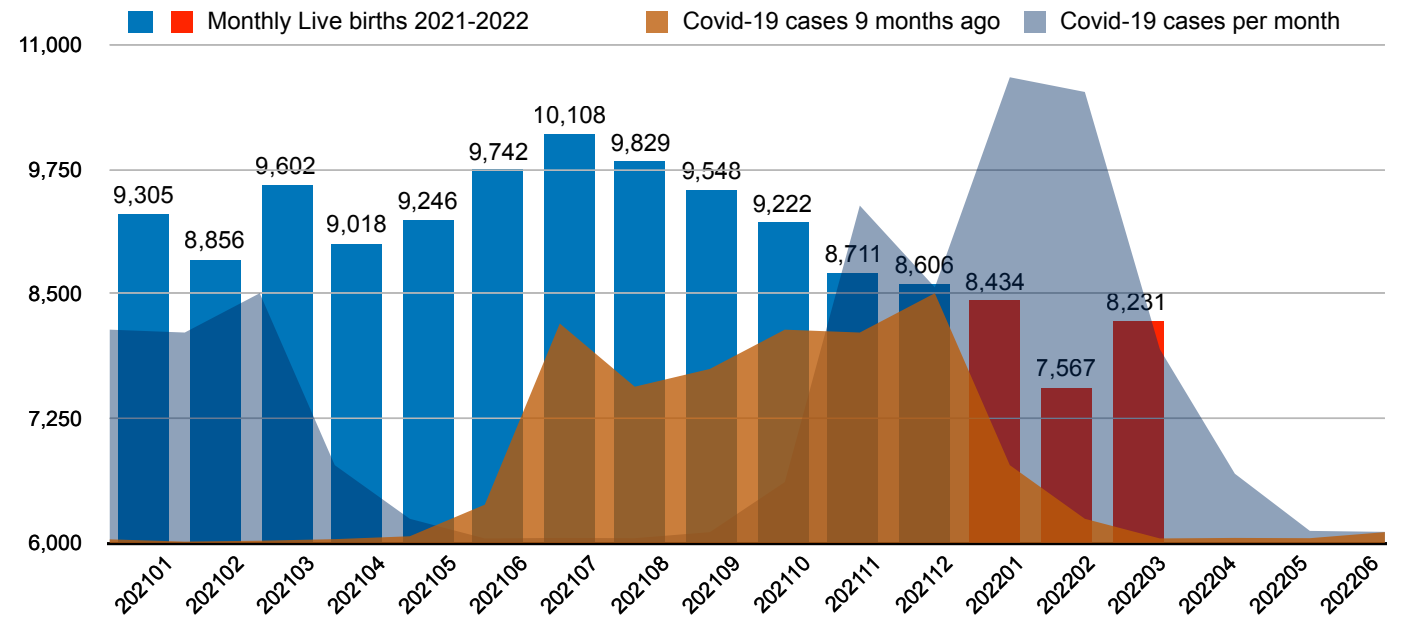


Fig. CZ 2

In the time section from 2021 to March 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosion of positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on already existing pregnancies, which could be proven by an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. Thus, a correlation cannot be justified. (ρ (rho) = 0.952, p = 0.00026 - high significance of a positive correlation claiming that low Covid-19 case numbers would explain low births, which is absurd).

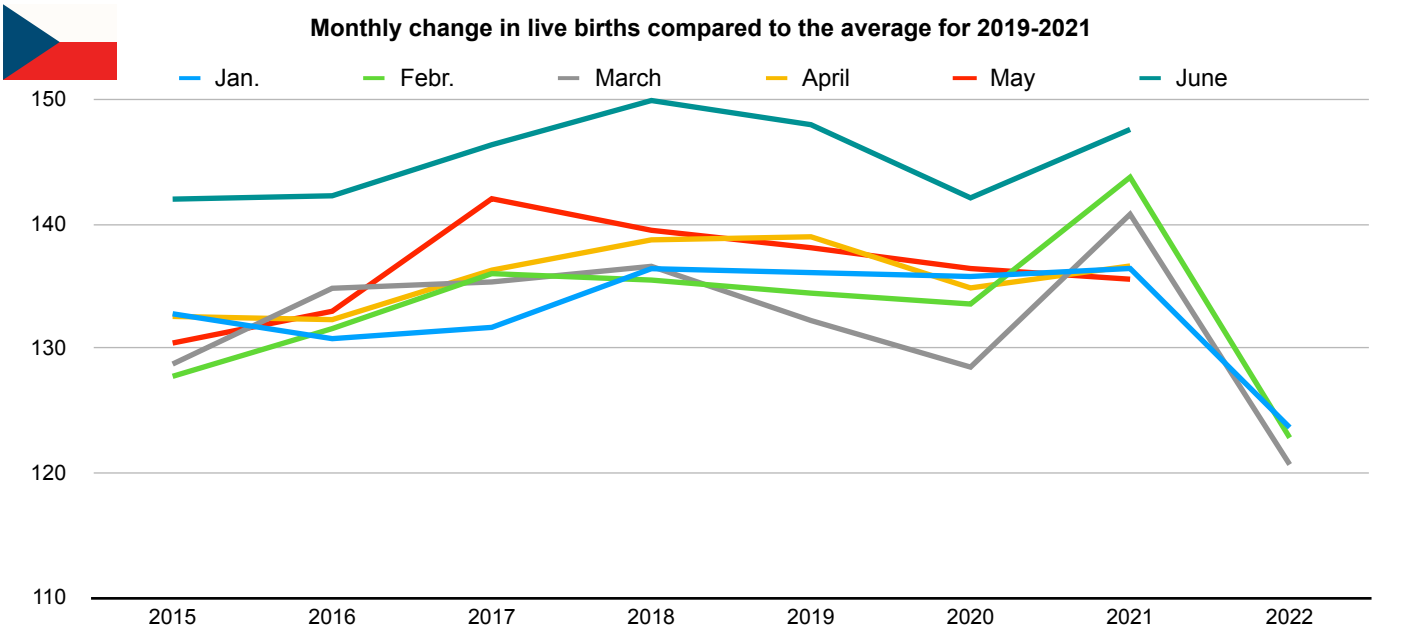


Fig. CZ 3

The development of only three transmitted individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- Stable births per day from 2016 to 2019.
- After the inexplicable drop in March 2020, there is a significant increase in February and March in 2021.
- In 2022, all three months fall to a new record low.

CZ – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	126.3	120.2	123.2	132.8	127.7	128.7	132.6	130.4	142.0	142.3
2015-16	128.1	121.4	127.2	130.8	131.6	134.8	132.3	133.0	142.2	148.8
2016-17	132.9	127.2	124.8	131.7	136.0	135.3	136.3	142.0	146.3	147.5
2017-18	136.6	132.4	132.0	136.4	135.5	136.6	138.7	139.5	149.9	150.7
2018-19	137.4	129.0	125.1	136.1	134.4	132.2	138.9	138.1	147.9	152.0
2019-20	134.7	129.7	121.0	135.8	133.5	128.5	134.8	136.4	142.1	148.9
2020-21	134.9	124.7	121.9	136.4	143.7	140.8	136.6	135.5	147.6	148.2
2021-22	135.2	132.0	126.2	123.6	122.8	120.7				
Difference to Ø 19-21	-0.47	4.17	3.47	-12.44	-14.42	-13.16				
Difference [%]	**-0.3%**	**3.3%**	**2.8%**	**-9.1%**	**-10.5%**	**-9.8%**				
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**				
Vacc./month	**1.6%**	**0.7%**	**2.7%**	**3.2%**	**15.0%**	**20.0%**				

Statistical analysis	Spearman's ρ (rho)	-0.5238	strong negative relationship
Interpretation (Cohen)	p-value	0.09136	no effect

Table CZ 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: The strong negative correlation between the level of the vaccination rate and the decline in births nine months later is not statistically significant, which contradicts the phenomenological picture!

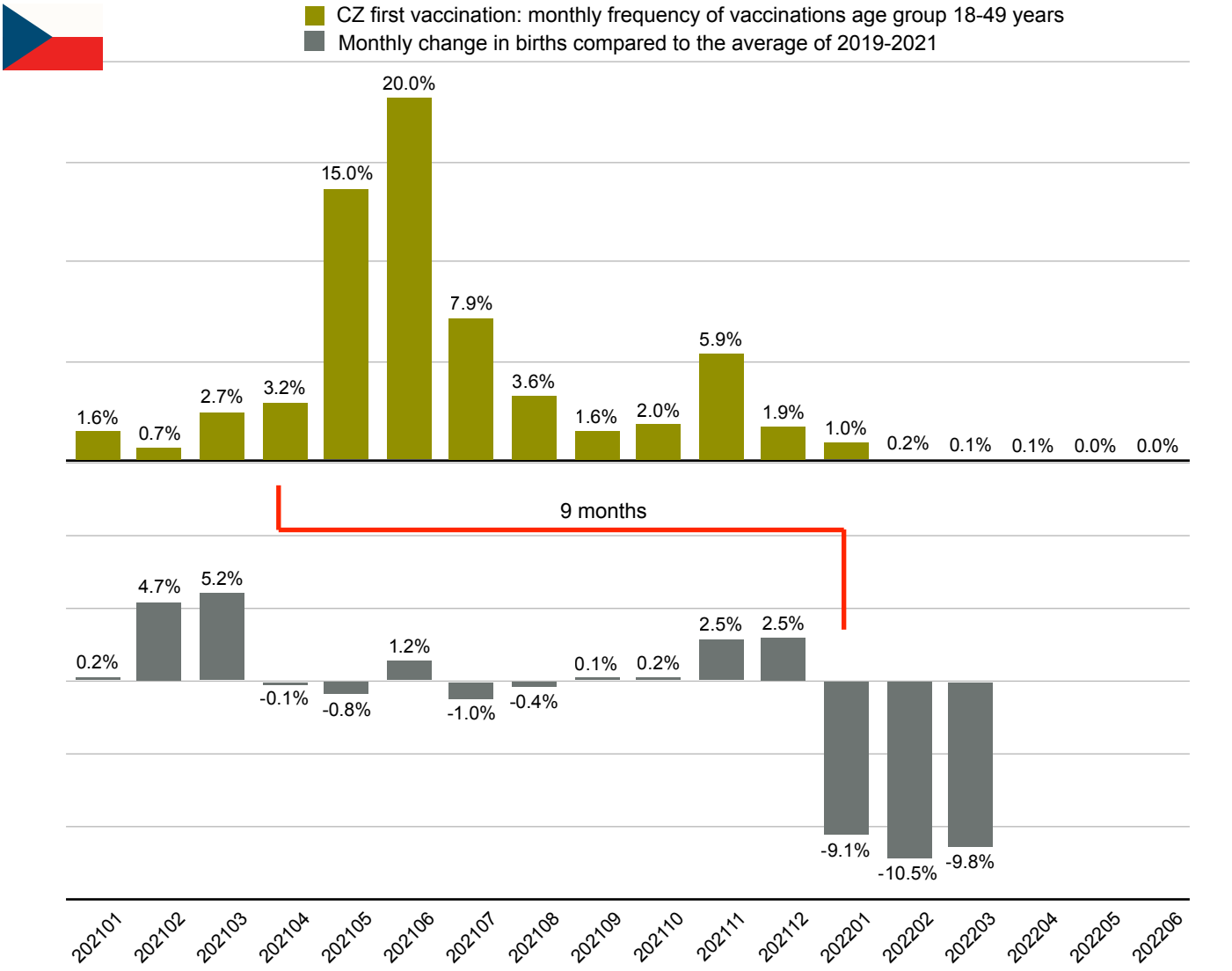


Fig. CZ 4, 5

The two charts show a very clear temporal correlation between the monthly vaccination rates nine months earlier and the decline in births in the Czech Republic from January 2022 onwards. This can be regarded as considerable, with rates between around 10%.

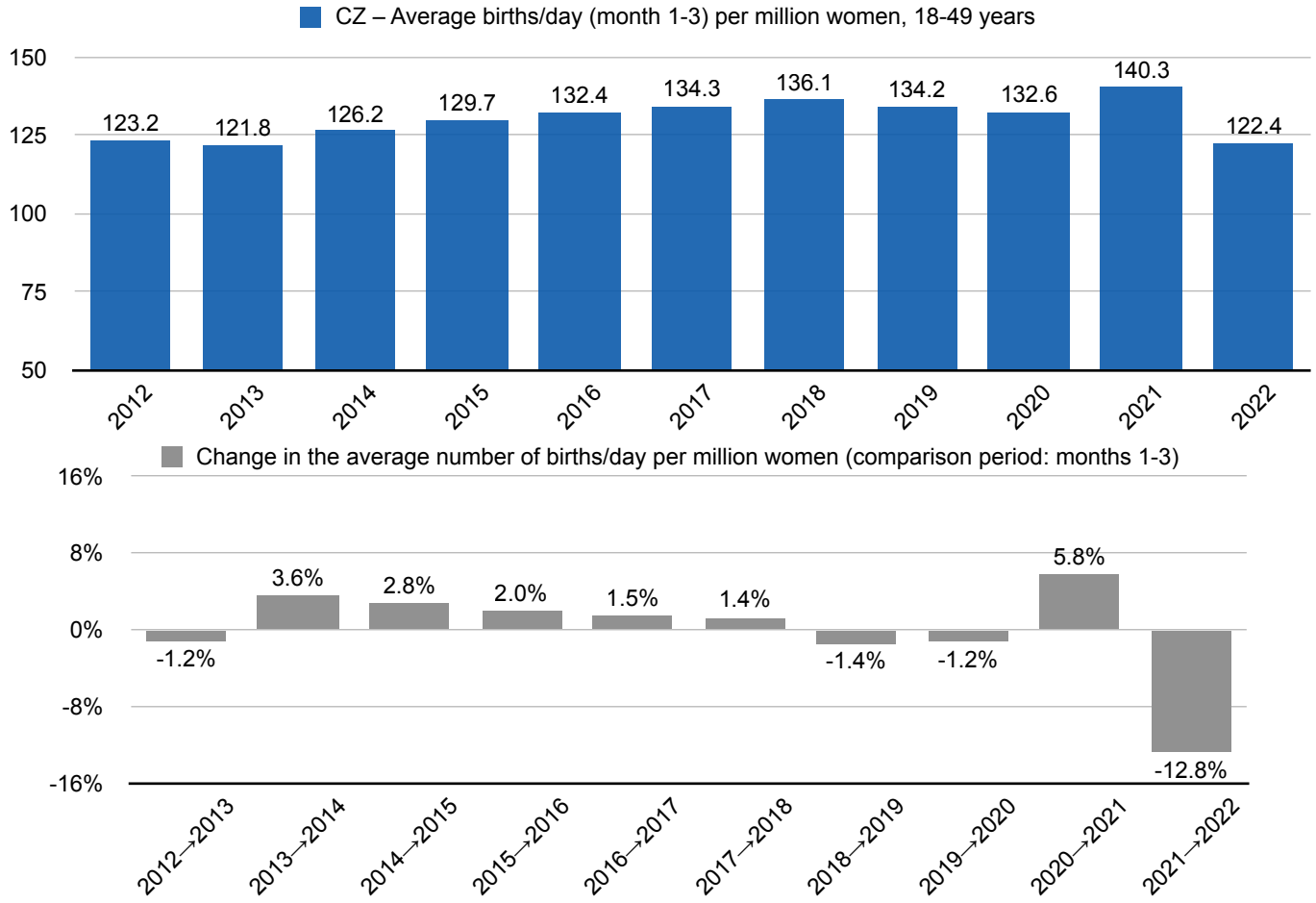


Fig. CZ 6, 7

From the upper figure CZ 6, a slight increase in the normalised average daily births can be seen with demographic normalization. After a decline in 2019 and 2020, the jump in 2021 and the double decline in 2022 represent the striking points.

The annual change in the normalised daily average in each case in the period from January to March is shown by the grey columns in the lower figure CZ 7. The increase in 2021 and the decrease in 2022 clearly stand out from the rest. The fact that the sudden occurrence and strength of the decline in 2022 cannot be regarded as a saturation effect is already shown by the previous monthly observation.

