Financial growth and Economic Growth in Europe : Is the Euro Beneficial for All Countries?

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Is Euro Beneficial for all Countries?

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Abstract

We revisit the financial-economic growth nexus, accounting for differential effects of large scale legislative frameworks, such as political and financial integration, in Europe. Debt is introduced as an integral component, and potential trifold endogeneity is investigated. Empirical findings show that neither political, nor financial integration, appear to have a direct impact on economic growth. In contrast, only monetary integration has a "dual" "indirect" impact on economic growth. First, the euro allows for improved access to financing, which enhances economic growth. This increases market values, which further accelerate economic growth. This is only evident within Eurozone, highlighting a "euro effect", whereas political integration seems to be insufficient in engaging the countries in a synergetic endogeneity. Second, the improved access to financing induced by the euro introduces an additional macroeconomic risk of "over-borrowing". This reverses the abovementioned spiral link by decreasing market values and therefore, lead the economies to spiral contraction. Consequently, the suitability of adopting euro should depend on the ability of each country to balance its dual role, under sustainable financing.

JEL codes: F43, O11, N14

Keywords: Financial Integration, Euro, Economic Growth, Government Borrowing, Generalized Method of Moments (GMM)

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I. Introduction

This study investigates the aptness of differential levels of integration in Europe, i.e., political and monetary, by focusing on its impact on the relationship between financial growth and economic growth, as well as public borrowing levels. Early literature (Schumpeter, 1911) recognizes that "open market" economies seem to be associated with higher economic growth, raising the question of whether and how financial growth is associated with economic growth. Several studies (e.g., Diaz-Alejandro, 1985; Fry, 1978) suggest that a deeper financial system is a pre-condition for economic growth because it reduces transactions costs and accelerates trading, while others (e.g., Robinson, 1952, 1979; Miller, 1998) purport that economic growth requires more intense trading and thus, a deeper financial system. Another branch of literature (e.g., Levine, 1996, 1997) recognize that financial growth and economic growth might interact and thus, potential endogeneity issues might render it difficult to establish direct causal relationships (Collins, 2007), thus they implicitly highlight the empirical nature of the relationship.

The underlying theoretical argument that links financial with economic growth is that markets influence the allocation of resources and information cross-sectionally and over time (Merton and Bodie, 1995). They can achieve that by improving information dissemination (Bagehot, 1873; Boyd and Prescott, 1986), mobilization of capital and resources (e.g., Sirri and Tufano, 1995), corporate governance (Myers and Majluf, 1984) and thus, reducing risk (e.g., Gurley and Shaw, 1955; Patrick, 1966). A necessary condition for markets to achieve this is some form of integration that allows an uninterrupted flow of capital, resources and information. Kose et al. (2009) argue that liberalization and financial integration appear to have an positive, but indirect effect on economic growth, especially for countries with low level of financial integration and financial deepening, while co-existence of financial integration and liberalization amplify their (Alfaro et al, 2004; Durham, 2004) impact.

However, not all studies come to a consensus with regards to the positive impact of financial growth on economic growth. According to several economists (e.g., Bhagwati, 1998; Stiglitz, 2002) an increasing capital account liberalization and unfettered capital flows pose a direct "instability" thread to economies, due to their exposure to macroeconomic shocks; a risk that they believe overcomes the benefits of liberalization. Relevant literature recognizes three major sources of induced risk. The first refers to "over-reliance" on market efficiency, which might lead to "excessive optimism" and thus, to the creation of asset bubbles (e.g., Gibson et al. 2013). The

second. The second refers to market openness (e.g., Alessi and Detken, 2011, Popov, 2011), which might create the conditions for premature growth and thus over exposure to macroeconomic shocks. Along the same lines, the third source of risk is identified into the funding sources of economic growth, where a better access to capital markets might lead to excessive borrowing.

Kose et al. (2009) purport that liberalization and financial integration appear to have a positive but indirect effect on economic growth, in spite of the potential induction of instability due to unfettered capital flows and thus, further integration does not always create growth. A minimum level of financial deepening is required beforehand. This implicitly recognizes that the optimal level and timing of integration depends on the existing relationship between financial growth and economic growth and that higher integration does not unconditionally accelerate growth. This is the primary objective of this study, which aims at investigating the impact of various levels of integration by focusing on the financial-economic growth nexus.

This is particularly relevant to Europe which has promoted financial, alongside political integration as the defining pillars of the, so called, "development model" (e.g., Friedrich et al., 2012). This approach has been mostly unquestionable (e.g., Edwards, 1998) until the sovereign bond crisis in 2009, when several countries experienced double digit slow down. This has been attributed to prior excessive optimism (Friedrich et al., 2012), excessive borrowing levels (De Grauwe and Ji, 2013) and intense contagion effects and spillovers (e.g., Beetsma et al., 2013). Friedrich et al., (2012) highlight the importance of political integration in accelerating growth, but fail to address how it affects the financial-economic growth nexus.

This paper seeks to investigate the aptness of differential levels of integration in Europe by focusing on how they affect financial growth and economic growth. First, we differentiate between financial and political integration in an aggregated level and examine their direct and indirect impact on financial growth and economic growth. We recognize that financial growth and economic growth might evolve endogenously and thus, we model explicitly structural endogeneity. Finally, in order to account for over-capitalization of expectations due to differential levels of integration (Friedrich et al., 2012) we introduce public borrowing levels as an integral part of relationship between financial growth and economic growth.

Our empirical analysis, on a sample of 27 European countries over a period from 1998 to 2012, highlights a dual effect of euro. First, it is found to have a direct positive impact only on financial

growth. Markets appear to capitalize stability expectations into enhanced market values and this has a significant spiral boosting effect on economic growth, even when debt is high. This link is not fully observed upon political integration alone and it is absent in non-member states. Second, the euro allows for increased borrowing, which under specific circumstances can enhance economic growth. However, the increased financing has a negative impact on market values and thus, it reverses the previous spiral link, suppressing growth. This is more evident during bull market periods. Consequently, the suitability of adopting the euro depends on the borrowing capacity of each country and its ability to benefit from financial growth in the long term.

II. Literature Review

A. Financial Growth and Economic Growth

Early literature (Schumpeter, 1911) reports positive correlation between financial growth and economic growth. "Open market" economies aim at reducing intermediary costs, in order to assist economic development, while centralized economies appear to experience slower growth.[1] Four major hypotheses have been developed to describe the link between the two figures (Kose et al., 2009). The supply-leading hypothesis (e.g. Diaz-Alejandro, 1985; Fry, 1978; McKinnon, 1973; Moore, 1986; Shaw, 1973) purports that a sustainably deepening financial system can lead to increased economic growth. In contrast, the demand-following hypothesis (e.g. Darrat, 1999; Demetriades and Hussein, 1996; Ireland, 1994; Patrick, 1966) suggests that increased demand requires more intensive trading and a deeper financial system; financial growth should follow economic growth spikes. More comprehensive approaches (e.g. Berthelemy and Varoudakis, 1996; Blackburn and Hung, 1998; Demetriades and Hussein, 1996; Greenwood and Jovanovic, 1990; Greenwood and Smith, 1997; Harrison et al. 1999; Saint-Paul, 1992) suggest a bi-directional relationship, arguing that economic growth requires financial deepening, which in turn further enhances economic growth. Finally, several studies (e.g. Lucas, 1988; Stern, 1989) argue that financial deepening only occasionally has a short-term impact on economic growth.[2]

[1] Watchel (2003) highlights that the absence of financial growth, especially before 1990 has had significant negative impact on economic growth, especially for economies that experience state intervention.
[2] Recent empirical literature (e.g. Manning, 2003; Rousseau and Wachtel, 2011) confirms that the impact of financial growth on economic development has weakened considerably after 1990.

The theoretical base for discussing the impact of financial on economic growth focuses on ameliorating market frictions (Merton and Bodie, 1995). An important function of markets towards this direction is the dissemination of information and a more efficient allocation of resources. Deeper and more liquid markets should make it easier, compared to individual investors, to collect information (Begehot, 1873), either through intermediary institutions (e.g., Ramakrishnan and Thakor, 1984; Allen, 1990; Bhattacharya and Pleiderer, 1985) or because firms would have the incentive to do so in order to limit exploitable private information (e.g., Grossman and Stiglitz, 1980; Kyle, 1984; Holmstrom and Tirole, 1993). This undeniably could improve resource allocation (Boyd and Prescott, 1986). Furthermore, since an enhanced capital flow would improve firms' access to capital, the equity capital structure is also expected to change, along with the way information about managerial decisions is disseminated (Berle and Means, 1932). Larger shareholders exhibit better means in acquiring this information (Grossman and Hart, 1980, 1986; Stulz, 1988) and an improved corporate governance can better engage with innovation and growth activities. In parallel, an improved access to the market can contribute to reducing individual firms' cost of capital by enhancing cross-sectional (e.g., Gurley and Shaw, 1955; Patrick, 1966; Greenwood and Jovanovic, 1990; Devereux and Smith, 1994) and time (e.g., Allen and Gale, 1997) diversification, as well as by reducing liquidity induced costs (e.g., Hicks, 1969; Diamond and Dybvig, 1983; Levine, 1991). Finally, another function which allows financial deepening to have an impact on economic growth is the improvement of savings' mobilization (e.g., Boyd and Smith, 1992; Lamoreaux, 1994) and facilitation of exchange (e.g., Williamson and Wright, 1994), which are a costly processes for individuals

These factors are usually latent and there are several empirical proxies in the literature to measure one or multiple dimensions of financial deepening, such as the size of financial intermediaries (Goldsmith, 1969), the size of the private institutions with respect to GDP and credit allocation (King and Levine, 1993), as well as the level of government ownership in the banking system (La Porta et al., 2002). The use of various proxies results in conflicting results and highlights that the link between financial growth and economic growth is empirical in nature and that, among other things, the link depends on how individual variables are measured. Furthermore, empirical findings are also affected by the models employed to account for the dynamic character of the relationship between financial growth and economic growth. The first studies (e.g., Goldsmith, 1969; King and Levine, 1993) employ cross-sectional samples, which although they address various dimensions of the relationship, they generally ignore causality and temporal dependence (Shan et al, 2001).

Therefore, several studies employ panel data samples and dynamic panel data techniques (e.g., Levine 1991, 1997) in order to extract any endogenous component and focus only on the direct impact. However, reverse causality and potential endogeneity are not explicitly accounted for. Towards this direction, some studies employ Vector Error Correction Models (VECM) in order to account for the temporal dependence (e.g., Ang and McKibbin, 2007), but they also ignore any structural causality.

B. Financial Growth and Macroeconomic Risk

However, not all studies support that financial growth is beneficial. A significant part of the literature reports a rather negative impact of financial growth on stability. Stiglitz (2000), challenging the idea of business-cycle volatility (Lucas, 1987), argues that excessive optimism, enhanced by more advanced financial systems, dramatically increases the probability of "asset bubble" creation and, consequently, the frequency of macroeconomic shocks (Gibson et al., 2013). More specifically, a deeper financial system can indeed improve mobilization of resources, information dissemination, corporate governance and reduce risk, but all these under the assumption that the markets operate efficiently. In contrast, a deeper inter connected structure that is not efficient could potentially create the unfounded expectations, due to the fact that participants expect them to be efficient, which could contribute to irrational capitalization of expectations (Friedrich et al., 2012). In case the countries are connected, contagion effects might become very significant (Beetsma et al., 2013). Unless efficient regulatory practices are in place (Popov and Smets, 2011), countries are exposed to a magnified impact on economic growth. Kaminsky and Reinhart (1999) provide empirical evidence of greater exposure to financial crises after a period of high growth, especially for countries that exhibit a parallel growth in their financial systems.

Literature recognizes two sources of risk. First, market openness (e.g. Alessi and Detken, 2011; Popov, 2011; Popov and Smets, 2011) is identified as one of the main sources of the trade-off between the contribution of financial to economic growth, and macroeconomic risk. Financial growth is seen as a funding and supporting mechanism for economic growth. However, this comes at the price of making the economy more susceptible to immaturely generated growth and to external shocks, both resulting from a greater contribution of individual bank risk to systemic risk. Kindleberger (1978), Minsky (1986) and Popov and Smets (2011) distinguish between "good" and "bad" growth. Second, another source of increased macroeconomic risk is the accumulation of

public debt in periods of growth, probably due to irrational optimism (Heinemann et al., 2013). Early literature recognises this negative impact in the form of reduced income or slower investment flows(e.g. Buchanan, 1958; Meade, 1958; Modigliani, 1961) or in the form of tighter fiscal and tax policies applied during a post-borrowing period in an effort to improve credibility (e.g. Adam and Bevan, 2005; Aizenman et al., 2007; Diamond, 1965; Saint-Paul, 1992). A non-linear relationship between public debt and economic growth has also been reported (e.g. Aschauer, 2000; Checherita and Rother, 2010; Clements et al., 2003; Krugman, 1988).[3]

C. Political and Monetary Integration

Heinemann et al. (2013) suggest that political and financial integrations might explain the dual effect of financial growth on economic growth and its non-linearity with debt. They argue that political and especially monetary integration can enhance not only the benefits of financial growth (e.g. Edwards, 1998), but also the contaminating effects of external macroeconomic shocks (e.g. Berglof et al., 2009), as well as that external financing might be beneficial to industries that depend on external funding. In contrast, empirical literature appears to be inconclusive reporting a rather moderate (Gourinchas and Jeanne, 2006, 2007; Kose et al., 2009) or long term (Kaminsky and Schmukler, 2008) positive impact of integration, or a slower growth for countries that depend on borrowing rather than on savings (Prasad et al., 2007).

Elaborating on this, Kose et al., (2009) argue that financial integration plays an important role on how the relationship between financial growth and economic growth is shaped. The fundamental principle for financial deepening is that it ameliorates resource allocation by limiting market frictions. A necessary condition to achieve this, is the unrestricted flow of these resources, which requires some form of integration. A more liberal market should allow capital to move, with less restrictions, to investments in developing economies, which are expected to yield higher returns. In parallel, a deeper and more mature financial system should also reduce relevant risks involved and therefore should easier attract capital. Consequently, Kose et al. (2009) observe that both financial deepening and financial integration should have a positive effect on economic growth

[3] These studies argue that public debt increases consumption power and up to a level (e.g. below 40%, Pattillo et al., 2002) may boost economic growth. However, beyond certain thresholds (e.g. beyond 90%, Clements et al. 2003; Kumar and Woo, 2010) the impact on credibility is disproportional, and thus a negative relationship is observed.

