SPILLOVERS

Research in Economics at Banco de Portugal • Biannual • Year VIII • July 2020

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Overview

The implications of the COVID-19 pandemic challenge all societies and Science. In the last months, academia and major institutions around the world have been rising to this challenge, with an unprecedented alliance of focus and resources. Banco de Portugal is also participating in this endeavor, anchored in its mission of maintaining price stability and pursuing financial stability. This issue of *Spillovers* is testimony of this agenda, focusing on the Bank's research-related activities.

Understanding the mechanisms underlying the transmission of the pandemic and the optimal policy response is our ultimate goal. Several economists of the Bank have been undertaking research directly related to the pandemic. We have also been engaging on discussions and hosting seminars with leading researchers in the field (see page 12). Indeed, the speed of new scientific output related to the pandemic – at the frontier of knowledge in economics – has been breathtaking.

As regards the Portuguese economy we have been thoroughly using the rich granular data on the Portuguese economy to understand the situation of households and firms. We have also updated our monitoring and forecasting econometric tools. This has implied a renewed integration of the supply and demand sides of the economy. To support this agenda, the Bank has been using novel high frequency data, for example related with electronic payments. In addition, Statistics Portugal and Banco de Portugal launched a regular survey on a large representative sample on firms in the beginning of April (see page 4). The micro data underlying this survey is very rich and will soon be available for researchers via the Microdata Laboratory of Banco de Portugal (BPLIM). I expect many interesting insights to be uncovered from this treasure trove.

These are truly unprecedented times. There are so many issues being shaped by our collective decisions in real time: the support to the most fragile throughout the pandemic, the degree of sustainability of the ensuing recovery, also in the face of climate challenges, the balance between global and national forces, the interaction and cooperation among policies, the deepening of EMU. In these circumstances solid research and evidence-based policy are all the more inescapable. I thus expect the momentum towards pushing our research frontier to be reinforced in the future. Banco de Portugal will surely continue to participate in this agenda, also within the Eurosystem. The revision of the ECB's monetary policy strategy is here a prominent example.

This edition of *Spillovers* also marks the end of Governor Carlos Costa's two terms at Banco de Portugal (see page 2). Throughout this decade Governor Costa always promoted sound research, continuously opened the Bank to the academia and listened thoughtfully to all ideas, new or old. These are the optimal conditions for research and policy to mature together.

Nuno Alves
Head of the Economics and Research Department

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Interview

Carlos da Silva Costa • Governor of Banco de Portugal

What importance do you attach to fundamental economic research at the Banco de Portugal?

I do attach great importance to it. Fundamental research is complementary to applied research, allowing for testing the refutability of assumptions or theories. In the applied phase, it is difficult to run such tests to the logical consistency or coherence of the theoretical framework. The tests I am talking about are not geared to check the veracity of the theory, but rather its soundness, the likelihood of it being refuted. The refutability of the theories used in the applied field entails a great deal of work in the theoretical field – and the fundamental research does that. It seems clear that for the Banco de Portugal to have a robust applied research, it also needs to invest in fundamental research, and there should be a continuum of concerns, not necessarily synchronous, between the two research types. The articulation between them is crucial. All this means that there is no need to choose between applied and fundamental research. One benefits from the other. The mission of the Bank must frame their fields of work. The Bank will fail its mission if it loses track of how monetary policy, financial stability and economic developments interact and if, as a result, it does not produce knowledge on which to base the performance of its economic advisory duties. I mean, the Bank has to observe and analyse reality to reinforce the knowledge gained in each of those areas, always keeping the whole in mind. Then we need to consider and manage resources and set priorities, according to the urgency and relative importance of the issues and the comparative advantage that we have – that is, by focusing on those issues we are most familiar with. We must keep asking ourselves about which issues matter for monetary policy, financial stability, and the growth of the Portuguese economy over the next decade. The Bank' research agenda should reflect those concerns and the priorities given to them.

Do you think that greater involvement of researchers in policy issues has improved the quality of advice to the Governor and the Board of Directors?

Absolutely. Keynes said we are all slaves of some defunct economist. I mean, our analytical frameworks were developed before we applied them. The wider the gap between theoretical and applied reflection, the greater the risk of present thinking being captured by past thinking. The schools' logic is somehow distressing. If someone claims to be Keynesian, neoclassical or Schumpeterian, that person is saying one of two things: either that he pays particular attention to certain variables or to a certain reality field, or that he uses the same analytical framework or formula without considering the differences in economic, monetary, financial and, not least, social, institutional and political reality. We must avoid that trap: if the situation I am looking at is different, the answer will have to take that difference into account and, as a result, will be different to a greater or lesser extent. If it is a question of method, instead of claiming to be Keynesian, neoclassical, or Schumpeterian, it may be better to assume that money matters, that the balance between supply and demand matters and it is not automatic… that innovation matters… or that entrepreneurship and creative destruction matter. The social and economic reality changes over time and differs according to geography and, therefore, the context of both fundamental and applied analysis becomes different. My attitude is always to say that, as economists, we have a toolbox that has been given to us over the years, but reality changes by itself and the tools must be fine-tuned to circumstances. What we have to do is try to understand to what extent the toolbox is the one that best fits reality. In fact, in contrast to the exact sciences, the object of analysis in the economic science (as in other social sciences) evolves and changes over time – people change their behaviour, their values, their social connections, the political context changes… The theory to be applied must follow such developments. A permanent interaction between the institutional, social, and political dimensions and research is thus justified. These dimensions cannot be ignored, they are the initial suitability or likelihood test for analytical assumptions. For instance, the explanatory power of the Phillips curve has been put into perspective by the lack of adherence to recent developments in wage and price-setting. Is it because of its theoretical inconsistency or, on the contrary, because of changes in the institutional framework and the geography of supply which determine the correlation of forces in wage and price-setting (globalisation, diminished strength of trade unions, hidden unemployment)? The fact that we are always coping with a new reality means that we cannot use the tools like we used them in the past. Therefore, a dialogue between economic policy makers and researchers is of major importance. Otherwise, we fall into a trap that can be compared to someone graduating from medical school without ever examining a patient.

