Global versus Local: The Financing of Foreign Direct Investment

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October 2004

Preliminary and incomplete
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Abstract

In this paper we analyze the conditions under which a foreign direct investment (FDI) involves a net capital flow across countries. Frequently, foreign direct investment is financed in the host country without an international capital transfer. We develop a model in which the optimal choice of financing an international investment trades off the relative costs and benefits associated with the allocation and effectiveness of control rights resulting from the financing decision. We find that the financing choice is driven by managerial incentive problems and that FDI involves an international capital flow when these problems are not too large. Our results are consistent with data from a survey on German and Austrian investments in Eastern Europe.

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1 Introduction

When does foreign direct investment (FDI) lead to an international capital transfer? While FDI by definition involves an international capital engagement, it is frequently financed in the host country, in which case there is no net movement of capital. In this paper we investigate under which conditions a net capital flow is induced and how this is related to the underlying motivation of the investment.

The literature on multinational firms does not provide an answer to this question. There are two main approaches to explaining FDI, one taking a macroeconomic, the other one taking a microeconomic perspective. The early, macroeconomic literature interpreted FDI as one particular form of capital flow that is driven by differences in international capital cost. This international finance view of FDI as a capital flow was challenged by economists like Kindleberger and Hymer who pointed out that FDI is often financed locally and is frequently flowing two ways, between countries with very similar interest rates.

The modern, microeconomic theories of multinational activities follow a more eclectic approach, incorporating elements of industrial organization, new trade theory and transaction cost economics. The multinational investment is carried out by an investor who has some idea, technology or management skills that could be successfully employed in some other country. The reason why the investor opts for production abroad instead of exporting is motivated by new trade theory arguments like transportation cost and tariff barriers. Similarly, the reason why the multinational prefers to produce goods in house rather than granting a license to a foreign producer, is explained by transaction cost type of arguments.

So, the modern theory of multinationals equates FDI with a technology transfer rather than a capital transfer. How this investment is financed, and to what extent a capital flow is induced, is not addressed by this literature.

In this paper we attempt to establish a link between these two approaches towards FDI. We take the microeconomic motivation for FDI as given and ask how the considerations that drive FDI in the first place affect the decision how to finance the investment. To put it in a nutshell, how does the technology transfer affect the capital transfer? Looking at FDI from the microeconomic point of view, we are able to develop a theory of FDI where capital cost considerations play a role, but where capital cost are firm or project specific, rather than country specific.

For this purpose, we set up a contract theoretical model with managerial incentive problems. In this model, the multinational investor has to choose how to finance this investment, globally or locally. We find that the financing structure can be used to govern the incentives of the manager.

We derive a number of predictions how this should affect the decision how to finance the investment. These predictions are then confronted with our survey data on German and Austrian international investment projects. We find that projects are financed locally if the incentive problems are rather large. If instead the incentive problems are moderate, global financing is preferred, leading to a capital flow to the host country.

The paper is organized as follows. In section 2 we develop the contract theoretical model. Sections 3 and 4 study the properties of the model under internal financing and bank financing, respectively. In section 5 we compare these properties, derive the optimal financial structure and determine the forces that are responsible for international capital flows. Section 6 introduces our data set, derives empirical predictions from our model and confronts these predictions with the data. Section 7 concludes.

To be completed! Literature to be included!

2 The model

Consider a multinational investor (she) with an idea for a potentially profitable investment project. To run the project the investor has to hire a manager (he). The project generates returns for up to two periods. In period 1 the project yields a return of R with probability p and of 0 with probability (1-p). In period 2 the project yields a return of Z.

The manager has two decisions to take. First of all, he chooses the probability of the project's success in period 1. To implement a particular $p > 0$, he incurs a non-pecuniary effort cost of $C(p)$, with $C'(0) = 0$ and $C'(1) = \infty$. The problem is that this effort level is not verifiable, so the manager's incentive to spend effort on implementing a particular p cannot be governed by a contract contingent on p.

The second decision the manager has to take is about how much of the project's returns to reveal and return to the investor. The problem is that the returns are not verifiable. This means the manager can claim not to have realized any returns and keep everything to himself, if he wishes to do so.

The investor, when hiring a manager, thus has to solve two kinds of managerial incentive problems. The first one is to make the manager choose effort to increase the probability of success of the project. We will call this the **efficiency problem**, since the issue is to increase the expected returns of the project by spending effort on increasing the probability of high returns. The second incentive problem is to make the manager hand over the returns of the project. We will call the second problem the **rent shifting problem** since here the issue is only about how to share the returns.

At the time the manager is hired, no contract can be written that would induce the manager to take the desired actions. Instead, the multinational investor has to govern the manager's behavior by exercising two different control rights.

First of all, she has access to a monitoring technology that allows her

to capture a share β of the returns in period 1. The cost of implementing this technology is a function of both β and d, the distance between headquarters and the location of the investment. The idea is that the larger the distance between headquarters and project, the more difficult and hence the more costly it is to monitor the manager. This is reflected by the following properties of the cost function $M(\beta, d)$.

$$\frac{dM}{d\beta} > 0, \frac{d^2M}{d\beta^2} > 0, \frac{dM}{dd} > 0, \frac{d^2M}{d\beta dd} > 0. \tag{1}$$

A second control right stems from fact that as the owner of the firm, the investor can liquidate the firm after period 1 and realize a liquidation value of L. This helps her in her negotiations with the manager about how to share the returns of period 1. Without loss of generality we assume that the negotiation between investor and manager is carried out as a Nash bargaining game, where each of the two sides gets his or her outside option if the negotiation breaks down and the project is liquidated and both share the net surplus of continuation whereby the investor receives a share α and the manager a share of $1 - \alpha$.

