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FINANCIAL DEVELOPMENT AND FDI FLOWS: EVIDENCE FROM ADVANCED ECONOMIES

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ABSTRACT

Foreign direct investment (FDI) has grown dramatically as a major form of international capital transfer over the past decades. This rapid growth in cross border investment has to a large partbeen due to the reduction in trade and investment barriers, the harmonization and mutual recognition of regulation and the removal of domestic impediments through reform and privatization (see OECD, 2001). Amongst the numerous FDI determinants studied in the literature, the development and depth of the financial sector has gained importance during the last decade. According to the *Paradox of Finance* hypothesis, despite the fact that Multinational Corporations (MNCs) are not locally financially constrained their affiliates interact significantly with the domestic financial system. Hence, a deep and efficient financial system should act as a pull factor for FDI flows. Using up-to-date FDI data for advanced and emerging economies, this research explores the role of previously unavailable financial variables in attracting FDI flows. The results show that fostering an efficient financial sector with diversified funding sources for enterprises contributes to increased participation by Multinational Corporations in the host economy. This insightful policy implication for advanced economies is that the restructuring of the financial system can contribute to economic recovery through the FDI channel as well. Finally, the results highlight the importance for the full implementation of the Banking Union and the Capital Markets Union in the EU.

Keywords: Foreign Direct Investment, Financial Development, Economic Growth, Advanced Economies

JEL Classification: O43, F21, F38, F65, G20

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1. Introduction

The galloping forces of economic globalization have promoted a marked surge in global trade volumes, the international mobility of products, factors of production and financial capital and a notable degree of harmonization in economic policies. Part of this process has involved an 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 suppressed international trade and capital flows, whilst FDI 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 country groups. The share of non-OECD economies in global capital inflows surpassed that of OECD economies for the first time in 2012. Regarding flows to emerging markets, China accounts for 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 into the European economy. 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. Moreover, 2016 was a favourable year, mainly because of 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 a resurgence of investment flows, (3.15 USD billion in 2016) which could

[1] Lane and 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*.

invigorate the economic recovery.

In search for productivity growth and improvement of living standards many countries compete by providing incentives to attract FDI (Oman, 2000). This stems from the recognition of the pivotal role that FDI plays in economic growth. Foreign direct investment is considered beneficial for a country's integration into 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 and 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 and 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 and 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 39advanced and emerging economies. A further

contribution of this research is the inclusion of indicators that were not available before 2015 and also a 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 level of development of the financial system is a significant determinant in attracting 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 are far away from best practices in the field.

The remainder of this paper is organized as follows: section 2 briefly summarizes the theoretical models for the 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 locating in a foreign economy. The implications of the neoclassical (Hecksher-Ohlin) model of 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 by large took place between developed economies, contradicting the predictions of the neoclassical theory. The early work of Vernon (1966), Hymer (1960) and Buckley and Casson (1976) emphasized the effect of imperfect markets for intermediate goods, which provide an incentive to large enterprises to internalize. In the case when the frictions take the form of foreign country policies, tariffs or exchange rate movements 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 Ownership - 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, 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 (Helpman, 1984; Markusen, 1984; Markusen and Maskus, 2002) is an attempt to merge the two types of FDI by accounting for divergence in skills between the source and the host economy. The model incorporates the approach based on the *gravity* models of international trade and accounts for geographical and economic distance, the cumulative economic activity and the skill differential which is, in essence, the factor behind Vertical FDI. Scholars have been basing their empirical work in variations of the aforementioned models using unilateral and bilateral FDI data as we describe in Section 2.3. Furthermore, building on the assumptions of the Knowledge-Capital model and accounting for third country effects has spawned the notion of *Export-Platform* FDI (Ekholm *et al.,* 2003; Baltagi *et al.*, 2007). The model enriches the two-country setting of the Knowledge Capital model and allows for demand and supply factors in a third economy to affect bilateral FDI patterns. A

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

potential host economy's remoteness in spatial or economic terms can significantly affect MNC decisions and also weigh on the intensity of the "traditional" bilateral pull factors. Export-platform FDI encompasses attributes of both horizontal and vertical FDI as the multinational corporation is assumed to engage in production in a foreign economy with the aim to serve a third market. Ekholm *et al.* (2003) distinguish between horizontal export platforms that only export from the affiliate to the third country and vertical export platforms which redirect a share of these exports back to the parent economy.

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 with international best practices. In terms of the incentives of the parent company, financial development in the source economy is expected to have a positive effect on foreign investment. Insofar as the financial system of the source economy is more efficient and deep compared to that of the host economy, the MNC has an advantage by having much greater access to credit (Desbordes and 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, the 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 and Kinoshita (2008) they are affected by domestic financial conditions, which therefore affect their investment decisions. Having established the prominent role of structural reforms as FDI inflow determinants (Bennassy - Quere *et al.*, 2005; Blonigen and 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 and 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 and Lensik, 2003; Alfaro *et al*, 2004; Crespo and 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 and Kinoshita, 2008).

According to Desai *et al.* (2006), a developed stock market increases the liquidity of listed companies and can reduce the 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 existence of capital controls is also of importance as it can hamper profits repatriation which MNCs value, hence FDI flows are more likely to be diverted to economies with minimal or no restrictions (Desai *et al.*, 2006). 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. According to the same study, the second implication is that stock market liberalization can turn the net present value (NPV) of certain investment projects positive through the diminishing cost of equity capital. Thus 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 along 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. The aforementioned mechanisms serve to explain what Campos and 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.

By contrast, according to Desbordes and Wei (2017) financial development in the host 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 and Wei, 2017). Nonetheless, Fournier (2015) argues that product market liberalization can act as a pull factor for FDI if it results in convergence to best practices and minimizes the distance from the country's peers. Increased competition in local markets is also an issue addressed by Bilir*et al*. (2014) 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; Ekholm *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, the empirical literature has 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 and Piger (2011) find that many of the independent variables used 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, with 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 *et al.*, 2008; Antonakakis and Todl, 2010), the level of economic development through the use of GDP per capita (Busse and Hefeker, 2005, Campos and 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. By contrast, GDP per capita and GDP growth are not unanimously associated with higher FDI flows as the two variables exhibit negative or insignificant coefficients in a number of studies[4] (Wernick*et al.*, 2009; Sekkat andV erganzones-Varoudakis, 2007; Asiedu, 2002; Habib and 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 and Kinoshita (2008); however they do not appear to significantly affect MNC decisions in the work of Buse and Hefeker (2005). In their meta-analysis using Bayesian Model Averaging, Antonakakis and Todl find compelling evidence of 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 Dellis *et al.* (2017) who use the ratio of tax revenues to GDP. Gastanga *et al*. (1998) find that

[4]Antonakakis and Todl (2010) provide a detailed review on FDI determinants.

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%. Anecdotal evidence has long encouraged the view 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 to 2000 (OECD, 2002). The latter trend towards emerging economies has been mostly due to institutional and reform factors (Grigonyte, 2010) which will be addressed. Nonetheless, there are studies that reveal a negative relationship between unit labor costs and inbound FDI (Bevan and Estrin, 2004; Demekas *et al*, 2005; Dellis *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 examined as a determinant of 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. By contrast, 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 and Verganzones-Varoudakis, 2007).

2.3.2 Institutional factors

In search of the deeper structures that affect FDI flows, scholars have been focusing on an array of institutional variables to complement the economic variables described above. Following the pioneering work of Wheeler and 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 and 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. 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 and Shah, 2013; Demekas *et al*., 2005; Walsh and Yu, 2010). Apart from the wage costs discussed above, the overall functioning and flexibility of labor markets appears to attract capital flows (Walsh and 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 and Solera, 2016).

2.3.3 Financial Factors

A prominent place among the institutional determinants of FDI flows, according to recent research papers, is given to 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 to attract foreign capital flows poses a major challenge.

