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Foreign Direct Investment in the Financial Sector: The Engine of Growth for Central and Eastern Europe?[*]

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Abstract

   This paper examines the impact of financial sector foreign direct investment (FSFDI) on economic growth by estimating a panel data model for 11 Central and Eastern European countries (CEECs)[1] between 1996 and 2003 in a cross-country growth accounting framework. The analysis concentrates on the efficiency channel linking FSFDI to economic growth. The results clearly indicate that there can be a relationship between FSFDI and economic growth. Approaching a medium degree of financial M&A is rewarded by higher economic growth after two periods. Beyond it, FSFDI seems to spur economic growth depending on a higher human capital stock. FSFDI-induced knowledge-spillovers to domestic banks can be an explanation for this phenomenon. Above a certain threshold, the crowding-out of local physical capital caused by the entry of a foreign bank seems to hamper economic growth. The value of the paper lies in (1) providing novel data on FSFDI in CEECs, (2) analyzing the impact of FDI on a sectoral level and (3) in modeling the hitherto only qualitatively discussed relationship between foreign banks and economic development into a structural, econometric model that combines two streams of economic research: the FDI-growth-literature and the finance-growth-literature.

Keywords: Financial sector foreign direct investment, economic growth, financial economics, transitional economies, panel data analysis.

JEL classification: C23, F36, G10, O16, P2

Finance-growth nexus homepage: `http://fgr.wu-wien.ac.at/institut/ef/nexus.html`.

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[1]the New EU Member States and Accession Countries, i. e. Bulgaria (BG), Croatia (HR), Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (RO), Slovenia (SI), Slovakia (SK)

Contents

1. Introduction and Motivation

Banks were inefficient and burdened with large amounts of non-performing loans in former socialist Central and Eastern European countries (CEECs) before 1990 (Fink, Haiss, Orlowski & Salvatore 1998). Capital was scarce and overall productivity low. The inflow of foreign capital – in particular foreign direct investment (FDI) – was seen as a key component for a solution of these problems (Sergi 2004). Accordingly, economic research has developed two different streams of literature. On the one hand, various studies have attempted to provide theoretical and empirical answers to the question of the overall impact of general FDI on the host economy. In this context the impact of FDI on economic growth has especially been analyzed (e. g. Borensztein, De Gregorio & Lee 1998, De Mello 1999, Nair-Reichert & Weinhold 2001, Campos & Kinoshita 2002, Mencinger 2003, Dimelis & Louri 2004, Ruschinski & Sturm 2004, Hansen & Rand 2004, Neuhaus 2005, Sohinger 2005). Results for CEECs are mixed but they argue that FDI can be a major growth trigger. On the other hand, the finance-growth nexus literature has elaborated meaningful links between the financial sector and economic growth over the last decade. Blum, Federmair, Fink & Haiss (2002) reviewed this literature and detected five different patterns of interference: a leading role of the financial sector (supply-leading approach), a demand-following, a bi-directional link, negative causality from finance to growth and no link. The direction of the causality link may change with the level of economic development (Rousseau & Wachtel 2005). Patrick (1966) points out that the financial sector plays a supply-leading role in underdeveloped markets. Cross-country studies such as Beck, Levine & Loayza (2000) generally seem to support the supply-leading link. Time-series studies and regional studies as Al-Tamimi, Al-Awad & Charif (2001) provide mixed evidence for this link. The positive view of the finance-led growth hypothesis normally focuses on more open and liberalized financial systems. Banking markets in CEE are an extreme case of openness as they are majority-held foreign.

While there is a plethora of literature on the consequences of financial sector foreign direct investment (FSFDI) for the host countries' financial system and also some descriptive analysis especially in the context of CEE countries (e. g. Naaborg, Scholtens, Bol, De Haan & De Haas 2003, Vessel 2003, Baudino, Caviglia, Dorrucci & Pineau 2004, Goldberg 2004, BIS 2004, Uiboupin 2004), empirical evidence on the economic impact of sectoral FDI is scarce (see Appendix C for an overview of related studies). This paper is one of the first attempts to fill this gap. The paper adds to the understanding of economic mechanisms by combining the two aforementioned streams of research: the FDI-growth-literature and the finance-growth-literature. We argue that the effects of FDI might differ depending on the target industry. While government ownership has been investigated with regard to its economic implications (see La Porta, Lopez-de-Silanes & Shleifer 2002), the growing importance of foreign ownership and underlying FSFDI has not been treated properly in the literature, too.

Reviewing the aforementioned streams of research, we are able to identify four important transmission channels linking FSFDI to economic growth. We observe that FSFDI induces a variety of micro-structure changes in the host countries. Among them, potential efficiency improvements for the whole financial sector are of specific relevance. We thus test for the

hypothesis that economic growth is led by FSFDI-induced efficiency gains. Using two different indicators for FSFDI we are going to estimate the impact on economic growth in 11 CEECs from 1994 to 2003. We adapt a cross-country growth accounting model to render the efficiency channel and employ fixed-effects panel data estimations.

This paper progresses as follows: Section 2 characterizes the transmission channels between FSFDI and economic growth, Section 3 presents the stylized facts of the FSFDI-growth nexus and its transmission in the CEECs, Section 4 develops the theoretical model following endogenous growth theory, Section 5 emphasizes econometric particularities of the panel data approach used for growth econometrics, Section 6 elaborates the empirical model and presents the estimation results, Section 7 summarizes the main findings and depicts directions for future research.

2. Transmission Channels Between FSFDI and Economic Development

The recent rise in FSFDI especially in emerging markets led to a renewed research emphasis on this field. Questions analyzed include why, which and where banks go abroad (e. g. Clarke, Cull, Peria & Sánchez 2001), privatization and ownership issues (e. g. Bonin, Hasan & Wachtel 2005, Sabi 1996, Weill 2003) and what is the impact on host and home countries' financial system (e. g. Claessens, Demirgüç-Kunt & Huizinga 2001, Herrero & Sirnon 2003, De Haas & Van Lelyveld 2006), frequently based on theories of multinational banking (e. g. Williams 1997). Direct investigations of the impact of FSFDI on economic growth and development are scarce (Levine 1996). We try to fill this gap.

In the following sections we emphasize possible benefits and drawbacks of foreign bank entry on financial sector and economic development with particular focus on CEE. In this way, we seek to identify transmission channels through which foreign ownership in banking may affect economic development. We are able to summarize four different channels: intermediation / efficiency, intermediation / credit volume, corporate governance & institution building, as well as signal effects for total FDI and portfolio investments (see Figure 1 and Haiss, Steiner & Eller (2005)). The status quo of empirical attempts testing these different transmission channels is summarized in Appendix C.

2.1. Transmission Channel I: Intermediation / Efficiency

Acquiring advanced technology and accumulating capital stock more effectively are the major challenges for sustained growth in the CEECs (Lee & Tcha 2004). Most transition countries possess relatively high-quality human capital stock (i. e. have a well-trained workforce), while the physical capital stock had been rather obsolete and in need of modernization through investment across the various economic sectors. With the lack of domestic investment (DI), FDI is usually argued to play a critical role in the transfer of market-oriented technologies and business practices and by contributing to the accumulation of physical capital in the real and in the financial sector (Dimelis & Louri 2004). We empirically investigate this technology
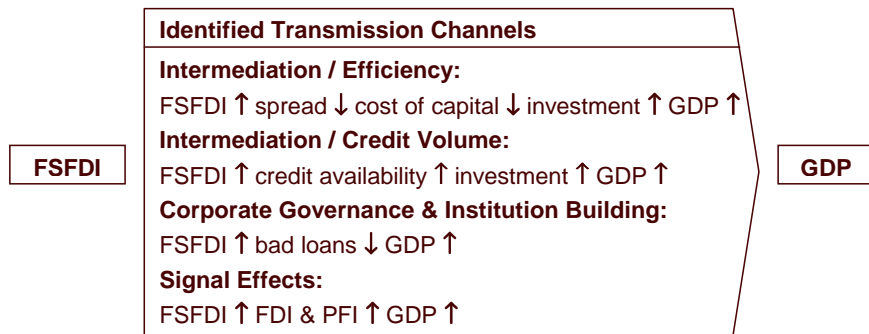
Figure 1: Identified Transmission Channels between FSFDI and Economic Growth

channel in financial sector FDI. Figure 2 depicts the respective line of argumentation, which is explained in detail in the following.
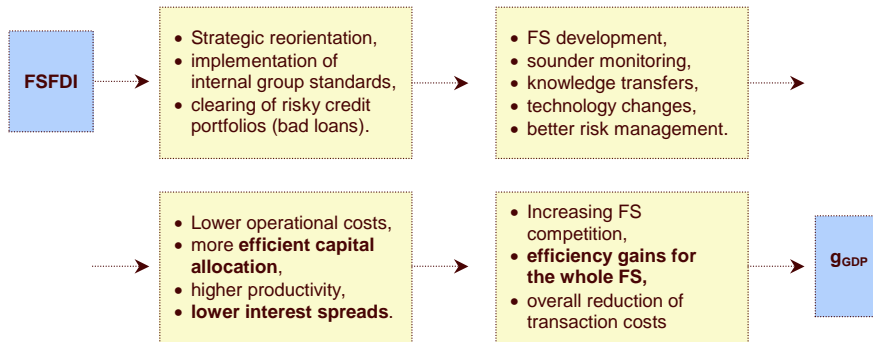
Figure 2: FSFDI-Induced Efficiency-Led Growth

2.1.1. Efficiency of Foreign Owned Banks in Emerging Markets

Bonin et al. (2005) and Claessens et al. (2001) analyze samples of mature and emerging markets and point out that foreign banks operating in emerging markets have been more efficient with regard to costs and profits than domestic banks, whereas the opposite is true in the case of mature markets. Let us stress subsequently the related arguments.

Strategic issues: Strategic reorientation on the market and technology changes in case of an acquisition may enhance efficiency. As foreign institutions enter new markets, their strategic interests will vary according to their home market or global activities. Most investors in emerging banking markets have long-term profit interests as these markets offer the potential for strong business volume growth across the various client groups, including retail banking (BIS 2004). Such "going local" strategies may help *local financial market development*, e. g., by the implementation of products new to the host market (Gallego, Herrero & Luna 2003).

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In the case of an acquired bank, the integration into a multinational or even global financial organization leads to a migration of strategic decisions to the foreign headquarters whereas day-to-day responsibilities remain at the local level (BIS 2004, 10). Close ties to the parental institution also derive from the access to parental resources which might be a stable funding base in times of crisis. Possible negative impacts might occur as shocks may be imported from the home market (BIS 2004). De Haas & Van Lelyveld (2006) find that there is a significant negative relationship between home country economic growth and host country credit by greenfields in CEE. Conversely, they conclude that during host market crisis periods domestic banks contracted their credit base, whereas greenfield foreign banks did not.

Management issues: Acquired banks usually receive a capital injection from the new owner (Papi & Revoltella 2003, 160), so the ability of the target to bear risk and grant fresh credit rises. Particularly foreign banks have great interest in implementing sound policies and risk management as they have the capacity to implement group-wide risk assessment techniques (BIS 2004, 15). Furthermore, foreign banks play an important role in *reducing the share of non-performing loans* that was and still is high particularly in former state owned banks (Sergi & Matoušek 2005) (for more details see Subsection 2.3.1 and Table 2). Papi & Revoltella (2003, 160) support this view and argue that the clearing of risky credit portfolios requires majority interest by the foreign bank and takes time due to restructuring needs. Putting these arguments together, *efficiency in risk management* is achieved through transfer of know-how and technologies as well as economies of scope due to risk-diversification.

Operational efficiency: Foreign banks will have a great interest in implementing internal group-standards. Standardization across borders may be difficult to achieve. Drawing on US-experience, Goldberg (2004, 6) argues that foreign banks are likely to have more efficient credit allocation as well as sound monitoring and thus less risk. Their operating costs are lower. Claessens et al. (2001) explain the high foreign bank presence in the CEECs with low banking costs and low non-interest income of domestic banks. Sabi (1996) and Weill (2003) find that foreign banks are more profitable and more effienct than domestic-owned banks in the CEECs. Green, Murinde & Nikolov (2004), on the other hand, points out that foreign and domestic owned financial organizations are not necessarily different with regard to economies of scale and scope. Concerning acquired institutions, Papi & Revoltella (2003, 175) argue that "for operating and thus cost efficiency a majority interest of at least 70 percent in the host bank capital is necessary". Cost efficiency can be realized only after a period of experimental learning in the new market and restructuring in the case of acquisitions.

These previous issues suggest that foreign owned banks can exploit higher efficiency. However, respective empirical investigations come up with mixed results. Havrylchyk (2006) concludes for Poland that greenfield banks have achieved higher levels of efficiency than domestic banks, foreign banks that acquired domestic institutions have not succeeded in enhancing their efficiency. Green et al. (2004), who tested eight CEE financial markets from 1993 to 2000, found that cost efficiency is not always dependent on ownership. Foreign owned banks are not more efficient than an average domestic bank in terms of economies

of scale and scope. An explanation for these results might be that foreign owners have up-front costs in modernizing the acquired banks. *Cost efficiency might only occur after some time.* Nevertheless, foreign owned banks are more *profit efficient* according to Bonin et al. (2005, 2158). They analyzed data of 67 banks in six CEE countries from 1994 to 2002. Papi & Revoltella (2003) provide an explanation for the contradictory findings about the relationship between ownership and bank efficiency on which we will draw in interpreting our empirical analysis. They argue that a certain *threshold in foreign ownership* is necessary to achieve changes in efficiency levels of the acquired bank. But, what about the impact on domestic banks and thus the whole financial sector? How is financial sector efficiency linked to economic development?

2.1.2. Efficiency Spillovers on the Whole Financial Sector

Foreign ownership may drive down banks' interest rate margins, thus lower companies cost of borrowing which should facilitate investment. Foreign owners may have a direct impact on efficiency gains in loan portfolio management of the affiliate and thus external finance for investment by corporations and households. Better risk management or lower operating costs allow for more efficient capital allocation. Foreign banks are able to set narrower interest margins and offer their services and products at lower prices. Local as well as regional competition among banks will increase (Drakos 2003). These *changes in the competitive structure of the banking industry* may induce efficiency gains in the whole sector as argued by most of the discussion on efficiency (Goldberg 2004, 5). Koivu (2004) found evidence that increasing financial sector efficiency measured by interest margins has growth-enhancing effects on economies in transition. She applied cross-country and time-series regressions on nine CEE countries over 1995–2002. Claeys & Van der Vennet (2004, 2) empirically tested the determinants of interest margins in CEE and found that "institutional reform shifts risk behavior before competition effects push margins down". Higher competition induced by foreign bank entry causes *lower interest margins* and thus higher financial sector efficiency.