Before starting the project, the multinational investor has to decide on how to finance the project. The investor can choose between financing the investment internally, through funds from the headquarters, or externally, with a bank credit. In the latter case the bank credit can be taken locally, from a foreign bank, or globally, from a multinational bank. Thus, there are two forms of global financing, internally or through a bank credit from a multinational bank, and one form of local financing, through a local bank.

The financing decision has an impact on the **allocation of the right to liquidate** the firm. If the project is financed with internal funds, the investor has the right to exercise her right to liquidate the firm as she pleases. If, however, a bank has granted a credit, only the bank has the right to liquidate the firm, conditional on the credit not being repaid. In this case the bank

realizes a liquidation value of L_B. However, if the credit is paid back in due time, the bank has no right to interfere, either.

The size of the liquidation value depends on who liquidates the project and where he or she is located with respect to the project. It seems natural to assume that the investor achieves a higher liquidation value than a bank, since she has better information on what to do with the assets. Similarly, it seems reasonable to assume that a local bank realizes a higher liquidation value than a global bank because of the locational advantage. Let $\overline{L}_B$ and $\underline{L}_B$ denote the liquidation value in case of liquidation by a local bank or a global bank, respectively. Then, our assumptions imply that

$$\underline{L}_B < L \quad \text{and} \quad \underline{L}_B < \overline{L}_B \tag{2}$$

A priori, it is not clear whether $\overline{L}_B < L$ or $\overline{L}_B > L$, i.e. whether the investor or a local bank can realize a higher liquidation value. However, for the host countries we have in mind it seems most plausible to assume that

$$\overline{L}_B < L \ . \tag{3}$$

This assumption captures the notion that the location advantage experienced by the local bank is smaller than the owner's advantage of being specialized in the business.

Throughout the paper we will assume that the investor has no financial constraints at the time of the investment, i.e. she can choose freely between internal and external finance, guided only by efficiency and rent shifting considerations. Once the investment has been taken, however, the project has to be self-financing, i.e. the credit cannot be secured by other funds the investor might have had access to in the beginning. The idea is that whatever funds the investor might initially have had a her disposal are used for other purposes throughout the game and hence are no longer available.

The time structure of the game is as follows. First the investor decides

about the financing of the investment and hires a manager. Then, both the manager chooses probability p of high return in period 1 and the investor implements his monitoring technology. Returns of period 1 are realized and the investor and manager negotiate about how to share the returns. If the project has been financed with internal funds, the investor can liquidate the firm if she is not happy with the outcome of the negotiation.

In case of bank finance, the investor has to repay the credit, otherwise the bank liquidates the firm.

If the firm is not liquidated at the end of period 1, return Z is realized in period 2.

The time structure is summarized in figure 1. To solve the model we proceed by backward induction.

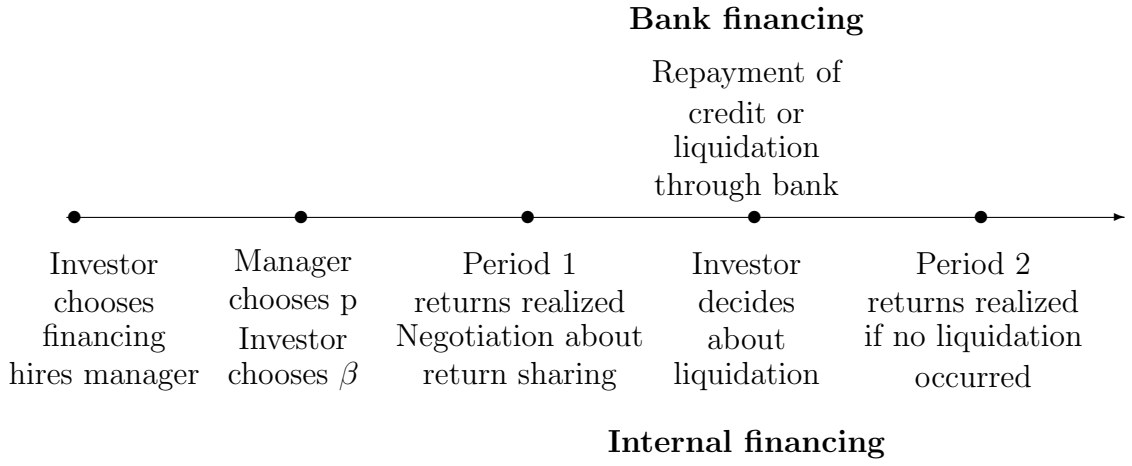

Figure 1

3 Internal financing

In this section we analyze the manager's decision to invest in effort and the investor's decision to monitor the manager if the firm is internally financed.

Consider period 2. If the project has not been liquidated before, it generates a return of Z. However, as this return is not verifiable, the investor cannot force the manager to hand over this return. Since this is the end of the project, the manager has nothing to lose and thus keeps all of Z to himself.

Consider now period 1. If the project has generated a return of 0, the manager cannot hand over any returns to the investor even if he wishes to. Hence, the only possibility for the investor to receive any positive payoff is to liquidate the firm. In this case, the investor's payoff is $L - M(\beta, d)$ and the manager's payoff is $-C(p)$.