(e.g., Frankel and Romer, 1999; Dollar and Kraay, 2003; Berg and Krueger, 2003), but the impact of integration should be expected to be rather indirect.

Contrary to this, indirect, positive effect, many studies (e.g., Rodrik, 1998; Bhagwati, 1998; Stiglitz, 2002) suggest that the current account opening and the unfettered flows of capital expose countries to marcroeconomic shocks and external spillover effects. Sudden loss of confidence could result in sudden stops of capital flows, with profoundly negative effects on economic growth. The various currency crises in the 1980's and 1990's have shown that countries with more liberal approaches have been more susceptible to sudden stops (e.g, Kaminsky and Reinhart, 1999; Edwards, 20005), especially when these are combined with low financial deepening and high public levels of debt. Indeed, the accumulation of public debt has been identified as a major source of exposure to external shocks. Eichengreen et al. (2006) argue that the only meaningful form of international capital flows is in the form of debt, which does not share the positive attributes of equity-like flows and thus, they might induce inefficient capital allocation (Wei, 2006) and increase financial instability (Berg et al. 2004). Introducing capital controls, would not reduce risk exposure because it would decrease liquidity in the banking system (Diamond and Rajan, 2001) and deprive the country from the necessary conditions for longer term macroeconomic growth (Jeanne, 2003).

Kose et al. (2009) argue that the development of financial integration could, in principle, benefit countries with lower levels of integration, but the cost-benefit analysis for more advanced economies is not straightforward, because it depends on potential endogeneity and threshold effects. They particularly stress out that due to the impact of potentially strong endogeneity, financial integration might not be the key to economic growth. This argument is supported by unique country studies, such as India and China (Prasad et al., 2003), which report that financial integration is neither a necessary nor a sufficient condition for economic growth (Ariyoshi et al., 2000; Bakker and Chapple, 2002). Kose et al. (2009) conclude that a more relevant question to pose is the suitability of the magnitude and timing of integration, since its impact on economic growth is not unconditional.

Recent studies support this view and provide evidence that financial integration could indeed under some conditions contribute to economic growth. In more detail, financial sector development appears to amplify the benefits of financial integration (Alfaro et al, 2004; Durham, 2004) and that a minimum level of financial deepening is a prerequisite (Hermes and Lensik, 2003). These

benefits might include greater diversification and thus, might lead to greater macroeconomic stability (Easterly et al., 2001; Denizer et al., 2002; Larrain, 2004; Beck et al., 2006), as well as a mitigation of the adverse growth effects of financial crises by shortening the expansion and contraction cycles (Calvo and Talvi, 2005; Kose et al., 2004). However, in order for these benefits to be realised, a greater level of integration than financial only (Eichengreen 2001) is required. This empirical evidence highlight the importance of the causality due to potential endogeneity.

This is particularly relevant in the context of European monetary integration and current financial instability. European policies have promoted the open market approach, pursuing higher levels of political, financial and trade integration, aspiring to improve government access to borrowing and thus, to higher economic growth. Indeed, during the mid-1990's period externally financed economic growth was realised, but this credit boom is believed to have made the region more vulnerable to external macroeconomic shocks (Berglof et al., 2009). Thereafter, both market openness and excessive borrowing have been criticised in the literature as risk inducing factors. More specifically, Heinemann et al. (2014) argue that optimism has increased confidence in the sovereign bond market, which decreased borrowing costs, especially for economies in transition. In contrast, De Grauwe (2011, 2012) and De Grauwe and Ji (2013) provide evidence that this confidence has elevated fragility, due to increased borrowing levels and contagion, to the extent that a sovereign debt crisis was inevitable, since governments have no power on money supply. Beirne and Fratzscher (2012) report that increased contagion and herding contagion during the financial crisis has caused a sharp "re"-focus of financial markets on fundamentals, which dissolved the earlier beneficial impact of optimism. In parallel, several studies (Mink and De Haan, 2012; Missio and Watzka, 2011) show that EU countries experience increased contagion effects, especially when "tangible bad" news hit the market, even if a country's fundamentals do not change dramatically (Gibson et al., 2013). Consequently, these studies recognize that integration intensifies the market reaction in both tails of the distribution, but they do not distinguish between the marginal impact of political versus financial integration.

III. Methodology

A. Model

In order to study the relationship between economic growth and the other two, potentially endogenous growth determinants, namely financial growth and government borrowing, the

starting point of the empirical approach suggested here is the neo-classical growth model (e.g., Mankiw, 1992, 1995). Growth; of country i at year t, is defined as the % difference of the logged GDP, i.e. $G_{i,t} = \left(\Delta[GDP_{i,t}]/GDP_{i,t-1}\right)$, which implies that given a convergence parameter, $\lambda > 0$, $G_{i,t} = -\lambda\left(GDP_{i,t} - GDP_{steady\ state}\right)$. Assuming that countries are not likely to be at their steady states, transitional dynamics should have a significant impact on growth. Literature (e.g., Christopoulos and Tsionas, 2004) approximates the long-run steady state of *GDP* with a linear function of structural parameters, i.e., $f(\cdot)$, which produces a testable equation of the following form

$$G_{i,t} = a_0 + \boldsymbol{a}'f\left(X_{Endogenous}, X_{Exogenous}\right) + v_{i,t} \ \rightarrow \ v_{i,t} = \eta_i + \lambda_t + \varepsilon_{i,t} \qquad (1)$$

where, $\boldsymbol{a}'$ is a vector of linear parameters, to be estimated, η_i is an unobservable country effect, capturing also the initial *GDP* state, λ_t is a time dymmy that captures time unobservable effects and $\varepsilon_{i,t}$ is a pure idiosyncratic error term. Literature (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998) suggests estimating the linear parameters of equation 1 using a dynamic panel difference (Arellano and Bond, 1991) or system (Arellano and Bover, 1995; Alonso-Borego and Arellano, 1996; Blundell and Bond, 1998) GMM technique. The objective of this approach is to extract the endogenous component of the regressors and, thus investigate their "pure" impact on economic growth, while the dynamic characteristics of the data are taken into consideration in the moment conditions, imposing that the error term (in the levels and in the first difference) is not autocorrelated and not correlated with the regressors. However, their approach does not address causality among the endogenous regressors, which might introduce multicollinearity issues (Mankiw et a., 1995; Leon-Gonzalez and Montolio; 2015).

This is a primary objective of the current study, which aims at investigating the differential impact of political and monetary integration, by addressing the structural causality among two endogenous regressors, namely financial, i.e., $FG = \left(\Delta[MCAP_t]/MCAP_{t-1}\right)$, measured as the % change in market capitalization , and debt, i.e., $DEB = \left(\Delta[Debt_t]/Debt_{t-1}\right)$, measured by the % change in the level of public debt, growth. In line with Christopoulos and Tsionas (2004), the structural causality is modelled by introducing two additional equations that define the long-run, equilibrium relations of $FG = \beta_0 + \boldsymbol{\beta}'g\left(X_{Endogenous}, X_{Exogenous}\right) + \eta_{FG;i} + \lambda_{FG;t} + \varepsilon_{FG;i,t}$ and $DEB = \gamma_0 + \boldsymbol{\gamma}'z\left(X_{Endogenous}, X_{Exogenous}\right) + \eta_{DEB,i} + \lambda_{DEB,t} + \varepsilon_{DEB,i,t}$, explicitly as stochastic endogenous variables, where $g(\cdot)$ and $z(\cdot)$ are linear approximations of the conditional mean of financial and

debt growth. Economic growth is explicitly allowed to affect the level of both. This creates a system of testable equations which can be summarized below:

$$G_{i,t} = (a_0 + \sum_{q} a_{0,q} D_{q,i,t}) + (a_1 + \sum_{q=1}^{2} a_{1,q} D_{q,i,t}) FG_{i,t} + (a_2 + \sum_{q=1}^{3} a_{2,q} D_{q,i,t}) DEB_{i,t} + \sum_{j=3}^{9} a_j CV_{j,i,t} + \varepsilon_{1,i,t} \quad (2.\text{a})$$

$$FG_{i,t} = (\beta_0 + \sum_{q} \beta_{0,q} D_{q,i,t}) + (\beta_1 + \sum_{q=1}^{2} \beta_{1,q} D_{q,i,t}) G_{i,t} + (\beta_2 + \sum_{q=1}^{3} \beta_{2,q} D_{q,i,t}) DEB_{i,t} + \sum_{j=3}^{9} \beta_j CV_{j,i,t} + \varepsilon_{2,i,t} \quad (2.\text{b})$$

$$DEB_{i,t} = (\gamma_0 + \sum_{q} \gamma_{0,q} D_{q,i,t}) + (\gamma_1 + \sum_{q=1}^{2} \gamma_{1,q} D_{q,i,t}) FG_{i,t} + (\gamma_2 + \sum_{q=1}^{2} \gamma_{1,q} D_{q,i,t}) G_{i,t} + \sum_{j=3}^{9} \gamma_j CV_{j,i,t} + \varepsilon_{3,i,t} \quad (2.\text{c})$$

where, *D* is a vector of dummy variables with $q = (E, EU, HD, T, C)$, which is employed in order to capture, in a piecewise fashion, potential non-linearities (Henderson et al., 2013). *E* is a dummy variable, that takes the value 1 when country *i* uses the euro as its currency and the value 0 when the country *i* uses its own national currency. Equivalently, *EU* is a dummy variable indicating whether country *i* has joined the European Union (not necessarily the euro) and *HD* is a dummy variable distinguishing the countries that have public debt exceeding the 90% level. $T_{time}, time = (2000, \dots, 2012)'$ is a vector of dummy variables that take the value of 1 to indicate a specific year and 0 elsewhere. This accounts for extraordinary macroeconomic effects, such as the beginning of the financial crisis in 2008-2009. Equivalently, $C_{country}, country = (Belgium, \dots, UK)'$ is a dummy variable that takes the value of 1 to indicate a specific country and 0 elsewhere. This accounts for country specific fixed effects. The combination of the two captures significant structural breaks in specific countries/time, due to regulatory changes, such as the 2003 labour market reforms in Germany. In addition, a conditioning set of exogenous variables, i.e., *CV*, is uniquely introduced in each equation in the model to account for known determinants of the endogenous variables and thus, reducing heteroskedasticity.

Eq (2.a) investigates the impact of financial growth on economic development. Recent literature provides empirical evidence that the link has dramatically weakened after the 1990s (e.g. Rousseau and Wachtel, 2011), especially for countries afflicted by financial crises. Under this scenario, coefficient $\alpha_1$would be statistically insignificant. If there is any differential effect resulting from the political, coefficient $\alpha_{2,EU}$, or monetary integration, coefficient $\alpha_{1,E}$, would have a statistically significant impact on *GDP*. Further, coefficients $a_{2,EU}$, $a_{2,E}$ and $a_{2,HD}$ investigate the potentially differential effect of excessive borrowing discussed in earlier literature (e.g. Prasad et al., 2007; Reinhart and Rogoff, 2010), within the European Union.

Following relevant literature (e.g. King and Levine, 1993, Levine, 1997), potential endogeneity between financial growth and economic growth is also examined in equation (2.b). Coefficient β_1 measures the impact of *GDP* on financial growth. If both a_1 and β_1 are statistically significant, a bidirectional relationship may better describe the interaction within Europe. If only one is significant, the supply-leading, a_1, or the demand-following, β_1, hypothesis would be confirmed. Potentially differential effects for the EU or the euro are captured by $a_{1,E}$, $a_{1,EU}$ and $\beta_{1,E}$, $\beta_{1,EU}$.

Furthermore, Equation (2.c) explores how the aforementioned variables affect public borrowing levels. Coefficients γ_1 and γ_2 capture this effect, while any differential within the Eurozone, would be captured by coefficients $\gamma_{1,EU}$ and $\gamma_{2,E}$. The inclusion of *DEBT* as an endogenous variable in this system of equations also examines the role of public borrowing on development. Accelerated *DEBT*, i.e., for direct investments in fiscal policies, could have a direct impact on *GDP* and at least one of the coefficients α_2 would be significant. In contrast, insignificant α_2s, with β_2 being significant, would mean that an investment for financial growth that further increases *GDP* would be a more appropriate strategy. If coefficients γ_1 and γ_2 are found to be significant too, this would indicate that either strategy may be a long-term engaging strategy rather than a short-term approach.

B. Estimation

This system of simultaneous equations is estimated with iterative GMM, with lags of dependent variables employed as instrumental variables in order to account for recursive effects. This method is preferred because it requires less strict distributional assumptions, while it accounts for heteroskedasticity and autocorrelation of unknown form. Economic growth and Financial growth might follow a lead lag relationship, but since potential structural endogeneity is primarily

investigated, a contemporaneous, simultaneous model is preferred over a VAR/VECM counterpart (Christopoulos and Tsional, 2005; Ang and McKibbin, 2007). This raises the importance of exploiting the dynamic features of the data in the instruments, rather than in the structural forms. We account for dynamic effects by using lags as instruments. This, according to previous literature (Arellano and Bond, 1991; Arellano and Bover, 1995; Alonso-Borego and Arellano, 1996; Blundell and Bond, 1998), contributes to estimation in multiple ways: (i) the parameters are estimated under the assumption that they are not correlated with the error terms of subsequent periods; (ii) the structural parameters are estimated taking into consideration the dynamic structure of the data (iii) the endogenous component of the conditioning set, i.e., *CV*, which, contrary to *FG* and *DEB*, are assumed to be strictly exogenous, is extracted and thus, the parameters $\alpha_j, \beta_j, \gamma_j$ capture their pure direct and indirect impact on growth. Estimation follows the steps below.