According to Eschenbach, Francois & Schuknecht (2000), *financial sector competition* triggered by foreign banks *is closely linked to economic growth* in emerging market economies. Their cross-country regression analysis covered 130 countries, including most of the transition countries over 1990–1999. Higher financial sector efficiency induced by higher financial sector competition should result in an overall reduction of transaction costs (Levine 1997). Greenfield investors represent new competitors per se, whereas acquisitions foster competition due to new market policies implemented by foreign owners, restructuring, and the rollout of group risk systems and corporate governance practices. If domestic banks are able to cope with foreign contenders, competition with foreign banks will improve the efficiency of the domestic banking system (see Claessens et al. 2001).

But one has also to consider, that banks will need to refocus their business and specialize on (other) new target groups (e.g. SMEs) what will lead to higher costs for domestic banks. They might succeed by offering services more closely tailored to the needs of the local population and not by trying to compete on price with foreign competitors which are mostly backed by large financial groups. They might also be crowded out as foreign owners "cherry

pick" and only riskier target groups remain. Periods of severe instability in the financial sector might follow (IADB 2005, Papi & Revoltella 2003).

While competition will increase, particularly *cross-border mergers and acquisitions* contribute to an *increase of concentration in the financial systems* of emerging market economies (BIS 2004, 21). This might be a simple effect of transition reflecting the deepening of host country financial sectors that demand host country supervisors to monitor this development. Foreign bank entry also exposes local markets to competition among CEE (or even global) countries. External shocks may have an impact on the activities of foreign owned banks in the host market, e. g. through the reduction of foreign operations. The recent diversification of Spanish banks away from a previous concentration on Latin America by acquiring banks in Italy and the UK could be interpreted this way. Altogether, these issues point out that foreign owned banks may create an environment where the entire financial system is forced to become more efficient, with interest rate margins and thus lending rates under severe downward pressure. This is important for the investment climate, economic growth and development (Rossi, Schwaiger & Winkler 2004, 77).

2.2. Transmission Channel II: Intermediation / Credit Volume

Well-capitalized foreign owners my provide a higher volume of credit to the host countries' companies. In CEE and other emerging markets, bank lending is the most common method of external financing and thus important for investment activities. Credit to the private sector remains relatively low, although it is most important for investment activities. Wachtel (2003, 44) points out that "deeper financial intermediation may be a significant causal factor in economic growth". To put it differently, well-capitalized foreign owners providing a higher volume of credit to the host countries' companies might contribute to investment and thus growth. But Wachtel (2003, 44) argues that "one cannot infer that every expansion of intermediary activity will be beneficial". As foreign owned banks hold increasingly high shares in banking assets in emerging market economies, it is crucial to look at the role that foreign owned banks play in credit allocation.

De Haas & Van Lelyveld (2002) show that local credit by foreign owned banks to domestic credit as well as to GDP[2] rose in the 90ies, except for Slovenia. The Slovenian financial market was opened to foreign institutions in 1998. In contrast, Engerer & Schrooten (2004) find no empirical evidence for an impact of foreign bank entry on financial depth in terms of credit volume in eight CEE countries over 1995–2002. The impact of foreign bank entry on credit supply in general depends on the form of market entry. In the case of an acquisition, the existing client base is maintained, not necessarily changing the credit volume. Restructuring may shift the focus to different target groups and requires a cleaning of non-performing loans (Naaborg et al. 2003). If a new subsidiary is established, the number of financial intermediaries will increase. In both cases better risk assessment allows foreign owned banks to finance higher risk/return projects. They have the ability to provide fresh money to the

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[2]One has to consider that credit to GDP may be only a rough measure. Particularly in transition economies, "the small size of the private sector may have restricted its credit growth as a share of GDP" (Koivu 2004, 49) and may therefore distort the picture of credit growth.

financial host market because foreign owned banks are backed by their parent companies. These issues on foreign bank entry affect a foreign banks' behavior in the host market and lead to higher competition. The impact of foreign bank lending on capital accumulation— consequently on investment and economic development—depends on the lending practices to different target groups (the private and the public sector) and on their reaction in times of economic downturn.

2.2.1. Impact of Lending Practices on the Private and the Public Sector

Credit supply to different target groups has various impacts on economic development. Lending to the private sector is necessary to further support private investment, whereas providing finance to an efficient state and thus improve infrastructure efficiency can be a major way to reasonably foster economic growth during transition (Fink, Haiss & Vukšić 2004).

Concerning the private sector, Bol, De Haas & De Haan (2003, 15) argue that *foreign financial institutions are more involved in lending to the private sector* than domestic banks in CEE. The rising involvement of foreign banks in private sector credit may have a positive impact on investment activities. According to Papi & Revoltella (2003), foreign bank lending is mostly directed to subsidiaries of multinational corporations because the assessment of information coming from the local private sector is often too difficult due to missing transparency or even lack of information. Mehl & Winkler (2003, 17) find for South-Eastern Europe that foreign owned banks "cherry picked" the best borrowers, particularly those from their own country of origin. The economy will grow below potential if this is the case. But foreign banks can also be primarily involved in *retail banking*, such as most Austrian banks in CEE Breyer (2004) and contribute to extend credit to the private sector compared to domestic banks. They seem to have replaced domestic banks as creditors. Credit to the private sector is on the rise from a comparatively low level according to Naaborg et al. (2003).

Credit to the public sector exceeds credit to the private sector in foreign owned as well as domestic banks in CEE (Bonin et al. 2005). Fink et al. (2004) applied panel data and cross-section regressions on a sample of nine CEE and 18 developed countries (1996–2000). They found that *domestic credit*, which includes private credit as well as credit to central and local governments, *was more important for growth than private credit.* Koivu (2004) supports these results applying a fixed effects regression analysis on 25 transition countries. These results are different from most theoretical and empirical literature because the above mentioned estimations use data on domestic credit. The specific characteristics in the accession countries account for these results. The results suggest that credit to the public sector may be growth-enhancing as well, because foreign banks finance budget and current account deficits (Breyer 2004, 73). This creates a certain mutual dependency of the public and the financial sector. In turn, the interest of foreign banks in an efficient, sound, regulated, and stable financial sector is aroused in order to mitigate country risk and promote economic development.

The effects of foreign owned bank lending are unevenly distributed among firms showing differences in e. g. size. Foreign bank entry therefore affects lending to SMEs and overall industrial structures particularly in industries that are dependent on bank finance. Small

local businesses mostly rely on *relationship lending* (IADB 2005, 136)). In many developing and transition economies, banks are highly involved in relationship lending. In other words, companies owned by related individuals may receive funding even if they are operating inefficient whereas potentially highly profitable projects may face problems in search for funding. Foreign owned institutions often "do not serve" relationship lending. They stick to international standards and may thus enhance allocative efficiency, contribute to institution building over the long run and enhance overall stability as well as sustainable economic development.

Interestingly, Giannetti & Ongena (2005) found that *young enterprises* that were established after the early transition period profited more from foreign bank entry. They focused on lending practices of foreign owned banks in a sample of 14 CEE countries from 1993 to 2002. The results showed that firms established in early transition received less lending from foreign owned banks. According to them, this may suggest that foreign owned banks might be able to mitigate problems of related lending as these firms mostly had worse corporate governance, had less dispersed ownership and benefited from favors of politicians. In which way these firms nevertheless contribute to economic growth shall not be discussed, however, the implementation of sound and international standards is crucial for stable economic development. In contrast, Vanassche (2004) showed that financial integration positively affected the external financing situation of older and more mature firms. A possible explanation is that information for such firms is easier available than for new ventures. Developing and transition economies face large *information asymmetries*. Therefore, foreign owned banks have information disadvantages. The use of soft information in lending decisions requires a decentralized organization because it is difficult to pass soft information within a bank. Within foreign banks, decision making is often not that much decentralized because of a lack of local expertise or local personnel may be considered untrustworthy. Therefore, SMEs may profit to a lesser extent from financial integration than large and established companies. This does not necessarily imply a negative impact on SMEs. The application of international standards by foreign owned banks may enhance allocative efficiency, contribute to institution building over the long run and enhance overall stability as well as sustainable economic development, i. e. support SMEs investment environment positively.

These issues were acknowledged by international organizations as the EU. According to Bruckbauer & Gardó (2004, 37), the offering of *structural funds* by the EU to the CEE member states was seen as a potential tool for stepping up lending to SMEs as banks had an opportunity to co-finance loans from these funds. For example in the Czech Republic, banks provided information for SMEs on how to qualify for the structural funds and they conducted pre- and co-financing.

To sum up, foreign banks are more involved in lending to the private sector than domestic banks. Foreign lending stimulates firm growth in sales, assets, and leverage via investment activities (Giannetti & Ongena 2005). Countries experienced higher growth rates when they had higher investment to GDP ratios. Among other reasons, efficient or inefficient allocation of resources contributes to differences in growth (Wachtel 2001, 339).

2.2.2. Lending Practices, Financial Sector Stability and Economic Development

Growing credit supply is not enough to guarantee a positive impact on investment activities and thus economic development. *Fast credit growth can also be a warning signal* indicating a potential financial crisis (Mehl & Winkler 2003). A lending boom may for example reflect an accumulation of bad loans such as in the Czech Republic at the end of the 90ies when private sector credit to GDP attained relatively high levels. In addition, countries can experience high rates of savings and investment, but have poor economic growth such as in the case of the former Soviet Union. Saving rates as well as investment rates used to be high, but machinery and equipment were scarce. What was the reason? Capital was simply not allocated in an efficient way (Wachtel 2001, 338). These examples show that *the quality of lending as well as efficient credit allocation seem to be significantly more important for economic performance than mere lending volumes* (Giannetti & Ongena 2005). This calls once more for the evaluation of the efficiency channel rather than sticking only to the credit volume as the sole intermediator.

Empirical evidence on the possible stabilizing influence of foreign ownership is provided by Engerer & Schrooten (2004) who analyzed eight CEE countries from 1995 to 2002. Their results as well as evidence provided by the IADB (2005) emphasize several advantages of foreign owned banks in this regard. Foreign parent companies might act as a lender of last resort to their local units and related private institutions. Furthermore, foreign owned banks are less exposed to local default risk due to the higher degree of global (risk) diversification and their often long-term interest. Beyond it, they argue that less volatile deposits and higher loan quality of foreign owned banks compared to domestic banks add to it. Better disclosure, accounting, and reporting practices as well as stronger prudential supervision are crucial for positive impacts of foreign bank entry on lending practices and financial sector stability.

De Haas & Van Lelyveld (2002) argue that there is at least no evidence of a persistent decrease in foreign credit during adverse economic times. They outline that recessions and crisis may lead to a temporary decrease in cross-border credit, which is then offset by foreign subsidiaries' credit. In addition, the presence of foreign banks within borders may encourage domestic depositors to keep their money within the domestic financial system in times of economic or financial distress because foreign banks are often recognized as being healthier and more efficient than domestic ones in transition countries (Levine 1996, Goldberg 2004). From a macroeconomic point of view, this "flight to quality" may be better than capital flight out of the country.

There are arguments supporting *procyclical lending practices* of foreign subsidiaries (e. g. Goldberg 2004). Foreign owners may also have lower exit costs, depending on the organizational form of market entry. They may be more *sensitive to shocks* in the host country and cut back on local operations rapidly (IADB 2005, 134). If lending becomes overly procyclical due to foreign banks behavior, credit swings will affect financial sector stability strongly. Goldberg (2004) points out that foreign banks as procyclical lenders do not appear to magnify the boom-boost cycles in emerging markets. If foreign owned banks were inclined to contribute to the overall soundness of the local financial market, financial crisis risks would decline and greater stability may foster economic development.

2.3. Transmission Channel III: Corporate Governance & Institution Building

From the perspective of most CEE host countries, financial markets were opened to foreign investors with the aim of a fast *improvement in the quality of banking* and the whole financial system (De Haas & Van Lelyveld 2002). For example, with the establishment of a two-tier banking system in 1987, foreign banks were encouraged to enter the Hungarian market, anticipating that they could improve corporate governance in the financial sector and contribute to institution building.

2.3.1. Implications on Corporate Governance

Acquired banks are usually subject to strategic reorientation and receive a capital injection which allows for the upgrading of technologies, know-how, and operational practices. Credit policies are usually adapted to group-wide and thus international standards. This seems of particular importance as banks in CEE were burdened with large amounts of *bad loans*. The government cleaned the banks' loan portfolios before or during privatization to make them more attractive for potential investors.

Foreign owned banks are less involved in connected lending as they need to stick to *international standards* and comply with internal group-wide rules which contribute to a reduction in bad loans (Fink et al. 1998). Foreign ownership creates an incentive to encourage sound banking practices and a disincentive to damaging speculative short-term financial flows (Wachtel 2003). Better loan portfolio and risk management can contribute to financial stability which is important for economic development (King & Levine 1993). In order to finance public and private investment and expenditure, there is a need for a stable and efficient banking system (Uiboupin 2004, 11). The implementation of sound financial practices by foreign owned banks may contribute to sound and more stable financial systems. But what about spillovers to domestic banks?

FDI literature highlights the importance of *spillover effects* (Uiboupin 2004, 11). Nevertheless, know-how and technology transfer within the *same* branch is seen as a problem (Hunya 2002). It might be less problematic to transfer know-how to other industries which do not represent competitors of the (foreign) investor. Mutual gains for both industries are rather possible. In the case of the financial industry, the implementation of stricter credit requirements will create the need for companies seeking external finance to adapt to these standards – mostly international standards. To put it differently, resources might be allocated to more profitable businesses that themselves stick to international accounting standards, auditing practices, or sound corporate governance. This is valid for companies seeking external finance. But over the long run, all industries might be affected which contributes to stable economic development. Again, a certain initial level of social capabilities and absorptive capacity of domestic companies as well as infrastructure in support of an improvement in corporate standards is needed. In that case, a crowding-out effect of investment can be avoided. Of course, this is not only true for foreign owned banks, but also for domestic banks adapting their standards to international level in the process of restructuration. The particular role of the financial sector as an intermediator within an economy will encourage such spillovers.

