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Willful Default by Developing Countries in the 1980s: A Cross-Country Analysis of Major Determinants

By

Peter Nunnenkamp and Hartmut Picht

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I. Introduction

In the literature the persistent debt crisis of the 1980s has mainly been interpreted as the consequence of mounting difficulties of developing countries to service their external debt as formerly agreed. The default issue was raised in terms of the debt-servicing capacity of debtor countries, i.e., their ability to pay. But most of the models built along these lines failed as an early-warning device for debt-servicing problems.¹ Among the reasons for this failure the missing sovereign-risk perspective is likely to figure prominently. Default is not only a matter of debt-servicing capacity, but also of the debtor's willingness to pay. Contrary to credit contracts in the national realm, the servicing of foreign debt is hardly enforceable by creditors. The honouring of contractual obligations becomes a matter of cost-benefit calculus.²

It can, thus, be hypothesized that the recent cumulation of defaults and debt renegotiations in various developing countries is not only to be attributed to impaired ability to pay. In the following analysis, an attempt is made to address this question empirically by testing the relevance of willful defaults. A wide definition of default is applied. It covers not only debt repudiation and permanent and unilateral moratoria that were hardly observed in the recent past, but also mutually agreed debt renegotiations and reschedulings. The analysis concentrates on reschedulings as the most prominent type of debt

Remark: This paper reports research undertaken in a project on the optimal structure of capital transfers from developed to developing countries; financial support was provided by the Deutsche Forschungsgemeinschaft.

¹ See e.g. Feder, Just [1977]; Abassi, Taffler [1982]; Schmidt [1984]; Cline [1984]; for an overview on these and other studies on debt-servicing problems, see Amelung, Mehlretter [1986].

² See e.g. Eaton, Gersovitz [1981a; 1981b]; Sachs [1983]; Sachs, Cohen [1982]; Lächler [1985].

restructuring in the 1980s.³ Bulow and Rogoff [1986, p. 2] define reschedulings as "negotiated partial defaults". Willful default should therefore be understood as an interruption in debt servicing that is willfully enforced by the debtors. Major hypotheses on the default issue are subjected to logit analysis, which allows one to identify the impact of different factors on the probability of default.⁴ Such an analysis may help to pave the way for more cooperative borrower-creditor relations and to reduce the considerable difficulties of many Third World borrowers in attracting foreign capital after the risk illusions of creditors have been destroyed.

This article proceeds with the presentation of some hypotheses on willful default which have been raised in the literature (Section II), the description of the basic logit model (Section III), and the specification of the estimation equations and the data applied (Section IV). The empirical results are presented in Section V. Section VI summarizes and draws conclusions.

II. Hypotheses on Willful Default

The notion of willful default on debt, as applied in this article, implies rationality on the part of the borrowers. We assume that governments of developing countries seek the country's benefit, rather than their own benefit. The hypotheses on willful default largely concentrate on macroeconomic variables.⁵ Public-choice reasoning would suggest, however, that the government agents are not eager to maximize the public welfare, but rather take decisions that improve their own well-being. It is left open in the present analysis to which extent the government's and the country's interests differ in the case of default decisions. This limitation should be kept in mind when interpreting the empirical results.

³ Although the face value of the foreign debt of higher-income debtors was not reduced by the reschedulings of the 1980s, the discounted present value of debt-service payments was adjusted downward through extended maturities and lower interest-rate spreads. Only very recently outright debt forgiveness is gaining momentum for this group of debtors; while public creditors granted debt relief in the case of many low-income debtors. In an ex-post perspective, the reschedulings during the initial phase of the international debt management represented the first step towards debt reduction.

⁴ This approach was applied earlier by Picht [1988].

⁵ Alternatively, the willingness of debtor countries to undertake policy reforms may be considered as a proxy for the willingness to pay. With appropriate policy reforms most problem debtors could support their current debt level. Hypotheses can then be constructed that relate a set of explanatory variables to a government's willingness to undertake policy reforms (we owe this suggestion to an anonymous referee). For example, the ability of debtor governments to extract domestic resources for debt-servicing purposes without being dislodged by their constituencies may prove significant. However, it is extremely difficult to quantify such political-economy arguments and to subject them to empirical analysis in a cross-country context. We therefore decided to test the notion of willful default in a direct way.