$\beta = \left(\alpha_{m,q}\beta_{m,q}\gamma_{m,q}\right)', m = 0, \dots, 10$ and $q = (\emptyset, E, EU, HD, T_{time}, C_{country})'$ is a vector of the parameters to be estimated, $\upsilon = (GDP, FG, DEB)'$ a vector of all endogenous variables and $z_r = CV_r$, a vector of all control variables of each equation $\mathrm{r} = 1, 2, 3$. $e_{1,t} = GDP_{i,t} - E\left[GDP_{i,t}|H_{i,t}\right]$ is the error term in (2.a), given the information set $H_{i,t}$ of countries i up to time t, $\mathrm{e_{2,t}} = \mathrm{FG_{i,t}} - \mathrm{E}\left[\mathrm{FG_{i,t}}|\mathrm{H_{i,t}}\right]$ is the error term in (2.b) and $\mathrm{e_{3,t}} = \mathrm{DEB_{i,t}} - \mathrm{E}\left[\mathrm{DEB_{i,t}}|\mathrm{H_{i,t}}\right]$ is the error term in (2.c).

We employ the following moment conditions. In order to derive consistent and efficient parameter estimates the idiosyncratic error terms are estimated assuming normality. The forecasting error, $\mathrm{e_{r,t}}$, is assumed to have a zero mean ($\mathrm{E}\left[\mathrm{f_{r,t}^{i}}\left(\beta, \upsilon_{\mathrm{i,t}}\right)\right] = \mathrm{E}\left[\mathrm{e_{r,t}}\right] = 0$). Forecasting errors are assumed to be independent from each other $\left(\mathrm{E}\left[\mathrm{f_{r,t}^{k}}\left(\beta, \upsilon_{\mathrm{i,t}}\right)\right] = \mathrm{E}\left[\mathrm{e_{x,i,t}e_{y,i,t}}\right] = 0, \text{for } (\mathrm{x} \neq \mathrm{y}) \in \mathrm{r}\right)$ and with homoscedastic, constant, variance $\left(\mathrm{E}\left[\mathrm{f_{r,t}^{var}}\left(\beta, \upsilon_{\mathrm{i,t}}\right)\right] = \mathrm{E}\left[\left(\mathrm{e_{r,t}}\right)^2\right] = \sigma_{\mathrm{e_r}}^2\right)$. In order to investigate the dynamic structure of the data (Levine, 2005), the errors should be serially uncorrelated ($\mathrm{E}\left[\mathrm{f_{r,t}^{l}}\left(\beta, \upsilon_{\mathrm{i,t}}\right)\right] = \mathrm{E}\left[\mathrm{e_{r,i,t}e_{r,i,t-j}}\right] = 0$), and the regressors weakly exogenous. Therefore, previous lags of the exogenous regressors (levels) are assumed to be uncorrelated with $\mathrm{e_{r,t}}$ ($\mathrm{E}\left[\mathrm{f_{r,t}^{z}}\left(\beta, \upsilon_{\mathrm{r,t}}\right)\right] = \mathrm{E}\left[\mathrm{e_{r,t}} * \mathrm{z_{r,t-j}}\right] = 0$. In addition, in order to avoid the inclusion of weak instruments cross-sectional moment conditions are introduced alongside the endogenous variables $\mathrm{E}\left[\mathrm{f_{r,t}^{\upsilon}}\left(\beta, \upsilon_{\mathrm{r,t}}\right)\right] = \mathrm{E}\left[\mathrm{e_{r,t}} \otimes \upsilon_{\mathrm{r,t-j}} \otimes \mathrm{Q_{r,t-j}}\right] = 0$, for $\mathrm{j} = 0,1, \dots, \mathrm{T}$, here $j = 0,1$. The model is estimated with

iterative GMM and validity of the moment conditions is tested using the *J*-statistic (Nansen, 1982).[4]

C. Data

This study employs annual, cross-sectional data on financial and macroeconomic indicators for 26 European countries over the period from 1999 to 2012 as summarized in the table below.[5] All variables are monetary (currency) and seasonally adjusted.

Variable	Definition
MCAP	Market Capitalization (% of GDP and in €).
GDP	Annual Gross Domestic Product (in €)
INF	Inflation (%)
Interest Rates	10 Year Government Bond Yield (%)
Trade	Trade (Imports + Exports in €)
Revenue	General Government Revenue (in €)
Expenditure	General Government Total Expenditure (in €)
Debt	General Government Gross Debt (in €)
Current Account	Current Account Balance (in €)
Savings	Gross National Savings (in €)

The primary concern refers to the proxy of financial growth. Levine (2005) argues that physical capital accumulation does not contribute much to economic growth (Jorgenson, 1995, 2005) and therefore a study of the link between financial growth and economic growth should focus on a measure of development, rather than on aggregated savings. Kose et al, (2009) also maintain that the macroeconomic impact of financial integration cannot be captured by conventional measures of integration and financial deepening and thus a market based measure is needed. Furthermore,

[4] The sample means of $(\beta, \upsilon_{i,t}) = [f^{i}_{r,t}(\beta, \upsilon_{i,t}), f^{k}_{r,t}(\beta, \upsilon_{i,t}), f^{l}_{r,t}(\beta, \upsilon_{i,t}),\ f^{var}_{r,t}(\beta, \upsilon_{i,t}), f^{\upsilon}_{r,t}(\beta, \upsilon_{i,t}), f^{z}_{r,t}(\beta, \upsilon_{r,t})]'$ are defined as: $g(\beta; S_{I,T}) = \frac{1}{T}\frac{1}{I}\sum_{i=1}^{I}\sum_{t=1}^{T} f(\beta, \upsilon_{i,t})$, where $S_{I,T}$ contains the observations of $\upsilon_{i,t-j}, j = 1, \dots, T$ of a sample T. β is chosen so that $g(\beta; S_{I,T})$ closely approximate $f(\beta, \upsilon_{i,t})$. When the number of moment conditions, K, is larger than the number of parameters, L, the GMM estimator can be written as; $\hat{\beta} = \underset{\beta}{\operatorname{argmin}} \left(g(\beta; S_{I,T})' * \widehat{W}_t * g(\beta; S_{I,T})\right)$, where $\widehat{W}_t$ is a KxK semi-definite "weighting" matrix, such as that $\lim_{T\to\infty} \widehat{W}_t \to W$ (population). $\hat{\beta}$ is estimated with "iterative" GMM, with a heteroskedasticity consistent covariance matrix (Newey and West, 1987) and the validity of model is tested using the $J \equiv \left(g(\beta; S_T)' * \widehat{W}_t * g(\beta; S_T)\right) \to \chi^2_{K-L}$ (Hansen, 1982). The initial hypothesis, (H_o), is that the model is valid. J-statistic is asymptotically Chi-squared with $K - L$ degrees of freedom.

[5] The data is collected from the World Bank's World Development Indicators database and International Monetary Fund source. Regression data is annual as a percentage of GDP. The 26 countries employed are in alphabetical order: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and United Kingdom (UK). Regional criteria have been applied alongside data availability.

Friedrich et al, (2012) suggest that excessive optimism set the base for irrationally capitalized expectations of stability and thus it led to excessive levels of borrowing, at a cost that was not fully reflecting fundamentals. We introduce public borrowing levels in our analysis as an integral part of the financial-economic growth nexus and thus, we postulate that any measure that does not capture market expectations could not reveal the, potentially endogenous, inter-relations between debt and the other two variables. Following Beck et al. (2000, 2008), MCAP, more precisely the % change of MCAP, is employed as a proxy for financial growth. This measure has been chosen on the grounds that it accounts not only for the quality and depth of the financial sector, but also for two other things. First, it is a collective measure of intra-country economic entities. Recent literature (Abiad et al., 2009; Heinemann et al., 2013; Imbs, 2006, 2007) emphasizes the importance of micro-level data. However, because our study focuses on governmental policies rather than on firm level analysis, the macro-level approach is more appropriate. Market capitalization, measures - albeit rigidly - financial growth as the sum of all individual entities within the economy. Thus it is a measure of financial activity that does not ignore firm specific effects. Second, it accounts for investor opinions concerning risk, both unsystematic (each individual firm) and systematic (the economy as a whole).

Then the other fundamental variables in our modelling include economic growth and debt. With respect to economic growth, following Levine (1997), we use the % growth of GDP. We consider public borrowing levels, because in Europe they have been the major burden in the peripheral economies that amplified the impact of restrained capital flows. The level of debt in the sample period has been steadily increasing and therefore this variable is not stationary. Therefore, we employ the first % difference. We purport that this accounts also for the dynamic character of the panel data set we have employed and that it should be expected to be more correlated with changing expectations and thus, our measure of financial growth. In Europe, financial and political integration have been very significant aspects of economic growth and that the foundation of this relationship lies on capitalization of expectations. Optimism was reflected on market valuations and thus, on capital flows, which in turn allowed a better mobilization of resources and consequently growth. However, this growth was externally financed and at some point, public borrowing was restricting rather than financing growth. We postulate that the impact of expectations should be better reflected on the rate that financial growth and economic growth accelerate with respect to the rate the borrowing grows.

Another important element in our study is the distinction between differential degrees of integration. Kose et al., (2009) make an explicit distinction between *de jure*, i.e., explicit measures, such as capital controls, and *de facto*, i.e., implicit measures that reflect legal restrictions, of financial integration, suggesting that a combination of the two should better reflect the openness of an economy.[6] In order to account for *de jure* measures we employ a combination of dummy variables that account for country specific and larger scale legislation effects. The country specific effects, *C*, capture implicitly the intensity of explicit measures among other unobservable effects. In addition, the dummy variables *EU* and *E*, capture the effects of two different levels of explicit legislation. The first is the political integration within the European Union and the second is the financial integration within the monetary union, namely the euro. Both are measures of differential degrees of integration, which are explicitly regulated on an integrated level. *EU* and *E* are expected to affect market expectations, thus, financial an depth growth and therefore, indirectly economic growth. However, in practice their impact on market openness of individual countries, i.e., captured by the combination of *C*, *EU* and *E*, might not be reflected on the *de facto* measures of financial integration. Therefore, we use the variable $Trd_t = \Delta(Trade_t)$, which captures changes in trade openness, measured as the sum of the monetary value of imports and exports. Trade openness is a conventional measure of *de facto* financial integration (Kose et al., 2009)

Furthermore, other variables are also introduced in the model to account for known *GDP* determinants, thus reducing heteroskedasticity. $\mathrm{CV} = (\mathrm{EXP}, \mathrm{REV}, \mathrm{SAV}, \mathrm{INF}, \mathrm{IR}, \mathrm{Trd}, \mathrm{CAB})$.[7] Following early literature (Arrow and Kurz, 1970; Diamond, 1989), $\mathrm{EXP} = \Delta\log(Expenditure_t)$ is used to capture changes in fiscal policies and in particular the impact of government spending on economic growth. Similarly, $REV = \Delta log(Revenue_t)$ captures the other side of fiscal policies; changes in general government revenue. $CAB = {Current\ Account}/{GDP}$ measures the current account balance as a proportion of *GDP*. Finally, in order to account for the convergence

[6] Kose et al. (2009) argue that in practice there are explicit measures that limit capital flows, which are necessarily strictly imposed. On the contrary, other countries that might follow liberal practices might experience low capital flows. Consequently, in order to better capture nominal, i.e., *de jure*, and effective, i.e., *de facto*, integration, a combination of the two is needed.

[7] The suggested model tries, by no means, to investigate the determinants of economic or financial growth, or public debt. The focus lies on potential endogeneity, accounting for some control variables. Please note that in (2.a), *CAB* is employed instead of *Trade* openness because the balance of imports/exports is expected to determine long-term growth. In contrast, in (2.b), *Trade* openness is preferred because it is a better indicator of total trading activity. In (2.c), inflation is excluded because it is expected to have a simultaneously increasing (higher monetary value) and decreasing (lower value of existing liabilities) impact on debt levels, and thus a non-significant impact.

in interest rates within the Eurozone, the 10 year government bond yields are employed. $IR = \Delta(Interest\ Rates_t)$ is the change in prevailing yields and reflect changes in the fundamentals. This is closely linked to our measure of financial growth, which also captures investors' expectations.

IV. Empirical Findings

A. Non-Parametric Analysis

1. Initial Observations

The average economic growth in figure 1 is positive, 5.29%, and overdispersed (std is 6.48%), which is somewhat expected due to the inclusion of both developing and developed economies, as well as a structural break in October 2008. The negative skewness (-0.0442) and the high kurtosis (5.6059) show that high dispersion is mainly due to the post-2008 contraction that many countries experienced. Furthermore, market capitalization accounts for around 65% of *GDP*, which shows that the financial sector plays a significant role in these economies. It is also highly dispersed, with a significantly long right tail (kurtosis is 11.5734 and skewness is 2.0959). In several cases the market value of listed companies exceeds *GDP*, by a maximum factor of 4.62, which indicates significant exuberance mainly recorded prior to 2008 (Shiller, 2005). The contribution of the political and financial integration to this confidence and its link with economic growth is the main focus of this study.

DEBT accounts for approximately 61% of *GDP*. It has a longer right tail (skewness is 3.6013 and kurtosis is 20.8301). This shows that several countries sustain considerably higher debt levels, in some cases exceeding 100%. This should be more pronounced after 2008 where *GDP* declines without a proportional decrease in public debt. A negative median, -€0.728b, for *CAB* shows that imports exceed exports in most cases. Consistently with *Trade*, *CAB* is significantly overdispersed with some extreme observations at both ends of the distributions. This highlights how inhomogeneous the structure of the countries that constitute the union is. Literature recognizes the combination of negative *CAB* and high debt as a major determinant of increased exposure to macroeconomic shocks, especially under reduced flexibility induced by a monetary integration.

2. Financial Growth and Economic Growth

Figure 2 presents graphically the link between economic growth, financial growth (Panels A-C) and *MCAP* (Panels D-F). Panels A shows that financial growth and economic growth tend to be positively correlated with countries exhibiting simultaneous financial growth and economic growth. According to panel B, this seems to be more intense in the countries that have joined the euro, since the dots seem to be more aligned to a positive correlation, unlike the countries that have kept their national currencies, which exhibit more observations closer to the XX' axis. Panel D shows an overall declining link between *MCAP* and economic growth. However there are several large observations close to the YY' axis, showing that there are countries that achieve high market value without necessarily experiencing high economic growth (or small increases in economic activity can spark high market values). The distinction becomes clearer in panels E and F. In the Eurozone the link between market values and economic growth seems to be exponentially increasing. In contrast, in the countries that have kept their national currencies two subgroups are observed. In the first group higher economic growth is not associated with high market values, while in the second, some very high figures are observed for *MCAP* in countries with low economic growth. The overall link tends to be rather negative, but with no clear trend.

