Marginal Product of Capital and FDI under Financial Frictions

Margarita Lopez Forero*

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Abstract

This paper empirically examines how external financial needs- measured at the sector level- and financial development at the country level interact to shape the aggregate marginal product of capital of a country (MPK) and its foreign direct investment inflows (FDI). Using new available data we construct annual aggregate MPK for 60 developing and developed countries during 1995-2009; we use industry-level data to construct an annual country-level measure of external financial dependence and assess its effects on MPK conditional on the level of financial development. Second, using bilateral FDI over 2001-2010 we analyze how external financial dependence and financial development determine FDI inflows in developing countries. Our findings imply that financial development seems to be a necessary condition -and certainly not a sufficient one- in order for production in financially dependent sectors to positively affect aggregate MPK and FDI in developing countries. These results taken altogether contribute to some extent to explaining the Lucas' Paradox of why aggregate capitals don't flow from rich to poor countries.

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*Paris School of Economics - University of Panthéon-Sorbonne. E-mail: margarita.lopez@psemail.eu

1 Introduction

Traditional trade theory predicts that if relative capital-to-labor ratios are different across countries and if capital mobility is allowed, then capital should flow from capital rich to capital poor countries, where return to capital should be higher. Therefore, large differences in capital ratios across countries should be reflected in large differences in *marginal product of capital* (MPK) and in capital flowing from capital rich to capital scarce economies, if capitals can move freely across economies. In practice, one could reasonably expect to see these patterns taking into account that global cross border financial flows have substantially increased in the past four decades, which suggests a widely financially integrated world. However, many authors have wondered about the validity of the assumptions behind these predictions which imply that differences in income across countries (reflecting differences in capital per capita) result in differences in marginal return to capital. These studies have been motivated by Lucas' (1990) findings, who claimed that in practice we do not observe the kind of flows predicted by standard theory, where they should flow from rich to poor countries. This is what has been dubbed the "'Lucas Paradox"' and arises from his analysis of the relationship between India and the U.S. in 1988 where he finds that the return to capital should be around 58 times higher in the former Lucas (1990). Given such differences, we should have seen all capitals flowing from the U.S. to India, but this has not been the case. This debate has gained importance among economists and policymakers in recent years because evidence suggests that even if the world has gradually been more financially integrated (e.g., Prasad et al. (2007)), not only have capitals not flown from rich to poor countries, as Lucas pointed out, but recently the pattern seems perverse, as capitals have been moving "up-hill", from poorer to richer countries. Thus, giving rise to the so-called global imbalances which have somewhat motivated recent protectionism proposals.

In line with this, there has been a vast theoretical and empirical literature, attempting to explain the up-hill pattern of capitals. For example, Lucas himself pointed out that large differences in capital-to-labor ratios doesn't mean that the same larger differences can be expected in the return to capital as poorer countries may lack of other factors that complement with capital (such as human capital). In general, the potential explanations of the paradox have relied on two types of arguments; the first is related to international capital market imperfections[1] and restrictions on international capital flows[2] that prevent capital from moving freely and being efficiently allocated across countries (such as sovereign risk and informational asymmetries). The second type of arguments relies on the idea that once the returns to capital are adjusted from risk and other factors that affect the total factor productivity, they might not end up being as high as suggested by

[1] See for example: Reinhart and Rogoff (2004), Gertler and Rogoff (1990) and Portes and Rey (2005).
[2] Reinhardt et al. (2013).

the relative scarcity of capital in poor countries. Some explanations for these factors are related to the "fundamentals" of an economy that preclude equalization of marginal return to capital across countries despite relative differences in capital endowments; this would be for example, missing factors of production (e.g., lack of human capital and productive infrastructure), the importance of land in production[3], technological differences, lack of sound institutions[4], policy induced distortions (such as tariffs, taxes, capital controls and non-trade barriers) and other *inefficiencies* affecting the overall production structure.

Among all possible explanations of Lucas' Paradox, this paper focuses on a specific inefficiency: financial underdevelopment, defined as the inability of the financial sector to intermediate credit to firms[5]. In particular Antràs and Caballero (2009) (AC henceforth) theoretically explore how financial underdevelopment creates a misallocation of capital across sectors, which is biased against the sectors that rely more on external finance than on internally generated cash flow (i.e., financially dependent sectors) and how trade openness can alleviate this misallocation problem by allowing specialization in less financially dependent sectors. They conclude that given the existence of cross-country heterogeneity in the efficiency of financial systems -that differently affect sectors depending on their external needs of finance- aggregate marginal return to capital is lower in countries with weaker financial systems. This, in turn eliminates the incentives for capitals flowing into these economies. On top of this, departing from the fact that aggregate MPK is the most common measure to approximate the return to capital, Caselli and Feyrer (2007) (CF from now on), propose simple cross-country estimates of MPK -in a given year- using easily accessible macroeconomic data and they find that once one accounts for the importance of "natural capital" in production (such as land) and differences in the relative price of capital, MPK is remarkably similar across countries. They conclude that there is no reason to expect more capitals flowing from capital rich to capital poor countries given that the return to capital isn't relatively higher in the later, hence rejecting the view that impediments to international capital flows play a major role in precluding capital flowing into poor countries. Instead, they attribute the lower capital ratios in these countries to the lack of capital complementary factors, higher relative prices of capital and higher overall *inefficiencies*.

Inspired by AC and CF, we empirically examine these overall inefficiencies through the lens of AC's theory. We follow CF's methodology in order to construct capital-to-labor ratios and aggregate MPK for an unbalanced panel of 60 countries over the period 1995-2009. In line with their findings, we confirm the existence of large cross-country differences in capital ratios and despite these differences MPK is very similar across countries and

[3]Caselli and Feyrer (2007).
[4]Alfaro et al. (2008).
[5]Which can also be seen as the incapability of firms to pledge future output to potential financiers.

sometimes it is even lower for capital poor countries. Furthermore, this pattern is stable over time. This means that given the lower capital ratios, there could be scope for increases in MPK in poorer countries, either by alleviating inefficiencies or by improving access to complementary factors with capital (e.g., higher levels of education). We argue that one way through which this inefficiency can work is in the form of an inability of the financial system to optimally allocate capital across different sectors which pins down aggregate capital productivity in relatively poorer countries. This means that if the financial sector of a country is underdeveloped, then domestic and foreign finance cannot easily be intermediated to firms, and some sectors will be disproportionately harmed by this inefficiency. More precisely, despite operating under a common financial system, those sectors that rely more on external finance will be more credit-limited than those that are able to generate sufficient internal funds. Under this scenario, AC claim that countries suffering from financial underdevelopment could circumvent the misallocation problem by specializing in production of sectors that are less harmed by the malfunctioning of the financial system (i.e., less financially dependent sectors) - this specialization being only allowed by international trade. This, in turn raises aggregate return to capital and attracts foreign capital inflows.

Therefore, a testable implication of AC's model is that *higher shares of production in less financially dependent sectors can increase aggregate MPK in countries with weaker financial intermediation systems and this attracts foreign capital inflows*. Accordingly, in this paper we empirically evaluate this proposition by examining how these two types of financial frictions at the country and sector level interact and affect aggregate return to capital (proxied by aggregate MPK) and capital inflows (proxied by bilateral FDI inflows[6]). The identification strategy that we follow in order to test this proposition in different panel regressions, is to separately assess the effect of a country's specialization in the production of financially dependent sectors (proxied by a *weighted average financial dependence* measure[7]) on MPK and in inward bilateral FDI flows, conditional on the development of the financial system. First we rely on a nonlinear MPK regression specification for developing and developed countries that interacts our proxy of external financial dependence with different measures of the level of financial development. Then, we restrict our sample to middle and low income economies (which by selection are relatively less financially developed than high income countries[8]) and estimate the effect of external financial dependence on FDI inflows in a gravity-like framework. Finally, in order to assess whether the mechanism through which financial external dependence affects FDI inflows is through its financial frictions, the effect is again, conditioned to depend on the level of financial

[6]International capital flows are composed of private (FDI and portfolio investment) and official flows (debt and aid).

[7]Section 3 details the construction of this and the rest of relevant variables.

[8]Section 3 gives stylized facts about this and other facts motivating our analysis.

development.

Our results suggest that increasing production in financially dependent sectors has a positive effect on MPK only if a country achieves a certain level of financial development, otherwise it has a negative and significant effect. Splitting our sample between developed and developing countries, shows that production in financially dependent sectors is only positive for the former, regardless of their financial development. While the effect is significantly negative for developing countries and the interaction term with financial development is positive and highly significant, which means that for these countries, financial development is a must in order production in financially intensive activities to be beneficial. Concerning FDI estimates (for developing countries), we find that production in financially dependent sectors is significantly negative and robust to inclusion and exclusion of standard controls, specially other channels that can explain the up-hill trend of capital flows, such as a country's overall risk (including institutions) and financial openness. These results suggest, as argued by AC, that there could be potential gains from trade openness in developing countries by specializing in less financially dependent sectors, but it seems that even though when trade openness has taken place, specialization in less financially dependent sectors has not happened. On the contrary, our measure of external financial dependence is comparable between developed and developing economies, while there is a big and persistent heterogeneity in financial development between developed and developing economies. Thus, our findings imply that this specialization only presents positive effects for MPK in advanced economies, and the main difference -between developed and developing- driving these results seems to be the existence of a sound financial system.

Summing up, consistent with CF's findings, we find that MPK is similar between capital rich and capital poor countries - sometimes even lower in the latter - and this pattern doesn't change over time. Furthermore, in line with AC's theory, financial development seems to be a necessary condition -and certainly not a sufficient one- in order for production in financially dependent sectors to positively affect aggregate MPK and FDI. In this logic, our paper is also closely related to Prasad et al. (2007), who study the relation between foreign capital and growth. Using industry level data, they find that when countries don't have a sufficiently developed financial system, foreign capital inflows don't play any role in the growth of financially dependent sectors, suggesting that foreign flows are not efficiently inter-mediated. They argue that financial development is a necessary pre-condition in order to benefit from foreign capital, and propose financial underdevelopment of poorer countries as a candidate for the explanation of up-hill trends of international capital flows. These results taken altogether contribute to some extent explaining Lucas' Paradox of why more capitals don't flow from capital rich to capital poor countries. In sum, the empirical contribution of this paper lies in providing new within-country evidence on how

production of financially intensive sectors shapes MPK and attracts FDI inflows, and how these effects strongly depend on country's financial sector's soundness.

The rest of the paper is organized as follows. Section 2 discusses a brief review of the relevant theoretical and empirical considerations and presents the theoretical mechanism in AC's model that we test in this paper. In order to motivate our results, we start by showing some stylized facts in Section 3, where we also describe the data, Section 4 presents the econometric strategy, Section 5 shows the empirical results and explores robustness checks and Section 6 concludes.

