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I. Introduction

The persistence of the international debt crisis has given rise to considerations that foreign direct investment (FDI) should play a larger role in the financing of less developed countries (LDCs) in the future. FDIs may provide external financing for developing countries even in times when new lending is restricted due to high credit risks. Flexible payment schedules and the extended property rights may differentiate FDIs from international loans and provide shelter against high country risks. However, FDIs are subject to sovereign risk as well. The option of sovereign states to defer loan repayments as soon as the costs of contract fulfillment exceed the benefits has its counterpart in expropriations of FDI. The potential of substituting FDI for debt depends on the attitude of the LDCs' governments towards FDI. A larger role for FDI, especially in times of restricted new lending, will only be possible if the political and economic situation of the borrowing country that induces creditors to expect a higher risk of willful default does not increase the risk of expropriations at the same time.

In the following analysis for thirty-one LDCs we proceed on the assumption that governments decide on expropriations on the basis of some rational cost-benefit calculus (Eaton and Gersovitz 1983: 77)[1]. This rules out mass expropriations due to ideological reasons that affect all FDIs in a country. The relations between foreign investors and host governments may then be interpreted in terms of the principal-agent theory[2]. After the investment is

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[1] The countries included are listed in Table A1 in the appendix.

[2] For a recent introduction and survey and an application of principal-agent theory on LDC debt see Strong and Waterson (1987) and Sachs (1983).

made, the investor (principal) has no means to prevent the host country's government (agent) to change the contractual base on which the decision to invest was taken. The government is thus able to affect ex post the profitability of the foreign investment. Due to the country's sovereignty, costs for the expropriating country can only result from future sanctions imposed by the foreign investors. With regard to the benefits of expropriations we can distinguish two cases: First, it may be assumed that the government aims at maximizing the country's welfare. Second, more realistically, governments may be considered to be mainly interested in maximizing their own welfare, e.g. in terms of reelection chances, or else, in terms of popular support on which even 'modern' dictatorial regimes depend (Tullock 1986, Rubin 1987)[1]. According to political-economy arguments, the government benefits from expropriations if it thereby obtains support from groups lobbying in favour of expropriations or is able to collect financial gains from the expropriations directly and favor certain groups by on-budget expenditures[2].

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[1] Rubin (1987:15) suspects that "modern dictatorship need a base of at least 20 or 30 percent active support and participation in its party, mass, and security organizations." Tullock (1987: 126) says about the typical dictator "that not only does he worry about his own safety, as a rough rule of thumb, he's apt to also want to be liked. ... Thus the dictator would, other things being equal, prefer to be the favorite of public opinion. It is true that he frequently will have difficulty in determining whether he is or isn't, but he may try to improve his status with the public by doing things that ... they will approve as well as by increasing the level of torture in his dungeons." A government is dictatorial in the sense of Tullock if there are no general and free elections.

[2] See Schneider/Frey (1985), who also distinguish between economic and political variables.

This distinction may be of particular importance with regard to the potential of substituting FDI for foreign debt. Different level of sovereign risk for FDI and foreign debt will be most likely if the LDC governments base their decisions on willful defaults and expropriations on a calculus that maximizes the country's welfare. In this case the technological diversity of FDIs renders firm specific factors important for the expropriation decision. The same applies to particular organizational skills, management techniques, or marketing skills, to name only a few other characteristics that are frequently subsumed under technological attributes of a firm broadly defined[1]. The economic calculus is likely to result in a selective pattern of expropriation. In comparison, loans are characterized by their homogeneity, and by syndication with reference to cross-default clauses, while there is no equivalent in the case of FDIs (e.g. Picht 1988a). The decision on willful default is therefore mainly influenced by macroeconomic factors. Under such circumstances, the potential of substitution between debt and FDI can be supposed to be relatively high because the risk determinants differ.

A different situation would evolve if expropriations are a reaction to general economic difficulties that cause dissatisfaction among the people. Policy-makers that act to stay in power and maximize their *own* utility can reasonably be expected to pay

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[1] See Caves (1982) and Cassen (1987) for an excellent discussion and overview, respectively, on the specific advantages that multinational investors may have.

more attention to the common nature of foreign debt and FDI as foreign claims on domestic output. The political risks for FDI and foreign debt may then go some way together. The pattern of expropriation is then likely to be relatively unspecific with regard to the 'technology' of the affected firms. Unspecific expropriations may, for example, hit foreign investments with high public visibility, or else, multinational firms of particular national origin as it seems to fit the prevailing political climate. Other ***varying and changing*** patterns are conceivable. In this situation the substitution of FDI for foreign debt becomes more difficult because the overall economic situation that determines the general credit risk may also translate into a general risk of foreign asset expropriation.

This paper tries to identify which of the two different, though not necessarily exclusive calculi governs the behavior of the LDCs towards FDI[1]. Economic and political-economic factors that are considered to determine the countries' costs and benefits from expropriations are used to explain selective and unspecific expropriation patterns. In Section II selective expropriation of FDIs is discussed. Notwithstanding the initial 'naive' assumption that the government maximizes the country's welfare, this starting point has merits for two reasons. First, it seems to be easier to formalize a decision calculus that is based on narrowly

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[1] Note that in some ideal world a political government may do what is best in terms of national welfare.

defined economic variables that are relevant for the country's welfare. Second, the differences between FDIs and foreign loans with respect to their risk exposure are quite straigth forward in this case. Further analyses of the structure of external LDC finance (debt/FDI-ratios) may have merits if it can be shown that expropriation risks and willful default risks are determined in distinctly different ways.

Section III takes up the alternative hypotheses that relate expropriations to a political-economic calculus of the government. Explanations of the test formats for both selective and unspecific expropriations are given in Section IV. The empirical evidence on the importance of the two patterns of government behavior is reported in Section V. In Section VI the mayor findings are summarized and interpreted, and conclusions are drawn with respect to recent in the international debt issue.

II. Hypotheses on Selective Expropriation

The decision calculus of a government aiming at maximizing the country's welfare can be depicted as an integral of the discounted future costs minus the discounted future benefits from expropriations[1]. Ideally, the government draws up a specific cost-benefit calculus for every FDI under consideration for ex-

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[1] See Basche (1979), Eaton/Gersovitz (1983,1984), Frey (1984), Lächler (1985), Jodice (1980).

propriation. In case of technologically (broadly defined) homogeneous FDIs it may be possible that one calculation is valid for all FDIs of a certain type. Most realistically, this may apply to investments (firms) in a particular industry. The importance of the specific costs and benefits is discussed in the next paragraphs.

Future foreign direct investments and divestments of already existing FDIs: It is often argued that international investors will be reluctant to engage in new FDI in a country that has expropriated foreign firms in the past (Basche 1979:16-17). In addition, foreign direct investors that have not been expropriated as yet may reduce the value of their outstanding investments because they fear further expropriations in the future. This reduction imposes costs on the expropriating country in terms of reduced growth perspectives due to foregone FDI.