How can research be (even) more useful? What steps might be desirable to improve the response to issues more directly concerning the Bank's duties?

There are two fields where we need to be aware of the problems to be tackled in the medium term. In the case of monetary policy, we have to adopt an agenda that considers the low inflation environment and the highly leveraged public and private actors, simultaneously in a context of structural change determined by globalisation and threats to sustainability. How does monetary policy normalisation take place in this context, in the aftermath of two severe crises and the current crisis, with balance sheets from central banks of such size? As regards financial stability, it is important to bear in mind the post-crisis risks of high bank leverage. We are highly dependent on the capacity of the system to absorb losses stemming from the necessary intertemporal allocation of savings, a pillar of economic development, especially when this allocation is mediated by the banks, as is predominantly the European paradigm. The system must ensure that savings are protected and, concurrently, it must bear the risk of financing the economy. The economic policy should set and manage the credit cycle size in order to restrain the destruction of capital resulting from the metamorphosis of the economic structure and which is more pronounced at times of severe crisis. The risk of capital destruction has to be more than offset by sustained growth, i.e., by the profitability of new investments and their impact both on value added per asset and on potential output growth, and on protecting employment and the income distribution model that guarantees socio-political cohesion and that society's preferences are met. There is no risk-free potential growth, but not all risk has the same impact on potential growth. What remains to be done is to think about how to manage the credit cycle, how to optimise the cycle amplitude to avoid capital destruction, beyond what results from optimal competitive dynamics and response to constant threats of technological innovation, changes in demand-side preferences and the arrival of new competitors from new geographies. The levels of capital required from banks must mirror a more structured thinking than mere short-term thinking: if I want to grow, I have to accept the risk of losing capital, but this risk has to be offset by additional income generated by what went well. This thinking should be done by going down into the field and involving departments such as the Banking Prudential Supervision or the Financial Stability Departments.

What do you consider to be the major challenge for economic research at central banks in coming years?

One of the major challenges lies in moving from aggregated to granular information. The average hides differentiated behaviours. For economic policy advice it is essential to understand the tails of the distribution. It must also be understood that economic policy seeks to guide the behaviour of public and private actors. Central banks must understand to what extent their instruments are capable of generating the desired incentives or signals and whether these incentives respond proportionally to the challenges of their time. The multiple economic actors must have incentives to converge on what is the intended outcome. The central bank must also be alert to incentives stemming from other policy instruments (e.g. tax policy, which may encourage/discourage mortgage credit). Are these other incentives consistent with the objectives of monetary policy or macroprudential policy? Or will they (partially) annul their effects? If we "waste our gunpowder" without obtaining the desired effect, we run the risk of discrediting the central bank's policy. In this sense, central banks are hostages to the institutional framework that presides over the whole economic activity (and not just the public institutional framework).

Do you have any final words for those who contribute to Research at the Banco de Portugal?

Research, research, research, both in the fundamental and in the applied field. Assuming that resources are scarce and taking a forward-looking attitude, defining priorities and respecting the principle of comparative advantages. Then, the better the data, the better the analysis. We have to dive into data; the aggregate data hides the most extreme risks. I would like to stress that the Economic and Research Department has a pivotal role, it is the Bank's flagship, but it must take advantage and mobilise the skills and knowledge existent across the Bank, in order to boost its own ability and achieve greater analytical depth.

By João Valle e Azevedo

COVID IREE – monitoring the impact of the pandemic on enterprises

The coronavirus outbreak constitutes a major and unprecedented shock to the Portuguese economy. With the aim of identifying, in a timely manner, the impact of the pandemic on non-financial corporations, Statistics Portugal and the Banco de Portugal decided in April to jointly launch a high-frequency survey addressed to Portuguese firms – the Fast and Exceptional Enterprise Survey – COVID-19 (COVID-IREE),

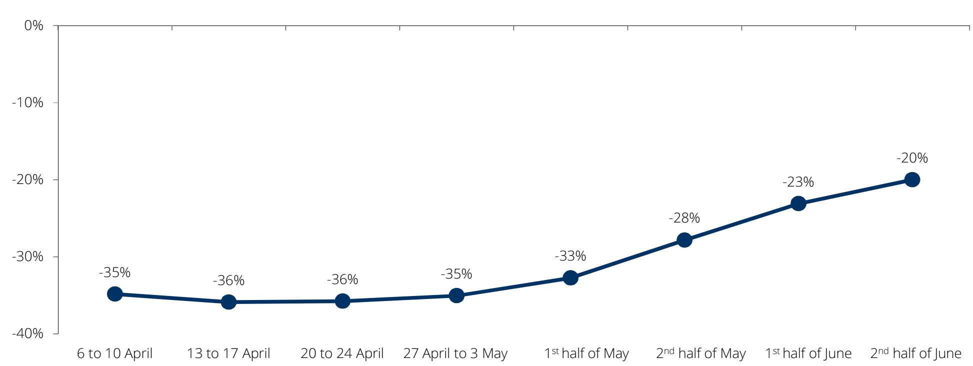
The survey started in the week of 6 to 10 April with a weekly frequency, having moved to a fortnightly frequency in May and June. Considering the evolution of the restrictions to economic activity resulting from the pandemic, the survey will be suspended from August onwards. The data collection for the last edition, referring to the first half of July, will be published on July 29th.

The survey is addressed to a broad range of micro, small, medium and large enterprises representative of the various sectors of economic activity, the sample totaling more than 8,800 firms. The results refer exclusively to the responding firms in each edition of the survey (around 5,500, on average).

