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THE INTERTWINING OF FINANCIALISATION AND FINANCIAL INSTABILITY

Jérôme CREEL
OFCE-Sciences Po and ESCP-Europe

Paul HUBERT
OFCE-Sciences Po

Fabien LABONDANCE
CRESE-Université de Franche-Comté and OFCE-Sciences Po

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Jérôme Creel
OFCE – Sciences Po & ESCP – Europe

Paul Hubert
OFCE – Sciences Po

Fabien Labondance
CRESE – Université de Franche-Comté & OFCE – Sciences Po

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Abstract

This paper aims to quantify the link between financialisation and financial instability, controlling for the financial and macroeconomic environment. Our main identification assumption is to represent these two concepts as a system of simultaneous joint data generating processes whose error terms are correlated. Based on panel data for EU countries from 1998, we test the null hypotheses that financialisation positively affects financial instability -a vulnerability effect- and that financial instability has a negative effect on financialisation -a trauma effect-, using Seemingly Unrelated Regressions and 3SLS. We find a positive effect of credit/GDP on non-performing loans - a vulnerability effect- in the EU as a whole, in the Eurozone, in the core of the EU but not at its periphery, and a negative effect of non-performing loans on credit/GDP - a trauma effect - in all samples. Even when relaxing our identification assumption, both opposite effects hold.

Keywords: Financial depth, financial instability, financial vulnerability, SUR model.

JEL Classification: E44; G10.

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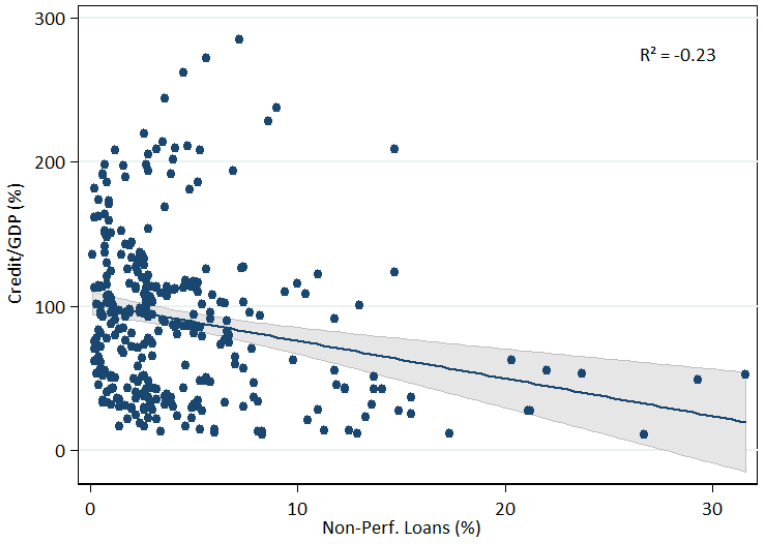
1. Introduction

The objective of this paper is to assess the interrelationships between financialisation and financial instability. The global financial crisis has shed light on the intertwining between the growth of the banking and financial sectors (financial deepening), financial deregulation (or absence of regulation in the case of wholesale financial markets) and financial instability (see Gorton and Metrick, 2012). The former two concepts (deepening and deregulation) are usually considered as two prominent aspects of financialisation (Sawyer, 2014) which, at the macroeconomic level, is often associated to the level of bank credit to GDP. Because the European Union (EU), under the initiative of the European Commission, has adopted a banking union which gives the European Central Bank (ECB) a role of prudential supervisor for most banks in the EU, the ECB is *de facto* in charge of monitoring financialisation and financial stability. Assessing their intertwining precisely for EU countries is an important issue in this context. We additionally focus on the potential heterogeneity of this link within the EU between Eurozone (EZ), core EU and periphery EU countries and question the relevance of a "one-size-fits-all" reform of banking supervision in the EU.

Although the determinants of bank credit to GDP have been largely investigated in the empirical and theoretical literature (see *infra*), the relationship between bank credit and financial instability has been rarely studied to our knowledge. One reason for this is the difficulty to quantitatively capture the concept of financial instability, and we assume that the most relevant candidate when analysing bank credit should be the share of non-performing loans to gross loans (see Cihak and Schaeck, 2010). Figure 1 shows a scatter plot of the latter variable and bank credit to GDP. The relationship is unclear and the raw correlation is -0.23. The contribution of this paper is to assess their conditional correlation and to single out the effect of each of these two variables on the other, for EU countries, imposing a panel structure on data and controlling for time and country fixed effects, and financial and macroeconomic environments. Our specification includes long-term real interest rates, taxes, a financial regulation index and market capitalisation, as well as inflation, real GDP and trade openness, all potential determinants of financialisation, as shown in the literature, and also possible determinants of financial instability.

Figure 1 – Financialisation and Financial Instability (Source: GFDD)



While estimating the link between financialisation and financial instability, we are confronted to two types of endogenous phenomenon. The first type is directly related to the

joint determination of these two left-hand-side variables. As price and quantity on a given market, financialisation and financial instability can be considered as the opposite sides of the same coin. To correct for their simultaneity, we use a Seemingly Unrelated Regressions (SUR) model which takes into account the correlation of error terms and provides more efficient estimates than OLS. The second type of endogeneity refers to the right-hand-side variables and to the estimation of their causal effect and to a potential omitted variable bias or reverse causality that would make these variables and the error term correlated. This second type of endogeneity is handled with instrumental variables.

The first and main identification assumption of this paper is to represent financialisation and financial instability as a system of simultaneous joint data generating processes (estimated with SUR) whose contemporaneous error terms are correlated. We test the following two null hypotheses: *(i)* there is a positive effect of financialisation on financial instability labelled a "vulnerability effect" and *(ii)* there is a negative effect of financial instability on financialisation that we label a "trauma effect". The first hypothesis would stem from the increasing fragility and risks of marginal loans, whereas the second would result from the potential deleveraging and reduced risk-taking of banks following a period of financial instability. In a second step and because our different variables of interest on the right-hand-side of our model might potentially be endogenous, we perform three-stage least squares (3SLS) estimation which enable us to combine the system estimation of SUR to the instrumental-variables method of 2SLS. We limit our empirical investigation to the period 1998-2012 for which we have access to macroeconomic, banking and market data for most of the EU countries. On this period, we can split the sample to characterize the interrelationships in the EZ, in the EU core and periphery.

Despite the raw negative correlation between financialisation and financial instability, we find a positive causal effect of the level of bank credit to GDP on the share of non-performing loans, and a negative causal effect of financial instability on financialisation. These results are robust to alternative financial instability variables, to the introduction of government debts,[1] to some EU subsamples, to non-linear specifications and to a 3-equation SUR model in which long-term interest rates are also considered endogenous. More precisely, we find the existence of a vulnerability effect in the EU as a whole, in the Eurozone, in the core of the EU but not at its periphery, and of a trauma effect in all samples. We also find some evidence of non-linearities between the two main variables. Whereas non-performing loans have the same linear effect on credit to GDP whatever the specification, the effect of credit to GDP on non-performing loans –the vulnerability effect– appears state and time contingent. It depends on and is reinforced by the level of credit to GDP and on the level of non-performing loans, and appears to kick in during crisis times rather than during good times.

We also investigate a market view of financialisation which draws on different characteristics than the credit view. The market view confirms the vulnerability effect in most cases; meanwhile, it gives rise to a distinction between the EU core and periphery countries as regards the trauma effect: the vulnerability effect remains whereas the trauma effect disappears in all samples, except the EU core countries. In the EU periphery, the vulnerability effect is concomitant with a reverse trauma effect.