2.3.2. Impact on Institution Building

Further spillovers on the infrastructure including regulation, legislation, or supervision are also possible (Bonin & Wachtel 2002). As foreign banks enter emerging markets, the introduction of new types of products or services is faster and innovation can even be accelerated via FSFDI (Wachtel 2001). This creates the need for supervisors to *adapt the legal environment* to these developments. If regulations for new services are not in place or are not accurately and fast enough adapted, abuse will occur, which will harm the financial sector and the whole economy (Bonin & Wachtel 2002). Foreign owned banks might even tend to introduce new products to evade existing legislation, particularly in the case of weak financial systems (Goldberg 2004, 14). Therefore, local supervisors have to upgrade their knowledge and further adapt regulations in order to secure financial sector stability. *Foreign owned banks* seeking to mitigate their own risk *act as a catalyst for regulatory changes and implementation of international standards* (BIS 2004, 14). In this way, foreign owned banks can contribute to institutional quality which is determined by the absence of corruption, red tape, or political violence (Faria & Mauro 2004, 3).

2.4. Transmission Channel IV: Signal Effects

Foreign owned banks may strive to gain higher market share through *product innovation* and by offering a variety of new financial services, such as asset management services. New market segments are being developed. Rising national income together with pension reforms may add to the demand for and implementation of tradeable securities as well for private investors (BIS 2004, 13). Product innovation and the *need of local risk-management* to hedge risks locally *foster capital market development.* In consequence, corporate investors may chose from a *greater range of finance possibilities* which may spur investment and economic growth. Additional non-financial portfolio investment as well as *non-financial FDI* might be drawn in, which in turn influences economic growth (Durham 2003, Reisen & Soto 2001). If investors that are regarded as rather cautious and risk averse (a usual perception of banks) enter and invest into a certain market, this initial move may pull in followers from other industries.

3. Stylized Facts

As Figure 3 shows, foreign penetration in the financial sector has particularly increased since 1999 and reached a level of more than EUR mn 25,000 or 6.8 % of GDP in 2003 in the respective countries under review[3]. Interestingly, the inward FSFDI stock as percentage of GDP reached 11.2 % in Estonia averaged from 1996 to 2003, which is an outlying case not only for this sample, but for entire CEE. Except for Estonia, Figure 4 shows that the average inward FSFDI stock to GDP ranges between 2.5 % and 5 % in CEE-10.

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[3]CEE-11: captures all new EU member states from CEE plus the three EU accession countries Bulgaria, Croatia, and Romania. CEE-10: captures for the inward FSFDI indicator all mentioned countries except Romania and for the financial M&A indicator all mentioned countries except Croatia.
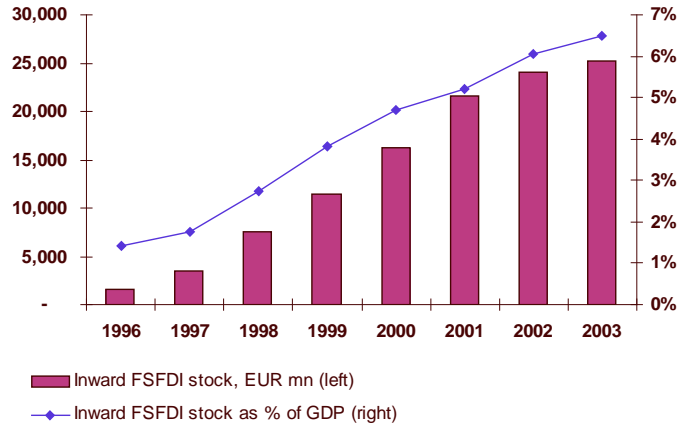
Figure 3: Steady Inflow of FSFDI to CEE-10, own calculations based on Hunya & Stankovsky (2005) and the AMECO database.
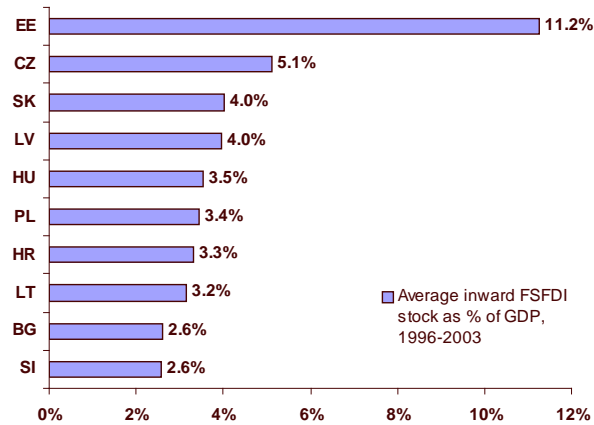
Figure 4: Average FSFDI Stock in CEE-10, 1996–2003; own calculations based on Hunya & Stankovsky (2005) and the AMECO database.

Figure 5 demonstrates that the financial sector accounts for a quite high share in total FDI. In 2002 the share of FSFDI in total FDI ranged between 9 % in Hungary and 28 % in Estonia. The overall respective average for CEE-10 increased from 17 % in 2001 to 19 % in 2002. Thus, the "importance" of FSFDI is increasing.

In this context, the question arises whether one can observe already from descriptive data that FSFDI and economic growth are connected. Figures 6 and 7 show simple scatter plots and suggest a slight, but positive link between economic growth and FSFDI. Differences in development among CEE countries are reflected in the broad dispersion of FSFDI inflows. Particular outliers are Croatia and Latvia, showing a rather high (low) growth in FSFDI, but at the same time a low (high) growth rate of real GDP per worker averaged over 1996 to 2003. Figure 7 indicates that FSFDI might not only be related positively to GDP *on average*, but also concerning annual observations. The latter impact will be tested in the

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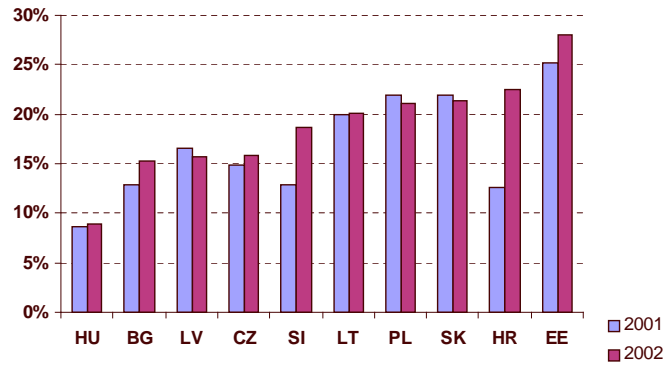
Figure 5: Share of FSFDI in Total FDI (Inward Stocks in mn EUR), 2001 and 2002; own calculations based on Hunya & Stankovsky (2005).

panel data framework. Again, the relatively high dispersion of the data is emphasized by this graph.
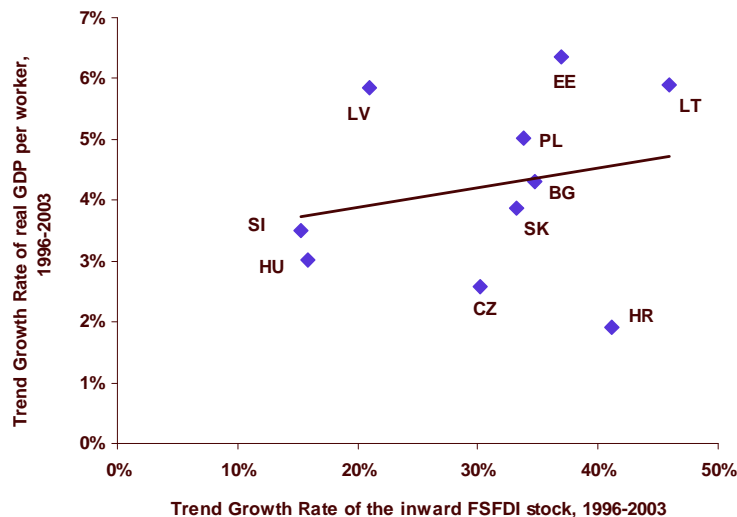
Figure 6: Economic Growth vs. Growth of FSFDI in CEE-10, averages 1996–2003; own calculations based on Hunya & Stankovsky (2005) and the AMECO database.

Table 1 as well as Figures 8 and 9 present the second indicator for FSFDI used in this analysis: completed cross border mergers and acquisitions (M&A) in the financial sector. In absolute terms, Poland has accumulated most of cross border financial M&A from 1994 to 2002, namely EUR mn 8,298. The Czech Republic (5,332 mn), Slovakia (1,219 mn), and Hungary (1,152 mn) follow. This ranking changes notably when we express the cross border financial M&A as percentage of GDP, averaged over 1994–2002. The Czech Republic has been able to attract on average the highest share of financial M&A in terms of national economic power (96.3 %). Estonia, Bulgaria, Slovakia, and Poland follow with a considerable high share of over 50 %. As a latecomer to bank privatization, Romania turns out to be

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Figure 7: Economic Growth vs. Growth of FSFDI in CEE-10, annual observations 1997–2003; own calculations based on Hunya & Stankovsky (2005) and the AMECO database.

the country with the lowest respective share: the average accumulation of financial cross border M&A amounts to only 19 % of GDP during the 1994–2002 period. Figure 8 shows that financial M&A has increased remarkably since 1999. Banks account for 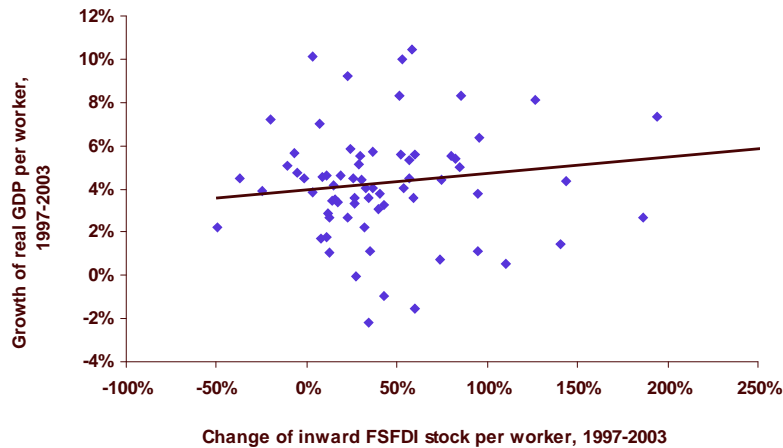the largest share in financial M&A. Recent trends show a decline in financial M&A activities because privatization is ending in most CEE countries. According to Breyer (2004), the share of total bank assets controlled by foreign owners accounted for about 70 % in CEE in 2004. Figure 9 indicates a high dispersion of M&A values over the panel observations. In the CEECs, financial sector M&A volumes vary considerably over time and across countries (for 2001 and 2002 see Table 1), leading – at first glance – only to a ambiguous connection with economic growth. We take this as an indication for the need to include country fixed effects in the interpretation. Such effects include the timing of banking crises (e. g. Croatia 1998/1999) and following waves of privatization. In Poland, frequent political changes (new governments about every year) led to a a stop-and-go pattern in bank privatization.

Our novel descriptive data show that FSFDI has a quite high importance for CEE-11, considering its high share in total FDI. Temporary effects due to changes of FSFDI on growth of real GDP per worker seem to occur, albeit countries are dispersed to a considerable extent. While Figure 10 shows that the change of *total* FDI and economic growth are interrelated negatively (supporting the findings of Mencinger (2003)), Figure 11 shows that it is promising to test for a potential hump-shaped relationship between (FS)FDI and economic growth. The subsequent estimations will render these first stylized facts in a more convincing manner.

Next we attempt to shed light on the evidence of the identified transmission channels as presented in Section 2 and, thus, guide the subsequent modeling and estimation approach. The reasoning in setting up the efficiency channel suggests a decreasing interest spread as response to the entry of foreign banks. This suggestion can be confirmed by the inspection of Figure 12. The average interest spread had been decreasing from 1994 (13.7 %) to 2003 (5.4 %). At the same time – and probably also induced by the decreasing interest spreads –

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Table 1: Completed Financial Cross Border M&A in CEE-10, 1994–2002 (own calculations based on the ECB Baudino et al. (2004) and the AMECO database).

	financial cross border M&A (% GDP) 2001	financial cross border M&A (% GDP) 2002	average financial cross border M&A (% GDP) per year 1994–2002	accumulated financial cross border M&A (mn EUR) 1994–2002
Czech Republic	184.6 %	194.0 %	96.3 %	5332
Estonia	0.0 %	0.0 %	78.8 %	350
Bulgaria	0.0 %	51.7 %	69.5 %	830
Slovakia	477.9 %	6.4 %	60.3 %	1219
Poland	74.6 %	15.1 %	58.4 %	8298
Slovenia	65.5 %	278.8 %	39.3 %	807
Lithuania	66.6 %	16.0 %	35.4 %	379
Latvia	38.0 %	0.0 %	34.3 %	196
Hungary	18.1 %	4.4 %	30.3 %	1152
Romania	6.3 %	0.7 %	19.0 %	628
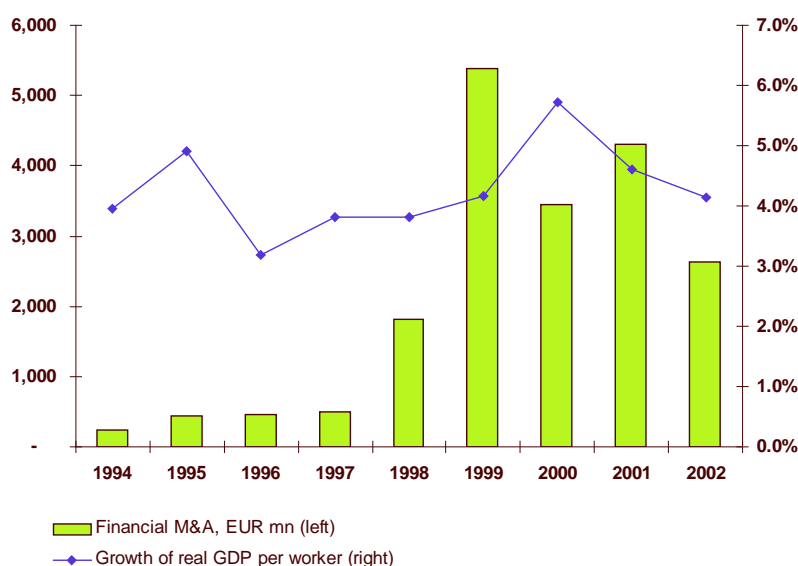
Figure 8: Economic Growth and Financial M&A in CEE-10, 1994–2002; own calculations based on the ECB Baudino et al. (2004) and the AMECO database.

the volume of private credits had been increasing. In general, interest rate margins in CEE were and still are higher compared to EU-15 financial markets. The reduction in interest rate margins had been faster in the first period of transition (Drakos 2003).

