

# Booms, busts and trend reversals? Shifts in births and fertility rates across the highly developed countries during the COVID-19 pandemic

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*Pandemic Babies? The Covid-19 Pandemic and Its Impact on Fertility and Family Dynamics, MPIDR (Online), 13 December 2021*

# Past evidence: the impact of shocks on fertility

- **Economic shocks and recessions:** mostly negative impact, including the Great Recession around 2008-12 (e.g., Sobotka et al. 2011; Goldstein et al. 2013); severity of the recession and welfare setting matter
- **Spanish flu:** fertility reduction & some later rebound (Boberg-Fazlic et al. 2017; Wagner et al. 2020), partly due to fetal loss
- **Large seasonal flu outbreaks:** short-term negative impact (Sardon 2014)
- **Zika epidemic in Brazil and other parts of Latin America in 2015-16:** strong negative effect on pregnancies and births (Rangel et al. 2020; Marteleto et al. 2020)

## Graphic detail

Daily chart

## Will the coronavirus lockdown lead to a baby boom?

Deadly epidemics seem to depress birth rates in the short term

## Pregnant pause

Birth rate, change from seasonal average, %



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## The baby boom that never was: France sees sharp decline in 'lockdown babies'

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## Coronavirus baby boom or bust? How the pandemic is affecting birthrates worldwide.



7 NEWS .com.au

Thursday, 8 April 2021

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## Coronavirus baby boom: Will global lockdown see massive jump in Australia's birth rate?

Kelly Burke • 7 NEWS • Published: Tuesday, 23 June 2020 2:47 pm AEST

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## The Covid Baby Bust Could Reverberate for Decades

The sudden drop in global fertility during the pandemic will have far-reaching consequences for businesses and economies

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## Baby Boom – Or Bust? How Covid Will Impact Birth Rates In 2021

For all the nudge nudge about lockdown baby making, the data tells a different story.

By Rachel Moss

07/01/2021 11:25am GMT

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## The coronavirus effect: Spain sees sharp decline in births

There was a 23% fall in registered newborns in the December-January period compared with the previous year, mirroring similar trends in neighboring countries

The New York Times

Opinion

## We Expect 300,000 Fewer Births Than Usual This Year

Signs are pointing to a sizable pandemic baby bust in the United States, with implications that will be with us for years to come.

By Melissa S. Kearney and Phillip B. Levine

Dr. Kearney is an economics professor at the University of Maryland. Dr. Levine is an economics professor at Wellesley College. In a report for the Brookings Institution last summer and an update in December, they predicted that the Covid pandemic would lead to a decline in U.S. births.

March 4, 2021

# COVID-19 and fertility: early evidence

## Evidence on short-term fertility intentions

- Many individuals and couples reported delaying or giving up their pregnancy plans (Luppi et al 2020 in 5 countries; Arpino et al. 2021 in Italy; Lindberg et al. 2020 in the US; Emery et al. 2021 for Moldova; Malicka et al. 2021 for Poland)

## Early evidence from online searches:

- Wilde et al. (2020): expected sharp downturn in births (by up to 16%) in the US from November 2020 to February 2021 based on fertility and pregnancy-related Google searches
- Smaller disruption expected from Berger et al.'s (2021) analysis of European and US data

## Initial work on birth trends

- Decline in births and fertility rates in Europe, Latin America, US, especially in December 2020 – January 2021 (Sobotka et al. 2021; Aassve et al. 2021; Lima et al. 2021, UN EGM 2021)

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# The Pandemic Caused a Baby Bust, Not a Boom

Birth rates in many high-income countries declined in the months following the first wave, possibly because of economic uncertainty

By Tanya Lewis on August 30, 2021 [أعرض هذا باللغة العربية](#)

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## BRIEF REPORT



### Early assessment of the relationship between the COVID-19 pandemic and births in high-income countries

Arnstein Aassve, Nicolò Cavalli, Letizia Mencarini, Samuel Plach, and Seth Sanders

[+ See all authors and affiliations](#)

PNAS September 7, 2021 118 (36) e2105709118; <https://doi.org/10.1073/pnas.2105709118>

Edited by Mary C. Waters, Harvard University, Cambridge, MA, and approved June 29, 2021 (received for review March 26, 2021)

Article

Figures &amp; SI

Info &amp; Metrics

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What is the latest evidence?

*Does the baby bust story hold?*

# Data: The STFF (short-term fertility fluctuations) Data Series under the Human Fertility Database

## The Human Fertility Database

### Short-Term Fertility Fluctuations

In response to the COVID-19 pandemic, the HFD team established a new data resource: Short-Term Fertility Fluctuations (STFF) data series. The STFF series complements the HFD by providing up-to-date data on live births by month for selected countries and by facilitating thereby scientific analysis of short-term fertility fluctuations. This project thus contributes to timely data availability, which is key for monitoring and examining the consequences of the ongoing pandemic for the population-level fertility trends.

Before using the data, please consult the [STFF Methodological Note](#), which provides a more comprehensive description of this data project, including important aspects related to data collection and data processing. We also recommend that you read the [STFF Metadata](#). This document includes country-specific information about data availability, completeness, data sources, as well as specific features of included data.

Data will be frequently updated and new countries will be added. Data are published under [CC BY 4.0 license](#).

For citing STFF data, please follow the [HFD data citation guidelines](#).

We invite you to explore these data using our online [STFF visualization toolkit](#).

#### Here you can download the following data and documentations:

- [STFF Metadata](#): concise description of country-specific data and data sources.
- [STFF Methodological Note](#): description of input and output data formats and methodology.
- **STFF output file** ([xlsx](#) or pooled [csv](#)): monthly counts of live births and TFR for selected countries.

Crude indicators do not allow direct comparison across countries and over time as they are affected by seasonality in childbearing. To provide comparable indicators, we publish seasonally and calendar adjusted data.

- **STFF seasonally- and calendar-adjusted output file** ([xlsx](#) or pooled [csv](#)): monthly counts of live births and TFR for selected countries.
- [Original data](#) (country-specific csv files in one zip file): original birth counts in standardized format.

*Note: Data on monthly TFR are preliminary. We are still working on the methodology and may revise it soon.*

**Last update: 12-12-2021**

#### Data availability

Country	STFF output	STFF adjusted
Austria	<a href="#">January 2000 - September 2021</a>	<a href="#">January 2012 - September 2021</a>
Belgium	<a href="#">January 2000 - August 2021</a>	<a href="#">January 2012 - August 2021</a>
Bulgaria	<a href="#">January 2000 - December 2020</a>	-
Canada	<a href="#">January 2000 - December 2020</a>	-
Canada: Quebec	<a href="#">January 2010 - August 2021</a>	-
Chile	<a href="#">January 2000 - March 2021</a>	-
Croatia	<a href="#">January 2000 - September 2021</a>	-
Czechia	<a href="#">January 2000 - June 2021</a>	<a href="#">January 2012 - June 2021</a>
Denmark	<a href="#">January 2000 - September 2021</a>	<a href="#">January 2012 - September 2021</a>

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<https://www.humanfertility.org/cgi-bin/stff.php>

# STFF Data series

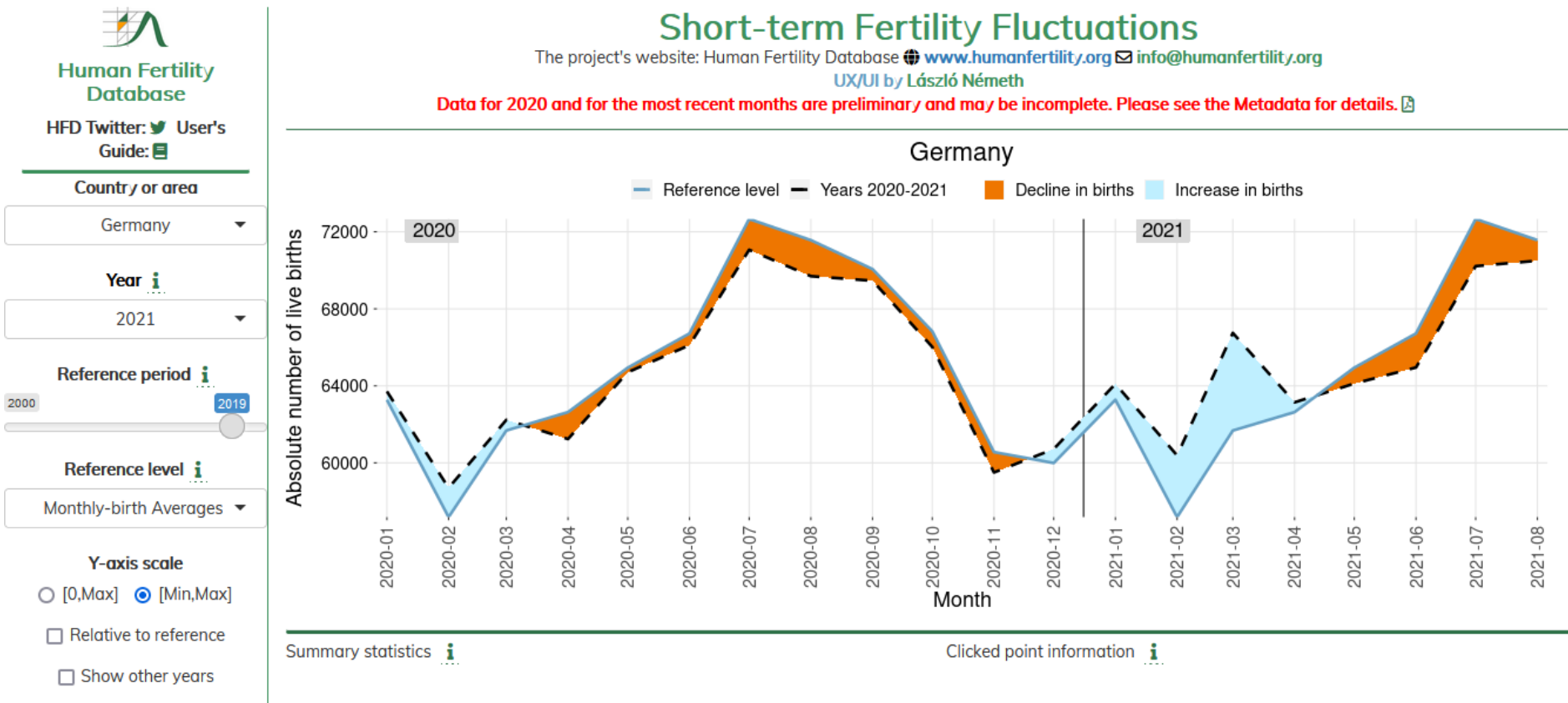
## The Short-Term Fertility Fluctuations (STFF) Data Series

