BANK OF GREECE

Financial Development and FDI Inflows

Evidence from Advanced Economies

Konstantinos Dellis
University of Piraeus

Contents

1. Introduction

The galloping forces of economic globalization have promoted a marked surge in global trade volumes, international mobility of products, factors and capital and a notable degree of harmonization in economic policies. This process has been emboldened by the overwhelming rise in Foreign Direct Investment (henceforth FDI), which is defined as cross-border expenditures to acquire or expand corporate control of productive assets. Over the past 35 years, the world FDI stock has increased from less than 1 trillion (or 6% of world GDP) to almost 25 trillion USD (or 33% of world GDP). The global financial crisis of 2008-2009 supressed international trade and capital flows, nonetheless FDI has picked up after 2014[1] and reached 1.52 trillion USD in terms of cross-border flows in 2017[2] (UNCTAD, 2018). The geography of FDI flows has shifted towards a greater participation of Emerging Economies after 2000, albeit with a pronounced concentration within this country groups. The share of on-OECD economies in global capital inflows surpassed that of EOCD economies for the first time in 2012. Regarding flows to the emerging markets, China accounts form more than 30% according to the most recent data. The global shift in trade and investment patterns has had a negative impact on the capital flowing to the European economy.

[1] Lane &Milesi-Ferreti (2017) highlight that, unlike portfolio investment, FDI has continued to rise even after the eruption of the Global Financial Crisis.
[2]Preliminary data taken from UNCTAD's *Investment Trends Monitor*.

Both the EU and the Euro-area have witnessed a sharp decline of their share after 2001, a development exacerbated by the financial crisis of 2008-09. The Euro-area accounts for less than 23% of FDI inflows in 2016 compared to 32% in 2002. The favourable data for EU in 2016 can be attributed mostly to one-off sizeable projects in the UK such as the SAB-Miller merger, with the preliminary data for 2017 pointing towards a "corrective" decrease in inbound flows. In Greece, in particular, FDI inflows have recorded a rather modest performance compared to regional averages and have been following EU and OECD patterns with a small time lag. The severe recession after 2009 further hampered the economy's attractiveness as a location for MNC investment, nevertheless developments after 2015 point towards resurgence of capital flows, (3.15 USD billion in 2016) which could invigorate the economic recovery.

In search for productivity growth and improvement of living standards many countries compete by providing incentives for external capital flows (Oman, 2000). This stems from the recognition of the pivotal role that FDI plays for economic growth. Foreign direct investment is considered beneficial for a country's integration in the globalized economy and represents a key source to finance capital investment to spur economic growth (see Campos and Kinoshita, 2008). In addition to increasing the domestic capital stock, foreign capital can exhibit a significant degree of complementarity with domestic capital, thus creating a "crowding-in" effect for local investment (Sekkat&Verganzones-Varoudakis, 2007). Both theoretical and empirical studies have confirmed the importance of FDI for the transfer of technology and know-how, human capital improvements, increasing competition and pushing for more positive development of firms, given appropriate host-country policies and a basic level of development (OECD, 2002). The presence of multinational firms can benefit domestic firms through backward or forward linkages (Javorcik, 2004). These channels, under the right conditions, can in turn be expected to make countries more competitive, productive and thus help stimulate their growth potential.

This paper contributes to the vast empirical literature of FDI determinants by elaborating on the effect of a deep and developed financial system on the attraction of foreign capital flows. On top of the traditional macroeconomic, geographic and social determinants, scholars have established a causal link between structural and institutional variables and inbound FDI flows (Benassy-Quere *et al.,* 2007; Antonakakis&Todl, 2010; Ciriaci*et al.,* 2016). The functioning of labour and product markets and the overall institutional and structural environment substantially affects the location decision of multinational corporations. In the same vein, the effectiveness of the financial system is a strong pre-requisite for attracting foreign capital according to Campos & Kinoshita (2008). To this end, this paper empirically tests the significance of no less than twenty five variables that capture the functioning of the financial sector, the money markets and the capital markets using an updated dataset for 30 OECD economies. A further contribution of this research is the inclusion of indicators

that were not available before 2015 and also the reliance on the most up-to-date data on FDI flows according to OECD BMD4 definition. The results clearly underscore that, after controlling for economic factors, the development of the financial market significantly attracts FDI for a potential host economy. This conclusion is robust to data and methodology modifications, thus providing insight towards shifting policy goals towards the restructuring and deepening of the money and capital markets especially in economies that exhibit a distance vis-à-vis best practices in the field.

The remainder of this paper is organized as follows: section 2 briefly summarizes the theoretical models for determinants of FDI with emphasis on the role of the financial sector development and presents a review of the recent empirical literature on the topic. The data used for the empirical estimations is described in section 3 whereas section 4 features the econometric results from the analysis and their implications for policy focusing on the case of Greece. The findings are summarized in the conclusion.

2. The Literature of FDI Determinants

2.1 Theory of International Investment

Identifying the determinants of FDI requires firstly the theoretical derivation of the motivation behind a firm's choice to invest abroad instead of relying on exporting goods and services or licensing a firm locates in a foreign economy. The implications of the neoclassical (Hecksher-Ohlin) model on international trade are that capital should flow to less capital intensive economies to exploit the difference in relative factor endowments (Sanchez-Martin et al., 2014). Nevertheless, as originally pointed out by Lucas (1990,1993) and validated by data on FDI flows (UNCTAD, 2014), capital movements at large took place between developed economies, contradicting the predictions of the neoclassical theory. The early work of Vernon (1966), Hymer (1976) and Buckley &Casson (1976) emphasized on the effect of imperfect markets for intermediate goods, which urged large enterprises to internalize. In the case when the frictions take the form of foreign country policies, tariffs or exchange rate movement it is imperative for the firm to internalize at the international level, thus becoming a Multinational Enterprise (MNE). A comprehensive synthesis of previous theories was the "Eclectic Theory"[3] developed by Dunning (1981) that distinguishes three sets of advantages that firms need to possess in order for FDI to be the dominant strategy. The theory spawned the Organization - Location - Internalization (O-L-I) paradigm after the three aforementioned sets of advantages, which has been highly popular as a basis for studying the determinants of FDI (Gastanga et al, 1998, Blonigen, 2005, Wernick et al., 2009).The economic,

[3]for a detailed description of the eclectic paradigm see Dunning (2001)

social and institutional attributes of a potential host economy shape the country's Location advantage and influence the Multinational's decisions in this theoretical context. Along these lines, the empirical research has strived to distinguish empirically which factors underpin the Location advantage of an economy and contribute to the allocation of foreign capital in the country.

The complex issues surrounding FDI location have spawned more sophisticated theoretical models that aim to model MNC behavior. In order to grasp the dynamics of international movement of capital, one must account for the purpose of FDI. Horizontal (or market-seeking) FDI refers to the effort to tap a new market for final products, while Vertical (or efficiency-seeking) FDI describes the MNC's aim to benefit from a set of cost advantages in the host economy. The *Knowledge-Capital* Model developed by Markusen*et al.* (2006) and Markusen (2007) is an attempt to merge the two types of FDI by accounting for divergence in skills between the source and the destination economy. The model incorporates the approach based on the *gravity* models of international tradeand accounts for geographical and economic distance, the cumulative economic activity and the skill differential whichis, in essence, the factor behind Vertical FDI. Scholars have been basing their empirical work in variations of theaforementioned models using unilateral and bilateral FDI data as we describe in Section 2.3

2.2 Financial Development and FDI

In the vein of the literature regarding the importance of structural and institutional determinants in the potential host economy, scholars have also intended to shed light on the role of the domestic financial sector in terms of depth, efficiency and harmonization to best international practices. In terms of the incentives of the parent company, financial development in the source economy is expected to have a positive effect for foreign investment. Insofar as the financial system of the source economy is more efficient and deep compared to that of the destination economy, the MNC has an advantage by having much greater access to credit (Desbordes& Wei, 2014; Donaubauer *et al.*, 2016). This preferential access to credit can be viewed as another organizational characteristic (considering the O-L-I paradigm) that distinguishes MNCs from domestic firms. On the other hand, host country financial system and its functions considerably affect local enterprises. At a first glance, this could appear irrelevant for FDI decisions since MNCs do not primarily rely on the domestic financial intermediaries for their investments. Nonetheless, as highlighted by Campos & Kinoshita (2008) they are affected by domestic financial conditions[4], which therefore affect their investment decisions. Having established the prominent role of structural reforms as FDI inflow

[4] The authors refer to this as the "Paradox of Finance".

determinants (Bennassy-Quere *et al.*, 2005; Blonigen&Piger, 2011) one line of thought recognizes the signaling effect posed by the reforms in the financial sector as part of the overall reform process of a host economy thus increasing the potential for MNC investment (Campos & Kinoshita, 2008). Moreover, the literature on FDI spillovers underscores the role of well-functioning financial markets in allowing domestic firms to benefit from MNC presence in the economy (Hermes &Lensik, 2003; Alfaro *et al*, 2003; Crespo &Fontoura, 2009). As a consequence, the higher the degree of productivity spillovers through vertical linkages, the higher the proportion of local suppliers capable of providing efficient inputs for MNCs (Campos & Kinoshita, 2008).

According to Desai *et al.* (2005), a developed stock market increases liquidity of listed companies and can reduce cost of capital for multinationals thus rendering the country attractive to international capital flows. The authors also recognize the importance of domestic credit restrictions and financial bottlenecks as the MNC affiliates raise a considerable share of their funds domestically. In that sense, less frictions and distortions in local financial markets act as a pull factor for FDI. The notion of capital controls also is of importance as it hampers profits repatriation which MNCs value, hence FDI flows are more likely to be diverted to economies with minimal or no restrictions (Desai *et al.*, 2005). The argument for reduced costs for MNCs in the presence of a developed financial sector is also presented in Henry (2000) who states that "First, if stock market liberalization reduces the aggregate cost of equity capital, then holding expected future cash flows constant, we should observe an increase in a country's equity price index when the market learns that a stock market liberalization is going to occur. The second implication is that we should observe an increase in physical investment following stock market liberalization, because a fall in a country's cost of equity capital will transform some investment projects that had a negative net present value (NPV) before liberalization into positive NPV endeavors after liberalization". The author also acknowledges the bi-directional causality between capital flows and financial market liberalization in the lines of Levine and Zervos (1998) in the sense that stock market liberalization attracts capital inflows which, in turn, reduce the risk-free rate and lower the cost of capital. Furthermore, the cost of lending is reduced as part of the risk is shared by foreign investors thus mitigating the risk premium.

On the other hand, according to Desbordes& Wei (2017) financial development in the destination country can act as a pull factor for FDI only if a substantial fraction of the MNC's capital is raised in the host economy or else it could provide the motive for greater substitution of foreign outsourcing for integration. In the latter case it could act as a deterrent for FDI. In addition, ease of access to finance is expected to benefit domestic firms as well, thus increasing competition in the host economy markets. This development can hinder expected profitability for MNCs and adversely affect investment decisions (Desbordes& Wei, 2017). Nonetheless, Fournier (2015) argues that

product market liberalization can act as a pull factor for FDI if it results into convergence with best practices and minimizes the distance with the country's peers. Increased competition in local markets is also an issue addressed by Bilir *et al*. (2013) who built a theoretical model that predicts capital flows away from these economies. Having said that, they posit that MNCs have an incentive to keep investing in these economies and channel their sales to the home economy or a third party thus increasing vertical and export-platform FDI (Yeaple, 2003; Ekhol *et al.*, 2007) to compensate for the decline in horizontal FDI. The effect of financial development on FDI flows is ambiguous according to the authors.

2.3 Empirical Literature

2.3.1 Economic Factors

Given the lack of a universal model for FDI, scholars in the empirical literature have included variables covering a wide spectrum of economic theory either focusing on a particular type of FDI (e.g. horizontal, vertical, R&D intensive etc.) or attempting a synthesis between theoretical models. In the words of Eicher et al. (2011) "a consensus on robust FDI determinants is still elusive" (p.1). Blonigen (2005) presents an elaborate survey of the prior literature and concludes that the complexity in the underlying relationships does not allow for broad generalizations based on anecdotal evidence. The complexity of the underlying interrelations is addressed in the meta-studies that deploy Bayesian Model Averaging (BMA) to establish causal relationships between the covariates that have been used in the empirical literature and the flow of FDI. Blonigen&Piger (2011) find that many of the independent variables use for empirical estimations do not yield a significant inclusion probability in the correct model for explaining FDI flows once a comprehensive set of FDI determinants is included. A similar conclusion is reached in the study by Eicher*et al*,,(2011) who, through the same statistical procedure, posit that model selection bias is common in many empirical studies, hence a large set of commonly used FDI determinants is not robust.