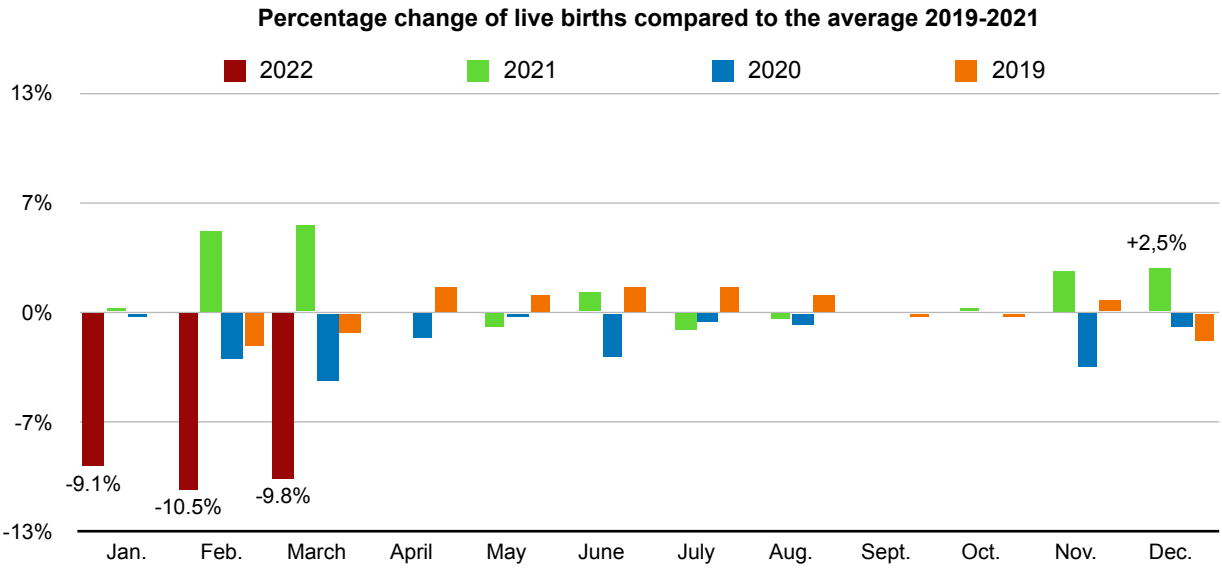


Fig. CZ 8

The monthly changes compared to the previous year's average impressively show the abrupt change from rising changes until December 2021 to -9.1% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

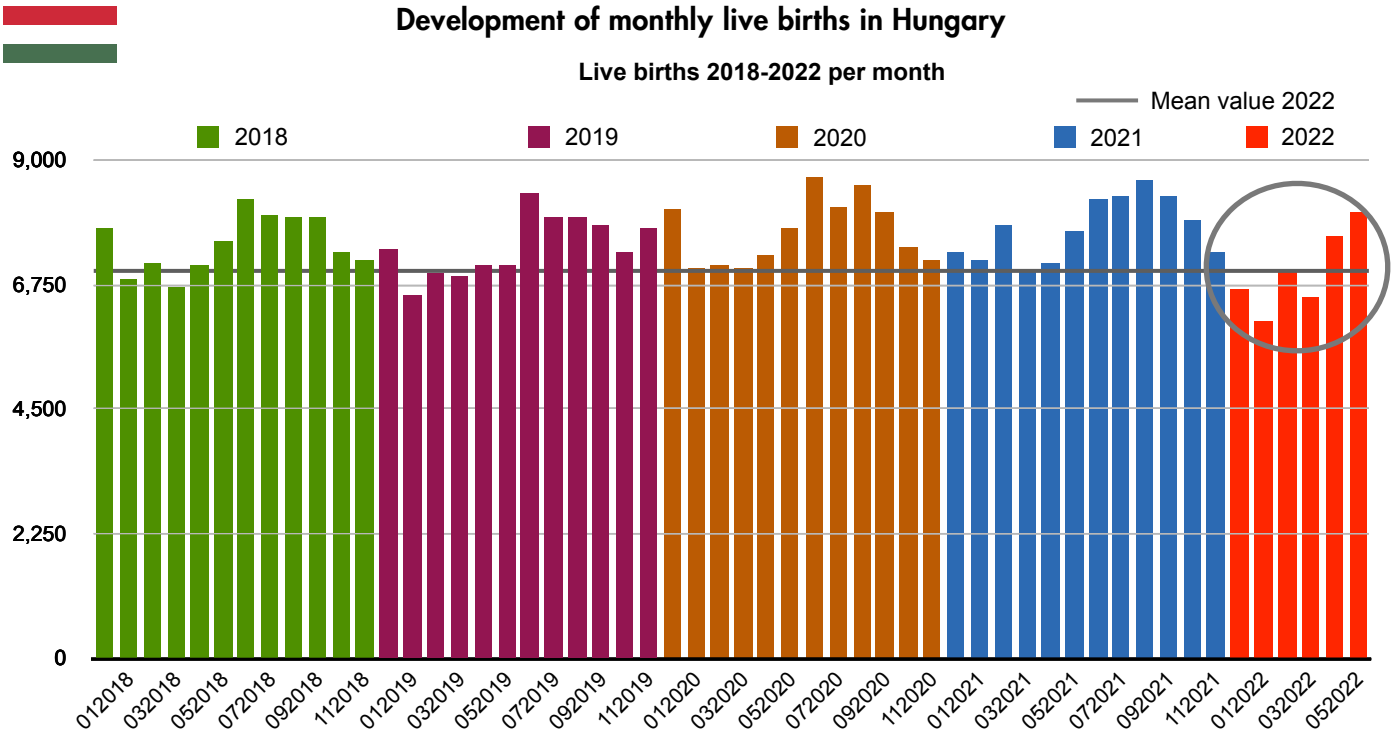


Fig. HU 1

The course of monthly live births in Hungary shows a regular slightly increasing periodic recurrence pattern, although in the first reported four months of 2022, births in Hungary also drop very significantly compared to previous years. The mean value of the six provisional monthly data reported so far is consistently below the previous year's level of the individual months, with exceptions (02.04/2018, 02.04/2019), so that the decline in births in 2022 can also be seen as a clear signal in Hungary.

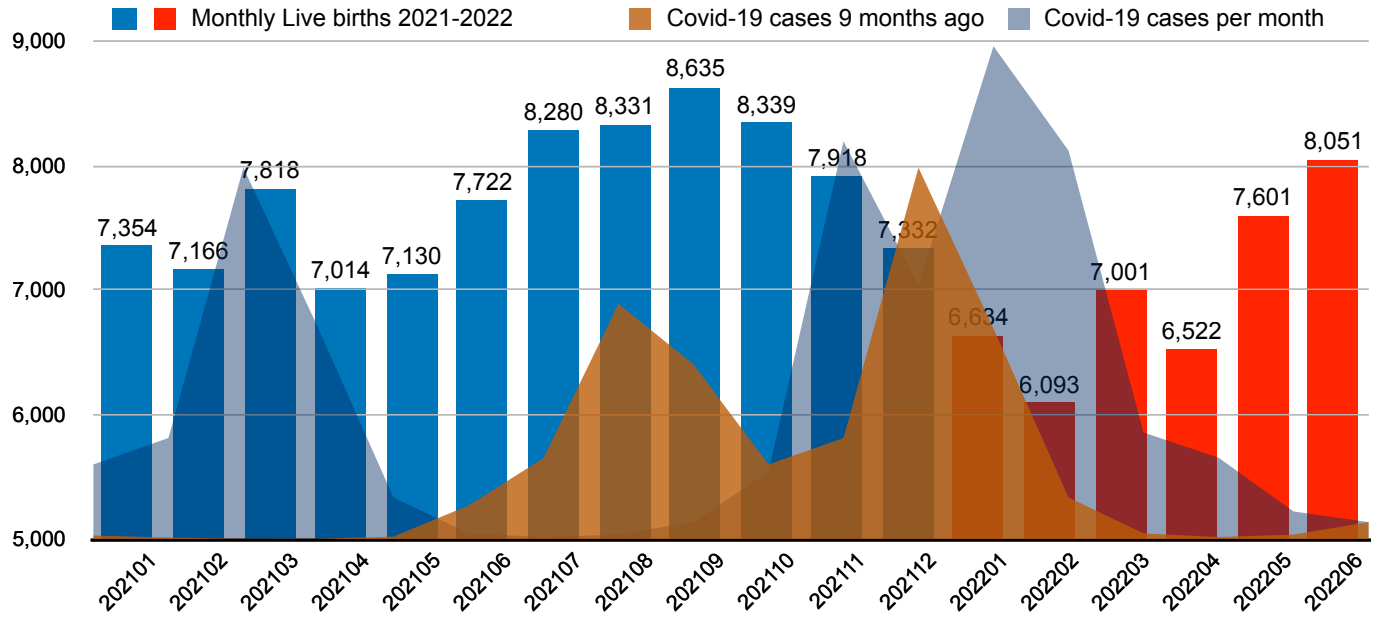


Fig. HU 2

In the time section from 2021 to June 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosion of positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on already existing pregnancies, which could be proven by an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. Thus, a correlation cannot be justified. (ρ (rho) = -0.145, p = 0.6696 - no significance).

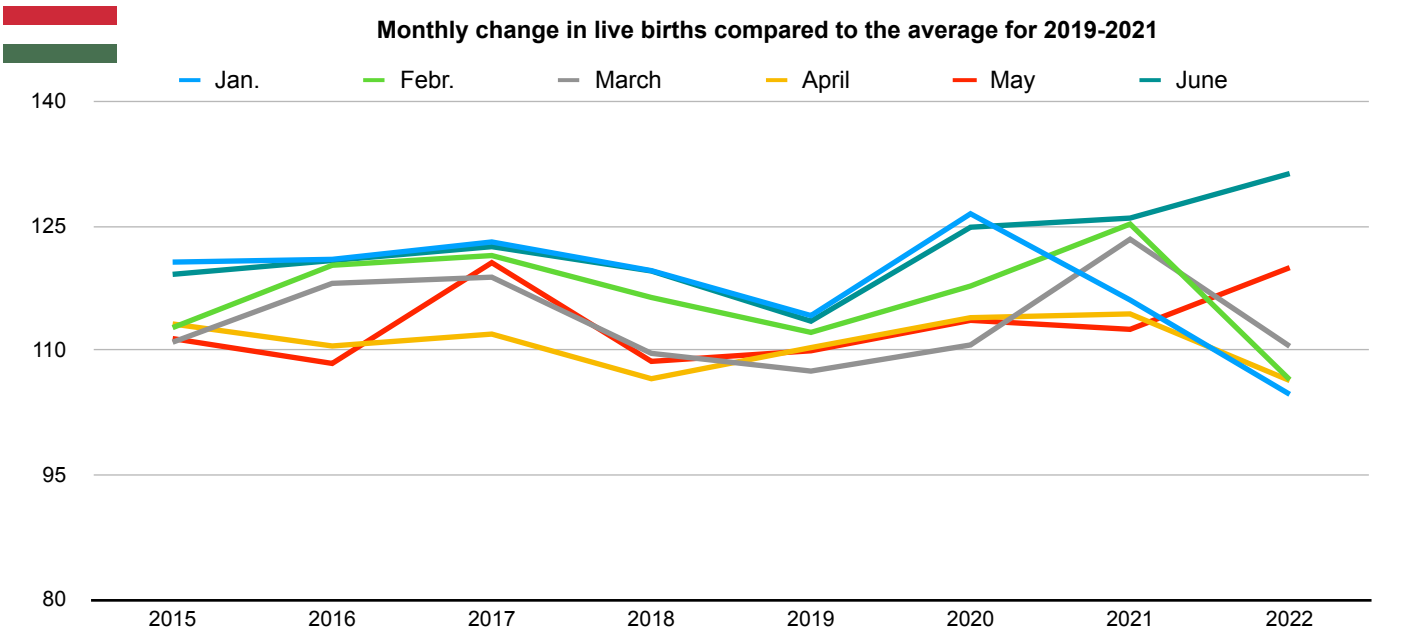


Fig. HU 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Two phenomena can be seen:

- Unsettled development at a constant level from 2015 to 2021.
- In 2022, all months except May and June fall to mostly new lows.

HU – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	120.5	116.6	117.0	120.6	112.7	111.0	113.2	111.4	119.1	124.4
2015-16	116.3	112.1	116.4	120.9	120.2	118.1	110.5	108.4	120.8	128.8
2016-17	128.2	120.6	117.9	123.0	121.4	118.8	111.9	120.5	122.5	129.5
2017-18	123.0	117.2	117.2	119.6	116.4	109.6	106.6	108.7	119.5	127.2
2018-19	122.6	116.0	110.4	114.2	112.1	107.5	110.3	109.9	113.5	129.7
2019-20	120.8	117.0	120.4	126.4	117.7	110.6	113.9	113.6	124.8	135.1
2020-21	125.4	119.7	112.4	116.0	125.2	123.4	114.4	112.5	125.9	130.7
2021-22	131.6	129.1	115.7	104.7	106.4	110.5	106.3	119.9	131.3	
Difference to Ø 19-21	8.65	11.56	1.28	-14.20	-11.91	-3.35	-6.52	7.93	9.87	
Difference [%]	**7.0%**	**9.8%**	**1.1%**	**-11.9%**	**-10.1%**	**-2.9%**	**-5.8%**	**7.1%**	**8.1%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**2.3%**	**1.2%**	**5.0%**	**25.0%**	**19.1%**	**4.3%**	**1.4%**	**1.4%**	**1.1%**	

Statistical analysis	Spearman's ρ (rho)	-0.6818	strong negative relationship
Interpretation (Cohen)	p-value	0.01042	small effect

Table HU 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a statistically significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

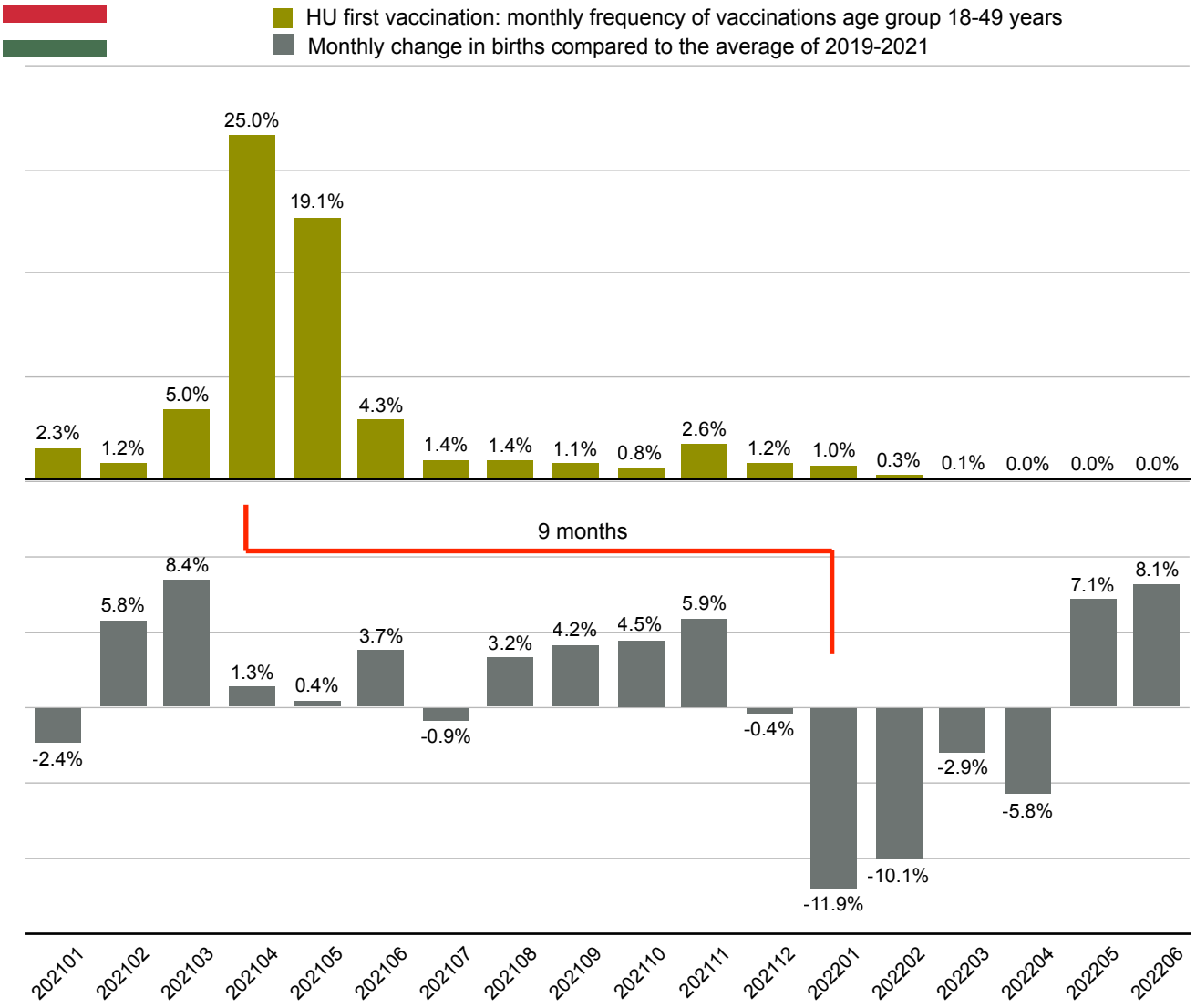


Fig. HU 4, 5

The two charts show a very clear temporal relationship between the monthly vaccination rates nine months before and the decline in births in Hungary from January 2022 onwards, with rates between 5 and 12%. However, this phenomenon seems to take a turn in May and June.