- Joint project of the Max Planck Institute for Dem Res. (Rostock) and the Wittgenstein Centre (VID, Vienna)
- Monthly number of births, from Jan 2000 to most recent (Sept 2021); **estimates of monthly Total Fertility Rates for 19 countries just added**
- Highly developed countries with good quality data
- Regularly updated (39 countries/areas at present)
- Metadata: 50+page document with all information about the data, sources, coverage, notes, warnings
- Methodological Note
- STFF visualization toolkit in Shiny
- Working Paper / Report on first trends at SocArXiv (24 Mar 2021, to be updated soon): <https://osf.io/preprints/socarxiv/mvy62>

<https://www.humanfertility.org/cgi-bin/stff.php>



# STFF Visualisation Toolkit (Shiny)



<https://mpidr.shinyapps.io/stfertility/>

STFF visualisation toolkit created by Laszlo Nemeth, MPIDR

# Data and methods

Monthly birth data: issues, adjustments, data selection

Adjusting monthly birth numbers for seasonality and calendar effects (*no. of days and weekdays by month*)

- R package seasonal (Sax and Eddelbuettel, 2018), which provides an interface to the seasonal adjustment software X-13ARIMA-SEATS (US Census Bureau, 2021)

## Estimating monthly Total fertility rate (TFR)

- 1. Obtain monthly population exposures: linear interpolation from annual exposure estimates for 2019-2022 (estimated for the Human Mortality Database / STMF series; Jdanov et al. 2021)
- 2. Compute monthly General Fertility Rate for women ages 15-44:  
$$(GFR(m) = B(m) / POP_{F(15-44)}(m))$$
- 3. Extrapolate the observed Ratio of TFR/GFR in 2016 to 2019 to 2020-2021, then use the estimated TFR/GFR ratios to derive monthly TFRs in 2020-2021

# Data and methods: adjusted monthly trends

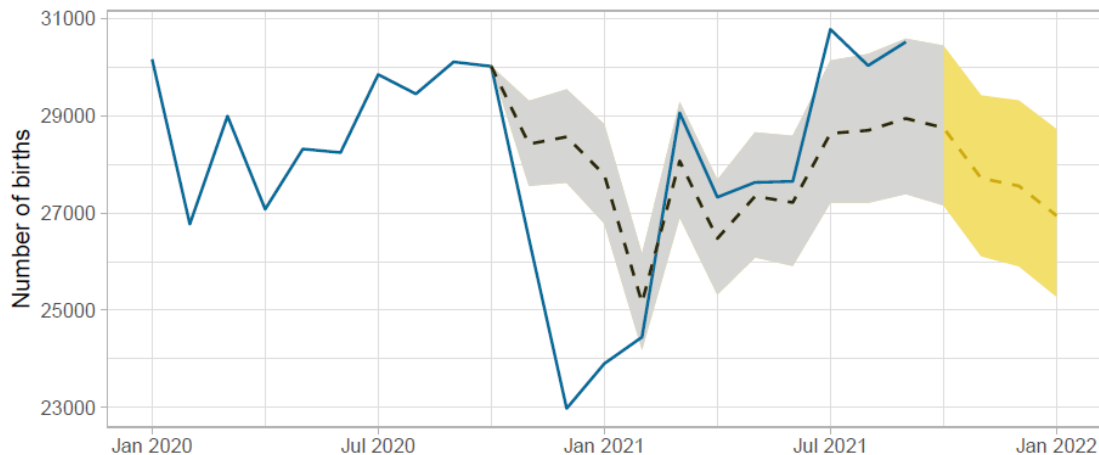
Observed and seasonally-adjusted monthly number of births, Spain,  
Jan 2010 to Sep 2021

Observed series (thin line) and adjusted series (thick line)



Monthly number of births, Spain, Jan 2020 to Jan 2022

Observed series (solid line) and forecast (dashed line) with 95% confidence limits



Filter — SEATS — X11

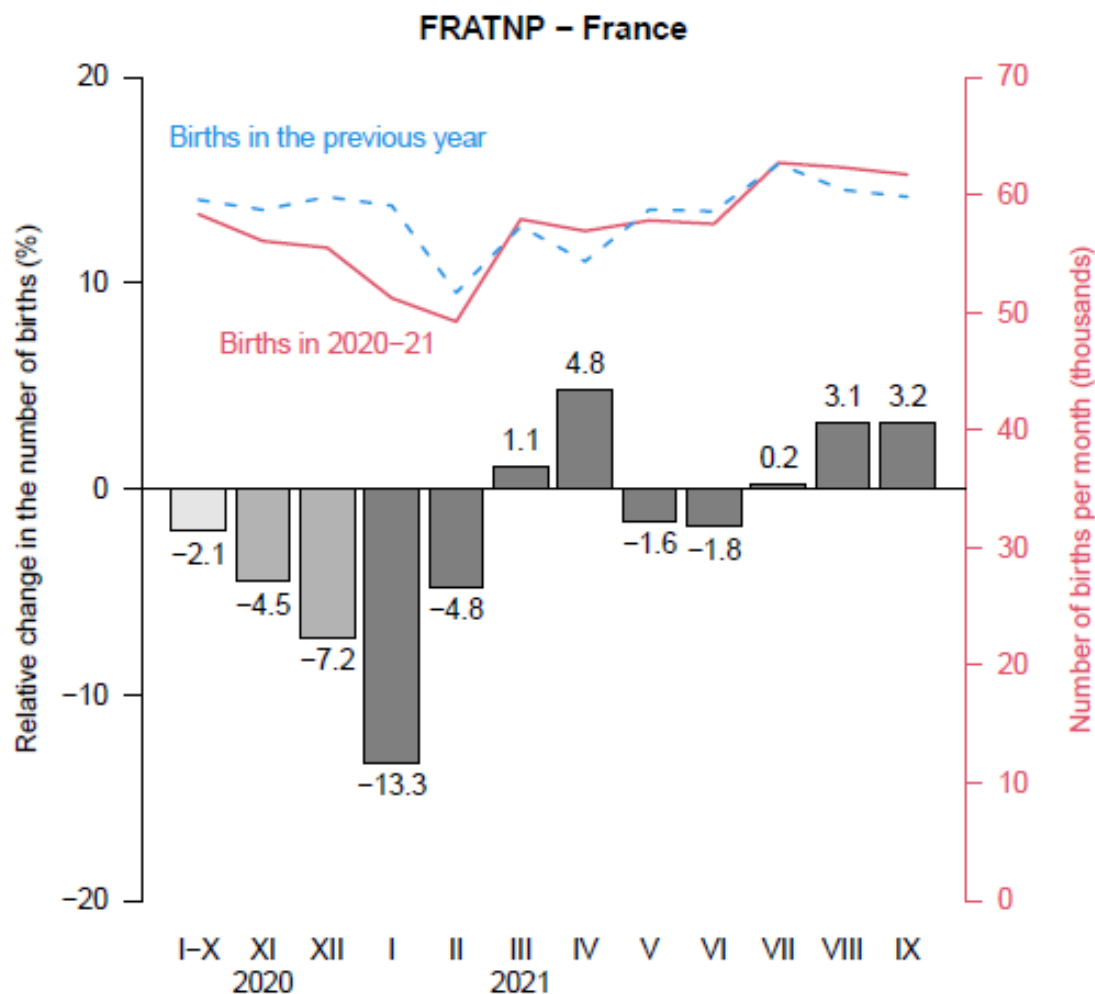
Calendar and  
seasonal adjustments  
using the seasonal  
adjustment software  
X-13ARIMA-SEATS &  
visualisation by Maria  
Winkler-Dworak