Traditionally, empirical studies are based on unilateral or bilateral FDI data in their effort to distinguish the robust determinants of foreign capital flows. The first group of studies focuses primarily on host country macroeconomic characteristics such as market size proxied by GDP (Gastanga, 2008; Antonakakis&Todl, 2010), the level of economic development through the use of GDP per capita (Busse&Hefeker, 2005, Campos & Kinoshita; 2008) and the pace of economic growth (Asiedu, 2002; Lee, 2006). The results regarding host country GDP are almost uniform, indicating that a substantial market matters for FDI decisions, corroborating the view of horizontal FDI. On the other hand, GDP per capita and GDP growth cannot be unanimously associated with

higher FDI flows as the two variables exhibit negative or insignificant correlation coefficients in a number of studies[5] (Wernick, 2009; Sekkat&Verganzones-Varoudakis, 2007; Asiedu, 2002; Habib &Zurawicki, 2002). The macroeconomic stability of the host economy has also been controlled for through the inclusion of inflation (the level or the standard deviation of the variable) and exchange rate volatility. High levels of inflation discourage FDI flows according to Campos & Kinoshita (2008), however do not appear to significantly affect MNC decisions in the work of Buse&Hefeker (2005). In their meta-analysis using Bayesian Model Averaging, Antonakakis&Todl find compelling evidence on the negative effect of inflation volatility (approximated by the standard deviation of inflation) on inward FDI flows. Furthermore, taxation on corporate profits and in general is considered to deter investment as it dampens expected future profitability. The negative effect is empirically established in the recent study by Delli*et al.* (2017) who use the ratio of tax revenues to GDP. Gastanga *et al*. (1998) find that taxation becomes detrimental after a certain threshold whereas Wei (2000) estimates that a one percentage point increase in the tax rate reduces FDI flows by 4,8%. Having said that, anecdotal evidence has long encouraged the hypothesis that MNCs seek low labor costs mostly for the purpose of vertical FDI. Nevertheless, the data strongly reject this conclusion with FDI flows predominantly confined among developed economies up until the year 2000 (OECD, 2002). The latter trend towards emerging economies has been mostly due to institutional and reform factors (Grigonyte, 2010) which will be addressed too. Nonetheless, there are studies that reveal a negative relationship between unit labor costs and inbound FDI (Bevan & Estrin, 2004; Demekas*et al*, 2005; Delli*et al.*, 2017) indicating that low production costs matter *inter alia* for the location choice faced by a multinational. Finally, trade openness measured as the sum of exports and imports over GDP has been placed under scrutiny regarding its connection to FDI flows. Drawing from the Internalization part of Dunning's (1981) O-L-I paradigm, one would expect a negative relationship between the two variables. It would appear less cumbersome for a company to export its products to an economy already highly dependent on international trade. On the contrary, if the purpose of the investment selling back to the origin country or to a third economy (export-platform FDI) then the level of integration of the domestic market into the global economy will act as a significant pull factor for MNCs to divert their capital. The validity of this argument is emboldened by the increased importance of Global Value Chains for trade and economic growth (World Bank, 2017). In accordance with this view, several papers conclude that more 'open' economies attract higher shares of global FDI flows (Schmitz, 2009; Albuquerque *et al*, 2005; Sekkat&Verganzones-Varoudakis, 2007).

[5]Antonakakis&Todl (2010) provide a detailed review on FDI determinants.

2.3.2 Institutional Factors

In search of the deeper structures that FDI flows can be attributed to, scholars have been casting light on an array of institutional variables to complement the economic variables described above. Following the pioneering work of Wheeler &Mody (1992) who included 13 variables that captured "domestic risk and policy" factors, a rich theoretical and empirical literature has emerged to encompass institutional quality and structural reform. Wheeler &Mody (1992) deployed principal component analysis (PCA) to show that the host country's legal system, quality of bureaucracy, income inequality, the attitude towards foreign investment and stability in the labor market matter for MNC decisions. The emergence of new datasets and concepts in the field has assisted economists to investigate the multifaceted effect of institutions on FDI flows. In their salient work, Benassy-Quere*et al* (2005) deploy a wide array of institutional variables drawn from the Worldwide Governance Indicators (World Bank) database, the French Ministry of Finance Network, the Fraser Institute and the World Development Indicators. Their approach is based on a gravity model with bilateral FDI flows including institutional distance between the origin and the host economy in some specifications. The data point to an overwhelming positive effect of reforms and institutional quality on FDI highlighted by the fact that 73 out of 75 variables used are significant. A fair number of empirical studies have established the exceptional role of infrastructure both for developing as well as developed economies in their search for inward FDI flows (Grigonyte, 2010; Alam& Shah, 2013; Demekas*et al*., 2005; Walsh & Yu, 2010). Apart from the wage costs discussed above, the overall functioning and flexibility of labor markets appears to attract capital flows (Walsh & Yu, 2010; Ciriaci*et al.*, 2016; Dellis*et al.*, 2017) as do competitive and well-functioning product markets (Benassy-Quere*et al.*, 2005; Ciriaci*et al.*, 2016; Canton & Solera, 2016).

2.3.3 Financial Factors

At a prominent place among the institutional determinants of FDI flows, according to recent research papers, lies the development of the domestic financial system. The concept of financial development is multi-dimensional and captures the depth of money and capital markets, the availability of funding through traditional and nontraditional sources such as venture capital, the depth of the stock market, the strong position of commercial banks and the existence and pervasiveness of capital and exchange controls. Given the recent turbulence in the financial system of many advanced and emerging economies, the improvement of the institutional quality in order to attract foreign capital flows poses as a major challenge.

The channels through which the relationship between financial development and FDI flows is culminated are diverse. Firstly, structural reform of the financial system and adherence to best practices acts as signal for commitment to reform and institutional quality improvement which

drives FDI flows as discussed in section 2.3.2 (Campos & Kinoshita, 2003). Despite the fact that MNC funding is systematically provided in the origin country, a considerable share of affiliate funding is through domestic financial markets, therefore frictions in the financial system increase the cost of financial capital thus affecting FDI decision adversely (Desai et al, 2005). In addition, profit repatriation restrictions commonly associated with capital controls reduce availability of profits at home; hence deter FDI flows to the domestic economy (Desai et al, 2005). Desai et al., (2005) also underscore that a well-developed stock market increases liquidity of listed companies and can reduce cost of capital thus rendering the country attractive to FDI, and, in the same vein, Henry (2000) argues that "[...] if stock market liberalization reduces the aggregate cost of equity capital, then holding expected future cash flows constant, we should observe an increase in a country's equity price index when the market learns that a stock market liberalization is going to occur". According to the same study, stock market liberalization through the diminishing cost of equity capital can turn the net present value (NPV) of certain investment projects positive, thus making investment in the host economy more attractive. Finally, there is rich literature that demonstrates the dependence of positive FDI spillovers on the functioning of the financial system (Alfaro *et* al., 2003; Hermes &Lensik, 2003; Crespo &Fontoura, 2009). When positive vertical spillovers are generated, the availability and quality of domestic suppliers for MNC inputs increases creating a favorable environment for potential investment endeavors (Campos & Kinoshita, 2003). The aforementioned mechanisms serve to explain n what Campos & Kinoshita (2008) call the "Paradox of Finance"; that is the fact that although MNCs are not locally financially constrained, their affiliates have substantial interactions with the domestic financial system.

This train of thought has spawned a growing empirical literature in the attempt of scholars to identify and quantify the effect of host country financial development on FDI inflows. An influencing study on Latin American and transition economies by Campos & Kinoshita (2008) uses a dense set of indicators from the World Bank's Financial Structure Dataset to gauge their impact of FDI flows as a percentage of GDP. Controlling for potential endogeneity of the reform variables with the implementation of the System GMM estimator (Blundel& Bond, 1998), the researchers confirm that financial liberalization attracts foreign capital flows. Both composite indicators that cover financial development and financial efficiency yield positive significant estimators, pointing to the importance of reform in the financial sector. Shmitz (2009) focuses on the financial determinants of FDI for 29 emerging economies by examining data from 1989 to 2007 and using indices from the EBRD *Transition Report*. Beyond the depth of the financial sector based on bank deposits from commercial banks, the paper includes an index of financial integration with the EU, measures of financial liberalization and a binary variable to control for the eruption of a banking crisis. The results point towards the positive impact of sound financial institutions on foreign capital

flows; more specifically, the enhancing effects of financial liberalization and the share of foreign owned banks are statistically significant and robust across all econometric estimations.

The bi-directional causality between financial reform and FDI flows is placed under scrutiny in the study by Sumare&Tchana-Tchana (2009) who use data on 29 emerging economies from 1994 to 2006 and exploit indicators from World Bank's *Financial Structures Dataset* and the IMF's *International Financial Statistics*. In order to do so, the deploy Panel Vector Auto Regression (VAR) techniques and use Granger Causality tests to establish the direction of the causal effect. Moreover, the estimate a system of two equations with three-stage least squares (3SLS) between Stock Market Development and FDI flows and Banking Sector Development and FDI flows. While the VAR(2) model yields inconclusive results on the nature of the underlying interrelationships, the results from the 3SLS methodology provides evidence for a significant causal effect of Stock Market Development on FDI inflows. A similar conclusion is reached by Otchere*et al*. (2011), who find strong evidence of bi-directional causality between a range of indicators capturing stock market development and FDI flows. In addition, banking sector indicators also appear to attract capital flows contrary to the findings of Sumare&Tchana-Tchana (2009). In their recent research, Blundell &Wignall (2017) estimate a gravity model for 54 country pairs for the period spanning form 1997 to 2012 to determine the financial determinants of bilateral FDI flows. Liberalization of the financial sectors is approximated by the Chinn-Ito index (Chinn & Ito, 2015; 2017) for which high values indicate fewer restrictions and frictions in the financial system. Controlling for size, distance, corruption, trade openness and country-pair fixed effects, the scholars find compelling evidence for the decisive role of financial openness in the destination country in spurring bilateral capital flows.

3. Data and Descriptive Statistics

3.1 FDI flows and Macroeconomic Variables

According to the OECD (2015) FDI is defined as "the establishment of a lasting interest in and significant degree of influence over the operations of an enterprise in one economy by an investor in another economy". We rely on OECD's database on *FDI Statistics according to Benchmark Definition 4th Edition (BMD4)* for our data on FDI. The updated dataset is based on data from Central Banks and Statistical Offices following the recommendations of the 6th edition of IMF's *Balance of Payments and International Investment Position Manual* (BPM6). The new database distinguishes between all units operating in a host economy and resident Special Purpose Entities (SPEs) in order to effectively gauge real multinational enterprise activity. Although a formal definition of SPEs remains elusive we can briefly identify them as legal entities controlled by a non-resident parent with little or no employment and production and marginal physical presence in the host economy (OECD, 2015). In the likely event that an affiliate in one host economy is merely use to pass through capital[6] before reaching the final recipient then the resulting data on FDI will be biased upwards. In addition, the new vintage of OECD data on FDI does not account for investment between *Fellow Enterprises*.Debt that passes through affiliates of the same parent company, which is identified through the implementation of the *Ultimate Controlling Parent*[7] definition, should not be included in the FDI flows more than once after the initial flow as it would cause double-counting. For all estimations the dependent variable is Inward FDI flows[8] measured in millions of US dollars. We refrain from working with FDI positions, also known as FDI Stock due to the fact that data on FDI stock suffer from discrepancies between book and market value. On top of that, intertemporal comparisons are easier to draw when usingFDI flows. Primarily, the data that exclude SPEs are used; however this constraint is relaxed for the purpose of robustness checks.

The independent variables used as the set of controls follow Delli*set al.* (2017) and include real GDP (2010 purchasing power parity), total tax rate as a percentage of profits tax revenues as a percentage of GDP, trade openness measured as the sum of exports and imports over GDP and unit labor costs in the form of an index taking the value of 100 in 2010, all coming from the OECD database, except for the tax rate that is extracted from the World Bank *Doing Business* Report and measures the amount of taxes and mandatory contributions payable by businesses after accounting

[6]OECD (2015) also coins the terms *pass-through capital* and *capital in transit* to describe such entities.
[7]Ultimate controlling parent (UCP): the entity proceeding up the affiliate's ownership chain that is not controlled by another entity (that is, owned more than 50%).

[8]The variable captures net total FDI inward flows which include debt, equity and reinvestment of earnings.

for allowable deductions and exemptions as a share of commercial profits. Finally, the stock of FDI measured in millions of US dollars is used as an additional regressor in a series of specifications and is taken from the OECD database with the same rules applying as described for the FDI flows.To capture the impact of the multifaceted aspects of the financial system we proceed to include no less than 25 variables covering financial depth, financial market and stock market development and governance in the banking and financial sector. The next section provides with the definitions, sources and short descriptions of these variables.

3.2 Financial Variables

There is no unique variable that encompasses all the attributes that constitute financial sector development. According to Schmitz (2009), financial development consists of two critical concepts; financial deepening and financial liberalization. He states that "Financial liberalization refers to a lower degree of government involvement, and a subsequently more market based financial system. Financial deepening, on the other hand, refers to increases in volumes of markets (such as increases in market capitalization and liquidity)". The two notions cannot be fully and efficiently conceptualized by a single observable factor. As a consequence, scholars have relied on a wide range of quantitative variables and indicators to quantify the reform and efficiency of a country's financial system. The same approach is carried out in this research effort, where no less than twenty-five variables are included separately in the baseline specification for the determinants of FDI flows. The variables at hand are drawn from different financial databases and aim to cover as many of the aspects that shape an economy's financial development as possible. Firstly, we rely on the well-known *Financial Structures Database* compiled by the World Bank to draw quantitative variables that capture the depth of the financial system, namely Liquid Liabilities (llgdp) and Bank Deposits (bdgdp) as a ratio of GDP, Deposit Bank Money Assets as a ratio of total assets (dbacba) and Private Credit by Deposit Money Banks (pcrdbgdp)[9]. The same source provides us with data on Stock Market Capitalization (stmktcap) and Private Bond Market Capitalization (prbond) (both as fractions of GDP) and, finally, Bank Concentration (concentration) measured as the share of the three largest banks' assets to total banking sector assets. All other financial variables are indicators compiled by esteemed institutions as, for example, the IMF' s *Financial Development Database.* We make use of the composite headline indicators that measure overall Financial Development, quality of Financial Institutions and Financial Markets. In addition, we also take advantage of the decomposition provided by the database and include indices for efficiency, depth and access

[9]Detailed description, measurement and sources for all financial variables are found in the Appendix.

regarding Financial Institutions and Financial Markets[10].

