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## Debt versus equity finance in developing countries: An empirical analysis of the agent-principal model of internat. capital transfers

Kieler Studien, No. 229

**Provided in Cooperation with:**

Kiel Institute for the World Economy – Leibniz Center for Research on Global Economic Challenges

*Suggested Citation:* Corsepius, Uwe; Nunnenkamp, Peter; Schweickert, Rainer (1989) : Debt versus equity finance in developing countries: An empirical analysis of the agent-principal model of internat. capital transfers, Kieler Studien, No. 229, ISBN 3163455514, Mohr, Tübingen

This Version is available at:

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# Kieler Studien

Institut für Weltwirtschaft an der Universität Kiel

Herausgegeben von Horst Siebert

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229

Uwe Corsepius · Peter Nunnenkamp · Rainer Schweickert

## Debt versus Equity Finance in Developing Countries

An Empirical Analysis of the Agent-Principal Model  
of International Capital Transfers

A93904 / 89 *Weltwirtschaft  
Kiel*



J.C.B. MOHR (PAUL SIEBECK) TÜBINGEN

ISSN 0340-6989

CIP-Titelaufnahme der Deutschen Bibliothek

**Corsepius, Uwe:**

Debt versus equity finance in developing countries : an empirical analysis of the agent-principal model of international capital transfers / Uwe Corsepius ; Peter Nunnenkamp ; Rainer Schweickert. - Tübingen : Mohr, 1989

(Kieler Studien ; 229)

ISBN 3-16-345551-4 kart.

ISBN 3-16-345552-2 Gewebe

NE: Nunnenkamp, Peter; Schweickert, Rainer; GT

Schriftleitung: Hubertus Müller-Groeling



Institut für Weltwirtschaft an der Universität Kiel

J. C. B. Mohr (Paul Siebeck) Tübingen 1989

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Printed in Germany

ISSN 0340-6989

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## Abbreviations

BIC	Business International Corporation
CNIE	Comisión Nacional de Inversiones Extranjeras
DAC	Development Assistance Committee
DSR	Domestic savings rate
FDI	Foreign direct investment
GDP	Gross domestic product
ILO	International Labour Office
IMF	International Monetary Fund
IR	Investment rate
LIBOR	London Interbank Offer Rate
LIE	Law to Promote Mexican Investment and Regulate Foreign Investment
MIDA	Malaysian Industrial Development Authority
NEP	New Economic Policy
ODA	Official development assistance
OECD	Organisation of Economic Co-operation and Development
OLS	Ordinary least squares
OOF	Other official flows
OPEC	Organization of Petroleum Exporting Countries
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development

## Preface

This study is part of a research project on the optimal structure of capital transfers between developed and developing countries. It attempts to assess the effects of different types of capital inflows on overall investment, domestic savings, and economic growth in Third World economies. Disincentive problems arising in situations where ownership and control of capital transfers are separate are analysed in an agent-principal context. The model explicitly recognizes that debt and equity transfers involve different compensation rules by which future returns are distributed among agents and principals. These rules in turn determine the investment and savings behaviour of capital-recipient countries.

The findings of this study have important consequences for the current discussion on the external financing of highly indebted countries. First of all, the evidence suggests that a great potential exists to enhance the efficiency of both foreign direct investment and debt finance. In the recent past many developing countries have focussed on financial restructuring, e.g. through debt-equity swaps. This priority could be mistaken as a substitute for economic policies that encourage the productive use of both types of foreign capital. Secondly, developing countries are well advised to build up a reputation as cooperative borrowers and cooperative hosts of foreign investment in order to obtain favourable transfer conditions. Towards this end, policy-induced bottlenecks that impede the mobilization of domestic savings should be removed, public investments expanded, and the widespread bias towards high-risk projects reduced.

The authors gratefully acknowledge financial support provided by the Deutsche Forschungsgemeinschaft for their research on the optimal structure of capital transfers between developed and developing countries. They are indebted to all those individuals in the private and public sectors of Chile, Malaysia, Mexico, and South Korea, who provided essential data and background information. Thanks are also due to

various members of international organizations and institutions in the United States and West Germany, who participated in the discussion of this research project.

The authors want to express their gratitude to Ulrich Lächler who developed the basic theoretical model applied in the present study when he was a senior research fellow at the Kiel Institute of World Economics. They benefited from the constructive criticism and many helpful suggestions of Ulrich Hiemenz and Volker Stüven. The authors also wish to thank Gretel Glissmann and Christiane Schröder for typing and retyping many parts of the study, and Michaela Rank for her statistical computations. Bernhard Klein and Itta Esskuchen of the editing staff deserve credit for painstakingly checking the manuscript.

Kiel, September 1989

Horst Siebert

## A. Introduction

Developing countries are generally faced with several options to raise foreign capital in order to supplement domestic savings and investment funds. Many low-income economies mainly depend on development aid from industrialized countries. More advanced developing countries, for which external aid is no longer available to a significant degree, are left with the alternative to borrow abroad or to attract foreign direct investment (FDI) and portfolio investment. Basically, the financing options reduce to a choice between foreign debt and equity finance for the latter group on which this study will focus.

In the 1970s and early 1980s, most of the developing countries opted for external borrowing in the first place. The share of FDI in the Third World's total resource receipts decreased from 19 per cent in 1970 to 8 per cent in 1983; whereas the role of commercial bank lending increased from 15 to 36 per cent [World Bank, d, 1985, p. 21].<sup>1</sup> Arguably, this structural shift of external financing towards borrowing contributed to the subsequent widespread debt crisis in the Third World. It is widely acknowledged that debt inflows involve higher risks for the recipient country than FDI inflows. Debt-service schedules are fixed ex ante and are typically not related to the country's ability to pay. Especially in the case of flexible interest loans, the risk of adverse world market developments is shifted from the creditor to the borrower. In sharp contrast, the payment of dividends to foreign investors is closely related to the host country's economic performance. The servicing of non-debt creating capital inflows is more flexible because FDI provides for risk sharing between the host country and foreign investors.

Moreover, FDI is designed for specific projects, while general balance of payments financing figures prominently in the case of debt. The latter type of financing may thus be more susceptible to an unproductive use of foreign capital. Finally, FDI is frequently considered superior to

<sup>1</sup> Recently, the share of FDI in total resource receipts recovered (1986: 15 per cent; 1987: 22.5 per cent). This increase was partly because of higher FDI inflows. But the shift in the composition of capital inflows was primarily due to the dramatic decline in bank lending to developing countries after the eruption of the debt crisis. Net bank lending dwindled from US \$ 34 billion in 1983 to US \$ 5 billion in 1987 (for recent data, cf. OECD [a, p. 47]).

debt because managerial skills and technological knowledge are transferred in addition to foreign finance. Consequently, FDI may be better suited to help overcoming the relative scarcity of human capital in developing countries.

According to this reasoning, developing countries would be well advised to change the structure of external financing towards more equity participation as a means to prevent or solve foreign debt problems. Actually, such a reorientation has been proposed since the debt crisis erupted in 1982 [cf. e.g. World Bank, d, 1985]. Recommendations include an intensified use of debt-equity swaps, the establishment of mutual funds to attract portfolio investment, the development and liberalization of domestic stock markets, as well as the issue of "quasi equities" such as commodity bonds. Although a significant restructuring of foreign resource inflows may be difficult due to the sheer amount of accumulated debt, several highly indebted countries recently revised their financing policies along the suggested lines. Debt-equity swaps became a common element of debt management strategies, particularly in Latin America. Chile reduced its foreign debt significantly in this way since 1985.<sup>1</sup> Other countries such as Malaysia and South Korea prepaid external debt obligations to the extent that outstanding debt stocks were reduced, and liberalized FDI regulations substantially.

It is the principal aim of the present study to analyse whether FDI as a risk sharing device is generally superior to debt. The impact of foreign capital inflows on domestic savings and economic growth has been a subject of long-lived controversy in the development literature. The substantial body of empirical research is mainly concerned with the effectiveness of foreign aid.<sup>2</sup> One major bone of contention is whether aid raises total domestic investment by an equal amount, as assumed in early applied development models [Chenery, Strout, 1966]; or is fungible enough to be treated as a general increment to income [Mosley, 1980; Papanek, 1972]; or is downright deleterious for various socio-political reasons [Griffin, Enos, 1970; Bauer, 1982]. Some attempts were made to

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<sup>1</sup> Debt conversions during 1985-1989 (February) amounted to 33 per cent of debt outstanding in 1985 [Banco Central de Chile, 1989].

<sup>2</sup> For an early survey, cf. Bhagwati [1978]; for a more recent summary of empirical research, cf. Agarwal et al. [1984]; cf. also Hiemenz [1986] and Cassen et al. [1986].

differentiate between alternative sources of foreign capital inflows, such as private versus official transfers [e.g. Papanek, 1973; Dowling, Hiemenz, 1983]. But the central distinction between debt and FDI inflows emphasized in this study was hardly addressed. The literature on optimal foreign capital accumulation focused on external borrowing, while FDI as an alternative source of foreign capital was largely neglected.<sup>1</sup>

Also in more recent attempts to model the international transfer of capital from a choice-theoretic perspective, the question what constitutes the optimal debt-equity structure of an economy receiving capital from abroad has hardly been addressed.<sup>2</sup> The reasoning of these studies that credit rationing may lead to non-cooperative equilibria in the international credit market has to be extended to the case of equity-financed capital transfers. The objective is to provide a choice-theoretic model that simultaneously includes debt and equity finance as alternative transfer channels, in order to determine the optimal composition of foreign capital transfers.

The central hypothesis derived from the model presented in Chapter B states that changes in the financial structure of a country do affect its macroeconomic performance. Referring to the agent-principal approach in microeconomic theory [Jensen, Meckling, 1976; Stiglitz, 1974], the model focuses on the incentive problems arising in situations where ownership and control of economic resources are separate and monitoring costs non-negligible. Once a transfer of funds has been agreed upon, the capital-recipient country (i.e., the agent) is free to decide as to how to use these funds. Moral hazard by the agent can only be ruled out if he would credibly commit himself to a certain investment behaviour (cooperative equilibrium). Otherwise the incentive problems lead to a second-best solution of transfer negotiations, i.e., a non-cooperative equilibrium, provided that moral hazard is properly anticipated by the rational principal. The agent-principal approach explicitly recognizes that debt and equity involve different compensation rules, by which future returns are distributed among the various providers of capital. These

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<sup>1</sup> Exceptions are Feder and Regev [1975] and Hanson [1974]; although debt and FDI are formally distinguished, the authors employ arbitrary assumptions about the risks of default and expropriation.

<sup>2</sup> Eaton, Gersovitz [1981]; Folkerts-Landau [1985]; Sachs [1982]; Sachs, Cohen [1982].

rules in turn determine the incentive structure that motivates the behaviour of the agent.

The basic agent-principal model (Section B.II) hypothesizes that the shift from debt to FDI involves a risk-return trade-off between income stability and expected future consumption under non-cooperative transfer conditions. That is, with a higher proportion of equity-financed inflows, the variability of residual income generated and retained in the capital-recipient country would decline, but the domestic savings incentives and hence the future growth prospects of that country would also be reduced. Only if conditions conducive to a cooperative equilibrium pertain, more FDI and less debt would yield a clear welfare improvement for the agent.

The widespread debt-servicing difficulties of developing countries in the 1980s indicate that the actual environment in which capital transfers took place is more accurately characterized by a non-cooperative process.<sup>1</sup> It is thus of considerable interest for the purpose of formulating policy recommendations to analyse empirically whether or not the model predictions on the economic performance effects of FDI and debt hold. Before doing so, however, the basic model's major assumptions will be critically discussed (Section B.III). Most importantly, the institutional and regulative framework governing different financial inflows in the capital-recipient countries has to be considered. Government regulations do not only affect the structure of capital transfers, but may also influence the use and thereby the efficiency of FDI and debt inflows. The policy-induced change in the ranking of FDI and debt with respect to their economic performance effects is likely to be the greater, the less fungible different forms of capital inflows are in the capital-recipient country.

The empirical analysis focuses on the effects of debt and FDI-financed capital inflows on overall investment, domestic savings, and economic growth of the agent. The investigation proceeds in two steps. The results of a cross-country study are summarized in Chapter C. Regression analysis is applied for a sample of 36 developing countries to

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<sup>1</sup> The likelihood of debt problems is higher under non-cooperative conditions because the investment response to capital inflows is smaller than in a cooperative environment, and the terms of a transfer are less favourable for the agent (cf. also Section B.II).

determine the "normal pattern" of response behaviour among developing countries. The cross-country estimations suggest that most agents were engaged in non-cooperative relations with foreign principals; but the results also point to possible exceptions. This means that neither form of capital inflow can be judged unambiguously superior to the other, and thus recommended for all countries.

Country-specific analyses are required to explain deviations from the normal pattern of response behaviour and to arrive at more specific conclusions. Country studies on Chile, Malaysia, Mexico, and South Korea are presented in Chapter D. These economies differ significantly in the structure of external financing and economic performance (Section D.II). For the purpose of this study it is most interesting, to

- evaluate if and why some countries succeeded to engage in cooperative agent-principal relations (Section D.III);
- discuss the possible influence of government regulations on the structure and efficiency of capital inflows (Section D.IV);
- perform regression analyses in order to identify empirically the economic performance effects of different capital inflows in a time-series framework (Section D.V).

By comparing the country-specific experiences, it can then be judged whether recent changes in the agents' attitudes towards FDI and debt are well suited to enhance the prospects for economic development in the capital-recipient countries. Chapter E summarizes the major conclusions.



## **B. The Agent-Principal Approach in International Finance**

### **I. The Agent-Principal Framework: Introductory Remarks**

The question of what constitutes the optimal structure of external financing in capital-recipient developing countries has not received much attention during the 1970s and early 1980s when debt finance was easily available. Concerns that debt had been accumulated too fast and at the expense of FDI were raised only after the eruption of the debt crisis in 1982. However, recommendations to adjust the composition of financial inflows by promoting equity-related transfers are rarely based on a sound economic analysis of the relative merits and disadvantages of different forms of external finance. FDI is considered superior to debt mainly because it provides for risk sharing between the foreign investor and the capital recipient; the probable costs of risk sharing are largely neglected.

Against this background, it is the principal aim of this chapter to present a formal framework for the empirical analysis of the economic performance effects of different financial inflows. The conceptual foundations of the basic model of Section B.II originate from the agent-principal approach in microeconomic theory. The choice-theoretic approach focuses on moral hazard problems arising in situations where ownership and control of economic resources are separate and monitoring costs non-negligible. The general message presented by Jensen and Meckling [1976] as well as Stiglitz [1974] is that changes in the financial structure affect the performance of a firm; this contrasts sharply with the Modigliani-Miller result that leverage is irrelevant and that performance remains unaffected by financial restructuring.

The agent-principal concept is applied to developing countries in the following. The international transfer of capital is characterized by informational asymmetries as well. As in the case of corporate financing, a moral hazard situation arises once a transfer agreement has been reached between the investor or lender (principal) and the capital-recipient country (agent). The foreign principal, unlike the agent, does not know how much is effectively invested after the capital transfer has taken place. If the incentive problems are properly anticipated by the principal, capital transfer negotiations can lead to a non-cooperative

rather than to the first-best cooperative outcome, due to informational asymmetries. However, several issues require special consideration in drawing a parallel between a firm and a country:

- Sovereign countries can wilfully repudiate their external debt and expropriate foreign equity; while sovereign risk is generally ignored in the context of firms operating within a well-defined legal system which enforces contracts and compels agents to obey certain rules.
- As concerns the agent's attitude towards risk, the standard assumption made in connection to the firm is that of risk-neutral behaviour among entrepreneurs. The same assumption appears less applicable to a nation as a whole, as reflected by the widespread concern on macroeconomic instability in developing countries.
- In the context of international capital transfers, the decision-making authorities of the capital-recipient country are looked upon as the agent. Typically Third World governments exercise a great influence on the use of capital inflows. Unlike the managers of an enterprise, however, the government agents do not obtain absolute control over the disposal of capital within the economy.

The model presented in Section B.II does not address the question of sovereign risk explicitly. Sovereign risk is most likely to play an important role with respect to the total transfer volume; whereas the primary concern of the following analysis is on the structure of capital inflows.<sup>1</sup> It has been shown by Lächler [1985, pp. 29 ff.] that the basic analytical structure and the agent's choice between debt and equity remain largely unchanged if sovereign risk considerations are introduced.

In contrast to the managers of an enterprise, the government agent is modelled as a risk-averse social planner maximizing a well-behaved social expected utility function with domestic consumption as its argument. As a starting point, we assume that foreign capital inflows are perfectly fungible, i.e., equally efficient, whether they appear in the form of debt, equity or external aid. Subsequently, the question of the government agent's control over the use of different capital inflows is raised. The discussion on the institutional and regulative framework de-

<sup>1</sup> The impact of sovereign risk on the attitudes of agents and principals, as well as the question of how to reduce sovereign risk are dealt with extensively in several project papers, e.g. Nunnenkamp [1988; 1989a]; Nunnenkamp, Picht [1988]; Picht, Stüven [1988]; Stüven [1988].

termining the government's leverage (Section B.III) refers especially to the country-specific analysis of Chapter D. The scope and nature of public regulations may differ considerably between particular capital-recipient countries.

## II. The Basic Model

The presentation of the model is organized as follows:<sup>1</sup> First of all, the behavioural underpinnings are elaborated for the agent and the principal. Secondly, the nature of the cooperative and non-cooperative equilibria is explained for equity and debt finance. Thirdly, Section B.II.3 derives the equilibrium debt-equity ratio under both transfer regimes. The fundamental result obtained here is that in choosing between debt and equity under non-cooperative conditions the government agent is confronted by a risk-return trade-off; i.e., the choice essentially becomes one of economic stability versus future consumption. Finally, the incentive problems are further explored by analysing the impact of alternative types of transfers on overall investment, in order to arrive at empirically testable propositions.

### 1. Behavioural Underpinnings

We consider a capital-recipient country whose future output ( $Q_{t+1}$ ) is a stochastic function of the amount invested in the present ( $I_t$ )

$$[1] \quad Q_{t+1} = x_{t+1} F(I_t).$$

The random variable  $x_{t+1}$  is distributed according to the probability density function  $g(x)$ , over the non-negative interval  $(0, \bar{x})$  with mean 1. Its realized value is revealed only after the investment has been made.

---

<sup>1</sup> The following presentation draws extensively on Lächler [1985], who developed the analytical approach for the purpose of the research project on the optimal structure of capital transfers between developed and developing countries of which the present study is a part as well.

Aggregate investment is determined from the solution to an inter-temporal maximization problem yielding an optimal anticipated consumption stream. The setting considered is a two-period Fisherian consumption model, where the government agent seeks to maximize a von Neumann-Morgenstern social utility function:

$$[2] \quad U = U_1(C_t) + \beta U_2(C_{t+1}),$$

where  $U' > 0$ ,  $U'' \leq 0$ , and  $U(0) = 0$ ;  $C$  denotes consumption, and  $\beta$  the time-discount factor.

In an autarchic context, i.e., without foreign capital transfers, the objective function can be written as:

$$[3] \quad U_1(\bar{y}-I) + \beta \int_0^{\bar{x}} U_2[xF(I)]g(x)dx \Rightarrow \max I,$$

subject to the inequality constraint  $0 \leq I \leq \bar{y}$ , where  $\bar{y}$  represents the initial endowment of the country (time-subscripts have been deleted for notational convenience). This equation has to be extended if the agent receives a fixed capital transfer amount from abroad ( $\bar{T}$ ) in the initial period, which can take place either in the form of a loan or in exchange for equity participation:<sup>1</sup>

$$[4] \quad U_1(\bar{y}+\bar{T}-I) + \beta \int_0^{\bar{x}} U_2[\tau(xF(I)-B)]g(x)dx \Rightarrow \max I,$$

where  $B$  = the amount owed to the foreign principal in period 2, in return for a debt transfer in period 1;

$\tau$  = the agent's equity share, i.e., 1 minus the equity share of net output accruing to the foreign principal in period 2, in return for an equity transfer in period 1 ( $0 \leq \tau \leq 1$ ).

Debt and equity financing involve different compensation rules. In the case of debt transfers, the agent owes the foreign lender a predetermined sum to be paid back in the second period; while in the other

<sup>1</sup> A third case, examined in Section B.II.4 for comparative purposes, is where the transfer is made in the form of external aid (treated as an unrequited gift).

case, the foreign investor receives a predetermined share of the agent's second period output. Assuming that the foreign principal is a rational, risk-neutral wealth-holder, it is a matter of indifference to him whether the capital transfer takes place in return for debt or equity participation, as long as the expected return on either claim remains the same.

- Under a *pure equity participation arrangement*, the expected value of the principal's output share is  $E[(1-\gamma)xF(I)] = (1-\gamma)F(I^e)$ .  $I^e$  denotes the level of investment that the agent is expected to undertake *ex post*, upon receipt of the transfer. The amount that the principal would currently be prepared to transfer for this share in future output is then:

$$[5] \quad T^{EQ} = (1-\gamma)F(I^e)/(1+R),$$

where  $R$  is the principal's rate of time preference.<sup>1</sup> In the second period, once the random variable is determined, the principal would receive  $(1-\gamma)xF(I)$  and the agent would be left with the remaining amount,  $\gamma xF(I)$ .

- In evaluating his claim under a *pure debt financing arrangement*, the principal recognizes that the agent can only fulfil his obligation if the realized future output,  $xF(I)$ , equals or exceeds the amount of the debt  $B$ , i.e., if  $x \geq B/F(I)$ . In that case, the agent would receive the difference,  $xF(I)-B$ , in period 2. Otherwise the principal would receive only  $xF(I)$ , while the agent receives nothing. The present expected value of the debt claim can be expressed as:

$$[6] \quad T^D = B \int_b^{\bar{x}} g(x) dx + F(I^e) \int_0^b xg(x) dx$$

$$= F(I^e) \left[ 1 - \int_b^{\bar{x}} (x-b)g(x) dx \right]; \quad \text{with } b \equiv B/F(I^e).^2$$

<sup>1</sup> For simplicity, and without damage to subsequent arguments,  $R$  is henceforth assumed to be 0.

<sup>2</sup> The observed interest rate on foreign debt,  $r = (B-T)/T$ , varies positively with the level of  $b$ ; for a proof, cf. Lächler [1985, pp. 6 f.].

If transfers represent a combination of debt and equity finance, debt repayment is assumed to take precedence over payments to foreign investors. The expected value of the equity claim becomes:  $T^{EQ} = (1-\gamma)[F(I^e) - T^D]$ . The total expected value of both debt and equity claims can then be written as:

$$\begin{aligned} [7] \quad T &= (1-\gamma)[F(I^e) - T^D] + T^D \\ &= F(I^e) \left\{ 1 - \gamma \int_b^{\bar{x}} (x-b)g(x)dx \right\}. \end{aligned}$$

In other words,  $T$  represents the amount a foreign principal is prepared to transfer in exchange for a combined claim defined by the values of  $\gamma$  and  $B$ , given that the agent is expected to undertake the level of investment  $I^e$ .

## 2. The Determination of Equilibrium

For expository convenience, the amount of foreign capital transferred to the agent is assumed to be exogeneously given. What then remains to be determined are the terms of the transfer,  $\gamma$  and  $B$ , and the levels of actual and anticipated investment,  $I$  and  $I^e$ . With rational agents and principals, an equilibrium outcome of the transfer process is defined by  $I = I^e$ . However, two solutions are conceivable, that satisfy this equilibrium condition depending on the amount of information assumed to be available in the model:

- Transfer negotiations yield a non-cooperative outcome if the principal only observes the final output of the agent, but is unable to identify how much of that output is attributable to past investment rather than to random factors.
- A cooperative equilibrium would be achieved if the agent could credibly precommit himself to a certain investment behaviour while negotiating the terms of transfers.

The characteristics of the cooperative and non-cooperative equilibria are discussed next for both equity and debt transfers. Given a fixed amount  $\bar{T}$  transferred to the agent, the agent's expected utility can be expressed as:

$$\begin{aligned}
 [8] \quad U(\tau, B, I) = & U_1[\bar{y} + \bar{T} - I] + \beta \int_b^{\bar{x}} U_2[\tau P(I)(x-b)] g(x) dx \\
 & + \beta \int_0^b U_2(0) g(x) dx.
 \end{aligned}$$

This utility function can be illustrated by a set of indifference curves ( $C_i$ ) in  $(\tau, I)$  space, as shown in Figure 1. The slope of each indifference curve is given by  $-(\delta U / \delta I) / (\delta U / \delta \tau)$ ; moving upward across the family of indifference curves yields higher utility for the agent. The curve  $TT'$  represents the combinations of points that yield an equal expected total return to the principal for a given transfer amount of  $\bar{T}$ .<sup>1</sup> The slope of that curve, derived from equation [7], is  $d\tau / dI|_{T=\bar{T}}$ , which can easily be shown to be  $\geq 0$ . Points above and to the left of  $TT'$  yield an expected return of less than  $\bar{T}$ , while points below and to the right imply a higher expected value.

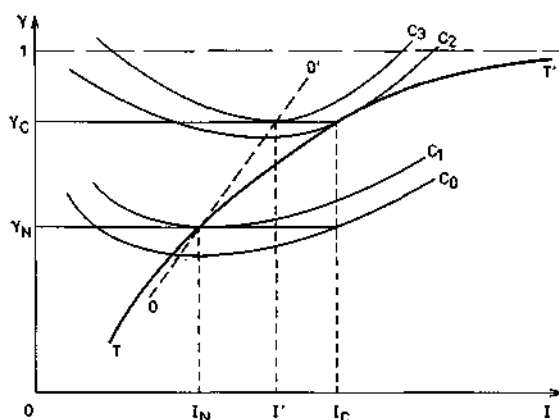
The optimal equilibrium outcome is given by the point  $(\tau_C, I_C)$ , provided that the agent is able to precommit himself to undertake a given ex post level of investment while negotiating over the terms of the transfer. The agent receives the transfer amount of  $\bar{T}$  by granting the principal the share  $(1 - \tau_C)$  of future output, and proceeds to invest  $I_C$ . This cooperative solution is derived by maximizing [8] with respect to  $\tau$  and  $I$ , subject to the constraint equation [7].

Assume alternatively that the agent does not precommit himself beforehand to invest  $I_C$ , but nonetheless were to receive the transfer on the favourable terms given by  $\tau_C$ . The best attainable position for the agent would then be to invest only  $I'$ .<sup>2</sup> That solution is obtained from the unconstrained maximization of [8] with respect to  $I$ , given that  $\tau = \tau_C$ . At point  $(\tau_C, I')$ , however, the expected value of the principal's

<sup>1</sup> It is assumed that fully competitive capital markets do not allow for extra profits of principals. Consequently, principals are prepared to transfer an amount of  $\bar{T}$  to the agent in exchange for a discounted repayment stream of the same amount.

<sup>2</sup> The point  $(\tau_C, I')$  is located on the curve  $00'$  which represents the combination of minima of the indifference curves, thereby indicating the agent's utility-maximizing investment behaviour for given transfer terms  $\tau$ .

Figure 1. - Cooperative and Non-Cooperative Equilibria for Equity Transfers



equity share lies below the amount  $\bar{T}$  transferred to the agent. A rational principal would anticipate this potential capital loss and offer to exchange  $\bar{T}$  only in return for a higher share of future output. That gives rise to the non-cooperative solution  $(\gamma_N, I_N)$ . In this situation, the ex post incentive of the agent to invest precisely the amount  $I_N$ , given  $\gamma = \gamma_N$ , is consistent with an anticipated return of  $\bar{T}$  to the principal.