2 Relationship to literature

This paper is closely connected to different fields. First, since it aims at examining the determinants of capitals in developing countries, it therefore joins the global imbalances' and the Lucas' Paradox literature. It specially relates to Alfaro et al. (2008), Prasad et al. (2007) and Caselli and Feyrer (2007). The first authors specifically study the determinants of the direction of capital flows, in the same way as we do in this paper and find that the main reason why more capitals don't flow to capital poor countries is their weak institutions. On the other hand, while using a different approach, our results rather echo Prasad et al. (2007), who find that financial underdevelopment in poorer countries limits absorption of capital and this can be one of the explanations for the uphill flows of capital. In line with their findings we argue that financial underdevelopment is one important driver of global imbalances. Concerning Caselli and Feyrer, the authors use a cross-section of countries and find that, at odds with the existence of large capital differences across countries, "'correctly measured"' MPK results in small differences of MPK across countries. In this paper we reproduce their analysis for a span of 15 years; our findings are in line with CF, where big MPK differences across capital rich and capital poor countries are not found and this pattern is stable over time.

Second, this paper also relates to a growing literature where financial development is studied as a comparative advantage which determines production specialization patterns of different countries, such as Rajan and Zingales (1998), Beck (2003, 2002), Do and Levchenko (2007) and Manova (2008). Additionally, our analysis also closely connects to another relatively new literature in international macroeconomics which is inspired in trade literature and applies gravity equations to international finance, such as Martin and Rey (2004), Portes and Rey (2005), Aviat and Coeurdacier (2007) and Okawa and Van Wincoop (2012). In the same fashion, Head and Ries (2008) and De Sousa and Lochard (2011) have shown that gravity equations also fit very well FDI flows.

Finally, since this paper aims at testing one theoretical mechanism in Antràs and Caballero (2009), it closely relates to Kalemli-Ozcan and Nikolsko-Rzhevskyy (2010), which to the best of our knowledge, is the unique attempt in providing empirical evidence of the former, more specifically, they test whether trade determines capital inflows in developing countries. For this purpose, they use panel-data for the period 1859-1913 on trade and FDI between three source countries, namely, France, Germany, and the U.K. and one host country, the Ottoman Empire. In order to test the complementarity between trade and capital flows and provide evidence of the causal impact from the former to the latter, they use an IV approach to correct for the reverse causation. Specifically, they use a variable related to the weather conditions which they interact with the content of trade of the Ottoman Empire as the time-varying instrument for trade. They state that this is a good instrument for the Ottoman Empire's trade by establishing a linkage between trade and production and then by arguing why production is closely tied to weather conditions in this case. The authors argue that their results are consistent with the complementarity between trade and FDI arising from the existence of financial frictions in the sense that trade increases the return to capital in financially underdeveloped economies. This is because trade serves as a channel to circumvent the problem of misallocation of capital due to the financing constraints, as argued by AC. On top of this, they also argue that this complementarity is consistent with the punishment hypothesis as trade works as an "implicit guarantee for creditors" due to the potential loss of benefits related to trade, hence inducing more capital inflows.

Thus, Kalemli-Ozcan and Nikolsko-Rzhevskyy's paper differs from this one in two main aspects. The first is that this paper does not provide a test of the complementary relationship between trade and capital flows as they do, but rather a test of the mechanism through which this complementarity takes place. Second, unlike their paper, ours goes one step further in providing evidence for AC's model by accounting for the existence of financial frictions and the way they interact to shape capital flows into developing countries. Therefore, the main contribution of this paper is to provide a direct test of the mechanism in AC - linked to financial frictions, which joins many other papers in contributing to the explanation of Lucas' Paradox. On the other hand, the paper also updates and extends the MPK analysis proposed by Caselli and Feyrer (2007), using new available data. Finally, the most important theoretical background of our analysis is AC's paper. Therefore, the following subsection will briefly detail the main mechanisms and implications of their theoretical model.

2.1 Antràs and Caballero's Mechanism

In contrast with the neoclassical international trade theory's predictions, AC argue that in a world with financial frictions that differently affect different countries and sectors, trade and capital mobility become complements from the point of view of less financially developed economies. For this purpose, they develop a benchmark model which consists of two-factor, two-sector and two-countries, where labor mobility is perfect across sectors. Both countries are initially symmetric except for financial heterogeneity at the sector and country level. This financial heterogeneity can be considered as follows:

Concerning the heterogeneity across countries and motivated by one of the characteristics that distinguishes the most the developing -South- from the developed -North- countries, one could expect a "South" developing economy as having a worse financial development, and a developed "North" economy as being more financially developed. On the other hand, when it comes about the heterogeneity across sectors, it is assumed that there are some sectors which are more financially dependent, meaning that they rely relatively more on external funds and thereby, they will face some constraints in financing their production; these ones will be called the "constrained sectors"[9]. In contrast, there are some other sectors which will not find any financial constraint because they rely less on external financing; these ones will be called the "unconstrained sectors". Consistent with the literature[10], this assumption is motivated by theoretical and empirical findings that support the idea that different industries are differently affected by financial underdevelopment. For the purpose of AC's model, the financial constraint faced by the more financially dependent sectors, can be viewed as the result of a problem of asymmetric information between the lender and the producer, where the latter has more information about the return of his production project and the former faces a costly state verification, which translates into a higher risk for the lender. It is clear then, that in South economies with their worse financial markets, this risk is higher than in North. Thus, the way these financial frictions interact can be seen as the capacity of the financial system to overcome a moral hazard problem that limits the amount of capital which borrowers can pledge to lenders, in some sectors of the economy- where, this ability measures the development of the financial system.

It is convenient to begin by taking a look at the autarkic equilibrium, where goods and factor markets clear domestically. South, with the worse financial institutions, will disproportionally allocate more capital to the unconstrained sector, whose output is then oversupplied and its relative price is depressed. This high capital-labor ratio in the uncon-

[9] Later in this article, when referring to these "constrained sectors", as named by AC in their paper, we will also call to them "financially intensive sectors" or "sectors dependent on external financing" as most literature does. All terms are to be understood as synonyms.

[10] See for example: (Bougheas et al., 2010) and (Sakuragawa et al., 2010) p.6

strained sector depresses relative wages and rental rates of capital in South. If international capital mobility is now allowed, capital will flow from South towards North seeking the higher return to capital, where the better financial development allows a more efficient allocation of factors across sectors. The implications on capital flows vary if international trade in goods is considered. When South opens itself up to trade, it will be confronted to an increase in the price of the unconstrained sector's good, leading to an incomplete specialization in the unconstrained sector, in which it now has a comparative advantage. Thus, it becomes a net importer of the financially constrained good.

Trade liberalization then allows South to allocate a disproportionate fraction of labor in the unconstrained sector -not being subject anymore to the domestic clearance conditions, thus increasing the marginal product of capital and its equilibrium rental rate. If one lets South to specialize in a sector with lower financial frictions, international trade decreases the negative impact of its financial underdevelopment on the rental rate of capital. Actually, the rate of return to capital becomes higher in South as trade integration not only reduces the discrepancy in the real return to capital in North and South, but in fact, it turns over the relationship.

The implication is thus that, in the presence of financial heterogeneity across sectors and countries, trade liberalization increases capital flows from North to South, so that trade and capital mobility complement each other in less financially developed economies. The key mechanism behind this reversal, is that with specialization, South indeed will allocate disproportionate resources in unconstrained sectors but only labor will be released from the financially constrained sectors. Capital will continue to gain a premium in the constrained sector because it is under-supplied, thus, it will not move. This implies that with perfect mobility across sectors, wages will continue to be depressed in South. This is contrary to what predicts the Hecksher-Ohlin-Mundell model, where factor mobility substitutes with trade because it allows factor price equalization (FPE). Thereby, the determinants of trade, which are given by the difference of factor prices, are not relevant anymore. However, in AC capital mobility alone is not sufficient for FPE.

Thus, two testable implications of this model are that trade and capital flows are complements in less financially developed countries, on the one hand. And on the other hand, one can test the mechanism behind this complementarity which is that *higher shares of production in less financially dependent sectors can increase aggregate MPK in countries with weaker financial intermediation systems and this attracts foreign capital inflows*. In this paper we privilege the second one because the relationship between trade and capital flows is far from simple and full of endogeneity concerns. Additionally, studying the determinants of marginal return to capital in financially underdeveloped countries and the way this affects

capital inflows can shed interesting insights on the uphill trends of capital flows.

3 Data

3.1 Data

We rely on two different unbalanced panels, one sample at the country level for the MPK regressions in developed and developing economies and a second sample for bilateral FDI gravity regressions restricted to developing countries and its relations with the rest of the world (developing and developed economies). Therefore, we first work with of 60 countries over 1995-2009, and then with a second panel for bilateral relations of 28 countries developing countries (from all partners) during 2001-2010. Data at the sector level come from Klapper et al. (2006) and UNIDO. Data at the country level come from different sources: The World Bank's World Development Indicators (WDI available online); Version 8.0 of the Penn World Tables (PWT)[11]; "The Changing Wealth of Nations" database[12] from the World Bank ; Chinn and Ito's (2009); the International Country Risk Guides (ICRG) from the PRS Group; and the IMF's International Financial Statistics (IFS). Bilateral data comes from United Nation's UNCTAD FDI database (2014) and from the ESCAP-World Bank Trade Cost Database (2014).

Appendix A provides a full list of the countries in each sample as well as some basic descriptive statistics for each country. Appendix B contains full definitions and sources of all variables included in the analysis. Finally, the next subsection describes the construction of the two key variables included in the regressions: MPK at the country-year level, which we use as a proxy for the return to capital in a given country; and in order to capture the cross-sector heterogeneity of financial frictions that affect a country in a given year, we construct a "weighted average external financial dependence" by using sector level data.

Aggregate Marginal Product of Capital

MPK is constructed following the methodology in Caselli and Feyrer (2007) and using new available data from PWT version 8.0 and from the World Bank. We extend their analysis and construct time-varying "proper" measures of MPK in an unbalanced panel of 60 countries during 1995-2009. The authors propose a measure of MPK by assuming that under perfect competition conditions in the capital markets, MPK equals the return to

[11] Feenstra et al. (2015) "The Next Generation of the Penn World Table" available for download at www.ggdc.net/pwt.

[12] The Wealth of Nations data set provides country level data on comprehensive wealth, adjusted net saving, and non-renewable resource rents indicators, as published in "The Changing Wealth of Nations" (2011). It presents a set of comprehensive wealth accounts for over 150 countries for 1995, 2000, and 2005, which allows a longer-term assessment of global, regional, and country performance in building wealth.

capital, which multiplied by total capital stock should equal total capital income. Total capital income can be easily calculated using total income (proxied by GDP) and a *proper* measure of the share of capital in total income. They argue that this proper measure should exclude non-reproducible capital from the "naive" common share of capital that is usually calculated (i.e., one minus the share of labor). This is especially important in the sense that non-reproducible capital (which is essentially land and its products[13]) accounts for a larger share of total production in developing countries than in developed countries (reproducible capital being lower in the former than in the latter). This in turn, creates an upward bias in the common naive measure of MPK in developing, capital poor, countries. Furthermore, the fact that capital is scarcer (in poorer countries) makes it relatively more expensive and this creates a second upward bias in the MPK of capital poor countries if they are not taken into account in the estimation. Therefore, MPK for country i at time t is constructed using the stock of reproducible capital (K_{it}), relative price of capital (P^k/P^c), share of labor compensation in GDP and total wealth W_{it} (defined as natural wealth plus reproducible capital), as follows:

$$MPK_{it} = \frac{[GDP \times P^c \times (1 - LaborShare)]_{it}}{(W \times P^k \times K)_{it}}$$

All variables used in order to construct MPK are easily and directly recovered from the different data bases with the exception of total wealth (W_{it}) for a given country at a given year. It is, therefore, convenient to explain further the way in which we proceeded in this regard. The construction of this variable required making some assumptions since the data that we used in order to estimate total wealth requires information on natural capital (i.e., land and natural-resource wealth). As mentioned above, these data comes from the World Banks database "The Changing Wealth of Nations" and since it is only available for the years 1995, 2000 and 2005, we assumed a linear relation between each of the 2 available points in time and predict a linear change for the last 4 years (i.e., 2006-2009) using the estimated slope in order to get yearly information about natural capital.

