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FINANCIAL STABILITY AND ECONOMIC PERFORMANCE

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Abstract

This paper aims at establishing the link between economic performance, financial depth and financial stability in the European Union from 1998 to 2011. We use the standard framework – both in terms of variables and econometric method – of Beck and Levine (2004) to estimate these relationships. Our results suggest that the traditional result that financial depth positively influences economic performance (or components of aggregate dynamics like consumption, investment or disposable income) is not confirmed for European countries. Furthermore, we use different measures of financial instability (institutional index, microeconomic indicators, and our own statistical index derived from a Principal Component Analysis) and find that financial instability has a negative effect on economic growth.

Keywords: Financial depth; Aggregate dynamics; Financial stability, Banks, Non-performing loans, CISS, Z-score, Principal Component Analysis.

JEL Classification: G10; G21; O40

1. Introduction

This paper examines the relationship between macroeconomic performance, financial depth and financial stability in the European Union (EU). Different views emerged from the literature on the links between finance and economic performance. On the one hand, credit is found to be determinant in the process of economic development. The literature often recalls the Schumpeterian view that entrepreneurs need credit to finance their innovations. Banks and financial markets are then viewed as facilitators. On the other hand, finance development appears to respond to economic growth. With economic expansion, firms and households are more likely to demand financial services. In both cases, the finance-growth relationship seems to be constrained by structural determinants such as the historical level of debt, the legal environment or the level of economic development. Beyond this finance-growth nexus, we investigate whether financial instability affects macroeconomic performance.

Focusing on the financial stability issue is motivated from both an academic and a policy perspective. This topic has emerged in the academic debate since the crisis (Arcand et al., 2012 ; Cecchetti and Kharroubi, 2012 ; Beck et al., 2014). A major reason for addressing the question of financial stability is its public good's nature (see e.g. Boyer et al., 2004): it is a non-rival good since its use does not prevent someone else from the same use, and it is non-excludable since no one can be deprived from its use. After financial crises, new regulations are proposed to supervise and frame the financial system to preserve its properties as a public good (Cartapanis, 2011). In the case of a banking crisis at the micro level, financial stability has to be preserved to avoid that idiosyncratic shocks have a systemic impact through different contagion links: contractual, informational or psychological (Borio, 2003). For instance, Lehman Brothers' bankruptcy in September 2008 has affected the whole

banking system through several channels. Contractually, its creditors were the first to be hit. But very quickly, bankruptcy was analysed as a severe negative signal on financial markets and, in particular, on interbank markets. It induced uncertainty and suspicion among banking institutions that became suddenly reluctant to participate to the money market. This informational or psychological link was transmitted all over the world and extreme tensions appeared on the European's and US' money markets, and consequently, affected the real economy. Moreover, payment systems are central to the smooth functioning of market economies and financial instability could potentially disrupt these.

European countries included financial stability in the European Treaty as an objective of the European Central Bank. According to Article 127(2) of the Treaty on the Functioning of the European Union, the ECB has "to smooth the conduct of policies pursued by the competent authorities relating to the prudential supervision of credit institutions and the stability of the financial system". But beyond this mandate, its policy formulation is difficult to achieve because of the difficulties to define, forecast and measure financial stability (see Schinasi, 2004). In the absence of a consensus, it is acknowledged that these regulations should at least be implemented at the European level. The banking union is one step in that direction. The EU is thus an adequate level to investigate the finance-economic performance relationship, all the more so as European countries, thanks to financial integration and converging prudential regulations, are relatively homogenous compared to the rest of the world.

Our study documents this need for regulation in providing evidence about the effects of financial depth and financial stability on aggregate dynamics. First, we assess the finance-economic performance nexus in the EU. Our dynamic panel estimations follow the methodology of Beck and Levine (2004), hence producing results that are comparable across

a wide array of the literature and robust to the use of alternative panel specifications. On a sample of all European countries from 1998 to 2011, we show that financial depth does not have a positive effect on economic performance and its subcomponents: consumption, investment and disposable income. Moreover, we find that financial depth may have a negative impact on economic performance. This result is, to our knowledge, original to the literature and supports the view that the previously highlighted positive effect depends on the level of financial development. Second, we assess the effect of financial stability on economic performance. We use different financial instability indicators that measure the macro and the micro dimension of financial stability: the Composite Indicator of Systemic Stress (CISS) provided by the ECB, aggregate prudential ratios for domestic banks for each country, stock market volatility and our own statistical index constructed with a Principal Component Analysis (PCA). We find that financial instability has a negative effect on economic performance, without affecting the financial depth effect. These results suggest that the level of financial depth in the EU is such advanced that finance depth has no longer a positive effect on economic growth. On the contrary, the deepening of finance bears some risks through the negative effects induced by financial instability.

The rest of this paper is organized as follows. Section 2 presents the related literature. Section 3 describes the data and Section 4 the methodology and results. Section 5 concludes.

2. Related Literature

This paper is related to the literature studying the link between finance and economic growth, and to the literature investigating the link between financial instability and growth.

2.1 Finance and Economic Performance

Different perspectives on the relationship between finance and economic performance have been emphasized, and theoretical and empirical controversies on this subject exist since the beginning of the XXth century (Ang, 2008). The debate can be summed up as follows. Pros highlight that the development of finance induces a better allocation of resources, mobilizes savings, can reduce risks and facilitates transactions. The financial sector acts as a lubricant for the economy, ensuring a smoother allocation of resources and the emergence of innovative firms. Cons recall that stock markets have destabilizing effects and that finance liberalization leads to financial crises. These more sceptical authors believe that the link between finance and economic growth is exaggerated (Stiglitz, 2000; Rodrik and Subramanian, 2009). De Gregorio and Guidotti (1995) argue that the link is tenuous or even non-existent in the developed countries and suggest that once a certain level of economic wealth has been reached, the financial sector makes only a marginal contribution to the efficiency of investment. It abandons its role as a facilitator of economic growth in order to focus on its own growth. This generates banking and financial groups that are finally "too big to fail", enabling these entities to take excessive risk since they know it will be mutualised via public authorities' interventions. Their fragility rapidly transmits to other corporations and to the real economy. The subprime crisis is certainly a good example of the power and magnitude of the effects of correlation and contagion on financial markets. Numerous empirical studies have investigated these questions. However, until recently, the literature highlighted a positive relationship between financial development and economic growth (Bumann et al., 2013). We can distinguish between cross-country, time series and panel studies.

Cross-country studies, mixing countries with different levels of development, generally found a positive effect of finance on economic performance with the notable exception of Ram (1999). King and Levine (1993) found that financial development indicators are positively associated with capital accumulation, total factor productivity growth and GDP growth. Focusing on the stock markets' influence Demirgüç-Kunt and Maksimovic (1998) and Levine and Zervos (1998) concluded that liquid stock markets are positively related to GDP growth. Nevertheless, these cross-country studies suffer from severe limits. Most of them only intend to quantify how finance affects economic performance, neglecting the reverse causality. When they deal with this endogeneity bias, they include instrumental variables. But, as demonstrated by Ahmed (1998), this technique is not robust when data are averaged over decades, which is usually the case. Another limit of these cross-country analyses is the grouping of countries that are highly heterogenous. This problem is highligted by Ram (1999) who show that after defining subgroups into his sample, an important parametric heterogeneity is observed. This is due to the fact that the link beetween finance and economic performance is mainly determined by the financial structures, the legal environment, the preferences and the policies implemented in each country (Arestis and Demetriades, 1997; Demirgüç-Kunt and Maksimovic, 1998).