Figure 3 presents the relationship between economic, financial growth and debt. It reveals that indeed economic growth and financial growth appear to be linked and this link seems to strengthen over time, in particular after 2008. In the period prior to 2008, panels B and C reveal that the link is relatively weaker in non-Eurozone countries. However, after 2008, the volatility of both financial growth and economic growth is higher for this sub-sample, indicating that the euro might cushion the impact of a macroeconomic shock on participating countries. Several studies (e.g. Manning, 2003; Rousseau and Wachtel, 2011) report that the link between economic growth and financial growth has weakened significantly, especially after 1990. However, in the period following 2008 their link appears to strengthen again, following a lead-lag pattern. This shows that this link might either be cyclical, i.e. depending on macroeconomic cycles, or that it is a natural consequence of a macroeconomic shock.[8]

[8] In this study we investigate the latter, without necessarily ignoring the first. We focus on the link between financial growth and economic growth and the impact of monetary integration. *MCAP* as a measure of financial growth reflects market expectations and thus is expected to better capture potential "euro" effects. If there are cyclical patterns, they should be reflected on market prices, assuming rationality. Relaxing the rationality or investigating the link between business cycles and macroeconomic shocks would deviate from the current focus, which is potential "euro" effects.

3. Bear vs Bull Market and Debt

Another observation refers to the nature of the link. Panels A-E show that economic growth changes are mostly observed after financial growth sparks. This shows that changes in *GDP* influence market expectations, which seem to precede any changes in economic growth. There is a notable "bull" market period starting at around 2000, being followed by a strong "bear" market period after 2008. The link between financial growth and economic growth seems to strengthen significantly around 2008 and *MCAP* notably captures subsequent *GDP* changes, especially in the Eurozone. This shows that the markets discount timely information about economic growth. Consequently, the dynamic structure chosen to investigate the direction of the relationship in equations (2.a), (2.b) and (2.c) seems to be justified.

Panels D and E focus on countries with public debt levels beyond 90% of GDP. During "bull" markets, economic growth is more moderate, about 5-6% p.a., than in countries with lower debt, about 6-10% p.a., while it decreases significantly during "bear" markets. Panels F-H distinguish between Eurozone and non-Eurozone countries. Panel F shows that, overall, higher borrowing is associated with exponentially lower economic growth. According to Panel H, this is consistent in non-Eurozone countries. In contrast, countries that have joined the euro appear to still be able to achieve higher economic growth. The euro seems to improve access to financing, which can further assist growth. Investigating this further figure 4 presents the relationship between the endogenous variables before and after the outburst of the financial crisis in 2008. The first column confirms previous findings. However, panels F and J, show that after 2008, countries that have not joined the Eurozone exhibit significantly lower growth across greater financial activity. Also, panels E and H show that the link between financial growth and economic growth is significantly stronger in a bearish market, though it does not disappear after a macroeconomic shock.

B. Parametric Analysis

1. Financial Growth and Economic Growth

Table 1 presents the estimation results of the model presented in equations (2.a), (2.b) and (2.c.) Focusing on the full sample, no significant link is observed between financial growth and economic growth in non-Eurozone countries. The highest absolute value of *t*-statistic is 1.67, showing that the two figures are rather independent. However, financial growth appears to have a

significant increasing effect on economic growth in countries that have adopted the euro (*FG*E* is 0.0311 and t-statistic is 2.53). In parallel, looking at the determinants of financial growth, a significant (2.04) coefficient of 0.8012 for the *EU* dummy shows that *G* has an increasing impact on financial growth for countries that have joined the European Union. This effect is found to be stronger for countries that have additionally joined the euro (coefficient is 0.3015 and t-statistic is 3.13). Consequently, the link between the two figures is present in Europe, and they are found to be endogenous in the Eurozone, but not necessarily within the European Union.

In addition, political integration does not appear to have any significant direct impact on either of the figures, since the coefficient of the *EU* dummy remains rather insignificant. In contrast, a significant (3.01) coefficient of 0.7433 of the *E* dummy shows that monetary integration seems to accelerate financial growth only, without any significant effect on economic growth.

A possible explanation for this finding could depend on the existence of the European Union, particularly of the Eurozone. The EU is significantly larger than any single country and it is therefore to be more resistant to market pressure than a single entity. Consequently, increased endogeneity between market condition and fundamentals should be expected. Monetary integration appears to have an increasing direct and indirect impact on financial growth, which in turn further enhances economic growth, engaging into a spiral relationship. The absence of this link in the non-EU countries leads to the conclusion that the contribution of EU is significant. Given that *MCAP* captures expectations, this contribution may be linked to increased confidence and thus, improved access to financing. Consequently, for a given change in *GDP*, market reacts more positively in Eurozone member states, probably because investors anticipate lower exposure to macroeconomic risk. This allows an investment flow that can further increase *GDP*.

However, this spiral effect does not seem to be consistent outside the Eurozone, not even in other (non-euro) member states. EU membership would assist countries with positive *GDP* changes to further increase the total market value, but this increased market value has no further impact on *GDP*, unless the country has joined the euro. From a market perspective, this seems to be distinctively different from EU membership. Market participants seem to capitalize their expectations for future political stability and thus for lower macroeconomic risk on current prices when a country joins the EU. This might be derived from expectations about political of financial stability. However, this seems not to be a sufficient condition to further increase their *GDP* and can only occur if they also adopt the common currency. When they do, they abandon their

monetary tools and, thus, they need to have discipline, aiming at increasing their competitive advantages. This, in combination with a higher level of political and monetary integration, seems to lead to higher stability expectations, which attract further economic development. This is a first sign that the euro is suitable for countries which anticipate that they can gain on the long term from the spiral link between financial growth and economic growth.

Moreover, this spiral link seems to be strongly present prior to 2008 only within the Eurozone. *GDP* has an increasing impact on financial growth (e.g. *G*E* is 0.3589 and *t*-statistic is 2.01), which in turn further increases *G* (e.g. *FG*E* is 0.0513 and *t*-statistic is 2.83). This shows that the euro could accelerate economic growth in countries that can benefit from this spiral link. Again, only financial growth is found to be directly affected by monetary integration, while political integration is not found to have any significant direct impact on both figures.

Furthermore, the euro appears to play a smoothing role too during the period following the outburst of the financial crisis. *GDP* improvements still increase market values only within the Eurozone (e.g. *G*E* is 0.2758 and *t*-statistic is 2.21), but now the Eurozone countries seem to be less exposed to market fluctuations. In more detail, an estimate of 0.1901 (2.60) shows that in non-Eurozone countries changes in *GDP* follow changes in market value. The mostly negative financial growth experienced during the post 2008 period appears to have a strong negative impact on the economic growth of these economies. In contrast, a negative estimate for the Eurozone countries of -0.1548 (-2.09) indicates that this effect is milder for countries that have adopted the euro. Negative financial growth still negatively affects economic growth, but the impact is considerably smaller in Eurozone member states. This indicates that non-Eurozone countries appear to be more exposed to market volatility after a macroeconomic shock than countries that belong to a monetary union. This highlights an additional beneficial impact of the euro, which seems to bate the impact of macroeconomic shocks.

2. Financial Growth, Economic Growth and Debt

The previous section highlights the contribution of the euro in accelerating both financial growth and economic growth, as well as their spiral link. This might be observed due to improved access to financing, which could be a major determinant of the spiral link. Equation (2.c) focuses on the impact of economic growth and financial growth on public debt growth, as well as on endogeneity issues.

The last section of table 1 shows that monetary integration appears to have a significant impact on public borrowing levels. Eurozone member states exhibit significantly higher (e.g. 0.0248 and *t*-statistic is 2.11) debt growth, both before (e.g. 0.1893 and *t*-statistic is 2.10) and after (e.g. 0.0199 and *t*-statistic is 1.99) 2008, while political integration does not exhibit any significant marginal impact. This is a sign of improved access to financing, probably due to additional confidence induced by monetary integration. This is further complemented when a member state experiences economic growth, but not necessarily upon financial growth. In more detail, there is a statistically significant difference in borrowing levels between member and non-member states. The impact of *G* is insignificant for countries that have not joined the EU (e.g. coefficient is -0.1842 and t-statistic is -0.36), but it has a rather increasing impact for member states (e.g. 0.1814 and t-statistic is 1.94), especially when the euro is the currency adopted (e.g. 0.2321 and t-statistic is 5.06). In contrast, no significant link appears to exist between financial growth and *DEB*. This shows that a country's fundamentals are more important than its financial profile in improving its borrowing position. Further, the mostly insignificant coefficients of *E* and *EU* in the last column indicate that any euro effect on borrowing becomes significantly less important during a "bear" market wherever financial commitments seem to be prioritised over economic development.

Naturally, the focus shifts on how the improved borrowing position (higher growth of debt accumulation) affects the spiral link between financial growth and economic growth. The first observation is derived from the third panel of the first section of Table 1. *DEB* seems to be endogenous to *GDP* growth with differing impact for member and non-member states. Higher debt growth seems to have a limiting impact on economic growth in countries that have not joined the euro (e.g. coefficient is -0.5076 and *t*-statistics is -2.08). In contrast, the higher borrowing capacity of euro member states seems to have an overall marginally positive impact on economic growth (e.g., 0.0075 (1.95) for *DEB***E* and 0.4863 (2.01) for *DEB***EU*). Consequently, the euro appears to have another indirect positive impact on economic growth. The Eurozone countries seem to have higher credibility that can be used to draw more funds, which can lead to further development.

However, there is a lack of consistency before and after 2008. During the booming period prior to 2008, higher debt growth has a positive impact (e.g., 0.0190 (2.27)) on economic growth, even when debt exceeds 90% of GDP (e.g., 0.0380 (2.57)). In contrast, in the years following the sovereign bond crisis, increases in debt seem to significantly limit growth opportunities (e.g., -0.0267 (-2.77)) in the Eurozone, especially for countries with high borrowing levels (e.g., -0.0413

(-2.37)). This, along with the notable absence of "euro effects" on debt, raises some concerns about the suitability, or the overall impact, of improved access to financing due to monetary integration. In the previous section, the euro has been found to protect countries from erratic market movements, by smoothening the negative impact of negative financial growth, but the limited monetary flexibility appears to significantly slow down economic growth during a bear market. Improved access to financing might endogenously accelerate economic growth, but during bear market periods financial obligations are prioritized and thus, the increased financing might be considered as "over-borrowing". In this case it seems to reverse the spiral link between financial growth and economic growth and thus, lead to recession.

Consequently, the benefits from the endogenous relationship between debt increases and economic growth are not unconditional. The euro might assist member states to achieve higher economic growth, but it might also lead them to unmanageable borrowing levels. This concern seems to be reflected on the impact of debt growth on financial growth, too. The third panel of the second section of Table 1 shows that higher *DEB* consistently lead to lower marker values. This slows down the spiral effect of the endogenous economic growth and financial growth. However, this happens only in the Eurozone countries (e.g., -0.5756 (-4.73)) and not in member states that have not joined the euro (e.g., 0.2582 (2.57)).

These findings lead to the conclusion that markets perceive the euro to have a dual role. First, it is found to have a beneficial impact by leading to an endogenous spiral link between financial growth and economic growth. However, this spiral link is bounded by borrowing levels. Positive debt growth might lead to higher growth during bull market conditions, but it reverses this spiral link during bear market conditions. This second role of euro, has a rather limiting impact on economic growth, especially when the increase in financing is not accompanied by improvement in the country fundamentals. The increased financing might improve *GDP* when the macroeconomic conditions allow for it, but it might also lead to unsustainable financing. This might constitute the foundations of what is reported in the literature as "bad" growth. Countries can improve their access to financing by joining the monetary union, but unless resources are utilized efficiently in order to improve fundamentals, economic growth might be fragile and susceptible to volatile macroeconomic conditions.

Consequently, the suitability of adopting the euro should depend on the ability of each country to benefit from the increased financing by engaging on the spiral endogenous link between financial

growth and economic growth, which could eventually improve fundamentals. Excessive borrowing without engaging on this link could lead to obviation of market confidence, which introduces an additional macroeconomic risk.

3. Robustness

The robustness of the empirical findings presented above is tested by considering a potential long term equilibrium among the endogenous variables, by considering a different estimation method, as well as by testing the strength of the instrumental variables. Table 2 presents the estimation results for the model presented in equations (2.a), (2.b) and (2.c). Parameters have been estimated considering an error correction specification, as well as using the Seemingly Unrelated Regression (SUR) method, which recognizes potential cross-correlations assuming that the innovations of the system are i.i.d.

In more detail, the bottom panel of Table 1 reports that all variables employed in the model are stationary, while the bottom part of the Table 3 reports that the residuals of the full sample estimation (Total in Table 1) are also stationary and non-heteroskedastic (cross-sectionally or over time). This indicates that the three endogenous variables might be cointegrated, exhibiting a long-term, equilibrium relationship. The first three columns of Table 2, present the estimates of the parameters of the model in equations (2.a), (2.b) and (2.c) with an error correction term. The error correction term is the lagged residual of the *GDP* regressed on a constant, *MCAP* and *Debt* (all values are logged). The cointegration term is a significant determinant of economic growth and financial growth, but not of debt growth. This indicates that MCAP and *GDP* are strongly linked to each other, following a long term equilibrium, while *Debt* only indirectly affects their growth. The presence of the cointegration term, as well as the different estimation method produces consistent estimates with the GMM estimation (Table 1)

Furthermore, Table 3 presents the correlations between the regressors and the instrumental variables, which are the first lag of regressors. The instruments appear to be highly correlated with the corresponding regressors and uncorrelated with the GMM residuals. Finally, the cross correlation between the GMM residuals appears to be rather small.