A very useful index that measures financial openness and the prevalence of restrictions and controls in financial operations is compiled by Chinn & Ito (2015; 2017). The authors base their work on IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)* and construct an indicator with high values representing more open capital account transactions. In addition, the aggregate index for Financial Markets and the sub-index for Financial Markets Efficiency from the *Global Competitiveness Report* (World Economic Forum) are included as explanatory variables. In order to capture more specific characteristics of the financial systems we also use the indices for Sound Money, Venture Capital availability and Access to Loans from the same report. The indicator for Sound Money based on surveys from the Fraser Institute is among the list of regressors and so is the index for Access to Credit from the World Bank's *Doing Business Report*.

3.3 Descriptive Statistics

The original dataset comprises of 39 advanced and emerging economies covering the time period from 2005 to 2016[11]. The main variable of interest to capture international capital flows is Net Financial Inflows for a given host economy measured in millions of USD. The variable is attained from the updated OECD Database under Benchmark Definition 4 (BMD4) which controls for Special Purpose Entities. The same source is relied upon for data on FDI stock (FDI position) which is used as an independent variable in a number of specifications. The main control variables are drawn from the OECD database and described in Section 3.1. Table 3.3.1 shown below outlines the basic descriptive statistics regarding these variables.

[10]For a discussion see Svirydzenka(2016).

[11]The full list of countries is tabulated in the Appendix.

Table 3.3.1: FDI and Control Variables

variable	mean	median	min	max	sd
FDI Net Inflows (non SPEs)	21827.6	6751.675	-28265.6	476684	55869.49
FDI Stock	506606.5	147486.6	4688.727	6555622	1094558
GDP Constant Prices	1649801	413103.4	11678.11	18231550	3129326
GDP Growth Y-o-Y	2.339205	2.356708	-14.7244	25.55729	3.690429
Tax Revenues % GDP	33.46316	33.049	12.649	49.583	7.23501
Tax Rate % Profits	43.882	45.124	19.8	76.7	13.324
TradeOpenness	1.0015	0.847044	0.246199	3.613015	0.578671
Unit Labour Costs	99.43872	100	49.43758	162.5947	10.08852

Regarding the estimations presented in Section 4, the number of countries in the panel diminishes as 9 countries lack data on FDI inflows net of SPE activity[12]. One must also keep in mind that there is only one observation of such data for the case of Switzerland and two observations for Estonia and Sweden. For comparison and robustness purposes, Section 4 reports econometric estimation results based on data for all units as well.

The core of this paper is the impact of financial structures on inbound FDI flows. To this matter we use variables and indicators from a plethora of sources to capture the multiple aspects of the financial system. Table 3.3.2 below provides with summary statistics for the 25 variables and indicators described in Section 3.2.

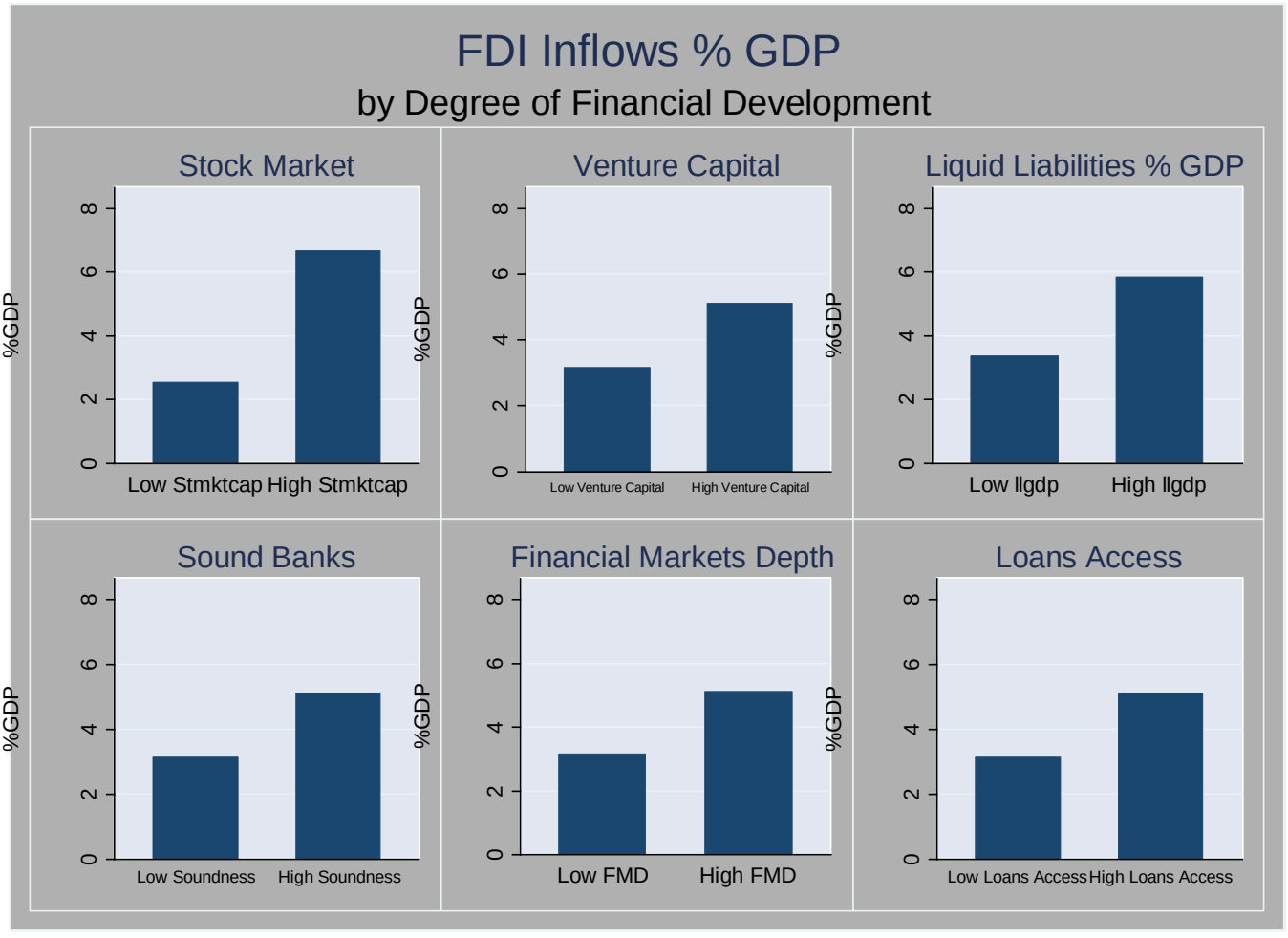
[12]Australia, Brazil, Canada, China, Indonesia, Ireland, Russia, United Kingdom and Israel.

Table 3.3.2: Financial Development Variables

variable	mean	median	min	max	sd
Financial Development Index	0.669036	0.695718	0.263526	1	0.172324
Financial institutions index	0.732105	0.743227	0.289525	1	0.153224
Financial markets index	0.598171	0.612733	0.025898	0.99998	0.248824
Financial institutions depth	0.605815	0.645018	0.115695	1	0.246727
Financial institutions access	0.576361	0.524662	0.100464	1	0.224098
Financial institutions efficiency	0.71797	0.738783	0.335127	0.889373	0.102851
Financial markets depth	0.590791	0.631492	0.048059	1	0.275801
Financial markets access	0.535267	0.560753	0	1	0.296338
Financial institutions efficiency	0.640146	0.702345	0.00148	1	0.344423
Chinn-Ito Index	1.760294	2.374419	-1.19473	2.374419	1.050767
Liquid liabilities %GDP	87.80991	75.06671	23.29291	399.1144	53.36047
Deposit money bank assets	96.98389	99.07286	71.86236	99.99907	5.133231
Private credit %GDP	99.82773	93.33949	14.97368	262.4581	47.88812
Stock Market Capitalization %GDP	65.14788	54.11451	3.728726	265.1282	46.67501
Private Bond Market Cap	39.77121	31.16606	0.001785	197.1345	36.83737
Bank concentration	65.82762	64.55107	29.85913	100	18.79833
Bank deposits %GDP	79.70857	64.72929	19.92317	479.6728	61.99727
Private credit by banks %GDP	92.26786	89.84466	12.98923	262.4581	44.29261
Sound money	9.222891	9.491677	4.843934	9.88672	0.708267
Financial market	4.655098	4.65141	2.523974	6.169314	0.665354
Financial efficiency	4.269808	4.343746	2.238308	5.813813	0.698096
Sound banks	5.438786	5.604472	1.444742	6.89599	1.012828
Venture capital	3.335265	3.322683	1.704493	5.278317	0.794276
Access to loans	3.481305	3.492012	1.56991	5.74359	0.918652
Access to credit	67.21217	68.75	15	100	17.85667

A first inspection of the role of financial structures on FDI flows stems from the descriptive statistics. Splitting the sample into high and low performing economies, derived from their financial variable score relative to the sample mean we can observe some interesting cross tabulations. For the vast majority of the variables outlined in Table 3.3.2 above, countries with high performance attract a significantly greater amount of FDI flows both in absolute terms and as a percentage of GDP. For example, above average stock market capitalization results into four percentage points of GDP more foreign capital flows. Figure 3.1 reveals a similar pattern for six of the financial variables[13]. That said, the importance of the financial variables in determining FDI flows is formally tested in Section 4.

Figure 3.1: Financial Structures and FDI Inflows



[13] The pattern is evident in 22 out of the 25 selected variables.

3.4 Methodology

Given the nature of our data we estimate the determinants of FDI inflows in levels using unilateral data. In all specifications, the level of FDI inflows in logarithmic form is the dependent variable[14] and we use a small set of four control variables in favor of a more parsimonious model. Each Financial Development indicator is included as an FDI determinant, thus yielding twenty-five panel data estimations for each specification. The baseline econometric model is the following:

$$\log(FDI)_{it} = \beta_0 + \beta_1 \log(GDP)_{it} + \beta_2 \text{tax}_{it} + \beta_3 \log(open)_{it} + \beta_4 \text{ulc}_{it} + \beta_5 \text{finance}_{it} + u_{it}$$

Before entering the regressions, the data on FDI flows are tested for stationarity through a set of Panel Unit Root tests. Looking at the individual time series for the countries with rectangular data sets (data for all 12 years) we cannot detect a linear time trend, hence the null hypothesis of the presence of a unit root is tested against second order stationarity. The results are described in Section 4.1. In order to tackle potential endogeneity issues stemming from the hypothesized reverse causality between FDI flows and macroeconomic variables such as GDP and trade openness we deploy instrumental variables techniques, more specifically a two-step GMM estimator where two lags are used as instruments for the endogenous regressors[15]. In the two-step GMM procedure the efficient or optimal weighting matrix is the inverse of an estimate of the covariance matrix of orthogonality conditions. This approach eliminates problems that could arise from the presence of heteroscedasticity. The financial variables are also treated as endogenous in another set of estimations following Donaubauer *et al* (2006), who argue that significant FDI flows can act as catalysts for reform in the receiving sectors. Since the financial sector is a major recipient of FDI flows in the sample, we test this hypothesis by including each financial indicator in the endogenous set of regressors and applying a *Difference in Sargan* Test[16] for the endogeneity of a specific set of variables.

In order to assess the robustness of the results we apply a number of alternate specifications and econometric approaches. Firstly, in line with many empirical papers (Campos & Kinoshita, 2003;

[14] To avoid discarding the few negative flows, we estimate the model with the level of FDI inflows as a robustness check.
[15] GDP, tax revenues and openness.
[16] See Baum (2008)

2008; Sanchez-Martin *et al.*, 2014) we include the lagged value of FDI inflows as an independent variable to construct a dynamic panel data set. This equation is then estimated via System GMM (Arellano &Bover, 1995; Blundell & Bond, 1998), which is preferred to the more traditional Difference GMM estimator (Arellano & Bond, 1991) due to the fact that the time dimension is small and the high persistence in the dependent variable[17]. Another set of regressions addresses the issue of spatial persistence of FDI flows by incorporating the value of FDI stock (FDI positions) in the set of independent variables. Moreover, we include year-fixed effects and country-fixed effects to capture unobserved factors at play as well as an indicator for Euro-area participation and the eruption of the financial crisis. Finally, following Blanchard &Acalin (2016), we exclude data for countries that exhibit a high correlation of FDI inflows and outflows. According to the authors, a significantly positive correlation coefficient is an indicator for pass-through capital that does not exert economic influence to the destination country.

4. Results

4.1 Baseline Regressions

This section sheds light to the empirical results regarding the determinants of FDI in the OECD economies. The dependent variable in all specifications is inward FDI flows measured in millions of dollars excluding Special Purpose Entities (SPEs) according to the OECD BMD4 classification.
Firstly, we fit the baseline model using the net FDI inflows of non-SPEs as the dependent variable (in logarithmic form). The main control variables are real GDP in PPP, tax revenues as a percentage of GDP, unit labor costs and trade openness defined as the ratio of imports plus exports over GDP, following Dellis *et al*. (2017). The econometric estimations consist of Pooled OLS, Random Effects estimation as well as Instrumental Variables estimation, namely the two-step GMM estimator. In this case, the endogenous variables (GDP, trade openness and tax revenues) are instrumented with their first two lags. The addition of the lagged FDI inflows term as a regressor requires the System GMM approach (Arellano & Bover, 1995; Blundell & Bond, 1998) and is presented in the first column of Table 4.1.1 that follows. The coefficients have the expected signs in line with the

[17] For a detailed assessment of dynamic panel data methods see Bond et al. (2001).

relevant theoretical and empirical literature and are statistically significant except for the one for tax revenues.