Additionally, it can be argued that the country loses foreign production and investment knowledge and the opportunity of know-how transfers to domestic firms. However, costs in terms of foregone know-how can be expected to be of only minor importance. A rational government will only expropriate firms if it is able to run them reasonably well on its own[1]. Consequently, the country is unlikely to suffer from considerable know-how losses even if foreign investors with technologies equivalent to the expropriated firm refrain from future investments. Considerable losses will only arise if foreign investors applying more advanced tech-

[1] See Jodice (1980) on the importance of the country's technological capabilities for expropriation decisions.

nologies reduce their investments. But as long as these investors do not expect the government to be able to handle their technology in the near future, they should stick to their former investment plans. An economically rational government will not initiate any measures against them.

Trade relations: Foreign investors that have been expropriated can be expected to press their governments for collective actions against the expropriating country. Trade barriers against the country's exports or even trade embargoes are the most likely economic sanctions (Eaton/Gersovitz 1983:97). However, past experience has shown that the effectiveness and thus the threat of those measures is limited at best. Hence, the influence on the decision of expropriations is supposed to be limited.

International credit lines: Expropriations may induce international banks to cut back the country's credit lines. This is because expropriations indicate high sovereign risk. Especially trade credits may be affected because foreign-owned firms typically maintain closer international financial and trade relations than domestic firms. On the other hand, expropriations reduce future FDI and thus increase the country's need for additional lending. This makes sovereign measures against lenders more costly for the country. Arguably, willful default decisions are governed by a different set of incentives than expropriations. Consequently we do not expect expropriations to affect the country's general credit standing. Firm-specific financial relations that may break down in case of expropriation can be replaced by extended international borrowing if the country has access to

international bank loans. This suggests that credit rationed countries will incur higher costs in case of expropriations and should be less willing to expropriate.

Future profits of the expropriated foreign firm: The most obvious economic benefit from expropriation results from the fact that after the expropriation the firm's profits accrue to the country's government (Basche 1979: 9-10, Lächler 1985: 31-32). In this respect only the expected transfers of dividends (and conceivable 'hidden' transfers through transfer pricing) to the foreign investor constitute an additional benefit. Reinvested profits benefit the country even with a foreign ownership of the firm. Assuming that management efficiency is independent of the firm's ownership, countries should be more likely to expropriate FDIs that are expected to yield high dividend payments in the future.

In summary, the costs of selective expropriation are mainly influenced by the technological standard of the firm, relative to the country's own technological capabilities, and the expected volume of future FDIs in this particular industry. These two factors may be even correlated because in general FDIs take place in sectors where foreign investors have a technological advantage. Higher expected profits constitute the major incentive in favour of expropriation. Depending on the particular social costs and benefits, all FDIs can be ranked with regard to their expropriation risks. As far as costs are concerned, firms applying similar technologies may be grouped together because they generate similar expropriation costs. Rational governments will thus

expropriate not a single but all of those homogeneous firms if the benefits exceed the costs. This suggests that the "nationalization" of a sector must not always be a purely political decision but may well rest on an economic calculus.

The classification of foreign owned firms is more difficult with respect to the benefits the country could obtain by expropriating them. It cannot be ruled out that single firms experience strong increases in their profitability which, in turn, will increase firm-specific expropriation risks. Generally, however, the profits of firms operating in the same economy can be expected to move together. If the country's government acts according to its cost-benefit calculus, the costs from expropriation exceed the benefits for all FDIs not yet expropriated at each point in time. High benefits from expropriation that may exceed the costs are especially likely in times of increasing profits due to macroeconomic developments.

However, the costs and benefits for the country associated with expropriations are not only determined by the specific characteristics of the foreign firms but also by the available substitutes for FDIs. Foreign investments in a certain industry and international loans used to set up domestic firms in this sector may be substitutes for the country. Thus, a country that expropriates FDIs and experiences the loss of future FDIs in this industry may be able to compensate for that loss by domestic investments as long as it is not rationed in the international loan market. For that reason we expect that countries with free access to international credits are more likely to expropriate

FDIs in times of high expected profitability than credit rationed countries. The latter ones face the dilemma that expropriations in highly profitable industries would imply corresponding high losses of future growth since the expropriations may cut off new FDIs in these sectors.

III. Hypotheses on Unspecific Expropriation

The preceding discussion leads to the conjecture that expropriations are selective with respect to the affected industrial sector. The model advanced is based on the 'naive' assumption that LDC governments attempt to maximize the county's welfare. In turn, other studies on expropriations have analysed predominantly political-economy factors that are related to general economic developments. The implied calculus is that of a government seeking its own goods rather than the common good of its constituency. The overall economic situation offers a general indicator for the investment climate and the threat of expropriation. Political-economy factors are thus supposed to be more appropriate for explaining more unspecific expropriations that do not show a sectoral concentration.

Political instability and sluggish economic development are often mentioned in the literature for giving rise to increased expropriation risks. A worsening of the people's economic situation is expected to foster political instability and opposition against the government (Kobrin 1978). It may also lead to increasing

criticism of foreign ownership of firms. Policy-makers may choose foreign investors as a scapegoat and channel the public pressure resulting from economic problems on them (Davies 1981: 6). But blaming the foreign investors may be insufficient to regain political support. Some confirmative action may be required to prove that the government is doing something about it. The risk of expropriation increases.

An alternative hypothesis on the effects of economic performance on expropriation risk has been proposed by Lächler (1985: 31-32). It is argued that expropriations are more likely in times of an unexpectedly high increase in national income. This argument is similar to the decision calculus in the case of selective expropriations. However, the reasoning of Lächler is based on macroeconomic costs from expropriation. Unforeseen income increases lead to unexpectedly high claims of foreign investors on the national income. In this situation it is more tempting for the government to expropriate foreign investors.

Balance-of-payments pressure is another factor frequently supposed to determine expropriation decisions. The government may take into account that expropriations stop the profit remittances and thus provide additional resources, especially foreign exchange, to strengthen economic growth (Jones 1984: 83). The probability of expropriations should thus increase with balance-of-payments pressure (Stoever 1982: 11, Lloyd 1974: 29, Truitt 1979: 45-46). Alternatively it may be argued that expropriations at times of large external imbalances set counterintentional signals; i.e.,

expropriations may cause a further drainage of foreign exchange. The counterhypothesis thus states that expropriations are less likely in times of balance of payments pressure (Picht 1988a)[1].

Finally, income variation may lead to a reduction of expropriation risks because of the possible cut-off from future FDI. New FDI may help to diversify the economy and reduce the income variability, especially if the economy is mono-structured (Picht 1988a). Furthermore, FDI provides a means of risk-sharing for countries because the flexible payment schedule to foreign investors compared to the fixed repayment of loans reduces the variability of domestic absorption.

IV. The Test Format and Its Data Base

Two alternative hypotheses have been raised regarding the behavior of governments towards expropriation of FDI. The hypothesis on selective expropriation is based on the assumption that the government tries to maximize the country's welfare. The decision calculus that leads to unspecific expropriations assumes that the government aims at maximizing its own utility. Most importantly, the hypotheses imply different relations between the country's economic performance and the risk of expropriation. Therefore,

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[1] Note that a non-sympathetic observer of a country governed by a dictatorial regime may reason that the rulers want to make sure that enough foreign exchange is available to import luxury goods for themselves. The implicit assumption, of course, is the existence of a foreign exchange gap.

the empirical analysis gives special emphasis to the impact of the country's economic performance on the expropriation risk.

