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Financialization and the macroeconomy. Theory and empirical evidence

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Abstract

This paper sheds light on the macroeconomic impact of banking financialization. We develop a new stock-flow consistent model, which reveals that excessive leverage increases financial fragility, lowers wages, and slows down real sector investment and GDP growth. Using a panel of 29 high income countries, we then construct indicators of banking financialization and investigate the impact of the latter on the wage share, gross capital formation and GDP growth, using a Bayesian structural VAR framework, as well as a set of fixed effect regressions. Our results highlight that financialization has had a detrimental impact on real sector growth. Finally, we discuss the implications of our results to propose reforms to the international financial system.

Keywords: Stock-Flow Consistent model, International finance, Bayesian SVAR, Financialization, Economic growth.

JEL classification: F65, G18, G28

Note: the authors would like to thank Marc Lavoie, Jacques Mazier as well as three anonymous referees for their useful comments on this paper. Any remaining errors are of course the authors' sole responsibility.

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Abstract

This paper sheds light on the macroeconomic impact of financialization in the banking sector. We develop a new stock-flow consistent model, which reveals that excessive leverage increases financial fragility, lowers wages, and slows down real sector investment and GDP growth. Using a panel of 29 high income countries, we then construct indicators of banking financialization and investigate the impact of the latter on the wage share, gross capital formation and GDP growth, using a Bayesian structural VAR framework, as well as a set of fixed effect regressions. Our results highlight that financialization has had a detrimental impact on real sector growth. Finally, we discuss the implications of our results to propose reforms to the international financial system.

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1. Introduction

Financialization is an interdisciplinary concept used to analyze the rising influence of financial markets, financial actors, financial narratives in the functioning of economies and societies (Langley (2008); Epstein (2005); Blackburn (2006); Orhangazi (2008); Willmott (2010); Aalbers and Castree (2015); Sokol (2015); Lysandrou (2016)). Within the field of macroeconomics, financialization is usually defined as "a pattern of accumulation in which profit making occurs increasingly through financial channels rather than through trade and commodity production" (Epstein (2005)). Previous work has analyzed this trend as a switch from the 'Fordist' accumulation regime to the "Finance-led" accumulation regime, characterized by lower economic growth and higher systemic fragility (Aglietta (1979); Aglietta (2000); Aglietta (2016); Boyer (2000); Boyer (2005); Boyer (2010)). Several recent empirical studies also indicate that unfettered financial development can be detrimental to real sector investment and economic growth given that the relationship uniting financial sector development and economic growth takes the form of an inverted U-shaped relationship (Rousseau and Wachtel (2011); Arcand et al. (2012); Ductor and Grechyna (2013); Manganelli and Popov (2013)). Indeed, larger financial sectors tend to experience deeper and more frequent financial crises, which are in turn associated with recessions (Reinhart and Rogoff (2009); Alessi and Detken (2014)). The increased complexity of the financial landscape also renders prudential regulation and policy response less effective, which increases moral hazard and systemic vulnerability (Buttiglione et al. (2014)). Finally, excessive financial development leads to the misallocation of human and capital resources, which hinders the growth of factor productivity (Cecchetti and Kharroubi (2012); Borio et al. (2016))¹.

The finance literature on financialization can itself be divided in two categories. International finance research has shown that financialization is associated with a profound change in the organization of the global banking sector in recent years, with three particular trends standing out (Lagoarde-Segot (2016)). *First*, banks have, over the last two decades abandoned their former 'credit culture' to adopt a 'shareholder value creation' culture instead. One important aspect of this process was the global adoption of a 'universal banking model' consisting in the merging of commercial banking with investment banking branches. *Second*,

¹ For instance, Borio et al. (2016) define the 'allocation component' of productivity as the covariance across sectors between the growth rate of sector-level employment shares and a term measuring whether labor is reallocated towards high or low productivity growth sectors. Their estimates, conducted in a sample of 21 countries in the 1979-2009 period, show that growth in the private credit to GDP ratio are associated with labor shifts to lower productivity sectors.

the rapid development of financial innovations has tremendously enhanced the complexity of credit intermediation schemes. Banks now typically rely on securitization techniques to transform illiquid assets into cash or highly liquid securities (which typically include cash, trading securities, available for sale securities, and unearned income from securities) and use the latter as collateral to obtain short-term wholesale funding, which is then reinvested in risky projects. This strategy, which relies on the massive development of shadow banking entities², enables banks to restructure their balance sheets, by transferring default risks to outside investors while maximizing short term shareholder returns (Altunbas et al. (2009)). *Third*, a sharp intensification of the mergers and acquisitions activity in global banking was observed, and a set of financial institutions have been formally identified as 'systematically important' due to their global size, complexity and interconnectedness (Board (2014)). According to the European Systemic Risk Board (Pagano et al. (2014)), the near-doubling in the size of the EU and US banking systems between 1996 and 2012 was indeed entirely attributable to the growth of the 20 largest banks. Such concentration went along with increased systematic risk - as exemplified by the increased correlations and probability for joint extremes documented in commodity futures studies (Paraschiv et.al, 2015) - and poses important challenges to macro-prudential regulation.

On the other hand, corporate finance research has shown that financialization has modified corporate behavior. Four main conclusions stand out in this branch of the literature. *First*, non-financial corporations have increasingly relied on global financial markets to access capital. This new behavior has induced a massive increase in stock, bonds, and hybrid financial assets combining the characteristics of debt and equity (such as convertible bonds, hybrid bonds and mezzanine finance). In the Eurozone only, the volume of financial instruments issued was multiplied by 30 between 2003 and 2015, where it ranged from 1 billion to 30 billion euros (Capital (2015)). *Second*, the development of an active market for corporate control and the adoption of fair-value reporting have blended the spheres of cash earnings and wealth accumulation in corporate sector's accounts (Gleadle et al. (2014)). For instance, a study published by Reuters (Brettel et al. (2015)) indicates that the dividends and buyback to net income ratio has increased steadily over recent years, reaching 116% in 2015 in a sample of 3,297 publicly traded non-financial US corporations. *Third*, there is increasing evidence of a disconnection between CEO compensation and performance. This feature

² Shadow banking represented 75 trillion dollars and accounted for 25% of global financial assets in 2014 Board (2014).

indicates a rent extraction behavior of senior executives which has been modeled through bargaining effects (Frydman and Jenter (2010); Piketty et al. (2014)). Such theoretical models are confirmed by empirical findings. For instance Lazonick (2013) highlighted a perfect negative correlation between financial and non-financial equity issues in the US, and a widespread use of levered stock buybacks to sustain the growth of earnings per share and senior management remuneration. *Fourth*, several case studies have underlined that the adoption of the shareholder value principle of corporate governance was detrimental to real investment in different national contexts (Froud et al. (2000); Jürgens et al. (2000); Lazonick (2013); Lazonick and O'Sullivan (2000); Morin (2000); Williams (2000), Brettel et al. (2015)).

The main contribution of this paper is to gather these different branches of the literature in a single theoretical framework, which we back up by several empirical estimations. Our objective is to highlight the impact of the recent dramatic changes observed in the structure of the financial and banking sector of OECD countries on macroeconomic growth and investment. At the theoretical level, we develop a new stock-flow consistent (SFC) model showing that the new structure of the financial system enhances systemic fragility. In recent years, Dynamic Stochastic General Equilibrium (DSGE henceforth) models have indeed come under harsh criticism³. Stock-flow consistent models (SFC henceforth) provide a useful alternative⁴ as they are based on existing macroeconomic aggregates that can be measured and ultimately be brought to actual data⁵. These models have recently gained popularity given their logical and accounting structure that can be further extended in empirical models that deal with a wide range of topics, without relying on overly simplistic assumptions. One of the contributions of this paper is therefore to provide support for this ongoing research program⁶ by focusing on the transmission mechanisms from the financial

³ For instance, Juselius and Franchi (2007), Chari et al. (2009), Dullien (2012) and more recently Blanchard et al. (2016) show the limitations and lack of realism of these micro-founded empirical models. One issue is that "(a)ggregate demand is derived as consumption demand by infinitely lived and foresighted consumers. Its implications (...) are strongly at odds with the empirical evidence" (Blanchard et al. (2016)). Another issue with DSGE models is that they do not take into account the financial sector (Garcia (2011)).

⁴ DSGE models are based on reduced-form estimations stemming from a restricted VAR, usually containing less than 9 macroeconomic variables and several pre-defined behavioral parameters (see, for instance, Smets and Wouters, 2007), whereas stock-flow consistent models have the potential to include several parameters (estimated and/or calibrated) that may be independent across specifications and less stringent assumptions on the behavior of institutional sectors.

⁵ It is important to note here that financial data on stocks, flows and revaluations are somehow limited (which in part explains why these models are not yet fully empirical). Some central banks of advanced economies (notably G-7 countries) keep track of these statistics for relatively long time spans, whereas other economies have records of these data for much shorter spans, and others do not keep track of financial accounts at all.

⁶ See, for instance, Godley and Lavoie (2007), Caverzasi and Godin (2014), Le Heron and Marouane (2015), Mazier and Tiou-Tagba (2012), Zezza and Valdecantos (2015), Duwicquet and Mazier (2015), Mazier and

sector to the real sector.

Our SFC model is made up of 42 equations that respect stock-flow dynamics and includes profitability rates in the financial sector. The interaction between real variables (GDP, investment, profits, wages) and financial variables (credit, equity, interest rates, equity prices) is explicit in the model and accounts for a system-wide explanation of the effects of financialization at a macroeconomic level. Our simulations shows that financialization, as represented by a sudden increase in firm leverage, boosts short run financial profitability and private leverage at the expense of long run real sector investment and economic growth. An exogenous increase in leverage indeed decreases wages, lowers profits, diminishes corporate investment and hinders GDP growth.

We then back up our theoretical conclusion with a set of robust empirical estimates on a panel of 29 OECD countries over the 1998-2014 period. We measure financialization through the private credit to GDP ratio, and develop a new 'financialization index', which simultaneously captures banks' increased profit orientation, their vulnerability to a classic bank run, and the banking sector's concentration. We then use two complementary empirical approaches. We first rely on a panel Bayesian structural VAR model, in which short-run identification restrictions are based on the macroeconomic literature and match some of the implications of the SFC model. Inspection of impulse response functions and variance decomposition analysis indicate that increases in the banking financialization index and in the level of private banking credit do not only interact positively with one another, but also jointly decrease the growth of wages, the growth of gross capital formation, and the growth of GDP. In a second line of analysis, we use a set of fixed effects panel regressions and show that both the financialization index and private credit have had a negative impact on the growth of GDP per capita and of GDP per worker. These results are robust to the inclusion of a set of additional factors that do not appear explicitly in our theoretical model. Finally, a simple simulation exercise indicates that the growth of the banking financialization index and private credit have slowed the industrialized countries' average annual growth rate in the post 2008 period by nearly 30%. The implications of these results from an international financial regulation perspective are discussed in the last section of the paper.

The remainder of the paper is structured as follows. Section 2 presents our theoretical model. Section 3 presents the dataset, the econometric methodology, and discusses our empirical

Valdecantos (2015), Giraud et al. (2016), Keen (1995), Caiani et al. (2016), Seppacher (2014), Reyes and Mazier (2014), Mouakil (2014).

results. Finally, section 4 summarizes our findings and discusses the main policy implications of our study.

2. Financialization and the macroeconomy: a theoretical framework

2.1. Stock-flow consistent models

The model presented in the next subsections provides a simple framework with which it is possible to analyze the macroeconomic impact of financialization⁷. Investment and saving are at the core of the analysis, given that they belong to both spheres (real and financial). Following the standard presentation of this type of models, and given the importance of the accounting framework, we begin with a description of the accounting matrices. We then present the key equations for some of the terms contained in, and used to describe, the former. This is then followed by a discussion of the effects of financialization.

2.2. National accounting

The upper part of table 1 (above the double horizontal line) shows the components that make up the consolidated national accounts of the hypothetical economy in which there are five institutional sectors: households (H), non-financial firms (F), financial institutions (or private banks B), the central bank (CB) and the government (G). The lower part of the table shows the consolidated financial accounts in flow form, where the identity *investment = saving* holds. Resources and assets have no sign, whereas uses and liabilities are preceded by a negative sign. Since the empirical model presented below focuses on the period that goes from 1998 to 2014, and given that during this time span inflation remained stable (at least as compared to the levels seen in the previous decades), our model assumes the evolution of consumer prices is constant. We also assume that profits, dividends and equity are managed by the financial sector (more on this below), and that employment is proportional to total output. The main accounting relationships can be described as follows.

(TABLE 1 ABOUT HERE)

Working households (column H) get their revenue from the wage bill (WB), which they spend on consumption and investment goods (C^H and I^H), as well as on tax and interest

⁷ The code is available from the authors upon request.

payments (Int_p^H and T^H). The difference between their income and their expenditures/payments amounts to their saving (S^H). The latter must also equal the difference between the flow of deposits they hold ($p_D\Delta D^H$)⁸ and the flow of their debt liabilities ($p_L\Delta L^H$). Non-financial firms (simply firms henceforth, column F) produce and sell consumption and investment goods (I and C) that are in turn demanded by households, firms and the government. This sector has to pay wages to households, profits (II) and dividends (Div) to entrepreneurs, interests (Int_p^F) to banks, taxes (T^F) to the government, and investment (I^F , alternatively investment costs) to itself. Firms hold a flow of deposits ($p_D\Delta D^F$) and finance their investment via newly issued debt ($p_L\Delta L^F$) and newly issued equity ($p_E\Delta E$). The difference between their assets and liabilities is equivalent to their savings (S^F , which is often negative).

The financial sector (column B) distributes profits and dividends to entrepreneurs which is an indicator of the increased financialization of firms' strategies and receives interest payments (Int). The sum of these items make up the sector's savings (S^B). The latter must also equal the difference between the assets managed by the financial sector, the flow of debt ($p_L\Delta L$), the flow of equity ($p_E\Delta E$), and banks' liabilities (the flow of refinancing, RF). Note also that this sector manages national savings (S) on behalf of all sectors.

The role of the central bank (column CB) is to issue new deposits ($p_D\Delta D$) every period and distribute these to the banking sector via the refinancing item (RF)⁹.

Finally, the government (column G) receives revenue from taxes (T) paid by households and firms, pays interest to banks (Int_p^G), and purchases consumption and investment goods (C^G and I^G). The difference between these receipts and outlays adds to the item S^G which corresponds to the public sector's balance. If outlays exceed receipts (i.e. if there is a public deficit), the difference adds to public debt ($p_L\Delta L^G$).

2.3. Focus on the model's key equations

The model is made up of two groups of equations: behavioral equations and

⁸ Throughout the presentation, several values appear separated into prices and volumes. This is particularly the case of the items belonging to the accumulation accounts (financial and non-financial instruments), all of which appear in table 1 as the product of the price of the item and the change in the corresponding stock.

⁹ The actual role of central banks is obviously much more complex than the simplified representation of our model. Given the illustrative purpose of our modeling exercise, the complexity, and the diversity of the roles of the Central bank (from enforcing regulations to setting inflation and exchange rate targets), we leave this issue to further investigation.

accounting identities. Accounting equations are based on table 1. Due to limited space, we present here only the equations that lie at the heart of our analysis of the implications of financialization. The full list of equations is given in the Appendix. The definition of abbreviations is given in Table 2.

(TABLE 2 ABOUT HERE)

2.3.1. Real sector equations

Firms' production of investment goods is represented by the expression $I = p_K \Delta K$ (eq. 2.1), and is a function of its own lags, of Tobin's q (the ratio of the stock of equity to the stock of non-financial assets), of profits, of the lending interest rate, and output. Profits (eq. 2.2), which are managed by the financial sector on behalf of entrepreneurs, correspond to the difference between national income (which is tantamount to outstanding production), the wage bill and taxes paid by households and firms (T^H and T^F , respectively)¹⁰.

$$I = p_K \Delta K = \varphi_0^f + \varphi_{11}^f p_{K-1} \Delta K_{-1} + \varphi_{12}^f p_{K-2} \Delta K_{-2} + \varphi_1^f (p_{E-1} E_{-1} / p_{K-1} K_{-1}) + \varphi_2^f \Pi_{-1} - \varphi_3^f r_{-1} + \varphi_4^f Y_{-1} \quad (2.1)$$

$$\Pi = Y - WB - T^H - T^F \quad (2.2)$$

The wage bill (eq. 2.3) is a function of its own lags and of the evolution of firms' financial situation, so that an increase in sales (or a drop in non-labor costs) has a positive lagged effect on wages. Alternatively, any increase in non-labor costs (or drop in sales), leads firms to cut down employment and/or wages. This transmission mechanism depends on whether we let wages be fully indexed to the firms' financial situation ($w_I = 1$) or the other way around ($w_I = 0$)¹¹.

$$WB = w_0 + w_{I1} WB_{-1} + w_{I2} WB_{-2} + w_I (C_{-1} + I_{-1} - I^F_{-1} - \Pi_{-1} - Int_p^F_{-1} - Div_{-1} - T^F_{-1}) \quad (2.3)$$

Interest payments¹² (eq. 2.4) are defined as the product of the lending (or passive) interest rate (r) and the stock of credit from the preceding period, for $s = H, F$ and G . Dividends (eq. 2.5) are modeled following the same logic, and are defined as the product of

¹⁰ This identity is calculated from GDP by the income approach and solving for Π .

¹¹ We set this parameter equal to 0.1, meaning that wages are not very sensitive to firms' financial situation. Note that our results indicate that, even when this is the case, wages tend to fall (more on this below).