The last figures of this section account for the *credit volume channel* and underpin the role of *bad loans*, of portfolio cleaning and the better position of foreign banks to withstand connected lending discussed earlier. While total domestic credit in the CEECs relative to
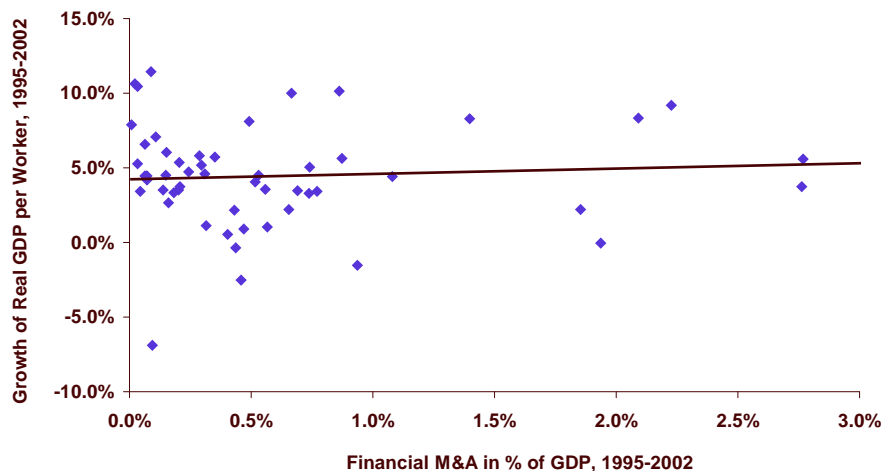
Figure 9: Economic Growth vs. Financial M&A (%GDP) in CEE-10; annual observations 1995–2002, own calculations based on the ECB Baudino et al. (2004) and the AMECO database.
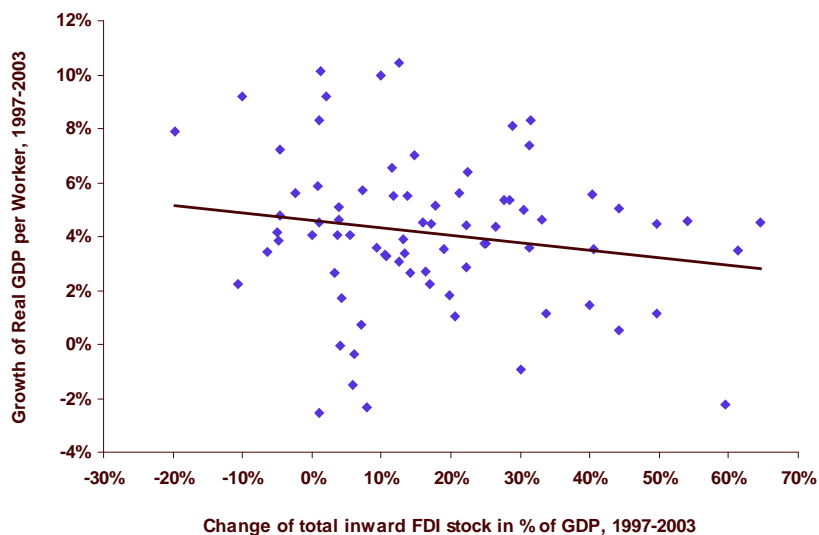
Figure 10: Negative Connection of Economic Growth and the *Change* of FDI in CEE-11; own calculations based on Hunya & Stankovsky (2005) and the AMECO database.

GDP is much lower compared to the Euro area (Breuss, Fink & Haiss 2004), credit to the public sector still plays a comparatively important role in CEE emerging markets as indicated by Figure 13. In CEE-11, public credit accounts for a large share of total credit (exceptionally high in the Czech Republic), whereas in the Euro area, private credit is about three times as high as credit to the public sector (Naaborg et al. 2003). There exist noteworthy differences between the various CEECs. In the Czech Republic, Slovakia and Estonia the volume of private sector credit to GDP ranged between 40 and 53 % whereas in Lithuania, Bulgaria and Romania the private credit ratio to GDP was less than 16 %.
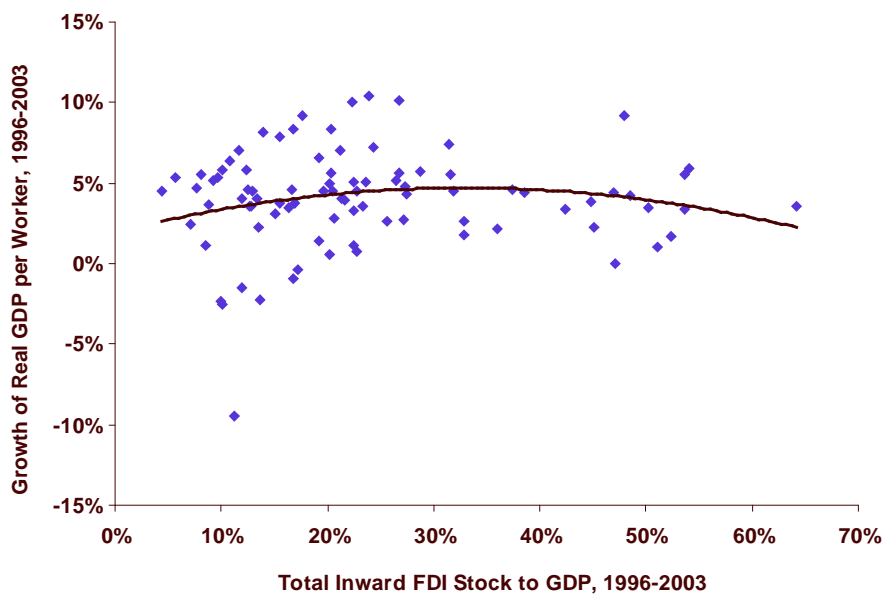
Figure 11: Hump-Shaped Relationship between Economic Growth and Total FDI in CEE-11; own calculations based on Hunya & Stankovsky (2005) and the AMECO database.
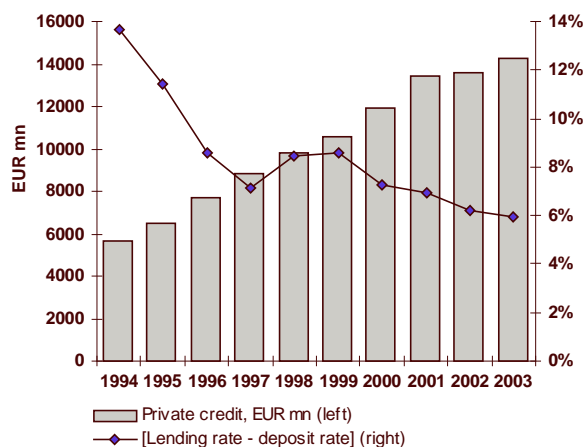
Figure 12: Average Private Credit (EUR mn) and Interest Spread in CEE-11, 1994–2003; own calculations based on EBRD (2004).

Credit to the private sector has expanded since the beginning of the 90ies – in volume as well as in relative terms. But, although private credit grew in absolute figures, particularly in Romania and Lithuania private credit to GDP remained at a relatively low level. As Figure 14 shows, private credit to GDP stagnated between 6-9 % in Romania which might be the consequence of the late privatisation there.

In Poland, private credit growth remained subdued in 2002/2003 as well as in the first half of 2004. It evened out at a level of about 30 %. The recession in 2001/2002 led to a
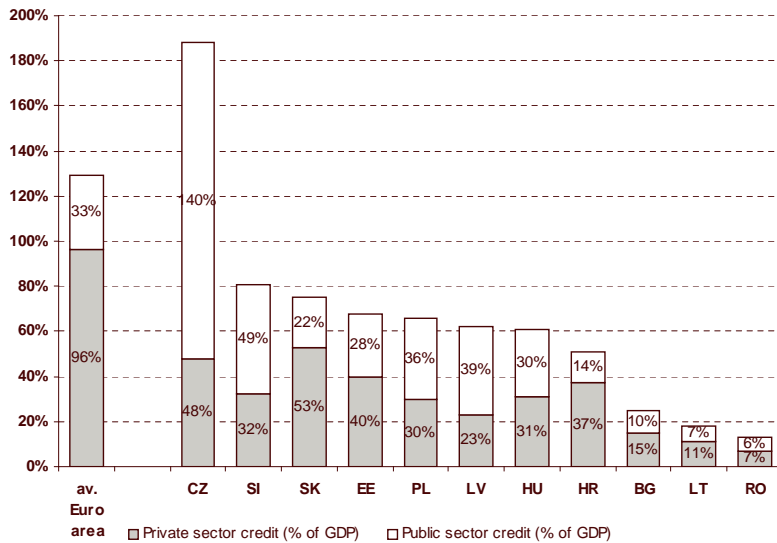
Figure 13: Bank Claims on the Public and the Private Sector as percentage of GDP in CEE-11 and the Euro Area in 2000; own calculations based on Naaborg et al. (2003, 8).
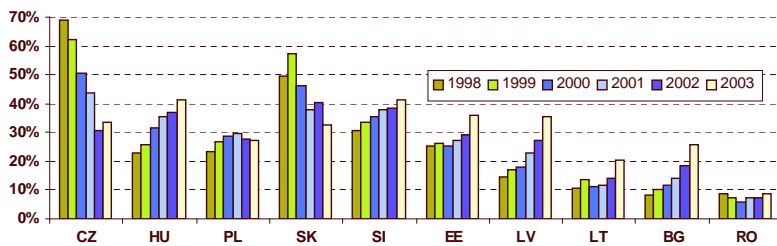
Figure 14: Private Credit to GDP in CEE-10, 1998–2003; own calculations based on IFS (International Financial Statistics).

slump in demand for loans and at the same time to an increasing amount of bad loans. In addition, changing criteria for classifying loan-quality contributed to statistical reduction in private credit. An increasing amount in bad-loans was another consequence (see Table 2).

The decline in private credit in the Czech Republic from 1994 on does not necessarily indicate a decline in credit to the private sector. It rather reflects the clearing of risky credit-portfolios. As a consequence of stricter credit requirements, bad loans were transferred from commercial banks to state-owned consolidation banks (Reininger, Schardax & Summer 2002). The same development took place in Slovakia. In general, poor conditions in the banking sector as well as legal enforcement problems, e. g., of creditor rights may have led to a stagnation in private credit (Naaborg et al. 2003). In contrast, Hungary showed constant growth in private credit from 1998 on and reached a level of 41 % of GDP in 2003.

Banks suffered and still suffer from relatively low loan portfolio quality due to high amounts of bad loans in all CEE countries. Bad loans, as shown in Table 2 include sub-standard, doubtful, and loss classification categories for loans, but exclude loans transferred

Table 2: Bad Loans as percentage of Total Loans in CEE-11, 1998–2003 (own calculations based on EBRD (2004)).

	CZ	HU	PL	SK	SI	EE	LV	LT	BG	RO	HR
1998	22.7 %	7.9 %	11.8 %	44.3 %	9.5 %	4.0 %	6.8 %	12.5 %	11.8 %	58.5 %	12.6 %
1999	24.5 %	4.4 %	14.9 %	32.9 %	9.3 %	2.9 %	6.8 %	11.9 %	17.5 %	35.4 %	20.6 %
2000	20.4 %	3.1 %	16.8 %	26.2 %	9.3 %	1.3 %	5.0 %	10.8 %	10.9 %	3.8 %	19.8 %
2001	14.1 %	3.0 %	20.5 %	24.3 %	10.0 %	1.2 %	3.1 %	7.4 %	7.9 %	3.4 %	15.0 %
2002	8.5 %	4.9 %	24.7 %	11.2 %	10.0 %	0.8 %	2.1 %	5.8 %	10.4 %	2.3 %	11.6 %
2003	5.0 %	3.8 %	25.1 %	9.1 %	9.4 %	0.5 %	1.5 %	2.6 %	4.4 %	1.6 %	9.4 %

to a state rehabilitation agency or consolidation bank. The reduction in bad loans has particularly started since the mid 90ies in most CEE countries.

Most likely because of the recession in 2001/2002, Poland has again experienced an increase in bad loans since 1999 and had by far the largest amount of bad loans to total loans (25.1 % in 2003). In Slovenia, bad loans remained stable at a 10 % level of total loans in the post-1998 period. In contrast, Hungary has experienced a decline in bad loans since 1993. The lowest share of bad loans in total loans was reached by Estonia (0.5 % in 2003). While concentrating on the efficiency channel in the following, we will keep the relationship between average loan quality and the FSFDI-driven rising foreign share in lending in mind.

4. Analytical Framework

4.1. Informal Growth Regressions Framework

Choosing a theoretical reference model for the empirical analysis of the impact of FDI on economic growth, most authors stick to a MRW-type model (Mankiw, Romer & Weil 1992) and introduce FDI as additional explanatory variable (see, e. g., Campos & Kinoshita 2002, Mencinger 2003, Neuhaus 2005). This kind of regression is usually characterized by the inclusion of initial income (in order to test conditional convergence), the investment ratio, and measures for human capital (see Temple 1999, 123). In addition, several variables of interest – typically variables concerning political (in)stability, inflation, or the extent of public sector impact – are built into the regression. Thus, this type of regression is driven in its specification mainly by previous results in the literature. Since there is a lack of explicit theoretical derivation of the impact of FDI, this approach can be classified as an *"ad-hoc growth regression"* in the tradition of Barro (1991).

