Newsletter no. 44, June 2020

Research Newsletter

DeNederlandscheBank
EUROSYSTEEM

Latest news

A paper by David-Jan Jansen (Financial Stability Division) on the 2010 U.S. Flash Crash has been accepted by the Journal of Money, Credit and Banking. The paper by David-Jan establishes that the 2010 Flash Crash had an almost immediate and substantial echo in Latin American equity markets. Based on an analysis of intraday data, the paper finds that these spillovers followed from normal interdependence between international financial markets rather than from financial contagion.

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Literature Overview on Epidemics:

Their macroeconomic effects and the implications of polices to combat them

The COVID-19 pandemic has led to unprecedented interventions by governments and central banks. At the same time, measures to contain the virus outbreak have been deployed, varying from social distancing to complete lockdowns. These developments have sparked the academic debate over the macroeconomic consequences of the pandemic as well as the potential trade-off between the containment of the virus and the support to the economy. This column aims at providing an overview of the most recent literature on pandemics.

Covid-19 and the experience from past outbreaks

An obvious step towards understanding the effects of a pandemic on the health of the society and on the economy is to look at similar pandemics from the past. Correia et al. (2020) find both supply- and demand-side effects of pandemics. On the supply-side, they find that US cities more severely affected by the Spanish flu pandemic experienced relative declines in manufacturing output and employment. On the demand-side, they find reductions in bank assets (which they interpret as a reduction in credit demand) and in motor vehicle registrations (interpreted as a reduction in consumer durable spending). These effects persisted from 1919 through 1923. In a cross-country panel, Barro et al. (2020) find that between 1918 and 1921, the Spanish flu reduced real GDP per capita by 6% and private consumption by 8%. Real stock returns lowered by 26-ppts, and the real returns on short-term government bills (similar to US T-bills) decreased by 14-ppts. Along similar lines, Alfaro et al. (2020) find that an unanticipated doubling of predicted infections during the COVID-19 and SARS outbreaks leads to a decline in (forecasted) aggregate equity market values by 4 to 11 percent.

On long-term effects, Brainerd et al. (2003) find that US states with one more death per thousand from the Spanish flu had an average annual increase in the rate of growth of real per capita income by at least 0.15 percent per year over the next ten years. They argue that this is consistent with growth theory since higher mortality rates imply a greater permanent reduction of the labour force, leading to an increase in capital per worker. Jordà et al. (2020) study the macroeconomic effects of pandemics in European countries using data on return on assets dating back to the 14th century. The authors find that the "average" pandemic depresses the real natural rate of interest for up to 40 years after the pandemic

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Latest news
Continued

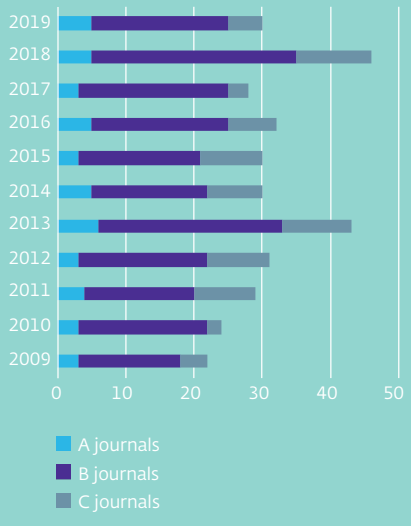
The report about the DBN research programme 2019 has been published [link]

In line with the DNB Research Agenda, the DNB Research programme 2019 had seven themes:

1. Effects of unconventional monetary policies
2. The new normal for monetary policy
3. Dynamics of inflation
4. Credit supply
5. Financial stability and financial regulation
6. Sustainability
7. Payments and market infrastructures

All projects are available at: https://www.dnb.nl/en/binaries/DNB%20Research%20Program%202019_tcm47-383265.pdf. In 2019 4 (out of 79) projects were stopped due to lack of sufficient results. In 2020, 40 projects of the research programme 2019 will be continued in 2020. In 2019 39 DNB working papers have been published, compared to 38 in 2018 and 27 in 2017. The number of publications in 2019 was slightly below the (high) level in 2018 (see figure).