[1] The introduction of European government debts in the analysis is an indirect test of their link with banking risk. The contagion between sovereign default risk and bank vulnerability has been investigated by Bolton and Jeanne (2011), Caruana and Avdjiev (2012), Acharya and Steffen (2015) and Acharya et al. (forthcoming).

Finally, even when relaxing our main identification assumption and performing individual panel estimations (pooled OLS, fixed- and random-effects) rather than joint ones over the entire sample of countries, both opposite effects hold.

The rest of this paper is organized as follows. Section 2 presents the literature. Section 3 describes the model, our empirical strategy and our hypotheses. Section 4 presents the data. Section 5 discusses the results. Section 6 concludes.

2. Related literature

This analysis refers to two strands of the existing literature. The first relates to bank credit and its determinants. Bernanke and Blinder (1988) revived the empirical literature on bank credit and its determinants after they extended the IS/LM model to include a banking sector, drawing on the assumption made by Tobin (1970) that bonds and credits are not perfect substitutes. They conclude that periods of money-demand and credit-demand shocks alternated between 1974 and 1985. The following literature expanded on the analysis of monetary policy channels of transmission, whereas the empirical determinants of bank credits were usually limited to economic activity and financing costs (e.g. Fase, 1995).

In the 2000s, the bulk of empirical papers about bank credit devoted attention to its impact on economic growth (see Ang, 2008, for a survey) whereas only a few papers investigated bank credit determinants. After Goodhart (1995), and drawing on a cointegrating VAR model of real credit to the private non-financial sector, real GDP, real interest rate and real property prices, Hofmann (2004) shows that shocks to property prices could explain the persistence in financial cycles. Cottarelli, Dell'Ariccia and Vladkova-Hollar (2005) study the bank credit growth in Central and Eastern European countries (CEECs) and test whether it could be attributed to a structural change of financial deepening. Their list of bank credit determinants includes public debt to GDP ratio, GDP per capita, an indicator of high inflation, an indicator of financial liberalization, and different institutional characteristics like accounting standards, legal origins and bank entry requirements. Except for the latter, all variables have the significant expected sign. Aisen and Franken (2010) explain real credit growth in 83 countries, with a distinction between, first, variables of economic performance, external shocks and policy stance; second, local characteristics of the credit market (like size, integration, and openness); and, third, bank characteristics *per se* (like share of public ownership, bank leverage, and bank return on equity). Despite this long list of variables, only a few are significant: namely, GDP growth and changes in money market rate. After having taken into consideration possible interactions between regions, trading partners' GDP growth rate of emerging Asia can be added to the list of significant determinants. A recent survey of determinants of domestic bank credit in emerging economies can be found in Gozgor (2014) who focuses his empirical study on the role of external factors. Chinn and Ito (2006) also discuss this role, relating it to capital controls and institutions, thus questioning the relationship between financial openness and financial development. Aiyar, Calomiris and Wieladek (2014) investigate the supply of credit and its linkages with (and leakages towards) credit substitution channels via foreign affiliates and branches to comply with macro-prudential measures.

The literature on financial instability and its determinants has developed more or less along two different lines of reasoning. The first one assumes that capitalism is intrinsically unstable (Minsky, 1995) and leads to leverage and credit booms and busts. The second one sticks to a general equilibrium approach and assumes that financial instability is caused by financial frictions (due to asymmetric information), hence by financial shocks and their propagation to

the rest of the economy (Calomiris, 1995; Mishkin, 1999). In contrast with the literature on bank credit determinants, empirical papers dedicated to financial stability determinants have been scarcer, to our knowledge. The reason can certainly be related to the difficulty of defining and quantifying this concept. Different measures have emerged in the literature. Loayza and Ranciere (2006) measure financial instability as the standard deviation of the growth rate of the private credit/GDP ratio over non-overlapping 5-year averages. The ECB has developed a Composite Indicator of Systemic Stress (CISS) for the euro area as a whole, available since 1999. The International Monetary Fund (IMF) has developed a financial stress index for 13 industrialized countries. At the micro level, several authors capture financial stability in the banking sector through the Z-score (Uhde and Heimeshoff, 2009; Fink et al., 2009), which measures the probability of default for a bank or a banking system. The share of non-performing loans in bank balance sheets is also used as a proxy of financial instability (Cihak and Schaeck, 2010), as it can trigger the onset of a banking crisis (Reinhart and Rogoff, 2011). Louzis, Vouldis and Metaxas (2012) study the macroeconomic and bank-specific determinants of non-performing loans in Greece, and find that they mostly respond to GDP, unemployment, interest rates and public debt.

Our contribution to the literature is to estimate simultaneously the interrelationships of bank credit and financial instability. We introduce financial instability as an explanatory variable of bank credit to GDP and the opposite, controlling for the main determinants put forward by the existing literature.

3. Model and Empirical Strategy

When assessing the link between financialisation and financial instability, we face the issue of potential endogeneity between our two variables of interest. One solution, and this is the main identification assumption of this paper, consists in thinking the problem not in a single-equation space, but as a system of simultaneous equations that jointly determine both dependent variables. The two equations are therefore mechanically related as the contemporaneous errors associated with each dependent variable are correlated, which seems a reasonable assumption for the two data processes.

Estimating the system provides estimates that are more efficient, because it takes into account the correlation between the error terms and therefore add information on the error structure. The most basic form of joint-system estimation is Seemingly Unrelated Regressions (SUR), also called Zellner (1962)-efficient regressions, using feasible generalised least-squares (FGLS). When the two equations do not have the same set of explanatory variables and are not nested, it leads to more efficient estimates than estimating each individual equation separately with OLS. Generally, the coefficients are only slightly different, but the standard errors are uniformly larger.

We estimate simultaneously the cross-effects of financialisation and financial instability using the following model, in which we assess the contribution of our variables of interest beyond financial and macro controls and the information captured by the lagged value of our dependent variables:

$$\begin{cases} F_{i,t} = \alpha_F + \beta_F F_{i,t-1} + \beta_{FS} S_{i,t} + \beta_{FX} X_{i,t} + \beta_{FZ} Z_{i,t} + \varepsilon_{F,t} \\ S_{i,t} = \alpha_S + \beta_S S_{i,t-1} + \beta_{SF} F_{i,t} + \beta_{SX} X_{i,t} + \beta_{SZ} Z_{i,t} + \varepsilon_{S,t} \end{cases} \quad (1)$$

where $F_{i,t}$ is the financialisation variable for a country i, $S_{i,t}$ is the financial instability variable, $X_{i,t}$ is the vector of financial controls, namely long-term real interest rates, the stock market

capitalisation, taxes and a financial regulation variable, and $Z_{i,t}$ is the vector capturing the macroeconomic environment, namely real GDP, inflation, trade openness together with country and time fixed effects. Using this model, we test two hypotheses:

> *Hypothesis n°1*: there is a positive effect of financialisation on financial instability labelled a "vulnerability effect", as suggested by Gorton and Metrick (2012) or Gourinchas and Obstfeld (2012), where the latter assert that financial vulnerabilities stem from high credit to GDP ratio. These vulnerabilities would stem from the increasing fragility and risks of marginal loans. This effect may also arise from the dependence of loan-loss provisioning to the evolution of bank lending. Pool et al. (forthcoming) show that banks reduce their loan-loss provisioning as a percentage of their total assets when bank lending increases, and therefore take on more risks.
>
> *Hypothesis n°2*: there is a negative effect of financial instability on financialisation that we label a "trauma effect", and which would result from the potential deleveraging and reduced risk-taking of banks following a period of financial instability.