Suppose next that the manager has realized a return of R. Investor and manager negotiate about how to share this return. If the negotiation fails, the investor realizes a payoff of $\beta R + L - M(\beta, d)$, from exercising her rights to monitor and to liquidate. It would be efficient to continue operation in order to realize returns Z instead of liquidating the firm, i.e. the net surplus of continuing is positive, $Z - L > 0$. As we have assumed above, both sides share the net surplus of continuation such that the investor receives a share α and the manager a share of $1 - \alpha$. Thus, if return R is realized, the investor's payoff is $\beta R + L + \alpha(Z - L) - M(\beta, d)$ and the manager's payoff is $(1 - \beta)R + (1 - \alpha)(Z - L) - C(p)$.[1]

From an ex ante point of view, the investor's expected payoff is hence

$$p[\beta R + L + \alpha(Z - L)] + (1 - p)L - M(\beta, d). \tag{4}$$

[1]The implicit assumption for these payoffs to be correct is $\beta R + L + \alpha(Z - L) \leq R$, since otherwise the liquidity constrained manager has not sufficient funds to pay the required amount that satisfies the bargaining condition.

and the manager's expected payoff is

$$p[(1-\beta)R + (1-\alpha)(Z-L)] - C(p). \tag{5}$$

Consider now the manager's decision to choose the probability of success, p, and the investor's decision to implement a monitoring technology that determines β, the share of returns the investor can appropriate through monitoring. Both decisions are taken simultaneously.

The manager's optimal effort choice, as a response to the investor's control rights, is described by the following Lemma.

Lemma 1 *The more effective the investor's control rights, i.e. the right to liquidate the firm, as captured by L, and the right to monitor the manager, as captured by β, the smaller is the effort chosen by the manager in equilibrium.*

Proof: See Appendix.

Note that the larger β and the larger L, the more of the payoff can be appropriated by the investor, either directly or indirectly, by improving her outside option and hence improving her bargaining position in the negotiation with the manager. This leaves less payoff for the manager and hence less motivation for him to spend effort on p.

Consider next the investor's decision to implement a monitoring technology β. The investor chooses β to maximize her expected payoff

$$p[\beta R + L + \alpha(Z-L)] + (1-p)L - M(\beta, d). \tag{6}$$

Lemma 2 *The larger the manager's effort choice p and the smaller the distance d, the larger the monitoring technology β chosen by the investor.*

Proof: See Appendix.

In equilibrium, manager and investor choose p^* and β^* such that both are best responses against each other. The following lemma describes how these

equilibrium decisions (p^*, β^*) are affected by changes in L, the investor's liquidation value, and by d, the distance between headquarters and investment project.

Lemma 3 *The equilibrium values p^* and β^* have the following properties.*

- *The larger L, the liquidation value of the firm, the smaller are both p^* and β^*.*
- *The larger d, the distance between headquarters and investment location, the larger p^* and the smaller β^*.*

Proof: See Appendix.

4 External financing

Instead of financing the investment project with internal funds the investor can choose to take a bank credit. Note that this credit is taken for strategic reasons, not because of liquidity constraints. The investor asks for a credit of size K and promises a repayment of $D \geq K$. The banking sector is assumed to be perfectly competitive. So repayment D is chosen such that the expected repayment guarantees an expected profit of zero to the bank.

$$pD + (1-p)\min(D, L_B) = K \ . \tag{7}$$

Involving a bank affects the bargaining between manager and investor about how to share the returns. If the two do not reach an agreement and the credit is not repaid it is no longer the investor but the bank that liquidates the firm. How exactly this affects the negotiation between manager and investor depends on whether the credit is small or large. Credits are called small if the liquidation value suffices to cover the necessary repayment, i.e. $K \leq L_B$. Credits are called large if the credit size exceeds the liquidation value, i.e. $K > L_B$.

Suppose the investor takes a small credit small, i.e. $K \leq L_B$. In this case, the liquidation value suffices to cover the credit sum, so the zero profit condition (7) boils down to $D = K$. The investor first receives credit sum K, then repays D, either from her share of the returns or, if the firm is liquidated, from the liquidation value L_B. Any liquidation returns in excess of D, $L_B - D$, accrue to the investor.

Thus, from the point of view of the investor, the only effect a small credit has is to lower the liquidation value and hence the payoff that she realizes when either returns are zero or the bargaining with the manager fails. When the negotiation with the manager breaks down her outside option is now L_B instead of L, so her payoff in the bargaining becomes smaller and that of the manager becomes larger. Furthermore, when returns are zero, a lower liquidation value is realized, leading to a dead weight loss that is fully borne by the investor. The expected payoff of the investor in case of a small bank credit is hence

$$\begin{aligned} & p[\beta R + (L_B - D) + \alpha(Z - L_B)] + (1-p)(L_B - D) + K - M(\beta, d) \quad (8) \\ = \; & p[\beta R + L_B + \alpha(Z - L_B)] + (1-p)L_B - M(\beta, d). \quad (9) \end{aligned}$$

using that $D = K$.

For the manager the expected payoff is

$$p[(1-\beta)R + (1-\alpha)(Z - L_B)] - C(p). \quad (10)$$

Total payoffs are

$$p[R + Z] + (1-p)L_B - C(p) - M(\beta, d) \quad (11)$$

Comparing the payoffs for both investor and manager in case of a small bank credit and in case of internal financing, we find that they differ only with respect to the liquidation value. From Lemma 3 we know that a change

in liquidation value affects the equilibrium values p^* and β^*, i.e. $p^*(L_B) \equiv \overline{p} > p \equiv p^*(L)$, and similarly $\beta^*(L_B) \equiv \overline{\beta} > \beta \equiv \beta^*(L)$.