The survey allows to identify some of the main effects of the COVID-19 pandemic on business activity, as it includes questions on firms' status (operating/closed), the impact on turnover and on the number of employees effectively working, as well as the main reasons behind those impacts. There are also questions regarding the availing of public support instruments and access to credit. Firms were also enquired (at times) about the length of time they would be able to remain in business without additional liquidity support measures, the number of persons in remote working and with alternate presence at the enterprise's premises, the burden of sanitary and safety requirements, the extent to which they have adapted their activity or intend to implement permanent changes to activity due to the pandemic, expectations regarding the time needed for turnover to return to a normal level, and the impact on prices.

A summary of the main findings of the several editions of the survey can be found in the websites of the Banco de Portugal (Portuguese only) and Statistics Portugal. The results of the COVID-IREE have been a crucial and timely piece of information in the monitoring and short-term forecasting of the Portuguese economy. Key findings indicate that firms' turnover during the state of emergency in April stood 35% below normal – but with significant differences across sectors – and presented a gradual improvement in May and June (June 2020 *Economic Bulletin*, Box 2 – "Impact of the pandemic on Portuguese enterprises – analysis based on the results of the COVID-IREE"; see also Economics in a picture). This evidence points to a very significant drop in economic activity in the second quarter of 2020.

Impact of the pandemic on enterprises' turnover | Percentage change vis-à-vis a scenario without the pandemic



Source: COVID-IREE. The results are based on the survey responses to the question regarding the impact of the COVID-19 pandemic on turnover, considering the mid-point of the reported interval for each enterprise, aggregated based on enterprise's turnover.

The micro database of the COVID-IREE survey will be made available by BPLIM to researchers from mid-July onwards. The pandemic constitutes a laboratory to study the behavior of firms in response to a major shock. The analysis of the COVID-IREE microdata is expected to contribute to uncover new evidence on how Portuguese firms were affected and responded to the disruptions caused by the crisis.

In every issue, we ask experts to briefly present and discuss two papers written by staff members. In this issue, the guest is Prof. Monica Costa Dias.

Monica Costa Dias (PhD University College London) is Deputy Research Director at the Institute for Fiscal Studies, in London. She is a Research Fellow at IZA, CEPR and the Human Capital and Economic Opportunity Working Group, and an editor of Fiscal Studies. Her research focuses on how inequalities build over the course of life, how they are transmitted across generations, and what policy can do to tackle the long-term consequences of poverty and deprivation. She combines economic theory, rich micro data and econometric methods to understand the behaviour of individuals and families and to study the impact of policy interventions. Her research has been funded, among others, by the Economic and Social Research Council (UK) and the European Commission, and has been published in leading academic journals such as *Econometrica*, the *Journal of Political Economy* or *Quantitative Economics*.

Featured published paper

Hugo Reis. 2020. "Girls' schooling choices and home production: Evidence from Pakistan", *International Economic Review*, Vol. 61, No. 2, May.

Female education continues lagging behind that of men in many of the world's poorest countries, and poverty remains the key factor determining whether or not a girl has access to education. Educating women must be a priority for economic development. Better educated women are more likely to participate in work, marry later, command a higher share of the household resources, and raise healthier and better educated children. It is therefore of crucial importance that we understand what is keeping girls away from education and how can families be supported in educating their daughters, particularly in the most deprived areas of the world.

This article addresses precisely these issues. Using a sophisticated combination of an economic model of behaviour and micro data, it investigates how families in rural Pakistan decide about investing in the education of girls. It then uses its findings to study the ways in which public policy can promote these investments.

Families pay a high cost for educating their daughters, both directly through fees and indirectly in lost home production. The latter is starkly reflected in the trade-off between the education of daughters and the labour force participation of mothers that this paper uncovers. Moreover, families also face capacity constraints in the provision of local school places beyond primary school. The paper shows that these are key determinants of the education outcomes for girls. Maternal education is also a key driver of whether or not girls attend education, with the daughters of more educated mothers being more likely to attend.

The paper then shifts attention to the question of whether public policy may promote education for girls. Cash transfers have often been use to incentivise certain investments in developing countries by alleviating credit constraints that may act as a deterrent. The paper looks at conditional cash transfers for educating girls, which families get only if the girl attends education beyond a certain grade, and unconditional cash transfers for families with children. It finds that conditional cash transfers are less expensive to run and are better targeted at improving the education of girls. However, both programmes show only modest effects because of the binding capacity of the local education provision. Instead, the paper finds that increasing the capacity of the local provision of school places is a more cost-effective policy.

Featured article from *Banco de Portugal Economic Studies*

Alves, Nuno, Fátima Cardoso and Nuno Monteiro. 2020. "A characterization of income and consumption inequality in Portugal" (JEL CODE: D12, D15, D31, E21, E24)

Inequality is at the core of the academic and policy debate in economics. It gained even more attention and relevance recently, with the widespread perception that the gap between the rich and the poor is widening and that the very wealthy are commanding an increasing share of resources while the fortunes of the poorest fail to improve. It is often argued that the austerity measures that followed the great recession may have accentuated economic inequalities by undermining the ability of governments to provide the safety net that protects the most vulnerable. In many places, we are now finding ourselves in the midst of the Covid-19 crisis with social insurance systems reduced to the bare minimum, incapable of providing the needed support for struggling families and of acting as economic stabilizers in face of possibly the worst recession of our lifetimes.

But not all is the same everywhere and some countries in Europe have defied the upward trend in inequality. In their work, Nuno Alves, Fatima Cardoso and Nuno Monteiro show that Portugal is one such case. Using data spanning over 20 years, they investigate the trends in economic inequality using two measures of wellbeing: disposable income and consumption.

