

## EDITORIAL

### ***FINANCE AND LONG-TERM GROWTH: ECONOMIC MODELLING AND EVIDENCE***

***Forthcoming in the Journal of Economic Behavior & Organization (JEBO)***

#### **1. INTRODUCTION**

The degree to which modern economics has taken into formal account the role of finance (*e.g.*, banks and other financial institutions) within theoretical models, empirical applications, and policy-oriented research has been greatly fluctuating in the last few decades. The interest in the topic was very high in the 1980s, then it sharply declined (especially in the 1990's, mainly due to the advent of real-business-cycles models) until the onset of the Great Financial Crisis of 2007-2009 when the fascination with the macroeconomic impact of finance has started increasing again. Indeed, the 2007's financial downturn led to losses for several markets, to the bankruptcy of different banks, financial institutions and investors, and to a related general economic recession. Consequently, governments, central banks, and policy-makers implemented a range of actions aimed to reduce the impact of the crisis and overhaul the financial system. These different actions ultimately affected not only the financial markets but also the real economy as a whole.

Now that the worst seems to be globally almost over, it is reasonable to conclude that the recent worldwide financial crisis has radically changed the way in which growth theorists, applied economists, and policy-makers usually think not only about the possible sources of long-term economic growth, but also about the potential implications of finance on economic growth, per-capita living standards, income distribution, the allocation of available resources, and ultimately on the importance of public intervention.

In order to gain a better understanding on these issues, in particular on the new role played by finance and financial institutions in the real economy following the Great Financial Crisis of 2007-2009, the Department of Economics, Management and Quantitative Methods at the University of Milan (Italy) decided to host in 2017 a three-days academic conference on "*Finance and Economic Growth in the Aftermath of the Crisis*". This conference gathered a huge number (close to one-hundred) of economists from all over the world who presented papers having as the main objective to re-examine the effects of finance on the real side of the economy and to discuss how finance (in a broad sense) could have shaped the sources of sustainable economic growth in the near future. Another theme of the conference was the analysis of which public policy could have actually been adopted by governments and policy-makers in order to achieve, along with a higher rate of per-capita output growth, also such goals as a more stable financial system and a more equitable income distribution. The conference took place on September 11-12-13, was open to different methodologies and approaches (*i.e.*, either theoretical/empirical, mainstream/non-mainstream, aggregative/agent-based research was presented), and saw the two of us serving as members of a (larger) scientific committee including also Costas Azariadis (Washington University, St. Louis, USA), Guido Cozzi (University of St. Gallen, Switzerland), Herbert Dawid (University of Bielefeld, Germany), Domenico Delli Gatti (University of the Sacred Heart, Italy), Mauro Gallegati (Polytechnic University of Ancona), and Stefano Neri (Bank of Italy).

The *Journal of Economic Behavior & Organization* had, in the meantime, generously agreed to publish those papers that survived its usual, rigorous editorial review process as part of this special issue. The contributions contained in this special issue are, therefore, among the latest efforts to begin evaluating the overall bearing of the recent theoretical and empirical debate on the long-run

connections between finance and economic growth and on the changing role that, due to the recent Great Financial Crisis, the new and old sources of economic development (such as, among others, R&D and innovation; the presence of financial networks, and the degree of financial development; the environment; and the governments' distribution policies) may have on future growth prospects worldwide.

The next section presents a broad overview of the different contributions of this special issue.

## 2. PRESENTATION OF THE CONTRIBUTIONS

In the first paper, titled “*The natural rate of interest and the financial cycle*”, Georgi Krustev explores how financial imbalances affect the natural rate of interest. He employs an extended version of the model by Laubach and Williams (2003) in which the financial cycle –arguably an omitted variable from the system– plays an explicit role in the joint estimation of the natural rates of interest, unemployment and output, and the sustainable growth rate of the US economy. By incorporating financial information, the natural rate of interest is modelled as a function of sustainable (“finance-neutral”) output growth. This allows the author to distinguish low-frequency movements in the trend component of the natural rate of interest from temporary deviations at higher frequencies due to financial headwinds and tailwinds. While the estimates confirm the sustained decline in the natural rate in recent decades, another finding of the paper is also that the global financial crisis and persistent deleveraging have temporarily lowered the natural rate of interest by around one percentage point below its long-run trend. This has likely impaired the effectiveness of interest rate cuts to stimulate the economy and lift inflation back to target immediately after the Global Financial Crisis. The dissipation of financial headwinds since around 2015 implies that monetary policy should have regained traction thereafter, as the natural rate of interest rebounded, aligning itself to its long-run component. By incorporating the financial cycle, the model also delivers more plausible business cycle dynamics. The evidence supports the argument that the omission of financial imbalances may lead to biases in the estimation of both the natural rate of interest and the potential output growth rate.