# Data issues & adjustments

- Data by month of occurrence vs. registration (e.g. South Korea, Russia; also recent data for Germany)
- Preliminary vs. final data (also incomplete data for the latest months; e.g. Switzerland)
- Fluctuations, irregularities (also due to small N in some countries)
- Monthly data: impact of seasonality
- Main comparisons and indicators:
  - Total live births compared to the same month in the previous year (relative change in %; with an adjustment for 29 days in 02-2020)
  - Estimated monthly live births adjusted for seasonality and calendar effects
  - Estimated monthly TFRs adjusted for seasonality and calendar
- Expected impact of the COVID-19: from November 2020 onwards (pregnancies started in early March, based on average pregnancy duration of 266 days or 8.7 months from ovulation to delivery; Jukic et al. 2013)

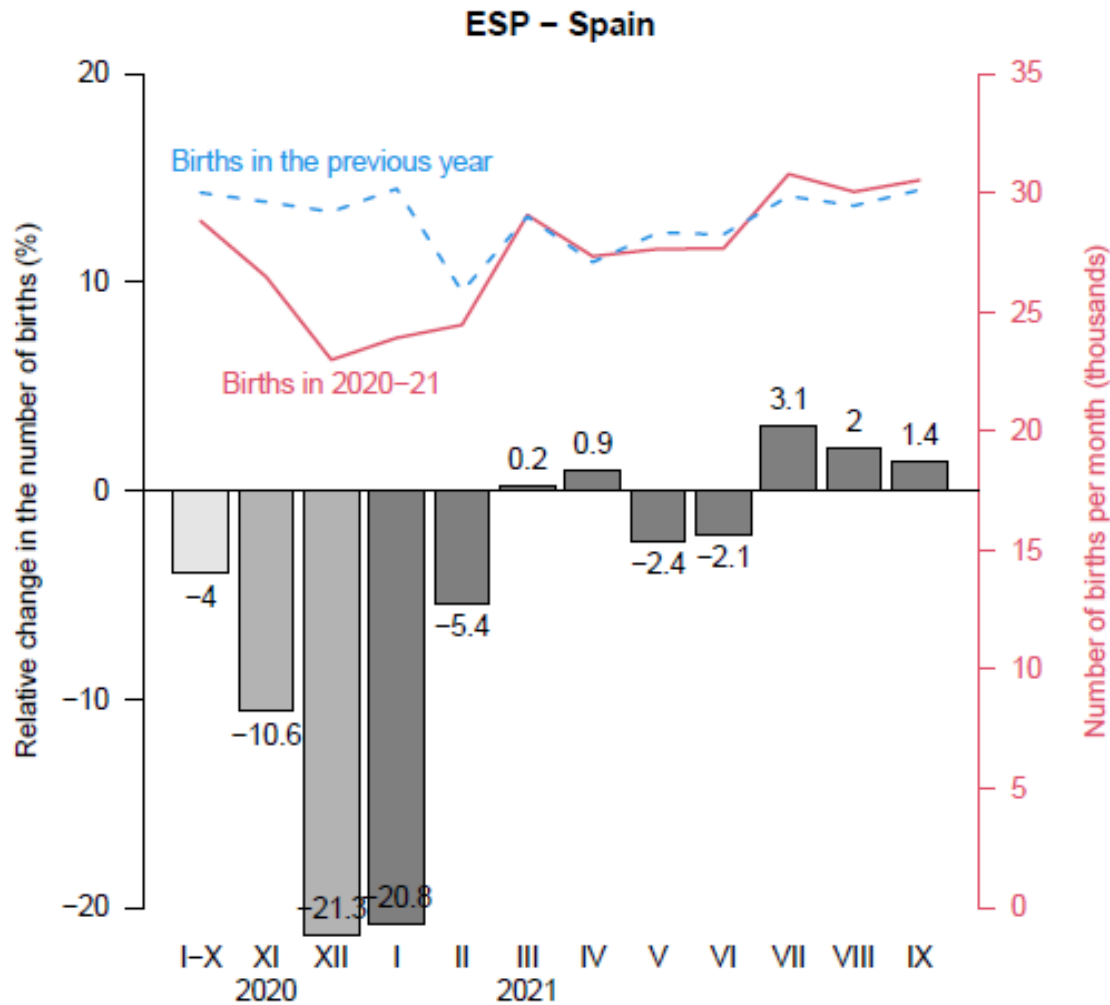
# Pandemic birth trends in the highly developed countries: an overview

# Western Europe: France



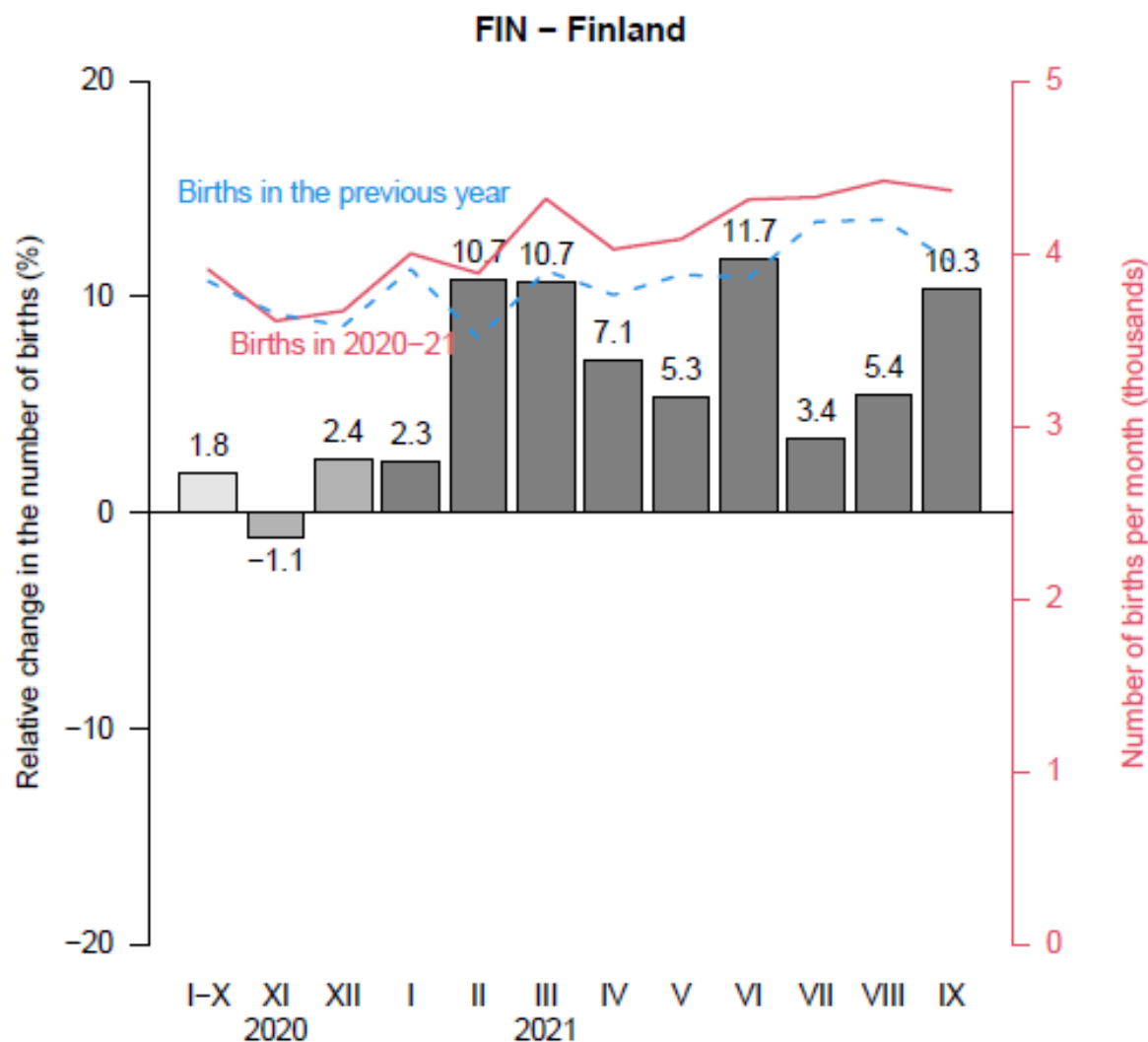
Relative year-on-year  
change in the number  
of births (%):  
France,  
Jan 2020-Sep 2021

# Southern Europe: Spain



Relative year-on-year change in the number of births (%):  
Spain,  
Jan 2020-Sep 2021