The hypotheses on willful default address the potential costs and benefits of such a behaviour for the country in question. In general terms, it would be rational to default on debt if the benefits exceed the costs.⁶ The gains to be reaped from default depend on the degree of foreign indebtedness and the debt-service burden. The higher the (discounted) net value of the contractual obligations that are refused to be paid, the higher the benefit for borrowers which otherwise would have to forgo domestic resources when the credits are due [Eaton, Gersovitz, 1981b, p. 302]. Moreover, countries may be more inclined to default on their debt when national income is lower than previously expected by both lenders and borrowers [Lächler, 1985, pp. 29ff.]. In this case, the benefits from default rise relative to the potential costs, whereas the benefit-cost ratio declines when national income is unexpectedly high. Debt contracts involve a pre-fixed payment schedule. The debt-service profile previously agreed on by the borrower and the lender is based on forecasts on the country's future capacity to meet its obligations. If the assumptions on income growth prove over-optimistic, the borrower has to transfer a higher share of the incremental income to the creditor. This is likely to strengthen the resistance against the punctual servicing of the debt. Furthermore, the costs of default are supposed to be positively related to the actual income level, whatever form the penalties from the creditor side may take, i.e., the costs are lower in situations of unexpected income drops. The likelihood of willful default is thus hypothesized to be higher (lower), when national income is unexpectedly low (high).

In deciding on default, the borrowers have to consider possible sanctions by their creditors. The threat of trade embargos or withdrawal of trade-related credit lines may particularly affect the decisions of developing countries that depend heavily on imports of essential investment and intermediate goods (for a discussion on the effectiveness of sanctions, see Sachs [1983, p. 20]; Bulow, Rogoff [1986]; Nunnenkamp [1989]). The likelihood of willful default may thus be negatively related to the relative importance of imports in domestic absorption. The threat of retaliatory actions may also be high for aid-dependent developing countries. Donor governments may refuse further bilateral aid payments and press international organizations to stop multilateral assistance for defaulting borrowers. This weakens the incentive to default on foreign debt.

In the presence of cross-default clauses, defaulting countries may be cut off from international capital markets [Folkerts-Landau, 1985, p. 330]. The potential costs involved depend on whether borrowers want to attract more foreign capital from private creditors. This is likely to be the case if favourable growth prospects indicate that foreign capital inflows may be used productively. A favourable growth performance should then weaken the incentive to

⁶ For the pioneering work in this respect, see Eaton, Gersovitz [1981a; 1981b]; Sachs [1983]; and Sachs, Cohen [1982].

default willfully. Alternatively, it may be argued that “rapidly growing countries may have less incentive to repay loans, since they do not expect to enter the market again after the period in which a net payment of loans is necessary” [Eaton, Gersovitz, 1981a, p. 16]. The threat of foreclosing future access to credit markets by commercial banks would not do much harm under such circumstances.

A further hypothesis on the costs of willful default relates to short-term fluctuations in economic activity [ibid., pp. 8f.]. Governments will be reluctant to default on their debt if foreign borrowing is used to smooth domestic absorption intertemporarily. This is because banks will probably refuse to play their role in stabilizing consumption or investment and in compensating for temporary export shortfalls in the case of willful default. It can thus be hypothesized that the incentive to default is negatively related to the degree of fluctuations in economic activity typically prevailing in a borrowing country.

The borrowers may try to reduce the potential costs of default arising from the creditors’ threat to foreclose future access to credits by counterthreats. A single borrower’s odds to get away with no or only modest costs are higher if he decides to default when other borrowers do so as well (bandwagon effect). Parallel behaviour of developing countries may create problems for the liquidity and solvency position of creditor banks. Faced by the counterthreat of a debtors’ cartel the creditors may compromise on sanctions. The likelihood for a specific country to default is thus expected to increase if other countries decide not to service their debt [Picht, 1988, p. 335]. But even a single large borrower may be able to match the potential penalties of creditors by counterthreats. Largeness may refer to the amount of total debt accumulated which can be used as an instrument to press for concessions by the commercial banks [Bulow, Rogoff, 1986]. Creditor countries may also refrain from retaliatory measures if the debtor country represents an important export market for them. It can therefore be hypothesized that the likelihood of willful default varies positively with the economic and political weight of borrowers.

III. The Test Format: Logit Model

The coverage of possible explanations of default seems fairly complete, if measured on what has been advanced as empirically testable conjectures in the literature. Each of the hypotheses presented above deals with partial explanations of willful default by developing countries. We do not aim at including all of them in a comprehensive and consistent theoretical model; we rather put the theoretically meaningful partial hypotheses together in a multivariate framework, which allows to single out the most relevant variables with respect to the developing countries’ decisions on default.

Logit analysis is applied on the basis of cross-country data. This technique is well-suited for the case in question, where the phenomenon to be explained, i.e., the existence or non-existence of default, can only be measured as [0/1] alternatives. Logit analysis has several advantages as compared to other methods. OLS-regression analysis is inadequate when the dependent variable is restricted to the [0/1] space. Simple linear regressions may generate probabilities below 0 and above 1 for the dependent variable [Pindyck, Rubinfeld, 1981, pp. 275 ff.]. The non-linear transformations suggested by logit, or else, by probit models avoid this problem. The estimation results of logit and probit analyses for equal data sets are quite comparable [Altman et al., 1981, pp. 31 ff.]. But the former offers computational advantages due to the iterative technique implied. Multiple discriminant analysis represents a possible alternative, which was applied in comparable studies [e.g. Frank, Cline, 1971]. The major advantages of the logit approach are that it avoids a-priori classification into defaulting and non-defaulting countries and that it provides straightforward testing of the significance of the various coefficients.⁷