We applied logit analysis on the basis of cross-country data. This technique fits to our problem because the dependent variable only takes the value '1' in case of expropriations or '0' otherwise (Altman et al. 1980:31-33)[1]. The logit technique calculates the likelihood (P) of expropriations as a function of the set of explanatory variables (X):

$$P(1) = [1 + \exp - (a + bX)]^{-1}$$

Data on the value of expropriated assets is not available. We refer to a survey which counts every expropriation as one event without regard to the respective value. The data set for the present study was provided by F.N. Burton and H. Inoue. They cover the number of expropriation cases in 53 LDCs from 1960 to 1977 and classify them according to the affected sector[2]. The data is based on a rather broad definition of forced divestment

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[1] OLS-regression analysis, thus, is not appropriate. In particular, it would allow the predicted expropriation likelihoods to range from below '0' to above '1' which is not acceptable. The logit-transformation addresses just this problem. Possible alternative techniques include probit estimates and multiple discriminant analysis. Probit results are largely comparable to those achieved with the logit technique, but carry computational disadvantages. Multiple discriminant analysis requires the a priori classification into expropriating and non-expropriating countries and does not provide an immediate test on the coefficients' significance.

[2] The sectoral classification contains Agriculture (including Fishery and Forestry), Banking and Insurance, Manufacturing, Mining, Service Sector and Unclassified, Petroleum (including Refinary and Distribution), Public Services (Electric Power, Railways, Water, Transport, Mass Media, etc.), Foreign Trade and Commerce.

and includes formal expropriations, extra-legal transfers of foreign assets, forced sales of FDIs, and contract renegotiations that ultimately lead to a loss of foreign ownership (Kobrin 1980: 68-69). The cross-country analysis presented here is based on expropriation cases during 1974/75. Due to the high variability of economic variables after the oil crisis, this period seems to be especially appropriate for working out the effects of possible determinants for expropriation decisions. The dependent variable V1 (expropriation) takes the value '1' for a country whenever there have been expropriations in 1974 or 1975, and '0' otherwise. A two-year period has been chosen to buffer the uncertain time lags that may result from the different institutional structures in the countries which influence the decision process on expropriations after relevant economic variables have changed.

The unavailability of data on explaining variables reduced the number of sample countries to thirty-one. Countries that have conducted encompassing nationalizations in the context of mayor changes in the political orientation (Ethiopia, Sri Lanka, Uganda) have been excluded. Probably, such expropriations were driven by ideological reasons with no underlying maximization calculus. Countries were also excluded when encompassing nationalizations occurred prior to 1974 and no new FDI took place afterwards.

We classified the expropriating countries into two groups: one with a selective expropriation pattern, and another one engaged in more widespread, i.e. unspecific expropriations. The classification refers to the number of annual expropriations and the

number of affected industries. We employed cluster analysis to separate the expropriating countries. The borderline drawn between selective and unspecific expropriations is three and more expropriation events in two or more industrial sectors[1]. The first subsample is represented by the variable V2, which is set '1' for cases with selective expropriations, and '0' otherwise. In the second subsample, the dependent variable V3 takes on the value '1' in the case of unspecific expropriations, and '0' otherwise.

Cluster analysis has also been used to provide another classification of the country sample. The costs associated with expropriation depend in part on the country's access to the international credit market. The share of private creditors in total public and publicly guaranteed long-term debt was considered as an indicator of credit constraints. A high share of private creditors was assumed to indicate relatively easy access to credit markets. The dummy variable V4 is based on this cluster, assigning '1' to all countries that were not credit-rationed, and '0' otherwise. In the empirical tests V4 was combined (multiplied) with other variables as well. Thereby the incremental output/capital ratio (IOCR) indicates the average productivity of new investments in the country[1]. The costs of additional credit nec-

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[1] For a detailed exposition of the clustering procedure and the employed criteria see appendix, part 3.

[2] See variable list in the appendix for the exact definition of all variables mentioned in the text.

essary to finance the new domestic investments that substitute FDI is given by the average terms the country must currently accept in case of new loan commitments (INT).

A credit-rationed country is not able to compensate foregone FDI by additional credit-financed domestic investments. This is taken into account by defining the dummy V4T, which is equivalent to 1-V4 and takes the value '1' if a country is credit-rationed. The dummy was combined with the flows of FDI to the country from 1972 to 1975 (FDIGDP - ratio of foreign direct investments to GDP) to indicate the costs from the potential loss of future FDI in the case of expropriation (V4TFDIGDP).

Possible trade sanctions are captured by the variable EX (ratio of real exports to GDP). The share of the country's exports in GDP is supposed to indicate the degree of vulnerability to trade sanctions. Due to the special characteristics of the logit transformation we substituted the constant term by the variable RFDIPC (reciprocal of FDI per capita). RFDIPC reflects the relative importance of FDI in the country. A cross-country logit estimation with a non-zero constant term implies that a certain base probability exists for every country, even if there is no FDI. The variable RFDIPC allows for a modified base probability that depends on FDI per capita in the country. Higher FDI per capita is expected to result in a higher base probability of expropriation.

Table 2 summarizes the explaining variables that have been employed in testing the hypotheses on selective expropriations and the expected signs of the coefficients.

Table 2 - Expected Relationship between the Likelihood of Selective Expropriations and Major Determinants

Explaining Variable:	RFDIPC	IOCR	EX	V4	V4IOCR	V4INT	V4TFDIGDP
Expected Sign:	- [a]	+	-	+	+	-	-

[a] Notice that higher FDI per capita in a country leads to a lower RFDIPC because the reciprocal value must be used to generate zero-likelihood of expropriation in a case of no FDI. The reason for this transformation is given by the limiting characteristics of the logit regression function.

We expect that the behavior of the country group with an unspecific pattern of expropriation is better explained by a variable set which includes political-economy variables and other indicators of the countries' overall economic situation. Due to data limitations we were not able to include all political-economic variables that have been mentioned in the literature on expropriations. We concentrate on the relevance of variables that reflect the country's general economic situation and can be interpreted in a political economic context (Table 3).

Real GDP growth rates per capita (GRPC) are taken as a general measure of the countries' economic performance. The arguments on political pressures in case of a sluggish economic performance suggest that high growth rates go along with low expropriation

risks. Unexpected income and profit increases that may cause expropriations are captured by the variable DGR, which measures the deviation of actual GDP growth rates from the recent growth trend. Possible risk reducing effects of high income variations are tested by the reciprocal of the variation coefficient of real GDP (RVAR).

Table 3 - Expected Relationship between the Likelihood of Unspecific Expropriations and Major Political-Economic Determinants

Explaining Variable:	RFDIPC	GRPC	DGR	RVAR	ESR
Expected Sign:	a -	-	+	a +	+/-

a The sign must be interpreted with regard to the fact that the explaining variable is taken as reciprocal. The reason for these transformations is given by the limiting characteristics of the logit regression function.

The balance-of-payments impact of changes in the terms of trade, interest rates, and real world demand that may influence the expropriation risk is indicated by an exogenous shock variable (ESR). Note that ESR is defined such that the variable is larger when the country is exposed to rising import prices, declining export prices, etc.[1] As has been argued in section III, the impact can be positive or negative.