We include financial variables in the regression that could impinge on the relationships between financialisation and financial instability.[2] We expect a negative effect of long-term real interest rates measuring financing costs on financialisation assuming that credit demand decreases and credit supply increases with interest rates and that the equilibrium on the credit market is driven by its short side. Fase (1995) reports results on financialisation for the Netherlands using nominal long-term interest rates. Alternatively, we focus on real long-term interest rates. We expect a positive correlation between the long-term real interest rate and financial instability: the latter materializes after real interest rates go up, hence weakening debtors' positions. A negative link between stock market capitalisation and financialisation would capture a substitution effect between banking intermediation and direct financing through financial market operations inducing a negative correlation between stock market capitalisation and financial instability as substitution should act as an insurance mechanism. We expect a positive link between taxes and financialisation and between taxes and financial instability. As regards the former link, the argument would come from the development of financial innovation for tax optimization and/or because of the deduction of interest payments from profits. The second link would proceed along the following logic: the higher the corporate tax, the higher the incentive to borrow (to grasp the full benefit of interest payments' deduction), the lower equity, the weaker banks, and the more unstable the banking and financial system. Stated differently, and following Keen and De Mooj (2012) and De Mooj, Keen and Orihara (2013), the corporate tax would violate the Modigliani-Miller theorem in the case of banking institutions: the high corporate tax induces recourse to borrowing (debt) at the expense of equity. Finally, we control for the existence of a positive link between financial deregulation and financialisation and a positive link between financial deregulation and financial instability as deregulation may increase risk-taking. Chinn and Ito (2006) report a positive relationship between financial openness and financial development whereas Tressel and Detragiache (2008) show that financial liberalisation has a limited impact on financial development, conditional on the existence of checks and balances on political power. Finally, Kaminsky and Schmukler (2008) show that financial liberalisation generates financial instability in the short run.

[2] Another interesting variable would have been the degree of securitization, enabling to have credit to GDP and non-performing loans corrected for securitization, so capturing all loans issued and not only those still on banks' balance sheet. Unfortunately, to our knowledge, such data is not available for our sample.

In addition, we control for the effect of macroeconomic variables like the GDP growth rate, the inflation rate, and trade openness on bank credit and financial stability. Hofmann (2004) shows that a shock to real GDP can increase credit, e.g. in Germany, Ireland or Finland; or it can have no effect, e.g. in the USA, UK and Japan. Louzis et al. (2012) report a negative impact of GDP growth on non-performing loans. Finally, Gozgor (2014) provides evidence of a positive link between trade openness and bank credit.

Two other issues, related to the onset of the global financial crisis and its European sequel, the sovereign-debt crisis, require some attention. First, the crisis has revealed the divergence between the Eurozone and the late newcomers in the EU, where the former have benefited from financial deepening for decades whereas the latter are in a process of financial development. The crisis has also revealed the gap between a core of EU countries and the periphery. These regional features may impinge on the relationship between financialisation and financial instability and require a specific investigation. Second, growing public debts may affect credit demand and crowd out some investments as well as it may deteriorate the balance sheets of banks and thus modify credit supply and increase risks in the banking and financial system. Therefore, we test these potential effects coming from fiscal variables by introducing government debts.

4. Data

4.1. Dependent variables

In our joint system framework, we intend to explain both financialisation and financial instability. We consider the financial deepening dimension to measure the financialisation concept. This is usually measured through the share of private credit in the economy. More precisely, we use the private credit by deposit money banks and other financial institutions to GDP ratio (%) of the Global Financial Development Database (GFDD) of the World Bank. We also use the deposit money banks' assets to GDP (%) as another measure of financial deepening. Adopting a stock market view of financialisation, we also introduce the turnover ratio (Beck and Levine, 2004) or the market capitalisation. Financial instability is captured with an aggregate prudential ratio which is the ratio of non-performing loans to gross loans, which is the most common variable used for credit markets and relevant as a warning signal for systemic banking insolvency (Cihak and Schaeck, 2010). We also test a stock market volatility variable, and make use of the Saint Louis Fed Financial Stress Index (STLFSI)[3] and the Composite Indicator of Systemic Stress (CISS) developed by the ECB for the euro area as instruments in our robustness section. The CISS includes 15 raw measures, mainly of market-based financial stress, which are split equally into five categories, namely the financial intermediaries sector, money markets, equity markets, bond markets and foreign exchange markets. The CISS places relatively more weight on situations in which stress prevails simultaneously in several market segments. It is unit-free and constrained to lie within the unit interval (see Hollo et al., 2012). Unfortunately, the latter two aggregate indicators exist neither at the country level nor for the entire EU. However, thanks to strong financial, monetary and trade integration in the EU, it seems reasonable to assume that the evolution of macroeconomic financial instability in the EU is highly correlated with financial instability in the euro area.

[3] We acknowledge that the STLFSI is constructed on US data, but because financial markets are one of the most integrated markets, at least much further than labour, goods or credit markets, we assume that this index could act as another relevant proxy for instability on financial markets in Europe.

4.2. Explanatory variables

We include two types of explanatory variables in our empirical model. First, GDP growth, the inflation rate and trade openness are included to control for the macroeconomic environment. Second, we include financial variables enabling us to control for factors that should affect our two variables of interest. Credit costs are captured by long-term real interest rates. The substitution effect between direct and indirect finance is tested with the stock market capitalisation or with the stock market turnover ratio. We assess the link between financialisation, financial instability and taxes by using different measures of tax policies. Our benchmark measure is cyclically adjusted direct taxes on business. We also examine alternatively the ratio of total direct taxes to GDP, the ratio of capital taxes to GDP, and the ratio of cyclically adjusted taxes on production and imports to GDP. On the fiscal side, we consider the ratio of gross public debt to GDP. Finally, to isolate the effect of deregulation, we include an index of financial reform, or alternatively the level of bank regulatory capital to risk-weighted assets (%). All variables are described in Table A in the Appendix and descriptive statistics are presented in Table B.

4.3. Subsample definitions

There have been important evolutions in financial institutions due to liberalisation, innovation and globalisation, which have made differences between financial systems central to their analysis (Djankov et al., 2003). One important contribution in that respect is Bruno et al. (2012) who analyse the heterogeneity of financial systems through the lens of asset allocation among OECD countries. To shed light on the heterogeneity of the relationship between financial stability and financialisation into the EU, we decompose the sample into several subsamples. First, we distinguish the Eurozone (EZ), composed of the 12 first member states of the euro area, leaving aside Luxembourg where the financial deepening is so strong as to make this small country an outlier. Second, the sovereign debt crisis highlighted the fragmentation in the Eurozone and in the EU. We then disentangle member states that belong to the core of the EU and member states that are more at the periphery. This separation is based on the spread between the long-term sovereign interest rates and the money market rate. The composition of these sub-samples is available in Table C in the appendix together with a comparison of the mean of the benchmark variables for the core and the periphery (Table D). A few comments are worth mentioning. First, according to the method chosen for disentangling the core and the periphery, Spain and Italy are included in the periphery of the EU. Second, the UK is part of the core.[4] Third, the pronounced differences in the variables of the core and the periphery of the EU suggest our grouping is reasonable. On the one hand, non-performing loans, taxes on business, inflation and growth are on average higher in the periphery than in the core. On the other hand, credits to GDP and market capitalization are on average higher in the core than in the periphery.