Logit analysis allows to assess the likelihood (P) of default as a function of a set of explanatory variables (X):

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

Thereby, a and b represent the estimation coefficients. Equation (1) is subjected to maximum likelihood estimation procedure. It is important to note that the coefficient b must not be confounded with the partial derivative. The latter is given by:

$$dP(1) / dX = P(1) [1 - P(1)]b, \quad (2)$$

where P stands for a chosen base level of the probability of default. This formula can be used to calculate predicted changes in the probability of default for a given change in the independent variable [Altman et al., 1981, p. 33].

IV. Specification of the Model and Data Base

In moving from the basic model level to empirical testing, it has to be decided as to how to define the dependent variable, and appropriate indicators must be identified for the explaining variables. As concerns the dependent variable, we refer to World Bank data on multilateral debt renegotiations [World Bank, c, p. 28]. The analysis covers 53 developing countries. Principally, "1" is attached to countries that renegotiated part of their debt with the Paris Club, other aid consortia, or commercial banks in the 1981–1984 period; if no

⁷ For a detailed discussion of the application and the conceptual limits of discriminant and logit analysis, see Klecka [1975] and Altman et al. [1981].

renegotiations took place, the variable is set "0".⁸ This procedure involves methodological problems insofar as the rescheduling events do not present a complete picture on willful defaults. Other forms of default are not captured, such as unilateral debt repudiation by borrowers. But this restriction, which is due to data limitations, is unlikely to distort the empirical results. For the 1981–1984 period no cases are known to us where defaulting countries did not finally reach a rescheduling agreement with their creditors. Hence, it can be argued that the dependent variable is "1" for all countries that refused to service their debt unilaterally.

More importantly, the rescheduling events may not only reflect willful default, i.e., an unwillingness to pay, but also an inability to pay due to exogenously created insolvency or illiquidity. The latter possibility has to be taken into account in the empirical estimations to avoid biased results. This is done by supplementing the set of hypotheses on willful default by a variable which captures the influence of external shocks on the rescheduling event. The equation estimated can then be written as:⁹

$$\hat{P}(1) = [1 + \exp - (a_0 + a_1X_1 + \dots a_nX_n + a_{n+1}N)]^{-1}, \quad (3)$$

where:

$X_1, \dots X_n$ = variables that indicate possible influences on willful default;

N = external-shock variable.

By N the balance-of-payments impact of world-market developments which are assumed to be beyond the control of individual debtor nations is measured.¹⁰ This variable encompasses terms-of-trade effects, real world-demand effects and interest-rate effects, all as a percentage share of the sum of the country's exports and imports.¹¹ Since the reschedulings of the 1981–1984 period are to be explained, the balance-of-payments impact is calculated for the preceding three years, i.e., 1978–1980. The 1975–1977 period represents the

⁸ Alternatively, "1" is attached to countries where the total amount of debt rescheduled in the 1981–1984 period exceeds 15 per cent of outstanding debt. Countries that renegotiated only marginal proportions of their debt may be considered as non-default cases rather than default cases; this applies to Pakistan (2.7 per cent), Guyana (5 per cent), Honduras (10 per cent), and Uganda (11 per cent). However, the estimation results are hardly affected when this adjustment is made. Consequently, the detailed results of this variant are not presented in Section V.

⁹ In all cases, the constant term a_0 is included to make sure that the likelihood estimated is not preset to either "0" or "1" if the explaining variables are zero.

¹⁰ For a detailed discussion of the methodological issues involved, see Nunnenkamp [1986, Ch. 5].

¹¹ For calculation procedures and definitions see the Appendix.

reference period for price and interest-rate changes; the difference between actual world demand in 1978–1980 and its hypothetical trend volumes is estimated on the basis of projections using the average growth rate observed in 1971–1977.

As concerns the partial hypotheses on willful default presented above, the following indicators are considered (for details see the Appendix):

- Different proxies indicate the potential benefits from default, i.e., the amount of resources saved by not servicing foreign debt. We refer to three alternatives: outstanding debt in per cent of the debtor's gross national product (in the following B), debt per capita of the borrowing country's population (A), and total debt-service payments relative to GNP (C).
- The empirical test of the hypothesis that borrowers are more inclined to default when national income is unexpectedly low requires one to make assumptions on the expected income growth. Two variants are tried: Firstly, the unforeseen change in economic growth is calculated as the difference between actual average GDP per-capita growth in the 1981–1984 period (in real terms) and the long-term growth trend experienced throughout the 1970s (E). Alternatively, a shorter and more recent reference period is chosen, i.e., 1978–1980 (F).
- The debtors' exposure to possible sanctions of creditor countries is measured in terms of the borrowers' imports, as a percentage share of gross domestic product (K), and in terms of foreign aid inflows per capita of the borrowers' population (I).
- Average growth of per-capita income in the 1970–1980 period is supposed to capture the conflicting hypotheses on the impact of the longer-term economic performance on the likelihood of default (D).
- The standard deviations of the residuals of (1) GDP per capita (G), and (2) exports (H), both derived from trend estimates for the 1970s, represent alternative measures of the degree of short-term fluctuations in economic activity. According to the reasoning in Section II, they are expected to be negatively related to the likelihood of default.
- The chances of individual borrowers to match possible penalties of creditors by counterthreats are measured by the total US\$-value of outstanding debt (M) and by the share of developed countries' exports shipped to the respective debtor country (L).¹²