V. Concluding Remarks

In this study, we investigate the suitability of adopting the euro, by revisiting the interaction between financial growth and economic growth in Europe. We introduce the growth of public financing as an integral component and investigate endogeneity among all three. We also investigate for potentially differential between the impact of political (European Union) and financial (Eurozone) integration.

The empirical findings indicate that neither political nor monetary integration exhibit any direct impact on economic growth. Their impact is rather indirect through financial and debt growth. In more detail, monetary integration appears to allow countries to borrow more and accelerates financial growth, both directly and indirectly through improvements in country fundamentals. Increased market values and improved financing further accelerate economic growth, indicating a spiral endogenous link between the three. However, this link is only observed within Eurozone member states, highlighting the existence of a "euro effect". This effect seems to be strong, especially during bear market conditions prior to 2008, when even countries with high debt balances can benefit from the spiral link and experience higher economic growth. In contrast, during the bearish market conditions in the post 2008 period, a sharp correction of market values and economic growth is observed, especially for countries with high levels of debt. This reverses the afore-mentioned spiral link and leads into recession.

Consequently, the euro is found to play a dual role. First, it has a positive indirect impact on economic growth, by allowing the countries to engage into a spiral endogenous link between financial growth and economic growth, as well as debt. Improved access to financing allows for more investments, which increase GDP. This increases market values, which have a further boosting impact on economic growth. EU members that have not joined the euro can still draw marginally more funds upon higher economic growth, but the lack of the common currency does not create the necessary confidence to enhance a synergetic endogeneity. However, this exuberance might lead countries to borrow more introducing a "moral hazard" of "over-borrowing". This second role of the euro introduces a macroeconomic risk, where countries might pursue economic growth through an improved credit profile due to the monetary integration, rather than through an improvement in country fundamentals. This might set the foundation for "bad" growth, which reverses the afore-mentioned spiral endogenous link after macroeconomic shocks, leading to recession. Therefore, the interaction between the dual role of the euro, which is unique for each country, should be a major determinant of the suitability of adopting the common

currency. On a larger scale, European policies should focus either on distinguishing between "good" and "bad" borrowing and thus between "good" and "bad" growth or on structural changes that will allow countries to benefit from the financial-economic growth momentum.

References

1. Abiad, Abdul, Leigh, Daniel, and Mody, Ashoka (2009) Financial integration, capital mobility, and income convergence. *Economic Policy,* 24 (58), 241-305.
2. Adam, Christopher S and Bevan, David L (2005) Fiscal deficits and growth in developing countries. *Journal of Public Economics,* 89 (4), 571-97.
3. Aizenman, Joshua, Lee, Yeonho, and Rhee, Youngseop (2007) International reserves management and capital mobility in a volatile world: Policy considerations and a case study of Korea. *Journal of the Japanese and International Economies,* 21 (1), 1-15.
4. Alessi, Lucia and Detken, Carsten (2011) Quasi real time early warning indicators for costly asset price boom/bust cycles: A role for global liquidity. *European Journal of Political Economy,* 27 (3), 520-33.
5. Alfaro, Laura, Chanda, Areendam, Kalemli-Ozcan Sebnem and Sayek Selin (2004) FDI and economic growth: The role of local financial markets. *Journal of International Economics,* 64 (1), 89-112.
6. Allen, Franklin (1990) The market for information and the origin of financial intermediation. *Journal of financial intermediation,* 1(1), 3-30.
7. --- and Gale, Douglas (1997) Financial markets, intermediaries and intertemporal smoothing. *Journal of political Economy,* 105 (3), 523-546.
8. Alonso-Borrego, Cesar and Arellano, Manuel (1996) Symmetrically normalized instrumental-variable estimation using panel data. *Journal of Business and Economic Statistics,* 17, 36-49.
9. Ang, James B. and McKibbin, Warwick J. (2007) Financial liberalization, financial sector development and growth: evidence from Malaysia. *Journal of development economics* 84.(1), 215-233.
10. Arellano, Manuel and Bond, Stephen (1991) Some tests of specification for panel data. Monte Carlo evidence and an application to employment equations. *Review of Economic Studies,* 58 (2), 227-297.
11. --- and Bover, Olympia (1995) Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics,* 68 (1), 29-51.
12. Ariyoshi, Akira, Habermeier, Friedrich, Ki, Andrei, Kriljenko, Jorge I. C. and Otker, Inci (2000) Capital controls: Country experiences with their use and liberalization. IMF Occasional Paper 190, International Monetary Fund, Washington.
13. Aschauer, David Alan (2000) Public capital and economic growth: issues of quantity, finance, and efficiency. *Economic Development and Cultural Change,* 48 (2), 391-406.
14. Bakker, Age and Chapple, Bryan (2002) Advanced country experiences with capital account liberalization. IMF Occasional paper 214, International Monetary Fund, Washington.
15. Bagehot, Walter (1983) Lombard Street: A description of the money market. Kegan, Paul & Trench.
16. Beck, Thorsten, Lundberg, Mattias and Majnoni, Giovanni (2006) Financial intermediary development and growth volatility: Do intermediaries dampen or magnify shocks? *Journal of International Money and Finance,* 25 (7), 1146-1167.
17. Beck, Thorsten, Levine, Ross, and Loayza, Norman (2000) Finance and the Sources of Growth. *Journal of financial economics,* 58 (1), 261-300.
18. Beck, Thorsten, Demirgüç-Kunt, Asli, and Maksimovic, Vojislav (2008) Financing patterns around the world: Are small firms different?. *Journal of Financial Economics,* 89 (3), 467-87.
19. Beetsma, Roel, Giuliodori, Massimo, De Jong, Frank, and Widijanto, Daniel (2013). Spread

the news: The impact of news on the European sovereign bond markets during the crisis. *Journal of International Money and Finance*, 34, 83-101.
20. Beirne, John and Fratzscher, Marcel (2012) The pricing of sovereign risk and contagion during the European sovereign debt crisis. *Journal of International Money and Finance*.
21. Berg, Andrew and Krueger, Anne (2003) Trade, growth, and poverty: A selective survey. IMF Papers 3-30. International Monetary Fund, Washington.
22. Berg, Andrew, Borensztein, Eduardo and Pattillo Catherine (2004) Assessing early warning systems. How have they worked in practice? IMF Working Paper 04/52, International Monetary Fund, Washington.
23. Berglöf, Erik, et al. (2009) Understanding the crisis in emerging Europe. *European Bank for Reconstruction and Development Working Paper*, (109).
24. Berle, Adolf and Means, Gardiner (1932) The modern corporate and private property. McMillian, New York, NY.
25. Berthelemy, Jean-Claude and Varoudakis, Aristomene (1996) Economic growth, convergence clubs, and the role of financial development. *Oxford Economic Papers,* 48 (2), 300-28.
26. Bhagwati, Jagdish (1998) The capital myth. The difference between trade in widgets and dollars. *Foreign Affairs*, 7 (3) 7-12.
27. Bhattacharya, Sudipto and Pfleiderer, Paul (1985) Delegated portfolio management. *Journal of Economic Theory,* 36 (1), 1-25.
28. Blackburn, Keith and Hung, Victor TY (1998) A theory of growth, financial development and trade. *Economica*, 65 (257), 107-24.
29. Blundell, Richard and Bond, Stephen (1998) Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87 (1), 115-143.
30. Boyd, John H. and Smith, Bruce D. (1992) Intermediation and the equilibrium allocation of investment capital: Implications for economic development. *Journal of Monetary Economics,* 30 (3), 409-432.
31. Brown, Morton B and Forsythe, Alan B (1974) Robust tests for the equality of variances. *Journal of the American Statistical Association,* 69 (346), 364-67.
32. Buchanan, James M and Buchanan, James M (1958) Public principles of public debt: a defense and restatement. RD Irwin Homewood, IL.
33. Calvo, Guillermo and Talvi Ernesto (2005) Sudden stop, financial factors and economic collapse in Latin America: Learning from Argentina and Chile. NBER Working Paper no 11153, National Bureau of Economic Research, Cambridge, MA.
34. Checherita, Cristina and Rother, Philipp (2010) The impact of high and growing government debt on economic growth, *An empirical investigation for the Euro Area. Frankfurt: European Central Bank Working Paper Series*, (1237).
35. Christopoulos, Dimitris K. and Tsionas Efthymios G. (2004) Financial development and economic growth: evidence from panel unit root and cointegration tests. *Journal of Development Economics*, 73 (1) 55-74
36. Clements, Benedict J, Bhattacharya, Rina, and Nguyen, Toan Quoc (2003) External debt, public investment, and growth in low-income countries. International Monetary Fund.
37. Collins, S. M. (2007) Comments on "Financial globalization, growth, and volatility in developing countries" by Eswar Prasad, Kenneth Rogoff, Shang-Jin Wei, and M. Ayhan Kose." In: Harrison, A. (Ed.), Globalization and Poverty, National Bureau of Economic Research Conference Report. University of Chicago Press, Chicago.
38. Darrat, Alif F (1999) Are financial deepening and economic growth causally related? Another look at the evidence. *International Economic Journal*, 13 (3), 19-35.

39. De Grauwe, Paul (2011), 'The governance of a fragile Eurozone', *Revista de Economía Institucional*, 13 (25), 33-41.
40. --- (2012) Economics of monetary union. Oxford University Press.
41. De Grauwe, Paul and Ji, Yuemei (2013) Panic-driven austerity in the Eurozone and its implications. *VoxEU. org*, 21.
42. Demetriades, Panicos O and Hussein, Khaled A (1996) Does financial development cause economic growth? Time-series evidence from 16 countries. *Journal of development Economics*, 51 (2), 387-411.
43. Denizer, Cevdet, Iyigun, Murat F. and Owen, Ann L. (2002) Finance and macroeconomic volatility. *Contributions to Macroeconomics*, 2 (1).
44. Devereux, Michael B. and Smith, Gregor W. (1994) International risk sharing and economic growth. *International Economic Review*, 535-550.
45. Diamond, Peter A (1965) National debt in a neoclassical growth model. *The American Economic Review*, 55 (5), 1126-50.
46. Diamond, Douglas W. and Dybvig, Philip H. (1983) Bank runs, deposit insurance, and liquidity. *The journal of political economy*, 401-419.
47. Diamond, Douglas W. and Rajan, Raghuram G. (2001) Banks and liquidity. *The American Economic Review*, 91 (2), 422-425.
48. Diaz-Alejandro, Carlos (1985) Good-bye financial repression, hello financial crash. *Journal of development Economics*, 19 (1), 1-24.
49. Dollar, David and Kraay, Aart (2003) Institutions, trade, and growth. *Journal of monetary economics*, 50 (1), 133-162.
50. Durham, Benson J. (2004) Absorptive capacity and the effects of foreign direct investment and equity foreign portfolio investment on economic growth. *European economic review*, 48 (2), 285-306.
51. Easterly, William, Islam, Roumeen and Stiglitz, Joseph E. (2001) Shaken and stirred: Explaining growth volatility. *Advances in Macroeconomic Theory*, 352-372.
52. Edwards, Sebastian (1998) Openness, productivity and growth: what do we really know? *The Economic Journal*, 108 (447), 383-98.
53. Eichengreen, Barry J. (2001) Capital Account Liberalization: What do cross-countrystudies tell us? *World Bannk Economic Review*, 15, 341-365
54. Eichengreen, Barry J., Hausmann Richardo and Panizza Ugo (2006) The pain of original sin. In Other People's Money, ed. By Barry Eichengreen and Ricardo Hausmann, University of Chicago Press, Chicago.
55. Friedrich, Christian, Schnabel, Isabel and Zettelmeyer Jeromin (2012) Financial integration and growth. Why is Emerging Europe different? *Journal of International Economics*, 89 (2), 522-538.
56. Fry, Maxwell J (1978) The permanent income hypothesis in underdeveloped economies:: Additional evidence. *Journal of Development Economics*, 5 (4), 399-402.
57. Frankel, Jeffrey A. and Romer, David (1999) Does trade cause growth?. *American economic review*, 379-399.
58.
59. Gibson, Heather D, Hall, Stephen G, and Tavlas, George S (2013) Fundamentally wrong: Market pricing of sovereigns and the Greek financial crisis. *Journal of Macroeconomics*.
60. Goldsmith R. W. (1969) Financial Structure and development. Yale University Press, New Haven, CT.
61. Gourinchas, Pierre-Olivier and Jeanne, Olivier (2006) The elusive gains from international

