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Jakob Schwab

North-South Globalization and Foreign Direct Investment

Essays in International Economics

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Jakob Schwab
Bonn, Germany

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Für meine Mutter und für meinen Vater.

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1.Introduction

Arguably, few things have shaped the world more over the last 30 years than the massive economic globalization which has taken place. It has been characterized by trade in goods and services between citizens from different nations, as well as the international integration of capital markets. Production chains have been 'sliced up' and now stretch over various production stages conducted at different locations around the world. Multinational enterprises (MNEs) have emerged and have dominated many economic activities, thereby also driving productivity growth (Bernard et al., 2009; Corrado et al., 2009). Globalization is believed to have stimulated worldwide economic growth, but also to have led to deep distributional consequences (Galor, 2008; Acemoglu, 2006). Empirically establishing a direct causal link between globalization and either growth or rising inequality can by nature not be done on the global, but only on the cross-country level. This, however, supports both hypotheses, that of growth and that of increasing inequalities as a result of countries' integration into international goods and factor markets (see e.g. Grossman and Helpman, 2015; Kanbur, 2015).

In addition to the distributional consequences within countries, multilateral economic integration was also broadly perceived to be more beneficial to already richer countries (the global 'North') than to the poorest countries in the world (the global 'South'). This picture evoked a broad public opposition to economic globalization and its political proponents, reaching a peak around the turn of the century (and culminating in massive protests against the alleged political architects of free-market globalization). Authoritative evidence on the true direction of the effects of globalization on the poor was even more scarce at that time. But it can be stated up to today that at least the bloomy prospects foretold by economic theory have not realized for the global South especially, at least not to the extent they were hoped for, and that this has created scepticism towards international free-market liberalization. (Easterly, 2008)

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The predictions of economic theory on the effects of North-South globalization for developing countries have long been driven by standard neoclassical 'factor-proportions' theory. The abundance of (low-skill) labor should enable poor countries to gain from globalization by specializing in the production of goods that use their abundant factor intensively (in trade) and by attracting capital flows (following capital market liberalization). As we will see in this dissertation, both did happen. But neither was unambigously associated with the predicted growth effects (Rodriguez and Rodrik, 2001; Kose et al., 2009). While by now there exists a theoretical literature able to explain negative effects of specialization for developing countries for the case of trade (e.g. Matsuyama, 2000), coherent theoretical arguments for the adverse effects of capital inflows still remain scarce. Appendix A of this dissertation lays out the basic mechanism of neoclassical theory and the growth and distributional effects of capital market integration in developing countries that follow from it. Even though individual capital returns should decrease, overall income should unambiguously rise as a result of capital inflows.

Driven by the greater availabilty of micro-level data, economic research on globalization has recently focussed increasingly on firm-level analysis. This has also raised particular concern with the role of multinational enterprises (see e.g. Helpman et al., 2004; Markusen, 2004), and on the structural level shifted attention to the phenomenon of *offshoring*. When firms offshore, this is likely to be connected with both trade and capital flows. Although the theories on this (e.g. Feenstra and Hanson, 1997; Grossman and Rossi-Hansberg, 2008) show how offshoring may exhibit distributional effects different from those expected from standard neoclassical theory, they do not explicitly consider the respective effect on growth and do not investigate the driving forces behind a countries attractiveness to offshoring investments.

This dissertation takes another approach by taking a step back. In order to adopt a structural perspective, it explicitly reconsiders neoclassical forces as the main drivers behind North-South globalization. That is, it explicitly accounts for differences in factor endowments to shape the interaction between rich and poor countries. It then

extends standard analysis in order to more differentiatedly analyze what might be the effect on growth and individuals' well-being, and how trade and capital flows are interdependent of each other. The analysis centers around the phenomenon of foreign direct investment (FDI), as this is usually believed to play a vital role in how economic opening may bring benefits to developing countries, and this focus accounts for the role of multinational enterprises in the overall process of globalization. In the literature, the most prominent feature of FDI usually put forward is that the presence of foreign owned firms bears the potential to bring advanced technology into countries from which local economic agents might benefit via spillover effects. This will only be a side issue here, the main reason being that the empirical evidence for these spillover effects appears not strong enough as to justify this second-order effect to take such an accentuated role in the general perspective on FDI in developing countries.[1] Instead – in the spirit of neoclassical analysis – we are overall more directly concerned with the first-order characteristic of FDI – the increase in the capital stock that it constitutes. We begin with some theoretical considerations on, first, potentially disparate growth and income effects of FDI, and then on how trade may induce capital inflows in developing countries, from a factor endowment perspective. Then, we will empirically test for this relationship. In the end, we are interested in understanding the mechanisms in international economic integration because of their results for the people affected by it. How individuals evaluate its outcomes will both drive the political economy of globalization, and may also give us an indication on its actual distributional effects, both within and between countries. Therefore, we lastly analyze how FDI is actually perceived by different economic agents in countries of different characteristics.

The following chapter 2 starts with a standard dynamic neoclassical growth model, where the build-up of a capital stock is responsible for

[1] The litature on spillover effects was sparked by the methodologically pathbreaking paper by Javorcik (2004). However, the literature following up on this finds only mixed evidence at best, as summarized in the overviews by e.g. Harrison and Rodríguez-Clare (2010) and Kose et al. (2009).

economic growth, in order to analyze the effects of FDI on development opportunities. It then includes a standard capital market imperfection that governs both, credit market interaction, and consequently also the opportunities for direct, physical investment. In this setting, when a developing, capital-scarce country opens up to the international capital market, it will experience FDI inflows. This will initially increase income. But as in the standard neoclassical setting, it will also reduce the return to individual investment in physical capital. This exacerbates credit constraints and hence negatively affects the possibility for potential entrepreneurs from within the developing country to obtain necessary credit for still profitable investment. In the long run, this hinders the build-up of domestically owned capital, and thereby reduces domestic overall income, compared to a path of slower, self-sustained growth. Because reduced domestic entrepreneurial activity also drives down domestic credit demand, inflows of FDI in the model also lead to outflows of financial capital from the receiving country. This provides a coherent explanation for the observed structure of two-way capital flows between developing and developed countries in FDI and financial capital which we observe in the data.

Chapter 3 then identifies another driver of capital inflows besides capital scarcity. Conventional intuition from standard Heckscher-Ohlin models of factor endowment driven trade says that trade in goods (or services) may replace incentives for capital flows. We show, by contrast, that when Heckscher-Ohlin trade takes place in high-skill and low-skill intensive goods, this rather creates incentives for capital to flow where trade specialization generates the greatest efficiency gains. According to this, the more a country specializes in goods of a certain skill intensity, the more capital inflows it should experience relatively. We then test this relationship empirically by creating a measure of relative Heckscher-Ohlin specialization in high-skill or low-skill intensive goods. While controlling for common factors of capital flows and trade specialization, we provide empirical support for the hypothesis that trade specialization in skills goes along with capital inflows.

The last chapter 4 explores whether distributional effects of FDI predicted by economic theory are reflected in people's attitudes towards MNEs as its most visible representatives. Using a survey-based data set that covers a wide range of rich and poor countries, we investigate how both, individual characteristics, as well as the macroeconomic and institutional environment shape relative attitudes towards FDI. We find that individuals who should profit from the presence of MNEs also show a more favorable attitude towards them, as do agents living in countries that are are more likely to benefit stronger from FDI. Moreover, we see that the influence of an individual's characteristics – such as education and the status as an entrepreneur – depends on the respective country's per capita income. These findings indicate that the differentiated distributional effects of FDI between developed and developing countries predicted by the neoclassical model are reflected in people's attitudes and hence are relevant for the political economy of globalization. Moreover, the conditional results on an individual's skill level as measured by education support the idea that MNEs are also relatively appreciated (by different agents in different countries) along the lines that basic Heckscher-Ohlin (Stolper-Samuelson) effects would predict for trade specialization, and are also consistent with the prevalence of FDI as offshoring in poor countries.
Altogether, the evidence presented in this dissertation and the theoretical considerations laid out indicate that North-South globalization may indeed exhibit quite distinct effects in both groups of countries. It furthermore shows that factor endowments may on a systemic level – beyond firm-level considerations – be highly relevant for understanding these differentiated effects, both within and between countries. By tractably elaborating on basic underlying forces from factor-endowment analysis and its mechanisms, this thesis furthermore demonstrates that this can be a fruitful exercise in order to understand structural effects governing North-South globalization.

The following three chapters present each of the above mentioned studies in detail. The dissertation closes with a brief conclusion and outlook in chapter 5.

2. The Mixed Blessing of FDI: Two-Way Capital Flows and Growth

2.1. Introduction

From most known theoretical considerations, financial globalization should promote capital flows to developing countries and this should increase welfare and growth. However, in aggregate, the amount of North-South capital flows remains to be rather small and the growth effects of financial liberalization show to be mixed at best (Kose et al., 2009). On a more refined level, we instead observe net flows of foreign direct investment (FDI) into developing economies, but at the same time, financial capital is flowing into the opposite direction – from developing and emerging economies into industrial countries – in almost equal amount.

This pattern is illustrated in Figure 2.1. It depicts net capital flows, disaggregated by type, seperately for the group of High-Income OECD countries ("North") and the group of all other, non-High-Income and non-OECD countries ("South") for the period from 1980-2013.[1]. For each group, it once shows the net aggregate outflow of FDI, and once net aggregate outflows of all other types of capital ('financial' capital).[2] By construction, flows between countries within a group net out, and the graph shows the outward (or inward) flows of the whole group of each type of capital, both as a share of worldwide GDP.[3]

[1] Based on country-level Balance of Payments data and definitions supplied by the International Monetary Fund (IMF)

[2] Financial capital includes portfolio investment, financial derivatives, other investment and reserve assets. FDI captures only that investment, where direct control over production is retained.

[3] The flows between the two groups do not net out to zero, because the data covers only 169 countries, excluding particularly offshore financial centers, as Zucman (2013) points out. He estimates that in fact the countries of the North

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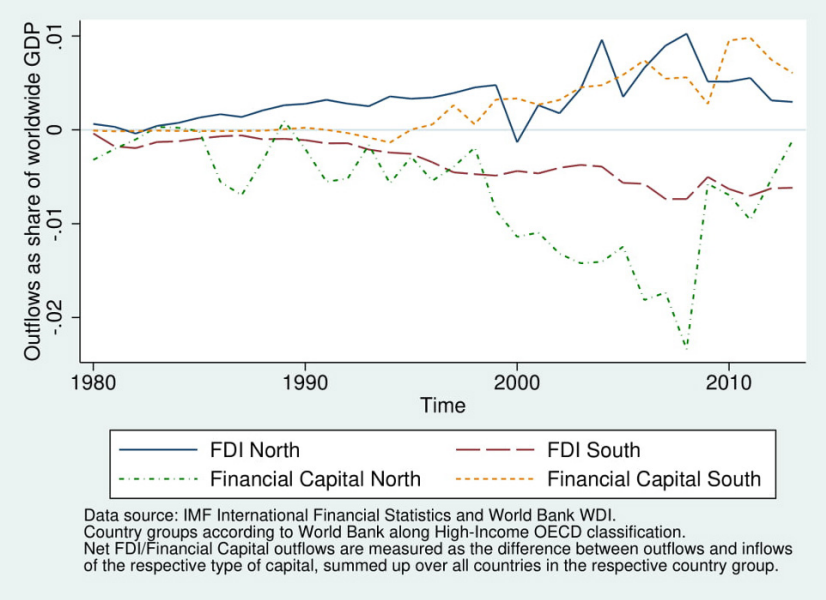


Figure 2.1.: Net capital flows by type and country group as share of worldwide GDP

Positive values imply net capital outflows of FDI / financial capital, negative values imply inflows. The two-way pattern of capital flows is quite stable over time and accentuating with the general surge of capital market globalization.[4]

This chapter offers a simple coherent theoretical foundation for this observation and analyzes the growth effects of this pattern. I include a simple capital market imperfection into a standard neoclassical (open-economy) model of growth to explain the flows of FDI from capital abundant to capital scarce countries and the opposing flow of

would be a net creditor if their holdings in tax havens were included. In the official data shown here, both groups would be net debtors.

[4] Although the pattern has slightly attenuated in recent years, particularly for the more volatile financial capital, the signs of the flows persist, implying, by the definition of net flows, still increasing aggregate stocks of either type of capital at already high levels.

financial capital as two sides to the same mechanism. This goes along with a nuanced perspective on the growth implications of FDI, which shows to be a mixed blessing for the receiving countries.

The model can thereby explain a couple of stylized facts on the effects of FDI in developing countries. The occurrence of that is mainly driven by low wage costs in the destination countries (Yeaple, 2003; Hanson et al., 2005), which supports the basic neoclassical paradigm. It is known that an inflow of productive capital has an immediate positive effect on a developing country's economy (see e.g. de Mello, 1997). However, the long-term growth effects seem to be rather limited, if not negative (Carkovic and Levine, 2002; Bussiere and Fratzscher, 2008; de Vita and Kyaw, 2009; Herzer, 2012; also concluded in Kose et al., 2009, for financial globalization as a whole). The few available evidence also shows that FDI inflows tend to crowd out domestic investment (Agosin and Machado, 2005; Wang, 2010; Morrissey and Udomkerdmongkol, 2012). These adverse effects can not be explained by existing theories of comprehensive capital market integration. By taking a dynamic growth perspective, this chapter relates the the structure of capital flows to growth patterns. It particularly shows that FDI may drive both, reduced domestic entrepreneurial activity, and financial capital outflows, and thereby reduce overall income in developing countries in the long run.

In the model, investment is freely pursued around the globe. Capital ownership is initially concentrated rich countries but the physical (and financial) capital owned need not be. Whereas international direct investment is not subject to frictions, the market for financial credit is generally imperfect. As a consequence, wealth plays a role for the possibility to obtain credit needed to conduct new investment. Therefore, the individual accumulation of assets is crucial for the further development of the worldwide distribution of (profitable) investment ownership and hence incomes. This is close to the analysis of international interaction on only an imperfect credit market by Matsuyama (2004), as will become clear below. Credit eligibility here does not only depend on wealth, but also on the profitability of the prospective investment. Then, inflowing FDI has a direct

impact on domestic entrepreneurial activity: By raising the wage rate and reducing the scarcity of capital, it decreases the marginal product of capital and hence of individual investments. Although the immediate raise in wage income also increases domestic income and hence pledgeability, the former effect dominates the latter: eventual entrepreneurs in poorer countries generally face the same investment opportunities in open markets, but due to their lower accumulated income, they are still not the ones who can actually invest, due to the structure of the credit market. There, potential investors from high income countries are preferred to pursue the basically same investment. On a fully integrated capital market, domestic entrepreneurial activity in developing countries is thus hindered by foreign direct investment.

This contrasts to an autarkic growth process, where at initially high marginal products to capital, and wage incomes that rise accordingly, an entrepreneurial class can emerge. Capital only builds up slowly by reinvested domestic savings, but thereby, with incomes increasing and marginal returns decreasing in pace, growth trickles down the economy by increased investment opportunities. Integrating into international capital markets interrupts this growth process. Income initially increases as capital rushes in, but investment income is foregone in the long run. This argument relates the real world observation of countries being stuck in a so-called 'middle income trap' (e.g. Eichengreen et al., 2013), i.e. growth slowdowns of emerging markets that experienced massive periods of growth prior to that, usually going hand in hand with their integration into world capital markets. The mechanism described also explains the accompanying structure of two-way capital flows that is observed: Because the immediate rise in income and thus savings that is induced by FDI is contrasted by a falling demand for credit by domestic agents, financial capital flows out of poorer countries into richer ones. This credit is hence used partly to, in turn, finance direct investment by Northern entrepreneurs in the South. The endogeneous wedge between the two types of capital income then shows responsible for lost out incomes in the long run in developing countries, despite the initial gains that the inflow of FDI brings about. By dampening domestic investment and hence credit demand, but

raising income and savings, FDI hence is the driving force behind the concurrent financial capital outflows, according to this theory.

In the baseline model, countries only differ in their income levels due to a different progress in the growth process. Even though we will take the perspective of a developing country throughout most of the analysis, the effects on incomes in richer countries are just the mirror image: An outflow of capital initially harms domestic workers, but investment around the world, and the access to credit to pursue it, increase national income in the long run.

The model is very stylized and attempts to explain by one single mechanism unexplained facts about the pattern of capital flows and growth the effects of FDI as a coherent phenomenon. It therefore in its simplest form abstracts from other potential mechanisms often said to be involved with FDI. It can easily be extended to include these and the discussion will briefly touch on a few directions for elaboration of the basic mechanism.

The remainder of the chapter is organized as follows: The next section discusses in more detail some related literature. Section 2.3 sets up the model and section 2.4 lays out how the growth and trickle down process in this economy emerges in autarky. Section 2.5 shows how this process is interrupted by the opening up of a small economy to world capital markets and section 2.6 discusses the resulting structure of capital flows. Some extensions are briefly presented in section 2.7: Section 2.7.1 lays out the two-country setting and 2.7.2 shows how the result is magnified when differences in total factor productivity between countries are accounted for. Section 2.8 concludes.

2.2. Related Literature

In the standard static neoclassical setting of capital flows, the increase in wage incomes exceeds the loss of capital incomes by domestic capital owners if capital flows into a capital scarce country. In a dynamic setting with perfect capital markets, this also leads to increased savings and surge in domestic capital ownership. Integration of capital

markets should then lead to an accelerated convergence between countries. Borrowing in order to invest on the one hand, or lending on the hand, both yield the same return in perfect capital markets, such that the type of capital flows is usually not even considered in this type of analysis. When Lucas (1990) put up the puzzle that capital is not flowing from North to South by close to the amounts predicted from theory, the literature following up on this argued that marginal returns to capital will probably be lower in developing countries even at lower physical capital stocks, mainly because of fewer accumulated (immobile) human capital (Mankiw et al., 1992). If only the buildup of physical, but not that of human capital can be financed via international capital markets, this may explain low inflows of capital into developing and emerging economies (Barro et al., 1995). Gourinchas and Jeanne, 2006, also find that an opening up to international capital markets with this type of distortion only marginally increases growth performances. This literature can well explain why capital doesn't flow in the amounts predicted, and why the marginal product for foreign investment remains low even at low levels of capital stocks. This would however not explain why we actually do observe net FDI flows into developing countries, as presented in Figure 2.1. Neither can it explain why at the same time, other types of capital are flowing in the reverse direction on net.

There is another extensive strand of literature that discusses how upstream flows of financial capital can be explained by an imperfect credit market, starting with the partial-equilibrium framework of Gertler and Rogoff (1990). Matsuyama (2004) shows in general equilibrium that this may lead to endogenous inequality between countries when capital flows to where capital already is, because this ensures security for lenders. The analysis undertaken here has a lot in common with (and borrows from) this work. It extends the analysis to more precisely model intertemporal links in the growth process, and to allow for FDI, defined as productive investment in another than the home country, while borrowing for home-, or world-market credit conditions. This is excluded in Matsuyama (2004), which concentrates only on the effect of competition on credit markets for

respective domestic investment, thereby generating aggregate financial capital flows from South to North to finance domestic investment there.

In the same line, and closely related to the work at hand, are the studies by Song et al. (2011) and Buera and Shin (2009). They look at how an economic transition will lead to outflows of financial capital when credit markets are imperfect. Whereas Buera and Shin (2009) concentrate on the supply side of credit as a driving force because entrepreneurs need to save in order to make investments, Song et al. (2011) show, with regard to the case of China, that the reallocation from financing-intensive state owned enterprises to more restricted private firms affects the demand side for credit, leading to a current account surplus during the transition period. All of these papers also do not consider the effects of FDI.

The first and only work to explicitly jointly account for the observations of Figure 2.1 is Ju and Wei (2010). To explain the structure of two-way capital flows, they provide a static model where capital flows are driven by differences in institutional quality between countries. The quality of financial institutions determines where financial capital goes and the level of property rights protection and capital scarcity determine where FDI flows to. However, both types of capital flows are not directly linked in their model. To generate the pattern shown in Figure 2.1, they therefore concentrate on a narrow group of countries that exhibit good property rights protection but at the same time weakly developed domestic financial markets. This is different to the analysis undertaken here insofar as we do not look at differences in institutional quality, but analyze this pattern as a result of interaction in one imperfect capital market of agents of different inital positions.[5] In contrast to Ju and Wei (2010), our analysis then considers the dynamic effects of FDI on domestic investment opportunities and income and thereby directly relates the inflows of FDI to financing

[5] Also, because the analysis undertaken here takes into account the role of individual agents, we do not have to assume aggregated convex costs of investment to obtain an interior solution.

opportunities for domestic entrepreneurs and concurrent financial capital outflows.[6]

By theoretically underpinning the empirical findings on the crowding out effect of FDI on domestic investment, my study is related to the works of Grossman (1984) and Reis (2001), who also comment on how FDI might slow down domestic entrepreneurial activity. Both results complement the argument made here, but stress different mechanisms. The former argues that possible entrepreneurs in developing countries prefer to leave the risk of investment to foreign investors and instead work in foreign companies for lower, but safe wage income. Risk sharing is no objective in my model, which implies that agents would prefer, but are prevented from becoming entrepreneurs. The resulting welfare losses in the economy opening up are thus absent in Grossman (1984). Reis (2001) on the other hand shows in a model of endogenous growth that the exogenous technological advantage of foreign firms may crowd out domestic research activities in partial equilibrium, so that the profits that accrue to these activities and then escape the country by repatriation may mirror domestic welfare losses. However, in her model, the countries differ in their technological characteristics and the capital market is restricted to direct investment.

I show the effect of a reduction of domestic entrepreneurial activity in a general equilibrium model of complete – and same – market interaction that deliberately stays as close to neoclassical growth theory as possible. I thereby deliver a tractable way to identify why – in contrast to conventional arguments – there is a short-run vs. long-run tradeoff involved with FDI and it could be disadvantegeaous for developing countries in the long run to have substantial shares of GDP leave the country as foreign factor payments such that GNI is lower than the domestic value of production. This pattern holds true for almost all developing countries.

[6] To be specific, The appendix of Ju and Wei (2010) extends their setting to a dynamic one. Still, feedback effects between investment and credit market interaction are cut. Consequently, short term effects are simply magnified in the long run.

I do not consider other effects of FDI than the increase in the domestic capital stock which are often attributed to it, such as technological or competition-induced spillover effects (see e.g. de Mello, 1997, for an overview). The reason is twofold: First, a metastudy by Harrison and Rodríguez-Clare (2010) concludes the empirical evidence on these two be negligable at best. Second, and more importantly, I want to highlight one specific effect of FDI, abstracting from everything else that may well be considered additionally. Even if positive effects are also present, the mechanism presented here should help answering the question why especially FDI doesn't have the expected overall positive effect on welfare in developing countries. Whereas most literature focuses on country-specific reasons, my model offers a systemic explanation for this.

2.3. The Model

The model is based on that of growth under imperfect credit markets from Matsuyama (2004), but alters the basic framework to analyze the effects of FDI in particular instead of only looking at the effect of competition for financial capital.[7]

Consider an economy that is made up by a homogeneous population of unit mass. Individual agents are indexed by $i \in [0, 1]$ and each supplies one unit of labor inelastically in each period. Agents are infinitely lived. There is only one good produced, used for consumption and production. Production follows standard neoclassical patterns: $Y_t = F(K_t, L_t)$, where K_t and L_t are aggregate supplies of physical capital and labor in period t. F is a constant-returns-to-scale production function and we normalize $L = 1$ such that production equals per capita production and can be expressed as $y_t = f(k_t)$, lower case notation indicating per capita variables. Furthermore, $f'(k) > 0 > f''(k)$. Inada conditions hold. However, since we will

[7] The central results in the autarky case therefore resemble the ones from Matsuyama (2004). The situation under open markets, however, looks fundamentally different here compared to the one in his setting.

have to make a statement about the characteristics of growth over history, suppose that $f(0) = \epsilon$, with ϵ small, but greater zero.
The labor market is competetive and labor is paid its marginal product, $w_t(k_t) = \frac{\partial F(K_t,1)}{\partial L}$. Invested physical capital receives the residual of production, which is, per invested unit of capital, $\rho_t = \frac{f(k_t)-w_t(k_t)}{k_t} = f'(k_t)$. $f'(k) > 0 > f''(k)$ implies that an increasing capital stock decreases per unit capital returns and increases wages.

For simplicity, capital depreciates fully after one period.[8] Agents save – in a Solow-type way – a constant fraction s of their income.[9] They can transfer their savings to the next period by either lending it on the competetive market for credit, earning the gross return of r_{t+1}, or by investing it into physical capital. Investment in physical capital only becomes effective the next period. If investing, each agent can run exactly one investment project by investing exactly 1 unit of capital into the joint production process. This restricts in both directions: First of all, investment is indivisible, i.e. there is a threshold of funds that have to be brought into each single investment. This will lead to competition on the market for credit in the first place. Secondly, this is the most extreme, but also most tractable form of individually diminishing returns to investment. If they weren't, the richest individual would always be able to attract all credit, as we will see. Both, indivisibility and diminishing returns, are in their extreme form a simplification and only introduced in this form for tractability, but both in general are essential for the mechanism to be at work.

If an individual i wants to invest, but her funds – which equal her savings – are not sufficient to ensure 1 unit of investment, she has to borrow the remaining share, $1 - sI_t^i$, on the credit market in order to invest one unit in physical capital in $t + 1$, where I_t^i is her end-of-period income. She then earns the return on her investment in

[8] This emphasizes the fact that some investment is not just 'earlier' when it comes to competition for investment, but that investment takes place constantly and investment opportunities are distributed structurally.

[9] This could easily be motivated by an OLG-Model with log-preferences and 'warm-glow' bequests or simply as a dynasty-model as in Matsuyama (2011). Both modifications to the interpretation would not change the results qualitatively.

$t+1$, has to repay her credit taken (if any) with interest, and also receives the wage payment on her labor supplied.[10] An entrepreneur's income in period $t+1$ then reads:

$$^{E}I^{i}_{t+1} = f'(k_{t+1}) - r_{t+1}(1 - sI^{i}_{t}) + w(k_{t+1}) \tag{2.1}$$

If she instead lends her savings, she receives the credit market return on this loan and earns her wage, and her income is given by:

$$^{L}I^{i}_{t+1} = r_{t+1}sI^{i}_{t} + w(k_{t+1}) \tag{2.2}$$

To compare the two, equation (2.1) can be rearranged to:

$$\begin{aligned} ^{E}I^{i}_{t+1} =& f'(k_{t+1}) - r_{t+1} + r_{t+1}sI^{i}_{t} + w(k_{t+1}) \\ =& (f'(k_{t+1}) - r_{t+1}) + {}^{L}I^{i}_{t+1} \end{aligned} \tag{2.3}$$

Thus, an individual will always be willing to become an entrepreneur if

$$f'(k_{t+1}) \geq r_{t+1} \tag{2.4}$$

Because this does not depend on individual characteristics, this is also the condition for any investment to take place. Because without investment, the marginal product would be infinitely high, this will always hold, either strictly or with inequality. We refer to equation (2.4) as the Profitability Constraint (PC). All individuals additionally underlie a borowing constraint (BC), however. This takes the form:

$$\lambda f'(k_{t+1}) \geq r_{t+1}(1 - sI^{i}_{t}) \tag{2.5}$$

This capital market imperfection lies at the heart of our analysis. It says that an individual with income I^{i}_{t} can only pledge a share $\lambda < 1$ of the prospective return to her investment (LHS) on her payback (RHS).[11] This has two implications: First, ceteris paribus,

[10] For simplicity, we assume that an entrepreneur still supplies labor. This doesn't affect the results, but avoids taxonomical exposition.

[11] This reduced form of the borrowing constraint is e.g. directly derived from a moral hazard story a la Holmstrom and Tirole (1997). Matsuyama (2004),

an individual with a lower income has less collateral to bring in the investment, thus has to raise more credit and consequently finds it harder to warrant for the high repayment by the return to investment, i.e. have the BC satisfied. Secondly, a higher aggregate capital stock decreases the prospective returns and thus the probability of everyone to be eligable for credit. λ is a measure of credit market imperfection.

If (2.4) holds with inequality, i.e. if physical investment is more profitable than lending, everyone would like to invest rather than lend on the credit market. As long as agents can do so, this investment decreases the left hand side of both equations, (2.4) and (2.5). Therefore, for any given r_{t+1}, either one will bind to 'stop' investment activity. The equilibrium interest rate r_{t+1} will be determined by supply and demand on the credit market, as spelled out below. The borrowing constraint will be binding as long as $\frac{1-sI_t^i}{\lambda} \geq 1$ for some individual i.[12]

We will restrict ourselves in what follows to the case that this holds, which is equivalent to saying that the borrowing constraint (2.5) is always binding for some agents and the profitability constraint (2.4) holds with inequality, i.e. physical investment is strictly profitable.[13] Those agents (we will introduce the reason for ex post income heterogeneity later) which have to borrow only as much that they can guarantee repayment will borrow on the credit market, invest their savings and credit taken in physical capital and become entrepreneurs. All others will lend their savings as credit. If an entrepreneur already has enough own funds such that these suffice for investment alone, she will make the investment and lend the remaining savings on the

p.860f, argues that it stands in line with most microfoundations of capital market imperfections that can be found in the literature.

[12] To be exact, it has to bind for the critical agent as defined below. This will in equilibrium be equal to the lowest income, making the two statements equivalent.