Table 1 summarizes the partial hypotheses on default and presents the expected signs of the explaining variables that enter the empirical analysis.

To perform the cross-country analysis, we refer to a sample of 53 developing economies for which the required information is available. The sample

¹² The hypothesis that parallel behaviour of debtors raises the likelihood of willful default cannot be tested in the following cross-country analysis.

Table 1 – *Expected Relationship between the Likelihood of Default and Explaining Variables*

Explaining variable	Expected sign	Explaining variable	Expected sign
Debt outstanding, 1980		Fluctuations ^b of:	
US\$ billion	+	GDP, 1970–80	–
per capita	+	exports, 1970–80	–
per cent of GNP	+	Development aid	
Debt-service burden ^a , 1978–80	+	per capita, 1978–80	–
Per-capita growth of real GDP, 1970–80	–/+	Imports in per cent of GDP, 1978–80	–
Change in per-capita growth of GDP		Share in developed countries' exports ^c , 1978–80	+
1981–84 vs. 1970–80	–	External shocks in per cent of imports plus exports ^d , 1978–80	+
1981–84 vs. 1978–80	–		

^a Total debt service to GNP. – ^b Standard deviation of residuals. – ^c Imports of the sample countries from the European Community, Japan, and the United States, as a percentage share of the latter countries' total exports. – ^d Balance-of-payments impact of changes in the terms of trade, interest rates, and real world-market demand in 1978–80 vs. 1975–77; the external-shock variable is calculated so that it is the more positive, the stronger adverse external shocks are (such as declining export prices, rising import prices, and rising interest rates); for details of calculation see the Appendix.

covers a wide spectrum of developing countries in terms of income level, economic growth, foreign indebtedness, structure of capital imports, and the relative success or failure to service foreign debt on schedule. All 53 countries enter the empirical estimates in the first step. Subsequently, various restrictions are imposed, mainly in terms of income level and the relative importance of different types of creditors, in order to consider important subgroups of the sample specifically.

The empirical analysis on the determinants of default is subject to some multicollinearity problems. Relatively high correlations between independent variables do not create difficulties when alternative indicators for the same explaining factor are involved (e.g. outstanding debt per capita, debt in per cent of GNP, and debt-service burden). High Pearson-correlation coefficients may distort the empirical results only if the variables in question were supposed to enter the logit analysis simultaneously (e.g. development aid per capita and the import/GDP ratio). In such cases, multicollinearity problems are avoided by excluding specific variables from the estimation. Section V presents estimates for different combinations of explaining variables where multicollinearity problems are minimized in this way.

V. Empirical Results

Before running multivariate estimations, we apply logit analysis to each of the above explaining variables separately. All partial default estimates, presented in Table 2, show the expected signs for the coefficients of the independent

Table 2 – *Partial Default Estimates: Logit-Analysis Results^a*

	Constant a ₀	t-stat.	X a ₁	t-stat.	Average likeli- hood	No. of itera- tions
Debt outstanding, 1980						
US\$ billion	-0.14	(-0.42)	0.0318	(1.23)	0.51	5
per capita	-0.01	(-0.02)	0.0001	(0.43)	0.50	4
per cent of GNP	-0.43	(-0.78)	0.0117	(1.12)	0.51	7
Debt-service burden ^b , 1978–80	-0.14	(-0.34)	0.0650	(0.80)	0.50	4
Per-capita growth of real GDP, 1970–80	0.42	(1.21)	-0.1666	(-1.53)	0.51	4
Change in per-capita growth of GDP, 1981–84 vs. 1970–80	-0.12	(-0.36)	-0.082	(-1.14)	0.51	4
vs. 1978–80	-0.03	(-0.89)	-0.070	(-1.17)	0.51	4
Fluctuations ^c of: GDP, 1970–80	0.41	(0.92)	-5.6561	(-0.83)	0.50	4
exports, 1970–80	0.28	(0.40)	-0.9547	(-0.26)	0.50	3
Development aid in per cent of GDP, 1978–80	0.60	(1.54)	-0.1057*	(-1.71)	0.52	5
Imports in per cent of GDP, 1978–80	0.49	(0.79)	-0.0121	(-0.68)	0.50	3
Share in developed coun- tries' exports ^d , 1978–80	0.04	(0.13)	0.2701	(0.33)	0.50	3
External shocks in per cent of exports plus imports ^e , 1978–80	-0.20	(-0.55)	0.040	(1.38)	0.51	4