[1] For a detailed description of 'ESR' see the appendix.

V. Empirical Results

The regressions have been organized in such a way that each variable was first used separately to get partial estimates. This was done without a constant term (sections A of Tables 4 and 5) and afterwards with inclusion of a constant term (section C of Table 4 and section D of Table 5). Estimates that combined "RFDIPC" as substitute for the constant term with each of the other explaining variables are reported in section B.

The empirical results at least for the hypothesis on selective expropriation (pure welfare calculus) are rather discouraging (Table 4). In the case of partial estimates with and without a constant term none of the coefficients is significant at the 10 percent level and only RFDIPC and V4TFDIGDP show the expected signs with a stable pattern in both estimations (Table 4, sections A and C). The average likelihood of the estimates hardly exceeds 50 percent, which is the bottom level of unreasoned chance. The combined estimates with RFDIPC did not improve the results in a significant way (section B). We must therefore conclude that we are not able to present empirical evidence for selective expropriations in developing countries[1]. This result must be seen with regard to the fact that it is based on the surely naive assumption that governments aim at maximizing the country's welfare and choose their measures according to a narrow economic calculus.

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[1] A similar conclusion has been drawn by Nunnenkamp, Picht (1988) with regard to willful defaults that may be driven "by other than macroeconomic considerations, e.g. by internal political pressures ...", p. 15.

Table 4 - Logit Estimates of the Probability of Selective Expropriation in Thirty-One Less Developed Countries

	No.	RFDIPC	IOCR	EX	V4	V4IOCR	V4INT	V4IOCR + V4INT	V4TFDIGDP + V4TDFDI[b]	AVR.LH
A.	1-8[a]	-2.41(-1.04)	-0.01(-0.62)	0.20(0.16)	-0.59(-1.05)	-0.03(-1.06)	0.09(0.98)	-0.03(-0.43) 0.00(0.02)	-0.63(-0.78) -0.20(-2.4)	-
	AVR.LH.	0.51	0.50	0.50	0.51	0.51	0.51	0.51	0.53	
B.	9	-2.52(-0.88)	0.00(0.07)							0.51
	10	-2.66(-1.09)		0.60(0.44)						0.52
	11	-2.20(-0.98)			-0.54(-0.96)					0.52
	12	-2.21(-0.98)				-0.03(-0.97)				0.52
	13	-2.21(-0.98)					0.08(0.88)			0.52
	14	-2.22(-0.98)						-0.03(-0.44) -0.01(-0.03)		0.52
	15	-2.66(-0.95)							-0.93(-1.02) 0.41(0.39)	0.54
C.	16-23[c]	-1.95(-0.76)	0.01(0.27)	3.26(1.40)*	-0.47(-0.64)	-0.02(-0.67)	0.06(0.54)	-0.03(0.41) -0.01(-0.07)	-0.60(-0.74) -0.03(-0.04)	
		[-0.15(-0.35)]	[-0.49(-0.69)]	[-1.05(-1.64)*]	[-0.12(-0.24)]	[-0.13(-0.28)]	[-0.15(-0.32)]	[-0.14(-0.29)]	[-0.19(-0.40)]	-
	AVR.LH.	0.51	0.51	0.52	0.51	0.51	0.51	0.51	0.53	

[a]The results presented in block A as 1 - 8 refer to the partial estimates without a constant term as indicated by the various explanatory variables. The AVR.LH-values are presented below the estimation results. - [b]Since DFDI is defined as a dummy that takes up definitorial differences with respect to FDIGDP, their impact can only be estimated jointly. - [c]The results in block C refer to partial estimates with a constant term. The constant term is given in brackets. The star * denotes significance level of 20 percent.

Sources: See appendix, part 1: list of variables and data tables. Own calculations.

The best reason for this poor statistical result we can think of is that expropriating governments may live in the illusion that they (or their agents) can run whatever private enterprise as good as the previous multinational owners. Certainly, they can hire foreign experts, buy new foreign technology, establish own distribution networks, etc., but it is hard to imagine that the governments can do so with the same ease across all industries.

Alternatively, government control may just be used for political patronage, and nationalized enterprises may be operated at almost ***any*** loss to gain the support of consumers and workers crucial for the regimes survival (Rubin 1987: 19). In this case, the pure welfare calculus assumed above would come next to irrelevance. This is the case of consciuos ignorance on the part of expropriating regimes.

In the alternative case (political calculus) of the hypothesis on unspecific expropriations (Table 5), two of the new variables (GRPC, ESR) prove significant at the 5 percent level in the partial estimates without a constant term (section A). GRPC shows the expected sign. ESR is negative, which confirms the hypothesis that expropriations are less likely in times of balance-of-payments pressures. The coefficients of GRPC and ESR do not differ largely in value when they are combined with RFDIPC, which serves as a substitute for the constant; but the level of significance deteriorates to 20 percent (section B). All estimates that include RFDIPC as an additional variable show a higher average likelihood than the corresponding partial estimates of the single

Table 5 - Logit Estimates of the Probability of Unspecific Expropriation in Thirty-One Less Developed Countries

No.	RFDIPC	GRPC	DGR	RVAR	ESR	IOCR	EX	V4	V4IOCR	V4INT	V4TFDIGDP+V4TDFDI[b]		AVR.LH
A. 1-11[a]	-31.85(-2.16)***	-0.50(-2.62)***	-0.05(0.57)	-0.75(-2.70)***	-0.59(-2.11)***	-0.09(-3.15)***	-4.97(-2.42)***	-1.30(-1.99)**	-0.79(-2.07)***	0.21(1.96)**	0.18(0.69)	-1.77(-2.18)***	-
AVR.IH	0.63	0.60	0.50	0.62	0.55	0.68	0.58	0.54	0.55	0.54	0.56		
B. 12	-22.41(-1.49)*	-0.28(-1.43)*											0.65
13	-28.39(-2.04)*		0.10(0.82)										0.64
14	-14.73(-1.16)			-0.47(-1.65)*									0.66
15	-24.60(-1.67)**				-0.50(-1.36)*								0.65
16	-5.36(-0.51)					-0.50(-1.36)*							0.69
17	-19.84(-1.37)*						-2.49(-1.21)						0.65
18	-24.27(-1.74)**							-0.81(-1.16)					0.64
19	-23.04(-1.73)**								-0.06(-1.45)*				0.66
20	-24.21(-1.73)**									0.13(1.11)			0.64
21	-28.65(-1.71)**										0.10(0.42)	-0.33(-0.31)	0.63
C. 22	-25.42(-1.74)**								-0.11(-1.26)	-0.17(-0.71)			0.66
23	-21.75(-1.55)*		0.09(0.74)		-0.49(-1.31)*								0.66
24	-21.68(-1.51)*				-0.40(-0.99)			-0.48(-0.62)					0.66
25		-0.26(-1.35)*		-0.52(-1.71)**									0.64
26		-0.44(-2.22)***						-0.56(-0.77)					0.61
27		-0.41(-2.00)**							-0.03(-0.72)				0.61
28		-0.47(-2.39)***									0.15((0.50)	-1.62(-1.69)*	0.64
29		-3.69(-1.75)**					-0.41(-2.16)***						0.64
30			0.07(0.71)		-0.59(-2.15)***								0.55
31			0.04(-0.37)				-5.26(-2.34)***						0.58
32				0.12(0.25)		-0.10(-1.71)**							0.68
33				-0.70(-2.08)***					-0.01(-0.27)				0.61
34				-0.57(-1.87)**			-1.95(-0.94)						0.63
35					-0.12(-0.28)	-0.08(-2.77)***							0.68
36					-0.45(-1.50)*			-0.87(-1.23)					0.56
37					-0.40(-1.34)*				-0.06(-1.43)*				0.57
38					-0.70(-2.12)***						0.31(0.92)	-1.82(-2.02)**	0.61
39						-0.09(-2.43)***	-0.93(0.17)						0.68
40									-0.08(-2.07)***		0.18(0.69)	-1.77(-2.18)***	0.62
41										0.21(1.96)**	0.18(0.69)	-1.77(-2.18)***	0.60
D. 42-53[c]	-9.36(-0.76)	-0.27(-1.35)*	-0.06(-0.46)	-0.16(-0.42)	-0.25(-0.75)	-0.11(-1.62)*	1.30(0.47)	0.72(0.72)	-0.00(-0.02)	-0.10(-0.64)	0.11(0.33)	-0.07(-0.07)	
	[-1.16(-1.79)**]	[-1.25(-2.32)***]	[-1.72(-3.25)***]	[-1.35(-1.62)*]	[-1.49(-2.88)***]	[0.44 (0.36)]	[-1.95(-2.34)***]	[-2.01(-2.68)***]	[-1.64(-2.63)***]	[-1.95(-2.72)***]	[-1.63(-2.58)***]		-
AVR.IH	0.66	0.66	0.65	0.64	0.65	0.68	0.65	0.65	(0.64)	0.65	0.64		