[13] Note, that this is different to Matsuyama (2004)'s analysis where an interior solution can only exist if the Profitability Constraint is binding in the richer countries. By cutting intertemporal links in individual incomes, he does not account for ex post heterogeneity between agents within countries, which changes the interpretation.

credit market, which also results in an entrepreneur's income given by equation (2.3).[14]

W.l.o.g., order the agents increasing in their income, such that I_t^i is increasing in i. Now, we define $\tilde{i}_t$ as the agent which can just pledge investment, i.e. for whom the borrowing constraint (2.5) is exactly binding, for a given r_{t+1}. Denote her critical income $\tilde{I}_t$, which is the income that just suffices such that equation (2.5) holds with equality. This is then given by:

$$\tilde{I}_t = \frac{r_{t+1} - \lambda f'(k_{t+1})}{s r_{t+1}} \tag{2.6}$$

All agents $i < \tilde{i}_t$ cannot invest, all agents $i \geq \tilde{i}_t$ can. It means that agents with a lower income and hence less collateral lend their savings, all those who in contrast can self-finance a larger share of investment will be able to invest. The richest agents will be preferred to obtain credit, because they can also ensure payback at high interest rates, but all borrowers pay the same interest rate. The exact equilibrium values of k_t, k_{t+1}, and r_{t+1} will depend on the whether an economy is closed or integrated into international markets.

2.4. Autarky

Credit Market Equilibrium

In autarky, equilibrium on the credit market is determined by equalizing respective credit supply and demand. For a fixed savings rate s, and given current period incomes, aggregate savings are fully determined and fixed in a given period. These savings can either be invested by the saver herself, or be lent on the credit market to be invested by someone else. Investment must hence equal savings, which is consequently given by $k_{t+1} = sf(k_t)$. The interest rate is then determined such as to equalize the two. From equation (2.6), we see that for a given k_{t+1}, more and more lower income agents will be able

[14] We will still refer to such an agent as 'entrepreneur' rather than 'lender'.

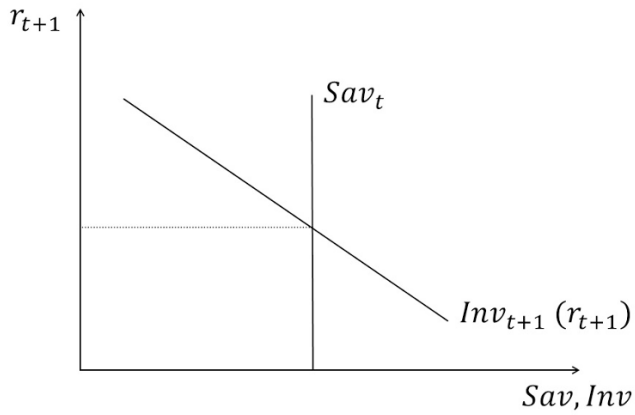


Figure 2.2.: Credit market equilibrium

to borrow funds necessary for investment with a decreasing interest rate. Hence, investment is also decreasing in the interest rate r_{t+1}. Equilibrium on the credit market is depicted in Figure 2.2. For a higher interest rate, there would be excess credit supply and vice versa. If able to demand credit (and not by the BC forced to supply), an agent will do so, such that the borrowing constraint regulates who can invest. Because all agents can run only 1 investment project, the amount of investment is also equal to the number of agents who invest. In equilibrium, the interest rate will hence to adjust such that exactly the fixed amount of savings can be invested by the same number of agents (from their own savings and the amounts borrowed). Equilibrium on the credit market is thus indirectly determined by $\tilde{I}_t$, which is the income of agent $\tilde{i}_t$, defined by

$$Sav_t = Inv_{t+1}(r_{t+1}) = 1 - \tilde{i}_t(r_{t+1}) \tag{2.7}$$

The amount of savings determines how many agents will be investors, and the lowest income of these, $\tilde{I}_t$, hence determines the interest rate. This is then from equation (2.6) given by

$$r^*_{t+1} = f'(k_{t+1})\frac{\lambda}{1 - s\tilde{I}_t} \tag{2.8}$$

As we will see in what follows, the income distribution may have flat parts, i.e. more agents may have the exact same income. If this is the case at $\tilde{i}_t$, some agents of those of equal income are credit rationed. Appendix 2.A of this chapter offers a different representation of the mechanism from the view of supply and demand, which underlies the savings-investment perspective given here.

From (2.8), we also see that the credit market imperfection implies that there is a wedge between the equilibrium interest rate and the return to physical investment, the latter being greater by $\frac{1-s\tilde{I}_t}{\lambda}$ per unit of capital, as long as the borrowing constraint is binding.

Dynamics

It follows from the above analysis that in autarky all domestic savings in period t are invested in physical capital, i.e. $sf(k_t) = k_{t+1}$ – either directly by the saver or via lending. This determines $f'(k_{t+1})$. The interest rate r_{t+1} will adjust such that all savings find an investor. Thus, for the aggregate economy, capital builds up and standard neoclassical growth emerges, irrespective of the capital market imperfection. Figure 2.3 illustrates the dynamics.

Because Inada conditions hold, the capital stock is increasing over time. The share of entrepreneurs in each period $t + 1$ is also given by k_{t+1}, and is hence increasing.

From equation (2.3), the income of an agent who becomes an entrepreneur will exceed that of an agent of same period-before income by exactly the excess profits of physical investment on her invested one unit of capital. She earns the wedge between returns to physical investment and the interest rate on what she borrows and and on her own savings. If she can fully self-finance her investment, one unit of

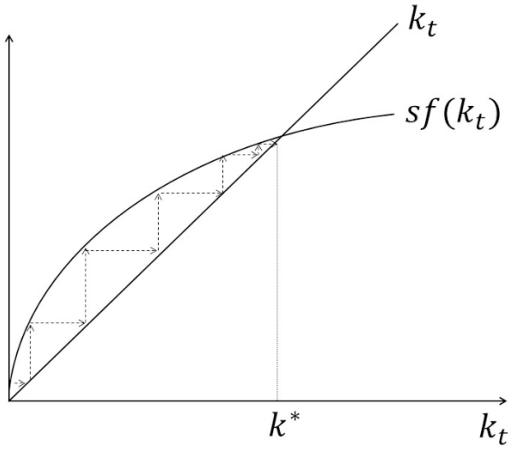


Figure 2.3.: Aggregate autarky dynamics

her savings is paid off with the higher return and the remainder is lent on the credit market.

An increasing capital stock implies that in each period the share of entrepreneurs must increase. Since it is the highest income (and thus highest savings) individuals who are able to borrow and invest, they must have had a higher income in the period before. Thus, all period-before entrepreneurs with the higher income will again be entrepreneurs in the next period, as long as the aggregate capital stock is increasing.[15] Equations (2.2) and (2.3) imply that the ordering of agents according to their income does not change, due to the deterministic path-dependence of incomes. But there must also be new investors who invest the increasing stock of capital. These must then have been lenders the period before and all periods before that. Figure 2.4 illustrates the transition and the resulting income distribution.

[15] Obviously, there is income heterogeneity within the group of entrepreneurs, depending on the time that they have been investors and have received the respective higher income.

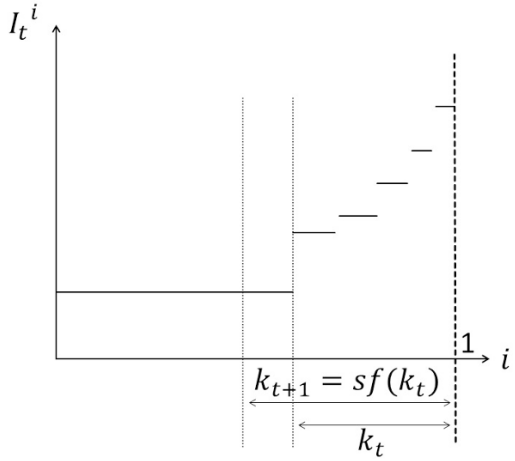


Figure 2.4.: Autarky transition

The critical income $\tilde{I}_t$ is hence the income of an agent who has been a lender throughout, from the beginnning of the growth process. Having only received wage income and saved part of that for all periods since then, by iterating (2.2), this income is given by:

$$^L I_t^i = w(k_t) + \sum_{i=0}^{t-1} w(k_i) s^{t-i} \prod_{j=0}^{t-i-1} r_{t-j} = \tilde{I}_t \tag{2.9}$$

This critical income determines the equilibrium interest rate, given by (2.8). In each period, the income of the next 'new' entrepreneur fixes the interest rate which in turn determines next period's incomes and so on. With an increasing capital stock, also the wage rate increases with economic growth.

The movement of the interest rate is ambiguous. Because the interest rate changes over time and part of a lender's income is also given by the return on her savings, the increasing wage income does technically not necessarily imply a rising overall income. We will,

however, assume that this is always the case and the income of pure workers/lenders increases with their wage income, which is in line with the empirical evidence.[16]

Assumption 2.1. *The income of pure lenders is increasing over time, i.e.* $\frac{\partial^L I_t^i}{\partial t} > 0$. *This derives from the increase of the wage income, which is rising with the increase in the capital stock. The increase in wage therefore must always offset possible losses in interest income on savings. For the necessary restrictions on the production function, see Appendix 2.B of this chapter.*

Assumption 2.1 always holds for reasonable parameter values.

The capital income of individual investors on the other hand decreases over time, but they benefit from the increase in the wage rate as well. The result on their overall income is ambiguous. However, more and more agents become entrepreneurs, yielding the higher income compared to that of the lenders. Aggregate GNI in autarky, $GNI_{a,t}$, must be equal to $GDP_{a,t} = f(k_t)$. We can rewrite this in terms of aggregated individual incomes, as yielded by iterating equations (2.2) and (2.3). This then reads

$$GNI_{a,t} = k_t(f'(k_t) - r_t) + \sum_{i=1}^{t-1} k_{t-i}(f'(k_{t-i}) - r_{t-i})s^i \prod_{j=0}^{i-1} r_{t-j} + w(k_t) + \sum_{i=0}^{t-1} w(k_i)s^{t-i} \prod_{j=1}^{t-i} r_{t-j+1}.$$

This representation emphasizes the fact that in each period the share of entrepreneurs receives an additional income on their 1 unit of invested capital (the terms in the first line), and all agents get a wage income (second line). All either get paid interest on their savings or, when investing, do not need to borrow this amount on the credit market. Thus, all income is discounted through with the respective interest rate of all relevant periods.

[16] See e.g. Chen and Ravallion (2010).

The overall dynamics of the aggregate capital stock, described by $sf(k_t) = k_{t+1}$, as laid out above, are not affected by the capital market imperfection.

Steady State

The dynamics implicitly define the steady state to which the autarky economy converges to, as depicted in figure 2.3:

$$sf(k^*) = k^* \tag{2.10}$$

In the steady state, the share of entrepreneurs is then also k^*. The respective incomes of each type of agent converge to:

$${}^{E}I^* = \frac{f'(k^*) - r^* + w^*}{1 - r^* s} \tag{2.11}$$

$${}^{L}I^* = \frac{w^*}{1 - r^* s} \tag{2.12}$$

Where again the steady state interest rate is determined by the most recent entrepreneur's last income, which was just given by (2.12).[17] It will adjust such that all savings can be invested by someone who is able to do so. The steady state level of investment is also unaffected by the credit market imperfection.

Note, that in the steady state, the savings of entrepreneurs cannot alone suffice to afford investment, i.e. $s\frac{f'(k^*)-r^*+w^*}{1-r^*s} < 1$. If they didn't demand credit, savings would be invested by new entrepreneurs, and a steady state would not yet be reached.

[17] An alternative way to look at it would be that 'in' the steady state, no new entrepreneur will emerge and $\tilde{I}_t$ is the income of the 'last' entrepreneur. Considering instead that we always only approach the steady state, marginal shares of the population will become new entrepreneurs and the critical income is given by the income of the lenders. We will look at it the latter way, even though it makes no difference for the analysis undertaken here.

GNI in the steady state is again equal to GDP, $f(k^*)$, and can be expressed as

$$GNI_a{}^* = k^* \frac{f'(k^*) - r^*}{1 - r^* s} + \frac{w^*}{1 - r^* s} = \frac{k^*(f'(k^*) - r^*) + w^*}{1 - r^* s} \quad (2.13)$$

2.5. Open Capital Markets

Now, consider a small economy in the South, which is fully described by the above characteristics, that opens up to the world market. To focus on the structural mechanism, assume that all other countries in the world (the North) are of the exactly same type. Especially, the level of capital market imperfection λ is equal in all countries, implying that differences in the competitiveness on the credit market arise from differences in incomes solely.[18] The countries differ only by that the North is more progressed (higher t), whereas the opening economy is behind (lower t) in the process of development. This implies that the world is relatively less capital scarce than the domestic country. Denote the period of opening up by T. Then the domestic capital ratio $k_T < k_T^W$ (the world capital ratio). For convenience, we will henceforth assume that the world is already in its steady state, such that $k_T^W = k^*$. This is not crucial: the analysis holds for all cases where a less developed country opens up to a more progressed world in terms of the development process described in section 2.4.

Opening up now implies two things: First, investors can freely invest their physical capital around the world. As above, each investor can only make one indivisible investment, but now needs to decide where to do so. Also, agents can freely lend and borrow at the world market for financial capital, only restricted by the borrowing constraint (2.5). Lenders receive the world market return $r^W = r^*$ on their savings. Potential borrowers face this credit cost and the borrowing constraint,

[18] Loosening this assumption would magnify our results while making the weaker point that institutional differences account for differences in developmental outcomes. The abstraction made here instead points out a feature of same market interaction.

which is dependent on their individual incomes and on the prospective return of their investment. Hence, borrowing source and investment location are potentially disentangled from each other in the open economy.

In period T, all saved incomes are determined by the history of incomes in the closed economy, and wage incomes by the capital installed, because foreign investment becomes only effective in the next period. With unrestricted physical investment, Northern investors will for the next period invest in the South and physical capital will flow into the domestic country until returns to physical investment are equalized, such that $k_{T+1} = k^W_{T+1} = k^*$. As the returns for all investors equalize around the world, also next period's returns for domestic investors drop due to the inflow of foreign capital, as $f'(k^*) < f'(k_T)$.

First, consider what this implies on the market for credit. The world market cost of credit is given by r^*. Agent i is in period T hence able to pledge investment for period $T+1$ iff

$$\lambda f'(k^*) \geq r^*(1 - sI^i_T) \quad \Leftrightarrow \quad I^i_T \geq \frac{r^* - \lambda f'(k^*)}{sr^*} \tag{2.14}$$

This is exactly equivalent to the critical income for borrowing in the steady state. However, by Assumption 2.1, the incomes of current domestic lenders in T are lower than this, and they will not be able to borrow and invest. For current domestic entrepreneurs, it is not clear whether their income exceeds the critical income. Denote the share of domestic agents who can in period T pledge payback and hence invest for the next period by $\tilde{k}_{T+1}$. Then, Proposition 2.1 holds.

Proposition 2.1. *The share of domestic entrepreneurs after opening up will at most be all agents that have been entrepreneurs before opening up, i.e.* $\tilde{k}_{T+1} \leq k_T$.

Proof. The world interest rate r^* is determined exactly such that for a lender with steady state income, given by (2.12), condition (2.14) is satisfied with equality, i.e. $\tilde{I}_T = {}^L I^* = \frac{w^*}{1-r^*s}$. Agents in South thus can borrow on international markets if their income exceeds that of a steady state lender. For those that are already entrepreneurs in the

moment of opening up, equation (2.14) may or may not hold, i.e. it is not clear whether ${}^{E}I_T^i > \tilde{I}_T$. It may hold for all, for only some, or for none of those that were already entrepreneurs. Lenders' income, in turn, by Assumption 2.1, in T is strictly lower than in the steady state, ${}^{L}I_T < {}^{L}I^* = \tilde{I}_T$. Thus, these agents cannot pledge investment for $T+1$ at world market conditions. □

The statement in Proposition 2.1 holds with equality if all past entrepreneurs can become entrpreneurs in the open economy.[19] Note, that the timing of investment in the model is not crucial for the result of Proposition 2.1.

What happens in the following periods? In period $T+1$, foreign investment becomes effective and the physical capital stock in the economy is given by k^* (which may – and does – differ from $\tilde{k}_{T+1}$, the difference given by the amount of FDI inflows). The increase in the capital stock raises the wage rate in $T+1$ to w^*. This is an immediate gain for the entire population and increases the balance sheet for pledging borrowing and investment for the subsequent periods. The income of a lender from period T to period $T+1$ in South is then given by:

$$ {}^{LS}I_{T+1} = w^* + sr^* \cdot {}^{LS}I_T \tag{2.15}$$

However, the income that would be just sufficient to obtain credit is still given by $\tilde{I}_{T+1} = \frac{r^* - \lambda f'(k^*)}{sr^*}$ and hence determined by steady state world market conditions, because foreign investment also rules domestic investment returns for all subsequent periods. The income just sufficient for pledging investment can be expressed as the wage income in steady state plus the savings on previous income, and the critical income in period $T+1$ can hence be rewritten as:

$$ \tilde{I}_{T+1} = w^* + sr^* \frac{w^*}{1 - r^* s} \tag{2.16}$$

[19] Because returns and thus investors' incomes are higher the lower the capital stock is, it is more likely that it holds for some or even all past entrepreneurs, the less developed the country is when opening up.

Comparing (2.15) and (2.16) shows that a Southern lender's income is still not sufficient to pledge investment. This is summarized in Proposition 2.2.

Proposition 2.2. *In an economy opening up to international investment, the share of entrepreneurs will not expand over time from the period after opening up, $T+1$ and it is fixed at $\tilde{k}_{T+1} \equiv \tilde{k}$ for all subsequent periods.*

Proof. The income of a lender in period $T+1$, given by (2.15) is lower than the critical income sufficient to pledge investment, given by (2.16), because ${}^{LS}I_T < \frac{w^*}{1-r^*s} = {}^{L}I^* = \tilde{I}_T$, which was the condition to be a lender in period T. The same wage rate combines with lower historical savings at same credit and investment market conditions. This argument holds for all subsequent periods. □

Who is once not wealthy enough to be eligible for borrowing after opening up will not be in $T+1$, $T+2$, and so on. When competing with world market investors for investment and credit, Southern entrepreneurs fall behind, because they have a lower historical income. The trickle-down mechanism is disrupted when the economy opens up to world capital markets. This is illustrated in figure 2.5 (for the case of all past entrepreneurs being able to borrow internationally). Especially for low levels of development, the capital inflow and concurring increase in the wage rate implies an immediate gain in individual incomes. But at the same time, due to FDI, the prospective returns for capital decrease so much that the agents in South still cannot pledge investment despite their risen income.

GNI thus also initially increases due to the inflow of FDI. It now doesn't have to equal GDP, which immediately jumps to $GDP_{o,t} = f(k^*)$ for $t > T$. GNI, in contrast, is given by

$$\begin{aligned} GNI_{o,t} = \tilde{k}(f'(k^*) - r^*) \sum_{i=0}^{t-T-1} (sr^*)^i \\ + w(k^*) \sum_{i=0}^{t-T-1} (sr^*)^i + f(k_T)(sr^*)^{t-T}, \end{aligned} \tag{2.17}$$

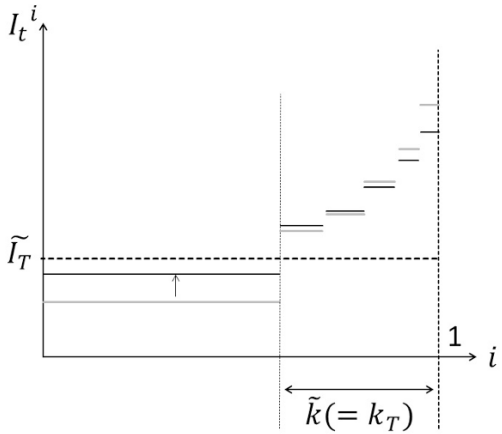


Figure 2.5.: An economy opening up

which is the constant capital income of the constant share of investors plus the constant wage payments, each transferred at the same rate throughout time from period T on, plus the remaining savings on the income from period T. Figure 2.6 illustrates the dynamics of this and contrasts it to the situation in autarky. In autarky, capital would build up slowly, but the share of entrepreneurs would expand, who would then reap the surplus profits on physical investment. When opening up, capital rushes into the country, but domestic agents who cannot become entrepreneurs in the moment of opening up will never be able to benefit from the gains of capital ownership.

GNI under open capital markets then converges to the following steady state value:

$$GNI_o{}^* = \tilde{k}\frac{f'(k^*) - r^*}{1 - r^* s} + \frac{w^*}{1 - r^* s} \tag{2.18}$$

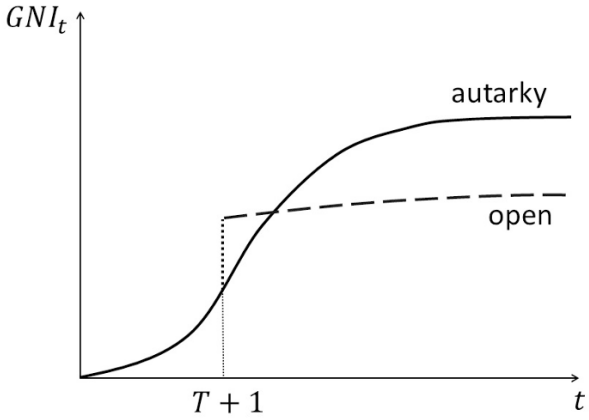


Figure 2.6.: Timepath of GNI

This compares to the autarky steady state GNI, which was given by:

$$GNI_a{}^* = k^* \frac{f'(k^*) - r^*}{1 - r^* s} + \frac{w^*}{1 - r^* s} \tag{2.13}$$

Proposition 2.3 summarizes the comparison of the two outcomes.

Proposition 2.3. *The steady state national income is strictly lower for a developing country after having opened up during the growth process than it would have been in autarky, i.e.* $GNI_o{}^* < GNI_a{}^*$.

Proof. By propositions 2.1 and 2.2, $\tilde{k} \leq k_T < k^*$, i.e. the number of domestic entrepreneurs after opening up is lower than the steady state number of entrepreneurs in autarky. Comparing the expressions for GNI in the respective steady states, as given by equations (2.18) and (2.13) yields the result. □

Steady state national income will always be lower when the country has opened up to international markets in the process of development.

In the long run, labor income would have been the same. But, in autarky, capital ownership and the concurring profits would be in domestic hands, which they are not if a country integrates into international capital markets. The standard neoclassical result of initial gains due to capital inflows is bought at the expense of a disruption in the trickle-down process.

2.6. The Structure of Capital Flows

The resulting structure of capital flows in and out of the country is straightforwardly analyzed, concentrating on the steady state for exposition.[20] Since the share of domestic investors who each invest 1 unit of capital is lower than the overall capital stock, FDI into the country is positive and given by the difference of the two:

$$FDI^*_{in} = k^* - \tilde{k} > 0 \tag{2.19}$$

The outflow of financial capital is given by the difference between *domestic* savings and investment. The latter is given by $\tilde{k} = k^* - (k^* - \tilde{k})$. Savings are the same as they would have been in autarky, where they would have constituted the steady state capital stock, lowered by the not occuring savings on the missed out returns to physical capital, and are hence given by $Sav^*_o = k^* - s(k^* - \tilde{k})\frac{f'(k^*)-r^*}{1-r^*s}$. Financial capital outflow as the difference of these two then reads

$$\begin{aligned} FC^*_{out} &= k^* - (k^* - \tilde{k})s\frac{f'(k^*) - r^*}{1 - r^*s} - [k^* - (k^* - \tilde{k})] \\ &= (k^* - \tilde{k})\left(1 - s\frac{f'(k^*) - r^*}{1 - r^*s}\right) > 0, \end{aligned} \tag{2.20}$$

[20] I here talk about 'net' flows in the sense of net for each type of capital flow - financial and direct investment. In the absence of costs to international investment, all domestic investors could invest abroad and all domestic capital could be FDI. We simply assume that an investor first invests at home as long as this yields the same return.

where the last inequality derives from the fact that savings on capital income in the steady state must be smaller than 1, as shown before. Compared to the autarky steady state, the reduction in savings is proportionally not as high as the difference in investment by domestic agents that is crowded out by foreign investment. These excess savings flow out of the country via the credit market, to flow back as direct investment. The structure of two-way capital flows is exactly what we had seen in Figure 2.1. The outflow of financial capital is here a direct result of the inflow of FDI. The difference in returns between the two types of investment that an imperfect capital market creates and the outflow of factor incomes show responsible for lost out welfare in the long run. The aggregate financial account is given by the difference between the outflow of financial capital (2.20) and FDI-inflow (2.19):

$$FA^* = (k^* - \tilde{k}) \left(-s \frac{f'(k^*) - r^*}{1 - r^* s} \right) < 0 \tag{2.21}$$

This implies a net flow of capital from North to South, such that the flows of FDI are not entirely met by the opposing flow of financial capital. In official statistics, both groups of countries appear to be net debtors, which obviously cannot be true. Following the literature, the predicted aggregate, although reduced, flow of capital from North to South from the model, is indeed rather what is likely to be actually happening, when capital holdings of Northern countries in offshore financial centers are added to official numbers (see Zucman, 2013).

2.7. Extensions

The basic setting considered so far was a simple and tractable way to isolate the effect of how FDI crowds out domestic investment in developing countries and leads to two-way capital flows. As that, the equilibrium described has some features that we would not expect to see in the real world. One is, for example, that with otherwise identical countries, the productive capital stock in the developing country (although not owned) is the same as in more developed

countries after opening up, and that happens immediately. As a result, in the steady state, income of lenders approaches the critical income, thus technically bringing them close to become entrepreneurs themselves when in a 'large' rest of the world, an infinite amount of investment projects is potentially realizable. Also, we should be interested in how this structure of capital flows and ownership affects agents in the Northern countries. Therefore, in the following, we will look at how the presented mechanism interacts with additional considerations that seem important in the study of FDI and the interaction between North and South. The result is, that the income diverging effect of FDI is even magnified when the interaction between different countries is modeled more explicitly.

We will first extend the analysis to a two-country-setting and then look at the interaction when the developing country does not only lag behind in capital endowment but also exhibits a lower total factor productivity. Both extensions should hold as a robustness test for the validity of the theory, as well as an elaboration of its predictions.

2.7.1. Two-Country Setting

The two country setting follows straightfoward from the analysis in section 2.5. Consider, country 'South', as before in period T, integrates its capital markets with 'North', which is now of the same size as the developing country. Both countries have grown as in section 2.4, only that $k_T^N > k_T^S$. Free movement of investment equalizes capital stocks from period $T+1$ on. The capital stock in each country is given by half of aggregate world savings, i.e. $k_{T+1}^S = k_{T+1}^N = \frac{1}{2}s(f(k_T^N) + f(k_T^S)) \equiv \bar{k}_{T+1}$. The capital stock in North is smaller as compared to autarky after opening up, by exactly the amount that it is increased in South. The dynamics of national capital stocks then follow Solow-type growth for both countries parallelly: $\bar{k}_{t+1} = \frac{1}{2}s2f(\bar{k}_t) = sf(\bar{k}_t), \ \ \forall t > T$.

However, income dynamics are disparate between the countries after opening up. As before, the credit market imperfection defines the critical income as given in (2.6), being the same for agents in both

countries. The comparison of incomes analogously to the one between (2.15) and (2.16) now reads

$$ {}^{L}I^{S}_{t+1} = w(\bar{k}_{t+1}) + sr_{t+1}{}^{L}I^{S}_{t} < w(\bar{k}_{t+1}) + sr_{t+1}{}^{L}I^{N}_{t} = {}^{L}I^{N}_{t+1}, \quad (2.22) $$

$\forall t \geq T$. Because ${}^{L}I^{S}_{T} < {}^{L}I^{N}_{T}$, all new capital will be invested by Northern agents. Define the share of entrepreneurs in South who could pledge for borrowing in T as $\tilde{k}^{S} \in [0, k^{S}_{T}]$. This share will again not expand. In contrast, the share of entrepreneurs in North is given by $\tilde{k}^{N}_{t} = 2\bar{k}_{t} - \tilde{k}^{S}$, which is increasing as long as the world economy is growing. GNI in country j is analogously given by

$$ \begin{aligned} GNI^{j}_{t} = \tilde{k}^{j}_{t}(f'(\bar{k}_{t}) - r_{t}) + \sum_{i=1}^{t-T-1} \tilde{k}^{j}_{t-i}(f'(\bar{k}_{t-i}) - r_{t-i}) s^{i} \prod_{h=0}^{i-1} r_{t-h} \\ + w(\bar{k}_{t}) + \sum_{i=1}^{t-T-1} w(\bar{k}_{i}) s^{i} \prod_{h=0}^{i-1} r_{t-h} + f(k^{j}_{t}) s^{t-T} \prod_{h=0}^{t-T-1} r_{t-h}. \end{aligned} \quad (2.23) $$

National income will increase for both countries with an increasing capital stock. However, South does not expand its share of entrepreneurs, whereas North does, by investing in both countries. South does – after an initial gain due to capital inflows – not only grow slower than North in terms of income, it does so also more slowly than it would have under autarky at that level.
Steady State national incomes are given by:

$$ GNI^{j*} = \tilde{k}^{j} \frac{f'(k^{*}) - r^{*}}{1 - r^{*}s} + \frac{w^{*}}{1 - r^{*}s} \quad (2.24) $$

where $\tilde{k^{N}} = 2k^{*}_{t} - \tilde{k}^{S}$. National income in South is strictly lower than in North and, in the long run, again also lower than it would have been under autarky. South hence unambiguously loses in the long run by integrating its capital market with a more advanced country.