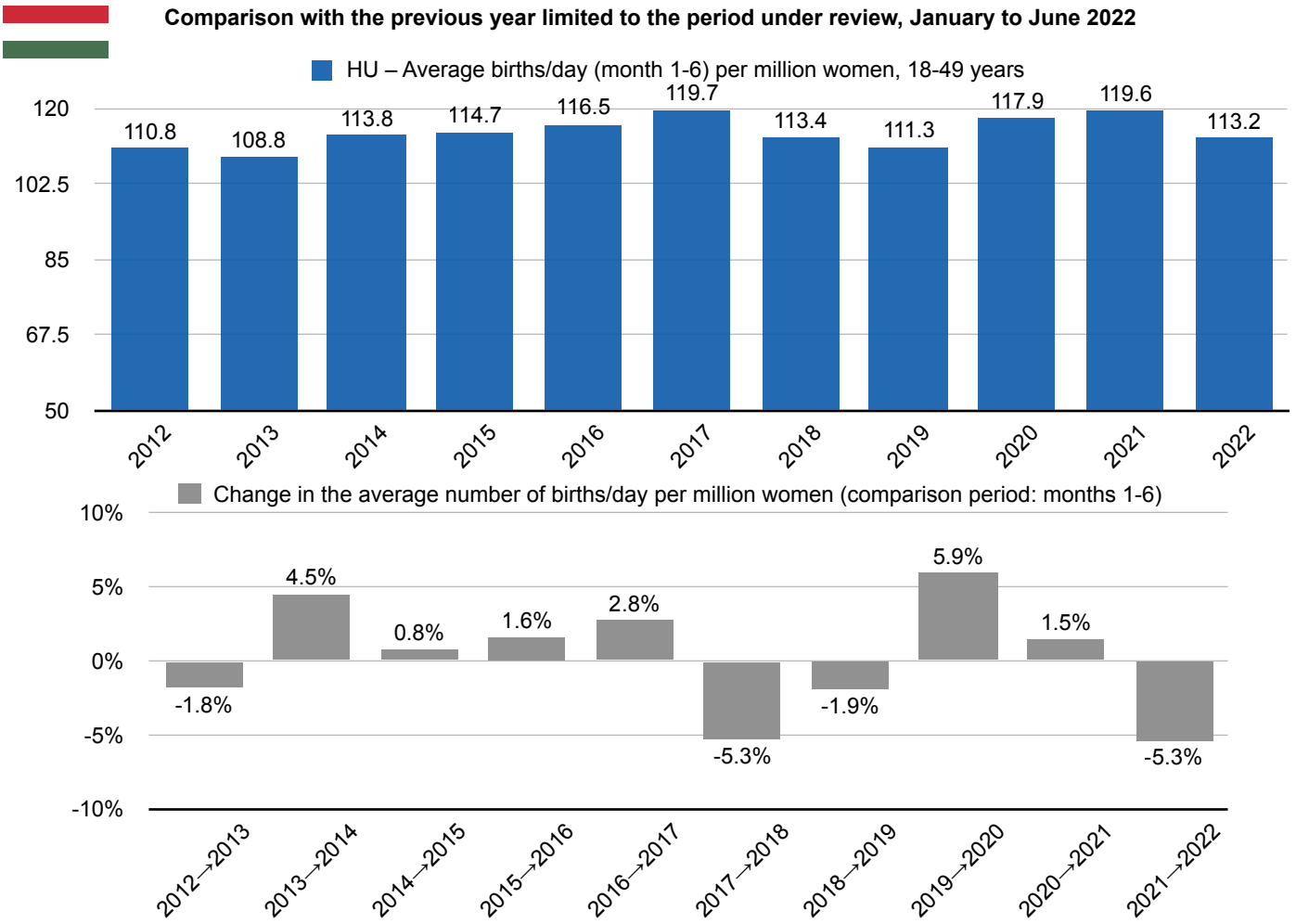


Fig. HU 6, 7

From the upper figure HU 6, a slight increase in the normalised average daily births can be seen with demographic normalization. After an increase in 2021, there was a clear decline in the number of births in 2022.

The annual change in the normalised average daily births in each case in the period from January to June is shown by the grey columns in the lower figure HU 7. The most marked annual changes can be noticed from 2017 to 2018, 2019 to 2020 and the decline in 2021 to 2022.

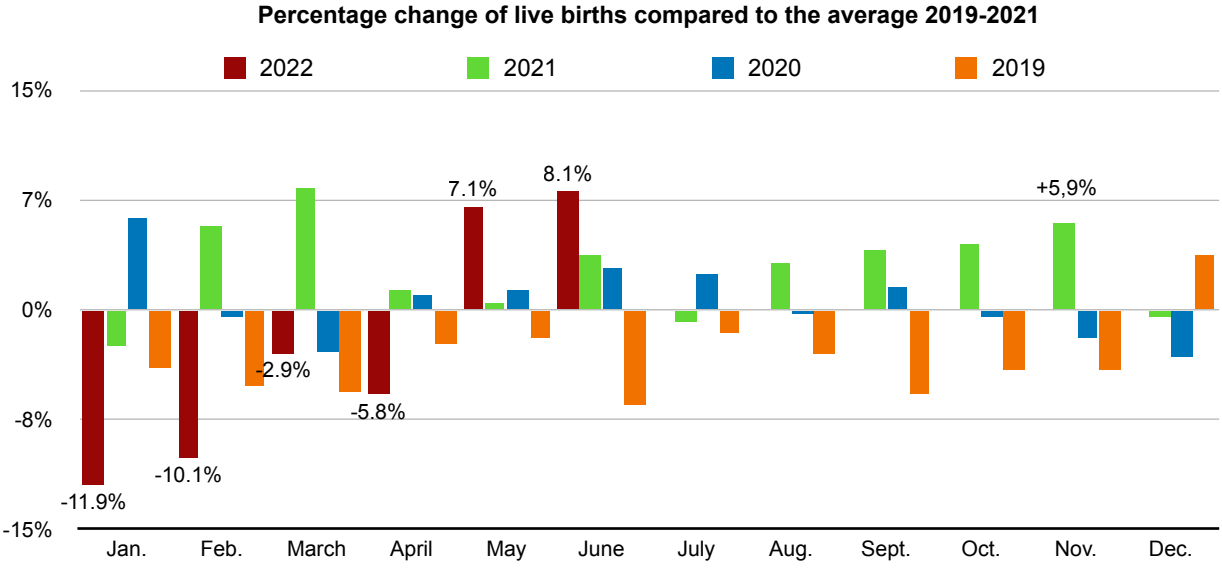


Fig. HU 8

The monthly changes compared to the previous year's average impressively show the abrupt change from rising changes until November 2021 to -11.9% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

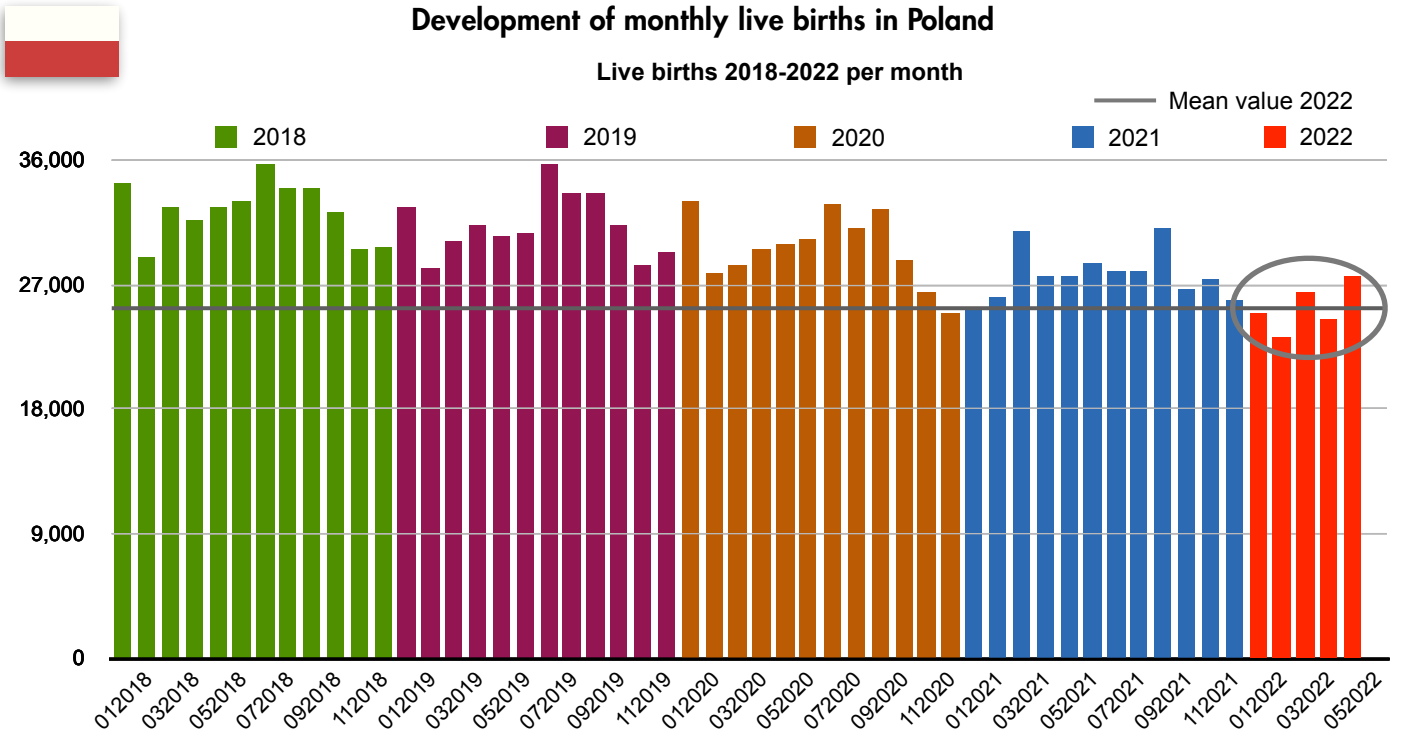


Fig. PL 1

The course of monthly live births in Poland shows a regular clearly falling periodic recurrence pattern. The population of women aged 18-49 has decreased by 4.9% from 8,617,979 to 8,192,688. In 2022, Poland has also seen a very significant drop in births in the first four months compared to previous years. The mean value of the five provisional monthly data reported so far is below the previous year's level of the individual months with a minimal undershoot in 12/2020, so that the decline in births in 2022 is also to be regarded as a clear signal in Poland.

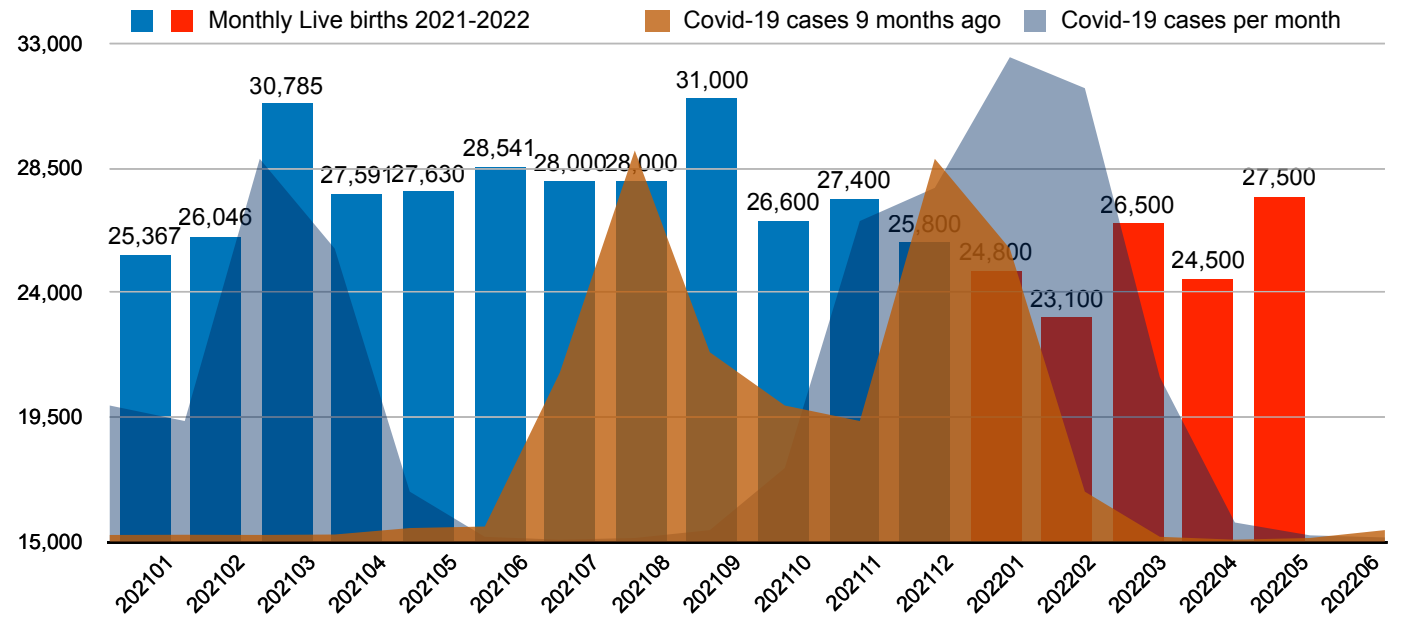


Fig. PL 2

In the time section from 2021 to May 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosion of positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on already existing pregnancies, which could be proven by an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. Thus, a correlation cannot be justified. (ρ (rho) = 0.224, p = 0.533 - no significance).

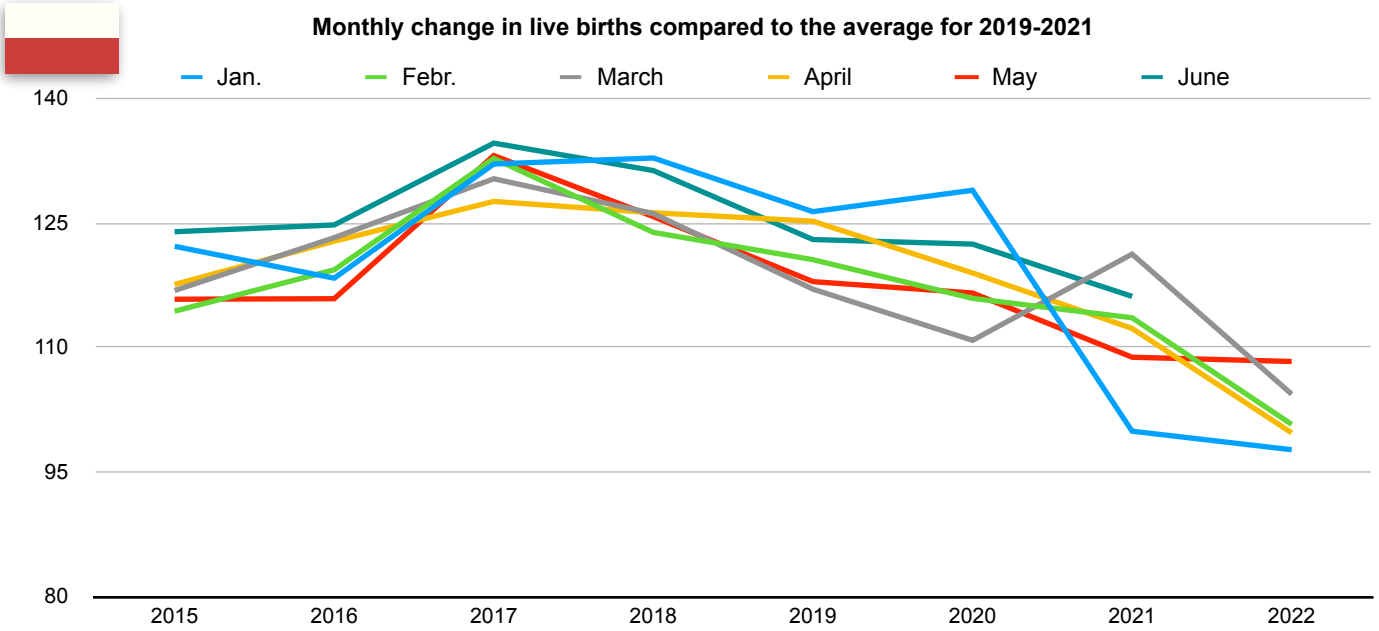


Fig. PL 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- Sharp increase from 2016 to 2017, here the refugee movement may have played a role.
- Declining birth rates per day despite normalization to the population from 2017 to 2020.
- Significant drop in the curves for all months to new lows in 2022.