¹² Throughout the presentation, underscore p stands for paid and r for received.

financial profitability (r_E) and the stock of equity (held by financial investors but managed by financial institutions) from the previous period.

$$Int_p^s = r p_{L-1} L^s \quad \text{for } s = H, F, G \quad (2.4)$$

$$Div = r_E p_{E-1} E_{-1} \quad (2.5)$$

2.3.2. Financial sector equations

Let us now focus on the financial sector. The change in deposits by households (eq. 2.6) is a function of its own lags, of households' current expenditure (on consumption and investment) and of the deposit (or active) interest rate (i). The same principle holds for firms, except that the latter's demand for liquidity (eq. 2.7) depends (apart from its lags) on the evolution of wages (a proxy for labor costs) and the interest rate paid on deposits.

$$p_D \Delta D^H = \psi_0^H + \psi_{11}^H p_{D-1} \Delta D^H_{-1} + \psi_{12}^H p_{D-2} \Delta D^H_{-2} + \psi_1^H (C^H + I^H) - \psi_2^H i \quad (2.6)$$

$$p_D \Delta D^F = \psi_0^F + \psi_{11}^F p_{D-1} \Delta D^F_{-1} + \psi_{12}^F p_{D-2} \Delta D^F_{-2} + \psi_1^F WB - \psi_2^F i \quad (2.7)$$

We assume that banks play a passive role in providing credit to households, firms and the public sector¹³. Therefore, equation 2.8 represents the flow of loans granted by banks to these sectors.

$$L^B = L^F + L^H + L^G \quad (2.8)$$

Firms' leverage ratio (that is the stock of credit demanded by firms expressed as a fraction of the stock of non-financial assets in the previous period) is modelled as a function of its lags, the lending interest rate and the ratio of the volume of equities to the volume of non-financial assets.

$$p_L * L^F / (p_{K-1} * K_{-1}) = \gamma_0^F + \gamma_{11}^F p_{L-1} * L_{-1}^F / (p_{K-2} * K_{-2}) + \gamma_{12}^F p_{L-2} * L_{-2}^F / (p_{K-3} * K_{-3}) - \gamma_1^F r_{-1} - \gamma_2^F E_{-1} / K_{-2} \quad (2.9)$$

¹³ This hypothesis is necessary to ensure that money is endogenous. It may seem counter-intuitive given that our model seeks to highlight the active role of the financial sector in the economy. However, as pointed out by an anonymous referee, to assume that bank's credit supply is the key function (as it was the case in our previous version of the model, which yields similar results and which is available upon request) is at odds with the foundations of post-Keynesian economics.

In turn, the demand for credit by households in flow form (eq. 2.10) depends on its lagged values, on the passive interest rate, on households' revenue (i.e. changes in the wage bill) and on the price of non-financial assets (a proxy for housing prices, p_K).

$$p_L \Delta L^H = \gamma_0^H + \gamma_{11}^H p_{L-1} \Delta L^H_{-1} + \gamma_{11}^H p_{L-2} \Delta L^H_{-2} - \gamma_1^H r + \gamma_2^H \Delta WB + \gamma_2^H \Delta p_K \quad (2.10)$$

Firms finance their investment by issuing equity and debt. The change in the volume of the former (eq. 2.11) depends on its lags, on the rate of financial profitability and its lags, and on external finance (the flow of debt).

$$\Delta E = \eta_0 + \eta_{11} \Delta E_{-1} + \eta_{12} \Delta E_{-2} + \eta_0^{re} r_E + \eta_1^{re} r_{E-1} + \eta_2^{re} r_{E-2} - \eta_2 \Delta L^F \quad (2.11)$$

The change in the price of loans depends on its lags, the lagged flow of credit and the evolution of the passive interest rate.

$$\Delta p_L = \varepsilon_0 + \varepsilon_{11} \Delta p_{L-1} + \varepsilon_{12} \Delta p_{L-2} + \varepsilon_{11}^L \Delta L_{-1} + \varepsilon_{12}^L \Delta L_{-2} - \varepsilon_{1r} \quad (2.12)$$

The evolution of the price of equity (eq. 2.13) is based on a set of microeconomic factors. It depends on its lagged values (which reflects departure from the 'efficient market hypothesis'), of changes in the volume of traded equities (which reflects the expected positive relationship between stock market turnover and return), on changes in the level of output (which reflects the impact of macroeconomic conditions on stock prices) and on changes in the ratio of the volume of equities to the volume of non-financial assets¹⁴.

$$\Delta p_E = \lambda_0 + \lambda_{11} \Delta p_{E-1} + \lambda_{12} \Delta p_{E-2} + \lambda_{11}^E \Delta E_{-1} + \lambda_{12}^E \Delta E_{-2} + \lambda_1 \Delta Y_{-1} - \lambda_2 \Delta (E/K) \quad (2.13)$$

The deposit (or active) interest rate (eq. 2.14) is a function of its own lags, and is negatively related to changes in saving, so that higher levels of saving (or lower consumption expenditures) diminish i . The same logic applies to the lending (or passive) interest rate (eq.

¹⁴ The last term of equation 2.13 is akin to a self-fulfilling prophecy: investors expect lower equity prices when the supply of equity increases relatively to the supply of non-financial assets. As a result, they exit the equity market and invest in physical assets instead resulting in lower equity prices. It may be interpreted as a proxy for Tobin's q , the main difference being that it focuses on volume rather than values. Therefore, the expected sign of λ_2 is opposite to that of a hypothetical parameter linked to Tobin's q . This assumption allows us to avoid simultaneity of p_E , for if this ratio were expressed in values, p_E would appear on both sides of the equation and a solution to the system would be more difficult to derive.

2.15), the main difference being that higher investment levels tend to raise r . Also, note that when i increases, this drags r in the same direction, so that the interest margin (or profit rate of banks, $r - i$) remains positive throughout the simulations.

$$i = \theta_0 + \theta_{11}i_{-1} + \theta_{12}i_{-2} - \theta_{11}^S \Delta S_{-1} - \theta_{12}^S \Delta S_{-2} \quad (2.14)$$

$$r = \zeta_0 + \zeta_{11}r_{-1} + \zeta_{12}r_{-2} + \zeta_{11}^I \Delta I_{-1} + \zeta_{12}^I \Delta I_{-2} + \zeta_{11}^i i_{-1} + \zeta_{12}^i i_{-2} \quad (2.15)$$

Finally, as shown in equation 2.16, the rate of financial profitability is a function of its own lags, of the lagged change in corporate profits, and of changes in equity prices.

$$r_E = \omega_0 + \omega_{11}r_{E-1} + \omega_{12}r_{E-2} + \omega_{11}^{\Pi} \Delta \Pi_{-1} + \omega_{12}^{\Pi} \Delta \Pi_{-2} + \omega_{11}^{pe} \Delta p_{E-1} + \omega_{12}^{pe} \Delta p_{E-2} \quad (2.16)$$

2.4. Financialization in the economy: a simplified view

The model presented above offers a simplified framework (without inflation nor external sector) with which to discuss some of the macroeconomic implications of financialization. We put forth a heuristic mechanism which is summarized in figure 1.

(FIGURE 1 ABOUT HERE)

The financialization process begins at phase A_1 , in which a set of structural changes in the financial sector make private non-financial firms demand more credit, which is, in turn supplied by banks. This shock can be thought of as the joint effect of financial sector deregulation and the development of information technology that are characteristic of the financialization process (Lagoarde-Segot (2016)).

Such an increase in the demand for debt finance (both as banking credit and bonds) makes firms shift their financial structure towards more leverage. As a result, the volume of equities issued falls and stock prices rise (eq. 2.13), which contributes to an increase in financial profitability (eq. 2.16, phase B_2)¹⁵. During this initial phase, banks and asset-holding individuals benefit from the situation, given the joint rise in interest payments, equity prices and dividend payments (phase B_1 and B_2). At an empirical level this process depicts the rise in

¹⁵ This theoretical process can be related to the wide use of levered stock buy-backs, which is documented in several recent studies (Lazonick (2013); Brettel et al. (2015)). As pointed out by the referee, in order to model levered stock-buybacks in realistic way, one should however make the supply of shares determined by an exogenous target for the rate of return on equity. We leave this as a possible extension of the model.

income inequality observed, among others, by Piketty (2013) or Saez and Zucman (2016).

In this context, a reallocation of resources towards financial markets takes place given that financial investment becomes more attractive than real sector investment. At a conceptual level, this feature of the model is in line with the Post-Keynesian theory of the firm view: financialization weakens the firms' preference for growth due to a simultaneous drop in available internal funds (which shifts the finance frontier of firms upwards) and an increased managerial focus on short term profitability and financial market results (which shifts firms' expansion frontier leftwards) (Dallery (2009)). It is also in line with the observed rise of the financial sector holdings to GDP ratio in high income countries.

In a fashion similar to Boyer (2000), the crisis is then triggered by the contradiction between rising leverage levels, increasing financial profitability and the corresponding drop in aggregate demand and real investment. The rise in financial profitability indeed appears to be unsustainable in the long term, given that it requires increases in interest payments and dividends, which are paid out of a thinning corporate income. The economy then shifts to phase *C*, where profit rates, investment, wages and output fall, which eventually also drags down financial profitability (phase *D*).

To get a more formal hint of the above process, consider the case where an exogenous increase in lending takes place. An increase in γ_0^B (eq. 2.9) would then increase *pro tanto* credit supplied by banks (eq. 2.8). This leads this sector to issue less equity than before the shock (eq. 2.11), given the trade-off between debt capital and equity capital (in volume). The fall in the latter makes the price of equity p_E rise. Given the presence of autoregressive components in equation 2.13, the rise in p_E lasts more than one period, which in turn causes financial profitability r_E to increase (eq. 2.16). The rise in financial profitability goes along with increased dividend payouts, as reflected in equation 2.5, where dividends increase with both r_E and p_E .

These trends have a negative impact on the real sector. Indeed, rising interest and dividend payments force the wage bill down (eq. 2.3). This lowers household consumption (eq. A.4 in the appendix), gross domestic product (eq. A.1 in the appendix), household investment (eq. A.5 in the appendix), and eventually backfires to the financial sector via lower corporate profits (eq. 2.2), equity prices (eq. 2.14) and financial profitability (eq. 2.16). This simple setting explains how financialization, proxied by an exogenous increase in the supply of finance to the economy and increased shareholder governance, boosts short run financial profitability and private leverage at the expense of long run real sector investment and economic growth. The contradiction between financial and real sector dynamics eventually

generates a crisis that ultimately undermines gross capital formation and economic growth, while leaving equity holders less well-off than before the reversal provoked by the fall in profits¹⁶.

2.5. Calibration and results

Finding a stable path for a simultaneous equations macroeconomic model often requires making unrealistic assumptions, thus sacrificing realism of all or some of the values in the system. In other words, choosing realistic or even feasible parameters and starting values is quite often incompatible with finding a steady-state. Furthermore, assuming parameters remain unchanged over a long time span (as several simulated models do) is unsatisfactory at best¹⁷.

Our simulations run for up to 25 periods with the values shown in the Appendix. With these observations we are sure that all series in the model have realistic values, so that when the shocks take place (in this case at $t = 14$) we know that the after-shock evolution of all series in the system is not unfeasible in a true economy¹⁸. The graphs we present in figures 2, 3 and 4 show the results of our modeling exercise for periods 12 to 20.

Figure 2 shows the evolution of some key indicators of the system under the baseline scenario. It shows that consumption, investment, wages and profits as proportion of GDP (upper panel), as well as the profit rate of non-financial firms, the rate of financial profitability and the interest rates (lower panel) lie within reasonable levels, and are comparable to the values found in an average high-income economy.

(FIGURE 2 ABOUT HERE)

For instance, from periods 6 to 20 the shares of consumption and investment are around 85 and 15%, respectively. Profit rates (real and financial) lie between 4 and 15%¹⁹,

¹⁶ Note that the recovery of investment and wages (particularly the latter) is rather uncertain, for the parameters in the corresponding equations may be lower after the downturn takes place, particularly so in the recovery phase. Wages in particular may be less sensitive to firms' financial situation ($\downarrow w_1$ in eq. 2.3), and investment less sensitive to profits and the ratio of market valuation to replacement value ($\downarrow \phi_1^f$ and $\downarrow \phi_2^f$ in eq. 2.1). Such changes in the value of parameters of equation 2.3 may enhance the persistence of the recession and makes its way back up much more slowly than the path that led to the race to the bottom of the economic cycle.

¹⁷ This is a point raised by Minsky (1957), who mentions that a way out of the difficulty of describing patterns that are "too" regular is to allow coefficients to vary over the cycle. We leave this exercise for further enquiry.

¹⁸ The EViews code of the model is available in the website: <https://luisreyesortiz.org/resources/>

¹⁹ Table 3 of Jorda et al (2017) reveals that, for a sample of developed countries, the average and standard deviation of real returns on equity are 6.89 and 21.94, and in nominal terms these values are 10.75 and 22.78. Either in nominal or in real terms, the values our model yields are close to observed values.

respectively, and interest rates go from roughly 3.2 to 11%²⁰. The shares of wages and profits go from roughly 35 to 65%, which are less realistic but still make economic sense from an analytical point of view.

The lower right-hand panel of figure 3 shows the evolution of the stock of debt as a ratio of GDP under two different scenarios, both divided by the baseline. The first of these (solid line) corresponds to a one-time increase of 5% in firms' leverage ratio (increase in $t=14$ only), whereas the second (dashed line) is a permanent increase of 5% in the same series (increase from $t=14$ onwards). In both scenarios, indebtedness as proportion of GDP increases more than under the baseline, with the permanent increase naturally taking the lead.

Note that under a temporary increase in private debt, the debt-to-GDP ratio stabilizes at around 100% 6 periods after the shock took place, whereas under a permanent increase in debt, the same ratio tends to stabilize at a higher level (slightly above 125%).

(FIGURE 3 ABOUT HERE)

This increase in debt demand has the effect of raising the current income of private banks via interest paid by firms (lower left-hand panel), which increases up to 5% when both shocks take place as compared to the baseline. Initially, non-financial firms bear the full cost of this debt increase, and this weighs negatively on their net revenue, so that they cut down wages and/or employment starting at $t=15$, that is, one period after the shock has taken place, given that interest payments enter with a negative sign and one lag in the wage equation 2.3. This is seen in the upper right-hand side panel of the same figure. The permanent increase in debt has a stronger effect, leading to a fall of 1.5% with respect to the baseline in period 18 for the temporary shock, and a continuous fall under the permanent shock, reaching a level that is 9.5% lower than that of the baseline.

Despite the reduction in the wage bill and the fact that investment rises thanks to the increase in available funds obtained via debt, the profit rate of non-financial firms is also reduced after a slight initial increase (upper left-hand panel). Since wages determine corporate profits contemporaneously (equation 2.2), the effect of the shocks on the profit rate also take place in

²⁰ At first glance, such values may not seem to be representative of the interest rates prevailing today in developed countries. However, according to data from the World Bank, in 2017 the value of this indicator for Australia was 5.2%, Iceland's is 7.3% and Singapore's 5.3%. If we add emerging market economies to the list, Costa Rica, Indonesia and South Africa have lending rates slightly above 10% in 2017.

$t=15$. Clearly, given the sharp reduction in workers' income and the ensuing reduction in consumption and investment sales, this further strengthens the fall in profits.

(FIGURE 4 ABOUT HERE)

Figure 4 shows the after-shock evolution of GDP and its components as compared to the baseline scenario. It shows that, following the increase in firms' indebtedness there is a strong reduction in GDP, household consumption and investment, brought about mainly by the fall in wages. This takes place despite the slight increase in firms' investment provoked by the rise in available funds obtained via debt.

3. Empirical analysis

3.1. Dataset

Our empirical analysis is based on a strongly-balanced panel of 29 high income countries²¹ for the period 1998-2014. Our data is taken from a variety of sources listed in Appendix 2. Our macroeconomic variables include the annual growth rates of constant GDP and gross capital formation, as well as the growth rate of the wage share in GDP²². In line with recent studies looking at the finance-growth nexus (Cecchetti and Kharroubi (2012)), our analysis also includes a set of variables which do not appear in our theoretical framework, but which are known to influence economic growth: trade openness, government spending to GDP ratio, working population growth, and CPI inflation. In particular, the inclusion of the inflation rate provides a robustness check for the mechanism presented in the model, which assumes constant prices.

One important prerequisite for our empirical investigation is to capture both the quantitative and qualitative aspects of the financialization process. To measure the

²¹ Australia, Austria, Belgium, Canada, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States. Country classification is the World Bank's Global Finance and Development database (2015).

²² The use of the wage share appears relevant as it is equivalent to deflating real wages by labor productivity. The wage share (α_L) is computed as the ratio of nominal labor income ($W * L$) to nominal income ($P * Y$), or equivalently, as the ratio of real wages (W/P) to labor productivity (Y/L): $\alpha_L = (W * L) / (P * Y) = (W/P) / (Y/L)$. Changes in the labor share can thus be explained by changes in the real wage and by changes in labor productivity. Using the wage share permits to control for the effects of productivity gains on wage, and also captures the firms' shareholder orientation, which lies at the heart of the theoretical model. Our econometric estimates are robust to using the wage bill rather than the wage share. Results are available upon request.

quantitative aspects of financialization, we rely on two variables: the volume of domestic credit to the private sector by banks and the volume of domestic credit to the private sector. These variables include loans, purchases of non-equity securities, and trade credit granted by banks and by financial corporations at large, respectively. As discussed previously, financialization is however also characterized by a set of complex qualitative changes in the banks' business model. To proxy for these changes we thus develop two new banking financialization indices, which are defined as follows:

$$FINANCIALIZATION_{i,t} = \frac{(1+ROA_{i,t})}{(1+LIQ_{i,t})} (1 + CONC_{i,t}) \quad (3.1)$$

In 3.1, *ROA* corresponds to the average annual return on banks' total assets in the banking sector (fee and net interest income net of operating costs, divided by average total assets), *LIQ* measures the ratio of liquid assets (such as cash and dues from banks, trading securities, reverse repos and cash collaterals) to total customer deposits (current, savings and term) and short term borrowing (money market instruments, CDs and other deposits), and *CONC* represents the share of the assets of the five largest banks in total banking assets as a proxy for concentration in the banking sector. This index decreases with liquidity (*LIQ*) and therefore increases with the banking sector's reliance on wholesale funding and with its exposure to a classic run-off. Previous studies have shown that the liquidity ratio is negatively correlated with securitization as banks having a low level of liquid assets tend to rely on securitization as a form of regulatory capital arbitrage (Cerrato et al. (2012)). A higher value of the index should thus also signal stronger reliance on securitization.