North, in turn, gains in the long run, even though workers initially lose due to the outflow of physical capital.[21]

The two-country equilibrium is even more stable than the small open economy case. Even though the income of a lender in South approaches that of a Northern lender and thus the critical income for investment in the steady state, this does not create investment chances on a large scale. The reason is, that all entrepreneurs' income is still higher than that of lenders all over the world and the historical entrepreneurs will also in steady state re-take investment chances, not leaving much room for 'new' investment. The time dimension does enter here – not in that investment is taken, but in that incomes are distributed which determine borrowing, and thus investment possibilities.

2.7.2. TFP-Differences

Capital flows to South are said to be reduced because human capital, infrastructure, etc. in developing countries are not comparable to those in developed economies. By affecting the incentives for FDI, this will obviously interact with the mechanism described here.

Consider South exhibits lower total factor productivity than North, such that

$$f^S(k) = \delta f(k),$$

with $\delta < 1$. Consequently, $f'^S(k) = \delta f'(k)$ and $w^S(k) = \delta w(k)$. In autarky, South would converge to a steady state given by $s\delta f(k^{*S,a}) = k^{*S,a} \Leftrightarrow \frac{f(k^*)^{S,a}}{k^{*S,a}} = \frac{1}{s\delta}$. Because the LHS is decreasing in k, $k^{*S,a}$ is lower than in the autarky steady state with higher TFP and thus lower than that in North.

If the two countries integrate their capital markets in T, capital returns from T+1 are equalized. Suppose $f'^S(k_T^S) > f'(k_T^N)$, such that some FDI will still take place in South, as empirically relevant. From

[21] The structure of capital flows is analogolous to the analysis in section 2.6. Physical capital inflows in South are now capital outflows in North and vice versa for financial capital.

T+1, relative capital stocks are implicitly determined by $f'^S(k_t^S) = \delta f'(k_t^S) = f'(k_t^N) \equiv \bar{f}'_t$. Consequently, $k_t^N > k_t^S$ holds $\forall t > T$. The capital stock, and with it GDP, is increased in South, but still lower than in North after opening up.

Again, the critical income to just pledge investment is given by $\tilde{I}_t = \frac{r_{t+1} - \lambda \bar{f}'_t}{r_{t+1} s}$, which is equal for agents in both countries. Lenders' income in South again compares to the critical income as follows:

$$^L I_{t+1}^S = \delta w(k_{t+1}^S) + s r_{t+1} {}^L I_t^S < w(k_{t+1}^N) + s r_{t+1} {}^L I_t^N = {}^L I_{t+1}^N \quad (2.25)$$

It is thus again not sufficient to pledge borrowing in open markets for southern agents. Note, that the difference is even greater than with equal TFP, because a lower capital stock and lower overall productivity reduce wage income in comparison to lenders in North, in addition to the lower historical income. Consequently, as for identical countries, all investment after opening up will be pursued by northern agents, such that $\tilde{k}_t^S = \tilde{k}_{T+1} \leq k_T^S$.

Steady state amounts of capital stocks are equal to autarky steady state amounts, $k^{*S,o} = k^{*S,a}$ and $k^{*N,o} = k^*$.[22] GNI in either country j in the steady state read

$$GNI^{j*} = \tilde{k}^j \frac{f'(k^{*j}) - r^*}{1 - r^* s} + \frac{w^{*j}}{1 - r^* s} \quad (2.26)$$

where $\tilde{k}^N = k^* + k^{*S} - \tilde{k}^S > k^*$. Because, as before, $\tilde{k}_t^S < k^{*S}$ holds, income in South is reduced by missed out investment returns $(k^{*S} - \tilde{k}^S) \frac{f'(k^{*S}) - r^*}{1 - r^* s}$, and analogously increased in North as an outcome of globalization in the long run. The result of diverging incomes (and disparate growth) induced by FDI still holds in this setting when countries are not identical and capital stocks installed do not equalize. It holds even stronger, because incomes are then diverging, and

[22] This is a direct result from that world savings has to equal world investment - as in autarky - and Jensen's Inequality. Throughout the growth process, by the same argument, capital stocks installed evolve as in autarky from their values at period T+1 on.

chances on investment hence further reduced for Southern agents. The underlying mechanism is not driven by the simplifying assumptions made earlier.

2.8. Conclusion and Outlook

We have included a standard capital market imperfection into a simple neoclassical model of growth to give a more nuanced view on the effects of FDI. This at the same time can systematically explain the observed structure of two-way capital flows between developed and developing countries.

Imperfect credit markets imply that there is an endogenous wedge between lending and entrpreneurial income, and that individual incomes determine the distribution of credit eligibility and hence investment possibilities. The natural trickle-down process that autarky growth entails is disrupted in a developing country when it opens up to international markets with more progressed economies. Then, FDI flows in, which raises the physical capital stock, but at the same time reduces its marginal product and thus possibilities to invest. Because the poorer country's agents cannot compete on the market for credit given this new conditions, the share of entrepreneurs will not expand anymore, despite an initially risen income due to the capital inflow. In the long run, the missed out returns on investment lower national income in comparison to the autarky growth path. Hence, there is a trade off between short and long run effects involved with opening up for international capital markets for developing countries. Our model also gives a theoretical underpinning for the empirical findings that countries that self-finance themselves experience better growth experiences in the aftermath (Aizenman et al., 2007).

Extending the model to a two-country analysis yields a pattern of parallel, but disparate growth. The losses of the poor countries in the long run are mirrored by gains for foreign investors (whereas the initial inflow is the typical win-win situation from static models). It shows that the structure of capital flows and incomes of countries

are mutually interdependent. This is different from saying that each type of capital has different idiosyncratic reasons to flow in either direction. Instead, inflows of FDI, outflows of financial capital, and underdevelopment are different sides of the same story here.

To illustrate the basic mechanism, we have first abstracted from any other differences between countries other than the capital stock. This assumption is strong and hints at the possibility that countries that lag behind could have developed in the same way as developed countries if they wouldn't have integrated their capital markets and let FDI flow into the country. This perspective emphasizes the structural character of the mechanism analyzed.

However, the assumption can be relaxed without altering the model's qualitative predictions. The structure of capital flows and growth effects from integration also occur as prediction from the model when productivity in the developing country is lower and hence the inflow of FDI. In this case, the split is even clearer, because agents in South would never be able to invest neither at home nor abroad in an international capital market. With a closed financial account, they would still have built up capital only slowly, but would have received entrepreneurial income from it.

Still, even when accounting for productivity differences, in the model, GDP is the same in the long run as it would be in autarky. It even jumps initially to that level. This is obviously simplifying. Following the previous literature, the reason for lower productivity could well be differences in human capital of poorer countries' working force. In the spirit of Galor and Zeira (1993), this is even more probable if credit markets are imperfect, such that poorer agents cannot borrow to invest in schooling. FDI is unlikely to reduce returns to investment in human capital, but should rather increase them. An initial inflow of capital could consequently loosen constraints for investment in human capital and also increase incentives to publicly invest in schooling.

Thus, the story could have two sides to it, depending on how the initial income gain is used. By creating taxable income, it could give governments opportunities to publicly invest in other factors that hold down economic development, such as schooling, but also infrastructure

and institutional development. From a policy perspective, it does hence not imply that FDI is necessarily negative for developing countries. But it shows that initial gains from integration to international capital markets may come at a price, and should hence not be treated carelessly. This might well be an explanation for the quite distinct experiences with capital market integration for developing economies.

The theory presented here is very stylized. It thereby abstracts from other mechanisms possibly involved with FDI and capital market integration. It thereby points at one paricular, potentially additional effect that should be taken into account, both, from a theoretical point of view, and from policy perspective. In the first place, it draws the attention to the fact that the observed structure of two-way capital flows may be both result of and reason for income disparities between countries. As discussed, it may in many ways interact with well-known results regarding capital market integration. It thus does add a novel argument by introducing another dimension to the discussion about the pattern and the welfare effects of globalization.

2.A. Appendix A: An Additional Perspective on Credit Market Equilibrium

This section gives a slightly different perspective on how equilibrium on the credit market is determined, than the one in section 2.4. Because when investing, also own savings are invested additional to borrowed funds, savings and credit supply, on the one hand, and investment and credit demand are each not perfectly identical concepts. We will here look at supply and demand, even though this closely resembles the logic from section 2.4 and delivers the exact same result. Credit supply is given by the current incomes of only lenders and credit demand by the additionally needed funds of those agents that are eligible to borrow and invest. Credit supply is hence given by $s \int_0^{\tilde{i}_t} I_t^i di$ and credit demand is given by $(1 - \tilde{i}_t) - s \int_{\tilde{i}_t}^1 I_t^i di$. Whereas the former is strictly increasing, the latter is strictly decreasing in in $\tilde{i}$. Equality of the two again determines $\tilde{i}_t$. This is illustrated in Figure 2.7. The

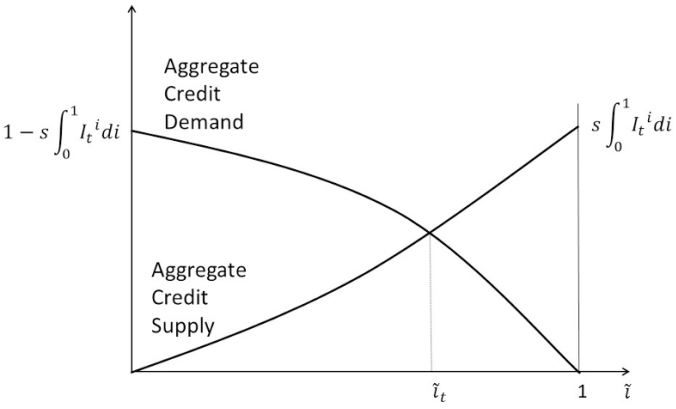


Figure 2.7.: Autarky credit market equilibrium, supply and demand

income of agent $\tilde{i}_t$, i.e. $\tilde{I}_t$, determines the interest rate r_{t+1} by (2.8) in any period, such that aggregate savings can be invested in every period.

2.B. Appendix B: Conditions on Assumption 1

We want to show under which conditions the income of lenders, ${}^{L}I^{i}_{t+1} = r_{t+1}sI^{i}_{t} + w(k_{t+1})$, is increasing over time. Dropping the individual index for readability, this condition is given by $w_t + r_t s I_{t-1} > I_{t-1} \forall t$.

Inserting (2.8) and rearranging yields:

$$I^2_{t-1} - \frac{1 + sw_t - s\lambda f'(k_t)}{s} I_{t-1} + \frac{w_t}{s} > 0 \tag{2.27}$$

The LHS is an upward opened parabola in I_{t-1}. Solving for its zeros yields

$$I_{t-1;1,2} = \frac{1 + sw_t - s\lambda f'(k_t)}{2s} \pm \sqrt{\left(\frac{1 + sw_t - s\lambda f'(k_t)}{2s}\right)^2 - \frac{w_t}{s}} \tag{2.28}$$

Now, we have to make some case distinctions:
a) For $\left(\frac{1+sw_t-s\lambda f'(k_t)}{2s}\right)^2 < \frac{w_t}{s}$, this has no solutions. Therefore for all I_{t-1}, The LHS of (2.27) is positive and income is unambiguously increasing.
b) If $\left(\frac{1+sw_t-s\lambda f'(k_t)}{2s}\right)^2 > \frac{w_t}{s}$ holds, such that (2.28) has two solutions, two cases may occur:
i)$1 + sw_t - s\lambda f'(k_t) < 0$. This is the case if the marginal product of capital is high and the wage rate rather low, i.e. especially likely in the beginning of the growth process. Because $\frac{w_t}{s} > 0$, both zeros, as given by equation (2.28), are then in the negative range of I_{t-1}. Therefore, for all positive values of I_{t-1}, condition (2.27) still holds, and income is further increasing (Note, that first period income is always positive). ii)If $1 + sw_t - s\lambda f'(k_t) > 0$, the zeros are in the positive range of I_{t-1}, such that for some incomes in between, we may have a decreasing income. Note, that this is the case only if the wage rate is sufficiently high compared to the return to physical capital, i.e. this would in any case only occur towards the end of the growth

process.
We can see that, with the evolution of the return to capital throughout the growth process, the likelihood runs from case b)i) to case a) to case b)ii).

Note also, that even in the last case, if income is already sufficiently high (i.e. greater than the solutions to (2.28), it will further increase anyway. However, to avoid taxonomical exposition, we can easily assume that even in the steady state, where (2.27) is most likely not to hold, it will still hold, i.e. we assume:

If

$$1 + sw^* - s\lambda f'(k^*) > 0$$

then

$$\left(\frac{1 + sw^* - s\lambda f'(k^*)}{2s}\right)^2 < \frac{w^*}{s}$$

In words, this is equivalent to assuming that the return to investment in physical capital is still sufficiently high throughout the growth process up to the steady state.

3. Reaping the Gains: Specialization and Capital Flows

This chapter is joint work with Christina Ortseifer.

3.1. Introduction

Differences in factor endowments between countries are relevant drivers of international trade flows (Romalis, 2004; Morrow, 2010). The classical and prominent Heckscher-Ohlin-Mundell paradigm states that the indirect trade of factors through commodities would replace incentives for international capital flows.[1] Still, we observe both, international trade in goods and capital flows, and both in rapidly increasing volume over the past 50 years. At the same time, it shows that specialization patterns go along the lines of high-skill and low-skill labor, rather than in terms of capital endowments. Theories that extend the standard Heckscher-Ohlin setting to incorporate these three factors allow for the endurance of factor price differences and hence capital flows. Nevertheless, they still do not point at a clear direction regarding the question of whether trade and capital flows are substitutes or complements in the sense that one tends to increase or decrease the volume of the other.

We in this chapter identify an effect in this type of analysis that makes trade and capital flows complementary. The intuition behind it is that advantegeous allocation of the respective skill factors enabled

[1] As treated formally in Mundell (1957).

J. Schwab, *North-South Globalization and Foreign Direct Investment*, https://doi.org/10.1007/978-3-658-22811-8_3

by trade raises the return of the third, composite factor capital and hence leads to capital inflows. We then test whether this mechanism can be observed in the data by constructing an index of skill level specialization and testing whether increased specialization in either direction (high-skill or low-skill) induces capital inflows.

In our model, both high-skill and low-skill labor, as well as capital are involved in production. When countries open up to trade, they increase their real income by producing for the world market those goods that use the *skill class* intensively that they are endowed with abundantly, and import the other goods for a lower price from the world market. If now production additionally requires capital, which obtains a share of the production value as returns, then the increased real return also affects the rewards for capital and hence creates incentives for capital flows. Capital reaps part of the gains from using the skill level that a country is abundantly endowed with for production for world markets.

For symmetric specialization patterns, the efficiency increasing effect of trade liberalization raises rental rates in both countries and hence does not imply a certain direction of capital flows, or any flows at all. It only implies symmetric worldwide gains for capital, in contrast to the asymmetric ones for labor skill classes between trading countries.[2]. However, given any differences in the relative intensity that bilateral trade induces for the participating countries, it implies differentiated effects on capital returns in the sense that a higher degree of specialization also implies larger potential gains for capital and hence capital inflows into the more strongly specializing country.

We conjecture from our anlysis that whenever countries make use of their abundant factor in order to export, the gains from increased Heckscher-Ohlin-type trade, arising from the potential to use certain skill classes as demanded by the world market, should attract capital, and trade liberalizing countries should also experience capital inflows. When testing this empirically, we want to delineate this mechanism

[2]For these, Stolper-Samuelson type effects prevail, even in the presence of capital mobility (see Ethier and Svensson, 1986)

from others that might possibly relate trade and capital flows. We therefore construct a measure of particularly Heckscher-Ohlin specialization for countries. By using data on skill embodied in goods classes and countries' trade data, we can analyze how skill intensive a country's overall exports are (also relative to imports). From this, we generate a comparable measure of both high-skill and low-skill intensive specialization which is postitive in both directions of deviation from no visible factor emphasis in exports. Furthermore, we control for the level of capital market integration and general investment climate to isolate the effect of intensified trade specialization on capital flows only, not concurrent integration into world goods and factor markets. The results strongly support our hypothesis that countries which show a higher factor intensity in exports, i.e. more Heckscher-Ohlin type specialization, also experience increased capital inflows.

The remainder of the chapter is structured as follows. The following section 3.2 relates our study to earlier literature. In section 3.3, the theoretical analysis is presented. Section 3.3.1 lays out the basic structure of the model and section 3.3.2 presents the autarky equilibrium. In section 3.3.3, the structure of the international capital market is described. Section 3.3.4 then shows how an opening up to goods trade affects the real rental rate in a small opening economy. Because when trade is bilateral, capital returns increase in all participating countries due to an increase in general efficiency of production, section 3.3.5 discusses how the world equilibrium is determined and in which direction capital will flow accordingly. Section 3.4 then presents the empirical test and results on the derived hypothesis on the complementarity between (factor endowment) trade and capital flows. Section 3.5 concludes and gives an outlook.

3.2. Related Literature

Technically, our theoretical analysis implements a 2-sector, 3-factor model. In this type of model, trade does not necessarily induce full

factor price equalization between countries.[3] There are always two 'extreme' factors which drive (incomplete) specialization patterns, and one 'middle' factor (Ruffin, 1981). If this middle factor is the mobile factor, which we consider the empirically relevant case, the question of whether trade specialization induces capital flows is isomorphic to the question of how the return to the middle factor in countries is affected by trade. Jones and Easton (1983) show that the effect of trade on the middle factor's return depends on how complementary it is to either of the extreme factors in production, i.e. how relatively important it is for production of the comparative advantage good in a country. In the present study, we abstract from this complementarity-effect to isolate a further effect of trade liberalization: Even if capital is equally important in the production of both high- and low-skill-intensive goods, this does affect the real return to the middle factor capital, and it unambiguously increases it. We shut down the factor-compementarity effect to show that a second force, namely that of increased factor allocation efficiency, always works in favor of composite capital. This effect does not depend on whether a country exports high-skill or low-skill intensive goods, i.e. the direction, but rather only on the degree of specialization.[4]

Despite the long-held assertion that complementarity between trade and capital flows can only be found in other reasons for trade than differences in factor endowments (Markusen, 1983), there is other, more specific, literature that incorporates factor endowment driven trade and capital flows. This usually focuses on trade specialization

[3] See e.g. Woodland (1982) for a treatment of models where N(factors)>M(goods).

[4] Our analysis focusses on incomplete specialization patterns only, because these yield tractable solutions and convey the basic intuition. Also, this shows the contrasting effect to the standard 2x2-model, where trade equalizes factor prices if countries still produce both types of goods in equilibrium. Full specialization along abundant factor endowments also then implies a deviation from factor price equalization and hence perfect substitutability between trade and capital flows, but does not necessarily imply complementarity either, as capital returns are likely to have diverged strongly before trade liberalization as well, if endowments are so different as to lead to full specialization. This is also pointed out by Jones (1956).

in the mobile factors themselves, which are then subject to some type of friction. In Jin (2012), capital investment underlies adjustment costs, which allows capital abundant countries to specialize in capital intensive goods and still attract capital flows out of savings from the world. Antràs and Caballero (2009), in turn, allow for different affectedness by financial restrictions between sectors that interact with the level of financial frictions in countries such that countries specialize in the goods that their financial development supports, and hence create higher returns for capital in unrestricted sectors in capital scarce countries. Technically, this resembles an endogenous Ricardo-Viner structure with internationally mobile sector-specific capital. This is also the approach of Neary (1995), who finds that sector-specificity generally should be the more appropriate view. However, general sector-specificity of capital, as in his model, seems more relevant for the short-, but not the long-run. Abstracting from any type of frictions, our model thereby attempts to capture a more general relationship, both in scope, and in time dimension.

Trade theories that explicitly account for the firm level also rather predict a tendency for substitutability of trade and capital flows. As discussed by Buckley and Casson (1981), individual firms face the decision to either incur higher fixed costs of setting up a subsidiary in a foreign country or to incur higher variable transport costs when directly exporting (proximitiy-concentration trade-off). Helpman et al. (2004) show that when firms are heterogeneous, the more productive firms will choose the former and less productive firms the latter. This can explain the coexistence of both, FDI and trade flows, in aggregate. It still makes both types of supplying foreign market substitutes, in the sense that falling trade costs should make more firms choose concentrated home production and direct exporting, and less foreign investment, as Neary (2009) points out. He then argues that instead when trade costs fall, firms would set up subsidiaries in single countries to serve complete trade blocs, thereby generating capital flows and trade (export-platform-FDI). Other extensions, such as that of Krautheim (2013) go in the same direction, arguing that serving foreign markets via goods trade may require or favor the

aquisition of wholesale and retail trading firms, such that also FDI works export-supporting.

Whereas these arguments concern horizontal internationalization by firms, vertical integration may also lead to within-company trade, and possibilities to trade may encourage FDI. Helpman (1985) develops a factor endowment model where the trade of headquarter services and intermediate products goes into opposing directions, where the aquisition of production sites can be interpreted as a capital flow. Markusen (2004) advances this idea for multinational corporations that pursue both, horizontal, and vertical integration.

Our general equilibrium model is much less specific and could generally include all these cases, as long as the reason for trade are factor endowment differences. Given the importance and extent of the comovement of trade and capital flows, we hence attempt to identify an underlying force behind the strong positive relationship between the two.

3.3. The Model

3.3.1. Setup

The model is constructed such as to most conveniently transfer the intuition from Heckscher-Ohlin-Samuelson models of trade with high-skill and low-skill intensive goods to a setting where capital is involved in production.

We consider that there are two goods $i \in 1, 2$ which are produced by constant returns to scale production technologies. Both goods are produced by three factors F: capital (K), high-skill labor (H) and low-skill labor (L). The distributive shares of capital and labor are the same in both sectors, whereas those of the two types of labor differ between the sectors. The production functions for the sectors are:

$$Y_1 = K_1^{\alpha} H_1^{\beta} L_1^{1-\alpha-\beta}, \tag{3.1a}$$

$$Y_2 = K_2^{\alpha} H_2^{\gamma} L_1^{1-\alpha-\gamma}, \tag{3.1b}$$

respectively, where $\alpha, \beta, \gamma > 0$, $\alpha + \beta < 1$, and $\alpha + \gamma < 1$.
Factor markets are competetive. Firms take factor prices r, s and w as given and minimize costs. The production functions (3.1) then correspond to unit cost functions of

$$C_1 = r^{\alpha} s^{\beta} w^{1-\alpha-\beta} \Delta_1 \tag{3.2a}$$

$$C_2 = r^{\alpha} s^{\gamma} w^{1-\alpha-\gamma} \Delta_2 \tag{3.2b}$$

where $\Delta_1 = \alpha^{-\alpha}\beta^{-\beta}(1-\alpha-\beta)^{-(1-\alpha-\beta)}$ and
$\Delta_2 = \alpha^{-\alpha}\gamma^{-\gamma}(1-\alpha-\gamma)^{-(1-\alpha-\gamma)}$.
Without loss of generality we assume that $\beta > \gamma$. By Shephard's Lemma, taking the derivative of (3.2) yields the unit input coefficients of factors F, denoted by $a_{iF} \equiv \frac{F_i}{Y_i}$, and shown explicitly in appendix 3.A of this chapter. Relative skill intensities are then given by

$$\frac{a_{1H}}{a_{1L}} = \frac{w}{s}\left(\frac{\beta}{1-\alpha-\beta}\right) \tag{3.3a}$$

$$\frac{a_{2H}}{a_{2L}} = \frac{w}{s}\left(\frac{\gamma}{1-\alpha-\gamma}\right). \tag{3.3b}$$

This implies that sector 1 is the high-skill intensive sector (defined by $\frac{a_{1H}}{a_{1L}} > \frac{a_{2H}}{a_{2L}}$). Note that this holds independent of the factor price of capital. This simplification will greatly facilitate the analysis and lead to results of relative production that are closely related to standard 2-sector-2-factor production patterns with only high-skill and low-skill labor. The assumption of strict equality in capital-labor shares in production between the two goods implies that capital is not particularly complementary to either type of labor. This shuts down the effect of capital being a 'friend' of one of the two other factors and hence of one of the sectors. By doing so, we will be able to isolate a further effect of trade liberalization that holds for specialization in either sector, not only the one that capital is complementary to. In reality, both effects should be present. By abstracting from one, we will be able to concentrate on the one that is of interest for us here.

We will also assume that countries always produce both goods in equilibrium, such that there will be no full specialization, even under free trade. This is to stay close to Heckscher-Ohlin intuition and it also is the analytically most interesting case. Extending the analysis to full specialization would require extensive taxonomical exposition and not generate much insight beyond that from standard 2x2 models in this case (see e.g. Jones, 1956), and the one provided here.

The solution of the model thus closely follows 2-sector general equilibrium models with only 2 factors of production, only with one additional equilibrium condition. Free entry implies that firms make zero profits. Hence, goods prices have to equal unit costs, such that $p_i = C_i(r, s, w)$. Solving this together with (3.2) gives a simple expression for the relation between the relative goods price and the relative wages of high-skill and low-skill workers, given by

$$\frac{w}{s} = \left(\phi \frac{p_2}{p_1}\right)^{\frac{1}{\beta-\gamma}}, \tag{3.4}$$

where $\phi = \frac{\gamma^\gamma}{\beta^\beta} \frac{(1-\alpha-\gamma)^{1-\alpha-\gamma}}{(1-\alpha-\beta)^{1-\alpha-\beta}} = \frac{\Delta_1}{\Delta_2}$.
The rental rate for capital, r, does not depend on the relative price of the two goods because its price enters unit costs symmetrically.
Full employment conditions of factors F read $F = a_{1F}Y_1 + a_{2F}Y_2$. Solving the system of full employment conditions of L & H yields production volumes of the respective sectors as functions of r, s, w, and factor endowments L & H:

$$Y_1 = \left(\tfrac{w}{r}\right)^\alpha \left(\tfrac{w}{s}\right)^\beta \tfrac{1}{\Delta_1(1-\alpha)(\beta-\gamma)} \left[\tfrac{s}{w}(1-\alpha-\gamma)H - \gamma L\right] \tag{3.5a}$$

$$Y_2 = \left(\tfrac{w}{r}\right)^\alpha \left(\tfrac{w}{s}\right)^\gamma \tfrac{1}{\Delta_2(1-\alpha)(\beta-\gamma)} \left[\beta L - \tfrac{s}{w}(1-\alpha-\beta)H\right] \tag{3.5b}$$

Because, again, r enters symmetrically, and using (3.4), relative production only depends on aggregate supplies of H and L and the

relative price of the two goods, and is given by

$$\begin{aligned}\frac{Y_1}{Y_2} &= \frac{p_2}{p_1}\frac{\left(\frac{p_2}{p_1}\right)^{\frac{1}{\gamma-\beta}}\phi^{\frac{1}{\gamma-\beta}}(1-\alpha-\gamma)H-\gamma L}{\beta L-\left(\frac{p_2}{p_1}\right)^{\frac{1}{\gamma-\beta}}\phi^{\frac{1}{\gamma-\beta}}(1-\alpha-\beta)H} \\ &\equiv \frac{p_2}{p_1}\Gamma(H,L,p_2/p_1)\end{aligned} \tag{3.6}$$

$\Gamma(H, L, p_2/p_1)$ is the relative value produced of good 1, as a function of the relative price of good 2.

Proposition 3.1. *The relative production value,* $\frac{p_1Y_1}{p_2Y_2} \equiv \Gamma$*, is decreasing in the relative price* $\frac{p_2}{p_1}$*, such that* $\frac{\partial\Gamma(H,L,p_2/p_1)}{\partial\frac{p_2}{p_1}} < 0$.

Proof. For a positive value of $\frac{Y_1}{Y_2}$, both numerator and denominator of Γ, as given in (3.6) are necessarily of equal sign. Therefore, for $\beta > \gamma$, and all else equal the numerator being the negative of the denominator, both need to be positive. The numerator is hence decreasing, the denominator increasing in $\frac{p_2}{p_1}$. Note that in autarky, the demand structure will ensure postitive values of both Y_1 and Y_2. □

Capital now accrues a constant share α of production, which can be shown by solving the full employment condition of K for r, which yields:

$$r = \frac{\alpha}{1-\alpha}\cdot\frac{wL+sH}{K} \tag{3.7}$$

For given prices p_2/p_1 and a numeraire chosen, the production side can be solved for r, s, w, Y_1, Y_2. Endowments, relative production, firms optimization and factor market clearing conditions yield unique solutions. The intuition behind these closely resembles that of standard 2-good, 2-factor models, except for that the capital endowment K

scales production and hence incomes.[5] The following relations hold for the division of factors between the two sectors:

$$\frac{K_1}{K_2} = \Gamma(H, L, p_2/p_1) \tag{3.8a}$$

$$\frac{H_1}{H_2} = \frac{\beta}{\gamma}\Gamma(H, L, p_2/p_1) \tag{3.8b}$$

$$\frac{L_1}{L_2} = \frac{1-\alpha-\beta}{1-\alpha-\gamma}\Gamma(H, L, p_2/p_1) \tag{3.8c}$$

Thogether with the full employment conditions and proposition 3.1, this implies that not only the produced relative value, but also the produced absolute quantity of good 1, Y_1, is decreasing, and that of good 2, Y_2, is increasing in the relative goods price $\frac{p_2}{p_1}$, as all factors are shifted to the sector whose good's relative price increases.