Tables 9 and 10 in Appendix A report the MPK measures averaged over 1995-2009 for each country, as well as a graphical visualization of the *proper MPK* measure (Figure 5). Finally, it is convenient mentioning that since we will also use the naive measures in the robustness analysis, we will follow the notation in CF in what follows. Hence, in the rest of the document "PMPKL" will be used in order to make reference to this *proper* measure of MPK, which includes the relative prices correction and the proper share of capital in total income correction.

[13] See appendix B for details.

Weighted average external financial dependence

As it was explained earlier, the construction of this variable combines 2-digits industry-level data on external financial dependence following the definition in Rajan and Zingales (1998) (R&Z, from now on) and production for each country and year at the industry-level. The proxy for each industry's financial dependence is calculated by Klapper et al. (2006) using data on U.S. companies over 1990-1999 from Standard and Poor's Compustat database and it is available in Maskus et al. (2012)[14]. While production data come from the Industrial Statistics Database (2010) collected by the United Nations Statistical Division and the contribution of the manufacturing sector in total production, from the WDI database (online) of the World Bank. The objective is to obtain a time varying measure of the extent of the country's reliance on external finance.

The idea behind this, which has been studied empirically by R&Z and many others, is that for technological reasons, some industries rely more on external finance than others[15]. R&Z define the dependence on external finance as the share of investment that a firm can't finance with its internal cash flows and is calculated as the capital expenditures minus cash flow from operations divided by capital expenditures of a firm. They compute this external dependence for 36 industries varying from tobacco (the industry with the lowest dependence on external finance -which is actually negative) to drugs, the industry with the highest dependence, using U.S. firm-level data from Compustat. The underlying assumption is that the degree of reliance on external finance across industries persists across countries. The argument for this is that given that large companies in the U.S. function under a relatively well-developed financial system, the measures observed for these can be a good proxy for the technological dependence of industries on external finance in other countries.

In this way, we use the time-invariant external dependence of each of the 22 2-digits industries (ISIC rev. 3) in the manufacturing sector and calculate the *weighted average external financial dependence* ($External\ Dep_{it}$) for each country i in year t. In order to do so, we multiply the industry's dependence on external finance by the fraction that each industry k contributes to the total manufacturing production in each country and year over the period 1995-2010, as follows,

$$External\ Dep_{it} = \sum_{k=1}^{22} \left[External\ Dep_k \times \frac{ValueAdded_{kit}}{V.A.\ Manuf_{it}} \right]$$

[14]Note that while the measure used in this analysis comes also from a newer paper from R. Rajan, the original and widely used R&Z's measure is calculated using the same data during the 1980's for 3 and 4-digits ISIC rev. 2 industries.

[15]See for example Beck (2002) and Manova (2008).

where $External\ Dep_k$ is the external dependence index by industry Klapper et al. (2006). An average of these values over 1995-2009 by country (Tables 9 - 10), as well as a graphical visualization (Figure 6) is presented in Appendix A .

3.2 Stylized facts

A first glance at data allows us motivating the econometric analysis in this paper. Some summary statistics are displayed in Table 1, where the variables are averaged by income groups, this is also the case for all figures presented in this section.[16] In this sense Figure 1 shows the evolution of capital-to-labor ratios over 1995-2009 for the different groups, as measured by reproducible capital (in million dollars) per worker. The first salient fact that can be seen is the high differences of capital ratios among groups and how these differences are maintained over time. Together with the information in Table 1 one can sum up Figure 1 in a rough way: High income countries (OECD and non OECD) have on average three times as capital as Upper Middle countries; these in turn have on average twice as capital as Lower Middle countries; and Low income countries are lagging very far behind having on average eight times less capital than Lower Middle countries. One can also say that capital ratios have steadily increased over 1995-2009 for all groups. Especially, the highest capital growth has taken place in Lower and Upper Middle income countries and in High non OECD countries -where it has more than doubled, while capital growth in Low income countries has been rather modest. All in all, differences in capital ratios between rich, middle income and poor countries, were huge in 1995, and continued to be huge in 2009.

Given these differences in capital ratios, it would be reasonable to expect the same big differences in the reward to capital between countries. Nonetheless, Figure 2 is in line with the findings in Caselli and Feyrer (2007), where the return to capital (as proxied by the MPK) doesn't reflect the big cross-country capital differences. MPK, being on average, even lower there where it is scarcer: in Lower Middle, and significantly lower in Low income countries. Additionally, the evolution of MPK is fairly stable over time for all groups. CF state that a proper measure of MPK must account for the higher relative importance of other types of capital (i.e., non reproducible capital) in production in capital poor countries. Otherwise, naively measured MPK, is overestimated both in rich and poorer countries, but significantly more in the latter. Furthermore, they emphasize the importance of accounting for the fact that capital goods are relatively cheaper in capital richer countries, which also overestimates MPK in capital poor countries. Accordingly, Figure 2 depicts a Naive MPK (the red dotted line) and a Proper MPK measure which takes into account the importance of non reproducible capital in production, both measures having been corrected by the

[16] Detailed statistics by country are presented in the appendix A.

relative differences in capital prices. At this point, one should also point out that the case for Low income countries is very particular and different from Middle income ones. Table 1 shows that these countries are, by far, lagging behind in every variable considered: capital ratios, financial development, Naive MPK and proper MPK. Additionally, there is no data for the latter beyond 2000, hence these countries will be left out of the econometric analysis.

The naive measure overestimates MPK for all groups, but the bias is much bigger for Low and (Upper and Lower) Middle income countries where land accounts for a significantly higher share in production than in High income countries. In this sense, on average, naive MPK is indeed higher in Middle income countries than in richer ones. However, when considering the proper MPK measure, MPK differences across countries begin to shrink; this is particularly true for rich OECD countries and Upper Middle countries. It becomes slightly lower in Lower Middle income and fairly higher in rich non OECD countries. However, it is also convenient to point out that the latter group is particular in its kind as well, since it includes countries such as China, Hong Kong and Singapore. These small differences between MPK across capital rich and capital poor countries, suggest that more than mere impediments to international capital movements across countries, must be at play behind the ”up-hill” trend of capitals: if return to capital is not much higher in capital poor countries, the incentives for capital to flow from richer to poorer countries disappear.

In line with this and in the same way as Lucas (1990), CF argue that lower capital-to-labor ratios in poorer countries are due to lower complementary factors and *inefficient uses of factors*. One type of inefficiency can be related to the financial system's ability to optimally channel resources in the economy, for instance Prasad et al. (2007) show that developing countries -and more specifically, less financially developed countries- have limited capacity to absorb foreign capital. They argue that foreign capital needs a sound domestic financial system in order to be effectively intermediated. In this sense, financial underdevelopment -by limiting the ability to absorb capital, could be a good candidate in explaining the lower capital ratios in developing countries.

When one examines standard measures of financial development for these different groups, a big heterogeneity is found across the groups. Figure 3 presents the evolution of financial development during 1995-2009 using two common *de facto* measures of the depth of the financial system: total private credit as a share of GDP and total capitalization as a share of GDP -which, besides credit includes capitalization of the stock market (the blue dotted line). Regardless of the measure considered, it is clear that the financial system is extremely heterogeneous among rich, middle income and poor countries. Both measures are most of the time, well above 100% (as a share of GDP) for rich countries, while it

hardly arrives to 100% for Middle income countries and they are significantly lower in Low income countries - well below 50%. On top of this, not only this variable is much higher in absolute terms for richer countries, but when one considers its growth, rich countries' financial development evolves much faster than in Middle and Low income countries. Therefore, it seems reasonable to consider the well-functioning of financial markets as a good candidate in explaining one type of inefficiency in developing countries. Which can explain the coexistence of small differences in MPK across countries and the large differences in capital-to-labor ratios. Next section, formally examines this question in detail within an econometric framework that takes into account other possible mechanisms behind these stylized facts.

One last important stylized fact motivating our analysis concerns the degree of average external financial dependence of a country's manufacturing production. Figure 4 displays the evolution of this variable during 1995-2009, which is constructed for each country using industry level data and is averaged by income groups in this figure. It reflects the degree of specialization of a country's production in financially intensive activities. An important aspect of this figure is the similarity of the external financial dependence level between High income and Middle income countries, which ranges on average between 4 and 5. This similarity is at odds with the large differences in financial development among these two groups that we just described above. On the other hand, this variable is noticeably lower in Low income countries, hardly arriving to 3, which is more in line with what one would expect according to their financial development level. Nevertheless, it will later be argued that despite these facts - seemingly more in accordance with what is expected, there are other factors specific to these countries driving these stylized facts.

There is a growing literature indicating that financial intensive activities should develop more extensively in countries with stronger financial systems, since financial development reduces the cost of raising external funds for firms[17]. Therefore, one should expect big differences in specialization in financially dependent activities across countries given the important financial development heterogeneity among developed and developing countries. Even though the related literature has shown that financial development and access to finance is positively and causally correlated with faster growth of financially dependent sectors (Rajan and Zingales (1998)) and higher exports (Beck (2003) and Manova (2008)) in these sectors, we observe that the aggregate differences in specialization in financially dependent sectors are not strikingly important and this might be one reason explaining why the return to capital is not higher in capital scarce economies. The explanation behind these different results is the different periods of time observed. Therefore, we don't use the same external financial dependence measure that these studies use, which is the original

[17] See for example: Rajan and Zingales (1998), Beck (2003), Beck (2002), Do and Levchenko (2007) and Manova (2008).

index in Rajan and Zingales (1998). Actually, the index from Klapper et al. (2006) is not positively related with the original R&Z's index. The latter measure is based on Compustat data from the 1980's, while the one that we rely on is based on Compustat data from the 1990's given that our analysis studies the period over 1995-2009[18]

In order to test our proposition, we now formally examine these facts by focusing in AC's theory, who claim that financial underdeveloped economies have a comparative advantage in less financially dependent sectors. Therefore, the benefits from trade -as suggested by their model- cannot be reaped without specializing in these sectors.

Table 1: Key variables evolution: 1995-2009 averages by income group.