The index also increases with the bank's net income to total asset ratio, reflecting an increased profit-driven culture in banking (*ROA*)²³. Finally, the index increases with the level of banking sector concentration (*CONC*) which is another important stylized fact. This simple index therefore captures several key facets of the financialization process.

When taken in first difference, the index may be conceptually connected to the Keynesian preference for liquidity theory of bank behavior²⁴ given that it captures a time varying trade-off between liquidity and banking profits. An increase in the *ROA* to *LIQ* ratio

²³ Our index relies on return on assets (*ROA*) rather than return on equity (*ROE*) in order to focus on the banks' profit margin rather than on the leverage effect. Recall that $ROE = ROA \times (\text{Total assets} / \text{Shareholder's equity})$.

²⁴ "There are a number of financial institutions, amongst which the banks themselves are the most important... which vary from time to time the proportionate division of their assets between long-term and short-term securities respectively" (Keynes (1936), 6:320). "(w)hen, for example, they (bankers) feel that a speculative movement or a trade boom may be reaching a dangerous phase, they scrutinize more critically the security behind their less liquid assets and try to move, so far as they can, into a more liquid position." (id. pp. 59-60).

indicates that banks have followed riskier strategies (if *LIQ* has decreased) or that anticipations of an economic slowdown have induced a stronger preference for investment in liquid assets (if *LIQ* has increased)²⁵. Taken together with the observed increase in mergers and acquisitions (*CONC*), this dynamic should cause the value of the financialization index to rise.

As a robustness check, we also use a more intuitive financialization index, which is defined as the ratio of changes in banking profitability (net of taxes) as a proportion of money creation:

$$RETURN_{i,t} = \frac{(1+\Delta ROA_{i,t})}{(1+\Delta M3_{i,t})} \quad (3.2)$$

Figure 5 plots the value of the financialization index over the study period for selected economies: the United States, three European economies (the UK, Germany and France), two tax havens (Switzerland and Luxembourg), and two emerging market economies (Poland and the Czech Republic). As expected, all charts display an upward trend, especially in the post-global financial crisis (GFC) period. Regarding the RETURN index, figures show increased volatility around the global financial crisis period for industrialized economies, and an earlier shock for Poland and the Czech Republic reflecting turmoil in the aftermath of the Russian crisis.

(FIGURE 5 ABOUT HERE)

3.2. Structural VAR modeling

3.2.1. Structural form

Our sample is constituted of a large number of high income countries observed over a relatively limited time span. In this case, panel data modeling appears well-adapted to this study, as it brings out individual heterogeneity and allows us to identify effects that would not be easily detectable with time series or cross-sectional data. We employ a structural VAR modeling framework in order to estimate the dynamic effects of financialization on the real sector. Our Structural Bayesian VAR model is estimated according to the method developed by Sims and Zha (1995, 1998), which we adapt to the case of panel data. We also incorporate

²⁵ As discussed in Bordeleau et al. (2010) if a bank is more reliant on short term funding, it may need to hold more liquid assets in order to maximize its profits, especially in the event of a recession.

time and individual dummies in order to control for unobservable heterogeneity (Beetsma et al. (2006); Kim and Lee (2008); Kim and Yang (2008)).

The reduced form of the vector auto-regression model VAR(q) is given as:

$$Y_{it} = \sum_{j=1}^q A_j Y_{i,t-j} + e_{it} \quad (3.3)$$

In (3.3), n is the number of variables, m the number of countries i ($i=1, \dots, m$), q the number of lags, $Y_{i,t}$ the vector of endogenous variables for country i and period t , $Y_{i,t-j}$ the $n \times 1$ vector of lagged variables for each i , A_j represents the $n \times n$ parameter matrix²⁶ and e_{it} the vector of errors with $e_{it} = b_i + b_t + b_{it}$ where b_i is the individual fixed effect, b_t is the time fixed effect and b_{it} is the disturbance term whose variance-covariance matrix has no restrictions, i.e. $E(b_{it}b'_{it}) = \Omega_b$ and $E(b_{it}) = 0$.

Letting L be the lag operator, the VAR(q) model can be rewritten as:

$$A(L)Y_{it} = e_{it} \quad (3.4)$$

$$\text{with } A(L) = I_n - A_1L^1 - \dots - A_qL^q$$

The process described in (3.4) is then expressed in a moving average infinite structural form in order to obtain the impulse response functions and the forecast error variance decomposition. An intermediate step consists in reversing the canonical VAR model using the Wold Theorem to obtain the moving average form:

$$Y_{i,t} = \sum_{k=0}^{\infty} C_k e_{i,t-k} = C(L)e_{it} \quad (3.5)$$

$$\text{with } A(L)^{-1} = C(L)$$

$$\text{and } C(L) = I_n + C_1L^1 + \dots = \sum_{k=0}^{\infty} C_kL^k$$

where e_t represents the vector of canonical innovations.

The structural Moving Average representation is then:

$$Y_{it} = \sum_{k=0}^{\infty} \theta_k \varepsilon_{i,t-k} = \theta(L)\varepsilon_{it} \quad (3.6)$$

$$\text{with } \theta(L) = P + C_1PL^1 + \dots = \sum_{k=0}^{\infty} \theta_kL^k$$

$$\text{where } \varepsilon_{it} = d_i + d_t + d_{it} \quad (3.7)$$

$$\text{and } b_{it} = Pd_{it}$$

P is an $n \times n$ invertible matrix which has to be estimated to identify the structural

²⁶ Given that our models have 5 variables, 1 lag, A_j takes the following form: $A = \begin{pmatrix} a_{11} & \dots & a_{15} \\ \vdots & \ddots & \vdots \\ a_{51} & \dots & a_{55} \end{pmatrix}$

shocks. The short-run constraints are imposed by setting some elements of the P matrix to zero. The j matrix represents the response functions of Y_{it} to structural shocks d_{it} , which are assumed to be uncorrelated and to have a unit variance:

$$E(d_{it}d'_{it}) = I_n \quad (3.8)$$

Ω_d is the variance-covariance matrix of the canonical innovations d_{it} , so that:

$$\Omega_b = P\Omega_dP' = PP' \quad (3.9)$$

Sims and Zha (1998) use priors and Bayesian inference to identify the P matrix²⁷. Bayesian inference is not affected by the presence of a unit root and cointegration²⁸ (Sims, 1988, Sims and Uhlig, 1991). This feature of the Sims and Zha (1998) method and Bayesian inference in general means macroeconomic variables can be introduced in levels rather than first differences, which is more informative.

3.2.2. Identification restrictions

When selecting identifying restrictions our objective was to maximize the credibility of the models. We therefore adopted a two-step strategy. In the first step, we considered the possible set of identification restrictions in the relevant SVAR literature. We then applied a second-order choice criterion and selected the restrictions that simultaneously fitted the key features of our SFC model. Therefore, the chosen set of restrictions both match our theoretical model and the established literature.

Our first set of restrictive hypotheses assumes that financial variables respond to shocks faster than real variables (Kim [2001]; Kim and Roubini [2000]; Sims and Zha [1995]; Kim and Yang [2008]). We thus assume that banking credit and the financialization index impact wage

²⁷ Bayesian inference permits to overcome the overfitting problem in SVAR models by reducing the number of parameters that have to be estimated. In flat-prior Bayesian inference, the likelihood and the posterior probability density function are Gaussian and thus not influenced by the presence of unit roots. Bayesian techniques of inference provide a reliable measure of uncertainty for the estimated models (Litterman, 1986) and enable us to compute likelihood-based error bands. With this approach, economic theory can be incorporated into the priors. The method imposes no restrictions on the conditional mean of lagged variable coefficients. However, it does restrict beliefs about lagged variable coefficients to be Gaussian and uncorrelated across equations conditional on contemporaneous variable coefficients, though it allows them to be correlated in different ways in different equations. As a result, this method not only makes it possible to evaluate large systems (because it imposes cross-equation restrictions on priors) but also allows non flat priors based on economic theory.

²⁸ Another modelling strategy would consist in checking the long run properties of the data in order to obtain additional results and to reduce the number of the parameters to be estimated. We leave this possibility to future research.

growth, GDP growth and GCF growth variables only with a lag, and that financialization has no short term impact on banking credit so that $P_{12} = P_{13} = P_{42} = P_{43} = P_{52} = P_{53} = P_{23} = 0$. This hypothesis also appears connected to the features of our theoretical model. Equation 2.1 indeed shows that interest rates and the stock of equity affect corporate investment with a lag. In addition, equation 2.3 shows that interest payments and dividends affect wages with a lag. Given that wages determine corporate profits (equation 2.2), that corporate profits have a lagged impact on corporate investment (equation 2.1), and that the latter is used in GDP accounting, it follows that financial shocks affect GDP with a lag (via the wage channel). A similar conclusion can be reached by considering that lagged wages affect household consumption (see equation 2 of the appendix), and that the latter is used in GDP accounting. This first set of restriction both matches our theoretical model and the established literature.

Our second set of restrictions assumes that the GDP growth rate, the GCF growth rate, private banking credit and the financialization index respond to changes in wages with a lag, so that $P_{21} = P_{31} = P_{41} = P_{51} = 0$. The lagged impact of changes in wages on the GDP growth rate and the GCF growth rate has been highlighted in various streams of the literature (Bhaduri and Marglin, 1990; Onaran and Yentürk, 2001; Lingens, 2007). In turn, the lagged impact of wages on financial development has been empirically modelled in previous studies on access to finance (Aaronson et.al, 2012, Dettling and Hsu, 2017).

This set of hypotheses is also connected to some of the implications of our theoretical model. Financial profitability and corporate investment indeed depend on lagged changes in profits (equations 2.16 and 2.1, respectively), which, as shown in equation 2.2, are determined by wages. A similar conclusion can be reached by considering that lagged wages affect household consumption (see equation A.2 in the Appendix), and that the latter is used in GDP accounting. Finally, equation 2.14 shows that the deposit rate decreases with lagged savings (which are determined by wages), while equation 2.15 shows that the lending rate depends on lagged investment (which are affected by wages, as discussed above). Changes in wages should thus also affect the profitability of the banking sector with a lag. Finally, real sector investment reacts with a lag to a GDP shock so that $P_{54} = 0$ (see equation A.6 in the Appendix).

SVAR model is hence fully identified with restrictions matching both the SVAR literature and the key features of our SFC model.

Formally, we let $Y = \begin{pmatrix} \text{vwage} \\ \text{financialization} \\ \text{privatebankcred} \\ \text{vgdp} \\ \text{vgfc} \end{pmatrix}$ the vector of endogenous variables, and $\varepsilon_t =$

$\begin{pmatrix} \varepsilon_{vwage} \\ \varepsilon_{fi} \\ \varepsilon_{bank} \\ \varepsilon_{vgdp} \\ \varepsilon_{vgcf} \end{pmatrix}$ the vector of structural shocks, where ε_{fi} represents the shock of liquidity and

ε_{vwage} , ε_{fi} , ε_{bank} , ε_{vgdp} and ε_{vgcf} are respectively the real demand, financialization index, banking credit, and real supply shocks. The matrix of contemporaneous restrictions is laid out as:

$$P = \begin{pmatrix} P_{11} & 0 & 0 & P_{14} & P_{15} \\ 0 & P_{22} & P_{23} & P_{24} & P_{25} \\ 0 & 0 & P_{33} & P_{34} & P_{35} \\ 0 & 0 & 0 & P_{44} & P_{45} \\ 0 & 0 & 0 & 0 & P_{55} \end{pmatrix}$$

Following Robio-Ramirez et al., 2009 the model is globally identified as it respects both order and rank criteria. In our model, $n=5$, and the identifying restrictions are imposed only on the contemporaneous matrix P , consequently $n=k=5$. We consider the matrices of restrictions Q_l with $l = 1, \dots, 5$, with $q_1 = 4, q_2 = 4, q_3 = 3, q_4 = 1, q_5 = 0$. The total number of restrictions is 12, higher than $\frac{n(n-1)}{2}$, so the model is identified following rank and order conditions.

3.3. Fixed effect regressions

In a second line of investigation, we include our financialization proxies in the following GDP per capita growth (and GDP per worker growth) model:

$$\Delta y_{k,t} = \alpha + \beta_k + \gamma_0 f i_{k,t} + \gamma_1 X_{k,t} + \varepsilon_{k,t} \quad (3.10)$$

Where X is a vector of control variables known to influence long term economic growth: working population growth, openness to trade measured by the ratio of imports and exports to GDP, the share of government consumption in GDP and CPI inflation. As these variables are not explicitly included in our SFC framework, their inclusion in the empirical setting constitutes an additional check for the theoretical linkages between financialization and growth. The obtained estimates also provide a robustness check for the results obtained with the SVAR model. In order to control for the cyclical effects, we also estimate the models using rolling five-year windows:

$$\Delta y_{k,t+5,t} = \alpha + \beta_k + \gamma_0 f i_{k,t+5,t} + \gamma_1 X_{k,t+5,t} + Y_{k,t} + \varepsilon_{k,t} \quad (3.11)$$

In 3.11, X is a vector of control variables including working population growth, openness to trade measured by the ratio of imports and exports to GDP, the share of government consumption in GDP and CPI inflation, all averaged from time t to $t + 5$. Our main hypothesis is that γ_o will be negative and significant in both equations 3.10 and 3.11.

3.4. Results

Impulse response functions from the SVAR model are shown in figures 6 and 7. The confidence intervals for the impulse response functions based on structural Bayesian vector autoregressive models are obtained from the procedure proposed by Sims and Zha (1999)²⁹. We interpret the response of the variable to the shock as positive when the credible interval is above zero, and as negative if it is below zero.

Inspection of the figures validates our theory: shocks on the domestic credit to GDP ratio and on two financialization indices exert a negative and significant impact on GDP growth, gross capital formation growth and on the wage share (in model 1).

Shocks on the domestic credit to GDP ratio exert a negative impact on GDP growth in both models, where the effect kicks in in period one and then decreases gradually. Shocks on the financialization indices exert a negative impact on the growth of GDP, starting at period 1 in both model. Shocks on the domestic credit to GDP ratio exert a negative impact on gross capital formation in both models. Shocks on the financialization indices have a negative impact on gross capital formation in both models, but the impact appears more sustained in model 1 (in model 2, the effect dies out after two periods).

Shocks on the domestic credit to GDP ratio exert a negative impact on the wage share in both models. Finally, shocks on the financialization indices have a negative impact on the wage share in both model. The effect is particularly strong in model 1.

Concurrently, a positive shock on the wage share eventually increases the growth of both GDP and gross capital formation³⁰. This result validates our conclusion that a decreased

²⁹ Following Sims and Zha (1995), we report Bayesian error bands corresponding to the 16% and 84% quantiles (68% confidence credible set), which corresponds to one standard error in the Gaussian case. Sims and Zha (1999) showed that 68% confidence intervals are often more useful than 95% ones, since they provide a more precise estimate of the true coverage probability. Results are significant if the confidence intervals do not recover 0.

³⁰ The impact on gross capital formation is uncertain in years 0-2 and turns significant in year 2, when the credible set stands above the x-axis.

wage share (which reflects a deceleration in the growth of real wages, net of productivity gains) constrains capital accumulation under financialization. Finally, a positive shock to GDP growth decreases the private banking credit to GDP ratio; while increases in the wage share and GDP growth both exert a negative impact on the two financialization indices. This indicates that financialization is both the *cause* and the *consequence* of a deceleration of real sector investment - in line with the predictions of our model and existing case study evidence (Lazonick, 2013).

Overall, these findings indicate that financialization, whether measured by an exogenous increase in the private banking credit to GDP ratio, or an increase in the financialization indices, induces a lower wage share, and has detrimental implications for economic growth and gross capital formation alike. Also note that the private credit to GDP ratio responds positively to a shock on the two market-based financialization indices, indicating Ponzi finance (real sector leverage being fueled by financial market development).

(FIGURE 6 ABOUT HERE)

Turning to the variance decomposition (table 3 and 4), we find that the growth of GDP is mostly impacted by shocks on its lagged values (up to approximately 69% in both models), followed by GCF (up to approximately 32% of explained variance in both models), banking credit (up to 3.1% or 2.8% in model 1 and model 2, respectively) and the financialization index (up to 2.4% of explained variance in model 1), and the return index (up to 0.38% of explained variance in model 2).

(TABLE 3 ABOUT HERE)

(TABLE 4 ABOUT HERE)

Similarly, the growth of GCF is mostly impacted by shocks on its own values (up to 100% of explained variance in both models). In model 1, this is followed by private banking credit (up to approximately 3.1% of explained variance), the financialization index (up to approximately 2.4% of explained variance), GDP and wage growth. In model 2, the most significant variables are GDP growth, private banking credit, the return index and wage growth (up to approximately 3.4%, 2.2%, 0.7% and 0.2% of explained variance, respectively)

These results indicate that the recent structural changes in the financial sectors of high-income economies have contributed and interacted with the observed sluggish real sector growth and wage share stagnation. The observed impact is statistically significant, yet

comprised within credible boundaries.

(TABLES 5a and 5b ABOUT HERE)

(TABLES 5c and 5d ABOUT HERE)

As shown in tables 5a and 5b, our fixed effect regressions confirm that both private credit and the financialization index exert a negative and significant impact on both real economic growth and real economic growth per worker. Tables 5c and tables 5d convey additional robustness to our findings by showing that the impact of banking credit and private credit on real economic growth and real economic growth per worker remains negative when the return index is used (the sign of the latter remains negative across all specifications).

Finally, we employ the parameters from these regressions in order to assess the magnitude of the effects of financialization on the growth of real GDP per capita. Using equation 4 in table 5a, we compare a country with constant financialization index and private credit to GDP ratio with one in which those variables grow at a rate of 5.25 and 8.96 percentage points per year (which is the sample's average for those with positive growth). The estimated parameters of -0.0491 and -0.0201 imply that the financialized economy's GDP per capita will grow at a rate on average 43.78 basis points lower than the other one. Given that the sample's average annual GDP per capita growth rate in the post 2008 phase is 1.04%, this effect strikes us as significant as it suggests that the observed average economic growth rate has fallen nearly 30% below its potential level.