5. Results

5.1. Baseline

Starting with our first hypothesis of a vulnerability effect, Table 1 shows that financialisation is a positive and significant determinant of financial instability. This is also true with or

[4] Usually in the literature, the distinction between the core and the periphery focuses on the Eurozone. A study about the linkages between financialisation and financial stability requires the inclusion of more countries and especially the UK in the corresponding subsample.

without the controls, but their inclusion reduces the magnitude of the effects. When including them, the coefficient is equal to 0.14 and is significant at the 5% level. According to our second hypothesis of a trauma effect, Table 1 shows that financial instability (non-performing loans in % of all loans) has a negative effect on financialisation (bank credit to GDP).[5] This is true with or without the financial and macro controls and the coefficient is equal to -0.14 and significant at the 1% level. Since all variables have been normalised, this means that a 1-standard-deviation increase in non-performing loans (namely, an increase of 5 percentage points of the share of non-performing loans) reduces credit to GDP of 0.14 s.d. or 8 percentage points.

We also assess in Table 1 the potential non-linear relations between financialisation and financial instability. We first introduce squared values of each variable of interest as an explanatory variable of the other (column 3). We find that non-performing loans have the same linear effect on credit to GDP whatever its level, while the effect of credit to GDP on non-performing loans –the vulnerability effect– is larger for high values of the credit to GDP ratio. We then look at the cross-effects of each variable on the other by introducing an interaction term of the lagged dependent variable with the variable of interest (column 4). Once again, it happens that the effect of non-performing loans on credit to GDP does not depend on the value of credit to GDP, whereas the effect of credit to GDP on non-performing loans clearly depends on the value of non-performing loans. Finally, we consider the time-contingency of the effect and we interact the variable of interest with a dummy for the crisis (column 5). The effect of non-performing loans on credit to GDP has not been altered during the financial crisis, whereas the vulnerability effect appears to kick in during crisis times rather than during good times. Interestingly, the crisis does not have an impact by itself. High levels of credit/GDP together with the occurrence of the crisis fuel financial instability.
Finally, we also test for a 3-equation SUR model which includes long-term interest rates as a third simultaneous variable. Although we are interested in the relationship between financialisation and financial instability with long-term interest rates included in the set of explanatory variables, one can view long-term interest rates as another variable whose determination is simultaneous to financialisation and financial instability. Column 6 in Table 1 provides estimates of the equation for our two variables of interest and shows that they are not modified by this assumption. For sake of parsimony, we therefore pursue the rest of the analysis with a 2-equation SUR model.

5.2. Estimating causal effects

So far, we have jointly estimated a set of equations assuming that they have no endogenous regressors. However, it is likely that our different variables of interest on the right-hand-side of equations are endogenous. Using three-stage least squares (3SLS or SUR-IV) enables to combine the system estimation of SUR with the instrumental variables method of 2SLS so as to get a consistent estimator of equations with endogenous regressors. The 3SLS estimator works in 3 steps: 1. we calculate fitted values of the endogenous variables based on the reduced-form regressions on the exogenous variables as in 2SLS, 2. we estimate the individual equations by 2SLS, using their fitted values in place of the endogenous regressors, 3. we estimate the system of equations jointly by GLS.

Identification depends on two main assumptions: that the instrument does not itself appear in the equation, and that the instrument does appear in another equation that influences the

[5] As a robustness test, we also introduced the deposit banks assets as another measure of financialisation. Results hold and are available from the authors upon request.

endogenous regressor. This means that there needs to be one omitted exogenous variable for each included endogenous variable. There are two ways to assess the relevance of our instrumental variables. They should explain a significant share of the variation in the endogenous regressor, and they should be exogenous to the dependent variables, or in other words, they should not be correlated with the dependent variables except through their effects on the endogenous regressors. We therefore provide the R^2 of the regression of the 3SLS residuals on the instruments (the Sargan test equivalent) to assess their relevance and they confirm the validity of the six instruments described below.

We instrument non-performing loans by the CISS, the stock market volatility and the STLFSI (columns 1 to 3), while we instrument credit to GDP by assets to GDP, the turnover ratio and the market capitalisation (columns 4 to 6) so as to ensure the robustness of our results over different instruments. Non-performing loans are shown to be influenced by macroeconomic and bank-specific factors like the too-big-to-fail presumption (Louzis et al., 2012). A model of non-performing loan determination would then also include an index of systemic risk, a volatility index or an index of financial stress. Similarly, the theoretical model of the degree of financialisation would nest the demand side of the credit market and also draw on the supply side, hence on the liquidity and depth of the financial system. These unobservable structural characteristics are proxied by assets to GDP, turnover ratio or market capitalisation. While our instruments are not highly correlated, the consistency of the estimated results across the 3 different instruments for each instrumented variable tends to support the validity of the instrumental variable approach to estimate causal effects of credit to GDP or non-performing loans one on the other.

Results of estimations with SUR-IV are reported in Table 2. They point to robust interrelationships between financialisation and financial instability and to robust correlations to macro control variables, GDP growth in the equation of credit to GDP and GDP growth and inflation in the equation of non-performing loans. In this latter equation, the correlations to the long-term interest rate and to taxes on business are also robust. There is a negative causal impact of non-performing loans on credit to GDP and a positive causal impact of credit to GDP on non-performing loans, suggesting that the "trauma" and "vulnerability" effects put forward in the previous section are indeed at work. In addition, while confirming the previous estimates, it is worth noticing that both effects are of higher magnitude with 3SLS than with a SUR model only. Since our baseline results are robust to IV estimation, the rest of the analysis is performed with the SUR model so as to provide the most conservative results with lower bound estimates rather than upper bound ones.

5.3. Sub-samples

SUR estimates for subgroups of countries (Table 3) confirm the trauma effect for the Eurozone, and core and periphery countries; however the effect is more than twice higher in core than periphery countries. Interestingly, there is a divergence for the vulnerability effect between the Eurozone and core countries on one side and periphery countries on the other side: financialisation has no incidence on financial instability in the latter. This may proceed from different stages of financialisation between the core and the periphery of the EU and shed light on the threshold impact of credit to GDP ratios on financial instability discussed in section 5.1.

The coefficients associated to the lagged values of our dependent variables are in all cases very significant and account for the persistence of these processes. We find in Tables 1 to 3, that long-term real interest rates have no impact on credit to GDP and a positive impact on

non-performing loans, a correlation which we also find in the Eurozone countries and in the periphery countries but not in the core ones. One possible interpretation of these impacts may be that long-term real interest rates have both positive effects on the supply side of credits and negative effects on the demand side that offset each other and explain the absence of any impact on the bank credit to GDP ratio. Nevertheless high interest rates would reveal the fragility of the weakest debtors (which are in the EU periphery), increase the share of non-performing loans and trigger financial instability. The substitution effect between bank intermediation and financial markets does not appear in the data: stock market capitalisation has no significant impact on financialisation. In addition, the stock market capitalisation has no effect on non-performing loans. Both results are confirmed for subgroups. It appears that direct taxes on business are negatively correlated with financial instability, but this result seems mainly driven by core countries. Finally, the index of financial reform is neither correlated with financialisation nor with financial instability. This is true for all subsamples of countries. The former result is consistent with Tressel and Detragiache (2008).