Journal Publications of DNB Research

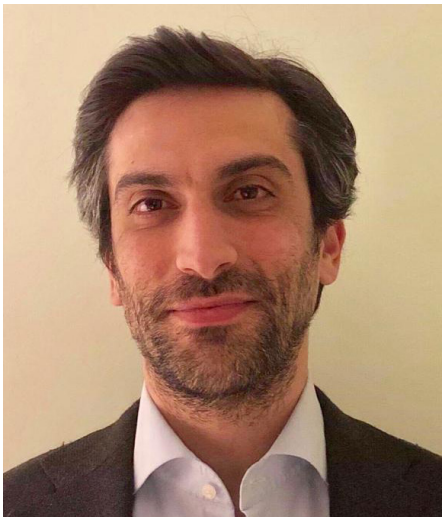


episode. The trough is deepest after 20 years, with the rate 1.5-ppts lower had the pandemic not occurred.

To estimate the economic impact of COVID-19 in the US, Atkeson (2020) conducts simulations of the SIR model from Wang et al. (2020) to study the progression of COVID-19 over the next 12-18 months. The progression is studied for different scenarios including: constant rates of mitigation over 18 months, reduction in the speed of mitigation and temporary imposition of severe mitigation measures. The author concludes that the US will require severe social distancing measures for a period of 12-18 months. Under almost all of the scenarios considered, at the peak of the disease progression, between 10% and 20% of the population (33 - 66 million people) suffers from an active infection at the same time. Under gradual relaxation of severe mitigation measures, the disease rebounds and reaches peak infection in about 450 days from now.

Effectiveness and economics of non-pharmaceutical interventions

In the absence of pharmaceutical therapies, governments have had to rely on non-pharmaceutical interventions (NPIs) in order to "flatten the curve". At the heart of these interventions is social distancing, which broadly encompasses policies aimed at reducing physical human interaction. Although not conclusive, the empirical evidence is that social distancing policies for moderate to highly infectious outbreaks, properly implemented, have been effective. Markel et al. (2007) find that cities that implemented early and sustained social distancing measures during the Spanish flu had lower peak and overall death rates. Notably, cities that activated, deactivated and re-activated NPIs tended to have bimodal mortality peaks, whereas cities that sustained their NPIs experienced no second peak. Similarly, a systematic review of social distancing in non-healthcare workplaces during the



2009 H1N1 pandemic finds that it delayed and reduced the peak influenza attack rate, especially when combined with other public health measures (Ahmed et al., 2018). However, the effectiveness declined with higher basic reproduction numbers, delayed intervention or lower compliance. Lower compliance with NPIs can occur due to social factors (including low income, limited access to sick leave, dependence on public transport – see Kumar et al., 2012); where social distancing measures have been triggered too early, resulting in intervention fatigue (Collinson et al., 2015); or due to informational barriers and low risk perceptions.

Blanket NPIs can be effective, but they also entail significant social and economic disruption. Adda (2016) performs a cost-benefit analysis of closing down schools for 2 weeks and public transportation for 1 week in France in response to flu-like illnesses. He finds that whilst effective in reducing disease incidence, these measures result in net costs to society, predominantly due to loss of human capital in school children and to a lesser extent due to GDP foregone from closure of public transportation. However, the authors find that these measures would be cost effective for flu epidemics where the death rate is above average. Importantly, there is no simple trade-off between public health policy and the economy – NPIs can have net positive effects on economic activity by reducing ››

the severity of the epidemic, which itself carries significant economic costs. In support of this, Correia et al. (2020) find that US cities which deployed NPIs earlier and more aggressively during the Spanish flu were associated with relatively higher economic activity after the pandemic receded. The authors observe that even in the absence of NPIs, economic activity would be reduced due to behavioural responses of individual households. But this does not guarantee that critical thresholds are reached (e.g. bringing the effective reproduction number to less than 1).
Ferguson et al. (2020) use a modified pandemic-planning influenza model to simulate the effectiveness of different combinations of public health interventions in combating the COVID-19 epidemic in the US and UK. Mitigation strategies (which are aimed at slowing but not necessarily stopping the epidemic) would still likely result in hundreds of thousands of deaths and the health systems (especially ICUs) being overwhelmed many times over. The recommended option then is for suppression, which is significantly more restrictive and is already being practiced by many countries. In this case, the aim is to reduce the effective reproduction number to below 1.