The second paper (by Alberto Bucci, Davide La Torre, Danilo Liuzzi and Simone Marsiglio) sheds light on the mechanisms through which a financial crisis can give rise to an economic crisis and how this, in turn, may feed into the financial crisis itself. In more detail, the authors rely on an epidemiological approach to study how the exchange of assets across banks may determine the health status of the overall financial system which, in turn, affects the level of productivity of the real economy. Since the level of real activity shapes the number of assets mutually exchanged across banks, the financial and economic sides of the economy are ultimately related to each other. Unlike most of the extant literature (that mainly focuses on issues related to risk-transmission between financial intermediaries and within the financial system, eventually accounting for the transmission of risk also across national borders), the authors analyze: (i) The implications of contagion (within the financial system) for the real side of the economy, and (ii) How economic activities may, in turn, contribute to further exacerbate financial contagion. Their model allows for two different equilibria. In the non-speculative equilibrium, the level of per capita income is maximal, while in the speculative equilibrium it is reduced by financial contagion. It is also showed that the convergence to the speculative equilibrium may give rise to economic fluctuations even in absence of random shocks. Finally, by allowing for a spatial dimension, the authors provide an intuitive explanation of why the recent financial crisis has rapidly become a global phenomenon, and of why in this case policy coordination across regions/countries is realistically needed.

The aim of the paper by Patrizio Morganti and Giuseppe Garofalo is to check the robustness of the law-finance-growth nexus taking into account: (i) The experience coming from the recent great recession; (ii) The recent economic literature showing that financial structure does matter for growth, (iii) The role of shadow-banking in altering the financial system. To do this, the authors conduct cross-sectional and panel econometric analyses on a sample of 62 countries over the period 1980-2016. The cross-country exercise captures long-term relationships among variables, while the panel exercise (by using data averaged over non-overlapping and overlapping 5-year windows and including country and time-fixed effects) captures cyclical movements in GDP. The starting point of their analysis is represented by the works by Levine (2002) and Beck *et al.* (2014; 2016). Contrary to the traditional literature, the authors find that both financial structure and development affect growth. Their single effect is positive, while their joint effect is: (i) Positive for financial development and bank-oriented structures, when focusing on cross-country variations, (ii) Positive for market-oriented structures and negative for financial development, when considering panel data. These outcomes do support the recent evidence that, as economies develop, the services offered by securities markets become more important for economic activity than those offered by banks. Another result of the paper is the robust evidence of a positive relationship between growth and shadow-banking during 2002-2016, which supports the idea that the latter complements traditional banking and affects the real economy.

The idea that policy-makers and researchers should approach systemic risk from a network perspective motivates the article by Tae-Sub Yun, Deokjong Jeong, and Sunyoung Park, which examines whether existing systemic risk measures reflect network structure well. In more detail, the authors, using simulation and real market data, analyze what kind of information (*e.g.*, financial institutions' size, leverage, or network structure) is significantly associated with existing systemic risk. The simulation model used in their paper is similar to a stress test. The objective of existing stress tests is to test the fragility of the entire financial system or individual financial institutions by imposing fierce financial conditions. The article shows that existing systemic risk measures do not fully reflect network information. Accordingly, the authors suggest a new systemic risk measure which is able to go beyond the limits of existing measures. In their view, the proposed measure can be a good complementary tool for monitoring systemic risk from a network perspective.

The paper by Andreas Samatas, Michalis Makrominas, and Andrea Moro looks at the European financial crisis of 2008 from the point of view of the effects of the allocation of credit to specific categories of borrowers. The authors investigate the link among finance, capital formation, and growth, and illustrate the mechanisms behind the decoupling of GDP growth from household income growth. Their article uses GMM regressions on EU26 during the period 1995-2008. It is found that excessive households' leverage through mortgage lending exerted a sort of "crowding-out" effect on the availability of credit to support innovation and productive investment. This crowding out effect ultimately translated into a GDP growth that was uncoupled from real household income. The authors argue that while finance in the form of lending to households may initially boost aggregate demand and consumption, when it is not allocated to support capital formation it does not find its way back into households as income through the production cycle. The allocation of more credit to households' mortgages and away from corporate projects is consistent with rational behavior since the former have lower risk and incur lower monitoring costs than the latter. However, even if this strategy minimizes short-term risk for each individual bank, nevertheless it generates a long-term systemic risk by not letting credit assume its economic function of stimulus to productive investments. The results of this article suggest that policy-makers should be concerned about how banks' investment strategies (towards households/firms) impact on economic growth at a systemic level.