This train of thought has spawned a growing empirical literature to identify and quantify the effect of host country financial development on FDI inflows. An influential study of Latin American and transition economies by Campos and

Kinoshita (2008) uses a dense set of indicators from the World Bank's Financial Structure Dataset to gauge their impact on FDI flows as a percentage of GDP. Controlling for potential endogeneity of the reform variables with the implementation of the System GMM estimator (Blundel and 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 Soumare and Tchana-Tchana (2009) who use data on 29 emerging economies from 1994 to 2006 and exploit indicators from the World Bank's *Financial Structures Dataset* and the IMF's *International Financial Statistics*. In order to do so, they deploy Panel Vector Auto Regression (VAR) techniques and use Granger Causality tests to establish the direction of the causal effect. Moreover, they 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*. (2016), who present 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 Soumare and Tchana-Tchana (2009).

In their recent research, Blundell-Wignall and Roulet (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[5] (Chinn and Ito, 2008; 2015) 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 host 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 the 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 used to pass capital[6]through 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

[5] Revised data accessed at http://web.pdx.edu/~ito/Chinn-Ito_website.htm
[6]OECD (2015) also coins the terms *pass-through capital* and *capital in transit* to describe such entities.

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 using FDI 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 Dellis *et al.* (2017) and include real GDP (2010 purchasing power parity),tax revenues as a percentage of GDP and the 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 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 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 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

[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.

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 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 *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 as a percentage of GDP (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. Other financial variables are drawn from 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 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 and Ito (2015). The authors base their work on the IMF's *Annual Report on Exchange Arrangements*

[9]Detailed description, measurement and sources for all financial variables are found in Table A2 in the Appendix.

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

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 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 1 shown below outlines the basic descriptive statistics regarding these variables and Table 2 provides summary statistics for the financial indicators.

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.

A first inspection of the impact 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

[11]The full list of countries is tabulated in Table A1 in the Appendix.
[12]Australia, Brazil, Canada, China, Indonesia, Ireland, Russia, United Kingdom and Israel.

we observe some interesting cross tabulations. For the vast majority of the variables outlined in Table 2, 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 1reveals 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.

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:

$$\log(FDI)_{it} = \beta_0 + \beta_1 \log(GDP)_{it} + \beta_2 \mathrm{tax}_{it} + \beta_3 \log(open)_{it} + \beta_4 \mathrm{ulc}_{it} + \beta_5 \mathrm{finance}_{it} + u_{it} \quad (1)$$

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

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

the presence of heteroskedasticity. 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 and Kinoshita, 2003; 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 and Bover, 1995; Blundell and Bond, 1998), which is preferred to the more traditional Difference GMM estimator (Arellano and Bond, 1991) due to the fact that the time dimension is small and dependent variable is highly persistent[17]. Another set of regressions addresses the issue of the spatial persistence of FDI flows by incorporating the value of the 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 and 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 on the host country.

4. Results

4.1 Baseline regressions

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 at PPP exchange rates, tax revenues as a percentage of GDP, unit labor costs and trade

[16] See Baum (2008)
[17] For a detailed assessment of dynamic panel data methods see Bond et al. (2001).

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 and Bover, 1995; Blundell and Bond, 1998) and is presented in the first column of Table 3. The coefficients have the expected signs in line with the relevant theoretical and empirical literature and are statistically significant except for that on tax revenues.

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 the ten economies (see Figure4**)** 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]. Finally, we enhance the robustness of our results by applying the Pesaran (2007) Panel Unit Root test which is valid under the hypothesis of *cross-sectional dependence* in the panel[20]. According to the test process, the Augmented Dickey Fuller (ADF) regressions are augmented with the cross-sectionaverages of lagged

[18]Chile Czech Republic France Greece Latvia Mexico Poland Portugal Turkey United States.
[19] See Hlouskova and Wagner (2005) for a discussion on Panel Unit Root tests.
[20] The Pesaran Test for Cross Sectional Dependence fails to reject the Null Hypothesis of Independence while the Friedman test rejects the Null Hypothesis at 10%.

levels and first-differences of the individual series. We allow for the number of lags for the unit root test to be endogenously determined by the information criteria and we apply one and two lags in the Breusch-Goddfrey specification of dependence. The findings corroborate the view of stationarity in the logged series of FDI flows. The econometric procedure, therefore, continues with the inclusion of the level of the FDI inflow series in logarithmic form as the dependent variable. Detailed results on the Panel Unit Root tests are presented in Table 9.

4.2 Financial structures and FDI flows

4.2.1 Estimations with financial variables

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 casts importance on 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 percentage 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 percentage 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 percentage point improvement. 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 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 determine the endogeneity of the variables treated as endogenous ex-post. In all estimations summarized in Table 4 we reject the null hypothesis of exogeneity which validates the treatment of the economic determinants of FDI as endogenous.

All four control variables maintain their sign and significance in the vast majority of specifications[21]. The correlation coefficients for the financial variables in relation to GDP (see Table 10) does not point towards collinearity, as corroborated by the stability of the regression coefficient for the variable in the specifications including the financial indicators[22]. 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 and 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; however this does not contradict the findings of the basic IV estimation. The final column controls for potential heteroskedasticity 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

[21]The significance of ULC is the most fragile, especially in the regressions presented in the first column of Table 4. This gives vigor to the argument that reform process (in this case financial sector reform) matters more than low wages in the case of advanced economies.

[22]The value for the coefficient of GDP ranges from 0.86 to 1.3 with a mean value of 1.04 which does not deviate significantly from the baseline results of Table 3.

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[23]. The argument is grounded in the idea that foreign capital flows, especially if allocated to the financial sector can lead to financial development and an improvement in existing structures (Donaubauer *et al.*, 2016).Moreover, foreign capital flows are expected to facilitate the reform process which includes financial sector reform. The results[24] 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.

4.2.2 Implications for Greece

Having established the positive pull effect exerted by the quality of financial structures as depicted in the results in Table 4, we can move on to assess the implications these results have for FDI inflows to the Greek economy. The log-linear specification dictates that the coefficients of the independent variables be interpreted as rates of change. For example, drawing from the first column of Table 4 one can conclude that a percentage point increase in liquid liabilities as a percentage of GDP causes a 0.6 percent increase in FDI inflows. Following this train of thought we attempt to gauge the positive impact of structural changes in the Greek financial

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

[24] Not tabulated here but available upon request.

system as these would be reflected in the improvement of the indicators used in the analysis. The reference point is 2016, the last year we include in the empirical specifications when FDI inflows reach 3.2 billion USD. For the financial indicators compiled by the World Economic Forum data exist for 2016 while most other indicators are available until 2015.

The coefficients for liquid liabilities and private credit to GDP range from 0.004 – 0.008. This implies that an increase by one percentage point (over GDP) could lead to an increase in FDI flows by 0.4-0.8 percent. With respect to the 2016 FDI inflows this translates into more than 12 million USD. It is important to note that liquid liabilities in 2016 were 99% of GDP, which is close to the average value for the 2005-2016 period, nonetheless they have recorded a maximum value of 108 %. Hence a restoration to this maximum value would imply a gain in FDI flows that surpasses 100 million. Taking stock on the effect of stock market capitalization, the respective point estimate of the coefficient is 0.015, thus signaling that one percentage point increase would lead to a surge of 1.5 percent in FDI inflows. Data for 2015 show a 22% share of GDP which is particularly low compared to the other countries in the sample and even a non-negligible 16 point deficit from the economy's average. Were the economy to reach the 38% average of the period in question, this could enhance FDI inflows by almost 800 million USD other things being equal.