As far as macro control variables are concerned, we find evidence that the GDP growth rate is negatively correlated to the credit to GDP ratio and to non-performing loans. The former result might be related to different degrees of financialisation in the EU and might therefore be related to the convergence effect: most developed economies in the EU share the most developed banking and financial systems; hence, these developed countries with relatively low GDP growth rates would show the most dynamic credit to GDP ratio, whereas least-developed ones would have the least dynamic. This argument is confirmed after the core and the periphery countries are tested separately: the GDP growth rate has an impact on credit to GDP ratios in the (least-financialised) periphery, but not in the (most-financialised) core (Table 3). The negative impact of the growth rate on non-performing loans would also match the argument of the convergence effect: the pace of growth in the least-developed-least financialised countries would not produce the same increase in risk-taking by banks and on financial markets as in the most-developed-most-financialised economies. In a highly financialised area, the smaller economic growth rate would be synonymous of riskier credit, generating a rise in non-performing loans.[6] The relative magnitude of the coefficients in Table 3 sheds some light on this issue though parameters are not statistically different. Evidence on the positive impact of inflation on financial instability is strong, but driven only by periphery countries. The absence of an effect of inflation on financial instability in the Eurozone is consistent with Blot et al. (2015) who find that there is no stable and clear link between financial stability and price stability in the Eurozone. Finally, trade openness is not correlated to credit to GDP or financial instability.[7]

5.4. Introducing government debt

We enlarge, in Table 4, the scope of common determinants of financialisation and financial instability to government debt. First, our previous results about the vulnerability effect still hold. Second, it appears that public debt to GDP ratios have a positive effect on financial instability in the EZ and core EU countries. However, if we decompose this effect between normal times and crisis times, it seems that this effect of government debt on financial instability happens only during crisis and that the effect is null (EZ and core EU countries) or

[6] The effect may also stem from the variation of loan-loss provisioning due to bank lending dynamics. Pool et al. (forthcoming) show that banks decrease provisioning when bank lending increases.

[7] This result is confirmed when replacing trade openness by an index measuring countries' degree of capital account openness, defined by Chinn and Ito (2006).

even negative (all countries or periphery EU countries) in normal times. This is consistent with the analysis of Caruana and Avdjiev (2012) and with the home bias in periphery countries that Acharya and Steffen (2015) reveal. Meanwhile, the trauma effect is no longer statistically significant in the Eurozone and EU core countries, and public debt to GDP ratios are negatively correlated to financialisation except for periphery EU countries. This supports the argument of a possible direct crowding-out effect in the core or of an indirect one in the periphery through the positive effect of higher public debt on financial instability which may push banks to reduce their supply of credits and to deleverage. This is consistent with Cantero-Saiz et al. (2014)'s conclusion that banks in high sovereign risk EU countries reduced their credit supply more when monetary policy is tight.

5.5. The stock market view of financialisation

Until then, we have only taken into account one dimension of financialisation, the credit view, whereas another dimension, the stock market view, could also be analysed. It is worth noting that in the EU the two views are not interchangeable as they do not capture exactly the same relationships because of a selection bias: households and small and mid-sized corporations do not have the same access to financial markets as large corporations. However, as Beck and Levine (2004) pointed out, financial deepening can also be measured through the turnover ratio which proxies the depth and liquidity of stock markets, while financial instability is captured with the stock market volatility.

Table 5 reports the estimates with this new set of variables. The opposite effects between financial instability and financialisation are still captured with some subsample limitations though. On the one hand, the turnover ratio positively affects stock market volatility, except in core EU countries. This suggests that the vulnerability effect is not contingent on the definition of financialisation. On the other hand, stock market volatility has a negative effect on the depth and liquidity of financial markets (the turnover ratio) in core EU countries only, confirming there the trauma effect. Surprisingly, stock market volatility has a positive effect on the turnover ratio in periphery EU countries. This effect may capture the still on-going development of financial markets in this part of the EU.

5.6. Relaxing the main identification assumption

Finally, we provide estimates suggesting how our identification assumption affects the main results. Therefore we move from the estimation of a joint system of equations to a single-equation space, namely the estimation of 2 individual panel equations (Table 6) where the error terms of both financialisation and financial instability processes are considered independently. We perform pooled OLS, as well as fixed- and random-effects estimations. It is striking to note that the previous outcomes for both hypotheses still hold. Non-performing loans are a significant negative determinant of bank credit to GDP, while the level of bank credit to GDP is a significant positive determinant of the share of non-performing loans to gross loans. Moreover, other financial and macro determinants of financialisation and financial instability which were statistically significant in the benchmark model remain so. The results about a vulnerability effect and a trauma effect in the EU are thus robust to our identification assumption.

6. Conclusion

We represent financialisation and financial instability as a system of simultaneous joint data generating processes (estimated with Seemingly Unrelated Regressions) whose error terms

are correlated and find that financialisation positively affects financial instability –the vulnerability effect– and financial instability negatively affects financialisation –the trauma effect–. We find evidence of some non-linearities between the two variables. Whereas non-performing loans have the same linear effect on credit to GDP, the effect of credit to GDP on non-performing loans –the vulnerability effect– appears state and time contingent. It depends on and is reinforced by the level of credit to GDP and on the level of non-performing loans, and appears to kick in during crisis times rather than during good times. In addition, the positive effect of financial deepening –measured with the turnover ratio– on financial instability and the negative effect of stock market volatility on financialisation are also found when considering the market view of financialisation rather than the credit one. Finally, even when relaxing our identification assumption, the level of bank credit to GDP remains a significant positive determinant of the level of non-performing loans (as a percentage of all loans), while financial instability has a negative effect on financialisation.

The existence of a vulnerability effect in the EU as a whole, in the Eurozone, in the core of the EU but not at its periphery, and of a trauma effect in all samples raises some policy recommendations. First, the existence of both effects confirms the requirement to control and supervise the supply of bank credits in the Eurozone and core countries of the EU. According to our results, monitoring bank credits, via policies which remain to be discussed – e.g. a change in capital adequacy ratios -, would alleviate the risks of financial instability. Second, in the EU periphery countries, the variations in long-term interest rates and inflation play a strong role in the rise of financial instability: hence, supervising bank credits in the periphery, within the Banking union, should be complemented with macroeconomic policies aimed at achieving low and stable inflation and long-term interest rates.