Time series studies have been developed in contrast to the above-mentioned limits. Arestis and Demetriades (1997) compare the finance-GDP growth link in Germany and in the United States. They find in Germany a relationship going from finance development to real GDP, whereas the reverse causal pattern runs for the United States. Xu (2000) also provides evidence of heterogeneity across countries. Arestis et al. (2001) compare the influence of banks and stock markets accross five developed countries. Their results show that both banks and stock markets promote GDP growth. But they also suggest that banks'

contribution is stronger than the stock markets'. Moreover, they point out that stock markets' volatility has negative effects in Japan, France and the United Kingdom. This variety of results can be interpreted as a limit to time-series analysis. These studies also suffer from small sample constraints. To preserve degrees of freedom, variables included in the analysis are kept to a minimun and these studies are subject to the omitted variable bias.

To address theses issues and to combine the benefits of cross-country analysis and time dimension, the literature moved to dynamic panel estimation procedures. Most of panel studies achieve the conclusion that financial development has a positive effect on economic performance, e.g. Beck, Levine and Loayza (2000), Rioja and Valev (2004), Rousseau and Wachtel (2000), Beck and Levine (2004) and Rajan and Zingales (1998) with industry-level data. Beck and Levine (2004), using dynamic panel data estimation, developed an empirical methodology based on Arellano and Bond (1991) that intends to take care of the endogeneity bias. They explain GDP per capita growth by means of the usual variables of the endogenous growth theory (*i.e.* the initial GDP per capita, the accumulation of human capital over the average years of education, government consumption, trade openness and inflation) and add to their model credit to the private sector and the turnover ratio as proxies of financial depth. They find that overall financial development impacts positively GDP growth. The turnover ratio and credit to the private sector are both significant suggesting that they complement each other. Nevertheless, the main conclusion that finance improves growth can be moderated. Calderon and Liu (2003) also find that financial development generally leads to economic growth, but they show that the causality from economic growth to financial development coexists. They find that the finance-growth link is more active in developing countries than in developed ones and that the longer the sample, the larger the effect of financial development.

In an attempt to reconcile the divergent views expressed in the literature, a nonlinear relationship between finance and economic growth has been postulated. Arcand et al. (2012) extend Beck and Levine (2004) by introducing credit to the private sector and the square of this variable in order to take account of potential non-linearity of financial depth. They are thus able to show that the relationship between economic growth and private sector credit is positive, but that the relationship between economic growth and the square of private sector credit (that is to say, the effect of credit to the private sector when it is at a high level) is negative. Taken together, these two factors indicate a concave relationship between economic growth and credit to the private sector: the relationship is positive up to a certain level of financial depth, and beyond a threshold, the effects of financial depth become negative. According to the different specifications estimated by Arcand et al. (2012), the threshold (as a percentage of GDP) lies between 80% and 100% of credit to the private sector. Cecchetti and Kharroubi (2012) come to similar results and make clear that these thresholds should not be viewed as targets, but more like "extrema" that might be reached only in times of crisis. In "normal" times, it would be better that private debt levels are lower so as to give the economies some manoeuvring room in times of crisis. To explain non-linearities, Aghion et al. (2005) and Fung (2009) argue that financial develoment helps catch-up the productivity frontier; for countries close to the frontier, positive effects from financial depth are limited or nonexistent.[1] Beck et al. (2012) insist on the fact that finance growth effect stems from firms rather than households. However, in developed countries, financial deepening originates from more households' lending. This may explain the weakness of the finance effect in high-income countries. It is worth acknowledging that those explanations do not exclude each other. They might even reinforce themselves and create an excess of finance that degenerates into financial instability.

[1] Philippon (2010) argue that the financial system grows faster than the real economy, with the consequence being that young talents are more attracted by the financial sector than the nonfinancial one.

Beyond questions of non-linearity, finance can also have its own potential negative effects. Indeed, liquidity and maturity transformation from deposit and savings to long-term investments can improve economic performance but can also be damaging. Deregulation and information asymmetries have encouraged banks to take more and more risks in recent years. Combined with financial deepening, it led to excessive lending, and reinforced bubbles that create conditions for financial fragility. The failure of financial institutions can have strong negative externalities. Laeven and Valencia (2012) show that banking crises tend to have larger real effects in advanced economies. Output losses are driven by deeper banking systems that impact deeply on the whole the economy.

2.2 Financial Stability

Schinasi (2004) proposes to define financial stability from its different characteristics, such as "enhancing economic processes, manage risks and absorb shocks". Financial stability represents the ability of a financial system to smoothly absorb the shocks the system has to face. Financial stability is a wide concept that relates to different aspects in finance. On a micro level, it refers to the market structures (a high degree of concentration reinforces the contagion risks from one bank to another) and to financial institutions themselves (depending on the fact that their business model requires high or low risk). On a macro level, it also relates to the monetary stability and to the functioning of the payment system. These domains are organised and supervised by central banks, supervisory authorities and private firms that ensure the functioning of the payment system between the financial institutions. Failures in the supervision or in the payment system may lead to financial instability.

One way to define financial stability is to take into account the ways to achieve it. Two main paradigms classify financial stability (see e.g. Borio, 2003): the macroprudential and microprudential ones. Macroprudential policies try to limit the occurrence of financial crisis in order to limit its impact on welfare. Microprudential policies try to limit financial institutions' probability of bankruptcy and idiosyncratic shocks.[2] Financial instability is exogenous to the financial system, and risks shoud be managed on an individual basis. This is a bottom-up approach and spillover effects between institutions are irrelevant. Macroprudential policies focus on the economic system as a whole and are aimed at circumscribing shocks that may have a macro impact.[3] Risks come from the system itself and the spillovers between institutions are important. Financial stability is generated through a top-down perspective, guaranteed by the actions of main financial institutions.

The complexity to define conceptually financial stability also involves various ways to quantify it. The ECB has developed a Composite Indicator of Systemic Stress (CISS) for the euro area as a whole (Hollo et al., 2012), available since 1999; it gives an appreciation of the macroeconomic financial stability. 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) that measures the probability of default for a bank or a banking system. Nevertheless, this indicator suffers from several limitations (Čihák et al., 2012). Using the financial stress index[4] developped by the IMF for thirteen industrialized economies, Proaño et al. (2013) analyze how the effect of the sovereign debt-to-GDP ratio on economic growth depends on financial stability and find that the debt-to-GDP ratio impairs economic growth only if financial stress is high.

[2] Its main objective is to guarantee a protection for the consumers (investors, depositors, etc…).
[3] Its main objective is to avoid economic costs in terms of GDP or unemployment stemming from financial instability.
[4] This is a composite indicator comprising information on the banking-sector volatility, stock market returns, stock market volatility, sovereign debt spreads, and an exchange market pressure index, very similar in spirit to the CISS for the EU.

3. Data

To quantify the links between financial depth, financial stability and economic performance in the EU, our data set is composed of country-variables from the 27 EU member states as of 2011.[5] We use annual data between 1998 and 2011.

3.1. Economic Performance

The main indicator of economic performance is the real GDP per capita growth rate, as in many papers dedicated to the real impact of finance. Following Stiglitz et al. (2009) who indicate that two other macro agregates are relevant to explain the economic performance, we include the real disposable income per capita growth rate and the household consumption per capita growth rate. Finally, we also analyse the impact of finance over private investment growth, measured as the growth rate of real gross fixed capital formation.

3.2. Explanatory variables

In order to compare our results with the conclusions of the literature, we include as explanatory variables: initial economic performance per capita, average years of education, government consumption over GDP, trade openness and inflation[6]. All these variables are expressed in log.[7]

Moreover, we include a measure of financial depth. Beck and Levine (2004) use the total of credit to the private sector from deposit banks. This measure was adequate until the 1990's

[5] Croatia only joined the EU in July 2013.
[6] We also test government expenditures instead of government consumption.
[7] To deal with zero value in inflation rates, we apply the inverse hyperbolic sine transformation used by Arcand, Berkes and Panizza (2012) : $(\hat{x} = \ln(x + \sqrt{x^2 + 1})$.

but it is now more relevant to include the total of credit to the private sector by deposit banks *and* other financial institutions. We also include the stock market turnover ratio.