These results suggest that financialization is an explanatory factor of the observed 'New Secular Stagnation' discussed among others in Summers (2014). Our study does not put into question the long run effect of financial development on economic growth, which has been established in the literature - especially for countries with low levels of financial development (Arestis et.al, 2015; Levine, 2005; Ang, 2008). Rather, we underline that it is the organization and the regulation of the financial industry, which ultimately determine the impact of finance on economic growth. Our results back up the post-Keynesian claim that finance-led economies build up major imbalances and are prone to increased instability and lower macroeconomic performance (Hein and van Treeck, 2010; Tomaskovic-Devey et al.; 2015). At an epistemological level, we reject the neo-liberal claim that free financial markets are the only legitimate foundation for economic progress. We instead call for policies seeking to re-embed financial activities in the economic realm (Storm, 2018).

4. Conclusion and discussion

The objective of this paper was to investigate the macroeconomic implications of financialization. Using a new stock-flow consistent model, we first presented a theory in which financialization, as proxied by an exogenous increase in firm credit demand, led to a drop in profits, wages and investment, and to an increase in interest payments. This mechanism was driven by a concomitant increase in equity prices and dividend payments which, given a 'profit versus growth' trade-off, led to lower levels in real sector investment and aggregate demand, up to a point where the contradiction between financial sector and real sector dynamics became unsustainable, resulting in a sharp reversal of the economic cycle. Model calibrations showed that this dynamic left the economy worse off, as compared to a baseline scenario where no exogenous increase in lending took place.

We then tested the model's main predictions by conducting an empirical analysis based on an international panel dataset of 29 high income countries, observed over the 1998-2014 period. In line with our theoretical findings, the inspection of impulse response functions and forecast error variance decomposition obtained using a Bayesian structural VAR model highlighted that increases in private credit and in a new banking financialization index positively affected each other and exerted a negative and significant impact on the wage share, the growth of gross capital formation, and the growth of GDP. These results were confirmed by a set of fixed-effect panel regressions, which revealed a sizable, yet credible, negative impact of financialization on both GDP per capita and GDP per worker growth. Our findings therefore show unambiguously that financialization carries significant macroeconomic costs.

It thus appears that one important future policy challenge may be to design and implement a comprehensive set of corrective measures which might curb these adverse effects. At this stage, it may be useful to map out existing propositions in this domain. First, there seems to be an increasing consensus that a set of significant macro-prudential reforms would be necessary in order to decrease financial instability. For instance, recent proposals made by international institutions such as the Financial Stability Board (Board (2014)) and the European Systemic Risk Board (Pagano et al. (2014)) include the removal of the preferential accounting treatment of debt (in order to decrease incentives to leverage), the implementation of an aggressive anti-trust policy in the banking sector (in order to control for systemic risk resulting partly from excessive banking concentration), the increase of minimum capital requirements (in order to limit leverage and increase banking resilience), the reform of the structure of the banking sector, either via ring-fencing or full separation (in order to reduce

risks due to investment activities), the reduction of large exposure limits among financials (in order to reduce the banks' exposure to security risks)...

In order to be effective, such reforms would require the adoption of a stricter stance on secrecy jurisdictions. Important steps in this direction appear to have recently been taken. In February 2014, G20 finance ministers endorsed an OECD initiative seeking to launch a new single standard for the automatic exchange of information. A group of 60 countries and jurisdictions have hence committed to obtaining information from their financial institutions and automatically exchanging that information with other jurisdictions on an annual basis. Another often cited proposal is the adoption of an international tax ('Tobin' tax) on financial transactions in order to "throw some sand in those well-greased wheels" (Tobin (1978)). In 2011, the European Commission put forth a European Union Financial Transaction Tax proposal ('EU FTT'), which would charge financial transactions with a tax of 0.1% for the exchange of shares and bonds and 0.01% across derivative contracts. At the time of writing this paper, this proposal was still being negotiated at the European level.

Second, various contributions have suggested that monetary and budgetary policy tools may need to be re-evaluated. An often discussed proposal in this regard is the adoption of a four percent inflation target by central banks, which would leave room for further interest rate cuts, deleverage the private sector, and promote private investment (Blanchard et al. (2010); Leigh (2010); Ball (2014)). According to its proponents, this new target would have the advantage of reducing the debt burden without restricting aggregate demand, while mitigating the financialization process by benefiting debtors. Such discussions may also be linked to current debates regarding the potential extension of the Central Banks' mission to the monitoring of financial instability, with the question of the optimality of an 'augmented Taylor rule' coming into particular focus (Käffer (2014)). Fiscal policy is another area to be mentioned given the negative impact of financialization on the wage share and aggregate demand. For instance, Piketty et al. (2014) have highlighted that the socially optimal top tax rate has been significantly underestimated in recent years.

Third, finance scholars and practitioners are increasingly aware that curbing the adverse effects of financialization will also involve the development of new managerial tools to guide the behavior of banks, corporations and their shareholders in a manner which is responsive to the interests of society (see Paraque and Perez (2016)). This topic is currently being developed by several researchers, private actors and international institutions. Examples abound: ethical investment, impact investment, micro-credit, social banking, alternative currencies, social stock exchanges... Such initiatives, which operate on the premise that

financial decisions and corporate governance should not be considered uniquely through the lens of shareholder profit maximization, are growing rapidly at an international level.

This paper does not allow us to issue any particular recommendations regarding the optimal content or sequencing of a reform package consisting in a mix of the above proposals. However, we hope that our results will contribute to anchoring the investigation of such policy responses as one of the major tasks for our profession. As argued in Padoa-Schioppa (2010), international financial stability may indeed be seen as a non-rivalrous, non-excludable global public good. One urgent challenge for economists is therefore to identify the corrective procedures that must be put in place in order to prevent global financiers from over-consuming this public good.

References

- Aalbers, M.B. and N. Castree. The international encyclopedia of geography: People, the earth, environment, and technology. Oxford Wiley, 2015.
- Aaronson, D., Agarwal, S., French, E., 2012. The Spending and Debt Response to Minimum Wage Hikes. *American Economic Review* 102(7): 3111-3139
- Aglietta, M.. A Theory of Capitalist Regulation: The U.S. Experience. London, Verso, 1979.
- Aglietta, M.. Shareholder value and corporate governance: some tricky questions. *Economy and Society*, 29(1):146-159, 2000.
- Aglietta, M.. La monnaie, entre dettes et souveraineté. Odile Jacob, 2016.
- Alessi, L. and C. Detken. Identifying excessive credit growth and leverage. ECB Working Paper, 2014. URL.
- Altunbas, Y., Gambacorta, L. and D. Marques-Ibanez. Securitisation and the bank lending channel. *European Economic Review*, 53(8):996-1009, 2009.
- Ang, J. B. 2008. A survey of recent developments in the literature of finance and growth. *Journal of Economic Surveys*, 22 (3): 536–576.
- Arcand, J.L., Berkes, E. and U. Panizza. Too much finance? IMF working paper, 2012.
- Arestis, P., Chortareas, G. and Magkonis, G. 2015. The financial development and growth nexus: A meta-analysis. *Journal of Economic Surveys*, 29 (3): 549–565.
- Bhaduri, A., and S. Marglin. 1990. “Unemployment and the real wage: the economic basis for contesting political ideologies.” *Cambridge Journal of Economics* 14: 375–393.
- Ball, L.M.. The Case for a Long-Run Inflation Target of Four Percent. Number 14-92. International Monetary Fund, 2014.
- Beetsma, R., Giuliadori, M. and F. Klaassen. Trade spill-over of fiscal policy in the European Union: a panel analysis. *Economic Policy*, 48(21):639-687, 2006.
- Blackburn, R.. Finance and the fourth dimension. *New Left Review*, 1(39):39-70, 2006.
- Blanchard, O., DellAriccia, G. and P. Mauro. Rethinking macroeconomic policy. *Journal of Money, Credit and Banking*, 42(s1):199-215, 2010.
- Blanchard, O. et al. Do DSGE models have a future? Technical report, 2016.
- FSB, Financial Stability Board. Global shadow banking monitoring report 2014, October 30, 2014.
- Bordeleau, E., Graham, C. The impact of liquidity on bank profitability, 2010.
- Borio, C.E.V., Kharroubi, E., Upper, C. and F. Zampolli. Labour reallocation and productivity dynamics: financial causes, real consequences. BIS Working Paper, 2016.

- Boyer, R. Is a finance-led growth regime a viable alternative to fordism? A preliminary analysis. *Economy and Society*, 29(1):111-145, 2000.
- Boyer, R. From shareholder value to CEO power: The paradox of the 1990s. *Competition & Change*, 9(1):7-47, 2005.
- Boyer, R. The collapse of finance but labour remains weak. *Socio-economic review*, 8(2):348-353, 2010.
- Brandt, P.T. and J.R.Freeman, 2006. *Advances in Bayesian Time Series Modeling and the Study of Politics: Theory Testing, Forecasting, and Policy Analysis*. *Political Analysis*, 14,(01), 1-36.
- Brettel, K., Gaffen, D. and D. Rohde. As stock buybacks reach historic levels, signs that corporate America is undermining itself, 2015. URL <http://www.reuters.com/investigates/special-report/usa-buybacks-cannibalized/>.
- Buttiglione, L., Lane, P., Reichlin, L. and V. Reinhart. Deleveraging, what deleveraging? the 16th geneva report on the world economy. International Center for Monetary and Banking Studies/Center for Economic Policy Research, September, 2014.
- Caiani, A., Godin, A., Caverzasi, E., Gallegati, M., Kinsella, S. and J. Stiglitz. Agent based-stock flow consistent macroeconomics: Towards a benchmark model. *Journal of Economic Dynamics & Control*, C(69):375-408, 2016.
- Global Capital. Euro corporate hybrid bonds - to stay over the cycle, 2015. URL <http://www.globalcapital.com/article/tggh3g30y1hf/euro-corporate-hybrid-bonds-to-stay-over-the-cycle>.
- Canova, Fabio & Ciccarelli, Matteo, 2013. "Panel Vector Autoregressive Models: A Survey," CEPR Discussion Papers 9380, C.E.P.R. Discussion Papers.
- Caverzasi, E. and A. Godin. Post-keynesian stock-flow-consistent modeling: a survey. *Cambridge Journal of Economics*, 1(39):157-187, 2014.
- Cecchetti, S.G. and E. Kharroubi. Reassessing the impact of finance on growth. BIS working paper, 2012.
- Cerrato, M., Choudhry, M., Crosby, J. and J.L. Olukuru. Why do UK banks securitize? Available at SSRN 2051379, 2012.
- Chari, V., Kehoe, P.J. and E.R. McGrattan. New Keynesian models: not yet useful for policy analysis. *American Economic Journal: Macroeconomics*, 1(1):242-266, 2009.
- Ciccarelli M. and A. Rebucci. 2003. Bayesian Vars : A Survey of the Recent Literature with An Application to the European Monetary System. IMF Working Paper 03/102.
- Dallery, T.. Post-keynesian theory of the firm under financialization. *Review of Radical Political Economics*, 4(41):492-515, 2009.
- Dettling, Lisa J., and Joanne W. Hsu (2017). "Minimum Wages and Consumer Credit: Impacts on Access to Credit and Traditional and High-Cost Borrowing," Finance and Economics Discussion Series 2017-010. Washington: Board of Governors of the Federal Reserve System
- Ductor L. and D. Grechyna. Financial development, technological progress and economic growth. *Technological Progress and Economic Growth* (July 2013), 2013.
- Dullien, S. Is new always better than old? On the treatment of fiscal policy in Keynesian models. *Review of Keynesian Economics*, (1):5{23, 2012.
- Duwicquet, V. and J. Mazier. Crise de la zone euro, integration financière et rationnement bancaire. *Revue Economique*, 66(4):783-804, 2015.
- Epstein, G. Introduction: financialization and the world economy. *Financialization*, pages 3-16, 2005.
- Froud, J., Haslam, C., Johal, S. and K. Williams. Shareholder value and financialization: consultancy promises, management moves. *Economy and Society*, 29(1):80-110, 2000.
- Frydman C. and D. Jenter. CEO compensation. Technical report, National Bureau of

- Economic Research, 2010.
- Garcia, N.E. DSGE macroeconomic models: a critique. *Economie Appliquée*, Special Issue on Macroeconomics, 1(64):149-171, 2011.
- Giraud, G., Mc Isaac, F., Bovari, E. and E. Zatsepina. *Coping with the collapse: A stock-flow consistent monetary macrodynamics of global warming*. 2016.
- Gleadle, P., Haslam, C. and Y. Yin. *Critical accounts and perspectives on financialization. Critical Perspectives on Accounting*, 2014.
- Godley, W. and M. Lavoie. *Monetary Economics: An Integrated Approach to Credit, Money, Income, Production and Wealth*. Palgrave Macmillan, 2007.
- Hein, E., and van Treeck, T. 2010. 'Financialisation' in Post-Keynesian models of distribution and growth. In M. Setterfield (ed.), *Handbook of Alternative Theories of Economic Growth*. Cheltenham: Edward Elgar, pp. 277–292.
- Jorda, O., Knoll, K., Kuvshinov, D., Schularik, M. and Taylor, A. The rate of return of everything, 1870-2015. NBER working papers 24112.
- Jürgens, J., Naumann, K. and J. Rupp. Shareholder value in an adverse environment: the German case. *Economy and Society*, 1(29):54-79, 2000.
- Juselius K. and M. Franchi. Taking a DSGE model to the data meaningfully. *Economics: the open-access, open-assessment E-Journal*, 1:4, 2007.
- Käffer, B. The Taylor rule and financial stability a literature review with application for the Eurozone. *Review of Economics*, 2(65):159-192, 2014.
- Keen, S. Finance and economic breakdown: Modeling Minsky's financial instability hypothesis'. *Journal of Post Keynesian Economics*, 17(4):607-635, 1995.
- Keynes, J.M. *The General Theory of Employment, Interest and Money*. Great Mind Series, Prometheus Books, reprint, 1936.
- Kim, S. International transmission of us monetary policy shocks: evidence from VAR's. *Journal of Monetary Economics*, 2(48):339-372, 2001.
- Kim, S. and J. W. Lee. Demographic changes, saving, and current account: an analysis based on a panel VAR model. *Japan and the World Economy*, 2(20):236-256, 2008.
- Kim, S. and N. Roubini. Exchange rate anomalies in the industrial countries: a solution with a structural VAR approach. *Journal of Monetary Economics*, 45(3):561-586, 2000.
- Kim, S. and D. Y. Yang. The impact of capital in flows on asset prices in emerging asian economies: is too much money chasing too little good? *Open Economies Review*, 2(22):293-315, 2008.
- Lagoarde-Segot, T. *Financialization: towards a new research agenda*. International Review of Financial Analysis, 2016.
- Langley, P. *The Everyday Life of Global Finance: Saving and Borrowing in Anglo-America*. Oxford University Press, 2008.
- Lazonick, W. The financialization of the US corporation: What has been lost, and how it can be regained (2013). *Seattle University Law Review*, 36:857, 2013.
- Lazonick, W. and M. O'Sullivan. Maximizing shareholder value: a new ideology for corporate governance. *Economy and Society*, 1(29):13-35, 2000.
- Le Heron, E. and A. Marouane. Une histoire de la modélisation post keynesienne stock flux cohérente contemporaine. *Cahiers du GREThA*, -(15), 2015.
- Leigh, D. Monetary policy and the lost decade: Lessons from Japan. *Journal of Money, Credit and Banking*, 42(5):833-857, 2010.
- Levine, R. 2005. Finance and Growth: Theory and Evidence. In P. Aghion and S. N. Durlauf (eds.), *Handbook of Economic Growth*. Oxford: Elsevier, pp. 865–934.
- Lingens, J., 2007. Unions, wage setting, and economic growth. *Economic Modelling* 24-1, pp. 167-188.