Focusing on the WEF financial variables we observe significantly higher values for the coefficients. A point surge in the venture capital index is associated with FDI inflows increasing approximately 60%. This percentage is translated into almost 1.5 billion USD, which is a profound amount given the historical data on FDI inflows to Greece. Nevertheless, the indices range from 1 to 7 and a unit increase is something exceptional as one can derive looking at the trajectory of these variables through the years. Bouncing back from a record of 1.82 in 2016 to the mean value of 2.23 is slightly less than a standard deviation surge in the index[25]; however it would exert a 25% increase in inflows which is no less than 800 million. It is also worth mentioning that Portugal and Spain score more than one unit higher than Greece in the 2016 panel, indicating that values close to 3 are not impossible to achieve and would bring

[25] The standard deviation for the 2005-2016 period is 0.516.

in more than 1.5 billion USD worth of FDI inflows. Similar conclusions can be drawn from the results on access to loans, which is one of the key issues the Greek financial system is attempting to tackle at the moment[26]. The coefficients from the empirical estimations associate a one point improvement in the indicator with inflow increases of approximately 40%. The index exhibits a higher degree of volatility compared to venture capital (a standard deviation of 0.82) and stands at 1.675 for 2016. The average value for the whole time sample is 2.35 thus pointing towards a 22% increase in the case the financial system is evaluated at its average score. In other words, a return to normality for the financing conditions of non-financial corporations could contribute, other things being equal, to more than 600 million of FDI inflows to the economy. Finally, the estimate for the effect of bank soundness is in the area of 0.25. The banking sector in Greece has been gravely affected by the financial crisis and this is documented in the 2.7 score in the 2016 WEF report. A score similar to the one measured for Portugal at 3.3 would imply a 15% surge in FDI inflows or approximately 480 million USD based on the 2016 data for the Greek economy. Overall, other things being equal, there are substantial gains from financial reform that the country could realize in the form of FDI inflows.

4.3 Additional robustness checks

4.3.1 Inflow-outflow correlation

According to Blanchard and 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 a direct impact on 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 the prevalence of such practices.

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

[26] Section 4.4 refers to the main policy efforts towards the development of the financial system.

controlling for the presence of SPEs in the FDI data. Figure 2 illustrates this fact; therefore we run the baseline estimations excluding observations for Austria, Chile, Denmark, Hungary, Iceland and Israel[27]. The results from the two-step GMM estimation outlined in Table 5 fully corroborate the finding presented in the first column of Table 4. The conclusions on the role of financial development as an FDI determinant remain unchanged.

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 of the specification. The second column of Table 5 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 5, 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 host economy and create the productivity spillovers discussed above.

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

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[28].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 largely retain their magnitude and significance when compared 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.

4.3.3 More control variables

The empirical evidence on FDI flow determinants rigorously supports 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 and Shah, 2013; Walsh and Yu, 2010) using the World Economic Forum Index for *Infrastructure Quality*, government effectiveness (Wernick *et al*, 2009; Ajide and 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

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

indicators (overall financial development, financial markets and financial institutions) 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 6.

4.3.4 Factor analysis

As a further robustness check we deploy Factor Analysis in order to reduce the number of variables that aim to capture financial system development. The urge to do so stems from the belief that unobservable characteristics such as financial depth and efficiency of the financial system underpin most of the indices used to assess the state of the financial system. Deploying Factor Analysis allows us to estimate these latent variables (as they are called in the econometric literature) and create composite indicators called *factors*[29]*.* The factors are then used as the independent variable that measures financial development in the context of the regressions discussed in Sections 4.2 and 4.3.

Initially we aim to disentangle the common factors behind *all* 25 financial variables used in the research. Using the principal component method we observe that there are six factors with an eigenvalue higher than unity, thus implying that they represent a greater share of the variance than a single observed variable. It is noteworthy that the first two factors cumulatively explain almost 60% of the total variances. On top of that, uniqueness (the part of the explained variance that is not shared with other variables) for all indices is below 40 % with the exceptions of the Chinn-Ito index (48%) and Sound Money index from the *Fraser Institute* (38%) thus indicating a rather strong effect of common underlying factors in the process[30]. In order to construct the factors according to the rotated factor loadings we use the *oblique rotation* technique which allows for the generated factors to be correlated, since it is rational to postulate that the unobserved traits of the financial system are not independent. The factor scores are then predicted using the regression scoring

[29]For an introduction to Factor Analysis see Kim and Mueller (1978),Gorsuch (1983).
[30]This is not so evident if one only looks at the pair-wise correlations among the financial variables (Table 10) where no coefficient exceeds 0.7.

method. The process indicates that the first factor is highly positively correlated with the *World Economic Forum* indicators (financial market efficiency, venture capital, bank soundness and access to loans). Hence we refer to it as Factor 1 (WEF) in the specifications. Placing the estimated factor score as an independent variable in the form discussed above yields a positive coefficient for this unobserved measure of financial development as depicted in Table 7. The variable for country size (log GDP) retains its strong significance and magnitude once modeled against the previous estimation results. The second factor is mostly affected by the indicators provided by the *International Monetary Fund* (financial market depth, financial market efficiency, financial institutions depth and financial institutions efficiency), however the rotated factor loadings are smaller than those of the first factor. Including the second factor in the model (not tabulated here) does not affect the positive significant effect of the first factor but fails to yield a similar effect for Factor 2.

Keeping in mind the results from the individual regressions that incorporate financial variables, it is interesting to attempt to reveal the common underlying factors behind the variables that proved significant in the majority of estimations summarized in Table 4. The rotated factor loadings are again estimated using the oblique rotation method with two factors explaining almost 80% of the total variance of the 13 significant variables. It comes as no particular surprise that the first factor is predominantly associated with the IMF indicators while the second factor is highly correlated with the financial variables available in the WEF database (see Table 11). A visualization of this result is clearly shown in Figure 3 which provides the loading plot for the rotated factor loadings.

The two factors are tested in the two-step GMM framework described in the previous sections and the results are presented in table 8. Both components that are assumed to underpin the individual financial indicators have a significant effect on FDI inflows in the OECD country group as observed in the first two columns of the table. Moreover, the final column reports the results from the specification that includes both factors and indicates that the estimated factor scores keep their positive effect and significance[31]. These results corroborate the role of financial

[31] The correlation coefficient of the two variables is 0.35.

reform as a robust determinant of FDI inflows. It is fruitful to note that the results hold under orthogonal (*varimax*) rotation which does not allow for correlation of the estimated common factors[32]. Nonetheless, the revealed uniqueness clearly points towards the oblique rotation as most appropriate in the cases discussed above.

4.4 Policy implications

The results presented and described in Section 4.2 provide an insight for policy action for economies competing for FDI. Direct estimations of the gains in terms of FDI inflows stemming from an improvement in the financial indicators are presented in section 4.2.2. 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 euro-area, 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 as described in section 4.2.2. In the case of Greece, a clearing out of 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[33] 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 balance sheets is currently to the fore in European policy discussions"**.** According to the Report, the improvement in the diminishing of the

[32] The results are not reported here.

[33]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 digitization" as policy priorities for the banking sector.

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 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 corporations are FDI-enhancing; therefore strengthening 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 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.

Another point of policy significance is the elevated importance of stock market capitalization and venture capital availability as FDI determinants for advanced economies. Diversification of funding sources is at the epicenter of the policy discussion in the OECD and the EU in particular with the proposed introduction of the *Capital Markets Union* (CMU) which aims to complement the Banking Union. Managing Director of the IMF Christine Laggard underscored that "[…] the euro area needs truly integrated financial and capital markets that allow companies to raise financing across borders more easily and support investment"[34]. This initiative is aimed to provide complementary funding to bank lending across EU countries thus facilitating capital accumulation irrespective of the firms' location. The fragmentation of financing conditions within the EU was exacerbated by the financial crisis and, given the empirical support for the importance of access to finance for FDI; unlocking capital through the CMU could provide the stimulus for growth-enhancing FDI projects. Across advanced economies the EU shows a lackluster performance (European Commission, 2018) with an average of 64,5% in stock market capitalization as a percentage of GDP while the figure is 138% in the US and 94% in Japan. The process could be exceptionally beneficial for countries in the EMU

[34] Speech given for the "EURO at 20" joint Conference in Dublin, Ireland hosted in June 2018.

periphery where stock market development is lagging compared to the core[35].