To take into account the macroeconomic dimension of financial stability, we include the CISS developed by the ECB for the Euro Area. The CISS includes 15 raw measures, mainly market-based financial stress, that 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 lay within the unit interval (see Hollo et al., 2012). Unfortunately, this aggregate indicator exists neither at the country level nor for the entire EU. However, thanks to strong financial, monetary and trade integration in the EU, it is reasonable to assume that the evolution of the macroeconomic financial stability in the EU is highly correlated with financial stability in the Euro Area, hence the relevance of the CISS.

Moreover, to capture the microeconomic dimension of financial stability, we use some aggregate prudential ratios such as the ratio of non-performing loans to gross loans which is relevant as a warning signal for systemic banking solvency (Cihak and Schaeck, 2010). We also test the banking Z-score and stock market volatility.

Finally, we also construct a statistical financial stability index with a Principal Component Analysis (FSI-PCA) based on various aggregate prudential ratios[8]. The first component of bank capital to total assets, net interest margin, bank non-performing loans to gross loans, stock market capitalization growth rate, return on assets, return on equity and liquid assets

[8] We have also constructed variants of this new financial stability index including or not some prudential ratios. The characteristics of the FSI-PCA and the estimation results remain similar.

to deposits and short term funding is estimated with a Principal Component Analysis and is therefore a linear combination of the seven preceding variables maximizing the common variance explained between these variables. The first component captures most of the common variance and the following orthogonal components contain less and less information than the preceding components. For the 27 countries of the sample, the first component has an eigenvalue (the variance of the component) comprised between 2.75 and 4.56 (a value superior to one means that the component captures more variance than its nominal share of the total variance of variables) and explains between 0.39 and 0.65% of the common variance of the series. Measures of sampling adequacy - the Kaiser-Meyer-Olkin (which compares the partial correlations and correlations between variables) and SMC (Squared Multiple Correlations of variables with all other variables) - support the relevance of PCA on the selected variables[9]. Our index of FSI-PCA is negatively correlated with variables of financial instability. In that sense, FSI-PCA must be viewed as an indicator of financial stability. When the FSI-PCE index increases, financial stability increases.

All variables are described in Table A in the Appendix. Descriptive statistics are presented in Table B and the correlation matrix between all variables is shown in Table C.

4. Empirical Analysis

4.1. Methodology

Following Beck and Levine (2004), we estimate the relationship between finance and GDP growth using the GMM estimator developed by Arellano and Bond (1991). The regression equation can be described in the following form:

$$y_{i,t} = \beta y_{i,t-1} + \gamma X_{i,t} + \delta Z_{i,t} + \varepsilon_{i,t} \quad (1)$$

[9] Principal component analysis estimates are available upon request.

where subscripts i and t represent respectively country and time period, $y_{i,t}$ is the dependent variable of economic performance, $y_{i,t-1}$ represents its lagged value, $X_{i,t}$ is a set of explanatory variables typically used in this type of study, $Z_{i,t}$ includes explanatory variables of financial stability and $\varepsilon_{i,t}$ is the error term that includes country-specific effect and time-specific effect.

With this estimated equation, some econometric issues arise. First, variables included in $X_{i,t}$ and $Z_{i,t}$ may not be fully exogenous and causality may run in both directions. Second, the country fixed-effects contained in the error term can be correlated with the explanatory variables. Third, the panel dataset has a relative short time dimension and a larger country dimension. These three issues can be addressed with the two-step GMM estimator proposed by Arellano and Bond (1991) in which the set of instrumental variables is constituted by the lagged values of all explanatory variables, including $y_{i,t-1}$. Moreover, Arellano and Bond (1991) rewrite equation (1) in first difference:

$$\Delta y_{i,t} = \beta \Delta y_{i,t-1} + \gamma \Delta X_{i,t} + \delta \Delta Z_{i,t} + \Delta \varepsilon_{i,t} \qquad (2)$$

By transforming the regressors in first difference, the country fixed-effect is removed, but a new bias is potentially introduced: the new error term can be correlated with the lagged dependent variable. Under the assumption that the error term is not serially correlated and that the explanatory variables are weakly exogenous, Arellano and Bond (1991) define the following procedure. In the first step of their GMM estimator, error terms are assumed to be homoskedastic and independent over time and across countries. Then, in the second step residuals obtained in the first step are used to build a consistent estimate of the variance-covariance matrix. Assumptions of independence and homoskedasticity are then relaxed, making the two-step estimator asymptotically more efficient that the first-step one.

We obtain robust standard errors using the Windmeijer (2005) finite sample correction. The assumption of no serial correlation in the error terms is crucial for the consistency of GMM estimator. We report the standard specification tests. Failure to reject the null hypothesis of the serial correlation tests imply that error terms are not serially correlated.

The use of a large number of instruments may lead to overidentification. In order to avoid it, we use variables in level as instruments only up to three lags instead of using all their history. The *p-value* of the Sargan test is included at the bottom of each table of results. We do not reject the null hypothesis that our instruments are valid.

Our estimation strategy differs from earlier ones since we do not use average data in our dynamic panel estimations[10]. Beck and Levine (2004) and Arcand et al. (2012) use average data in order to quantify the long term relationship between finance and economic performance. Their data are usually averaged over 5-year periods to disentangle credit cycles effects. Beyond Ahmed (1998)'s argument, we do not follow this assumption for two other reasons. First, business cycles measured by the National Bureau of Economic research (NBER) in the United States and by the Center for Economic Policy Research (CEPR) in Europe are longer than five years. Measures of financial cycles (Drehmann et al., 2012) show that financial cycles have a much lower frequency than the traditional business cycles. Their average duration has increased since the 1980's and is now around 20 years making 5-year average data unable to fit the duration of these cycles. Second, it may be worth investigating not only the long term effects of finance on economic performance but also its short term effects: the use of average data disregards the latter.

[10] More precisely, we only include average data as a robustness check.

4.2. Financial Depth and Economic Performance

In a first step, we replicate on our sample the seminal estimations of the literature. The overall fit of the model in column (1) of Table 1 is consistent with Beck and Levine's (2004). Initial economic performance, trade openness and government consumption are significant with the usual sign. On the contrary, average years of education and inflation are not significant[11]. Other specifications, with non-linearity and/or other indicators of economic performance give relatively similar outcomes.

[Insert Table 1 here]

Quite noteworthy, these first estimations show that the level of financial depth in the EU is not a significant positive determinant of economic performance. Estimations with four different economic performance measures (GDP growth per capita, household consumption growth per capita, disposable income growth per capita and investment growth) all show that when financial depth is proxied by the ratio of the amount of credit provided to the private sector by banks and other financial institutions over GDP, no improvement in economic performance shall be awaited from an increase in allocated credit.

Moreover, this measure of financial depth has sometimes a significant negative effect. These results are consistent whith recent works that established a limit for financial depth positive effects (Arcand et al., 2012; Cecchetti and Kharroubi, 2012). The latter show that beyond an unobserved threshold, negative effects may start to appear. We also performed additional estimations including the squared GDP per capita (column 2 of Table 1) or the squared ratio of credit to GDP (column 3 of Table 1) to the benchmark model to evidence the potential non-linear effects of the levels of economic or financial development. The squared ratios are not statistically significant and their inclusion does not affect the previous result.

[11] If the model is specified as a panel with fixed or random effects (see section 4.3), the theoretical "endogenous-growth model" seems to fit well the data. In contrast with FE and RE panels, the benchmark model corrects for the endogeneity bias.