^a The equation estimated can be written as: $\hat{P}(1) = [1 + \exp - (a_0 + a_1 X)]^{-1}$; X denotes the various explaining variables as given in the first column. t-statistics in parentheses; * denotes significance at the 10 per cent level; number of observations: 53. – ^b Total debt service to GNP. – ^c Standard deviation of residuals. – ^d Imports of the sample countries from the European Community, Japan, and the United States, as a percentage share of the latter countries' total exports. – ^e Balance-of-payments impact of changes in the terms of trade, interest rates, and real world-market demand in 1978–80 vs. 1975–77; for details of calculation, see the Appendix.

Source: World Bank [a; b; c]; UNCTAD [1987]; OECD [various issues]; IMF [a; b]; own calculations.

variables. For the long-term growth indicator, where competing hypotheses were raised in the literature, the coefficient is negative. So, the argument that rapidly growing countries opt for default since they do not expect to rely on further capital imports in the future is rejected. However, the explanatory power of the partial calculations remains extremely limited. The average likelihood of the estimates hardly exceeds 50 per cent.¹³ Moreover, only the coefficient of the development-aid variable is statistically significant at the 10 per cent level.

The quality of the estimations in terms of correctly identifying default and non-default cases improves only slightly when a multivariate approach is applied to all 53 sample countries. The highest average likelihood reported in Table 3 amounts to 56 per cent. The evidence on some of our hypotheses is considerably stronger, however, as compared to the partial calculations. With only two exceptions (for variable H, i.e., the fluctuation in exports, in (9) and (10) of Table 3), all coefficients reveal the expected sign. Among the variables that are significant at the 10 per cent level or better, long-term growth of GDP (variable D) figures prominently. In five out of six equations where D is included, the coefficient is significantly negative. The hypothesis that a favourable growth performance weakens the incentive to default is strongly supported. Apparently, fast-growing economies are prepared to attract further capital inflows in the future, since foreign capital may be absorbed productively. These countries face strong incentives to refrain from willful default, because otherwise they may be cut off from international capital markets and their economic performance may suffer from the creditors' sanctions.¹⁴

For the remaining variables, the evidence is not as strong. This refers particularly to variables A, B, and C, which are supposed to capture the economic benefits of default. All coefficients of the debt indicators and the debt-service burden remain insignificant. One may be tempted to conclude that willful defaults are motivated by other than macroeconomic considerations, e.g. by internal political pressures that are not related to social cost-benefit calculi. This reasoning is supported by the observation that variables L and M, indicating the debtors' potential to match possible sanctions of the creditors by counterthreats, remain insignificant as well.¹⁵ In this instance, however, other economic factors should also be irrelevant, which is not the case:

¹³ Since the phenomenon to be explained, i.e., the existence or non-existence of default, can only be measured as [0/1] alternative, the bottom line of the probability estimated by logit analysis is given by 50 per cent.

¹⁴ The finding that fast-growing economies are less likely to default may also be interpreted in an ability-to-pay context. Strong economic growth in the past renders it easier for debtors to service their debt.

¹⁵ The insignificance of outstanding debt (M) conflicts with the reasoning of Bulow and Rogoff [1986] that countries with large debts will easily achieve negotiated partial default.

Table 3 – Logit Estimates of the Probability of Default for all 53 Sample Countries^a

	Constant term	Debt outstanding		Debt-service burden	Per-capita growth of real GDP, 1970–80	Change in per-capita growth of GDP		Fluctuations of: GDP exports		Development aid per capita	Imports in % of GDP	Share in developed countries' exports	Out-standing debt, US\$ bill.	External shocks in % of (exports+imports)	Average likelihood	No. of iterations
		per capita	% of GNP		D	1981–84 vs. 1970–80	1981–84 vs. 1978–80	G	H	I	K	L	M	N		
		A	B	C		E	F									
1)	0.08 (0.17)			0.093 (1.00)			–0.042 (–0.68)			–0.019 (–1.34)					0.52	5
2)	0.09 (0.19)			0.063 (0.68)	–0.23* (–1.92)		–0.100 (–1.45)								0.53	5
3)	–0.24 (–0.51)			0.048 (0.58)			–0.061 (–1.00)					0.17 (0.21)			0.51	4
4)	–0.29 (–0.53)			0.104 (1.11)	–0.18 (–1.59)								0.041 (1.39)		0.53	5
5)	0.14 (0.22)			0.194 (1.47)	–0.30** (–2.16)		–0.054 (–0.72)			–0.035* (–1.81)			0.055* (1.69)		0.56	6
6)	–0.60 (–0.89)			0.097 (1.07)		–0.103 (–1.31)		–6.0 (–0.88)					0.044 (1.41)		0.53	10
7)	–0.55 (–0.57)		0.007 (0.60)		–0.35** (–2.13)		–0.118 (–1.57)		–0.8 (–0.17)			1.82 (1.52)	0.047 (1.36)		0.55	5
8)	0.25 (0.49)	0.051 (0.17)					–0.056 (–0.94)			–0.014 (–1.12)					0.52	4
9)	0.67 (0.65)				–0.32** (–2.15)		–0.154* (–1.93)		2.6 (0.58)		–0.036* (–1.68)		0.045 (1.33)		0.55	5
10)	0.14 (0.15)				–0.28** (–2.04)		–0.094 (–1.29)		2.2 (0.48)	–0.023 (–1.55)			0.053 (1.52)		0.55	5
11)	–0.89 (–1.21)			0.092 (1.02)		–0.097 (–1.19)		–4.6 (–0.66)					0.030 (1.03)	0.046 (1.45)	0.53	7