- Litterman, R.B., 1986. Forecasting with Bayesian Vector Autoregressions - five years of experience. *Journal of Business and Economic Statistics* 38, 4:25.
- Lysandrou, P. The colonization of the future: An alternative view of financialization and its portents. *Journal of Post Keynesian Economics*, 39(4):444-472, 2016.
- Manganelli, S. and A. Popov. Financial dependence, global growth opportunities, and growth revisited. *Economics Letters*, 120(1):123-125, 2013.
- Mazier, J. and A. Tiou-Tagba. World imbalances and macroeconomic imbalances: A three country stock-flow consistent model with fixed or flexible prices. *Metroeconomica*, 63(2):358-388, 2012.
- Mazier, J. and S. Valdecantos. A multi-speed Europe: is it viable? a Stock-Flow Consistent approach. *European Journal of Economics and Economic Policies: Intervention*, 12(1):93-112, 2015.
- Minsky, H. Monetary systems and accelerator models. *The American Economic Review*, XLVII(6):860-883, 1957.
- Morin, F. A transformation in the French model of shareholding and management. *Economy and Society*, 1(29):36-53, 2000.
- Mouakil, T. A 'Minsky crisis' in a Stock-Flow Consistent model. *Revue de la Régulation*, 2(16):1-26, 2014.
- Orhangazi, O. Financialisation and capital accumulation in the non-financial corporate sector: A theoretical and empirical investigation on the US economy: 1973-2003. *Cambridge Journal of Economics*, 32(6):863-886, 2008.
- Özlem O., Yentürk, N., 2001. Do Low Wages Stimulate Investment? An analysis of the relationship between distribution and investment in Turkish private manufacturing industry, *International Review of Applied Economics*, 15:4, 359-374
- Padoa-Schioppa, T. Markets and government before, during, and after the 2007-20XX crisis. Per Jacobsson Foundation, 2010.
- Pagano, M., ESRB Advisory Scientific Committee, et al. Is Europe overbanked? In *mBank-CASE Seminar Proceedings*, number 132. CASE-Center for Social and Economic Research, 2014.
- Paranque, B. and R. Perez. Finance Reconsidered: New Perspectives for a Responsible and Sustainable Finance. *Critical Studies on Corporate Social Responsibility*. Emerald UK, 2016.
- Paraschiv, F., Mudry, P.A., Andries, A., 2015. Stress testing techniques for portfolios of commodity futures, using extreme-value theory and copulas. *Economic Modelling* 50, p.9-18.
- Piketty, T. *Le capital au 21e siècle*. Editions du Seuil, 2013.
- Piketty, T., Saez, E. and S. Stantcheva. Optimal taxation of top labor income: a tale of three elasticities. *American Economic Journal: Economic Policy*, 6(1):230-271, 2014.
- Reinhart, C. and K. Rogoff. *This Time is Different: Eight Centuries of Financial Folly*. Princeton University Press, 2009.
- Reyes, L. and J. Mazier. Financialized growth regime: Lessons from Stock-Flow Consistent models. *Revue de la Régulation*, 16(2):17-57, 2014.
- Rubio-Ramirez, J.F., Waggoner, D.F., , Zha, T., 2010. Structural Vector Autoregressions: Theory of Identification and Algorithms for Inference. *The Review of Economic Studies* 77, no. 2 (2010): 665-96.
- Rousseau, P. and P. Wachtel. What is happening to the impact of financial deepening on economic growth? *Economic Inquiry*, 1(49):276-288, 2011.
- Saez, E. and G. Zucman. Wealth inequality in the United States since 1913. Evidence from capitalized income tax data. *The Quarterly Journal of Economics*, 2(131):519-578,

- 2016.
- Scialom, L.. Economie bancaire. La Decouverte, 2013.
- Sepecher, P. Pour une macroéconomie monétaire dynamique et complexe. *Revue de la Regulation*, 2 (16):2-35, 2014.
- Sims, C. Bayesian skepticism on unit root econometrics. *Journal of Economic Dynamics and Control*, 1(12):463-474, 1988.
- Sims, C. and H. Uhlig. Understanding unit rooters: a helicopter tour. *Econometrica*, 6(59):1591-1599, 1980.
- Sims, C. and T. Zha. Does monetary policy generate recessions?: Using less aggregate price data to identify monetary policy. Paper, Yale University, page 782, 1995.
- Sims, C and T. Zha (1998). Bayesian methods for dynamic multivariate models. *International Economic Review*, Vol. 39, No. 4, pp. 949-68.
- Sims, C., and Zha, T. (1999). Error bands for impulse response. *Econometrica*, 67, 5, 1113-1155
- Smets, F. and Wouters, R. (2007) Shocks and frictions in US Business Cycles: A Bayesian DSGE Approach, *American Economic Review*, Vol. 97, No. 3, pp. 586-606.
- Sokol, M. Financialisation, financial chains and uneven geographical development: Towards a research agenda. *Research in International Business and Finance*, 39(B):686-695, 2015.
- Stiglitz, J. and A. Weiss. Credit rationing in markets with imperfect information. *The American Economic Review*, 71(3):393-410, 1981.
- Storm, S. 2018. Financialization and economic development: a debate on the social efficiency of modern finance. *Development and Change*, 49 (2): 302-329.
- Summers, L.H. Reflections on the new secular stagnation hypothesis. *Secular stagnation: Facts, causes and cures*, pages 27-40, 2014.
- Tobin, J. A proposal for international monetary reform. *Eastern Economic Journal*, 3(4):153-159, 1978.
- Tomaskovic-Devey, D., Lin, K.-H. and Meyers, N. 2015. Did financialization reduce economic growth?. *Socio-Economic Review*, 13 (3): 525-548.
- Williams, K. From shareholder value to present-day capitalism. *Economy and Society*, 1(29):1-12, 2000.
- Willmott, H. Creating 'value' beyond the point of production: branding, financialization and market capitalization. *Organization*, 5(17):517-542, 2010.
- Zeza, G. and S. Valdecantos. Reforming the international monetary system: a Stock-Flow Consistent approach. *Journal of Post Keynesian Economics*, 2(38):167-191, 2015.

Appendix A.1. SFC model: system of equations

Note: Equation numbers do not match those presented in the main body of the article.

Gross Domestic Product (Y) is here defined by the demand approach. That is, as the sum of aggregate consumption (C) and investment (I), which are carried out by the private and public sectors respectively.

$$Y = C + I = C^H + C^G + I^H + I^G + I^F \quad (\text{A.1})$$

Households' consumption is determined by its own lags, households' revenue (W^B) and by the sector's wealth (W^H). The parameters c^a_1 and c^a_2 are the marginal propensity to consume out of income and wealth, respectively.

$$C^H = c_0^a + c_{11}^a C^H_{-1} + c_{12}^a C^H_{-2} + c_1^a W^B_{-1} + c_2^a W^H_{-1} \quad (\text{A.2})$$

The public sector's non-investment expenditure is here defined as public consumption, which is determined by its own lags and by the level of GDP lagged one period. The latter is included with a minus sign, meaning that fiscal policy is meant to be counter-cyclical in this economy. Naturally, the sum of household consumption and government non-investment expenditure is aggregate consumption (eq. A.4).

$$C^G = c_0^g + c_{11}^g C^G_{-1} + c_{12}^g C^G_{-2} - c_1^g Y_{-1} \quad (\text{A.3})$$

$$C = C^H + C^G \quad (\text{A.4})$$

Households' investment (seen here as current expenditure I^H) equals accumulation of non-financial assets by this sector ($p_K \Delta K^H$), and is treated as a constant fraction of output from the previous period.

$$I_H = p_K \Delta K^H = \kappa Y_{-1} \quad (\text{A.5})$$

Overall current investment (or total accumulation of non-financial assets) is a function of its own lags, Tobin's q (the ratio of the stock of equities to the stock of non-financial assets $p_{E-1} E_{-1} / p_{K-1} K_{-1}$), firms' profits (Π), the lending interest rate and GDP.

$$I = p_K \Delta K = \varphi_0^f + \varphi_{11}^f p_{K-1} \Delta K_{-1} + \varphi_{12}^f p_{K-2} \Delta K_{-2} + \varphi_1^f (p_{E-1} E_{-1} / p_{K-1} K_{-1}) + \varphi_2^f \Pi_{-1} - \varphi_3^f r_{-1} + \varphi_4^f Y_{-1} \quad (\text{A.6})$$

Like public consumption, public (non-market) investment is also seen here as a policy tool used to counter adverse shocks. However, instead of making it depend on lagged GDP, we make it a function of current private investment.

$$I^G = p_K \Delta K^G = \varphi_0^g - \varphi_1^g (I^H + I^F) \quad (\text{A.7})$$

As a matter of accounting, firms' investment is simply the difference between total current investment and investment from households and the government.

$$I^F = p_K \Delta K^F = I - I^H - I^G \quad (\text{A.8})$$

Changes in the price of non-financial assets are determined by its lagged values, as well as by changes in wages, the volume of capital and the lending interest rate.

$$\Delta p_K = \tau_0 + \tau_{11} \Delta p_{K-1} + \tau_{12} \Delta p_{K-2} + \tau_{11}^{WB} \Delta WB_{-1} + \tau_{12}^{WB} \Delta WB_{-2} + \tau_{11}^K \Delta K_{-1} + \tau_{12}^K \Delta K_{-2} - \tau_{10}^r r - \tau_{11}^r r_{-1} \quad (\text{A.9})$$

As described in the main body of the paper, wages are a function of their own lags and of net sales by firms (described here as the difference between aggregate consumption and investment, and profit, interest, dividend and tax outlays). On the other hand, profits are obtained from the national income identity that specifies that this macroeconomic aggregate is the sum of profits (capitalists' income), wages (workers' income) and taxes (public sector revenue).

$$WB = w_0 + w_{11} WB_{-1} + w_{12} WB_{-2} + w_1 (C_{-1} + I_{-1} - I^F_{-1} - \Pi_{-1} - Int_p^F_{-1} - Div_{-1} - T^F_{-1}) \quad (\text{A.10})$$

$$\Pi = Y - WB - T^H - T^F \quad (\text{A.11})$$

Interests on debt issued paid (denoted with underscore p) by households, firms and the government is the product of the lending interest rate and the stock of debt liabilities lagged one period. The sum of these three items makes up total interests, which are the main resources of banks.

$$Int_p^s = r p_{L-1} L^s_{-1} \quad \text{for } s = H; F; G$$

$$(\text{A.12})$$

$$Int = Int^H + Int^F + Int^G \quad (\text{A.13})$$

Firms pay dividends to equity holders, and these are defined as the product of the financial profitability rate (r_E) and the stock of equities lagged one period.

$$Div = r_E p_{E-1} E_{-1} \quad (A.14)$$

Taxes paid by households are a fixed proportion of their lagged savings (eq. A.15), and taxes paid by firms are a fraction of lagged capitalists' profits (eq. A.16).

$$T^H = t_H(WB_{-1} - C^H_{-1}) \quad (A.15)$$

$$T^F = t_F \Pi_{-1} \quad (A.16)$$

The flow of deposits held by households (alternatively, households' money demand function) is determined in standard IS-LM fashion. That is, as the sum of the transactions motive ($\psi_1^H(C^H + I^H)$) and the speculative motive ($\psi_2^H i$). As in other equations, previous values of deposit flows held are included here in reference to the variable's values.

$$p_D \Delta D^H = \psi_0^H + \psi_{11}^H p_{D-1} \Delta D^H_{-1} + \psi_{12}^H p_{D-2} \Delta D^H_{-2} + \psi_1^H (C^H + I^H) - \psi_2^H i \quad (A.17)$$

The same reasoning applies to the flow of deposits held by firms, which depends on wages paid to workers and the interest rate, meaning that firms will demand more money when wages increase and when the incentive to hold cash decreases (via i). The sum of the stock of deposits held by firms and households is total demand for deposits (eq. A.19).

$$p_D \Delta D^F = \psi_0^F + \psi_{11}^F p_{D-1} \Delta D^F_{-1} + \psi_{12}^F p_{D-2} \Delta D^F_{-2} + \psi_1^F WB - \psi_2^F i \quad (A.18)$$

$$D = D^H + D^F \quad (A.19)$$

The flow of credit supply by banks is a function of its own lags, as well as of financial profitability and its lags, and the spread between the lending rate and the interest rate paid on deposits.

$$p_L \Delta L = \gamma_0^B + \gamma_{11}^B p_{L-1} \Delta L_{-1} + \gamma_{12}^B p_{L-2} \Delta L_{-2} + \gamma_{10}^{Bre} r_E + \gamma_{11}^{Bre} r_{E-1} + \gamma_{12}^{Bre} r_{E-2} + \gamma_{10}^{Bri} (r - i) + \gamma_{11}^{Bri} (r_{-1} - i_{-1}) + \gamma_{12}^{Bri} (r_{-2} - i_{-2}) \quad (A.20)$$

The flow of credit demand by households is a function of its lags, the lending interest rate, the change in households' wages and the level of the price of non-financial assets (as a proxy of the price of housing). The flow of the demand for public debt (eq. A.22, alternatively the public deficit) comes from the real sector transactions that the government has to finance,

that is, in the form of public investment and non-investment expenditures, interests on debt and to this we subtract taxes received from the private sector. Private firms' indebtedness (eq. A.23) is the difference between credit supply by banks, and credit demand by households and the government. This assumes that firms take on credit granted by banks passively, which is both in line with the accounting of our model and with what we think has been going on between the financial sector and the real sector for the past three decades.

$$p_L \Delta L^H = \gamma_0^H + \gamma_{11}^H p_{L-1} \Delta L^H_{-1} + \gamma_{11}^H p_{L-2} \Delta L^H_{-2} - \gamma_1^H r + \gamma_2^H \Delta WB + \gamma_2^H \Delta p_K \quad (\text{A.21})$$

$$p_L \Delta L^G = I^G + C^G + Int_p^G - T \quad (\text{A.22})$$

$$L^F = L - L^H - L^G \quad (\text{A.23})$$

Newly issued equities are a function of their own lags, as well as of financial profitability and newly issued debt. Note that the sign that precedes the coefficient accompanying ΔL^F (η_2) is negative, meaning that the more firms issue credit the less they issue equities. This relationship involves volumes only, but clearly indicates that internal funding (own funds or equity issued) competes with external funding (credit issued) on the liability side of firms' balance sheets.

$$\Delta E = \eta_0 + \eta_{11} \Delta E_{-1} + \eta_{12} \Delta E_{-2} + \eta_0^{re} r_E + \eta_1^{re} r_{E-1} + \eta_2^{re} r_{E-2} - \eta_2 \Delta L^F \quad (\text{A.24})$$

The change in the price of deposits is a function of its past values, as well as of the past values of the change in the volume of the same instrument and of the deposits interest rate. As in the deposits demand equation, the last relationship is negative (via β_1), and represents money demand in standard IS-LM fashion.

$$\Delta p_D = \beta_0 + \beta_{11} \Delta p_{D-1} + \beta_{12} \Delta p_{D-2} - \beta_{11}^D \Delta D_{-1} - \beta_{12}^D \Delta D_{-2} - \beta_1 i \quad (\text{A.25})$$

The change in the price of loans (which, empirically, can be calculated from the financial accounts implicitly) is a function of its lags, the change in the volume of loans and of the lending interest rate. The relationship between the change in the price of loans and the passive interest rate is seen here from the point of view of debt holders so that a rise in the interest rate forces banks to reduce loan prices (alternatively lending conditions).

$$\Delta p_L = \varepsilon_0 + \varepsilon_{11} \Delta p_{L-1} + \varepsilon_{12} \Delta p_{L-2} + \varepsilon_{11}^L \Delta L_{-1} + \varepsilon_{12}^L \Delta L_{-2} - \varepsilon_1 r \quad (\text{A.26})$$

The change in the price of equity depends on its past values, on the past values of the change in their volumes, on the change in GDP and on the change in the ratio of financial-to-non-financial-assets. The last term is included as an imperfect (though necessary) proxy of the change in Tobin's q , here seen as the ratio of the volume of equities to the volume of non-financial assets.

$$\Delta p_E = \lambda_0 + \lambda_{11}\Delta p_{E-1} + \lambda_{12}\Delta p_{E-2} + \lambda_{11}^E\Delta E_{-1} + \lambda_{12}^E\Delta E_{-2} + \lambda_1\Delta Y_{-1} - \lambda_2\Delta(E/K) \quad (\text{A.27})$$

The interest rate paid on deposits (alternatively the leading interest rate) is a function of its own past values, and of the change in savings. The last relationship is negative, given that a rapid increase in national savings can make savings themselves less attractive, which ultimately translates into a lower remuneration for savers (i).

$$i = \theta_0 + \theta_{11}i_{-1} + \theta_{12}i_{-2} - \theta_{11}^S\Delta S_{-1} - \theta_{12}^S\Delta S_{-2} \quad (\text{A.28})$$

The same logic holds for the lending interest rate, although its main determinant is investment, and to its list of determinants we add the interest rate on deposits, so that the evolution of both interest rates (and thus the spread) remains within reasonably close limits. The positive association between investment and the lending interest rate means that the higher investment is (in the absence of money expansion) the more expensive credit becomes.

$$r = \zeta_0 + \zeta_{11}r_{-1} + \zeta_{12}r_{-2} + \zeta_{11}^I\Delta I_{-1} + \zeta_{12}^I\Delta I_{-2} + \zeta_{11}^i i_{-1} + \zeta_{12}^i i_{-2} \quad (\text{A.29})$$

Financial profitability (meaning here equity profitability) is a function of its own lags, the changes in non-financial profits and the changes in the price of equity.

$$r_E = \omega_0 + \omega_{11}r_{E-1} + \omega_{12}r_{E-2} + \omega_{11}^{\Pi}\Delta \Pi_{-1} + \omega_{12}^{\Pi}\Delta \Pi_{-2} + \omega_{11}^{pe}\Delta p_{E-1} + \omega_{12}^{pe}\Delta p_{E-2} \quad (\text{A.30})$$

The remaining equations are accounting identities that are necessary for the model to be stock-flow consistent. Thus, household wealth (W^H) is the sum of the stock of the sector's non-financial assets and deposits less their debt liabilities. Firms' wealth (W^F) is expressed in the same way, with the only difference that it adds equity issuing (alternatively own funds) to the identity for this sector. Government wealth (W^G) is simply the difference between the

stock of non-financial assets (alternatively public goods such as infrastructure) and public debt. Banks' wealth (W^B) is the difference between aggregate wealth (here expressed as total non-financial assets) and wealth by the other non-financial sectors and the central bank. The latter is defined as the difference of the stock of refinancing and its deposits liabilities (i.e. money printed).

$$W^H = p_K K^H + p_D D^H - p_L L^H \quad (\text{A.31})$$

$$W^F = p_K K^F + p_D D^F - p_L L^F - p_E E \quad (\text{A.32})$$

$$W^G = p_K K^G - p_L L^G \quad (\text{A.33})$$

$$W^B = p_K K - W^H - W^F - W^G - W^{CB} \quad (\text{A.34})$$

$$W^{CB} = RF - p_D D \quad (\text{A.35})$$

Household savings are the difference between household revenue (wages) and the flow of deposits, and their outlays in the form of interest payments, taxes, consumption expenditure, newly issued debt and investment.

$$S^H = WB - Int^H - T^H - C^H + p_D D^H - p_L L^H - I^H \quad (\text{A.36})$$

Firms' savings (alternatively their self-financing) is the difference between total production of consumption and investment goods, which is ultimately carried out by firms, and their expenses (investment, labor costs, interests, dividends, taxes and profits).

$$S^F = Y - I^F - WB - Int^F - Div - T^F - \Pi \quad (\text{A.37})$$

We define government and bank's saving as the change in the corresponding sectors' wealth. Although this does not make sense strictly speaking, it is a simplifying assumption that has to be made from an accounting point of view.

$$S^G = \Delta W^G \quad (\text{A.38})$$

$$S^B = \Delta W^B \quad (\text{A.39})$$

Central bank saving is treated here as the closing line for the corresponding item, that is, as the difference between aggregate savings and the savings of households, firms, the government and private banks. We also assume that investment equals savings.

$$S^{CB} = S - S^H - S^F - S^G - S^B \quad (\text{A.40})$$

$$S = I \quad (\text{A.41})$$

Refinancing by the central bank equals the stock of credit granted plus the stock of equities issued less banks' wealth. This identity is the bottom part of table 1 for banks in stock form.

$$RF = p_L L + p_E E - W^B \quad (\text{A.42})$$

Finally, the unwritten identity is:

$$p_D D + W^{CB} = p_L L + p_E E - W^B \quad (\text{A.43})$$

Our simulations show that dividing through the left-hand side and the right-hand side of this identity yields 1 for all periods of the simulation, so that the system of equations is properly closed. This means that there are no black holes in our system, so that all items are properly explained.