Strictly speaking, this "crude" extension of MRW is confronted with remarkable problems related to measurement and estimation. "Although simple aggregate models are always dubious, some important insights are neglected in the absence of a formal theoretical derivation" (Temple 1999, 124). This insight is of particular importance when taking into account that the variable of interest (FSFDI) could be correlated with initial efficiency (A). A is an unobserved variable in the MRW-framework and, thus, has to be omitted. Our arguments raised in Subsection 2.1 support the probability that FSFDI is really correlated with A. As

a consequence, its parameter estimates would be biased due to the omitted variable problem (see Durlauf, Johnson & Temple 2004).

4.2. Cross-Country Growth Accounting

In respect of the deficiencies of the informal growth regression approach, we apply the concept of cross-country growth accounting, or growth accounting with externalities, respectively, following in particular Temple (1999, 124 f.) and Badinger (2003, 180 ff.). Cross-country growth accounting enables the examination of the relative contributions of growth in inputs and growth in efficiency or technical progress, respectively. The change of output is directly regressed on the changes in factor inputs. Let us start with the following (augmented) standard neoclassical production function with constant returns to scale (perfect competition is assumed):

$$Y = AK^\alpha H^\beta L^{1-\alpha-\beta}, \tag{4.1}$$

where Y is the output (GDP), A is technical progress or overall efficiency, respectively, K is the physical capital, H is the human capital and L is the used labor force. Considering the constant returns to scale, the intensive form of equation (4.1) can be written as follows:

$$y = Ak^\alpha h^\beta, \tag{4.2}$$

where y is the output-labor ratio (Y/L), k is the physical capital-labor ratio (K/L) and h is the human capital-labor (H/L) ratio. Expanding this equation to the cross-section and time dimension and taking logarithms of both sides and time derivatives we get following cross-country growth accounting equation:

$$\Delta \ln y_{it} = \Delta \ln A_{it} + \alpha \Delta \ln k_{it} + \beta \Delta \ln h_{it}, \tag{4.3}$$

where $i = 1, \ldots, N$ (country index), $t = 1, \ldots, T$ (time index). The differenced logarithmic series represents the growth rate in continuous time ($\Delta \ln y_{it} = \frac{\partial \ln y_{it}}{\partial t} = \frac{\partial y_{it}/\partial t}{y_{it}} = \frac{\dot{y}_{it}}{y_{it}}$). This step provides direct estimates of factor shares and there is no term in initial efficiency, which would be difficult to approximate. This notation allows additionally for the estimation of the physical capital elasticity (α) and human capital elasticity (β) of the output. In traditional single country growth accounting these elasticities are usually imposed (see Temple 1999, 124).

How can FSFDI be included into (4.3)? It is a crucial issue to identify the appropriate input factor through which FSFDI may affect the output. The few theoretical approaches modeling explicitly economic growth in dependency of FDI detect three possible ways of influence (see Borensztein et al. 1998, Ruschinski & Sturm 2004). Firstly, FDI is seen as an inflow of foreign capital affecting the domestic physical capital stock k (either positively via greenfield investments, or also negatively via crowding-out of domestic investment). Secondly, FDI influences economic growth via knowledge-spillovers which contribute to the development of local human capital h. Thirdly, FDI spurs economic growth through its positive effects on overall efficiency A. One can expect that FSFDI works mainly through the A-channel, since greenfield (de novo) investments play a minor role compared to privatization-related M&A

(brownfield investment) in the financial sector (Baudino et al. 2004, CGFS 2005, Hainz & Clayes 2005). We are going to follow primarily this line in modeling the impact of FSFDI. Nevertheless, the econometric estimations try to consider also the two other effects – inspired primarily by the findings of Borensztein et al. (1998).

Let us assume, that the change in overall efficiency is determined, ceteris paribus, by an exogenous component (γ_{A0}) and the change in the degree of FSFDI (FSFDI-induced efficiency). Analogous to Badinger (2003, 181), we can specify the subsequent relationship:

$$\Delta \ln A_{it} = \gamma_{A0} + \gamma_{A1}\Delta FSFDI_{it} \tag{4.4a}$$

$$\Delta \ln A_{it} = \gamma_{A0}^{p} + \gamma_{A1}^{p} FSFDI_{it}. \tag{4.4b}$$

Equation (4.4a) represents temporary efficiency-led growth effects induced by the change of FSFDI. Since the change of FSFDI affects also its level we can test the hypothesis that there are even permanent effects on the efficiency growth rate triggered by the change in the respective level of FSFDI. Thus, substituting (4.4a) and (4.4b) into (4.3) we can distinguish two central models, which form the base for the empirical estimations in Section 6:

$$\Delta \ln y_{it} = \gamma_{A0} + \gamma_{A1}\Delta FSFDI_{it} + \alpha\Delta \ln k_{it} + \beta\Delta \ln h_{it} \tag{4.5a}$$

$$\Delta \ln y_{it} = \gamma_{A0}^{p} + \gamma_{A1}^{p} FSFDI_{it} + \alpha\Delta \ln k_{it} + \beta\Delta \ln h_{it}. \tag{4.5b}$$

Equation (4.5a) represents the *temporary FSFDI-induced efficiency-led growth hypothesis* and equation (4.5b) represents the *permanent FSFDI-induced efficiency-led growth hypothesis*.

Before applying this analytical framework on the central question of research, we have to bear in mind potential shortcomings of this approach. Firstly, we require information on the stocks of physical and human capital. Because of relatively short time series for investment series, the approximation of the initial values – we are going to start with 1994 – will be a crucial issue when constructing the data set for the examined CEE countries. Secondly, while the efficiency channel through which FSFDI affects economic growth can be specified in this way, other channels as elaborated in Haiss et al. (2005) need to be investigated. Further work on the theoretical front is obviously warranted.

Additionally, the application of the finance-growth-nexus to the transition economies warrants some caution. Due to rather short time series available and difficulties to model the evolution of output in transition economies, findings on transition economies should be treated as rather preliminary (Mehl & Winkler 2003). The possible impact of inflation (see Khan & Senhadji 2000, Rousseau & Wachtel 2002, Valdovinos 2003)), of bad loans and the possible association of fast credit growth with financial distress (see Cottarelli, Dell' Ariccia & Vladkova-Hollar 2005, Kraft & Jankov 2005) are worth mentioning in this context.

5. Empirical Methodology

5.1. Panel Data Regressions

This subsection discusses the econometric particularities of panel data regressions for estimating the impact of FSFDI on economic growth. We will finally show that a variable-intercept

panel data model with country- and time-fixed effects is the most appropriate one for our question of research.

5.1.1. Why Panel Data Regressions?

One of the most important strengths of the panel data approach (PDA) is the *combination of both the time dimension and the cross-section dimension.* This combination leads to more observations, "increasing the degrees of freedom and reducing the collinearity among explanatory variables – hence improving the efficiency of econometric estimates" (Hsiao 2003, 3). Using only time-series models, conversely, would imply to include long lags in order to prevent short-run fluctuations to drive apparent long-run correlations. This, in turn, would lead to fewer observations since the cross-section variation is for the most part ignored (see Temple 1999, 133). Thus, *long-run growth effects* can be addressed with a higher degree of confidence using panel data regressions. But we have to consider that panel data regressions based on annual frequency data, without controlling for time-specific effects, are often determined by short-run movements or by business cycle fluctuations (see Eller 2004). As a consequence, it is broadly acknowledged to construct perennial averages or to use annual data with time-specific dummies in order to capture the likelihood of short-run effects (see Davoodi & Zou 1998).

Furthermore, the PDA enables to *control for omitted variables* that are persistent over time. "By utilizing information on both the inter-temporal dynamics and the individuality of the entities being investigated, one is able to control in a more natural way for the effects of missing or unobserved variables" (Hsiao 2003, 5). Unobservable differences that are systematically related across countries and are fairly constant over time – think about the characteristics of FSFDI – can be considered within the PDA by the implementation of *country-specific effects.* The inclusion of these effects is not only an optional tool in order to get more information about individual- or time-specific characteristics of the examined countries, it is also an econometric necessity in order to inhibit correlation between the regressors purely because of contemporaneous time or country shocks. Ignoring these effects can lead to parameter heterogeneity in the model specification, what, in turn, "could lead to inconsistent or meaningless estimates of interesting parameters" (Hsiao 2003, 8).

5.1.2. Dynamic or Static Panel?

The inclusion of lagged dependent variables as regressors helps to control for omitted variable bias. The ability to lag explanatory variables may also help to control for endogeneity bias. Along these lines, a dynamic specification of the model can be used to test for Granger causality or joint determination of the variables (see Nair-Reichert & Weinhold 2001, Hansen & Rand 2004). Although we recognize these advantages of a dynamic panel model, in this version of the paper we would like to stick strictly to the theoretical model, which does not explicitly call for an inclusion of a lagged dependent variable. In a future step, when we are going to employ Granger causalities, we will impose the inclusion of the lagged dependent variable. In this paper we specify the empirical panel data model in a static way. The impact of lagged values of FSFDI can still be tested.

5.1.3. Homogeneous or Heterogeneous Coefficients?

Since we are primarily interested in testing whether the behavioral relationship predicting economic growth is the same *across* the 11 CEE countries and *over* the 10 years period, the slope coefficients of the prediction equation are assumed to not vary neither from one country to the other nor from one year to the other (see also Baltagi 2001, 47). Assuming that the slope coefficients are independently distributed, their values can be restricted to be constant across countries within a given year (for a similar reasoning see Bottasso & Sembenelli 2001, 173). In this manner, one can still exploit the main advantage of the PDA, namely high degree of freedoms. Beyond it, we can capture differences across the countries in differences in the constant term. While the slope coefficients are assumed to be constant, the intercept is assumed to vary over the cross-section units and absorbs in this way country-specific, unobservable particularities. These assumptions lead us to the application of the *variable-intercept model* (see Hsiao 2003).

Analysis-of-covariance tests help to identify the source of sample variation and to detect the homogeneity of slope and intercept coefficients among different cross-sectional units at different times (see Hsiao 2003, 14 ff.). Accordingly, our estimations of the variable-intercept model are encompassed by covariance tests for intercept homogeneity across cross-sectional units. The null hypothesis of homogeneous (common) coefficients across the countries is tested against the alternative hypothesis of a heterogeneous (country-specific) intercept conducting simple F-tests with and without restrictions. A significant F-value indicates country-specific intercepts.

5.1.4. Fixed or Random Effects?

Once detected country-specific intercepts in the sample, one has to decide whether to treat them as fixed constants over time (fixed effects) or as random variables (random effects). A respective assessment is necessary.

One can think about the possibility that FSFDI attempts may induce international external effects. They are difficult to measure, remain persistent over time and vary across countries. Country-specific effects within the fixed-effect approach can take such externalities into account. In the variable-intercept model with fixed effects omitted individual-specific variables are treated as fixed constants over time.

Another argument supports the fixed-effect approach: this examination focuses differences between specific CEE countries. The situation is not that each country is randomly sampled from a pool of worldwide countries. The sole interest lies in the mentioned CEE countries and therefore a panel with random effects does not seem to be appropriate. Against this background, we have finally given exclusive priority to the fixed-effects estimation procedure.

6. Estimation

6.1. Empirical Specification and Estimation Procedure

6.1.1. Specification

With respect to the previously discussed methodological requirements, the following *static variable-intercept panel data model with country-fixed and time-fixed effects* forms the starting point for the empirical estimations (see Hsiao 2003):

$$y_{i,t} = \alpha_i^* + \beta' \mathbf{x}_{i,t} + \lambda_t + u_{i,t}, \tag{6.1}$$

where $i = 1, \ldots, N$ (cross-section units), $t = 1, \ldots, T$ (time index), $y_{i,t}$ is the dependent variable (economic growth), β' is a $1 \times K$ vector of constants representing the slope coefficients of the explanatory variables, $\mathbf{x}_{i,t}$ is a $K \times 1$ vector of explanatory variables (growth or level of FSFDI, growth of physical and human capital stock per worker, growth of government consumption to GDP as control variable), α_i^* is a 1×1 scalar representing the unobserved individual-specific effects, and $u_{i,t}$ is the error term representing the effects of those unobserved variables that vary over i and t; it is assumed to be an independently identically distributed random variable with mean zero and variance σ_u^2 ($u_{it} \sim IID(0, \sigma_u^2)$)[4]. Additional $T - 1$ dummy variables λ_t are included, whereby one of the time effects must be dropped to avoid perfect collinearity (see Greene 2000, 564).

As long as the slope coefficients remain homogeneous and the intercept remains heterogeneous over the cross-section units, the subsequent estimations, conducted in EViews 5.0, follow equation (6.1).

6.1.2. Procedure

The equations of the previous section are estimated in the following way: we start from a panel data model where all the variables (inclusive intercept) are homogeneous across the countries and over time. In a first step, *F-tests for the heterogeneity of the intercept* are run. We follow the procedure presented in Section 5.1.3 and in the case of significant country-specific effects, they are treated as fixed ones (remind the reasoning in Section 5.1.4). Time-fixed effects are included per assumption in each equation because of the likelihood of short-run business cycle fluctuations (remember the discussion in Section 5.1).

In a second step, the country-specific residuals of the model (at this point a variable-intercept panel model, given the significant heterogeneous intercept) are examined. Considerable differences in all the standard deviations of the country-specific residuals indicate *group-specific heteroskedasticity*. Since heteroskedasticity leads to biased standard errors, we use White heteroskedasticity-robust standard errors and covariance to allow for reliable significance interpretations.

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[4]Given these properties of the noise term, the ordinary least squares (OLS) estimator is the best linear unbiased estimator (BLUE). Since the observed values for α_i^* take the form of dummy variables, this OLS estimator is called the least square dummy variable (LSDV) estimator.