Table 4.1.1 Baseline Specification

	System GMM	**Pooled OLS**	**Random Effects**	**Two Step GMM**
VARIABLES	log FDI	log FDI	log FDI	log FDI
log FDI (-1)	0.290**			
	(0.042)			
log GDP	0.786***	1.084***	1.060***	1.069***
	(0.000)	(0.000)	(0.000)	(0.000)
Tax revenues	-0.026	-0.015	-0.020	-0.014
	(0.110)	(0.277)	(0.384)	(0.390)
ULC	-0.024***	1.440***	1.434***	1.366***
	(0.000)	(0.000)	(0.000)	(0.000)
log Openness	1.078***	-0.017	-0.029***	-0.001
	(0.003)	(0.114)	(0.002)	(0.959)
Constant	-0.424	-2.801**	-1.085	-4.340**
	(0.736)	(0.039)	(0.560)	(0.024)
Observations	158	198	198	161
R-square		0.580	0.571	0.560
Number of countries	22	25	25	22
Sargan-Hansen Statistic	138.9			3.271
Arellano Bond AR(1) Test P-value	0.0168			
Arellano Bond AR(2) Test P-value	0.095			
Anderson CCStatistic				154.2
Endogeneity Statitsic				9.001

Robust pval in parentheses

*** p<0.01, ** p<0.05, * p<0.1

It is important to note that before running the estimations we look at the time series properties of the variables in question, namely FDI inflows. More specifically, we deploy Panel Unit Root Tests to determine the stationarity of net FDI inflows. In order to include as many tests as possible we restrict the dataset to ten countries[18] and twelve years to construct a balanced panel which is fit for all unit root tests provided by the Stata 15 Software. Looking at the individual time series graphs for

[18] Chile Czech Republic France Greece Latvia Mexico Poland Portugal Turkey United States

the ten economies (see Appendix A16**)** it is safe to assume that a trend term is not required in the alternative hypothesis of the unit root tests. We specifically employ the Im-Pesharan-Shin test (IPS) which indicates the use of two lags in the process following the Schwarz-Bayes and Akaike information criteria. The test statistic leads to a rejection of the null hypothesis of a unit root in the series at the 5% level of significance. Moreover, we also utilize the Levin-Lin-Chu (LLC) test and the Breitung test procedures, which corroborate our findings and conclude that the FDI inflows are stationary. The IPS test does not make the restrictive assumption that all panels share the same autoregressive coefficient as do both the LLC and Breitung tests[19]. Detailed results are presented in Table A3 in the Appendix.

4.2 Financial Structures and FDI Flows

The next step is to include the first set of financial reform variables. The model is estimated for each of the financial development variables both with System GMM and static IV-GMM approaches. In the initial results a good proportion of financial indicators appear to significantly attract FDI flows. More specifically, the composite index for financial development from the IMF has a positive and significant effect as well as the financial markets index. The results from the two-step IV-GMM estimator with no dynamic term in the right-hand side include more significant indicators. Table 4.2.1 casts importance to the coefficients of the financial variables under four different specifications. Looking at the individual semi-elasticities, we can note that a percentage point increase in the liquid liabilities as a fraction of GDP can enhance inbound FDI flows by 0.5%, a result almost identical to the effect of a point increase in bank deposits as a percentage of GDP. The headline Financial Development Index compiled by the IMF exhibits a robust and substantial pull effect on capital flows. A percentile point increase in the index is associated with a rise in FDI inflows by more than 2%, other things being equal. The depth of financial institutions and financial markets as measured by the indices from IMF's *Financial Development Database*appear also to cause a surge in FDI flows to the host economy by close to 2% for a percentile point improvement.

[19] See Hlouskova& Wagner (2006) for a discussion on Panel Unit Root tests.

The empirical evidence at hand signals the importance of deep capital markets in influencing investment decisions. In all specifications, a percentage point increase in stock market capitalization is expected to spur a growth in FDI flows by 1 to 1.5%. On the other hand, there is no evidence for the importance of private bond markets in the process.

The *Sargan Test* statistic for all the regressions fails to reject the null hypothesis of validity of the chosen instruments, thus corroborating the use of the first two lags as instruments for the endogenous variables. Furthermore, the *Anderson CC Test* is a test for the first stage of the IV-GMM estimation and examines the correlation of the instruments with the endogenous regressors. The reported statistics point towards the rejection of the null hypothesis that the instruments are not correlated with the excluded endogenous variables; as a result, we can infer that our choice of instruments is valid. Finally, in all specifications we deploy a *Difference-in-Sargan* test to ex-post determine the endogeneity of the variables treated as endogenous. In all estimations summarized in Table 4.2.1 we reject the null hypothesis of exogeneity which validates the treatment of the economic determinants of FDI as endogenous.

Table 4.2.1 Financial Variables Coefficients

Financial Variable	IV	System GMM	IV - Year Effects	IV- Country Cluster SE
Financial Development Index IMF	2.504**	2.413*	2.392**	2.186*
Financial institutions index	1.210	1.715	1.415	0.550
Financial markets index	1.755**	1.385	1.550**	1.699**
Chinn-Ito Index	0.145	0.061	0.121	0.133
Liquid liabilities %GDP	0.004**	0.004	0.005***	0.004
Deposit money bank assets	-0.042	-0.045**	-0.054**	-0.047
Private credit %GDP	0.006***	0.005	0.007***	0.005
Stock Market Capitalization %GDP	0.014***	0.015***	0.013***	0.014***
Private Bond Market Capitalization %GDP	-0.001	-0.001	0.001	-0.001
Financial institutions depth	2.014***	1.840**	1.930***	1.906**
Financial institutions access	-0.656	-0.258	-0.524	-0.638
Financial institutions efficiency	-1.192	-0.206	-0.678	-3.148
Financial markets depth	1.903***	1.737***	1.894***	2.059***
Financial markets access	0.246	0.201	0.345	0.310
Financial institutions efficiency	-0.125	-0.234	-0.574	-0.367
Bank concentration	-0.006	-0.007	-0.005	-0.011
Bank deposits %GDP	0.004***	0.004**	0.005***	0.005**
Private credit by banks %GDP	0.002	0.001	0.004	0.001
Sound money (Fraser Institute)	-0.420	0.065	-0.174	-0.769**
Financial market (WEF)	0.559***	0.415***	0.522***	0.580***
Financial efficiency (WEF)	0.651***	0.541***	0.669***	0.673***
Sound banks (WEF)	0.230**	0.136	0.133	0.250***
Venture capital (WEF)	0.643***	0.582***	0.673***	0.639***
Access to loans (WEF)	0.432***	0.358***	0.430***	0.435***
Access to credit (WB)	-0.003	-0.004	-0.006	-0.011

All four control variables maintain their sign and significance in the vast majority of specifications. In the case of the System GMM estimator there is strong indication of the significance and positive coefficient of the lagged FDI flows indicating a degree of persistence in the direction of capital flows in the same vein as Walsh & Yu (2010) and Sanchez-Martin (2014). Despite that fact, our baseline estimation for this exercise is the (static) IV estimator with the use of the two-step procedure with two lags used as instruments for the endogenous variables. Year fixed effects have been included in the estimations shown in Column 3 of Table 4.2.1, however this does not

contradict the findings of the basic IV estimation. The final column controls for potential heteroscedasticity stemming from unobserved country characteristics by using cluster Standard Errors at the country level. Notably, Liquid Liabilities as a percentage of GDP do not appear significant as in Column 1 and the index of Sound Money exhibits a negative significant effect. Other than that, the deduction that sound financial structures act as FDI determinants cannot be disputed under any different specification. In all regressions the Arellano-Bond serial correlation test leads to the rejection of second order autocorrelation and the non- rejection of autocorrelation in the first differences as expected. No autocorrelation for the differenced error terms implies that the original error terms follow a random walk (Greene, 2003), whereas second order autocorrelation would imply misspecification in the model.

Another source of robustness is the inclusion of the relevant financial variable along with GDP, trade openness and tax revenues in the subset of endogenous variables to control for potential reverse causality between FDI and financial development[20]. The argument is grounded in the sense that foreign capital flows, especially if allocated to the financial sector can lead to financial development and improvement of existing structures (Donaubauer*et al.*, 2016).Moreover, foreign capital flows are expected to facilitate the reform process which includes financial sector reform. The results[21] clearly indicate that the financial variables that act as pull factors for FDI inflows remain largely intact and corroborate the conclusions of the initial estimates. Nonetheless, the results for the *Difference-in-Sargan* test that captures the potential endogeneity of a subset of variables indicate that the financial variables are best treated as exogenous giving vigor to the estimations described in Table 4.2.1.

4.3 Additional Robustness Checks

4.3.1 Inflow-Outflow Correlation

According to Blanchard & Acalin (2016) an issue that needs to be addressed when evaluating global capital flows is the existence of patterns indicating that capital can simply pass through the country without having direct impact in the economy that appears as the recipient. Under this scenario, these flows do not efficiently measure FDI inflows in that host country. The authors propose looking at individual country inflows and outflows in order to establish such practices.

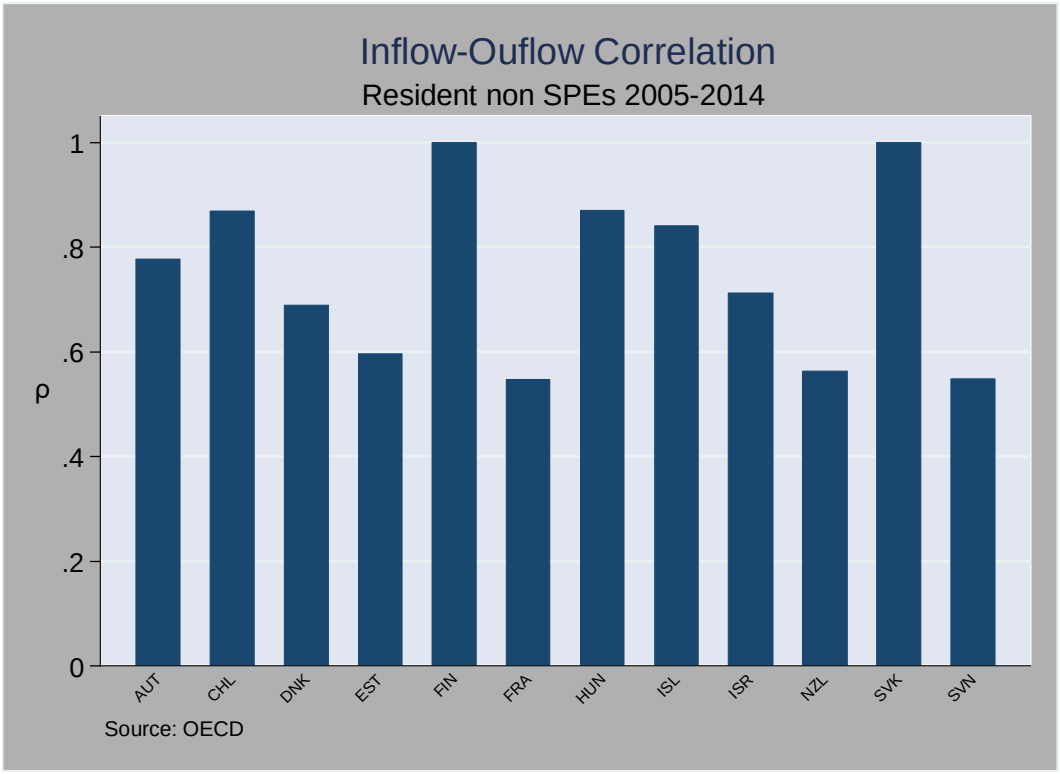
[20]Campos & Kinoshita (2008) also account for potential bi-directional causality between FDI flows and structural reform.

[21] Not tabulated here but available upon request

More specifically, a high correlation coefficient between contemporaneous inflows and outflows is a clear indicator of capital simply passing through the economy. We calculate the Pearson correlation coefficient for the countries in the sample and find substantial co-movement in inflows and outflows even after controlling for the presence of SPEs in the FDI data. Figure 4.1 in the illustrates this fact; therefore we run the baseline estimations excluding observations for Austria, Chile, Denmark, Hungary, Iceland and Israel[22]. The results from the two-step GMM estimation outlined in Table 4.3.1 fully corroborate the finding presented in the first column of Table 4.2.1. The conclusions on the role of financial development as an FDI determinant remain unchanged.

[22]The figure shows a unity coefficient for Finland and Slovakia, however there is only two data points available for these two countries.

Figure 4.1: FDI Inflow-Outflow Correlation



4.3.2 Crisis Indicator and Old FDI data

The same conclusions can be drawn once an indicator variable for the financial crisis of 2009 is introduced in the specification. The second column of Table 4.3.1 describes the results for the financial variables once the effect of the crisis in the advanced economies is controlled for in the form of a dummy variable capturing the period after 2009. The sign and significance of the coefficients show notable persistence; on the other hand one could underline the difference in magnitude for some indicators. For example, the effect of the financial markets index (IMF) is less pronounced once we account for the crisis and pre-crisis period and so is the case with the indicator that captures the depth of financial institutions (IMF). The comparison with the "old" FDI data that account for all units including resident SPEs yields some fruitful results. As can be observed in the third column of Table 4.3.1, relying on the data for all operating units as our FDI inflows measure can lead to the conclusion that a largest share of the financial indicators can be recognized as a significant determinant of foreign capital flows. Namely, Access to Financial Markets and the Efficiency of Financial Institutions appear positive and statistically significant at the 1% and 5%

level respectively. Moreover, the concentration of commercial banks is shown to hinder FDI flows to the host economy whilst yielding insignificant results in the other specifications. These observations, coupled with the differences in the magnitude of the coefficients compared to the baseline estimation are yet another argument for the use of the updated FDI data to control for these shell companies. The structural transformation and modernization of the financial system is a policy target insofar as it attracts MNCs that will exert economic influence at the destination economy and create the productivity spillovers discussed above.