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[36]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 towards the 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-area on corporate investment is highlighted in a recent study by the ECB (2018). Companies in the EU face significant constraints on external finance as financial institutions undertake credit rationing 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 depicts the enhancing effect that access to loans has on FDI

[35] For 2015 Stock Market Capitalization was 22% of GDP in Greece and 27% in Portugal compared to 80% in France and 92% in the Netherlands.

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

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, 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. Given the innovative role that SMEs play in the Greek economy, the availability of capital through loans, venture capital or the stock market is essential for the dissemination of the technology and 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 host economy (Campos and Kinoshita, 2008). Financial transactions, soundness of the banking system, unhindered access to credit matter, *inter alia,* for the goals of the MNC 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 battery 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 development of the domestic financial institutions and the convergence to best practices can act as a significant pull factor for foreign capital and MNC presence in the economy. The results are robust to different econometric methods and data variations, thus giving vigor to the argument that domestic financial development attracts FDI flows.

The results underline the pressing need for financial reform, especially in countries experiencing structural rigidities and crisis-hit financial institutions if they wish to establish themselves as major recipients of FDI. In the euro area context, this implies that the completion of the final steps of the *Banking Union*is pivotal for the resurgence of capital flows to member countries. The implication for Greece, in particular, is that the necessary boost to the weak domestic capital formation can be assisted by the restoration of trust in the banking system, the tackling of non-performing loans and the diversification of financing choices for private enterprises. Moreover, the need to develop credible alternative sources of funding for European firms through the Capital Markets Union and fully exploiting venture capital emerges as a key policy objective. Having said that, it is well documented in the literature that the level of financial development not only attracts MNC participation but also acts as a catalyst for the productivity spillovers attributed to FDI. Hence, under favorable financial conditions, the superior technology and managerial practices attributed to MNCs can disseminate to the domestic economy spurring long-term economic growth.

6. References

Alam, A. and S.Z.A. Shah, (2013). "Determinants of foreign direct investment in OECD member countries", *Journal of Economic Studies,* 40.

Albuquerque, R., N. Loyaza, and L. Serven (2005)."World market integration through the lens of foreign direct investors," *Journal of International Economics, 66.*

Ajide, K. and Raheem, I. (2016). "Institutions-FDI nexus in ECOWAS countries", *Journal of African Business.*

Alfaro, L., A. Chanda, S. Kalemli-Ozcan, and S. Sayek (2004). "FDI and economic growth: the role of local financial markets," *Journal of International Economics,* 64, pp. 89–112.

Antonakakis, N. and G. Tondl (2012). "Do determinants of FDI to developing countries differ among OECD countries? Insights from a Bayesian panel data approach", *Vienna University of Economics and Business Draft working paper*.

Antras, P. (2003). "Firms, contracts, and trade structure", *Quarterly Journal of Economics*, 118.

Arellano, M. and S. Bond (1991). "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations", *Review of Economic Studies,* 58.

Arellano, M. and O. Bover (1995). "Another look at the instrumental variables estimation of error components models", *Journal of Econometrics*, 68.

Asiedu, E. (2002). "On the determinants of foreign direct investment to developing countries: is Africa different?", *World Development*, 30.

Asiedu, E. (2013). "Foreign direct investment, natural resources and institutions", *International Growth Centre (IGC) Working Paper Series*.

Baltagi, B., P. Egger and M. Pfaffermayr. (2007). "Estimating models of complex FDI: are there third-country effects", *Journal of Econometrics*, 140.

Bank of Greece (2018). *Governor Report.*

Barrell, R. and N. Pain (1997). "Foreign direct investment, technological change, and economic growth within Europe", *The Economic Journal*, 107.

Baum, C., (2008). "Using instrumental variables techniques in economics and finance", *German Stata Users Group Meeting Presentation Notes.*

Bénassy-Quéré, A., M. Coupet, and T. Mayer (2007). "Institutional determinants of foreign direct investment", *The World Economy*, Vol. 30(5), pp. 764-782.

Bergstrand, J. H. and P. Egger, (2007). "A knowledge-and-physical-capital model of

international trade flows, foreign direct investment, and multinational enterprises," *Journal of International Economics*, 73.

Bevan, A. and S. Estrin (2004). "The determinants of foreign direct investment into European transition economies", *Journal of Comparative Economics*, 32.

Bilir, L., Chor, D and Manova, K. (2013). "Host country financial development and MNC activity", *NBER Working Papers*, 20046.

Blanchard, O. and J. Acalin (2016). "What does measured FDI actually measure?" *Peterson Institute for International Economics, Policy Brief*, PB16-17.

Blonigen, B. A. (2005). "A review of the empirical literature on FDI developments", *Atlantic Economic Journal*, 33.

Blonigen, B. and J. Piger (2011). "Determinants of foreign direct investment". *NBER Working Paper 16704.*

Blundell, R., and S. Bond. (1998). "Initial conditions and moment restrictions in dynamic panel data models*", Journal of Econometrics*, 87.

Blundell-Wignall, A. and C. Roulet (2017), "Foreign direct investment, corruption and the OECD Anti-Bribery Convention", *OECD Working Papers on International Investment*, 2017/01.

Buckley, P.J. and M. Casson, (1976), "The future of the multinational enterprise", Macmillan, London.

Buch, C.M., I. Kesternich, A. Lipponer, and M. Schnitzer (2009). "Exports versus FDI revisited: does finance matter?", *University of Tübingen, Deutsche Bundesbank, and University of Munich. Mimeo*.

Busse, M. and C. Hefeker (2007). "Political risk, institutions and foreign direct investment", *European Journal of Political Economy*, 23.

Campos, N. and Y. Kinoshita (2003). "Why does FDI go where it goes? New evidence from the transition economy*", IMF Working Paper 03/228*.

Campos, N. and Y. Kinoshita (2008). "Foreign direct investment and structural reforms: evidence from eastern Europe and Latin America". *IMF Working Paper 08/29* .

Carr, D, Markusen, J R., and Maskus, K E. (2001) "Estimating the knowledge–capital model of the multinational enterprise," *American Economic Review*, 91.

Casson, M. (1990). "The theory of foreign direct investment" .In P. Buckley (Ed.), International Investment (pp. 244–273).

Chinn, Menzie D. and H. Ito (2008). "A new measure of financial openness", *Journal of Comparative Policy Analysis,* 10.

Chinn, Menzie D. and H. Ito (2015). Notes on the Chinn-Ito financial openness index, http://web.pdx.edu/~ito/Readme_kaopen2016.pdf.

Ciriaci, D, N. Grassano, and A. Vezzani (2016). "Regulation, red tape and location choices of top R&D investors", *European Commission Discussion Paper,* 31.

Crespo, N. and M. Fontoura (2007). "Determinant factors of FDI spillovers—what do we really know?", *World Development,* 35.

Dellis,K., D. Sondermann, and I. Vansteenkiste (2017). Determinants of FDI Inflows in advanced economies: does the quality of economic structures matter. *ECB Working Paper 2066.*

Demekas, D., B. Horvath, E. Ribakova, and Y. Wu.(2007). ''Foreign direct investment in European transition economies: the role of policies,'' *Journal of Comparative Economics*, 35.

Desai, M. A., C. F. Foley, and J. R. Hines Jr. (2006). "Capital controls, liberalizations, and foreign direct investment", *The Review of Financial Studies*, 19.