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Table 1: Benchmark

	(1) All	(2) All	(3) All	(4) All	(5) All	(6) All
	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.
Lag Dep. Var.	0.76***	0.75***	0.73***	0.73***	0.72***	0.64***
	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.05]
Credit/GDP	0.26***	0.14**	0.12**	0.16**	0.04	0.13**
	[0.05]	[0.06]	[0.06]	[0.06]	[0.08]	[0.06]
(Credit/GDP)²			0.13***			
			[0.04]			
Interaction				0.10**		
				[0.04]		
Credit/GDP * Crisis					0.28**	
					[0.12]	
Crisis					-0.01	
					[0.15]	
LT Real IR		0.19***	0.16**	0.17**	0.20***	0.41***
		[0.07]	[0.06]	[0.07]	[0.07]	[0.07]
Market Cap.		0.01	0.02	0.02	0.03	0.05
		[0.05]	[0.04]	[0.05]	[0.05]	[0.05]
Tax. Business		-0.10**	-0.11**	-0.09	-0.12***	-0.09**
		[0.04]	[0.04]	[0.04]	[0.04]	[0.04]
Fin. Reform		-0.02	-0.02	-0.11	-0.12	0.04
		[0.51]	[0.49]	[0.50]	[0.50]	[0.50]
GDP growth		-0.28***	-0.24***	-0.32***	-0.23***	-0.27***
		[0.05]	[0.05]	[0.06]	[0.06]	[0.05]
Inflation		0.15**	0.13**	0.12**	0.15***	0.32***
		[0.06]	[0.06]	[0.06]	[0.06]	[0.07]
Trade Open.		-0.04	-0.05	-0.02	-0.05	0.00
		[0.05]	[0.05]	[0.05]	[0.05]	[0.06]
	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP
Lag Dep. Var.	0.88***	0.86***	0.86***	0.86***	0.84***	0.86***
	[0.04]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]
Non-Perf L.	-0.10***	-0.14***	-0.14***	-0.13***	-0.11**	-0.09**
	[0.03]	[0.03]	[0.04]	[0.04]	[0.05]	[0.04]
(Non-Perf L.)²			0.01			
			[0.03]			
Interaction				-0.05		
				[0.03]		
Non-Perf L. * Crisis					-0.03	
					[0.07]	
Crisis					0.17	
					[0.11]	
LT Real IR		0.02	0.01	0.04	0.00	-0.06
		[0.05]	[0.05]	[0.05]	[0.05]	[0.05]
Market Cap.		0.03	0.03	0.03	0.03	0.02
		[0.03]	[0.03]	[0.03]	[0.03]	[0.03]
Tax. Business		0.01	0.01	0.00	0.01	0
		[0.03]	[0.03]	[0.03]	[0.03]	[0.03]
Fin. Reform		-0.41	-0.4	-0.34	-0.33	-0.34
		[0.36]	[0.36]	[0.36]	[0.36]	[0.35]
GDP growth		-0.19***	-0.19***	-0.18***	-0.16***	-0.16***
		[0.04]	[0.04]	[0.04]	[0.04]	[0.04]
Inflation		0.01	0.00	0.02	-0.01	-0.08
		[0.04]	[0.04]	[0.04]	[0.04]	[0.05]
Trade Open.		0.02	0.01	0.02	0.00	-0.01
		[0.04]	[0.04]	[0.04]	[0.04]	[0.04]
Country/Time/Cst	Yes	Yes	Yes	Yes	Yes	Yes
3-equation model	No	No	No	No	No	Yes
N	275	182	182	182	182	179
R^2_1	0.61	0.75	0.76	0.75	0.76	0.74
R^2_2	0.88	0.88	0.88	0.88	0.89	0.89

Standard errors in brackets. ** p < 0.05, *** p < 0.01 Estimated from equation (1). All variables are normalised by country. The interaction term is between the lag of the dependent variable and credit/GDP in the upper panel, and non-performing loans in the lower panel. In column (6), the SUR model is estimated with 3 dependent variables: non-performing loans, credit/GDP, and long-term interest rates, and the overall model is augmented with short-term interest rates. For sake of simplicity, the 3rd equation for long-term interest rates and the parameters for short-term interest rate are not shown here. They are available from the authors upon request.

Table 2: SUR-IV 3SLS estimation

	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	All	All	All	All
Instrumented	Non-Perf L.	Non-Perf L.	Non-Perf L.	Credit/GDP	Credit/GDP	Credit/GDP
Add. Instrument	CISS	Volat	STLFSI	Asset/GDP	Turnover	Market Cap.
	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.
Lag Dep. Var.	0.74***	0.74***	0.74***	0.74***	0.74***	0.74***
	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]
Credit/GDP	0.27***	0.27***	0.27***	0.26***	0.26***	0.26***
	[0.08]	[0.08]	[0.08]	[0.08]	[0.08]	[0.08]
LT Real IR	0.18***	0.18***	0.18***	0.18***	0.18***	0.18***
	[0.07]	[0.07]	[0.07]	[0.07]	[0.07]	[0.07]
Market Cap.	0.02	0.02	0.02	0.02	0.02	0.02
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]
Tax. Business	-0.10**	-0.10**	-0.10**	-0.10**	-0.10**	-0.10**
	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]
Fin. Reform	0.05	0.05	0.05	0.04	0.04	0.04
	[0.51]	[0.51]	[0.51]	[0.51]	[0.51]	[0.51]
GDP growth	-0.25***	-0.25***	-0.25***	-0.25***	-0.25***	-0.25***
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]
Inflation	0.15**	0.15**	0.15**	0.15**	0.15**	0.15**
	[0.06]	[0.06]	[0.06]	[0.06]	[0.06]	[0.06]
Trade Open.	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04
	[0.06]	[0.06]	[0.06]	[0.05]	[0.05]	[0.06]
	Regression of 3SLS residuals on instruments					
R^2	0.02	0.03	0.01	0.03	0.01	0.01
	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP
Lag Dep. Var.	0.89***	0.90***	0.90***	0.90***	0.90***	0.90***
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]
Non-Perf L.	-0.20***	-0.20***	-0.20***	-0.21***	-0.21***	-0.21***
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]
LT Real IR	0.04	0.04	0.04	0.05	0.05	0.05
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]
Market Cap.	0.04	0.04	0.04	0.04	0.04	0.04
	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]
Tax. Business	0.00	0.00	0.00	0.00	0.00	0.00
	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]
Fin. Reform	-0.46	-0.46	-0.46	-0.47	-0.47	-0.47
	[0.36]	[0.36]	[0.36]	[0.36]	[0.36]	[0.36]
GDP growth	-0.20***	-0.20***	-0.20***	-0.20***	-0.20***	-0.20***
	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]
Inflation	0.02	0.02	0.02	0.03	0.03	0.02
	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]
Trade Open.	0.02	0.02	0.02	0.02	0.02	0.02
	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]
	Regression of 3SLS residuals on instruments					
R^2	0.05	0.02	0.05	0.00	0.01	0.02
Country/Time/Cst	Yes	Yes	Yes	Yes	Yes	Yes
N	182	182	182	182	182	182

Standard errors in brackets. ** p < 0.05, *** p < 0.01 Estimated from equation (1). All variables are normalised by country.

Table 3: Geographical zones

	(1) All	(2) EZ	(3) Core	(4) Periphery
	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.
Lag Dep. Var.	0.75***	0.75***	0.72***	0.73***
	[0.04]	[0.05]	[0.06]	[0.07]
Credit/GDP	0.14**	0.23***	0.17**	0.05
	[0.06]	[0.08]	[0.08]	[0.11]
LT Real IR	0.19***	0.22***	0.05	0.27***
	[0.07]	[0.08]	[0.18]	[0.08]
Market Cap.	0.01	-0.02	0.05	0.01
	[0.05]	[0.06]	[0.07]	[0.05]
Tax. Business	-0.10**	-0.07	-0.20**	-0.08
	[0.04]	[0.05]	[0.08]	[0.06]
Fin. Reform	-0.02	0.64	0.32	0.04
	[0.51]	[0.57]	[0.79]	[0.73]
GDP growth	-0.28***	-0.20***	-0.31***	-0.26***
	[0.05]	[0.07]	[0.07]	[0.08]
Inflation	0.15**	0.11	0.13	0.18***
	[0.06]	[0.07]	[0.12]	[0.07]
Trade Open.	-0.04	-0.03	0.00	-0.04
	[0.05]	[0.06]	[0.11]	[0.06]
	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP
Lag Dep. Var.	0.86***	0.94***	0.89***	0.89***
	[0.05]	[0.05]	[0.06]	[0.06]
Non-Perf L.	-0.14***	-0.11***	-0.19***	-0.08**
	[0.03]	[0.03]	[0.06]	[0.04]
LT Real IR	0.02	0.03	0.01	-0.01
	[0.05]	[0.05]	[0.13]	[0.04]
Market Cap.	0.03	0.06	0.02	0.04
	[0.03]	[0.03]	[0.06]	[0.03]
Tax. Business	0.01	0.05	-0.04	0.05
	[0.03]	[0.03]	[0.06]	[0.03]
Fin. Reform	-0.41	-0.04	0.05	-0.07
	[0.36]	[0.33]	[0.59]	[0.39]
GDP growth	-0.19***	-0.24***	-0.27***	-0.02
	[0.04]	[0.04]	[0.05]	[0.04]
Inflation	0.01	0.00	0.01	0.03
	[0.04]	[0.04]	[0.09]	[0.04]
Trade Open.	0.02	0.06	0.06	0.00
	[0.04]	[0.04]	[0.08]	[0.03]
Country/Time/Cst	Yes	Yes	Yes	Yes
N	182	126	92	90
R^2_1	0.75	0.77	0.71	0.82
R^2_2	0.88	0.92	0.86	0.95

Standard errors in brackets. ** p < 0.05, *** p < 0.01 Estimated from equation (1). All variables are normalised by country.