Income Group	Year	K/L	Naive MPK	Proper MPK	External Dep.	Credit	Total Cap.
High: OECD	1995	78,920	13.23	11.28	0.25	73.03	118.97
	2000	77,934	13.29	10.95	0.26	94.59	179.25
	2005	96,147	13.31	11.55	0.25	110.60	184.49
	2009	12,4387	12.26	10.99	0.27	147.65	199.68
High: nonOECD	1995	57,039	17.73	15.86	0.29	95.26	171.34
	2000	73,074	20.32	17.72	0.28	111.20	235.66
	2005	100,163	20.53	16.27	0.27	112.97	275.77
	2009	132,108	18.50	17.74	0.27	171.34	398.47
Low	1995	1,980	10.56	2.37	0.26	14.39	40.20
	2000	1,587	8.45	1.21	0.33	14.11	.
	2005	2,085	.	.	0.26	11.74	13.22
	2009	2,545	.	.	0.30	11.33	42.74
Lower middle	1995	7,184	20.19	8.22	0.25	30.42	57.07
	2000	11,761	17.09	7.41	0.27	33.68	64.54
	2005	15,475	22.86	10.07	0.23	35.14	96.10
	2009	21,785	18.84	7.00	0.20	37.65	132.58
Upper middle	1995	20,668	19.22	10.37	0.24	27.22	72.32
	2000	22,769	20.71	12.15	0.24	35.49	59.83
	2005	28,299	20.69	13.32	0.23	33.77	62.80
	2009	46,895	13.69	9.75	0.22	42.54	51.63

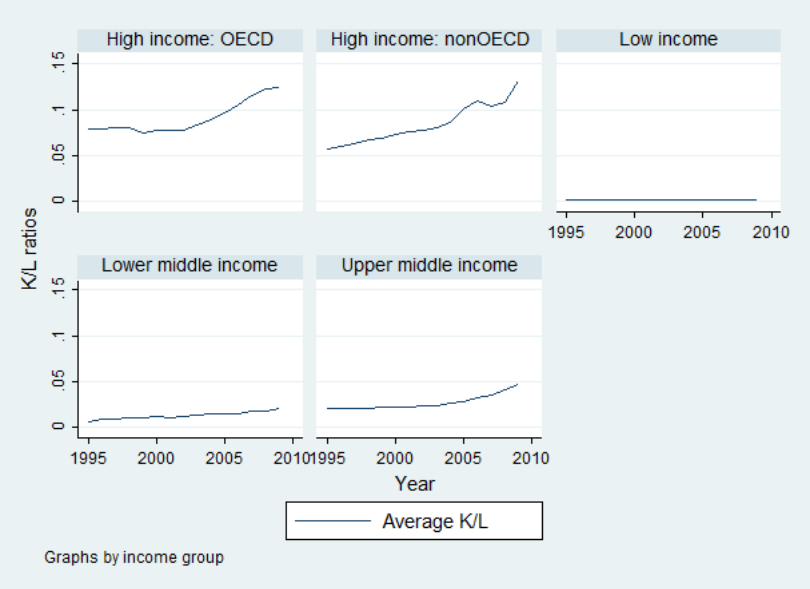
K/L is capital per worker, Naive MPK is marginal product of capital corrected by relative capital prices but not accounting for the importance of non-reproducible capital (or natural capital) in total production, Proper MPK accounts for non-reproducible capital, External Dep. is the measure of external financial dependence weighted by the share of each sector in a country's manufacturing production, Credit is total private credit as a share of GDP, Total Cap. is total capitalization as a share of GDP which includes credit and capitalization of the stock market.

Before turning to the econometric analysis, it is convenient noting that even if the "properly measured" MPK shrinks the MPK differences across developed and developing countries (and even turns around the relation for the low and low and middle income countries), there is still enough between variation in this measure in our panel in order to perform an econometric analysis on this variable. Table 8 in the Appendix decomposes the MPK

[18]The difference between both indexes arises in large part because of changes in industrial environment between the two periods in the U.S. Some sectors that were booming in the 1980's were shrinking in the 1990's. For instance, Biotech did not exist in the 1980's and became a big part of U.S. industry by the end of the 1990's.

Figure 1:

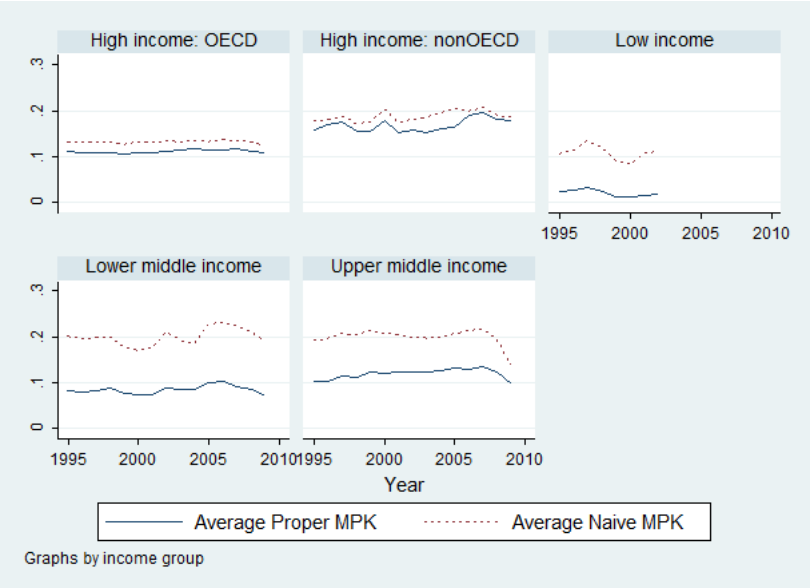
Evolution of capital-to-labor ratios around the world



Notes: Capital ratios in million USD are averaged by income group. Source : Author's calculations, using data from Penn World Tables PWT version 8.0 and The Changing Wealth of Nations database (World Bank).

Figure 2:

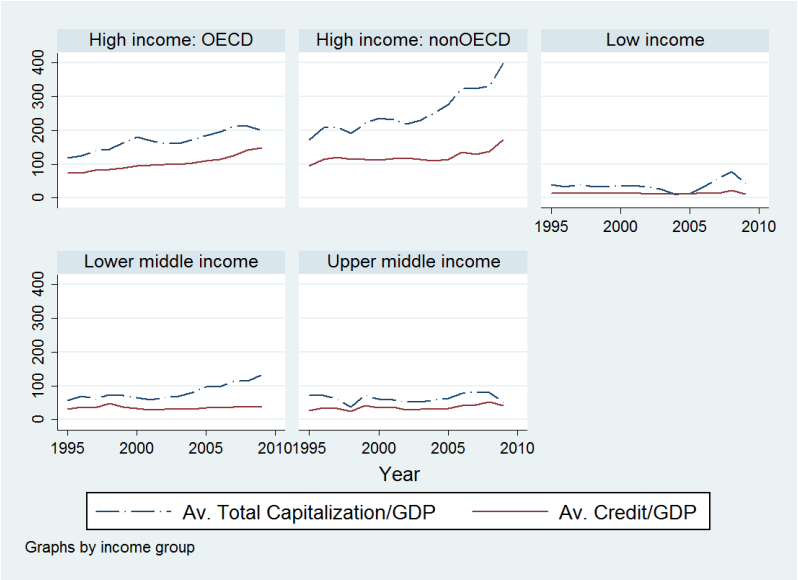
Naive and Proper MPK evolution averaged by income group



Notes: Proper MPK is the price and natural capital (land) corrected measure and Naive MPK is only the price corrected measure but doesn't include natural capital (land). These measures are averaged by income group. Source : Author's calculations, using data from Penn World Tables PWT version 8.0 and The Changing Wealth of Nations database (World Bank).

Figure 3:

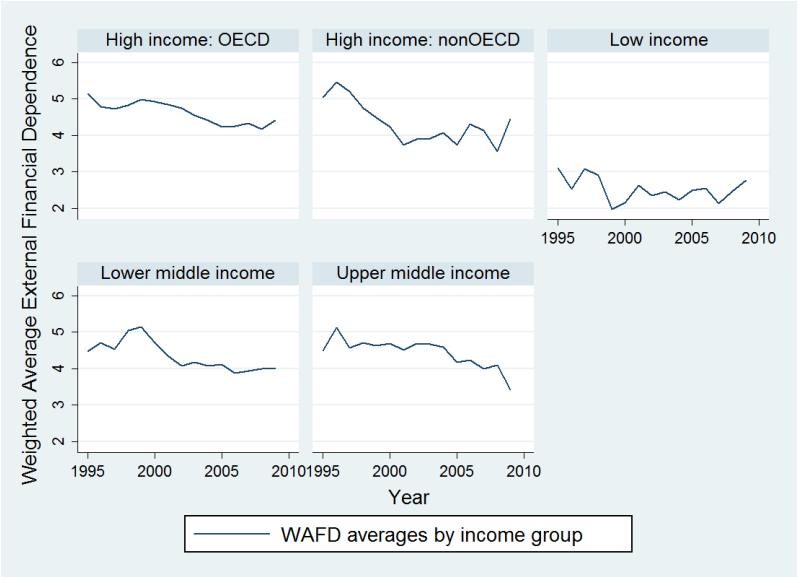
Financial Development measures averaged by income group



Notes: Credit is total private credit over GDP and Total Capitalization is total private credit plus stock market capitalization over GDP. These measures are averaged by income group. Source : Author's calculations from Global Financial Development Database (World Bank).

Figure 4:

External Financial Dependence measure averaged by income group



Notes: WAFD is our measure of average financial dependence at the country level, where each sector is attributed a dependence index from Rajan and Zingales (1998) and is weighted by production in each sector. In these figures, this measure is averaged by income group. Source : Author's calculations from Rajan and Zingales (1998) and Unido Database (United Nations).

variation between countries and within countries and it can be seen that most of the variation comes from between country differences.

4 Econometric analysis

Our empirical objective is to examine how financial development at the country level and external financial dependence at the sector level interact to shape aggregate MPK and capital inflows. More specifically, we test whether *higher shares of production in less financially dependent sectors can increase aggregate MPK and attract capital inflows in countries with weaker financial intermediation systems*. For this purpose, we first work with time-varying data at the country-level in order to examine MPK among capital rich and capital poor countries. Next, we focus on FDI inflows in developing countries by relying on bilateral time-varying data at the level of the country.

4.1 MPK developed vs. developing countries

How the overall return to capital of a country is affected by production in financially intensive sectors? Given that developed dramatically differ from developing countries in terms of financial development and that we expect production in financially intensive sectors to differently affect both types of countries, we proceed in two steps in order to answer this question. First, we examine how financially intensive production is related to MPK in a given country, where we condition the relation to depend on whether the country is a developing or a developed one. Second, we evaluate whether these differences among developed and developing countries come from differences in the efficiency of their financial itermediation.

We, therefore, begin by estimating the following two-way fixed effects models by OLS,

$$ln\ PMPKL_{it} = \alpha + \lambda_1\ External\ Dep_{it} + \beta^{'} X_{it} + \eta_i + \psi_t + \epsilon_{it} \tag{1}$$

and

$$\begin{aligned} ln\ PMPKL_{it} = \alpha + \lambda_1\ External\ Dep_{it} + \lambda_2\ External\ Dep_{it} \times 1(Dev_i = 1) \\ + \beta^{'} X_{it} + \eta_i + \psi_t + \epsilon_{it} \end{aligned} \tag{2}$$

where $ln\ PMPKL_{it}$ is the aggregate marginal product of capital for country i at time t, corrected by relative capital prices and using a proper measure of capital share in income, as explained in section 3. $External\ Dep_{it}$ is the logarithm of weighted average external financial dependence and $1(Dev_i = 1)$ is a binary variable taking the value of one when the country is classified as developed and zero otherwise.[19] Provided our hypothesis,

[19]The list of developing and developed countries is provided in the appendix A.

we expect λ_2 to be positive given that financial development is strongly related to the level of development of a country. X_{it} are time-varying control variables at the country level such as financial development, financial openness (kaopen), trade openness (de facto measure), corruption, law and order risk index, internal conflict, external conflict, government stability. All these variables are introduced in logarithms. Finally, η_i are country fixed effects and ψ_t are time effects. In order to account for heteroskedasticity and allow correlation of errors across repeated observations within countries, standard errors are clustered at the country-level.