Franz X. Hof and Klaus Prettnner augment the R&D-based economic growth model of Romer (1990) by introducing a wealth-based status motive in the household's utility function. In so doing, they distinguish between different types of assets that households can accumulate and explicitly take into account the fact that these assets may differ in their status-relevance to the representative household. This approach is motivated by the evidence (taken from the psychological and economics literatures) showing that the wealth of households has a crucial effect on their status perception and that the degree of status-gratification that households derive from different forms of assets varies substantially. The authors show that in such an augmented R&D-based growth model the status-relevance of shares issued by entrants into the intermediate goods producing sector is of crucial importance for long-run economic growth: an increase in the intensity of the quest for status raises the steady-state economic growth rate only if the status-related extra return of investing in shares is strictly positive. Moreover, for a given degree of status-consciousness of the representative household, the long-run economic growth rate depends positively on the relative status-relevance of shares issued by entrants versus the status-relevance of investments made in physical capital. Finally, the authors also show that –as long as shares are status-relevant– an increase in the status-consciousness of households impacts on the inefficiency of the decentralized balanced growth path. Overall, the framework built by Hof and Prettnner has the potential to explain why countries in which shares are a more popular saving vehicle tend to grow faster.

The paper by Alessia Lo Turco, Daniela Maggioni and Alberto Zazzaro investigates, in a long-run perspective, whether and to what extent the impact of financial development on the growth rate of a given industry is amplified by input-output (IO) linkages connecting that industry to other industries which are in need of external finance. If financial development is expected to promote disproportionately more the growth of industrial sectors that are more in need of external finance, it also favors more the industries that are linked by IO relations to more financially dependent industries. In order to assess such kind of relationship, the authors extend the empirical country-sector growth model proposed by Rajan and Zingales (1998) through including the interaction of upstream and downstream sectors' financial dependence with countries' financial development. In a cross-section of countries at different development stages, observed in the time span 1995-2007, the paper replicates Rajan and Zingales's (1998) original findings and it further shows that the development of domestic financial markets favors disproportionately more the growth of sectors whose upstream providers are more dependent on external finance. On the contrary, there is no evidence of significant effects through the downstream linkages. The beneficial indirect effect of financial development propagating from upstream input providers is higher in magnitude than the direct effect mediated by sectors' own financial dependence. Therefore, this paper highlights that neglecting the role of the propagation effects of finance, so as triggered by IO linkages, delivers a biased view on the role of finance for growth.

Gabriele Tedeschi, Maria Cristina Recchioni and Simone Berardi study how banks' behavior influences financial cycles by assessing the ability of a calibrated agent-based model to describe agents' strategic behavior through the value of the estimated parameters. Based on the Brock and Hommes (1997) model, they calibrate parameters on daily data for three bank indices – S&P 500 SmallCap 600, STOXX Europe 600 Banks and STOXX Asia/Pacific 600 Banks –, running from 1994 to 2016. They find some similarities among the three areas as all three markets are characterized by the predominance of trend-follower behavior, and high values of risk aversion support the existence of a strong instability in the time series investigated. Some relevant differences also emerge, given that financial instability affected more Western countries; moreover, the parameters of these countries show volatility clustering, indicating long transition periods between frenzied and calm times. As for banks' behavior, the authors observed a decline in the

power of the chartist strategy during crises, suggesting that prolonged financial tensions induce banks not to rely on information on past prices. Moreover, they observed the emergence of switching behaviors during pre/post periods of financial instability. On the one hand, the paper confirms that fundamentalists work as a thermostat of the system, by realigning prices to the fundamental price. On the other hand, the paper finds that chartists not only generate asset bubbles, but also herald their arrival; indeed, large aggregate fluctuations in the indices' time series are preceded by an increase in the number of trend-followers.

Andrea Boitani and Chiara Punzo present a NK-DSGE two-agent model with savers and capitalists (where the former class is more risk averse than the latter). In line with the literature following Adrian and Shin (2010), the leverage of banks turns out to be procyclical after an exogenous negative shock hits the value of banks assets. The paper focuses on the distributive effects between savers and capitalists which are endogenously determined by leverage procyclicality after a shock. Based on a measure given by the ratio between the consumption of savers and that of capitalists, they find that the distributive effect is always non-favorable to savers and long lasting. In particular, the unfavorable distributive effect on savers is greater when capitalists are more risk averse. This has consequences for macroprudential policy, as lower regulatory requirements amplify the negative effect. Therefore, stricter regulatory requirements unambiguously favor savers. At the same time, stricter or more conservative monetary policy rules adopted by the central bank (for instance, a tougher inflation targeting) appear to penalize more savers than softer rules (such as the Taylor rule). Moreover, the paper suggests that softer monetary rules and stricter regulatory rules are complementary, given that they reinforce one another in stabilizing the economy and mitigating the distributive effects of negative financial shocks.