Most studies focus exclusively on income inequality because income information is more readily available and less prone to measurement error. However, income provides only an incomplete view of economic inequalities, fluctuating in response to transitory shocks and individual choices that do not reflect variation in wellbeing. In turn, consumption provides a more accurate picture of the permanent economic circumstances of families and their variation across the population. Indeed, it has been shown that the `income poor' do not necessarily coincide with the `consumption poor', at least when income and consumption are measured on a yearly basis as is usual. For instance, a worker who takes a one year gap to travel or pursue other interests will have little income to report on that year, but will likely consume a fair amount out of savings or borrowing. Her consumption will reflect expectations about lifetime income, while her income will reflect a choice to take time away from paid work.

Based on the two measures, this study provides a more complete description of what happened to economic inequality in Portugal over the recent past, and how inequalities are changing across generations. It shows that inequality in consumption dropped over the entire period, and dropped faster than inequality in disposable income. It goes on to measure how inequalities changed across cohorts to demonstrate that indeed the aggregate trends reflect genuine change across cohorts, with more equality among the most recent ones in both income and consumption. It then investigates what might be driving these changes and finds evidence suggestive of the roles of the welfare system, credit markets and families.

As often happens with the most interesting research, this article leaves one wanting for more. For instance, why is the gap between the richer and the poorer closing – is it the poorer getting better or the richer getting worse? How are the various sources of income contributing to the closing of the gap? In particular, what is happening to inequalities in the labour market and how do they relate with inequalities in education qualifications? To what extent is the increasing labour force participation of women contributing to closing the gap? Are family structures changing in ways that attenuate economic inequality? And what reforms to the welfare system might have contributed to closing inequalities? The rich data that is now available presents a wealth of opportunities to learn about the nature of inequalities in Portugal and what can be done to tackle them.

Recently published

Our economists publish in a wide range of economic and finance journals and scholarly books.

Mathematical and Quantitative Methods

- Cabral, I. C., P. P. Ribeiro and J. Nicolau. 2019. "Tracking the relationship between euro area equities and sovereign bonds". *International Journal of Monetary Economics and Finance,* 12 (6): 511-537 (JEL Codes: C22, C51, F36, G01 e G11).
- Correia, Sergio, Paulo Guimarães, Tom Zylkin. "Fast Poisson estimation with high-dimensional fixed effects". *The Stata Journal,* volume 20, issue 1, pgs 95-115, 2020 (JEL Codes: C33, C35, C55).
- Portugal, Pedro, and António Rua. 2020. "How the ins and outs shape differently the U.S. unemployment over time and across frequencies". *European Economic Review,* 121, 103348 (JEL Codes: C10, E24, E32).

Forthcoming

- Duarte, Cláudia, José R. Maria, and Sharmin Sazedj. 2020. "Trends and cycles under changing economic conditions". *Economic Modelling* (JEL Codes: C11, C30, E32).
- Lourenço, Nuno, Carlos Melo Gouveia and António Rua. 2020. "Forecasting tourism with targeted predictors in a data-rich environment". *Economic Modelling* (JEL Codes: C53, C55, F47).
- Matei Demetrescu, Iliyan Georgiev, Paulo M.M. Rodrigues and A.M. Robert Taylor. 2020. "Testing for episodic predictability in stock returns". *Journal of Econometrics* (JEL Codes: C12, C22).

Macroeconomics and Monetary Economics

- Antunes, António, and Ercolani, Valerio. 2020. "Public debt expansions and the dynamics of the household borrowing constraint". *Review of Economic Dynamics* 37: 1-32 (JEL Codes: E21, E44, E62, H6).
- Gomes, Diego B.P., Felipe S. Iachan and Cezar Santos. 2020. "Labor Earnings Dynamics in a Developing Economy with a Large Informal Sector". *Journal of Economic Dynamics and Control,* 113, 103854 (JEL Codes: E24, E26, J24, J31, O17).

Forthcoming

- Cavalcanti, Tiago, Georgi Kocharkov and Cezar Santos. 2020. "Family Planning and Development: Aggregate Effects of Contraceptive Use". *Economic Journal* (JEL Codes E24, I15, J13, O11).

Public Economics

Forthcoming

- Garcia, Filomena, Luca David Opromolla, Andrea Vezzulli and Rafael Marques. 2020. "The effects of official and unofficial information on tax compliance". *Journal of Economic Psychology* (JEL Codes: H26).

Health, Education, and Welfare

- Reis, Hugo. 2020. "Girls' Schooling Choices and Home Production: Evidence from Pakistan". *International Economic Review,* Department of Economics, University of Pennsylvania and Osaka University Institute of Social and Economic Research Association, vol. 61(2), pages 783-819, May. (JEL Codes: I25, I28).

Labour and Demographic Economics

- Carneiro, Pedro, Sokbae Lee, and Hugo Reis. 2020. "Please call me John: Name choice and the assimilation of immigrants in the United States". *Labour Economics,* Elsevier, vol. 62(C) (JEL Code: J30 J32 C81 P5).

Industrial Organization

Forthcoming

- Caliendo, Lorenzo, Giordano Mion, Luca David Opromolla, and Esteban Rossi-Hansberg. 2020. "Productivity and organization in Portuguese firms". *Journal of Political Economy* (JEL Codes: L20).

Economic Development, Innovation, Technological Change, and Growth

- Dias, Daniel A., Carlos Robalo Marques and Christine Richmond. 2020. "A Tale of Two Sectors: Why is Misallocation Higher in Services than in Manufacturing?". *The Review of Income and Wealth,* 66(2): 361-393 (JEL Codes: D24, O11, O41, O47).