The investor's equilibrium payoff in case of a small bank credit is thus

$$\overline{p}[\overline{\beta}R + L_B + \alpha(Z - L_B)] + (1 - \overline{p})L - M(\overline{\beta}, d) \tag{12}$$

Comparing this payoff to her payoff in case of internal financing we find that the investor has a higher payoff in case of a small bank credit if and only if

$$\underbrace{(\overline{p} - p)[\alpha(Z - L_B)] + [(\overline{p}\overline{\beta}R - M(\overline{\beta}, d)) - (p\beta R - M(\beta, d))]}_{\text{efficiency effect}} \tag{13}$$

$$- \underbrace{p(1 - \alpha)(L - L_B)}_{\text{rent shifting effect}} - \underbrace{(1 - p)(L - L_B)}_{\text{capital cost effect}} \geq 0 \tag{14}$$

The efficiency effect captures the fact that a lower liquidation value makes the manager choose a larger p which in turn leads to a larger β as well. The rent shifting effect captures that the reduction in liquidation value means that the investor captures a smaller share of the first period's returns. Finally, the capital cost effect reflects the dead weight loss that results from the fact that with positive probability the firm will be liquidated, at a lower value.

The following Lemma summarizes the different effects of a small bank credit.

Lemma 4 Small bank credit

A small credit

- *shifts rents from the investor to the manager (negative rent shifting effect)*
- *increases the manager's effort choice (positive efficiency effect)*
- *causes a dead weight loss due to the lower liquidation value (negative capital cost effect).*

Taking up a small bank credit can be seen as a commitment device of the investor to refrain from appropriating too large a share of the returns in the process of negotiating with the manager, in order to make the manager choose a higher effort. This commitment, however, comes at a cost, since the capital cost in case of a local bank credit are higher. This is reflected by the lower liquidation value that is realized if the returns turn out to be zero. Hence, the positive efficiency effect has to compensate not only the negative rent shifting effect but also the negative capital cost effect.

Consider now the case of a large bank credit, i.e. $K > L_B$. In contrast to a small bank credit, the full repayment of a large credit is not possible if the firm is liquidated. D has to be chosen such that the zero profit condition for the bank is fulfilled. The bank realizes an expected payoff of zero, for any expected value of p, $\hat{p}$, if

$$\begin{aligned} \hat{p}D + (1-\hat{p})L_B &= K \quad (15) \\ D &= \frac{1}{\hat{p}}[K - (1-\hat{p})L_B] \quad (16) \end{aligned}$$

How does a large credit affect the negotiation between manager and investor? The outside option of not coming to an agreement is now $\beta R - M(\beta, d)$ for the investor, since all of the liquidation value goes to the bank if the credit is not repaid. The surplus from continuation is now $(Z - D)$ because the project can be continued only if the credit is repaid in full. Thus, the investor's expected payoff is

$$K + p[\beta R + \alpha(Z - D)] + (1-p)0 - M(\beta, d) \quad (17)$$

$$= p[\beta R + D + \alpha(Z - D)] + (1-p)L_B - M(\beta, d) \quad (18)$$

using (16) and the fact that in equilibrium $p = \hat{p}$. The manager's expected payoff is

$$p[(1-\beta)R + (1-\alpha)(Z - D)] - C(p) \quad (19)$$

Total payoffs are

$$p[R+Z]+(1-p)L_B-C(p)-M(\beta,d) \tag{20}$$

Note that this time it is the manager who has to suffer a payoff loss. The reason is that with such a large credit to repay, continuing the project becomes less valuable, and hence the manager's payoff from bargaining with the investor becomes smaller. This has of course a negative effect on his incentive to spend effort on probability p.

In the Appendix we show that in this case equilibrium values p^* and β^* will be lower than in case of internal financing, provided $D > L$, i.e. $p^*(D) \equiv \underline{p} < p \equiv p^*(L)$, and similarly $\beta^*(D) \equiv \underline{\beta} < \beta \equiv \beta^*(L)$. So the investor's equilibrium payoff in case of a large credit is

$$\underline{p}[\underline{\beta}R+D+\alpha(Z-D)]+(1-\underline{p})L_B-M(\underline{\beta},d) \tag{21}$$

Comparing this payoff to her payoff in case of internal financing we find that she enjoys a higher payoff in case of a large bank credit if and only if

$$\underbrace{-(p-\underline{p})[\alpha(Z-D)+(1-\alpha)(D-L_B)]-[(p\beta R-M(\beta,d))-(\underline{p}\underline{\beta}R-M(\underline{\beta},d))]}_{\text{efficiency effect}} \tag{22}$$
$$+\ \underbrace{\underline{p}(1-\alpha)(D-L)}_{\text{rent shifting effect}}-\underbrace{(1-\underline{p})(L-L_B)}_{\text{capital cost effect}}\geq 0$$

The investor gains what the manager loses, but at the same time she loses from the lower liquidation value that results again in a dead weight loss whenever returns are zero. The following lemma summarizes these different effects.

Lemma 5 Large bank credit

A large credit

- *shifts rents from the manager to the investor (positive rent shifting effect)*

- *reduces the manager's effort choice (negative efficiency effect)*
- *causes a dead weight loss due to the lower liquidation value (negative capital cost effect).*

Thus, we find that small and large credits affect payoffs and incentives of investor and manager in very different ways. A small credit can be used to shift rents to the manager, whereas a large credit can be used to shift rents to the investor. This rent shifting implies a positive or a negative efficiency effect. However, both kinds of credits cause a dead weight loss due to higher capital costs.