The empirical embodiment of the tax system as a determinant of FDI inflows has proven to be a cumbersome task, reflected in the contradicting results regarding the sign and significance of the chosen tax variables[23].We complement the baseline specification with the substitution of the total tax rate as a percentage of profits instead of the tax revenues as a percentage of GDP. Nonetheless, the data availability is more compressed in this case with 187 missing values compared to 82 in the case of tax revenues.The results for the two-step GMM specifications yield a strongly significant negative coefficient for the tax rate in line with Yeaple (2003) and Ciriaci *et al.* (2016). Moreover, the financial variables retain at large their magnitude and significance when cast next to the baseline results with the exception of Private Credit as a percentage of GDP and the Depth of Financial Institutions which do not appear to exert a statistically significant effect on FDI inflows.

[23]See, for example, Devereux & Griffith (1998) or Azemar&Desbordes (2009).

Table 4.3.1 Robustness Checks

Financial Variable	Excluding High Inflow Outflow Correlation	CrisisDummy	FDI AllUnits
Financial Development Index IMF	2.473**	2.404**	4.086***
Financial institutions index	0.923	1.247	3.012***
Financial markets index	2.013***	1.647**	3.238***
Chinn-Ito Index	0.139	0.125	0.275*
Liquid liabilities %GDP	0.004**	0.004***	0.008***
Deposit money bank assets	-0.051*	-0.049*	-0.025
Private credit %GDP	0.011***	0.007***	0.012***
Stock Market Capitalization %GDP	0.014***	0.013***	0.013***
Private Bond Market Cap. %GDP	0.010	-0.001	0.003
Financial institutions depth	2.836***	1.974***	2.745***
Financial institutions access	-0.994*	-0.630	-1.005*
Financial institutions efficiency	-2.504	-0.991	1.697
Financial markets depth	2.007***	1.915***	2.914***
Financial markets access	0.203	0.264	1.221***
Financial institutions efficiency	0.330	-0.333	1.182**
Bank concentration	-0.008	-0.005	-0.012*
Bank deposits %GDP	0.004***	0.005***	0.010***
Private credit by banks %GDP	0.004	0.003	0.007**
Sound money (Fraser Institute)	-0.428	-0.190	-1.014**
Financial market (WEF)	0.566***	0.527***	0.887***
Financial efficiency (WEF)	0.676***	0.662***	0.955***
Sound banks (WEF)	0.176*	0.157	0.332***
Venture capital (WEF)	0.663***	0.684***	0.905***
Access to loans (WEF)	0.434***	0.429***	0.663***
Access to credit (WB)	0.008	-0.004	-0.007

4.3.3 More Control Variables

The empirical evidence on FDI flow determinants rigorously support the impact of a wider set of host country variables, namely structural and institutional indicators. We complement our results by broadening the set of control variables described in Section 4.1 with variables that capture the structural and institutional performance of the economies. Specifically, we control for the quality of infrastructure (Demekas *et al*, 2005; Alam& Shah, 2013; Walsh & Yu, 2010) using the World Economic Forum Index for *Infrastructure Quality*, government effectiveness (Wernick *et al*, 2009; Adjide& Raheem, 2016) via the World Bank's *Worldwide Governance Indicators*, labor market liberalization (Ciriaci *et* al, 2016; Dellis *et* al, 2017) proxied by the OECD *Employment Protection Legislation* Index and efficiency in the goods market using the indicator from WEF *Global Competitiveness Report*. The included variables have the expected signs with positive coefficients for governance, infrastructure quality and goods market efficiency and negative for the employment protection legislation index (since high values imply more stringent labor markets). Turning to the financial development variables, one can observe robust results for ten variables appearing as FDI determinants. Perhaps not surprisingly, the inclusion of institutional indexes has rendered the IMF composite indicators (overall financial development, financial markets and financialinstitutions) insignificant. On the other hand, variables gauging specific attributes of the financial system such as liquid liabilities and stock market capitalization show stability in their magnitude and significance and confirm the role that financial structures play in the attraction of foreign capital. The results are summarized in table 4.3.2.

Table 4.3.2 Economic and Institutional Controls

Financial Variable	Infrastructure Quality, Governance	Infrastructure Quality, Governance, EPL	Infrastructure Quality, Governance, EPL, Goods Market
Financial Development Index IMF	0.907	0.972	0.528
financial institutions index	0.877	1.499	0.951
financial markets index	0.416	0.238	0.074
Chinn-Ito Index	-0.196	-0.163	-0.192
liquid liabilities %GDP	0.008***	0.008***	0.007***
deposit money bank assets	-0.045	0.007	0.048
private credit %GDP	-0.005	-0.005	-0.004
Stock Market Capitalization	0.014***	0.014***	0.013***
Private Bond Market Capitalization	-0.006**	-0.006**	-0.006*
financial institutions depth	-0.315	-0.236	-0.411
financial institutions access	0.466	0.836	0.598
financial institutions efficiency	5.795**	6.953***	5.601**
financial markets depth	1.200*	1.245*	1.182*
financial markets access	0.300	0.148	-0.273
financial institutions efficiency	-0.521	-0.558	-0.289
bank concentration	-0.017**	-0.016*	-0.012
bank deposits %GDP	0.007***	0.007***	0.006***
private credit by banks %GDP	-0.005	-0.005	-0.004
sound money (Fraser Institute)	-0.276	-0.418	-0.284
financial market (WEF)	0.681**	0.693**	0.455
financial efficiency (WEF)	0.730***	0.874***	0.720**
sound banks (WEF)	0.293*	0.346**	0.203
venture capital (WEF)	0.701***	0.766***	0.631**
loans access (WEF)	0.408**	0.561***	0.407*
access to credit (WB)	-0.006	-0.011	-0.009

4.4 Policy Implications

The results presented and described in Section 4.2 provide an insight for policy action for economies competing for FDI. Drawing from a rich and diverse set of institutional variables and using a parsimonious group of control variables, we find ample evidence to support the necessity and relevance of improved financial structures in order to influence MNC location decisions. Fostering the recovery of fragile financial institutions, mainly commercial banks, is of utmost importance for countries that have been hit hard by the financial crisis. In the Eurozone, for example, restoring confidence in the banking system through decisive action to reduce the burden of Non-Performing Loans (NPLs) could act as a signal for more favorable financing conditions for MNC affiliates, thus directing FDI flows to the domestic economy. In the case of Greece, resolution of the commercial banks' balance sheets is the number one challenge as identified by the Bank of Greece in the 2017 *Governor Report* (Bank of Greece, 2018).

Re-building trust in the financial system through the implementation of necessary reforms[24] will help bring back deposits to the formal financial sector and create the preconditions for capital flows. In the case of Greece and other financially distressed European economies, the tackling of Non-Performing Loans (NPLs) is a policy priority for the restoration of trust in the banking system. In the ECB's *Financial Stability Review* (2017) it is stated that "The challenge of resolving the large stocks of NPLs weighing on bank balancesheets is currently to the fore in European policy discussions"**.**According to the Report, the improvement in the diminishing of the stock of NPLs has been modest. Bold reforms in the area of NPL sales in order to lift the burden from the financial intermediaries are required with strong support from the public sector within the distressed countries. The results in Sections 4.2 and 4.3 corroborate the view that private credit provided by banks and unhindered access to loans for corporates are FDI-enhancing; therefore strengthening the banks' balance sheets can act as a pull factor for foreign capital transfer.This issue is pressing; however it is not the single impediment in the sound functioning of the financial sector in OECD economies. A series of malfunctions and bottlenecks is acknowledged by the European Institutions in the case of the EU and, to this end, the European Commission and the European Central Bank are working towards the finalization of the *Banking Union*, which aims at restoring confidence in the

[24]The ECB's *Financial Stability Review* (2017) lists "[…] achieving economies of scope and scale via consolidation, diversifying sources of income and taking advantage of the opportunities offered by digitalization" as policy priorities for the banking sector.

European banking system. The results in the previous section strongly point towards the importance of a resilient financial system for the flow of international capital.

The aforementioned conclusions are in line with one of the main policy targets outlined in the IMF's *Global Financial Stability* Report (2017) which highlights that "Policymakers and regulators should fully address crisis legacy problems and require banks and insurance companies to strengthen their balance sheets in advanced economies. This includes putting a resolution framework for international banks into operation, focusing on risks from weak bank business models to ensure sustainable profitability, and finalizing Basel III". That said, policymakers should keep in mind that the rapid de-regulation preceding the financial crisis had adverse effects on the stability of the financial system. Hence, the liberalization process aiming at dismantling rigidities should be coupled with the implementation of necessary regulations and safety nets (IMF, 2017). In addition, the emergence of financial institutions depth as a robust determinant in the results highlights the importance of private sector credit and pension fund assets[25]for the availability of diverse sources of funding for domestic enterprises (ECB, 2017). Working towards amplifying the set of institutions able to provide capital contributes to efficient and flexible domestic corporations, which in turn can collaborate with MNCs and deliver economic growth. As stated in Section 2.2 the existence and quality of domestic clients and suppliers skews foreign capital towardsthe host economy.

The findings also underscore the pivotal role of financing and access to credit when it comes to the direction of MNC capital. The negative impact of credit constraints that followed the sovereign debt crisis in the Euro-zone on corporate investment is highlighted in a recent study by the ECB (2018). Companies in the EU face significant constraints in external finance as financial institutions undertake creditrationing as a response to the financial turmoil of the last decade. The urgency to alleviate these frictions in order to spur investment is underscored in the study, thus acknowledging yet another link between financial sector operation and investment.Table 4.2.1 depicts the enhancing effect that access to loans has on FDI flows and, more importantly, the impact of venture capital availability. Despite the fact that MNCs are not spatially constrained in terms of financing their operations, the subsidiaries primarily aim to tap domestic sources of finance. Venture capital has gained strength especially when it comes to ambitious and risky projects that could induce positive spillovers for the host economy. It is, therefore, pivotal to facilitate and encourage the functioning of vehicles of venture capital to complement traditional financing. Taking stock on the innovative role that SMEs play for the Greek economy, the availability for capital through loans, venture capital or the stock market is essential for the dissemination of the technology and

[25]The indicator includes private credit, pension fund assets, mutual fund assets and insurance premia as a percentage of GDP (Svirydzenka, 2016).

knowledge spillovers concomitant with MNC presence. Ample financing opportunities for domestic firms create a fostering environment for multinationals through the formation of efficient suppliers and clients thus encouraging investment projects.

5. Conclusion

In this paper we have attempted to gauge the impact of Financial Market Development on the magnitude of inbound FDI flows among advanced economies. In order to do so we use the updated data for FDI flows according to OECD's BMD4 definition to control for the role of Special Purpose Entities (SPEs) as well as an array of financial structure indicators from the World Bank, the IMF , the World Economic Forum and the Fraser Institute .Theory on MNC location preferences states that, although parent companies rely on external financing, their affiliates are closely intertwined with the financial system of the recipient economy (Campos & Kinoshita, 2008). Financial transactions, soundness of the banking system, unhindered access to credit matter, *inter alia,* for the goals of the multinational corporation once it decides to engage in any form of FDI. Apart from being a part of an all-encompassing reform effort, it can provide MNCs incentives for investment through creating a favorable financing environment for the transactions of their subsidiaries.

It is therefore, critical to examine and quantify the impact of multiple attributes of the domestic financial system on the flow of FDI. A variety of Instrumental Variables (IV) econometric techniques is deployed in order to control for potential endogeneity of the economic and reform variables and the results provide ample evidence for the importance of sound financial indicators and deep money and capital markets for the attraction of FDI flows. More than half of the proposed measures of financial development prove to be significant determinants of FDI flows, a conclusion that holds under different specifications, samples and econometric approaches. Financial Development matters for FDI both when measured at the aggregated and disaggregated level. The depth of the financial markets and the ease of access to credit stand out as robust determinants of foreign capital flows once we control for a compact set of economic variables widely used in the empirical literature. The results underline the pressing need of financial reform, especially in countries experiencing structural rigidities and crisis-hit financial institutions if they wish to establish themselves as major recipients of FDI. Having said that, it is documented in the literature that the level of financial development not only attracts MNC particpation but also acts as a catalyst for the productivity spillovers attributed to FDI.