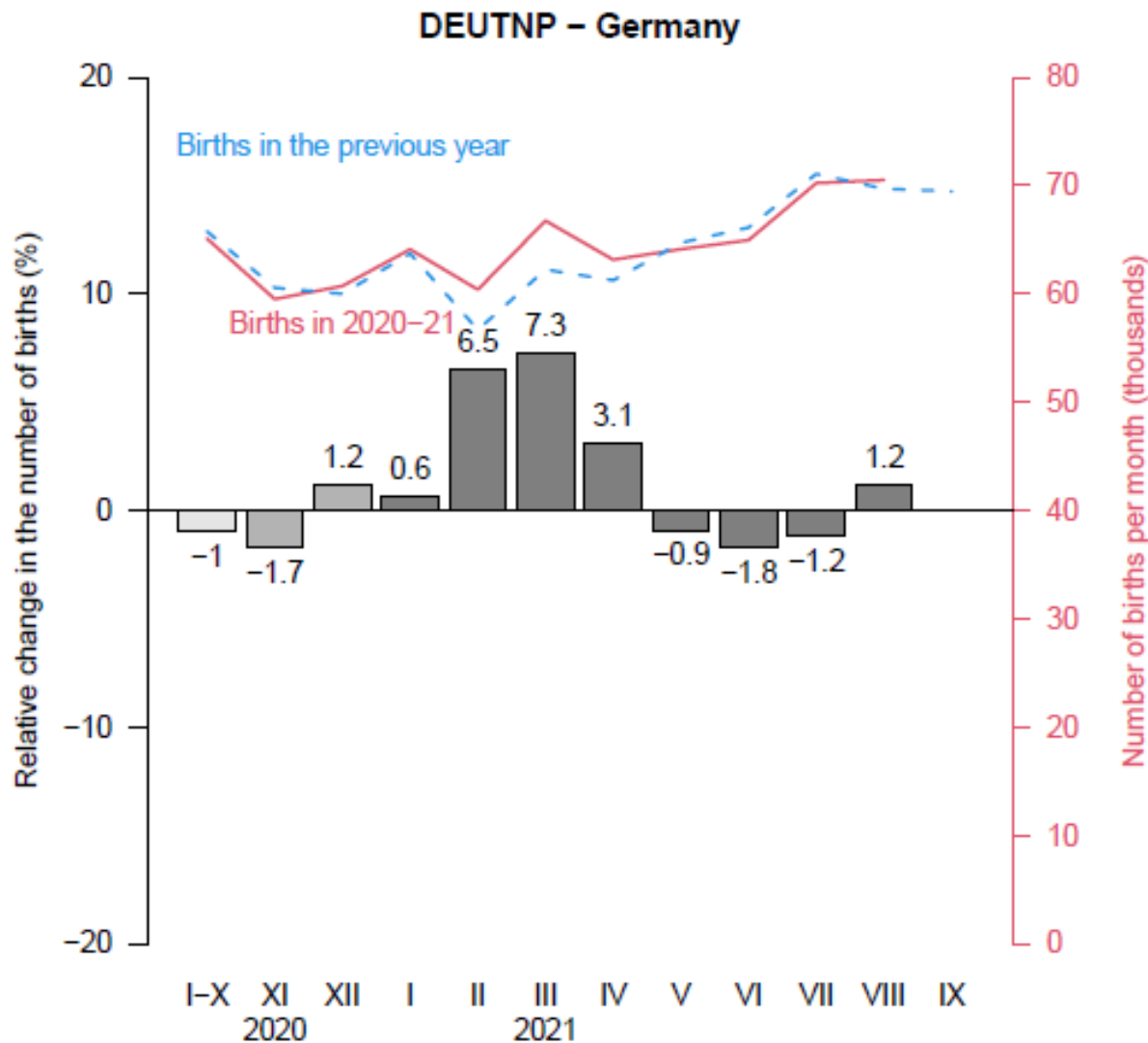
# Nordic countries: Finland



Relative year-on-year change in the number of births (%): Finland, Jan 2020-Sep 2021

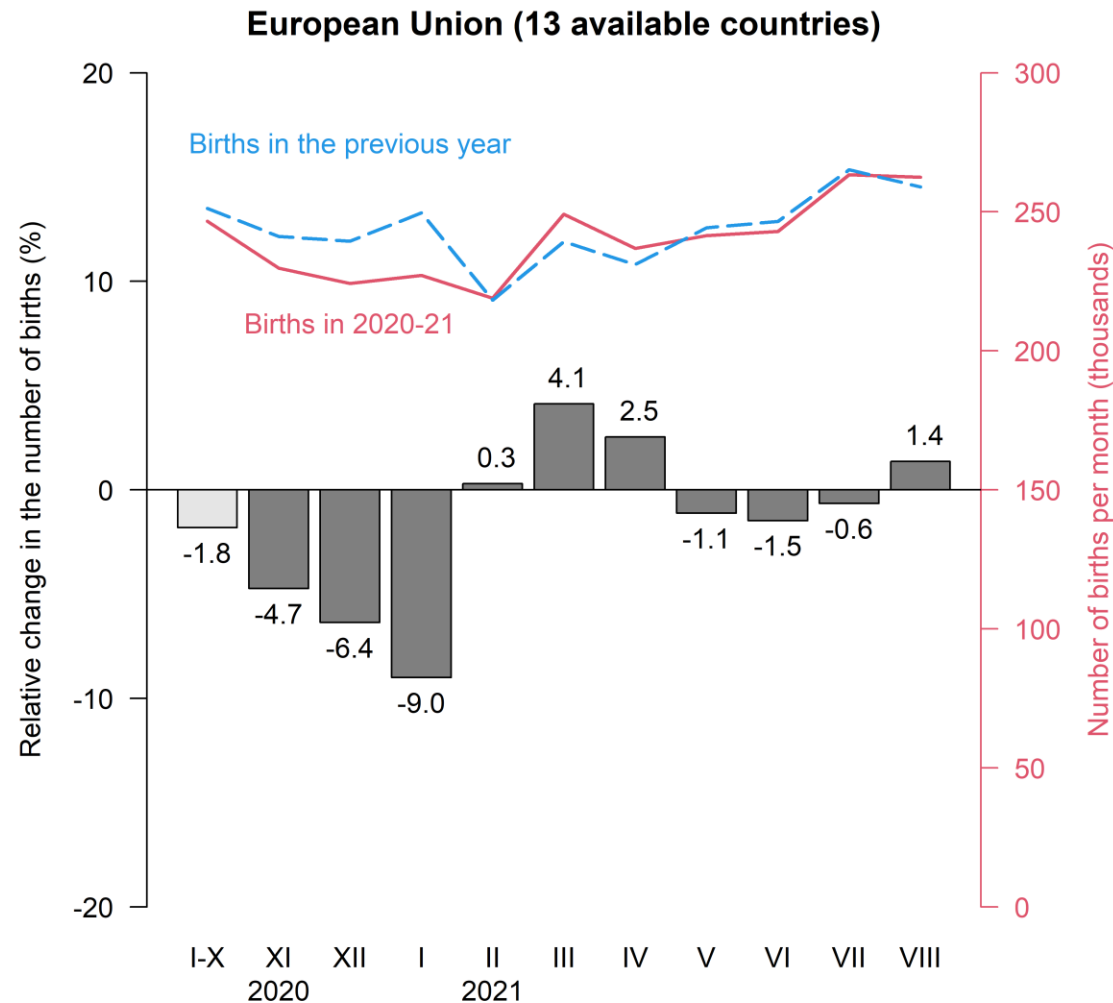


# Central Europe: Germany



Relative year-on-year change in the number of births (%): Finland, Jan 2020-Aug 2021

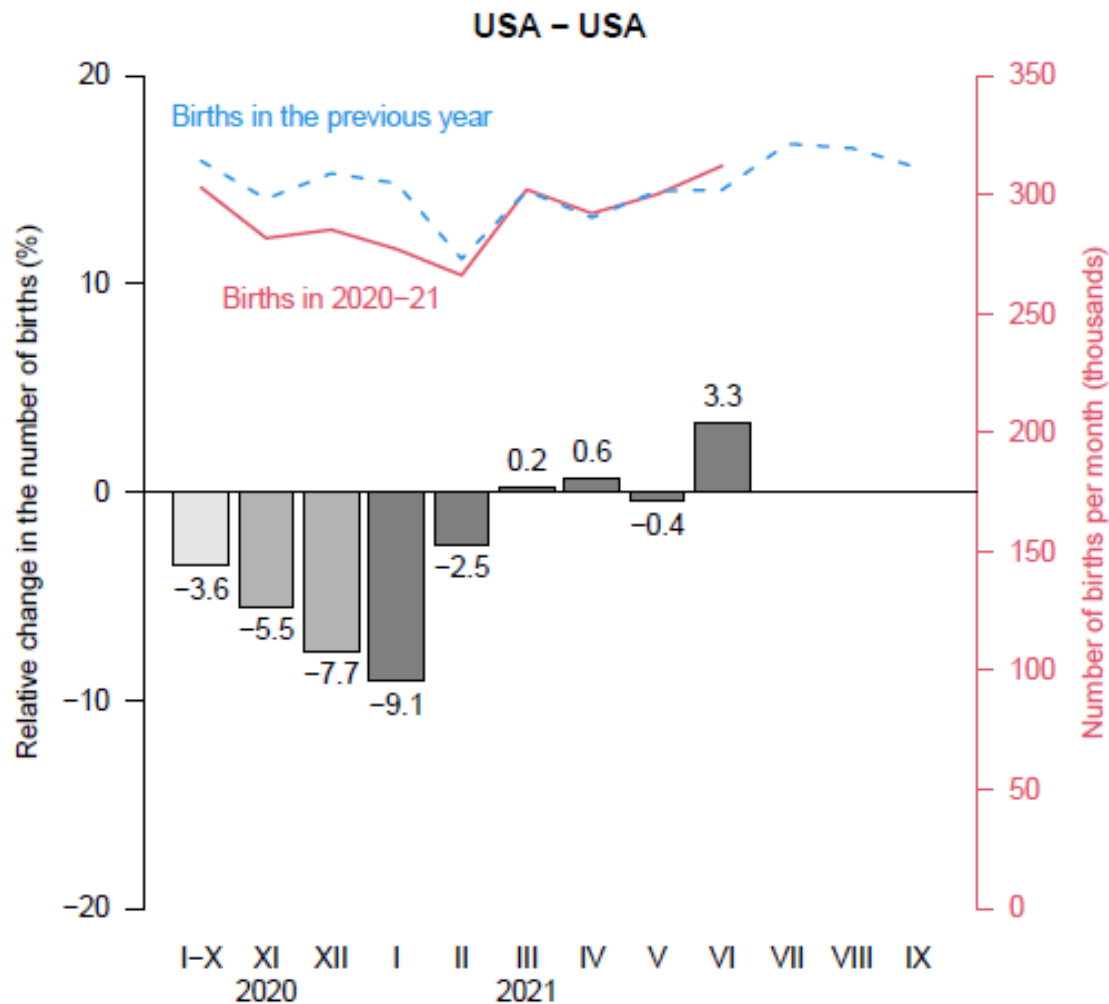
# European Union (13 countries)