Forthcoming

- Dias, Daniel A., and Carlos Robalo Marques. 2020. "Every Cloud Has a Silver Lining: Cleansing Effects of the Portuguese Financial Crisis". *Oxford Bulletin of Economics and Statistics*, forthcoming (JEL Codes: D24, E32, L25, O47).

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Intergenerational wealth inequality: the role of demographics • 2020 • António R. Antunes, Valerio Ercolani

During the last three decades in the US, the older part of the population has become significantly richer, in contrast with the younger part, which has not. We show that demographics account for a significant part of this intergenerational wealth gap rise. In particular, we develop a general equilibrium model with an OLG structure which is able to mimic the wealth distribution of the household sector in the late 1980s, conditional on its age structure. Inputting the observed rise of life expectancy and the fall in population growth rate into the model generates an increase in wealth inequality across age groups which is between one third and one half of that actually observed. Furthermore, the demographic factors help explain the change of the wealth concentration conditional on the age structure; for example, they account for more than one third of the rise of the share of the elderly within the top 5% wealthiest households. Finally, consistent with a stronger life-cycle motive and an increase of the capital-labor ratio, the model produces an interest rate fall of 1 percentage point.

Measuring wage inequality under right censoring • 2020 • Paulo M.M. Rodrigues, Pedro Raposo, João Nicolau

In this paper we investigate potential changes which may have occurred over the last two decades in the probability mass of the right tail of the wage distribution, through the analysis of the corresponding tail index. In specific, a conditional tail index estimator is introduced which explicitly allows for right tail censoring (top-coding), which is a feature of the widely used current population survey (CPS), as well as of other surveys. Ignoring the top-coding may lead to inconsistent estimates of the tail index and to under or over statements of inequality and of its evolution over time. Thus, having a tail index estimator that explicitly accounts for this sample characteristic is of importance to better understand and compute the tail index dynamics in the censored right tail of the wage distribution. The contribution of this paper is threefold: i) we introduce a conditional tail index estimator that explicitly handles the top-coding problem, and evaluate its finite sample performance and compare it with competing methods; ii) we highlight that the factor values used to adjust the top-coded wage have changed over time and depend on the characteristics of individuals, occupations and industries, and propose suitable values; and iii) we provide an in-depth empirical analysis of the dynamics of the US wage distribution's right tail using the public-use CPS database from 1992 to 2017.

A non-hierarchical dynamic factor model for three-way data • **2020** • António Rua, Maximiano Pinheiro, Francisco Dias

Along with the advances of statistical data collection worldwide, dynamic factor models have gained prominence in economics and finance when dealing with data rich environments. Although factor models have been typically applied to two-dimensional data, three-way array data sets are becoming increasingly available. Motivated by the tensor decomposition literature, we propose a dynamic factor model for three-way data. We show that this modeling strategy is flexible while remaining quite parsimonious, in sharp contrast with previous approaches. We discuss identification and put forward a set of identifying restrictions that enhance the interpretation of the model. We propose an estimation procedure based on maximum likelihood using the Expectation-Conditional Maximization algorithm and assess the finite sample properties of the estimator through a Monte Carlo study. In the empirical application, we apply the model to inflation data for nineteen euro area countries and fifty-five products covering the last two decades.

The expected time to cross a threshold and its determinants: A simple and flexible framework • **2020** • Paulo M.M. Rodrigues, João Nicolau, Gabriel Zsurkis

In this paper we introduce a flexible framework to estimate the expected time (ET) an outcome variable takes to cross a threshold conditional on covariates. The proposed methodology makes use of the Markovian property and allows us to infer the impacts that covariates have on the ET an outcome variable takes to revert to a value of interest (for instance, its mean) given a specific starting point. An empirical application to the U.S. economy is provided, which investigates how the yield spread (YS) influences the ET the industrial production (IP) growth rate takes to return to its mean considering several initial values for the outcome variable. Our results suggest that the YS may have an important role in stimulating a faster return to desirable growth rates when the economy is in contraction or faces weak growth. Moreover, the YS also seems relevant in the presence of positive and high IP growth rates since a negative value of this variable may contribute for the IP growth rate to quickly return to below average values.

Forecasting tourism with targeted predictors in a data-rich environment • **2020** • António Rua, Carlos Melo Gouveia, Nuno Lourenço

Along with the deepening of globalization and economic integration, economic agents face the challenge on how to extract useful information from large panels of data for forecasting purposes. Herein, we lay out a modelling strategy to explore the predictive content of large datasets for tourism forecasting. In particular, we assess the role of multi-country datasets to nowcast and forecast tourism by resorting to factor models with targeted predictors to cope with such a data-rich environment. Drawing on business and consumer surveys for Portugal and its main tourism source markets, we document the usefulness of factor models to forecast tourism exports up to several months ahead. Moreover, we find that forecast performance is enhanced if predictors are chosen before factors are estimated.

Types of International Traders and the Network of Capital Participations • **2020** • João Amador, Sónia Cabral, Birgitte Ringstad

The landscape of international traders is quite diverse. Firms can operate as exporters and importers, and also along the goods and services dimensions. Some firms strongly engage in several of these international trade flows, some firms only participate in one of them, while for other firms trade flows are just a small share of turnover. In this paper we suggest a taxonomy that classifies international traders in terms of the complexity of their participation in international trade. In addition, we study the linkages between different types of traders and build the network of their capital participations. The paper concludes that more complex international traders tend to be larger, younger, more productive and pay higher wages. However, their profitability is not clearly different from that of other traders. Moreover, evidence on capital linkages between types of traders suggests that minor traders do not compensate their low engagement in foreign markets through strong capital participations with other types of traders. Conversely, complex traders present strong capital linkages, thus adding two layers of complexity. Moreover, for more complex traders, the existence of many external capital participations is associated with labour productivity gains.