6. References

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Appendix

Table A1: Original Country Set

Brazil	Denmark	Italy	Portugal
Indonesia	Estonia	Japan	SlovakRepublic
Russia	Finland	Korea	Slovenia
Australia	France	Latvia	Spain
Austria	Germany	Luxembourg	Sweden
Belgium	Greece	Mexico	Switzerland
Canada	Hungary	Netherlands	Turkey
Chile	Iceland	NewZealand	UnitedKingdom
China	Ireland	Norway	UnitedStates
CzechRepublic	Israel	Poland	

Table A2: Financial Variables

Variable	Unit	Description	Source
FinancialDevelopmentIndex	0-1 (=more financial openness)	Aggregate Indicator	IMF[26]
FinancialInstitutionsIndex	0-1 (=more financial openness)	Aggregate Sub-Indicator	IMF
FinancialMarketsIndex	0-1 (=more financial openness)	Aggregate Sub-Indicator	IMF
FinancialInstitutionsDepth	0-1 (=more financial openness)	Private Sector Credit to GDP, Pension fund assets to GDP, Mutual fund assets to GDP, Insurance premiums (life + non-life) to GDP	IMF
FinancialInstitutionsAccess	0-1 (=more financial openness)	Bank branches per 100,000 adults and ATMs per 100,000 adults	IMF
FinancialInstitutionsEfficiency	0-1 (=more financial openness)	Net interest margin, Lending-deposits spread, Non-interest income to total income, Overhead costs to total assets,	IMF

[26]International Monetary Fund: *Financial Development Database.*

		Return on assets, Return on equity	
FinancialMarketsDepth	0-1 (=more financial openness)	Stock Market Capitalization to GDP, Stocks traded to GDP, International debt securities of government to GDP,Total debt securities of financial corporation to GDP, Total debt securities of nonfinancial corporation to GDP	IMF
FinancialMarketsAccess	0-1 (=more financial openness)	Based on the percentage of market capitalization outside of top 10 largest companies to proxy access to stock markets, Total number of issuers of debt	IMF
FinancialInstitutions Efficiency	0-1 (=more financial openness)	Stock market turnover ratio (value traded/stock market capitalization)	IMF
Chinn-ItoIndex	0-1(=less capital controls)	Composite Index examining existence of multiple Exchange Rates, restrictions on Current Account transactions, restrictions on Capital Account Transactions and requirement of the surrender of Export Proceeds[27]	Chinn & Ito[28]
Liquidliabilities	% GDP	Ratio of liquid liabilities to GDP	World Bank[29]
Depositmoneybankassets	% of Deposit (Money & Central) Bank Assets	Ratio of deposit money bank claims on domestic nonfinancial real sector (as defined above) to the sum of deposit money bank and Central Bank claims on domestic nonfinancial real sector (as defined above)	World Bank
Private credit by Deposit Money Banks	% GDP	Claims on domestic real nonfinancial sector by deposit money banks as a share of GDP	World Bank
StockMarketCapitalization	% GDP	Value of listed shares to GDP	World Bank
PrivateBondMarketCapitalization	%GDP	Private domestic debt securities issued by financial institutions and corporations as a share of GDP	World Bank
Bankconcentration	%	Assets of three largest banks as a share of assets of all commercial banks.	World Bank
Bankdeposits	%GDP	Demand, time and saving deposits in deposit money banks as a share of GDP	World Bank
Private credit by banks	%GDP	Private credit by deposit money banks to GD.	World Bank
Access to Credit	0-100 (=best)	Strength of credit reporting systems and effectiveness of collateral and bankruptcy	World Bank[30]

[27]Based on IMF: *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).*
[28]http://web.pdx.edu/~ito/Chinn-Ito_website.htm.
[29]Financial Structure and Development Dataset.
[30]Doing Business Report

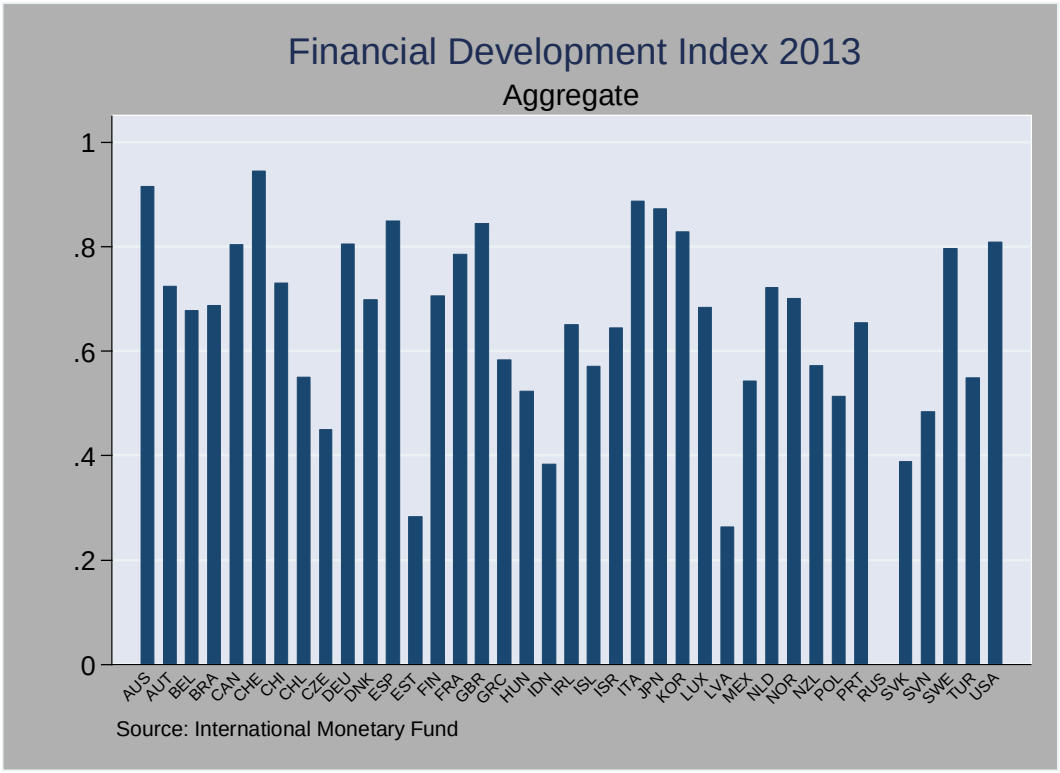
		laws in facilitating lending	
Financialmarket	1-7 (=best)	Aggregate Indicator	WEF[31]
Financialefficiency	1-7 (=best)	Aggregate Sub-Indicator[32]	WEF
Soundbanks	1-7 (=best)	In your country, how do you assess the soundness of banks?	WEF
Venturecapital	1-7 (=best)	In your country, how easy is it for start-up entrepreneurs with Innovative but risky projects to obtain equity funding?	WEF
Access to loans	1-7 (=best)	In your country, how easy is it for businesses to obtain a bank loan?	WEF
Soundmoney	0-10(=best)	Money growth, Standard deviation of inflation, Inflation: most recent year, Freedom to own foreign currency bank accounts	Fraser Institute[33]

Table A3: Panel Unit Root Tests for log (FDI)

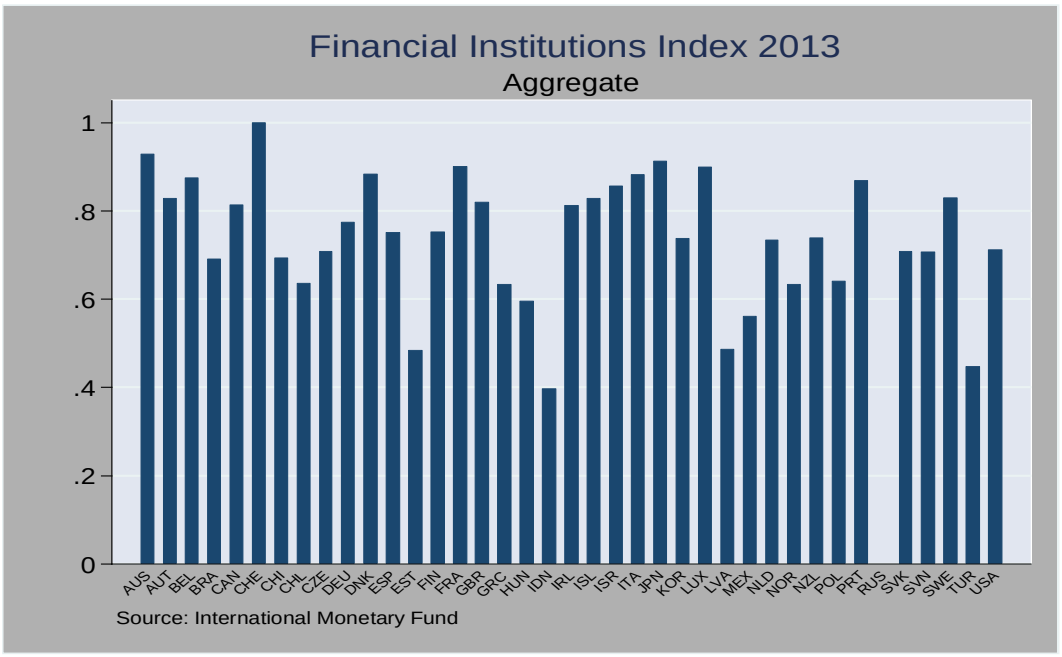
Test	Breitung 1 Lag	Breitung 2 Lags	IPS 2 Lags	Fisher 1 Lag	Fisher 2 Lags	LLC 2 Lags
Statistic	-2.462	-1.624	-2.148	40.291	18.789	-2.328
P-value	0.007	0.052	0.016	0.005	0.536	0.010

[31]World Economic Forum: *Global Competitiveness Report 2017-2018.*
[32]Comprising of: Financial Services Meeting Business Needs, Affordability of Financial Services, Financing through Local Equity Market, Access to loans, Venture Capital Availability.
[33]*Economic Freedom Report*