Modelling epidemics and policy recommendations

Modern models of epidemics date back to 1927 with the original SIR model of Kermack and McKendrick (1927). Since then, the SIR approach has been used extensively to model epidemics and the effectiveness of containment measures, including COVID-19 (e.g. Ferguson et al., 2020; Atkeson, 2020). The major weakness of these classical models is that they do not explicitly consider private trade-offs between the expected costs and benefits of contracting the disease against the cost and benefits of limiting social contact, which may limit their predictive capacity. Perrings et al. (2014) introduce a new class of "economic epidemiology" models to emphasise the individual economic incentives which affect infectious disease spread at the macro level. In these models, private economic incentives can be targeted, opening up a novel set of disease management instruments for analysis beyond blanket interventions like social distancing or mass shutdowns.

To that end, Eichenbaum et al. (2020a) incorporate the SIR model into a macro model to study the interaction between economic decisions and epidemics. In their model, the epidemic has both aggregate demand and supply effects. The latter arise because the epidemic exposes the working population to the virus, the risk of which makes it cut back on its labour supply. The former arise because the epidemic exposes people who purchase consumption goods to the virus. The authors find that people's decision to cut consumption and work reduces the severity of the epidemic, but exacerbates the size of the induced recession.

Economic trade-offs also help to explain heterogeneity in disease avoidance strategies such as between low- and high-risk demographics. Kaplan et al. (2020) fit the SIR model into a heterogeneous agents framework where some households are hit harder than others. Importantly, they show that the most exposed households also have the lowest liquidity, and may not be able to survive for long without financial help. Glover et al. (2020) extend the analysis to also account for different age groups in a multisector economy and show that governments facing higher redistribution costs may opt for less mitigation measures. Bayer et al. (2020) estimate a heterogeneous agents model using data for the US. They find that conditional (e.g. on being unemployed) transfers yield a higher fiscal multiplier than unconditional transfers. Overall, their estimates show that the actual transfers of the stimulus package decided by the US government reduce the output loss due to the lockdown by about 50 percent. However, a major weakness in their analysis is that they abstract from disruptions in the transmission of those measures to the real economy.

Acemoglu et al. (2020) develop a multi-risk SIR model (MR-SIR) where infection, hospitalization and fatality rates vary between groups—in particular between the "young", "the middle-aged" and the "old". Their MR-SIR model enables a tractable quantitative analysis of optimal policy similar to those already developed in the context of the homogeneous-agent SIR models. For baseline parameter values for the COVID-19 pandemic applied to the US, they find that optimal policies differentially targeting risk/age groups significantly outperform optimal uniform policies and most of the gains can be realized by having stricter lockdown policies on the oldest group. Similar to Eichenbaum et al. (2020b), they show that targeted policies that are combined with measures that reduce interactions between groups and increase testing and isolation of the infected can minimize both economic losses and deaths.

Thus far, there has been little discussion of the feedback of supply shocks on demand. Guerieri et al. (2020) address this by considering "Keynesian" supply shocks in multisector economies, with various asset market structures, which trigger relatively larger drops in demand. This is especially the case in economies with incomplete markets and liquidity constrained households. The authors show that standard fiscal stimulus can be less effective than usual because government spending cannot be directed to the most affected sectors. Monetary policy, as long as it is unimpeded by the ZLB, can have magnified effects by preventing firm exits. Turning to optimal policy, their model suggests closing down contact-intensive sectors and providing full insurance payments to those affected, ››

despite the lower per-dollar potency of fiscal policy. In a similar vein, Faria-e-Castro (2020) shows that unemployment insurance benefits generate the largest consumption boost for borrowers, while savers favour unconditional transfers.