5 Optimal financing choice

How should the investor finance the project if he is free to choose, i.e. if he does not face any financial constraints?

The first result summarizes the different effects that are driving the choice of small or large bank credits, as opposed to internal financing.

Result 1
- *A small credit is chosen instead of internal financing if the positive efficiency effect outweighs the negative rent shifting and capital cost effects.*
- *A large credit is chosen instead of internal financing if the positive rent shifting effect outweighs the negative efficiency and capital cost effects.*

Consider next how a change in distance affects the relative choice of financing. This is described in the following result:

Result 2 *The larger the distance d,*

- *the smaller the efficiency effect,*
- *the larger the rent shifting effect and*

- *the smaller the capital cost effect of small and large bank credits.*

Hence, the larger the distance d,

- *the more likely it is that a large credit is chosen instead of internal financing and*
- *the less likely it is that a small credit is chosen instead of a large credit.*

Proof: See Appendix

To get an intuition for this consider again the investor's payoff difference in case of a large credit as compared to internal financing. In the following inequality we indicate how the different effects are affected by an increase in distance. A $(-)$ or $(+)$ sign indicates that this term gets smaller or larger as distance increases.

$$\underbrace{-\overbrace{(p-\underline{p})}^{(-)}[\alpha(Z-D)+(1-\alpha)(D-L_B)]-\overbrace{[(p\beta R-M(\beta,d))-(\underline{p}\beta R-M(\underline{\beta},d))]}^{(-)}}_{\text{efficiency effect}} \tag{23}$$

$$+\underbrace{\overbrace{p}^{(+)}(1-\alpha)(D-L)}_{\text{rent shifting effect}}-\underbrace{\overbrace{(1-p)}^{(-)}(L-L_B)}_{\text{capital cost effect}} \geq 0$$

So the negative effects get smaller and the positive effect gets larger as the distance gets larger. This is due to the concavity of the manager's effort cost function. The larger the distance, the less monitoring occurs and hence the more the manager spends effort for any given liquidation value. This increases the marginal cost of additional effort and hence reduces the efficiency effect of a bank credit.

In case of a small bank credit the relative changes are indicated in the following payoff difference

$$\underbrace{\overbrace{(\overline{p}-p)}^{(-)}[\alpha(Z-L_B)] + \overbrace{[(\overline{p}\overline{\beta}R - M(\overline{\beta},d)) - (p\beta R - M(\beta,d))]}^{(-)}}_{\text{efficiency effect}} \tag{24}$$

$$-\underbrace{\overbrace{p}^{(+)}(1-\alpha)(L-L_B)}_{\text{rent shifting effect}} - \underbrace{\overbrace{(1-p)}^{(-)}(L-L_B)}_{\text{capital cost effect}} \geq 0$$

As we see, in case of a small credit, the positive efficiency effect is reduced and the negative rent shifting effect is increased, thus both reduce the left hand side of the inequality. The negative capital cost is reduced, however. So the overall effect is not to unambiguous. But as the capital cost effect is the same for small as well as for large credits, the attractiveness of small credits as opposed to large credits is unambiguously reduced. Furthermore, for low values of α, the attractiveness of small credits as opposed to internal financing is unambiguously reduced as well.

Finally, we consider the optimal choice of taking a credit from a local versus a global bank, if a credit is to be taken at all. This choice is described in the following result.

Result 3

- *Suppose the investor chooses a large credit to benefit from the positive rent shifting effect. Then it is optimal to choose a local bank.*

- *Suppose instead the investor chooses a small credit to benefit from the positive efficiency effect. Then the optimal choice between a local and a global bank depends on the relative sizes of the positive efficiency effect and the negative rent shifting and capital cost effects.*

The intuition for this result is straightforward. In case of a large credit, the rent shifting is achieved through choosing the appropriate D. The liquidation value matters only for the determination of the capital cost. So,

whatever rent shifting is desired should be chosen at the lowest possible dead weight loss, i.e. at the highest possible liquidation value. This makes it optimal to choose the local bank.

In case of small credit, the investor faces a tradeoff instead. The smaller the liquidation value, the larger the positive efficiency effect. But at the same time, the larger the negative rent shifting and capital cost effect. Depending which of the two countervailing forces dominates, the investor will choose a small credit from a local or from a global bank.

6 Empirical predictions and data

In this section we derive a number of empirical predictions from the results established before and confront them with survey data.

The Data

The data consists of new survey data of 660 German and Austrian firms with 2200 investment projects in transition countries during the period 1900 to 2001. In terms of value the 1200 German investment projects represent 80 percent of total investment in Eastern Europe in this period, while the 1000 Austrian investment projects represent 100 percent of total Austrian investment to Eastern Europe. The questionnaire of the survey comes in three parts: information on parent firms in Austria and Germany, information on the actual investment, and information on Eastern European affiliates and their environment. Due to the length of the questionnaire we personally visited the parent firms in Austria or Germany, or conducted the interview by phone.

The sample is unique in several dimensions. First, it includes detailed information on parent firms in Austria and Germany. Second, it contains information about how and where the investment is financed. Third, it includes information on affiliates in Eastern Europe and their environment. The sample consists of quantitative as well as qualitative information. German and

Austrian investment in Eastern Europe go predominantly to Central Europe including the Czech and Slovak Republic, Hungary, and Poland (over 80 percent), to Southern Europe including Bulgaria, Croatia, and Romania (16 and 12 percent, respectively), and to the former Soviet Union including Russia and Ukraine (7.4 and 6.2 percent, respectively).