Next, going one step further in testing our proposition, we evaluate whether the different effects of financially intensive production between developed and developing countries are driven by differences in the development of the financial system. For this purpose, we estimate a non-linear version of equation 1 by allowing the effect of financially intensive production to vary with the country's level of financial development. This, with the aim of assessing whether it is only aggregate development that matters, or if it is rather financial development the key variable driving the results. We do so by including an interaction term between our proxy of external financial dependence and two alternative measures of financial development by focusing on each one at a time, as follows,

$$\begin{aligned} ln\, PMPKL_{it} = \; & \alpha + \beta^{'} X_{it} + \lambda_1 External\ Dep_{it} + \beta_1 Fin\ Dev_{it} \\ & + \lambda_3 \left(External\ Dep_{it} \times Fin\ Dev_{it}\right) + \eta_i + \psi_t + \epsilon_{it} \end{aligned} \tag{3}$$

where $Fin\ Dev_{it}$ is the logarithm of a time-varying measure for financial development in each country, as measured by either of the two alternative standard variables: (1) *Total private credit over GDP* and (2) *Total Capitalization*, which is total private credit plus stock market capitalization over GDP. This estimation is first performed on the whole sample of countries and then separately on developed and developing countries. The separate samples estimations imposes less constraints given that it allows the estimated coefficients (for both, those of our variables of interest and those of the rest of controls) to differ between developed and developing countries. In this sense, given the hypothesis that we aim at testing, we expect λ_3 to be positive and λ_1 negative. Meaning that in order for production in financially intensive sectors to be advantageous, a financial system capable of intermediating resources efficiently is required.

Finally, we turn to the evaluation of the effects of these financial frictions on capital inflows tn developing countries, more specifically FDI flows.

4.2 FDI developing countries

Are financial frictions a possible additional explanation of the Lucas' Paradox? In order to assess this question, we analyze how financial dependence affects capital inflows in financially underdeveloped economies and whether this effect varies according to the level of financial development of these economies. To that end, we restrict our sample to Middle and Low income countries -which by selection are relatively less financially developed than High income countries- and we estimate the effect of external financial dependence on FDI inflows in a gravity-like framework. Subsequently, with the purpose of assessing whether the mechanism through which production in financially intensive sectors affects FDI inflows is through the existence of financial frictions, we asses its effect conditional on the level of financial development. Hence, the following two gravity equations for bilateral inward FDI flows are estimated by OLS,

$$ln\left(FDI_{ijt}\right) = \alpha + \lambda_1 External\ Dep_{it} + \phi' X_{ijt} + \beta' X_{it} + \delta_{ij} + \psi_t + \epsilon_{ijt} \tag{4}$$

and

$$\begin{aligned} ln\left(FDI_{ijt}\right) = \alpha &+ \lambda_1 External\ Dep_{it} + \beta_1 Fin\ Dev_{it} \\ &+ \lambda_2 \left(External\ Dep_{it} \times Fin\ Dev_{it}\right) \\ &+ \phi' X_{ijt} + \beta' X_{it} + \delta_{ij} + \psi_t + \epsilon_{ijt} \end{aligned} \tag{5}$$

where FDI_{ijt} are FDI inward flows in a developing country i, from partner j, in year t and where partners can be both developed and developing countries. X_{ijt} are bilateral time-varying controls such as the product of the GDP of both partners and bilateral trade costs in year t. $Fin\ Dev_{it}$ is financial development as measured by *Total private credit over GDP*. X_{it} are additional domestic controls varying over time, such as trade openness, financial openness, country overall risk and institutions related variables (all in logarithms). The latter are of especial importance since *weaker institutions* in developing countries have been found to be a strong determinant of capital flows to these countries and a potential explanation of the Lucas' Paradox[20]. Finally, δ_{ij} is the dyadic fixed effect for domestic and partner, and ψ_t are time effects. The dyadic term captures important gravity variables that don't varying over time such as distance, contiguity, common language, colonial ties and common trade agreement (to the extent that it does not vary over time). The standard errors are clustered at the country-pair level to account for heteroskedasticity and non-independence among repeated observations within countries pairs.

[20] See for instance: Alfaro et al. (2009).

Before presenting the empirical results, it is convenient to motivate the use of gravity in this framework. Gravity equations, despite of its earlier lack of theoretical foundation, have long been used in order to explain trade flows between two partners given their extremely good data fitting[21]. Thus, recent literature has provided them with a theoretical micro foundation which requires an explicit admittance of countries' multilateral resistance terms in order to have theory-consistent estimations.[22] Roughly speaking, accounting for multilateral resistance translates in taking into account cross-country differences in terms of prices and fixed costs of trading. Within a panel framework, these effects are controlled for by introducing fixed effects at the country-time dimension for importer and exporter and country-pair dummies. In this paper, while we introduce the latter, we are not able to introduce time-varying country dummies due to the fact that our variables of interest vary on the country-time dimension. Therefore, we will content to use as much as time-varying controls as possible, and of especial interest, we introduce bilateral time-varying trade costs which should take care -to some extent- of multilateral resistance since it accounts for changes in trade costs across all bilateral partners.

Similarly, gravity variables have been shown to fit data on international financial flows at least as well as trade in goods, where distance is strongly and negatively correlated with assets trade, which seems to reflect informational costs[23]. At first sight, this could be perplexing to a certain extent, when the type of capital flows that one has in mind is FDI, where distance could be positively related to FDI given the proximity-concentration trade-off[24]. However, this theoretical negative effect is rarely found in the data given the "aggregation biases" and the fact that purely horizontal FDI is seldom seen in practice.[25] Furthermore, since distance is used as an utter control in this paper, we can safely dismiss its effect, which is captured by the country-pair fixed effects. Additionally, one of the purposes of using gravity equations has always been analyzing the trade effect of different trade policies, therefore the gravity ingredients become mere controls when the actual interest is the trade effect of a given additional variable. In the same way, this paper uses gravity-type variables aiming at controlling for all possible determinants of capital inflows and introduces the additional variables of interest: financial frictions.

[21] The so-called gravity variables (i.e., distance and GDP, in its simplest form) where introduced by Tinbergen (1962) and, ever since, have extensively been used in international trade given their remarkable empirical performance in predicting trade flows.

[22] See Anderson and Van Wincoop (2003).

[23] See Portes and Rey (2005) and Aviat and Coeurdacier (2007) for motivations on the use of gravity equations to explain bilateral capital flows.

[24] This trade-off is related to the fact that FDI and trade can be substitutes since they are alternative ways of serving a foreign market. Specifically, this is the case of horizontal FDI where distance increases the incentives for investing abroad given that trade costs are an increasing function of distance.

[25] See Blonigen (2001) and Head and Ries (2001) for a discussion on the difficulty in identifying the substitutability between FDI and exports implied by pure horizontal FDI.

5 Results

Estimations results for the MPK analysis for the whole sample of countries are presented are presented in subsection 5.1 and the results for the FDI estimations in developing countries are found in subsection 5.2.

5.1 MPK developed vs. developing countries

Table 2: MPK, external dependence and overall development.

	(1) lnPMPKL	(2) lnPMPKL
External dependence	-0.28	-0.61^a
	(-1.21)	(-2.71)
$1(Dev_i = 1) \times$ External dependence		0.90^a
		(3.78)
Fin. Development	-0.01	-0.01
	(-0.16)	(-0.26)
Controls	Yes	Yes
Country F.E.	Yes	Yes
Time F.E.	Yes	Yes
Observations	654	654
Adjusted R^2	0.896	0.907
F	2.25	4.85

t statistics in parentheses. All All variables in logs.
All regressions include country time-varying controls, country and time F.E., errors clustered at country level.
^{c} $p < 0.10$, ^{b} $p < 0.05$, ^{a} $p < 0.01$

Table 2 shows the estimates for the basic MPK unconditional specification 1 and for specification 2, where the effect of financial dependence is allowed to depend on the overall development of the country, captured by the dummy variable, $1(Dev_i = 1)$. Both specifications are performed on the whole sample of countries.

The estimated coefficient on External Dependence, $\hat{\lambda}_1$, in column (1), is negative but insignificant. Suggesting, therefore, that there is no overall effect of specializing in financially intensive sectors on the MPK of a country. However, this relation seems to be hiding both a strong negative and a strong positive effect at the same time. This is confirmed by the results in column (2), where the effect is allowed to adjust for developed and developing countries. $\hat{\lambda}_1$ becomes stronger in magnitude and significant at the 1-percent level, while the coefficient on the interaction term with the development dummy, $\hat{\lambda}_2$ is positive and also significant at highest levels. Where, the interpretation is this that production in financially intensive sectors is on average, negatively related to the aggregate return of capital in a developing country while the relation is positive for developed countries ($\hat{\lambda}_2 > \hat{\lambda}_1$ in

Table 3: MPK, external dependence and financial development

	Dependent Variable: ln PMPKL					
	All countries		High Income		Low & Mid. Income	
	(1)	(2)	(3)	(4)	(5)	(6)
External dependence	-0.28	-1.74^a	0.25^a	-0.04	-0.55^b	-2.00^a
	(-1.21)	(-4.57)	(2.83)	(-0.10)	(-2.55)	(-4.69)
Fin. Development	-0.01	0.51^a	-0.07	0.00	0.10	0.75^a
	(-0.16)	(4.24)	(-1.64)	(0.04)	(1.33)	(3.40)
External Dep. $\times$ Fin. Development		0.37^a		0.06		0.44^a
		(4.83)		(0.72)		(3.18)
Controls						
Trade openness	0.05	0.02	0.06	0.06	-0.14	-0.17
	(0.30)	(0.11)	(0.39)	(0.39)	(-0.74)	(-0.94)
Chinn-Ito index	-0.01	0.02	0.05	0.05	-0.06	-0.06
	(-0.08)	(0.25)	(0.50)	(0.53)	(-0.61)	(-0.54)
Corruption	-0.04^b	-0.04^b	-0.01	-0.01	-0.08^b	-0.08^b
	(-2.19)	(-2.28)	(-0.51)	(-0.50)	(-2.33)	(-2.27)
Government Stability	0.00	0.01	0.00	0.00	0.00	0.00
	(0.34)	(0.65)	(0.42)	(0.46)	(0.10)	(0.19)
Law and Order	0.03	0.03	0.01	0.01	0.06	0.06
	(0.88)	(0.96)	(0.60)	(0.63)	(1.12)	(1.24)
Internal Conflict	-0.00	0.00	-0.00	-0.00	-0.02	-0.02
	(-0.20)	(0.09)	(-0.17)	(-0.14)	(-1.03)	(-0.85)
Country F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	654	654	370	370	284	284
Adjusted R^2	0.896	0.907	0.932	0.931	0.892	0.899
F	2.25	5.57	9.97	10.59	14.33	32.25

t statistics in parentheses. All variables in logs.
All regressions include country and time F.E., errors clustered at country level.
^{c} $p < 0.10$, ^{b} $p < 0.05$, ^{a} $p < 0.01$

absolute terms).