Fernandez-Villaverde and Jones (2020) make a first attempt to estimate the SIR model for various US states and countries around the world. The authors allow for a time-varying contact rate in order to capture behavioral and policy induced changes associated with social distancing. Moreover, they simulate the model forward to consider possible futures for various countries, states, and cities, including the potential impact of herd immunity on re-opening.

So far, all major central banks have taken measures to counteract the negative effects of the pandemic on the economy. However, the literature is still premature and the attempt to incorporate monetary policy in the macro-SIR model is in progress.

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Forthcoming Conferences

The following planned conferences have been cancelled or postponed due to the Corona virus.

8 June **ESCB Heads of Research meeting hosted by DNB Postponed** to 16 November 2020

22 and 23 June 2020 **De Nederlandsche Bank - Sveriges Riksbank - Deutsche Bundesbank 6th Annual Macroprudential Conference Postponed** to June 2021

28 August 2020 **EEA/ESEM Day Ahead Canceled**

Depending on the situation concerning COVID-19, the following event will take place:

CALL FOR PAPERS
23e Annual Research Conference 29 and 30 October 2020
Monetary Non-Neutrality: The Real Effects of Monetary Policy in the Short and Long-Run

In recent years the strong response of central banks to the weak economic conditions has pushed monetary policy to explore uncharted territories. As the phase of low inflation and low natural rates extend over time, major central banks are in the process of reviewing their strategies, a process that turns out to be extremely challenging in light of the sudden advent of the coronavirus pandemic.

In the effort to provide a sound scientific background to those strategies, we aim at answering the following questions: Which are the relevant channels of the monetary policy transmission mechanism? How strong and long-lasting are the effects of monetary policy? Are there any long-run consequences of persistently low nominal interest rates? What are the limits of monetary policy? Are there undesired or unexpected effects from QE? What are the long-run implications of the massive monetary expansion triggered by the coronavirus pandemic?

We invite the submission of high quality theoretical and empirical papers that study the real effects of monetary policy in the short and long run. The conference will also feature a special session discussing the response to the pandemic. Topics of interest include, but are not limited to:

- The relevant channels of the monetary transmission mechanism;
- The effect of monetary policy in the long and short run;
- State dependent effects of monetary policy;
- Monetary policy framework in a world with low equilibrium real interest rates;
- High indebtedness and consequences for monetary policy;
- Monetary policy and productivity;
- Monetary policy in a post-coronavirus world.

Paper submission & important dates
Manuscripts should be submitted to DNB_ResearchConference@dnb.nl by the 15th of June 2020. Authors of accepted papers will be notified by the 10th of July 2020.

Program committee
Paolo Bonomolo, Andrea Colciago, Jakob de Haan, Razvan Vlahu ››

DNB working papers

Since January 2020 the following Working Papers have been published, please use the following Link:

- **662** - Financial knowledge and trust in financial institutions. Carin van der Cruijsen, Jakob de Haan and Ria Roerink, 19 December2019
- **663** - The economic forces driving FinTech adoption across countries. Jon Frost, 6 January 2020
- **664** - Evolution of monetary policy frameworks in the post-crisis environment. Anna Samarina and Nikos Apokoritis, 7 January 2020
- **665** - Bank instability: Interbank linkages and the role of disclosure. Christian König-Kersting, Stefan Trautmann and Razvan Vlahu, 7 January 2020
- **666** - Natural Rate Chimera and Bond Pricing Reality. Claus Brand, Gavin Goy and Wolfgang Lemke, 16 January 2020
- **667** - Corporates' dependence on banks: The impact of ECB corporate sector purchases. Joost Bats, 16 January 2020
- **668** - Crowded trades, market clustering, and price instability. Marc van Kralingen, Diego Garlaschelli, Karolina Scholtus and Iman van Lelyveld, 24 January 2020
- **669** - How banks respond to distress: Shifting risks in Europe's banking union. Mark Mink, Rodney Ramcharan and Iman van Lelyveld, 24 January 2020
- **670** - Skating on thin ice: New evidence on financial fragility. Jasmira Wiersma, Rob Alessie, Adriaan Kalwij, Annamaria Lusardi and Maarten van Rooij, 24 January 2020
- **671** - Consumer propensity to adopt PSD2 services: trust for sale? Michiel Bijlsma, Carin van der Cruijsen and Nicole Jonker, 3 February 2020
- **672** - The importance of value chains for euro area trade: a time series perspective. Duncan van Limbergen and Robert Vermeulen, 4 February 2020
- **673** - Inflated credit ratings, regulatory arbitrage and capital requirements: Do investors strategically allocate bond portfolios? Martijn Boermans and Bram van der Kroft, 13 February 2020
- **674** - Demand shocks for public debt in the Eurozone. Andras Lengyel and Massimo Giuliodori, 2 March 2020
- **675** - Banks' net interest margins and interest rate risk: communicating vessels? Raymond Chaudron, Leo de Haan and Marco Hoeberichts, 6 March 2020
- **676** - Global and local currency effects on euro area investment in emerging market bonds. Martijn A. Boermans en John D. Burger, 16 March 2020
- **677** - Product diversification as a performance boosting strategy? Drivers and impact of diversification strategies in the property-liability insurance industry. Patty Duijm and Ilke Van Beveren, 23 March 2020
- **678** - Liquidity Coverage Ratio in a Payments Network: Uncovering Contagion Paths. Richard Heuver and Ron Berndsen, 24 March 2020
- **679** - Effects of credit restrictions in the Netherlands and lessons for macroprudential policy. Gabriele Galati, Jan Kakes and Richhild Moessner, 27 March 2020
- **680** - Banknote verification relies on vision, feel and a single second. Frank van der Horst, Jelle Miedema, Joshua Snell and Jan Theeuwes, 16 April 2020
- **681** - Shallow or deep? Detecting anomalous flows in the Canadian Automated Clearing and Settlement System using an autoencoder. Leonard Sabetti and Ronald Heijmans, 19 April 2020
- **682** - How much liquidity would a liquidity-saving mechanism save if a liquidity-saving mechanism could save liquidity? A simulation approach for Canada's large-value payment system. Shaun Byck and Ronald Heijmans, 19 April 2020
- **683** - Is there anybody out there? Detecting operational outages from LVTS transaction data. Neville Arjani and Ronald Heijmans, 19 April 2020

DNB occasional studies (new since january 2020)

Since March 2019 the following occasional studies have been published, please use the following link:

Nr. 1 (2020): Central Bank Digital Currency - Objectives, preconditions and design choices
Peter Wierts and Harro Boven (April 2020)

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Published Articles in Journals

- **Is fiscal policy in the euro area Ricardian?** Nikki Panjer, Leo de Haan and Jan Jacobs
  Empirica, 2020, 47, 411-429

For published articles in journals please use the following link:

Forthcoming Articles in Journals

- **Bank-based versus market-based financing: Implications for systemic risk.** Joost Bats and Aerdt Houben
  Journal of Banking and Finance
- **The interaction between private sector and public sector labor markets: Evidence from Romania** Valeriu Nalban and Andra Smadu
  Economic Modelling
- **Does modeling a structural break improve forecast accuracy?** Tom Boot and Andeas Pick
  Journal of Econometrics
- **Testing the multivariate regular variation model** John Einmahl, Fan Yang and Chen Zhou
  Journal of Business and Economic Statistics
- **The effects of fiscal policy at the effective lower bound** Dennis Bonam, Jakob de Haan and Beau Soederhuizen
  Macroeconomic Dynamics
- **Finite horizons and the monetary/fiscal policy mix.** Kostas Mavromatis
  International Journal of Central Banking

For forthcoming articles in journals please use the following Link:

Published Books

- **Financial Markets and Institutions: A European Perspective (fourth edition)** Jakob de Haan, Dirk Schoenmaker and Peter Wierts
  Cambridge University Press

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Editor: Jolanda Kok
mailto: secretariaat-ebo@dnb.nl

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