Table 4: Introducing government debt

	(1) All	(2) EZ	(3) Core	(4) Periphery	(5) All	(6) EZ	(7) Core	(8) Periphery
	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.	Non-Perf L.
Lag Dep. Var.	0.72***	0.70***	0.65***	0.74***	0.69***	0.71***	0.63***	0.70***
	[0.05]	[0.06]	[0.07]	[0.07]	[0.04]	[0.06]	[0.06]	[0.06]
Credit/GDP	0.18***	0.28***	0.22***	0.02	0.14**	0.25***	0.20***	-0.13
	[0.06]	[0.08]	[0.08]	[0.11]	[0.06]	[0.08]	[0.07]	[0.11]
Gov. Debt	0.08	0.15**	0.16**	-0.08	-0.21***	-0.12	-0.12	-0.50***
	[0.06]	[0.07]	[0.07]	[0.10]	[0.08]	[0.14]	[0.10]	[0.13]
Gov. Debt * Crisis					0.48***	0.35**	0.47***	0.66***
					[0.10]	[0.15]	[0.14]	[0.15]
Crisis					0.36**	0.3	0.34	0.55***
					[0.14]	[0.20]	[0.23]	[0.18]
LT Real IR	0.17***	0.18**	0.07	0.31***	0.21***	0.17**	0.13	0.31***
	[0.07]	[0.08]	[0.17]	[0.09]	[0.06]	[0.08]	[0.18]	[0.08]
Market Cap.	0.02	0.02	0.08	0.00	0.02	-0.01	0.05	0.00
	[0.05]	[0.06]	[0.07]	[0.06]	[0.04]	[0.06]	[0.07]	[0.05]
Tax. Business	-0.10**	-0.06	-0.22***	-0.09	-0.09**	-0.05	-0.23***	-0.08
	[0.04]	[0.05]	[0.08]	[0.06]	[0.04]	[0.05]	[0.07]	[0.05]
Fin. Reform	-0.02	0.7	0.47	0.02	0.16	0.67	0.3	0.42
	[0.50]	[0.56]	[0.78]	[0.73]	[0.47]	[0.55]	[0.73]	[0.67]
GDP growth	-0.27***	-0.21***	-0.30***	-0.26***	-0.24***	-0.20***	-0.27***	-0.19**
	[0.05]	[0.07]	[0.07]	[0.08]	[0.05]	[0.07]	[0.07]	[0.07]
Inflation	0.15**	0.11	0.15	0.19***	0.14**	0.09	0.18	0.12
	[0.06]	[0.07]	[0.11]	[0.07]	[0.06]	[0.07]	[0.13]	[0.07]
Trade Open.	-0.03	-0.03	0.06	-0.02	-0.03	-0.03	0.1	-0.01
	[0.05]	[0.06]	[0.11]	[0.07]	[0.05]	[0.06]	[0.10]	[0.06]
	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP	Credit/GDP
Lag Dep. Var.	0.84***	0.91***	0.88***	0.90***	0.83***	0.89***	0.87***	0.84***
	[0.05]	[0.05]	[0.06]	[0.07]	[0.05]	[0.05]	[0.06]	[0.06]
Non-Perf L.	-0.09**	-0.06	-0.10	-0.09**	-0.10**	-0.06	-0.10	-0.11***
	[0.04]	[0.04]	[0.06]	[0.04]	[0.04]	[0.04]	[0.06]	[0.04]
Gov. Debt	-0.11***	-0.12***	-0.16***	0.03	-0.15***	-0.25***	-0.18**	-0.07
	[0.04]	[0.04]	[0.05]	[0.05]	[0.06]	[0.08]	[0.08]	[0.07]
Gov. Debt * Crisis					0.06	0.17	0.02	0.15
					[0.07]	[0.09]	[0.11]	[0.08]
Crisis					0.23**	0.26**	0.14	0.43***
					[0.10]	[0.12]	[0.18]	[0.09]
LT Real IR	0.03	0.04	-0.04	-0.02	0.03	0.03	-0.09	0.00
	[0.05]	[0.05]	[0.13]	[0.05]	[0.05]	[0.05]	[0.14]	[0.05]
Market Cap.	0.02	0.03	-0.01	0.05	0.01	0.01	-0.02	0.04
	[0.03]	[0.04]	[0.05]	[0.03]	[0.03]	[0.04]	[0.06]	[0.03]
Tax. Business	0.01	0.04	0.00	0.05	0.01	0.04	0.00	0.04
	[0.03]	[0.03]	[0.06]	[0.03]	[0.03]	[0.03]	[0.06]	[0.03]
Fin. Reform	-0.4	-0.1	-0.13	-0.07	-0.33	-0.1	-0.12	0.05
	[0.35]	[0.32]	[0.57]	[0.39]	[0.34]	[0.32]	[0.57]	[0.35]
GDP growth	-0.17***	-0.21***	-0.24***	-0.02	-0.14***	-0.19***	-0.23***	0.03
	[0.04]	[0.04]	[0.05]	[0.04]	[0.04]	[0.04]	[0.05]	[0.04]
Inflation	0	-0.01	-0.03	0.03	-0.01	-0.02	-0.07	0.02
	[0.04]	[0.04]	[0.08]	[0.04]	[0.04]	[0.04]	[0.10]	[0.03]
Trade Open.	0.01	0.05	-0.02	-0.01	0	0.04	-0.03	-0.03
	[0.04]	[0.04]	[0.08]	[0.03]	[0.04]	[0.04]	[0.08]	[0.03]
Country/Time/Cst	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	182	126	92	90	182	126	92	90
R^2_1	0.75	0.78	0.72	0.82	0.78	0.79	0.76	0.85
R^2_2	0.89	0.93	0.88	0.95	0.89	0.93	0.88	0.96

Standard errors in brackets. ** p < 0.05, *** p < 0.01 Estimated from equation (1). All variables are normalised by country.