Endogenous Growth and Monetary Policy: How Do Interest-Rate Feedback Rules Shape Nominal and Real Transitional Dynamics? • 2020 • Pedro Mazeda Gil, Gustavo Iglésias

Monetary authorities have followed interest-rate feedback rules in apparently different ways over time and across countries. The literature distinguishes, in particular, between active and passive monetary policies in this regard. We address the nominal and real transitional-dynamics implications of these different types of monetary policy, in the context of a monetary growth model of R&D and physical capital accumulation. In this setup, well-behaved transitional dynamics occurs under both active and passive monetary policies. We carry out our study from three perspectives: the convergence behaviour of catching-up economies; a structural monetary-policy shock (i.e., a change in the long-run inflation target); and real industrialpolicy shocks (i.e., a change in R&D subsidies or in manufacturing subsidies). We uncover a new channel through which institutional factors (the characteristics of the monetary-policy rule) influence the economies' convergence behaviour and through which monetary authorities may leverage (transitional) growth triggered by structural shocks.

Labor Earnings Dynamics in a Developing Economy with a Large Informal Sector • 2020 • Diego B. P. Gomes, Felipe S. Iachan, Cezar Santos

We study labor earnings dynamics in a developing economy with a large informal sector. We use nationally representative Brazilian panel data that cover both formal and informal workers. We document large disparities in earnings fluctuations faced by these segments of the labor market, as well as the high frequency of transitions between them. Informality is associated with more volatile earnings, while workers in the formal sector are subject to significant downside risk. Transitions between formal and informal employment bring large asymmetric earnings shocks and have a frequency that depends on age and the initial earnings level.

On-site inspecting zombie lending • 2020 • Diana Bonfim, Steven Ongena, Hans Degryse, Geraldo Cerqueiro

Banks may have incentives to continue lending to "zombie" firms in order to avoid or delay the recognition of credit losses. In spite of growing regulatory pressure, there is evidence that "zombie lending" remains widespread, even in developed countries. We exploit information on a unique series of authoritative on-site inspections of bank credit portfolios in Portugal to investigate how such inspections affect banks' future lending decisions. We find that following an inspection a bank becomes up to 9 percentage points less likely to refinance a firm with negative equity, implying a halving of the unconditional refinancing probability. Hence, banks structurally change their lending decisions following on-site inspections, suggesting that – even in the age of reg-tech – supervisory "reg-leg" can remain a potent tool to tackle zombie lending.

Tighter Credit and Consumer Bankruptcy Insurance • 2020 • António R. Antunes, Anne Villamil, Marcel Peruffo, Caterina Mendicino, Tiago Cavalcanti

How does bankruptcy protection affect household balance sheet adjustments and aggregate consumption when credit tightens? Using a tractable model of unsecured consumer credit we quantify the trade-off between the insurance and the creditworthiness effects of bankruptcy in response to tighter credit. We show that bankruptcy dampens the effect of tighter credit on aggregate consumption on impact. This is because it allows borrowers to sustain consumption against severe financial distress. However, by leading to consumers' exclusion from the credit market for a certain period, bankruptcy also reduces their ability to smooth consumption over time, implying a slower recovery. The bankruptcy code establishes how costly it is to default, and, thus, plays a crucial role in determining consumers' bankruptcy decisions and in shaping consumption dynamics. We quantify that the 2005 BAPCPA reform, by making filing for bankruptcy more costly, worsened the negative welfare effects of the subsequent credit tightening.

From the *Banco de Portugal Economic Studies*

Banco de Portugal Economic Studies aims to publish theoretical and applied studies prepared by economists at Banco de Portugal, often co-authored with external researchers. All articles are signed and are of the sole responsibility of their respective authors. The articles aim to contribute to an informed and high-quality debate on the Portuguese economy. The journal intends to be a reference publication in that debate, and is directed to a relatively specialized public on economic issues.

January 2020

A characterization of income and consumption inequality in Portugal • Nuno Alves, Fátima Cardoso, Nuno Monteiro.

Portuguese Household Finance and Consumption Survey: results for 2017 and comparison with the previous waves • Sónia Costa, Luísa Farinha, Luís Martins, Renata Mesquita.

Non-performing loans and bank lending: Evidence for Portugal • Carla Marques, Ricardo Martinho, Rui Silva.

April 2020

Exchange Rate Cooperation Agreement between Portugal and Cabo Verde: characterisation, developments and challenges after 20 years • Ana F. Correia, Vanda G. Cunha, Fernando Heitor, José R. Maria, Luís Saramago.

The granularity of Portuguese firm-level exports • Sónia Cabral, Carlos Melo Gouveia, Cristina Manteu.

The measurement of labour market slack: an empirical analysis for Portugal • Fernando Martins, Domingos Seward.

Economics synopsis **The sources of wage variability in Portugal: a binge reading survey** • Pedro Portugal.

Seminars

DEE regularly invites experts in various fields of economics to present their latest research. Banco de Portugal staff, as well as researchers from other central banks, Portuguese and foreign universities are invited to attend. The following is a list of the seminars that were organized during the last six months. See the seminars' webpage for a list of past and next seminars.