The demand side is characterized by standard, homothetic, Cobb-Douglas preferences over the two goods which will be identical across countries. The consumers' utility function is given by

$$U = X_1^{\theta} X_2^{1-\theta}. \tag{3.9}$$

Consumers take goods prices as given and optimize their expenditure to maximize utility. Their resulting relative consumption of the two goods is

$$\frac{X_1}{X_2} = \frac{\theta}{1-\theta}\frac{p_2}{p_1}. \tag{3.10}$$

The price to obtain 1 unit of utility is thus given by the standard Cobb-Douglas price index

$$P = \left(\frac{p_1}{\theta}\right)^{\theta}\left(\frac{p_2}{1-\theta}\right)^{(1-\theta)}. \tag{3.11}$$

[5] The additional factor market clearing condition for capital, or (3.7), solves for one additional unknown, r.

3.3.2. Autarky

In autarky, capital supply K is given by domestic endowment, and consumption of both goods must equal production. Equilibrium is determined by equalizing relative demand $\frac{X_1}{X_2}$ as given in (3.10) and relative supply $\frac{Y_1}{Y_2}$ as in (3.6). This yields the resulting relative autarky equilibrium price

$$\left(\frac{p_2}{p_1}\right)_a = \frac{1}{\phi}\left[\lambda\frac{H}{L}\right]^{(\beta-\gamma)}, \tag{3.12}$$

where $\lambda = \frac{\theta(1-\alpha-\beta)+(1-\theta)(1-\alpha-\gamma)}{\theta\beta+(1-\theta)\gamma}$.

From this, the autarky equilibrium is obtained. Countries that have a larger relative endowment in low-skill labor produce relatively more of the low-skill intensive good 2, which then has a lower relative price. Capital does not affect the relative price ot the two goods and hence relative production, but only overall production of both goods.

The rental rate is higher in countries that are endowed with less capital, but both wage income and salary are smaller, as is overall income.[6]

We now want to analyze the effect of trade liberalization on capital flows in an economy which is described by the above system. We will henceforth keep the level of capital market openness constant while considering a movement towards free trade.

3.3.3. Open Capital Markets and International Investment

(Somehow) open capital markets imply that the stock of capital, K, need not be exogenously given by the domestic endowment. Instead, capital will flow such as to maximize effective returns. We assume that capital returns have to be consumed where they occur. Hence,

[6] Consider equation (3.7) together with (3.8) and the distributional shares from the production functions (3.1) to see that an increase in capital will increase both wage and salary incomes and reduce the rental.

the real return r/P to capital is decisive for the decision to invest in a country.[7] There may be barriers to international investment that translate to proportional investment costs $\delta \geq 1$. Full capital mobility is given when $\delta = 1$. Investors choose to invest in a country as long as

$$\frac{r}{P} \geq \delta \frac{r^*}{P^*} \tag{3.13}$$

where an asterisk denotes world market variables, or those in the foreign investors' home country, respectively.
Solving the zero profit conditions, (3.4) and (3.7), and using (3.11), for any given capital stock, the real rental in a country reads

$$\frac{r}{P} = \Theta \left[\left(\frac{p_2}{p_1}\right)^{\frac{\gamma}{(\beta-\gamma)(1-\alpha)}} L + \phi^{\frac{1}{(\gamma-\beta)}} \left(\frac{p_2}{p_1}\right)^{\frac{-(1-\alpha-\gamma)}{(\beta-\gamma)(1-\alpha)}} H \right]^{(1-\alpha)} \left(\frac{p_2}{p_1}\right)^{\theta} K^{\alpha-1}, \tag{3.14}$$

where

$$\Theta = \theta^{\theta}(1-\theta)^{(1-\theta)} \frac{\Delta_1^{\frac{\gamma}{(\beta-\gamma)}}}{\Delta_2^{\frac{\beta}{(\beta-\gamma)}}} \left(\frac{(1-\alpha)}{\alpha}\right)^{(\alpha-1)}.$$

The relative price of the two goods may with open capital markets either be determined by home demand and supply (no free trade) or world market conditions (trade).

We can see from equation (3.14) that the real return to capital depends negatively on the current capital stock. When returns are low, capital will flow into the country such that (3.13) will hold with equality. Also, if the rental rate in a country increases, more capital will move in, until respective returns equal again. This does not influence goods market relative prices (as given by (3.12), or by world market conditions, respectively). With capital mobility, hence, capital stocks adjusts until

$$\frac{r}{P} = \delta \frac{r^*}{P^*} \ . \tag{3.15}$$

[7] Alternatively, P/P^* can be interpreted as an exchange rate between the home and a foreign country, or the world market, respectively.

3.3.4. Small Open Economy

Now we look at how trade liberalization in this setting affects capital flows. We can interpret the situation of no trade as one of prohibitively high trade costs. We assume iceberg trade costs, such that for one unit to arrive in the destination country, τ units have to be shipped in the source country. This implies with the type of barter trade here, that in order to trade good l for one unit of good m in another country ($l, m \in 1, 2$), τ^2 units of good l have to be shipped from the domestic country. Thus, a country will trade with another if either one of the two following conditions hold:

$$\tau^2 \left(\frac{p_2}{p_1}\right)_a < \left(\frac{p_2^*}{p_1^*}\right)_a \tag{3.16a}$$

or

$$\left(\frac{p_2}{p_1}\right)_a > \tau^2 \left(\frac{p_2^*}{p_1^*}\right)_a \tag{3.16b}$$

Which one will possibly hold depends on the ratio of autarky prices (remember that these are not influenced by possible capital inflows). It is then more likely to hold, the lower trade costs τ are. If (3.16a) holds, the home country will export good 2 and import good 1, and vice versa if (3.16b) holds. By trade, goods prices will converge to make the respective condition hold with equality. For a small open economy, a decrease of τ will hence lead to an adjustment in the relative goods price, then given by $\frac{p_2}{p_1} = \tau^2 \frac{p_2^*}{p_1^*}$ or $\frac{p_2}{p_1} = \frac{1}{\tau^2} \frac{p_2^*}{p_1^*}$.

We can hence interpret a trade liberalization as a change in the relative goods prices. Production patterns will adapt accordingly, shifting ressources to the sector whose relative price has increased.[8] What does this imply for the real return to capital? With a change

[8] From (3.4) we can also understand that Stolper-Samuelson effects will occur for high- and low-skill laborers. The analysis of real gains and losses for the skill classes is skipped here as not being our primary interest, but goes along the usual lines, as presented in e.g. Feenstra (2003), pp. 13ff.

in relative prices, the real rental changes according to

$$\frac{\partial(\frac{r}{P})}{\partial(\frac{p_2}{p_1})} = \Theta K^{\alpha-1}\left[\left(\frac{p_2}{p_1}\right)^{\frac{\gamma}{(\beta-\gamma)(1-\alpha)}} L + \phi^{\frac{1}{(\gamma-\beta)}}\left(\frac{p_2}{p_1}\right)^{\frac{-(1-\alpha-\gamma)}{(\beta-\gamma)(1-\alpha)}} H\right]^{-\alpha} \cdot \left(\frac{p_2}{p_1}\right)^{\frac{\gamma}{(\beta-\gamma)(1-\alpha)}-(1-\theta)} \left[\frac{\gamma+(\beta-\gamma)\theta}{(\beta-\gamma)} L - \frac{(1-\alpha-\gamma)-(\beta-\gamma)\theta}{(\beta-\gamma)}\phi^{\frac{1}{(\gamma-\beta)}}\left(\frac{p_2}{p_1}\right)^{\frac{1}{(\gamma-\beta)}} H\right]. \tag{3.17}$$

Proposition 3.2. *The rental rate has its minimum at the autarky price level and increases with any change in the relative goods price* $\frac{p_2}{p_1}$ *from that level.*

Proof. $\frac{r}{P}(\frac{p_2}{p_1})$ has an extremum where (3.17) is zero. This is only the case if the second bracket of (3.17) is zero, which is true only at

$$\frac{p_2}{p_1} = \frac{1}{\phi}\left[\lambda\frac{H}{L}\right]^{(\beta-\gamma)}, \tag{3.18}$$

which is exactly the autarky price level. Appendix 3.B of this chapter shows that it is indeed a minimum ($\frac{\partial^2(\frac{r}{P})}{\partial(\frac{p_2}{p_1})^2} > 0$ at the autarky relative price level given by (3.12)). □

Hence, the real rental is lowest at the autarky price and increases monotonously for both increasing and decreasing relative goods prices from the autarky level. Figure 3.1 depicts the real rental r/P as a function of the relative goods price.

Hence, if relative goods prices change due to opening up for goods trade, the real rental rate will increase and capital will flow into the country. This does not depend on whether a country specializes in one good or the other. Both, if the relative price increases or decreases, the real rental rate will always increase. The reason is that specialization always entails efficiency gains, as one good can be bought cheaper on the world market, which frees ressources for production of the other good, which is now worth more. When capital is involved in production, it participates in these changes and profits from an increased real marginal product. It hence partly reaps the gains from

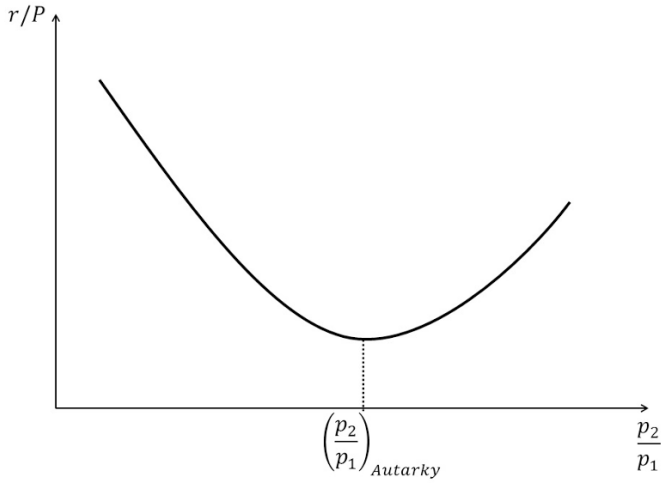


Figure 3.1.: The real rental rate and world market goods prices

specialization. In different words, capital flows in when labor can be allocated more efficiently to produce for the world market. Only the inflow of capital can hold the real rental rate at its equilibrium level given by (3.15).[9] Hence, for a small open economy, opening up for trade, and specializing in one good or the other to produce for the world market along its relatively abundant factor, will lead to capital inflows.

3.3.5. Two and Many Countries

When opening up to trade in a two- or more-country setting, goods prices change in both countries, only in different directions. Thus, also the real rental will increase in both countries. It is not per se clear in which direction capital will flow. The question is, for whom

[9] See again (3.14) for how an inflow of capital reduces the real rental rate back to its exogenous equilibrium level.

the price changes relatively more and for whom this is more influential when together reaching a new world market price equilibrium.

Whereas in a conventional 2-immobile-factor setting, worldwide free trade equilibrium prices and production of the two goods is the same as for one, large country with the combined endowments of both countries, and hence international trade yields the same result as complete international integration, here this is different. Because capital endowments additionally scale production of the two goods, it depends on the division of the worldwide stock of capital onto the two countries to determine how much of the goods in which they specialize in can be produced. The capital stocks in turn depend on the relative goods price, trade and investment costs. World market equilibrium is reached when goods markets clear and equality of real rentals (3.15) holds. Then, that country for which the real rental rate increases stronger, will experience additional capital flows due to the opposingly directed common goods price changes from international trade. In general terms, which country this will be can only be answered numerically. But before doing so, we can gain some intuition on what determines whose country's production becomes more attractive to capital.

Graphical Analysis

From (3.7), we see that, for a given capital stock, the nominal rental rate is a direct monotone function of overall income, I, in a country, given by $r = \frac{\alpha}{K} I$. Hence, r/P is also a direct monotone function of I/P, which is by definition equal to the level of utility $U = I/P$, such that

$$\frac{r}{P} = \frac{\alpha}{K} \frac{I}{P} = \frac{\alpha}{K} U. \tag{3.19}$$

Hence, the real rental rises linearly in the level of utility. The question of which country's real rental rises more due to trade integration, and hence will experience larger capital inflows, is isomorphic to the

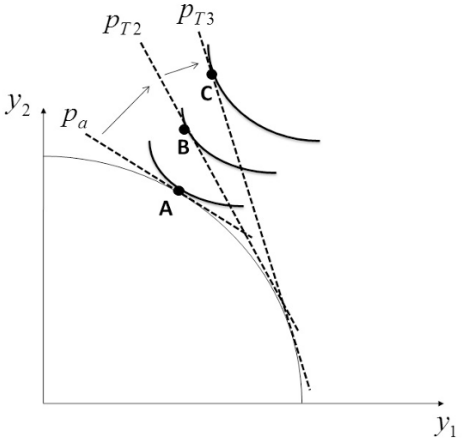


Figure 3.2.: Prices and utility

question of which country gains more from bilateral trade.[10] By Heckscher-Ohlin logic, utility rises in the degree of specialization. Figure 3.2 depicts how the level of utility increases with the difference in trade prices to autarky prices.

If two or more countries simultaneously open up for bilateral trade with each other, this price effect will differ between the countries. The direction of capital flows induced by trade only depends on for whom the price change is more pronounced. This by proposition 3.1 and (3.6) at the same time implies a greater level of specialization in production.[11] The more a country accordingly specializes in one type of good for exporting on the world market, the more capital will it see flowing in compared to other countries (which may experience

[10] Note that this only concerns utility increases *without* those that a following capital inflow entails.

[11] The relations expressed in equation (3.8) furthermore imply that production of the good that becomes relatively cheaper will be produced less, such that it will be imported.

increased outflows despite, or because of, trade liberalization), because capital is attracted by the increase in efficiency due to production for the world market. It is the relative degree of specialization, that follows an opening up to a new world market price, which decides which country will experience capital inflows. For the case of capital flows and frictionless free trade, the world market price after capital flows can be derived in closed-form solution, which we analyze in the following.

Full World Market Equilibrium

In the absence of trade costs, the world market equilibirum can be solved explicitly. Combining worldwide production of the two goods given in (3.5), to determine relative world supply Y_1/Y_2, and equalizing with relative world demand, making use of the price-rental relationship (3.4) yields the following implicit solution for the world market relative price in open markets:

$$\left(\frac{p_2}{p_1}\right)_o = \frac{1}{\phi}\left[\lambda\frac{H + H^*\left(\frac{r}{r^*}\right)^\alpha}{L + L^*\left(\frac{r}{r^*}\right)^\alpha}\right]^{\beta-\gamma} \tag{3.20}$$

Comparing this to the expression for autarky prices (3.12), the relative price change depends on the importance of the own country's endowment in overall prices. Ceteris paribus, and regarding the conjectures from the graphical analysis before, an initially smaller country gains more from trade, because its own relative endowment of high-skill and low-skill labor has less effect on the world market relative price, which hence differs more from its own autarky price. Small here, however, also means in terms of capital before capital flows, not only absolute endowments of H and L, hence economically small. This is captured by the weighting of respective labor endowments by the rental rates. $\frac{r}{r^*}$ here also represents the ratio of the real rentals, beacuse with free trade, also price levels P and P^* equal across countries. Also, the more extreme a country's relative skill endowments are, the more it will specialize in the production of the good that uses the abundant

factor intensively, and hence diverge from the production pattern of autarky.

Generally, equation (3.20) could have multiple solutions, because r and r^* depend on the world market price themselves. However, $\frac{r}{r^*}$ is uniquely determined when capital flows are taking place between the two countries, and is given by δ, or $1/\delta$, respectively. With full capital mobility ($\delta = 1$), equation (3.20) reduces to:

$$\left(\frac{p_2}{p_1}\right)_o = \frac{1}{\phi}\left[\lambda\frac{H+H^*}{L+L^*}\right]^{\beta-\gamma}, \tag{3.20'}$$

which is again the same world market price as if the world was one large country.

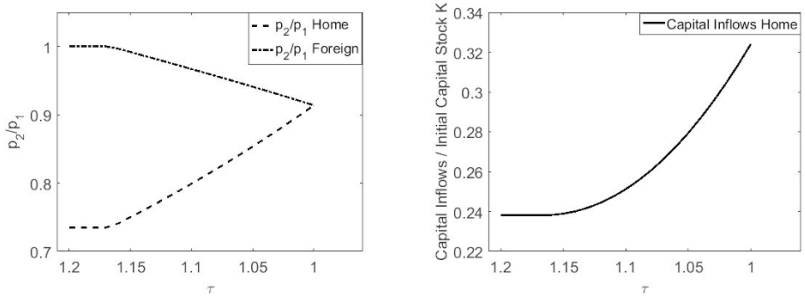
Numerical Solution

The following simulation exercises exemplarily illustrate the effect in the home economy of bilateral trade liberalization in the model described. We will assume that the home country is relatively smaller than the foreign country, but has an effect on world market prices.

First, consider that the home economy is relatively abundant in low-skill labor. Table 3.1 shows the parameters underlying the analysis. We consider a steady reduction in trade costs τ, and its effect on the level of capital inflows. Equilibrium is determined by jointly solving (3.15), and a) autarky prices when (3.16a) does not hold, or b) world

Table 3.1.: Parameters for trade cost decrease

α	0.33	β	0.44
γ	0.22	θ	0.5
δ	1		
K	250	K^*	1000
H	200	H^*	1000
L	800	L^*	1000



(a) (b)

Figure 3.3.: Simulation: Trade Cost Decrease

goods market clearing when it holds.[12] The world market clearing condtions are given by:

$$Y_1^* = X_1^* + \tau(X_1 - Y_1)$$
$$Y_2 = X_2 + \tau(X_2^* - Y_2^*)$$

where Y_i and Y_i^* are given by (3.5), and X_i and X_i^* are determined by consumers' expenditure minimization.

Figure 3.3 shows the simulation results for a decrease of τ from 1.2 to 1. In figure 3.3(a), we see the relative goods prices in both economies, home and foreign, as a function of trade costs τ. Next to it, in figure 3.3(b), the corresponding capital flows from foreign to home relative to the initial capital stock K are depicted. It shows that for high levels of trade costs, no trade is taking place and neither the relative goods price nor the real rental is affected by the decrease in trade costs. Still, there are positive capital flows into the capital scarce home economy. From some point on, trade costs are low enough such that prices in the two countries converge. Although prices change for both countries, this is particularly pronounced for the home country. Accordingly, due to trade, additional capital flows

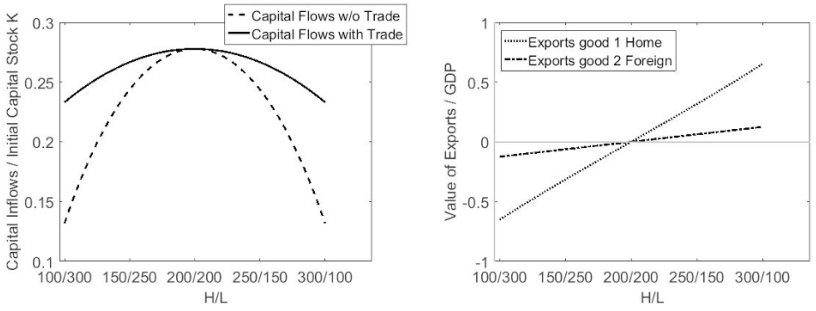
[12] (3.16b) will not hold in this constellation.

from foreign to home. These capital inflows increase with the level of trade liberalization.

Whereas this illustration has shown the example of a relatively low-skill abundant economy, we can also analyze changes in the level of relative initial skill endowment. We will therefore consider the case of complete free trade ($\tau = 1$), but vary the relative home endowment with skills. We therefore jointly solve for relative real return equality (3.15) and the free trade world market price (3.20′). We compare this to the level of capital flows without free trade, i.e. solving rental rate equality (3.15) with autarky prices given by (3.12). Table 3.2 lists the parameters used in this exercise. The results are shown in figure 3.4. Figure 3.4(a) plots capital flows from foreign to home relative to the initial capital stock without free trade ($\tau \to \infty$) and those with free trade ($\tau = 1$) for varying relative values of H and L, keeping the relative endowments in foreign constant. When the relative endowments equal (at 1), no trade is taking place, and there are consequently no additional capital flows due to trade taking place. When relative endowments differ, capital flows do decrease overall in both cases, because then the home endowment is not as "fitting" anymore for the symmetric model constellation in production technologies and preferences. But the opportunity to trade still raises the resulting level of capital flows from the large to the smaller country. This is true for both directions of specialization, low-skill and high-skill. Because trade is balanced, being smaller also implies a greater relative

Table 3.2.: Parameters for endowment variation

α	0.33	β	0.44
γ	0.22	θ	0.5
δ	1	τ	1
K	250	K^*	1000
L^*	1000	H^*	1000



(a) (b)

Figure 3.4.: Simulation: Varying Skill Endowments

dependence on trade and hence greater specialization in production relative to overall production. Figure 3.4(b) depicts the according export values of goods 1 and 2 for the two countries relative to GDP, which is calculated as the value of overall production in terms of good 1. Both export values equal in absolute terms but are greater in relative terms for the (home) country that consequently experiences additional capital inflows.

The numerical exercises illustrate the scope of the effect that the opportunity to trade influences incentives for capital flows and the direction that these take: The country for which trade induces greater specialization in factor endowment driven trade will also experience more capital inflows.[13]

[13]Note that a country that is larger in terms of capital than the ones illustrated here, may experience capital outflows in general. But trade – if specializing stronger than the other country – will by the same mechanism then reduce its capital outflows.

3.4. Empirical Test

3.4.1. Data and approach

It follows from the theoretical analysis that for an individual country, relatively more Heckscher-Ohlin-trade specialization in high- or low-skill intensive goods should also lead to increased capital inflows. Both are likely to be correlated in the data for other reasons than the one that our theory puts forward, as trade and capital flows may both be the common result of greater overall political and economic integration into world markets. To test our hypothesis, we therefore have to seperate the two effects. We do so by constructing a measure for relative overall trade specialization in either skill class and at the same time controlling for the degree of financial account liberalization and overall investment risk in a country in a given year. We then run a panel regression including country and time fixed effects. Our baseline regression thus looks like the following:

$$\begin{aligned} CapInflows_{c;t} =& \beta_0 + \beta_1 * HOS_{c;t} + \beta_2 * CapOpen_{c;t}^{dejure} \\ &+ \beta_3 * InvSec_{c;t} + \alpha_t + \alpha_c + \epsilon_{ct} \end{aligned} \tag{3.21}$$

Our dependent variable are the net capital inflows in country c in year t. Our interest is in the coefficient β_1 on the measure of Heckscher-Ohlin skill specialization (HOS, as explicated below). From our theory, we would expect it to have a positive sign. We then control for the degree of *de jure* capital market openness ($CapOpen$), and the (absence of) overall investment risk in the country at that time ($InvSec$). We use country fixed effects to single out peculiar characterisitcs such as geographical or cultural proximitiy to other countries. We therefore only exploit the within-variation in Heckscher-Ohlin specialization. We also include time fixed effects in order to control for a time trend in both trade and capital flows and also to capture the idea of being interested in the *relative* degrees of specialization, as suggested by our theory.

The measure of capital openness needs to be a de jure measure because de facto measures are by definition constructed out of capital inflows themselves and would thus make our test pointless. A measure of de jure capital market openness is provided by Chinn and Ito (2006). It is constructed as to measure the extent of capital controls that are enforced in a country and hinder capital inflows (and outflows) regardless of the general attractiveness of the country to capital flows. A higher value of *CapOpen* implies more de jure financial account openness.

Investment security is measured by an index provided by the International Country Risk Guide on the investment risk profile in a country. It is constructed to measure the risk of private investment in a country and captures the level of and danger associated with viability/expropriation, profits repatriation, and payment delays for international investment. Unfortunately, this index is only available from 1984 on, but for a wide range of countries. The index runs from 0 to 12, where a higher number indicates less risk, which is why we denote the measure positively by *InvSec*.

As our dependent variable, we use *net* capital inflows in a country in a given year. We restrict the analysis to equity investment only, since this should be most directly affected by the increased possibilities to use the abundant factor efficiently for production for the world market. We therefore for once report the effect on FDI flows only, because this is the most intuitive application of the idea of productive foreign investment. Since investment can also be on a smaller scale when direct investment is profitable, we then also use the sum of FDI and portfolio equity investment as overall investment. We divide the respective level of (positive or negative) net capital inflows by GDP. This not only makes numbers comparable, but also excludes valuation and growth effects. Net inflows yield a positive value of $CapInflows$, net outflows a negative one. All data on capital flows is taken from the IFS Financial Statistics. GDP data is taken from the World Bank World Development Indicators (WDI).

Our independent variable of interest is the degree of specialization in either high-skill or low-skill labor. There is, however, no direct

data on the aggregate skill content of countries' exports available, and calculation is problematic. For example, the measure of skill intensities used most regularly in the trade literature is the number of production and non-production workers in a particular industry as provided by the US census for manufactures. However, assigning this industry-level data to bilateral trade data, which is only available in product classification, is only reliably feasible at the 3-digit level, which implies roughly 20 different product classes. At this highly aggregated level, there is first of all not much variation in skill intensities between product classes, and second, this will partially miss specialization patterns, since these will change the product chain within industries, as e.g. pointed out by Krugman (2008).[14]

We therefore construct a more refined measure of countries' actual specialization patterns along skill levels. The UNCTAD RFI database (documented in Shirotori et al., 2010) reports skill intensities in production on the SITC2 4-digit product level. hence on a much more differentiated scale. This measure is constructed by taking data on factor endowments of exporting countries (for skill abundance, the authors use data on schooling obtained from Barro and Lee (2001)) and relating these to factual exports to gather from this the skill intensity embodied in product classes. For our purpose, this has the advantage that this measure is directly drawn from actual trade data, and thus reveals factual specialization patterns. At the same time, it is computed from worldwide observations, so that we can directly apply it on individual country-level observations without being tautological. On the SITC2 4-digit level, there are 651 different product classes for which we have data on skill intensities. These are available for each year in our sample, even though the variation over time within

[14] Our results do still hold for applying this measure on the 3-digit level, but tend to be less pronounced. More importantly, they then seem to be driven by exports of few, relatively skill intensive product classes, such as machinery and chemical products, but not by variation between other product classes. This raw approach hence is likely to particularly miss specialzation patterns in rather low-skill intensive industries, or that in low-skill intensive sections of the production chain.

product classes is small. $H_{i;t}$ represents the skill level embodied per value of exports of the respective product class i in year t.[15] For exposition, table 3.3 shows the 12 least and 12 most skill intensive product classes from the RFI Database for the year 2000, the last year in our sample. Less skill intensive goods are mostly particular textiles and basic agricultural exports, whereas the most skill intensive goods tend to be chemical products.[16]

Since we want to know about a country's overall specialization level, we take this product-level data and combine it with trade flows in these product classes in order to construct aggregate country-year observations of factor intensity in trade patterns. Countries' exports and imports on the SITC2 4-digit product level are taken from the NBER-United Nations Trade Data, as documented in Feenstra et al. (2005). We then assign these trade flow volumes the respective skill intensity of the exported products and aggregate these. We thus obtain the overall skill embodied in a country's exports (and imports) in year t. The average skill intensity in exports is then given by this sum of all skill embodied in product level exports, divided by the value of overall exports. This average skill embodied in export value will be our measure of skill intensity in exports, denoted H1. We then also relate this to the average skill intensity of imports, calculated accordingly, to obtain a measure of relative skill intensity of exports over that of imports, denoted H2.

[15] Note that the relative skill intensity is – in line with our theory – equal for all countries (by equation (3.3)). Because our theory also abstracts from changing technologies, we for robustness also use constant values $H_{i,2000}$, applying the measured skill intensities from 2000 for all years in the sample. The results do not change.

[16] But also, some agricultural goods that are produced on large scales, such as barley, have relatively high high-skill intensity measures. This may be true, as the production of these is highly automated, but it may also reflect one weakness of using actual trade data, namely that export subsidies for low-skill intensive goods in high-skill abundant countries lead to these as being measured relatively high-skill intensive. Apart from crops, however, we consider this problem to be rather small.