Desbordes, R. and S.-J.Wei (2014). "The effects of financial development on foreign direct investment", *World Bank Policy Research Working Paper* 7065.

Desbordes, R. and S.-J.Wei (2017). "The effects of financial development on foreign direct investment", *NBER WorkingPaper* 23309.

Desai, M.A., C.F. Foley and J.R. Hines (2006). "Capital controls, liberalizations, and foreign direct investment", *Review of Financial Studies,* 19.

Devereaux, M. and R. Griffith (1998). "Taxes and the location of production: evidence from a panel of US multinationals", *Journal of Public Economics*.

Dunning, J. (1973). "The determinants of international production*", Oxford Economic Papers,* 25.

Di Giovanni, J. (2005). "What drives capital flows? The case of cross-border M&A activity and financial deepening", *Journal of International Economics,* 65.

Donaubauer*, J. E.* Neumayer and P. *Nunnenkamp* (2016), "Financial market development in host and source countries and its effects on bilateral FDI*", Kiel Working Papers*, 2029.

Dunning, J.H. (1993). "Multinational enterprises and the global economy", Wokingham, England: Addison-Wesley Publishing Company.

Dunning, John H (2001). "The eclectic (OLI) paradigm of international production: past, present and future," *International Journal of Economics and Business*, 8.

Eicher, T., L. Helfman, and A. Lenkoski (2011). "Robust FDI determinants: Bayesian model averaging in the presence of selection bias", *Journal of Macroeconomics,* 34.

Ekholm, K., R. Forslid, and J.R. Markusen, (2003), "Export-platform foreign direct investment", *NBER Working Paper*. 9517.

European Central Bank (2017). *Financial stability review.*

European Commission (2018). Capital markets union factsheets.

Fournier, J. (2015), "The heterogeneity of product market regulations", *OECD Economics Department Working Papers*, 1182.

Gastanaga, V., J. Nugent, and B. Pashamova. (1998). ''Host country reforms and FDI inflows: how much difference do they make?'' *World Development*, 27.

Grigonyte, D. (2010), "FDI and structural reforms in the Baltic States", *European Commission Country Focus.*

Gorsuch, R. L. (1983). *Factor analysis*. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum.

Greene, W. (2003). *Econometric Analysis*, Pearson.

Gylfason, T., and G. Zoega.(2001). "Natural resources and economic growth: the role of investment," *CEPR Discussion Paper* 2743.

Habib, M and L. Zurawicki (2002). "Corruption and foreign direct investment", *Journal of International Business Studies*, 33.

Harrison, A.E. and M.S. McMillan (2003). Does direct foreign investment affect domestic credit constraints? *Journal of International Economics,* 61.

Helpman, E. (1984). "A simple theory of international trade with multinational corporations". *Journal of Political Economy.*

Henry, P. B. (2000). "Do stock market liberalizations cause investment booms?", *Journal of Financial Economics*, 50.

Hermes, N. and R. Lensink (2003). "Foreign direct investment, financial development and economic growth", *Journal of Development Studies*, 40.

Hlouskova, J. and W., Martin, (2005), "The performance of panel unit root and stationarity tests: results from a large scale simulation study", *Diskussions schriften, Universitaet Bern.*

Hymer, S. (1960). *The international operations of national firms: a study of direct foreign investment,* Cambridge, MA: MIT Press.

International Monetary Fund (2017). *Global financial stability report.*

Javorcik, B.S. (2004).''Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages,'' *American Economic Review*, 94.

Jensen, N. (2003). “Democratic governance and multinational corporations: political regimes and inflows of foreign direct investment”, *International Organization*, 57.

Kim, J. O., and C. W. Mueller (1978). “Introduction to factor analysis. What it is and how to do it”, *Sage University Paper Series on Quantitative Applications the Social Sciences, 07*.

Lane, P., R., and G.- M. Milesi-Ferretti (2017). “International financial integration in the after math of the global financial crisis”, *Central Bank of Ireland and IMF, mimeo*.

Levine, R., and S. Zervos. (1998). “Stock markets, banks, and economic growth”, *American Economic Review*, 88.

Lucas, R. (1993). “On the determinants of direct foreign investment: evidence from East and Southeast Asia”, *World Development*, 21.

Lucas, R. (1990). “Why doesn’t capital flow from rich to poor countries?” *American Economic Review Paper and Proceedings*, 80.

Markusen, J. R. (1984). "Multinationals, multi-plant economies, and the gains from trade, " *Journal of International Economics*, 16.

Markusen, J.R., K.E. Maskus (2002). “Discriminating among alternative theories of the multinational enterprise”, *Review of International Economics,* 10.

Martinez, V., M. Bengoa and B. Sanchez-Robles (2012). “Foreign direct investment and trade: complements or substitutes? Empirical evidence for the European Union”, *Technology and Investment*, 3.

Markusen, J.R. and K.E. Maskus (2001). "Multinational firms: reconciling theory and evidence," in *Topics in Empirical International Economics: A Festscrift in Honor of Robert E. Lipsey*. M. Blomström and L.,S. Goldeberg eds. Chicago: University of Chicago Press.

Otchere, I., I. Soumare, and P. Yourougou (2016), “FDI and financial market development in Africa”, *The World Economy.*

Pagan, A.R. and D. Hall (1983). “Diagnostic tests as residual analysis”. *Econometric Reviews*, 2.

Pain, N. (1997). “Continental drift: European integration and the location of UK foreign direct investment”, *The Manchester School Supplement*, 65.

Pain, N. and M. Lansbury (1997). “Regional economic integration and foreign direct investment: the case of German investment in Europe”, *National Institute Economic Review,* 160.

Pesharan, M. (2007). “A simple panel unit root test in the presence of cross sectional dependence”, *Journal of Applied Econometrics,* 22.

Prasad, E., K. Rogoff, S. Wei, and M.A. Kose (2003). “Effects of financial globalization on developing countries: some empirical evidence”, *IMF Occasional Paper* 220.

Resmini, L. (2000). “The determinants of foreign direct investment in the CEECs: new evidence from sectoral patterns”, *Economics of Transition*, 8.

Schmitz, M (2009). “Financial reform and capital flows to emerging Europe”, *IIIS Discussion Paper* 278.

Sekkat, K. and M. Verganzones-Varoudakis (2007). “Openness, investment climate, and FDI in developing countries”, *Review of Development Economics,* 11.

Shatz, H. and A.J. Venables (2000). “The geography of international investment”, *World Bank Policy Research Working Paper,* 2338.

Singh, H., and K. Jun (1996). “The determinants of foreign direct investment in developing countries”, *Transnational Corporations*, 5.

Soumaré, I. and F. Tchana Tchana (2011). “Causality between FDI and financial market development: Evidence from emerging markets”, *MPRA Paper* 31328.

Svirydzenka, K. (2016). “Introducing a new broad-based index of financial development”, *IMF Working Paper*.

Trevino, L.J. and F.G. Mixon (2004). “Strategic factors affecting foreign direct investment decisions by multi-national enterprises in Latin America”, *Journal of World Business*, 3.

Vernon, R.(1966). “International investment and international trade in the product cycle”, *Quarterly Journal of Economics*, 80.

Walsh,J. and Yu, Y. (2010). “Determinants of foreign direct investment: a sectoral and institutional approach. *IMF Working Paper* 10/187.

Wei, S. J.(2000). “How taxing is corruption on international investors?” *Review of Economics and Statistics,* 82.

Wernick, D. A., Haar, J., and Singh, S. (2009). “Do governing institutions affect foreign direct investment inflows? New evidence from emerging economies”, *International Journal of Economics and Business Research*, 3.

Wheeler, D. and Moody, A. (1992). “International investment decisions: the case of US firms”, *Journal of International Economics*, 33.