2020

Jan. 10 **The Great House Price Divergence: A Quantitative Investigation of House Price Fundamentals** • Markus Karlman • IIES - Institute for International Economic Studies

16 **Housing Booms and the U.S. Productivity Puzzle** • José Carreño • Northwestern University

17 **Fireside Chats: Communication and Consumer Expectations in the Great Depression** • Mathieu Pedemonte • University of California-Berkeley

22 **Trade, Misallocation, and Capital Market Integration** • László Tétényi • New York University

23 **Intangible Investment and Market Concentration** • Joshua Weiss • New York University

27 **The Real Effects of Bank Lending Cuts** • Juan Herreño • Columbia University

28 **The Financial Channels of Labor Rigidities: Evidence from Portugal** • Edoardo Acabbi • Harvard University

30 **Bank Competition, Cost of Credit and Economic Activity: Evidence from Brazil** • Gustavo Joaquim • Massachusetts Institute of Technology

31 **Compositional Nature of Firm Growth and Aggregate Fluctuations** • Vladimir Smirnyagin • University of Minnesota

Feb. 3 **The Effects of Public Procurement on Medicine Supply** • Javier Brugues • UCL – London

4 **Who should bear the risk of economic growth?** • Carlos Eugénio da Costa • EPGE/FGV

5 **Job Ladder and Business Cycles** • Felipe Alves • New York University

6 **Monetary Policy and the Mortgage Market** • Karin Kinnerud • IIES - Institute for International Economic Studies

7 **Homeownership and Portfolio Choice over the Generations** • Gonzalo Paz-Pardo • UCL – London

19 **Monetary Policy and Intangible Investment** • Lev Ratnovski • European Central Bank

Mar. 3 **Are CEOs paid extra for riskier pay packages?** • Rui Albuquerque • Boston College

4 **Aggregate Dynamics in Lumpy Economies** • Isaac Baley Gaytán • Universitat Pompeu Fabra – Barcelona

May 8 **The Macroeconomics of Testing and Quarantining** • Sergio Rebelo • Northwestern University

22 **Fiscal Policy during a Pandemic** • Miguel Faria e Castro • Federal Reserve Bank of St. Louis

27 **Risk-Adjusted Capital Allocation and Misallocation** • Joel David • Federal Reserve Bank of Chicago

Jun. 17 **Not-Parametric Gravity: Measuring the Aggregate Implications of Firm Heterogeneity** • Costas Arkolakis • Yale University

24 **Did the Paycheck Protection Program Hit the Target?** • João Granja • Chicago Booth

30 **What explains the crash of bank stock prices during COVID-19? The role of health, financial and oil price risks** • Sascha Steffen • Frankfurt School of Finance & Management

Summary of Covid-19 seminars

During the last few months, the Economics and Research Department of Banco de Portugal organized a series of seminars in which different researchers presented their papers that studied different ways in which the Covid pandemic affected the economy and how policy can help. In what follows, we provide a summary of these presentations:

2020

May 7 | Paper: "An economic model of the Covid-19 epidemic: The importance of testing and age-specific policies" (with L. Brotherhood, P. Kircher and M. Tertilt) • Cezar Santos • Banco de Portugal

Cezar Santos presented a paper that investigates the role of testing and age-composition in the Covid-19 epidemic. It augments an SIR epidemiological model with individual choices regarding how much time to spend working and consuming outside the house, both of which increase the risk of transmission. Individuals are unsure whether they caught Covid. Testing reduces the time of uncertainty. Younger people are less likely to die, exacerbating their willingness to take risks and to impose externalities on the old. The paper explores heterogeneous policy responses in terms of testing, confinements, and selective mixing by age group.

May 8 | Paper: "The Macroeconomics of Testing and Quarantining" (with M. Eichenbaum and M. Trabandt) • Sergio Rebelo • Northwestern University

Sergio Rebelo considered an environment in which people are uncertain about their health status. Their work studies the impact of testing with and without quarantining infected people. He finds that testing without quarantines can worsen the economic and health repercussions of an epidemic. In contrast, a policy that uses tests to quarantine infected people has very large social benefits.

May 22 | Paper: "Fiscal Policy during a Pandemic" • Miguel Faria-e-Castro • Federal Reserve Bank of St. Louis

Miguel Faria-e-Castro presented a paper that studies the effects of the 2019-20 coronavirus outbreak in the United States and subsequent fiscal policy response in a nonlinear DSGE model. He used a calibrated version of the model to analyze different types of fiscal policies. He showed that UI benefits are the most effective tool to stabilize income for borrowers, who are the hardest hit, while savers may favor unconditional transfers. Liquidity assistance programs are effective if the policy objective is to stabilize employment in the affected sector.

June 24 | Paper: "Did the Paycheck Protection Program Hit the Target?" (with Christos Makridis, Constantine Yannelis, and Eric Zwick) • João Granja • Chicago Booth

João Granja presented a paper on the Paycheck Protection Program (PPP), a large and novel small business support program that was part of the initial policy response to the COVID-19 pandemic in the US. He does not find evidence that funds flowed to areas more adversely affected by the economic effects of the pandemic, as measured by declines in hours worked or business shutdowns. He also finds significant heterogeneity across banks in terms of access to these funds, which is not explained solely by loan demand. Firms seem to have used the first round funds to build up savings and meet loan and other commitments.

June 30 | Paper: "What explains the crash of bank stock prices during COVID-19? The role of health, financial and oil price risks" (with Viral V Acharya and Rob Engle) • Sascha Steffen • Frankfurt School of Finance & Management

Sascha Steffen presented a paper on the reaction of bank stock prices to the COVID-19 pandemic. He documents a rapid and persistent market value decline of US bank equity. Market participants episodically price balance sheet liquidity of banks, as they did during the global financial crisis. This reflects the draw-down of pre-arranged lines of credit by firms, which ignites liquidity risk for banks. Bank stock returns also co-move heavily with bank-level loan exposure to other sectors with significant under-performance (oil, retail). These results may have important implications for the design of stress-tests.

July 2 | Paper: "Epidemics in the Neoclassical and New Keynesian Models" (with S. Rebelo and Matthias Trabandt) • Martin Eichenbaum • Northwestern University

Martin Eichenbaum analyzed the effects of an epidemic in three standard macroeconomic models. He showed that the neoclassical model does not rationalize the positive comovement of consumption and investment observed in recessions associated with an epidemic. He argued that Introducing monopolistic competition into the neoclassical model remedies this shortcoming even when prices are completely flexible. Finally, sticky prices lead to a larger recession but do not fundamentally alter the predictions of the monopolistic competition model.