Appendix A2. Data sources

Description of variables used in the empirical section.

Name	Definition	Source
5-bank asset concentration	Assets of five largest banks as a share of total commercial banking assets. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax, discontinued operations and other assets.	Global Financial Development Database (GFDD, World Bank) June 2016; Bankscope, Bureau van Dijk (BvD)
CPI Inflation, consumer prices (annual %)	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.	International Monetary Fund, International Financial Statistics and data files.
Exports of goods and services (constant 2010 US\$)	Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Data are in constant 2010 U.S. dollars.	World Bank national accounts data, and OECD National Accounts data files.
General government final consumption expenditure (% of GDP)	General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation.	World Bank national accounts data, and OECD National Accounts data files.
Imports of goods and services (constant 2010 US\$)	Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Data are in constant 2010 U.S. dollars.	World Bank national accounts data, and OECD National Accounts data files.
Liquid	Liquid assets to deposits and short term funding (%). the ratio of the value of liquid assets (easily converted to cash) to short-term funding plus total deposits. Liquid assets include cash and due from banks, trading securities and at fair value through income, loans and advances to banks, reverse repos and cash collaterals. Deposits and short term funding includes total customer deposits (current, savings and term) and short term borrowing (money market instruments, CDs and other deposits).	Global Financial Database (GFDD, World Bank) June 2016.
M3	Broad money (M3) includes currency, deposits with an agreed maturity of up to two years, deposits redeemable at notice of up to three months and repurchase agreements, money market fund shares/units and debt securities up to two years.	World Bank (International Monetary Fund, International Financial Statistics data files).
Privatebankcred	Domestic credit to private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.

Privatecred	Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises. The financial corporations include monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies.	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.
ROA	Bank return on assets (% , after tax): Commercial banks' after-tax net income to yearly averaged total assets.	Global Financial Development Database (GFDD, World Bank) June 2016: Bankscope, Bureau van Dijk (BvD)
VGCF	Gross capital formation (annual % growth), Annual growth rate of gross capital formation based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.	Global Financial Database (GFDD, World Bank) June 2016: World Bank national accounts data, and OECD National Accounts data files.
VGDP	GDP growth (annual %), Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.	World Bank national accounts data, and OECD National Accounts data files.
VWAGE	Adjusted wage share: total economy: as percentage of GDP at current factor cost (Compensation per employee as percentage of GDP at factor cost per person employed)	AMECO database -annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN)
VARWAGE	Percentage variation of total employee compensation. Domestic concept, included are residents as well as non-residents working for resident producer units. Compensation of employees includes wages and salaries (D.11) and employers' social contributions (D.12). Expressed in purchasing power standard (PPS)	AMECO database -annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN)
Working population	Total population between the ages 15 to 64 as a percentage of the total population. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	World Bank staff estimates based on age distributions of United Nations Population Division's World Population Prospects.

Appendix A3. Bayesian inference

Among the many advantages of Bayesian inference, two of them were considered decisive for our paper. First, BVAR models overcome the overfitting problem by reducing the number of parameters that have to be estimated into 6 « hyper-parameters » (8 in the case of Sims and Zha's prior). These hyper-parameters control (i) the dimension of the prior variance of the parameters, (ii) the random walk prior of the first lags; (iii) the relative weight of the lags; (iv) the speed of decreasing of the variance as the number of lags increase; (v) the standard deviation of the deterministic part and (vi) the standard deviation of the exogenous coefficients (Ciccharelli, Rebucci, 2003, Brandt and Freeman, 2006).

In particular, consider the prior covariance matrix with diagonal elements of the q^{th} lags of variable i in equation x of the form $V(\theta_+|P) = \Omega$ with $\Omega_{q,i,x} = \left(\frac{\lambda_0\lambda_1}{\sigma_i q \lambda_3}\right)^2$ and $\lambda_0 = [0; 1]$, $\lambda_1 > 0$, $\lambda_2 = 1$, $\lambda_3 > 0$, $\lambda_4 \geq 0$, $\lambda_5 \geq 0$. We also include two sets of dummy observations (as in Sims and Zha, 1998) for unit roots, trends, and cointegration: $\mu_5 \geq 0$ (prior weights about the presence of unit roots), $\mu_6 \geq 0$ (prior weights about trends and weights for initial observations), as well as the prior degrees of freedom $\nu > 0$ (this point is detailed by Brandt and Freeman, 2006). Thus, if n is the number of variables and q the number of lags, we end up with a decomposition of $nq+1$ dimension for each country in the sample. Note that we have selected only one lag as it is optimal according to the Bayesian Schwartz criterion, and appropriate given the limited period (and number of observations) of our study.

Let us consider the structural form of the VAR model using (3.6) that can be rewritten as:

$$YP - W\theta_+ = \epsilon \quad (\text{A.44})$$

where Y is a $T \times n$ matrix, W is a $T \times k$ matrix of lagged variables with $k = nq$ coefficients for each equation, ϵ is a $T \times n$ matrix. If $Z = [Y, -W]$ and $\theta = [P', \theta'_+]'$, the likelihood function is:

$$\begin{aligned} L(Y|\theta) &\propto |P|^T \exp\left\{-\frac{1}{2} \text{tr}(Z\theta)'(Z\theta)\right\} \\ &\propto |P|^T \exp\left\{-\frac{1}{2} b'(I \otimes Z'Z)b\right\} \end{aligned} \quad (\text{A.45})$$

With $b = \text{vec}(\theta)$ is a $n(k+n) \times 1$ vector; $b_0 = \text{vec}(P)$ is a $n^2 \times 1$ vector; $b_+ = \text{vec}(\theta_+)$ is $nk \times 1$ vector, I a $(n \times n)$ identity matrix.

$$\text{The Sims and Zha (1998)'s prior sets } g(b) = g_0(b_0)g(b_+ - h(b_0); H(b_0)) \quad (\text{A.46})$$

With $g_0(\cdot)$ a marginal distribution of b_0 and $g(\cdot; \Omega)$ the standard normal probability distribution function with covariance matrix Ω . The posterior density function of b is written as:

$$q(b_0) \propto g_0(b_0) |P|^T |(I \otimes W'W)H(b_0) + I|^{-\frac{1}{2}} \exp\left\{-\frac{1}{2} b_0' (I \otimes Y'Y) b_0 + h(b_0)' H(b_0)^{-1} h(b_0) - b_0^{*'} (I \otimes W'W + H(b_0)^{-1}) b_0^*\right\}$$

With $q(b_+ | b_0) = \varphi(b_0^*; (I \otimes W'W + H(b_0)^{-1})^{-1})$
and $b_0^* = (I \otimes W'W + H(b_0)^{-1})^{-1} ((I \otimes W'Y) + H(b_0)^{-1} h(b_0))$

Table 1: Consolidated national and financial accounts, symbols and initial values

	H	F	B	CB	G	
Wages	WB 80	$-WB$ -80				=0
Profits		$-\Pi$ -17.6	Π 17.6			=0
Interests	$-Int^H$ -4	$-Int^F$ -3	Int 9		$-Int^G$ -2	=0
Dividends		$-Div$ -10	Div 10			=0
Taxes	$-T^H$ -1.4	$-T^F$ -1			T 2.4	=0
Consumption	$-C^H$ -66	C 76			$-C^G$ -10	=0
Investment	$-I^H$ -8	$I - I^F$ 24-10			$-I^G$ -6	=0
Saving	$-S^H$ -8.6	$-S^F$ -12.4	$S - S^B$ 51.8-55.6	0	$-S^G$ -24.8	=0
Deposits	$p_D \Delta D^H$ 20.6	$p_D \Delta D^F$ 17.6		$-p_D \Delta D$ -38.2		=0
Credit	$-p_L \Delta L^H$ -20	$-p_L \Delta L^F$ -20	$p_L \Delta L$ 55.6		$-p_L \Delta L^G$ -15.6	=0
Equity		$-p_E \Delta E$ -20	$p_E \Delta E$ 20			=0
Refinancing			$-\Delta RF$ -20	ΔRF 20		=0

Note: the item *Saving* is the sum of the flow of financial instruments (assets minus liabilities) net of investment expenditures.

Table 2: Description of variables.

Variable	Description	Initial value
C^H	Consumption expenditures of households	66
C^G	Consumption expenditures of the government	10
C	Total consumption demand (produced by firms)	76
Div	Dividends	10
I^H	Investment expenditure of households	8
I^F	Investment expenditure of firms (costs)	10
I^G	Public investment expenditures	6
I	Total investment demand (produced by firms)	24
Int^H	Interests paid by households	4
Int^F	Interests paid by firms	3
Int^G	Interests paid by the government	2
Int	Total interests received by private banks	9
S^H	Households' savings	8.6
S^F	Firms' savings	-12.4
S^B	Banks' savings	55.6
S^G	Public balance	-24.8
S	National savings	51.8
T^H	Taxes paid by households	1.4
T^F	Taxes paid by firms	1
T	Total tax receipts	2.4
WB	Wage bill	80
Π	Profits	17.6
D^H	Volume of deposits held by households	100
D^F	Volume of deposits held by firms	50
D	Volume of deposits issued by the central bank	150
E	Volume of equities issued by firms (managed by banks)	200
i	Active (or deposits) interest rate	0.02
L^H	Volume of debt issued by households	100
L^F	Volume of debt issued by firms	75
L^G	Volume of debt issued by the government	50
L	Volume of debt held by private banks	225
p_E	Price of equity	1
p_L	Price of debt	1
R	Passive (or lending) interest rate	0.04
r_E	Rate of financial profitability	0.05
RF	Refinancing (value)	200
Δ	Depreciation rate (wear and tear of physical capital)	0.05
W^B	Banks' wealth (value)	100
W^H	Households' wealth (value)	150
W^F	Firms' wealth (value)	150
W^G	Public sector wealth (value of infrastructure)	100

Table 3: Variance decomposition analysis – model 1

Forecast error variance decomposition for VWAGE					
% of h-step ahead forecast error variance explained by:					
Horizon	VWAGE	FINANCIALIZATION	PRIVATEBANKCRED	VGDP	VGCF
1	84.43	0.00	0.00	14.19	0.97
2	79.90	0.38	0.14	13.84	5.23
3	78.81	0.84	0.42	13.81	5.50
4	78.25	1.14	0.64	13.77	5.53
8	77.64	1.49	0.93	13.68	5.53
10	77.59	1.52	0.95	13.67	5.52
Forecast error variance decomposition for FINANCIALIZATION					
% of h-step ahead forecast error variance explained by:					
Horizon	VWAGE	FINANCIALIZATION	PRIVATEBANKCRED	VGDP	VGCF
1	0.00	97.80	0.46	0.67	0.34
2	0.20	96.96	0.49	0.96	0.54
3	0.29	96.36	0.68	1.11	0.67
4	0.33	95.96	0.84	1.18	0.74
8	0.36	95.28	1.21	1.25	0.81
10	0.37	95.20	1.27	1.25	0.81
Forecast error variance decomposition for PRIVATEBANKCRED					
% of h-step ahead forecast error variance explained by:					
Horizon	VWAGE	FINANCIALIZATION	PRIVATEBANKCRED	VGDP	VGCF
1	0.00	0.00	96.94	1.79	0.85
2	0.06	0.56	96.32	1.32	1.07
3	0.08	1.33	95.40	1.21	1.06
4	0.10	2.04	94.59	1.17	1.05
8	0.12	3.55	92.93	1.15	1.06
10	0.13	3.79	92.69	1.15	1.07
Forecast error variance decomposition for VGDP					
% of h-step ahead forecast error variance explained by:					
Horizon	VWAGE	FINANCIALIZATION	PRIVATEBANKCRED	VGDP	VGCF
1	0.00	0.00	0.00	69.04	30.96
2	0.82	0.58	1.06	64.41	32.74
3	0.91	1.40	2.38	62.21	32.46
4	0.92	2.05	3.39	60.90	31.97
8	0.91	2.99	4.77	59.23	31.16
10	0.91	3.08	4.88	59.07	31.09
Forecast error variance decomposition for VGCF					
% of h-step ahead forecast error variance explained by:					
Horizon	VWAGE	FINANCIALIZATION	PRIVATEBANKCRED	VGDP	VGCF
1	0.00	0.00	0.00	0.00	100.00
2	0.09	0.90	1.14	0.65	96.78
3	0.11	1.52	1.96	0.75	95.11
4	0.13	1.89	2.46	0.77	94.16
8	0.14	2.35	3.09	0.79	92.98
10	0.14	2.39	3.14	0.80	92.89

Table 4: Variance decomposition analysis – model 2

Forecast error variance decomposition for VWAGE					
% of h-step ahead forecast error variance explained by:					
Horizon	VWAGE	RETURN	PRIVATEBANKCRED	VGDP	VGCF
1	84.77	0	0	12.5	2.3
2	77.82	0.22	0.04	13.01	8.33
3	76.76	0.31	0.18	13.48	8.66
4	76.47	0.32	0.32	13.56	8.71
8	76.16	0.32	0.61	13.56	8.7
10	76.11	0.32	0.65	13.55	8.69
Forecast error variance decomposition for RETURN					
% of h-step ahead forecast error variance explained by:					
Horizon	VWAGE	RETURN	PRIVATEBANKCRED	VGDP	VGCF
1	0	96.39	0.31	1.96	0.63
2	0.15	95.5	0.41	2.2	0.94
3	0.15	95.37	0.47	2.23	0.99
4	0.16	95.31	0.52	2.24	0.99
8	0.16	95.25	0.58	2.24	0.99
10	0.16	95.24	0.59	2.24	0.99
Forecast error variance decomposition for PRIVATEBANKCRED					
% of h-step ahead forecast error variance explained by:					
Horizon	VWAGE	RETURN	PRIVATEBANKCRED	VGDP	VGCF
1	0	0	93.41	5.98	0.27
2	0.05	0.28	93.92	4.72	0.44
3	0.08	0.34	94.13	4.14	0.58
4	0.1	0.36	94.17	3.8	0.69
8	0.12	0.38	94.16	3.38	0.89
10	0.12	0.38	94.15	3.34	0.91
Forecast error variance decomposition for VGDP					
% of h-step ahead forecast error variance explained by:					
Horizon	VWAGE	RETURN	PRIVATEBANKCRED	VGDP	VGCF
1	0	0	0	69.2	30.8
2	0.67	0.31	0.4	66.03	32.15
3	0.72	0.35	0.99	65.18	32.22
4	0.72	0.37	1.55	64.71	32.02
8	0.72	0.38	2.65	63.88	31.57
10	0.72	0.38	2.8	63.75	31.52
Forecast error variance decomposition for VGFCF					
% of h-step ahead forecast error variance explained by:					
Horizon	VWAGE	RETURN	PRIVATEBANKCRED	VGDP	VGCF
1	0	0	0	0	100
2	0.15	0.64	0.62	3.09	95.05
3	0.18	0.66	1.12	3.36	94.18
4	0.19	0.67	1.49	3.42	93.7
8	0.19	0.67	2.14	3.43	92.97
10	0.19	0.67	2.23	3.43	92.87

Table 5a: Financialization and economic growth.

SPECIFICATION	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financialization index	-0.0311*** (-3.406)			-0.0278** (-2.552)	-0.0290** (-2.662)	-0.0311*** (-3.406)			-0.0278** (-2.552)	-0.0290** (-2.661)
Private credit to GDP		-0.0199** (-2.112)		-0.0296*** (-3.806)			-0.0199** (-2.112)		-0.0296*** (-3.808)	
Banking credit to GDP			-0.0203** (-2.199)		-0.0300*** (-4.051)			-0.0203** (-2.200)		-0.0300*** (-4.053)
Working population growth	0.802 (1.151)	0.882 (1.070)	0.884 (1.079)	0.348 (0.483)	0.337 (0.474)	-0.199 (-0.286)	-0.120 (-0.145)	-0.118 (-0.144)	-0.654 (-0.909)	-0.665 (-0.935)
Trade openness	0.00859 (0.497)	0.0343*** (2.953)	0.0344*** (2.971)	0.0276** (2.134)	0.0276** (2.149)	0.00859 (0.497)	0.0343*** (2.955)	0.0344*** (2.972)	0.0276** (2.135)	0.0276** (2.150)
CPI inflation	0.108 (1.042)	0.147 (1.270)	0.146 (1.277)	0.180* (2.010)	0.177* (1.990)	0.108 (1.043)	0.147 (1.271)	0.146 (1.278)	0.180* (2.011)	0.177* (1.992)
Government spending to GDP	-1.296*** (-7.286)	-1.042*** (-5.857)	-1.048*** (-6.046)	-1.047*** (-6.472)	-1.061*** (-6.752)	-1.296*** (-7.285)	-1.042*** (-5.856)	-1.048*** (-6.045)	-1.047*** (-6.471)	-1.061*** (-6.751)
Constant	0.303*** (6.397)	0.210*** (5.708)	0.210*** (5.772)	0.260*** (6.065)	0.262*** (6.157)	0.303*** (6.397)	0.210*** (5.708)	0.210*** (5.772)	0.260*** (6.065)	0.262*** (6.158)
Observations	440	447	447	404	404	440	447	447	404	404
R-squared within	0.353	0.324	0.103	0.132	0.130	0.312	0.290	0.0709	0.0955	0.0953
R-squared overall	0.103	0.104	0.326	0.373	0.377	0.0741	0.0710	0.292	0.338	0.342
Number of countries	29	29	29	29	29	29	29	29	29	29
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
F test	16.83	21.21	21.24	30.79	30.14	14.85	17.94	17.93	22.54	22.09

Note: Specifications (1) to (5) use real GDP growth as dependent variable. Specifications (6) to (10) use real GDP per worker growth as dependent variable. Data ranges from 1980 to 2014 for OECD countries. The financialization variable is defined as the ratio of banking net ROA over bank's liquid assets, factored by banking concentration, as defined in equation (18). All estimates include country and year dummies. Robust standard errors are in parentheses. Significance at the 1/5/10% level is indicated by ***/**/*..