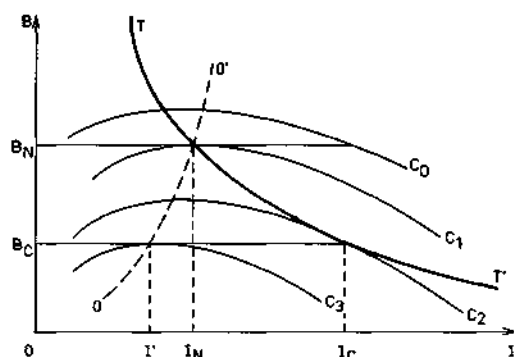
Both solutions have their counterpart in the case of debt finance. The utility function of the agent (equation [8]) can also be illustrated by a family of indifference curves ( $C_j$ ) in  $(B, I)$  space, as shown in Figure 2. The slope of each curve is given by  $-(\delta U / \delta I) / (\delta U / \delta B)$ ; in this case, downward movements across indifference curves imply increasing utility. The curve  $TT'$  again portrays the combination of points that yield an equal expected return to the principal. In the case of debt, the slope of that curve is  $dB / \delta I|_T = \bar{T}$ , which is  $\leq 0$ . Points above and to the right of  $TT'$  imply that  $T > \bar{T}$ , while to the left and below,  $T < \bar{T}$ . Applying the same logic as before, it can be readily observed that the point  $(B_C, I_C)$  represents the cooperative solution. The non-cooperative solution is given by  $(B_N, I_N)$ .

### 3. The Equilibrium Debt-Equity Ratio

In the basic agent-principal model, it is entirely left up to the agent to determine the equilibrium combination of debt and equity



Figure 2 - Cooperative and Non-Cooperative Equilibria for Debt Transfers



finance, given a constant total amount of capital transferred ( $\bar{T}$ ).<sup>1</sup> The agent's optimal debt-equity ratio depends on the type of the transfer regime, i.e., cooperative versus non-cooperative. In the cooperative setting, the agent maximizes his expected utility function (equation [8]) by taking the principal's transfer constraint (equation [7]) explicitly into account. After rearranging equation [7] and integrating it into the agent's utility function, the maximization procedure reveals that risk-averse agents always prefer equity finance over debt finance [for detailed calculations, cf. Lächler, 1985, pp. 15 f.]. Consequently, the optimal debt-equity ratio is 0 in the cooperative equilibrium.

In the non-cooperative setting, the agent takes the terms of transfers,  $\tau$  and  $B$ , as given. He simply maximizes equation [8] with respect to  $I$ , i.e.,  $\delta U / \delta I = 0$ . The total derivative of  $U(\tau, B, I)$  then reduces to:

$$\begin{aligned}
 [9] \quad dU &= U_{\tau} d\tau + U_B dB \\
 &= [\beta F(I) \int_b^{\bar{x}} U_2'(\cdot)(x-b)g(x)dx]d\tau - [\tau \beta \int_b^{\bar{x}} U_2'(\cdot)g(x)dx]dB.
 \end{aligned}$$

The agent's optimal combination of  $\tau$  and  $B$  must satisfy the transfer constraint (equation [7]). Hence, the expression for  $d\tau$  obtained by

<sup>1</sup> This is because the principal is indifferent as to the proportion of debt to equity claims he receives in return for the capital transfer, provided that the combined value of those claims remains the same.

taking the total derivative of equation [7], such that  $dT = 0$ , is integrated into equation [9]. After rearranging terms and dividing everything by  $dB$ , this yields:

$$[10] \quad dU/dB = A\gamma\beta \left[ \int_b^{\bar{x}} U_2'(\cdot) \left\{ x \int_b^{\bar{x}} g(x) dx - \int_b^{\bar{x}} xg(x) dx \right\} g(x) dx \right] \\ + A\beta \int_b^{\bar{x}} U_2'(\cdot) (x-b)g(x) dx \left[ F'(I) [1-\gamma] \int_b^{\bar{x}} xg(x) dx \right] \frac{dI}{dB},$$

$$\text{where } A = \left[ \int_b^{\bar{x}} (x-b)g(x) dx \right]^{-1} > 0.$$

In equation [10],  $dU/dB$  refers to the change in utility resulting from an increase in debt obligations accompanied by a commensurate change in  $\gamma$  so as to keep the total value of the principal's claims constant. Similarly,  $dI/dB$  represents the impact on the agent's utility maximizing investment behaviour of a switch from equity finance to debt finance, without altering the sum transferred. The first term of equation [10] is always negative provided that the agent displays some degree of risk aversion [for a formal proof, cf. Lächler, 1985, p. 40]. Equity finance is a means of sharing risks, in contrast to debt finance. Therefore, a rise in the debt-equity ratio reduces the agent's utility to the extent that risk matters to him. The sign of the second term of equation [10] depends on the sign of  $dI/dB$ , which is shown to be positive in Section B.II.4.

Hence, the risk-averse agent faces a trade-off between risk and future return in a non-cooperative environment. A country can achieve greater income stability by shifting the structure of external financing towards more equity participation and less debt, but at the expense of lower expected future consumption. The optimal debt-equity ratio is derived by solving for the combination of  $(\gamma, B)$  such that  $dU/dB = 0$ . Contrary to the cooperative case, where all-equity finance is optimal for risk-averse agents, we would, in this case, expect to obtain a solution with positive amounts of both types of claims.

#### 4. The Investment Response to Alternative Sources of Finance

##### a. The Non-Cooperative Case

The agent's non-cooperative investment response is found by maximizing the utility function (equation [8]) with respect to  $I$ , while regarding the terms of transfers as fixed parameters. This yields the following condition:

$$[11] \quad \delta U / \delta I = -U'_1(\cdot) + \gamma \beta F'(I) \int_b^{\bar{x}} U'_2(\cdot) x g(x) dx = 0.$$

The total differential of equation [11] reveals the investment response to perturbations in the parameters  $(\bar{y}, \bar{T}, \gamma, B)$ . Assuming an agent who has yet to receive any foreign transfers, the total differential at the point  $(T = 0, \gamma = 1, B = 0)$  can be written as:<sup>1</sup>

$$[12] \quad d(\delta U / \delta I) = (\delta^2 U / \delta I^2) dI - U''_1(\cdot) (d\bar{y} + d\bar{T}) \\ + (1-\alpha) U'_2(\cdot) d\gamma + [\alpha \beta F'(I) / F(I)^2] \left[ \int_0^{\bar{x}} U'_2(\cdot) g(x) dx \right] dB = 0.$$

As a benchmark situation, assume the agent receives aid (treated here as an unrequited gift). This is tantamount to an increase in the agent's initial endowment ( $d\bar{y} > 0$ ). The investment response can then be solved from equation [12], by letting  $d\bar{T} = d\gamma = dB = 0$ , to yield:

$$[13] \quad 0 \leq (dI / d\bar{y}) = U''_1(\cdot) / (\delta^2 U / \delta I^2) \leq 1.^2$$

Expression [13] simply states that the agent allocates part of his higher endowment towards current consumption and part of it towards future consumption. A transfer constraint is not binding here because the agent has no obligations to pay back. Alternatively, under debt or

<sup>1</sup> The following exposition is simplified by assuming a utility function with constant degree of relative risk aversion  $\alpha$ , with  $0 < \alpha < 1$ .

<sup>2</sup> The second inequality follows from the fact that at the initial position  $\delta^2 U / \delta I^2 = U''_1(\cdot) + U''_1(\cdot) [F''(I) / F'(I) - \alpha F'(I) / F(I)] \leq U''_1(\cdot) \leq 0$ .

equity finance, the agent's response would be constrained by the transfer condition equation [7]. In the initial situation of ( $\tau = 1$ ) and ( $B = 0$ ), the total differential of equation [7] becomes:

$$[14] \quad dT = dB - F(I)d\tau.$$

The effect of an equity-financed transfer is obtained by setting  $dB = 0$ , and substituting for  $d\tau$  from equation [14] into equation [12], which yields:

$$[15] \quad \left. \frac{dI}{dT} \right|_{\tau} = \frac{U_1'(\cdot)}{(\delta^2 U / \delta I^2)} + \frac{(1-\alpha)\beta U_2'(\cdot)/F(I)}{(\delta^2 U / \delta I^2)}.$$

The first term on the right is positive and identical to the expression derived in equation [13], while the second term is generally negative. Therefore, provided that the agent is not "infinitely" risk averse (i.e.,  $\alpha < 1$ ), the investment response to an equity-financed transfer is less than the response to a gift, and possibly negative.

In contrast, the effect of a debt-financed transfer is obtained by setting  $d\tau = 0$ , and substituting for  $dB$  from equation [14] into equation [12], which yields:

$$[16] \quad \left. \frac{dI}{dT} \right|_B = \frac{U_1'(\cdot)}{(\delta^2 U / \delta I^2)} - \frac{\alpha \beta [F'(I)/F(I)]^2 \int_0^{\bar{x}} U_2'(\cdot) g(x) dx}{0} > 0.$$

Both terms on the right hand side of equation [16] are generally positive, while the first term is the same as in equation [13]. Hence, the total investment response to a debt-financed transfer is greater than the response to a gift of equal size.

These results show that in a non-cooperative environment the investment response to a foreign aid inflow lies between the response to an equity and to a debt inflow. A debt-financed transfer generally leads to a higher level of investment than an equity-financed transfer of equal size. Therefore, by switching from equity to debt finance, the structure of incentives facing the agent changes in favour of raising the amount of investment.<sup>1</sup>

<sup>1</sup> This proposition can also be proved without assuming an initial autarchic position (i.e.,  $T = 0$ ); for details, cf. Lächler [1985, pp. 21 f.].

*b. The Cooperative Case*

In Section B.II.3 it was shown, that the risk-averse agent always chooses equity over debt finance in a cooperative environment. Due to supply constraints, however, the optimal debt-equity ratio may be difficult to achieve. Consequently, it is of interest to examine the agent's investment behaviour in response to debt and equity under cooperative transfer conditions. To obtain the cooperative solution, the agent maximizes the following Lagrangian equation with respect to  $(I, \tau)$  or  $(I, B)$ :

$$\begin{aligned}
 [17] \quad L = & U_1(\bar{y} + \bar{T} - I) + \beta \int_b^{\bar{x}} U_2[\tau F(I)(x-b)]g(x)dx \\
 & + \lambda \left\{ \bar{T} - F(I) \left( 1 - \tau \int_b^{\bar{x}} (x-b)g(x)dx \right) \right\}
 \end{aligned}$$

where  $\lambda$  denotes the Lagrangian multiplier associated with the principal's transfer constraint. The first-order conditions for a maximum are:

$$[18] \quad \delta L / \delta I = \delta U / \delta I - \lambda F'(I) \left[ 1 - \tau \int_b^{\bar{x}} xg(x)dx \right] = 0;$$

$$[19a] \quad \delta L / \delta B = \delta U / \delta B - \lambda \tau \int_b^{\bar{x}} g(x)dx = 0; \text{ or:}$$

$$[19b] \quad \delta L / \delta \tau = \delta U / \delta \tau + \lambda F(I) \int_b^{\bar{x}} (x-b)g(x)dx = 0;$$

$$[20] \quad \delta L / \delta \lambda = \bar{T} - F(I) \left[ 1 - \tau \int_b^{\bar{x}} (x-b)g(x)dx \right] = 0.$$

The comparative static effects of an increase in  $\bar{T}$  or  $\bar{y}$  are found by calculating the total derivatives of the necessary conditions. After rearranging the resulting equations, the following two systems are obtained:

[21] equity financing:

$$A_y(dI, dB, d\lambda)^T = [U_1'(\cdot), 0, -1]^T d\bar{T} + [U_1'(\cdot), 0, 0]^T d\bar{y};$$

[22] debt financing:

$$A_B(dI, dB, d\lambda)^T = [U_1'(\cdot), 0, -1]^T d\bar{t} + [U_1'(\cdot), 0, 0]^T d\bar{y}.$$

The superscript T denotes a transposed vector;  $A_T$  and  $A_B$  represent the (3 x 3) bordered Hessians associated with the Lagrangian maximization problem under each financing form. Both matrices are symmetric and negative-definite (as required by the second-order condition for a maximum). Applying Cramer's rule in the two equations [21] and [22] yields:

$$(dI/d\bar{t})_T \geq (dI/d\bar{y})_T \geq 0; \text{ and}$$

$$(dI/d\bar{t})_B \geq (dI/d\bar{y})_B \geq 0.$$

In other words, the cooperative agent would always invest more in response to a transfer entailing future repayment obligations than in response to a foreign gift of equal size. The ranking of the investment response to debt and equity inflows is left indeterminate in the cooperative setting. This result contrasts remarkably with that one derived under non-cooperative conditions. It also turns out that, for any given level of debt or FDI transfers, the equilibrium level of investment undertaken by the agent is always greater in a cooperative environment than in a non-cooperative one. The differences in the response pattern lend themselves to the empirical tests presented in Chapters C and D.

### III. Government Leverage and the Efficiency of Foreign Finance

#### 1. The Superiority of FDI: A Counterhypothesis

The most interesting proposition derived from the agent-principal model is that under non-cooperative transfer conditions the investment response to an equity-financed transfer from abroad would be smaller than that to a debt-financed transfer. A corollary of this result is that domestic savings and economic growth of the agent should exhibit the

same order of response behaviour. Domestic savings (S) are defined as total savings minus foreign savings, i.e.,  $S = I - T$ . Similarly, assuming that a nation's growth rate is positively related to the volume of investment, the same pattern of growth responses to foreign capital inflows should result as was described for investment.

These results sharply conflict with the widespread reasoning that FDI is generally superior to debt [cf. e.g. World Bank, d, 1985; Picht, 1987]. According to the counterhypothesis, a shift towards debt finance relative to equity finance affects the economic performance of the capital-recipient country *negatively*. Most notably, the counterhypothesis claims that the investment response to FDI inflows is more favourable than in the case of debt finance. It is argued that debt inflows do not help to overcome the most binding constraint to economic development in the majority of Third World economies, i.e., the lack of human capital. FDI is regarded as best suited to alleviate the capital scarcity of developing countries since managerial skills and technological knowledge are transferred in addition to foreign finance. Human-resource development is likely to encourage complementary investments, so that the over-all investment ratio may increase.

The investment response to FDI inflows is also considered to be higher because FDI is essentially private in nature; while the use of debt inflows is said to be mainly determined by the public authorities of the capital-recipient country. Consequently, a consumptive use of foreign funds may be less likely in the case of equity finance than in the case of debt finance. FDI is typically tied to specific projects. Once approved by the authorities, the government's leverage on the use of the funds is relatively weak. A foreign equity holder is relatively free to dispose of his resources such that profits are maximized. The objective of profit maximization typically requires to devote equity transfers to investment rather than consumption purposes.

An unproductive use of debt inflows may be encouraged by the government agents' objective to maximize their own welfare. The counterhypothesis considers the government's leverage on debt inflows as pervasive. The share of public and publicly guaranteed debt in total long-term outstanding debt of all developing countries reached 90 per cent in

1987.<sup>1</sup> Public-choice reasoning suggests that an unproductive use of foreign funds is most likely if politicians, bureaucrats and managers of public enterprises decide on the allocation of capital [cf. also Picht, 1987, pp. 32 ff.]:

- In contrast to private agents, the individual welfare of public agents is not closely related to the extra income which might be generated by foreign-financed investments. Their welfare position rather depends on various perquisites and non-monetary fringe benefits. The incentives to carefully evaluate the social benefits from alternative uses of capital inflows and to select the most productive ones remain relatively weak in the public sector.
- The time horizon of politicians is typically shorter than that of private agents. This may negatively affect the incentives of the public sector to invest foreign funds [Fama, Jensen, 1983]. Especially long-term investments with pay-offs which do not materialize during the expected term of office are of little interest to public agents, even though such projects may be highly profitable from a social welfare point of view.

Actually, a substantial part of debt inflows did not enlarge the productive capacity of the capital-recipient countries in the past. This is evident from the pervasive empirical evidence on capital flight [Duwendag, 1986; Khan, Haque, 1987]. Moreover, general balance of payments financing figures prominently in the case of debt inflows. A productive use is rather unlikely, especially in the case of short-term debt raised for consumption-smoothing purposes.

Even though public agents may prefer consumptive uses of debt inflows, it cannot be denied that also public investments are financed externally. But these investments may be relatively inefficient. Public agents have only weak incentives to carefully assess the social welfare effects of alternative investments, due to their well defined self-interest and the relatively short planning horizon. Furthermore, centralized bureaucratic decision making in the public sector adds to the risk of greatly erroneous decisions on huge debt-financed investment projects.

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<sup>1</sup> This extremely high figure was partly due to the reluctance of private creditors to extend further non-guaranteed credits after the debt crisis erupted in 1982. Even in the 1970s, however, the share of private non-guaranteed debt was persistently below 25 per cent [World Bank, c, 1988].



Such decisions are not subject to the self-correcting mechanism implicit in various independent decisions by competing private agents.

## 2. The Relevance of the Institutional and Regulative Framework

The counterhypothesis on the economic performance effects of FDI and debt provides a major challenge to the predictions derived from the agent-principal model presented above. The basic model hypothesizes a risk-return trade-off in the case of FDI finance for all capital-recipient countries engaged in non-cooperative agent-principal relations, while the counterhypothesis claims a general superiority of FDI over debt. Both lines of reasoning have in common, however, that their predictions are fairly general. The aim to predict a normal pattern of response behaviour in developing countries requires (rather restrictive) assumptions on the institutional and regulative framework under which capital transfers are taking place:

- The agent-principal model assumes that, once transfers have been made, the allocation of those funds for either consumption or investment is unambiguously determined by the government agent, irrespective of whether transfers take the form of debt or equity finance. Moreover, the basic model considers all types of capital inflows as perfectly fungible. The model thus assumes equally efficient investments, independent of whether they are debt or FDI-financed.
- The counterhypothesis expects an adverse impact on the investment response to debt inflows because of the government's neglect of social welfare considerations. In contrast to the agent-principal model, it is assumed that the government has full control over debt inflows, while the use and efficiency of FDI inflows are not influenced at all by public authorities.

The agent-principal model and the counterhypothesis both reduce the various types of capital inflows to the two basic categories of equity and debt finance. Moreover, the normal-pattern predictions naturally abstract from country-specific factors that may influence the ranking of the economic performance effects of different resource inflows. The government's leverage on the use and efficiency of capital transfers is likely to differ between individual capital-recipient countries as well as within

the major categories of foreign finance, especially between different forms of debt.

Further differentiation of debt inflows may be required with respect to the debtor and creditor structure of external financing, as well as the maturity of loans:

- The government's leverage can be expected to be particularly strong for public debt, and less pervasive for private debt. The welfare maximization calculus of public agents (described by the counterhypothesis) may encourage an unproductive use of the former type of debt in the first place.
- The investment response to foreign debt inflows can be expected to be particularly weak in the case of short-term loans raised for consumption-smoothing purposes.
- The creditor composition of debt matters since loans from official sources are typically subsidized, in contrast to credits raised in private financial markets. High grant elements may weaken the incentives of the capital recipient to use the transfers efficiently. So, the economic performance effects of credits from official sources are likely to resemble the effects of foreign aid, rather than the effects of non-subsidized debt.

The government's leverage on the use of capital transfers may also differ between individual capital-recipient countries. The institutional and regulative framework governing capital imports is likely to vary in terms of both the scope and types of public interventions. So, the normal pattern of response behaviour revealed by the cross-country analysis of Chapter C may comprise different country-specific experiences. For the country studies of Chapter D, it is thus important to gain insights into the institutional arrangements and government regulations that may influence the economic performance effects of FDI and different types of external debt. Especially the efficiency of investments and thereby the ranking of economic growth effects may be affected.

Typical interventions that may reduce the efficiency of debt inflows encompass the following, *inter alia* (for a detailed presentation, cf. Section D. IV)<sup>1</sup>:

<sup>1</sup> The efficiency of debt inflows may also be eroded by cross-default clauses: "The introduction of cross-default clauses covering publicly guaranteed debt have significantly blurred the differences in risk

- Public guarantees for debt inflows are likely to weaken the incentives of debtors to rigorously assess the credit risks, and to evaluate whether additional income expected from investments exceeds the cost of foreign borrowing.<sup>1</sup>
- Apart from guaranteeing the repayment of debt, governments frequently assume the risk of exchange rate variations. This gives rise to (additional) moral hazard problems. The incentives to carefully assess the cost of foreign borrowing are further eroded, and individual borrowers may be tempted to take excessive risks.
- In many capital-recipient countries, the cost of foreign borrowing is artificially lowered by economic policy measures. Exchange rate policies figure prominently in this respect. Especially in highly inflationary economies, fixed exchange rate regimes typically result in overvalued domestic currencies. Insufficient nominal devaluations may render the real cost of foreign borrowing even negative. The policy-induced distortions in relative factor prices encourage a misallocation of scarce resources. Labour-intensive investments are discriminated, for example, although such investments may fit well to the country's comparative advantages.

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among individual borrowers within a country, since a delinquent borrower is supported by others to avoid triggering the cross-default clause" [Folkerts-Landau, 1985, p. 326]. Under such institutional arrangements, the efficiency of debt inflows may be impaired because of reduced monitoring efforts by the creditor banks. In the context of syndicated bank lending, free-rider problems are likely to affect the incentives of monitoring negatively. That is because the costs of monitoring have to be borne exclusively by the bank engaged in monitoring, while the benefits of effective monitoring would accrue to all members of the bank syndicate [Picht, 1987, p. 35].

<sup>1</sup> The consequences of public guarantees can be expected to depend on the institutional arrangements governing the internal relations between the guarantor and the private agents [for details, cf. Stüven, 1989]. Most notably, the above reasoning on distorted incentives implicitly assumes that the guarantor foregoes any claims on defaulting debtors after the private agents have called on the government's guarantees. Under alternative conditions, the guarantor assumes the transfer risk, but does not provide an outright bail-out for defaulting debtors. In other words, the guarantor services the private debt in terms of foreign exchange, but maintains a claim in domestic currency against the private agent. Such an arrangement may significantly reduce the disincentive problems and may even help to overcome the enforcement problems in sovereign lending.

- Government interference in the sectoral allocation of debt inflows offers a more radical means to influence the use of foreign loans. Privileged access to foreign capital is typically granted to government-designed priority sectors. The efficiency of debt inflows is negatively affected if those priority sectors do not conform to the country's comparative advantages. This is most likely to happen in the case of heavy industrialization programs involving skill-intensive industries.

The government can also influence the efficiency of FDI inflows. Future expected output generated by foreign investments is affected indirectly by various macroeconomic policies, especially fiscal and discriminating tax policies. Moreover, the government may determine the sectoral allocation of FDI inflows in a similar way as in the case of foreign debt. Actually, the approval procedures for FDI are even more restrictive and selective in many developing countries. Foreign investment is frequently promoted (e.g. by government subsidies) in specified sectors where domestic enterprises are not engaged, while other sectors are rigorously protected from foreign competition. Negative consequences on efficiency may be twofold: Similar to debt, misallocation of capital is bound to arise if the approval procedures neglect the country's comparative advantages. Additionally, the efficiency of both foreign and domestic investments is likely to suffer from artificially reduced competitive pressures and publicly enforced market segmentation.

The efficiency of FDI inflows may be also impaired by local participation rules and joint venture requirements. Foreign investors are reluctant to transfer technologies and managerial skills especially if they may hold only minority shares in joint ventures and if their choice to select local partners is unduly restricted. Participation rules may reduce the particular advantages of FDI over debt finance which were stressed by the counterhypothesis. They render it more difficult for capital-recipient countries to remove bottlenecks to economic development resulting from human capital scarcity.

#### IV. Summary of Major Hypotheses

The agent-principal model presented above reduces the various types of capital inflows to the two basic forms of equity and debt finance (foreign

aid serving as a reference case). The same applies to the counterhypothesis which claims a general superiority of FDI over debt, as far as investment and economic growth effects are concerned. According to the agent-principal model, the investment response to both debt and FDI inflows should exceed the investment response to inflows that do not entail future repayment obligations (foreign aid) in the case of cooperative agent-principal relations. Under non-cooperative transfer conditions, however, FDI finance is expected to involve a trade-off between income stability and expected future consumption; the investment response to debt should then be stronger than the investment response to FDI inflows.

Both the basic model and the counterhypothesis assume the growth response to different capital inflows to obey the same pattern as in the case of investment. Economic growth is regarded as a stochastic function of the overall investment level. The disturbances caused by factors not considered explicitly may render it difficult to identify a normal pattern of response behaviour when economic growth is to be explained. Especially the country-specific framework of institutions and regulations governing capital inflows may obscure the growth effects of debt versus equity. This framework determines the government's leverage on the use and thereby the efficiency of transfers within the capital-recipient country. Efficiency may not only differ between debt and FDI, but also between various types of debt finance. Probably, the government's leverage is particularly strong for public debt, and less pervasive for private debt.

The scope and types of government regulations are likely to differ between individual capital-recipient countries. The possible effects of public interference in the structure and use of foreign finance have to be discussed more closely in a country-specific context. Before doing so in Chapter D, however, a first test of the normal pattern predicted by the basic agent-principal model will be presented in the subsequent chapter. Cross-country regressions are performed on the investment and growth response to debt and FDI inflows.

### C. Debt versus Equity in a Cross-Country Context

The principal aim of this chapter is to test (a) if the transfer negotiations between foreign principals and Third World agents are co-operative or non-cooperative, and (b) whether FDI finance involves a trade-off between income stability and expected future consumption under non-cooperative conditions, or is generally superior to debt as claimed by the counterhypothesis. As shown above, the risk-averse agent would always prefer equity over debt finance in a cooperative agent-principal environment. On the basis of this conclusion alone one might infer that a non-cooperative situation is more representative of actual transfer processes, since most countries receive foreign loans as well as FDI. But this outcome could just as easily be due to the fact that those countries face supply constraints in terms of the types of transfers made available by foreign principals.

Neither of the two alternative equilibria of transfer negotiations can be ruled out definitely by ex ante considerations. A cooperative outcome is conceivable if the agent complies with all previously negotiated commitments, including the amount of investment to be undertaken, in spite of the disincentives noted above. Perhaps more realistically, this outcome could be achieved if the principal had the ability to monitor the agent directly or to impose penalties on the agent for not responding in a co-operative manner. That would eliminate moral hazard problems. But monitoring involves considerable costs and suffers from information barriers as well as limited legal enforcement capabilities. Therefore, our hypothesis is that capital transfers to developing countries are best described by a non-cooperative process. The change in aggregate investment ( $I$ ), resulting from an increase in foreign transfers ( $T$ ) in the form of debt, FDI or aid, should then obey the following pattern:

$$[23] \left. \frac{dI}{dT} \right|_{FDI} \leq \left. \frac{dI}{dT} \right|_{AID} \leq \left. \frac{dI}{dT} \right|_{DEBT}$$

On the other hand, expression [24] should hold in a cooperative environment:

$$[24] \left. \frac{dI}{dT} \right|_{AID} \leq \left( \left. \frac{dI}{dT} \right|_{FDI}, \left. \frac{dI}{dT} \right|_{DEBT} \right)$$

The ranking of the investment effects of FDI and debt is left indeterminate under cooperative conditions by the basic agent-principal model. In contrast, expression [25] should hold for all countries if the counterhypothesis on the superiority of FDI is correct:

$$[25] \left. \frac{dI}{dT} \right|_{FDI} > \left. \frac{dI}{dT} \right|_{DEBT}$$

According to both the basic agent-principal model and the counterhypothesis, economic growth and domestic savings should exhibit the same order of response behaviour as given for investment.

## I. The Test Format and Data Base

The following equation provides the basic test format to discriminate which of the patterns given by expressions [23] - [25] best characterizes actual transfer processes in a sample of 36 developing countries:

$$[26] \quad X_i = a_0 + a_1 FDI_i + a_2 AID_i + a_3 DEBT_i$$

The exogenous variables on the right-hand side of this equation represent net foreign capital inflows per annum received by country  $i$  in the form of FDI, aid and external debt, each expressed as a share of the capital-recipient country's gross domestic product (GDP).<sup>1</sup> Three variables are used separately for the endogenous variable  $X$ : (a) the aggregate investment ratio,  $IR$ ; (b) the domestic savings rate,  $DSR$ , also expressed as a share of GDP; and (c) the annual per capita growth of GDP in constant prices, denoted  $GR$ .

We expect to obtain  $a_1 < a_2 < a_3$  because of our hypothesis of non-cooperative agent-principal relations. With regard to the individual coefficient estimates, the theory states that these should satisfy the following constraints:

<sup>1</sup> For detailed definitions of variables and data sources, cf. Appendix I.