Relative year-on-year change in the number of births (%):  
European Union,  
Jan 2020-Aug 2021

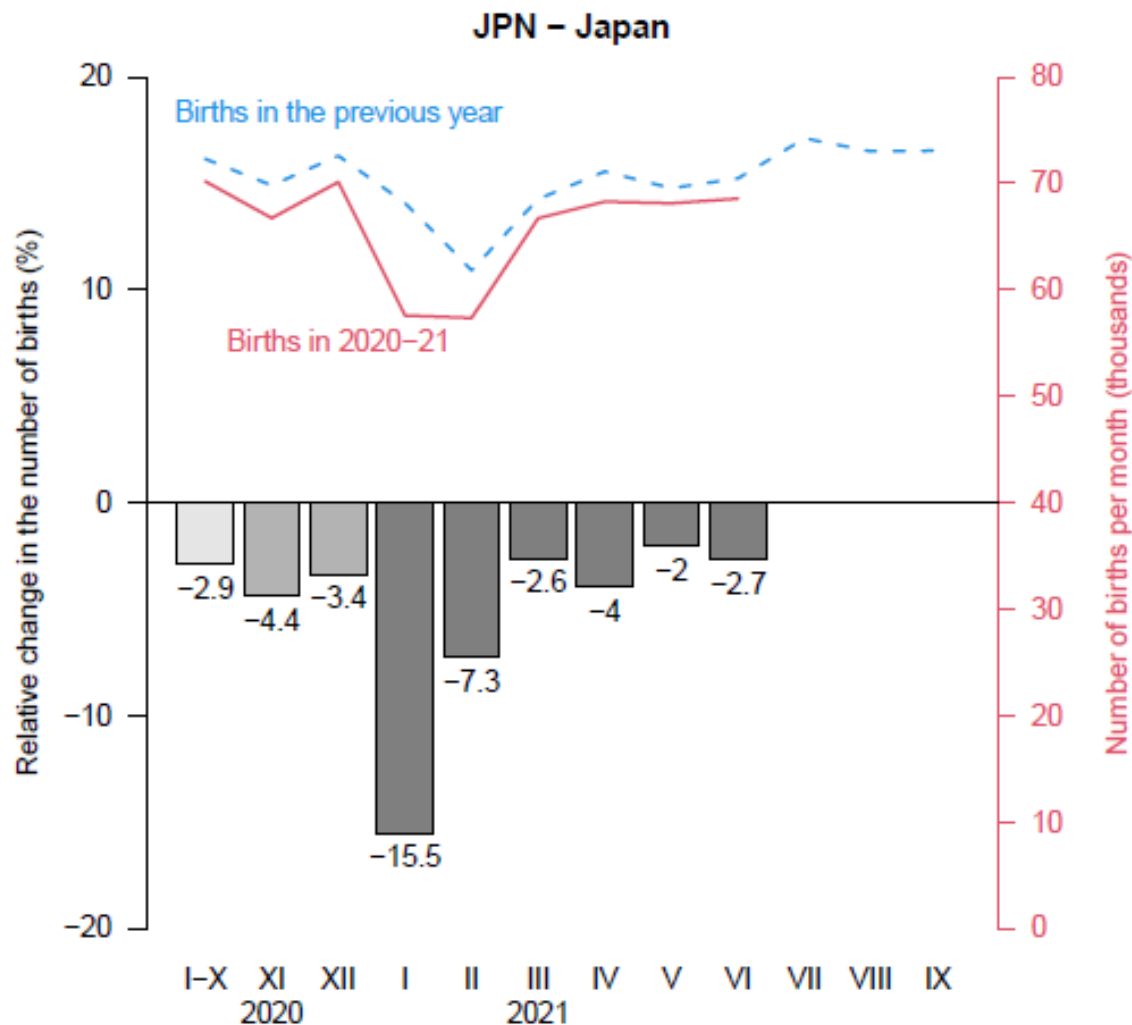
Countries covered:  
Belgium, Denmark,  
Finland, France,  
Germany, Hungary,  
Italy, Latvia,  
Netherlands, Portugal,  
Slovenia, Spain,  
Sweden

# United States



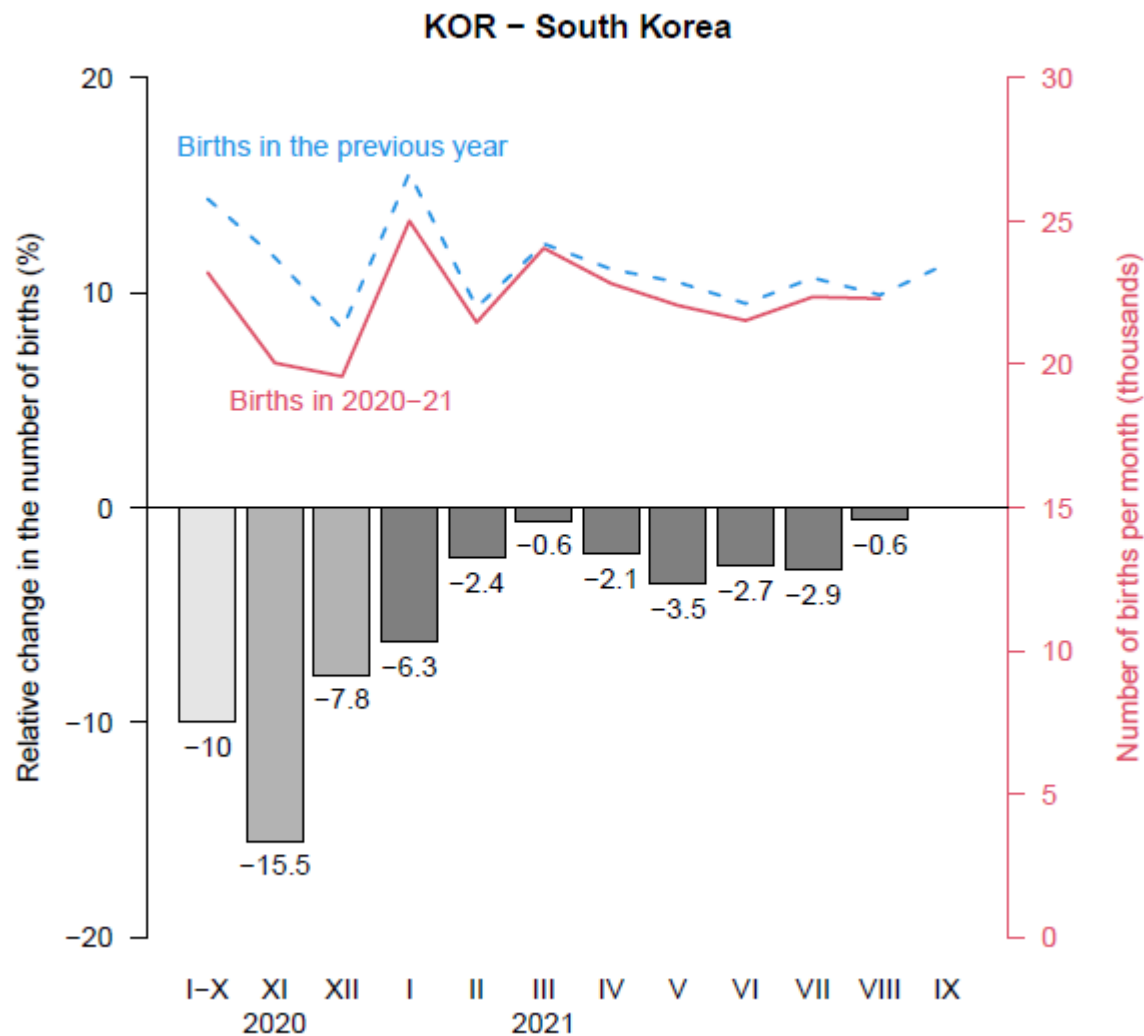
Relative year-on-year  
change in the number  
of births (%):  
United States,  
Jan 2020-Jun 2021