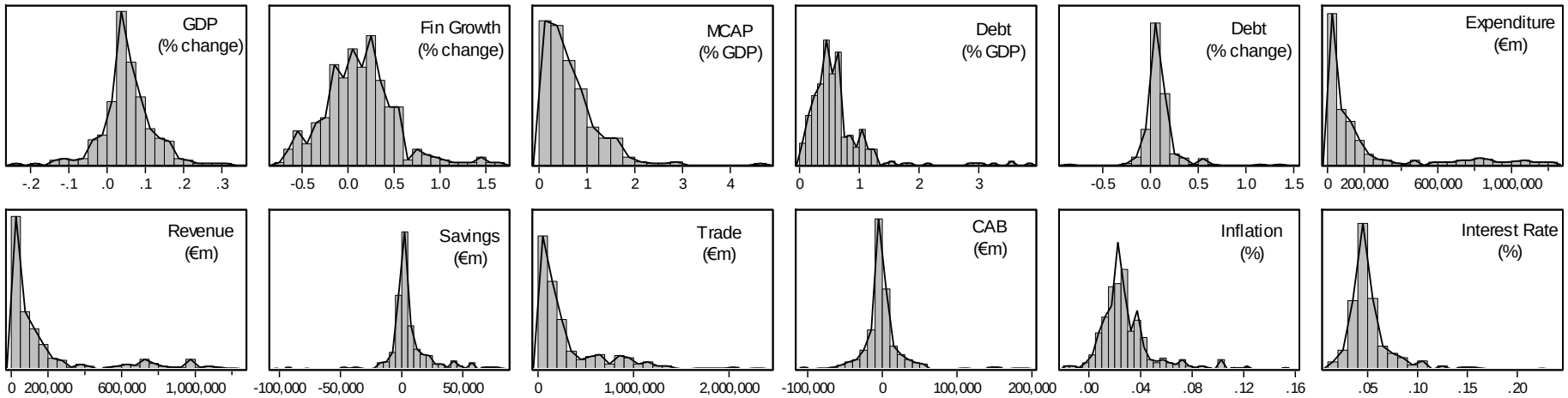
financial integration. *The Review of Economic Studies,* 73 (3), 715-41.
62. --- (2007).Capital flows to developing countries: The allocation puzzle. (National Bureau of Economic Research).
63. Greenwood, Jeremy and Jovanovic, Boyan (1990) Financial Development Growth, and the Distribution of Income. *Journal of Political Economy*, 98.
64. Greenwood, Jeremy and Smith, Bruce D (1997) Financial markets in development, and the development of financial markets. *Journal of Economic Dynamics and Control,* 21 (1), 145-81.
65. Grossman, Sanford J. and Hart, Oliver D. (1980) Disclosure laws and takeover bids. *The Journal of Finance*, 35 (2) 323-334.
66. --- and Stiglitz. Joseph E. (1980) On the impossibility of informationally efficient markets. *The American economic review,* 70(3), 393-408.
67. --- (1986) The costs and benefits of ownership: A theory of vertical and lateral integration. *The Journal of Political Economy*, 691-719.
68. Gurley, John G. and Shaw, Edward S. (1995) Financial aspects of economic development. *The American Economic Review,* 45 (4), 515-538.
69. Hansen, Lars Peter (1982) Large sample properties of generalized method of moments estimators. *Econometrica: Journal of the Econometric Society*, 1029-54.
70. Harrison, Paul, Sussman, Oren, and Zeira, Joseph (1999) Finance and growth: Theory and new evidence'.
71. Heinemann, Friedrich, Osterloh, Steffen, and Kalb, Alexander (2014) Sovereign risk premia: The link between fiscal rules and stability culture. *Journal of International Money and Finance,* 21, 110-127.
72. Hermes, Niels and Lensink, Robert (2003) Foreign direct investment, financial development and economic growth. Journal of Development Studies, 40 (1), 142-63.
73. Hicks, John (1969) A theory of economic history. Vol. 163. Oxford University Press, Oxford.
74. Im, Kyung So, Pesaran, M Hashem, and Shin, Yongcheol (2003) Testing for unit roots in heterogeneous panels. *Journal of econometrics,* 115 (1), 53-74.
75. Imbs, Jean (2006) The real effects of financial integration. *Journal of International Economics,* 68 (2), 296-324.
76. --- (2007) Growth and volatility. *Journal of Monetary Economics,* 54 (7), 1848-62.
77. Ireland, Patrick Richard (1994) The policy challenge of ethnic diversity: immigrant politics in France and Switzerland. Cambridge, MA. Harvard University Press.
78. Jeanne, Olivier M. (2003) Why do emerging economies borrow in foreign currency? International Monetary Fund, 3-177.
79. Jorgenson, Dale W. (1995) Productivity: International comparisons of economic growth Vol. 2, Mit Press.
80. --- (2005) Accounting for growth in the information age. Handbook of economic growth 1, 743-815.
81. Kaminsky, Graciela L and Reinhart, Carmen M (1999) The twin crises: the causes of banking and balance-of-payments problems. *American economic review*, 473-500.
82. Kaminsky, Graciela Laura and Schmukler, Sergio L (2008) Short-Run Pain, Long-Run Gain: Financial Liberalization and Stock Market Cycles. *Review of Finance,* 12 (2), 253-92.
83. Kindleberger, Charles Poor and Kindleberger, Charles P (1978) Government and international trade. International Finance Section, Department of Economics, Princeton University.
84. King, Robert G and Levine, Ross (1993) Finance and growth: Schumpeter might be right. *The quarterly journal of economics,* 108 (3), 717-37.

85. Kose, Ayhan M. (2004) Volatility and comovement in an integrated world economy: An exploration. In Horst Siebert ed., Mocroeconomic Policies in the World Economy, 89-122.
86. Kose, Ayhan, et al. (2009) Financial globalization and economic policies. Centre for Economic Policy Research.
87. Krugman, Paul (1988) Financing vs. forgiving a debt overhang. *Journal of development Economics*, 29 (3), 253-68.
88. Kumar, Manmohan and Woo, Jaejoon (2010) Public debt and growth. *IMF Working Papers*, 1-47.
89. Lamoreaux, Naomi R. (1994) Insider lending. Cambridge Books.
90. La Porta, R., Lopez-de-Silanes, F. Shleifer, A. and Vishny, R. (2002) Investor protection and corporate valuation.*Journal of finance*, 1147-1170.
91. Larrain, Borja (2004) Financial development, financial constraints and the volatility of industrial output. Public Policy Discussion Paper, 4 (6), Federal Reserve Bank, Boston.
92. Leon-Gonzalez, Roberto and Montolio, Daniel (2015) Endogeneity and panel data in growth regressions: A Bayesian model averaging approach, *Journal of Macroeconomics*, 46, 23-39.
93. Levine, Ross (1997) Financial development and economic growth: views and agenda. *Journal of economic literature,* 35 (2), 688-726.
94. --- (2005) Handbook of Economic Growth, Volume 1A, Elsevier.
95. Lucas, Robert E (1987) Models of business cycles. Basil Blackwell Oxford, 26.
96. Lucas Jr, Robert E (1988) On the mechanics of economic development. *Journal of monetary economics,* 22 (1), 3-42.
97. Mankiw, Gregory N. (1992). Macroeconomics. Harward University, NY.
98. --- (1995) The growth of nations. Brooking Papers on Economics Activities, 275-310.
99. Manning, Alan (2003) The real thin theory: monopsony in modern labour markets. *Labour Economics*, 10 (2), 105-31.
100. Myers, Stewart C., and Majluf, Nicholas S. (1984) Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics,* 13 (2), 187-221.
101. McKinnon, Ronald I (1973) Money and capital in economic development. Brookings Institution Press.
102. Meade, James E (1958) Is the national debt a burden? *Oxford Economic Papers*, 10 (2), 163-83.
103. Merton, Robert C. Bodie, Zvi (1995) A conceptual framework for analysing the financial environment. In: Crane D.G., et al. (Eds.), The Global Financial System: A functional Perspective. Havrard Business School Press, Boston, MA, 3-31.
104. Miller, Merton H (1998). Financial markets and economic growth. *Journal of Applied Corporate Finance*, *11*(3), 8-15.
105. Mink, Mark and De Haan, Jakob (2012) Contagion during the Greek sovereign debt crisis. *Journal of International Money and Finance*.
106. Minsky, Hyman P (1986) The evolution of financial institutions and the performance of the economy. *Journal of Economic Issues,* 20 (2), 345-53.
107. Missio, Sebastian and Watzka, Sebastian (2011) Financial contagion and the European debt crisis. CESifo working paper: Monetary Policy and International Finance.
108. Modigliani, Franco (1961) Long-run implications of alternative fiscal policies and the burden of the national debt. *The Economic Journal,* 71 (284), 730-55.
109. Moore, Michael C (1986) Elevated testosterone levels during nonbreeding-season territoriality in a fall-breeding lizard, Sceloporus jarrovi. *Journal of Comparative Physiology*

A, 158 (2), 159-63.
110. Newey, Whitney K and West, Kenneth D (1987) Hypothesis testing with efficient method of moments estimation. *International Economic Review*, 777-87.
111. Patrick, Hugh T (1966) Financial development and economic growth in underdeveloped countries. *Economic development and Cultural change*, 14 (2), 174-89.
112. Pattillo, Catherine A, Poirson, Helene, and Ricci, Luca Antonio (2002) External Debt and Growth. International Monetary Fund.
113. Popov, Alexander (2011) Financial liberalization, growth, and risk. *Growth, and Risk (January 15, 2011)*.
114. Popov, Alexander and Smets, Frank (2011) On the tradeoff between growth and stability: The role of financial markets. *VoxEU. org*, 3.
115. Prasad, Eswar S, Rogoff, Kenneth, Wei, Shang-Jin and Kose, AAyhan (2003) Effects of financial globalization on developing countries: Some empirical evidence. IMF Occasional Paper 220, International Monetary Fund, Washington.
116. --- Rajan, Raghuram G, and Subramanian, Arvind (2007) Foreign capital and economic growth. National Bureau of Economic Research.
117. Rajan, Raghuram G and Zingales, Luigi (1996) Financial dependence and growth. National Bureau of Economic Research.
118. Ramakrishnan, Ram TS, and Thakor, Anjan V. (1984) Information reliability and a theory of financial intermediation. *The Review of Economic Studies*, 51 (3), 415-432.
119. Reinhart, Carmen M and Rogoff, Kenneth S (2010) Growth in a Time of Debt. National Bureau of Economic Research.
120. Robinson, Joan (1952) The rate of interest and other essays. McMillan, London.
121. --- (1979) The generalisation of the general theory. The Generalisation of the General Theory and Other Essays. Palgrave Macmillan UK. 1-76.
122. Rodrik, Dani. (1998) Who needs capital-account convertibility? *Essays in international finance*, 55-65.
123. Rousseau, Peter L and Wachtel, Paul (2011) What is happening to the impact of financial deepening on economic growth? *Economic Inquiry*, 49 (1), 276-88.
124. Saint-Paul, Gilles (1992) Fiscal policy in an endogenous growth model. *The Quarterly Journal of Economics*, 107 (4), 1243-59.
125. Schumpeter, Joseph A (1911) 1934 *The theory of economic development*.
126. Shaw, Edward S (1973) Financial deepening in economic development. Oxford University Press New York, 39.
127. Sirri, Erik R., & Tufano, Peter (1995). The economics of pooling. *The global financial system: A functional perspective*, 81-128.
128. Shan, J. Z., Morris, A. G. and Sun, F. (2001) Financial development and economic growth. An egg and chicken problem? *Review of International Economics*, 9, 443-454.
129. Stern, Nicholas (1989) The economics of development: a survey. *The Economic Journal*, 99 (397), 597-685.
130. Stiglitz, Joseph E. (2002) Information and the Change in the Paradigm in Economics. *The American Economic Review*, 92 (3), 460-501.
131. --- (2000) Capital market liberalization, economic growth, and instability. *World development*, 28 (6) 1075-1086.
132. Stulz, René M. (1988) Managerial control of voting rights: Financing policies and the market for corporate control. *Journal of financial Economics* (20), 25-54.

133. Wachtel, Paul (2003) How much do we really know about growth and finance? *Economic review*, (Q1), 33-47.
134. Wei, Shang-Ji (2006) Connecting two views on financial globalization. Can we make further progress? Journal of the Japanese and International Economies, 20 (4), 459-481.
135. Williamson, Steve and Wright, Randall (1994) Barter and monetary exchange under private information. *The American Economic Review*, 104-123.

Figure 1. Distribution and Descriptive Statistics



	GDP (% change)	*Fin Growth (%ΔMCAP)*	*MCAP (% GDP)*	*Debt (% GDP)*	*Debt (% change)*	*Interest Rates*	*Revenue*	*Savings*	*Trade*	*CAB*	*Inflation*	*Expenditure*
Mean	0.0529	0.1235	0.6490	0.6119	0.0854	0.0514	1.97E+11	5.49E+09	3.25E+11	1.48E+09	0.0292	2.08E+11
Median	0.0482	0.1081	0.5275	0.5146	0.0618	0.0461	7.07E+10	1.26E+09	1.56E+11	-7.28E+08	0.0250	7.45E+10
Maximum	0.3123	1.6545	4.6200	3.8778	1.3540	0.2250	1.22E+12	8.00E+10	2.36E+12	1.99E+11	0.1530	1.22E+12
Minimum	-0.2289	-0.7302	0.0315	0.0633	-0.8386	0.0140	1.35E+09	-1.01E+11	5.63E+09	-1.05E+11	-0.0170	1.60E+09
Std. Dev.	0.0648	0.3880	0.5451	0.4869	0.1557	0.0232	2.92E+11	2.01E+10	4.15E+11	3.21E+10	0.0218	3.13E+11
Skewness	-0.0442	0.6552	2.0959	3.6013	2.4298	2.8621	1.8474	-0.1219	2.1470	2.5195	1.9693	1.8409
Kurtosis	5.6059	4.5790	11.5734	20.8301	23.8638	15.8147	5.2145	10.6485	8.1683	16.6138	8.8387	5.0984
Unit Root-Level	-3.71 (0.00)	-6.19 (0.00)	-1.59 (0.06)	2.06 (0.98)	-3.58 (0.00)	0.57 (0.72)	3.63 (0.99)	-3.64 (0.00)	4.24 (1.00)	-1.89 (0.02)	-6.13 (0.00)	5.01 (1.00)
Unit Root-1st Dif				-1.91 (0.03)		-3.49 (0.00)	-5.83 (0.00)		-7.74 (0.00)			-3.71 (0.00)

Figure 1 presents the histogram of the variables employed. The bars present the frequencies while the lines are the normalized empirical distributions. The table on the bottom of this figure presents the descriptive statistics of the variables employed, as well as the results of the Im et al. (1997) unit root test. The null hypothesis is that there is a unit root, either on the level or the first difference of the variables employed.