Table 3.3.: Skill intensities of product classes

Most skill intensive Product classes	$H_{i;2000}$
Ores and concentrates of uranium and thorium	11.03811
Mechanical wood pulp	10.79112
Sawlogs in the rough,whether/not stripped of bark	10.32102
Barley,unmilled	10.24047
Other phenols and phenol-alcohols	10.22291
Cresols,n.e.s,and their salts	10.22291
Halogenated,sulphonated,etc.derivatives of phenol	10.22291
Phenol(hydroxybenzene),chemically pure,& its salts	10.22291
Other phenols and phenol-alcohols	10.22291
Organo-mercury compounds	10.21946
Seep's or lambs' wool,greasy or fleece-washed	10.16085
Horses, asses, mules and hinnies, live	10.13878
Least skill intensive Product classes	**$H_{i;2000}$**
Oils,animal & vegetable,boiled,oxidized, etc.	2.625086
Cotton,carded or combed	2.703924
Tea	2.759669
Jute & other textile bast fibres,nes,raw/processed	2.792496
Copra	2.96619
Carpets of other textile materials	2.97924
Carpets of wool or fine animal hair	2.97924
Groundnuts (peanuts),green,whether or not shelled	3.106773
Cotton seeds & Cotton seed oil	3.109285
Sheep and lamb skin leather	3.669646
Groundnut (peanut) oil	3.711931
Tin ores and concentrates	3.713806

The formulas for the two indicators hence read:

$$H1_{c;t} = \frac{\sum_i H_{i;t} * EX_{c;i;t}}{\sum_i EX_{c;i;t}} \tag{3.22a}$$

and

$$H2_{c;t} = \frac{\sum_i H_{i;t} * EX_{c;i;t}}{\sum_i EX_{c;i;t}} \Big/ \frac{\sum_i H_{i;t} * IM_{c;i;t}}{\sum_i IM_{c;i;t}}, \tag{3.22b}$$

where $EX_{c;i;t}$ and $M_{c;i;t}$ are the exported and imported values of country c in product class i at time t. H1 and H2 are highly correlated (0.90).

Both measures, and particularly H1, are measures of (relative) skill intensity of exports. From this, we aim at identifying specialization patterns in *either*, low-skill or high-skill intensive goods. Thus, those countries that have a relatively low level of high-skill embodied in exports should be seen as specializing strongly (in low-skill intensive goods), as well as those that show a rather high level (specializing in high-skill intensive goods). We therefore use as a natural reference point the median level of high-skill specialization, as measured by H1 and H2, in a certain year. We can then interpret any deviation from this reference point in both directions as a stronger relative specialization in a skill level. Our respective measures of Heckscher-Ohlin-specialization then read:

$$HOS1_{c;t} = |ln\left(\frac{H1_{c;t}}{H1_{MED;t}}\right)| \tag{3.23a}$$

$$HOS2_{c;t} = |ln\left(\frac{H2_{c;t}}{H2_{MED;t}}\right)| \tag{3.23b}$$

By taking the absolute value of logs of a fraction, both measures are always positive and increase, the more distant the fraction is from 1. Thus, we interpret a higher value in both measures as a greater level of specialization, as compared to the median worldwide pattern in a given year.[17] Furthermore, the use of logs implies that a relative specialization pattern of e.g. average skill embodied in exports of $1/x$ times the median country in that year receives the same value as one of x times the median.

The measures constructed for HO-trade have no direct representation in the theoretical model above. By Proposition 3.1 and equations (3.8), the the type of good of which the relative price increases will be produced more, whereas production of the other type of good will

[17] Using the median, instead of e.g. the average skill level embodied in all exports for H1, and no adaption for H2, has the advantage that we obtain relative measures of specialization, and furthermore, that we can keep samples comparable in terms of high-and low-skill specializing countries for both measures.

decrease. By equation (3.10), relative consumption reacts exactly in the opposite way. Hence, countries will export more of those goods which they can sell at a higher price at the world market than in autarky. The empirical measures used here show the degree of high- or low-skill specialization per exported value, which would be equal for two countries exporting the respective factor-intensive good in the model (because there are only two goods, i.e. only one to export), independent of how much of it. We therefore here test for the importance of HO-trade in overall trade, assuming that there are other reasons for trade as well. We have hence created measures for countries' revealed relative specialization in skill levels based on a very refined definition of product classes that we can use to test whether it has an influence on net capital inflows.

The data on investment risk is only available from 1984 on and our trade data only goes until 2000, such that including all variables, the regressions cover a sample over the time span from 1984 to 2000. Summary statistics of the variables used in the analysis over the respective period are given in table 3.11 in appendix 3.C of this chapter. For some countries there are no observations in some years, so that we are left with around 1500 country-year observations in our sample, coming from 119 countries.

3.4.2. Results

We run regressions of type (3.21) with both dependent variables, net FDI and overall equity investment inflows, each on both measures of skill specialization in a country. Standard errors are clustered on the country level. The results are presented in table 3.4.

The estimated coefficients are indeed positive and statistically significant for the entire sample. Heckscher-Ohlin specialization does generally go along with net capital inflows. The coefficients of our control variables also show the expected sign, even though capital market openness is not statistically significant in any specification.[18]

[18] Since we analyze net flows, this is not too surprising in general, as there are both countries that tend to have net in- and outflows in our sample. For the

Table 3.4.: Results

VARIABLES	(1) Net FDI	(2) Net FDI	(3) Net Inv.	(4) Net Inv.
HOS1	0.0197*		0.0349**	
	(0.0100)		(0.0154)	
HOS2		0.0204**		0.0364**
		(0.0100)		(0.0164)
CapOpen	0.00151	0.00141	0.00128	0.00105
	(0.00156)	(0.00158)	(0.00265)	(0.00264)
InvSec	0.000749	0.000751	0.000717	0.000730
	(0.000642)	(0.000642)	(0.000765)	(0.000775)
Country fixed effects	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes
Constant	0.0133**	0.0134**	0.0125	0.0127
	(0.00559)	(0.00561)	(0.00831)	(0.00830)
Observations	1,533	1,532	1,369	1,368
R2	0.069	0.070	0.054	0.055
Number of Countries	119	119	118	118

Robust standard errors clustered on the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

These findings could also result from theoretical considerations on complementarity of capital with either one skill class, and a skewed sample. If capital were e.g. high-skill complementing, then relative specialization in high-skill intensive goods would create incentives for capital inflows. The mechanism that we propose here should instead lead to capital inflows whenever a country specializes relatively more in either skill class. In order to test our mechanism more precisely, we therefore split our sample in two groups. We then run the regression as in (3.21) once on only those countries, who have a higher relative specialization in skills, and once on those that show a lower relative specialization in skills, compared to the median country in a respective

fact that the investment risk profile is not very meaningful, we take as an explanation that it is highly correlated with capital market openness, and that profitability may outweigh the absence of risk in determining (changes in) capital flow patterns.

year. These may be different groups, depending on which definition of specialization is considered, and depending on the year of the observation. For those regressions that use $HOS1$ as regressor (hence considering only specialization in exports), we split the sample by whether $\frac{H1_{c;t}}{H1_{MED;t}}$ is greater or smaller than 1. For those regressions that use $HOS2$ (hence relating average exported and imported skill level embodied in goods), the relevant split point is $\frac{H2_{c;t}}{H2_{MED;t}}$, and whether this is greater or smaller than 1.[19] The results are shown in table 3.5, columns 1-4 for the relatively high-skill exporting countries, and columns 5-8 for those that relatively specialize in low-skill intensive goods.

Even though reducing the sample size takes a little power from the model, we see that the results for either group still show the same pattern, and also the coefficients are broadly in similar dimensions for both as for the entire sample. We do see that the results overall appear slightly stronger for the relatively more high-skill specializing countries, but that also for relatively low-skill specializing countries, a stronger relative specialization in these low-skill intensive goods goes along with net capital inflows. We also see that for high-skill exporting countries (which tend to be more developed countries), capital flows including portfolio equity investment seem to react slightly stronger, whereas for low-skill exporting countries (predominantely emerging and developing economies), FDI shows the relatively more clear response to trade specialization. Overall, the above findings show that countries who specialize relatively more in goods of either skill class tend to observe larger capital inflows. Our findings hence support our theoretical predictions. When countries specialize in a skill class in their trade pattern, and hence can be said to pursue increased Heckscher-Ohlin type of trade, this also raises net capital inflows.

[19] Here, the definition that relates skill specialization to the median country in a year helps us to keep both samples of relevant size, in order to retrieve reliable statistical inference for both groups, those that specialize relatively more high-skill and those that specialize relatively more low-skill intensive.

Table 3.5.: Results by type of specialization

	High-skill exporting countries			
VARIABLES	(1) Net FDI	(2) Net FDI	(3) Net Inv.	(4) Net Inv.
HOS1	0.0849		0.116*	
	(0.0513)		(0.0635)	
HOS2		0.0913**		0.142**
		(0.0401)		(0.0553)
CapOpen	-0.000193	-0.000841	0.00281	0.00219
	(0.00307)	(0.00292)	(0.00609)	(0.00643)
InvSec	-0.000325	-0.000727	-0.000171	-0.000455
	(0.00113)	(0.00105)	(0.00156)	(0.00156)
Country fixed effects	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes
Constant	0.0133**	0.0158**	-0.0226	-0.0324***
	(0.00656)	(0.00663)	(0.0152)	(0.0117)
Observations	791	772	718	697
R2	0.062	0.066	0.040	0.047
Countries	78	78	76	77
	Low-skill exporting countries			
VARIABLES	(5) Net FDI	(6) Net FDI	(7) Net Inv.	(8) Net Inv.
HOS1	0.0170**		0.0174	
	(0.00772)		(0.0117)	
HOS2		0.0132*		0.0123
		(0.00753)		(0.0112)
CapOpen	0.00279	0.00246	0.000639	0.000187
	(0.00175)	(0.00165)	(0.00177)	(0.00172)
InvSec	0.00149*	0.00193**	0.000849	0.00141
	(0.000750)	(0.000854)	(0.000865)	(0.000982)
Country fixed effects	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes
Constant	0.0104	0.0125	0.0174**	0.00818
	(0.00659)	(0.00900)	(0.00824)	(0.00727)
Observations	739	753	648	665
R2	0.134	0.146	0.166	0.178
Countries	66	68	64	67

Robust standard errors clustered on the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3.4.3. Robustness Tests

In this section, we run a series of robusness tests. First, we explicitly compare the effect of high-skill (or low-skill) complementarity of capital with the effect of specialization in general. Second, we test whether more open countries experience higher capital inflows also due to factor trade specialization. Thirdly, we control for the effect of a country's GDP per capita, capital stock and growth, respectively.

Capital-Skill Complementarity

Our theoretical model has explicitly abstracted from any type of complementarity between capital and either of the skill classes. As discussed, besides (and jointly with) the effect identified, this could also drive capital inflows. When splitting the sample in relatively high- and low-skill exporting countries, we saw that the effect of specialization was slightly stronger for high-skill exporting countries.

In order to more directly test for high- or low-skill complementarity of capital and to additionally control for that this is not what drives our results, we include skill specialization in the regression as an explanatory variable by itself. To this end, we take the logs of $\frac{H1_{c;t}}{H1_{MED;t}}$ and $\frac{H2_{c;t}}{H2_{MED;t}}$, but refrain from eliminating their sign. We denote these variables by $H1_{c;t}^{Rel}$ and $H2_{c;t}^{Rel}$, respectively. A higher value thus indicates an increased relative specialization in high-skill intensive goods of country c in year t. As constructed, they are of equal scale as our main explanatory variables $HOS1$ and $HOS2$, which allows us to compare magnitudes of the estimates. The results are shown in table 3.6.

It appears that there is a tendency for capital to be skill-complementary, as the sign of the coefficients for skill specialization is positive. However, these results are only significant for aggregate equity inflows. When comparing the effect with that of specialization in both directions itself, we see that the point estimates are lower for skill specialization than for any type of specialization ($HOS1$ & $HOS2$) in all specifications. We can conclude that although

Table 3.6.: Estimation results: control for skill specialization

VARIABLES	(1) Net FDI	(2) Net FDI	(3) Net Inv.	(4) Net Inv.
HOS1	0.0298*		0.0497**	
	(0.0166)		(0.0208)	
HOS2		0.0302**		0.0495**
		(0.0142)		(0.0206)
CapOpen	0.00174	0.00161	0.00166	0.00136
	(0.00155)	(0.00154)	(0.00262)	(0.00260)
InvSec	0.000611	0.000611	0.000446	0.000467
	(0.000669)	(0.000662)	(0.000781)	(0.000809)
$H1^{Rel}_{c;t}$	0.0176		0.0351*	
	(0.0158)		(0.0210)	
$H2^{Rel}_{c;t}$		0.0202		0.0388*
		(0.0125)		(0.0201)
Country fixed effects	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes
Constant	0.0137**	0.0143**	0.0140*	0.0154*
	(0.00561)	(0.00567)	(0.00804)	(0.00806)
Observations	1,533	1,532	1,369	1,368
R2	0.070	0.072	0.057	0.060
Number of Countries	119	119	118	118

Robust standard errors clustered on the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

there might be a slight tendency for capital-skill complementarity, the general effect of trade specialization is relevant on its own and even more important, regarding the amount of capital flows that it induces.

Capital Openness and Trade

In order for trade liberalization to have an effect on capital flows, these capital flows need to be possible at all. We therefore test whether the effect of trade driving capital flows is particularly pronounced for countries that have lower legislative barriers to capital flows. We thus include interaction terms of *CapOpen* and our measures of Heckscher-Ohlin specialization in the regressions.

Table 3.7.: Estimation results: interaction HOS and capital market openness

VARIABLES	(1) Net FDI	(2) Net FDI	(3) Net Inv.	(4) Net Inv.
HOS1	0.0206**		0.0404**	
	(0.0102)		(0.0158)	
HOS2		0.0223**		0.0448**
		(0.0103)		(0.0174)
CapOpen	0.000192	-7.14e-05	-0.00225	-0.00284
	(0.00194)	(0.00198)	(0.00257)	(0.00260)
InvSec	0.000720	0.000719	0.000557	0.000554
	(0.000658)	(0.000660)	(0.000815)	(0.000828)
HOS1 # CapOpen	0.00778		0.0202**	
	(0.00552)		(0.00927)	
HOS2 # CapOpen		0.00867		0.0220**
		(0.00559)		(0.00984)
Country fixed effects	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes
Constant	0.0136**	0.0136**	0.0133	0.0133
	(0.00573)	(0.00574)	(0.00859)	(0.00862)
Observations	1,533	1,532	1,369	1,368
R-squared	0.070	0.071	0.059	0.061
Number of Countries	119	119	118	118

Robust standard errors clustered on the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.7 shows the results. The coefficients on the interaction terms are indeed positive. They are, however, not significant for net FDI inflows, but only for net overall equity inflows. This may reflect the fact that our measure of capital controls more strongly weighs measures aiming at controlling financial capital than those on direct investment. We also see that the results for the HOS-measures are not affected by this. This indicates that even though the effect of factor-specific trade on capital inflows is slightly positively depending on the absence of restrictions to investment, capital that enters the country in order to pursue this may find its ways around these and the effect is present independently of this. It may furthermore indicate a

generally rather high, i.e. sufficient level of capital market openness in the sample.

Per Capita GDP

The theoretical analysis has pointed out that the capital stock in a country will for standard neoclassical reasons also play a role in determining capital flows. For the initial capital stock, this is controlled for by accounting for country fixed effects. However, also changes over time may influence incentives for capital to flow into a country. The same holds for the general level of economic development, which may attract capital flows. We therefore first jointly proxy for both, the capital stock and changes in the economic situation, by the level of GDP per capita in a country. The data on this comes from the WDI. The results are given in table 3.8.

We see that this does not affect our results. The coefficient on GDP per capita has a negative sign, possibly representing that an increased capital stock does indeed rather go along with decreased incentives for capital inflows. This effect is insignificant, however. Because the expectations on the effects of level of the capital stock and economic activity point in different directions, GDP per capita as a proxy may pool the two in an inappropriate way. In order to disentangle the effect of the capital stock and GDP growth further, we thus in the following include each on their own as controls.

Capital Stock

The Penn World Tables supply data on capital stocks in a wide range of countries, although not for all that we have included in the regressions so far. The estimation results when controlling for the level of a country's capital stock are shown in table 3.9.

The results generally resemble those from table 3.8. The level of capital stock shows a negative sign, but this is insignificant. Furthermore, it is not the correlation between trade specialization and the

Table 3.8.: Estimation results: control for per capita GDP

VARIABLES	(1) Net FDI	(2) Net FDI	(3) Net Inv.	(4) Net Inv.
HOS1	0.0208*		0.0474	
	(0.0108)		(0.0322)	
HOS2		0.0217**		0.0458*
		(0.0104)		(0.0247)
CapOpen	0.00150	0.00141	0.000927	0.000672
	(0.00154)	(0.00156)	(0.00244)	(0.00239)
InvSec	0.000595	0.000591	0.000797	0.000809
	(0.000666)	(0.000667)	(0.000820)	(0.000833)
GDP p.c.	-5.05e-07	-5.25e-07	1.00e-06	9.32e-07
	(1.55e-06)	(1.54e-06)	(4.77e-06)	(4.69e-06)
Country fixed effects	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes
Constant	0.00126	0.000592	-0.0186	-0.0191
	(0.0152)	(0.0150)	(0.0478)	(0.0454)
Observations	1,480	1,479	1,324	1,323
R-squared	0.065	0.066	0.051	0.052
Number of countries	116	116	115	115

Robust standard errors clustered on the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

initial capital stock, that drives our results, but the effect of trade specialization itself.

Growth

Capital inflows should be greater in relative periods of growth of a country. Although *InvSec* already partly accounts for the overall investment climate in a country, we can furthermore explicitly control for this. Here, we would expect an opposite effect to that of the capital stock, i.e. we would expect a positive sign.

In the theoretical analysis, trade itself would lead to growth. Hence, this part of growth in the data is an effect that we would explicitly want to see included as an effect from trade on capital inflows. Still, there could be various other reasons for economic growth, influencing

Table 3.9.: Estimation results: control for capital stock

	(1)	(2)	(3)	(4)
VARIABLES	Net FDI	Net FDI	Net Inv.	Net Inv.
HOS1	0.0195*		0.0332**	
	(0.0103)		(0.0161)	
HOS2		0.0218**		0.0368**
		(0.0105)		(0.0176)
CapOpen	0.000935	0.000804	0.000809	0.000564
	(0.00163)	(0.00164)	(0.00281)	(0.00278)
InvSec	0.000579	0.000583	0.000527	0.000540
	(0.000696)	(0.000697)	(0.000832)	(0.000839)
CapStock	-1.59e-09	-1.52e-09	-1.79e-09	-1.62e-09
	(1.28e-09)	(1.25e-09)	(1.95e-09)	(1.99e-09)
Country fixed effects	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes
Constant	-0.00189	-0.00313	-0.00464	-0.00671
	(0.00643)	(0.00670)	(0.00769)	(0.00788)
Observations	1,453	1,452	1,303	1,302
R-squared	0.066	0.067	0.051	0.052
Number of countries	111	111	110	110

Robust standard errors clustered on the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

capital flows and possibly being related with trade specialization. We hence take data on growth of real per capita GDP for the respective years from the WDI and include this as a control variable in our estimations. The results are shown in table 3.10.

The results again do not change. Per capita GDP growth indeed shows a positive sign, this effect is statistically insignificant, however. More importantly, the results for our measures of Heckscher-Ohlin specialization are still positive and significant, such that we can conclude that even if periods of growth and skill level specialization are correlated, we can identify a particular effect of the latter on equity capital inflows.

Table 3.10.: Estimation results: control for per capita GDP growth

	(1)	(2)	(3)	(4)
VARIABLES	Net FDI	Net FDI	Net Inv.	Net Inv.
HOS1	0.0227**		0.0395**	
	(0.0104)		(0.0163)	
HOS2		0.0238**		0.0413**
		(0.0103)		(0.0170)
CapOpen	0.00136	0.00125	0.00109	0.000843
	(0.00154)	(0.00156)	(0.00262)	(0.00261)
InvSec	0.000595	0.000593	0.000505	0.000515
	(0.000704)	(0.000703)	(0.000859)	(0.000869)
Growth	0.000100	0.000104	0.000294	0.000297
	(0.000232)	(0.000231)	(0.000311)	(0.000311)
Country fixed effects	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes
Constant	-0.00347	-0.00440	-0.00747	-0.00917
	(0.00616)	(0.00644)	(0.00768)	(0.00774)
Observations	1,500	1,499	1,341	1,340
R-squared	0.066	0.067	0.051	0.053
Number of countries	118	118	117	117

Robust standard errors clustered on the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3.5. Conclusion and Outlook

We have in this chapter elaborated on a rather intuitive mechanism regarding the interdependence of globalization: as trade entails efficiency gains, capital should, as a residual factor, also profit from specialization in terms of skill intensities of immobile labor in worldwide production. Therefore, in countries that are relatively well endowed with one type of labor and that open up their goods markets to the rest of the world, production should shift towards these goods that use the abundant factor intensively. Our theoretical analysis shows that this will always increase the return to capital that is used in production of both goods and thus create incentives for capital to flow into specializing countries. Our stylized model allows us to single

out this effect, that would then still be relevant when interacting with other effects, such as capital-skill complementarity, which may also shape the direction of capital flows.
This finding is in stark contrast to standard Heckscher-Ohlin trade theory, where trade replaces incentives for capital to flow across borders, if it is one of the factors of production. We here account for the fact, that indeed specialization along the lines of factor endowments is taking place in immobile high-skill and low-skill labor, whereas capital is relatively free to cross borders. Incorporating these facts into a simple and tractable model allows us to in the logic of exactly the same determinants of trade draw diametrically opposing conclusions regarding the incentives for capital flows that trade induces.

We then test our hypothesis empirically to see whether the proposed mechanism is of empirical relevance and can be found in the data. Therefore, we construct a measure of the degree of skill-level specialization of countries and find strong support for our hypothesis. Trade specialization does lead to overall capital inflows, both for relatively high-skill and low-skill intensive specializing countries, and controlling for various other factors.

We believe that our framework has a very intuitive grasp, but still forcefully explains findings of concurrent trade specialization and capital flows. We have thus deliberately refrained from extending the model to account for more complex production structures to keep it tractable. However, the framework can easily be extended to incorporate different effects than the one pointed out here. The effect of internationally mobile capital participating in gains that trade specialization entails should still be considered in the discussion on the many (and one) face(s) of globalization.

3.A. Appendix A: Factor Input Coefficients $\mathbf{a_{iF}}$

By solving the cost minimization problem, firms in the 2 sectors choose the following optimal inputs of the 3 factors:

$$
\begin{aligned}
a_{1K} =& r^{\alpha-1}s^{\beta}w^{1-\alpha-\beta}\left(\tfrac{\alpha}{1-\alpha-\beta}\right)^{1-\alpha}\left(\tfrac{\beta}{1-\alpha-\beta}\right)^{-\beta}\\
a_{1H} =& r^{\alpha}s^{\beta-1}w^{1-\alpha-\beta}\left(\tfrac{\alpha}{1-\alpha-\beta}\right)^{-\alpha}\left(\tfrac{\beta}{1-\alpha-\beta}\right)^{1-\beta}\\
a_{1L} =& r^{\alpha}s^{\beta}w^{-\alpha-\beta}\left(\tfrac{\alpha}{1-\alpha-\beta}\right)^{-\alpha}\left(\tfrac{\beta}{1-\alpha-\beta}\right)^{-\beta}\\
a_{2K} =& r^{\alpha-1}s^{\gamma}w^{1-\alpha-\gamma}\left(\tfrac{\alpha}{1-\alpha-\gamma}\right)^{1-\alpha}\left(\tfrac{\gamma}{1-\alpha-\gamma}\right)^{-\gamma}\\
a_{2H} =& r^{\alpha}s^{\gamma-1}w^{1-\alpha-\gamma}\left(\tfrac{\alpha}{1-\alpha-\gamma}\right)^{-\alpha}\left(\tfrac{\gamma}{1-\alpha-\gamma}\right)^{1-\gamma}\\
a_{2L} =& r^{\alpha}s^{\gamma}w^{-\alpha-\gamma}\left(\tfrac{\alpha}{1-\alpha-\gamma}\right)^{-\alpha}\left(\tfrac{\gamma}{1-\alpha-\gamma}\right)^{-\gamma}
\end{aligned}
\tag{3.24}
$$

3.B. Appendix B: Proof of Real Rental Minimum

The derivative of r/P, as given in (3.14), is by (3.17):

$$\frac{\partial(\frac{r}{P})}{\partial(\frac{p_2}{p_1})} = \Theta K^{\alpha-1}\left[\left(\frac{p_2}{p_1}\right)^{\frac{\gamma}{(\beta-\gamma)(1-\alpha)}} L+\phi^{\frac{1}{(\gamma-\beta)}}\left(\frac{p_2}{p_1}\right)^{\frac{-(1-\alpha-\gamma)}{(\beta-\gamma)(1-\alpha)}} H\right]^{-\alpha} \cdot \left(\frac{p_2}{p_1}\right)^{\frac{\gamma}{(\beta-\gamma)(1-\alpha)}-(1-\theta)}\left[\frac{\gamma+(\beta-\gamma)\theta}{(\beta-\gamma)}L-\frac{(1-\alpha-\gamma)-(\beta-\gamma)\theta}{(\beta-\gamma)}\phi^{\frac{1}{(\gamma-\beta)}}\left(\frac{p_2}{p_1}\right)^{\frac{1}{(\gamma-\beta)}} H\right]. \tag{3.17}$$

and its zero is given by the autarky price (3.18). At this, the second derivative of r/P with respect to $\frac{p_2}{p_1}$ reduces to

$$\frac{\partial^2(\frac{r}{P})}{\partial(\frac{p_2}{p_1})^2} = \Theta K^{\alpha-1}\left[\left(\frac{p_2}{p_1}\right)^{\frac{\gamma}{(\beta-\gamma)(1-\alpha)}} L+\phi^{\frac{1}{(\gamma-\beta)}}\left(\frac{p_2}{p_1}\right)^{\frac{-(1-\alpha-\gamma)}{(\beta-\gamma)(1-\alpha)}} H\right]^{-\alpha}\left(\frac{p_2}{p_1}\right)^{\frac{\gamma}{(\beta-\gamma)(1-\alpha)}-(1-\theta)} \left[-\left(\frac{1}{(\gamma-\beta)}\right)\frac{(1-\alpha-\gamma)-(\beta-\gamma)\theta}{(\beta-\gamma)}\phi^{\frac{1}{(\gamma-\beta)}}\left(\frac{p_2}{p_1}\right)^{\frac{1}{(\gamma-\beta)}-1} H\right] > 0 \tag{3.25}$$

When we look at an extremum, $\frac{(1-\alpha-\gamma)-(\beta-\gamma)\theta}{(\beta-\gamma)}$ must be greater than zero, because otherwise (3.17) could not be zero (and there was no local extremum of r/P). Hence, (3.25) must be positive. This implies that the extremum of r/P as a function of the relative goods price at the autarky price given by (3.18) is indeed a minimum. Since there is no other extremum, the function of (3.14) looks like depicted in Figure 3.1 and is increasing in both directions from the autarky price.

3.C. Appendix C: Summary Statistics

Table 3.11.: Summary statistics of product- and country-specific variables

Variable	Obs	Mean	Std. Dev.	Min	Max
$H_{i,t}$	11119	7.121224	1.608827	0.7203289	11.2858
$H_{i,2000}$	651	7.828983	1.502626	2.625086	11.03811
$H1_{c,t}$	2781	5.982004	1.372169	1.171284	8.799596
$H2_{c,t}$	2764	0.8219775	0.1774013	0.1754505	1.513017
$H1_{c,t}$ / $H1_{MED,t}$	2781	0.9795381	0.2004088	0.2234989	1.580504
$H2_{c,t}$ / $H2_{MED,t}$	2764	0.9766633	0.2094319	0.2176675	1.904193
$HOS1_{c,t}$	2781	0.1748848	0.1503466	0	1.498349
$HOS2_{c,t}$	2764	0.1815658	0.1590568	0	1.524787
Net $FDI_{c,t}$	2000	0.0145916	0.0553066	-0.552422	1.618238
$NetInv_{c,t}$	1757	0.0140848	0.0600831	-0.552422	1.618238
$CapOpen_{c,t}$	2332	-0.0952775	1.519268	-1.863972	2.439009
Inv. $Risk_{c,t}$	2012	6.156018	2.052345	0	11.1667
GDP $p.c._{c,t}$	2699	8141.971	12496.22	50.04	72866.87
$CapStock_{c,t}$	2582	654521.1	2310451	99.79869	2.96E+07
$Growth_{c,t}$	2730	1.511087	7.329508	-65.02997	142.0705

4. Like it or Not? How the Economic and Institutional Environment Shapes Individual Attitudes towards Multinational Enterprises

This chapter is joint work with Philipp Harms.

4.1. Introduction

The integration of goods and factor markets has affected the lives of individuals all over the world. While some agents have reaped enormous benefits from this process, others have lost in terms of income and welfare.[1] It is usually argued that individuals are aware of the distributional effects of globalization, and that this knowledge shapes their preferences over various policy issues such as protection, financial market regulation etc. In this chapter, we use a large survey-based data set to explore whether this conjecture is correct when it comes to individuals' attitudes towards multinational enterprises (MNEs).

We test whether socio-economic characteristics influence these attitudes in the way suggested by economic theory: do those individuals whom theory predicts to gain from the presence of multinational

[1] The distributional effects of globalization have been the subject of numerous theoretical and empirical analyses: see Krugman (2008) and Goldberg and Pavcnik (2007) for respective overviews.

J. Schwab, *North-South Globalization and Foreign Direct Investment*, https://doi.org/10.1007/978-3-658-22811-8_4

firms – e.g. because they have the opportunity of earning a higher wage – actually express a more favorable perception of foreign direct investment (FDI)?
We find that, indeed, younger and better-educated persons welcome multinational enterprises. Moreover, a superior work status and a higher income relative to the country-specific average result in a more positive attitude. However, cross-country differences in the average assessment of FDI are substantial, with, e.g., the likelihood of a French person approving the presence of MNE's being almost 30 percent lower than that of an (otherwise identical) Irish person.