^a For the exact definition of variables, see the Appendix. – ^b Due to multicollinearity problems, all variables cannot be considered in the analysis simultaneously; different sets of explaining variables are selected for which multicollinearity problems are negligible. Several variables (such as A, B, and C) are considered as alternative indicators for specific hypotheses. – t-statistics in parentheses; * significant at the 10 per cent level; ** significant at the 5 per cent level (two-tailed t-test). Estimates for which the algorithm does not converge in 20 steps are not reported.

Source: World Bank [a; b; c]; UNCTAD [1987]; OECD [various issues]; IMF [a; b]; own calculations.

- Countries seem more inclined to default on their debt when national income is lower than previously expected. According to the argument raised by Lächler [1985], this behaviour is economically rational, since the benefits from default rise relative to the potential costs. But variable F is significant in (9) exclusively.
- Apart from the evidence on the long-term growth variable, other cost factors are relevant as well. This refers mainly to variables I and K, notwithstanding that the coefficients are significant in some equations only. Negative signs of I indicate that the likelihood of default decreases with higher dependency on foreign development aid; the incentive to default willfully is stronger when the possible refusal of creditor governments to grant further assistance involves only small amounts of aid. Similarly, the higher the potential of sanctions in the form of trade embargos and foreclosure of export credits (indicated by K), the greater the debtors' reluctance to willfully stop servicing foreign debt.

The rather poor explanatory power of the above logit estimates is not surprising. This result is typical for cross-country analyses based on a fairly heterogeneous set of sample economies. The group of 53 countries considered here consists of extremely poor African and South Asian economies with per-capita incomes below 300 US\$ (1980) on the one hand, and advanced Latin American countries with incomes of more than 2000 US\$ on the other hand; or else, we refer to debtors for whom private creditors are of no importance at all (such as Bangladesh, El Salvador, Guatemala, India, and Somalia, where private creditors accounted for less than 3 per cent of total debt in 1980), and debtors for whom the relations with commercial banks are of overriding importance (such as Algeria, Argentina, Brazil, and Mexico, where the respective shares exceeded 80 per cent). In the following the heterogeneity of the sample is reduced by imposing restrictions in terms of income level and the structure of foreign indebtedness.

Table 4 reports the logit estimates for 36 sample countries for which private creditors account for more than 25 per cent of total (public and publicly guaranteed) debt. The cost-benefit calculus with respect to defaults on commercial loans should play a significant role within this subgroup.¹⁶ Actually, the overall explanatory power of the logit estimates improves for this less heterogeneous sample. The estimated likelihood increases to up to 67 per cent in (11). But even this outcome is insufficient to serve as a basis for predictions on willful default. Apparently, other than the economic factors considered here have an important impact on the borrowers' default decisions. In particular, the bandwagon effect as a potential means to reduce the costs of default may

¹⁶ With the exception of Zaire, this subgroup does not include any country that merely renegotiated its public debt with aid consortia.

Table 4 – Logit Estimates of the Probability of Default for 36 Developing Countries with Considerable Debt from Private Sources^a