# East Asia: Japan



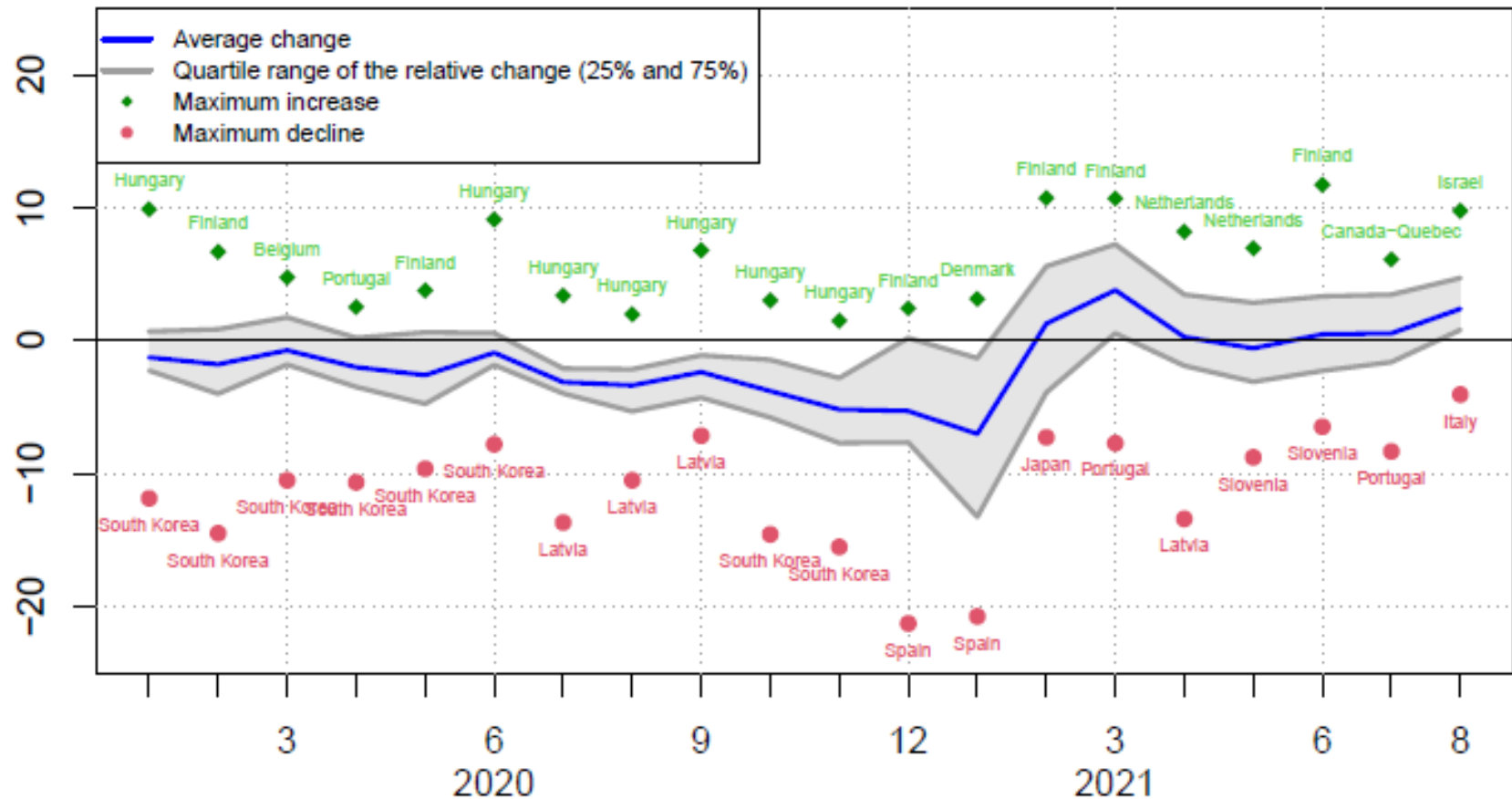
Relative year-on-year  
change in the number  
of births (%):  
Japan,  
Jan 2020-May 2021

# East Asia: South Korea



Relative year-on-year  
change in the number  
of births (%):  
Japan,  
Jan 2020 - July 2021

## Relative change in the number of births (%)

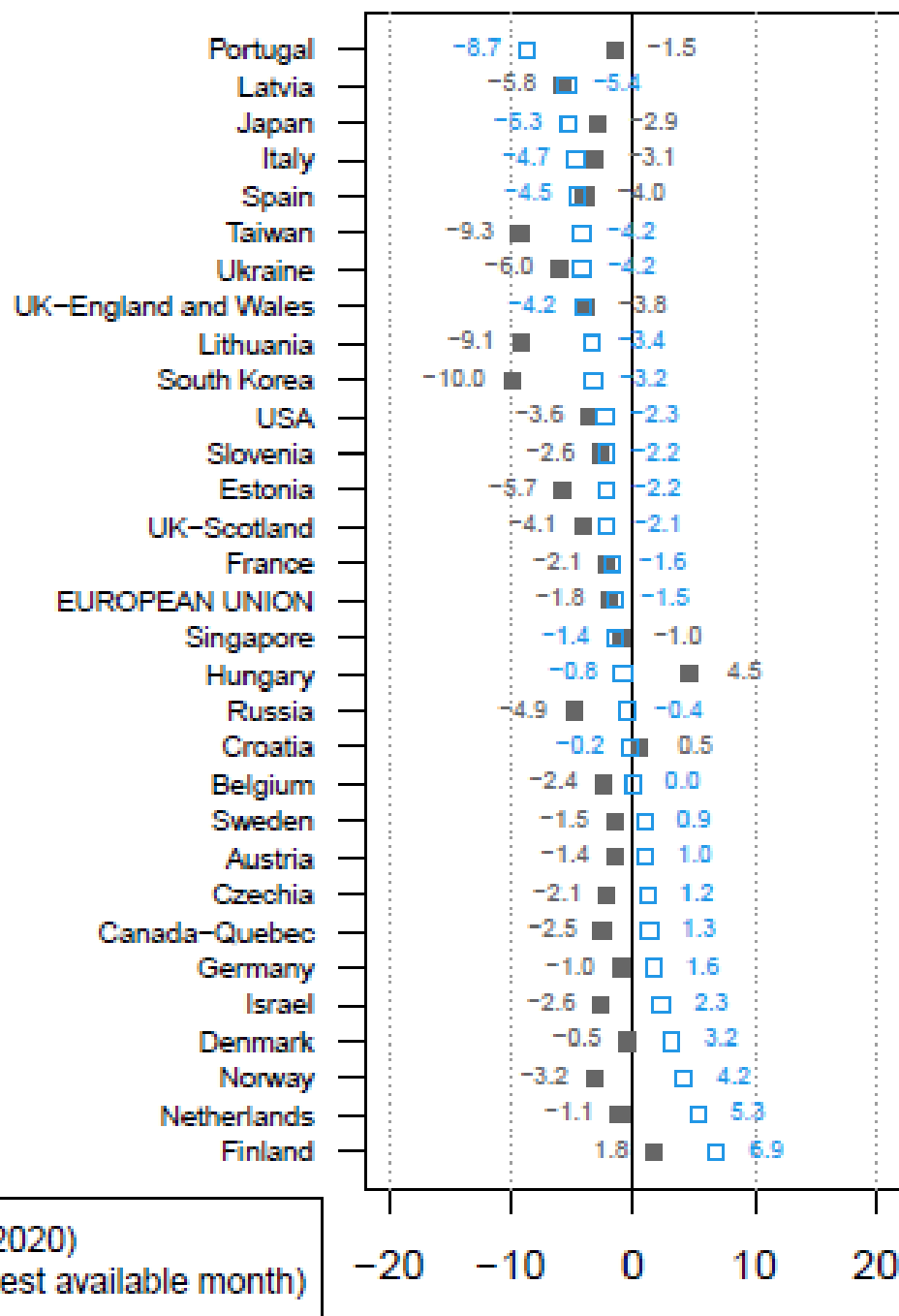


Average relative year-on-year change in the number of births (%):  
16 countries with data until at least August 2021

*Figure excludes countries with large fluctuations in data or with incomplete data: Lithuania, Russia, Ukraine, Chile; Croatia, Taiwan, Switzerland, Estonia*