By Cezar Santos

Meet our researchers

In this issue we present two members of our research staff.

Paulo Guimarães is currently responsible for the Banco de Portugal Microdata Research Laboratory. He holds an undergraduate degree in Economics (1986) from Faculdade de Economia do Porto (FEP) and a Phd in Economics (1992) from the University of South Carolina. Prior to joining the Bank in 2014 he taught statistics and econometrics in several universities both in Portugal and abroad. He published in a wide range of journals, including the *Review of Economics and Statistics*, the *Journal of Industrial Economics*, the *Journal of Urban Economics*, the *Journal of Economic Geography*, and the *American Economic Journal: Macroeconomics*. He is currently an invited full professor at FEP.

Please, tell us about the research you are carrying on at DEE

I am an applied microeconometrician with a keen interest on the practical questions that arise from the empirical analysis of large data sets, and on the exploration and development of tools that can help with that process. In particular, I maintain an interest in the development of techniques and algorithms for estimation of regression models with high-dimensional fixed effects. This is a line of work that was initiated several years ago jointly with Pedro Portugal, and that has allowed us to develop and explore increasingly sophisticated regression models that account for multiple sources of unobserved heterogeneity. At the moment our efforts are centered on the development of wage regression models with high-dimensional fixed effects that also account for peer effects. While most of the work with Pedro translates into empirical applications in the labour market I also maintain an interest in applications to other areas. The most relevant is the study of the impact that the spatial agglomeration of economic activity has on firm behaviour, namely on productivity, as well as on the entry, exit, and location decision of firms."

Paulo Rodrigues is principal research economist at the Department of Economic Studies (DEE) of the Banco de Portugal and full professor (adjunct) at Nova School of Business and Economics. Paulo joined the Banco de Portugal in 2008. He holds a PhD in Econometrics (1998) from the School of Economic Studies of the University of Manchester, UK. He was a Jean Monnet Fellow at the European University Institute in Florence, and a visiting professor at universities in Europe and Canada. His research interests include time-series econometrics, macroeconometrics, financial econometrics, panel data econometrics as well as empirical economics and finance. He has published a number of peer-reviewed articles in several internationally renowned scientific journals, including the *Review of Economics and Statistics, Journal of Econometrics, Econometric Theory, Econometrics Reviews, Journal of Financial Econometrics, Econometrics Journal, Oxford Bulletin of Economics and Statistics, Journal of Empirical Finance* and the *International Journal of Forecasting*. He is also an external fellow of the Essex Centre for Financial Econometrics, University of Essex, UK and of the Clive Granger Centre for Time Series Analysis, University of Nottingham, UK.

Please, tell us about the research you are carrying on at DEE

My research has over the years focused on theoretical as well as applied econometric topics relevant to the areas of economics and finance. Theoretical contributions have included the development of new estimation methods, new testing procedures and forecasting approaches with the aim to facilitate and promote sound empirical research in economics and finance. More applied work has centered on modelling and forecasting real estate prices, tourism demand, asset prices, financial markets volatility, tail risk behavior, firm survival, wage inequality and wage persistence.

Recent research interests include, predictability methods, the development of bootstrap methods, extreme value theory and related econometric methods, machine learning methods and applications to economics and finance, big data, and high-dimensional fixed effects dynamic panel data models and associated econometric and computational issues.

I am grateful to my colleagues at DEE for the friendly and highly stimulating research environment, and intense exchange and discussion of ideas. Several research studies have resulted from collaborative work carried out in the department as well as with other national and international co-authors

Visiting fellows 2020

Banco de Portugal offers cash grants to support research projects in the field of Economics, with a view to promoting interchange between the scientific and academic communities and the Bank, and to contributing towards the improvement of theoretical and applied research in Portugal.

Applicants wishing to develop research projects in the Economics and Research Department must hold a Doctorate degree or be about to finalise their Doctorate degree. Preferred topics include monetary and labour economics, financial intermediation, banking, and studies on the Portuguese economy.

Application instructions are available. Applications are invited from all interested parties

Further information may be obtained via email: conferences@bportugal.pt.

Visitors

Jan. 6 – Jun. 6 • Ana Isabel Sá • University of Porto

Jan. 20 – Feb. 7 • Carlos Eugénio Costa • FGV EPGE Brazilian School of Economics and Finance

Consultants

Miguel Portela • University of Minho

Upcoming events and announcements

All events will be held virtually until further notice.

Seminars 2020

Jul. 8 Manuel Adelino • Duke University
20 David Baqaee • UCLA
22 Chad Jones • Stanford University
Sep. 11 Enrique Sentana • CEMFI
16 Ralf Meisenzahl • Chicago FED
23 Ben Moll • London School of Economics
Oct. 22 Christa Bouwman • Mays Business School at Texas A&M University
14 Christian Moser • Columbia Business School
21 Hugo Hopenhayn • UCLA
28 Erik Hurst • Chicago Booth
Nov. 4 Andrés Rodríguez-Clare • University of California, Berkeley
11 Aysegul Sahin • University of Texas
18 Arnaud Costinot • MIT
25 Francisco (Paco) Buera • Washington University at St. Louis
Dec. 2 Oleg Itskhoki • Princeton University

Courses 2020

Sep. 7-10 **Structural Estimation in Corporate Finance** • Toni Whited • University of Michigan
Oct. 7-9 **The Macroeconomics of Market Power** • Jan Eeckhout • UPF Barcelona, ICREA and GSE

Conferences 2020

Nov. 16 **10th Banco de Portugal Conference on Portuguese Economic Development in the European Area**
Dec. **4th BPLIM Conference**

Correspondence to the editor

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This newsletter, as well as other online information about Economic Research at Banco de Portugal is available here.

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