	Constant term	Debt outstanding per capita	% of GNP	Debt-service burden	Per-capita growth of real GDP, 1970–80	Change in per-capita growth of GDP vs. 1970–80	1981–84 vs. 1978–80	Fluctuations of GDP exports	Development aid per capita	Imports in % of GDP	Share in developed countries' exports	Out-standing debt, US\$ bill.	External shocks in % of (exports+ imports)	Average likelihood	No. of iterations
		A	B	C	D	E	F	G	H	I	K	L	M	N	
1)	1.15 (1.01)		0.009 (0.51)		-0.22 (-1.32)			-7.5 (-0.69)						0.58	3
2)	5.13** (2.58)				-0.61** (-2.23)			-10.8 (-0.61)			-0.070* (-1.99)			0.62	9
3)	0.30 (0.43)			-0.060 (-0.53)			-0.124 (-1.31)			0.018 (0.63)				0.54	5
4)	1.21 (1.50)			-0.031 (-0.28)	-0.29* (-1.91)		-0.103 (-1.05)							0.57	5
5)	0.61 (0.81)			-0.026 (-0.27)			-0.103 (-1.23)					-0.28 (-0.30)		0.54	5
6)	0.93 (1.10)			-0.003 (-0.03)	-0.28* (-1.71)								0.073* (1.83)	0.60	6
7)	1.17 (1.04)			0.036 (0.23)	-0.38* (-1.79)		-0.074 (-0.66)			-0.029 (-0.70)			0.076* (1.85)	0.61	6
8)	-0.18 (-0.18)			0.068 (0.55)		-0.163 (-1.33)		-10.3 (-0.94)					0.080* (1.79)	0.59	9
9)	0.52 (0.34)		0.019 (0.90)		-0.44* (-1.83)		-0.134 (-1.19)					2.32 (1.40)	0.078* (1.74)	0.64	11
10)	0.49 (0.54)	-0.184 (-0.53)					-0.111 (-1.21)			0.007 (0.28)				0.54	5
11)	4.90** (2.27)				-0.66** (-2.19)		-0.173 (-1.29)		-2.6 (-0.50)		-0.092** (-2.23)		0.070 (1.54)	0.67	9
12)	2.05 (1.38)				-0.37* (-1.74)		-0.088 (-0.82)		-4.3 (-0.83)	-0.022 (-0.63)			0.064 (1.55)	0.62	6

^a Share of private creditors in total (public and publicly guaranteed) debt > 25 per cent. For the exact definition of variables, see the Appendix. – ^b Due to multicollinearity problems, all variables cannot be considered in the analysis simultaneously; different sets of explaining variables are selected for which multicollinearity problems are negligible. Several variables (such as A, B, and C) are considered as alternative indicators for specific hypotheses. – t-statistics in parentheses; * significant at the 10 per cent level; ** significant at the 5 per cent level (two-tailed t-test). Estimates for which the algorithm does not converge in 20 steps are not reported.

Source: World Bank [a; b; c]; UNCTAD [1987]; OECD [various issues]; IMF [a; b]; own calculations.

be relevant. In a pooled analysis for 10 developing countries and the 1976–1985 period, Picht [1988, p. 349] found this factor to be statistically significant. The governments of debtor countries were encouraged to opt for default when large borrowers such as Argentina, Brazil, and Mexico took the lead.

All in all, Table 4 confirms the results for the specific variables, as presented in Table 3 for all 53 sample countries. This refers particularly to the fairly strong evidence on the long-term growth variable D. The following differences between the two sets of estimations are noteworthy:

- Not surprisingly, the development-aid variable I is no longer significant for the restricted sample. The threat to be cut off from further aid payments is not effective for countries which strongly rely on commercial debt.¹⁷
- Contrary to I, the threat of trade sanctions is somewhat stronger for countries with considerable debt from private sources. In both cases where K as a measure of import dependency is included (equations 2 and 11) the coefficient is significantly negative. This result supports the reasoning of Bulow and Rogoff [1986] that the debtor's gains from trade represent a collateral for sovereign lending.
- The impact of exogenously created liquidity and solvency problems on default, as captured by the external-shock variable N, remains fairly modest for the overall sample of 53 developing countries (Table 3); while N is significantly positive in four out of six equations in Table 4.

In a second attempt to reduce the sample heterogeneity, countries with very low per-capita income are excluded from the logit analysis (Table 5).¹⁸ The relevance of cost considerations in deciding on default is largely the same as in Table 4. This applies to the significantly negative coefficients of variables D and K, as well as the insignificance of short-term fluctuations in GDP and exports (G and H, respectively)¹⁹ and development aid (I). Similarly, the potential of counterthreats by borrowers, indicated by variables L and M,

¹⁷ The significance level of the negative coefficients of I improves when the logit estimates are based on the 45 countries with shares of private creditors in total debt of more than 10 per cent (rather than more than 25 per cent). These estimations are not presented here because other results remain largely unaffected.

¹⁸ When the criterion applied is per-capita income > 400 US\$ (1980), 38 countries enter the analysis; in the case of per-capita income > 500 US\$, the sample is reduced to 32 debtors. In Table 5, only those estimates are reported which reveal additional information, or which are excluded from Table 4 since the algorithm does not converge.

¹⁹ The insignificance of G and H conflicts with the argumentation of Eaton and Gersovitz [1981a] that short-term consumption smoothing represents the main reason for sovereign borrowing. The results rather support the reasoning of Bulow and Rogoff [1986, p. 26]: "The loans are patently not short term. It seems totally implausible that the rulers of these countries have discount rates so low that they will repay these debts ..., primarily in order to be eligible to borrow (...) again sometime well into the next decade".