Figure 2. Economic Growth and Market Capitalization. Eurozone and National Currencies

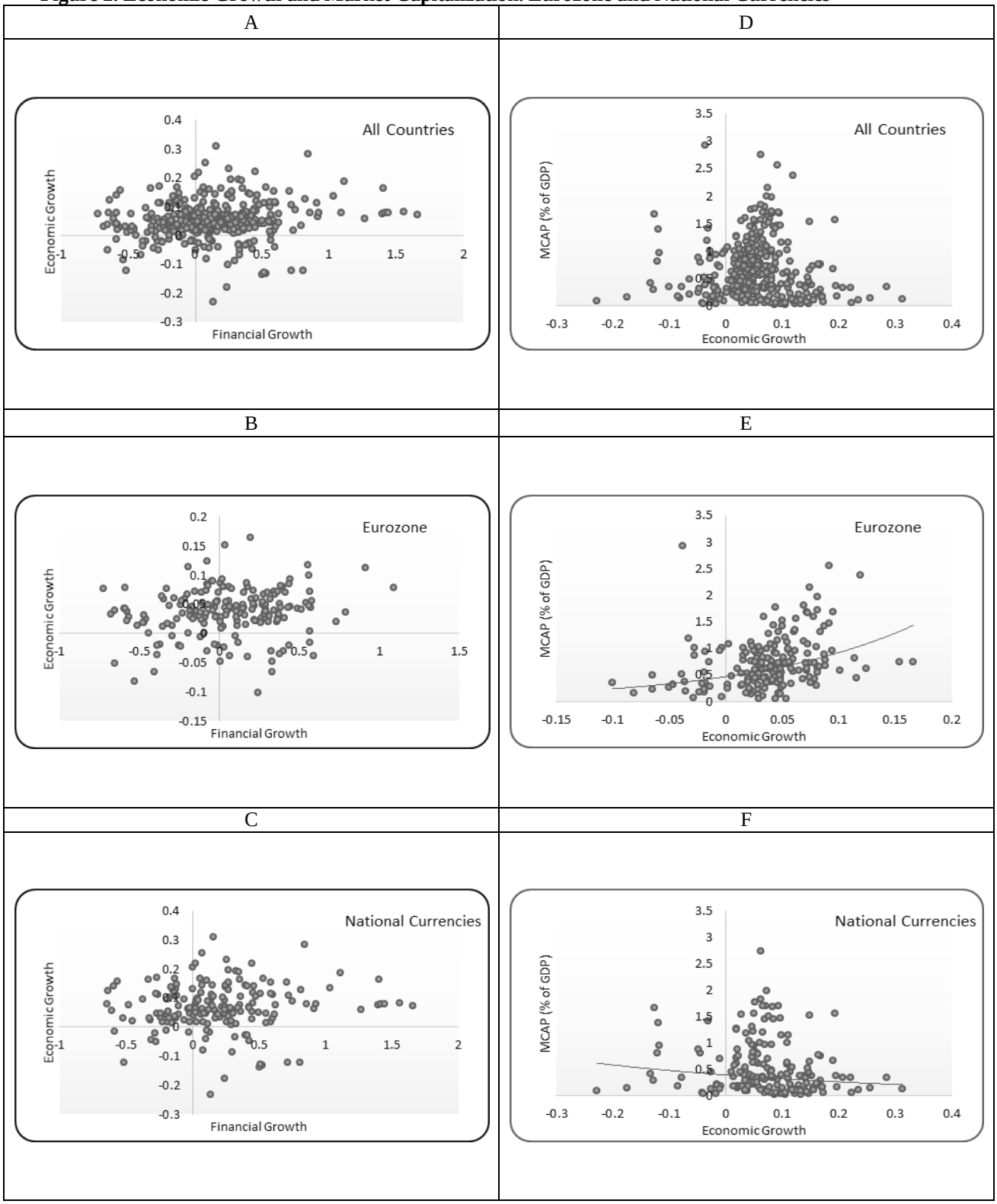
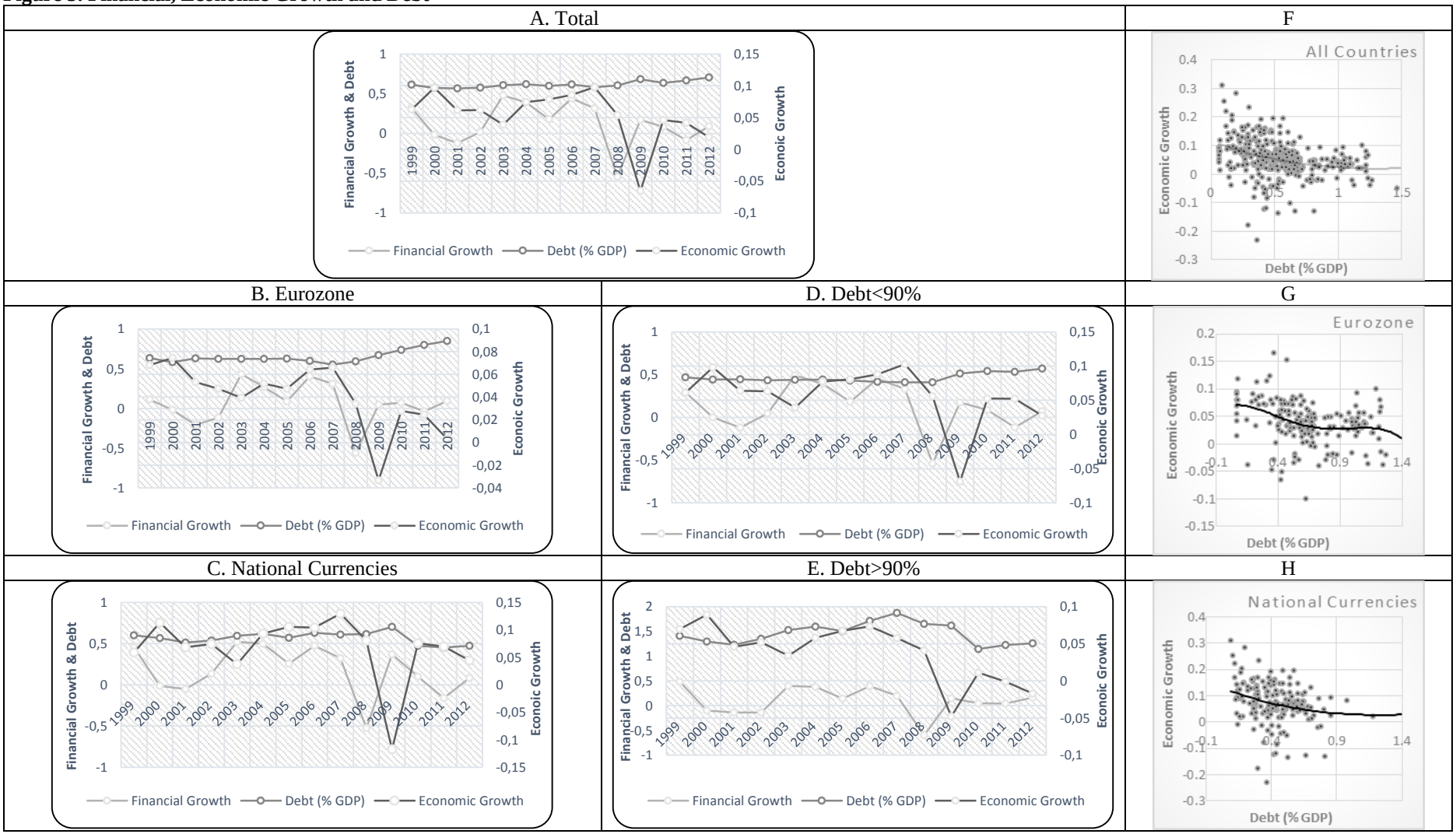


Figure 1 presents economic growth, defined as % change of GDP, over market capitalization, defined as MCAP as % of GDP, and financial growth, defined as % change of MCAP, across all countries, as well as across countries that have joined euro and countries that have kept their national currency. The last column presents the Granger causality test for GDP and MCAP.

Figure 3. Financial, Economic Growth and Debt



The first two columns of figure 2 present the average financial growth and economic growth, as well as the average level of depth over the sample period, dissected into two sub-samples; countries that have joined the euro and countries that have not, as well countries with debt levels higher than 90% and countries with less than 90%. The last column links economic growth and debt levels across sample, under national currencies and in the Eurozone.

Figure 4. Economic, Financial Growth and Debt Levels. Inter-relations

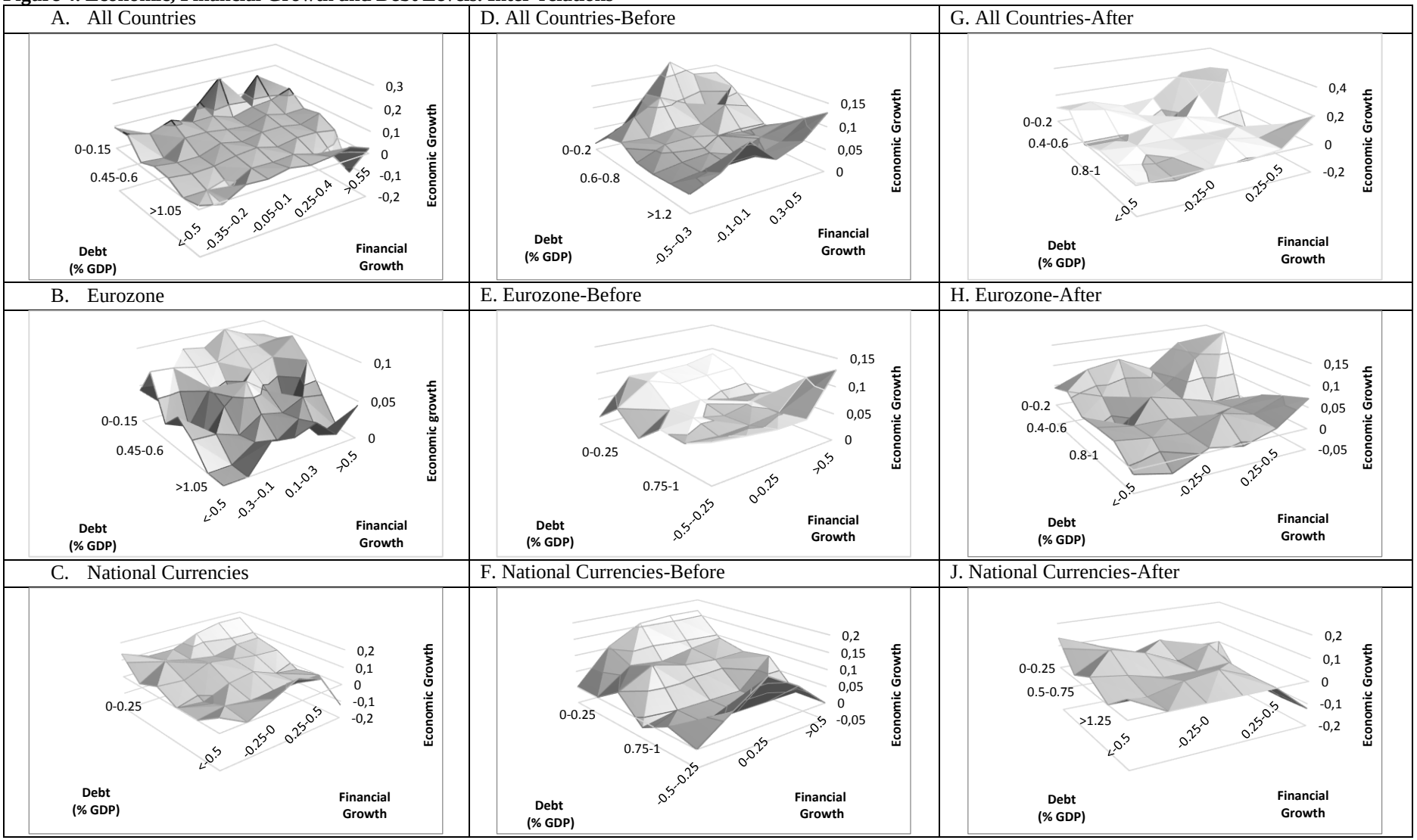


Figure 3 presents the average economic growth across different levels of debt and financial growth for all countries, Eurozone and countries with national currencies. The subsamples are further dissected into the period prior to and after 2008.