In a second step, we attempt to explain these international differences in attitudes by replacing country-specific fixed effects with variables that capture countries' level of development, industrial structure and institutional environment. Interestingly, while per-capita GDP does not seem to affect country-specific averages, the extent of inequality and corruption, the status as a raw materials exporter, financial development, and the degree of "social globalization" have a significant influence.

Finally, we test whether the marginal effect of individual characteristics depends on the country-specific environment. The neoclassical model suggests that the rate of return in *capital-scarce* countries decreases as a result of financial globalization, while it increases in *capital-rich* countries. This leads us to the hypothesis that the presence of MNEs is perceived as being more harmful by capital owners in poor countries. Our results confirm this conjecture: we find that, ceteris paribus, firm owners are more critical about FDI in economies with a lower per-capita income. Moreover, we show that the marginal effect of a person's educational attainment on her attitude towards MNEs crucially depends on a country's per-capita income, with well-educated people in rich countries adopting a more positive view, and their counterparts in poor economies being rather sceptical towards FDI. This finding is in line with the observation that *horizontal* FDI that favors high-skilled workers prevails in rich countries, while poor countries attract a larger share of *vertical* FDI. Moreover, our empirical finding supports a theory that interprets multinational enterprises as

institutions that facilitate trade and thus reinforce specialization patterns (Ortseifer and Schwab, 2015). According to Stolper-Samuelson arguments, this should benefit the abundant factor – skilled labor in rich countries, and low-skilled workers in poor countries.

The two papers most closely related to the work at hand are Kaya and Walker (2012) and Mayda and Rodrik (2005). Kaya and Walker (2012) also analyze the opinions about FDI, using the same data set as we do. However, they restrict their analysis to individual determinants of agents' attitudes towards MNEs without considering macroeconomic variables. Mayda and Rodrik (2005) analyze an older vintage of the survey data set we use and focus on the respondents' view on trade liberalization. Moreover, they put a much smaller emphasis on the analysis of macroconomic determinants or the interaction of macroeconomic variables with individual characteristics. Contributions on the *effects* of popular attitudes towards globalization are provided by Cadot et al. (2006) and Noland (2005): While Cadot et al. (2006) focus on France and show that these attitudes actually affect trade policy, Noland (2005) demonstrates that they have an impact on FDI inflows and country ratings.

The remainder of the chapter is organized as follows: The next section 4.2 presents the primary data used throughout the analysis, while section 4.3 presents first estimation results on individual determinants of agents' views on FDI. Section 4.4 analyzes the economic and institutional factors that determine the remaining cross-country differences in average attitudes. In section 4.5, we then explore how a country's macroeconomic environment influences the marginal effect of indvividual characteristics on the perception of MNEs. A number of robustness tests are pursued in section 4.6. Section 4.7 summarizes and concludes.

4.2. Primary Data

The International Social Survey Programme (ISSP) organizes national surveys in a broad cross-section of countries, eliciting information on

a large set of socially relevant topics. The data we use is from the ISSP 2003 National Identity II module. Across countries, the dataset covers 45,993 individual observations. The respondents are from 35 countries, including developed, emerging and developing countries. The number of individual observations per country ranges from 837 (Great Britain) to 2383 (Russia).

The respondents answer a broad set of questions regarding their feelings towards their national identity, including their attitude towards foreign investment, free trade, and international political cooperation. Furthermore, they provide detailed information on their socioeconomic background. This allows us to relate individuals' attitudes towards MNEs to their personal characteristics.

The indicator that we use in order to measure individuals' views on multinational enterprises is the answer to the following question: "How much do you agree or disagree with the following statement? : 'Large international companies are doing more and more damage to local businesses in [your country]' ". The respondents are asked to answer on a scale from "Agree strongly" (=1) to "Disagree strongly" (=5).[2] As framed, the statement refers to inward investment only. Although we will cautiously interpret it as a general stand on financial globalization and direct investment, this restriction should be kept in mind.[3].

As our main dependent variable, we use a binary indicator, MNE-PHIL, which takes the value 1 if a respondent does not agree with the statement (i.e. if he or she instead gives the answer 3,4, or 5). Note that we interpret the intermediate answer 3, "Neither agree nor disagree", as being in favor of FDI since the respondent does not explicitly express resentment towards MNEs. Defined such, over the entire sample, roughly 40% of the population reveal a favorable opinion on MNEs. To check the robustness of our findings with respect to this definition, we will later adopt the alternative view and interpret only

[2] We capture this answer in the variable $\text{MNE}_{\text{Damage}}$.

[3] It has been shown in other contexts that respondents tend to answer this type of questions similarly whether for their own country only or in general terms (see e.g. Scheve and Slaughter, 2001)

explicit disagreement with the statement above (i.e. giving the answer 4 or 5) as being in favor of multinational enterprises. The resulting binary dependent variable MNE-PHIL$_{\text{Active}}$ takes a 1 for only about 20% of respondents in the sample. Finally, as an alternative to these binary variables, we create a categorical variable MNE-ATT along a 3-class-scale. MNE-ATT takes the value 1 if respondents (strongly) agree, 2 if they neither agree nor disagree, and 3 if they (strongly) disagree with the statement. In all three cases, a higher value of the dependent variable can be interpreted as a more *favorable* attitude towards MNEs.[4]

Across countries, there is a high variation in the average national response. France shows the lowest average value of MNE-PHIL (0.21) whereas people in Sweden reveal, on average, the most positive opinion on FDI (average MNE- PHIL of 0.58). The average values of MNE-PHIL for the countries in our sample are presented in Figure 4.1.

In addition to the information about attitudes towards multinational enterprises, the ISSP survey also elicits a wide range of information on respondents' socioeconomic background. In our baseline estimations, we include information on gender, age, education, income, and employment status as our main explanatory variables on the individual level. *Male* is a gender dummy. For education, we take the highest *Degree* of a person, ranging from 1="no formal education" to 5="university degree completed". We proxy for the position in firm hierarchies by creating a dummy that reflects whether a respondent supervises others at work (*WrkSup*), which could also possibly represent informal qualification. Moreover, the relative income position of the person in her society is included (*RelIncome*), computed as the respondent's annual income relative to the sample average in his or her respective country.

[4]The overall rather negative view on FDI that is revealed by the widespread agreement with the statement may raise the question whether the framing might bias the average answer. However, since we are interested in the determinants of relative individual attitudes only, the variation across respondents should provide us with good information on what makes it more likely that a person has a more positive or negative view on multinationals.

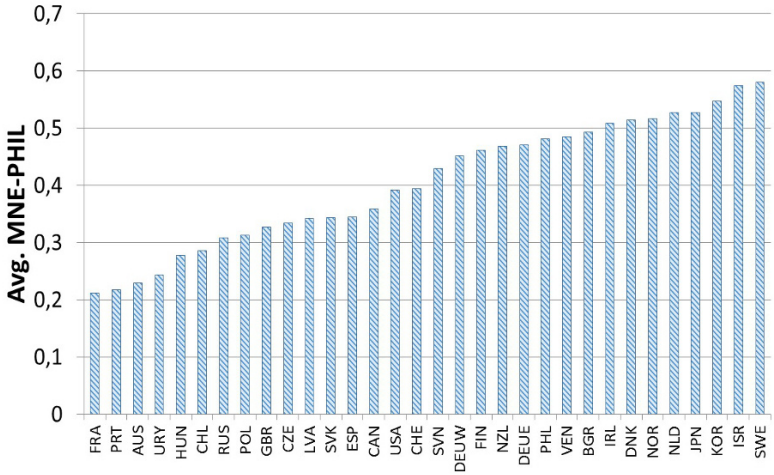


Figure 4.1.: Average value of MNE-PHIL, i.e. share of persons who do not (strongly) agree with the statement that "large international companies are doing more and more damage to local businesses in [our country]".

The data does not provide information on capital ownership, but it gives information on whether a respondent is self-employed, and if, how many people he or she employs. From this information, we will define as a firm owner anyone who is self-employed and employs more than 10 people (dummy *CapOwn*). In our sample, 5,135 out of 45,993 responents (≈11%) declare to be self-employed. Of these, about 7.2% report to employ more than 10 employees (374 respondents, ≈0.88% of 41,768 respondents who gave information on their self-employment status and the respective number of employees.).[5] Finally, to account for the possibility that the attitude towards MNEs is predominantly driven by individuals' attitudes towards everything that is foreign, we use the response to the following statement: "Generally speaking, [your

[5]Our results are robust to any other reasonable employment cutoff for the definition of firm ownership. We use the cutoff of 10 employees because, for Germany, any number of employees between 2 and 9 is reported as 9.

country] is a better country than most other countries.", as a control variable. Again, responses vary on a scale from 1, "agree strongly", to 5, "disagree strongly". This is our variable *Cosmopol*. A higher value should hence proxy for a less nationalist, more cosmopolitan attitude.

The survey was conducted in 2003. A list of the ISSP variables we use and their interpretation (table 4.9), as well as summary statistics of these respondent-specific variables (table 4.10) are given in this chapter's appendix 4.A. Typically, not all questions were asked in all countries, so that we exclude these countries (South Africa and Austria) from the analysis. Taiwan and the Arab part of Israel are excluded, too, because, for lack of macroeconomic variables, we will have to drop them the analysis later, and we want to keep the sample comparable. This leaves us with observations from 32 countries. Among these, we delete all observations where respondents picked "Can't choose", "NA, refused" answers in variables of interest, and remain with roughly 25,000 observations in most specifications.

4.3. Socioeconomic Determinants

We start by analyzing how personal characteristics determine individuals' attitude towards MNEs. There are good reasons to believe that they do. We conjecture that persons who are more likely to profit from the presence of multinational enterprises are also more prone to be in favor of these enterprises, and look for whether this can indeed be seen in the data. We therefore test whether individual characteristics that should enable someone to benefit from FDI also positively influence attitudes towards FDI. Following Feenstra and Hanson (1997) for vertical FDI and Helpman et al. (2010) for horizontal FDI (which is chosen as mode of market access by the most productive companies, following Helpman et al., 2004), activities of multinational corporations are likely to be high-skill complementary. We therefore expect workers with higher educational attainments – as reflected by the variable *Degree* – to have an especially positive attitude towards MNEs. The skills that allow a person to benefit from

FDI need not necessarily stem from acquiring a formal degree. We proxy for this by the level of the work position which is obtained, e.g. because a person had vocational training or acquired skills through learning-by-doing. This is captured by whether someone supervises others at work or not, indicated by the dummy variable *WrkSup*. *Age* might play a role since human capital depreciates over time such that younger people are in a better position to meet the skill requirements of multinational enterprises. We also test for a gender effect in order to account for the possibility that e.g. women may generally be discriminated against on the labor market, such that *Male*s would be more positive towards FDI.

A more favorable economic position, as measured by the variable *RelIncome*, should – for both economic and social reasons – bring about a more positive attitude towards multinationals: first, the generally higher life-satisfaction that is associated with a higher relative income is likely to result in a rather optimistic view on the functioning of the economy, including the presence of MNEs. Moreover, a higher relative income is also likely to reflect other factors that enable a person to benefit from FDI, be it as an employee or as a customer. Owning a firm, as defined above (*CapOwn*), is (beyond its indirect impact via a higher income) likely to influence the perspective on the presence of MNEs, although we do not have a clear hypothesis on the direction of this effect: due to increased competition it could be negative, or it could be positive due to spillover effects.

We test the influence of these individual characteristics on the attitude towards MNEs by running the following regression:

$$MNE - PHIL_{ic} = \boldsymbol{\beta'} \boldsymbol{X_{ic}} + \alpha_c + \epsilon_{ic} \tag{4.1}$$

$MNE - PHIL_{ic}$ represents the realization of MNE-PHIL or MNE-ATT for individual i living in country c, $\boldsymbol{X_{ic}}$ is the set of individual characteristics, α_c is a country dummy and ϵ_{ic} is an error term. The use of country fixed effects ensures that our results capture the pure individual effects, while eliminating all country-specific differences in answers.

We run equation (4.1) as an OLS linear probability (LPM) and as a logit model on the binary dependent variable MNE-PHIL. When using the 3-scale categorical dependent variable MNE-ATT as regressand, we apply an ordered logit model. For all three specifications, standard errors are clustered at the country level to control for the possibility that disturbances are correlated between respondents in the same country. For OLS and ordered logit, we report the estimated coefficients, for logit, marginal effects are displayed. The results can then be interpreted as the increase in the probability to have a more positive view on MNEs.

Table 4.1 reports the results. We find that, indeed, better educated and younger persons are more likely to adopt a favorable attitude towards FDI, as are those in a higher work hierarchy position, in line with our expectations. Note that since we are controling for *Cosmopol* – whose coefficient is significantly positive, as expected – the effect of *Degree* is not driven by the effect of education on the general xenophobia of a person. Nevertheless, the positive coefficent of *Degree* could still reflect the fact that education changes the understanding of the role of MNEs, independent of the underlying peronal affectedness. For the positive effect of *WrkSup*, this is less probable, and it is likely that it represents a direct economic effect.Firm ownership itself has no significant effect, although the sign of the coefficient is positive. The relative income position within a country, by contrast, does have a significantly positive effect on perceptions of FDI.

Overall, we can conclude that people in a better economic position are more likely to take a positive stand on FDI. This also confirms results by Kaya and Walker (2012) and is in line with predicitons from economic theory on actual distributional effects of FDI, as discussed above.

Because the composition of individuals with respect to their socioeconomic characteristics is likely to differ across countries, our findings might explain the large cross-country differences in indivdiuals' *average* attitude towards MNEs. It could, for example, be that some countries are, on average, less hostile towards FDI because they have a younger, or better educated, population. However, this

Table 4.1.: Estimation results for individual determinants

	(1)	(2)	(3)
VARIABLES	OLS MNE-PHIL	Logit MNE-PHIL	OLogit MNE-ATT
Male	0.0096	0.0093	0.099***
	(0.0076)	(0.0073)	(0.034)
Age	-0.0017***	-0.0017***	-0.0074***
	(0.00033)	(0.00032)	(0.0014)
Degree	0.027***	0.028***	0.13***
	(0.0044)	(0.0038)	(0.018)
WrkSup	0.032***	0.031***	0.17***
	(0.0095)	(0.0093)	(0.041)
CapOwn	0.0084	0.0067	0.073
	(0.030)	(0.028)	(0.13)
RelIncome	0.029***	0.029***	0.14***
	(0.0061)	(0.0065)	(0.030)
Cosmopol	0.036***	0.035***	0.17***
	(0.0040)	(0.0036)	(0.017)
Country fixed effects	yes	yes	yes
Constant	0.25***		
	(0.023)		
Cut1			1.23***
			(0.11)
Cut2			2.41***
			(0.11)
Observations	25,673	25,673	25,673
R2	0.085		
Pseudo R2		0.0659	0.0540
% correctly predicted		64.89	

Robust standard errors clustered at the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

does not appear to be the case. Table 4.2 reports the results on the country dummies from regression (4.1), that were supressed in table 4.1. We see that, even after controlling for the most important individual characteristics, the estimated country fixed effects vary sigi-

Table 4.2.: Estimated country fixed effects (cont'd from table 4.1)

	(1)	(2)	(3)		(1)	(2)	(3)
VARIABL.	OLS MNE-PHIL	Logit MNE-PHIL	OLogit MNE-ATT	VARIABL. (CONT'D)	OLS MNE-PHIL	Logit MNE-PHIL	OLogit MNE-ATT
Individual controls	yes	yes	yes	KOR	0.11***	0.097***	0.43***
					(0.0045)	(0.0042)	(0.018)
NOR	0.12***	0.11***	0.46***	CZE	-0.063***	-0.060***	-0.24***
	(0.0032)	(0.0031)	(0.014)		(0.0080)	(0.0073)	(0.034)
CHE	-0.028***	-0.026***	0.023	HUN	-0.10***	-0.10***	-0.48***
	(0.0083)	(0.0079)	(0.034)		(0.0089)	(0.0080)	(0.038)
IRL	0.12***	0.11***	0.83***	SVK	-0.094***	-0.092***	-0.45***
	(0.0056)	(0.0050)	(0.023)		(0.0072)	(0.0067)	(0.032)
DNK	0.12***	0.11***	0.64***	RUS	-0.074***	-0.072***	-0.24***
	(0.0031)	(0.0028)	(0.015)		(0.0039)	(0.0036)	(0.017)
NLD	0.15***	0.14***	0.62***	CHL	-0.093***	-0.098***	-0.35***
	(0.0070)	(0.0064)	(0.027)		(0.0071)	(0.0062)	(0.031)
CAN	-0.0034	-0.0017	-0.0043	POL	-0.060***	-0.058***	-0.26***
	(0.0041)	(0.0040)	(0.017)		(0.0068)	(0.0063)	(0.029)
AUS	-0.13***	-0.15***	-0.66***	LVA	-0.091***	-0.090***	-0.41***
	(0.0046)	(0.0038)	(0.017)		(0.0055)	(0.0052)	(0.025)
SWE	0.18***	0.16***	0.58***	VEN	0.12***	0.12***	1.11***
	(0.0060)	(0.0056)	(0.024)		(0.0082)	(0.0074)	(0.034)
DEUW	0.075***	0.071***	0.40***	URY	-0.14***	-0.15***	-0.64***
	(0.0095)	(0.0085)	(0.037)		(0.0077)	(0.0069)	(0.034)
DEUE	0.093***	0.088***	0.42***	BGR	0.066***	0.062***	0.42***
	(0.0094)	(0.0084)	(0.037)		(0.0062)	(0.0057)	(0.025)
FIN	0.093***	0.086***	0.43***	PHL	0.072***	0.067***	0.37***
	(0.0044)	(0.0038)	(0.017)		(0.0053)	(0.0048)	(0.021)
FRA	-0.19***	-0.21***	-0.92***				
	(0.0055)	(0.0051)	(0.026)	Constant	0.25***		
GBR	-0.0013	-0.0019	-0.079***		(0.023)		
	(0.0067)	(0.0061)	(0.027)	Cut1			1.23***
JPN	0.15***	0.14***	0.73***				(0.11)
	(0.0042)	(0.0034)	(0.018)	Cut2			2.41***
ESP	-0.022**	-0.021**	-0.093**				(0.11)
	(0.0099)	(0.0087)	(0.041)				
NZL	0.14***	0.14***	0.57***				
	(0.0095)	(0.0080)	(0.035)				
PRT	-0.15***	-0.16***	-0.68***	Observations	25,673	25,673	25,673
	(0.010)	(0.0089)	(0.043)	R2	0.085		
SVN	0.029***	0.027***	0.20***	Pseudo R2		0.0659	0.0540
	(0.0084)	(0.0076)	(0.033)	% correctly		64.89	
ISRJ	0.18***	0.16***	0.82***	predicted			
	(0.0039)	(0.0036)	(0.020)				

Robust standard errors clustered at the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

ficantly across countries. The fixed effects are based on the estimation of equation (4.1) and all numbers are expressed relative to the USA. The United States are a natural reference country and also show an intermediate average attitude towards FDI.

Figure 4.2 depicts the coefficients of the country dummies next to the average country answer for the same countries as before.[6] We see that controlling for individual characteristics changes the remaining average answer. Individual characteristics thus matter for countries' average attitude towards FDI. Countries like Latvia or Slovakia show an even stronger country-specific resentment towards FDI when we account for the socioeconomic composition of these countries in the sample, whereas for Great Britain and New Zealand we observe the opposite. However, although the standard deviation of average answers slightly decreases for the whole sample when we control for individual characteristics, it is only slightly lower when we do so (0.1096) than when we don't (0.1110). The remaining (statistically significant, as table 4.2 shows) variation between countries in average revealed attitudes towards FDI could be due to cultural differences, either in economic attitudes or in answering surveys.[7] But it could also reflect the fact that the economic and social environment of a person influences the effects of FDI and therefore the attitude towards MNEs.

4.4. Why Do Attitudes towards MNEs Differ Across Countries?

Different economic and social environments may attract different types of FDI, and in different environments the effects of MNEs on individuals' prosperity and well-being may therefore vary. Moreover, the *perceptions* of distributional effects of FDI and of the role of MNEs may vary across environments. Based on these observations, we will

[6] The regression run for that purpose uses the de-meaned (relative to the sample means) individual characteristics as explanatory variables and adds the size of the US fixed effect. This simply shifts up the estimated coefficients for the country dummies compared to those reported in table 4.2, but does not affect their differences, and is done in order to make the numbers comparable.

[7] This seems to be the implicit assumption of Kaya and Walker (2012). They do not control for the patriotism of individuals and hence furthermore ascribe this effect to country-varying cosmopolitan attitudes.

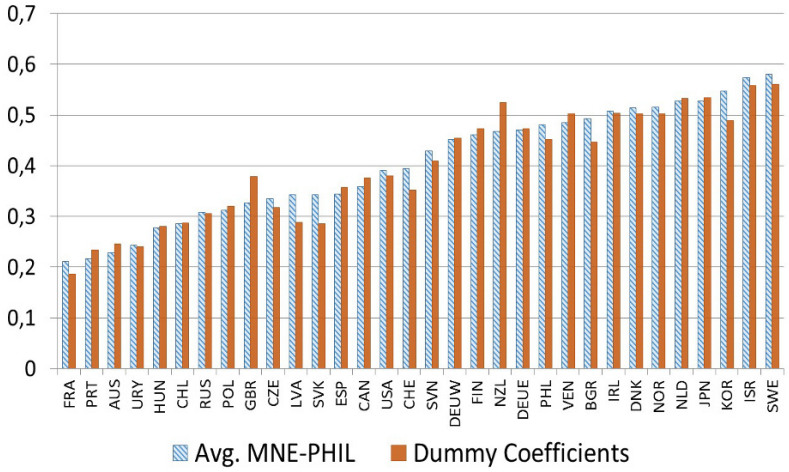


Figure 4.2.: Average values of MNE-PHIL and estimated country fixed effects from regression on demeaned individual characteristics.

test the influence of parameters that characterize the macroeconomic and social environment on respondents' attitudes towards FDI. We hence replace the country dummies in regression (4.1) by country-level characteristics and estimate the following regression:

$$MNE - PHIL_{ic} = \boldsymbol{\beta_1'} \boldsymbol{X_{ic}} + \boldsymbol{\beta_2'} \boldsymbol{Z_c} + \epsilon_{ic} \tag{4.2}$$

The variables in vector $\boldsymbol{Z_c}$ represent country-level variables of interest.[8] For all these variables, we take the average over the 5-year period before the survey was conducted, i.e. 1999-2003, as this period should be most influential in shaping individuals' attitudes.

Kose et al. (2009) point out that the effects of financial globalization, and FDI in particular, in developing and emerging economies may differ from those in developed economies. Thus, we include the log

[8] Most of these regressors are retrieved from the World Bank's World Development Indicators. A detailed list of variable definitions and sources is provided in Appendix 4.A.

of per capita GDP (*GDP p.c.*) as a natural explanatory variable in our regression. A high degree of income inequality could also affect how the distributional effects of MNE activity are perceived. We therefore use countries' Gini-coefficient as an additional regressor (*GINI*). People's actual exposure to multinational enterprises may also influence their perspective on FDI, so we include the average inward FDI stock in a country divided by GDP (*FDIStock*). FDI that focuses on resource extraction is likely to be rather non-inclusive and generate discontent within the population. On the other hand, primary sector investment has the potential of facilitating technological cooperation and hence increasing the economic possibilities of developing and emerging economies. Because sectoral FDI data is only selectively available, we proxy for the extent of extractive FDI by using the share of fuel exports and ore exports, respectively, in countries' overall exports (*FuelExp*, *OreExp*). As argued by Arteta et al. (2001), countries that are open to international trade are more likely to benefit from FDI. We measure de facto trade openness by the average ratio of imports plus exports divided by GDP (*TradeOpen*). The empirical literature furthermore emphasizes the role of capital market development for a country's ability to reap gains from FDI (e.g. Bailliu, 2000; Edwards, 2001). The value of stocks publicly traded as a share of GDP gives us an indicator for a country's financial depth and capital market development (*CapDev*). Another effect that is emphasized by the literature on FDI and growth is that foreign firms bring advanced technologies into the receiving country (see Harrison and Rodríguez-Clare, 2010, for an overview). We therefore conjecture that countries which are less developed in terms of total factor productivity have more potential to benefit from FDI. For this reason, we also include a measure of countries' TFP relative to that of the Unites States (*TFP*).[9]

In addition to the economic environment, social and institutional factors are likely to influence the growth effects of FDI (see, e.g., Bussiere and Fratzscher, 2008) and may also determine how the

[9]This variable is retrieved from the Penn World Tables.

distributional consequences of FDI are evaluated. Our first candidate for this is corruption: In countries that are characterized by rampant corruption, the benefits from FDI are likely to be reserved to a small elite. To test whether this affects respondents' view on multinational enterprises, we use the index of perceived corruption published by Transparency International (*Corr*), which ranges from 0 to 10, with a value of 0 reflecting an extreme degree of corruption and a score of 10 reflecting (perceived) absence of corruption. In a similar fashion, the extent of direct democratic control over political institutions could have an influence. To test or this, we use an index provided by the Polity IV Project (polity 2), evaluating the level of democracy in a country on a scale from -10 to 10 (*Democ*). Finally, we use the KOF indices of "political and social globalization" (Dreher, 2006), which indicate by how much countries are integrated into formal and informal networks of cultural, social and political exchange. The KOF indices range from 0 to 100, with 100 being the highest possible level of political and social globalization. We conjecture that individuals in countries that are more "politically and socially globalized", as reflected by *PolGlob* and *SocGlob* adopt a more favorable view on multinational enterprises.[10] A table of all country-level variables used, including scaling and sources, is found in table 4.11, summary statistics are depicted in table 4.12, both listed in appendix 4.A of this chapter.

The elements of $\boldsymbol{\beta_2}$ indicate by how much a difference in a country-specific variable shifts the probability that a person views FDI rather positively, compared to a person with the same socioeconomic characteristics in another country. The country-specific variables $\boldsymbol{Z_c}$ are, of course, identical for all respondents in one country, but we run regression (4.2) on all individual observations. In such a multilevel analysis with many per-group observations and relatively few groups the standard errors would be biased downward without clustering,

[10] Interestingly, the KOF indices are not strongly correlated at the country level, with the correlation between both measures amounting to a mere 0.47. Generally, more geographically remote countries (e.g. Japan, Chile) tend to be less socially globalized than politically.

Table 4.3.: Estimation results for country level determinants

	(1)	(2)	(3)		(1)	(2)	(3)
VARIABLES	OLS MNE-PHIL	Logit MNE-PHIL	OLogit MNE-ATT	VARIABLES (CONT'D)	OLS MNE-PHIL	Logit MNE-PHIL	OLogit MNE-ATT
Individual controls	yes	yes	yes	Democ	-0.012	-0.012	-0.068
					(0.023)	(0.024)	(0.11)
GDP p.c.	-0.0060	-0.0047	0.070	PolGlob	-0.0028	-0.0028	-0.012
	(0.060)	(0.060)	(0.28)		(0.0021)	(0.0020)	(0.0097)
GINI	-0.81**	-0.77**	-3.07*	SocGlob	-0.0079***	-0.0076***	-0.037***
	(0.35)	(0.36)	(1.69)		(0.0014)	(0.0014)	(0.0071)
FDIStock	0.12	0.11	0.81				
	(0.10)	(0.11)	(0.54)	Constant	1.09*		
FuelExp	0.22**	0.22**	1.09**		(0.59)		
	(0.086)	(0.086)	(0.49)	Cut1			-1.82
OreExp	-0.50**	-0.52***	-2.78***				(2.75)
	(0.19)	(0.19)	(0.95)	Cut 2			-0.66
TradeOpen	0.095	0.098	0.38				(2.76)
	(0.086)	(0.085)	(0.40)				
CapDev	0.058**	0.056**	0.20	Observations	25,673	25,673	25,673
	(0.028)	(0.028)	(0.13)	R2	0.069		
TFP	-0.075	-0.078	-0.46	Pseudo R2		0.0526	0.0424
	(0.083)	(0.083)	(0.43)	% correctly		64.26	
Corr	0.053***	0.053***	0.23***	predicted			
	(0.012)	(0.012)	(0.054)				

Robust standard errors clustered at the country level in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
Full regression table in table 4.13

which we account for. It should, however, be kept in mind that variation in country-level variables comes from only a rather small set of countries.[11]

Table 4.3 shows the estimation results for the country specific variables. The level of income has slightly positive, albeit insignificant, coefficients in all estimations. Inequality, by contrast, has a significant negative effect on the average perception of FDI. The de-facto exposure to FDI does not seem to significantly influence whether a person has a more positive picture of FDI, although the coefficients are positive. Living in a country that is an exporter of raw materials significantly affects the perspectives on FDI. However, this goes only partially in the direction that one would expect. In fuel-exporting countries, people seem to view FDI rather positively. In ore-exporting countries,

[11] As highlighted by Bryan and Jenkins (2013), our regression closely resembles a regression of the dummies from regression (4.1) on country-specific variables, using a sample of as many observations as there are groups/countries.

by contrast, respondents have a more critical view of multinational corporations. These results are not driven by particular countries, but remain valid when we exclude those countries from the sample that rely most heavily on raw material exports. Trade openness and total factor productivity exhibit the expected positive effect, but their coefficients are not statistically significant. The level of capital market development in a country, by contrast, significantly affects how FDI is perceived. This is in line with the argument that a certain level of financial depth is required in order for economic agents to be able to obtain gains from the presence of MNEs, e.g. via spillover effects, or simply by taking part in increased economic activity. Only for the ordered logit regression on MNE-ATT, the effect of *CapDev* is not statistically significant, albeit still positive.