4.3. Financial Stability and Economic Performance

We now turn our investigation to the effects of financial stability on aggregate dynamics. With the CISS index, we take into account the macroeconomic dimension of financial stability. We also test two indicators of microeconomic financial stability, non-performing loans and the Z-score. We also test the impact of stock market volatility and our own FSI-PCA measure. Since microeconomic and macroeconomic dimensions of financial stability are strongly linked, we test each micro financial stability measure individually and then jointly with the macroeconomic CISS. Estimates are reported in Table 2 for GDP growth, and in Tables D, E and F in the Appendix, for consumption growth, disposable income growth and investment respectively.

[Insert Table 2 here]

First, introducing financial stability measures in the model does not affect the impact of financial depth: it remains nil when economic performance is proxied by GDP growth per capita and it remains often negative when economic performance is proxied by investment growth. Second, macroeconomic financial stability, proxied by the CISS, appears negatively related to GDP and investment growth. Non-performing loans also have a negative impact on GDP, consumption and disposable income growth. Consistently with the Z-score's limits evoked by Cihak et al. (2013), we do not find that this variable affects economic performance. The inclusion of stock market volatility is significant only to explain investment growth and still with a negative sign. We finally include the FSI-PCA that we contructed with aggregate prudential ratios. This variable has a significant and positive effect on all dependent variables. Because the FSI-PCA measures financial stability rather than instability, the effect means that the deterioration of bank's aggregate prudential ratios impact negatively economic performance, in accordance with former outcomes.

To sum up, there is a clear pattern in these data and results for a negative relationship between financial instability and economic performance. This relationship is robust to different measures of financial stability or instability, and to different measures of economic performance.

4.3. Robustness tests

To assess the sensitivity of our results to data or econometric choices further, we present several robustness tests[12]. First, we include other variables that can proxy financial depth like the total assets of deposit banks and of the other financial institutions.

[Insert Table 3 here]

Second, we test the robustness of Arellano-Bond's estimator. We estimate the equivalent empirical model with both fixed- and random-effects. Hausman tests indicated that the individual effects and our explanatory variables were systematically related, so that the fixed effects (FE, also called within) estimator was the most appropriate choice. The FE estimator, which allows for varying intercept terms across countries, deals efficiently with unobserved heterogeneity, as time-invariant omitted variables do not bias the regression results. This proves especially important when unobservable variables, such as financial markets and banking industry characteristics, and regulatory rules and institutions, may be important in explaining the effects of financial depth or stability on economic performance. A FE estimator has the advantage of controlling for different national effects of stable unobserved variables, and over our short sample, we may assume those unobservable variables are stable. The appropriateness of our FE estimation was also confirmed by an F-test for the significance of fixed effects. However, it also often makes sense to treat the unobserved effects as random draws from the population, and this approach is appropriate

[12] We only present results for GDP growth. Results for the other measures of economic performance are available upon request to the authors.

from an omitted variables or heterogeneity perspective. Therefore, we also estimate the panel with random-effects (RE). Last, the Wooldridge test for autocorrelation in panel data indicated a first order correlation and we therefore use both FE and RE estimators robust to an AR disturbance terms.

[Insert Table 4 here]

Third, we take into account the long-term effects pointed out by Beck and Levine (2004) and estimate regressions with average variables. To take into account the fact that credit growth is cyclical, we split our sample of 14 years in 7 non-overlapping 2-year periods and in 4 non-overlapping 5-year periods.

Results are reported in Tables 3 and 4 for the robustness to financial depth indicators and to alternative estimators respectively. Table G in the Appendix provides estimates for 2-year and 5-year averages. All robustness checks strongly confirm our two main results for the EU: first, financial depth does not impinge on economic performance, in the best case, or it impinges negatively in the worst; second, financial instability harms economic performance.

5. Conclusion

This paper examines the relationship between macroeconomic performance, financial depth and financial stability. We assess the finance-economic performance nexus in the EU. We base our estimations on Beck and Levine (2004) who developed a dynamic panel estimation framework. We show that financial depth does not have a positive effect in the EU. Moreover, we find that financial depth can have a negative impact on economic performances. This result is, to our knowledge, an innovation. Second, we introduce some financial instability indicators that measure the macro and the micro dimension of financial stability. We use several types of indicators. One is calculated by the ECB, two are based on banking aggregate prudential ratios, one is market-related as it measures the stock market

volatility and finally we construct one with a principal component analysis. In most cases, the use of these indicators shows that financial instability has a negative effect on economic performance, but their inclusion does not reverse the financial depth effect.

These results suggest that financial depth in the EU has now reached a too-high level so that finance effects are no longer favourable to economic performance. Moreover, financial deepening represents a risk through the damaging effects induced by financial instability. Recent banking and sovereign debt crisis illustrate these negative effects.

These results have various policy implications. The argument by bank lobbies, *i.e.* that regulating the size and growth of the financial sector would negatively impact the growth of the economies in question, is not supported by the EU data. The need for better micro and macro prudential regulations is also demonstrated. In particular, the effect of banks' non-performing loans has been shown to be damaging for economic performance, so as macroeconomic financial instability. Dealing with micro and macro financial stability, through the banking Union for instance or the ECB's OMT, would participate in improving the real economy.

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Table 1: Benchmark Dynamic Panel Estimations

	GDP/cap. Growth rate			Consumption/cap. Growth rate			Disp. Income/cap. Growth rate			Investment Growth rate		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Private Credit	-0.001*	0	0	0	-0.001*	0,002	-0,001	-0.001**	0,001	-0.002***	-0.002***	-0.004*
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Turnover Ratio	0	0	0	0	0	0	0	0	0	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
School	0,094	0,113	0,05	0,035	0,092	0,035	0,021	0,138	-0,003	0.552*	0.793**	0.551*
	[0.10]	[0.22]	[0.07]	[0.07]	[0.08]	[0.08]	[0.15]	[0.11]	[0.10]	[0.32]	[0.31]	[0.33]
Gov. Consump.	-0.384***	-0,377	-0.419***	-0,139	-0,169	-0,158	-0.321***	-0.394***	-0.281***	-0.791***	-0.729***	-0.692**
	[0.12]	[0.44]	[0.11]	[0.15]	[0.15]	[0.13]	[0.12]	[0.10]	[0.10]	[0.17]	[0.15]	[0.29]
Inflation rate	0,001	0,001	0,004	0,006	0,009	0,008	0.009**	0.010**	0,006	0,009	0,006	0,005
	[0.01]	[0.01]	[0.00]	[0.01]	[0.01]	[0.01]	[0.00]	[0.00]	[0.01]	[0.01]	[0.01]	[0.01]
Trade Openness	0.279*	0,295	0,205	0.301***	0.243**	0.250**	0.224*	0,117	0.270*	0,213	0,356	0,283
	[0.14]	[0.20]	[0.14]	[0.12]	[0.12]	[0.13]	[0.13]	[0.17]	[0.16]	[0.16]	[0.23]	[0.22]
Initial Econ. Perf.	-0.101*	0,288	-0,08	-0.122**	-0.341**	-0.191***	-0,082	-0,583	-0.162**	-0.000***	-0.000**	-0.000***
	[0.05]	[1.85]	[0.08]	[0.05]	[0.14]	[0.06]	[0.07]	[0.69]	[0.07]	[0.00]	[0.00]	[0.00]
Squared GDP/cap.		-0,023			0,013			0,03			-0.008*	
		[0.10]			[0.01]			[0.04]			[0.00]	
Squared Priv. Credit			0			0			0			0
			[0.00]			[0.00]			[0.00]			[0.00]
Constant	0.995*	-0,754	1.234**	0,419	1.411*	1.181*	0,964	3,39	1.416*	0,611	0,048	0,166
	[0.53]	[10.06]	[0.56]	[0.54]	[0.85]	[0.63]	[0.70]	[3.23]	[0.80]	[0.82]	[0.87]	[1.59]
Sargan test *p-val.*	0,99	0,99	1,00	0,99	0,99	0,99	0,99	0,99	1,00	0,99	0,99	0,99
AR1	0,02	0,05	0,08	0,04	0,06	0,05	0,02	0,08	0,11	0,09	0,11	0,05
AR2	0,23	0,24	0,24	0,45	0,4	0,46	0,01	0,01	0,00	0,1	0,01	0,14
Countries	27	27	27	27	27	27	26	26	26	27	27	27
Obs	246	246	246	243	243	243	223	223	223	240	240	240