PL – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	117.0	110.6	111.1	122.2	114.3	116.8	117.6	115.8	123.9	129.4
2015-16	117.9	108.9	108.8	118.3	119.3	123.2	122.8	115.8	124.7	129.7
2016-17	122.6	121.4	116.8	132.1	132.7	130.3	127.6	133.1	134.6	138.1
2017-18	128.1	123.1	114.0	132.8	123.8	126.1	126.2	125.7	131.3	137.5
2018-19	124.1	117.5	114.3	126.3	120.5	117.0	125.2	117.9	123.0	138.4
2019-20	121.5	114.0	113.7	128.9	115.9	110.8	118.9	116.5	122.4	128.4
2020-21	112.1	106.8	97.5	99.9	113.5	121.2	112.3	108.8	116.1	110.2
2021-22	104.7	111.5	101.6	97.6	100.7	104.3	99.7	108.3		
Difference to Ø 19-21	-14.49	-1.30	-6.94	-20.72	-15.96	-12.00	-19.11	-6.13		
Difference [%]	**-12.2%**	**-1.1%**	**-6.4%**	**-17.5%**	**-13.7%**	**-10.3%**	**-16.1%**	**-5.4%**		
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**		
Vacc./month	**2.2%**	**1.4%**	**2.0%**	**5.2%**	**20.4%**	**11.5%**	**5.0%**	**3.5%**		

Statistical analysis	Spearman's ρ (rho)	-0.6727	strong negative relationship
Interpretation (Cohen)	p-value	0.01652	small effect

Table PL 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a statistically significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

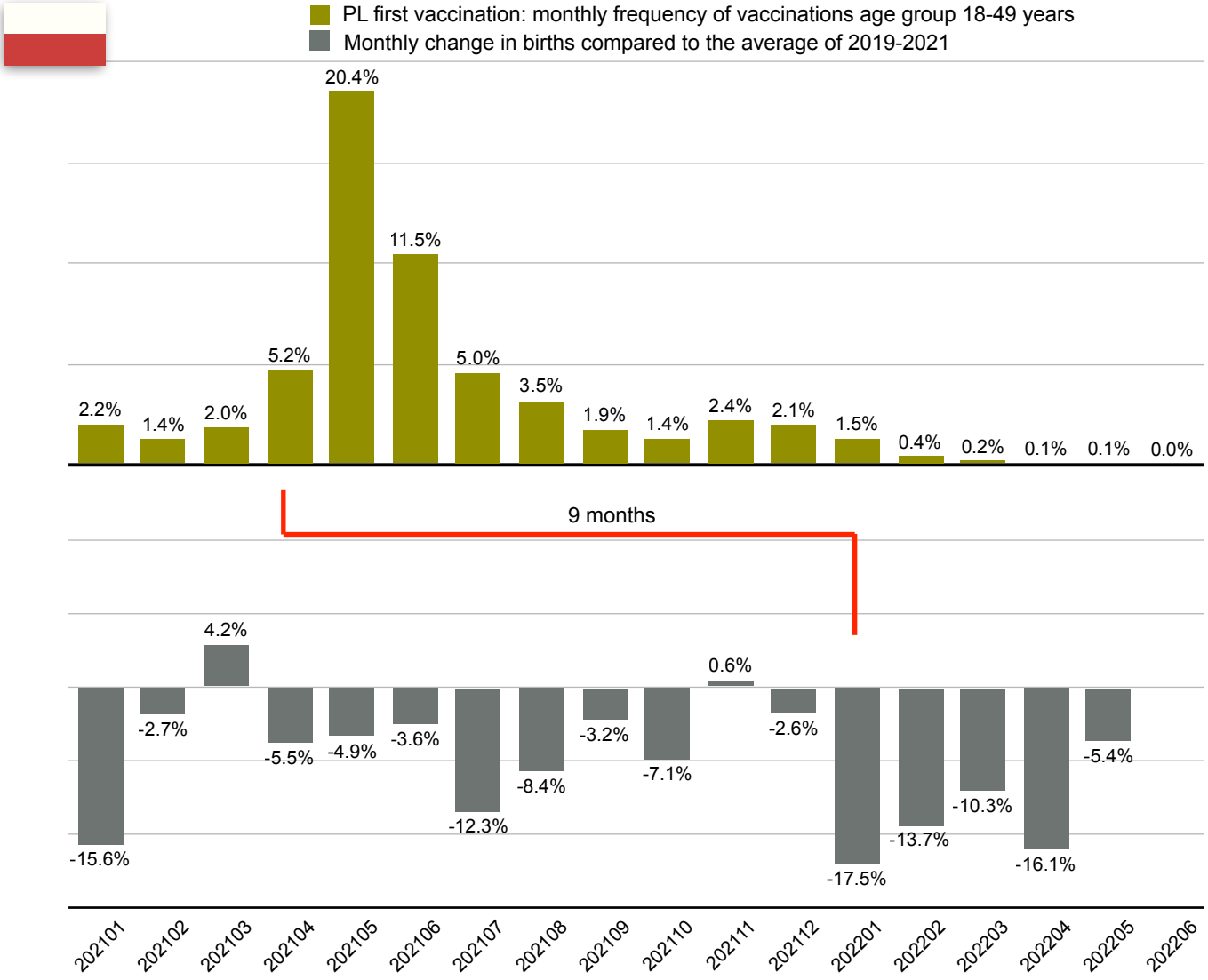


Fig. PL 4, 5

In the period from January 2021 to May 2022, the two diagrams show a very clear temporal correlation between the monthly vaccination rates nine months earlier and the decline in births in Poland from January 2022 onwards. With rates of between 10 and 18%, this stands out noticeably in terms of density and permanence from what happened in the previous year.

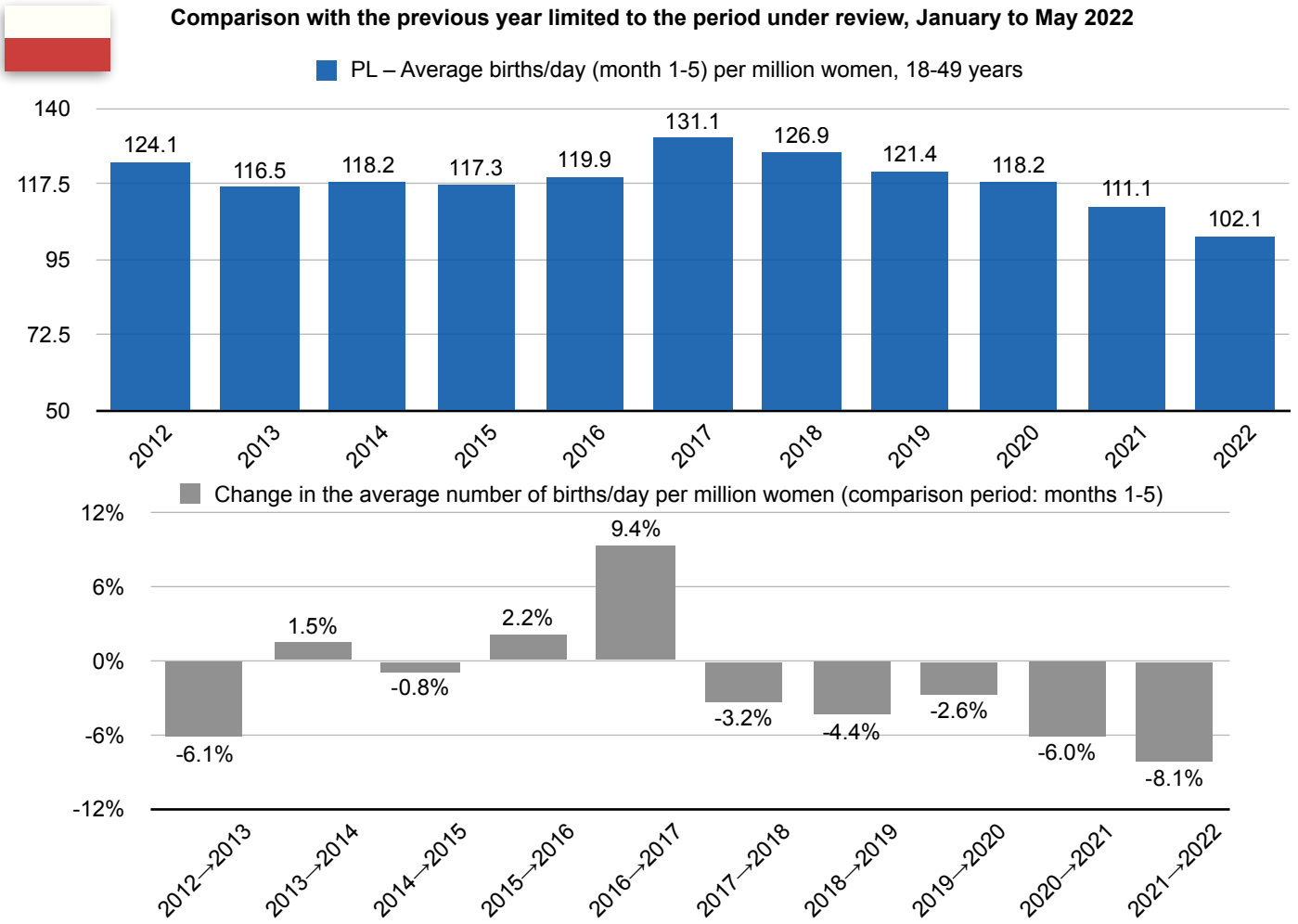


Fig. PL 6, 7

From the upper figure PL 6, a clear decline in the normalised average daily births since 2017 can be seen with demographic normalization. This leads successively in 2021 and 2022 to a new record low value in the period under consideration.

The annual change in the normalised average daily value in each case in the period from January to May is shown by the grey columns in Figure PL 7 below. The continuously increasing decline in the last 5 years represents a particular family planning development in Poland, which seems to have had an additional effect in 2022.

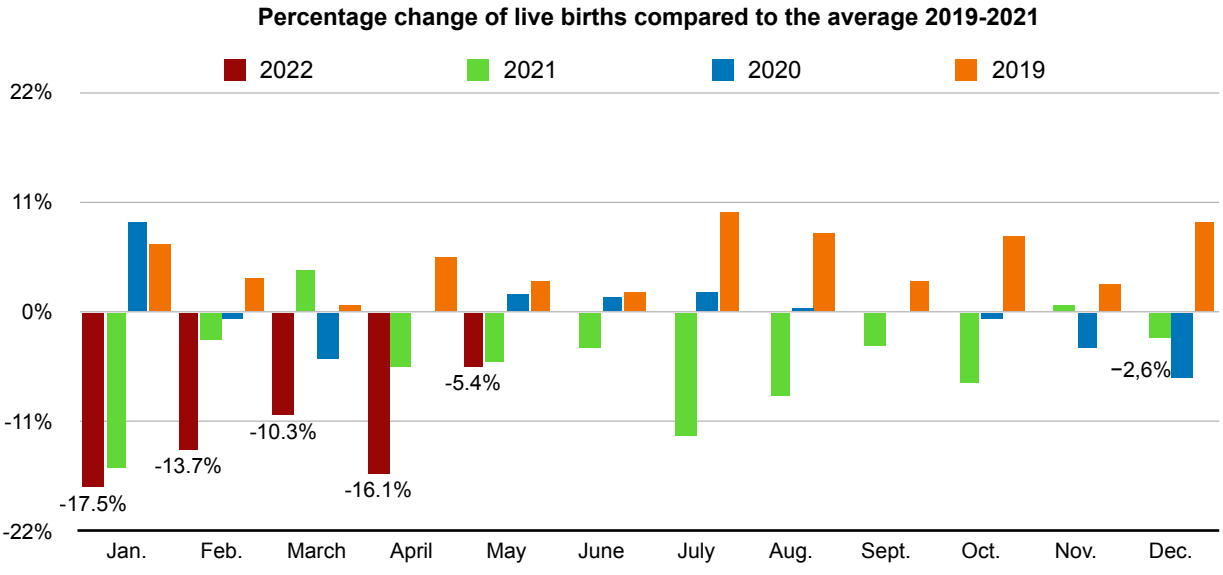


Fig. PL 8

The monthly changes compared to the previous year's average impressively show the abrupt change from -2.6% in December to -17.5% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 monthst.

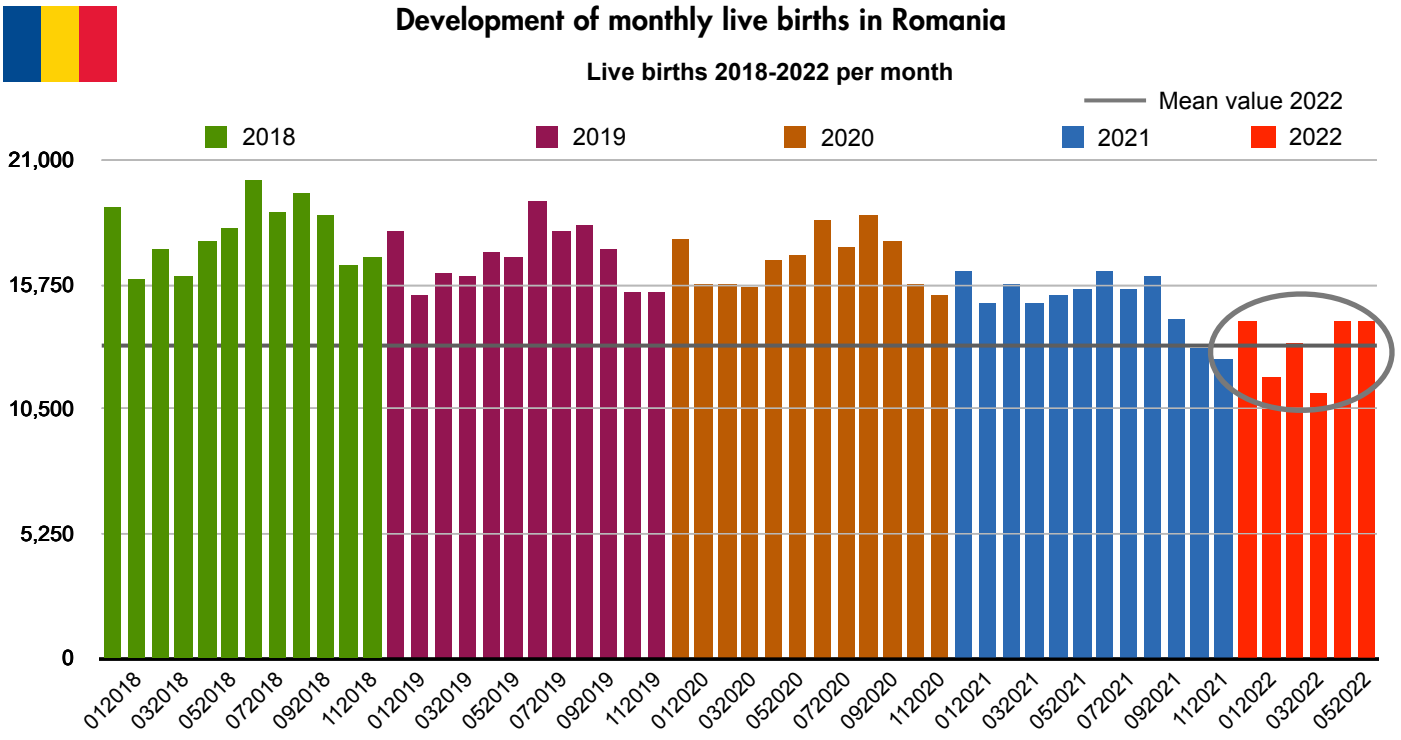


Fig. RO 1

The course of monthly live births in Romania shows a regular clearly falling periodic recurrence pattern. The population of women aged 18-49 has decreased by 11.6% from 4,403,666 to 3,893,586. In 2022, the birth rates in Romania have also dropped very sharply compared to previous years. The mean value of the six provisional monthly data reported so far is consistently far below the previous year's level of the individual months, so that the decline in births in 2022 must also be regarded as a very clear signal in Romania.

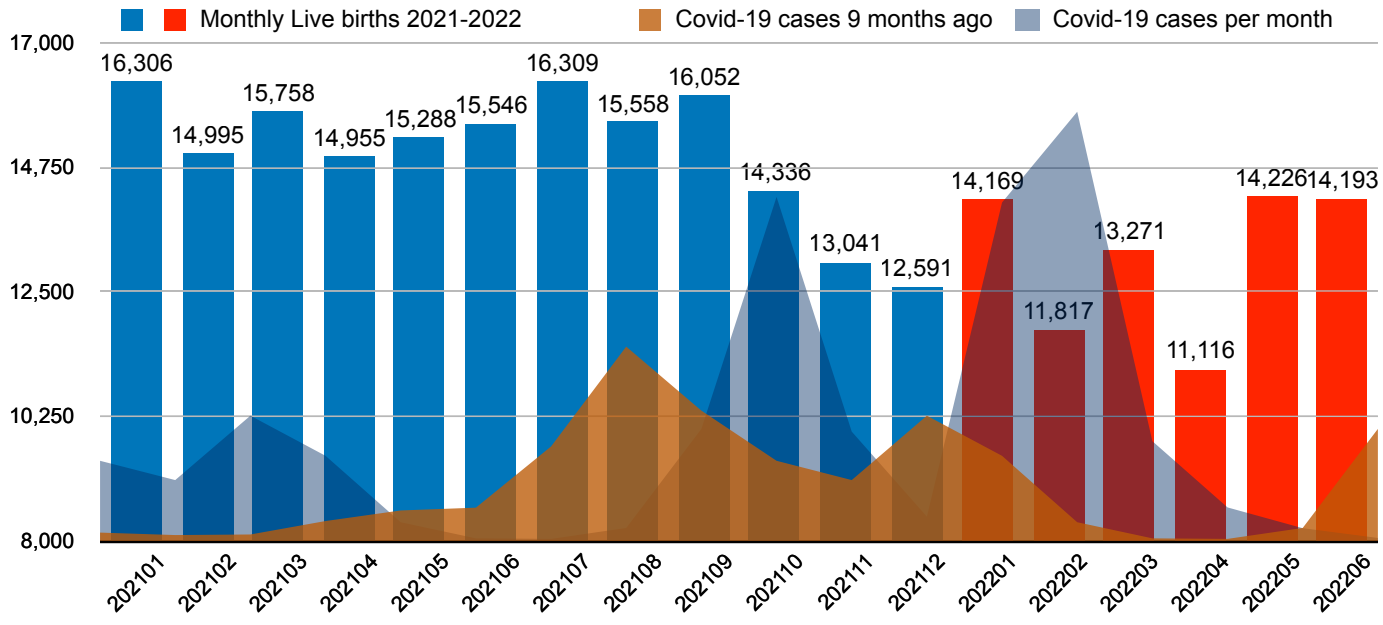


Fig. RO 2

In the time section from 2021 to June 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosion of positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on already existing pregnancies, which could be proven by an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. Thus, a correlation cannot be justified. (ρ (rho) = 0.7, p = 0.01647 - positive correlation with opposite statement to the observed decline in births and thus without causal relationship).