- [27] a)  $-1 \leq a_2 \leq 0$ , when the endogenous variable is DSR,  
 b)  $0 \leq a_2 \leq 1$ , when the endogenous variable is IR,  
 c)  $a_2 \geq 0$ , when the endogenous variable is GR,  
 d)  $a_3 \geq 0$ , when the endogenous variable is IR or GR.

The first step is to see whether any of these constraints can be statistically rejected. But the primary concern is less with the absolute size of the individual coefficients. For purposes of theory validation, their relative size is of main interest. With that focus in mind, we can set up the alternative proposition that there is no significant difference in the responses to the various forms of capital inflows. This alternative proposition may be supported or rejected by testing the simultaneous constraint:  $a_1 = a_2 = a_3$ . Continuing along these lines, we can proceed to make pair-wise comparisons, and examine whether the data permits us to reject the following restrictions:

- [28] a)  $a_2 = a_3$   
 b)  $a_1 = a_3$   
 c)  $a_1 = a_2$

The crucial test for supporting or rejecting the hypothesis of a non-cooperative environment against the alternative, that a cooperative environment applies, concerns restriction [28.c]. By comparing expressions [23] and [24], we observe that in both cases it is predicted that  $a_3 \geq a_2$ , and further, that it is left indeterminate whether  $a_3 \leq a_1$  in a cooperative environment. What is clear, however, is that in a cooperative environment we would observe that  $a_1 \geq a_2$ , while in the non-cooperative environment,  $a_1 \leq a_2$ . Restriction [28.b] is important for supporting or rejecting the counterhypothesis on the superiority of FDI in countries with non-cooperative agent-principal relations. The model predicts  $a_3 > a_1$ , while the opposite pattern,  $a_3 < a_1$ , is expected by the counterhypothesis.

Having performed these tests, two further issues are addressed below. Since the coefficient estimates are made by ordinary least square (OLS) methods, it is necessary to discuss the simultaneity bias that might be involved in this procedure. The other issue concerns the sample homogeneity. Possibly, some capital-recipient countries have de-



veloped a cooperative relationship with foreign principals, while a non-cooperative relationship prevails for other developing countries. This question is examined by running separate regressions for problem borrowers that experienced debt-servicing difficulties recently, and non-problem borrowers without major debt difficulties.

To perform the cross-country analysis, a sample of 36 developing countries reporting positive net financial inflows of FDI, debt, and development aid is selected. The sample covers a wide spectrum of Third World economies in terms of income level, economic performance, overall dependence on foreign resource inflows, and composition of capital imports.

We added all capital flows within each category over the period 1976-1979, so that the sample points of the regression analysis represent period aggregates or averages.<sup>1</sup> There are several reasons why the estimates are restricted to the second half of the 1970s. Comparable time series on the structure of net capital imports were not available until 1976. On the other hand, statistical information on most of the variables was available up to 1984, except for domestic savings. Nevertheless, we decided to concentrate on the second half of the 1970s because thereafter both the volume and structure of international capital transfers to developing countries were significantly affected by severe economic shocks. At the turn of the decade, the second oil price shock induced a new round of enormous financial recycling of surpluses of the Organization of Petroleum Exporting Countries (OPEC), which drastically altered the previous pattern of financial flows of the late 1970s. This was followed in the early 1980s by another shock to the international capital markets. With the eruption of severe repayment crises in some important debtor countries, Western commercial banks abruptly halted the provision of fresh money to the problem-ridden Latin American region. That altered the financial flows to developing countries in terms of regional distribution and structural composition. To avoid statistical noise on this account, we chose 1979 as the endpoint date. To assess the robustness of

<sup>1</sup> For details on data and methodical questions, cf. Lächler and Nunnenkamp [1987]. Table A1 reports the correlation coefficients between all variables used in the subsequent regression analysis. In view of the fairly small correlation between independent variables, we should not expect any serious multicollinearity problems to arise.

our primary results, however, we repeated the main regressions extending the endpoint date to 1981 (i.e., after the oil price shock occurred, but before Mexico suspended payments, triggering the debt crisis).

## II. Basic Empirical Results

The coefficient estimates obtained from the regressions described by equation [26] are presented in Table 1. The most remarkable feature of the basic results for the 1976-1979 period (lines 1) is that in all cases the estimated coefficient values follow the characteristic pattern of a non-cooperative equilibrium, i.e.,  $a_1 < a_2 < a_3$ . The counterhypothesis on the superiority of FDI over debt is clearly rejected. Moreover, none of the conditions implied by our hypothesis, and outlined in expressions [27.a] - [27.d], can be rejected with much confidence. Although the point estimates of  $a_2$  violate conditions [27.b] and [27.c], this deviation from the predicted range is not significant at the 5 per cent level.

The coefficient estimates for the extended period 1976-1981 (lines 2 in Table 1) display the same qualitative pattern as those for 1976-1979. There are some differences in terms of the statistical significance of the estimated values. The considerable decline in the explanatory power of the growth equation (GR) may be attributed to the increased economic turbulence experienced in 1980-1981, when factors ignored in the regression analysis attained greater importance in determining economic growth. The other major difference is that the coefficient of aid in the investment equation (IR) turns out to be significantly negative, contrary to what was hypothesized. This may be due to a simultaneity bias, which we discuss later.

All in all, it can be concluded from Table 1 that the basic behavioural responses suggested by the agent-principal model, along with the hypothesis that capital transfers take place in a non-cooperative environment, are not rejected by the empirical evidence. It is interesting to note, however, that the regressions with IR and DSR as endogenous variables exhibit a significantly higher  $R^2$  than the growth equations. It can be argued that this finding is also consistent with the basic agent-principal model. The underlying theory concerns the determination of investment, while changes in output are a stochastic function of invest-

Table 1 - Impact of Capital Inflows on Investment, Domestic Savings, and Economic Growth: Cross-Country Regression Results for 36 Developing Countries (a)

Endogenous variable	Estimation period	Const. ( $a_0$ )	FDI ( $a_1$ )	AID ( $a_2$ )	DEBT ( $a_3$ )	$\bar{R}^2$ F	SSR	Number of observations
IR	1) 1976-1979	19.20*** (1.63)	-1.74 (1.86)	-0.30 (0.24)	1.95*** (0.44)	0.36 7.27	712	35
	2) 1976-1981	19.74*** (1.30)	-2.36 (1.52)	-0.66*** (0.21)	2.49*** (0.45)	0.53 12.84	359	32
DSR	1) 1976-1979	16.60*** (1.87)	-2.51 (2.16)	-0.99*** (0.28)	1.63*** (0.51)	0.38 8.29	993	36
	2) 1976-1981	15.43*** (1.87)	-1.31 (2.21)	-1.24*** (0.29)	2.38*** (0.68)	0.46 10.48	817	34
GR	1) 1976-1979	4.26*** (0.81)	-2.89*** (0.93)	-0.23 (0.21)	0.002 (0.22)	0.21 4.15	184	36
	2) 1976-1981	3.11*** (0.93)	-1.85 (1.10)	-0.19 (0.15)	0.07 (0.32)	0.04 1.42	203	34

(a) The underlying test format is given by equation [26]; for the definition of variables and data sources, cf. the text and Appendix I. All estimates were made by OLS-methods. Standard errors in parentheses; \*\*\*significant at the 1 per cent level. SSR denotes the sum of squared residuals. The number of observations is slightly reduced in several equations because of lacking data.

Source: Own calculations.

ment. Hence, even if the model could perfectly explain IR, we should still expect a less than perfect fit in the case of GR. On the other hand, measurement errors may offset this statement. The observed values of IR may not correspond to true investment in the sense of foregone present consumption to raise future output. In national accounting, the label of investment gets attached to various unproductive activities, while other more productive expenditures are mislabeled consumption.<sup>1</sup> This problem does not arise in the growth equations, since output

<sup>1</sup> Management perquisites and white elephant projects represent examples of the former, and the acquisition of cars an example of the latter type of activities.

changes presumably reflect true investment activities, independent of how they are treated in national accounting.

The low explanatory power of the growth equations may be due to country-specific institutional arrangements and government regulations that impair the efficiency and thereby the growth impact of foreign capital. As argued in Section B.III, the basic agent-principal model has to abstract from such country-specific factors. Especially in the cross-country analysis, government interference in the use of resource inflows cannot be incorporated systematically. Detailed country-specific information is required to evaluate why the normal pattern of response behaviour is blurred in the growth equation. So, the results presented here suggest to supplement the cross-country regressions by time-series analyses, and thereby discuss the regulative framework governing capital inflows in specific countries. This will be done in Chapter D.

The need to consider in country-specific studies the disturbances caused by government regulations is also evident from the next logical step of our analysis, i.e., to examine whether the alternative proposition of equally strong economic performance effects of different capital inflows can be rejected. This is done by testing the parameter restriction  $a_1 = a_2 = a_3$ , and the pair-wise constraints [28.a] - [28.c]. We use a standard F-test procedure of estimating the restricted form of equation [26] and comparing the resulting sum of squared residuals with those obtained from the unrestricted estimations of Table 1. Table 2 reports these test results. From the first column of F-statistics we observe that the alternative proposition, which claims that all forms of external finance are alike in their impact on economic performance, is clearly rejected. In other words, there does appear to be a significant difference in the investment and growth response to alternative sources of finance.

With regard to the pair-wise constraint tests, the results are not quite as convincing, although each of the restrictions [28.a] - [28.c] is rejected at least once in the relevant series of tests. As argued above, the test of  $a_1 = a_2$  is the decisive one in terms of confronting the non-cooperative hypothesis against the cooperative environment. The last column of Table 2 shows that restriction [28.c] cannot be rejected when IR and DSR are used as endogenous variables, while it is rejected in the case of GR. Possibly, the differences between the economic performance effects of various capital inflows would have been more pronounced in

Table 2 - Constraint Tests: Cross-Country Results for 36 Developing Countries (a)

Endogenous variables(b)	Parameter restrictions			
	$a_1 = a_2 = a_3$	$a_2 = a_3$	$a_1 = a_3$	$a_1 = a_2$
IR	SSR = 1198 F(3,31) = 5.7*	SSR = 1193 F(1,31) = 20.9*	SSR = 794 F(1,31) = 3.6	SSR = 726 F(1,31) = 0.61
DSR	SSR = 1674 F(3,32) = 7.3*	SSR = 1671 F(1,32) = 21.9*	SSR = 1096 F(1,32) = 3.31	SSR = 726 F(1,32) = 0.52
GR	SSR = 235 F(3,32) = 3.0*	SSR = 188 F(1,32) = 0.7	SSR = 235 F(1,32) = 8.9*	SSR = 234 F(1,32) = 8.7*

(a) SSR denotes the sum of squared residuals obtained by estimating equation [26] for the 1976-1979 period with the respective constraints imposed. These values are then compared with the SSR of the unconstrained estimations, as reported in lines 1 of Table 1, to derive the F-statistics; \*indicates that the parameter restriction can be rejected at the 5 per cent level of confidence. - (b) For the definition of variables, cf. the text and Appendix I.

Source: Own calculations.

the absence of government regulations affecting the use of those inflows. It is also conceivable, however, that the cross-country results can be improved if simultaneous equation problems and the question of sample homogeneity are taken into account. This will be done in the subsequent section, before presenting the country-specific analyses.

### III. Some Extensions of the Empirical Analysis

The estimation technique used so far involves single-equation OLS. Hence, some doubt is bound to arise with regard to the unbiasedness of the estimated coefficients. Such doubt has been frequently voiced in criticism of studies addressing the effectiveness of aid [e.g. Over, 1975; Papanek, 1972]. The main thrust of these critiques is that domestic savings and economic growth are not only determined by the amount of aid inflows, but, in turn, they also determine how much aid flows in.

Consequently, AID would not be fully exogenous in equation [26], which violates the orthogonality principle and leads to biased estimates.

With respect to the two-way causation argument between aid and domestic savings or growth, an underlying premise is that foreign assistance is largely given (for altruistic reasons) to countries in need. That by itself, however, is not enough to generate biased estimates. A further necessary assumption for that result is that needy countries are more likely to exhibit lower savings or growth rates. Should that assumption be valid, then the estimated relation between aid and savings or growth will reflect both the response of aid recipients and the motives of aid donors.

To account for the possibility of two-way causation in the case of AID, we reestimated equation [26] using a two-stage instrumental variable technique (2SLS), such that DEBT, FDI and GDP per capita were specified as the exogenous instruments. In spite of this adjustment, all three regressions yielded the same basic results as were obtained by OLS. The 2SLS regression involving GR provides a representative example:

$$[29] \text{ GR} = 3.79 - 2.81 \text{ FDI} - 0.11 \text{ AID} + 0.02 \text{ DEBT}$$

$$(1.52) \quad (0.96) \quad (0.35) \quad (0.23)$$

SSR = 190      (standard errors in parentheses)

By comparing this result with the growth-equation in Table 1 (line 1), it is evident that the relative order of the estimated coefficients is the same in both cases; i.e.,  $a_1 < a_2 < a_3$ , as hypothesized for a non-cooperative environment.

The two-way causality argument applied to AID is much less plausible in the case of FDI and DEBT. Here a convincing theoretical argument referring to simultaneous equation problems does not exist. The choice of instrumental variables would be entirely arbitrary so that we did not attempt to explore this possibility further. If the negative coefficients of FDI in Table 1 were to be blamed on simultaneity bias, the logical corollary would have to be that FDI inflows (but not debt inflows) are systematically channeled to low-saving or slow-growing economies. It

is difficult to find a persuasive argument to justify this type of behaviour among foreign principals.

The question of sample homogeneity is more relevant. Most notably, some sample countries encountered serious debt-servicing difficulties, while others did not. Empirical evidence tells that such different experience was not simply due to random draws or fate, but rather to different patterns of conduct among the relevant decision makers.<sup>1</sup> Differences in conduct may have had as a consequence that some agents developed a cooperative relationship with their foreign principals, while others remained in a non-cooperative relationship. In Section B.II, it was shown that the level of investment undertaken in response to a debt-financed transfer is always less in a non-cooperative equilibrium than in a cooperative one. At the same time, the terms of a transfer (e.g., interest rate) are always less favourable for the capital recipient in a non-cooperative environment relative to a cooperative situation. Consequently, the likelihood that a borrower would run into debt-servicing difficulties is always higher in a non-cooperative environment.

To investigate this issue, our sample of 36 capital-recipient countries was divided into two subgroups on the basis of whether or not a country was engaged in multilateral debt renegotiations during the 1975-1984 period [for information on reschedulings, cf. World Bank, d, 1985]. Separate regressions of equation [26] were performed over each subsample, to see if any difference in the pattern of responses emerged. We expect countries with cooperative agent-principal relations to be concentrated in the subgroup that did not experience debt-servicing problems, and countries with non-cooperative relations in the subgroup that encountered debt problems. Consequently, the cooperative response pattern should hold for non-problem borrowers, and the non-cooperative response pattern for problem borrowers.

The separate estimation results provide some support to the notion that a different transfer relationship, involving a different response pattern, has developed in some countries. But that evidence is largely restricted to the growth equation. Table 3 reveals that the countries encountering debt-servicing difficulties (countries with reschedulings)

<sup>1</sup> For a discussion of domestic policies in capital-recipient countries, cf. e.g. Baneth [1986]; Khan and Knight [1983]; Nunnenkamp [1986]; Zaidi [1985].

Table 3 - Impact of Capital Inflows on Economic Growth in Developing Countries with and without Debt Reschedulings: Cross-Country Regression Results for 36 Developing Countries (a)

Subgroup	Const. ( $a_0$ )	FDI ( $a_1$ )	AID ( $a_2$ )	DEBT ( $a_3$ )	$\bar{R}^2$ F	SSR	Number of observa- tion
Countries with reschedulings	3.98*** (0.98)	-2.30** (0.84)	-0.68** (0.25)	0.06 (0.37)	0.48 6.00	53	17
Countries without reschedulings	4.08*** (1.20)	3.46 (4.51)	-0.18 (0.14)	0.03 (0.25)	0.01 1.07	74	19
(a) The underlying test format is given by equation [26] with GR as endogenous variable. Standard errors in parentheses; **significant at the 5 per cent level; ***significant at the 1 per cent level; for the definition of variables and data sources, cf. the text and Appendix I. The OLS estimates are based on the 1976-1979 period. SSR denotes the sum of squared residuals.							

Source: Own calculations.

exhibit the typical response pattern characteristic of a non-cooperative environment. The overall explanatory power of this regression is quite high. A noticeable contrast emerges in the case of countries without reschedulings.<sup>1</sup> For this subgroup, the estimated coefficient values obey a pattern that is more consistent with a cooperative situation.<sup>2</sup>

The separate estimation results were both fairly close to those obtained from the combined sample regressions reported in Table 1, when IR and DSR were used as endogenous variables.<sup>3</sup> This is surprising

<sup>1</sup> The differences in the growth responses to capital inflows between the two subgroups are also reflected in the F-test, which compares the SSR from both subsample regressions to the SSR of the growth equation in Table 1 (line 1). The F-statistic of  $F(4, 28) = 3.22$  is significant at the 5 per cent level.

<sup>2</sup> The low  $\bar{R}^2$  of the growth equation for the countries without reschedulings was to be expected. This subgroup presumably contains a more heterogeneous set of capital-recipient countries than the subgroup of problem borrowers.

<sup>3</sup> Therefore, the separate estimation results are not presented here in detail. The strong similarities to the combined sample results were also reflected in the F-tests. The SSR from both subsample regressions



since the agent-principal model deals with the investment response to capital inflows under different transfer conditions in the first place. Possibly, the applied criterion to divide the sample into two subsamples, i.e., the existence or non-existence of reschedulings, is not sufficient to discriminate between cooperative and non-cooperative transfer conditions. Therefore, a broader set of indicators will be considered in the country-specific analyses of Chapter D.

#### IV. Summary

The above cross-country analysis on the economic performance effects of debt and FDI inflows provided a first test of the basic agent-principal model developed in Chapter B. By and large, the results confirm the central prediction of the model that the investment responses to alternative forms of capital inflows are different. Also, the hypothesis cannot be rejected that in a non-cooperative environment capital-recipient countries face a trade-off between less income variation and faster economic development, when confronted with the alternative of receiving debt or FDI inflows. Whereas debt-financed transfers exert a relatively stronger positive influence on overall investment, equity-financed transfers provide the benefit of lower fluctuations in domestic consumption. This result sharply conflicts with the counterhypothesis, which claims a general superiority of FDI over debt as far as economic performance effects are concerned.

However, the results also indicate that factors which could not be considered explicitly in the basic model influence the economic performance effects of debt and FDI inflows. In some instances, the normal pattern of response behaviour predicted by the model is obscured by country-specific influences. Most notably, government regulations on the use of foreign capital are likely to affect the efficiency of debt and FDI-financed investments. It can only be assessed in the subsequent country-specific analyses whether or not the efficiency of debt is more seriously impaired by government regulations than the efficiency of FDI.

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were compared with the respective SSR-figures of Table 1. In the case of the investment ratio,  $F(4,27) = 0.95$ ; in the case of domestic savings,  $F(4,28) = 1.65$ . Both F-statistics are insignificant.

On the basis of the cross-country regressions, neither form of capital inflow can be judged unambiguously superior to the other, and thus recommended for all countries, independent of social attitudes towards risk. A clear welfare improvement can only result from a shift of the risk-return trade-off towards less risk and more growth. Such shifts may be achieved if information channels between agents and foreign principals are improved, property rights better defined, and legal enforcement of claims ensured. Institutional changes in these respects would reduce monitoring costs and thereby provide a more conducive setting for attaining cooperative agent-principal relations. Some capital-recipient countries may have evolved further in this regard than others. The question as to how developing countries may credibly precommit themselves against moral hazard will be further assessed in the country studies of Chapter D.

## **D. The Effects of Debt and Equity Inflows: Time-Series Analyses**

### **I. Major Objectives**

The purpose of the cross-country analysis of Chapter C was to determine which of the alternative response patterns best describes the observed behaviour among a fairly wide spectrum of Third World economies. In other words, the discussion focused on the normal pattern of the economic performance effects of alternative capital inflows. The findings suggest that most developing countries were engaged in non-cooperative relationships with foreign principals. In several instances, however, the overall explanatory power of the regressions and the significance of estimated coefficient values remain rather low. This points to considerable deviations from the normal pattern as far as individual countries are concerned. It is a major objective of the subsequent time-series analyses to explain such deviations for four selected countries (Chile, Malaysia, Mexico, and South Korea). As will be shown in Section D.II, these countries differ significantly in terms of economic performance and the composition of external financing.

To explain country-specific differences in response behaviour the basic choice-theoretic context, given by the agent-principal model, is maintained. But the analysis is extended by considering in more detail the transfer relations between agents and principals, as well as the institutional and regulative framework governing capital inflows in the four sample countries:

- The basic theory suggests that the response pattern depends on the type of transfer equilibrium. In Section D.III, it is assessed in which of the sample countries the agent-principal relations can be characterized as cooperative, and non-cooperative respectively. The transfer regime is expected to have an impact on the agents' investment and savings behaviour in the first place.
- The argument that policy intervention may obscure the normal pattern and even reverse the ranking of the economic performance effects of alternative capital inflows is advanced in Section D.IV. This reasoning refers to the economic growth effects particularly.

The analysis is also extended with regard to the composition of external financing. The discussion on the government's leverage on the use

of external funds in Section B.III suggests a further differentiation of debt inflows. The empirical analysis of Section D.V supplements the basic debt-equity dichotomy by additional regression estimates where private and public debt, as well as debt from different sources and of different maturity are treated separately.

## II. The Structure of Capital Inflows and Economic Performance: Overview

The type of transfer regime between agents and principals and the regulative framework governing capital inflows within the capital-recipient countries are expected to have a significant impact on the economic performance of developing countries. To test this proposition empirically in a time-series context, countries had to be selected that differ remarkably in terms of both the composition of external financing and their economic performance. Furthermore, the sample should contain countries that encountered major difficulties in meeting external payment obligations as well as countries that did not experience such difficulties. Against this background, we selected the following four countries: Chile, Malaysia, Mexico, and South Korea. In the subsequent paragraphs, it is assessed whether the data for these countries reveal a strong and direct correlation between alternative capital inflows and economic performance.

As far as economic performance is concerned, we focus on overall investment, domestic savings and economic growth, since these variables are considered as endogenous variables in the subsequent regression analysis. In terms of economic performance the four countries can be divided into two subgroups (Table 4). In all respects, Malaysia and South Korea performed better than Chile and Mexico. Over the whole period considered (1970-1985), all three performance indicators were lowest in Chile. South Korea experienced the highest investment ratio (IR) and, with more than 8 per cent annually, by far the highest average economic growth rate. Malaysia showed the highest average savings ratio (DSR), which even exceeded the average investment ratio.<sup>1</sup>

<sup>1</sup> It cannot be concluded, however, that Malaysia was a capital-exporting country rather than a capital-importing one. Domestic savings are treated as a residual item in national accounting. Data shortcomings have as a consequence that the DSR and the IR are not strictly comparable.

Table 4 - Economic Performance in Chile, Malaysia, Mexico, and South Korea, 1970-1985 (per cent of GDP)

	Investment ratio	Savings ratio	Real economic growth rate
1970-1985			
Chile	14.7	10.0	2.1
Malaysia	27.7	30.4	6.5
Mexico	20.6	15.0	4.6
South Korea	27.7	21.7	8.2
1977-1983			
Chile	14.9	9.2	3.6
Malaysia	30.6	32.0	7.2
Mexico	21.9	15.9	4.5
South Korea	30.7	23.8	6.8

Source: Banco Central de Chile [1986; 1988]; Banco de México [a]; Bank of Korea [1984]; Economic Planning Board [1987]; Secretaría de Programación y Presupuesto [various issues]; World Bank [f]; own calculations.

During the period of large debt inflows (1977-1983), the DSR and IR of Malaysia and South Korea further increased, as compared to the average figures for the whole period of 1970-1985 (Table 4). That increase remained relatively small in the case of Mexico; while Chile even experienced a decline in the DSR. The change in growth patterns is somewhat different. The growth figures of the fast-growing economies further improved in the case of Malaysia, but declined slightly in the case of South Korea. Economic growth rates did not change in Mexico; they picked up in Chile, but this country still experienced the lowest growth rates among the sample countries.

Notably, all countries experienced negative economic growth rates in or immediately after the year of the highest debt inflows.<sup>1</sup> But in South Korea as well as in Chile the reduction of debt inflows in the 1980s went along with an improvement in real economic growth; whereas Mexico suffered from a second slump to negative economic growth just three years after the first one 1982/83.

<sup>1</sup> This is evident from annual growth figures which are not reported here.

Table 5 - Structure of Capital Inflows in Chile, Malaysia, Mexico, and South Korea, 1970-1986

	Total capital inflows		Debt	FDI	Aid
	mill. US \$	per cent of accumulated GDP	per cent of total capital inflows		
1970-1986					
Chile	20930	7.6	91.6	5.1	3.3
Malaysia	20611	7.7	52.4	43.1	4.5
Mexico	111469	5.7	86.1	13.1	0.8
South Korea	34626	4.4	92.5	4.9	2.6
1977-1983					
Chile	14694	9.6	87.9	10.0	2.1
Malaysia	11557	8.7	49.9	47.0	3.1
Mexico	97432	9.2	74.4	25.2	0.4
South Korea	26036	6.2	97.3	1.6	1.1

Source: IMF [a]; OECD [c]; World Bank [c]; own calculations.

Remarkable differences between the sample countries prevailed also in terms of overall dependence on capital inflows and the structure of external financing (Table 5). Over the whole period under consideration, capital inflows relative to GDP were highest in Malaysia and lowest in South Korea. The Latin American countries outpaced Malaysia in the 1977-1983 period, whereas capital inflows remained relatively low in South Korea. For the 1970-1986 period, the differences in the composition of capital inflows can be summarized as follows:

- The share of debt inflows in total capital inflows was highest in Chile and South Korea. Nearly all capital provided by foreign principals was debt; the share of FDI figured around 5 per cent only.
- On the other hand, a strong preference for FDI can be seen in the case of Malaysia. The share of this type of capital inflow exceeded 40 per cent in this country.
- Mexico ranged between these extreme cases with FDI accounting for a share of 13.1 per cent of total inflows.
- The share of aid inflows was below 5 per cent in all countries. In Mexico aid inflows were negligible, while they played the largest role in Malaysia.

The differences became even more pronounced in the 1977-1983 period, when both FDI and debt inflows peaked<sup>1</sup>. The share of FDI increased in Chile, Malaysia, and Mexico;<sup>2</sup> while it further declined in the case of South Korea, compared with the whole period of 1970-1986.<sup>3</sup>

Differences in the overall dependence on capital inflows and in the composition of external financing are also reflected in the stocks of foreign capital (Table A2). Chile and Malaysia represent the extremes in terms of overall dependence on external capital. Debt plus FDI stocks of end-1983 amounted to 110.8 per cent of GDP in Chile, but to only half of that figure in Malaysia.<sup>4</sup> For Mexico and South Korea, the respective figures amounted to 64 and 71 per cent respectively. Table A2 also confirms that all countries, except Malaysia, heavily relied on debt rather than on FDI. The ratio of debt stocks over FDI stocks further increased between 1978 and 1983 in Chile, Mexico and South Korea, though to a significantly different extent. The increase was modest in Mexico (1983: 6.5), whereas the ratio nearly tripled to 23.4 in the case of South Korea.<sup>5</sup> In sharp contrast, the extremely low ratio of 1.7 which Malaysia realized in 1978 did not increase up to 1983.

<sup>1</sup> Capital inflows in the 1977-1983 period accounted for 56.1 per cent of total capital inflows in 1970-1986 in the case of Malaysia. The corresponding shares for the other countries are 70.2 per cent (Chile), 75.2 per cent (South Korea), and 87.4 per cent (Mexico).

<sup>2</sup> Compared with the whole period of 1970-1986, the shares of FDI nearly doubled in Chile and Mexico, reaching more than 10 per cent and 25 per cent respectively. In Malaysia less than half of total inflows consisted of debt in the 1977-1983 period, so that the difference in the shares of debt and FDI amounted to less than 3 percentage points.