*This table reports the results of a set of dynamic panel estimations aimed at estimating the effect of financial depth on four economic performances. All regressions are estimated with annual data from 1998 to 2011 using the first-differenced GMM estimator. The bottom of the table reports the p-values of standard specification tests. Robust (Windmeijer) standard errors are in brackets. * p<0.1, ** p<0.05, *** p < 0.01. Malta is the missing country in regressions 7, 8 and 9. Data source: World Bank, United Nations, ECB & Eurostat.*

Table 2: Dynamic Panel estimations – GDP per capita growth rate and Financial Stability

GDP	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Private Credit	0	0	-0.001	0	0	0	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Turnover Ratio	0	0	0	0	0	-0.000*	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
School	0.039	0.162	0.059	0.121	0.155	0.166	0.07	0.099	0.124
	[0.10]	[0.16]	[0.10]	[0.11]	[0.13]	[0.17]	[0.11]	[0.13]	[0.13]
Gov. Consump.	-0.349**	-0.399**	-0.388***	-0.399***	-0.452***	-0.447***	-0.368***	-0.371***	-0.424***
	[0.14]	[0.17]	[0.15]	[0.14]	[0.11]	[0.10]	[0.11]	[0.11]	[0.12]
Inflation rate	0.002	0.003	0.001	0.005	0.004	0.007	0.003	0.004	0.003
	[0.01]	[0.01]	[0.01]	[0.01]	[0.00]	[0.01]	[0.00]	[0.01]	[0.00]
Trade Openness	0.316***	0.21	0.322**	0.239**	0.205	0.159	0.282***	0.268*	0.296**
	[0.11]	[0.17]	[0.16]	[0.11]	[0.18]	[0.19]	[0.10]	[0.16]	[0.13]
Initial Econ. Perf.	-0.112***	-0.139***	-0.123**	-0.099**	-0.114*	-0.126**	-0.114***	-0.089*	-0.135***
	[0.04]	[0.05]	[0.05]	[0.04]	[0.07]	[0.06]	[0.04]	[0.05]	[0.04]
CISS	-0.054**					-0.043**	-0.04	-0.044	-0.034
	[0.03]					[0.02]	[0.03]	[0.03]	[0.03]
Non Perf. Loans		-0.011***				-0.010**			
		[0.00]				[0.00]			
Z-score			0.001				0		
			[0.00]				[0.00]		
Volatility				0				0	
				[0.00]				[0.00]	
FSI-PCA					0.003*				0.003*
					[0.00]				[0.00]
Constant	0.926	1.502**	1.107*	1.054*	1.406**	1.669***	1.064*	0.829	1.214*
	[0.70]	[0.73]	[0.62]	[0.61]	[0.58]	[0.48]	[0.55]	[0.62]	[0.68]
Sargan test *p-val.*	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,99
AR1	0,02	0,04	0,03	0,02	0,01	0,03	0,04	0,02	0,02
AR2	0,08	0,19	0,24	0,00	0,29	0,16	0,10	0,01	0,07
Countries	27	27	27	26	27	27	27	26	27
Obs	246	219	245	206	214	219	245	206	214

*This table reports the results of a set of dynamic panel estimations aimed at estimating the effect of financial depth and financial instability on GDP per capita growth. All regressions are estimated with annual data from 1998 to 2011 using the first-differenced GMM estimator. The bottom of the table reports the p-values of standard specification tests. Robust (Windmeijer) standard errors are in brackets. * p<0.1, ** p<0.05, *** p < 0.01. Austria is the missing country in regressions 4 and 8. Data source: World Bank, United Nations, ECB & Eurostat.*

Table 3: Robustness – Financial Depth

GDP	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Private Credit	0									
	[0.00]									
Deposit Banks assets	-0.001	0			0	0	0	0	0	0
	[0.00]	[0.00]			[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Non bank's assets	0	0			0	0	0	0	0	0
	[0.00]	[0.00]			[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Financial assets			0	0						
			[0.00]	[0.00]						
Squared Fin. assets				0						
				[0.00]						
Turnover Ratio	0	0	0	0	0	0	0	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
School	0.101	0.055	0.089	0.016	0.084	0.057	0.043	-0.052	0.224	0.121
	[0.07]	[0.25]	[0.24]	[0.18]	[0.16]	[0.14]	[0.17]	[0.30]	[0.16]	[0.14]
Gov. Consump.	-0.373**	-0.433***	-0.446***	-0.429***	-0.335**	-0.496***	-0.387***	-0.349***	-0.415***	-0.455***
	[0.18]	[0.14]	[0.16]	[0.13]	[0.15]	[0.13]	[0.14]	[0.13]	[0.14]	[0.17]
Inflation rate	0.005	0.003	0.003	-0.001	0.005	0.003	0.002	0	0.002	0.008
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Trade Openness	0.258	0.476	0.471	0.528	0.439*	0.302*	0.486*	0.476**	0.277	0.109
	[0.17]	[0.32]	[0.30]	[0.33]	[0.26]	[0.18]	[0.27]	[0.21]	[0.18]	[0.14]
Initial Econ. Perf.	-0.106	-0.289***	-0.294***	-0.313***	-0.255**	-0.199***	-0.264***	-0.199***	-0.135**	-0.074
	[0.07]	[0.10]	[0.09]	[0.11]	[0.10]	[0.06]	[0.08]	[0.07]	[0.06]	[0.09]
CISS					-0.057**					-0.024
					[0.03]					[0.05]
Non Perf. Loans						-0.013***				-0.010*
						[0.00]				[0.01]
Z-score							0.001			0.001
							[0.00]			[0.00]
Volatility								-0.002***		0
								[0.00]		[0.00]
FSI-PCA									0.003	0
									[0.00]	[0.00]
Constant	1.054	2.175***	2.210***	2.297***	1.654***	2.227***	1.842***	1.381***	1.059*	1.478**
	[0.65]	[0.58]	[0.62]	[0.43]	[0.58]	[0.46]	[0.60]	[0.48]	[0.56]	[0.73]
Sargan test *p-val.*	1,00	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,99	1,00
AR1	0,10	0,03	0,02	0,04	0,00	0,06	0,03	0,01	0,02	0,08
AR2	0,27	0,07	0,07	0,08	0,06	0,38	0,08	0,07	0,18	0,13
Countries	26	26	26	26	26	26	26	25	26	25
Obs	225	249	249	249	249	229	248	208	202	174

*This table reports the results of a set of dynamic panel estimations aimed at estimating the effect of financial depth and financial instability on GDP growth per capita. We test in particular various indicators of financial depth. We include the deposit money bank assets to GDP (%). We also include the sum of the pension fund assets to GDP + mutual fund assets to GDP + insurance assets to GDP. This sum is called "non bank's assets". Financial assets are the sum of the deposit banks assets and the non bank's assets. All regressions are estimated with annual data from 1998 to 2011 using the first-differenced GMM estimator. The bottom of the table reports the p-values of standard specification tests. Robust (Windmeijer) standard errors are in brackets. * p<0.1, ** p<0.05, *** p < 0.01. Malta is missing in all regressions and Austria is missing in regressions 8 and 10. Data source: World Bank, United Nations, ECB & Eurostat.*