[a] The results presented in block A as 1 - 8 refer to the partial estimates without a constant term as indicated by the various explanatory variables. The AVR.IH-values are presented below the estimation results. - [b] Since DFDI is defined as a dummy that takes up definitional differences with respect to FDIGDP, their impact can only be estimated jointly. - [c] The results in block D refer to partial estimates with a constant term. The constant term is given in brackets. - The stars ***, **, * denote significance levels of 5, 10, and 20 percent.

Sources: See appendix, part 1: list of variables and data tables. Own calculations.

variables. The hypothesis that expropriations are more likely in times of unexpectedly high economic growth cannot be validated. The coefficients are insignificant in all estimates that include DGR. The hypothesis related to DGR is most strongly based on a narrow economic calculus compared to the other variables discussed.

The hypothesis that high income variability reduces the expropriation risk is clearly falsified by the negative sign of RVAR. The variable is significant at the 5 percent level in the partial estimate without a constant and also shows substantial significance in the combination with RFDIPC (section B). This result indicates that the political pressure arising from a highly variable income is likely to lead to expropriation decisions that are oriented towards short-run political benefits and disregard the long-run economic costs.

For comparison, the previous determinants of selective expropriation are considered as additional variables, although the interpretation is sometimes different. As in the estimates on selective expropriations, the coefficients of the variable set V4, IOCR, and V4IOCR have negative signs in the partial estimates (sections A and B). The t-values are comparable to those of the new variables discussed above. The partial estimates that include IOCR result in the highest average likelihood. But the meaning of IOCR and the related variables is different in the setting of unspecific expropriations. If emphasis is laid on political-economic arguments, the incremental output-capital ratio and

access to the international credits have to be interpreted in the same line as growth per capita. The government of a country that is not credit rationed and has a high capital productivity is not likely to come under political pressure to expropriate foreign firms because of dissatisfaction with the economic development. For that reason, negative coefficients were to be expected for IOCR, V4, and V4IOCR. With reference to the average likelihood we can even conclude that IOCR is a better indicator for this hypothesis than GRPC. IOCR also performs better than V4IOCR and V4, which is obvious if we look at the multivariate estimates (section C). The consideration of credit rationing as a factor that influences the costs of expropriation is meaningful only for the selective expropriation calculus. In case of the calculus for unspecific expropriations, which is oriented towards the country's general economic situation, the variable IOCR alone seems to be more appropriate.

The export share variable (EX) appears with the expected negative sign and with a high significance in the partial estimate without constant and in section C when it is combined with GRPC. This indicates that the costs from potential trade sanctions are relevant for unspecific expropriations along the same line as has been put forward with regard to selective expropriations.

Throughout the multivariate estimates in section C, the variables GRPC and IOCR are dominant in terms of t-values. The high correlation of these two variables (see Table A2 in the appendix) renders it impossible to include both variables simultaneously in the estimates. RVAR and EX remain significant in part of the

multivariate estimates. The combination of each of these variables with GRPC results in a relatively high average likelihood. Estimations of IOCR with other variables that were significant in the partial estimates result in low t-values of the additional variables, whereas IOCR remains significant. The external shock variable poses some problems in multivariate testing because of the high correlation with most macroeconomic performance variables. The remaining combinations with ESR result in low average likelihoods, except the one with IOCR; but ESR is insignificant in the latter estimate.

From the whole discussion, it should have become clear that the statistical problems were severe. Nevertheless, a look at the estimation results in Table 5 suggests that the interpretations of the variables that measure the actual economic performance of a country (GRPC and IOCR) are fairly robust with respect to the specification of the logit-regression function. A similar conclusion can be drawn with respect to the external shock variable (ESR). The estimation procedure is certainly not very convincing from an econometric point of view (e.g. Picht 1988c: 444-445), but there is probably not much more one can do in the light of the limited statistical data available on the expropriation issue on a cross-national basis.

VI. Conclusions

The following conclusions can be drawn from the empirical tests. First, we were not able to support the hypothesis that selective

expropriations are driven by a pure welfare-economic calculus with costs and benefits directly related to the technological characteristics of foreign firms. Instead, the hypothesis that governments decide on expropriations with regard to their political self-interest seems to be more appropriate. This is true if we look at more widespread expropriations that are unspecific in terms of technological standards (industries). The main factor that drives politically motivated expropriations is the poor overall economic performance of a country, which reinforces earlier findings (e.g. Picht 1988a).

The result is revealing with respect to the underlying model of the calculus of benefits and costs of expropriations. Additional regressions were run for selective expropriations that included political-economy variables. The results were as discouraging and uncertain as the results for the prue welfare-economic calculus. The only explanation of why overall national welfare considerations as expressed by selective rather than unspecific expropriations are not reflected ***at all*** in the empirical results we can think of is that either government illusion about its potential or ignorance prevailed. This does not seem to be totally unrealistic (Tullock 1986: 9-11) in a world where authoritarian governments are dominant with its extrem form being the dictatorship[1]. In fact, a look at the list of countries covered by this analysis (Table A1, appendix) does not leave any doubts in this respect.

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[1] "The dictator ... has not to worry about the policy outcomes of his decisions, but about their effect on other high officials and on other powers in his government. ... He may in various ways sacrifice the ***welfare of the state*** for his own continuance in office" (Tullock 1987: 116, own emphasis).