To assess whether or not FDI consists of a capital flow from Germany or Austria to Eastern Europe the share of FDI that is locally financed in Eastern Europe and that comes from external sources matters. In Germany, 27 percent and in Austria 47.9 percent of total investment are at least partly financed by external sources (external and mixed financing). 30 to 40 percent of all external and mixed funding are coming from local sources either through a loan by a local bank in the host country or by equity raised in the host country. Thus, in roughly 15 percent of the cases an FDI investment to Eastern Europe does not involve a capital flow. These figures do not take into account reinvested profits by affiliates in the host country which count as FDI and do not involve a capital transfer from the home to the host country. Affiliates in Eastern Europe finance 39 percent (German multinationals) and 73 percent (Austrian multinationals) of total investment out of internal cash flow.

Table 1: Financing of FDI in Eastern Europe by Parent Firm
(in percent of total FDI)

type of finance	Germany	Austria
external	8.43	11.85
internal	67.54	49.52
mixed (external and internal)	18.63	36.07
missing	5.40	2.56

Empirical Results

Our first prediction is based on Result 3, which says that large credits should be financed locally, whereas small credits should be financed either

through a local or a global bank.

Hypothesis 1 Credit Size and Choice of Bank

There is a positive correlation between credit size and the choice of local versus global bank. The larger the credit, the more likely it is that a local bank is chosen.

To establish how valid this hypothesis is, we consider the Table 2. This table presents the number of small and large credits taken from local banks, global banks or a combination of the two. We find that around 21 percent of all local credits are small, whereas almost 79 percent are large. In contrast, global credits are small in almost 45 percent of all cases and large only in 55 percent. The Chi-square value confirms that size and location of credit are indeed correlated in the predicted fashion.

Table 2: Credit Size and Mode of Bank Financing

Mode of financing		Credit size		
		Small	Large	Total
local	Cases	14	52	66
	In % of credit size	21.21	78.79	100.00
	In % of mode of financing	5.49	15.29	11.09
global	Cases	207	255	462
	In % of credit size	44.81	55.10	100.00
	In % of mode of financing	81.18	75.00	77.65
Mixed local and global	Cases	34	33	67
	In % of credit size	50.75	49.25	100.00
	In % of mode of financing	13.33	9.71	11.26
Total	Cases	255	340	595
	In % of credit size	42.86	57.14	100.00
	In % of mode of financing	100.00	100.00	100.00

Chi-Square value = 15.05 (sign level of 0.0001)
Small: share of bank loan smaller than 50 percent of investment level

Our next hypothesis is about the choice of global versus local banks.

Hypothesis 2 Global Bank versus Local Bank

- *The larger the rent shifting effect, i.e. the more the investor cares about appropriating rents from the manager, the less she is inclined to choose global bank finance as opposed to local bank finance.*
- *The larger the distance, the less likely is global bank finance as opposed to local bank finance.*

The first part of the second hypothesis is based on Result 1 which compares the relative merits of small and large credits , and on Result 3, which relates the size of credits to the choice between local and global bank. The second part of the hypothesis is based on Result 2 which describes the effect of a change of distance on the choice of credit financing, and again on Result 3. The first part of the second hypothesis is based on Result 1 which compares the relative merits of small and large credits , and on Result 3, which relates the size of credits to the choice between local and global bank. The second part of the hypothesis is based on Result 2 which describes the effect of a change of distance on the choice of credit financing, and again on Result 3.

This hypothesis is tested in Table 3. The dependent variable in this Logit Regression is a dummy equal to 1 if the credit is taken from a German or Austrian bank, and equal to 0, if the credit is taken locally. As explaining variables we use Market size, R&D/Sales ratio and Distance. We present descriptive statistics of these variables in the Appendix.

Market size is a dummy equal to 1 if the investor reported that the size of the local market was a very important or an important motivation to invest in this location. We use this variable to capture the rent shifting motivation. If the market size for the investor's investment project is large, the investment project is perceived as profitable. In this case, the investor's concern is primarily to capture the expected returns, rather than to induce

the manager to develop the market. We find that the coefficient of Market size has the expected negative sign and that it is significant at the 3 percent level for both specifications.

The variable R&D/Sales measures the ratio of R&D expenditures and sales of the investor's local investment project. We use this variable to capture the efficiency effect. The larger this R&D ratio, the less the investment relies on standard procedures and hence the more important is the manager's effort to induce a high return. This efficiency effect favors small credits, but since there is no clear prediction what bank should be chosen for small credits, there is no prediction what sign the coefficient of this variable should have. In fact, we find that the coefficient of the R&D variable is insignificant in both specifications.

Finally, we include the variable distance, which measures the distance between headquarters and local investment project. We find the predicted negative coefficient for this variable, and it is significant at the 1 percent level.

Table 3: Global Bank versus Local Bank

Dependent Variable: Dummy = 1 in case of global bank, Dummy = 0 in case of local bank

	(1)	(2)
Market size	-0.64	-0.63
	(0.03)	(0.03)
Ln R&D/sales	0.02	0.01
	(0.69)	(0.82)
Ln distance		-0.44
		(0.01)
Constant	2.31	5.10
	(0.00)	(0.00)
Log likelihood	-167	-163
N	412	409

P-values in parentheses

Our last hypothesis is based again on Results 1 and 3. This hypothesis captures the decision between global and local financing.