Table 4: Robustness – Alternative Estimators

GDP	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Fixed Effect							Random Effect						
Private Credit	0	0	-0.001***	0	0	-0.001***	0	-0.000***	0	-0.000***	-0.000***	-0.000**	-0.000**	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Turnover Ratio	0	0	0	0	0	0	-0.000*	0.000*	0	0	0.000*	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
School	0.214***	0.255***	0.343***	0.207**	0.181*	0.323***	0.291***	0.036	0.069**	0.058*	0.034	0.032	0.04	0.078**
	[0.08]	[0.08]	[0.08]	[0.08]	[0.09]	[0.08]	[0.09]	[0.04]	[0.03]	[0.03]	[0.04]	[0.03]	[0.03]	[0.03]
Gov. Consump.	-0.379***	-0.323***	-0.178***	-0.381***	-0.379***	-0.220***	-0.238***	-0.154***	-0.092***	-0.145***	-0.153***	-0.096***	-0.137***	-0.098***
	[0.07]	[0.07]	[0.05]	[0.07]	[0.08]	[0.06]	[0.06]	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]
Inflation rate	0.011**	0.013***	0.014***	0.011**	0.008	0.013***	0.015***	0.015***	0.016***	0.016***	0.015***	0.013***	0.016***	0.017***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Trade Openness	0.238***	0.208***	0.255***	0.243***	0.231***	0.241***	0.213***	0.030**	0.021*	0.003	0.029**	0.017	0.012	-0.004
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Initial Econ. Perf.	-0.167***	-0.135***	-0.121***	-0.168***	-0.153***	-0.111***	-0.097***	-0.017**	-0.017***	-0.035***	-0.016**	-0.021***	-0.016**	-0.029***
	[0.03]	[0.02]	[0.02]	[0.03]	[0.03]	[0.02]	[0.02]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
CISS		-0.084***					-0.125***		-0.133***					-0.095***
		[0.02]					[0.03]		[0.02]					[0.02]
Non Perf. Loans			-0.005***				-0.005**			-0.006***				-0.005***
			[0.00]				[0.00]			[0.00]				[0.00]
Z-score				0.001			0.001				0			0
				[0.00]			[0.00]				[0.00]			[0.00]
Volatility					-0.001***		0					-0.002***		-0.001***
					[0.00]		[0.00]					[0.00]		[0.00]
FSI-PCA						0.004***	0						0.005***	0
						[0.00]	[0.00]						[0.00]	[0.00]
Constant	1.370***	0.913***	0.016	1.379***	1.362***	0.118***	0.189**	0.479***	0.254**	0.713***	0.480***	0.457***	0.480***	0.510***
	[0.20]	[0.22]	[0.06]	[0.21]	[0.25]	[0.04]	[0.08]	[0.13]	[0.11]	[0.12]	[0.13]	[0.12]	[0.12]	[0.12]
R^2 adj.	0.37	0.39	0.35	0.37	0.41	0.35	0.47	-	-	-	-	-	-	-
R^2 within	0.45	0.47	0.44	0.45	0.49	0.44	0.56	0.28	0.34	0.41	0.28	0.39	0.38	0.52
R^2 between	0.69	0.66	0.65	0.69	0.65	0.68	0.56	0.59	0.73	0.76	0.60	0.73	0.73	0.85
Obs.	293	293	264	291	237	257	215	320	320	291	318	263	284	241

*This table reports the results of a set of dynamic panel estimations aimed at estimating the effect of financial depth and financial instability on GDP Growth per capita. All regressions are with annual data from 1998 to 2011 fixed or random effects. * p<0.1, ** p<0.05, *** p < 0.01. Data source: World Bank, United Nations, ECB & Eurostat.*

APPENDIX

Table A: Data Description and Sources

Data	Frequency	Description	Source
Economic performance (i.e. dependent variable)			
GDP growth rate per capita	Annual	Real GDP per capita (log first difference)	Eurostat
Disposable Income growth per capita	Annual	Real disposable income (log first difference)	Eurostat
Consumption growth rate per capita	Annual	Households consumption in volume (log first difference)	Eurostat
Private Investment growth rate	Annual	Gross fixed capital formation, million of euros (log first difference)	Eurostat
Seminal independent variables			
Inflation	Annual	Annual growth rate of harmonized Index of Consumer Prices	Eurostat
Trade openness	Annual	Average of total trade (*i.e* the sum of exports and imports of goods and services) relative to GDP	Eurostat
Government consumption	Annual	Value of goods and services purchased or produced by general government and directly supplied to private households for consumption purposes relative to GDP.	Eurostat
School	Annual	Average year of schooling	United Nations
Financial Depth indicators			
Private credit to GDP in %	Annual	The financial resources provided to the private sector by domestic money banks as a share of GDP. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.	World Bank
Turnover ratio	Annual	Stock market turnover ratio: Total value of shares traded during the period divided by the average market capitalization for the period.	World Bank
Financial stability indicators			
National Banking stability (Z score)	Annual	The Z-score combines in one single indicator the banks' profitability (l), capital ratio (k) and return volatility (r). Obviously, the Z-score will increase with the banks' profitability and capital ratio, and decrease with increasing return volatility. Thus, from an economic viewpoint the Z-score initially measures the probability of a bank to become insolvent when the value of assets becomes lower than the value of debt. Hence, a higher (lower) Z-score implies a lower (higher) probability of insolvency risk.	World Bank
Non performing loans	Annual	Ratio of defaulting loans (payments of interest and principal past due by 90 days or more) to total gross loans (total value of loan portfolio). The loan amount recorded as nonperforming includes the gross value of the loan as recorded on the balance sheet, not just the amount that is overdue.	World Bank
FSI-PCA	Annual	Financial stability indicator based on banking aggregate prudential ratios	Own calculations
Composite Indicator of Systemic Stress	Weekly extra-polated annually	It comprises the five arguably most important segments of an economy's financial system: the sector of bank and non bank financial intermediaries, money markets, securities (equities and bonds) markets as well as foreign exchange markets.	ECB
Volatility of stock price index	Annual	Volatility of stock price index is the 360-day standard deviation of the return on the national stock market index. (Bloomberg)	World Bank

Table B: Summary Descriptive Statistics of the main variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Economic performance (i.e. dependent variable)					
GDP Growth rate per capita	378	0,054	0,067	-0,200	0,288
Consumption Growth rate per capita	375	0,053	0,064	-0,217	0,288
Disposable Income Growth per capita	355	0,053	0,070	-0,214	0,270
Investment Growth rate	372	0,025	0,109	-0,503	0,479
Seminal independent variables					
School	378	2,302	0,141	1,792	2,573
Inflation	378	1,703	0,784	-1,301	4,772
Trade Openness	374	3,995	0,459	3,202	5,223
Government Consumption	378	2,995	0,145	2,542	3,395
Financial Depth indicators					
Private credit to GDP in %	344	93,149	57,667	6,383	288,109
Turnover ratio	378	61,804	52,974	0,139	259,593
Financial stability indicators					
Composite Indicator of systemic stress	351	0,214	0,160	0,066	0,560
Z-score	376	12,500	7,768	-3,449	40,862
Non performing loans	343	4,746	5,011	0,100	31,600
Stock markets volatility	295	26,104	10,410	11,503	65,187
FSI-PCA	332	0,159	3,783	-29,396	8,147