Second, these findings suggest also that a country may face difficulties if it tries to attract more FDI to compensate for a reduction in new loan commitments. The same reasons that lead creditors to restrict new lending, i.e., poor economic performance (e.g., Nunnenkamp and Picht 1988; Picht 1988a, 1988b) will also induce foreign investors to hesitate with new investments. Apparently, firm-specific measures of self-protection generated by the use of technologies that increase the cost of expropriation for the host country do ***not*** seem to be particularly successful in 'realistic' political settings[1].

Third, governments must build up a reputation that they do not succumb to the political pressures against foreign investors ***and*** lenders in case of sluggish economic performance. Otherwise the access to foreign sources of finance, in particular to loans and foreign direct investments, will be restricted just in times of emerging economic difficulties, i.e. when additional foreign financing is most urgently needed.

Thus, arrangements that serve as 'institutional collaterals' need to be found that address specifically the government's incentive to expropriate and willfully default when the economic performance is poor. Yet, it is difficult to imagine how such arrangements may look like if the presumption is that one is dealing,

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[1] The concept of self-protection was introduced by Ehrlich and Becker (1972). An elaboration for the case of expropriations can be found in Sinn (1987). Practical examples are given in Poynter (1986).

more often than not, with non-democratic, ultimately unaccountable regimes. As we have mentioned at the outset, their decision calculus is hard to conceptualize for the purpose at hand, although our findings suggest that to do so would be more appropriate.

It is interesting to note, fourth, that external shocks, which may eventually lead to real income losses in the future, initially seem to reduce the likelihood of an expropriation. It is perhaps here where expropriation risks differ systematically from default risks, since some empirical evidence is available that suggests that the risk of willful default increases with external strains (Nunnenkamp and Picht 1988; Picht 1988a, 1988b). The difference might be that the change in the expropriation risk follows with some lag to the initial shock. In other words, the variable measuring the external shock might be taken as a leading indicator with respect to the exposure to expropriation risk.

Finally, from all that has been said it should also become obvious that the present euphoria with respect to debt-for-equity swaps in LDC financing as a way of handling existing 'old' debts should be looked at with caution from the sovereign risk perspective. It appears to us that this aspect has largely been ignored until present[1]. The reason, of course, is that the debt crisis was predominantly viewed as either a liquidity or a solvency problem, and as a matter of government opportunism towards foreign investors and creditors.

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[1] For a recent account and survey on debt-equity-conversations see Roberts and Remolona (1987) and Huss (1988).

Appendix

Part 1: List of Variables

RFDIPC	Reciprocal of FDI per capita; population in 1975 (mill.)/Estimate of the stock of direct private investment of DAC members in developing countries - End 1975 (mill. SDR). [Source: International Monetary Fund, International Financial Statistics, and OECD, Preliminary Estimate of the Stock of Direct Private Investment of D.A.C. Members in Developing Countries]
GRPC	Average real GDP growth rate per capita in 1974-75; GDP measured in 1980-prices (national currency). [Source: International Monetary Fund, International Financial Statistics]
DGR	Difference in real GDP growth between average rates of 1974-75 and 1970-73.[Source: International Monetary Fund, International Financial Statistics]
RVAR	Reciprocal of the variation coefficient of GDP growth rates 1970-1975, in prices of 1980. [Source: International Monetary Fund, International Financial Statistics]
ESR	Balance-of-payments impact of external shocks in 1974-75 (average). The varialbe is defined such that it is the more positive, the stronger the negative external shocks were (such as declining export prices, rising import prices, and rising interest rates); for details see part 2 of the appendix.
IOCR	Incremental output capital ratio, defined as change in GDP divided by investment, i.e. gross fixed capital formation + increase in stocks, in current prices. Deviating from the standard definition, the IOCR-values for Morocco and Honduras were calculated as the ratio of GNP in US$ relative to the capital stock estimate (see Picht 1988) in prices of 1980. [Source: International Monetary Fund, International Financial Statistics]
EX	Ratio of real exports to GDP in 1974-75; real exports = export value (mill. US$)/[export unit values (1980=100) · 10], GDP (bill. US$) = GDP in prices of 1980. [Source: International Monetary Fund, International Financial Statistics,and Direction of Trade Statistics]

INT	Average nominal interest rate of new commitments by all creditors minus growth rate of US wholesale price index (1974-75 average). Due to data shortage the 1974 value was used in the case of Venezuela. [Source: World Bank, World Debt Tables]
FDIGDP	Ratio of foreign direct investments to GDP, in US$. Direct investments are defined as equity capital (item 49, table 2) plus other long-term capital (item 5, table 2). In cases where the dummy variable DFDJ is set '1', direct investments are measured as item 49-52, table 2, or item 24, if not available otherwise. [Source: International Monetary Fund, Balance of Payments Statistics, and International Financial Statistics]
DFDI	Dummy variable set '1' or '0' depending on the definition of foreign direct investments (see variable definition FDIGDP).
GRGDP	Average real GDP growth rate, 1974-75.
FDIS75	FDI-stock in 1975 (in US$).
V1	Dummy variable set '1' if there was at least 1 expropriation in 1974-75, and '0' otherwise.
V2	Dummy variable set '1' if there was selective expropriation in 1974-75, and '0' otherwise (see part 3 of this appendix for details).
V3	Dummy variable set '1' if there was unspecific expropriation in the 1974/75, and '0' otherwise (see part 3 of this appendix for details).
V4	Dummy set '1' if country is not credit constrained, and '0', if country is credit constrained; see part 3.
V4T	Dummy variable defined as 1-V4.
V4INT	Defined as V4 · INT.
V4IOCR	Defined as V4 · IOCR.
V4FDIGDP	Defined as V4T · FDIGDP.
V4TDFDI	Defined V4T · DFDI.

Part 2: Definition of the External Shock Variable[1]

In order to separate exogenous world-market effects on the balance-of-payments situation of our sample countries from influences arising from domestic policies, the sample countries were assumed to be "small economies", i.e., the determination of export and import prices, international interest rates, as well as real world-market demand could not be influenced by any individual debtor country. Thus, ESR encompasses terms-of-trade effects (ES_{tot}), interest-rate effects (ES_{ir}), and real world-demand effects (ES_{wd}) on the country's balance of payments, all expressed as a percentage share of the sum of the country's nominal exports (X) and nominal imports (M)[2].

$$(A1)\quad ESR = (ES_{tot} + ES_{wd} + ES_{ir})/(X + M)$$

The three elements of ESR were calculated for the 1974-1975 period; the preceding years served as the reference period. The terms-of-trade effects were defined as follows:

$$(A2)\quad ESR_{tot} = \sum_{t=1974}^{1975} (MV_t \cdot P_t^M - XV \cdot P_t^X)$$

$$(A3)\quad P_t^M = P_t^M - P_{71/3}^M$$

$$(A4)\quad P_t^X = P_t^X - P_{71/3}^X$$

where[1]:

MV	=	import volume;
XV	=	export volume;
P^M	=	import prices (unit values);
P^X	=	export prices (unit values);
$P_{71/3}$	=	reference prices; average of the 1971-1973 value.

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[1] For further methodological procedures, see Balassa [1981, pp. 142 ff.]; Nunnenkamp [1986, pp. 51 ff.].