Table 1. Estimation Results

	Growth					Financial Growth					Debt Growth				
	Total		Before		After	Total		Before		After	Total		Before		After
Interc	0.1725	0.1792	0.1802	0.1852	0.1548	-0.5993	-0.4198	-0.6750	-0.6244	-0.4124	0.2060	0.2342	0.2408	0.2387	0.2175
	(4.76)	(4.74)	(4.29)	(4.09)	(3.17)	(-2.32)	(-1.56)	(-2.09)	(-1.82)	(0.31)	(1.49)	(1.64)	(2.44)	(2.1)	(1.61)
E	-0.0159	-0.0201	-0.0158	-0.0223	-0.01784	0.7433	0.8204	0.7952	0.8517	0.7763	0.0248	0.0197	0.1893	0.0221	0.0199
	(-1.24)	(-1.33)	(-1.20)	(-1.35)	(-1.29)	(3.01)	(3.14)	(3.09)	(3.21)	(3.11)	(2.11)	(2.17)	(2.10)	(2.37)	(1,97)
EU	-0.0052		-0.0064			0.1849		0.1634			0.0147		0.0148		
	(-0.93)		(-1.01)			(1.94)		(1.89)			(1.88)		(1.89)		
FG	-1.1301	0.0057	-0.7675	-0.0195	0.1901						-0.5576	0.1033	-0.2874	0.0769	0.1134
	(-1.67)	(0.34)	(-1.56)	(-1.51)	(2.6)						(-0.74)	(1.71)	(-0.37)	(1.17)	(0.45)
*FG*E*	0.0311	0.0313	0.0551	0.0513	-0.1548						-0.1450	-0.1325	-0.0280	-0.0531	-0.1838
	(2.53)	(2.46)	(3.33)	(2.83)	(-2.09)						(-1.88)	(-1.67)	(-0.29)	(-0.54)	(-0.75)
*FG*EU*	0.1544		0.1484								0.6883		0.3971		
	(1.71)		(1.52)								(0.91)		(0.51)		
G						-0.7069	0.7946	-0.8482	0.7171	0.9850	-0.1842	-0.0348	-0.3240	-0.4537	0.5095
						(-0.84)	(1.52)	(-0.94)	(0.79)	(1.37)	(-0.36)	(-0.12)	(-0.64)	(-0.92)	(0.96)
*G*E*						0.3015	3.4359	0.2750	3.3589	0.2758	0.2321	0.2349	0.2587	0.2577	0. 0877
						(3.13)	(3.39)	(2.75)	(2.01)	(2.21)	(5.06)	(4.96)	(4.21)	(4.15)	(1.21)
*G*EU*						0.801		0.9378			0.1814		0.2488		
						(2.04)		(2.03)			(1.94)		(2.05)		
DEB	-0.5076	-0.0251	-0.4615	-0.0709	0.0464	0.5008	0.6366	0.6839	0.9190	0.2404					
	(-2.08)	(-1.76)	(-2.61)	(-2.32)	(0.69)	(1.06)	(2.96)	(1.29)	(3.09)	(0.77)					
*DEB*E*	0.0075	0.0070	0.0190	0.0116	-0.0267	-0.5756	-0.5875	-0.4435	-0.4553	-0.4978					
	(1.95)	(1.94)	(2.27)	(2.72)	(-2.77)	(-4.73)	(-4.69)	(-2.22)	(-2.18)	(-3.33)					
*DEB*EU*	0.4863		0.3844			0.2582		0.4242							
	(2.01)		(2.18)			(2.57)		(2.89)							
*DEB*HD*	0.0221	0.0203	0.0380	0.0378	-0.0413	0.0268	0.0617	-0.2092	-0.1903	0.1920					
	(1.34)	(1.17)	(2.57)	(2.33)	(-2.37)	(0.24)	(0.53)	(-1.35)	(-1.17)	(1.22)					
Exp	-0.4183	-0.3956	0.2029	0.1915	-0.9926	0.4895	0.4379	0.186	0.5034	0.2062	-0.1832	-0.1846	-0.1870	-0.1478	-0.2757
	(-1.51)	(-1.37)	(0.69)	(0.59)	(-2.1)	(2.63)	(2.26)	(1.77)	(1.61)	(0.94)	(-1.83)	(-1.79)	(-0.5)	(-0.39)	(-1.44)
Rev	0.0839	0.0475	-0.3812	-0.4064	0.4025	-0.4599	-0.4241	-0.5361	-0.4835	-0.3220	0.3516	0.3146	0.1272	0.1549	0.4626
	(0.31)	(0.17)	(-1.36)	(-1.32)	(0.81)	(-2.59)	(-2.3)	(-1.91)	(-1.67)	(-1.33)	(3.43)	(3.28)	(1.07)	(1.04)	(3.47)
Sav	0.3908	0.3262	0.3989	0.3884	0.1937	0.3804	0.3633	0.5319	0.4665	-0.1794	-0.6771	-0.6556	-0.5671	-0.5793	-0.6765
	(1.26)	(1.01)	(1.32)	(1.18)	(0.34)	(1.82)	(1.69)	(1.81)	(1.49)	(-0.52)	(-6.98)	(-6.67)	(-3.73)	(-3.66)	(-4.46)
Trade						0.1946	0.1432	0.3977	0.3209	0.2193	-0.2560	-0.2554	-0.2640	-0.2555	-0.2855
						(1.93)	(1.38)	(2.63)	(2.05)	(1.54)	(-4.92)	(-4.81)	(-3.75)	(-3.54)	(-3.1)
CAB	0.0178	0.0124	0.0251	0.0160	0.0120										
	(1.21)	(0.81)	(1.73)	(1.03)	(0.39)										
IR	-0.0047	-0.0049	-0.0038	-0.0040	-0.0056	-0.0012	-0.0017	-0.0008	-0.0010	-0.0017	-0.0055	-0.0059	-0.0032	-0.0041	-0.0071
	(-2.97)	(-3.01)	(-2.14)	(-2.17)	(-3.21)	(-0.91)	(-1.01)	(-0.86)	(-0.90)	(-1.03)	(-4.85)	(-5.93)	(-3.98)	(-4.02)	(-5.78)
Inf	0.5111	0.4794	0.7033	0.6902	0.3609	-0.2522	-0.2091	-0.2169	-0.2075	-0.1589					
	(6.51)	(5.82)	(9.21)	(8.24)	(2.29)	(-4.46)	(-3.56)	(-2.25)	(-2.06)	(-2.42)					
J	3.08	5.76	7.14	6.07	4.55										
p	(0.80)	(0.45)	(0.31)	(0.41)	(0.60)										

Table 1 presents the estimation results for the model in equations (2.a), (2.b) and (2.c). Total refers to the full sample, while before and after include the estimation results for the periods prior to and after 2008. An additional column is added in the "Total" and "Before" sections, where the same models are estimated, excluding the EU dummy variable. All countries in the sample have joined the Eurozone by 2012, independently of their decision to join the euro. In order to avoid estimation problems, EU was excluded. *J*-statistics is reported in pairs for the total, before and after period. All estimations include dummy variables to account for time and country fixed effects.

Table 2. Robustness Test

	Equilibrium (GMM)			SUR Estimation		
	G	FG	DEBT	G	FG	DEB
Interc	0.1395	-0.4221	0.2257	0.1624	-0.4476	0.2136
	(5.16)	(1.99)	(1.54)	(5.11)	(-2.14)	(1.64)
E	-0.0478	-0.1591	0.1423	-0.0491	0.6395	0.0193
	(-1.96)	(-2.64)	(3.36)	(-1.91)	(3.46)	(3.61)
EU	-0.0045	-0.0026	-0.0433	-0.0050	0.1720	0.0160
	(-0.23)	(-1.56)	(0.66)	(-0.27)	(-1.55)	(1.73)
FG	-1.0091		-0.0723	-1.0604		-0.4281
	(-1.38)		(-0.69)	(-1.78)		(-0.43)
*FG*E*	0.0261		-0.2315	0.0302		-0.2264
	(2.10)		(-1.89)	(2.36)		(-1.92)
*FG*EU*	0.0817		0.2719	0.1641		0.2640
	(1.71)		(0.95)	(1.85)		(0.97)
G		-1.1429	-0.0883		-0.9447	-0.0674
		(-1.26)	(-0.45)		(-0.56)	(-0.11)
*G*E*		0.9257	0.3883		0.6226	0.4319
		(2.06)	(2.42)		(3.89)	(3.38)
*G*EU*		0.6651	0.1343		0.5089	0.1441
		(1.66)	(0.50)		(2.38)	(1.65)
DEB	-0.0443	0.4457		-0.4195	0.6429	
	(-1.75)	(1.71)		(-1.49)	(1.17)	
*DEB*E*	0.0918	-0.1850		0.0959	-0.2280	
	(2.91)	(-2.33)		(3.19)	(-2.97)	
*DEB*EU*	0.4115	0.8209		0.4045	0.5764	
	(2.46)	(2.66)		(2.01)	(2.59)	
*DEB*HD*	0.0092	0.1282		0.0163	0.0921	
	(1.41)	(0.91)		(1.46)	(0.91)	
Exp	-0.1492	0.2456	-0.2893	-0.2110	0.2381	-0.2912
	(-1.37)	(1.82)	(-2.13)	(-1.33)	(2.80)	(-1.75)
Rev	0.1337	-0.1008	0.4249	0.0904	-0.4752	0.4258
	(0.92)	(-2.58)	(4.87)	(1.41)	(-3.01)	(5.06)
Sav	0.3400	0.1906	-0.7069	0.3474	0.2562	-0.7103
	(2.05)	(2.43)	(-7.51)	(2.44)	(2.26)	(-7.83)
Trade		0.2757	-0.2821		0.1946	-0.2823
		(1.76)	(-5.65)		(1.83)	(-5.86)
CAB	0.0969			0.0369		
	(0.64)			(1.26)		
IR	-0.0043	-0.0002	-0.0067	-0.0040	-0.0001	-0.0071
	(-2.68)	(-0.01)	(-3.78)	(-2.73)	(-0.01)	(-4.43)
Inf	0.4244	0.2141		0.3093	-0.2109	
	(2.21)	(2.27)		(3.71)	(-2.33)	
Co-integration	0.0181	0.1501	0.0086			
	(2.89)	(2.62)	(0.37)			
J		2.38				
p		(0.88)				

Table 2 presents the estimation results of the model presented in equations (2.a), (2.b) and (2.c), with two alternative methods. The ne three columns present the estimation results employing the GMM method, where a cointegration term is added. The error correction term is computed as $u_{i,t} = \log(\text{GDP}) - c_0 - c_1\log(\text{MCAP}) - c_2\log(\text{Debt})$. The following three columns present the estimation results employing the SUR method, where the residuals are allowed to be cross-correlated, but they are i.i.d overall.

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Table 3. Correlation Matrix

T / T-1	E_1	E_2	E_3	E	EU	HD	G	E*G	EU*G	FG	E*FG	EU*FG	DEB	E*DEB	EU*DEB	HD*DEB	EXP	REV	SAV	TRADE	CAB	INF
E	0.00	-0.03	0.05	0.96	0.40	0.36	-0.27	0.48	-0.08	-0.15	-0.10	-0.18	0.38	0.79	0.48	0.36	0.36	0.28	-0.11	-0.08	0.10	-0.16
EU	0.00	-0.04	0.08	0.50	0.84	0.19	-0.31	0.28	0.10	-0.12	-0.06	-0.15	0.31	0.41	0.57	0.19	0.24	0.13	-0.23	-0.10	-0.01	-0.21
HD	-0.01	0.06	0.04	0.38	0.16	1.00	-0.07	0.25	0.00	-0.08	-0.07	-0.09	0.71	0.72	0.67	1.00	0.25	0.07	-0.31	-0.24	-0.16	0.00
G	-0.05	-0.07	-0.09	-0.24	-0.37	-0.07	0.75	0.00	0.15	-0.06	0.03	-0.04	-0.34	-0.24	-0.39	-0.07	-0.33	-0.16	0.31	0.19	-0.07	0.36
*E*G*	0.02	-0.06	-0.01	0.58	0.24	0.29	-0.04	0.75	0.08	-0.12	-0.09	-0.13	0.15	0.42	0.22	0.27	0.04	0.11	0.11	0.04	-0.06	0.10
*EU*G*	0.03	-0.14	-0.06	0.09	0.29	0.06	0.12	0.21	0.75	-0.11	-0.01	-0.13	-0.10	0.02	0.02	0.05	-0.16	-0.03	0.18	0.12	-0.07	0.23
FG	0.04	0.02	-0.03	-0.08	0.00	-0.09	0.35	0.17	0.33	0.72	0.13	0.22	-0.16	-0.13	-0.10	-0.10	-0.21	0.00	0.29	0.17	-0.03	0.26
*E*FG*	-0.01	0.06	0.00	-0.01	0.00	-0.07	0.16	0.29	0.17	0.15	0.72	0.16	-0.11	-0.08	-0.09	-0.08	-0.11	0.02	0.20	0.11	-0.02	0.14
*EU*FG*	0.03	-0.04	0.00	-0.06	0.04	-0.09	0.31	0.21	0.36	0.22	0.15	0.73	-0.10	-0.12	-0.07	-0.10	-0.14	0.01	0.23	0.17	-0.03	0.21
DEB	0.00	0.04	0.29	0.39	0.27	0.72	-0.25	0.20	-0.11	-0.08	-0.07	-0.06	0.99	0.76	0.90	0.72	0.53	0.25	-0.52	-0.47	0.03	-0.09
*E*DEB*	0.01	0.02	0.12	0.79	0.33	0.70	-0.23	0.39	-0.07	-0.12	-0.07	-0.13	0.74	0.97	0.76	0.71	0.45	0.26	-0.32	-0.38	0.08	-0.14
*EU*DEB*	0.00	0.02	0.20	0.53	0.55	0.68	-0.30	0.27	-0.03	-0.08	-0.08	-0.10	0.87	0.80	0.96	0.68	0.48	0.24	-0.47	-0.42	0.02	-0.18
*HD*DEB*	-0.01	0.06	0.14	0.37	0.16	1.00	-0.08	0.24	0.00	-0.09	-0.08	-0.09	0.71	0.73	0.68	1.00	0.26	0.07	-0.31	-0.25	-0.16	0.00
EXP	0.03	0.00	0.03	0.33	0.19	0.25	-0.27	0.11	-0.17	0.03	0.02	0.01	0.57	0.44	0.52	0.25	0.94	0.75	-0.34	-0.24	0.09	0.03
REV	0.01	-0.01	0.03	0.31	0.06	0.08	-0.19	0.15	-0.15	-0.03	-0.03	-0.09	0.22	0.26	0.20	0.07	0.74	0.97	0.27	-0.18	0.19	-0.02
SAV	-0.02	-0.03	-0.02	-0.04	-0.22	-0.29	0.16	0.05	0.05	-0.07	-0.05	-0.11	-0.59	-0.32	-0.57	-0.31	-0.32	0.25	0.90	0.18	0.08	0.00
TRADE	-0.05	-0.04	-0.04	-0.06	-0.06	-0.24	0.20	0.04	0.14	0.05	0.06	0.08	-0.48	-0.37	-0.43	-0.25	-0.25	-0.16	0.22	0.98	0.02	0.27
CAB	0.02	0.00	0.02	0.09	-0.04	-0.13	0.02	0.04	0.01	0.02	0.03	0.01	0.03	0.08	0.01	-0.14	0.03	0.21	0.18	0.05	0.96	-0.17
INF	-0.05	0.03	-0.04	-0.19	-0.29	-0.01	0.10	-0.13	-0.12	-0.05	0.01	-0.03	-0.10	-0.17	-0.20	-0.01	0.15	0.03	-0.09	0.21	-0.17	0.75
E_1	1.00	-0.04	-0.14																			
E_2	-0.04	1.00	0.09																			
E_3	-0.14	0.09	1.00																			
RESIDUALS																						
B-F-STAT COUNTRY	1.43	1.17	1.29																			
	(0.09)	(0.26)	(0.16)																			
B-F-STAT PERIOD	1.27	1.64	1.61																			
	(0.34)	(0.08)	(0.09)																			
UNIT ROOT-LEVEL	-4.01	-6.85	-3.32																			
	(0.00)	(0.00)	(0.00)																			

Table 3 presents the correlation matrix between the instrumental variables, the regressors and the GMM residuals, as well as the cross correlations of the GMM residuals. The variables in the columns are the regressors, while the variables in the rows are the instruments, i.e. the first lag of the regressors. The values for the residuals are the cross-correlations. In the bottom panel, residual diagnostics, from the full sample (Total) estimation results presented in Table 1, consist of the Brown-Forsythe (1974) test for cross-sectional and period heteroskedasticity and the Im et al. (1997) unit root test. The null hypotheses are variance equality and the existence of a unit root, respectively.