Table C: Correlations of the main variables

	GDP /cap.	Cons. /cap.	Disp. Income /cap.	Invest.	School	Inflation	Trade Open.	Gov. Cons.	Private credit	Turnover ratio	CISS	Z-score	Non Perform. Loans	Volat.	FSI-PCA
GDP/cap.	1														
Consumption/cap.	0,94***	1													
Disposable Income/cap.	0,95***	0,91***	1												
Investment	0,66***	0,59***	0,64***	1											
School	0,03	0,01	0,02	0,11**	1										
Inflation	0,39***	0,41***	0,43***	0,26***	0,05	1									
Trade Openness	0,15***	0,11*	0,12**	0,03	0,52***	0,08	1								
Govern. Consumption	-0,31***	-0,27***	-0,28***	-0,2***	0,17***	-0,32***	-0,16***	1							
Private credit	-0,48***	-0,47***	-0,48***	-0,36***	-0,04***	-0,39***	0,02	0,15***	1						
Turnover ratio	-0,23***	-0,22***	-0,24***	-0,04	-0,07	-0,16***	-0,46***	0,34***	0,28***	1					
CISS	-0,46***	-0,36***	-0,44***	-0,53***	0,26***	-0,1*	0,11**	0,17***	0,34***	0	1				
Z-score	-0,07	-0,1*	-0,1*	0,07	-0,17***	-0,15***	0,02	0,02	0,08	0,14***	-0,09*	1			
Non performing loans	-0,13***	-0,13**	-0,13**	-0,22***	0	0,08	-0,1*	-0,1*	-0,23***	-0,18***	0,09	-0,27***	1		
Volatility	-0,4***	-0,35***	-0,4***	-0,45***	0,08	-0,07	-0,05	0,17***	0,03	-0,02	0,55***	-0,07	0,24***	1	
FSI-PCA	0,47***	0,46***	0,46***	0,42***	0,05	0,28***	0,15***	-0,11*	-0,32***	-0,11***	-0,26***	0,15**	-0,6***	-0,24***	1

*This table reports the correlation coefficients between the main variables used in this paper. * p<0.1, ** p<0.05, *** p < 0.01. Data source: World Bank, United Nations, ECB & Eurostat.*

Table D: Dynamic Panel estimations – Consumption per capita growth and Financial Stability

Consumption	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Private Credit	-0.001	0	0	0	0	0	-0.001	-0.001	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Turnover Ratio	0	0	0	0	0	0	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
School	0.051	0.049	0.061	-0.102	0.12	0.054	0.046	-0.002	0.111
	[0.07]	[0.11]	[0.09]	[0.14]	[0.12]	[0.08]	[0.05]	[0.10]	[0.09]
Gov. Consump.	-0.198*	-0.172*	-0.17	-0.114	-0.229	-0.161	-0.205	-0.208	-0.287**
	[0.12]	[0.10]	[0.30]	[0.21]	[0.32]	[0.12]	[0.14]	[0.13]	[0.13]
Inflation rate	0.009*	0.018**	0.008	0.014**	0.01	0.015***	0.011*	0.014***	0.014***
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.00]	[0.01]	[0.00]	[0.01]
Trade Openness	0.235**	0.164*	0.303	0.241	0.272	0.179*	0.210**	0.098	0.177
	[0.10]	[0.09]	[0.20]	[0.18]	[0.23]	[0.11]	[0.10]	[0.13]	[0.12]
Initial Econ. Perf.	-0.109***	-0.115**	-0.148***	-0.044	-0.152***	-0.109**	-0.101***	-0.023	-0.126**
	[0.04]	[0.05]	[0.05]	[0.08]	[0.05]	[0.05]	[0.04]	[0.07]	[0.05]
CISS	0.03					0.03	0.026	0.049	0.018
	[0.03]					[0.04]	[0.03]	[0.03]	[0.03]
Non Perf. Loans		-0.007***				-0.008			
		[0.00]				[0.01]			
Z-score			0.001				0.001		
			[0.00]				[0.00]		
Volatility				0				-0.001	
				[0.00]				[0.00]	
FSI-PCA					0.003*				0.003
					[0.00]				[0.00]
Constant	0.668	0.893*	0.622	0.175	0.811	0.776	0.725	0.617	1.124*
	[0.51]	[0.51]	[1.17]	[1.14]	[1.42]	[0.58]	[0.55]	[0.55]	[0.64]
Sargan test *p-val.*	0,99	0,99	0,98	0,99	0,98	0,99	0,99	0,99	0,99
AR1	0,03	0,04	0,03	0,03	0,02	0,03	0,07	0,07	0,02
AR2	0,26	0,21	0,38	0,49	0,20	0,19	0,60	0,44	0,38
Countries	27	27	27	26	27	27	27	26	27
Obs	243	216	243	205	212	216	243	205	212

*This table reports the results of a set of dynamic panel estimations aimed at estimating the effect of financial depth and financial instability on consumption growth per capita. All regressions are estimated with annual data from 1998 to 2011 using the first-differenced GMM estimator. The bottom of the table reports the p-values of standard specification tests. Robust (Windmeijer) standard errors are in brackets. * p<0.1, ** p<0.05, *** p < 0.01. Austria is the missing country in regressions 4 and 8. Data source: World Bank, United Nations, ECB & Eurostat.*

Table E: Dynamic Panel estimations – Disposable Income per capita growth and Financial Stability

Disposable Income	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Private Credit	0	0	0	-0.001	0	0	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Turnover Ratio	0	0	0	0	0	0	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
School	-0.008	0.04	0.051	-0.033	0.061	-0.002	-0.021	-0.049	0.03
	[0.13]	[0.16]	[0.16]	[0.19]	[0.18]	[0.14]	[0.12]	[0.12]	[0.10]
Gov. Consump.	-0.288***	-0.352***	-0.362***	-0.253	-0.444***	-0.292***	-0.281**	-0.299***	-0.397***
	[0.11]	[0.11]	[0.13]	[0.19]	[0.08]	[0.10]	[0.12]	[0.11]	[0.10]
Inflation rate	0.009**	0.009	0.009*	0.007	0.01	0.011**	0.008	0.014	0.01
	[0.00]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Trade Openness	0.279**	0.259*	0.22	0.428	0.224*	0.248	0.27	0.216	0.242
	[0.12]	[0.16]	[0.18]	[0.34]	[0.13]	[0.16]	[0.19]	[0.19]	[0.17]
Initial Econ. Perf.	-0.118**	-0.157***	-0.096	-0.135	-0.122***	-0.123***	-0.102	-0.06	-0.124**
	[0.05]	[0.05]	[0.07]	[0.12]	[0.04]	[0.05]	[0.07]	[0.07]	[0.05]
CISS	-0.028					-0.029	-0.031	-0.019	-0.036
	[0.03]					[0.04]	[0.03]	[0.04]	[0.04]
Non Perf. Loans		-0.007				-0.006**			
		[0.00]				[0.00]			
Z-score			0.001				0		
			[0.00]				[0.00]		
Volatility				0				0	
				[0.00]				[0.00]	
FSI-PCA					0.003***				0.003***
					[0.00]				[0.00]
Constant	1.028**	1.566***	1.137	0.57	1.538***	1.226**	0.957*	0.87	1.452**
	[0.46]	[0.57]	[0.70]	[1.02]	[0.56]	[0.54]	[0.53]	[0.67]	[0.59]
Sargan test *p-val.*	0,99	0,99	0,99	0,96	0,99	0,99	0,99	1,00	1,00
AR1	0,02	0,02	0,03	0,00	0,03	0,02	0,05	0,03	0,04
AR2	0,00	0,00	0,02	0,16	0,01	0,00	0,01	0,05	0,01
Countries	26	26	26	24	26	26	26	24	26
Obs	223	199	223	187	195	199	223	187	195