Table 5b: Financialization and economic growth.

SPECIFICATION	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Five-year average financialization index	-0.0469*** (-3.066)			-0.0491*** (-2.827)	-0.0493*** (-2.845)	-0.0469*** (-3.066)			-0.0491*** (-2.827)	-0.0493*** (-2.845)
Five-year average private credit to GDP		-0.0219** (-2.063)		-0.0201*** (-3.408)			-0.0219** (-2.064)		-0.0202*** (-3.411)	
Five-year average banking credit to GDP			-0.0217** (-2.086)		-0.0200*** (-3.509)			-0.0217** (-2.087)		-0.0200*** (-3.512)
Five-year average working population growth	1.842*** (3.025)	1.312 (1.390)	1.323 (1.413)	1.254* (1.987)	1.261* (2.006)	0.842 (1.383)	0.310 (0.329)	0.322 (0.343)	0.253 (0.400)	0.260 (0.413)
Five-year average openness to trade	-0.0168 (-1.070)	-0.00280 (-0.224)	-0.00272 (-0.218)	-0.0126 (-1.008)	-0.0125 (-1.003)	-0.0168 (-1.070)	-0.00280 (-0.224)	-0.00272 (-0.218)	-0.0126 (-1.009)	-0.0125 (-1.004)
Five-year average government spending to GDP	-1.067*** (-5.042)	-0.894*** (-3.480)	-0.898*** (-3.505)	-0.943*** (-5.020)	-0.948*** (-5.102)	-1.067*** (-5.041)	-0.893*** (-3.479)	-0.898*** (-3.504)	-0.942*** (-5.019)	-0.948*** (-5.101)
Five-year average CPI inflation	0.164 (1.094)	0.238 (1.221)	0.238 (1.220)	0.153 (1.116)	0.152 (1.109)	0.164 (1.096)	0.238 (1.222)	0.238 (1.221)	0.153 (1.118)	0.152 (1.111)
Constant	0.300*** (5.243)	0.217*** (4.514)	0.215*** (4.485)	0.295*** (5.776)	0.294*** (5.774)	0.300*** (5.242)	0.217*** (4.513)	0.215*** (4.484)	0.295*** (5.776)	0.294*** (5.774)
Observations	303	302	302	267	267	303	302	302	267	267
R-squared within	0.676	0.197	0.565	0.193	0.169	0.609	0.134	0.120	0.139	0.650
R-squared overall	0.130	0.565	0.176	0.708	0.708	0.0882	0.490	0.490	0.650	0.122
Number of countries	29	29	29	29	29	29	29	29	29	29
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
F test	28.69	13.66	13.64	30.72	30.48	18.16	8.604	8.534	22.68	22.49

Note: Specifications (1) to (5) use five-year average real GDP growth as dependent variable. Specifications (6) to (10) use five-year average real GDP per worker growth as dependent variable. Data ranges from 1998 to 2014 for 29 OECD countries. Five-year averages for the independent variables are computed over the same period as the dependent variable. The financialization variable is defined as the ratio of banking net ROA over bank's liquid assets, factored by banking concentration, as defined in equation (18). All estimates include country and year dummies. Robust standard errors are in parentheses. Significance at the 1/5/10% level is indicated by ***/**/*.

Table 5c: Financialization and economic growth.

SPECIFICATION	(1)	(2)	(3)	(4)	(5)	(6)
Return index	-0.000406 (-0.709)	-0.000439 (-0.792)	-0.000449 (-0.813)	-0.000406 (-0.709)	-0.000439 (-0.792)	-0.000449 (-0.813)
Private credit to GDP		-0.0187* (-1.908)			-0.0187* (-1.908)	
Banking credit to GDP			-0.0191* (-1.977)			-0.0191* (-1.977)
Working population growth	0.997 (1.375)	0.959 (1.171)	0.959 (1.176)	-0.00445 (-0.00614)	-0.0426 (-0.0520)	-0.0430 (-0.0527)
Trade openness	0.0124 (0.739)	0.0329** (2.363)	0.0329** (2.377)	0.0124 (0.739)	0.0329** (2.364)	0.0329** (2.379)
CPI inflation	0.218** (2.337)	0.269*** (3.028)	0.267*** (3.033)	0.218** (2.339)	0.269*** (3.030)	0.267*** (3.035)
Government spending to GDP	-1.190*** (-7.029)	-1.016*** (-6.161)	-1.022*** (-6.340)	-1.190*** (-7.029)	-1.015*** (-6.160)	-1.022*** (-6.340)
Constant	0.237*** (5.838)	0.202*** (5.469)	0.202*** (5.526)	0.237*** (5.838)	0.202*** (5.469)	0.202*** (5.526)
Observations	452	416	416	452	416	416
R-squared	0.338	0.111	0.110	0.0667	0.307	0.0747
R-squared	0.0987	0.344	0.345	0.296	0.0748	0.308
Number of countries	29	29	29	29	29	29
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
F test	18.01	25.70	25.86	14.35	19.47	19.60
R-squared within	0.338	0.344	0.345	0.296	0.307	0.308

Note: Specifications (1) to (3) use real GDP growth as dependent variable. Specifications (4) to (6) use real GDP per worker growth as dependent variable. Data ranges from 1980 to 2014 for OECD countries. The financialization variable is defined as the ratio of banking net ROA over bank's liquid assets, factored by banking concentration, as defined in equation (18). All estimates include country and year dummies. Robust standard errors are in parentheses. Significance at the 1/5/10% level is indicated by ***/**/*..

Table 5d: Financialization and economic growth.

SPECIFICATION	(1)	(2)	(3)	(4)	(5)	(6)
Five-year average return index	-0.00221 (-1.369)	-0.00182 (-1.297)	-0.00185 (-1.325)	-0.00221 (-1.369)	-0.00182 (-1.297)	-0.00185 (-1.325)
Five-year average private credit to GDP		-0.0223** (-2.609)			-0.0223** (-2.612)	
Five-year average banking credit to GDP			-0.0219** (-2.661)			-0.0219** (-2.664)
Five-year average working population growth	1.980*** (3.017)	1.459** (2.053)	1.476** (2.086)	0.979 (1.493)	0.458 (0.644)	0.475 (0.671)
Five-year average trade openness	-0.0207 (-1.256)	-0.0134 (-0.875)	-0.0134 (-0.873)	-0.0207 (-1.257)	-0.0134 (-0.876)	-0.0134 (-0.874)
Five-year average government spending to GDO	-0.902*** (-4.226)	-0.840*** (-4.434)	-0.848*** (-4.493)	-0.902*** (-4.226)	-0.839*** (-4.432)	-0.847*** (-4.492)
Five-year average CPI inflation	0.186 (1.398)	0.203 (1.543)	0.202 (1.543)	0.186 (1.400)	0.203 (1.545)	0.202 (1.545)
Constant	0.214*** (4.482)	0.217*** (5.402)	0.216*** (5.357)	0.213*** (4.482)	0.217*** (5.402)	0.216*** (5.357)
Observations	289	253	253	289	253	253
R-squared	0.599	0.237	0.201	0.517	0.168	0.555
R-squared	0.125	0.627	0.626	0.0764	0.555	0.142
Number of countries	29	29	29	29	29	29
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
F test	30.01	21.33	21.18	18.28	14.08	13.94

Note: Specifications (1) to (3) use five-year average real GDP growth as dependent variable. Specifications (4) to (6) use five-year average real GDP per worker growth as dependent variable. Data ranges from 1998 to 2014 for 29 OECD countries. Five-year averages for the independent variables are computed over the same period as the dependent variable. The financialization variable is defined as the ratio of banking net ROA over bank's liquid assets, factored by banking concentration, as defined in equation (18). All estimates include country and year dummies. Robust standard errors are in parentheses. Significance at the 1/5/10% level is indicated by ***/**/*.

Figure 1: The financialization process

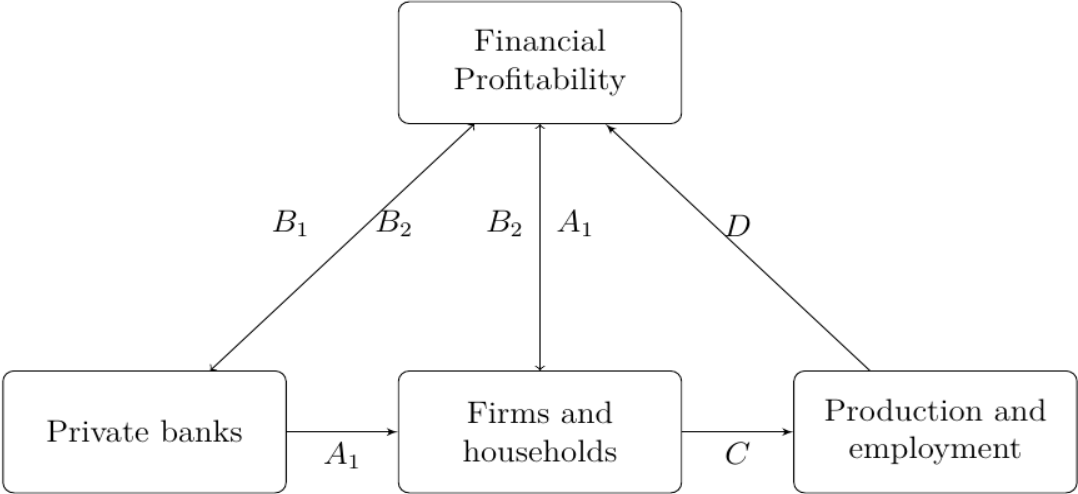


Figure 1: Financialization process.

Figure 2 Accounting identities

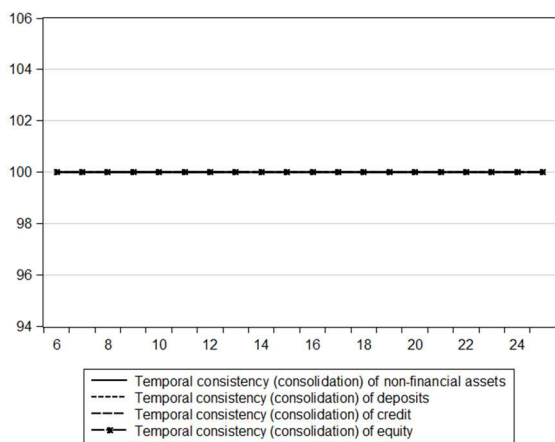
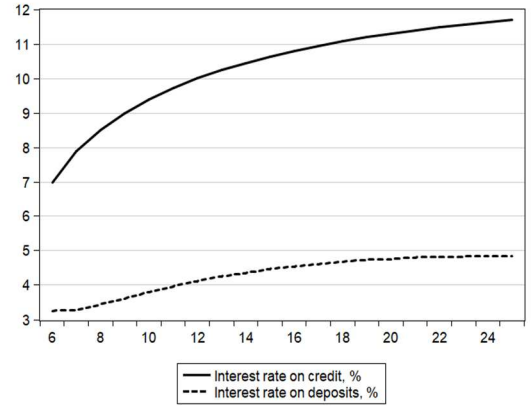
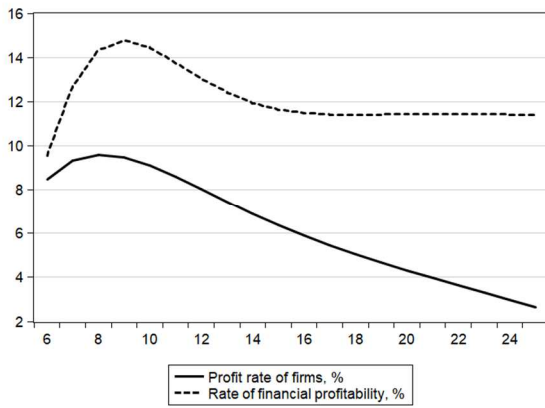
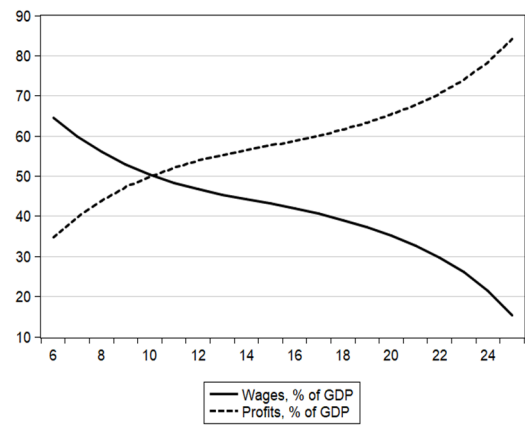
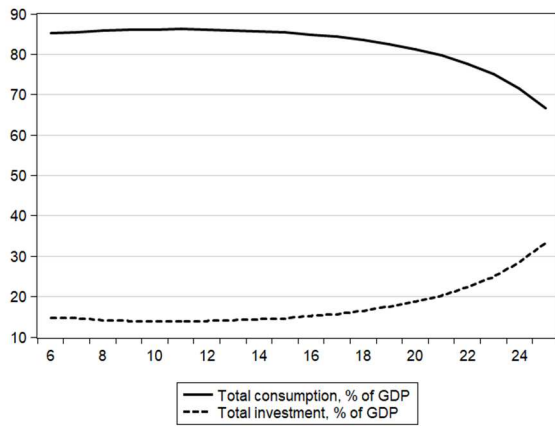


Figure 3: SFC Model; impact of an exogenous increase in credit compared to the baseline

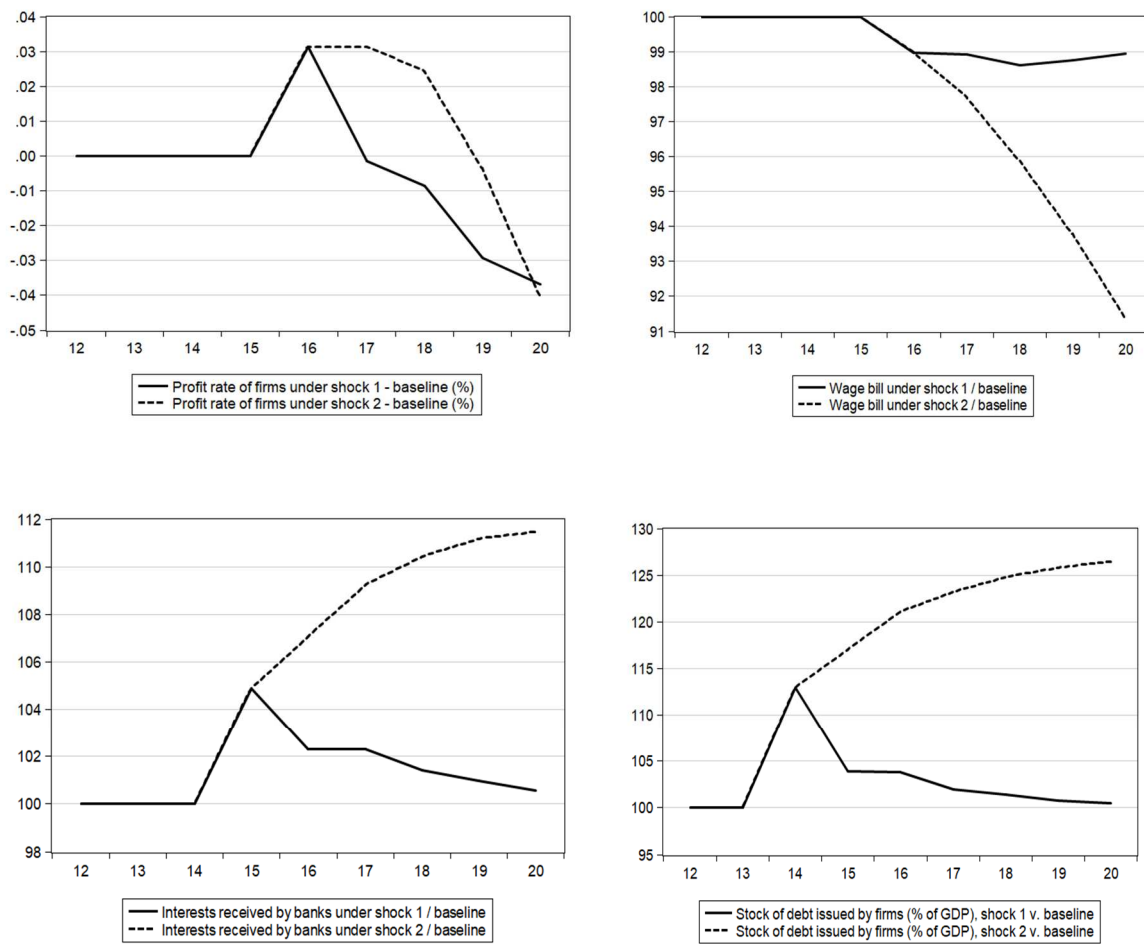


Figure 4: SFC Model; impact of an exogenous increase in credit compared to the baseline. Permanent shock (left panel) and temporary shock (right panel)