Are these differences among developed and developing countries due to the existence of financial frictions? This question is assessed with the help of specification 3, where the effect of specializing in financially intensive sectors is estimated conditional on the country's level of financial development. Table 3 displays these results, where columns (1) and (2) estimations correspond to the unconditional and conditional (on financial develepment) MPK regressions on the whole sample of countries, columns (3) and (4)

report the results on the High income countries sample and columns (5) and (6) on the developing countries sample (Low and Middle Income economies).

From the comparison between the signs and significance of the $External\ Dependence$ coefficients in the different MPK regressions an interesting pattern arises: when all countries are pooled together, there seems again to be no average effect of specializing in financially dependent sectors, given that $\hat{\lambda}_1$ is not even significant at the lowest level of acceptance. However, the unconditional regressions results (for High income and Low-Middle income) suggest that this apparent insignificance is due to the highly significant and opposite effects that $External\ Dependence$ has on developed and developing countries' MPK. Very interestingly, when the interaction term with financial development is introduced for the whole sample, the magnitude of the coefficient on $External\ dependence$ becomes much bigger and statistically significant at the highest levels, while the sign of the interaction is positive and also significant at the 1-percent level. This means that for a given country in our sample, on average, increasing its local production of financially intensive goods has a negative effect on its aggregate MPK, unless it benefits from a sufficiently developed financial system.

Regarding each of the groups of countries separately, the results seem to hint at the same effect and in favor of our hypothesis. For High income countries, $\hat{\lambda}_1$ is positive and significant at the 1-percent level for the unconditional regression. While it becomes statistically insignificant and the sign flips when it is interacted with financial development. Furthermore, the coefficient of the interaction term is neither significant at any level of acceptance. Exactly, the opposite happens to Low and Middle Income countries, where $\hat{\lambda}_1$ has a significant, important (in magnitude) and negative effect on MPK in both specifications. On top of this, the introduction of the interaction term strengthens the negative main effect of $ExternalDependence$ with respect to the unconditional regression. Where, both effects become significant at the 1-percent level and go in the opposite direction ($\hat{\lambda}_1 < 0$ and $\hat{\lambda}_3 > 0$). Hence, this findings point in the direction of our priors, where the existence of financial frictions in developing countries seem to be part of the reasons explaining why the level of the aggregate return to capital is not as high as predicted by their relatively low level of capital-to-labor ratios.

Given that we are exploiting the within variation of the data, this means that for a given High income country - where the financial system is considered to be sufficiently developed, producing in financially intensive sectors improves, on average, the aggregate economy. Furthermore, providing additional credit to the economy doesn't seem to matter for this effect to take place, possibly because firms already get enough finance. On the other hand, in developing countries, the results show that providing additional credit to the

economy is a necessary condition in order to reap the benefits of expanding the production of financially intensive sectors. Suggesting, thus, that firms do not get enough financing in these economies, given their relatively less efficient financial intermediation.

Concerning the controls variables, most of them are self-explicative and display the expected sign: from the overall country risk -represented by *corruption*, *government stability*, *law and order* and *internal conflict*- only *corruption* appears to be significant. Furthermore, it seems to matter only when Low and Middle income countries are included in the sample. The negative coefficient of financial development for developed countries might seem somehow strange, even if it is estimated without precision. However, one possible explanation for this can be that credit, efficiently intermediated to firms, translates into more capital. Thus, lower aggregate MPK as well since it is a decreasing function of capital given the classical hypothesis of diminishing marginal returns. On top of this, the coefficient on *kaopen* in developing countries may also be a bit puzzling at a first glance. On the one hand, *kaopen* reflects financial openness of a country and its coefficient has a negative sign. However, surprisingly, it doesn't appear to be significant. There can be two possible explanations for these results. Either, foreign finance does not necessarily translate into capital given the relatively inefficient domestic financial markets. Or *kaopen* is not necessarily reflecting overall capital openness in our estimations. The latter argument can be explained by the fact that financial openness is likely to be collinear with *trade openness*.

Finally, when an alternative measure for financial development is considered, the results point in the same direction. Estimation results for equation 3 with the logarithm of *Total Capitalization* as a proxy for the efficiency of the financial system are reported in Table 11 in the Appendix.

Now, in the following subsection we turn to the evaluation of the effect of these financial frictions on the inward FDI in developing countries.

5.2 FDI developing countries

Table 4 presents the FDI gravity equations, where specifications 3 and 4 are estimated for developing countries, in column (1) and (2) respectively. Where the effects of interest are the coeffcients on $External\ Dep_{it}$ and its interaction with $Fin.\ Development_{it}$.

The FDI gravity equations, also confirm our hypothesis: producing in financially intensive sectors is negatively related to FDI inflows in developing countries given that $\hat{\lambda}_1$ is negative, significant at the 5-percent level and robust to the inclusion of standard gravity controls. Furthermore, the effect is robust to the introduction of other possible country time-varying

Table 4: FDI developing countries

	Dependent Variable: ln FDI_{ijt}	
	(1)	(2)
External dependence	-0.73^b	-4.70^b
	(-2.12)	(-2.51)
Fin. Development		1.90^b
		(2.49)
External dependence $\times$ Fin. Development		1.04^b
		(2.17)
Controls		
GDP_ijt	0.60^a	0.46^b
	(3.24)	(2.08)
Trade Costs_ijt	-0.56	-0.48
	(-1.52)	(-1.28)
Trade openness	0.09^b	0.08^c
	(2.08)	(1.87)
Chinn-Ito index	0.41	0.31
	(1.41)	(1.08)
Corruption	-0.10	-0.09
	(-0.80)	(-0.79)
Government Stability	0.01	0.01
	(0.23)	(0.23)
Law and Order	-0.11	-0.10
	(-1.01)	(-0.90)
Internal Conflict	-0.23^a	-0.24^a
	(-3.43)	(-3.50)
Country-pair F.E.	Yes	Yes
Time F.E.	Yes	Yes
Observations	2704	2704
Adjusted R^2	0.763	0.764
F	21.67	19.59

t statistics in parentheses. ll variables in logs.
All regressions include country-pair F.E. and time F.E., errors clustered at country-pair level.
^{c} $p < 0.10$, ^{b} $p < 0.05$, ^{a} $p < 0.01$

determinants of capital inflows, especially those that are related to *institutions* which have been put forward in the literature (Alfaro et al. (2008)).

When we assess whether this negative effect depends on the development of the financial markets, by interacting it with financial development in column (2), $\hat{\lambda}_1$ becomes much stronger in magnitude and remains statistically significant at the 5-percent level. While $\hat{\lambda}_2$ is positive and highly significant as well. The coefficient of financial development is also strong and significant. The positive sign might be an indication that FDI needs a well-functioning financial system in order to take place, which is also in line with the results in Prasad et al. (2007). A counterargument at which one could think is the fact that FDI should actually substitute for the malfunctioning of the domestic financial system and therefore, one should expect it to negatively related to financial development[26]. Even if this might be true, it is also reasonable to think that once an affiliate is established in a foreign country (i.e., first FDI has already taken place), ex-post it needs a good domestic financial system in order to well develop its investment project (e.g., finance day to day expenses, face an unexpected shock, reorganize or expand its production, etc.), investors can anticipate this and incorporate it in their decision-making. All in all, there seems to be a great deal of evidence rather supporting the second view, which is also being echoed by our results[27].

Additionally, in what concerns the control variables, it can be seen that only the bilateral size variables, overall domestic trade openness and the internal conflict dummy (with the highest significance) -all of them having the expected sign- seem to remain important determinants of bilateral FDI. This might be a consequence of the restrictions imposed by the country-pair and time effects. In sum, since we are examining the within variation of the variables, we can say that for the average developing country from our sample, expanding its production towards the more financially dependent sectors unambiguously discourages FDI inflows from the rest of the world, unless the country has a sufficiently developed financial market (more private credit, in this case).

Summing up, our analysis of the different impacts of a higher specialization in financially dependent sectors, shows that its effects on MPK and FDI inflows differ dramatically depending on the financial system's efficiency. A well functioning financial system seems to be a necessary condition for this variable to positively affect MPK and attract FDI flows, otherwise, it is significantly and negatively related to both variables. These results comply with the theory developed by Antràs and Caballero (2009), where the lower development of the financial system creates an artificial comparative disadvantage in the sector that uses it intensively. Therefore, specializing according to its comparative advantage allows

[26] See for instance, Hausmann and Fernandez-Arias (2000)

[27] See for example: Alfaro et al. (2009) and Desbordes and Wei (2014).

circumventing the negative effects on aggregate return to capital within a country producing under a worse financial system. This in turn, increases the incentives for capital inflows from the rest of the world.

These findings combined with the stylized facts presented earlier, suggest that the production in financially dependent sectors is too high for these developing countries considered in our sample, given their financial development level. Which in turn, seems to be one plausible explanation of why MPK is not higher in these countries where capital ratios are significantly lower than in richer countries. This indicates that there is scope for improvements in MPK in financially underdeveloped countries, given their lower relative capital per worker, and that one way through which this could be done is by alleviating the misallocation due to a weaker financial system. Thus, either by improving their financial intermediation or by increasing specialization according to their comparative advantage. Nevertheless, one could think the second option to be unrealistic and even undesirable given the fact that more financially dependent sectors are usually the more technological and the ones that bring about the highest innovation, which seems to be essential for growth. Therefore, we believe that a better interpretation of our results should be that financial development is crucial for increasing aggregate return to capital in developing countries in order to overcome the misallocation problems within these economies.

5.3 Robustness MPK

In this section we consider two alternative "naive measures" of MPK : a first one including only the correction concerning the relative prices of capital (PMPKN), and a second one without any correction (MPKN). Following the notation in Caselli and Feyrer (2007), where N stands for "naive" and P for "price corrected".[28]

We begin by presenting the estimations of equations 1 and 2 for each of these alteranitve MPK's in Table 5. Next we estimate of equation 3, where the effect of $External\,dependence$ varies according to the level of financial development and is estimated for the three different samples. These results are reported in Table 6 for the price-corrected measure and in Table 7 for the MPK measure with no corrections.

Results in Table 5, show that the results are robust to alternative MPK measures, although the less corrections introduced in the MPK measure, the lower the effects and the less precisely estimated. However, the coefficient on the interaction term between $External\ dependence$ and the overall development of the country, remains significant at the 5-percent level even with the "naivest" MPK measure (and at the 1-percent level with

[28] See section 3 for more details on the differences between the naive and proper measures.

the price-corrected measure). Suggesting, thus, that production in financially intensive sectors is negatively related to MPK in developing countries while the relation is positive for developed countries (given that it is still the case that $\hat{\lambda}_2 > \hat{\lambda}_1$).