<sup>3</sup> In South Korea FDI inflows were strongly discouraged before 1983. Therefore the average share of this type of capital inflow was only 1.6 per cent in 1977-1983. After 1983 FDI inflows picked up considerably, while debt inflows were reduced and even negative in 1986. Although a policy change towards more FDI and less debt can be recognized in all sample countries, the change in government attitude concerning the structure of capital inflows was most pronounced in the case of South Korea (cf. Section D. IV).

<sup>4</sup> The different ranking of Malaysia in the cases of foreign capital inflows and stocks is due to the fact that the debt accumulation of the early 1980s started from an extremely low base figure.

<sup>5</sup> South Korea was the only country within our sample where FDI stocks as per cent of GDP decreased between 1978 and 1983 (3 and 2.3 per

The evidence presented so far indicates that the differences in economic performance among the four sample countries are not unambiguously determined by the differences in the composition of capital inflows. Chile and Mexico, which are similar insofar as their economic performance was relatively poor, nonetheless revealed significant differences in the structure of external financing. Even more strikingly, Malaysia and South Korea reveal drastically different capital import structures although both countries resemble each other in terms of the favourable economic performance. Actually, Malaysia and South Korea represent the two polar cases among the sample countries in terms of the role of FDI in total capital inflows.<sup>1</sup> At the first glance, the South Korean example fits well into the non-cooperative response pattern of the basic agent-principal model, i.e., high investment and high economic growth being associated with debt financing. The Malaysian example, however, sharply contradicts this pattern.

The corollary of this conclusion is of course that the evidence is as ambiguous as far as the counterhypothesis is concerned, according to which the growth impact of FDI should be higher than that of debt because FDI is essentially private in nature. Here the South Korean example does not fit.

A closer examination of the structure of debt inflows casts further doubts on the reasoning that economic performance strictly depends on whether foreign capital is raised by private or public agents, and provided by private or public principals. Table 6 shows that the composition of debt inflows (in terms of borrowers, creditors, and maturity) differs considerably between the four sample countries.<sup>2</sup> But the relationship

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cent respectively). On the other hand, debt stocks as per cent of GDP jumped from 25.7 per cent (1978) to 61.7 per cent (1983).

<sup>1</sup> In 1977-1983, the difference in the share of FDI in total capital inflows between Malaysia and South Korea exceeded 45 percentage points (Table 5).

<sup>2</sup> As argued above, short-term loans may be raised for consumption-smoothing purposes. But the maturity of debt, and especially changes in the share of short-term debt, may also indicate foreign principals' concerns about the agent's ability and willingness to service external obligations as previously agreed upon. Short-term loans provide the principals with more flexibility to reduce their engagement in capital-recipient countries that behave in a non-cooperative manner. The relative importance of short-term debt increased substantially in all coun-



Table 6 - Structure of Debt Inflows (a) in Chile, Malaysia, Mexico, and South Korea, 1970-1986

	Total debt	Short-term debt	Government borrowing	Debt from official sources
	mill. US \$	per cent of total debt		
1970-1986				
Chile	19173	14.9	44.2	3.4
Malaysia	10804	-36.3	76.8	25.4
Mexico	95945	-7.0	50.7	8.8
South Korea	32042	33.6	32.9	28.8
1977-1983				
Chile	12914	28.0	11.1	-5.9
Malaysia	5762	-10.1	89.9	23.2
Mexico	72474	-7.6	36.7	5.5
South Korea	25340	39.7	25.4	23.3
(a) Defined according to balance of payments statistics.				

Source: Cf. Table 5; own calculations.

with the economic performance of the capital-recipient countries remains ambiguous:

- With regard to debt maturities, the well-performing countries, Malaysia and South Korea, represent the extreme cases. Over the whole period 1970-1986, Malaysia and, to a lesser extent, Mexico experienced outflows of short-term debt; whereas Chile and South Korea showed positive short-term debt shares.<sup>1</sup> Especially South Korea resorted to short-term debt as a source of debt inflows.

tries immediately before the peak in annual debt inflows was reached, as is evident from a comparison of Table A3 with the average shares for the whole period 1970-1986. The rise was most pronounced in the case of Mexico, where it amounted to 45 percentage points [for the case of Mexico, cf. also Corsepius, 1988b, p. 7]. In contrast to Malaysia and South Korea, Chile and especially Mexico experienced large outflows of short-term loans in the years following the peak, i.e., after the Latin American debt crisis erupted.

<sup>1</sup> During the period of large debt inflows (1977-1983), the share of short-term debt in Chile was nearly twice as high as the average figure of 1970-1986 (Table 6).

- As concerns the role of public borrowing, the largest difference again prevailed between Malaysia and South Korea. Less than one third of total debt inflows were raised by the South Korean government;<sup>1</sup> while the public sector accounted for more than three quarters of total debt inflows in Malaysia, which nonetheless performed extraordinarily well.<sup>2</sup>
- The creditor structure conflicts with the reasoning that economic performance is necessarily poor in countries where foreign loans are available at subsidized conditions. Debt from official sources accounted for more than a quarter of total debt inflows in both Malaysia and South Korea. The share of this type of debt was below 10 per cent in Chile and Mexico, and became even negative in the 1977-1983 period in Chile.

From the reported differences among the sample countries, clear-cut relations between the composition of capital inflows and economic performance cannot be derived. That is, neither the general pattern expected in a non-cooperative agent-principal framework, nor that one expected by the counterhypothesis is clearly reflected by the data for the four economies considered. This result strongly points to the relevance of country-specific factors in determining the impact of alternative forms of capital inflows on investment, savings, and economic growth. In the subsequent sections, two factors are discussed that may figure prominently in this respect. Some of our sample countries may have succeeded to engage in cooperative relations with foreign principals (Section D.III). And country-specific government regulations concerning the use of capital

<sup>1</sup> In all sample countries, except Chile, the government's leverage on debt inflows was stronger than reflected by the calculated shares of public foreign borrowing. This refers especially to South Korea. South Korean commercial banks were state-owned during much of the period under consideration, and all credits had to be approved by the government. In Malaysia and Mexico, governments borrowed extensively in domestic credit markets, thereby crowding out private investors which had to borrow in international credit markets instead (for details, cf. Section D.IV).

<sup>2</sup> The differences among the sample countries became even more pronounced during the period of heavy borrowing. In 1977-1983, about 90 per cent of total Malaysian debt inflows consisted of government borrowing; while the respective South Korean share dropped to 25 per cent. The most drastic changes in the structure of borrowers are reported for Chile (cf. Tables 6 and A3); for the underlying reasons, cf. Section D.IV.

inflows may blur the normal pattern of economic performance effects of foreign capital, especially as concerns the impact of capital transfers on economic growth (Section D. IV).

### III. Cooperative versus Non-Cooperative Transfer Negotiations

It depends on the perception of the agent's investment behaviour by the principal whether or not a cooperative equilibrium is achieved. The agent may signal that he is prepared to engage in cooperative relations. High IRs, the concentration of investment in low-risk projects, and successful mobilization of domestic savings may provide such signals. However, unless the institutional framework of transfer negotiations allows for a credible precommitment to a certain investment behaviour, the outcome of transfer negotiations ultimately depends on the principal's expectations on the agent's future economic course. The principal decides on the terms of the capital transfer. They in turn determine the type of equilibrium.

Ideally, the outcome of transfer negotiations with foreign investors is thus to be assessed by evaluating the terms of FDI contracts. Unfortunately, such information is generally not available.<sup>1</sup> But indirect evidence points to cooperative relations with foreign investors in the cases of Malaysia, Mexico, and South Korea. Governments in these countries did not abstain from complementary investments over the 1970-1985 period, although such a behaviour was predicted by the agent-principal model in a non-cooperative environment. The Pearson-correlation coefficient measuring the correlation between FDI inflows and the public IR was significantly positive for Malaysia (0.93) and Mexico (0.89). In the case of South Korea, the government's investment policy was neutral with respect to FDI inflows. The insignificant Pearson-correlation coefficient (0.05) indicates that a shift towards more consumption did not

<sup>1</sup> Balance of payments data, collected from different sources for Malaysia, show that repatriated dividend payments exceeded the interest payments on external debt throughout the 1979-1984 period. A significant part of profit repatriation, however, was undertaken by only two multinational companies operating in the petroleum and gas sector [Nunnenkamp, 1989b]. Moreover, comparable data for the other sample countries are not available.

take place when FDI inflows increased. If foreign investors supplied their investment capital at non-cooperative terms, the three countries would have been better off by behaving in a non-cooperative manner as well, i.e., reducing public investments when FDI inflows increased.

The classification of Malaysia as "cooperative" may be questioned because of the nationalization of foreign-based plantation and mining companies, following the implementation of the New Economic Policy (NEP) in the early 1970s. Apparently, however, "the NEP had little effect on foreign investors" [Imran, Fadil, 1986, p. 180]. Overall FDI inflows increased continuously in the early 1970s [Nunnenkamp, 1989b, p. 8]. The set-back in 1975 (from fairly high inflows in the previous year) may be due to uncertainties arising from the implementation of the NEP. But FDI inflows recovered quickly and increased steadily until 1982. This may be due to several reasons. First of all, the nationalization was selective rather than unspecific.<sup>1</sup> Secondly, the Malaysian nationalization approach of "buying-back" foreign companies is likely to have less detrimental effects on agent-principal relations than outright expropriation without adequate compensation. Consequently, the negative effects of the NEP on the (microeconomic) profitability of investments were presumably much smaller than its effects on the macroeconomic performance of Malaysia.

Contrary to Malaysia, considerably more uncertainty was created by the nationalization process in Chile. The expropriation of foreign multinationals in the first half of the 1970s was concentrated on the mining sector. But nationalization took place in some other sectors as well, and the outcome of compensation negotiations was less predictable than in Malaysia.<sup>2</sup> Multinational companies were compensated only after FDI inflows were suspended completely by foreign investors, and a new government took office. Hence, agent-principal relations were more likely to be affected negatively in the longer run. Moreover, complementary investments were not undertaken in the case of Chile. The Pearson-corre-

<sup>1</sup> In the case of selective expropriation it is more likely that the government aims at some social welfare maximization. On the other hand, political economy arguments suggest that unspecific expropriations are more likely if the government agent maximizes his own welfare. For a detailed analysis of the different effects of selective versus unspecific expropriation, cf. Picht and Stüven [1988].

<sup>2</sup> Cf. Zabala [1987] for a description of the nationalization process in Chile].

lation coefficient between public investment and FDI inflows is significantly negative (-0.6). In addition, the massive FDI inflows in 1978-1982 were associated with a declining overall IR. This suggests an inverse relationship between FDI inflows and domestic investment, which is characteristic for a non-cooperative environment [Corsepius, 1988a, pp. 6 f.]. Consequently, the relations with foreign investors can be classified as non-cooperative in the case of Chile.

Also in the case of debt inflows the agent may influence the principal's risk perception by his own investment behaviour. The agent signals a cooperative behaviour by increasing the likelihood that external credits can be repaid. High IRs, high DSRs, and the concentration of investments in low-risk rather than high-risk projects may provide such cooperative signals.

The IRs of Malaysia and South Korea in 1977-1983 were about 5 percentage points higher than the average IR of all developing countries.<sup>1</sup> In sharp contrast, the IRs of Chile and Mexico were substantially below the reference measure (Table 4). The average IR for all developing countries was 1.2 percentage points higher in the 1977-1983 period, as compared to the overall average of 1970-1985. In Malaysia and South Korea, this improvement was considerably more pronounced and amounted to about 3 percentage points. At the same time, the increase in Mexico did not exceed that one for all developing countries, and remained marginal in the case of Chile (0.2 percentage points).

A similar picture emerges from the comparison of the DSRs of the sample countries with the average DSR ratio for all middle-income developing countries in 1977-1983 [data from World Bank, d]. Malaysia and South Korea were again above the average, and the Latin American countries substantially below. There can thus be no doubt that, concerning the criteria of high investment and mobilization of domestic savings, Malaysia and South Korea behaved in a cooperative manner, whereas Chile and Mexico behaved non-cooperatively.

At first glance, the differences in agent-principal relations are less clear-cut with regard to the riskiness of investments. One possible indicator to assess the riskiness of investments is to judge the sectoral allocation of resources against the assumed comparative advantage of the

<sup>1</sup> The latter figure amounted to an average of 25.6 per cent in 1977-1983 [IMF, e].

capital-recipient countries. All sample countries could be classified as middle-income developing countries in the 1970s and early 1980s. So, large-scale heavy industrialization, involving non-standardized production, and promotion of human-capital intensive sectors were presumably not in line with the comparative advantage of the sample countries.

A policy-induced preference towards heavy industrialization can be observed in all sample countries. Chilean and Mexican investments were heavily concentrated in highly physical and human-capital intensive industries (Tables A4, A5). But also in Malaysia and South Korea the allocation of debt inflows reflected the general policy of heavy industrialization [Table A6; Nunnenkamp, 1989b, p. 13]. Arguably, the policy-induced industrialization bias had less detrimental effects on agent-principal relations in Malaysia and South Korea than in the Latin American countries. The general policy attitude in Malaysia and South Korea was outward looking. There was thus a better chance that misallocation could be prevented in the longer run. Success or failure of industrialization policies was measured by world market standards. Hence, Malaysia and South Korea faced stronger incentives to adjust industrialization policies, once it was evident that the officially promoted infant industries were unlikely to become competitive in international markets. Actually such adjustments were discussed in both countries in the recent past, and partly implemented already.<sup>1</sup> The overall policy stance was more inward oriented in the Latin American countries, especially in Mexico. Because of comprehensive and persistent import-substitution policies in Mexico, the risk of permanent mis-specialization was considerably greater than in the Asian sample countries. Rational foreign principals would have taken these differences into account when deciding on the terms of capital transfers.

Moreover, the world market orientation of Malaysia and South Korea reduced the riskiness of investments by generating the foreign exchange required to meet debt-service obligations:

- Export promotion was a major goal of government policy in South Korea since the first Five-Year Plan in 1962 [Collins, Park, 1988]. Table A7 shows that privileged access to credits represented a major instrument of export promotion in the 1970s. The ratio of total (domestic and for-

<sup>1</sup> For the Malaysian case, cf. Nunnenkamp [1989b, p. 14 f.]; for South Korea, cf. Schweickert [1989, pp. 15 f.].

eign) loans over total assets was considerably higher in export-oriented industries than in domestic-market oriented industries. Additionally, interest rates on loans to export-oriented industries were substantially lower than for domestic-market oriented industries. The difference in average costs of borrowing reached 5 percentage points in 1980 (Table A7).

- Malaysia adjusted its industrial policy towards an outward-looking strategy in the early 1970s [Ariff, Semudram, 1987, pp. 40 f.]. Major incentives provided for export-oriented industries were outright export subsidies, accelerated depreciation, and tax reductions [cf. also Spinanger, 1986, p. 92]. Export credits were available at concessional terms. Further incentives were granted for exporters operating in the free trade zones that were established in 1971.

Due to the policy stance adopted by the Korean and Malaysian governments, a substantial proportion of available resources was allocated to export-oriented industries. On the other hand, the allocation of foreign credits in Mexico reflected the strong inward orientation of economic policies. Inward-oriented sectors, which generated less than 30 per cent of Mexico's exports in 1980, accounted for 60 per cent of Mexican debt. The manufacturing sector which received only 40 per cent of debt inflows generated nearly three quarters of total exports [Corsepius, 1988b, p. 6]. Similarly, inward-oriented sectors received the bulk of debt inflows in Chile. In the 1974-1981 period, mining and manufacturing accounted for 76.8 per cent of total Chilean exports, whereas only 31.8 per cent of total foreign debt outstanding accrued to these two sectors (Table A8).

The differences between the sample countries in terms of export promotion are clearly reflected in the export performance figures presented in Table 7. In 1977-1983, average exports as per cent of GDP were substantially higher in South Korea and Malaysia than in Chile and Mexico. But foreign principals may be more interested in weighting the export performance of a borrowing country against its foreign indebtedness. The differences were even more pronounced when calculating the ratio of exports to total debt stocks. Less than a quarter of the debt stocks of end-1983 were covered by exports in Chile and Mexico; whereas Korean exports accounted for more than half of the accumulated debt, and exports were significantly larger than the stock of debt in Malaysia.

Table 7 - Export Performance in Chile, Malaysia, Mexico, and South Korea, 1977-1983

	Chile	Malaysia(a)	Mexico	South Korea
Average exports as per cent of GDP, 1977-1983(b)	21.0	52.6	13.3	33.3
Export as per cent of total debt stock, 1983	22.0	147.8	21.6	53.8
(a) Public and publicly guaranteed debt only. - (b) Period averages.				

Source: IMF [e]; Table A2.

The favourable export performance and thereby the availability of foreign exchange for debt-service payments in Malaysia and South Korea provided clear signals that these countries could be perceived as low-risk agents by foreign principals in the 1970s and 1980s. On the other hand, the investment policies in Chile and Mexico resulted in higher risks concerning the liquidity status of these countries.

The overall behaviour of the agents signaled that Malaysia and South Korea, in contrast to Chile and Mexico, were prepared to engage in cooperative transfer negotiations with foreign creditors. But it is the principal who decides on the terms under which debt is transferred, and thereby on the type of equilibrium to be reached. Not surprisingly, the differences in the agents' behaviour have their counterpart in different credit terms, as reflected in the interest rate spreads above the London Interbank Offer Rate (LIBOR) in 1977-1983 (Table 8). Foreign debt finance was supplied at non-cooperative terms in the cases of Chile and Mexico. Average interest rate spreads amounted to 1.21 percentage points for these countries. This figure was very close to the average spread calculated for a group of developing countries with serious debt problems (1.23), and significantly above the average for developing countries without major debt-servicing difficulties (1.01). Over the same period, interest rate spreads were lower for Malaysia (0.54) and South Korea (0.94). In the case of Malaysia, they were even lower than the average spread for four industrialized countries (0.77). In 1984, also South Korea approached the credit standing of the industrialized countries; the difference in spreads became marginal.



Table 8 - Interest Rate Spreads over LIBOR in Selected Debtor Countries (a), 1977-1983

	1977	1978	1979	1980	1981		1982		1983	
					1. half	2. half	1. half	2. half	1. half	2. half
Chile	2.11	1.54	1.09	1.02	1.00	0.99	1.02	1.32	(0.55)	na
Malaysia	(0.96)	0.58	(0.56)	0.58	(0.30)	0.54	0.35	0.29	0.29	0.46
Mexico	1.57	1.47	0.81	0.84	1.09	0.86	1.20	0.68	na	(1.88)
South Korea	1.85	1.10	0.61	0.84	0.95	0.74	0.72	0.56	0.77	0.68
21 developing countries(b)	1.74	1.32	0.88	0.97	1.13	1.14	1.02	1.09	0.88	0.79
9 major problem borrowers (b, c)	1.78	1.35	0.88	0.88	1.07	1.22	1.15	1.40	1.26	1.33
8 non-problem borrowers (b, d)	1.66	1.16	0.85	1.14	0.94	0.79	0.74	0.65	0.70	0.62
Industrialized countries(b, e)	1.23	0.34	0.80	0.68	0.60	0.54	0.57	0.61	0.73	0.57

(a) Unweighted averages of individual contracts; in parentheses if the number of loans is less than four. - (b) Averages weighted with the share of each country in total credits. - (c) Argentina, Brazil, Chile, Yugoslavia, Mexico, Nigeria, Philippines, Turkey, and Venezuela. - (d) Egypt, Ivory Coast, India, Indonesia, Colombia, Malaysia, South Korea, and Thailand. - (e) France, Japan, United States, United Kingdom.

Source: Nunnenkamp, Junge [1985, p. 57].

All in all, the transfer regime governing debt flows to the sample countries can be characterized as cooperative in the cases of Malaysia and South Korea, and non-cooperative in the cases of Chile and Mexico. The analysis of the transfer regime in the case of FDI inflows leads to the same conclusion, except for Mexico which behaved in a cooperative manner against foreign investors.<sup>1</sup> These results, summarized in

<sup>1</sup> It may be useful to make a small analytical observation at this point. The basic agent-principal model presented in Section B.II implicitly

Table 9 - Transfer Regimes in Chile, Malaysia, Mexico, and South Korea

		Debt	
		cooperative	non-cooperative
FDI	cooperative	Malaysia, South Korea	Mexico
	non-cooperative	-	Chile

Table 9, add to the plausibility of our reasoning that the differences among the sample countries in terms of the composition of capital inflows and economic performance (as reported in Section D.II) may be due to country-specific characteristics in agent-principal relations. The finding that the transfer regimes differ between our sample countries is most relevant for formulating country-specific hypotheses on the impact of alternative types of capital inflows on overall investment and domestic savings. Before specifying the test format in Section D.V, however, the role of government regulations has to be discussed in the subsequent paragraphs.

#### IV. The Regulation of Capital Inflows

Government interventions may have as a consequence that capital inflows are not perfectly fungible, as was assumed by the basic agent-principal model. They may modify the incentives of the recipients of foreign capital as to how to use the resources transferred. In particular, governments can direct the allocation of foreign funds within the country

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assumes that each capital-recipient country is engaged in either a cooperative or a non-cooperative relationship with foreign principals, but not both (as it is argued here for Mexico). This is because all capital inflows are considered as perfectly fungible. But the assumption of perfectly fungible capital transfers is unduly restrictive, as will be shown in Section D.IV. Once this assumption is relaxed, it is possible that an agent is simultaneously involved in cooperative relations with some principals (e.g. foreign investors) and non-cooperative ones with others (e.g. foreign creditors). Notwithstanding non-cooperative transfer negotiations in the case of debt for example, foreign investors may offer cooperative terms for FDI contracts, provided that the agent does not abstain from domestic investments which are complementary to FDI projects.

and manage the costs of external borrowing. The ranking of the economic performance effects of capital inflows may thus be affected by the degree and nature of interventions, so that the normal pattern predicted by the agent-principal model is obscured. This refers to the effects on economic growth in the first place. Against this background, government policies which may have influenced the use and the efficiency of foreign capital inflows in the sample countries are evaluated next. But the relative importance of various regulations can hardly be assessed in quantitative terms. Typically, the set of interventions prevailing in a capital-recipient country is not homogeneous; different regulations may even have opposing effects on the efficiency of capital inflows in that country. Consequently, the subsequent review of government interventions can only provide a rough and tentative indication about the direction in which the varying sets of regulations influenced the relationship between different types of capital inflows and economic performance of the agent.

### 1. The Efficiency of Debt

Typically, governments in developing countries do not only regulate the amount of foreign debt flowing into their countries. Economic policies also influence the efficiency of foreign loans, i.e., the effects of foreign credits on economic growth. Especially government guarantees, measures reducing borrowing costs, and selective credit policies are widespread interventions which may reduce the efficiency of debt inflows.

*Government guarantees:* Policies which reduce the exchange rate risks for borrowers or assure credit repayment figure prominently in many developing countries. By assuming the exchange rate risk, the public authorities increase the attractiveness of foreign credits artificially. Domestic debtors are released from making costly provisions for exchange rate changes and from investing in activities which generate foreign exchange. The incentives to use foreign debt inflows efficiently are weakened in two ways, if governments issue ex ante repayment guarantees costlessly or create expectations that firms with debt repayment difficulties will be bailed out. First of all, moral hazard problems arise as borrowers feel less responsible for the repayment of the debt and take excessive risks. Secondly, foreign lenders and domestic inter-

mediaries may no longer evaluate credit risks properly, because final repayment by the government is assured.

With the exception of Malaysia all sample countries lowered the exchange rate risk for borrowers:

- Between February 1978 and June 1979, Chile established an active crawling peg with a preannounced rate of devaluation. Thereafter the nominal exchange rate was fixed until June 1982 [Corbo, 1985]. Two observations indicate that economic agents perceived this exchange rate policy as credible and did not expect surprising devaluations [Cuadra, Hachette, 1988]: Chilean deposits in the United States (as per cent of M2) declined steadily until late 1981; and the premium of the US dollar in the parallel exchange market over the official rate did not increase significantly until the last quarter of 1982.
- During 1970-1975, Mexico maintained a fixed exchange rate; after the devaluation in 1976 the exchange rate was fixed again. In addition, Banco de México offered an exchange insurance program to private debtors. This scheme was only rarely used, however, since the Central Bank was regarded as being able to support the exchange rate permanently.
- The Korean Won was fixed against the US dollar in the 1974-1979 period. Exchange rate risks were largely ruled out during these years.

Moreover, some form of government repayment guarantee existed in all sample countries but Mexico. In the case of Mexico, oil reserves were perceived by foreign lenders and domestic borrowers as guaranteeing at least the repayment of public foreign debt. In the 1975-1981 period, 45 per cent of total debt inflows accrued to the state-owned oil company PEMEX [Ortiz, Bueno, 1988]. PEMEX invested the foreign funds for its own asset expansion initially. In the late 1970s, however, the non-oil public sector used PEMEX increasingly as a conduit for external borrowing [Luke, 1988, p. 63].

The specific arrangements for government repayment guarantees differed significantly among the three remaining countries. In Chile the government did not issue repayment guarantees explicitly for private debt. But with the 1976/77 interventions in almost bankrupt finance companies and the Banco Osorno, all depositors received complete compensation. This made foreign lenders and domestic depositors believe that the credits were in fact guaranteed by the state [Díaz-Alejandro,

1985, p. 8]. Explicit government guarantees existed in Malaysia and South Korea. The Malaysian government frequently issued repayment guarantees for non-financial public enterprises, whose borrowing increased by nearly 40 per cent annually in the 1983-1986 period. Bank of Korea (i.e., the Central Bank) and the government-owned commercial banks provided repayment guarantees in South Korea. The credibility of these guarantees was high since the government bailed out highly indebted firms in 1971, after a major depreciation of the Won [Park, 1986, p. 1028]. In sum, arrangements which encouraged an inefficient use of debt inflows existed in all four countries, since the governments partly assumed exchange rate and repayment risks.

*Reduced borrowing costs:* The impact of debt inflows on economic growth is also affected by government interventions which lower artificially the costs of foreign loans. Domestic currencies become overvalued if exchange rate devaluations in highly inflationary developing countries remain consistently smaller than the inflation differential to the major industrialized countries. Consequently, the costs of credits raised in industrialized countries decline for borrowers in these developing countries, and may even become negative in real terms. Government-induced subsidization of borrowing costs further weakens the incentives to use debt efficiently. Firstly, labour-intensive investments are discriminated against, although they may be in line with the country's factor endowment. Secondly, careful project evaluation is discouraged. Investments are realized which are only profitable because of artificially lowered capital costs. As overvaluation is not sustainable over time, the costs of external finance may increase dramatically if the exchange rate is adjusted ad hoc. Many investments may become unprofitable suddenly, and a major economic recession is likely to occur.

As concerns borrowing costs in the sample countries, external debt in Malaysia was cheaper than domestic debt up to 1978 only, when debt inflows were still negligible (Table 10). Thereafter the interest rate differential favoured domestic credits. On the contrary, effective interest rates for foreign loans were reduced in the other three countries, in which the government already assumed the exchange rate risk:

- In Chile real interest rates of credits denominated in US dollars were on average 29 percentage points lower than domestic credits in the 1976-1981 period (Table 10). The tremendous size of the interest rate

Table 10 - Real Borrowing Costs for Domestic (a) and Foreign Loans (b) in Chile, Malaysia, Mexico, and South Korea, 1975-1984

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
<b>Chile</b>										
Domestic	15.6	28.5	25.9	18.6	10.6	13.3	33.7	40.5	15.5	18.5
Foreign	43.7	-19.4	-13.6	2.6	-9.8	-7.5	3.7	28.4	3.5	42.7
Differential(c)	-28.1	47.9	39.5	16.0	20.4	20.8	30.0	12.1	12.0	-24.2
<b>Malaysia</b>										
Domestic	na	5.9	3.3	2.5	4.0	1.1	-1.2	3.0	7.4	7.5
Foreign	15.3	0.8	-5.8	-3.4	7.7	9.2	8.2	11.5	6.8	11.1
Differential(c)	na	5.1	9.1	5.9	-3.7	-8.1	-9.4	-7.5	0.6	-3.6
<b>Mexico</b>										
Domestic	3.9	-12.3	-3.6	2.0	-0.1	-1.8	7.9	-52.8	-17.8	-4.5
Foreign	-3.3	43.3	1.0	-7.2	-6.9	-12.2	5.4	223.7	-6.6	-9.3
Differential(c)	7.2	-55.6	-4.6	9.2	6.8	10.4	2.5	-276.5	-24.4	4.8
<b>South Korea</b>										
Domestic	-9.7	0.8	5.8	2.4	0.2	-5.8	-2.0	4.9	6.6	8.0
Foreign	-18.2	-9.7	-4.2	-5.6	-6.2	27.0	2.8	13.8	13.1	13.0
Differential(c)	27.9	10.5	10.0	8.0	6.4	-32.8	-4.8	-8.9	-6.5	-5.0
(a) Average real interest rate for domestic credits in national currency. - (b) Average real interest rate for foreign credits in foreign currency, corrected for the actual devaluation. - (c) Domestic minus foreign.										