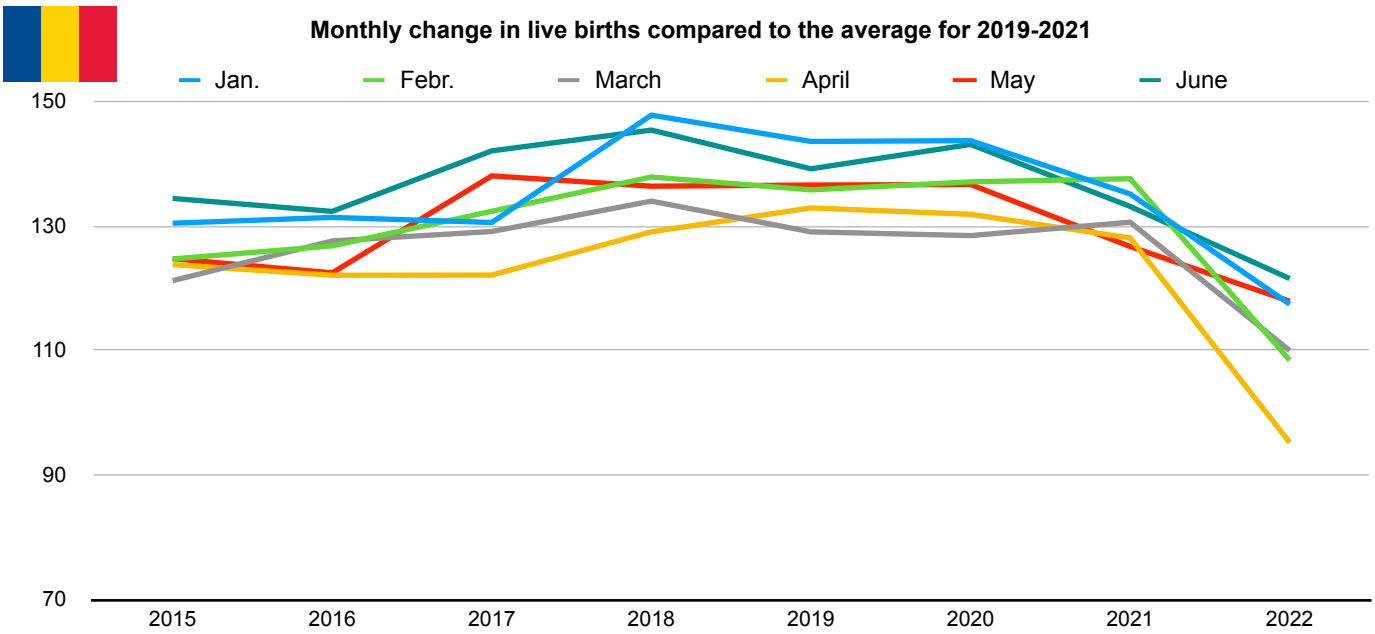


Fig. RO 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Three phenomena can be seen:

- Significant increase from 2015 to 2018.
- Declining births per day despite normalization to population from 2018 to 2021.
- Very sharp drop in curves for all months to new lows in 2022.

RO – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	128.8	123.9	121.6	130.4	124.7	121.2	123.7	124.7	134.4	148.1
2015-16	131.1	123.4	122.7	131.3	126.8	127.5	122.0	122.4	132.3	141.6
2016-17	135.1	134.4	125.9	130.5	132.3	129.1	122.1	138.0	142.0	151.1
2017-18	140.2	135.4	129.1	147.7	137.8	133.9	129.0	136.3	145.4	156.2
2018-19	145.1	132.5	131.3	143.5	135.8	129.0	132.9	136.5	139.1	153.6
2019-20	137.1	127.6	123.1	143.7	137.0	128.4	131.8	136.6	143.1	150.7
2020-21	143.3	132.5	124.6	135.1	137.5	130.6	128.0	126.7	133.1	135.1
2021-22	118.8	111.6	104.3	117.4	108.4	109.9	95.2	117.9	121.5	
Difference to Ø 19-21	-23.08	-19.24	-22.02	-23.37	-28.38	-19.37	-35.74	-15.41	-16.92	
Difference [%]	**-16.3%**	**-14.7%**	**-17.4%**	**-16.6%**	**-20.8%**	**-15.0%**	**-27.3%**	**-11.6%**	**-12.2%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**2.1%**	**2.6%**	**4.8%**	**6.6%**	**8.1%**	**2.7%**	**2.0%**	**2.0%**	**2.4%**	

Statistical analysis	Spearman's ρ (rho)	-0.5273	strong negative relationship
Interpretation (Cohen)	p-value	0.04778	small effect

Table RO 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a statistically significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

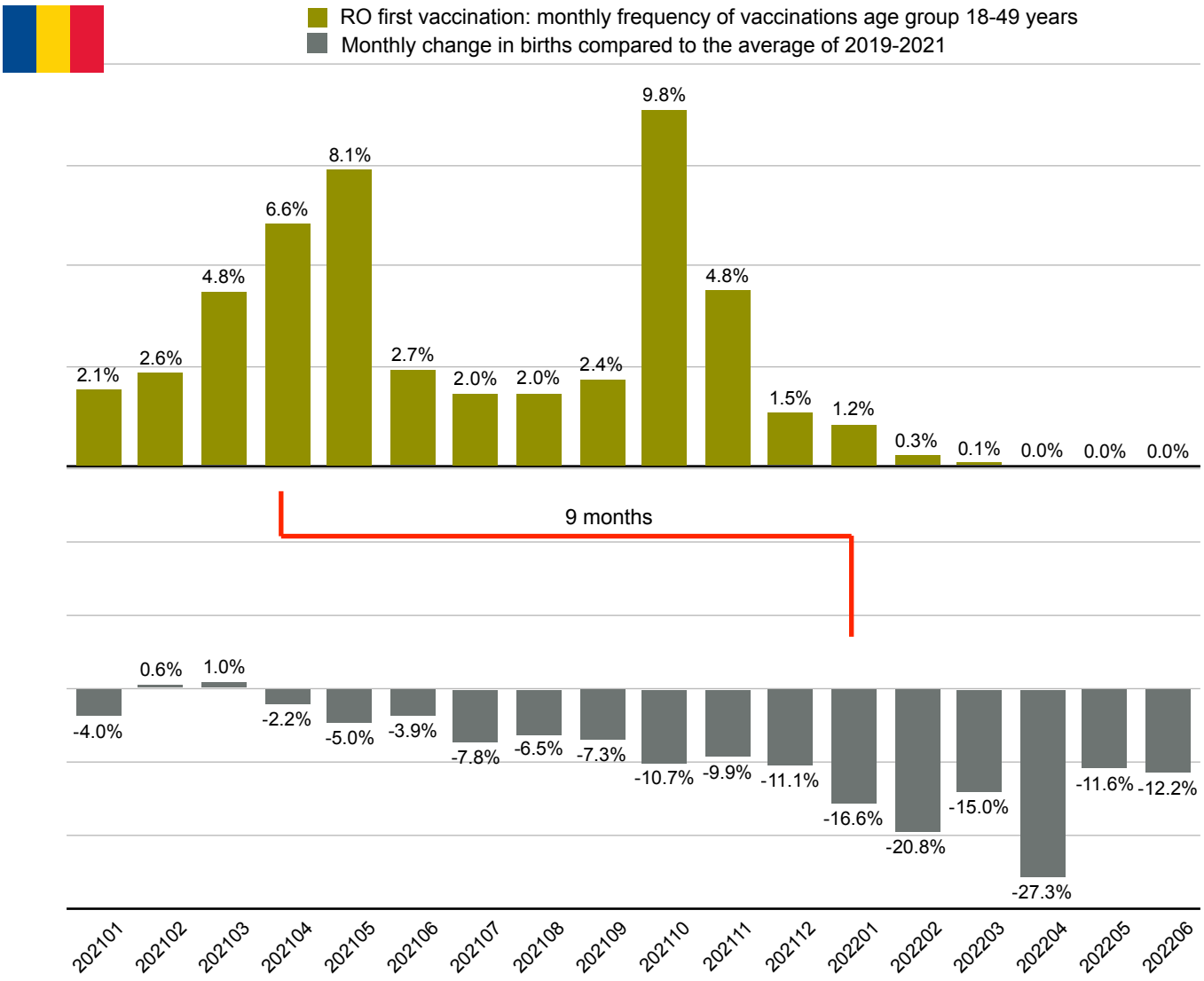


Fig. RO 4, 5

In the period from January 2021 to June 2022, the two diagrams show a noticeable temporal connection between the monthly vaccination frequencies nine months in the past and the dramatisation of the decline in births in Romania from January 2022 onwards to values of up to -27.3%. This development contrasts clearly with the previous year's rates, especially in the increase.

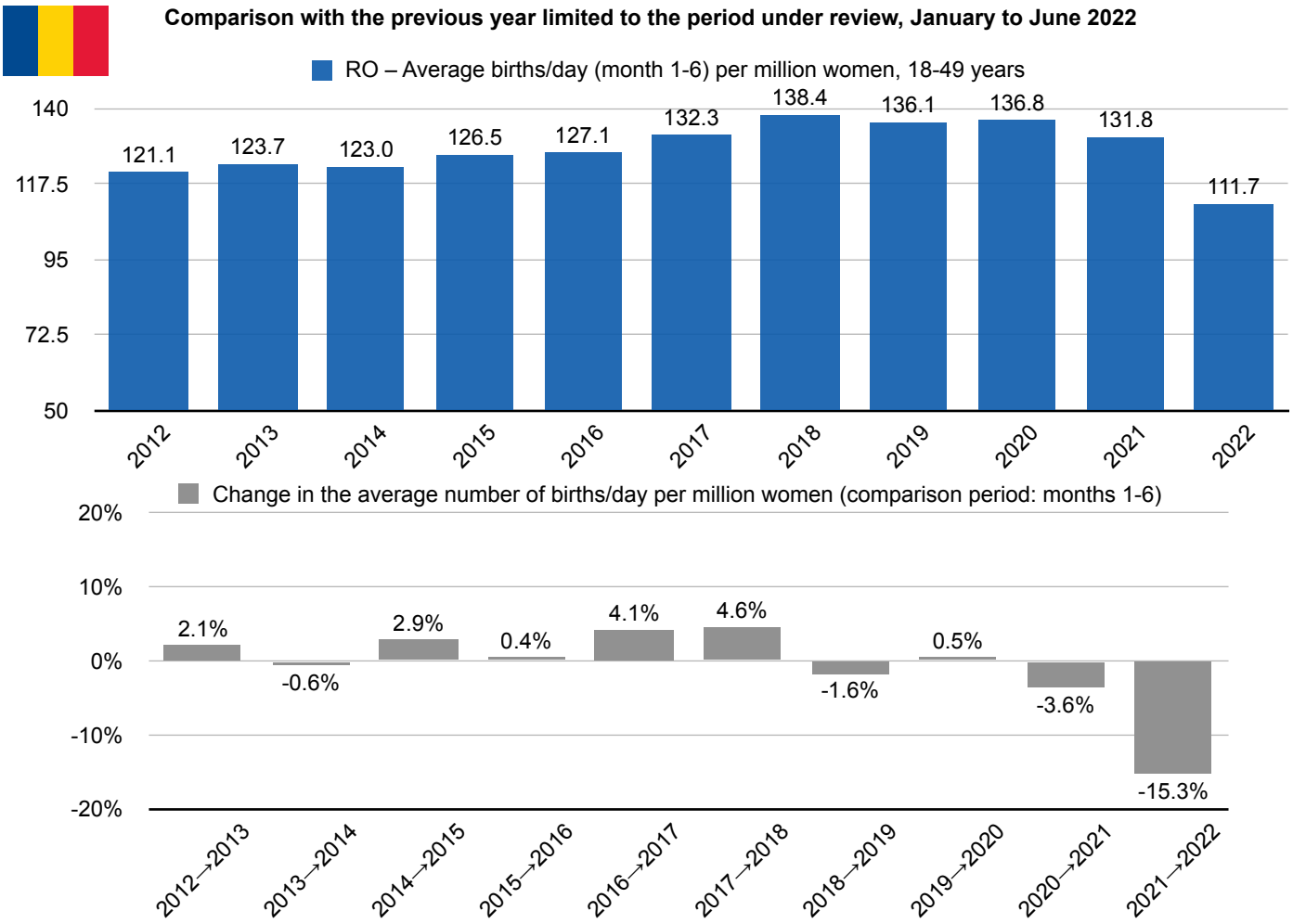


Fig. RO 6, 7

From the upper figure RO 6, a clear increase in the normalised average daily births can be seen with demographic normalization until 2018. After the values remain at this level for four years, there is a drastic decline to a target value far below the previous minimum in 2022.

The annual change in the normalised average daily value in each case in the period from January to June is shown by the grey columns in Figure RO 7 below. As the striking end point of the annual changes, Romania sets a very clear signal with -15.3%, whose temporal link with the vaccination event is undeniable.

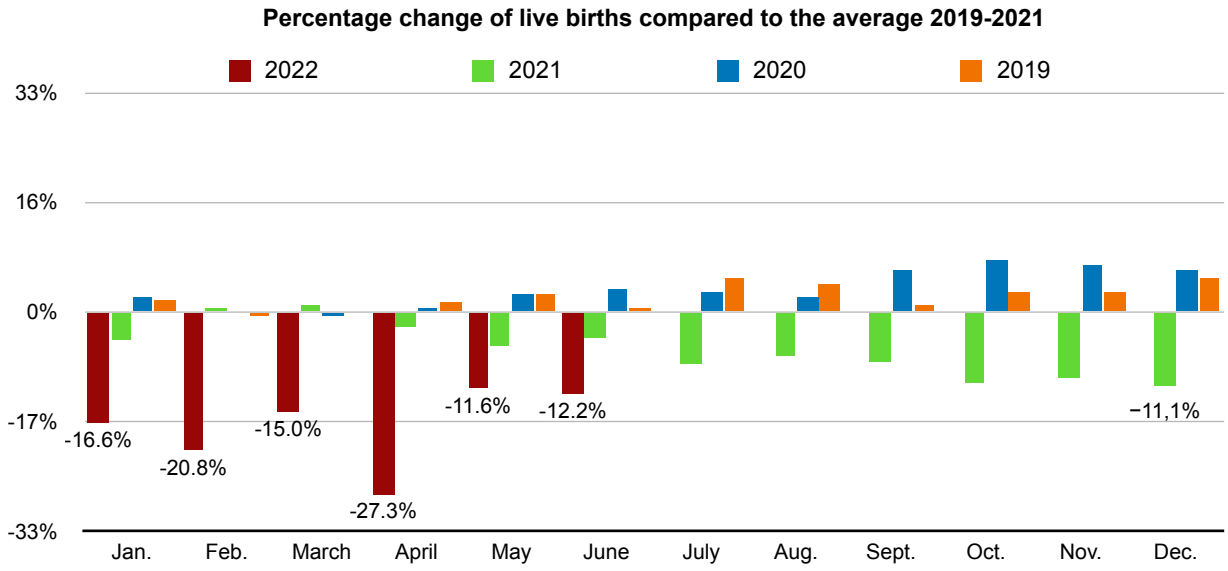


Fig. RO 8

The continuous decline in birth rates as early as 2021 calls for in-depth background analyses. In addition, however, a further dramatisation of the decline is also discernible here at the turn of the year, which can be assigned to the vaccination campaign. In any case, in Romania we will have to look for multi-factorial backgrounds that are pushing family planning back so much.

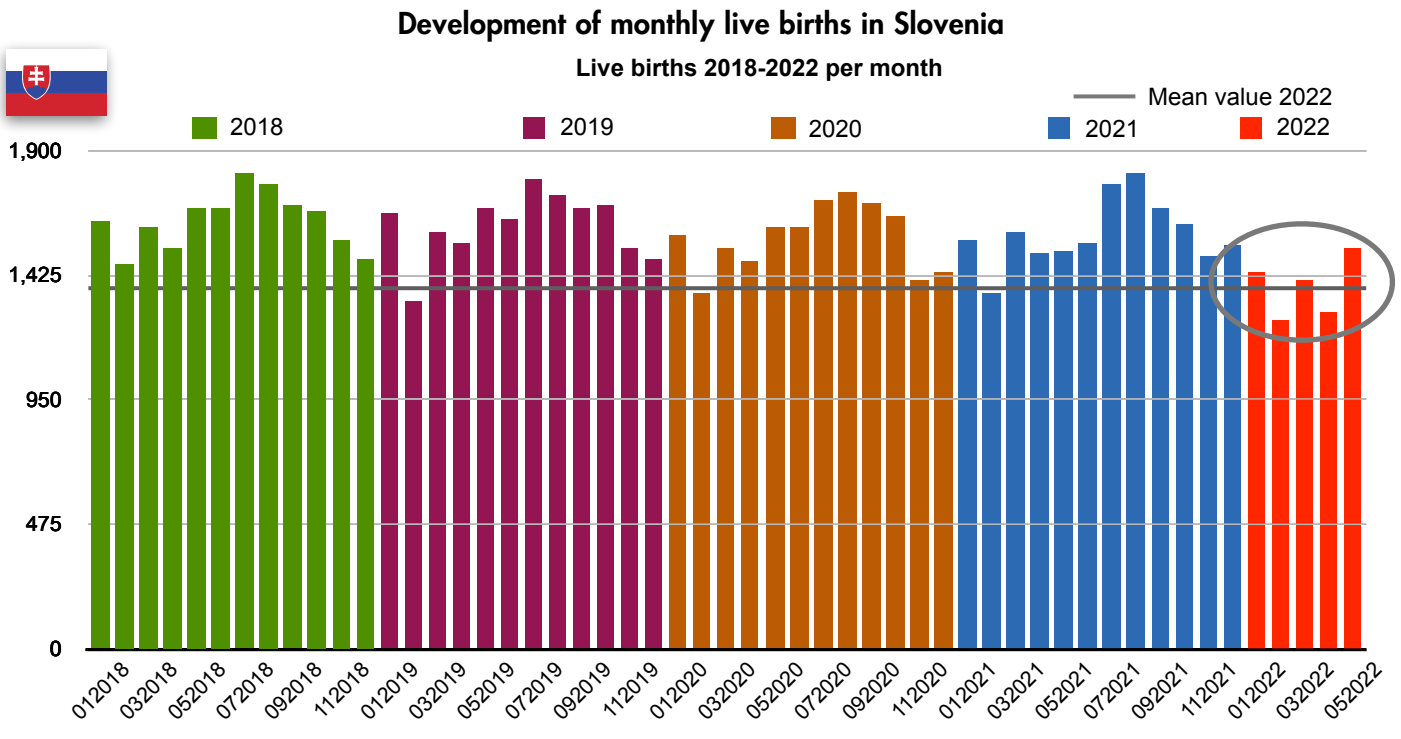


Fig. SI 1

The course of monthly live births in Slovenia shows a regular periodic repetition pattern, whereby in 2022 the birth figures in Slovenia also drop very sharply compared to previous years. The mean value of the five provisional monthly data reported so far is, with exceptions (02/2019, 02/2020, 02/2021), far below the previous year's level of the individual months, so that the decline in births in 2022 must be regarded as a very clear signal in Slovenia as well.