The same happens with the effect on the alternative MPK measures when we examine $External\ dependence$ conditional on the level of financial development, where the magnitude of the coefficients is lower than before but they point to the same direction. Estimations results for the price-corrected MPK measure remain significant at the 1-percent level. An interesting difference with respect to the "proper MPK measure" arises for High income countries: regardless of the specification considered, $\hat{\lambda}_1$ is positive. Nonetheless, it is only significant (at the highest levels) for the unconditional regression, while it is estimated without precision when it is interacted with financial development (the interaction is even negative for price-corrected measure). Concerning the "naivest MPK measure", in Table 7, where the coefficients display the lowest magnitude and significance with respect to our baseline specifications, the estimates still comply to our hypothesis. When the whole sample of countries is considered in column (2), the estimates of the interaction term as well as the main coefficients on $External\,dependence$ and $Fin.development$ are significant at the 5-percent level and suggest that financially intensive production is negatively related to MPK when financial development is low. Finally, estimations results for the Low and Middle income countries, in column (6) suggest that this effects are mostly driven by these countries, however, the coefficient on the interaction term becomes insignificant.

A possible interpretation of these results is that the price-correction might be important when assessing the effects of financial frictions on MPK. Given that a less efficient financial market translates into costlier production in financially intensive sectors, these differences should be accounted for in the analysis. This is the case when the aggregate MPK measure is corrected for the fact that capital is relatively more expensive in less developed economies.

Table 5: Alternative MPK

Dependent variable:	ln PMPKN		ln MPKN	
	(1)	(2)	(3)	(4)
External dependence	-0.21	-0.49^{c}	-0.24	-0.44^{c}
	(-0.93)	(-1.96)	(-1.29)	(-1.99)
Developped=1 $\times$ External dependence		0.75^{a}		0.55^{b}
		(2.80)		(2.11)
Fin. Development	-0.02	-0.03	0.06	0.06
	(-0.62)	(-0.75)	(1.38)	(1.36)
Controls	Yes	Yes	Yes	Yes
Country F.E.	Yes	Yes	Yes	Yes
Time F.E.	Yes	Yes	Yes	Yes
Observations	654	654	654	654
Adjusted R^2	0.916	0.924	0.884	0.888
F	2.13	3.03	8.39	7.80

t statistics in parentheses. All variables in logs.
All regressions include country time-varying controls, country and time F.E., errors clustered at country level.
^{c} $p < 0.10$, ^{b} $p < 0.05$, ^{a} $p < 0.01$

Table 6: Alternative MPK (including the price-correction)

	Dependent Variable: ln PMPKN					
	All countries		High Income		Low & Mid. Income	
	(1)	(2)	(3)	(4)	(5)	(6)
External dependence	-0.21	-1.41^{a}	0.22^{a}	0.39	-0.43^{c}	-1.73^{a}
	(-0.93)	(-3.19)	(2.84)	(0.95)	(-1.87)	(-5.53)
Fin. Development	-0.02	0.40^{a}	-0.08	-0.12	0.05	0.63^{a}
	(-0.62)	(2.99)	(-1.64)	(-1.02)	(0.74)	(4.45)
External dependence $\times$ Fin. Development		0.30^{a}		-0.03		0.40^{a}
		(3.56)		(-0.44)		(4.43)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	654	654	370	370	284	284
Adjusted R^2	0.916	0.924	0.922	0.922	0.906	0.914
F	2.13	4.79	6.26	8.10	12.17	34.14

t statistics in parentheses. All variables in logs.
All regressions include country time-varying controls, country and time F.E., errors clustered at country level.
^{c} $p < 0.10$, ^{b} $p < 0.05$, ^{a} $p < 0.01$

5.4 Endogeneity concerns and future work

First, one could think that our results are likely to be endogenous if one has in mind a potential reverse causality from capital inflows to financial development and average external financial dependence of the country. This could be the case if foreign capital substitutes

Table 7: Alternative MPK (no corrections at all)

	Dependent Variable: ln MPKN					
	All countries		High Income		Low & Mid. Income	
	(1)	(2)	(3)	(4)	(5)	(6)
External dependence	-0.24	-1.04^{b}	0.10	0.03	-0.39^{c}	-1.17^{b}
	(-1.29)	(-2.25)	(0.75)	(0.04)	(-2.03)	(-2.23)
Fin. Development	0.06	0.34^{b}	-0.05	-0.03	0.09	0.43^{c}
	(1.38)	(2.44)	(-0.95)	(-0.21)	(1.42)	(1.84)
External dependence $\times$ Fin. Development		0.20^{b}		0.01		0.23
		(2.28)		(0.12)		(1.64)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	654	654	370	370	284	284
Adjusted R^2	0.884	0.888	0.846	0.846	0.886	0.889
F	8.39	7.82	13.64	13.03	54.93	35.99

t statistics in parentheses. All variables in logs.
All regressions include country time-varying controls, country and time F.E., errors clustered at country level.
^{c} $p < 0.10$, ^{b} $p < 0.05$, ^{a} $p < 0.01$

for the malfunctioning of the financial system. Nonetheless, even if this argument might be true at the aggregate level, we think that the fact of using bilateral data on FDI is a good way to be safe in terms of reverse causality, given that financial dependence and financial development are aggregate variables. For bilateral FDI to determine one of these aggregates, it would require that a country's partner's FDI inflows represent a sufficiently important share among the aggregate flows from the rest of the world. Additionally, from the stylized facts presented above, we can recall that one of the motivations for our emprirical analysis is the relative inertia in the differences (concerning financial development and capital-to-labor ratios) and similarities (concerning average external dependence) across countries and over time. Thus, we think that there are good reasons to believe that these variables are not being causally determined by our measure of capital flows.

However, one could arguably be concerned about potential endogeneity problems related to a simoultaneous determination of financial development and the production in financially intensive sectors. For instance, in relation to this potential bias, Do and Levchenko (2007) find that domestic demand shapes the development of the financial system. In this sense, one could consider the use of an instrument for financial development in order to tackle possible concerns regarding the endogeneity related to a simoultaneous determination of our variables. A possible future path in this direction, could be to follow the literature on the empirical link between financial development and growth. More specifically, one could use the "legal origins" instrument proposed by de Silanes et al. (1997), who use cross-country differences in legal origin as an exogenous determinant of

the differences in financial development.

Additionally, a standard issue when using gravity equations is the problem of ”zeros”. This, due to the fact that the log-transformation of the variables requires dropping zero values which can in turn be informative and create selection biases. Therefore, one could apply a Poisson estimate, as suggested by Silva and Tenreyro (2006) in order to account for the zeros that are lost in the FDI flows due to the log-transformation of the variable.

Finally, concerning possible extensions of this work, one could replicate the country-level analysis at the sector level, both for MPK and for FDI in order to assess whether our results hold for more granular data and perform an analysis closer to the spirit of the methodology in Rajan and Zingales (1998). However, the use of FDI gravity equations requires bilateral data at the sector level, which is only available for one single year (FDI data from CEPII) and precludes exploiting the advantages of working with panel data. [29]

6 Conclusions

Large differences in capital ratios across countries should be reflected in large differences in marginal product of capital (MPK) and in capital flowing from capital rich to capital scarce economies. New available data allowed us extending the proper MPK measures proposed by Caselli and Feyrer (2007) over time, for an unbalanced panel of 60 countries during 1995-2009. Our findings comply with their results where the return to capital in capital-poor countries is not as high as predicted by their lower level of capital-to-labor ratios. Indeed, MPK seems to be the lowest in the capital poorest countries. Furthermore, this pattern is stable over time. This implies that there are no incentives for capital to flow into capital poor economies. CF attribute the lower capital ratios to lower endowments of complementary factors, *inefficiencies* and differences in relative prices of capital. This suggests that given the lower capital ratios, there is scope for increases in MPK in poorer countries, by alleviating these inefficiencies or by improving complementary factors with capital (e.g., higher levels of education).

On the other hand, Antràs and Caballero (2009) develop a theory where given the existence of heterogeneity in external financial needs across sectors, financial underdevelopment at the country level creates a misallocation problem which can be circumvented by specializing in sectors that are less subject to suffer from the financial malfunctioning. Therefore, financially underdeveloped countries could increase aggregate MPK and attract capital inflows by specializing in less financially intensive sectors. Thus, in this paper we connect this theory with the findings concerning the lower MPK's in developing countries and we

[29] See: http://www.cepii.fr/CEPII/fr/bddmodele/presentation.asp?id=4

examine the *inefficiencies* behind these lower return to capital in capital poorer countries through the lens of AC's theory. One way through which this inefficiency can work is in the form of an inability of the financial system to optimally allocate capital across different sectors, which pins down aggregate capital productivity.

Hence, we examine how aggregate MPK in developing and developed countries is related to financial frictions, as measured by their aggregate production in financially intensive sectors and their level of financial development. Our findings point that on average, production in financially intensive sectors is negatively related to the aggregate MPK of a country and the effect becomes positive only when the financial markets are sufficiently developed. The relation being specially strong among developing countries, who markedly differ from developed countries in terms of financial development.

Additionally, despite the fact that aggregate capital does not flow from capital rich to capital poor countries in the ways predicted by theory, in absolute terms, capital poorer countries do receive capital inflows. We thus, evaluate bilateral FDI inflows in developing countries and find that these are strongly discouraged by the existence of financial frictions. Again, when we allow the effect of producing in financially intensive sectors to depend on financial development, our results suggest that the effect is only positive when a sufficiently developed financial intermediation in the recipient country is achieved. This echoes the existing literature that points that financial underdevelopment can be one of the reasons explaining the existence of global imbalances and the "up-hill" trend of capitals (e.g., Prasad et al. (2007)).

Finally, even though we do not directly evaluate misallocation of capital in this analysis, our findings imply that financial frictions depress the return to capital in financially underdeveloped economies. This, in turn, points that there is no misallocation of capital across countries given their actual levels of financial development and financial dependence. However, this suggests that there is, indeed, misallocation of capital within less financially developed economies and this might one of the reasons why aggregate MPK is not higher in these countries. That is, that if capital was well allocated within these countries their aggregate MPK should be higher (i.e., than that of capital-rich countries), as their capital-labor ratios predict.

All in all, our findings suggest that higher MPK could be achieved either by alleviating financial constraints in developing economies, which could be done either by improving the financial system, or by decreasing production of financially dependent sectors. However, the long run consequences of the second option opens new questions as more financially dependent sectors are also the more technological and innovative.

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Appendix

Appendix A: Descriptive Statistics

Table 8: Panel statistics: within and between variation

	Variable	Mean	Std. Dev.	Min	Max	Observations
PMPKL$_i$	overall	11.54	4.81	2.13	33.80	N = 654
	between		4.57	2.39	25.02	n = 60
	within		1.60	6.10	20.31	T-bar = 10.9
External Dependence$_i$	overall	0.25	0.06	0.06	0.52	N = 654
	between		0.06	0.10	0.45	n = 60
	within		0.02	0.15	0.33	T-bar = 10.9

PMPKL is the *proper* MPK measured. External Dependence corresponds to the country's manufacturing sector's external financial needs.