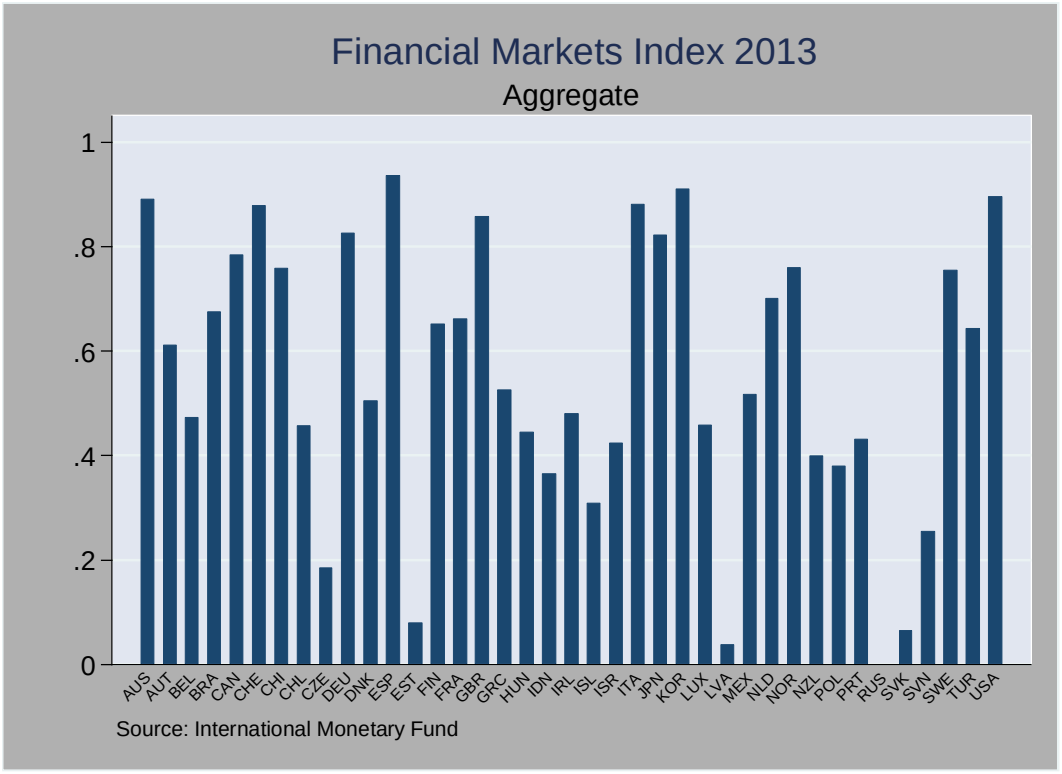
Graph A1: Financial Development Index



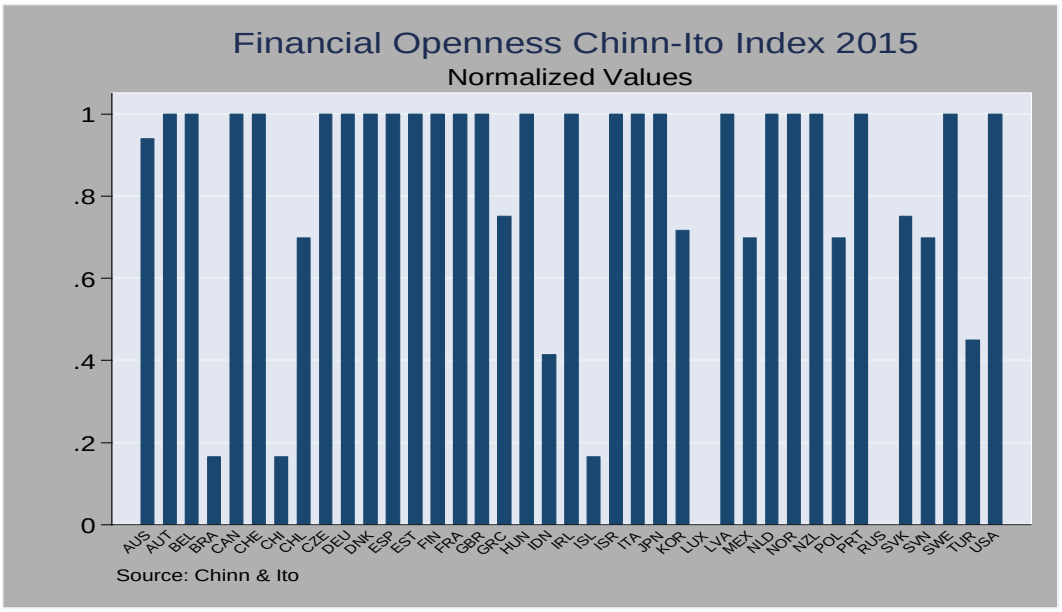
Graph A2: Financial Institutions Index



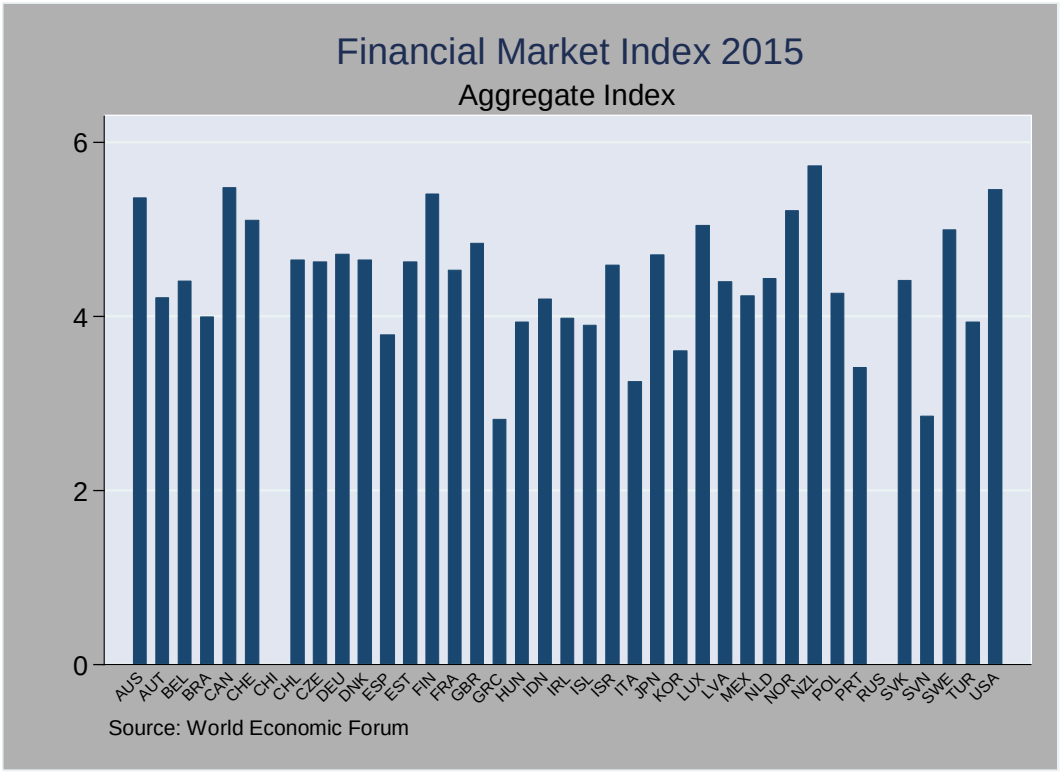
Graph A3: Financial Markets Index



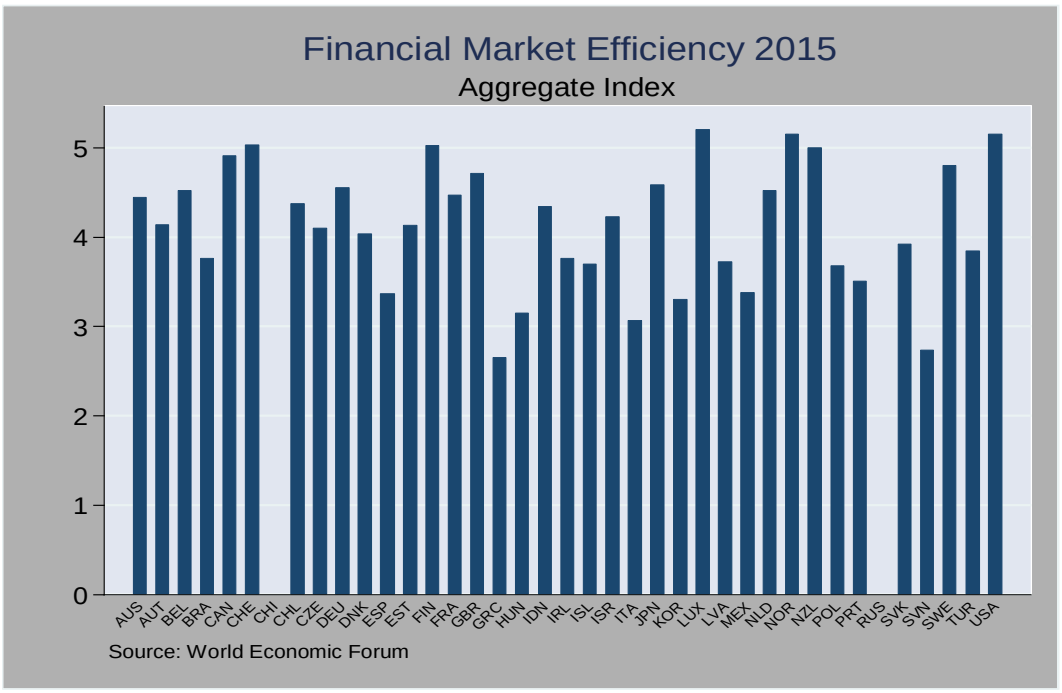
Graph A4: Financial Openness Index



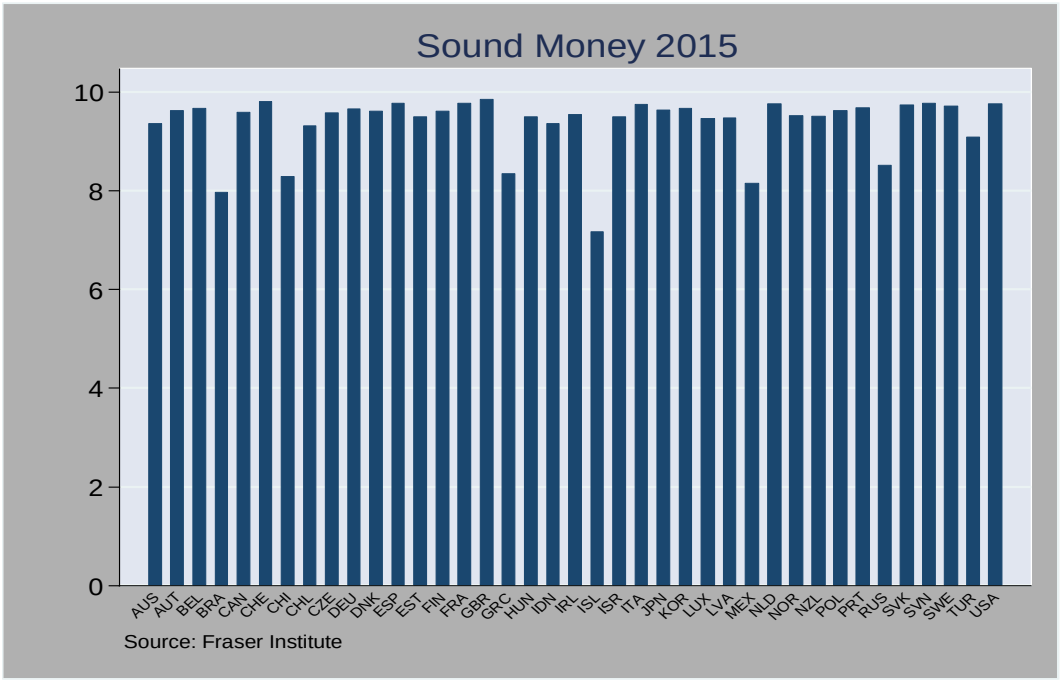
Graph A5: Financial Market Index



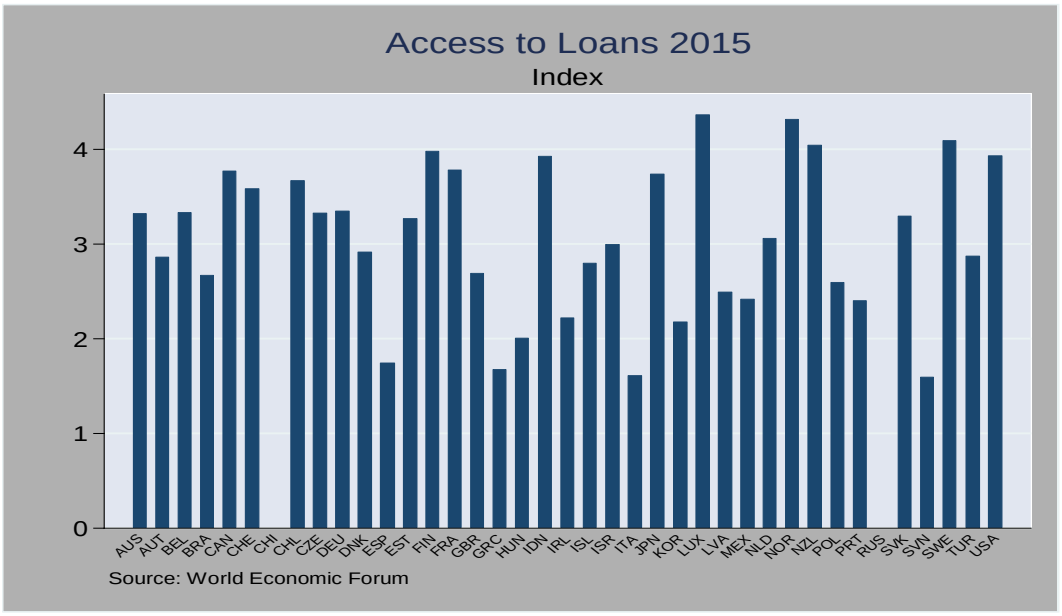
Graph A6: Financial market Efficiency Index