World Economic Forum (2017), *Global competitiveness report.*

Yeaple, S. R.(2003). “The role of skill endowments in the structure of u.s. outward foreign direct investment,” *The Review of Economics and Statistics*, 85.

7. Tables and figures

Table 1: FDI and control variables

variable	units	mean	median	min	max	sd
FDI Net Inflows (non SPEs)	USD Million	21827.6	6751.675	-28265.6	476684	55869.49
FDI Stock	USD Million	506606.5	147486.6	4688.727	6555622	1094558
GDP Constant Prices	USD Million	1649801	413103.4	11678.11	18231550	3129326
GDP Growth	Y-o-Y % Change	2.339	2.356	-14.724	25.557	3.690
Tax Revenues	% GDP	33.463	33.049	12.649	49.583	7.235
Tax Rate	% Profits	43.882	45.124	19.8	76.7	13.324
Trade Openness	% GDP	100.15	84.704	24.6199	361.301	57.867
Unit Labour Costs (ULC)	Index 2010=100	99.438	100	49.437	162.594	10.088

Table 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-ItoIndex	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 capitalization	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

Table 3 Baseline specification

	System GMM	**Pooled OLS**	**RandomEffects**	**TwoStep 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***	-0.017	-0.029***	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)
log Openness	1.078***	1.440***	1.434***	1.366***
	(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	0.582	0.580	0.571	0.560
Number of countries	22	25	25	22
Sargan-HansenStatistic	138.9			3.271
Arellano Bond AR(1) Test P-value	0.0168			
Arellano Bond AR(2) Test P-value	0.095			
AndersonCCStatistic				154.2
EndogeneityStatitsic				9.001

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

Table 4 Financial variables coefficients

FinancialVariable	IV	System GMM	IV - YearEffects	IV- CountryCluster 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 (FraserInstitute)	-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

Table 5 Robustness checks

FinancialVariable	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 institution sefficiency	-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 (FraserInstitute)	-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

Table 6: Economic and institutional controls

FinancialVariable	InfrastructureQuality, Governance	InfrastructureQuality, 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 %GDP	0.014***	0.014***	0.013***
Private bond market cap. %GDP	-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 institution sefficiency	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 (FraserInstitute)	-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**
Access to loans (WEF)	0.408**	0.561***	0.407*
Access to credit (WB)	-0.006	-0.011	-0.009

Table 7: Results with factor variables (all financial indicators)

	TwoStep GMM		System GMM
VARIABLES	log FDI	log FDI	log FDI
log GDP	1.247***	1.203***	1.503***
	(0.000)	(0.000)	(0.000)
logOpenness	1.297***	1.211***	1.580***
	(0.000)	(0.000)	(0.000)
ULC	-0.007	-0.042*	-0.034
	(0.894)	(0.050)	(0.178)
Tax Revenues	0.011	0.014	-0.021
	(0.568)	(0.460)	(0.874)
Factor 1 (WEF)	0.162	0.195*	0.339**
	(0.170)	(0.094)	(0.012)
Constant	-6.600	-3.074	-4.723**
	(0.158)	(0.180)	(0.020)
Observations	66	66	59
R-squared	0.761	0.724	
Sargan-HansenStatistic	1.271	3.394	61.47
AndersonCCStatistic	65.56	30.93	-
EndogeneityStatitsic	7.218	4.824	-
Arellano Bond AR(1) Test P-value	-	-	0.0208
Arellano Bond AR(2) Test P-value	-	-	0.304
Year Fixed Effects	Yes	No	No

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

Table 8 Results with Factor Variables (Significant Financial Indicators)

VARIABLES	log FDI	log FDI	log FDI
log GDP	1.043***	0.875***	0.929***
	(0.000)	(0.000)	(0.000)
LogOpenness	1.420***	1.692***	1.468***
	(0.000)	(0.000)	(0.000)
ULC	-0.004	-0.016	-0.004
	(0.819)	(0.431)	(0.809)
Tax Revenues	-0.024	-0.067***	-0.044**
	(0.157)	(0.002)	(0.046)
factor 1 (WEF)	0.464***		0.377***
	(0.000)		(0.000)
factor 2 (IMF)		0.563***	0.275*
		(0.001)	(0.069)
Constant	-3.225	1.679	-1.033
	(0.146)	(0.522)	(0.664)
Observations	113	113	113
R-squared	0.661	0.624	0.665
Sargan-HansenStatistic	1.779	2.737	1.282
AndersonCCStatistic	105.7	105.9	47.88
EndogeneityStatitsic	1.251	4.975	2.221

Robustpvalinparentheses

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

Table 9: 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	Pesharan 2 BG Lags
Statistic	-2.462	-1.624	-2.148	40.291	18.789	-2.328	-2.92
P-value	0.007	0.052	0.016	0.005	0.536	0.010	0.005

Table 10 Correlation matrix

Table 10.a

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) GDP	1.000									
(2) FinancialDevelopment	0.471	1.000								
	0.000									
(3)financial institutions	-0.026	0.752	1.000							
	0.639	0.000								
(4) financial markets	0.665	0.914	0.420	1.000						
	0.000	0.000	0.000							
(5) chin-ito index	-0.130	0.263	0.384	0.131	1.000					
	0.009	0.000	0.000	0.017						
(6) liquid liabilities	0.075	0.418	0.531	0.249	0.125	1.000				
	0.136	0.000	0.000	0.000	0.014					
(7) deposits	-0.398	0.068	0.320	-0.106	0.200	0.002	1.000			
	0.000	0.234	0.000	0.063	0.000	0.968				
(8) private credit	0.121	0.638	0.617	0.496	0.262	0.409	-0.008	1.000		
	0.015	0.000	0.000	0.000	0.000	0.000	0.872			
(9) stock market cap	0.106	0.604	0.493	0.525	0.192	0.487	-0.037	0.484	1.000	
	0.041	0.000	0.000	0.000	0.000	0.000	0.486	0.000		
(10) private bond market cap	-0.013	0.412	0.479	0.245	0.194	0.157	0.025	0.682	0.176	1.000
	0.819	0.000	0.000	0.000	0.001	0.007	0.682	0.000	0.003	

Table 10.b

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) GDP	1.000								
(2) financial institutions depth	0.147	1.000							
	0.007								
(3) financial institutions access	-0.201	0.102	1.000						
	0.000	0.061							
(4) financial institutions efficiency	-0.136	0.257	0.054	1.000					
	0.012	0.000	0.317						
(5) financial markets depth	0.338	0.831	-0.009	0.279	1.000				
	0.000	0.000	0.875	0.000					
(6) financial markets access	0.624	0.291	-0.108	-0.073	0.386	1.000			
	0.000	0.000	0.045	0.180	0.000				
(7) financial markets efficiency	0.626	0.384	-0.139	0.074	0.614	0.391	1.000		
	0.000	0.000	0.010	0.174	0.000	0.000			
(8) concentration	-0.394	0.271	-0.026	0.311	0.245	-0.292	0.120	1.000	
	0.000	0.000	0.631	0.000	0.000	0.000	0.027		
(9) bank deposits	-0.123	0.373	0.326	0.276	0.359	0.147	-0.106	-0.185	1.000
	0.015	0.000	0.000	0.000	0.000	0.008	0.055	0.000	