Finally, all the estimations are accompanied by several *sensitivity checks*. The robustness of the estimation results depends on the inclusion of additional variables identified by past studies as potentially important explanatory variables for growth (see Levine & Renelt 1992, Sala-i-Martin 1997). Therefore, we are going to check whether the base regressors remain significant and of the theoretically predicted sign when specific *control variables* are added. Among others, it is important to control for fluctuations in the size of the public sector (see Eller 2004). The ratio of real government consumption to real GDP, both measured in domestic market prices, covers the impact of the public sector on the real economy. Wages and salaries are a large component of government consumption, which has been shown to be unambiguously associated with lower growth (see Barro & Sala-i-Martin 1995). In a future version of this paper, we attempt to control also for inflation effects. The inclusion of inflation as conditioning variable may be of special relevance during the early stages of economic transition, which are usually characterized by high inflation (Rousseau & Wachtel 2002). Mamatzakis, Staikouras & Koutsomanoli-Fillipaki (2005) and Cottarelli et al. (2005) thus control for the inflation rate in their investigation of banking concentration and financial deepening in transition economies (for a similar argument see also Fink, Haiss & Ugljesic 2005).

In addition, overall pure cross-section regressions are run. Outliers are separated from the model. The various indicators for FSFDI shown in Section 3 are tested and last, but not least, the time span is varied.

6.2. Estimation Results

The estimation output is summarized in the Output Tables 1–2 (see Appendix B). Using the inward FSFDI stock per employee or per GDP, respectively (Output Table 1), or using cross border financial M&A as indicator for FSFDI (Output Table 2) yields more or less the same results. The standard growth regression variables behave as expected: the change of physical capital stock per employee is related positively and highly significant to economic growth. The change of human capital per employee shows in all but one specification the expected positive sign, albeit not significant. As expected, government consumption to GDP is related negatively to economic growth, confirming the negative impact of the size of the public sector on economic growth.

However, the temporary and permanent FSFDI-induced efficiency-led growth hypotheses cannot be confirmed by *direct* estimates of the two FSFDI indicators. Although FSFDI shows the expected positive impact on economic growth, the coefficient is not statistically significant. Accordingly, more careful handling of the variables is necessary.

The theoretical pros and cons of FSFDI for the host economy (see Section 2) suggest that there are limits for economic gains from FSFDI. Thus, the optimal degree of FSFDI lies somewhere in between an extremely high and an extremely low one. One can think about a *hump-shaped relationship* between economic growth and FSFDI, which is in part also suggested by the stylized facts presented in Section 3. In adapting the Stiglitz & Weiss (1981) argument that foreign banks buy entry by accepting worse lending risks, one could argue that foreign banks do so once competitive rivalry driven by rising FSFDI surpasses a

certain threshold. With lags this may be detrimental to GDP growth. As a consequence, we constructed a transformed index of FSFDI per GDP representing a hump-shaped impact of FSFDI on economic growth (for details see the data appendix). This index is related positively to economic growth with a lag of two periods (see regressions 4.5ad, 4.5bc, and 4.5be). While it is highly significant for the estimation employing the financial M&A indicator, it is not significant for the estimations with the inward FSFDI stock indicator (although it shows a higher t-statistic than the direct estimates for this indicator). Further analysis should strengthen this estimation approach in order to detect potential non-linearities between (FS)FDI and growth [5].

Borensztein et al. (1998) detected a positive and significant interaction between the stock of human capital and FDI. They interpret this finding with the observation that "the flow of advanced technology brought along by FDI can increase the growth rate of the host economy only by interacting with that country's absorptive capability". Following this line of research, we implement as a second improvement *interaction terms* between the stock of FSFDI and the stock of human and physical capital.

We enclose the products of FSFDI and human and physical capital simultaneously in three different regressions. While the interaction of the FSFDI stock with the index of employees' education has a positive impact on economic growth, the interaction of the FSFDI stock with the stock of physical capital is associated negatively to growth. Both effects together can explain the insignificant impact of FSFDI in the other equations. The specification in regressions 4.5bb and 4.5bd (financial M&A per employee or to GDP, respectively) replaces the FSFDI variable by the mentioned interaction terms and yields coefficients that are highly statistically significant. The high significance of the interaction terms may be the effect of the omission of other relevant factors, in particular, the FSFDI variable by itself. Therefore we include FSFDI, human capital, and physical capital individually alongside their product in regression 4.5ab (change of inward FSFDI stock per employee). In that way, we can test jointly whether these variables affect growth by themselves or through the interaction term (see Borensztein et al. 1998). Compared to other equations of Table 1 with the same amount of total observations, this regression delivers the highest adjusted R^2. The two interaction terms do not change their sign and are still significant, albeit only at the 10 % level. FSFDI by itself enters the equation positively but is still not statistically significant.

Let us try to interpret these findings more accurately. Firstly – considering the positive human capital-related interaction term – we can detect *complementary effects between FSFDI and human capital on economic growth. FSFDI seems to spur economic growth depending on a higher human capital stock* which is in line with the finding by Borensztein et al. (1998) that the contribution of FDI to growth holds only when the host country has a minimum stock of human capital. Knowledge-spillovers to domestic banks associated with the inflow of FSFDI can be an explanation for this phenomenon. These spillovers can take place if

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[5]For alternative possibilities to estimate a hump-shaped relationship see Crespo-Cuaresma & Silgoner (2004), who detected a non-linear relationship between inflation and growth in Europe and try to estimate in particular the thresholds where the inflation rate is correlated negatively or positively, respectively, with economic growth.

domestic banks are able to cope with the increasing competition induced by foreign owners. However, strong evidence on such spillovers has not been found yet (UNECE 2001, 209). Furthermore, foreign banks seeking to mitigate their own risk might act as a catalyst for regulatory changes and implementation of international corporate standards. Consequently, improvements in accounting standards and auditing practices have to follow (BIS 2004, 13). Such implemented higher standards create the need for adoptions and further human capital formation of employees in all industries and companies, not only those seeking for external bank finance. In this context, the particular role of the financial industry within an economy needs to be considered.

Secondly – considering the negative physical capital-related interaction term – *substitutive effects between FSFDI and domestic physical capital on economic growth* are indicated. De Mello (1999) similarly finds that FDI among OECD economies is growth-enhancing only for countries in which domestic and foreign capital are complements. On the one hand, FSFDI may have a weaker impact on economic growth in the case of a higher physical capital stock. On the other hand, the physical capital stock may have a weaker impact on economic growth in the case of a higher FSFDI stock. The latter effect can be interpreted by the crowding-out of local physical capital caused by the entry of a foreign bank. Schumpeterian effects of creative destruction seem to be at work. The first effect, however, which is probably the stronger one, cannot be interpreted that straightforward. Analogously to Carkovic & Levine (2002) and Campos & Kinoshita (2002), we could argue that FSFDI is only growth-enhancing in countries with low physical capital stocks. In any case, respective analysis deserves more attention. In general, the mode of entry (greenfield vs. M&A), the kind of business and operation of foreign owners and their target groups (retail vs. wholesale) has to be considered with regard to the impact on local physical capital formation.

As mentioned before, the panel data estimations have also been encompassed by *overall cross-section regressions*. The positive impact of FSFDI on economic growth as suggested by Figure 6 can be broadly confirmed by the cross-section results, where the trend growth rate of FSFDI per employee between 1996 and 2003 is related positively and highly significant to economic growth. Nevertheless, the small sample of 11 CEE countries could lead to small sample biases and therefore these results have to be interpreted with caution.

Finally, first attempts have been initiated to address potential endogeneity and simultaneity problems in the estimation equations. Preliminary general method of moments (GMM) estimations with instrumental variable techniques (following the procedure as proposed and discussed by Blundell & Bond (1998), Badinger, Müller & Tondl (2002), Staehr (2003)) confirm the aforementioned results. In particular the negative effect of the interaction between the physical capital stock and FSFDI is still significant, while in a few equations the human capital-related interaction term is not significant anymore, albeit still positive.

7. Concluding Remarks

Reviewing and combining the finance-growth and the FDI-growth literature, we identify special characteristics of foreign owned banks, such as better risk-management techniques, and

discuss research results on how foreign owned banks have an impact on financial sector development. We find some positive but preliminary evidence. We contribute to the literature by identifying the following possible transmission channels between FSFDI, financial sector development and economic growth: intermediation / efficiency, intermediation / credit volume, corporate governance and institution building, as well as signal effects for total FDI and portfolio investments.

Our empirical results indicate that there can be a positive relationship between FSFDI and economic development – depending on a careful examination of lagged, hump-shaped or interacted effects of FSFDI. While we concentrate on one aspect of the relationship between FSFDI and growth – the efficiency channel – further channels need to be investigated in the future. Does FSFDI trigger growth in private domestic credit (whereas credit volume frequently is mentioned as a likely cause for GDP growth in the literature)? Does FSFDI trigger shrinking interest rate margins (whereas credit price again should have an impact on investment and growth according to common assumptions)? Does FSFDI also attract FDI in the real sector or portfolio investment into the host country stock exchange (i. e. are there spillover effects)?

The above research clearly calls also for a regional broadening. While we concentrated on "emerging Europe" (i. e. the New EU Member and Candidate Countries from CEE) here, the model could be replicated for Latin America and South-East Asia which show many similarities in transition efforts. The true value of the paper lies in modeling hitherto only qualitatively discussed possible relationships into a structural, econometric model that follows the standard forward of two streams of related literature.

The connection between FSFDI and economic growth is very sample- and channel-dependent. The investigation of different country samples and different causal linkages appears to be a fruitful avenue for further research. From an econometric point of view, it is a promising approach to employ GMM and instrumental variable techniques in order to control for endogeneity of explanatory variables. In addition, the analysis of Granger causalities for the variables where the panel results showed a significant relationship shall contribute to a better interpretation of potential bi-directional interference between FSFDI and economic growth.

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A. Data Appendix

Growth rates: for the calculation of growth rates we follow Temple (1999, 119) and apply his trend growth conception. Using only initial and final output for the calculation of the growth rate may be misleading since either of these may be at some distance from the trend path of output (due to short-run instabilities, as business cycle fluctuations). Therefore, it may be preferable to use the least squares growth rate, obtained by regressing the natural log output series on a constant and a time trend. We use this calculation method for the pure cross-section regressions and for several interpolations. In regressions based on annual values we are using the log first-differences for the growth rate.

RGDPL: real GDP at 1995 domestic market prices divided by the number of employed persons of the total economy. The values for Croatia between 1994 and 1999 are interpolated with the trend growth rate between 2000 and 2005. *Source:* AMECO (annual macro-economic) database of the European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN), April 2005.

NGDP: (nominal) GDP at current market prices in mn EUR. *Source:* AMECO database.

Physical capital stock: real physical capital stock per employee at 1995 domestic market prices. Time series on the physical capital stock (K) were calculated by using perpetual inventory methods. The initial capital stock values (K_0) were calculated following Easterly & Levine (2001) by $K_0/Y_0 = (I/Y)^\phi / g_y^\phi + \delta$, where $(I/Y)^\phi$ represents annual average investment rates (gross fixed capital formation (GFCF) of the business sector) over a ten year period, g_y^ϕ denotes output growth averaged over a ten year period, and δ is a constant rate of depreciation assumed to be 0.07. Assuming that the growth rate of the capital stock can be approximated by the growth rate of GFCF, further values of the capital stock are calculated by taking the initial value, using annual real changes of GFCF and dividing the values by the number of employed persons of the total economy. *Source:* WIIW Research Reports 314, March 2005; International Financial Statistics (IFS) of the IMF; AMECO database.

Human capital stock: constructed index using reported education levels of employees 1996–2003 (low educated: ISCED-classification 0-2, weight 1; medium educated: ISCED 3-4, weight 1.4; high educated: ISCED 5-6, weight 2). *Source:* EUROSTAT, labour force surveys, primarily 2nd quarter 1998–2003 (no data for Croatia). Data for 1996–1997 are interpolated using the trend growth rate between 1998 and 2003. Data for Lithuania are adjusted because of a structural break 2000–2001 which has given rise to overestimated high educated and underestimated low educated employees. The EUROSTAT data have been favored respecting educational attainment rates of the Barro and Lee (2000) database, since the latter one does not provide sufficient data for the Baltic countries.

Employment: number of employed persons of the total economy. *Source:* AMECO database (national accounts).

GOVGDP: Real final consumption expenditure of the general government to real GDP at 1995 domestic market prices, representing the size of the public sector. *Source:* AMECO database.

Exchange rate USD/EUR: USD/EUR (ECU), synthetic USD/EUR exchange rates: using ECU-basket of 1989; average exchange rate. Calculation for 1980–1998: synthetic Euro, ECU-weights from 17 September 1989. *Source:* Bundesbank (2001). Calculation from 1999 on: average rate. *Source:* IFS, Code "163.RH.ZF".

FINMA – total financial cross border M&A: flow data relating to completed M&A (mn EUR) in the financial sector for all eleven CEECs (except Croatia) from 1994 to 2002. The data exclude corporate transactions involving less than 5 % of ownership of banks and non-bank financial institutions or less than 3 % if the transaction value is greater than 1 million US-$. Although, in practice, all transactions referred to are acquisitions, the acronym M&A is used. *Source:* European Central Bank (Baudino et al. 2004).

FSFDI – inward FSFDI stock: financial intermediation (mn EUR) according to NACE-code J including equity capital, reinvested earnings and loans for all eleven CEECs (except Romania) from 1996 to 2003. BG: FDI stock for 1999 as given by BNB. The following years are calculated by adding the EUR inflow of the respective year (in 2000: EUR inflow converted from USD). FSFDI inward stock plus EUR inflows from 2002. HU, SK, HR: Inward FSFDI stock refers to equity capital and reinvested earnings. LV: for 1992-2000 financial intermediation includes only equity capital of registered financial institutions. RO: no classification for financial intermediation available. HR: From 1993–2000 cumulated EUR inflows of equity capital (USD inflows converted with the average exchange rate into EUR). *Source:* Hunya & Stankovsky (2005). Primary source: National Banks according to international investment position (IIP).

FDIINFL: total FDI inflows (USD) for all eleven CEECs (except Croatia) from 1994 to 2002. Converted into EUR using USD-EUR-1989 basket average exchange rate. *Source:* European Central Bank (Baudino et al. 2004).

FDI: total inward FDI stock (mn EUR) including equity capital, reinvested earnings and loans from 1996 to 2003. *Source:* Hunya & Stankovsky (2005). Primary source: National Banks according to international investment position (IIP).