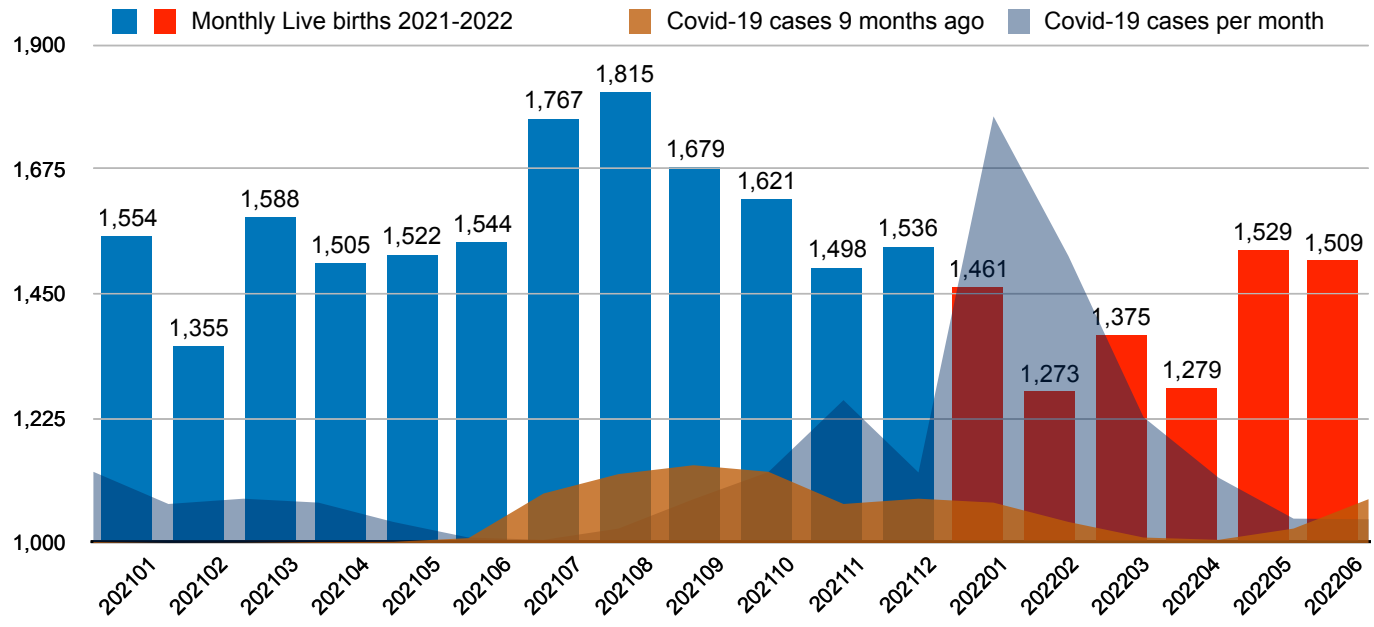


Fig. SI 2

In the time section from 2021 to May 2022 shown in Figure 2, the Covid-19 case numbers reported monthly are shown in light blue and the Covid-19 case numbers 9 months earlier are shown in brown in an area diagram. A connection between the decline in births and the explosion of positive tests at the beginning of 2022 cannot be deduced, because there could only be an influence on already existing pregnancies, which could be proven by an increase in stillbirths, which cannot be determined, as data on stillbirths and abortions are not available.

The brown area shows the Covid-19 case numbers in the conception phase 9 months ago, where the case numbers were at a falling level. Thus, a correlation cannot be justified. (ρ (rho) = 0.618, p = 0.043 - positive correlation with opposite statement to the observed decline in births and thus without causal relationship).

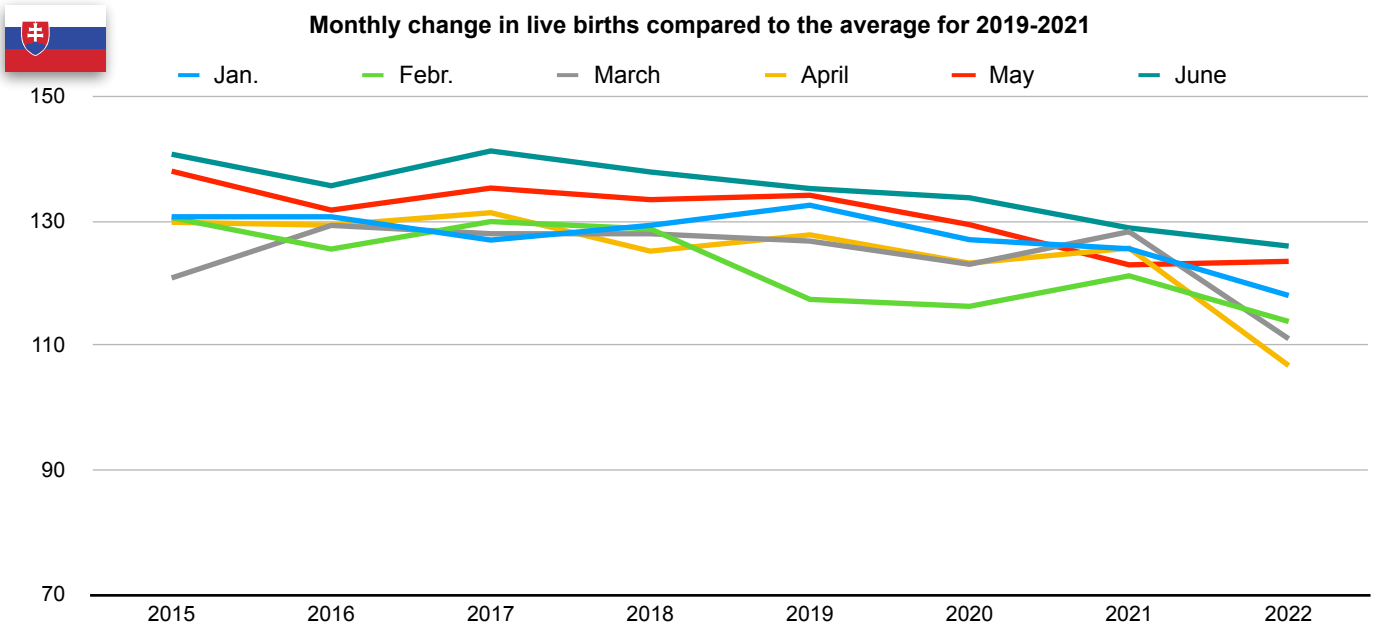


Fig. SI 3

The development of the individual months from year to year is shown in the line diagram, where the individual months are distinguished by colour. Two phenomena can be seen:

- Slight decline in daily births from 2016 to 2021 despite normalization to population from 2018 to 2021.
- Significant drop in the curves for all months to new lows in 2022 with the exception of the month of May.

SI – Average monthly live births / day per million women, 18-49 years

Birth month	Oct.	Nov.	Dec.	Jan.	Febr.	March	April	May	June	July
2014-15	138.0	122.2	121.5	130.6	130.5	120.8	129.7	138.0	140.7	144.3
2015-16	132.9	125.5	117.8	130.6	125.4	129.2	129.3	131.7	135.6	145.7
2016-17	128.6	122.5	118.3	126.9	129.9	127.9	131.3	135.2	141.2	147.0
2017-18	136.8	124.8	118.5	129.2	128.7	127.9	125.1	133.4	137.8	143.8
2018-19	132.7	128.0	118.4	132.5	117.4	126.7	127.7	134.1	135.2	143.0
2019-20	135.2	126.6	118.6	126.9	116.2	123.0	123.2	129.4	133.7	137.5
2020-21	132.7	116.7	115.3	125.5	121.1	128.2	125.6	122.9	128.8	142.7
2021-22	130.9	125.0	124.0	118.0	113.8	111.0	106.7	123.5	125.9	
Difference to Ø 19-21	-2.64	1.25	6.64	-10.33	-4.44	-14.95	-18.77	-5.31	-6.64	
Difference [%]	**-2.0%**	**1.0%**	**5.7%**	**-8.0%**	**-3.8%**	**-11.9%**	**-15.0%**	**-4.1%**	**-5.0%**	
month of 1st. vaccination	**Jan. 2021**	**Febr. 2021**	**March 2021**	**April 2021**	**May 2021**	**June 2021**	**July 2021**	**Aug. 2021**	**Sept. 2021**	
Vacc./month	**1.7%**	**0.8%**	**2.8%**	**2.0%**	**13.2%**	**12.3%**	**6.5%**	**5.0%**	**9.0%**	

Statistical analysis	Spearman's ρ (rho)	-0.6273	strong negative relationship
Interpretation (Cohen)	p-value	0.01942	small effect

Table SI 1

The statistical analysis examines the correlation between percentage birth decline and vaccination frequency nine months before: There is a statistically significant strong negative correlation between the level of vaccination frequency and the decline in births nine months later!

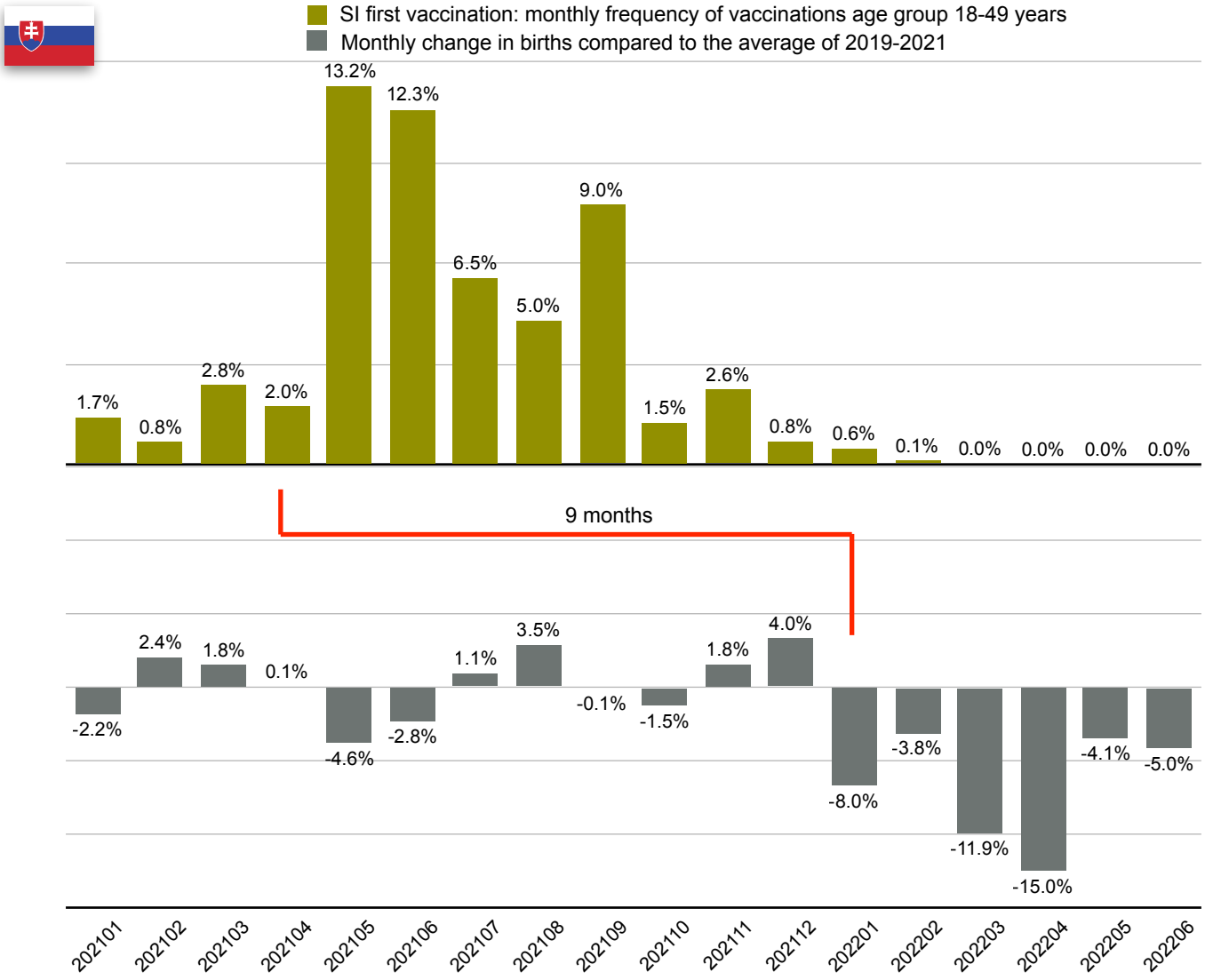


Fig. SI 4, 5

In the period from January 2021 to June 2022, the two diagrams show a clear temporal correlation between the monthly vaccination frequencies nine months before and the significant decline in the number of births in Slovenia from January 2022 of between 4 and 15%. This discernible temporal correlation is a clear signal also in Slovenia.

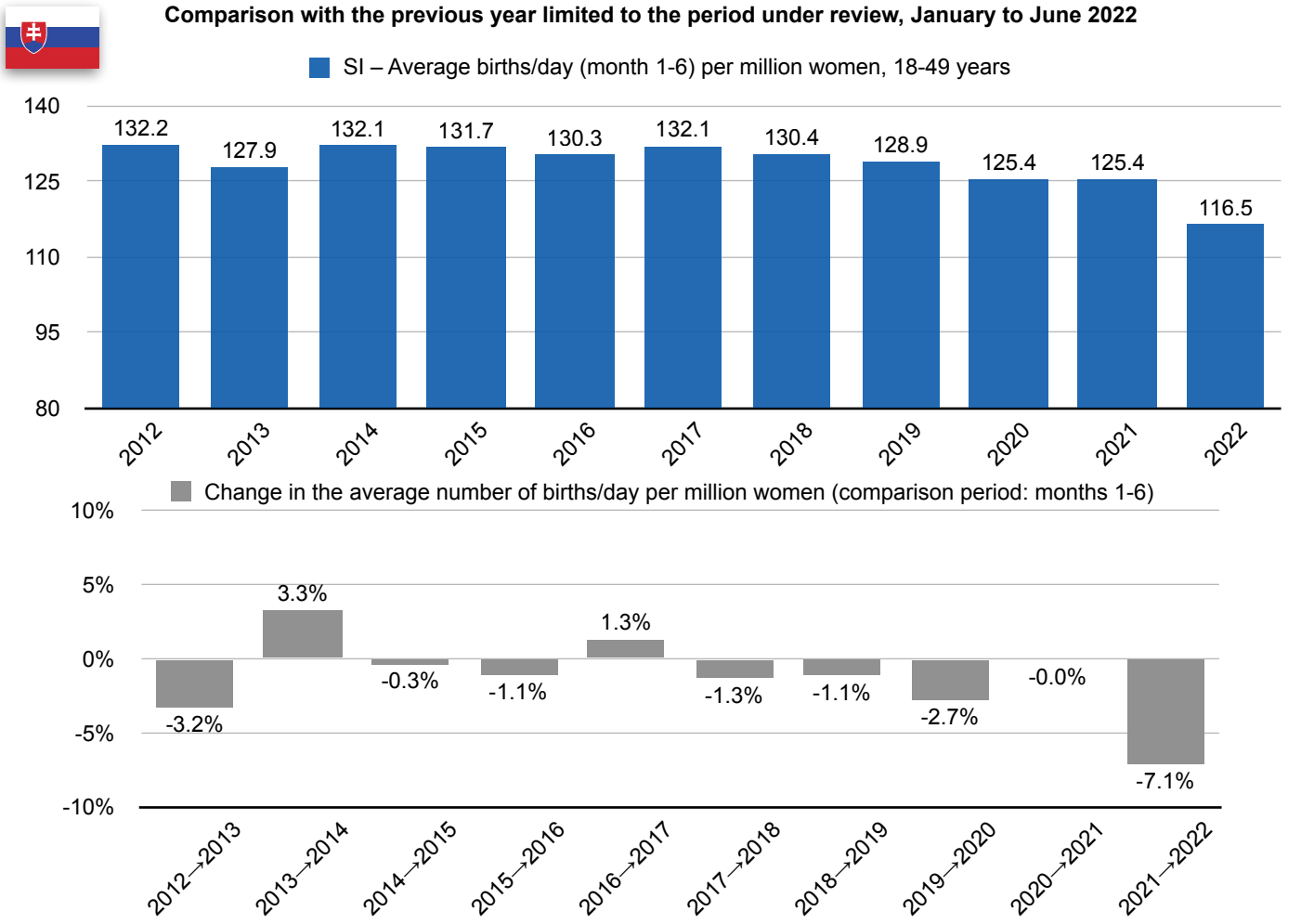


Fig. SI 6, 7

The upper figure Si 6 shows a slight downward trend since 2017 when normalised for demographics. The decline in births from 2021 to 2022 leads to a new record low in Slovenia.