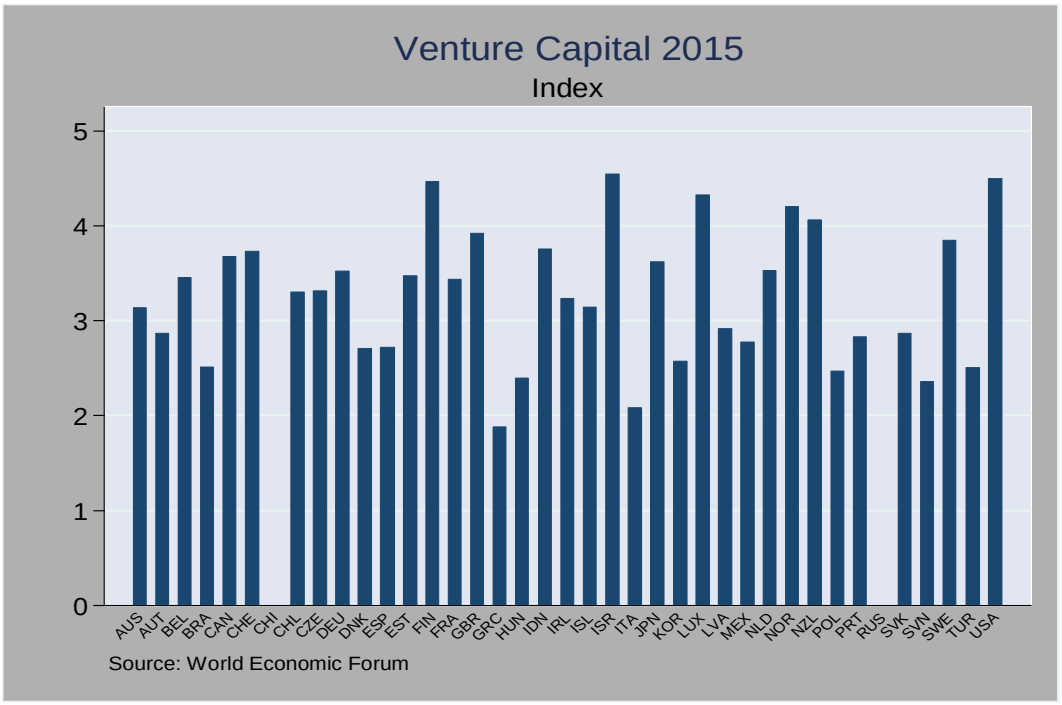
Graph A7: Sound Money Index



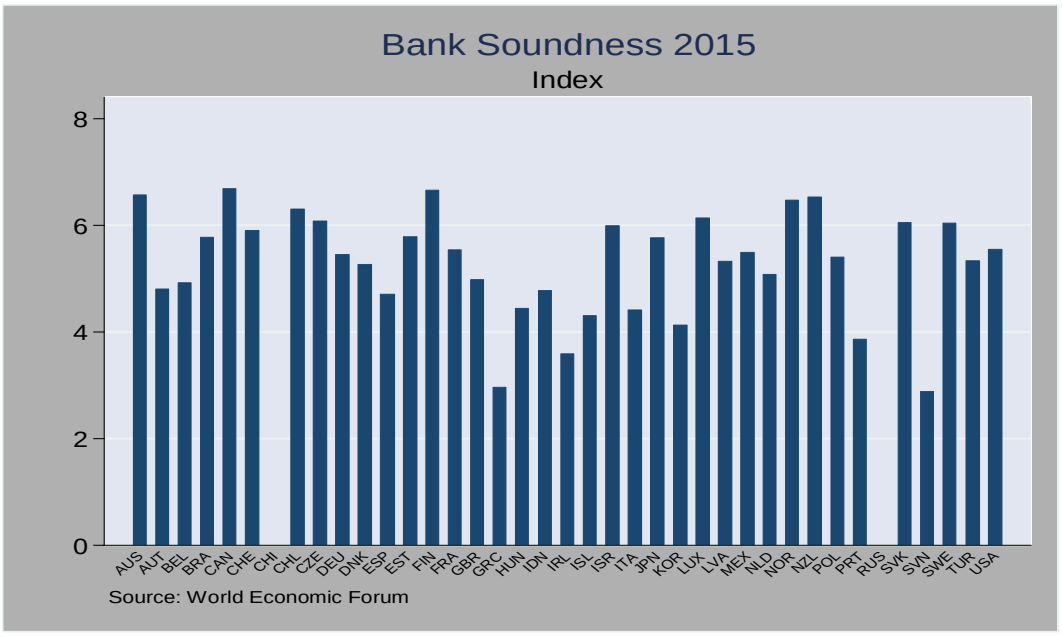
Graph A8: Access to Loans Index



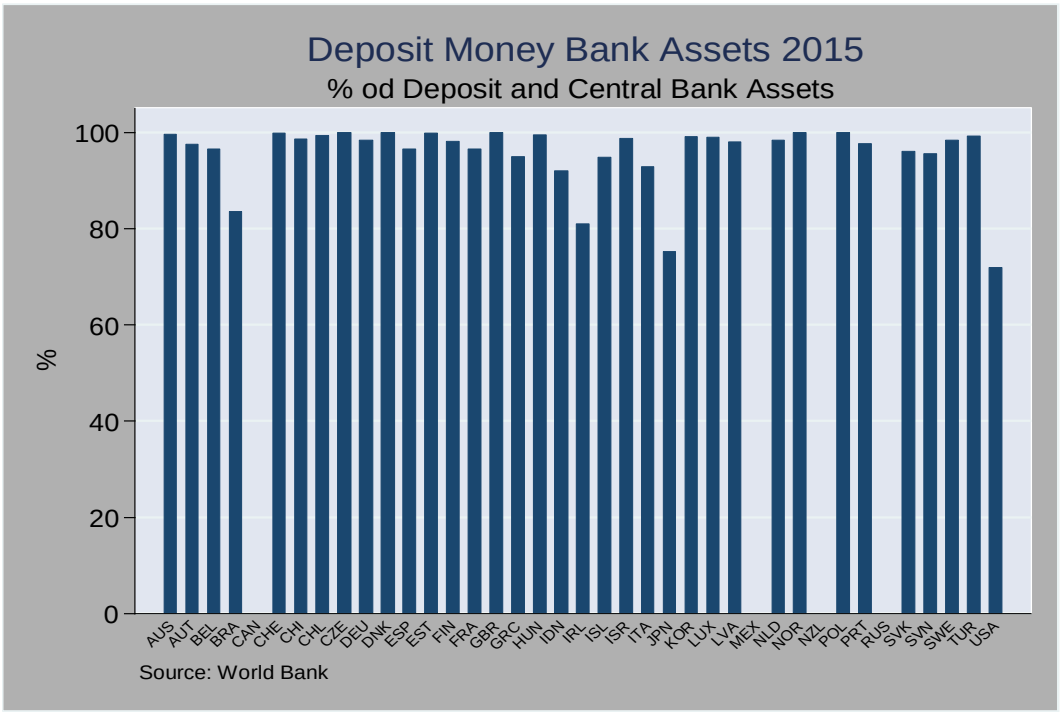
Graph A9: Venture Capital Index



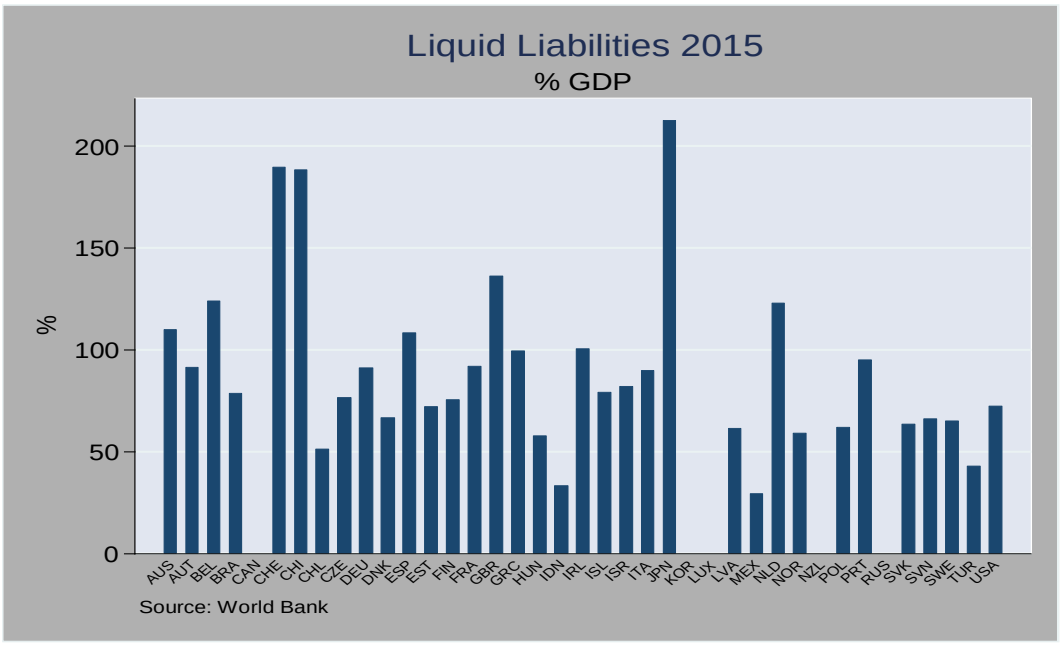
Graph A10: Bank Soundness Index



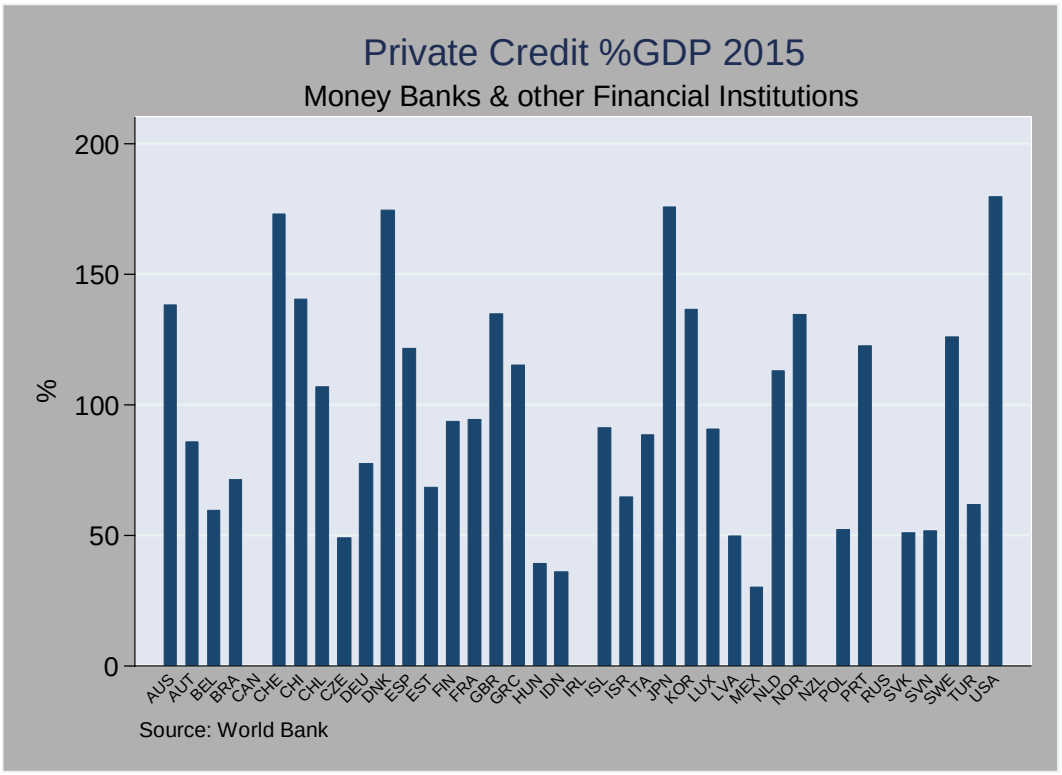
Graph A11: Deposit Bank Money Assets



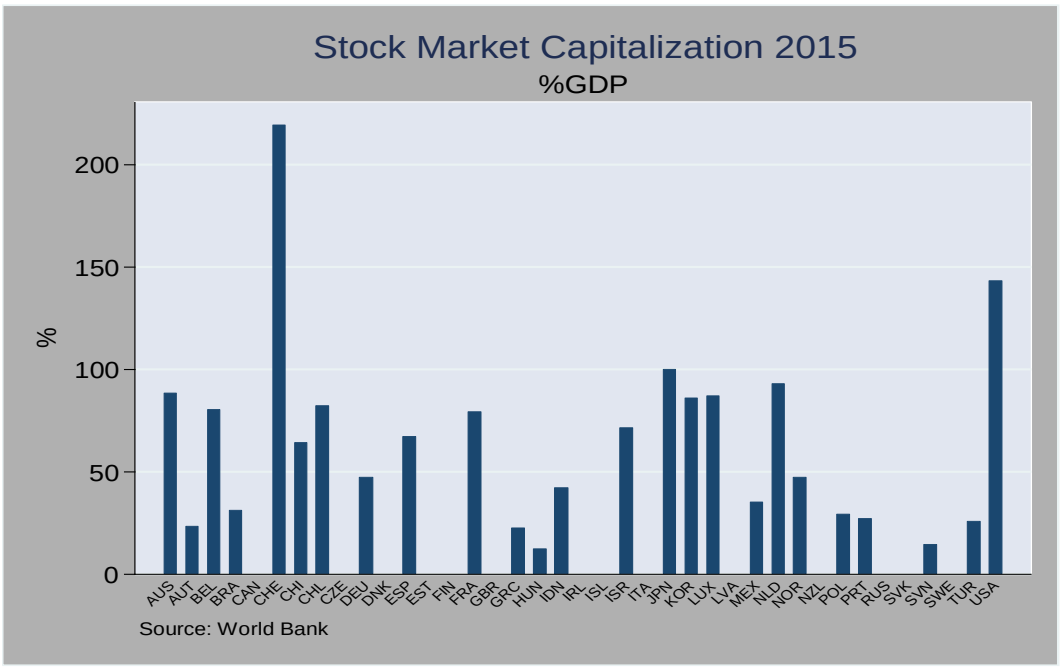
Graph A12: Liquid Liabilities % GDP



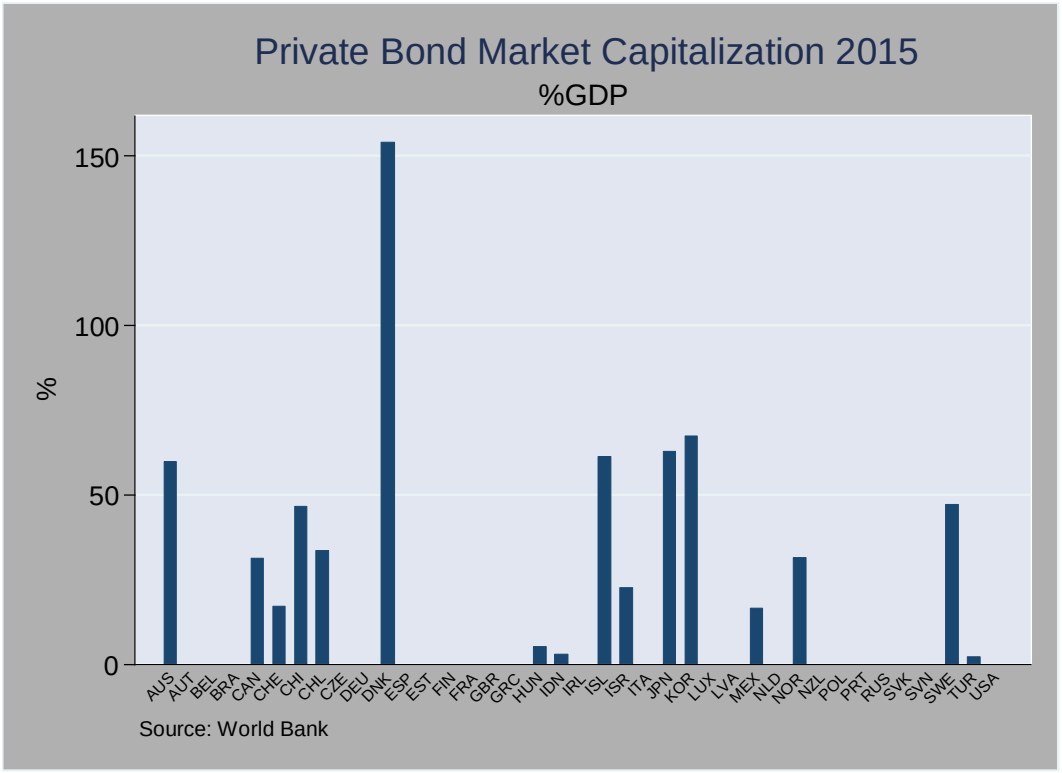
Graph A13: Private Credit % GDP



Graph A14: Stock Market Capitalization % GDP



Graph A15: Private Bond Market Capitalization % GDP



Graph A16: Time Series Graphs log(FDI)