For the societal variables, the absence of corruption, as indicated by a high value of the TI index, does contribute to a more positive view of the role of MNEs. However, for democracy, the picture is not as expected. The point estimates show a negative sign, although insigificant. Surprisingly, the levels of social and political globalization in a country have a negative effect on the attitude towards MNEs, and for social globalization, the coefficient is highly statistically significant. This result is robust to excluding subcategories of the KOF social globalization indices – for example those that measure the prevalence of famous international brands in an economy. This is a puzzling, yet interesting result that deserves further investigation.

We conclude that macroeconomic variables and those of the societal environment do influence country-specific perspectives of FDI. Many – but not all – do so in the directions which would be predicted on theoretical or empirical grounds. Note, finally, that the effects of the individual determinants are not affected by the inclusion of macroeconomic variables. The full regression table that also displays the coefficients of individual characteristics is provided in appendix 4.B of this chapter, table 4.13.

4.5. (How) Do Marginal Effects of Individual Characteristics Differ across Countries?

In this section, we explore whether the socio-economic environment not only affects the overall attitude towards MNEs in a country, but also shapes the perceived distributional effects of FDI at the individual level. If the environment determines which agents potentially benefit and lose from the presence of multinational enterprises, this should – regarding our previous results – reflect in relative individual attitudes towards these. To identify the impact of aggregate variables on the marginal impact of socio-economic characteristics, we therefore interact individual-specific with country-specific data.

We start by testing a central implication of the neoclassical model: since capital is relatively scarce in developing countries, returns are high and capital should move there from developed countries. This raises the overall income in the receiving country, but reduces returns to capital that is already in place, i.e. for entrepreneurs. The opposite effect should be visible in capital-abundant developed countries. Capital moving away harms jobs and wages, whereas capital owners should profit from better investment possibilities abroad. Based on these considerations, we will test whether entrepreneurs perceive the role of MNEs more positively in *rich* countries. To this end, we interact the dummy variable that indicates whether a person is a capital owner with his or her country's per capita GDP. This results in the following regression equation:

$$MNE - PHIL_{ic} = \boldsymbol{\beta_1'} \boldsymbol{X_{ic}} + \boldsymbol{\beta_2'} \boldsymbol{Z_c} + \beta_3 Y_{ic} + \epsilon_{ic} \qquad (4.3)$$

where β_3 is the coefficient on the interacted variable of the firm-owner-dummy with (log of) GDP per capita. All other variables, both individual and on the country level, are still included as regressors. In order to ease interpretation of coefficients and their signs of interacted variables, which is problematic in logit and ordered logit models, we restrict ourselves to the linear probabilty model in this section. The results of the above regression for the variables of interest is reported

in column 1 of table 4.4. The full regression result is again found in appendix 4.B, table 4.14.

Inspecting the signs of the respective coefficients supports our hypothesis: The direct effect on the stand towards FDI of being an entrepreneur is negative, but it becomes more positive as per-capita GDP increases (the interaction term). This implies that in poorer (i.e. capital-scarce) countries, firm owners do not like FDI, but they tend to like it more in richer (capital-abundant) countries. Focusing on our sample, we find that the total effect of beeing a firm owner is significantly negative at the 25%-quantile of GDP per capita (a country like Poland), but significantly positive at the 75%-quantile (a country like Germany). Thus, owning a firm increases the likelihood of being in favor of FDI in rich countries, but reduces it in poorer countries.

Another personal characteristic whose influence on the attitude towards FDI possibly depends on country-specific variables is agents' educational attainment: Depending on the purpose of their presence, MNEs may employ people with different skill levels. Whereas poorer countries are more likely to attract vertical FDI, richer countries experience relatively higher shares of horizontal FDI (see e.g. Yeaple, 2003; Hanson et al., 2005) This is likely to be associated with different demands for various skills, with horizontal FDI increasing the demand for high-skilled workers and vertical FDI increasing the demand for low-skilled workers. Moreover, MNEs facilitate trade and reduce trade costs. If trade is driven by relative factor endowments, the Stolper-Samuelson Theorem predicts that it increases the real wage for low-skilled labor in poorer, low-skill abundant countries and the real wage of high-skilled labor in richer, high-skill abundant countries.[12] The respective skill group is then also the one likely to benefit from FDI. To test the hypothesis that the influence of a person's skill level on his or her attitude towards multinational enterprises differs between rich and poor countries, we interact the educational *Degree* of a person

[12] Romalis (2004) confirms the empirical relevance of the Heckscher-Ohlin model and argues that trade is rather driven by differences in endowments of high-skilled and low-skilled labor.

Table 4.4.: Estimation results of interaction terms

	(1)	(2)	(3)
VARIABLES	OLS MNE-PHIL	OLS MNE-PHIL	OLS MNE-PHIL
Degree	0.026***	-0.16***	-0.16***
	(0.0051)	(0.045)	(0.045)
CapOwn	-1.48***	0.023	-1.36**
	(0.53)	(0.031)	(0.52)
Individual controls	yes	yes	yes
GDP p.c.	-0.0063	-0.060	-0.060
	(0.060)	(0.060)	(0.060)
Country level controls	yes	yes	yes
CapOwn #	0.15***		0.14**
GDP p.c.	(0.053)		(0.053)
Degree #		0.019***	0.018***
GDP p.c.		(0.0046)	(0.0046)
Constant	1.09*	1.69***	1.68***
	(0.59)	(0.59)	(0.59)
Observations	25,673	25,673	25,673
R2	0.069	0.070	0.070

Robust standard errors clustered at the country level in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
Full regression table in table **??**

with per-capita GDP. Given the discussion above, we expect a positive sign for the interaction term.

The results of this exercise are shown in column 2 of table 4.4. They strongly support our hypothesis: Not only is the interaction term significantly positive, such that the effect of a greater skill level on a favorable attitude increases with the respondent's country's per capita GDP, but the positive sign for *Degree* even turns negative. This change in sign of the effect of *Degree* again happens within relevant values of *GDP p.c.*: we evaluate the overall effect of skill level at the 25%- and 75%-quantiles of GDP per capita in our sample, and it is indeed negative in the former and positive in the latter. This supports

the hypothesis that FDI is seen more negatively by higher skill classes in poorer countries, whereas in rich countries, being a relatively high skilled worker leads to a more favorable attitude towards FDI.

Column 3 of table 4.4 shows that the previous results still hold when both interaction variables are included in one regression.

4.6. Extensions and Robustness Checks

This section explores some extensions of the above analysis and test whether our results are robust to alternative specifications. More specifically, we use a different definition of our dependent variable, control for the attitude towards free trade, weigh the observations to correct for sample composition, and use measures of factor abundance instead of per-capita GDP when computing interaction terms. For means of exposition, we run one robustness test at a time.

4.6.1. Narrow Definition of MNE-Phily

So far, our dependent variable defined someone as having a positive attitude towards MNEs if he or she did not agree with the critical statement about MNEs. Hence we interpreted those who "neither agree nor disagree" with the statement that large international companies do harm to local businesses as having a rather favorable view on FDI. In this subsection, we adopt a narrower definition, by only defining those as viewing FDI positively that *actively* disagree or strongly disagree with the statement. We denote this new dummy variable as $\text{MNE-PHIL}_{\text{Active}}$ and run regressions of type (4.1), (4.2), and (4.3) using it as a regressand. For exposition, we only report the estimations of the LPM regressions in the text. The results are shown in table 4.5. The full regression table can again be found in appendix 4.B, table 4.15.[13]

[13] The results do not change for the logit and ordered logit regressions. Compared to the results above, only the percent correctly predicted rises to about 0.8, which is, however, not surprising, given the greater share of zeros for $\text{MNE-PHIL}_{\text{Active}}$.

Table 4.5.: Robustness test: MNE-PHIL$_{\text{Active}}$

	(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)
VARIABL.	OLS MNE-PHIL$_{\text{Act}}$	OLS MNE-PHIL$_{\text{Act}}$	OLS MNE-PHIL$_{\text{Act}}$	OLS MNE-PHIL$_{\text{Act}}$	VARIABL. (CONT'D)	OLS MNE-PHIL$_{\text{Act}}$	OLS MNE-PHIL$_{\text{Act}}$	OLS MNE-PHIL$_{\text{Act}}$	OLS MNE-PHIL$_{\text{Act}}$
Male	0.034***	0.039***	0.040***	0.038***	TradeOpen		0.033	0.033	0.031
	(0.0064)	(0.0068)	(0.0065)	(0.0064)			(0.067)	(0.067)	(0.067)
Age	-0.00066**	-0.00076***	-0.00077***	-0.00078***	CapDev		0.013	0.014	0.013
	(0.00024)	(0.00026)	(0.00025)	(0.00025)			(0.025)	(0.026)	(0.025)
Degree	0.020***	0.020***	0.020***	-0.19***	TFP		-0.12	-0.11	-0.11
	(0.0042)	(0.0044)	(0.0043)	(0.042)			(0.095)	(0.095)	(0.093)
WrkSup	0.034***	0.031***	0.031***	0.031***	Corr		0.029***	0.028***	0.028***
	(0.0080)	(0.0097)	(0.0095)	(0.0093)			(0.0092)	(0.0093)	(0.0090)
CapOwn	0.021	0.033	-0.73*	0.034	Democ		-0.016	-0.016	-0.022
	(0.025)	(0.024)	(0.41)	(0.024)			(0.020)	(0.019)	(0.019)
RelIncome	0.024***	0.024***	0.024***	0.025***	PolGlob		-0.0014	-0.0014	-0.0016
	(0.0053)	(0.0050)	(0.0050)	(0.0049)			(0.0017)	(0.0017)	(0.0017)
Cosmopol	0.025***	0.025***	0.024***	0.025***	SocGlob		-0.0068***	-0.0068***	-0.0066***
	(0.0028)	(0.0039)	(0.0038)	(0.0037)			(0.0013)	(0.0013)	(0.0013)
Country fixed effects	yes	no	no	no	CapOwn # GDP p.c.			0.077*	
								(0.041)	
GDP p.c.		0.056	0.056	-0.0035	Degree # GDP p.c.				0.021***
		(0.051)	(0.051)	(0.051)					(0.0044)
GINI		-0.33	-0.32	-0.35					
		(0.28)	(0.28)	(0.27)					
FDIStock		0.24**	0.24**	0.24**	Constant	-0.0047	0.15	0.15	0.81
		(0.11)	(0.11)	(0.11)		(0.020)	(0.48)	(0.48)	(0.49)
FuelExp		0.19*	0.19*	0.17					
		(0.10)	(0.11)	(0.10)	Obs.	25,673	24,890	25,673	25,673
OreExp		-0.52***	-0.52***	-0.52***	R2	0.085	0.064	0.064	0.065
		(0.16)	(0.16)	(0.16)					

Robust standard errors clustered at the country level in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
Full regression table in table 4.15.

We see that the results do not change, although some of the country level characteristics appear to be slightly less significant. In turn, the *Male* dummy now becomes positively significant in all specifications.[14] More importantly, the results on the interacted variables remain valid also in this specification.

4.6.2. Attitudes towards Trade

The way the statement on attitudes towards MNEs is framed in the survey, it could be misunderstood by respondents to point at large international companies all over the world, not just those present in the country. The answer could thus represent a general attitude towards

[14] Whether this result has an economic background or it is simply due to the fact that MNE-loving males are more prone to give a proactive statement, rather than a cautious one, is subject to interpretation.

Table 4.6.: Robustness test: Trade attitudes

	(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)
VARIABL.	OLS MNE-PHIL	OLS MNE-PHIL	OLS MNE-PHIL	OLS MNE-PHIL	VARIABL. (CONT'D)	OLS MNE-PHIL	OLS MNE-PHIL	OLS MNE-PHIL	OLS MNE-PHIL
Male	0.0033	0.0089	0.0089	0.0074	OreExp		-0.51***	-0.51***	-0.51***
	(0.0079)	(0.0073)	(0.0073)	(0.0073)			(0.18)	(0.18)	(0.17)
Age	-0.0016***	-0.0018***	-0.0018***	-0.0018***	TradeOpen		0.090	0.088	0.087
	(0.00033)	(0.00033)	(0.00033)	(0.00032)			(0.079)	(0.079)	(0.079)
Degree	0.027***	0.026***	0.026***	-0.17***	CapDev		0.061**	0.061**	0.060**
	(0.0042)	(0.0049)	(0.0049)	(0.042)			(0.027)	(0.027)	(0.027)
WrkSup	0.031***	0.024**	0.024**	0.024**	TFP		-0.048	-0.051	-0.048
	(0.0093)	(0.011)	(0.011)	(0.010)			(0.080)	(0.079)	(0.080)
CapOwn	0.0040	0.019	-1.37**	0.020	Corr		0.056***	0.056***	0.057***
	(0.029)	(0.030)	(0.54)	(0.030)			(0.011)	(0.011)	(0.011)
RelIncome	0.027***	0.027***	0.027***	0.028***	Democ		-0.011	-0.011	-0.017
	(0.0058)	(0.0059)	(0.0059)	(0.0059)			(0.022)	(0.022)	(0.022)
Cosmopol	0.039***	0.037***	0.037***	0.037***	PolGlob		-0.0028	-0.0028	-0.0030
	(0.0040)	(0.0051)	(0.0051)	(0.0050)			(0.0019)	(0.0019)	(0.0019)
TradePhob	-0.040***	-0.045***	-0.045***	-0.045***	SocGlob		-0.0074***	-0.0074***	-0.0072***
	(0.0094)	(0.0094)	(0.0094)	(0.0094)			(0.0013)	(0.0013)	(0.0013)
Country fixed effects	yes	no	no	no	CapOwn # GDP p.c.			0.14** (0.054)	
GDP p.c.		-0.028	-0.028	-0.085	Degree # GDP p.c.				0.020***
		(0.054)	(0.054)	(0.054)					(0.0043)
GINI		-0.83**	-0.83**	-0.86**					
		(0.33)	(0.33)	(0.32)	Constant	0.36***	1.35**	1.35**	1.98***
FDIStock		0.099	0.10	0.10		(0.029)	(0.53)	(0.53)	(0.53)
		(0.10)	(0.10)	(0.10)					
FuelExp		0.24***	0.24***	0.22**	Obs.	24,890	24,890	24,890	24,890
		(0.085)	(0.086)	(0.085)	R2	0.090	0.075	0.076	0.076

Robust standard errors clustered at the country level in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
Full regression table in Table 4.16.

free trade in goods and services, rather than towards the presence of multinational enterprises. To avoid such a misinterpretation, we include the response to the following statement as an additional regressor: "Free trade leads to better products becoming available in [your country]." As with $\text{MNE}_{\text{Damage}}$, the answers range from 1 (= strongly agree) to 5 (= strongly disagree). Hence a higher value of the variable *Trade-Phob* reflects a rather negative attitude towards international trade. Given that *Trade-Phob* more directly elicits the sentiment towards free trade, any difference between the agreements with the two statements should even more precisely depict the particular view on the special role of companies' presence.

The results are given in table 4.6. They show that controlling for respondents' attitude towards free trade doesn't change the previous results on the determinants of the attitude towards FDI. This is a particularly strong finding since many determinants of individuals'

attitudes towards MNEs may be highly correlated with their attitude towards free trade. The coefficients in table 4.6 thus capture the "pure/direct" effects of socioeconomic characteristics and macroeconomic factors, while the "total" effect would also include the influence that is operating via agents' attitude towards goods and services trade.

4.6.3. Population Weights

In the sample used, the relative number of observations from different countries does not reflect differences in country sizes. The ISSP deliberately aims at surveying an approximately equal amount of persons from each country in the sample. This implies that, relative to the country size, some environments are over-represented in terms of observations. In order to control if our results also apply to a representative individual sampled from the countries covered by the ISSP, we adjust our estimations by applying weights to observations that represent their relative country size.[15] The weights are designed as to make all observations from one country together reflect the relative country size in terms of the relevant population older than 15. For respondent i in country c, it is computed as the ratio of the real population size to the number of observations from that country in the sample:[16]

$$Weight_{ic} = \frac{Population(\geq 15yrs)_c}{Observations_c}$$

The data on working-age population are taken from the WDI. We then run the regressions (4.1) - (4.3) with the respective weights applied to each observation. The results are shown in table 4.7, and table 4.17, respectively. They show that the relative over-representation of some countries does not drive our results and that these findings

[15] Note that this does not fully solve the problem of external validity. Our analysis can only make a statement on the average answer of persons in the countries in which the survey was conducted.

[16] See e.g. Cameron and Trivedi (2010), p.113 ff.

Table 4.7.: Robustness test: Sample weights

	(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)
VARIABL.	OLS MNE-PHIL	OLS MNE-PHIL	OLS MNE-PHIL	OLS MNE-PHIL	VARIABL. (CONT'D)	OLS MNE-PHIL	OLS MNE-PHIL	OLS MNE-PHIL	OLS MNE-PHIL
Male	0.0058	0.0078	0.0078	0.0065	TradeOpen		0.10	0.10	0.098
	(0.0077)	(0.0075)	(0.0075)	(0.0076)			(0.087)	(0.087)	(0.088)
Age	-0.0027***	-0.0029***	-0.0029***	-0.0030***	CapDev		0.060*	0.060*	0.060*
	(0.00056)	(0.00051)	(0.00051)	(0.00050)			(0.033)	(0.033)	(0.033)
Degree	0.027***	0.024***	0.024***	-0.13**	TFP		-0.096	-0.096	-0.098
	(0.0051)	(0.0050)	(0.0050)	(0.055)			(0.12)	(0.12)	(0.12)
WrkSup	-0.0078	-0.012	-0.011	-0.011	Corr		0.049***	0.049***	0.050***
	(0.023)	(0.022)	(0.022)	(0.022)			(0.013)	(0.013)	(0.014)
CapOwn	0.022	0.034	-1.28**	0.034	Democ		0.025	0.026	0.020
	(0.064)	(0.062)	(0.53)	(0.062)			(0.023)	(0.023)	(0.024)
RelIncome	0.027***	0.029***	0.029***	0.030***	PolGlob		-0.0040	-0.0040	-0.0043
	(0.0074)	(0.0076)	(0.0075)	(0.0073)			(0.0025)	(0.0025)	(0.0025)
Cosmopol	0.036***	0.037***	0.037***	0.038***	SocGlob		-0.0060***	-0.0061***	-0.0058***
	(0.0051)	(0.0045)	(0.0045)	(0.0046)			(0.0012)	(0.0013)	(0.0012)
Country fixed effects	yes	no	no	no	CapOwn # GDP p.c.			0.13**	
								(0.054)	
GDP p.c.		-0.036	-0.036	-0.083	Degree # GDP p.c.				0.015***
		(0.067)	(0.067)	(0.068)					(0.0053)
GINI		-0.65	-0.65	-0.71*					
		(0.40)	(0.40)	(0.40)					
FDIStock		-0.032	-0.028	-0.032	Constant	0.31***	1.12	1.11	1.67**
		(0.11)	(0.11)	(0.12)		(0.029)	(0.75)	(0.75)	(0.77)
FuelExp		0.32**	0.33**	0.31**					
		(0.12)	(0.12)	(0.13)	Obs.	25,673	25,673	25,673	25,673
OreExp		-0.46*	-0.46*	-0.45*	R2	0.061	0.052	0.053	0.053
		(0.26)	(0.26)	(0.26)					

Robust standard errors clustered at the country level in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
Full regression table in Table 4.17.

apply to a representative sample whose composition reflects relative country sizes.

4.6.4. Factor Endowments

In section 4.5, we argued that differentiated effects of firm ownership and skill level between rich and poor countries can be explained by differences in relative factor endowments in these countries. We therefore used GDP per capita as a proxy for either type of relative factor abundance, capital and high skill. Although this is straightforward and allows us to think about differences in the perceived distributional effects of capital market integration between different countries comprehensively, we can also test these hypotheses seperately by accounting for the interaction of either type of endowment at the country level with the respective relative individual endowment. To this end,

we take data from the Penn World Tables on the aggregate capital stock (in 2005 PPP-US$) and relate this to the size of a country's labor force to create a measure of relative capital abundance (*CapAb*). For high-skill abundance, we use the average years of schooling in a country (*HumCapAb*), retrieved from the Barro-Lee dataset (Barro and Lee, 2013). We then include both variables as country-level variables in our regressions and interact them with the individual endowments (*CapOwn* and *Degree*, respectively) of persons in the sample, similar to the strategy in section 4.5. Note that we leave per-capita GDP as an explanatory country level variable in the regressions in order to disentangle the separate effect of factor abundance from the effect of per-capita income. Table 4.8 reports the results of interest, a complete regression table is again provided in the appendix in table 4.18.

Column 1 shows the results when including capital abundance as an additional country level characteristic. The coefficient shows a negative sign, but is insignificant. The relative capital abundance in a country has no explanatory power on average attitudes towards FDI, and being a firm owner has no significant effect either. This changes when it is interacted with the level of capital abundance (column 2). The significantly negative coefficient shows that it is indeed the case that firm owners in capital scarce countries tend to dislike FDI whereas they have a more positive attitude in capital-abundant countries (the interaction term). Again, the change in sign of the combined effect of *CapOwn* occurs within the middle quartiles of the sample in terms of capital abundance.

Columns 3 and 4 do the same for human-capital abundance. Here, the overall level in a country has a significantly positive effect when included on its own. This is in line with the empirical literature, that views the level of human capital in a country as decisive for the ability to experience gains from FDI (Borensztein et al., 1998).[17] When comparing the effect of individual education in low-skill and

[17] The fact that both *HumCapAb* and *Degree* have a significantly positive influence on people's attitudes towards MNEs shows that the "aggregate" effect of human capital at the country level goes beyond having many well-educated persons who, at the individual level, appreciate the presence of MNEs.

Table 4.8.: Robustness test: Factor endowments

	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
VARIABLES	MNE-PHIL	MNE-PHIL	MNE-PHIL	MNE-PHIL
Degree	0.027***	0.027***	0.024***	-0.027
	(0.0048)	(0.0048)	(0.0046)	(0.030)
CapOwn	0.021	-0.12*	0.025	0.025
	(0.031)	(0.070)	(0.031)	(0.030)
Individual controls	yes	yes	yes	yes
GDP p.c.	0.027	0.028	-0.046	-0.055
	(0.070)	(0.070)	(0.056)	(0.057)
Country level controls	yes	yes	yes	yes
CapAb	-5.7e-07	-5.9e-07		
	(5.1e-07)	(5.1e-07)		
HumCapAb			0.020**	0.0072
			(0.0074)	(0.0094)
CapOwn # CapAb		1.0e-06*		
		(5.5e-07)		
Degree # HumCapAb				0.0049
				(0.0029)
Constant	0.86	0.86	1.16**	1.40***
	(0.64)	(0.64)	(0.44)	(0.46)
Observations	25,673	25,673	25,673	25,673
R2	0.069	0.069	0.070	0.071

Robust standard errors clustered at the country level in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
Full regression table in Table 4.18.

high-skill abundant countries by including the interaction term with country skill abundance, the overall positive effect for *Degree* vanishes. However, even though a differentiated effect of degree in high- and low-skill abundant countries is still visible in the signs of the coefficients, it becomes marginally insignificant (with a p-value of 0.102 for the

interaction term). The combined effect of *Degree* is still positive and significant (at the 1%-level) at the 75%-quantile of countries in our sample in terms of *HumCapAb* (a country like Canada). Still, we can only partially confirm that the finding of differentiated effects of the individual skill level on views towards FDI between rich and poor countries is driven by the difference in the level of relative skill endowments. This finding may be driven by the fact that "years of schooling" exhibit less cross-country variation than per-capita GDP. But also, it suggests that the second channel we sketched above – the prevalence of horizontal FDI in rich economies and of vertical FDI in poor countries – may be more important in determining individuals' attitudes towards multinational enterprises than these companies' role in facilitating trade and in reinforcing Stolper-Samuelson effects.

4.7. Summary and Conclusions

In this chapter we have analyzed the factors that determine individuals' attitudes towards multinational enterprises. Apart from highlighting the role of socio-economic characteristics at the individual level, we have identified some of the economic and institutional variables that cause the considerable cross-country differences in the assessment of MNEs. It turned out that, *ceteris paribus*, individuals living in countries that are characterized by a high degree of corruption and inequality are more likely to take a hostile attitude towards foreign companies. Moreover, financial development, the structure of exports and the degree of "social globalization" have a significant influence on a country's average perception of FDI.

In addition, we have demonstrated that the marginal effect of some individual characteristics on the attitude towards MNEs depends on country-specific variables, most importantly per-capita GDP: domestic firm owners view multinational firms more positively in rich countries than in poor countries. The same holds for individuals with a higher educational attainment. We interpret these results as evidence that the distributional consequences of FDI are perceived along the lines

suggested by economic theory: in poor countries, the negative effect of FDI on the return to capital is more pronounced, generating a hostile attitude among incumbent entrepreneurs. Moreover, better educated persons in rich countries appreciate multinational enterprises' role in raising the demand for skilled labor - either by reinforcing Stolper-Samuelson effects or by predominantly engaging in horizontal FDI.

We believe that these results are important for (at least) two reasons: first, they contribute to a better understanding of individuals' support or discontent towards globalization in general, and multinational enterprises in particular. Moreover, they suggest that individuals, when defining their attitude towards multinational enterprises, are aware of the distributional implications of FDI and that their judgement is guided by their own distributional interests. The next step would be to further disentangle the various – economic and non-economic – motivations that determine an individual's view on foreign firms, and to assess the relative importance of these motivations. While such an exercise is beyond the scope of this study, it provides potential avenues for future research.