# Summary: pandemic birth trends across 29 countries: Pre-pandemic (Jan-Oct 2020) vs. Pandemic (Dec 2020+) period

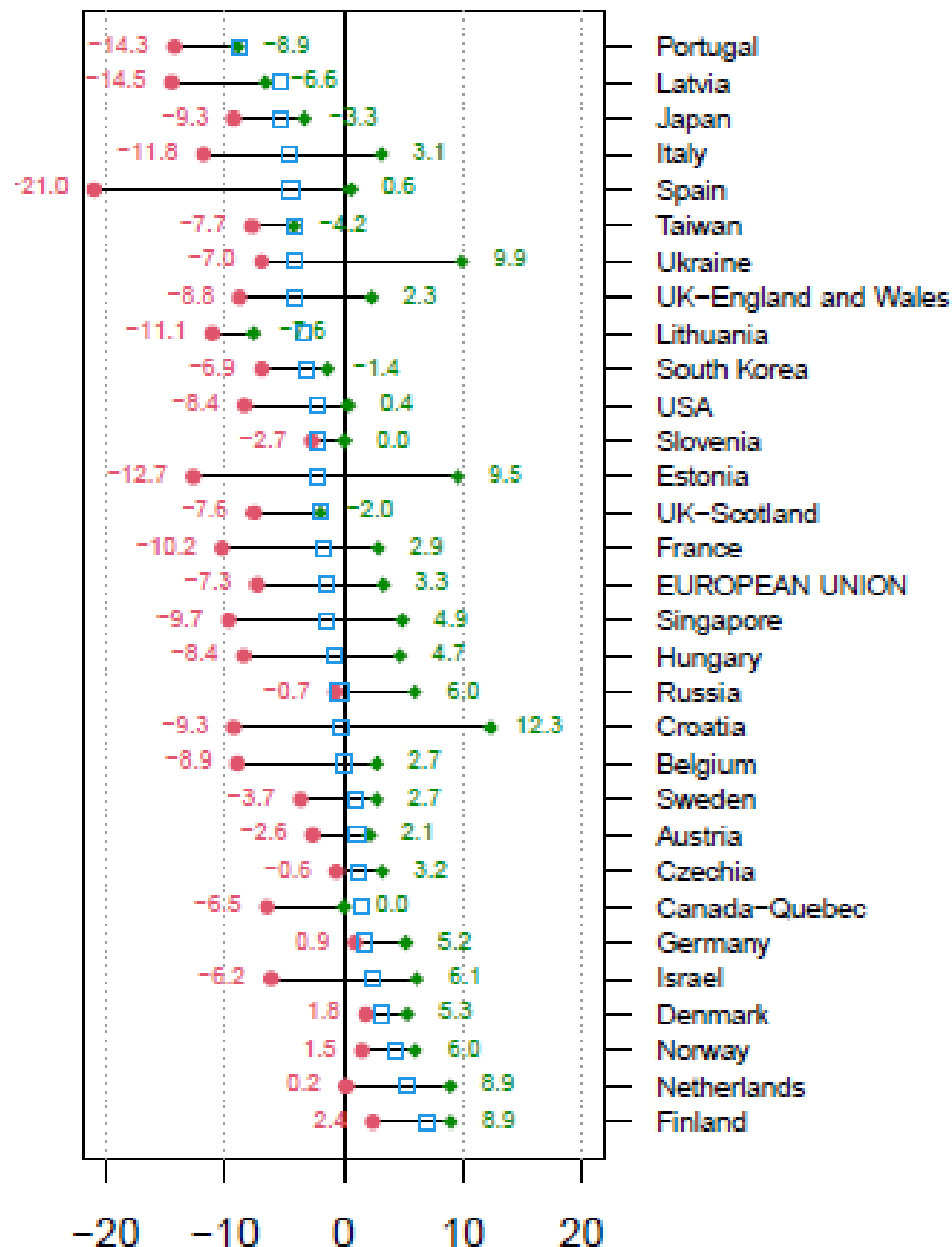
Average relative year-to-year change in the number of births before and during the pandemic (%)



# Summary: pandemic birth trends across 29 countries: A detailed look at the pandemic period since Dec 2020

Average relative year-to-year change in the number of births during the pandemic (since Dec. 2020), %

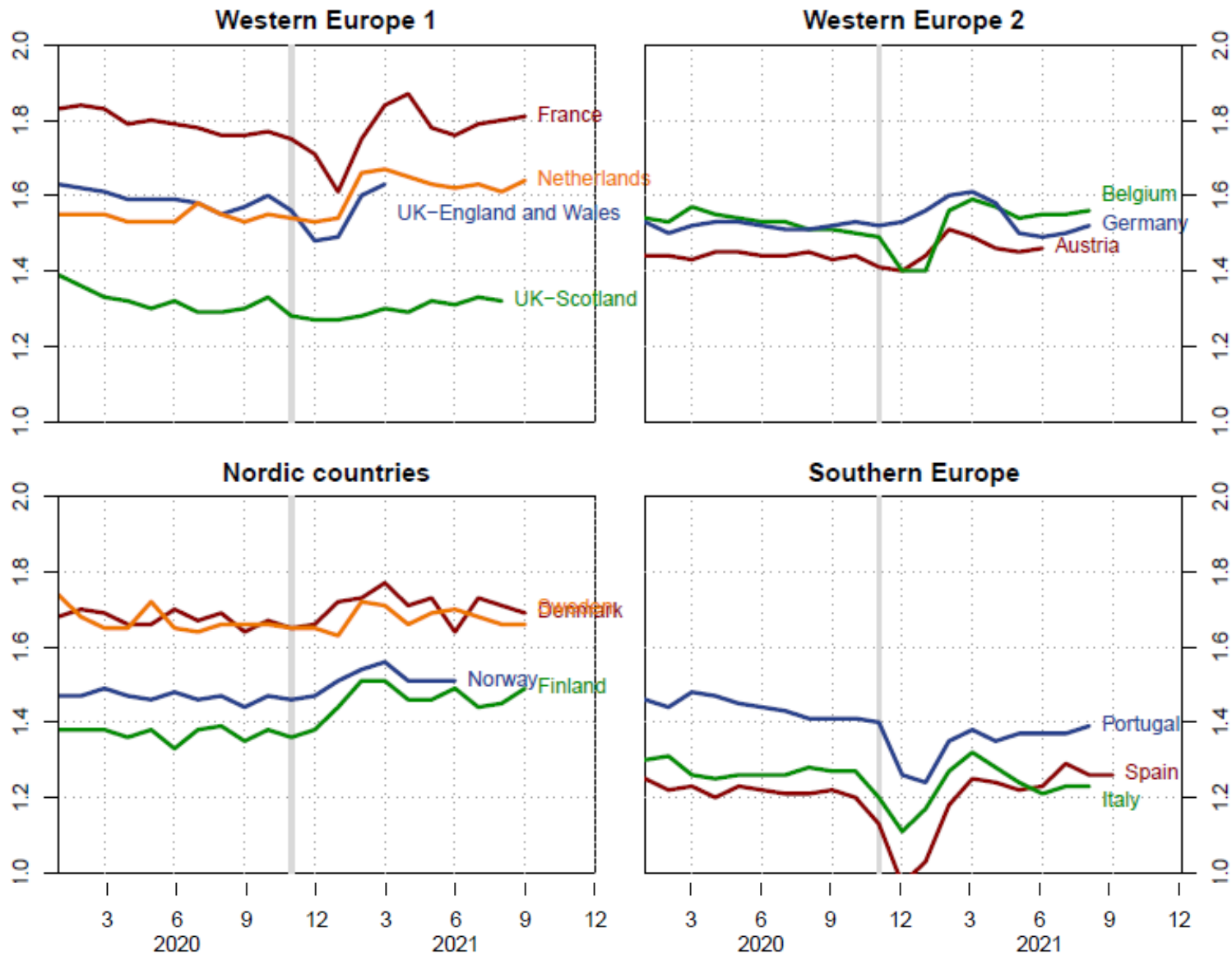
- Pandemic period
- December 2020 to January 2021
- March to April 2021