The annual change in the normalised daily average value in the period from January to June is shown by the grey columns in the lower figure SI 7. As the striking end point of the annual changes, Slovenia sets a very clear signal with -7.1%, whose temporal link with the vaccination event could be clearly demonstrated.

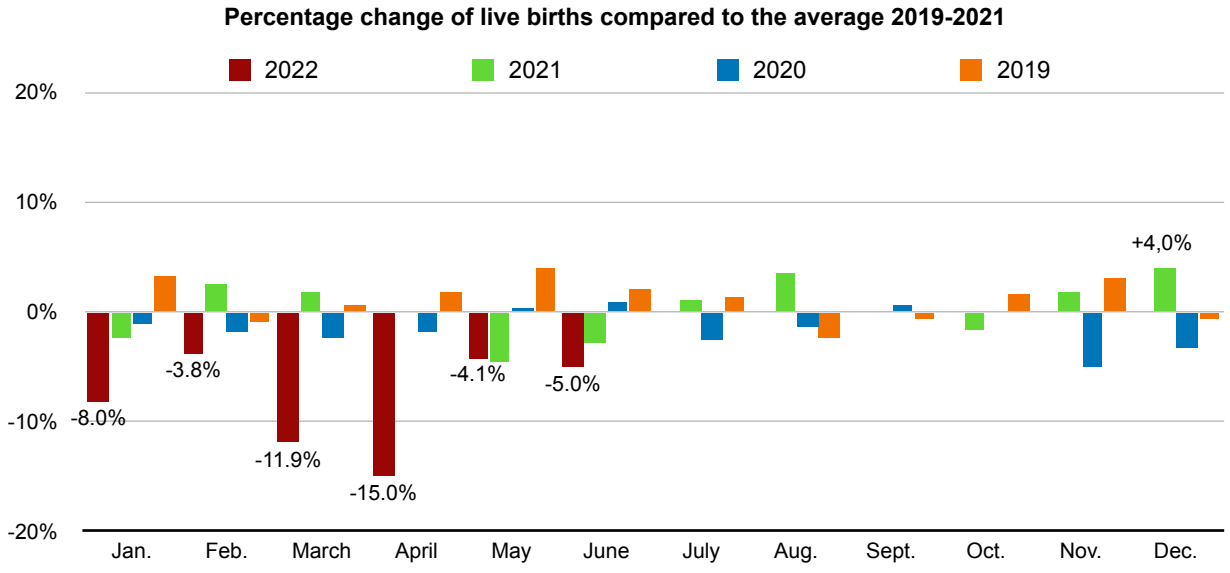
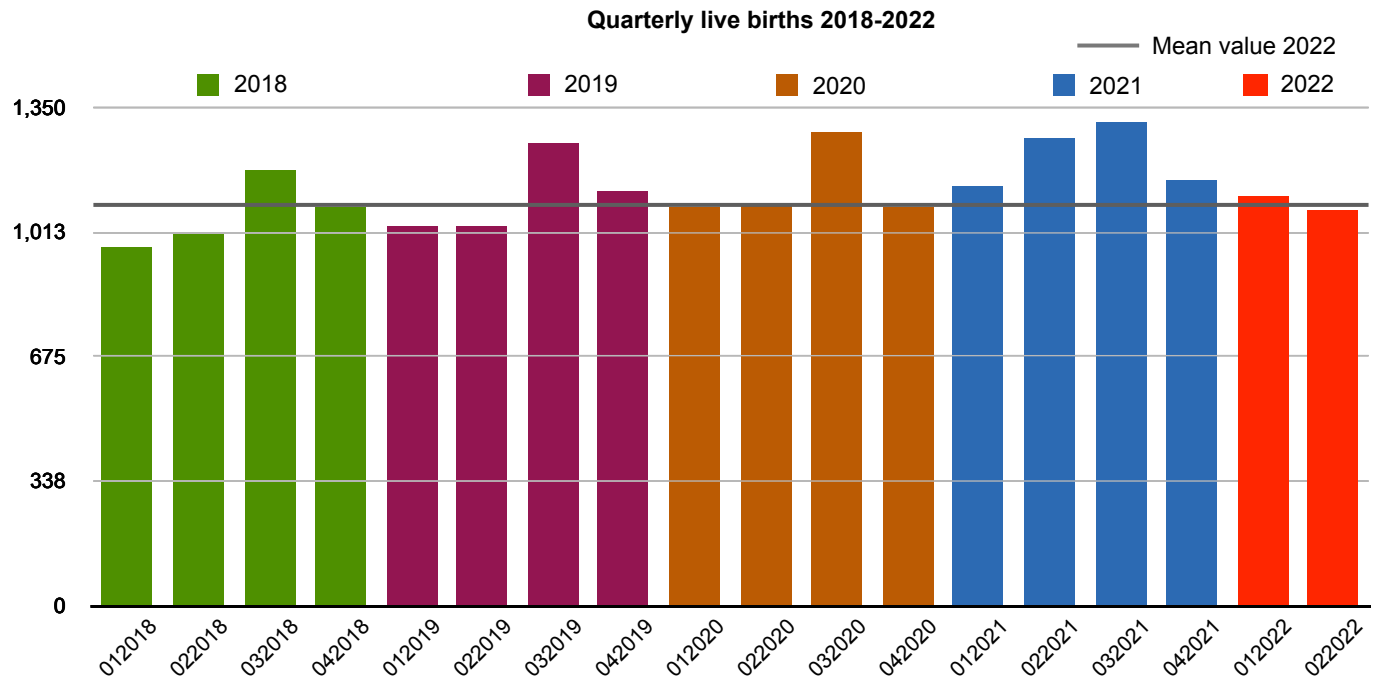


Fig. SI 8

The monthly changes compared to the previous year's average impressively show the abrupt change from +4.0% in December to -8.0% in January 2022, which can be attributed to the vaccination campaign with a time lag of 9 months.

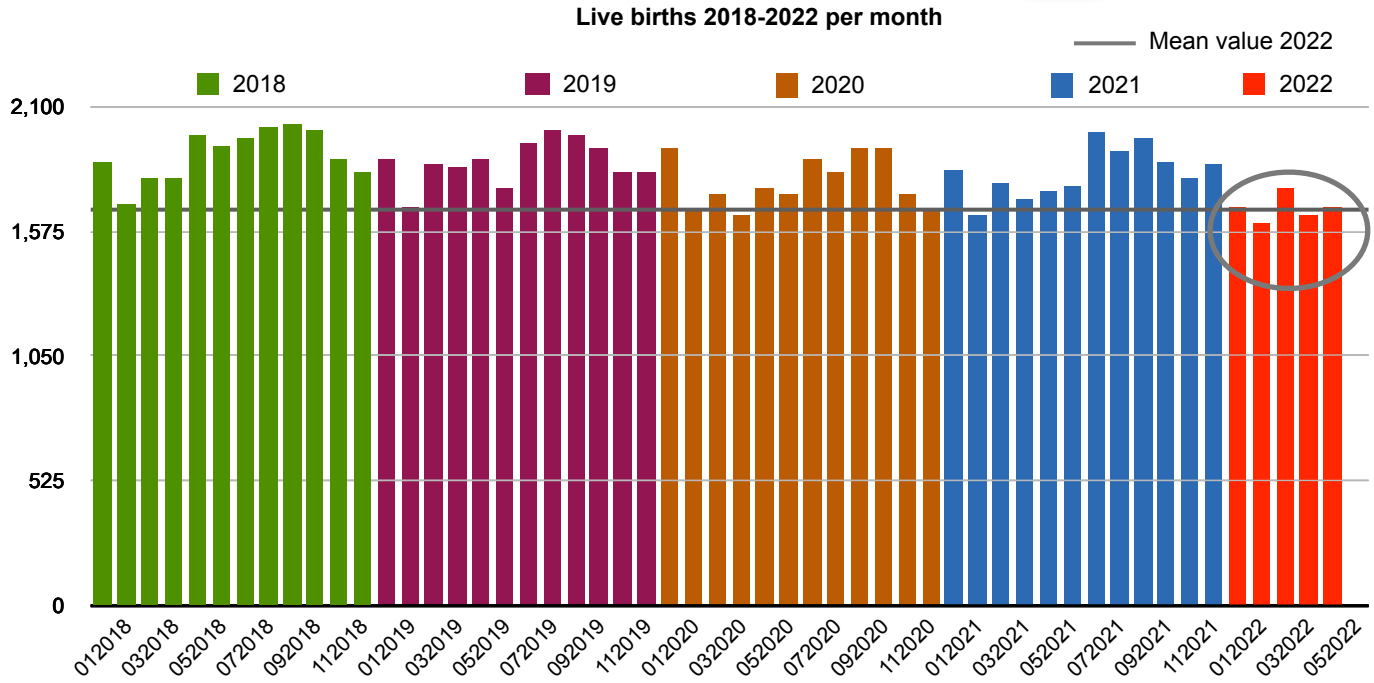
Presentation of further only partially available country data

Development of monthly live births in Island



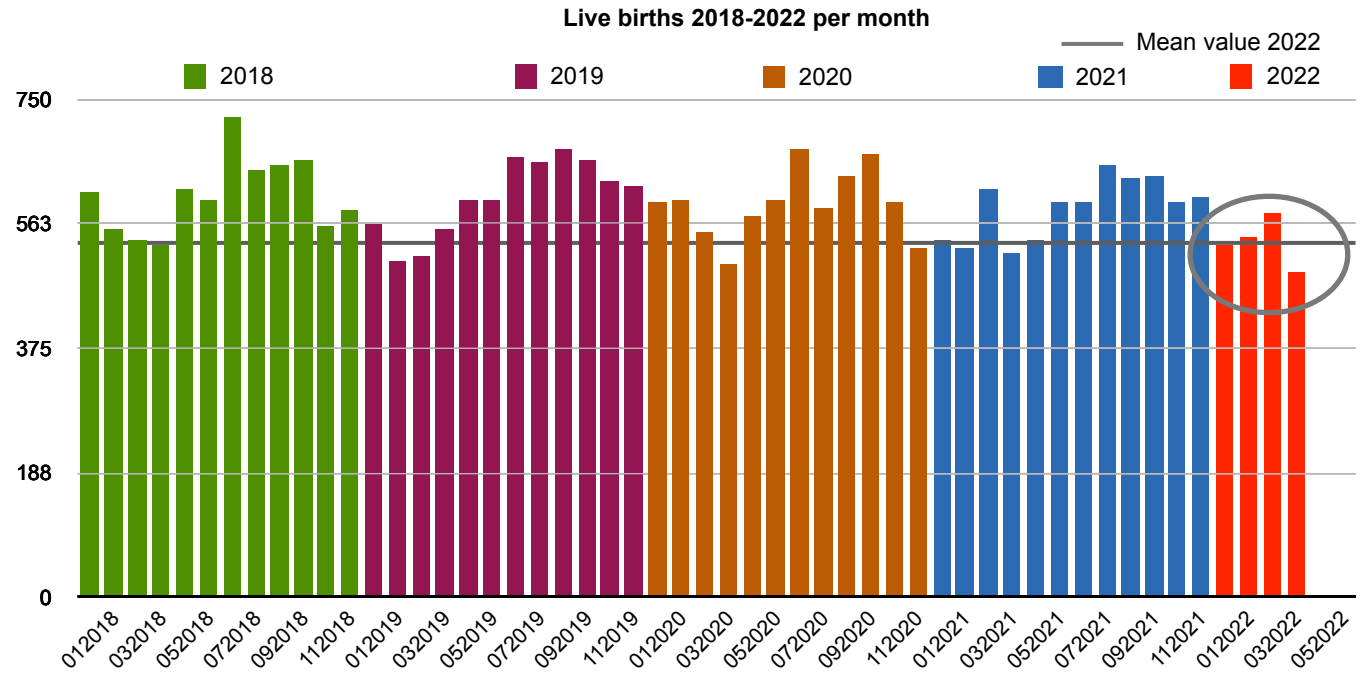
The current development of birth rates in Iceland and Norway is currently only reported quarterly, so that a differentiated analysis is not possible. Norway incomprehensibly omits the first quarters of the previous years before 2021, which makes a comparison impossible at present. In Iceland, one can see an increasing trend from 2018 to 2022 for the first two quarters, with the number of women aged 18-49 increasing by 12.6% from 70,512 to 79,405, which should explain this trend. Against this background, the development 2022 is to be classified as a noticeable decline in births, comparable to the countries considered so far. For a precise analysis of the development, it remains to be seen whether monthly data will soon be transmitted again, e.g. to Eurostat.

Development of monthly live births in Nordirland



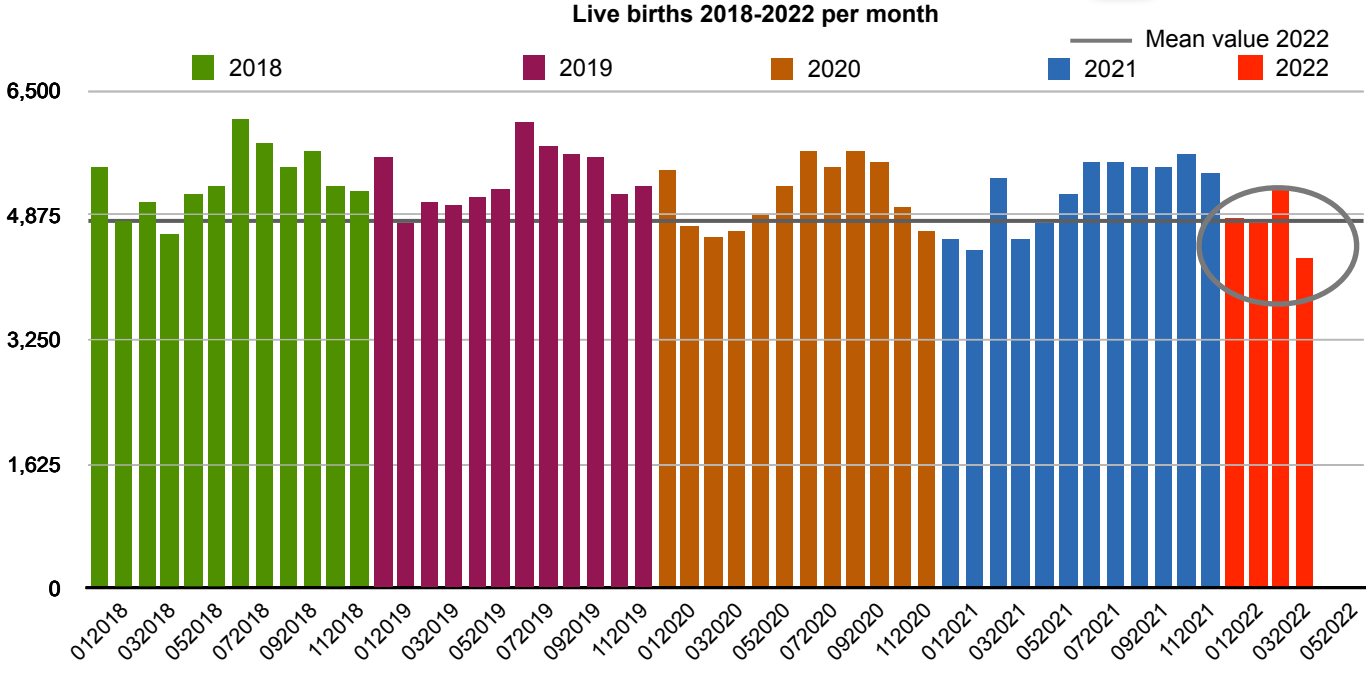
No immunisation data is known from Northern Ireland, so only the visual illustration of the continuing decline in births also observed in Northern Ireland is to be demonstrated here. Compared to the previous year's average, births have decreased by 506 or by -5.9%. Unfortunately, the birth figures from the United Kingdom are only available up to December 2021.

Development of monthly live births in Montenegro



No immunisation data are known from Montenegro, therefore only the visual illustration of the continuing decline in births also observed in Montenegro is to be demonstrated here. The decline in births compared to the previous year's average is 51 or -2.3%.

Development of monthly live births in the Republic of Serbia



No vaccination data are known from Serbia, therefore only the visual illustration of the continuing decline in births also observed in Serbia is to be demonstrated here. The decline in births compared to the previous year's average amounts to 439 or -2.2%.