4.A. Appendix A: Variables and Summary Statistics

Table 4.9.: Variable description of individual variables

Variable	Description
Male	Dummy if respondent is male
Age	Age of respondent
Degree	Highest Degree of Education, from "No formal qualification"to “University degree completed"
WrkSup	Dummy if respondent supervises others at work
CapOwn	Dummy if respondent employs more than 10 employees
RelIncome	Income of respondent relative to average income in country
Cosmopol	Response to agreement on patriotic statement
TradePhob	Response to agreement on statement on free trade

Table 4.10.: Summary statistics of individual variables

Variable	Obs	Mean	Std. Dev.	Min	Max
$\text{MNE}_{\text{Damage}}$	41560	2.40472	1.07773	1	5
MNE-PHIL	40919	0.39820	0.48953	0	1
$\text{MNE-PHIL}_{\text{Active}}$	40919	0.18708	0.38998	0	1
MNE-ATT	40919	1.58528	0.78543	1	3
Male	45191	0.45879	0.49830	0	1
Age	45198	45.91	17.19	15	94
Degree	45198	2.70357	1.45937	0	5
WrkSup	42770	0.22845	0.41984	0	1
CapOwn	41768	0.00876	0.09320	0	1
RelIncome	32351	1.00084	0.99019	0.00183	30.42361
Cosmopol	43039	2.55863	1.10188	1	5
TradePhob	39674	2.35890	0.94211	1	5

Table 4.11.: Variable description of country-specific variables

Variable	Description	Source
GDP p.c.	Log of per capita GDP, average 1999-2003	World Bank World Development Indicators
GINI	GINI coefficient, average 1999 - 2003	World Bank World Development Indicators
FDIStock	Stock of inward FDI per GDP, average 1999-2003	UNCTAD FDI/TNC Database, WDI
FuelExp	Share of fuel products in merchandise exports, average 1999-2003	World Bank World Development Indicators
OreExp	Share of ore products in merchandise exports, average 1999-2003	World Bank World Development Indicators
TradeOpen	Sum of exports and imports divided by GDP, average 1999-2003	World Bank World Development Indicators
CapDev	Total value of publicly traded stocks as a share of GDP, average 1999-2003	World Bank World Development Indicators
TFP	Total Factor Productivity, relative to U.S., average 1999-2003	Penn World Tables
Corr	Index of perceived (absence of) corruption, average 1999-2003	Transparency International
Democ	Comprehensive (polity 2) Index of democratic institutions, average 1999-2003	Polity IV
PolGlob	KOF Index of Political Globalization, average 1999-2003	Dreher (2006)
SocGlob	KOF Index of Social Globalization, average 1999-2003	Dreher (2006)
CapAb	Capital stock divided by labor force, in Mio PPP-US$, average 1999-2003	Penn World Tables
HumCapAb	Average years of schooling in age group >15, in year 2000	Barro & Lee (2013)

Table 4.12.: Summary statistics of country-specific variables

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP p.c.	32	9.871843	0.6272125	7.891331	10.68659
GINI	32	0.3359875	0.0677547	0.247	0.5206
FDIStock	32	0.3245	0.2247785	0.015	1.245
FuelExp	32	0.0945312	0.1881254	0.001	0.827
OreExp	32	0.0469375	0.0761594	0.004	0.426
TradeOpen	32	0.7811809	0.3427446	0.20515	1.70188
CapDev	32	0.5621031	0.6232287	0	2.2825
TFP	32	6.559375	2.322382	2.4	9.7
Corr	32	9.39375	1.137609	5.4	10
Democ	32	86.00825	10.73421	45.438	97.178
PolGlob	32	71.90581	14.25516	39.244	90.25
SocGlob	32	0.8056062	0.2498954	0.3391	1.5354
CapAb	32	137682.5	54762.18	27,736.90	222,720.50
HumCapAb	32	10.23	1.405948	6.71	12.69

4.B. Appendix B: Additional Full Regression Tables

Table 4.13.: Complete regression table 4.3: Country-specific variables

	(1)	(2)	(3)
	OLS	Logit	OLogit
VARIABLES	MNE-PHIL	MNE-PHIL	MNE-ATT
Male	0.016**	0.015**	0.12***
	(0.0070)	(0.0069)	(0.032)
Age	-0.0019***	-0.0019***	-0.0080***
	(0.00032)	(0.00032)	(0.0014)
Degree	0.026***	0.026***	0.13***
	(0.0051)	(0.0048)	(0.021)
WrkSup	0.026**	0.025**	0.14***
	(0.011)	(0.011)	(0.048)
CapOwn	0.022	0.021	0.15
	(0.031)	(0.030)	(0.13)
RelIncome	0.029***	0.030***	0.14***
	(0.0062)	(0.0065)	(0.030)
Cosmopol	0.034***	0.033***	0.16***
	(0.0052)	(0.0051)	(0.024)
GDP p.c.	-0.0060	-0.0047	0.070
	(0.060)	(0.060)	(0.28)
GINI	-0.81**	-0.77**	-3.07*
	(0.35)	(0.36)	(1.69)
FDIStock	0.12	0.11	0.81
	(0.10)	(0.11)	(0.54)
FuelExp	0.22**	0.22**	1.09**
	(0.086)	(0.086)	(0.49)
OreExp	-0.50**	-0.52***	-2.78***
	(0.19)	(0.19)	(0.95)
TradeOpen	0.095	0.098	0.38
	(0.086)	(0.085)	(0.40)
CapDev	0.058**	0.056**	0.20
	(0.028)	(0.028)	(0.13)
TFP	-0.075	-0.078	-0.46
	(0.083)	(0.083)	(0.43)
Corr	0.053***	0.053***	0.23***
	(0.012)	(0.012)	(0.054)
Democ	-0.012	-0.012	-0.068
	(0.023)	(0.024)	(0.11)
PolGlob	-0.0028	-0.0028	-0.012
	(0.0021)	(0.0020)	(0.0097)
SocGlob	-0.0079***	-0.0076***	-0.037***
	(0.0014)	(0.0014)	(0.0071)
Constant	1.09*		
	(0.59)		
Cut1			-1.82
			(2.75)
Cut 2			-0.66
			(2.76)
Observations	25,673	25,673	25,673
R2	0.069		
Pseudo R2		0.0526	0.0424
% correctly predicted		64.26	

Robust standard errors clustered at the country level in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Table 4.14.: Complete regression table 4.4: Interacted variables

	(1)	(2)	(3)
VARIABLES	OLS MNE-PHIL	OLS MNE-PHIL	OLS MNE-PHIL
Male	0.016**	0.014*	0.014*
	(0.0071)	(0.0071)	(0.0071)
Age	-0.0019***	-0.0019***	-0.0019***
	(0.00032)	(0.00032)	(0.00031)
Degree	0.026***	-0.16***	-0.16***
	(0.0051)	(0.045)	(0.045)
WrkSup	0.026**	0.027**	0.026**
	(0.011)	(0.011)	(0.011)
CapOwn	-1.48***	0.023	-1.36**
	(0.53)	(0.031)	(0.52)
RelIncome	0.029***	0.031***	0.031***
	(0.0062)	(0.0061)	(0.0061)
Cosmopol	0.034***	0.035***	0.035***
	(0.0052)	(0.0050)	(0.0051)
GDP p.c.	-0.0063	-0.060	-0.060
	(0.060)	(0.060)	(0.060)
GINI	-0.82**	-0.84**	-0.84**
	(0.35)	(0.34)	(0.34)
FDIStock	0.13	0.12	0.13
	(0.10)	(0.10)	(0.10)
FuelExp	0.23**	0.21**	0.21**
	(0.087)	(0.087)	(0.087)
OreExp	-0.50**	-0.50***	-0.50***
	(0.19)	(0.18)	(0.18)
TradeOpen	0.094	0.093	0.091
	(0.086)	(0.086)	(0.086)
CapDev	0.058**	0.057**	0.057**
	(0.028)	(0.027)	(0.027)
TFP	-0.078	-0.075	-0.078
	(0.083)	(0.083)	(0.083)
Corr	0.053***	0.053***	0.053***
	(0.012)	(0.012)	(0.012)
Democ	-0.011	-0.017	-0.016
	(0.023)	(0.024)	(0.024)
PolGlob	-0.0028	-0.0030	-0.0030
	(0.0021)	(0.0021)	(0.0021)
SocGlob	-0.0079***	-0.0077***	-0.0077***
	(0.0014)	(0.0014)	(0.0014)
CapOwn # GDP p.c.	0.15***		0.14**
	(0.053)		(0.053)
Degree # GDP p.c.		0.019***	0.018***
		(0.0046)	(0.0046)
Constant	1.09*	1.69***	1.68***
	(0.59)	(0.59)	(0.59)
Observations	25,673	25,673	25,673
R2	0.069	0.070	0.070

Robust standard errors clustered at the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4.15.: Complete regression table 4.5: MNE-PHIL$_{\text{Active}}$

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	Logit	OLS	Logit	OLS	OLS
VARIABLES	MNE-PHIL$_{Active}$	MNE-PHIL$_{Active}$	MNE-PHIL$_{Active}$	MNE-PHIL$_{Active}$	MNE-PHIL$_{Active}$	MNE-PHIL$_{Active}$
Male	0.034***	0.037***	0.039***	0.041***	0.040***	0.038***
	(0.0064)	(0.0054)	(0.0068)	(0.0062)	(0.0065)	(0.0064)
Age	-0.00066**	-0.00078***	-0.00076***	-0.00085***	-0.00077***	-0.00078***
	(0.00024)	(0.00024)	(0.00026)	(0.00027)	(0.00025)	(0.00025)
Degree	0.020***	0.022***	0.020***	0.022***	0.020***	-0.19***
	(0.0042)	(0.0029)	(0.0044)	(0.0035)	(0.0043)	(0.042)
WrkSup	0.034***	0.032***	0.031***	0.029***	0.031***	0.031***
	(0.0080)	(0.0065)	(0.0097)	(0.0085)	(0.0095)	(0.0093)
CapOwn	0.021	0.014	0.033	0.022	-0.73*	0.034
	(0.025)	(0.019)	(0.024)	(0.018)	(0.41)	(0.024)
RelIncome	0.024***	0.018***	0.024***	0.018***	0.024***	0.025***
	(0.0053)	(0.0043)	(0.0050)	(0.0043)	(0.0050)	(0.0049)
Cosmopol	0.025***	0.024***	0.025***	0.024***	0.024***	0.025***
	(0.0028)	(0.0026)	(0.0039)	(0.0040)	(0.0038)	(0.0037)
Country fixed effects	yes	yes	no	no	no	no
GDP p.c.			0.056	0.052	0.056	-0.0035
			(0.051)	(0.052)	(0.051)	(0.051)
GINI			-0.33	-0.27	-0.32	-0.35
			(0.28)	(0.30)	(0.28)	(0.27)
FDIStock			0.24**	0.19*	0.24**	0.24**
			(0.11)	(0.10)	(0.11)	(0.11)
FuelExp			0.19*	0.17**	0.19*	0.17
			(0.10)	(0.081)	(0.11)	(0.10)
OreExp			-0.52***	-0.53***	-0.52***	-0.52***
			(0.16)	(0.17)	(0.16)	(0.16)
TradeOpen			0.033	0.053	0.033	0.031
			(0.067)	(0.070)	(0.067)	(0.067)
CapDev			0.013	0.0068	0.014	0.013
			(0.025)	(0.026)	(0.026)	(0.025)
TFP			-0.12	-0.13	-0.11	-0.11
			(0.095)	(0.082)	(0.095)	(0.093)
Corr			0.029***	0.034***	0.028***	0.028***
			(0.0092)	(0.0098)	(0.0093)	(0.0090)
Democ			-0.016	-0.020	-0.016	-0.022
			(0.020)	(0.019)	(0.019)	(0.019)
PolGlob			-0.0014	-0.0014	-0.0014	-0.0016
			(0.0017)	(0.0016)	(0.0017)	(0.0017)
SocGlob			-0.0068***	-0.0064***	-0.0068***	-0.0066***
			(0.0013)	(0.0012)	(0.0013)	(0.0013)
CapOwn # GDP p.c.					0.077*	
					(0.041)	
Degree # GDP p.c.						0.021***
						(0.0044)
Constant	-0.0047		0.15		0.15	0.81
	(0.020)		(0.48)		(0.48)	(0.49)
Observations	25,673	25,673	24,890	24,890	25,673	25,673
R-squared	0.085		0.064		0.064	0.065
Pseudo R2		0.09		0.066		
% corr. pred		82.01		81.71		

Robust standard errors clustered at the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4.16.: Complete regression table 4.6: Control for trade attitudes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	Logit	Ologit	OLS	Logit	Ologit	OLS	OLS
VARIABLES	MNE-PHIL	MNE-PHIL	MNE-ATT	MNE-PHIL	MNE-PHIL	MNE-ATT	MNE-PHIL	MNE-PHIL
Male	0.0033	0.0030	0.068**	0.0089	0.0083	0.091***	0.0089	0.0074
	(0.0079)	(0.0076)	(0.035)	(0.0073)	(0.0072)	(0.034)	(0.0073)	(0.0073)
Age	-0.0016***	-0.0017***	-0.0072***	-0.0018***	-0.0019***	-0.0078***	-0.0018***	-0.0018***
	(0.00033)	(0.00032)	(0.0014)	(0.00033)	(0.00032)	(0.0014)	(0.00033)	(0.00032)
Degree	0.027***	0.027***	0.13***	0.026***	0.026***	0.13***	0.026***	-0.17***
	(0.0042)	(0.0037)	(0.018)	(0.0049)	(0.0046)	(0.021)	(0.0049)	(0.042)
WrkSup	0.031***	0.030***	0.16***	0.024**	0.023**	0.13***	0.024**	0.024**
	(0.0093)	(0.0091)	(0.040)	(0.011)	(0.010)	(0.046)	(0.011)	(0.010)
CapOwn	0.0040	0.0023	0.044	0.019	0.017	0.12	-1.37**	0.020
	(0.029)	(0.028)	(0.13)	(0.030)	(0.029)	(0.13)	(0.54)	(0.030)
RelIncome	0.027***	0.027***	0.13***	0.027***	0.027***	0.13***	0.027***	0.028***
	(0.0058)	(0.0062)	(0.029)	(0.0059)	(0.0062)	(0.029)	(0.0059)	(0.0059)
Cosmopol	0.039***	0.039***	0.19***	0.037***	0.036***	0.17***	0.037***	0.037***
	(0.0040)	(0.0036)	(0.017)	(0.0051)	(0.0050)	(0.024)	(0.0051)	(0.0050)
TradePhob	-0.040***	-0.040***	-0.23***	-0.045***	-0.045***	-0.24***	-0.045***	-0.045***
	(0.0094)	(0.0095)	(0.047)	(0.0094)	(0.0094)	(0.047)	(0.0094)	(0.0094)
Country fixed effects	yes	yes	yes	no	no	no	no	no
GDP p.c.				-0.028	-0.028	-0.044	-0.028	-0.085
				(0.054)	(0.053)	(0.25)	(0.054)	(0.054)
GINI				-0.83**	-0.79**	-3.19**	-0.83**	-0.86**
				(0.33)	(0.34)	(1.61)	(0.33)	(0.32)
FDIStock				0.099	0.089	0.69	0.10	0.10
				(0.10)	(0.10)	(0.55)	(0.10)	(0.10)
FuelExp				0.24***	0.23***	1.15**	0.24***	0.22**
				(0.085)	(0.086)	(0.50)	(0.086)	(0.085)
OreExp				-0.51***	-0.53***	-2.79***	-0.51***	-0.51***
				(0.18)	(0.18)	(0.90)	(0.18)	(0.17)
TradeOpen				0.090	0.092	0.35	0.088	0.087
				(0.079)	(0.079)	(0.37)	(0.079)	(0.079)
CapDev				0.061**	0.059**	0.23*	0.061**	0.060**
				(0.027)	(0.028)	(0.13)	(0.027)	(0.027)
TFP				-0.048	-0.050	-0.30	-0.051	-0.048
				(0.080)	(0.080)	(0.43)	(0.079)	(0.080)
Corr				0.056***	0.056***	0.24***	0.056***	0.057***
				(0.011)	(0.011)	(0.051)	(0.011)	(0.011)
Democ				-0.011	-0.012	-0.065	-0.011	-0.017
				(0.022)	(0.022)	(0.11)	(0.022)	(0.022)
PolGlob				-0.0028	-0.0028	-0.012	-0.0028	-0.0030
				(0.0019)	(0.0018)	(0.0089)	(0.0019)	(0.0019)
SocGlob				-0.0074***	-0.0071***	-0.034***	-0.0074***	-0.0072***
				(0.0013)	(0.0013)	(0.0065)	(0.0013)	(0.0013)
CapOwn # GDP p.c.							0.14**	
							(0.054)	
Degree # GDP p.c.								0.020***
								(0.0043)
Constant	0.36***			1.35**			1.35**	1.98***
	(0.029)			(0.53)			(0.53)	(0.53)
Cut1			0.66***			-3.19		
			(0.13)			(2.54)		
Cut 2			1.85***			-2.02		
			(0.11)			(2.54)		
Observations	24,890	24,890	24,890	24,890	24,890	24,890	24,890	24,890
R2	0.090			0.075			0.076	0.076
Pseudo R2		0.07	0.059		0.058	0.048		
% corr. pred.		64.83			64.2			

Robust standard errors clustered at the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4.17.: Complete regression table 4.7: Sample weights

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	Logit	Ologit	OLS	Logit	Ologit	OLS	OLS
VARIABLES	MNE-PHIL	MNE-PHIL	MNE-ATT	MNE-PHIL	MNE-PHIL	MNE-ATT	MNE-PHIL	MNE-PHIL
Male	0.0058	0.0053	0.070*	0.0078	0.0072	0.079**	0.0078	0.0065
	(0.0077)	(0.0075)	(0.041)	(0.0075)	(0.0073)	(0.040)	(0.0075)	(0.0076)
Age	-0.0027***	-0.0028***	-0.011***	-0.0029***	-0.0030***	-0.012***	-0.0029***	-0.0030***
	(0.00056)	(0.00051)	(0.0022)	(0.00051)	(0.00048)	(0.0020)	(0.00051)	(0.00050)
Degree	0.027***	0.028***	0.13***	0.024***	0.024***	0.11***	0.024***	-0.13**
	(0.0051)	(0.0050)	(0.024)	(0.0050)	(0.0049)	(0.023)	(0.0050)	(0.055)
WrkSup	-0.0078	-0.0069	0.0016	-0.012	-0.011	-0.016	-0.011	-0.011
	(0.023)	(0.023)	(0.10)	(0.022)	(0.022)	(0.097)	(0.022)	(0.022)
CapOwn	0.022	0.021	0.091	0.034	0.033	0.15	-1.28**	0.034
	(0.064)	(0.062)	(0.26)	(0.062)	(0.060)	(0.25)	(0.53)	(0.062)
RelIncome	0.027***	0.027***	0.14***	0.029***	0.029***	0.14***	0.029***	0.030***
	(0.0074)	(0.0075)	(0.037)	(0.0076)	(0.0077)	(0.038)	(0.0075)	(0.0073)
Cosmopol	0.036***	0.036***	0.17***	0.037***	0.037***	0.17***	0.037***	0.038***
	(0.0051)	(0.0052)	(0.027)	(0.0045)	(0.0046)	(0.025)	(0.0045)	(0.0046)
Country fixed effects	yes	yes	yes	no	no	no	no	no
GDP p.c.				-0.036	-0.035	-0.055	-0.036	-0.083
				(0.067)	(0.068)	(0.31)	(0.067)	(0.068)
GINI				-0.65	-0.62	-2.23	-0.65	-0.71*
				(0.40)	(0.41)	(1.86)	(0.40)	(0.40)
FDIStock				-0.032	-0.047	0.20	-0.028	-0.032
				(0.11)	(0.12)	(0.56)	(0.11)	(0.12)
FuelExp				0.32**	0.33**	1.70***	0.33**	0.31**
				(0.12)	(0.13)	(0.64)	(0.12)	(0.13)
OreExp				-0.46*	-0.49*	-2.86**	-0.46*	-0.45*
				(0.26)	(0.28)	(1.32)	(0.26)	(0.26)
TradeOpen				0.10	0.11	0.35	0.10	0.098
				(0.087)	(0.089)	(0.40)	(0.087)	(0.088)
CapDev				0.060*	0.060*	0.21	0.060*	0.060*
				(0.033)	(0.034)	(0.16)	(0.033)	(0.033)
TFP				-0.096	-0.10	-0.69	-0.096	-0.098
				(0.12)	(0.12)	(0.57)	(0.12)	(0.12)
Corr				0.049***	0.050***	0.21***	0.049***	0.050***
				(0.013)	(0.014)	(0.059)	(0.013)	(0.014)
Democ				0.025	0.026	0.14	0.026	0.020
				(0.023)	(0.024)	(0.11)	(0.023)	(0.024)
PolGlob				-0.0040	-0.0041*	-0.018*	-0.0040	-0.0043
				(0.0025)	(0.0025)	(0.011)	(0.0025)	(0.0025)
SocGlob				-0.0060***	-0.0059***	-0.029***	-0.0061***	-0.0058***
				(0.0012)	(0.0013)	(0.0059)	(0.0013)	(0.0012)
CapOwn # GDP p.c.							0.13**	
							(0.054)	
Degree # GDP p.c.								0.015***
								(0.0053)
Constant	0.31***			1.12			1.11	1.67**
	(0.029)			(0.75)			(0.75)	(0.77)
Cut1			1.00***			-1.62		
			(0.13)			(3.46)		
Cut 2			2.22***			-0.41		
			(0.16)			(3.46)		
Observations	25,673	25,673	25,673	25,673	25,673	25,673	25,673	25,673
R2	0.061			0.052			0.053	0.053
Pseudo R2		0.047	0.039			0.033		

Robust standard errors clustered at the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4.18.: Complete regression table 4.8: Factor endowments

	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
VARIABLES	MNE-PHIL	MNE-PHIL	MNE-PHIL	MNE-PHIL
Male	0.016**	0.016**	0.016**	0.015**
	(0.0070)	(0.0070)	(0.0070)	(0.0071)
Age	-0.0019***	-0.0019***	-0.0019***	-0.0019***
	(0.00032)	(0.00032)	(0.00032)	(0.00031)
Degree	0.027***	0.027***	0.024***	-0.027
	(0.0048)	(0.0048)	(0.0046)	(0.030)
WrkSup	0.026**	0.026**	0.025**	0.026**
	(0.011)	(0.011)	(0.011)	(0.011)
CapOwn	0.021	-0.12*	0.025	0.025
	(0.031)	(0.070)	(0.031)	(0.030)
RelIncome	0.029***	0.029***	0.030***	0.031***
	(0.0060)	(0.0060)	(0.0062)	(0.0062)
Cosmopol	0.033***	0.033***	0.036***	0.037***
	(0.0048)	(0.0048)	(0.0046)	(0.0046)
GDP p.c.	0.027	0.028	-0.046	-0.055
	(0.070)	(0.070)	(0.056)	(0.057)
CapAb	-5.7e-07	-5.9e-07		
	(5.1e-07)	(5.1e-07)		
HumCapAb			0.020**	0.0072
			(0.0074)	(0.0094)
GINI	-0.87**	-0.87**	-0.69**	-0.74**
	(0.37)	(0.37)	(0.30)	(0.30)
FDIStock	0.11	0.11	0.12	0.13
	(0.10)	(0.10)	(0.098)	(0.099)
FuelExp	0.23***	0.24***	0.24**	0.24**
	(0.081)	(0.081)	(0.095)	(0.093)
OreExp	-0.49***	-0.50***	-0.59***	-0.59***
	(0.17)	(0.17)	(0.18)	(0.18)
TradeOpen	0.074	0.073	0.083	0.079
	(0.086)	(0.086)	(0.081)	(0.081)
CapDev	0.065**	0.066**	0.054**	0.054**
	(0.029)	(0.029)	(0.023)	(0.022)
TFP	-0.083	-0.085	-0.049	-0.046
	(0.081)	(0.081)	(0.078)	(0.078)
Corr	0.053***	0.053***	0.058***	0.059***
	(0.011)	(0.011)	(0.011)	(0.011)
Democ	-0.0099	-0.0097	-0.012	-0.012
	(0.022)	(0.022)	(0.023)	(0.023)
PolGlob	-0.0030	-0.0030	-0.0022	-0.0023
	(0.0023)	(0.0023)	(0.0016)	(0.0016)
SocGlob	-0.0076***	-0.0076***	-0.0081***	-0.0081***
	(0.0015)	(0.0015)	(0.0014)	(0.0014)
CapOwn # CapAb		1.0e-06*		
		(5.5e-07)		
Degree # HumCapAb				0.0049
				(0.0029)
Constant	0.86	0.86	1.16**	1.40***
	(0.64)	(0.64)	(0.44)	(0.46)
Observations	25,673	25,673	25,673	25,673
R2	0.069	0.069	0.070	0.071

Robust standard errors clustered at the country level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5.Conclusion and Outlook

The studies presented in this thesis each by their own provide analyses of mechanisms involved with North-South globalization and, particularly, capital market integration that are novel to the literature. Together, they demonstrate that with theoretical considerations on the structural, aggregate level, we are able to consistently rationalize some unexplained empirical facts in international economics. This includes disparate growth patterns between North and South, two-way capital flows, and the interaction between trade specialization and capital movements. Such structural theories can also explain how the outcome of capital market integration is perceived by individual agents. This shows that understanding important dynamics of international economic integration does not necessarily require to focus on firm level behavior.

At the same time, explicitly considering the interaction between aggregate dynamics and individual opportunities generates valuable insights. Chapter 2 analyzes the effect of the decrease of the overall marginal product of capital due to an inflow of FDI on individual (entrepreneurs') chances on the credit market, and how this may generate adverse effects on national income. In this setting, this has feedback effects on the global financial market by inducing financial capital flows from developing to high income countries. Chapter 4 explores whether the macroeconomic environment interacts with individual characteristics in shaping individual perceptions of FDI in a way consistent with established theories on the functioning of the global capital market and its distributional effects. The analysis confirms these interactions. These findings may indicate that the structural mechanisms underlying the theoretical chapters indeed govern the distributional effects of globalization between the global North and South – within and between countries.

The perspectives highlighted in this thesis also explore dimensions of FDI that have not been emphasized by earlier literature: chapter 2 explicitly accounts for the time dimension by modeling a dynamic

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setting, and finds a trade-off between the short- and the long-run consequences of FDI inflows. In chapter 3, the role of physical capital as a complementary factor to both types of labor skill is explored to identify an effect of trade-capital-flow-complementarity. These dimensions also bear the potential to broaden our understanding of policy options and necessities. As for chapter 2, the analysis implied that FDI may initially incur positive effects, which, however, come at the cost of interrupting an organic growth process. To internalize this dynamic trade-off could be important for policy makers in developing countries, but also for advocates of development policies in e.g. international organizations, and shift emphasis on countervailing this negative effect by more cautiously capitalizing on the initial gains from FDI, in order to prolong that growth period by other supportive means. The line drawn to financial capital outflows may as well open ways for more differentiated capital market liberalization policies. The analysis in chapter 3 furthermore shows that trade liberalization and the integration into the international capital market can not be seen independent of one another, and that e.g. an increased export orientation may also constitute a viable policy option to attract capital flows. Lastly, we have demonstrated in chapter 4 that those agents who should – according to classical theories – benefit from FDI are also the ones being more positive about it. This tend to be persons in better economic positions, but beyond that may vary between developed and developing countries. These results are important for the political economy of market liberalization, and can thus reveal which groups should be targeted in order to generate a greater public support for liberalization policies, and also in order to avoid misunderstandings between economic theorists and policy makers on the one hand and the public on the other hand, such as those described by Easterly (2008) and in the introduction to this dissertation.

I provide strong empirical evidence for the relationships proposed here. Earlier literature has paid little attention to the phenomena of two-way capital flows and the correlation between trade and capital flows, and thereby to other observations that go along with the surge of FDI. However, FDI – in particular between developed and

developing countries – should not be viewed seperately from these other phenomena, but is, on the contrary, a rather complex occurrence. In this collection of essays, I have proposed tractable analytical frameworks under which this complexity can be accounted for.

This provides various avenues for future research. Overall, it appears as a fruitful exercise to further combine the effects derived in the aggregate with firm-level dynamics or a more refined modeling of production structures. If the analysis in chapter 2 were extended such as to model individual investment and firm competition more explicitly, it could also capture the possibility of technological spillover effects. In such a setting, the importance of the two effects for outcomes on the credit and investment market could be compared. The very general framework in chapter 3 could also be analyzed in a setting of monopolistic competition or heterogeneous firms, in the spirit of Romalis (2004), such that the interaction between factor abundance and scale effects could be explored. Beyond that, it would also be interesting to see how deviating from the assumption of homothetic preferences and the resulting different trade patterns influence capital flows, when e.g. growth (possibly induced by the international division of labor itself) leads to high-skill products being demanded in increasing amount on the world market. For chapter 4, a new round of the ISSP survey has been conducted and is going to be released, such that the empirical analysis could exploit changes over time, instead of the pure cross-country analysis pursued here. The findings of this, however, could already bear further potential for economic researchers: indicating that individuals seem to align their attitudes with their alleged benefits, they render a fruitful way for proxying actual distributional effects, also in more refined settings and where data on actual economic outcomes and causal relationships is rare.

Overall, the work collected in this dissertation provides new perspectives on North-South globalization and FDI. It thereby takes a systemic approach in order to coherently explain some findings involved with North-South globalization on the structural level. This

discloses new avenues, both from a theoretical perspective and for policy making.

A. The Neoclassical Case of Capital Flows

This section in brief lays out the basic mechanism of foreign capital inflows into a capital scarce country according to the neoclassical model.[1] The country produces one good Y, by means of capital, K, and labor, L. The production function is given by $Y = F(K, L)$, where $\frac{\partial Y}{\partial K} > 0$ and $\frac{\partial^2 Y}{\partial K^2} < 0$. Perfect competition on factor markets implies factors are paid their marginal product. The real return to capital is hence given by $r = \frac{\partial Y}{\partial K}$, and is consequently decreasing in K. This is depicted in figure A.1. The return to the fixed amount of labor is given by $F(K, L) - rK$ and is hence given by the area between the marginal product of capital, $\frac{\partial Y}{\partial K}$, and the interest rate, r_a.

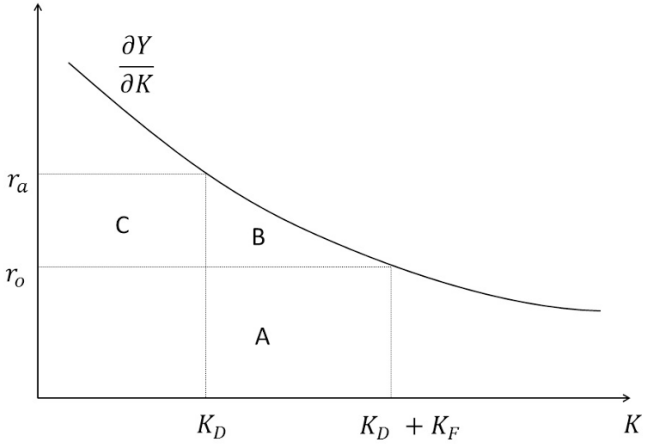

Figure A.1.: Capital inflows and domestic income in the neoclassical model

[1] The representation here bases on a similar one in Ju and Wei (2010).

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Now consider a domestic economy that is relatively capital scarce (low K_D), and thus has a relatively high rental rate in autarky (r_a). Either a large world market or a foreign country is relatively more capital abundant. Thus, the foreign interest rate r_F is lower, and hence capital will flow into the country until $r = r_o$ in figure A.1, which is either equal to the world market interest rate r_F, or lies between the domestic and the foreign interest rate in autarky. K_F is the amount of foreign capital that flows in. The gain in aggregate production through the inflow is the entire area below the line of the marginal product to capital between K_D and K_F (i.e. all marginal products of all inflown capital), which is exactly the area made up by the rectangular area A and the triangle B. Now, foreign capital holders will be remunerated with the rental rate on their capital held, which is simply $r_o K_F$, given by area A. This is the capital income that leaves the country as foreign profits. However, the area denoted by B is additional income that stays in the country. B is the domestic gain by foreign capital inflow.

However, in addition to the overall gain, the inflow of foreign capital also affects the distribution of this income between capital and labor in the domestic economy. At the new interest rate, overall capital income is given by $r_o K_D$. This is lower than the autarky capital income $r_a K_D$ by exactly the area denoted by C. On the other hand, labor gains the entire area between r_a and r_o that is below the marginal product, i.e. labor incomes rises by the area given by C + B. Hence, C is redistributed from capital to labor and labor additionally gains B, following an inflow of foreign capital.

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