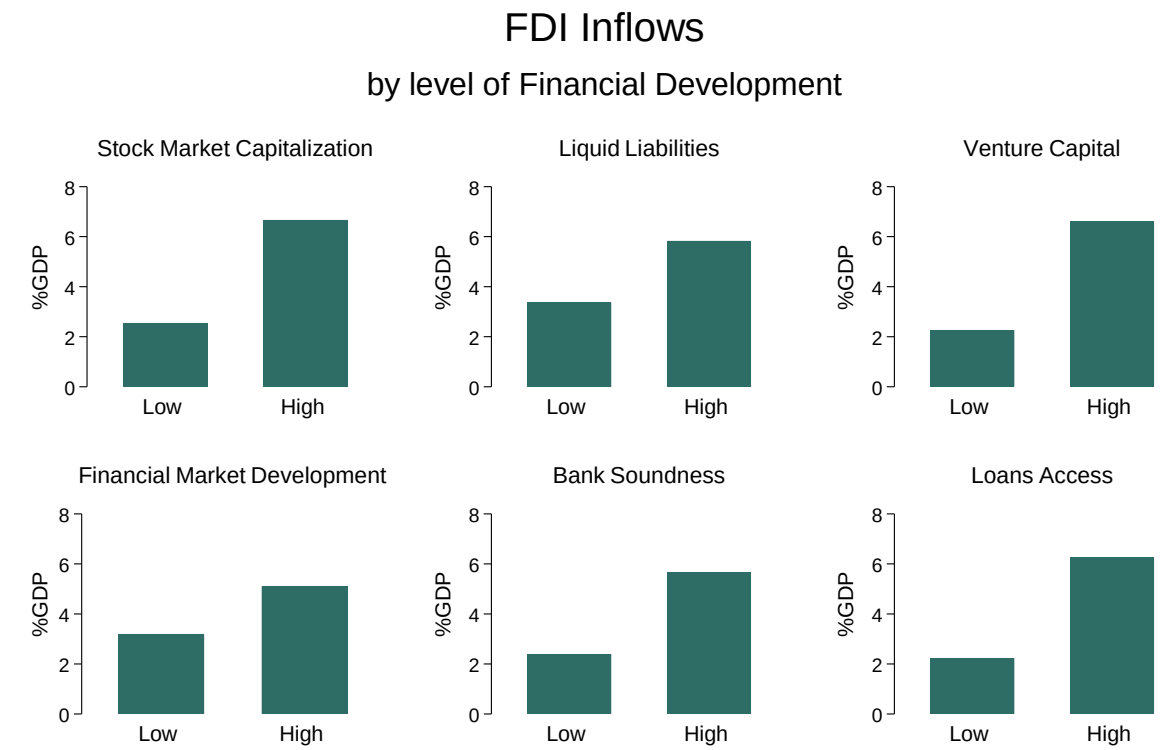
Table 10.c

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) GDP	1.000								
(2) private bank credit	-0.111	1.000							
	0.026								
(3) sound money	0.001	0.217	1.000						
	0.987	0.000							
(4) financial markets (WEF)	0.060	0.232	0.200	1.000					
	0.255	0.000	0.000						
(5) financial efficien (WEF)	0.122	0.219	0.183	0.926	1.000				
	0.020	0.000	0.001	0.000					
(6) sound banks	0.068	-0.055	0.078	0.780	0.693	1.000			
	0.199	0.326	0.157	0.000	0.000				
(7) venture capital	0.016	0.177	0.137	0.848	0.917	0.598	1.000		
	0.769	0.001	0.013	0.000	0.000	0.000			
(8) loans access	-0.042	0.134	0.092	0.795	0.871	0.654	0.859	1.000	
	0.422	0.017	0.093	0.000	0.000	0.000	0.000		
(9) credit by banks	0.274	0.304	0.115	0.378	0.200	0.108	0.128	0.053	1.000
	0.000	0.000	0.057	0.000	0.001	0.087	0.043	0.406	

Table 11: Rotated Factor Loadings (Signifcant Financial Variables)

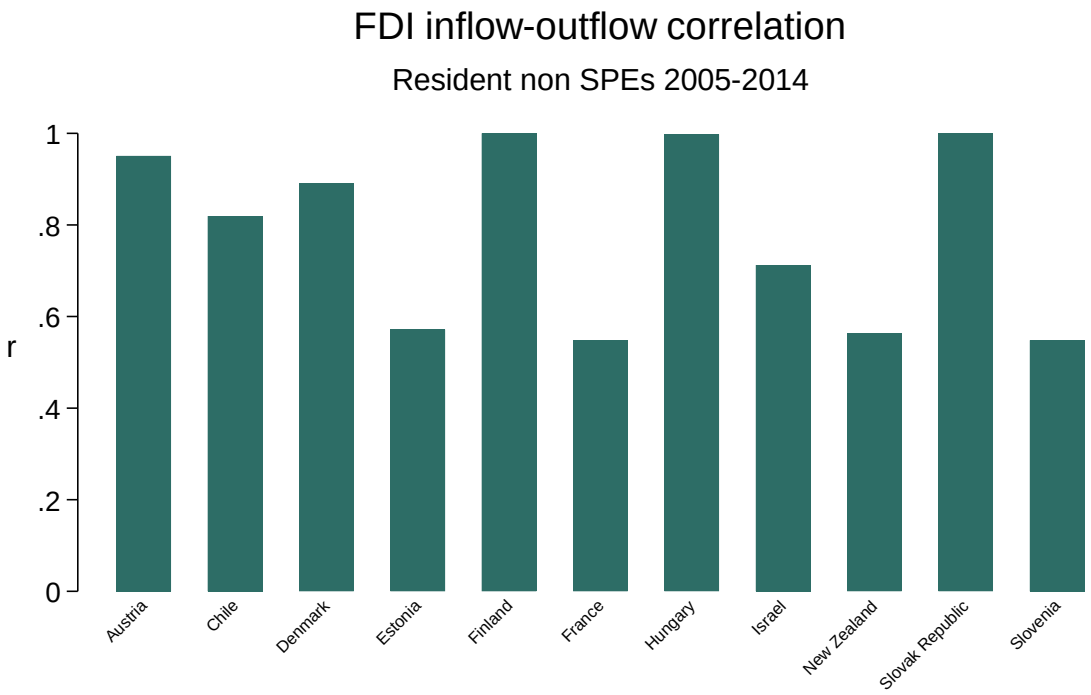
Variable	Factor1	Factor2	Factor3	Uniqueness
Financial development	-0.0436	0.9782	0.0208	0.0556
Financial markets	-0.0235	0.9533	-0.1835	0.1978
Liquid liabilites	-0.0489	0.0380	0.9828	0.0236
Private credit	-0.0409	0.5303	0.1604	0.6469
Stock market cap	0.3600	0.3790	0.3332	0.3823
Financial institutions	0.0536	0.7879	0.1591	0.2274
Financial markets depth	0.0789	0.8878	0.0649	0.1094
Bank deposits	0.0282	-0.0344	0.9910	0.0302
Financial markets	0.9329	0.0629	0.0105	0.0810
Financial markets efficiency	0.9417	0.0798	-0.0029	0.0565
Sound banks	0.8113	-0.0848	-0.1155	0.3988
Venture capital	0.9205	0.0315	0.0018	0.1312
Loans access	0.9809	-0.1048	0.0291	0.0873