Source: Banco de México [b]; Collins, Park [1987]; Cuadra, Hachette [1988]; IMF [d]; own calculations.

differential may be traced back to very high domestic interest rates<sup>1</sup> and the overvaluation of the Peso.<sup>2</sup>

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The high real domestic interest rates can be partly attributed to the high demand for capital due to the low capitalization of firms and the need for financial restructuring after the policy reforms in the mid-1970s. Later on, the partial segmentation between domestic and international capital markets [Mizala Salces, 1985] and distress borrowing of firms also contributed to high real interest rates. For a careful analysis of the determinants of Chilean interest rates, cf. Zahler [1985].

2

Cf. Corbo [1985] and Sjaastad [1984] for an analysis of the exchange rate policy in Chile.

- In the case of Mexico, borrowing in the United States was generally cheaper in the 1970-1981 period [Corsepius, 1988b, p. 20]. Exceptions were the years 1976-1977, when Mexico devalued the Peso substantially, thereby discontinuing its fixed exchange rate against the US dollar.
- In the 1966-1979 period, domestic official lending rates in South Korea were always higher than foreign borrowing costs [Collins, Park, 1988]. The real interest rate on foreign credits averaged -8.8 per cent during the years 1975-1979. Thereafter the costs of foreign borrowing increased dramatically due to the devaluation of the Won (Table 10).<sup>1</sup>

*Selective credit policies:* In many developing countries, the government directly determines the use of most of the debt inflows, because it controls the allocation of foreign debt within the economy. The fungibility of capital inflows may be severely reduced in this way. The government's influence on the allocation of foreign credits is not restricted to debt inflows raised by the government and public enterprises. Sometimes also private foreign debt is channeled to publicly designed priority sectors. State-owned banks typically play an important role as intermediaries in this respect. Especially if public credit allocation favours public consumption and/or inefficient investments, the expected impact of debt inflows on investment and economic growth is negatively affected.

An analysis of credit allocation policies in the sample countries reveals marked differences, which reflect the differences in overall economic development policies. Private debt accounted for 55.1 per cent of total debt outstanding in the 1979-1982 period in Chile, which pursued a market-oriented approach to economic development since 1974 (Table 11). The government did not influence the allocation of private debt in this period. Only from 1982 onwards, the public sector borrowed heavily in order to restructure the economy after the crisis in 1982 and to recapitalize the insolvent financial system.<sup>2</sup> Consequently, selective credit policies were of minor importance in Chile.

<sup>1</sup> In order to account for the structural break in South Korean policies towards external debt, dummy variables will be introduced in the empirical calculations for this country (for details, cf. Section D.V.2).

<sup>2</sup> Cf. Behrens Fuchs [1985, pp. 404 ff.] for a description of the restructuring of the Chilean financial sector.

Table 11 - The Debtor Structure in Chile, Malaysia, Mexico, and South Korea, 1975-1987 (a) (per cent)

	1975-1978		1979-1982		1983-1987	
	Public	Private	Public	Private	Public	Private
Chile	74	26	45	55	72	28
Malaysia(b)	73(c)	27(c)	75(d)	25(d)	84	16
Mexico	76	24	69	31	73	27
South Korea(b)	91(c)	9(c)	86(d)	14(d)	81	19
(a) Share in total debt outstanding. - (b) Long-term debt only. - (c) 1975 only. - (d) 1980-1982.						

Source: Banco Central de Chile [1988]; Banco de México [c]; Quijano, Antia Berhens [1985]; Secretaría de Hacienda y Credito Publico [1988]; World Bank [c, 1988].

On the contrary, the government played a much more active role in the allocation of debt inflows in Malaysia, Mexico and South Korea. The public sector in Mexico accounted on average for more than two thirds of total foreign debt in the 1970s (Table 11). Domestic financial intermediation declined continuously.<sup>1</sup> Foreign funds were increasingly used to finance budget deficits and the operating losses of inefficient public enterprises, which were not allowed to increase their tariffs in an inflationary environment [Quijano, Antia Berhens, 1985, pp. 96-99]. Furthermore, PEMEX was granted privileged access to international capital markets, and financed its heavy asset expansion mainly abroad.<sup>2</sup> While the investments were profitable initially, asset expansion continued even when international interest rates rose and the probability of falling oil prices grew. PEMEX reached a critical situation in 1980/81, when sales and earnings were clearly incompatible with the volumes of accumulated debt and assets. The overexpansion in capacity by the publicly privileged PEMEX and the financing of current public expenditures

<sup>1</sup> Broad money in Mexico (currency held by the public, private checking accounts, saving and time deposits, short-term certificates) declined from 21.4 per cent of GDP in 1970 to 11.8 per cent in 1986.

<sup>2</sup> In the 1975-1981 period, almost 45 per cent of total public debt inflows accrued to PEMEX [Ortiz, Bueno, 1988]. In Table 12 the external debt of PEMEX is distributed among various sectors, since PEMEX's activities include oil exploration as well as refining.



are likely to have weakened the relationship between debt inflows and both economic growth and overall investment in Mexico.

Similar to Mexico, the government and public enterprises accounted for almost 75 per cent of total foreign debt outstanding in the 1980s in Malaysia. Apparently most of the foreign funds raised by the Malaysian public sector were invested.<sup>1</sup> However, it can be expected that those investments did not speed up economic growth in the short run. In the 1970s, most foreign loans were provided by multinational organizations. These loans were used for infrastructure development in the first place (Table 12). Due to long gestation periods, positive growth effects, if any, were substantially delayed. In the 1980s, the government favoured heavy investments by non-financial public enterprises, e.g. in ship-building, and in the production of automobiles, steel, and cement. Probably, the concentration on heavy and human-capital intensive industries was in conflict with Malaysia's comparative advantages. In fact, many externally financed projects failed to generate sufficient foreign exchange to service debt through their own operations [Imran, Fadil, 1986, p. 54]. Government expectations on favourable effects on economic growth and export performance were frustrated to a large degree. Non-performing loans of public enterprises had to be converted into government equity.

The strategy of the Korean government to control the allocation of foreign debt was different from that in the other sample countries. Direct government borrowing amounted to less than 30 per cent of total debt inflows in the 1976-1983 period; within public debt, social overhead projects figured prominently (Table 12). But the government controlled about two thirds of the corporate sector's financing needs (domestic and foreign), largely through the state-owned banking system.<sup>2</sup> The govern-

<sup>1</sup> In Malaysia the operating budget of the federal government showed consistently surpluses between 1973 and 1985. But these were insufficient to finance the growing investment expenditures [cf. Bank Negara Malaysia, 1987].

<sup>2</sup> In the 1965-1969 period, the Korean government controlled 75 per cent of all funds borrowed by the corporate business sector. Subsequently, this share decreased to 64 per cent in the years 1970-1974, and 56 per cent in the 1975-1979 period [Bank of Korea, b]. From 1980 onwards, the government's leverage declined further with the privatization of the banking system.

Table 12 - Sectoral Distribution (a) of Public and Publicly Guaranteed External Debt Outstanding in Chile, Malaysia, Mexico, and South Korea, 1982

	Chile	Malaysia	Mexico	South Korea
Agriculture, forestry, fishing	2.3	2.2	2.3	3.3
Mining, quarrying	11.1	12.1	11.3	0.1
Manufacturing	15.9	3.4	8.8	17.7
thereof:				
Food, beverages, Tobacco	9.7	8.3	20.0	4.8
Textiles, clothing, leather	0.1	6.8	0.0	10.6
Chemicals	12.1	17.1	51.4	23.9
Basic metals	61.8	na	16.4	36.6
Fabricated metals, machinery	0.7	37.1	7.4	15.3
Other manufactures	15.5	30.7	4.8	8.8
Services	53.4	41.2	32.9	65.9
thereof:				
Social overhead(b)	55.5	81.8	50.0	47.9
Community	12.7	4.7	17.3	7.6
Other services	31.8	13.5	32.7	44.5
Other	17.3	41.1	44.7	13.1

(a) In per cent of total in the case of major sectors; in per cent of major sectors in the case of subsectors. - (b) Includes electricity, gas, water production, transport and storage, communications.

Source: World Bank [a; b]; own calculations.

ment used its influence to promote heavy industries and chemicals, whose share in total external borrowing of the manufacturing sector increased from 57 per cent in the late 1960s to 78 per cent in the 1976-1980 period [Collins, Park, 1988].<sup>1</sup>

Government intervention in the allocation of foreign debt inflows is likely to have negatively affected the economic growth impact of foreign loans in South Korea. Neither comprehensive heavy industrialization, involving highly human-capital intensive sectors, nor social overhead projects could be expected to foster economic growth in the short run; a favourable impact was to materialize with considerable delay at best. Even though South Korea is economically more advanced than Malaysia, it

<sup>1</sup> Credits were found to be fungible between officially promoted heavy industries and non-priority sectors in the 1970s [Hong, Park, 1986, pp. 172-180]. On-lending by privileged borrowers to other borrowers somewhat weakened the government's influence on the final allocation of debt inflows.

can be doubted that all of the promoted heavy industries conformed with South Korea's comparative advantages. This refers especially to the chemical industry which is highly skill and technology intensive. Further support for this view might be derived from the fact that the chemical industry experienced significantly lower gross rates of return on capital than the average of manufacturing industries [Hong, Park, 1986, p. 169].

South Korea changed its policies towards foreign debt gradually in the 1980s. After the privatization of the banking system, the access to and the costs of foreign borrowing became more equal across industries [Schweickert, 1989]. In addition, the high IR was supposed to be financed through domestic savings since the mid-period adjustment of the Fifth Five-Year Plan in 1982 [Park, 1986, pp. 1038 ff.]. The ratio of savings to GNP increased from 21 per cent in 1982 to 33 per cent in 1986. Due to the successful mobilization of domestic savings the remarkably high IR of 31 per cent could be maintained, although foreign loans were repaid since 1986. In the empirical estimates the structural break in Korean attitudes towards external debt will be captured by introducing dummy variables (cf. Section D.V.2).

In summary, the discussion of government interventions concerning external debt inflows supports our reasoning in Section B.III on the relevance of the institutional and regulative framework in obscuring the growth impact of debt inflows expected by the basic agent-principal model. The relative importance of the different regulations can hardly be assessed exactly. Similarly, the differences between the four sample countries are difficult to evaluate in quantitative terms. But the direction in which the varying sets of government interventions influenced the relationship between debt inflows and economic performance is clear from the short review. Most interventions favoured inefficient uses of debt. It is thus unlikely that the empirical estimations reveal the strongly positive impact of debt inflows on economic growth, that was derived from the basic agent-principal model by assuming an undistorted regulative environment. In Mexico government policies are likely to have weakened the relationship between foreign debt and overall investment as well; while in Chile, Malaysia and South Korea debt inflows were mainly invested, though inefficiently to a considerable extent.

## 2. The Efficiency of FDI

In the following it is analysed whether a similar conclusion can be drawn with respect to FDI. Government interventions concerning FDI inflows serve mainly two purposes. Firstly, certain subsectors are protected from foreign competition, while FDI is promoted and frequently subsidized in other industries. This is mostly done by selective approval procedures or explicit prohibition of FDI in some subsectors. Secondly, local participation is aimed at by imposing local content rules and joint venture requirements. Depending on the degree of these regulations and their application, the effects of FDI inflows on economic performance may deviate from the normal pattern predicted by the agent-principal model.

*Selective approval procedures:* Regulations concerning the allocation of FDI within the domestic economy may restrict the fungibility of capital inflows, and substantially reduce the contribution of FDI to economic development in the recipient country. Economic growth effects are most likely to remain limited if the most profitable sectors are not open to FDI, and if efficiency gains from competition between national and foreign investors cannot arise due to regulations. On the other hand, the promotion of FDI by tax privileges and other subsidies absorbs public resources which cannot be spent for other purposes. The economic costs are particularly high, if the favoured sectors do not conform to the comparative advantages of the host country. In that case, FDI can well be profitable at the firm level. But (macro-)economic growth in the host country may be retarded rather than promoted. Selective approval procedures may have additional negative effects on the efficiency of FDI inflows, if the priorities of the government and the eligibility criteria are unclear and subject to discretion. Arbitrariness and uncertainty may involve considerable information and bargaining costs for the potential investor. Moreover, it is open to question whether the most productive FDI projects are realized, since bargaining power does not necessarily coincide with efficient production. In particular, discrimination against small investors is likely to emerge.

Differences in the regulation of FDI were much more pronounced among the sample countries than in the case of foreign debt. Chile and Malaysia employed less interventionist attitudes against FDI than Mexico and South Korea. FDI regulations were gradually liberalized in Chile

from 1974 onwards. In the 1974-1976 period, foreign investors still faced considerable uncertainties. To gain approval individual fixed-term contracts had to be concluded with the government, the negotiation of which involved red tape and bureaucratic leeway of the Chilean authorities [BIC, 1987, p. 31].<sup>1</sup> With the new Foreign Investment Law of March 1977, remaining discriminations against FDI were largely abolished. Domestic and foreign firms were generally given equal treatment. This implied that most sectors were open to FDI, with the exception of activities reserved for public enterprises.

In Malaysia the treatment of FDI was fairly liberal in the 1960s, but became more selective in the early 1970s with the implementation of the NEP. Foreign participation in agriculture and mining was strongly discouraged, and the process of take-overs of plantation and mining companies was speeded up [Imran, Fadil, 1986, p. 168]. The Malaysian-owned PETRONAS was empowered with the exclusive right to exploit petroleum resources from 1974 onwards. Consequently, FDI in the 1970s and early 1980s was concentrated in the manufacturing sector. The sectoral distribution of FDI approved in the 1980-1987 period does not allow a clear-cut judgement on the efficiency of FDI. About 30 per cent of all approved projects were in human-capital intensive industries, e.g. chemicals, basic metals, and transport equipment (Table 13). On the other hand, labour-intensive production of electrical and electronic items represented the most important recipient of FDI. Moreover, about 40 per cent of all FDI projects were strongly export-oriented [for details, cf. Nunnenkamp, 1989b; Table A2]. All in all, it is thus unlikely that the approval procedures of the Foreign Investment Committee weakened the effects of FDI on economic growth in Malaysia.

Contrary to Chile and Malaysia, the selective treatment of FDI in Mexico probably reduced the positive impact of FDI on economic growth considerably. Petroleum exploration and refining was reserved exclusively for the Mexican state; i.e., one of the fastest growing sectors was

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<sup>1</sup> In the same period, Chile still acknowledged the Andean Group's Cartagena Agreement, which limited transfers of profits, dividends, and interest on foreign capital to 14 per cent per annum. In addition, new FDI in certain industries, such as banking, was prohibited under decision No. 24 of that agreement.

Table 13 - Sectoral Distribution of FDI in Chile, Malaysia, Mexico, and South Korea, 1977-1987 (per cent of total)

	Chile	Malaysia	Mexico	South Korea
	1986-stocks	accumulated flows 1980-1987	1986-stocks	accumulated flows 1977-1986
Agriculture, fishing	3.3	na	0.0	0.6
Mining	39.6	na	1.3	0.2
Manufacturing	25.1	3414(a)	71.2	71.1
thereof:				
Electrical and electronic products	na	16.7	na	22.6
Chemicals	na	15.5	na	25.1
Food	na	11.2	na	6.1
Basic metals	na	7.2	na	4.2
Transport equipment	na	6.2	na	20.9
Machinery	na	5.0	na	6.6
Textiles	na	3.4	na	1.4
Others	na	34.8	na	13.1
Services	32.0	na	27.5	28.1
Total(a)	2756	na	15047	1728

(a) Mill. US \$.

Source: CNIE [1988a]; Lee [1987]; MIDA [1987]; Zabala [1987]; own calculations.

closed to FDI in the 1970s.<sup>1</sup> Until recently, the approving commission decided upon FDI projects on the basis of a catalogue of broad and vague criteria. Inter alia, it was evaluated whether FDI projects displaced Mexican companies which were working satisfactorily, and whether they provided the Mexican economy with new technology. Arbitrary decisions created uncertainty for the applying firm.<sup>2</sup> The approval process

<sup>1</sup> In the 1977-1981 period, petroleum exploration expanded by 25.1 per cent per annum in real terms; while the real growth rate of the manufacturing sector - in which most FDI was concentrated - amounted to 8.4 per cent [Corsepius, 1988b].

<sup>2</sup> After the promulgation of the "Law to Promote Mexican Investment and Regulate Foreign Investment" (LIE) in 1973, new FDI was initially hindered by bureaucratic delays, which created backlogs of as much as seven months. In 1978 the administration was reorganized by appointing a new executive secretary with far-reaching responsibilities, and applications were usually handled within 30 days thereafter [Sigmund, 1984].

dures aimed at avoiding the crowding out of Mexican firms by more efficient foreign investors. But efficiency gains were forgone by limiting competition between foreign and domestic firms.<sup>1</sup> Inefficiencies were also encouraged on the side of foreign investors. Once approved, multinational firms enjoyed rents created by protection. Market entry of other foreign investors was severely restricted, since competing FDI projects were not approved. Moreover, available data for 1979 show that the importance of FDI across industries was positively associated with the level of (nominal) import protection (this result is derived from unpublished World Bank data). From a macroeconomic perspective, the policy-induced allocation of FDI to import-substituting activities distorted the incentives to invest efficiently.

South Korea employed the most restrictive attitude towards FDI among the sample countries in the 1970s. In fear of a surge of Japanese investments, the government introduced FDI regulations in the second half of the 1960s already [Lee, 1987, p. 19; Kim, 1977, p. 384]. Due to the lack of administrative capacity, FDI became effectively restricted with the new Foreign Capital Inducement Act of 1973 only [Lee, 1987, p. 19 ff.]. The act specified criteria for ineligible FDI projects. Inter alia, projects which would compete with domestic firms in overseas markets and/or disrupt domestic demand or supply of raw materials and intermediate inputs were not approved. These criteria indicate that the Korean authorities relied on domestic investors whenever possible, thereby restricting the competition by possibly more efficient foreign firms. The eligibility criteria were used to direct FDI inflows towards heavy industries and chemicals, whose share in total FDI increased significantly during the 1970s (Table 13).<sup>2</sup> As was argued above, at least some of

<sup>1</sup> It may be argued that efficiency losses were contained by the fairly liberal treatment of FDI in the so-called "maquiladora" industries (i.e., industries being located at the boarder or in in-bond locations). But the "maquiladora" policy is rather a reflection of the government's attempt to segment markets and protect domestic enterprises producing for the internal market. The liberal treatment applied only to investors exporting at least 80 per cent of their production [for an overview on "maquiladora" industries, cf. ILO, 1987].

<sup>2</sup> Comparing 1972-1976 and 1977-1981, the share of heavy industries and chemicals in total FDI in manufacturing rose from 54.5 to 61.7 per cent; the share of the chemical industry jumped from 9.9 to 30.6 per cent. On the other hand, the sharp decline in the share of textiles from 21 to 0.4 per cent is particularly noteworthy [Schweickert, 1989].

these priority industries did not conform to South Korea's comparative advantages. A favourable growth impact of FDI can thus be expected with considerable delay at best. Moreover, the incentives of foreign investors in heavy industries to run their operations efficiently were reduced, since they benefited from tax exemptions and, even more importantly, from an increasing import protection.<sup>1</sup>

The discussion on the selectivity of approval procedures in the sample countries suggests that government interventions have lowered the effects of FDI on economic growth particularly in Mexico and South Korea. On the contrary, entry barriers to FDI were relatively low in Chile during most of the 1970-1986 period. Government regulations should not have altered the predictions of the agent-principal model concerning FDI in Chile. The evidence is ambiguous with respect to Malaysia; but government interventions did not favour inefficient investments to the degree observed in Mexico and South Korea.

*Local participation rules:* The regulation of the ownership structure of FDI projects provides another set of government interventions which may have detrimental effects on the efficiency of FDI inflows. Frequently, developing countries require FDI to be in the form of joint ventures and prescribe a minimum participation of local investors. Especially if foreign investors are confined to a minority share, FDI is made less attractive for multinational firms which want to ensure tight control of their subsidiaries in order to implement their global strategy. Under such conditions, foreign investors may be reluctant to transfer technologies and managerial skills, because they are unable to fully control the use of their resources. Joint venture requirements are likely to discourage investments of technology-intensive and relatively small firms in the first place. For the latter it may be most difficult to find adequate local partners, since they cannot bear the costs involved in searching for and negotiating with potential partners as well as evading restrictions.

With the exception of Chile all sample countries regulated the degree of foreign equity participation in FDI projects. Differences existed

<sup>1</sup> During the period of heavy industrialization, the proportion of items which could be imported without prior government approval declined from 61.7 per cent in 1968 to 50.5 per cent in 1976. This proportion dropped by 20 percentage points to 35.4 per cent in machinery (including the so-called strategic industries) [Koo, 1984, p. 12].



with respect to the degree of restrictions, possible exceptions, and the availability of local partners:

- Since 1973 the LIE in Mexico required all new FDI as well as the enlargement of existing foreign firms to be 51 per cent Mexican-owned. Exceptions to the general 51/49 rule existed in both directions. On the one hand, foreigners must not hold more than 40 per cent of firms producing automobile parts, for example. On the other hand, firms exporting at least 80 per cent of their production and being located at the boarder or in in-bond locations (maquiladora investments) could be wholly owned by foreigners. Small and medium-sized foreign firms could also have fully owned subsidiaries without going through the full approval procedure of the Comisión Nacional de Inversiones Extranjeras (CNIE).<sup>1</sup> Furthermore, a foreign majority holding could be permitted on a case by case basis, if the project was considered to be in the national interest. Some multinational firms circumvented the 51/49 rule by Mexican dummy owners, pyramid schemes, and similar arrangements [Corsepius, 1988b, p. 10]. While this may have weakened the effects of the restrictive ownership policy, it did not ensure efficient FDI projects. Investors who succeeded to circumvent the regulations were not necessarily the most efficient ones.
- Similar to Mexico, the Korean government showed a strong preference for minority-owned FDI projects until the early 1980s. Particularly labour-intensive projects and projects oriented towards local market sales were required to have a local majority participation. For other projects the foreign equity share was limited to 50 per cent. Exceptions were possible and granted on a case by case basis. Examples included investments in the free trade zones, other entirely export-oriented projects, technology-intensive projects, and investments which required large amounts of capital being unavailable domestically.
- Malaysia's attitude towards the ownership structure of FDI became more restrictive in the 1970s. Regulations limiting foreign equity participation to 30 per cent applied mainly to domestic-market oriented indus-

<sup>1</sup> Small and medium-sized investors must not have a net worldwide turnover of more than US \$ 8 million, nor employ more than 500 persons internationally and 250 in Mexico. The value of sales in Mexico was not allowed to exceed a certain index, and at least 35 per cent of the production had to be exported [CNIE, 1988b, pp. 77-80].

tries and projects using non-renewable resources.<sup>1</sup> Ownership regulations were handled more flexible in other important areas, e.g. in free trade zones; even wholly foreign-owned subsidiaries were allowed. While the significant public participation in joint ventures absorbed domestic savings and foreign debt inflows, it facilitated the fulfillment of the ownership requirements and reduced the search costs for foreign investors.

In Mexico and South Korea, government policies concerning the degree of foreign ownership in FDI projects were sufficiently comprehensive and strict to affect both the volume and the efficiency of FDI inflows negatively. The picture is again less clear-cut for Malaysia. Most notably, export-oriented projects which were rendered attractive by the overall Malaysian development approach were excluded from the otherwise restrictive ownership policy. Because of the quantitative importance of export-oriented FDI, the growth-impairing effects of the ownership regulations were probably mitigated to a considerable extent. FDI inflows increased continuously up to 1982, i.e., even after the restrictive ownership policy was implemented. Apparently foreign investors did not perceive Malaysia's ownership regulations as a major investment hindrance.<sup>2</sup>

In view of the widespread debt crisis, all sample countries encouraged FDI inflows recently by deregulation and providing additional benefits for foreign investors. Chile and Mexico introduced debt-equity swaps to reduce their debt burden and attract new foreign equity capital. Basically the foreign investor buys foreign debt on the secondary market at a discount, and sells it to the central bank of the debtor country in exchange for the face value (or somewhat less) of the debt in national currency.<sup>3</sup> The money is then used to finance new FDI projects. The net benefit for the investor amounts to 20-30 per cent of the face value of the debt. In addition, Mexico has allowed explicitly foreign

<sup>1</sup> In addition to Malaysians owning the majority of shares, equity participation of Bumiputras (i.e., the indigenous population of Malaysia) was required to be at least 30 per cent.

<sup>2</sup> On the contrary, the regulations in Mexico did affect the volume of FDI inflows negatively. For an empirical test, cf. Corsepius [1988b, pp. 34 f.].

<sup>3</sup> For technical details on the debt-equity swap programs, cf. BIC [1987].

majority participation in 34 priority sectors since 1984. The approval procedures have been evaluated and revised in order to avoid arbitrary decisions [CNIE, 1988a, p. 51]. Similarly, Malaysia relaxed equity participation rules so that companies selling at least 50 per cent of their output to world markets or free trade zones may be wholly foreign owned since late-1986. The same applies to firms employing at least 350 full-time Malaysian workers.<sup>1</sup> The greatest changes in FDI policies occurred in South Korea. Most importantly, a negative list of projects not eligible for FDI was introduced in 1984. The shift from the positive to the negative-list approach represented a substantial liberalization: 69 per cent of all sectors and 86.3 per cent of manufacturing industries were opened to FDI [Ministry of Finance, 1984]. Projects not included in the negative list were approved automatically, if they met the criteria referring to ownership, investment amount, and required tax exemptions.

The empirical results to be presented in the following section will, however, not be affected significantly by these policy shifts. Generally, the period covered in the empirical estimations does not include the very recent past because of lacking comparable data.

## V. External Financing, Government Regulations, and Economic Performance

### 1. Specification of Hypotheses

In order to assess the economic performance effects of alternative types of capital inflows empirically, equation [26] is reestimated using time-series data for the four sample countries.

$$[26^*] \quad X = a_0 + a_1 \text{ FDI} + a_2 \text{ AID} + a_3 \text{ DEBT}$$

As in the cross-country analysis of Chapter C, the exogenous variables on the right-hand side of this expression represent net foreign capital inflows received in the form of FDI, aid and external debt, each

<sup>1</sup> Cf. MIDA [1987] for the various measures which were introduced in 1985-1986.

expressed relative to the capital-recipient country's GDP (for detailed definitions of variables, cf. Appendix II). Again three variables are used separately for the endogenous variable X: (a) the aggregate IR; (b) DSR (both investments and domestic savings were divided by GDP); and (c) real growth of GDP, denoted GR.