*This table reports the results of a set of dynamic panel estimations aimed at estimating the effect of financial depth and financial instability on disposable income per capita growth. All regressions are estimated with annual data from 1998 to 2011 using the first-differenced GMM estimator. The bottom of the table reports the p-values of standard specification tests. Robust (Windmeijer) standard errors are in brackets. * p<0.1, ** p<0.05, *** p < 0.01. Malta is missing in all regressions and Austria and Luxembourg are missing in regressions 3 and 8. Data source: World Bank, United Nations, ECB & Eurostat.*

Table F: Dynamic Panel estimations - Investment growth and Financial Stability

Investment	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Private Credit	-0.001*	-0.002***	-0.002***	-0.001	-0.002***	-0.001	-0.001	0	-0.001
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Turnover Ratio	0	0	0	0	0	0	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
School	0.268	0.478	0.624***	0.335	0.728**	0.245	0.454	0.313	0.266
	[0.27]	[0.30]	[0.22]	[0.26]	[0.30]	[0.21]	[0.28]	[0.30]	[0.26]
Gov. Consump.	-0.630**	-0.846***	-0.813***	-0.748***	-0.825***	-0.573***	-0.741***	-0.525	-0.626***
	[0.25]	[0.17]	[0.18]	[0.20]	[0.14]	[0.22]	[0.28]	[0.38]	[0.23]
Inflation rate	0.017*	0.008	0.014***	0.01	0.01	0.020**	0.015	0.019	0.012
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.02]	[0.01]
Trade Openness	0.207	0.022	0.203	0.016	0.067	0.17	0.16	0.149	0.186
	[0.19]	[0.18]	[0.13]	[0.16]	[0.12]	[0.19]	[0.21]	[0.20]	[0.22]
Initial Econ. Perf.	0	-0.000**	-0.000***	-0.000**	-0.000***	0	0	-0.000*	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
CISS	-0.214***					-0.188***	-0.204***	-0.178*	-0.160**
	[0.06]					[0.06]	[0.05]	[0.10]	[0.07]
Non Perf. Loans		-0.009				-0.007			
		[0.01]				[0.00]			
Z-score			0.001				0		
			[0.00]				[0.00]		
Volatility				-0.002***				-0.001	
				[0.00]				[0.00]	
FSI-PCA					0.007***				0.006*
					[0.00]				[0.00]
Constant	0.612	1.712**	0.548	1.644	0.931*	0.684	0.734	0.411	0.72
	[1.04]	[0.76]	[0.77]	[1.20]	[0.55]	[1.17]	[1.02]	[1.54]	[1.00]
Sargan test *p-val.*	0,99	0,97	1,00	0,98	0,99	0,99	0,99	0,98	0,98
AR1	0,01	0,02	0,11	0,03	0,03	0,00	0,03	0,01	0,02
AR2	0,40	0,16	0,08	0,17	0,01	0,08	0,48	0,18	0,19
Countries	27	27	27	26	27	27	27	26	27
Obs	240	216	240	202	212	216	240	202	212

*This table reports the results of a set of dynamic panel estimations aimed at estimating the effect of financial depth and financial instability on investment. All regressions are estimated with annual data from 1998 to 2011 using the first-differenced GMM estimator. The bottom of the table reports the p-values of standard specification tests. Robust (Windmeijer) standard errors are in brackets. * p<0.1, ** p<0.05, *** p < 0.01. Austria is the missing country in regressions 4 and 8. Data source: World Bank, United Nations, ECB & Eurostat.*

Table G: Robustness tests – 2-year and 5-year Averages

GDP	2-year Average							5-year Average						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Private Credit	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Turnover Ratio	0	0	0	0	0	0	0	-0.000*	-0.000**	-0.000*	-0.000**	-0.000*	0	-0.000*
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
School	0.411*	0.511*	0.407**	0.434*	0.416*	0.408**	0.522***	0.141	0.146	0.141*	0.124	0.145*	0.098	0.027
	[0.23]	[0.27]	[0.18]	[0.23]	[0.23]	[0.18]	[0.16]	[0.10]	[0.09]	[0.08]	[0.08]	[0.08]	[0.10]	[0.07]
Gov. Consump.	-0.376***	-0.346***	-0.283*	-0.339***	-0.317**	-0.276*	-0.263**	-0.181**	-0.187**	-0.237***	-0.165**	-0.162***	-0.177*	-0.201**
	[0.14]	[0.12]	[0.15]	[0.11]	[0.13]	[0.16]	[0.12]	[0.08]	[0.08]	[0.08]	[0.07]	[0.06]	[0.10]	[0.09]
Inflation rate	-0.001	-0.005	0.003	0.003	-0.002	0.005	-0.015	0.007	0.006	-0.003	0.002	0.006	0	0.001
	[0.02]	[0.02]	[0.01]	[0.02]	[0.01]	[0.02]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.02]
Trade Openness	0.148	0.142	0.065	0.145	0.136	0.077	-0.07	0.166*	0.171**	0.06	0.190**	0.164	0.169**	0.05
	[0.11]	[0.11]	[0.08]	[0.11]	[0.12]	[0.14]	[0.09]	[0.09]	[0.08]	[0.08]	[0.08]	[0.10]	[0.08]	[0.08]
Initial Econ. Perf.	-0.232***	-0.201***	-0.167***	-0.249***	-0.182***	-0.155***	-0.036	-0.124***	-0.127***	-0.100***	-0.127***	-0.126***	-0.137***	-0.102**
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.06]	[0.06]	[0.02]	[0.02]	[0.02]	[0.01]	[0.02]	[0.03]	[0.04]
CISS		-0.082					-0.016		0.006					0.083
		[0.05]					[0.06]		[0.04]					[0.12]
Non Perf. Loans			-0.008***				-0.010**			-0.004***				-0.003
			[0.00]				[0.00]			[0.00]				[0.00]
Z-score				0.001			-0.001				-0.001			-0.001
				[0.00]			[0.00]				[0.00]			[0.00]
Volatility					-0.002**		-0.002*					0		-0.001
					[0.00]		[0.00]					[0.00]		[0.00]
FSI-PCA						0.005**	0						-0.002	-0.001
						[0.00]	[0.00]						[0.00]	[0.00]
Constant	1.969***	1.374**	1.436**	1.948***	1.377**	1.215***	0.483	0.829	0.844*	1.194***	0.781	0.791*	1.044**	1.443**
	[0.53]	[0.54]	[0.61]	[0.49]	[0.60]	[0.29]	[0.84]	[0.53]	[0.46]	[0.41]	[0.49]	[0.48]	[0.48]	[0.58]
Sargan test *p-val.*	0,21	0,12	0,28	0,23	0,17	0,25	0,91	0,05	0,12	0,27	0,15	0,09	0,09	0,62
AR1	0,09	0,04	0,11	0,06	0,05	0,00	0,01	0,29	0,31	0,07	0,38	0,26	0,30	0,12
AR2	0,67	0,62	0,31	0,98	0,51	0,08	0,07	-	-	-	-	-	-	-
Countries	27	27	27	27	27	26	25	27	27	27	27	27	27	26
Obs	73	73	67	73	70	65	62	53	53	52	53	49	52	49

*This table reports the results of a set of dynamic panel estimations aimed at estimating the effect of financial depth and financial instability on GDP Growth per capita. All regressions are estimated 2-year non-overlapping average data from 1998 to 2011 using the first-differenced GMM estimator. The bottom of the table reports the p-values of standard specification tests. Robust (Windmeijer) standard errors are in brackets. * p<0.1, ** p<0.05, *** p < 0.01. Austria is missing in regressions 6, 7 and Cyprus in 7. Data source: World Bank, United Nations, ECB & Eurostat.*