Figure 5: Cross-country MPK, averages 1995-2009

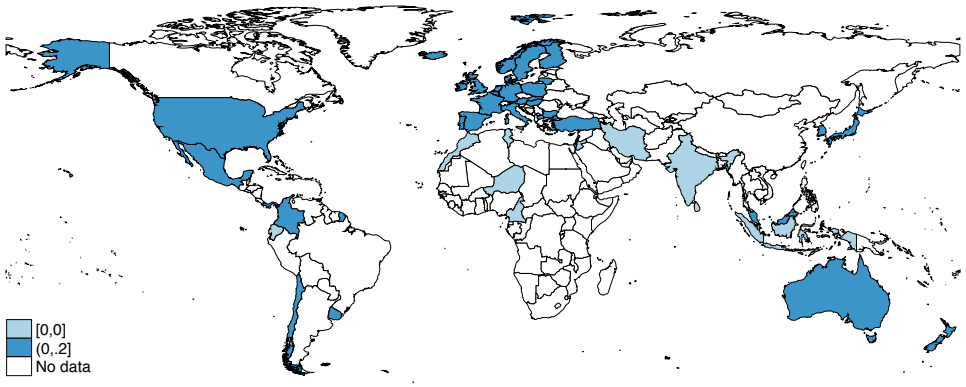
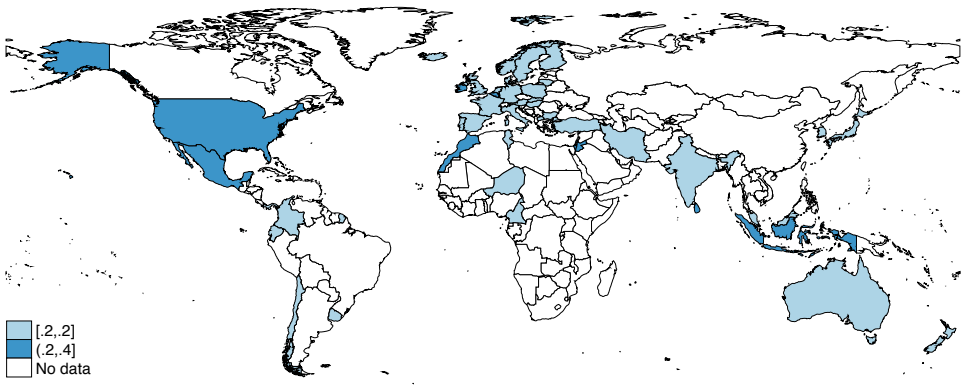


Figure 6: Cross-country External Dependence Manuf., averages 1995-2009



[INCLUDE MEAN DIFF TESTS HERE]

Table 9: Summary Statistics Developing Countries: averages 1995-2009

Country	PMPKL	PMPKN	MPKN	External Dep.	Credit/GDP	Total Cap./GDP	obs.
Azerbaijan	9.18	31.09	34.11	0.11	9.13	.	9
Bolivia	4.46	22.23	28.08	0.10	50.89	53.44	4
Botswana	14.78	23.50	38.95	0.24	10.65	19.07	2
Bulgaria	12.09	22.82	22.06	0.25	24.38	33.85	12
Cameroon	5.88	17.57	26.61	0.22	7.63	.	8
Colombia	8.41	18.96	17.04	0.25	27.44	42.66	11
Cote d'Ivoire	6.56	16.64	26.85	0.26	17.78	25.28	3
Ecuador	6.56	26.74	20.59	0.13	26.38	33.28	14
Egypt, Arab Rep.	19.28	43.19	54.22	0.26	48.52	87.54	6
Gabon	7.63	15.73	42.76	0.17	7.17	.	1
India	8.01	23.63	24.52	0.29	29.83	75.91	14
Indonesia	8.87	21.14	21.98	0.34	26.57	51.71	13
Iran, Islamic Re	6.71	17.80	19.67	0.25	28.27	42.36	13
Jordan	10.00	13.66	12.03	0.31	74.90	190.44	15
Latvia	10.18	14.27	17.70	0.19	52.68	62.49	13
Lithuania	13.08	17.95	23.43	0.21	29.75	48.88	10
Malaysia	11.54	18.82	12.30	0.26	115.60	272.40	13
Mexico	14.39	20.70	25.31	0.31	19.18	44.51	13
Moldova	2.39	5.24	8.34	0.16	23.14	.	9
Morocco	10.99	16.46	14.62	0.31	49.12	88.05	14
Nigeria	3.38	23.84	29.02	0.36	8.79	16.66	2
Panama	19.66	34.27	36.44	0.19	80.47	103.94	6
Peru	15.27	23.80	18.81	0.19	15.95	35.58	2
Philippines	10.34	22.31	20.92	0.27	40.40	93.09	9
Poland	8.66	13.67	14.44	0.24	25.03	41.78	13
Romania	9.30	16.38	15.72	0.20	14.38	24.09	14
Sri Lanka	5.72	11.32	13.21	0.30	27.48	41.77	10
Thailand	14.42	25.84	13.58	0.25	151.63	196.68	2
Tunisia	11.85	17.78	16.46	0.22	62.86	74.82	12
Turkey	20.17	33.12	33.32	0.23	17.69	39.30	14
Uruguay	12.33	20.39	15.45	0.23	32.24	29.19	12
Total	10.38	20.41	20.98	0.24	37.36	72.69	11.5

Source: sample_it.dta

Table 10: Summary Statistics Developed Countries: averages 1995-2009

Country	PMPKL	PMPKN	MPKN	External Dep.	Credit/GDP	Total Cap./GDP	obs.
Australia	8.54	11.82	12.35	0.22	84.01	181.12	11
Austria	8.85	9.72	10.62	0.22	105.90	131.95	14
Belgium	11.08	11.78	11.36	0.31	79.82	148.48	10
Cyprus	10.94	13.25	11.29	0.22	202.12	247.52	15
Czech Republic	9.43	11.11	12.56	0.22	45.23	68.52	12
Denmark	8.86	10.36	10.86	0.25	111.19	167.93	14
Finland	9.41	12.01	10.87	0.22	64.26	175.80	15
France	9.09	10.19	12.28	0.27	87.43	164.77	12
Germany	9.38	10.05	11.37	0.27	112.82	162.61	11
Greece	13.23	15.15	13.74	0.20	53.39	97.22	9
Hong Kong SAR, C	20.75	20.75	15.94	0.21	147.23	494.62	15
Hungary	8.68	10.69	13.48	0.26	40.03	64.11	12
Iceland	8.08	9.10	7.74	0.19	91.50	146.33	11
Ireland	24.01	28.42	26.67	0.45	122.68	183.01	15
Israel	17.58	19.41	14.42	0.33	76.54	134.04	12
Italy	12.67	13.95	11.62	0.22	76.51	116.22	15
Japan	12.17	12.50	11.62	0.28	196.53	271.59	13
Korea, Rep.	16.09	17.05	15.58	0.28	81.01	132.98	14
Malta	14.18	15.44	14.38	0.28	101.65	139.13	14
Netherlands	9.45	10.73	13.23	0.28	138.08	241.55	14
New Zealand	9.50	17.46	20.88	0.17	110.33	150.21	13
Norway	11.69	17.64	18.43	0.22	77.95	118.91	14
Portugal	9.76	10.69	9.04	0.20	137.91	179.48	11
Singapore	25.02	25.02	16.86	0.37	104.06	273.18	15
Slovak Republic	9.36	11.58	13.89	0.22	41.51	47.33	15
Spain	8.68	9.76	10.13	0.23	116.17	187.30	15
Sweden	11.71	14.08	15.05	0.27	95.49	195.66	14
United Kingdom	13.55	14.75	16.43	0.27	140.58	275.76	15
United States	10.39	11.96	12.47	0.31	171.88	302.84	13
Total	12.42	14.30	13.80	0.26	106.07	184.57	13.4

Source: sample_it.dta

Appendix B. Definitions and sources of variables used in the analysis

[INSERT TABLE *VARIABLES* HERE]

List of FDI Host countries (developing)

Albania, Bulgaria, Colombia, Egypt, India, Jordan, Latvia, Lithuania, Malaysia, Mexico, Morocco, Panama, Philippines, Poland, Romania, Sri Lanka, Tunisia, Turkey, Uruguay.

List of FDI Home countries (developed and developing)

Albania, Algeria, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Bosnia and Herzegovina, Brazil, Brunei, Darussalam, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Côte d'Ivoire, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Finland, France, Gabon, Georgia, Germany, Greece, Guatemala, Guinea, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Korea (Republic of), Kuwait, Kyrgyzstan, Latvia, Lebanon, Liberia, Lithuania, Luxembourg, Macedonia (FYR), Malaysia, Mali, Malta, Mauritania, Mauritius, Mexico, Moldova (Republic of), Morocco, Netherlands, New Zealand, Nicaragua, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russian Federation, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Syrian Arab Republic, Thailand, Tunisia, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Venezuela, Vietnam.

Appendix C. Additional tables

Table 11: Alternative Financial Development

	Dependent Variable: ln PMPKL					
	All countries		High Income		Low & Mid. Income	
	(1)	(2)	(3)	(4)	(5)	(6)
External dependence	-0.04	-1.45^{a}	0.24^{a}	0.55	-0.25	-1.58^{b}
	(-0.29)	(-3.27)	(2.91)	(1.04)	(-1.60)	(-2.49)
Fin. Development	0.03	0.46^{a}	-0.07	-0.15	0.13^{b}	0.64^{b}
	(0.68)	(3.86)	(-1.28)	(-1.03)	(2.19)	(2.71)
External dependence $\times$ Fin. Development		0.30^{a}		-0.06		0.34^{b}
		(3.61)		(-0.63)		(2.12)
Controls						
Treade openness	0.12	0.11	0.09	0.09	-0.06	-0.05
	(0.72)	(0.67)	(0.61)	(0.61)	(-0.30)	(-0.28)
Chinn-Ito index	0.00	0.01	0.08	0.08	-0.09	-0.08
	(0.05)	(0.14)	(0.73)	(0.72)	(-0.77)	(-0.73)
Corruption	-0.03^{c}	-0.03^{c}	-0.00	-0.00	-0.05^{c}	-0.05^{c}
	(-1.74)	(-1.90)	(-0.10)	(-0.09)	(-1.78)	(-1.74)
Government Stability	0.00	0.00	0.00	0.00	-0.00	-0.00
	(0.02)	(0.28)	(0.48)	(0.42)	(-0.28)	(-0.20)
Law and Order	0.03	0.03	0.01	0.01	0.07	0.07
	(0.96)	(1.01)	(0.51)	(0.48)	(1.33)	(1.38)
Internal Conflict	0.00	0.00	-0.00	-0.00	-0.02	-0.01
	(0.08)	(0.27)	(-0.15)	(-0.17)	(-0.85)	(-0.71)
Country F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	624	624	369	369	255	255
Adjusted R^2	0.886	0.892	0.932	0.931	0.871	0.874
F	2.39	4.09	6.92	6.69	78.38	171.99

t statistics in parentheses. All variables in logs.
All regressions include time-varying country level controls, country and time F.E., errors clustered at country level.
^{c} $p < 0.10$, ^{b} $p < 0.05$, ^{a} $p < 0.01$