Table 5: Stock market view of financialisation

	(1) All	(2) EZ	(3) Core	(4) Periphery
	Volat	Volat	Volat	Volat
Lag Dep. Var.	0.52***	0.55***	0.48***	0.51***
	[0.05]	[0.05]	[0.07]	[0.07]
Turnover	0.21***	0.19***	-0.09	0.36***
	[0.05]	[0.06]	[0.08]	[0.06]
LT Real IR	0.06	0.1	0.52***	0.01
	[0.07]	[0.09]	[0.18]	[0.09]
Credit/GDP	0.08	0.06	0.01	0.31**
	[0.07]	[0.09]	[0.08]	[0.15]
Tax. Business	-0.04	-0.01	-0.02	-0.07
	[0.05]	[0.06]	[0.07]	[0.08]
Fin. Reform	0.07	-0.04	0.24	0.21
	[0.61]	[0.68]	[0.89]	[0.98]
GDP growth	-0.61***	-0.69***	-0.62***	-0.55***
	[0.06]	[0.08]	[0.08]	[0.10]
Inflation	-0.02	-0.04	0.37***	-0.14
	[0.07]	[0.08]	[0.12]	[0.09]
Trade Open.	0	0.07	-0.06	0.02
	[0.07]	[0.08]	[0.12]	[0.08]
	Turnover	Turnover	Turnover	Turnover
Lag Dep. Var.	0.53***	0.51***	0.49***	0.34***
	[0.06]	[0.07]	[0.09]	[0.11]
Volat	0.01	-0.02	-0.25***	0.32**
	[0.07]	[0.09]	[0.09]	[0.13]
LT Real IR	0.09	0.03	0.44**	-0.04
	[0.10]	[0.12]	[0.20]	[0.14]
Credit/GDP	-0.02	0.03	0.07	-0.19
	[0.09]	[0.12]	[0.09]	[0.22]
Tax. Business	0.17**	0.19**	0.15	0.28**
	[0.07]	[0.08]	[0.08]	[0.11]
Fin. Reform	0.13	0.07	-0.24	-0.94
	[0.77]	[0.90]	[0.99]	[1.41]
GDP growth	0.31***	0.31***	0.14	0.53***
	[0.09]	[0.11]	[0.10]	[0.15]
Inflation	0.07	-0.01	0.38***	-0.08
	[0.08]	[0.10]	[0.14]	[0.13]
Trade Open.	-0.04	-0.05	-0.09	-0.12
	[0.09]	[0.11]	[0.13]	[0.12]
Country/Time/Cst	Yes	Yes	Yes	Yes
N	200	138	107	93
R^2_1	0.64	0.68	0.67	0.65
R^2_2	0.40	0.38	0.57	0.32

Standard errors in brackets. ** p < 0.05, *** p < 0.01 Estimated from equation (1). All variables are normalised by country.

Table 6: Alternative estimation methods

	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	All	All	All	All
	Pooled OLS	FE	RE	Pooled OLS	FE	RE
	Non-Perf L.	Non-Perf L.	Non-Perf L.	Credit/GDP	Credit/GDP	Credit/GDP
Lag Dep. Var.	0.71***	0.59***	0.62***	0.86***	0.80***	0.81***
	[0.04]	[0.06]	[0.05]	[0.05]	[0.06]	[0.05]
Credit/GDP	0.18***	0.23***	0.20***			
	[0.07]	[0.07]	[0.06]			
Non-Perf L.				-0.14***	-0.16***	-0.14***
				[0.03]	[0.05]	[0.04]
LT Real IR	0.21***	0.25***	0.25***	0.02	0.01	0.00
	[0.07]	[0.07]	[0.07]	[0.05]	[0.05]	[0.05]
Market Cap.	0.00	-0.02	-0.01	0.03	-0.03	-0.02
	[0.05]	[0.05]	[0.05]	[0.03]	[0.03]	[0.03]
Tax. Business	-0.13***	-0.13**	-0.14***	0.01	-0.05	-0.01
	[0.05]	[0.05]	[0.05]	[0.03]	[0.04]	[0.03]
Fin. Reform	-0.18	2.69***	-0.59	-0.31	1.01	-0.47
	[0.53]	[1.02]	[0.68]	[0.36]	[0.76]	[0.58]
GDP growth	-0.24***	-0.19***	-0.21***	-0.18***	-0.22***	-0.22***
	[0.06]	[0.06]	[0.06]	[0.04]	[0.03]	[0.03]
Inflation	0.16***	0.17***	0.18***	0.01	-0.01	-0.02
	[0.06]	[0.06]	[0.06]	[0.04]	[0.05]	[0.04]
Trade Open.	-0.04	-0.04	-0.03	0.02	0.11**	0.09**
	[0.06]	[0.06]	[0.06]	[0.04]	[0.05]	[0.04]
Country/Time/Cst	Yes	Yes	Yes	Yes	Yes	Yes
N	186	169	186	188	171	188
R^2 / R^2_within	0.73	0.65	0.75	0.88	0.71	0.88

Standard errors in brackets. ** p < 0.05, *** p < 0.01 Estimated from equation (1) but each equation separately. All variables are normalised by country.

APPENDIX

Table A: Data Description and Sources

Abbreviation	Description	Source	Frequency
Credit/GDP	Private credit by deposit money banks and other financial institutions to GDP (%)	GFDD	annual
Non-Perf L.	Bank non-performing loans to gross loans (%)	GFDD	annual
Asset/GDP	Deposit money banks' assets to GDP (%)	GFDD	annual
Turnover	Stock market turnover ratio (%)	GFDD	annual
CISS (composite indicator of systemic stress)	Index comprising the five most important segments of a financial system: bank and non-bank financial intermediaries sector, money markets, securities markets and foreign exchange markets.	ECB	Weekly aggregated to annual
STLFSI	St. Louis Fed Financial Stress Index	FRED	annual
Volat	Stock price volatility (%)	GFDD	annual
LT Real IR	Real long term interest rates (difference between long term interest rates and inflation)	Authors calculation using OECD & WDI	annual
Market Cap.	Market capitalisation of listed companies (% of GDP)	WDI	annual
Tax. Business	Cyclically adjusted direct taxes on business (% of GDP)	OECD	annual
Gov. Debt	Gross public debt, Maastricht criterion, as % of GDP	OECD	annual
Fin. Reform	Index of financial reform	IMF	annual
Inflation	Inflation, consumer prices (annual %)	WDI	annual
GDP growth	GDP growth (annual %)	WDI	annual
Trade Open.	Trade (% of GDP)	WDI	annual

Table B: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Main variables					
Credit/GDP	344	93.12	57.61	6.38	284.62
Non-Perf L.	343	4.75	5.01	0.10	31.60
Financial controls					
LT Real IR	277	2.30	2.03	-1.72	21.00
Market Cap.	405	53.80	47.05	2.41	323.66
Tax. Business	278	0.21	0.55	0.01	3.44
Fin. Reform	330	0.92	0.08	0.49	1.00
Macro controls					
Inflation	405	3.68	5.16	-4.48	59.10
GDP growth	405	2.55	3.68	-17.95	12.23
Trade Open.	397	110.09	52.52	46.64	333.53

Table C: Subsamples composition

Eurozone (EZ)	Core	Periphery
Austria	Austria	Bulgaria
Belgium	Belgium	Cyprus
Germany	Germany	Estonia
Spain	Denmark	Spain
Finland	Finland	Greece
France	France	Hungary
Greece	Luxembourg	Ireland
Ireland	Netherlands	Italy
Italy	Sweden	Lithuania
Netherlands	United Kingdom	Latvia
Portugal		Malta
		Poland
		Portugal
		Romania
		Slovenia
		Slovakia

Table D: Mean of the main variables in Core and Periphery subsamples

	Core	Periphery
Credit/GDP (% of GDP)	115.83	80.32
Non-Perf L. (%)	2.19	6.32
LT Real IR	2.16	2.46
Market Cap. (% of GDP)	91.05	31.89
Tax. Business (% of GDP)	0.08	0.32
Fin. Reform (index)	0.95	0.90
Inflation (annual %)	1.90	4.72
GDP growth (annual %)	1.96	2.91
Trade Open. (% of GDP)	112.37	108.70