The paper by Giovanni Dosi, Marcelo C. Pereira, Andrea Roventini and Maria Enrica Virgillito aims at assessing whether supply-side labor market policies are enough in order to get an economy out of a big recession. They propose a set of labor market and fiscal policy experiments in an agent-based macroeconomic model and study the different effects of supply-side active labor market policies (ALMPs) vs. demand-management, passive labor market policies (PLMPs). Two alternative institutional settings, a Fordist and a post-Fordist regime, are considered to capture the historical transition from the post-WWII toward the post Thatcher-Reagan period. The paper analyzes the effects of ALMPs aimed at promoting job search and at providing training to unemployed people. Then, these policies are compared with unemployment benefits by implementing fiscal rules for the public budget in line with the European Stability and Growth Pact. The authors maintain that an appropriate level of skills is not enough to sustain growth when workers face adverse labor demand conditions; supply-side policies are not able to reverse the negative interaction between flexibility and austerity; PLMPs outperform ALMPs in reducing unemployment and workers' skill deterioration; and demand-management policies are better suited to mitigate inequality and to sustain long-run growth. The paper then debunks the discourse advocating the combination of flexible labor markets, active labor market policies (ALMPs), and austerity rules as a potentially virtuous way out from deep crises, such as the Great Recession.

The Eurozone crisis has revitalized the debate between economists on the role played by wages in open economies. The paper by Alessandro Caiani, Ermanno Catullo and Mauro Gallegati contributes to this debate by evaluating the effects of alternative wage growth regimes on the macroeconomic performance of different countries. Based on an agent-based stock-flow consistent (AB-SFC) macroeconomic model, the authors investigate how wage growth patterns impact on the economic dynamics of a 'monetary union'. Simulation results suggest that changes in the wage growth pattern not only impact on the demand, but also produce non-trivial effects on the supply

side of the economy. In particular, scenarios more favorable to the growth of wages seem to reinforce the Schumpeterian process of firms' selection, pushing marginal firms out of the market and favoring the growth of more productive ones. This, in turn, produces positive effects on the allocation of R&D investment and firms' innovative performance, thereby fostering a faster growth of labor productivity. On the contrary, wage moderation scenarios allow less productive firms to survive, leading to market structure characterized by higher number of firms having smaller dimension, thereby causing a more dispersed and less effective allocation of R&D efforts. Accordingly, the paper suggests that deregulation aiming to dampen wage growth and to increase wage flexibility may be advantageous in the short run but is detrimental from a Schumpeterian perspective, as it discourages R&D in product and process innovation, allowing less innovative firms to survive by exploiting the lower labor costs. These results seem to make a case for a coordinated policy of wage increases across core and peripheral country as a possible way out of the recession which hit European economies after the global financial turmoil and the Euro crisis.

Paola D'Orazio and Marco Valente propose an agent-based computational approach to analyze the diffusion of green finance by focusing on the positive role that a state investment bank (SIB) can play in this respect. The paper analyzes the effects of different types of banks' willingness to lend on the environmental quality diffusion and on the contribution of different types of finance to GDP. Simulation results show how both the level of aggregate green quality and the green propensity to innovate are higher when a SIB is in action. Moreover, the highest levels of green quality are achieved when the presence of the SIB is coupled with strong consumers' preferences oriented towards environmental quality. Therefore, the paper suggests a potentially crucial role for public investments banks in improving the functioning of the financial system (especially during crises) and sustaining economic resilience by filling the so-called 'green financial gap'. According to the authors, more efforts should be put forward by governments to create, or improve, public financial institutions in order to deliver the adequate financial resources to tackle climate change.

Clearly, many more years of work will be required to address in a more exhaustive way all of the issues raised in this special issue of the JEBO, and briefly outlined above. For sure, all the contributors to this special issue have taken interesting and important steps towards this important objective.

This special issue was made possible thanks to the support of many. In particular we are grateful to Elsevier, JEBO, and especially JEBO Co-Editor-in-Chief Daniel Houser, for the support, suggestions, and encouragement provided throughout the process of creation of this special issue. We thank all authors for their valuable contributions to both the conference and this special issue, as well as all the anonymous referees for their precious comments that improved the quality of the papers included in this volume and aided in the journal's rigorous review process.

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