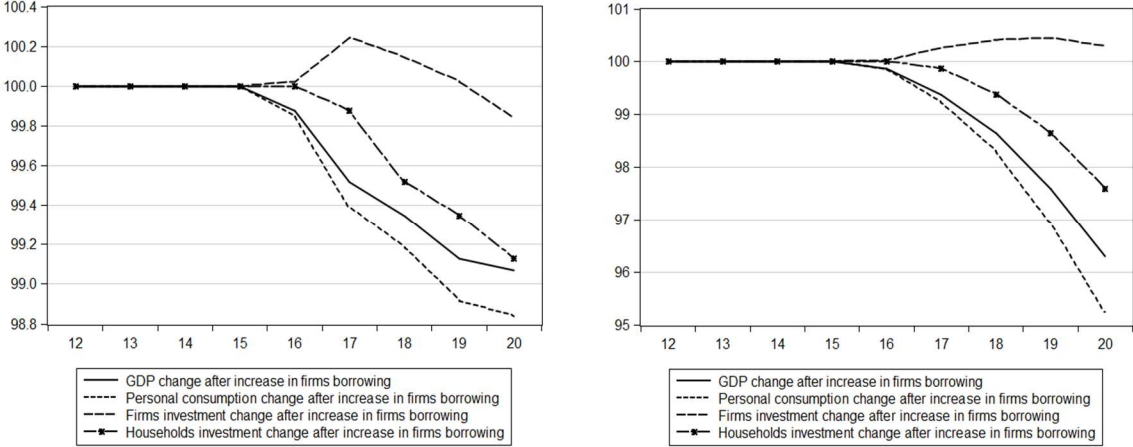
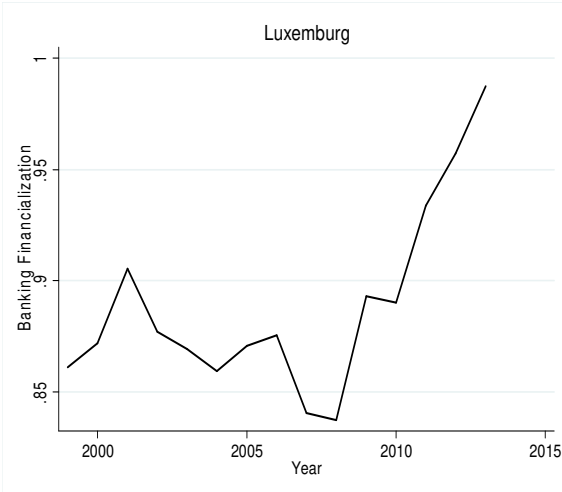
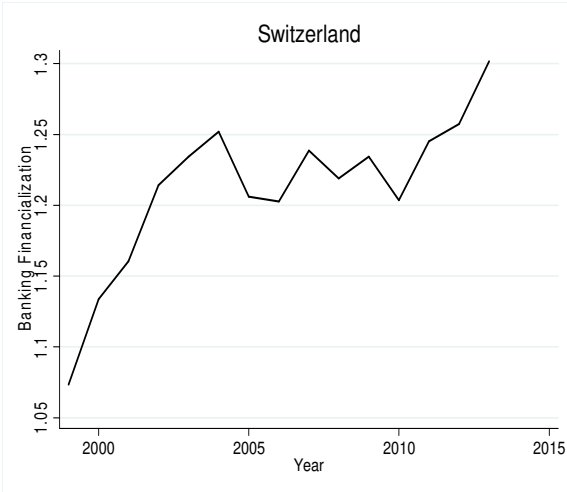
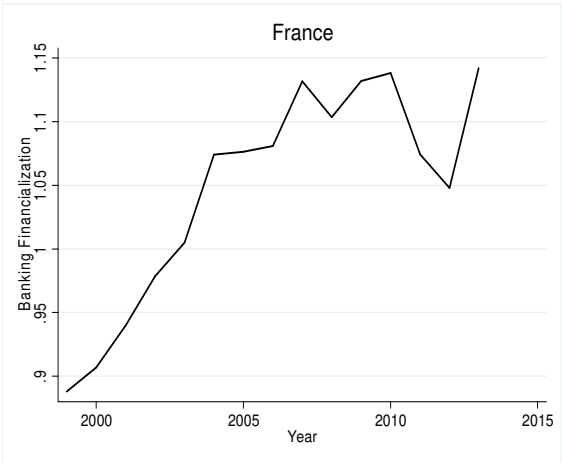
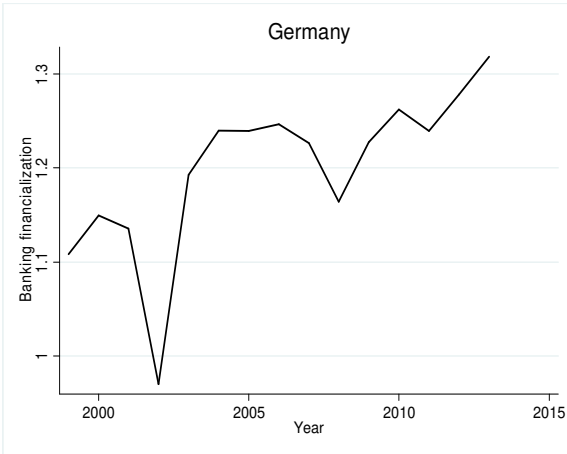
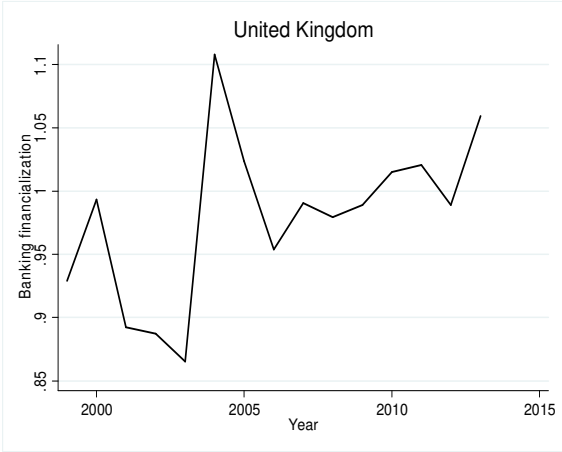
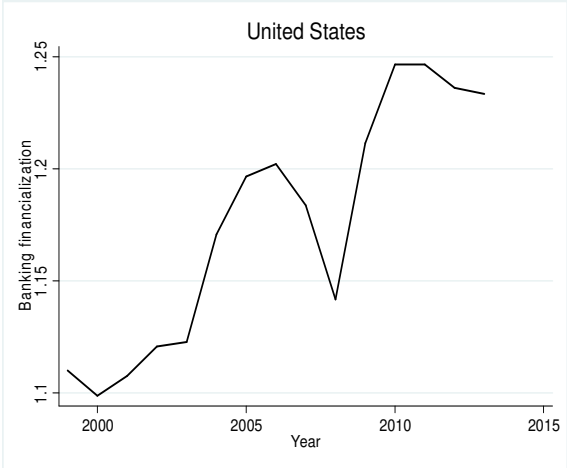


Figure 5a: FINANCIALIZATION index in selected countries.



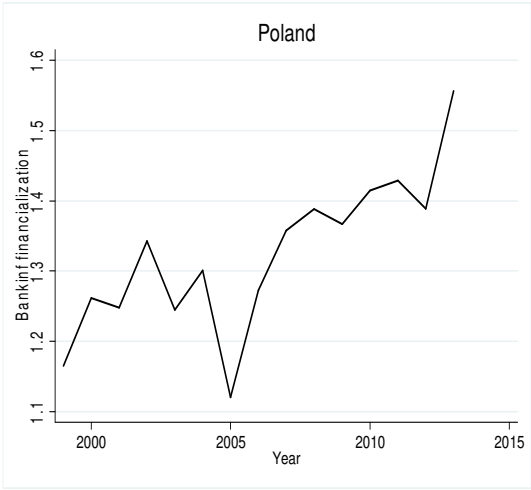
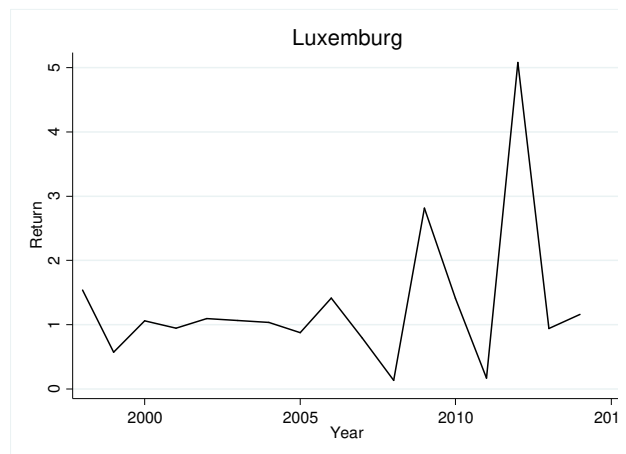
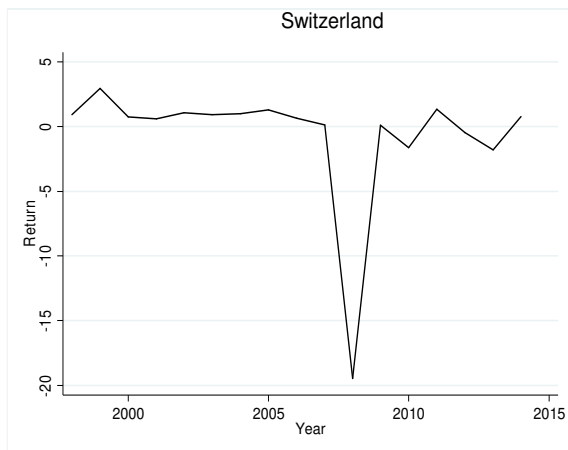
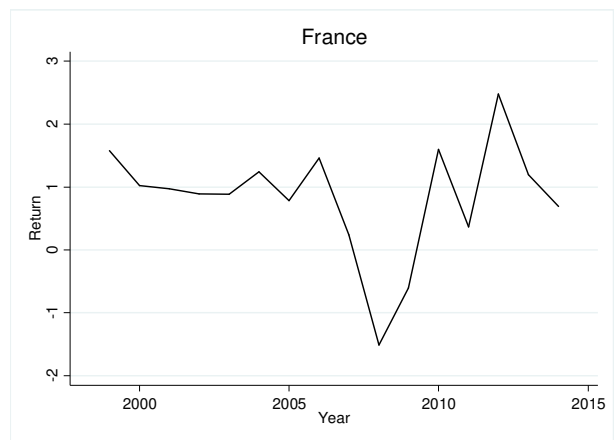
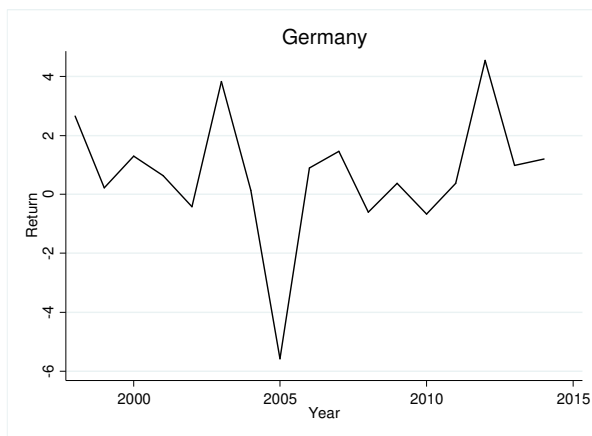
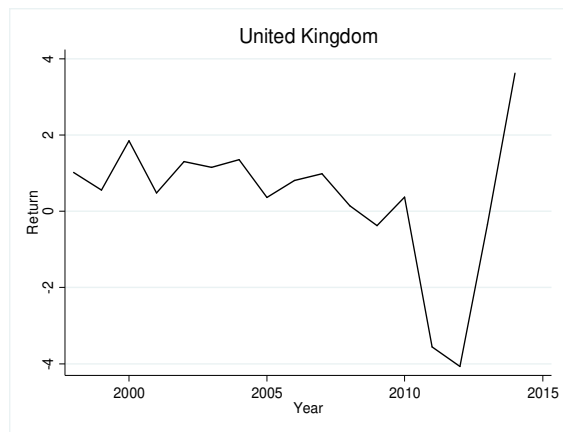
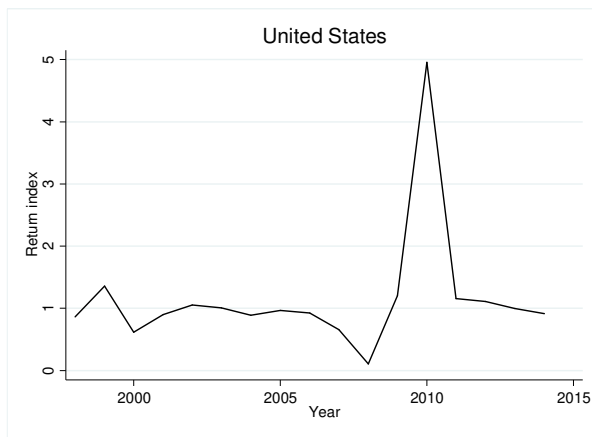


Figure 5b: RETURN index in selected countries



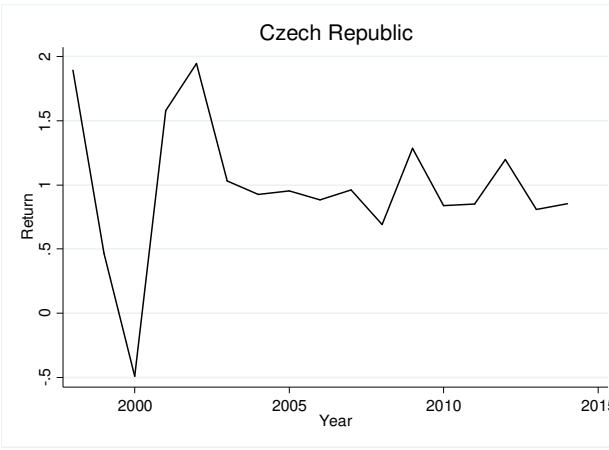
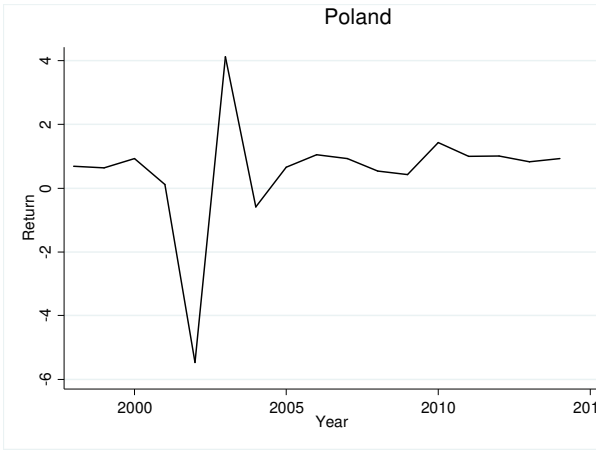


Figure 6 Impulse response functions – model 1

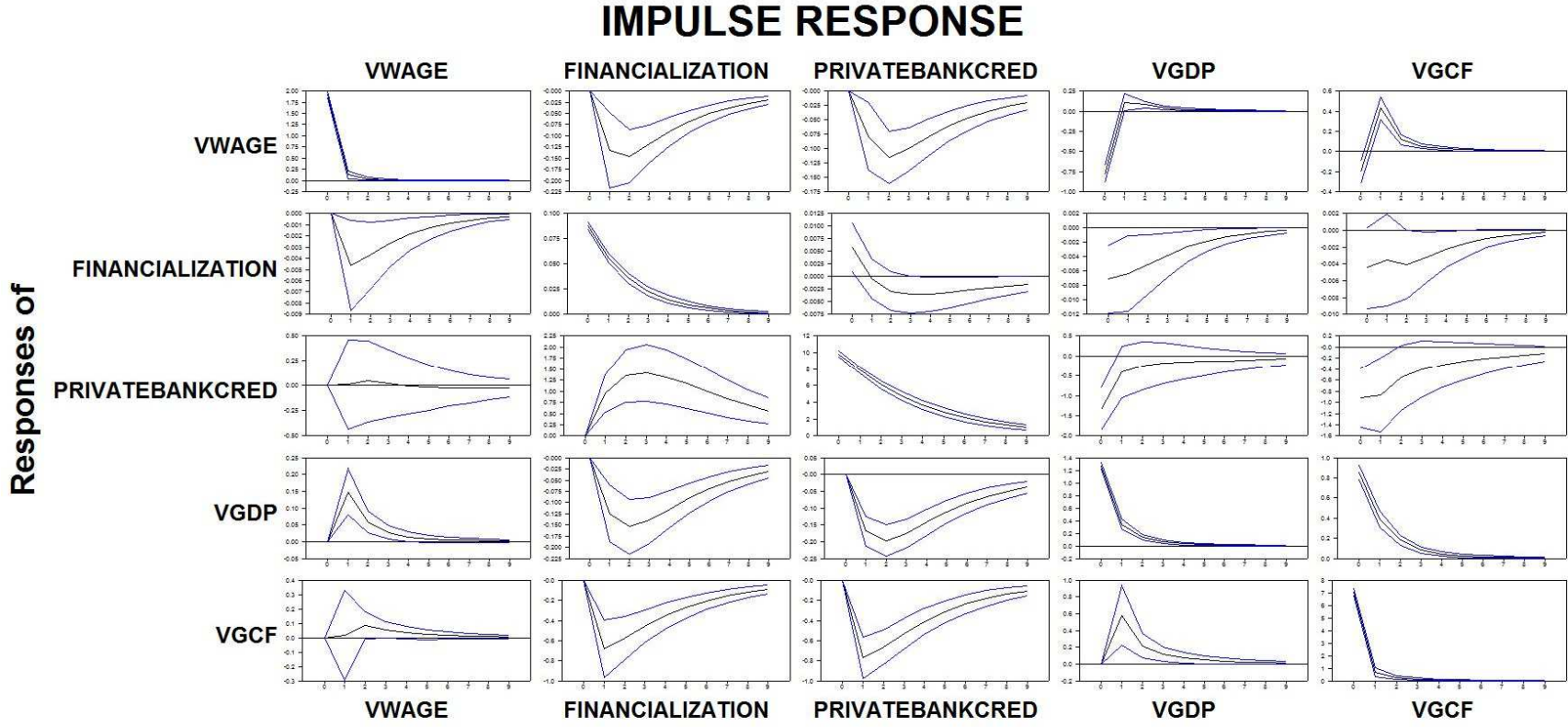


Figure 7 Impulse response functions – model 2