[2] ESR was calculated relative to the value of external trade since the absolute US$-amount of external shocks was likely to depend strongly on the overall size of the sample countries. Principally, it seemed more appropriate to relate ESR to the debtors' GDP, since this measure presents a better indication of the exposure to external shocks. Nevertheless, we selected the former measure since multicollinearity problems were reduced in this way.

The world-demand effects can be written as:

$$(A5) \quad ES_{wd} = \sum_{t=1974}^{1975} [WMS_{71/3} \cdot (XVW_t^{tr} - XVW_t^{act})]$$

where[2]: XVW^{act} = actual export volume of all world-market suppliers

XVW^{tr} = trend export volume of all world-market suppliers; calculated on the basis of average annual growth of world-export volumes in the 1971-1973 period;

$WMS_{71/3}$ = average world-market shares of the sample countries in the 1971-1973 period; calculated on the basis of export values.

Finally, the third element, i.e. interest-rate effects, was calculated as follows:

$$(A6) \quad ES_{ir} = \sum_{t=1974}^{1975} (i_t \, D_{t-1})$$

$$(A7) \quad i_t = i_t - i_{71/3}$$

where[3]: i_t = average interest rate on foreign debt (new commitments, all creditors);

D = debt outstanding and disbursed at end of period.

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[1] Export and import values of merchandise trade, as given in IMF, International Financial Statistics, deflated by unit-value indices of exports and imports (1980=100), as presented in UNCTAD, Handbook of International Trade and Development Statistics, 1986 Supplement.

[2] Merchandise exports of sample countries and all world-market suppliers, as given in IMF, International Financial Statistics.

[3] All data are from World Bank, World Debt Tables; since sufficient information on private non-guaranteed debt was not available for the mid-1970s, the calculations were based on public and publicly guaranteed debt exclusively.

Part 3: Using Cluster-Analysis for Grouping Raw Data

A. Selective vs. Unspecific Expropriation

The raw data provided by Burton and Inoue was aggregated into two categories that indicate whether annual expropriations in a country showed a selective or unspecific pattern. The two types of expropriation were distinguished by taking into account the number of expropriations during the year and the number of affected sectors. This yielded a two-dimensional data field. The sectoral classification contains Agriculture, Finance, Manufacturing, Mining, Others, Petroleum, Public Services, Transports, and Unspecified.

The data was divided into two clusters using the Ward-Method (seuclid). This was done for all 53 countries included in the original data set, excluding Ethiopia, Sri Lanka, and Uganda for reasons explained in the text. It was necessary to "normalize" the raw data (mean zero, variance one) in order to get an unbiased classification. Since the present analysis covers only the years 1974-1975, two dummy variables were defined for 1974 and 1975, respectively. The dummies for each year were set '1' when the country's expropriation measures were classified as selective, '2' in case of unspecific expropriations, and '0' if there were no expropriations in the country during that year.

The clustering procedure resulted in a border line between the two data subsets according to which the expropriations of a country were classified as unspecific if there were at least 3 expropriation events in at least 2 sectors during the year.

The dummy series for 1974 and 1975 were then aggregated into a single one. Different institutional structures in the countries determine the decision process on expropriations and may cause uncertain time lags after relevant economic variables have changed. Expropriation was assumed to be unspecific, if the condition for "unspecific" was met at least in one of the two years

in the country. This seems appropriate, because unspecific expropriations in one year may have precursors or hangovers in the preceding or following year; the latter should not be classified as selective, even if the number of expropriation events was small. Consequently, a country was classified as selective expropriator if there were only selective expropriations in one or both years.

In the logit regression analysis we tested: (a) cases of selective expropriations versus the "rest" of the country sample (containing countries that showed an unspecific expropriation pattern or did not expropriate at all during 1974/75) and (b) cases of unspecific expropriations versus all other cases.

B. Credit-Rationed vs. Non-Credit Rationed

The same technique, i.e., the Ward-Method of clustering data sets, was used to distinguish between countries that are credit-rationed and those that face no credit constraints.

The 1974/75 average of the share of private creditors in total public and publicly guaranteed long-term debt by private and public creditors was used as the clustering variable. The resulting border line laid at about 31 percent of private creditors in total debt. Countries with higher shares are considered as non-constrained. Based on this classification the dummy variable V4 is set '1' if the country is considered credit-constrained, and '0' otherwise.

Table A1 - Expropriation of Foreign Direct Investments, Structural and Economic Performance Variables for Thirty-One Developed Countries

No.	Country	V1	V2	V3	RFDIPC	GRPC	DGR	RVAR	ESR	IOCR[a]	V4	FDIGDP	DFDI	INT[b]	EX	GRGDP	FDIS75
1	Algeria	1	0	1	0.06	0.37	-4.02	0.57	0.18	7.37	1	1.78	1	-6.82	0.60	3.52	350
2	Argentina	1	0	1	0.02	0.15	-0.25	1.62	0.19	11.18	1	0.03	0	5.62	0.37	2.61	2000
3	Benin	1	1	0	0.13	0.64	-1.88	0.63	0.11	14.17	0	0.34	0	-11.57	0.09	3.32	30
4	Bolivia	0	0	0	0.06	3.56	-0.39	5.67	2.93	28.57	1	1.37	1	-7.42	0.20	5.89	1000
5	Brazil	0	0	0	0.01	4.47	-2.87	1.99	2.32	22.18	1	1.50	0	-4.62	0.01	6.96	9100
6	Burma	0	0	0	0.67	1.21	2.07	1.17	-2.81	33.52	0	0.00	1	-11.82	0.07	3.40	55
7	Columbia	1	0	1	0.02	1.17	-3.38	2.69	1.24	20.98	0	0.43	1	-6.62	0.08	4.03	1200
8	Costa Rica	1	1	0	0.01	1.44	-3.72	2.79	0.57	15.80	1	4.20	1	-5.92	0.22	3.82	250
9	Dom. Republic	0	0	0	0.02	2.63	-5.07	3.01	1.17	23.32	0	2.51	1	-7.37	0.14	5.60	350
10	Ecuador	0	0	0	0.02	2.59	-7.11	1.37	0.21	24.43	1	3.26	1	-7.42	0.34	6.01	500
11	Egypt	0	0	0	0.65	3.54	2.66	1.29	0.45	25.91	0	0.06	0	-8.52	0.10	5.78	70
12	El Salvador	0	0	0	0.04	2.87	1.42	4.37	1.11	26.80	0	1.17	1	-5.87	0.27	6.00	130
13	Guatemala	0	0	0	0.03	-0.11	-2.19	2.93	0.59	24.00	0	2.25	1	-6.87	0.18	4.16	260
14	Guyana	1	1	0	0.01	7.67	7.21	0.91	1.90	29.29	1	1.18	1	-8.32	0.58	8.71	180
15	Honduras	1	1	0	0.02	-4.89	-6.54	0.71	-0.68	50.86	0	0.63	1	-8.97	0.38	-1.66	230
16	India	1	1	0	0.30	2.82	2.21	0.90	1.05	23.03	0	-0.01	1	-11.62	0.05	4.95	2400
17	Kenya	0	0	0	0.02	-2.15	-7.61	1.21	0.44	6.28	0	0.97	1	-9.32	0.25	1.47	650
18	Korea	0	0	0	0.05	5.48	-3.19	2.82	2.61	23.60	1	0.73	0	-5.67	0.13	7.20	950
19	Madagaskar	1	0	1	0.05	-0.94	0.62	0.45	-1.15	11.93	0	1.01	1	-12.32	0.19	1.63	180
20	Mauretania	1	1	0	0.03	1.55	-0.27	0.37	-1.92	11.99	0	-14.63	0	-12.02	0.50	4.12	55
21	Mexico	0	0	0	0.02	2.37	-1.13	3.94	3.40	25.02	1	0.56	0	-4.62	0.03	5.86	4800
22	Morocco	1	1	0	0.07	6.19	5.03	1.36	1.29	56.22	0	-0.05	1	-7.77	0.15	9.22	300
23	Nigeria	1	1	0	0.03	1.41	-8.06	0.75	0.30	17.86	1	1.76	1	-8.07	0.39	4.56	2900
24	Pakistan	1	1	0	0.11	2.08	3.67	0.73	2.32	34.11	0	0.16	0	-10.57	0.09	5.08	750
25	Panama	1	1	0	0.00	-1.35	-3.81	1.66	1.97	6.50	1	2.27	1	-5.37	0.22	2.09	2250
26	Peru	1	0	1	0.01	1.83	-1.51	3.18	1.37	23.82	1	1.54	0	-5.97	0.02	4.61	1700
27	Philippines	1	1	0	0.04	3.32	-0.52	3.98	1.09	20.47	0	0.42	0	-6.72	0.10	5.95	1220
28	Sudan	0	0	0	0.35	8.84	8.04	0.64	4.55	77.13	0	0.00	1	-8.42	0.09	1.38	55
29	Thailand	1	1	0	0.15	3.58	-0.06	3.47	0.61	22.62	0	1.32	1	-7.47	0.16	6.29	330
30	Togo	0	0	0	0.03	-0.75	-0.07	0.45	-0.17	7.99	1	-2.25	1	-7.52	0.18	1.82	90
31	Venezuela	1	1	0	0.00	2.97	0.88	2.42	-1.30	22.14	1	-0.64	1	-4.22	0.56	6.07	4000