Hypothesis 3 Global versus Local Finance

- *The larger the rent shifting effect, i.e. the more the investor cares about appropriating rents from the manager, the less likely is global finance.*
- *The larger the efficiency effect, i.e. the more the investor cares about inducing the manager to spend effort, the less likely is global finance.*

The first part of the hypothesis follows directly from Results 1 and 3, which establish that large credits rather than internal financing, let alone small credits are called for if the rent shifting effect is large, and large credits are taken from local banks. The second part of the hypothesis follows from Result 1, which states that small credits rather than internal financing is preferred for large efficiency effects. From Result 3 we know that small credits can be taken from either local or global banks. So local bank financing is more likely than internal financing, and there is no relative advantage vis a vis global bank financing. The overall effect of the efficiency effect for global versus local financing should be negative, if the effect of local bank vis a vis internal financing dominates.

Table 4 presents our Logit Regression of Global versus Local Financing. The dependent variable is a dummy equal to 1 in case of global financing (global bank or internal financing) and equal to 0 in case of local bank financing. As before, the variable Market size captures the rent shifting effect. Its coefficient exhibits the expected negative sign and it is significant for all specifications at the 6 percent level and more. R&D sales ratio captures the efficiency effect and it shows the expected negative sign, significant at the 0 percent level for all specifications.

We also include a number of other variables for which we have either nor prediction or which are not modelled in our set-up. The expected sign of

distance depends on whether the local bank represents a small or a large credit. We find a positive sign for the variable, that would be consistent with the small credit view of a local bank credit. But it turns insignificant if we include country fixed effects in the regression, whereas Market size and R&D ratio do not become insignificant.

Not surprisingly, we find that Exchange rate risk reduces the use of global financing and banking underdevelopment increases the use of global bank financing. Both variables have significant coefficients, but their inclusion does not reduce the significance of the variables described above.

Table 4: Global versus Local Finance

Dependent Variable: Dummy = 1 in case of global finance, Dummy = 0 in case of local bank

	(1)	(2)	(3)
Market size	-0.66	-0.62	-0.44
	(0.00)	(0.01)	(0.06)
Ln R&D /sales	-0.11	-0.11	-0.12
	(0.00)	(0.00)	(0.00)
Ln distance	0.25	0.42	0.12
	(0.02)	(0.00)	(0.37)
Exchange rate risk		-1.00	-1.07
		(0.00)	(0.00)
Banking		0.80	1.23
underdevelopment		(0.00)	(0.00)
Country fixed effects			-1.24
			(0.00)
Constant	0.79	0.12	2.68
	(0.27)	(0.87)	(0.01)
Log likelihood	-413	-393	-383
N	1597	1597	1597

P-values in parentheses

7 Conclusion

In this paper we have studied the question to what extent foreign direct investments involve a capital transfer to the host country. We have found that investments tend to be financed locally if the investor worries about capturing the returns of the investment and about giving incentives to the manager to spend effort. So, local financing is the choice for investment projects that exhibit large managerial incentive problems. Capital transfers take place if the investment involves rather standard technology, the returns of which are relatively easy to appropriate, i.e. if neither of the two incentive problems is too large. Hence technology transfer and capital transfer are not as complementary as is often thought.

To be completed!

8 Appendix

Table 5: Descriptive Statistics

localbank	Dummy variable D=1, 133 observations when FDI investor involved bank in transition countries to finance investment
globalbank	Dummy variable D=1, 530 observations when FDI investor involved host bank in Germany or Austria to finance investment
marketsize	Dummy variable D=1, 1389 observations when market size is prime motivation for FDI investor
R&D/sales	min: 0.00%, max: 82,20%, mean: 2,08%, median: 0,00%, 1619 observations
distance	min: 17 km, max: 6000 km, mean: 906 km
exchange rate risk	Dummy variable D=1, 694 observations when firm perceived exchange rate risk as important
banking underdevelopment	Dummy variable D=1, 216 observations when firm perceived banking development in Eastern Europe country as poor

Proof of Lemma 1

Note that the following first order condition maximizes the manager's payoff

$$(1-\beta)R + (1-\alpha)(Z-L) - C'(p) = 0. \tag{25}$$

Using the implicit function theorem we can show that

$$\frac{dp}{dL} = -\frac{-(1-\alpha)}{-C''(p)} = -\frac{(1-\alpha)}{C''(p)} < 0 \tag{26}$$

and

$$\frac{dp}{d\beta} = -\frac{-R}{-C''(p)} = -\frac{R}{C''(p)} < 0. \tag{27}$$

Q.E.D.

Proof of Lemma 2

Note that the investor maximizes his payoff with the following first order condition

$$pR - \frac{dM}{d\beta} = 0 \tag{28}$$

Using the implicit function theorem, we can derive

$$\frac{d\beta}{dp} = -\frac{R}{-\frac{d^2M}{d\beta^2}} > 0 \tag{29}$$

and

$$\frac{d\beta}{dd} = -\frac{-\frac{d^2M}{d\beta dd}}{-\frac{d^2M}{d\beta^2}} < 0 \tag{30}$$

Q.E.D.