In the agent-principal framework, the expected pattern of coefficients ( $a_1$ ,  $a_2$ ,  $a_3$ ) depends on the type of the transfer regime governing the capital inflows in each country:

- In Section D.III, agent-principal relations were shown to be non-cooperative for Chile. Consequently, the model predicts the following pattern of regression coefficients in the case of Chile:

$$[30] \ a_1 < a_2 < a_3$$

- Malaysia and South Korea succeeded to engage in cooperative transfer relations with both foreign creditors and foreign investors. The theoretical framework thus predicts a different pattern of regression coefficients:

$$[31] \ a_1 > a_2 < a_3$$

- In the case of Mexico, the evidence presented above pointed to cooperative relations with foreign investors, but non-cooperative relations with foreign creditors. The coefficient  $a_3$  is always supposed to be greater than that of aid ( $a_2$ ), irrespective of whether debt transfers take place in a cooperative or in a non-cooperative environment. Moreover, we expect  $a_1 > a_2$ , because of cooperative transfer relations with foreign investors. Hence, expression [31] should also hold in the case of Mexico.<sup>1</sup>

<sup>1</sup> The model predictions on the ranking of economic performance effects of alternative capital inflows can be applied to the Mexican case as well, although the assumption of perfectly fungible capital inflows has been relaxed (cf. Section D.III). In Section B.II.4, the investment response to FDI and debt inflows is derived by assuming that the agent has not received any transfers before. The effects of FDI and debt are assessed separately, and compared to the investment effects of unrequited gifts in the form of foreign aid. The pair-wise comparisons are then used to derive the ranking of all three types of capital inflows. This procedure can be maintained for an agent who is engaged in a cooperative relationship with some foreign principals, and a non-cooperative relationship with others.

Similar to the cross-country analysis, the counterhypothesis on the general superiority of FDI over debt expects  $a_1 > a_3$ . F-tests are employed to test the proposition that the different types of capital inflows do not have a statistically different impact on the endogenous variables, i.e.,  $a_1 = a_2 = a_3$  (pair-wise restrictions are given by expressions [28.a] - [28.c] in Section C.I).

In additional estimations, debt inflows are differentiated according to the maturity of credits, the type of borrower, and the type of lender (for the economic rationale, cf. Sections B.III and D.II). Long-term debt (DEBT-L) may be expected to have a more favourable impact on economic performance than short-term debt (DEBT-S), especially if the latter is raised for consumption-smoothing purposes and to cover temporary operating deficits of the government and the business sector. Private agents are supposed to use debt inflows (DEBT-Pr) more efficiently than government agents (DEBT-Gv). The growth impact of credits provided by private sources (DEBT-Ba) is expected to be larger than the impact of credits from official sources (DEBT-Mu), since the concessionality of the latter may weaken the incentives to use external funds efficiently. The equations to be estimated are then:

$$[32] \quad X = b_0 + b_1 \text{ FDI} + b_2 \text{ AID} + b_3 \text{ DEBT-S} + b_4 \text{ DEBT-L}$$

$$[33] \quad X = c_0 + c_1 \text{ FDI} + c_2 \text{ AID} + c_3 \text{ DEBT-Gv} + c_4 \text{ DEBT-Pr}$$

$$[34] \quad X = d_0 + d_1 \text{ FDI} + d_2 \text{ AID} + d_3 \text{ DEBT-Mu} + d_4 \text{ DEBT-Ba}$$

According to the above reasoning, the following expression is expected to hold in addition to expressions [30] and [31] respectively<sup>1</sup>:

$$[35] \quad y_3 < y_4 \quad y = b, c, d$$

Again, the statistical significance of differences between the coefficient values is evaluated by applying F-Tests. Here the restrictions are:

$$[36] \quad y_1 = y_2 = y_3 = y_4 \quad y = b, c, d$$

<sup>1</sup> For equations [32] - [34], the coefficients  $y_1$ ,  $y_2$ , and  $y_3$  ( $y = b, c, d$ ) replace the coefficients  $a_1$ ,  $a_2$ , and  $a_3$  in expressions [30] and [31].

- [37] a)  $y_1 = y_2$   
 b)  $y_1 = y_3$   
 c)  $y_1 = y_4$   
 d)  $y_2 = y_3$   
 e)  $y_2 = y_4$   
 d)  $y_3 = y_4$

The restrictions  $a_1 = a_2$ , and  $y_1 = y_2$  are the crucial ones for determining the type of transfer regime. A cooperative equilibrium is characterized by  $a_1 > a_2$ , and  $y_1 > y_2$ ; while a non-cooperative equilibrium is characterized by  $a_1 < a_2$ , and  $y_1 < y_2$ . The counterhypothesis on the superiority of FDI over debt requires  $a_1 > a_3$ , and  $y_1 > (y_3, y_4)$ .

## 2. Data Base and Methodological Remarks

The main data sources are balance of payments statistics and national account statistics (for a detailed description, cf. Appendix II). The estimation period differs between the four sample countries. This is due to the data situation in the first place.<sup>1</sup> Regressions start in 1965 in the case of South Korea, 1967 for Malaysia and Mexico, and 1970 for Chile. Data on lending by official and private creditors are only available since 1970. All estimations run until 1986, except for the domestic savings equations in the cases of Chile and Mexico.

Additional calculations for Mexico are based on a shorter period, i.e., 1967-1981. The Mexican time-series data on FDI and debt inflows are highly correlated for the whole period of 1967-1986. The correlations are substantially smaller for 1967-1981. This is because both debt and FDI flows to Mexico were drastically reduced in the 1980s [for statistical details, cf. Corsepius, 1988b, p. 16]. Biased results due to multicollinearity can thus be largely ruled out by running the regressions for the shortened period. This procedure seems reasonable, since from 1982 on-

<sup>1</sup> Due to the lack of comparable data and problems of equation specification, no estimates are presented in the following for (a) equation [32] in the case of Mexico, and (b) equation [34] in the case of South Korea [for details, cf. Corsepius, 1988b; Schweickert, 1989].

wards the scarcity of foreign finance contrasts sharply with the situation in the preceding years.

Two-period moving averages are used for the capital inflow variables, except for South Korea. The statistical fit of the estimations is considerably improved in this way. This is mainly because the impact of capital inflows on economic performance is unlikely to be fully realized in the year when inflows are reported. A lagged impact is most likely when economic growth is the endogenous variable. The lag between current investment and the materialization of increased output appears to be two periods in Malaysia, and one period in Chile and Mexico; while the lag appears to be less than one period in the case of South Korea.

Two-period moving averages of the endogenous variable are applied in additional estimations of the savings equation for Chile. Distortions which are likely to emerge from the well-known problems in measuring domestic savings as the residual item in the national accounts are reduced in this way; the statistical fit of the estimation improves considerably.

Evidently overall investment, domestic savings and economic growth are not only affected by capital inflows, but also by the internal economic policies of the capital-recipient countries. In the present study, an extensive specification of equations [26\*] and [32] - [34] is not intended. Because of data constraints, the time-series analyses have to be based on a fairly limited number of observations. A significant reduction in the degrees of freedom, due to the inclusion of further variables, has to be avoided. To prevent mis-specification to the extent possible, and at the same time maintain sufficient degrees of freedom, a trend variable is occasionally considered as a catch-all variable for neglected variables. Especially the statistical fit of the savings equation is improved by this procedure, with the exception of Chile.

Equation specification proved to be most difficult in the case of South Korea. Two additional factors had to be taken into account, which may lead to biased results otherwise:

- Korean policies towards external debt changed dramatically since 1981 (cf. Section D.IV). This was likely to affect the relationship between capital inflows and economic performance variables. Most notably, the coefficients of debt may be distorted if calculated for the whole period 1965-1986 and thereby neglecting the structural break in 1981.

- Distortions may also arise from short-term effects of the two oil price shocks which affected South Korea most seriously. Economic growth and domestic savings declined temporarily. Soaring current account deficits in 1974/75 and 1979/80 were financed by additional debt inflows in order to keep investments high and sustain imports [Park, 1986, p. 1030]. Lower economic growth and reduced domestic savings went along with higher inflows of short-term and private debt particularly.

Dummy variables were included in the regressions to account for these factors. With regard to the reorientation in debt policies, the slope dummy D1 was introduced for total debt inflows in 1981-1986. The effects of the oil price shocks on savings and growth were captured by slope dummies for DEBT (D2), DEBT-S (DS2), and DEBT-Pr (DPR2), all for the years 1974/75 and 1979/80.<sup>1</sup>

All equations were estimated by applying OLS techniques. A maximum-likelihood procedure was used if results were biased by first-order autocorrelation of the residuals. Additionally, estimates of the restricted versions of the equations were compared with the unrestricted ones using a standard F-test procedure (constraint tests).

### 3. Empirical Results

#### *a. The Investment Response*

The agent-principal approach of international finance developed in Chapter B deals with the investment response of the recipient country to different types of capital inflows in the first place. Hence, the empirical estimates of the investment equation are crucially important to decide whether the model predictions hold, or whether the response pattern is better explained by the counterhypothesis on the general superiority of FDI over debt.

Table 14 shows that the overall statistical fit of the investment equation is fairly strong for all four countries considered. In all cases the constant term is highly significant. This points to the relevance of

<sup>1</sup> Dummies for the oil price shock periods were also used in a recent study assessing the effects of external debt on economic growth in South Korea [Kim, 1987]. They proved to be highly significant.



Table 14 - Impact of Capital Inflows on Investment in Chile, Malaysia, Mexico, and South Korea: Regression Results (a)

Exogenous variables	Chile(b)	Malaysia(b)	Mexico(b)	Mexico(b)	South Korea
	1970-1986	1967-1986	1967-1986	1967-1981	1965-1986
Constant	0.12*** (0.02)	0.24*** (0.04)	0.18*** (0.02)	0.13*** (0.01)	0.16*** (0.05)
FDI	-1.11*** (0.32)	0.78* (0.41)	4.73* (2.38)	8.74*** (1.37)	-3.18 (2.65)
AID	1.97 (5.34)	-5.70 (4.23)	-53.19 (30.63)	-71.89** (23.87)	0.27 (1.17)
DEBT	0.44*** (0.14)	0.58** (0.21)	0.10 (0.26)	-0.11 (0.14)	0.47** (0.20)
T	-	-	-	0.003*** (0.001)	0.008*** (0.002)
D1	-	-	-	-	-0.39* (0.22)
$\bar{R}^2$	0.70	0.91	0.67	0.88	0.83
D.W.	1.48	1.78	1.78	2.43	1.31

(a) For the definition of variables, cf. Appendix II. Standard errors in parentheses; \*significant at the 10 per cent level; \*\*significant at the 5 per cent level; \*\*\*significant at the 1 per cent level. -

(b) Corrected for first-order autocorrelation of the residuals.

Source: Banco Central de Chile [1986; 1988]; Banco de México [c]; Bank of Korea [1984]; Economic Planning Board [1987]; IMF [c]; OECD [c]; Quijano, Antia Berhens [1985]; Secretaría de Hacienda y Crédito Público [1988]; Secretaría de Programación y Presupuesto [various issues]; World Bank [c; f]; own calculations.

variables which were not taken into account explicitly in the regression. This result was of course to be expected since we estimated a reduced form of the investment equation. The coefficients of the capital inflow variables are significant for three of our four countries in the case of FDI and DEBT. The impact of AID remains insignificant with the exception of Mexico.

According to the underlying model, the ranking of the investment effects of FDI and AID determines the type of equilibrium in transfer

negotiations between the principal and the agent. From the discussion of transfer negotiations in the sample countries in Section D.III we concluded that cooperative relations prevailed in Malaysia, Mexico (with foreign investors only), and South Korea; whereas Chile was characterized by non-cooperative relations. Consequently, the coefficient of FDI should be greater than that of AID for the three first mentioned countries, and smaller for Chile. Table 14 provides some support for the hypothesized pattern in the cases of Chile, Malaysia and Mexico. In all these countries the coefficients of FDI are significant. Investment was positively affected by higher values of FDI in Malaysia and Mexico. The negative impact of FDI in Chile indicates a reduction of complementary investments. The latter conclusion is stressed by the constraint tests of Table 15. The positive difference between the investment response to debt inflows in Chile and the response to FDI inflows is shown to be highly significant. This result sharply conflicts with the counterhypothesis on the general superiority of FDI over debt.

Nonetheless, the empirical support for the basic agent-principal model is not as strong as expected. The differences in the investment response of Chile and Malaysia to FDI and AID remain insignificant, as indicated by the constraint tests presented in Table 15. It is only for Mexico that the empirical findings clearly support the model predictions.

Table 15 - Impact of Capital Inflows on Investment in Chile, Malaysia, Mexico, and South Korea: Constraint Tests (a)

Restriction	Chile	Malaysia	Mexico	Mexico	South Korea
	1970-1986	1967-1986	1967-1986	1967-1981	1965-1986
FDI=AID=DEBT	9.70**	1.34	2.86*	21.25**	1.41
FDI=AID	0.33	2.42	3.51*	11.13**	2.77
FDI=DEBT	18.95**	0.16	3.35*	39.73**	2.07
AID=DEBT	0.08	2.67	3.05	9.08**	0.04
(a) For the estimated equations, cf. Table 14. A standard F-test procedure is used to test if the hypothesized restrictions hold; *if the hypothesis of equal coefficient values is rejected at the 10 per cent level; **if the hypothesis of equal coefficient values is rejected at the 5 per cent level.					

Source: Cf. Table 14; own calculations.

To some degree, disturbances in the hypothesized pattern of FDI and AID may be due to conceptual and statistical reasons. The model defines AID as the reference case. It may reasonably be argued that the insignificant coefficient of AID renders insignificant the differences in the investment impact of FDI and AID as well. This is supported by the fact that the constraint tests confirm the model predictions for Mexico; only for this country the aid variable is significant, notwithstanding that the overall amount of aid inflows was very small. A similar reasoning refers to the ranking of DEBT versus AID. The impact of debt inflows on investment was predicted to be larger than that of aid inflows, irrespective of whether or not cooperative agent-principal relations prevailed. Actually the coefficients of DEBT are significantly positive except for Mexico (Table 14). Nevertheless it is again only for the latter country that the constraint tests reveal a significantly different investment response between AID and DEBT.

But more importantly, the expected pattern of response behaviour becomes blurred because of country-specific policy interventions. Most of the deviations from the model predictions can be attributed to government regulations influencing the economic performance effects of capital inflows (cf. Section B.IV). This is most evident for FDI in the case of South Korea. The restrictive and discretionary approval procedures of the Korean authorities resulted in low and erratically changing FDI inflows. Once approved, foreign investors were granted privileged tax treatment and priority access to foreign and domestic credit markets. This is likely to have somewhat reduced domestic investments. Hence, the insignificant coefficient of FDI is not surprising, notwithstanding South Korea's cooperative relations with foreign principals.

The impact of government regulations is also evident from the investment response to debt inflows:

- The completely insignificant coefficient of DEBT for Mexico is especially noteworthy. The Mexican government resorted to both international and domestic credit markets to finance the operating losses of public enterprises and huge public deficits. The latter were due to high government consumption in the first place. External debt financing for these purposes reduced the investment impact of DEBT in a direct way. But overall investment was reduced indirectly as well. Private borrowers were crowded out by excessive public borrowing in domestic credit

markets. The overall IR was affected to the extent that private enterprises had no access to foreign loans.

- Contrary to Mexico, foreign credits were largely invested in Chile which was also characterized by non-cooperative relations with foreign creditors. As predicted by the model, the impact of DEBT on investment in Chile is significantly larger than the impact of FDI (Table 15).
- A comparison between Mexico and Malaysia is interesting as well. In both countries public deficits were very high, and state-owned enterprises absorbed foreign loans to a substantial degree. But in Malaysia the flow of foreign debt to the public sector was used to raise investments rather than government consumption. The constraint test shows that the investment response of Malaysia did not differ between DEBT and FDI (*ibid.*).
- A significantly positive impact of DEBT is also observed for South Korea. Korean policies towards external debt changed drastically since 1981. The significant dummy variable D1 indicates that South Korea succeeded to further increase overall investment in the 1980s, even though the government started to limit additional debt inflows and reduced the stock of outstanding debt recently.

The major conclusions on the investment response to different capital inflows derived from Tables 14 and 15 can be maintained if debt is differentiated according to the type of borrower, the maturity of debt, and the type of creditor. In Section A of Table 16, two groups of countries can be identified. As was to be expected, the investment impact of private borrowing (DEBT-Pr) was significantly positive in Chile and South Korea. Both countries experienced relatively moderate budget deficits. Direct government borrowing played a minor role in South Korea particularly. This is reflected by the totally insignificant coefficient for government debt (DEBT-Gv). On the other hand, public borrowing figured prominently in Malaysia and Mexico. The significantly positive coefficient of DEBT-Gv in Malaysia and the negative, though not significant, coefficient for Mexico can be attributed to the aforementioned differences in the institutional framework governing debt inflows in these countries.

The unproductive use of foreign loans in Mexico is also evident from Section C of Table 16. While the coefficient of debt from private sources (DEBT-Ba) is significantly positive in Chile and Malaysia, a

Table 16 - Investment Impact of Differentiated Debt Inflows in Chile, Malaysia, Mexico, and South Korea: Regression Results (a)

	A. Government versus private debtors							
	Const.	FDI	AID	DEBT-Gv	DEBT-Pr	T	D1	$\bar{R}^2$ D.W.
Chile(b) 1970-1986	0.12*** (0.01)	-1.36*** (0.30)	1.32 (3.67)	0.20 (0.15)	0.45*** (0.10)	-	-	0.77 1.71
Malaysia(b) 1967-1986	0.25*** (0.04)	0.77 (0.41)	-6.96 (4.65)	0.70*** (0.25)	0.41 (0.30)	-	-	0.90 1.48
Mexico(b) 1967-1981	0.15*** (0.02)	6.19** (2.07)	-72.36** (22.05)	-0.21 (0.14)	0.33 (0.31)	0.003*** (0.001)	-	0.90 2.72
South Korea(b) 1965-1986	0.16** (0.06)	-0.23 (2.45)	-0.34 (1.57)	0.18 (0.59)	0.46* (0.22)	0.007** (0.003)	-0.31 (0.25)	0.86 1.36
	B. Long-term versus short-term debt(c)							
	Const.	FDI	AID	DEBT-L	DEBT-S	T	D1	$\bar{R}^2$ D.W.
Chile(b) 1970-1986	0.11*** (0.02)	-1.19*** (0.27)	3.88 (4.27)	0.42*** (0.12)	0.85** (0.30)	-	-	0.77 1.25
Malaysia(b) 1967-1986	0.24*** (0.04)	0.80* (0.41)	-6.42 (4.36)	0.71** (0.24)	0.41 (0.25)	-	-	0.91 1.54
South Korea 1965-1986	0.09 (0.06)	-2.19 (2.55)	1.17 (1.19)	1.08** (0.39)	0.18 (0.24)	0.011*** (0.003)	-0.57** (0.22)	0.85 1.54
	C. Official versus private creditors(d)							
	Const.	FDI	AID	DEBT-Mu	DEBT-Ba	T	D1	$\bar{R}^2$ D.W.
Chile(b) 1970-1986	0.12*** (0.02)	-1.62*** (0.45)	1.88 (5.37)	0.04 (0.56)	0.36** (0.13)	-	-	0.58 1.55
Malaysia(b) 1967-1986	0.22*** (0.04)	0.81* (0.38)	-1.57 (4.19)	0.76 (0.54)	0.51*** (0.16)	-	-	0.89 2.41
Mexico(b) 1965-1986	0.15*** (0.01)	10.22*** (1.33)	-146.38*** (29.12)	0.52 (1.80)	-0.56*** (0.17)	0.004*** (0.001)	-	0.88 2.22
(a) For the definition of variables, cf. Appendix II. Standard errors in parentheses; *significant at the 10 per cent level; **significant at the 5 per cent level; ***significant at the 1 per cent level. - (b) Corrected for first-order autocorrelation of the residuals. - (c) Regression for Mexico not performed because of lacking data. (d) Regression for South Korea not performed because misspecification could not be avoided by including a trend variable as a proxy.								

Source: Cf. Table 14; own calculations.

sharply contrasting picture is shown for Mexico. The negative investment impact of DEBT-Ba can be attributed to the 1981-1983 period in the first place. External borrowing by the Mexican government from private sources increased strongly, while domestic capital formation decreased. Unconditional credits from official sources were no longer available for Mexico. But the access to unconditional commercial credits enabled the public sector to finance government consumption and operating losses of public enterprises.

The differences between the sample countries are less pronounced if long-term debt (DEBT-L) and short-term debt (DEBT-S) are compared (Table 16, Section B). The investment impact of DEBT-L is significantly positive in all cases.<sup>1</sup> The impact of DEBT-S is positive in all countries as well, but significant only in Chile. Apparently, some part of DEBT-S was raised to cover temporary current account deficits in Malaysia and South Korea. However, Table A9 shows that the differences in the investment response to DEBT-S and DEBT-L inflows remained insignificant for Malaysia.

In summary, the empirical results on the impact of different types of capital inflows on overall investment in the four sample countries indicate that the counterhypothesis on the general superiority of FDI over debt has to be rejected. Especially the Chilean example shows that a risk-return trade-off is likely to emerge in the case of FDI finance under non-cooperative transfer conditions, as was hypothesized by the basic agent-principal model. This means that neither form of capital inflow can be judged unambiguously superior to the other, and thus recommended for all capital-recipient countries. This is done by the counterhypothesis which neglects the disincentive problems arising from asymmetric information in international capital markets, thereby implicitly assuming cooperative agent-principal relations for all developing countries. The cross-country analysis of Chapter C has shown, however, that the majority of developing countries was engaged in non-cooperative transfer negotiations.

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<sup>1</sup> The high coefficients of DEBT-L in the cases of Malaysia and, especially, South Korea support the results presented by Go [1985]; the investment impact of long-term debt in Asian developing countries was found to be insignificantly different from one.

At the same time, the above empirical results support the predictions of the basic agent-principal model to some extent only. The proposition that the investment impact of external aid, foreign debt and direct investment did not differ significantly was invalidated for Chile and Mexico; but it could not be rejected for Malaysia and South Korea. Country-specific government regulations and restrictions on the flow and use of external resources obscured the normal pattern of response behaviour hypothesized by the agent-principal model.

#### *b. The Impact on Domestic Savings*

The response pattern revealed for overall investment in the preceding section may be expected to have its counterpart in the case of domestic savings. This is because, *ex post*, domestic savings are simply the difference between overall investment and resource inflows; in other words, investments have to be financed either by domestic savings or foreign capital transfers. Consequently, the coefficients estimated for the investment and the savings equations should differ only by a factor of one. Actually, however, other differences may arise between the investment and savings response patterns. This is due to the following reasons:

- The estimation of the savings equation is subject to statistical vagaries to a considerably larger extent than the investment equation. Domestic savings are calculated as the residual item in the national accounts. Table 17 shows that the overall statistical fit of the savings equation varies considerably, depending on the definition of the endogenous variable and the period considered.
- Even more importantly, the problem of two-way causality is likely to figure prominently in estimating the savings equation. Negative income effects because of external shocks may negatively affect domestic savings in the first place. This may induce additional capital inflows in countries that try to maintain the overall investment level. In that case the domestic savings performance explains the development of capital inflows, rather than being the endogenous variable. In the following it is not attempted to apply a 2SLS procedure to solve this problem, because of difficulties in choosing theoretically meaningful instrumental

variables for the four countries considered. We rather refer to country-specific information on the investment behaviour and the policy stance towards capital inflows in comparing the estimation results for the investment and savings equations.

The similarities in terms of the ranking of coefficient values between Tables 14 and 15, and Tables 17 and 18 respectively are most pronounced for Chile and Mexico. In both countries, the proposition of an

Table 17 - Impact of Capital Inflows on Domestic Savings in Chile, Malaysia, Mexico, and South Korea: Regression Results (a)

Exogenous variables	Chile(b)	Chile(b,c)	Malaysia(b)	Mexico(b)	Mexico(b)	South Korea
	1970-1985	1970-1985	1967-1986	1967-1985	1967-1981	1965-1986
Const.	0.01 (0.04)	0.05 (0.06)	0.32*** (0.03)	0.13*** (0.03)	0.08*** (0.01)	0.17** (0.06)
FDI	-1.61 (1.06)	-1.72** (0.61)	-0.47 (0.54)	-2.72 (2.91)	4.67*** (1.11)	-3.27 (2.95)
AID	23.30* (11.73)	11.81 (11.83)	-13.55*** (4.36)	55.47 (47.73)	-8.47 (19.45)	-2.34 (1.36)
DEBT	0.40 (0.32)	0.28 (0.22)	-0.75*** (0.18)	0.29 (0.27)	-0.34** (0.12)	0.03 (0.30)
T	-	-	0.006*** (0.001)	-	0.004*** (0.001)	0.007*** (0.003)
D1	-	-	-	-	-	-0.98*** (0.30)
D2	-	-	-	-	-	-0.37* (0.21)
$\bar{R}^2$	0.23	0.68	0.77	0.15	0.86	0.89
D.W.	1.64	1.22	2.26	1.89	2.49	1.95

(a) For the definition of variables, cf. Appendix II. Standard errors in parentheses; \*significant at the 10 per cent level; \*\*significant at the 5 per cent level; \*\*\*significant at the 1 per cent level. - (b) Corrected for first-order autocorrelation of the residuals. - (c) Two-period moving averages of domestic savings used as endogenous variable.

Source: Cf. Table 14; own calculations.



Table 18 - Impact of Capital Inflows on Domestic Savings in Chile, Malaysia, Mexico, and South Korea: Constraint Tests (a)

Restrictions	Chile	Chile(b)	Malaysia	Mexico	Mexico	South Korea
	1970-1985	1970-1985	1967-1986	1967-1985	1967-1981	1965-1986
FDI=AID						
=DEBT	4.71**	5.55**	10.59**	1.69	9.78**	2.18
FDI=AID	4.80**	1.30	10.80**	1.54	0.45	0.17
FDI=DEBT	2.72	10.90**	0.18	0.96	19.23**	1.41
AID=DEBT	3.85*	0.96	8.41**	1.34	0.18	4.33*

(a) For the estimated equations, cf. Table 17. A standard F-test procedure is used to test if the hypothesized restrictions hold; \*if the hypothesis of equal coefficient values is rejected at the 10 per cent level; \*\*if the hypothesis of equal coefficient values is rejected at the 5 per cent level. - (b) Two-period moving averages of domestic savings used as endogenous variable.

Source: Cf. Table 14; own calculations.

equally strong impact of different capital inflows is clearly rejected for the savings equation as well (Table 18). Moreover, the impact of FDI continues to be stronger than the impact of DEBT in Mexico, and weaker in Chile (Table 17). In the latter case, the significantly negative coefficient of FDI indicates that domestic savings were replaced to a substantial degree by FDI inflows. In Mexico debt inflows had a significantly negative impact on domestic savings, while a negative relationship is not observed for FDI inflows. This result is confirmed by the significantly negative coefficients of both DEBT-Gv and DEBT-Pr in Mexico in Table 19.<sup>1</sup>

<sup>1</sup> Tables 19 and A10 also reveal a strong substitution effect of debt inflows from official sources (DEBT-Mu) for both Mexico and Chile. Rather surprisingly this is not the case for DEBT-Ba, although the investment impact of this type of debt was significantly negative. This discrepancy is probably due to the fact that debt inflows fuelled capital flight to a significant extent, particularly in Mexico. Mexican assets in foreign countries are estimated to amount to US \$ 40-70 billion, compared with US \$ 99 billion debt outstanding in 1985 [Corsepius, 1988b, p. 16 f.]. In the case of Chile, the positive effect of DEBT-S on domestic savings is striking, whereas the effect of DEBT-L remains insignificant. This result is because of the restructuring of the Chilean economy in the 1970s. New investment opportunities were created, and the domestic financial sector was liberalized.