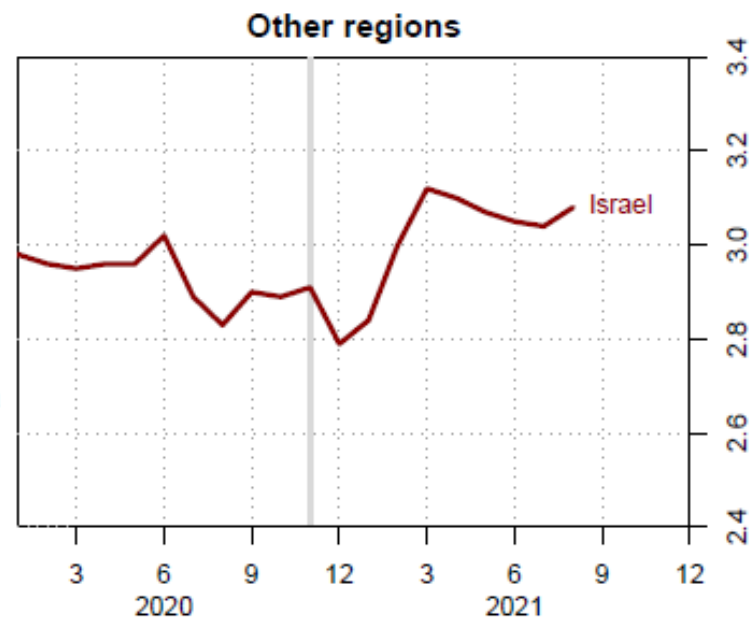
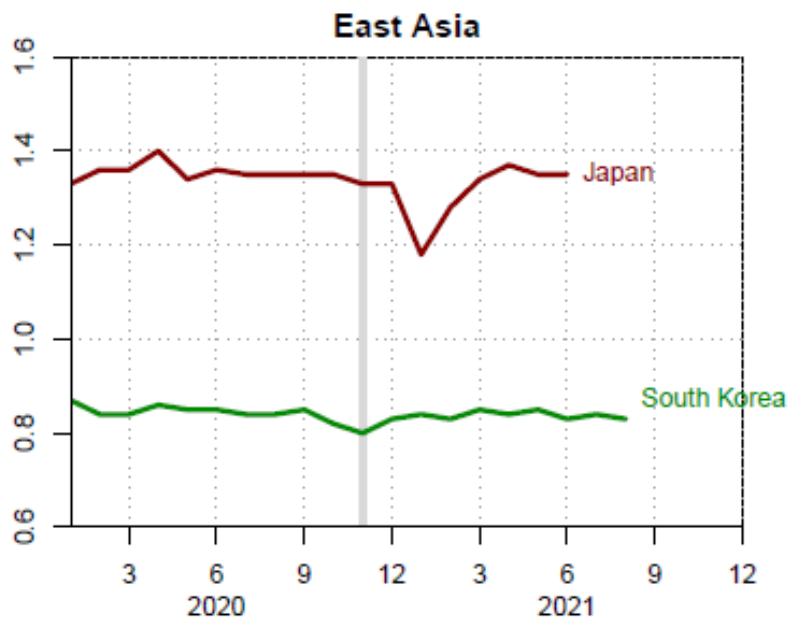
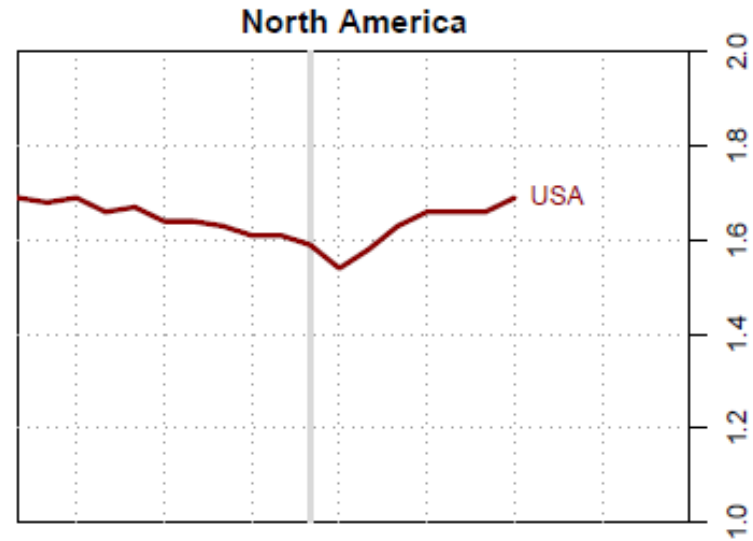
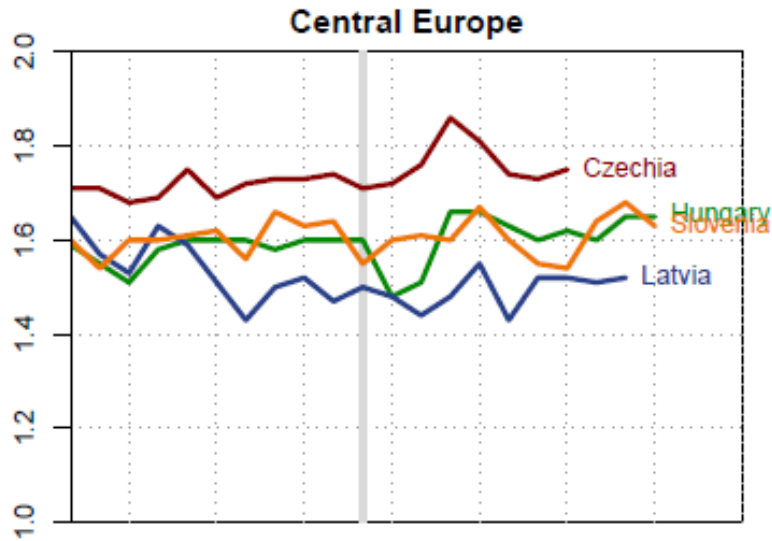


# Monthly trends in Total Fertility Rate

# Western, Northern and Southern Europe

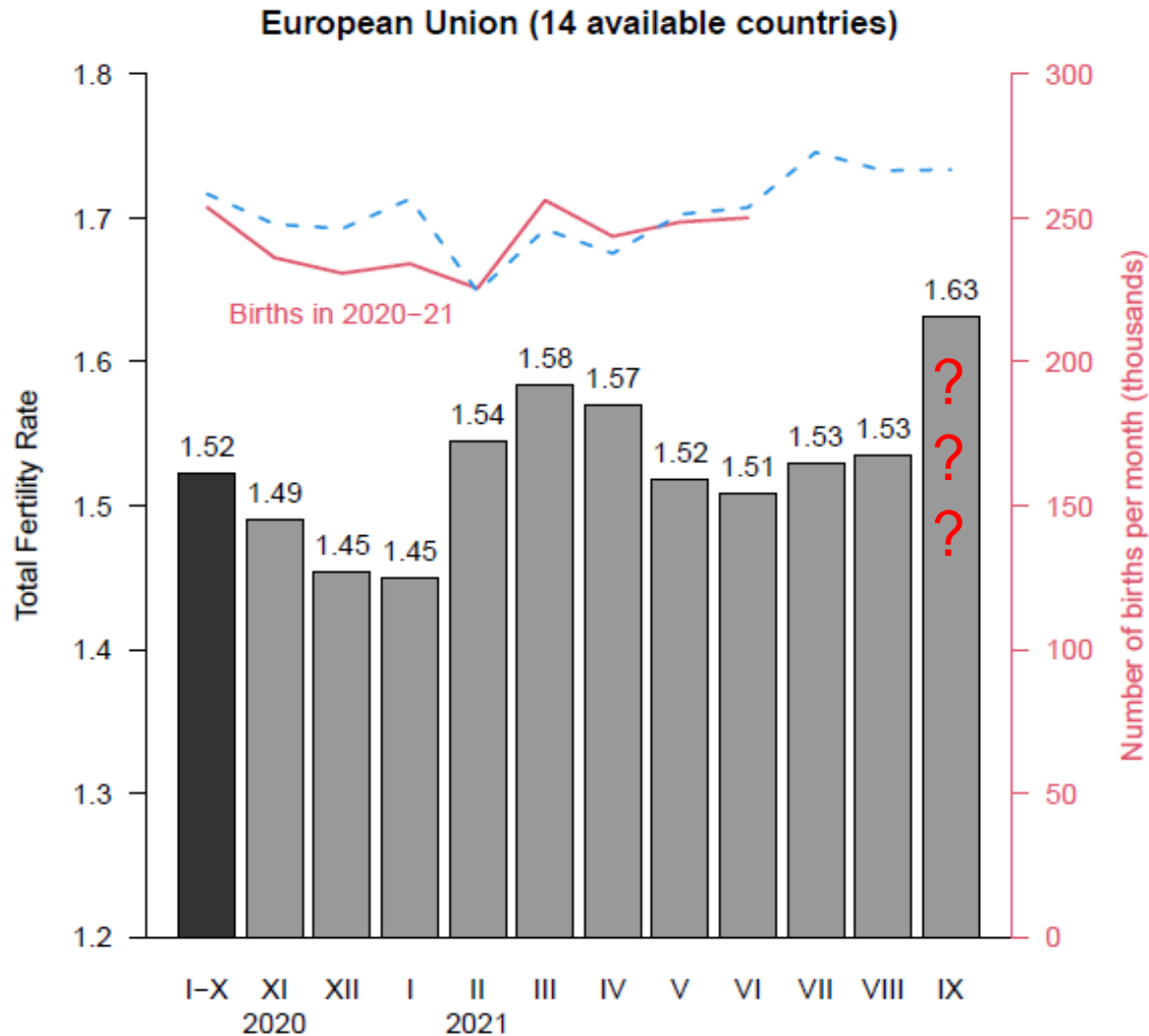


# Other regions including US, Japan



# European Union

14 countries with available data until September 2021



Countries covered:  
Austria, Belgium,  
Denmark, Finland,  
France, Germany,  
Hungary, Italy,  
Latvia, Netherlands,  
Portugal, Slovenia,  
Spain, Sweden

# Pandemic births surprises: birth recovery after the baby bust?

## *The biggest surprises:*

### 1. Concentrated trend reversal in Feb-Mar 2021

- Consistent across countries, regions and contexts
- Mostly short-lived
- Peak mostly in March 2021: huge upturn from Jan. 2021 in all countries ex. Portugal, but also a jump compared with Mar. 2020
- Estimated TFR jump from January to March up to 0.3 (Spain), +0.13 in the EU
- More upturns in the making in Autumn 2021?

2. Bust and boom compensating each other: In most countries only a minor overall pandemic effect so far

3. Surprising COVID-19 baby boom in Netherlands and Finland (smaller one in Norway and Denmark)

4. So far, very small or no impact visible of the 2<sup>nd</sup> (Autumn 2020) wave

# Discussion

Longer-term trends: stable trend or minor waves of booms and busts?

- Why did birth trends stabilise since Spring 2021 (late Summer/Autumn conceptions)? What was the impact of economic stabilisation?
- Will birth trends respond to the new waves of the pandemic and lockdowns? Or did people “get used” to live with the pandemic?
- Longer-term fertility downturns more likely if COVID-19 leaves long-lasting scars in economy, labour market and if it affects government spending

Thank you!

➔ also to the fantastic HFD team at the MPIDR!

STFF (Short-Term Fertility Fluctuations) dataset:

<https://www.humanfertility.org/cgi-bin/stff.php>

STFF Visualisation Toolkit:

<https://mpidr.shinyapps.io/stfertility/>



Early report on monthly birth trends (to be updated soon, 😊)

<https://osf.io/preprints/socarxiv/mvy62>

(Sobotka, Tomas, Aiva Jasilioniene, Ainhua A. Galarza, Kryštof Zeman, Laszlo Nemeth, and Dmitri Jdanov. 2021. “Baby Bust in the Wake of the COVID-19 Pandemic? First Results from the New STFF Data Series.” SocArXiv. March 24.

doi:10.31235/osf.io/mvy62)

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