Hump-shaped index for FSDFI: is constructed analogously to Eller (2004): in a country ranking the lowest and highest values of FSFDI per GDP get a value of one. The next lowest and highest values get higher values and this procedure is continued up to the medium range

values of FSFDI per GDP, which get the highest values. This procedure is repeated for each year within the estimation period.

B. Estimation Output Tables

TABLE 1: PANEL DATA RESULTS FOR THE IMPACT OF FSFDI ON ECONOMIC GROWTH IN SELECTED CEE COUNTRIES, 1996-2003

Cross-Country Growth Accounting, Annual Data, Whole Sample

Explanatory Variables / Equations	Dependent Variable: $\Delta ln(RGDPL_{it})$						
	Temporary Effects				**Permanent Effects**		
	(4.5aa) $FSFDI_{it} =$ $\Delta ln(FSFDIEMP_{it})$	**(4.5ab)** $FSFDI_{it} =$ $\Delta ln(FSFDIEMP_{it})$	**(4.5ac)** $FSFDI_{it} =$ $\Delta ln(FSFDIGDP_{it})$	**(4.5ad)** $FSFDI_{it} =$ $\Delta(FSFDIHUMP_{i,t-2})$	**(4.5ba)** $FSFDI_{it} =$ $ln(FSFDIEMP_{it})$	**(4.5bb)** $FSFDI_{it} =$ $ln(FSFDIGDP_{it})$	**(4.5bc)** $FSFDI_{it} =$ $ln(FSFDIHUMP_{i,t-2})$
Constant	0.034*** (10.308)	0.068 (1.536)	0.034*** (12.193)	0.037*** (12.877)	0.017 (0.454)	0.035 (1.424)	0.030*** (4.148)
$FSFDI_{it}$	0.0006 (0.073)	0.002 (0.241)	-0.0012 (-0.131)	0.003 (1.309)	0.003 (0.439)	0.0005 (0.064)	0.007 (1.277)
$\Delta ln(k_{it})$	0.102*** (4.654)	0.102*** (5.176)	0.103*** (4.675)	0.115*** (3.236)	0.101*** (4.718)	0.103*** (4.722)	0.075*** (2.292)
$\Delta ln(h_{it})$	0.008 (0.030)	0.078 (0.272)	-0.008 (-0.007)	0.049 (0.231)	0.002 (0.008)	0.005 (0.019)	0.293 (1.125)
$\Delta ln(GOVGDP_{it})$	-0.123* (-1.808)	-0.113* (-1.733)	-0.119* (-1.765)		-0.126* (-1.895)	-0.123* (-1.849)	
$ln(FSFDI_{it}) \times ln(h_{it})$		0.005* (1.802)					
$ln(FSFDI_{it}) \times ln(k_{it})$		-0.003* (-1.859)					
Adj. R²	0.409	0.418	0.409	0.356	0.402	0.400	0.347
No. of Total Observations	63	63	63	45	64	64	54
Not Included Countries	RO	RO	RO	RO	RO	RO	RO
F-Value	3.389	3.220	3.391	2.618	3.230	3.215	2.760
Prob > F	0.0005	0.0006	0.0005	0.013	0.0007	0.0007	0.005

Notes: Estimation method: LSDV, static variable-intercept panel data model with country-fixed and time-fixed effects.
t-statistics are in parentheses, basing on heteroskedasticity-robust standard errors (White diagonal s.e. & covariance; no d.f. correction).
Asterisks indicate variables whose coefficients are significant at the 10%(*), 5%(**), and 1% (***) level, respectively.
Time-fixed effects are included per assumption in each equation because of the likelihood of short-run business cycle fluctuations.
Source: For the variable definitions and sources see the data appendix. All regressions are calculated with EViews 5.0.

TABLE 2: PANEL DATA RESULTS FOR THE IMPACT OF FINMA ON ECONOMIC GROWTH IN SELECTED CEE COUNTRIES, 1996-2002

Cross-Country Growth Accounting, Annual Data, Whole Sample

Explanatory Variables / Equations	Dependent Variable: $\Delta ln(RGDPL_{it})$				
	Permanent Effects				
	(4.5ba) $FINMA_{it} = ln(FINMAEMP_{it})$	**(4.5bb)** $FINMA_{it} = ln(FINMAEMP_{it})$	**(4.5bc)** $FINMA_{it} = ln(FINMAGDP_{it})$	**(4.5bd)** $FINMA_{it} = ln(FINMAGDP_{it})$	**(4.5be)** $FINMA_{it} = ln(FINMAHUMP_{i,t-2})$
Constant	0.035*** (5.058)	0.024*** (3.304)	0.023** (1.968)	0.040*** (3.119)	0.023*** (6.102)
$FINMA_{it}$	-0.002 (-0.595)		-0.002 (-0.704)		0.015*** (2.799)
$\Delta ln(k_{it})$	0.125*** (5.299)	0.113*** (4.899)	0.126*** (5.297)	0.106*** (4.415)	0.109*** (6.163)
$\Delta ln(h_{it})$	0.919 (1.482)	0.292 (0.459)	0.929 (1.498)	0.404 (0.640)	-0.483 (-1.240)
$\Delta ln(GOVGDP_{it})$	-0.204*** (-3.530)	-0.170*** (-3.076)	-0.202*** (-3.491)	-0.171*** (-3.009)	-0.205*** (-3.615)
$ln(FINMA_{it}) \times ln(h_{it})$		0.007*** (3.443)		0.006*** (2.988)	
$ln(FINMA_{it}) \times ln(k_{it})$		-0.003*** (-3.597)		-0.002*** (-3.152)	
Adj. R²	0.433	0.418	0.434	0.490	0.492
No. of Total Observations	45	45	45	45	70
Not Included Countries	HR	HR	HR	HR	HR
F-Value	2.866	3.352	2.874	3.227	4.515
Prob > F	0.007	0.002	0.007	0.003	0.00001

Notes: Estimation method: LSDV, static variable-intercept panel data model with country-fixed and time-fixed effects.
t-statistics are in parentheses, basing on heteroskedasticity-robust standard errors (White diagonal s.e. & covariance; no d.f. correction).
Asterisks indicate variables whose coefficients are significant at the 10%(*), 5%(**), and 1% (***) level, respectively.
Time-fixed effects are included per assumption in each equation because of the likelihood of short-run business cycle fluctuations.
Source: For the variable definitions and sources see the data appendix. All regressions are calculated with EViews 5.0.

C. Literature Review Tables: The Four Detected Transmission Channels and the Status Quo of Empirical Analysis

FINANCIAL SECTOR EFFICIENCY - STATUS QUO OF EMPIRICAL ANALYSIS

Authors, Year of publication	Sample coverage data	Dependent Variables	Explanatory Variables (FS-related)	Explanatory Variables (others)	Control Variables	Empirical methodology	Investigated links	Major findings	Additional results
Bonin, Hasan, Wachtel (2005)	Region: 67 banks from 6 Central and Eastern European (CEE) countries Time: 1994-2002	ownership status: foreign greenfield; domestic de novo; state-owned; privatized bank	Return On Assets (ROA); interest margin; commission income ratio; cost ratio; non interest expenditure ratio; loan ratio; deposit ratio; liquid asset ratio; equity ratio; loan loss provision ratio	-	-	stochastic frontier analysis to estimate bank efficiency; regression analysis	transition process (privatization) - distinction in ownership => impact on efficiency	foreign-owned banks are the most cost and profit efficient (in particular greenfield banks); state-owned banks the least cost and profit efficient	domestic banks have a local advantage in fee-for-service business; timing of privatization matters for performance
Claessens, Demirgüç-Kunt, Huizinga (2001)	Region: 7900 banks from 80 countries Time: 1988-1995	ownership status: foreign vs. domestic; emerging vs. developed countries	interest margin; non-interest profits; before tax profits; net profit; loan loss provisions; overhead costs	-	-	regression analysis	foreign banks => impact on efficiency of domestic banks	in emerging markets: foreign banks have higher profits; increase in foreign bank presence leads to decrease in profitability and margins of domestic banks	reduction in on-interest income and overall expenses of foreign owned banks lead to greater efficiency in the local banking system but have a possible crowding-out effect
Drakos (2003)	Region: 283 banks in 11 CEE countries Time: 1993-1999	interest margin of foreign; state-owned and domestic private banks	liquidity risk (liquid assets/total liabilities); default risk (loan loss provisions/loans); interest rate risk (net short term assets/equity); leverage (equity/total assets)	-	-	estimations in the context of a dealership model	transition process => impact on ownership status; foreign bank entry => impact on interest margins	foreign banks lead to increased competition => positive impact on sector efficiency transition process => decrease in interest margins	low margins are also affected by state-ownership (state owned banks set narrower margins) => not only the efficiency level influences interest margins
Eschenbach, Francois, Schuknecht (2000)	Region: 93 countries (no specifications) Time: 1986-1995	interest margin; average GDP growth per capita; net profit/total assets	foreign bank assets; M3/GDP; interest margin; private credit; reform indicator; non-performing loans	trade openness; bureaucratic quality; corruption; general law conditions; total value of GDP	initial GDP; initial human capital; population growth	cross-country growth regressions	financial sector openness => financial sector competition => economic growth	positive link between financial sector openness - financial sector competition and financial sector competition - economic growth	-
Eschenbach, Francois (2004)	Region: 130 countries – including most of the transition countries Time: 1990 - 1999	interest margin; average Gross Domestic Product (GDP) growth per capita	M3/GDP; interest margin; private credit; trade protection index; gross operating bank profit; foreign bank assets; financial crisis indicator	trade openness; bureaucratic quality; dummy variable for transition economies; corruption; general law conditions; total value of GDP	population growth; inflation	cross-country growth regressions	financial sector openness => financial sector competition => economic growth	strong positive link between financial sector openness - financial sector competition as well as between financial sector competition - economic growth confirmed	open financial sectors are more competitive and lead to lower financial service prices; protection of the financial sector mostly in lower income countries
Green, Murinde, Nikolov (2004)	Region: 273 banks from 9 CEE countries Time: 1995-1999	foreign vs. domestic ownership (dummy variable)	interest cost; operating cost; output (loans, non-interest income, other earning assets)	input prices (labor, capital, deposit price)	-	augmented translog function and two cost share equations	foreign banks => impact on efficiency of domestic banks	cost efficiency (operational efficiency) is not always dependent on ownership (foreign vs. domestic)	foreign banks are not more efficient than an average domestic bank (in terms of economies of scale and scope)

FINANCIAL SECTOR EFFICIENCY (CONTINUED) - STATUS QUO OF EMPIRICAL ANALYSIS

Authors, Year of publication	Sample coverage data	Dependent Variables	Explanatory Variables (FS-related)	Explanatory Variables (others)	Control Variables	Empirical methodology	Investigated links	Major findings	Additional results
Koivu (2004)	Region: 25 transition countries (CEE, CIS + South Eastern Europe) Time: 1993-2001	real GDP growth	interest margin; credit	-	RI (Reform Indicators) and others	fixed-effects panel data regression and modified Granger causality test	efficiency, size of the banking sector => economic growth; direction of causality between financial sector and economic development	low interest margins => growth enhancing; bank credit with ambiguous effects on growth (in case of one year lag => neg. effect on growth); causality: two-way causality (no exact specifications)	increase in reforms in banking sector => decrease in interest margins ; reforms needed before enlargement of the banking sector (growth is related to reforms and stabilization)
Naaborg, Scholtens, De Haan et al (2003)	Region: 8 CEE countries Time: 1993-2000	foreign vs. domestic ownership (dummy variable)	non-interest costs; after-tax income; interest margin; ROA; private credit/total bank credit	per capita income	-	simple correlation analysis	foreign owned banks => profitability	foreign owned banks have higher profitability levels than domestic banks	foreign bank presence and financial sector development vary considerably among countries
Papi, Revoltella (2003)	Region: 112 banks from 9 transition economies Time: 1993-1997	ROA; overhead costs/total assets	total assets; net loans/total assets; operating income/net interest revenue; foreign ownership (dummy variable)	-	-	regression analysis; General Least Squares (GLS) estimations	FDI in the financial sector => efficiency levels	foreign participation is positively linked to profitability	improvements in operating efficiency require a foreign majority interest (for cost-efficiency >70%)
Rossi, Schwaiger, Winkler (2004)	Region: 9 CEE countries Time: 1995-2002	total costs (operating expenses); total profits (operating profit minus loan loss provisions); loans; deposits; other earning assets	-	labor; capital; deposits; price of labor	-	cross-country and time series studies	cost and profit efficiency in transition economies	general low but increasing level of cost and profit efficiency (profit efficiency grows stronger, but shows a lower present level)	reasons: need for restructuration, expanding market share,...; high concentration and foreign ownership affect cost and profit efficiency
Uiboupin (2004)	Region: 219 banks from 10 CEE countries Time: 1995-2001	private credit to GDP	interest margin; interest income/total assets; before tax profit; non-interest income; total operating expenses; loan loss provisions; equity; short-, long-term deposits	real GDP growth rate; GDP per capita; annual CPI change; money market interest rate	-	Arellano-Bond estimations instead of using fixed effects	foreign bank entry => impact on performance of the banking industry	foreign bank entry increases competition; foreign banks raise overhead costs of the local banks in the short term	negative impact of foreign bank entry on revenues from interest-earning assets, on-interest income and profitability of domestic banks
Zajc (2004)	Region: 6 CEE countries Time: 1995-2000	interest margin; non-interest income; before-tax profit; overhead costs; loan loss provisions	number, share of foreign banks; equity/total assets; non-earning assets; customer and short term funding	country dummies; GDP per capita; real GDP growth; inflation	-	regression analysis; weighted least squares method	foreign bank entry => impact on performance of the banking industry	foreign bank entry enhances competition; reduces net interest margins, income and profits; increases overhead costs of domestic banks	-