Proof of Lemma 3

The equilibrium is described by the following two first order conditions

$$\begin{aligned} (1-\beta^*)R + (1-\alpha)(Z-L) - C'(p^*) &= 0 & (31)\\ p^*R - \frac{dM(\beta^*, d)}{d\beta} &= 0 & (32) \end{aligned}$$

Using the implicit function theorem for linear equation systems we can derive the following properties.

$$\frac{dp^*}{dL} = \frac{|F_{pL}|}{|F|} = \frac{\begin{vmatrix} (1-\alpha) & -R \\ 0 & -\frac{d^2M}{d^2\beta} \end{vmatrix}}{\begin{vmatrix} -C''(p) & -R \\ R & -\frac{d^2M}{d\beta^2} \end{vmatrix}} = \frac{-(1-\alpha)\frac{d^2M}{d\beta^2}}{C''(p)\frac{d^2M}{d\beta^2} + R^2} < 0 \tag{33}$$

$$\frac{d\beta^*}{dL} = \frac{|F_{\beta L}|}{|F|} = \frac{\begin{vmatrix} -C''(p) & (1-\alpha) \\ R & 0 \end{vmatrix}}{\begin{vmatrix} -C''(p) & -R \\ R & -\frac{d^2M}{d\beta^2} \end{vmatrix}} = \frac{-(1-\alpha)R}{C''(p)\frac{d^2M}{d\beta^2} + R^2} < 0 \tag{34}$$

$$\frac{dp^*}{dd} = \frac{|F_{pd}|}{|F|} = \frac{\begin{vmatrix} 0 & -R \\ \frac{d^2M}{d\beta dd} & -\frac{d^2M}{d\beta^2} \end{vmatrix}}{\begin{vmatrix} -C''(p) & -R \\ R & -\frac{d^2M}{d\beta^2} \end{vmatrix}} = \frac{R\frac{d^2M}{d\beta dd}}{C''(p)\frac{d^2M}{d\beta^2} + R^2} > 0 \tag{35}$$

$$\frac{d\beta^*}{dd} = \frac{|F_{\beta d}|}{|F|} = \frac{\begin{vmatrix} -C''(p) & 0 \\ R & \frac{d^2M}{d\beta dd} \end{vmatrix}}{\begin{vmatrix} -C''(p) & -R \\ R & -\frac{d^2M}{d\beta^2} \end{vmatrix}} = \frac{-C''(p)\frac{d^2M}{d\beta dd}}{C''(p)\frac{d^2M}{d\beta^2} + R^2} < 0 \tag{36}$$

Q.E.D.

Proof of Lemma 5

We want to show that for large credits equilibrium values p^* and β^* are lower than in case of internal financing, provided $D > L$, i.e. $p^*(D) \equiv \underline{p} < p \equiv p^*(L)$, and similarly $\beta^*(D) \equiv \underline{\beta} < \beta \equiv \beta^*(L)$.

To see this recall that the investor's and manager's expected payoffs, for a given D are

$$K + p[\beta R + \alpha(Z - D)] + (1-p)0 - M(\beta, d) \tag{37}$$

and

$$p[(1-\beta)R + (1-\alpha)(Z-D)] - C(p) \tag{38}$$

So the equilibrium in case of a large credit is described by the following two first order conditions

$$(1-\beta^*)R + (1-\alpha)(Z-D) - C'(p^*) = 0 \tag{39}$$

$$p^*R - \frac{dM(\beta^*, d)}{d\beta} = 0 \tag{40}$$

These conditions are identical with the ones in case of internal financing, only L is replaced by D. So the same properties as the one established in Lemma 3 apply.

Q.E.D.

Proof of Result 2

To see this reconsider the condition for choosing a large credit from above. We show that as d increases, the terms are affected as indicated by $(-)$ or $(+)$.

$$\underbrace{-\overbrace{(p-\underline{p})}^{(-)_1}[\alpha(Z-D)+(1-\alpha)(D-L_B)]-\overbrace{[(p\beta R-M(\beta,d))-(\underline{p}\underline{\beta}R-M(\underline{\beta},d))]}^{(-)_2}}_{\text{efficiency effect}} \quad (41)$$

$$+\underbrace{\overbrace{p}^{(+)_3}(1-\alpha)(D-L)}_{\text{rent shifting effect}}-\underbrace{\overbrace{(1-p)}^{(-)_4}(L-L_B)}_{\text{capital cost effect}} \geq 0$$

Consider first $(-)_1$. This follows from the fact that $\frac{d^2p}{d(-L)dd} < 0$. To see this recall that

$$\frac{dp^*}{dL}=\frac{-(1-\alpha)\frac{d^2M}{d^2\beta}}{C''(p)\frac{d^2M}{d\beta^2}+R^2}<0 \quad (42)$$

Hence

$$\frac{d^2p^*}{dLdd}=\frac{(1-\alpha)\frac{d^2M}{d^2\beta}\left[\frac{d^2M}{d\beta^2}C'''(p)\frac{dp}{dd}\right]}{\left(C''(p)\frac{d^2M}{d\beta^2}+R^2\right)^2}>0 \quad (43)$$

and therefore $\frac{d^2p}{d(-L)dd} < 0$ i.e. the positive efficiency effect of lowering the liquidation value is reduced the larger the distance.

Consider next $(-)_2$.

To see this consider

$$\frac{d[p\beta R-M(\beta,d)]}{d(-L)} = \frac{dp}{d(-L)}\beta R+\frac{d\beta}{d(-L)}\underbrace{(pR-\frac{dM(\beta,d)}{d\beta})}_{=0}>0 \quad (44)$$

$$\frac{d^2[p\beta R - M(\beta, d)]}{d(-L)dd} = \underbrace{\frac{d2p}{d(-L)dd}}_{-}\beta R + \underbrace{\frac{dp}{d(-L)}}_{+} R \underbrace{\frac{d\beta}{dd}}_{-} < 0 \tag{45}$$

Consider finally $(+)_3$ and $(-)_4$. They follow directly from Lemma 3 which establishes that $\frac{dp}{dd} > 0$.

Note that the effects in case of a small credit are affected in exactly the same fashion.

Q.E.D.

9 References

To be completed