Figure 1: Financial structures and FDI inflows



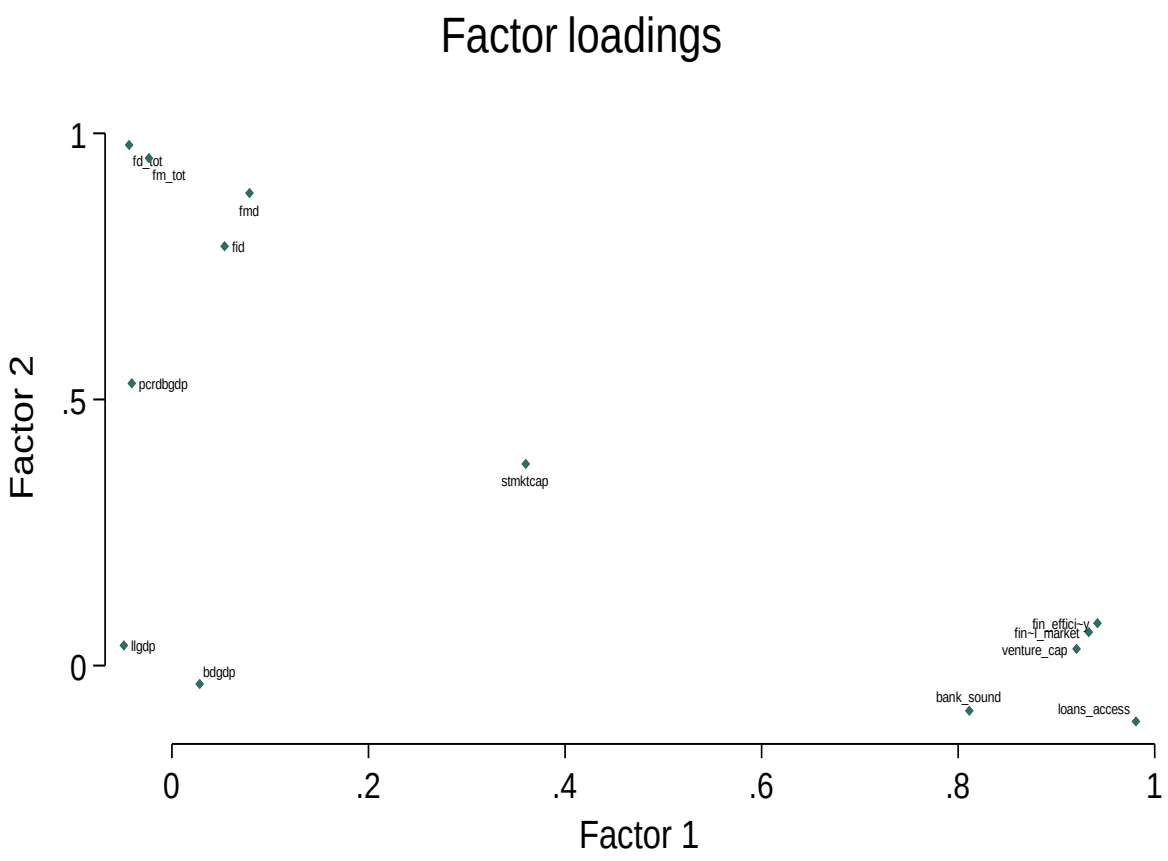
Source: World Bank, World Economic Forum, International Monetary Fund

Figure 2: FDI inflow-outflow correlation



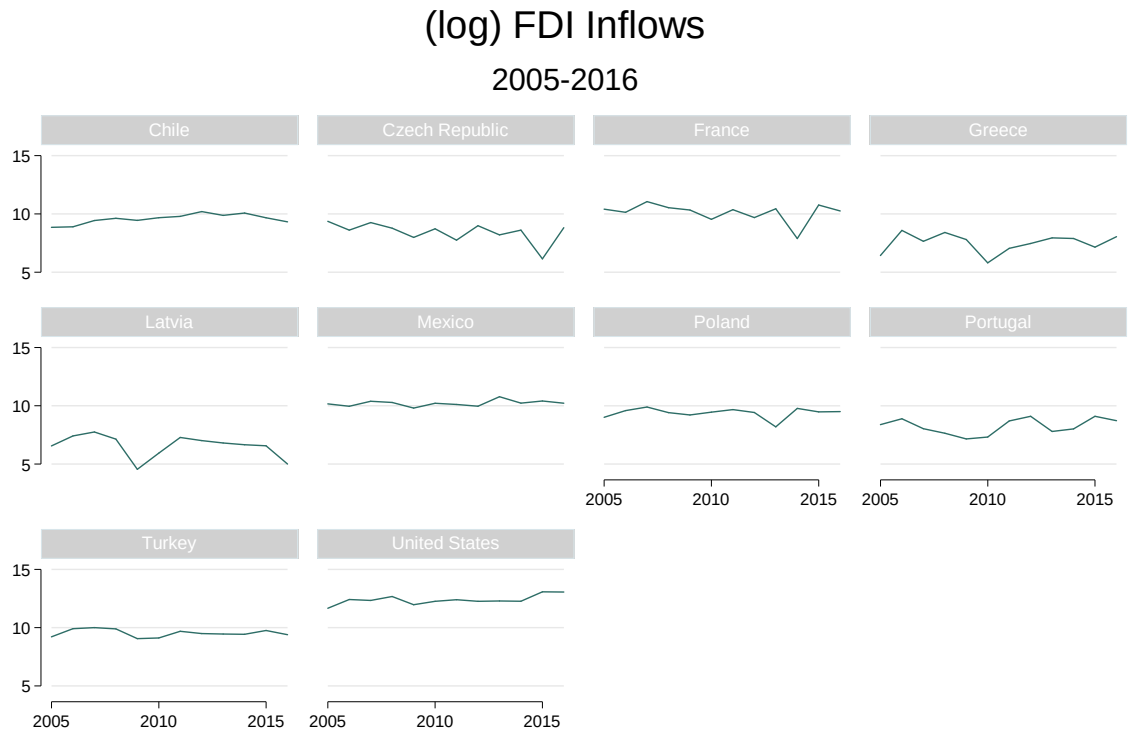
Source: OECD Author's Calculations

Figure 3 Loading plot



Rotation: oblique oblimin(0)
Method: principal factors

Figure 4: Time Series Graphs log(FDI)



Appendix

Table A1: Original Country Set

Brazil	Denmark	Italy	Portugal
Indonesia	Estonia	Japan	Slovakia
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
Financial development index	0-1 (=more financial openness)	Aggregate Indicator	IMF[37]
Financial institutions index	0-1 (=more financial openness)	Aggregate Sub-Indicator	IMF
Financial markets index	0-1 (=more financial openness)	Aggregate Sub-Indicator	IMF
Financial institutions depth	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
Financial institutions access	0-1 (=more financial openness)	Bank branches per 100,000 adults and ATMs per 100,000 adults	IMF
Financial institutions efficiency	0-1 (=more financial openness)	Net interest margin, Lending-deposits spread, Non-interest income to total income, Overhead costs to total assets, Return on assets, Return on equity	IMF
Financial markets depth	0-1 (=more	Stock Market Capitalization to GDP,	IMF

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

	financial openness)	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	
Financial markets access	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
Financial institutions efficiency	0-1 (=more financial openness)	Stock market turnover ratio (value traded/stock market capitalization)	IMF
Chinn-Ito Index	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[38]	Chinn and Ito[39]
Liquid liabilities	% GDP	Ratio of liquid liabilities to GDP	World Bank[40]
Deposit money bank assets	% of Deposit (Money and 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
Stock Market Capitalization	% GDP	Value of listed shares to GDP	World Bank
Private Bond Market Capitalization	%GDP	Private domestic debt securities issued by financial institutions and corporations as a share of GDP	World Bank
Bank concentration	%	Assets of three largest banks as a share of assets of all commercial banks.	World Bank
Bank deposits	%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

[38]Based on IMF: *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).*
[39]http://web.pdx.edu/~ito/Chinn-Ito_website.htm.
[40]Financial Structure and Development Dataset.

Access to Credit	0-100 (=best)	Strength of credit reporting systems and effectiveness of collateral and bankruptcy laws in facilitating lending	World Bank[41]
Financial market	1-7 (=best)	Aggregate Indicator	WEF[42]
Financial efficiency	1-7 (=best)	Aggregate Sub-Indicator[43]	WEF
Sound banks	1-7 (=best)	In your country, how do you assess the soundness of banks?	WEF
Venture capital	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[44]

[41]Doing Business Report
[42]World Economic Forum: *Global Competitiveness Report 2017-2018.*
[43]Comprising of: financial services meeting business needs, affordability of financial services, financing through local equity market, access to loans, venture capital availability.
[44]*Economic Freedom Report*

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