[a]Deviating from the standard definition, the IOCR-values for Morocco and Honduras were calculated as the ratio of GNP in US$ per capital stock estimate (see Picht, 1988a) in Prices of 1980. - [b]Due to data shortages the 1974 value was used in the case of Venezuela.

Sources: See list of variables. Own calculations.

Table A2 - Matrix of Correlation Coefficients for Dependent and Independent Variables of the Logit-Model Regressions for Thirty-One Less Developed Countries

	V1	V2	V3	RFDIPC	GRPC	DGR	RVAR	ESR	IOCR	V4	V4IOCR	V4INT	V4TDFIGDP	V4TDFDI	FDIGDP	DFDI	INT	EX
V1	1	0.72 (0.00)	0.37 (0.37)	-0.27 (0.14)	-0.18 (0.34)	0.05 (0.79)	-0.27 (0.14)	-0.26 (0.17)	-0.15 (0.41)	-0.02 (0.93)	-0.12 (0.51)	0.01 (0.95)	-0.20 (0.28)	-0.13 (0.49)	-0.14 (0.46)	-0.03 (0.89)	-0.97 (0.37)	0.32 (0.08)
V2		1	-0.37 (0.04)	-0.14 (0.45)	0.01 (0.96)	0.11 (0.55)	-0.22 (0.24)	-0.15 (0.41)	0.05 (0.80)	-0.11 (0.54)	-0.12 (0.52)	0.10 (0.60)	-0.25 (0.18)	-0.14 (0.46)	-0.19 (0.30)	0.03 (0.89)	-0.21 (0.25)	0.26 (0.16)
V3			1	-0.17 (0.36)	-0.25 (0.17)	-0.08 (0.66)	-0.98 (0.69)	-0.14 (0.47)	-0.27 (0.14)	0.13 (0.48)	0.00 (0.98)	-0.12 (0.53)	0.06 (0.73)	0.01 (0.95)	0.07 (0.69)	-0.07 (0.70)	0.06 (0.74)	0.08 (0.65)
RFDIPC				1	0.21 (0.26)	0.43 (0.02)	-0.23 (0.22)	-0.16 (0.38)	0.32 (0.08)	-0.41 (0.02)	-0.36 (0.05)	0.39 (0.03)	0.03 (0.87)	0.23 (0.22)	-0.06 (0.76)	-0.04 (0.84)	-0.44 (0.01)	-0.34 (0.06)
GRPC					1	0.63 (0.00)	0.20 (0.29)	0.54 (0.00)	0.50 (0.00)	0.07 (0.70)	0.30 (0.11)	-0.09 (0.65)	-0.02 (0.91)	-0.09 (0.63)	0.01 (0.97)	-0.12 (0.54)	0.17 (0.37)	-0.14 (0.46)
DGR						1	-0.09 (0.65)	0.22 (0.23)	0.51 (0.00)	-0.24 (0.19)	-0.12 (0.51)	0.23 (0.21)	-0.09 (0.65)	0.10 (0.58)	-0.23 (0.22)	-0.08 (0.68)	-0.21 (0.25)	-0.12 (0.51)
RVAR							1	0.37 (0.04)	-0.03 (0.89)	0.14 (0.44)	0.31 (0.09)	-0.08 (0.68)	0.26 (0.15)	-0.02 (0.93)	0.30 (0.11)	-0.06 (0.75)	0.58 (0.00)	-0.27 (0.14)
ESR								1	0.38 (0.04)	0.20 (0.27)	0.30 (0.10)	-0.18 (0.33)	0.29 (0.11)	-0.12 (0.54)	0.34 (0.06)	-0.16 (0.38)	0.42 (0.02)	-0.39 (0.03)
IOCR									1	-0.32 (0.08)	-0.12 (0.54)	0.30 (0.10)	0.13 (0.50)	0.39 (0.03)	0.06 (0.73)	0.14 (0.46)	-0.07 (0.67)	-0.22 (0.24)
V4										1	0.88 (0.00)	-0.96 (0.00)	0.04 (0.85)	-0.72 (0.00)	0.24 (0.20)	-0.02 (0.72)	0.61 (0.00)	0.31 (0.09)
V4IOCR											1	-0.85 (0.00)	0.03 (0.86)	-0.63 (0.00)	0.23 (0.21)	-0.13 (0.49)	0.53 (0.00)	0.21 (0.25)
V4INT												1	-0.04 (0.85)	0.69 (0.00)	-0.24 (0.20)	-0.04 (0.84)	-0.49 (0.01)	-0.38 (0.04)
V4TFDIGDP													1	0.28 (0.13)	0.92 (0.00)	0.32 (0.08)	0.31 (0.09)	-0.32 (0.08)
V4TDFDI														1	0.11 (0.57)	0.55 (0.00)	-0.32 (0.08)	-0.24 (0.20)
FDIGDP															1	0.32 (0.08)	0.40 (0.03)	-0.23 (0.21)
DFDI																1	-0.06 (0.75)	0.81 (0.09)
INT																	1	0.05 (0.80)
EX																		1

Notes: See variable list in the appendix for the definition of the variables. The significance levels are presented in parentheses.

Source: See data in Table 1 and list of variables. Own calculations.

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