The pattern of response behaviour remains fairly stable for South Korea as well. As in the case of the investment equation, the impact of different types of capital inflows on domestic savings does not differ significantly (Table 18).<sup>1</sup> This can be attributed to economic policy measures in the first place, as indicated by the significantly negative dummy variables D1 and D2 in Table 17. D1 captures the impact of the debt-reduction policies started in the early 1980s, while domestic savings continued to increase. Additionally, D2 accounts for the negative relationship between domestic savings and debt flows to South Korea after the two oil price hikes. The external shocks caused domestic savings to decline, since private agents tried to smooth consumption. The Korean government, however, aimed at maintaining a desired investment level. It resorted to compensatory debt financing from international capital markets until domestic savings recovered.<sup>2</sup>

The estimates of the savings and investment equations differ most remarkably in the case of Malaysia. In contrast to Table 15, the constraint tests for the savings equation (Table 18) clearly support the hypothesis of cooperative agent-principal relationships; the negative impact of AID on domestic savings is significantly stronger than that of FDI and DEBT, as was predicted by the model in a cooperative environment. Policy interventions may have influenced the coefficient values for specific capital inflow variables in the savings and investment equations (Tables 14 and 17). The negative relationship between debt inflows and domestic savings is fairly strong ( $-0.75$ ), notwithstanding the strongly positive impact of debt on overall investment ( $0.58$ ); i.e., the difference between both coefficients considerably exceeds the factor of one. Similar

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Domestic savings were positively affected by these measures. Additionally, banks were permitted to borrow abroad for domestic relending since 1977. At least until 1981 this liberalization mainly encouraged the inflow of short-term credits. Consequently, these inflows are positively related to the improvement in domestic savings and investment.

<sup>1</sup> Generally, the impact of foreign resource inflows on domestic savings in South Korea turned out to be insignificant. This result was also revealed in a study on the determinants of domestic savings in South Korea in the 1965-1981 period [Yusuf, Peters, 1984].

<sup>2</sup> The Korean government strongly influenced the decision making of the state-owned commercial banks. Each credit had to be approved. This is reflected by the negative coefficient of the dummy variable DPR2 in Table 19 which is nearly significant at the 10 per cent level.

Table 19 - Domestic Savings Impact of Differentiated Debt Inflows in Chile, Malaysia, Mexico, and South Korea: Regression Results (a)

	A. Government versus private debtors								
	Const.	FDI	AID	DEBT-Gv	DEBT-Pr	T	D1	DPR2	$\bar{R}^2$ D.W.
Chile(b) 1970-1985	0.04 (0.04)	-2.43** (0.94)	20.00* (9.25)	-0.24 (0.40)	0.40 (0.26)	-	-	-	0.40 2.00
Chile(b, c) 1970-1985	0.06* (0.03)	-2.46*** (0.66)	16.23* (8.66)	-0.43 (0.34)	0.29 (0.19)	-	-	-	0.73 1.54
Malaysia(b) 1967-1986	0.32*** (0.03)	-0.38 (0.54)	-14.72*** (4.43)	-0.97*** (0.30)	-0.49 (0.31)	0.006*** (0.001)	-	-	0.77 2.28
Mexico(b) 1967-1981	0.06*** (0.01)	7.00*** (1.50)	-6.81 (16.01)	-0.26** (0.10)	-0.75** (0.23)	0.004*** (0.001)	-	-	0.89 2.46
South Korea 1965-1986	0.16** (0.06)	-3.69 (3.05)	-2.05 (1.36)	0.53 (0.71)	-0.02 (0.40)	0.007** (0.003)	-1.07*** (0.30)	-0.43 (0.27)	0.90 1.83
	B. Long-term versus short-term debt (d)								
	Const.	FDI	AID	DEBT-L	DEBT-S	T	D1	DS2	$\bar{R}^2$ D.W.
Chile(b) 1970-1985	0.03 (0.03)	-1.71* (0.85)	17.58* (9.65)	0.16 (0.28)	1.11** (0.40)	-	-	-	0.40 1.81
Chile(b, c) 1970-1985	0.05 (0.04)	-1.84** (0.60)	14.90 (10.08)	0.21 (0.22)	0.99* (0.46)	-	-	-	0.71 1.63
Malaysia(b) 1967-1986	0.32*** (0.04)	-0.54 (0.57)	-14.28*** (4.70)	-0.79*** (0.21)	-0.58 (0.40)	0.006*** (0.001)	-	-	0.75 2.29
South Korea 1965-1986	0.11* (0.06)	-2.49 (2.52)	-1.54 (1.20)	0.67 (0.38)	-0.69 (0.53)	0.009*** (0.003)	-1.04*** (0.26)	-0.25 (0.51)	0.92 1.84
	C. Official versus private creditors(e)								
	Const.	FDI	AID	DEBT-Mu	DEBT-Ba	T	D1	D2	$\bar{R}^2$ D.W.
Chile(b) 1970-1985	0.05 (0.03)	-3.63*** (1.10)	14.01 (9.72)	-2.08* (1.09)	0.36 (0.23)	-	-	-	0.47 1.80
Chile(b, c) 1970-1985	0.05 (0.04)	-2.88*** (0.67)	15.85* (8.76)	-2.02* (0.97)	0.31 (0.19)	-	-	-	0.76 1.62
Malaysia(b) 1967-1986	0.30*** (0.04)	-0.02 (0.58)	-16.63** (5.76)	0.27 (1.13)	-0.74*** (0.16)	0.007*** (0.001)	-	-	0.75 2.41
Mexico(b) 1970-1985	0.12*** (0.01)	0.63 (1.15)	22.36 (24.59)	-11.59*** (1.99)	0.20 (0.17)	0.003*** (0.001)	-	-	0.84 2.48
(a) For the definition of variables, cf. Appendix II. Standard errors in parentheses; *significant at the 10 per cent level; **significant at the 5 per cent level; ***signifi- cant at the 1 per cent level. - (b) Corrected for first-order autocorrelation of the residuals. - (c) Two-period moving averages of domestic savings used as endogenous vari- able. - (d) Regression for Mexico not performed because of lacking data. - (e) Regression for South Korea not performed because misspecification could not be avoided by including a trend variable as a proxy.									

Source: Cf. Table 14; own calculations.

to South Korea, the Malaysian government adopted an "anti-cyclical" investment policy. The government ran substantial fiscal deficits in order to maintain the investment level when economic activities were sluggish and domestic savings relatively low. Moreover, foreign borrowing by non-financial public enterprises was encouraged by providing government guarantees.<sup>1</sup>

### *c. The Impact on Economic Growth*

The agent-principal model basically refers to the response of overall investment and domestic savings to capital transfers. The above results show that the investment and savings behaviour of capital-recipient countries was influenced by country-specific regulations in several instances. The institutional and regulative framework is likely to become even more relevant in explaining the economic growth response to different capital inflows. The model considers economic growth to be a stochastic function of investment. In Section D.IV, regulations were shown to influence the efficiency of capital inflows systematically, and thereby their economic growth effects. It is thus not surprising that the overall statistical fit of the growth equations remains relatively poor, as was the case in the cross-country analysis of Chapter C. This is especially true for the time-series results for Malaysia and South Korea (Table 20).

The remarkable differences in the coefficients of the explanatory variables between Tables 14 and 20 indicate that government regulations indeed influenced the efficiency and growth effects of externally financed investments significantly. The impact of government regulations differs considerably among the sample countries.<sup>2</sup> In interpreting the empirical

<sup>1</sup> Especially long-term credits from private sources were raised to finance public investments at times of relatively low domestic savings. Consequently, the coefficients of DEBT-Gv, DEBT-L and DEBT-Ba are significantly negative in Table 19.

<sup>2</sup> It is thus confirmed that it is most important to supplement cross-country studies on the economic performance effects of capital inflows by country-specific analyses. In a recent study, it was shown that FDI plus long-term debt inflows had a positive impact on the efficiency of investments, when all Asian developing countries were considered as a

Table 20 - Impact of Capital Inflows on Economic Growth in Chile, Malaysia, Mexico, and South Korea: Regression Results (a)

Exogenous variables	Chile(b,c)	Malaysia(d)	Mexico(b,c)	Mexico(b,c)	South Korea
	1970-1986	1967-1986	1967-1986	1967-1981	1965-1986
Constant	-0.14*** (0.03)	-0.03 (0.04)	0.08 (0.07)	0.09*** (0.02)	0.09*** (0.02)
FDI	4.77*** (0.86)	2.33*** (0.74)	6.37 (5.81)	-2.96 (2.38)	0.30 (4.29)
AID	60.75*** (10.15)	13.45** (5.92)	-111.01 (104.08)	-6.95 (32.56)	-0.64 (0.82)
DEBT	-0.28 (0.26)	-0.71*** (0.24)	-1.02* (0.52)	-1.37*** (0.21)	0.32 (0.31)
T	-	-	-	0.005*** (0.001)	-
D1	-	-	-	-	-0.77 (0.46)
D2	-	-	-	-	-0.83** (0.32)
$\bar{R}^2$	0.69	0.41	0.26	0.71	0.18
D.W.	2.22	1.84	1.52	2.62	2.15

(a) For the definition of variables, cf. Appendix II. Standard errors in parentheses; \*significant at the 10 per cent level; \*\*significant at the 5 per cent level; \*\*\*significant at the 1 per cent level. - (b) Corrected for first-order autocorrelation of the residuals. - (c) Exogenous variables lagged one period. - (d) Exogenous variables lagged two periods.

Source: Cf. Table 14; own calculations.

results the following types of regulations figure prominently:

- selective allocation policies, as well as promotion and protection of priority sectors;

group [Rana, Dowling, 1988], while foreign aid inflows tended to reduce the efficiency of investments. A comparison of Malaysia and South Korea reveals, however, that the effects may differ widely between individual countries (Table 20). Country-specific government regulations provide a possible explanation.

- restrictions on the degree of foreign ownership in FDI projects;
- regulations concerning royalty and profit remittances;
- public guarantees and subsidization of foreign loans.

The role of government regulations in explaining disturbances in the expected growth response to capital inflows is most striking in South Korea. The overall fit of the growth equation is particularly poor for this country. All capital inflow variables remain completely insignificant; also the F-statistics reported in Table 21 are extremely poor.<sup>1</sup> The strong involvement of the Korean government in the allocation of both debt and FDI inflows tended to equalize the growth impact of different types of capital transfers and to render it insignificant in the short run.

- FDI played only a minor role in the external financing of South Korea.

The insignificant short-term growth impact can be attributed to interventions into the sectoral distribution of FDI inflows. The approval system was highly effective in allocating FDI inflows to human-capital intensive industries. Positive economic growth effects are therefore to be expected in the longer run at best. Furthermore, privileged tax treatment and import protection lowered the incentives to invest efficiently.

- In the case of debt finance, the efficiency of investments was affected in a similar way. Priority sectors which were unlikely to contribute significantly to economic growth in the short run were promoted by highly discriminatory loan allocation, credit subsidization and government guarantees, because of official expectations on a favourable growth potential in a longer term perspective.

The explanatory power of the growth equation for South Korea is somewhat improved if different types of external debt are considered separately. This refers particularly to the differentiation between DEBT-L and DEBT-S. In Section B of Table 22, DEBT-L has a signifi-

<sup>1</sup> By and large, the same results were revealed in a recent study by Park [1987], who regressed economic growth on FDI, aid, commercial loans, public loans, and the rate of growth of the labour force. The major exception was the significantly positive coefficient of FDI inflows reported in the Park study. The latter result was probably due to the fact that the estimation was performed for the 1953-1982 period. Since hardly any FDI inflows were recorded before 1962, a linear regression is likely to overestimate the impact of FDI on economic growth in this case.

Table 21 - Impact of Capital Inflows on Economic Growth in Chile, Malaysia, Mexico, and South Korea: Constraint Tests (a)

Restrictions	Chile	Malaysia	Mexico	Mexico	South Korea
	1970-1986	1967-1986	1967-1986	1967-1981	1965-1986
FDI=AID=DEBT	24.62**	6.38**	2.14	0.28	0.54
FDI=AID	32.43**	4.14*	1.33	0.01	0.06
FDI=DEBT	28.18**	12.61**	1.47	0.46	0.01
AID=DEBT	35.56**	5.72**	1.12	0.03	0.99

(a) For the estimated equations, cf. Table 20. A standard F-test procedure is used to test if the hypothesized restrictions hold; \*if the hypothesis of equal coefficient values is rejected at the 10 per cent level; \*\*if the hypothesis of equal coefficient values is rejected at the 5 per cent level.

Source: Cf. Table 14; own calculations.

cantly positive impact on economic growth.<sup>1</sup> The slope dummy D1 is significantly negative. The latter result can be attributed to the revised debt policy adopted by Korean authorities in the 1980s. The government succeeded to reduce debt inflows and to simultaneously improve real economic growth by reducing the subsidization of foreign credits, making access to credits less preferential, and further encouraging domestic savings.

Differences in the efficiency of FDI inflows between Chile, Malaysia and Mexico are obvious when comparing the growth impact of FDI (Table 20) with the corresponding investment impact (Table 14). Despite the negative investment impact, economic growth was positively related to FDI inflows in Chile. On the contrary, the positive investment response contrasts with an insignificant growth effect in Mexico. In Malaysia, both investment and economic growth were positively related to FDI inflows. These differences can be explained by the impact of different institutional and regulative settings on the efficiency of FDI. Most importantly, the superiority in terms of economic growth effects of a liberal treatment of foreign investors is clearly demonstrated.

<sup>1</sup> However, the constraint tests do not reveal a significantly different growth impact of DEBT-L and DEBT-S (Table A11).

Table 22 - Economic Growth Impact of Differentiated Debt Inflows in Chile, Malaysia, Mexico, and South Korea: Regression Results (a)

	A. Government versus private debtors								
	Const.	FDI	AID	DEBT-Gv	DEBT-Pr	T	D1	DPR2	$\frac{R^2}{D.W.}$
Chile(b, c) 1970-1986	-0.16*** (0.03)	5.53*** (0.79)	64.22*** (8.43)	0.15 (0.37)	-0.23 (0.22)	-	-	-	0.75 2.37
Malaysia(d) 1967-1986	-0.05 (0.04)	2.28*** (0.73)	15.84** (6.17)	-0.40 (0.35)	-1.13** (0.43)	-	-	-	0.43 2.08
Mexico(b, c) 1967-1981	0.08** (0.03)	-1.29 (3.08)	-4.47 (32.03)	-1.31*** (0.21)	-1.86** (0.58)	0.005*** (0.001)	-	-	0.70 2.88
South Korea 1965-1986	0.09*** (0.02)	-0.55 (4.23)	-0.49 (0.92)	0.91 (1.20)	0.23 (0.41)	-	-0.87* (0.46)	-0.98** (0.41)	0.22 1.96
	B. Long-term versus short-term debt(e)								
	Const.	FDI	AID	DEBT-L	DEBT-S	T	D1	DS2	$\frac{R^2}{D.W.}$
Chile(b, c) 1970-1986	-0.15*** (0.03)	4.85*** (0.82)	64.25*** (10.03)	-0.12 (0.28)	-0.69 (0.42)	-	-	-	0.70 2.35
Malaysia(d) 1967-1986	0.04 (0.04)	2.35*** (0.78)	13.68* (6.38)	-0.69** (0.27)	-0.77 (0.50)	-	-	-	0.37 1.84
South Korea 1965-1986	0.09 (0.02)	-1.37 (3.43)	-1.08 (0.72)	0.77* (0.40)	-0.46 (0.92)	-	-0.82* (0.41)	-1.32 (0.87)	0.41 1.94
	C. Official versus private creditors(f)								
	Const.	FDI	AID	DEBT-Mu	DEBT-Ba	T	D1	D2	$\frac{R^2}{D.W.}$
Chile(b, c) 1970-1986	-0.16*** (0.04)	5.57*** (1.30)	65.39*** (12.40)	0.89 (1.40)	-0.16 (0.29)	-	-	-	0.67 2.31
Malaysia(d) 1967-1986	-0.07 (0.05)	2.61*** (0.75)	24.87** (8.45)	0.10 (1.31)	-0.63*** (0.20)	-	-	-	0.55 2.05
Mexico(b, c) 1970-1986	0.22*** (0.04)	-2.37 (4.13)	5.97 (97.99)	-32.38** (11.71)	0.96 (0.74)	-0.005*** (0.002)	-	-	0.69 2.20
(a) For the definition of variables, cf. Appendix II. Standard errors in parentheses; *significant at the 10 per cent level; **significant at the 5 per cent level; ***signifi- cant at the 1 per cent level. - (b) Corrected for first-order autocorrelation of the re- siduals. - (c) Exogenous variables lagged one period. - (d) Exogenous variables lagged two periods. - (e) Regression for Mexico not performed because of lacking data. - (f) Re- gression for South Korea not performed because misspecification could not be avoided by including a trend variable as a proxy.									

Source: Cf. Table 14; own calculations.



The efficiency of FDI inflows was most seriously affected in Mexico. This was due to a number of regulations. Firstly, the possibility of profit remittances and the degree of foreign ownership were limited. Secondly, foreign investments were not approved in some booming sectors. Thirdly, efficiency-increasing competitive pressures were reduced by not allowing FDI inflows in activities where domestic firms were engaged. Fourthly, once approved, foreign investors were isolated from competition as well, mainly by import protection.

Compared with Mexico, the conditions for an efficient use of FDI inflows were better in Malaysia.<sup>1</sup> Minority-owned joint ventures were preferred as well. But the sectoral distribution of FDI inflows was relatively favourable and less discriminatory. Notwithstanding the promotion of some highly human-capital intensive industries, foreign investments were allowed in labour-intensive and standardized manufacturing as well. A substantial part of FDI projects was export-oriented. Moreover, capital and profits could be transferred back freely.

Since 1974, FDI policies were clearly most liberal in Chile. Interventions into the allocation of FDI inflows were kept to the minimum. Foreign ownership participation and profit remittances were treated liberally. Moreover, capital and product markets were opened to international competition. These factors were conducive to an efficient use of FDI inflows.

The differences among the sample countries are less pronounced in the case of debt finance. Positive investment effects of DEBT were generally not translated into positive economic growth effects. In Mexico and Malaysia, the growth effects were even significantly negative (Table 20). The efficiency of debt-financed investments suffered from policy-induced distortions in all countries. Notwithstanding some differences concerning the extent and nature of regulations, all countries (except Chile) adopted selective debt allocation policies, thereby favouring priority sectors which were frequently not in line with the country's comparative advantage. Moreover, many governments subsidized and guaranteed foreign loans (only in Malaysia foreign credits were not subsidized). The

<sup>1</sup> FDI (together with portfolio investment and export credits) had a positive impact on the change in total factor productivity in Malaysia [Lee et al., 1986, p. 46]. This result supports our reasoning on a relatively efficient use of this type of capital inflows in Malaysia.

comparison of the coefficients of DEBT in the growth and investment equations suggests that the negative effects of government interventions on economic growth were quite similar in the countries under consideration.

The results relating to overall debt inflows are confirmed by the coefficients of different types of debt inflows (Table 22):

- In the case of Chile, all types of debt inflows show insignificant coefficients in the growth equation, although the investment impact of DEBT-Pr, DEBT-L, DEBT-S, and DEBT-Ba was significantly positive.
- The inefficiency of DEBT-Gv is most evident in Mexico, where it is significantly negative. But Malaysia provides a case in point as well. In the growth equation, the coefficients of DEBT-Gv and of the main sources of public borrowing, i.e., DEBT-L and DEBT-Ba, are insignificant (DEBT-Gv) or significantly negative; whereas all three types of debt carried a positive investment impact.
- In both Mexico and Malaysia, excessive public borrowing in domestic credit markets contributed to the negative growth impact of private borrowing in international capital markets (DEBT-Pr). Private borrowers in Mexico which were crowded out in domestic credit markets resorted to foreign loans to a substantial degree. The incentives to use these loans efficiently were rather weak, due to the fixed and overvalued exchange rate of the Peso and artificially low credit costs. An inefficient use of loans raised by private borrowers was not encouraged in the case of Malaysia. But private borrowers which were crowded out in domestic capital markets had little access to international capital markets, with the exception of some large firms. Therefore, more productive private investment projects were probably replaced by inefficient public investment projects. This substitution tended to affect overall economic growth negatively.

The reasoning that the efficiency of investments was strongly influenced by government regulations, rather than by the type of borrowers and creditors as well as the maturity of debt, is confirmed by the constraint tests presented in Table A11. With only two exceptions, the F-statistics remain completely insignificant. In other words, the growth impact of different debt inflows was more or less the same. This indicates that the governments' leverage on all types of foreign debt was fairly strong.

All in all, government interventions affected the efficiency of debt inflows in a negative way and to a similar extent in our sample countries. In contrast, FDI regulations were liberal in Chile, most restrictive in Mexico and South Korea, and less restrictive in Malaysia. Consequently, the positive difference between the growth impact of FDI and foreign debt inflows is highly significant in Chile, somewhat less pronounced in Malaysia, and insignificant in Mexico and South Korea (Table 21). As concerns the growth impact of different capital inflows, evidence suggests that country-specific regulations on the use of these inflows may obscure considerably the response patterns which were expected by the basic agent-principal model and the counterhypothesis. Nonetheless the conclusion can be maintained that a general superiority of FDI over debt is not to be observed, when economic growth is the endogenous variable. Similarly, however, the hypothesis of a trade-off in FDI financing under non-cooperative transfer relations does not hold for the growth equation. In judging on the relative merits and disadvantages of different resource inflows, it is thus crucially important to carefully evaluate country-specific information on the institutional and regulative framework governing capital transfers.

## E. Summary and Conclusions

It was the major aim of this study to assess the effects of different types of capital inflows on overall investment, domestic savings and economic growth in developing countries. First and foremost it is analysed whether FDI is generally superior to foreign debt inflows. The relevance of this question stems from the fact that recommendations, e.g. by the World Bank, to restructure the composition of external financing by promoting foreign equity participation at the expense of debt financing are rarely derived from a sound theoretical basis.

FDI is typically regarded as a risk sharing device for developing economies, without considering possible costs in terms of forgone future consumption in the capital-recipient country. The latter may be due to disincentive problems arising in the transfer negotiations between foreign investors and creditors and the capital recipients. The nature of moral hazards is likely to vary between different types of capital inflows. This is because debt and equity finance involve different compensation rules by which future returns are distributed among the parties engaged in transfer negotiations.

In the present study disincentive problems are discussed in an agent-principal framework. The basic model focuses on moral hazard arising in situations where ownership and control of economic resources are separate and monitoring costs non-negligible. Once a transfer of funds has been agreed upon, the capital-recipient country (i.e., the agent) is free to decide as to how to use these funds. Moral hazard by the agent can only be ruled out if he is able to credibly commit himself to a certain investment behaviour (cooperative equilibrium). Otherwise transfer negotiations result in non-cooperative equilibria.

The choice-theoretic reasoning that credit rationing may lead to non-cooperative transfer equilibria in international credit markets is extended to the case of equity-financed capital transfers, in order to determine the optimal composition of foreign capital transfers. The central hypothesis derived from the basic agent-principal model states that changes in the financing structure of a country do affect its macro-economic performance. Different compensation rules in the cases of debt and equity finance determine the incentive structure that motivates the behaviour of the agent. More specifically, the model hypothesizes that

under non-cooperative conditions the shift from debt to FDI involves a risk-return trade-off between income stability and expected future consumption. That is, with a higher proportion of equity-financed inflows the variability of residual income generated and retained in the capital-recipient country declines; but the domestic savings incentives and therefore the future growth prospects of that country would also be reduced.

Only if conditions conducive to a cooperative equilibrium pertain, more FDI and less debt would yield a clear welfare improvement for the agent. But the environment in which capital transfers took place in the late 1970s and early 1980s is more accurately characterized by a non-cooperative process. This is indicated by the recent debt-servicing difficulties of many developing countries. Moreover, a first test of the above hypotheses in a cross-country context points to non-cooperative agent-principal relations in the majority of the sample countries.

By and large, the cross-country analysis on the economic performance effects of debt and FDI confirms the prediction of the underlying model that the investment responses to alternative forms of capital inflows are different. Also, the hypothesis cannot be rejected that in a non-cooperative environment capital-recipient countries face a trade-off between less income variation and higher expected future consumption, when confronted by the alternative of receiving debt or FDI inflows. Debt-financed transfers exert a stronger positive influence on overall investment, while equity-financed transfers provide the benefit of lower fluctuations in domestic consumption. This result sharply conflicts with the counterhypothesis which claims a general superiority of FDI over debt as far as economic performance effects are concerned.

On the basis of the cross-country regressions, neither form of capital inflows can be judged unambiguously superior to the other, and thus recommended for all countries independent of social attitudes towards risk. But the results also indicate the following:

- Factors not considered explicitly in the basic agent-principal model tend to distort the expected normal pattern of economic performance effects of debt and FDI inflows. Most notably, government regulations on the use of foreign capital are likely to affect the efficiency of debt and FDI-financed investments.

- Apparently, some capital-recipient countries have evolved further than others in providing a more conducive setting for attaining cooperative agent-principal relations.

The question as to how developing countries may signal a cooperative behaviour as well as the relevance of the institutional and regulative framework governing capital inflows are discussed in detail in country-specific studies. The selected countries (Chile, Malaysia, Mexico, and South Korea) differ remarkably in terms of economic performance and the composition of external financing. The basic choice-theoretic context is maintained in the time-series analysis. Country-specific factors are considered to explain deviations from the normal pattern of response behaviour: (1) The transfer regime is expected to have an impact on the agents' investment and savings response in the first place; (2) policy intervention may particularly affect the ranking of the economic growth effects of debt and FDI inflows. Moreover, differences in the government's leverage on the use of external funds suggest a further differentiation of debt inflows, which supplements the basic debt-equity dichotomy.

Country-specific evidence on the terms of capital transfers, the overall amount and sectoral distribution of investment, as well as the mobilization of domestic savings supports the reasoning that the transfer regimes differ between the sample countries. Especially Malaysia and South Korea signaled that they were prepared to engage in cooperative agent-principal relations, e.g. by successfully mobilizing domestic savings in addition to foreign capital inflows and by heavily investing in export generating activities. These countries were granted significantly better credit terms by the foreign principals. In sharp contrast, debt finance was supplied at non-cooperative terms in the cases of Chile and Mexico. The analysis of the transfer regime in the case of FDI inflows leads to the same conclusion, except for Mexico which behaved in a co-operative manner towards foreign investors.

Notwithstanding the differences in the transfer regime, the review of government regulations reveals that public interventions favoured inefficient uses of foreign debt in all sample countries. Government guarantees and artificially reduced borrowing costs lowered the incentives to carefully assess the productivity of debt-financed investments. Moreover, selective credit policies rendered it unlikely that debt inflows had the

strongly positive impact on economic growth expected by the basic agent-principal model. In Mexico government policies tended to weaken the relationship between foreign debt and overall investment as well; while in Chile, Malaysia and South Korea debt inflows were mainly invested, though inefficiently to some extent.

Similarly, selective and discriminating approval procedures as well as restrictive local participation rules tended to affect the efficiency of FDI inflows negatively. But differences in the regulation of FDI were much more pronounced among the sample countries than in the case of debt. Chile and Malaysia employed by far less interventionist attitudes against FDI than Mexico and South Korea. Only recently, all sample countries encouraged FDI inflows by deregulation and providing additional incentives for foreign investors. The empirical estimates for the 1970s and early 1980s are hardly affected by those recent policy changes.

The time-series regressions support the model prediction on the relevance of the type of transfer relations (cooperative versus non-cooperative) in determining the economic performance effects of different financial inflows. At the same time, however, the expected pattern of response behaviour is obscured in several instances by the institutional and regulative framework governing capital inflows. The results on the investment response can be summarized as follows:

- Most notably, the counterhypothesis on the general superiority of FDI over debt is rejected. The Chilean example clearly shows a risk-return trade-off in the case of FDI finance under non-cooperative transfer conditions, as was hypothesized by the agent-principal model.
- The empirical results support the predictions of the basic agent-principal model to some extent only. The alternative proposition that the investment impact of foreign debt, external aid and FDI does not differ significantly is invalidated for Chile and Mexico; but it cannot be rejected for Malaysia and South Korea. By and large, the deviations from the model predictions fit well into the evaluation of government regulations and restrictions on the flow and use of external resources.

The estimation of the savings equation is subject to considerable statistical and methodological vagaries. The similarities in the pattern of response behaviour between the investment and the savings equation are most pronounced in Chile and Mexico. The impact of FDI continues to be

stronger than the impact of debt in Mexico, and weaker in Chile, when domestic savings are to be explained. The different ranking in Chile and Mexico can be attributed to cooperative relations with foreign investors in the case of Mexico, while Chile maintained non-cooperative relations with both foreign creditors and investors. The pattern of response behaviour remains fairly stable for South Korea as well. For Malaysia the ranking of the estimated coefficients in the savings equation supports the hypothesis of cooperative agent-principal relations.