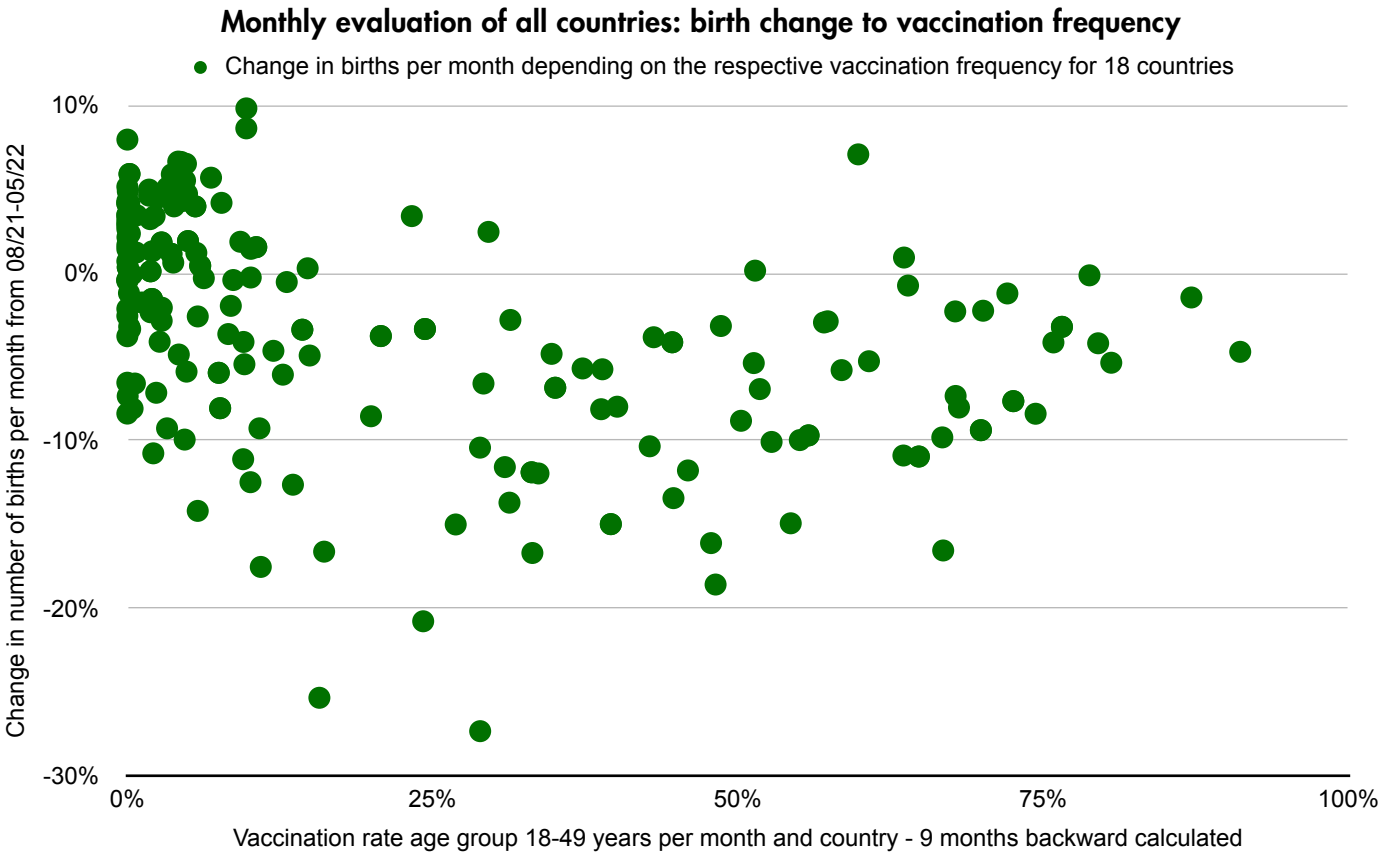
Evaluation: Europe

Region	Country	Births 2022	Ø 2019-21	Change Ø → 2022	Spearman ρ	p-value	1st vacc. 9 month prior 18-49 *	Population 18-49 years	Vacc. rate* total 18-49
North	Finland	22,180	23,266	-4.7%	-0.918	0.000033	1,712,463	2,164,149	79.1%
West	Switzerland	39,326	43,079	-8.7%	-0.873	0.00023	2,344,443	3,653,573	64.2%
West	Netherlands	81,125	83,339	-2.7%	-0.802	0.0015	5,056,399	7,019,309	72.0%
North	Latvia	8,026	8,859	-9.4%	-0.800	0.0016	416,436	745,854	55.8%
West	Austria	39,635	41,448	-4.4%	-0.773	0.0027	2,489,729	3,682,383	67.6%
West	Germany	285,753	313,543	-8.9%	-0.770	0.0046	30,725,410	45,321,314	67.8%
North	Lithuania	12,392	14,988	-17.3%	-0.741	0.0029	839,806	1,123,367	74.8%
East	Hungary	41,902	43,504	-3.7%	-0.682	0.0104	2,550,513	4,231,659	60.3%
East	Poland	126,400	146,145	-13.5%	-0.673	0.0165	8,535,540	16,639,191	51.3%
North	Sweden	54,560	58,457	-6.7%	-0.664	0.0130	3,239,628	4,222,335	76.7%
East	Slovenia	8,426	9,211	-8.5%	-0.627	0.0194	457,167	852,427	53.6%
North	Estonia	5,810	6,534	-11.1%	-0.582	0.0302	330,014	544,258	60.6%
East	Romania	78,792	97,022	-18.8%	-0.527	0.0478	2,674,679	8,029,346	33.3%
East	Czech Republic	24,232	27,146	-10.7%	-0.524	0.0914	1,975,874	4,538,565	43.5%
North	Denmark	28,828	30,049	-4.1%	-0.427	0.0949	1,908,007	2,361,498	80.8%
West	France	357,900	362,541	-1.3%	-0.355	0.1423	23,913,873	26,186,117	91.3%
South	Portugal	32,048	34,743	-7.8%	-0.297	0.2024	3,748,115	4,112,736	91.1%
South	Spain	159,705	172,399	-7.4%	-0.209	0.2686	16,490,325	19,638,928	84.0%
West	Belgium	56,604	57,430	-1.4%	-0.145	0.3348	3,780,494	4,678,439	80.8%
	Σ Europe - Selection	1,463,644	1,573,703	-7.0%	-0.522	3.014E-14	113,188,915	159,745,448	70.9%

* Number of persons with first vaccination in the age group 18-49 years, 9 months before the last reporting month of births.

The table was sorted in ascending order according to Spearman's rho.

- At present, all countries show a decline in births between −1.3% and −18.8% compared to the same period last year.
- All countries show a negative correlation between vaccination frequency and birth rate decline, whereby CZ, DK, PT, FR, BE, ES are not classified as significant – France, Belgium, Portugal, and Spain are also three statistically unusable countries with a proven lockdown effect.
- he significance of the negative correlation lies in 7 countries below the limit of 0.005 as demanded by Prof. Ioannidis.
- The decline in births in the analysed european country sample compared to the previous year's average, amounts to a total of −110,059 births or −7.0%.



Each point of the scatter diagram represents a vaccination frequency of one month of the 18 countries with associated birth change 9 months later. The birth period covers August 2021 (the last month guaranteed to be unaffected by vaccination) to May 2022. The period of vaccination frequencies starts with the baseline in November 2020 (vaccination frequency zero) and extends to August 2021. (ρ (rho) = −0.5193; p = 1.995E−13)
Conclusion: The presence of a direct association between pairs of months 9 months apart is indicative of an immediate effect of vaccination. A statement on the possible duration is not possible at the present time.

EMA notifications - Vaccine side effects of Covid-19 vaccines

Reaction complex Impairment of the female reproductive organs, as of 20.08.2022

Impairment of the female reproductive	BioNTech	AstraZeneca	Moderna	Janssen	Novavax	Total
	2,608	623	675	94	0	4,000
Menstrual disorder	91,323	13,635	17,830	3,319	48	126,155
Heavy menstrual bleeding	26,531	4,645	5,034	1,039	6	37,255
Menstrual disorder	21,809	2,027	4,310	697	13	28,856
Dysmenorrhoea	13,594	1,548	2,428	439	4	18,013
Irregular menstruation	12,961	1,928	2,573	493	1	17,956
Intermenstrual bleeding	12,754	1,284	2,478	575	6	17,097
Amenorrhoea	12,461	1,073	2,228	486	9	16,257
Delayed menstruation	10,781	3,227	1,805	324	4	16,141
Polymenorrhoea	9,998	974	1,978	377	5	13,332
Oligomenorrhoea	3,708	293	713	128	1	4,843
Hypomenorrhoea	2,121	481	337	82	4	3,025
Menstrual cramps	1,406	60	255	66	1	1,788
Menometrorrhagia	1,089	60	246	14	0	1,409
Premenstrual syndrome	1,019	85	197	20	0	1,321
Premenstrual pain	582	97	112	20	1	812
Premenstrual dysphoric disorder	46	8	7	0	0	61
Premenstrual headache	35	12	7	2	0	56
Menopausal disorder	9	3	1	0	0	13
	24	4	5	2	0	35
Impairment of the female genital	2,760	623	704	95	0	4,182
Adnexa uteri pain	596	87	182	19	0	884
Endometriosis	383	87	72	5	0	547
Ovulation pain	345	54	74	10	0	483
Uterine pain	314	28	89	13	0	444
Menopausal symptoms	220	82	64	15	0	381
Ovarian cyst	243	47	53	12	0	355
Vulvovaginal pain	157	47	28	5	0	237
Premature menopause	56	50	17	1	0	124
Vulvovaginal itching	59	18	17	0	0	94
Vulvovaginal dryness	55	22	9	2	0	88
Vulvovaginal burning	53	18	14	1	0	86
Vulvovaginal discomfort	53	15	13	1	0	82
Vulvar ulceration	47	19	9	0	0	75
Coital bleeding	51	10	8	0	0	69
Vulvovaginal swelling	31	8	10	1	0	50
Uterine polyp	29	5	12	1	0	47
Uterine hypertension	23	4	13	0	0	40
Vaginal ulceration	18	11	9	1	0	39
Female infertility	27	6	3	1	0	37
Endometrial thickening	24	4	5	2	0	35
Inflammation of the uterus	30	1	1	0	0	32
Ovarian dysfunction	17	0	7	3	0	27
Vulval disorder	15	4	5	1	0	25
Vulvovaginal inflammation	18	3	1	2	0	24
Vaginal cyst	7	13	2	0	0	22

https://impfnebenwirkungen.net/ema/tabellen/krankd.html

A high number of unreported cases can be assumed, many individual symptoms are unspecific. A connection to the decline in the birth rate must be examined.

EMA notifications for the reaction complex Impairment of the male reproductive organs, as of 20.08.2022

	BioNTech	AstraZeneca	Moderna	Janssen	Novavax	Total
Testicular affection	343	158	113	29	0	643
Testicular pain	290	126	91	21	0	528
Testicular swelling	52	27	22	7	0	108
Testicular discomfort	12	7	0	1	0	20
Testicular torsion	5	1	0	0	0	6
Testicular cyst	1	2	2	0	0	5
Testicular injuries	3	0	0	0	0	3
Testicular mass	0	1	2	0	0	3
Testicular abscess	2	0	0	0	0	2
Testicular atrophy	1	0	0	1	0	2
Testicular retraction	1	1	0	0	0	2
Benign neoplasm of the testis	1	0	0	0	0	1
Testicular hypertrophy	1	0	0	0	0	1
Testicular scan abnormal	0	0	0	1	0	1
Impairment of the sperm	88	63	18	4	1	174
Haematospermia	38	32	6	1	1	78
Ejaculatory failure	15	7	6	0	0	28
Testicular disorder	13	9	2	1	0	25
Testicular oedema	3	5	0	0	0	8
Decreased sperm volume	3	4	0	0	0	7
Decreased sperm concentration	6	0	0	1	0	7
Sperm discolouration	2	2	1	0	0	5
Aspermia	2	2	0	0	0	4
Sperm analysis abnormal	1	1	2	0	0	4
Sperm analysis abnormal	1	1	0	0	0	2
Spermatogenesis abnormal	1	0	0	1	0	2
Hypospermia	0	1	0	0	0	1
Decreased viscosity of semen	1	0	0	0	0	1
Sperm volume abnormal	1	0	0	0	0	1
Sperm poisoning	1	0	0	0	0	1
Infection of the seminal vesicles	1	0	0	0	0	1
Spermatic cord haemorrhage	1	0	0	0	0	1
Testicular failure	0	0	1	0	0	1
Total sperm count reduced	1	0	0	0	0	1
Scrotal affection	60	24	19	2	0	105
Pain in the scrotum	27	15	14	1	0	57
Swelling of the scrotum	20	7	2	1	0	30
Scrotal oedema	8	2	3	0	0	13
Scrotal erythema	6	0	0	0	0	6
Scrotal exfoliation	4	0	0	0	0	4
Disorder of the scrotum	3	0	0	0	0	3
Scrotal infection	2	1	0	0	0	3
Scrotal erosion	1	0	0	0	0	1

https://impfnebenwirkungen.net/ema/tabellen/krankd.html

A high number of unreported cases can be assumed, many individual symptoms are unspecific. A connection to the decline in the birth rate must be examined.

Data discussion

The present data analysis attempts to focus on 2 variables, namely birth rates and vaccination frequency. Assuming that the realization of the desire to have children depends on numerous factors such as the economic situation, plans, and perspectives for the child and the family, the current situation is highly sensitive and prone to disruption. Consequently, birth rates can be seen as a sensitive indicator of social, economic, and medical developments.

The pandemic obviously had a strong influence on the decision to have a child. Several factors might have contributed. On the one hand there was a massive decline in birth rates at the beginning of 2021, which I have called the "lockdown trough". It is very pronounced in the 4 countries that stood out with particularly harsh lockdown measures: France, Belgium, Spain, and Portugal. The temporarily forced withdrawal into the closest private environment did not promote the desire to have children but rather caused it to fall due to general uncertainty and other psychological effects. In some countries, such as Switzerland, the Netherlands, and Hungary, a kind of catch-up effect was found following the restrictions and subsequently the so-called relaxations.

An effect of Covid 19 vaccinations is evident in the global decline in birth rates 9 months after having started the vaccination campaign in the age group 18-49, evident in almost every country. Since this part of the vaccination campaign fell in the second half of spring 2021, in which hardly any lockdown measures but rather "relaxations" were implemented, relevant psychological and social moments appear very unlikely. If any, a reverse effect, i.e. an increase in the desire to have children was to be expected for that phase. The correlation with the vaccination campaign and the situation at that time suggests that there were physiological influences by vaccination on the fertility of women or men. In support of this, the adverse reactions of the vaccines reported in Eudravigilance and US-VAERS, especially heavy menstrual bleeding and irregular menstruation, provide strong evidence of causality.[5] Recently, signs of decreased male fertility were detected in male semen donors.[6]

Summing up all reports from the countries investigated, yielded a minus of 110,059 births, related to the selection of European countries studied, with large nations such as Italy and Great Britain still to be evaluated. If serious efforts were made to clarify the situation, close cooperation between clinics and medical specialists could provide valid information for the urgently needed re-evaluation of the risk-benefit assessment, which is obviously not wanted under the great influence of politics and pharmaceutical industry.

In this context, I would also like to refer to studies that deal with the consequences of vaccination on fertility. The following sources are recommended for further research:

• Gat, Kemen, et al: Study on the temporary impairment of sperm quality by Covid-19 vaccination.[7]

and an Austrian study on the psychosocial impact of the Covid-19 pandemic:

• Dr. Barbara Rothmüller: Intimacy and social relations in the time of physical distancing[8]

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Conclusion

- The first half of 2022 was marked by a significant decline in births ranging from 1.3% in France to 19% in Romania.
- In 15 countries this decline exceeded 4%, in 7 countries it exceeded 10%.
- A significant negative correlation between birth rates decline and vaccination frequency is found in 13 of 18 countries. In Finland, Switzerland, the Netherlands, Latvia, Austria, Germany, and Lithuania, as well as for Europe as a whole, the correlation analysis even yielded p-values of 0.005 or less.
- No correlation was found between the decline in birth rates and the incidence of Covid-19 infections or hospitalizations assigned to Covid-19.
- Adverse reactions related to the female reproductive organs and study findings related to male fertility point to a causal interpretation of the association of birth declines and the Covid-19 vaccinations.
- Observations of fertility centres for corresponding signs should be collected.
- With reference to the Bradford-Hill criteria, a relationship temporality between the decline in births and the course of the initial vaccination campaign (doses 1 and 2) nine months earlier could be demonstrated. There was a very high analogy between the European countries. The uniformly observed decline in the number of births with a temporal connection to the start of the vaccination campaign is thus not an isolated national phenomenon. Some countries are still withholding their data. Norway has sent data for the second quarters, but is currently withholding data for the first quarters.
- Given the considerable individual and social relevance of the link between vaccination campaigns and declining birth rates, the immediate suspension of Covid-19 vaccination for all persons of childbearing and reproductive age should be called for.
- Data on stillbirths, spontaneous, and any other abortions must be provided in a timely manner.
- It remains to be explored:
  - How exactly does the Covid-19 vaccine exert its apparent deleterious effect on female reproductive capacity?
  - Does the Covid-19 vaccine also affect male reproductive capacity?
  - How long do these effects last?
- My remarks and comments are not intended to exclude any interpretations, they are as factual as possible. Waiting for traditional scientific publications is unacceptable in view of the considerable individual and social threats posed by the emergency-approved vaccines.

Raimund Hagemann, Data analyst, technically supported by Ulf Lorré and Dr Hans-Joachim Kremer

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