FINANCIAL SECTOR INTERMEDIATION - STATUS QUO OF EMPIRICAL ANALYSIS

Authors, Year of publication	Sample coverage data	Dependent Variables	Explanatory Variables (FS-related)	Explanatory Variables (others)	Control Variables	Empirical methodology	Investigated links	Major findings	Additional results
Baudino, Caviglia, Dorrucci et al (2004)	Region: 12 CEE countries Time: 1993-2002	monetization; stock market capitalization; ROA; Return On Equity (ROE); private credit; credit spreads	cross-border M&A flows; foreign bank assets	FDI stocks; FDI flows	-	descriptive analysis	foreign bank entry => stability in lending practices	foreign banks mostly involved in retail business; FSFDI is robust to local business cycles	low risk of less stable credit provision by foreign banks; comparatively stable financial environment
Cottarelli, Dell'Ariccia, Vladkova-Hollar (2005)	Region: 24 CEE and Baltic countries Time: 1973-1996	GDP per capita;	bank entry restrictions; legal origin; cumulative growth of private credit	public debt ratio; inflation rate; liberalization index; accounting	-	panel data regressions	credit growth	higher financial deepening is correlated to GDP per capita; speed in financial deepening does not seem abnormal in the countries under study	more transparent countries have deeper banking systems
De Haas, Van Lelyveld (2002)	Region: 5 CEE countries Time: 1993-2000	GDP growth	domestic credit; foreign subsidiaries credit; cross-border credit	-	-	simple correlation analysis	foreign bank credit => volatility of credit supply compared to domestic credit	increase in foreign bank credit relative to GDP as well as relative to domestic credit	temporary reduction in cross-border credit was offset by increases in local subsidiary's credit
Engerer, Schrooten (2004)	Region: 8 CEE countries Time: 1995 - 2002	foreign bank assets; interest margin; private credit; reform indicator; non-performing loans	trade openness; bureaucratic quality; corruption; general law conditions; GDP growth	initial GDP; initial human capital; population growth	-	simple correlation analysis	foreign bank entry => financial intermediation	ambiguous impact on financial depth and the importance of credit to the private sector; heterogeneity among CEE financial sectors	foreign banks help the improvement of financial intermediation and reduction in bad loans; foreign banks play a role in institutional development
Giannetti, Ongena (2005)	Region: 14 CEE countries Time: 1993-2002	firm sales; assets; debt/assets; trade credit/sales; number of firms	foreign bank lending; total blank lending/GDP	financial loans/total liabilities; sectoral employment; firm employees; dummy variables for the time when firm started to operate	institutional variable; legal framework variable; business cycle effects	panel data regressions	foreign bank lending => firm growth	firm growth in sales, assets and leverage stimulated by foreign lending; improvement in capital allocation; mitigation of connected lending problems by foreign owned banks	allocational efficiency improved by foreign lending; foreign bank entry affects industrial structure; SMEs benefit to a lesser extent from foreign bank lending
Mehl, Winkler (2003)	Region: 8 Southeast European countries Time: 1993-2001	real GDP growth per capita	private credit; broad money/GDP	share of private sector/GDP; degree of transition	war; initial human capital; inflation; initial GDP per capita	OLS, 2SLS and country fixed effect analysis	financial depth => economic growth	no significant growth enhancing effect of financial depth; significant growth effect of degree of transition and inflation	no significance of initial human capital and initial GDP per capita; foreign banks contributed to the increase in monetization (stabilizing influence)
Khan, Senhadji (2000)	Region: 159 industrial and developing countries Time: 1960-1999	real GDP growth per capita; investment/GDP	domestic credit; domestic credit and stock market capitalization; private and public bond market and stock market capitalization	population growth; trade growth rate	log initial income	cross-country and time-series regressions	financial depth => economic growth	strong positive and significant relationship between financial depth and economic growth in cross-country estimations; introducing the time-dimension shows weaker results	non-linear relationship between financial depth and economic growth; high sensitivity to variables of financial depth
Naaborg, Scholtens, De Haan et al (2003)	Region: 8 CEE countries Time: 1993-2000	foreign vs. domestic ownership (dummy variable)	non-interest costs; after-tax income; interest margin; ROA; private credit/total bank credit	per capita income	-	simple correlation analysis	foreign owned banks => credit supply	private credit remained at a relatively low level but rose slightly	foreign owned banks took over the role as creditors; public credit exceeded private credit
Sabi (1996)	Region: 33 banks in Hungary Time: 1992-1993	foreign vs. domestic ownership (dummy variable)	profitability: ROA; ROE; operating profit ratio; interest margins; liquidity and credit risk: loan deposit ratio; long term loans/total loans; security/total assets	-	-	student's t and Kruskal Wallis tests	foreign bank performance in Hungary	foreign banks are more profitable, not exposed to high liquidity or credit risk	reason: at the beginning of transition foreign banks were mostly involved in wholesale banking, they operated branches in the host markets

INSTITUTION BUILDING - STATUS QUO OF EMPIRICAL ANALYSIS

Authors, Year of publication	Sample coverage data	Dependent Variables	Explanatory Variables (FS-related)	Explanatory Variables (others)	Control Variables	Empirical methodology	Investigated links	Major findings	Additional results
Beck, Demirgüç-Kunt, Levine (2003)	Region: 115 industrial, developing countries Time: 1990-1995	stock market development; protection of property rights; private credit	financial intermediary	legal origin; tenure of supreme court judges; common vs. case law; supreme court power; legal justification; independence	-	cross-country regressions and historical comparisons	differences in legal origin => cross-country differences in financial development	legal origin matters for financial development; legal traditions differ in their ability to adapt to evolving economic conditions	legal systems adaptability as exogenous component explains cross-country differences in financial intermediary development
Beck, Levine, Loayza, (2000)	Region: 74 countries Time: 1960-1995	real GDP growth	commercial bank assets/total assets; liquid liabilities/GDP; private credit	-	legal origin; income	cross-section and panel-data (GMM estimators) regression analysis	differences in financial development => GDP growth	exogenous components of financial intermediary development are positively associated with economic growth	legal and accounting reforms can boost financial development and economic growth
Bol, Lensink, De Haan (2002)	Region: 8 CEE countries Time: 1992-2000	number of foreign banks; foreign bank assets	reform in banking; interest rate liberalization; transition of trade and foreign exchange system; private credit; M2/GDP	share in private sector/public sector; degree of civil, political rights, of democracy; reform indicator; political freedom indicator; GDP; investment rate	inflation; wealth indicator; population	principal components analysis	foreign bank entry => importance of reforms and political freedom	foreign bank entry positively responds to reform measures; some evidence for political freedom could be found	reforms affecting financial sector effciency, the structure of the financial sector and domestic investment attract FSFDI
Falcetti, Lysenko, Sanfey (2005)	Region: 25 transition countries Time: 1989-2003	real GDP growth	-	average of eight EBRD transition indicators; general government balance relative to GDP	initial conditions index; country dummy variables to capture fixed effects	single and simultaneous equation specification	reforms => economic growth (including a lag)	robust, positive influence of reforms in one period on subsequent growth	higher growth is associated with further reform efforts; fiscal discipline, catch-up, initial conditions, trade links and oil prices influence a country's growth performance
Faria, Mauro (2004)	Region: 55 emerging market economies Time: 2001	total equity; FDI; portfolio equity; portfolio debt; other liabilities	-	institutional quality index; GDP/capita; primary, secondary school attainment	natural resources; openness; English legal origin; transition	cross-country growth regressions	institutional quality => FDI, portfolio investment	institutional quality is significantly, positively associated with FDI, portfolio equity and total equity	natural resources and human capital are pull-factors for FDI
Mehl, Vespro, Winkler (2005)	Region: 7 South Eeastern European (SEE) countries Time: 1993-2003	GDP per capita growth	EBRD index of banking sector reform; EBRD transition indicators; number of foreign banks; private credit/GDP; creditor rights index; broad money/GDP (monetization)	government expenditure/GDP; inflation; openness	time dummies; accession dummy; initial human capital; initial GDP per capita	panel data regressions (no inclusion of fixed effects)	legal environment; financial deepening; foreign banks => economic growth	sound legal environment (higher creditor right protection together with higher macroeconomic stability) contributes positively to economic growth; foreign bank entry positively contributes to economic growth, too	only weak evidence of a positive link between financial deepening and economic growth; too short time series, possible ill-suited standard growth regression framework and higher importance of quality are possible explanations

FINANCIAL SECTOR SIGNAL EFFECTS - STATUS QUO OF EMPIRICAL ANALYSIS

Authors, Year of publication	Sample coverage data	Dependent Variables	Explanatory Variables (FS-related)	Explanatory Variables (others)	Control Variables	Empirical methodology	Investigated links	Major findings	Additional results
Buch (2002)	Region: Bank for International Settlement (BIS) reporting countries Time: 1997	cross-border bank claims/GDP; cross-border bank assets/total external debt (bank lending + bond finance)	restrictions in banking; distance; controls on cross-border financial credits	EU-membership (dummy variable); common legal system; common language	-	cross-country regressions	determinants of cross-border bank asset holdings	increase of cross-border banking assets and bond finance with higher level of economic development; decrease of cross-border lending with economic development, with distance and EU-membership	no homogeneity across countries of determinants of cross-border asset holdings; no significant impact of common legal system and language on the structure of debt
Buch, De Long (2004)	Region: 138 OECD country pairs Time: 1995-2000	number of cross-border bank mergers	information costs; index of capital controls	language; law; regulations; government ownership	ROA; size of the biggest banks; domestic credit/GDP; density of population; GDP	tobit regression analysis	international bank mergers => identification of pull factors	information costs (proxied by distance and common cultural factors) impede cross-border bank mergers; regulations have an influence as well	reduction in information costs possible though advancements in technology that promote travel and communication
Demekas, Balázs, Ribakova Wu (2005)	Region: 15 SEE countries Time: 2000-2002	FDI flows; FDI stock	-	distance between host and source; log GDP; cultural ties; foreign exchange and trade liberalization; tariff revenue; corporate income tax; infrastructure reform; corruption	-	bilateral cross-section regressions	FDI => identification of pull factors	high unit labor costs, high corporate tax burden and high level of import tariffs discourage FDI	tax holidays and domestic corruption are less important
Demirgüç-Kunt, Maksimovic (2002)	Region: 40 countries Time: 1989-1996	GDP/capita; turnover; bank/GDP; market; return on assets; net sales/net fixed assets	long-term capital; proportions of companies passing certain growth levels	total assets/GDP; net fixed assets/total assets	law and order indicator, commonlaw dummy; creditor rights index; shareholder rights index	-	bank-, market-based financial systems => impact on firm growth	development of a country's legal system predicts access to external finance	both systems affect financing in different ways, especially at lower levels of financial development
Vanassche (2004)	Region: 45 countries (27 industries) Time: 1980-1997	industry growth rates of real value added	private credit; stock market capitalization; liquid liabilities	trade openness; maturity of firms	human capital; rule of law	cross-country regressions	financial openness => industry growth	financial integration enhances growth in any industry as well as domestic financial sector development	industries in need of external finance grow faster in open economies

SOURCES OF EXTERNAL FINANCING AND ECONOMIC DEVELOPMENT - STATUS QUO OF EMPIRICAL ANALYSIS

Authors, Year of publication	Sample coverage data	Dependent Variables	Explanatory Variables (FS-related)	Explanatory Variables (others)	Control Variables	Empirical methodology	Investigated links	Major findings	Additional results
Durham (2003)	Region: 88 low and high income countries Time: 1977-2001; 1982-2000	GDP growth	FDI; Bond Foreign Portfolio Investment (BFPI); Other Foreign Investment (OFI)	level of financial, legal development; secondary schooling; investment ratio	initial level of real per capita income; population growth; average total investment/GDP	cross-section regressions	FDI, OFI, BFPI => impact on economic growth and volatility of business cycles	Foreign Portfolio Investment (FPI), BFPI, OFI => no significant impact on growth; OFI has positive effect in countries with larger equity markets and few corruption; only OFI affects macroeconomic volatility	FDI and EFPI more helpful in promoting growth; several factors (e.g. initial conditions) important for growth effects
Durham (2004)	Region: 80 countries (low and high income countries) Time: 1979-1998	GDP growth	FDI; EFPI; stock market capitalization	trade/GDP; male education rate; business regulation index; property rights index; corruption index	initial real per capita income; average total investment/GDP; population growth	cross section regressions including robustness checks (extreme bound analysis)	FDI, EFPI => impact on economic growth	lagged FDI, EFPI => no direct, unmitigated positive effect on economic growth	level of financial and institutional development determinant for the impact on growth
Fink, Haiss, Vukšić (2004)	Region: 9 CEE, 18 developed countries Time: 1991, 1996-2000	real output growth per capita	domestic, private credit; stock market capitalization; bonds outstanding	capital stock growth; labor participation; educational attainment	-	panel-data and cross-section estimations	sources of external finance => economic growth	growth enhancing effect of bond markets; no significant growth enhancing effect of stock markets; higher growth enhancing effect of domestic than private credit	transfer mechanisms differ over the development cycle of an economy; FDI and portfolio investment help to raise capital accumulation
Fink, Haiss, Hristoforova (2003)	Region: 13 developed countries Time: 1950-2000	GDP growth	bond market capitalization	-	-	causality tests following Engel and Granger (1987)	bond markets in developed countries <=> economic growth	findings in support of a supply-leading role of the financial sector in USA, UK, CH, GER, AUT, NL, E; interdependence in JPN, FIN and IT	stationary, co-integration, and causality features of the variables are taken into account
Krkoska (2001)	Region: 25 transition countries Time: 1998 - 2000	gross fixed capital formation	FDI; foreign credit; domestic credit; state subsidies; capital market financing; real interest rate; stock market liquidity	privatization revenues; accession dummy; natural resources dummy; EBRD transition indicator	-	linear approach of the two functions (SUR estimations)	FDI vs. other forms of financing => gross fixed capital formation	FDI, an increase in capital market capitalization and availability of domestic credit => positive correlation to gross fixed capital formation	FDI is the largest source of external enterprise financing; capital accumulation is promoted by international capital flows; gross fixed capital formation drives economic growth
Reisen, Soto (2001)	Region: 44 OECD non-member states and Turkey Time: 1986-1997	real GDP growth per capita	FDI; portfolio equity; bond flows	lagged GDP; squared national savings; government consumption; log (terms of trade)	-	regression analysis	broad categories of net capital inflows => their independent impact on economic growth	most important growth impact by portfolio equity inflows; followed by FDI showing low reversibility; contribution to growth by foreign bank lending only in a well-capitalized banking system; no significant growth impact of bonds and official flows	developing countries should encourage portfolio equity inflows and FDI to stimulate long-term growth