Not surprisingly, the distorting impact of the institutional and regulative framework is most evident with regard to the economic growth effects of capital inflows. The estimates reveal remarkable differences in the impact of both debt and FDI on overall investment on the one hand and economic growth on the other hand. Government interventions tended to affect the efficiency of debt inflows in a negative way and to a similar extent in all four sample countries. The growth impact of various types of debt inflows is more or less the same. This indicates that the governments' leverage on the use of debt was fairly strong, irrespective of the type of borrower and creditor, and the maturity of loans. In contrast, FDI regulations were most restrictive in Mexico and South Korea, significantly less so in Malaysia, and fairly liberal in Chile. Consequently, the difference between the growth impact of FDI and foreign debt inflows is significantly positive in Chile, somewhat less pronounced in Malaysia, and insignificant in Mexico and South Korea.

As in the case of investment, a general superiority of FDI over debt is not to be observed when economic growth is to be explained. Similarly, however, the hypothesis of a trade-off in FDI financing under non-cooperative transfer relations does not hold for the growth equation in the time-series framework. In judging on the relative merits and disadvantages of different capital inflows, it is thus crucially important to carefully evaluate country-specific information on the institutional and regulative framework governing capital transfers.

The above findings have important consequences as concerns the current discussion on the optimal structure of external financing of developing countries. Recent recommendations to change the composition of capital inflows towards more foreign equity participation and less debt have led many capital-recipient countries to revise their financing policies. Most notably, debt-equity swaps became a common feature of debt



management strategies, especially in Latin America. But the economic performance effects of such financial restructuring remain uncertain at best unless the incentives for an efficient use of external resources are strengthened.

As far as equity-related inflows are concerned, the superiority in terms of economic growth of a liberal treatment of foreign investors has been clearly demonstrated. Especially the Mexican example reveals that various obstacles must be removed in order to ensure favourable growth effects of FDI:

- The degree of foreign ownership should not be unduly restricted. Otherwise the growth-enhancing transfer of technological and managerial skills is likely to suffer.
- Selective approval procedures should be abolished as far as possible. FDI should also be allowed in activities where domestic firms are engaged. This would add to efficiency-increasing competitive pressures.
- Foreign investors should not be isolated from competition either. Entry barriers for competing enterprises should be relaxed to ensure an efficient use of FDI. Moreover, import protection granted to approved foreign investors must be phased out. In this way, the risk would be reduced that FDI is confined to sectors in the production of which the capital-recipient country has no comparative advantages.

The country studies suggest that the potential to enhance the efficiency of debt inflows is even larger. Arguably the recent priority on financial restructuring is mistaken as an alternative to revise economic policies that encourage an unproductive use of foreign loans. Financial restructuring might be considerably less urgent once the conditions for improved efficiency of debt are created. Most importantly, selective and discriminating debt allocation policies must be revised in order to translate favourable investment effects of debt inflows into favourable economic growth effects. The preferential access to foreign loans of priority sectors, e.g. heavy and human-capital intensive industries, that are not in line with the capital-recipient country's comparative advantages should be abolished. Labour intensive and export oriented industries as well as traditional and standardized lines of production should be granted equal access to foreign debt inflows. The chances that foreign loans flow to the most productive uses would be improved further if (1) the governments discontinued the widespread subsidization of foreign borrowing,

(2) the overvaluation of domestic currencies was avoided, and (3) public guarantees for foreign loans were no longer granted.

The proposed policy revisions may also help the capital-recipient countries to engage in cooperative relations with foreign creditors and investors. If this goal were achieved, the likelihood of problems in servicing foreign payments obligations would be reduced. This is because under cooperative agent-principal relations a higher share of domestic absorption would be devoted to capital formation, and the capital recipients would benefit from more favourable transfer conditions, e.g. lower interest rates on foreign loans. It may be difficult to achieve cooperative agent-principal relations unless the capital recipient can credibly pre-commit himself to abstain from moral hazards once the capital is transferred. Nonetheless, the country studies suggest that agents signaling that they are prepared to engage in cooperative relations are honoured by foreign principals.

So, developing economies are well advised to build up a reputation as cooperative borrowers and cooperative hosts of FDI in order to obtain better transfer conditions. Towards this end, policy-induced bottlenecks that impede a successful mobilization of domestic savings should be removed, complementary public investments maintained and expanded, and the widespread bias in favour of high-risk projects reduced. Especially a world-market oriented development approach provides a clear signal that cooperative agent-principal relations are aimed at. Such a strategy limits the transfer risk for foreign capital providers, since export earnings are generated out of which external payments obligations can be serviced. Moreover, the risk of moral hazards by the agent is reduced. World-market orientation adds to the benefits to be reaped by the agent from continued external trade relations. Consequently, the threat of foreign principals to impose trade sanctions may provide a safeguard against moral hazards. Under such conditions, the agent's commitment to stick to a preannounced investment behaviour is easier to enforce, and monitoring costs are reduced.

Finally, the present study suggests possible ways as to how to elaborate on the underlying agent-principal model. The assumption that the various types of capital transfers are perfectly fungible is unduly restrictive, even though the government's leverage on the disposal of foreign capital inflows was shown to be fairly strong in the case of both

debt and FDI finance. The incentive structure as to how to use the transferred resources differs between public borrowers, private borrowers, and private investors attracting equity shares from abroad. In other words, more than one agent exists in the capital-recipient country. The model, which so far is restricted to the relations between foreign suppliers of capital and the government of the recipient country, should be extended by explicitly considering those other actors as well. The predictive power of the model may be improved by systematically analysing the internal agent-principal relations within the capital-recipient country. For example, the relationship between the country's population as the principal of domestic productive resources and the government agent must be evaluated more closely.

More specifically, it has to be assessed theoretically and empirically whether the consequences of public guarantees on the efficiency of capital inflows depend on the institutional arrangements governing the internal relations between the government guarantor and the private agents. Disincentive effects may be avoided if the guarantor assumes the transfer risk, but does not provide an outright bail-out for defaulting debtors [Stüven, 1989]. Under such conditions, the guarantor services the private debt in terms of foreign exchange, but maintains a claim in domestic currency against the private agent. Such an arrangement may even help to overcome the enforcement problems in sovereign lending.

## Appendices

### I. Cross-Country Analysis: Definition of Variables

The data for the explanatory variables, aid, debt, and FDI, are taken from OECD [c]. Aid consists of grants and net official development assistance (ODA) loans provided by the member countries of the OECD Development Assistance Committee (DAC), multilateral agencies, and OPEC member countries. The figures do not include financial flows from the International Monetary Fund (IMF) (except loans by the IMF Trust Fund), member countries of the Council for Mutual Economic Assistance, developing countries, and grants by private voluntary agencies. Grants cover gifts (in money or in kind), for which no repayment is required, as well as grant-like flows, i.e., loans repayable in the recipients' currencies. ODA loans carry maturities of over one year and contain a grant element of at least 25 per cent.

Official loans with a grant element of less than 25 per cent (other official flows, OOF) are classified as debt-creating financial flows. In addition to OOF, the debt figures include net private sector flows in the form of export credits and portfolio investment from DAC members. Portfolio investment, as defined in the OECD source, largely corresponds to transactions by the private monetary sector (bank loans). Loans by branches in offshore centres of banks resident in DAC countries are omitted. The portfolio investment figure is a direct measurement of (gross) new bank transactions with more than one year maturities less repayments of principal, converted to US \$ at the average annual exchange rate.

The data on FDI are from the OECD figures on net private sector flows from DAC member countries to developing countries.

All explanatory variables are expressed as a percentage share of the recipient country's GDP. The developing countries' nominal GDP, as given in IMF [c], is converted to US \$ by applying annual average exchange rates.

Data on the endogenous economic performance variables (apart from domestic savings) are from IMF [c]. Average annual economic growth rates are given by GDP per capita in constant prices. IRs refer to the average share of gross fixed capital formation in GDP. Information on

gross national savings (excluding net current transfers from abroad) is from World Bank [e] and is expressed as a share of GDP, as reported in the same source.

## II. Time-Series Analysis: Definition of Variables

Exogenous Variables			
Variable	Country	Definition	Source
FDI	Malaysia, Mexico, South Korea	Gross foreign direct investment(a)	IMF [a]
	Chile	Net foreign direct investment plus subcategories of portfolio investment (other bonds, corporate equity)(a, b)	IMF [a]
AID	Chile, Malaysia, Mexico, South Korea	Grants only	OECD [c]
DEBT	Chile, Malaysia, Mexico, South Korea	Sum of DEBT-Pr and DEBT-Gv	-
DEBT-Pr	Chile, Malaysia, South Korea	Sum of short and long-term debt flows to deposit money banks and other sectors	IMF [a]
	Mexico	Annual change in private non-guaranteed debt outstanding	Banco de México [c]; Quijano, Antia Berhens [1985]; Secretaría de Hacienda y Crédito Público [1988]
DEBT-Gv	Chile, Malaysia, South Korea	Short and long-term debt flows to the resident official sector(c)	IMF [a]
	Mexico	Annual change in public and publicly guaranteed debt outstanding	Banco de México [c]; Quijano, Antia Berhens [1985]; Secretaría de Hacienda y Crédito Público [1988]
DEBT-L	Chile, Malaysia, South Korea	Long-term debt flows to the resident official sector, deposit money banks, and other sectors(c)	IMF [a]

Exogenous Variables			
Variable	Country	Definition	Source
DEBT-S	Chile, Malaysia, South Korea	Short-term debt flows to the resident official sector, deposit money banks, and other sectors	IMF [a]
DEBT-Mu	Chile, Malaysia, Mexico, South Korea	Net inflows of public and publicly guaranteed debt from official sources	World Bank [c]
DEBT-Ba	Chile, Malaysia, Mexico, South Korea	Net debt inflows from private sources include public and publicly guaranteed debt from suppliers and financial markets, plus total non-guaranteed private debt(d)	World Bank [c]
D1	South Korea	DEBT for 1981-1986; 0 for all other years	-
D2		DEBT for 1974, 1975, 1979, 1980; 0 for all other years	
DS2		DEBT-S for 1974, 1975, 1979, 1980; 0 for all other years	
DPR2		DEBT-Pr for 1974, 1975, 1979, 1980; 0 for all other years	
T	Malaysia, Mexico, South Korea	Trend variable	-
IR	Chile	Gross fixed capital formation	Banco Central de Chile [1986; 1988]
	Malaysia		World Bank [f]
	Mexico		Banco de México [a], Secretaría de Programación y Presupuesto [various issues]

Exogenous Variables			
Variable	Country	Definition	Source
IR	South Korea	Gross fixed capital formation	Bank of Korea [1984]; Economic Planning Board [1987]
DSR	Chile, Malaysia, Mexico, South Korea	Domestic savings	cf. IR
GDP	Chile, Malaysia, Mexico, South Korea	Gross domestic product at current market prices	cf. IR
GR	Chile, Malaysia, Mexico, South Korea	Annual growth rate of real GDP	cf. IR

(a) The FDI data do not include credits which multinational enterprises extend to their subsidiaries. These credits are included in debt inflows. - (b) The subcategories of portfolio investment are included to take account of debt-equity swaps. - (c) Debt inflows related to public sector bonds are included in the cases of Chile and Malaysia. - (d) In the case of non-guaranteed private debt the available data allow to discriminate between creditors for some years only. Since non-guaranteed debt from official sources designated to private borrowers is of negligible size, total non-guaranteed private debt is assumed to originate from private creditors.



### III. Appendix Tables

Table A1 - Correlation between Domestic Savings, Investment, Economic Growth, and Foreign Resource Inflows in 36 Developing Countries, 1976-1979

	DSR	IR	GR/cap.	FDI/GDP	AID/GDP	DEBT/GDP
DSR	1	0.72	0.41	-0.06	-0.49	0.45
IR		1	0.18	-0.05	-0.20	0.61
GR/capita			1	-0.45	-0.24	-0.03
FDI/GDP				1	-0.09	0.12
AID/GDP					1	-0.08
DEBT/GDP						1

Source: Appendix II; own calculations.

Table A2 - The Stock of Foreign Debt and FDI in Chile, Malaysia, Mexico, and South Korea, 1978 and 1983

	Year	Chile	Malaysia	Mexico	South Korea
Foreign debt(a)					
per capita (US \$)	1978	526	195	495	344
	1983	1617	720	1174	1051
per cent of GDP	1978	36.6	15.4	31.7	25.7
	1983	95.6	35.6	61.7	61.7
FDI(b)					
per capita (US \$)	1978	134	118	91	41
	1983	257	418	181	45
per cent of GDP	1978	9.4	9.3	5.8	3.0
	1983	15.2	20.7	9.5	2.3
Foreign debt/FDI	1978	3.9	1.7	5.4	8.4
	1983	6.3	1.7	6.5	23.4
(a) Stock of total foreign debt at the end of each year. Stock of government and government guaranteed debt in the case of Malaysia. -					
(b) Stock of FDI at the end of each year. Figures for 1978 calculated as stock at the end of 1983 minus FDI flows in the period 1979-1983 in the case of Malaysia.					

Source: IMF [a; b]; OECD [b; d]; World Bank [e]; own calculations.

Table A3 - The Structure of Debt Inflows (a) in Chile, Malaysia, Mexico, and South Korea, before and after the Peak in Total Debt Inflows

	Total debt	Short-term debt	Government borrowing	Debt from official sources
	mill. US \$	per cent of total debt		
Year of the peak and the year before				
Chile (1980/1981)	7478	29.3	-6.2	-2.8
Malaysia (1982/1983)	4551	0.4	75.3	14.0
Mexico (1980/1981)	40658	37.7	3.2	4.2
South Korea (1979/1980)	11250	55.7	32.5	13.7
Two years following the peak				
Chile (1982/1983)	1037	-15.3	166.4	3.3
Malaysia (1984/1985)	3391	6.7	53.4	28.7
Mexico (1982/1983)	18456	-91.9	132.2	7.6
South Korea (1981/1982)	8648	19.0	15.2	12.0
(a) Defined according to balance of payments statistics.				

Source: Cf. Table 5; own calculations.

Table A4 - Gross Fixed Capital Formation in Selected Manufacturing Industries in Chile, 1979-1982 (as per cent of total manufacturing)

ISIC	Industry(a)	1979	1980	1981	1982	1979-1982 (b)
	<i>Highly labour intensive</i>					
322	Clothing	1.0	1.0	1.2	0.4	0.9
323	Leather products, excl. footwear	0.5	0.2	0.4	0.2	0.3
324	Footwear	0.8	0.5	0.8	0.3	0.6
332	Furniture	0.5	0.3	1.3	-0.3	0.5
390	Other manufactures	0.1	0.3	0.9	0.1	0.3
	<i>Highly capital intensive</i>					
311/						
312	Food manufacturing	33.2	26.1	22.6	18.7	25.2
351	Industrial chemicals	1.7	1.7	0.8	1.6	1.5
369	Nonmetal mineral products	1.8	2.6	9.0	20.2	8.4
371	Basic iron, steel industries	4.4	2.1	3.0	1.8	2.8
372	Nonferrous metal industries	9.0	6.0	11.2	13.4	9.9
	<i>Low human-capital intensive</i>					
322	Clothing	1.0	1.0	1.2	0.4	0.9
323	Leather products, excl. footwear	0.5	0.2	0.4	0.2	0.3
324	Footwear	0.8	0.5	0.8	0.3	0.6
390	Other manufactures	0.1	0.3	0.9	0.1	0.3
	<i>Highly human-capital intensive</i>					
313	Beverage industries	6.3	8.7	5.5	3.2	5.9
351	Industrial chemicals	1.7	1.7	0.8	1.6	1.5
352	Other chemicals	3.8	2.6	4.3	3.2	3.5
371	Basic iron, steel products	4.4	2.1	3.0	1.8	2.8
372	Nonferrous metal industries	9.0	6.0	11.2	13.4	9.9
384	Transport equipment	3.0	0.9	1.0	0.6	1.4
(a) The classification of the industries was taken from Spinanger [1987]. Spinanger calculated the factor intensities for five Asian countries and the United States. Only those industries which belonged to the same category in at least five out of six country cases were included. - (b) Period averages.						

Source: UN [1985]; own calculations.

Table A5 - Value Added, Debt, and Exports in Selected Manufacturing Industries in Mexico (in per cent of total)

ISIC	Industry	Value added(b)	Exports	ISIC	Debt(c)	
		1979-1983	1980		private	public
					1980	
	<i>Highly labour intensive</i>					
322	Clothing	2.9	0.4	320	1.4	0.0
323	Leather products, excl. footwear	0.9	0.2			
324	Footwear	1.9	0.1			
332	Furniture	1.7	2.1	330	0.3	0.0
390	Other manufactures	1.8	1.7	390	0.6	1.4
	<i>Highly capital intensive</i>					
311/312	Food manufacturing	16.1	9.0	310	8.1	28.3
351	Industrial chemicals	5.7	1.8	350	28.6	43.1
369	Nonmetal mineral products	3.4	0.6	360	7.2	0.1
371	Basic iron steel industries	4.8	2.1	370	15.4	18.4
372	Nonferrous metal industries	1.2	8.0			
	<i>Low human-capital intensive</i>					
322	Clothing	2.9	0.4	320	1.4	0.0
323	Leather products, excl. footwear	0.9	0.2			
324	Footwear	1.9	0.1			
390	Other manufactures	1.8	1.7	390	0.6	1.4
	<i>Highly human-capital intensive</i>					
313	Beverage industries	6.5	0.9	310	8.1	28.3
351	Industrial chemicals	5.7	1.8	350	28.6	43.1
352	Other chemicals	5.5	1.5			
371	Basic iron, steel products	4.8	2.1	370	15.4	18.4
372	Nonferrous metal industries	1.2	8.0			
384	Transport equipment	6.5	0.8	380	32.0	7.3

(a) The classification of the industries was taken from Spinanger [1987]. Spinanger calculated the factor intensities for five Asian countries and the United States. Only those industries which belonged to the same category in at least five out of six country cases were included. - (b) In per cent of total value added in manufacturing. Period averages. - (c) In per cent of total foreign private (public) debt in the manufacturing sector.

Source: Banco de México [c]; UNCTAD [1987]; UN [1985]; World Bank [a]; own calculations.

Table A6 - Sectoral Distribution of Foreign Loans in South Korea (a), 1966-1982 (per cent of total)

	1966-1970	1971-1975	1976-1980	1981-1982
Agriculture, forestry and fishery	11.4	13.0	6.7	9.2
Mining	1.0	-	0.1	0.2
Manufacturing industries	39.8	38.8	39.4	15.2
Heavy industries and chemicals	(22.7)	(26.3)	(30.8)	(12.8)
Light industries	(17.1)	(12.5)	(8.6)	(2.4)
Social overhead	39.5	29.8	38.8	55.5
Services	6.5	13.4	14.5	14.4
Other	1.8	5.0	0.3	5.3
Total (mill. US \$)	1693.2	4523.2	11810.5	5734.1

(a) Period averages.

Source: Collins, Park [1987, Table 3.11].

Table A7 - Discrimination in Access to an Average Costs of Borrowing between Subgroups of the Manufacturing Industry in South Korea, 1972-1984

		1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Differences in access to loans (percentage points) (a)	Small versus large firms	-18.45	-17.00	-21.20	-11.56	-6.38	-0.59	-2.67	-2.72	-5.46	-4.50	1.61	0.43	2.56
	Domestic-market oriented versus export-oriented firms	-2.50	-4.20	-6.85	-8.45	-3.20	-4.23	-5.31	-5.86	-16.90	-12.79	-9.07	-7.44	-6.29
	Light industry versus heavy and chemical industry	-6.91	-0.42	7.79	3.44	-1.27	-2.48	-5.66	-0.28	-2.56	-6.96	-0.68	-0.67	-1.25
Differences in average costs of borrowing (percentage points) (b)	Small versus large firms	2.18	3.11	0.92	2.73	2.59	1.89	3.64	-0.26	2.32	0.47	-0.70	-0.76	-0.32
	Domestic-market oriented versus export-oriented firms	1.40	0.06	1.06	2.78	0.91	0.37	-0.43	-1.90	5.02	4.55	4.04	1.98	2.29
	Light industry versus heavy and chemical industry	2.78	2.25	0.21	1.92	3.56	2.79	5.76	4.11	2.47	2.15	1.64	1.70	0.07

(a) Proxied by the difference in the ratio of total bank loans and foreign loans over total assets between the sectors. - (b) Measured by the difference in effective interest payments divided by total borrowing (foreign loans, bonds, etc. included).

Source: Bank of Korea [a].

Table A8 - Composition of GDP, Debt, and Exports in Chile, 1974-1981  
(in per cent of total)

	Share in GDP	Exports	Debt
	1974-1981		1982
Agriculture	6.9	4.6	} 5.6
Fishing	0.5	0.2	
Mining	9.0	54.2	12.4
Manufacturing	22.7	22.6	19.4
Electricity, gas, water	2.0	0.0	6.8
Construction	5.0	0.0	6.3
Trade	16.1	2.1	10.5
Transport, communication	5.8	11.3	3.1
Services	31.5	4.9	8.4
Others(a)	-	-	27.5
(a) Credits for consumption, financial institutions, and unspecified sectors.			

Source: Banco Central de Chile [1983]; El Mercurio [1983]; own calculations.

Table A9 - Investment Impact of Differentiated Debt Inflows in Chile, Malaysia, Mexico, and South Korea: Constraint Tests (a)

	A. Government versus private debtors						
	FDI =AID -DEBT-Gv =DEBT-Pr	FDI=AID	FDI= DEBT-Gv	FDI= DEBT-Pr	AID= DEBT-Gv	AID= DEBT-Pr	DEBT-Gv =DEBT-Pr
Chile	10.25**	0.54	26.50**	30.62**	0.10	0.06	5.08**
Malaysia	1.04	2.85	0.02	0.43	2.67	2.60	0.72
Mexico	17.54**	12.35**	9.83**	6.40**	10.75**	10.90**	2.43
South Korea	0.14	0.01	0.03	0.09	0.14	0.31	0.23
	B. Long-term versus short-term debt						
	FDI =AID -DEBT-L =DEBT-S	FDI=AID	FDI= DEBT-L	FDI= DEBT-S	AID= DEBT-L	AID= DEBT-S	DEBT-L =DEBT-S
Chile	11.55**	1.42	33.95**	26.84**	0.67	0.53	3.33*
Malaysia	1.31	2.91	0.03	0.53	2.73	2.56	1.23
South Korea	2.23	3.00	1.89	0.92	0.01	0.74	3.42*
	C. Official versus private creditors						
	FDI =AID -DEBT-Mu =DEBT-Ba	FDI=AID	FDI= DEBT-Mu	FDI= DEBT-Ba	AID= DEBT-Mu	AID= DEBT-Ba	DEBT-Mu =DEBT-Ba
Chile	5.34**	0.42	8.01**	15.21**	0.12	0.08	0.37
Malaysia	0.31	0.33	0.01	0.45	0.31	0.25	0.19
Mexico	23.40**	28.50**	16.39**	55.72**	23.86**	25.30**	0.34
(a) For the estimated equations, cf. Table 16. A standard F-test procedure is used to test if the hypothesized restrictions hold; *if the hypothesis of equal coefficient values is rejected at the 10 per cent level; **if the hypothesis of equal coefficient values is rejected at the 5 per cent level.							

Source: Cf. Table 14; own calculations.

Table A10 - Domestic Savings Impact of Differentiated Debt Inflows in Chile, Malaysia, Mexico, and South Korea: Constraint Tests (a)

	A. Government versus private debtors						
	FDI =AID =DEBT-Gv =DEBT-Pr	FDI=AID	FDI= DEBT-Gv	FDI= DEBT-Pr	AID= DEBT-Gv	AID= DEBT-Pr	DEBT-Gv =DEBT-Pr
Chile	6.73**	6.35**	4.93**	7.20**	4.90**	4.54*	4.75*
Chile(b)	7.44**	4.76*	11.88**	16.53**	3.77*	3.43*	6.10**
Malaysia	7.69**	12.20**	0.65	0.03	9.61**	9.77**	0.91
Mexico	11.42**	0.73	24.06**	21.12**	0.17	0.14	3.70*
South Korea	1.51	0.43	1.77	1.66	4.48*	2.97	0.45
	B. Long-term versus short-term debt						
	FDI =AID =DEBT-L =DEBT-S	FDI=AID	FDI= DEBT-L	FDI= DEBT-S	AID= DEBT-L	AID= DEBT-S	DEBT-L =DEBT-S
Chile	6.79**	4.25*	3.74**	7.48**	3.32*	2.89	4.79*
Chile(b)	5.32**	2.77	11.73**	13.91**	2.15	1.93	3.09
Malaysia	6.80**	10.23**	0.14	0.01	8.14**	7.88**	0.22
South Korea	2.91*	0.24	1.78	0.52	5.04**	0.51	3.84*
	C. Official versus private creditors						
	FDI =AID =DEBT-Mu =DEBT-Ba	FDI=AID	FDI= DEBT-Mu	FDI= DEBT-Ba	AID= DEBT-Mu	AID= DEBT-Ba	DEBT-Mu =DEBT-Ba
Chile	8.18**	3.57*	1.56	10.75**	3.08	2.00	5.75**
Chile(b)	7.15**	4.52*	1.16	19.94**	4.09*	3.20*	5.63**
Malaysia	10.65**	9.43**	0.07	1.12	10.94**	7.47**	0.72
Mexico	12.54**	0.77	31.52**	0.11	1.77	0.82	31.72**
(a) For the estimated equations, cf. Table 19. A standard F-test procedure is used to test if the hypothesized restrictions hold; *if the hypothesis of equal coefficient values is rejected at the 10 per cent level; **if the hypothesis of equal coefficient values is rejected at the 5 per cent level. - (b) Two-period moving averages of domestic savings used as endogenous variable.							

Source: Cf. Table 14; own calculations.



Table A11 - Economic Growth Impact of Differentiated Debt Inflows in Chile, Malaysia, Mexico, and South Korea: Constraint Tests (a)

	A. Government versus private debtors						
	FDI =AID -DEBT-Gv -DEBT-Pr	FDI=AID	FDI= DEBT-Gv	FDI= DEBT-Pr	AID= DEBT-Gv	AID= DEBT-Pr	DEBT-Gv -DEBT-Pr
Chile	25.92**	52.38**	43.20**	46.02**	58.73**	59.07**	4.61*
Malaysia	4.84**	5.53**	8.84**	14.37**	7.10**	7.26**	1.41
Mexico	0.48	0.01	0.01	0.03	0.01	0.01	0.81
South Korea	0.55	0.01	0.10	0.04	1.49	0.36	0.22
	B. Long-term versus short-term debt						
	FDI =AID -DEBT-L -DEBT-S	FDI=AID	FDI= DEBT-L	FDI= DEBT-S	AID= DEBT-L	AID= DEBT-S	DEBT-L -DEBT-S
Chile	18.74**	37.31**	29.85**	31.39**	41.90**	41.47**	1.54
Malaysia	3.96**	3.71*	11.74**	8.50**	5.13**	4.93**	0.02
South Korea	1.31	0.01	0.37	0.06	3.92*	0.33	1.09
	C. Official versus private creditors						
	FDI =AID -DEBT-Mu -DEBT-Ba	FDI=AID	FDI= DEBT-Mu	FDI= DEBT-Ba	AID= DEBT-Mu	AID= DEBT-Ba	DEBT-Mu -DEBT-Ba
Chile	14.97**	24.67**	9.03**	15.74**	30.24**	28.44**	0.67
Malaysia	5.75**	7.49**	3.24*	14.26**	9.03**	9.10**	0.29
Mexico	3.92	0.01	6.30**	0.52	0.13	0.01	7.40**
(a) For the estimated equations, cf. Table 22. A standard F-test procedure is used to test if the hypothesized restrictions hold; *if the hypothesis of equal coefficient values is rejected at the 10 per cent level; **if the hypothesis of equal coefficient values is rejected at the 5 per cent level.							

Source: Cf. Table 14; own calculations.

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