Table 5 – *Logit Estimates of the Probability of Default for Developing Countries of Medium and Higher Per-Capita Income^a*

	Per-capita income					
	> 500 US\$		> 400 US\$			
	(1)	(2)	(3)	(4)	(5)	(6)
Constant term	-4.26* (-1.75)	-1.27 (-0.91)	-1.20 (-1.14)	1.89 (1.33)	1.18 (0.95)	-1.17 (-0.99)
Debt outstanding per capita (A) % of GNP (B)	0.060* (1.98)					
Debt-service burden (C)		0.104 (0.78)	0.089 (0.74)			
Per-capita growth of real GDP, 1970–80 (D)				-0.36* (-1.90)	-0.36* (-1.87)	
Change in per-capita growth of GDP 1981–84 vs. 1970–80 (E)	-0.407* (-1.87)	-0.189 (-1.29)	-0.234* (-1.75)			-0.206 (-1.45)
1981–84 vs. 1978–80 (F)				-0.142 (-1.39)	-0.063 (-0.63)	
Fluctuations of: GDP (G)	-8.0 (-0.72)	-7.2 (-0.68)	-7.2 (-0.76)			1.2 (0.13)
exports (H)				0.0 (0.00)	-0.1 (-0.01)	
Development aid per capita (I)					-0.033 (-1.62)	-0.015 (-0.98)
Imports in % of GDP (K)				-0.050* (-1.71)		
Share in developed countries' exports (L)	0.64 (0.58)					
Outstanding debt (US\$ bill.) (M)		0.038 (0.95)				0.030 (0.77)
External shocks in % of (exports + imports) (N)	0.089 (1.62)	0.072 (1.46)	0.078* (1.88)	0.081* (1.88)	0.093* (2.03)	0.101** (2.13)
Average likelihood	0.62	0.57	0.57	0.59	0.60	0.58
No. of iterations	19	8	6	6	6	6

^a Only those estimates are presented which reveal additional information. Number of countries included: 38 in the case of per-capita income > 400 US\$; 32 in the case of per-capita income > 500 US\$. For the exact definition of variables, see the Appendix. Due to multicollinearity problems, all variables cannot be considered in the analysis simultaneously; different sets of explaining variables are selected for which multicollinearity problems are negligible. Several variables (such as A, B, and C) are considered as alternative indicators for specific hypotheses. – t-statistics in parentheses; * significant at the 10 per cent level; ** significant at the 5 per cent level (two-tailed t-test).

Source: World Bank [a; b; c]; UNCTAD [1987]; OECD [various issues]; IMF [a; b]; own calculations.

continues to lack significance. The picture is somewhat different as far as the indicators on the benefits to be reaped from default are concerned. For the relatively advanced debtors (per-capita income > 500 US\$ in 1980), some evidence exists that the higher the amount of foreign resources the borrower may get hold of by default, the higher the likelihood of willful default. However, this relationship is only significant in the case of B, i.e., debt outstanding in per cent of GNP. As concerns the relative benefits from default as reflected in E, Table 5 provides support to the hypothesis that the likelihood of willful default is higher, when national income is unexpectedly low. The negative coefficient of variable E reveals that the resistance against the punctual servicing of foreign debt is stronger when the borrower has to transfer a higher share of national income to the creditors due to unforeseen income drops.

VI. Summary and Conclusions

The empirical evidence on the various hypotheses on willful default differs considerably. Hardly any support is provided for those factors which indicate the amount of resources the borrower may get hold of by refusing debt-service payments. Somewhat better results are achieved with respect to the variables reflecting the benefits relative to the potential costs of default. As far as specific cost factors are concerned, the highly significant long-term growth variable points to the interest of debtors to maintain cooperative relations with creditors as long as the borrowing country may improve its economic welfare by attracting foreign capital. Other factors such as the dependency on imports provide further evidence on the effectiveness of sanctions. The threat to be cut off from public aid inflows is relevant for low-income developing countries in the first place. But the explanatory power of the logit analysis applied remains limited. The overall quality of the estimations is insufficient to serve as a basis for predictions on willful default.

The crucial assumption underlying the above analysis is that decisions on willful default are rational, i.e., based on an economic calculus of the overall benefits and costs for the developing country in question. Third World governments are supposed to act in the country's best interest, rather than seeking to maximize their own benefit. Both assumptions appear to be fairly restrictive, considering our empirical results. Apparently, willful defaults are not only motivated by aggregate welfare considerations.

Future research may show how effective internal political pressures by specific interest groups are in inducing the government to default on foreign debt. The resistance of influential segments of the debtor countries' population against macroeconomically required adjustment programs, especially if imposed by foreign parties such as the International Monetary Fund, demonstrates the relevance of such a political-economy approach [Haggard, Kaufman,

1989]. Public sentiments about foreign banks exploiting the developing countries may create a climate where willful default is called for, irrespective of the social costs involved.

In a similar vein, the role of governments has to be analysed in more detail. They may have strong incentives to strengthen hostile sentiments against commercial creditors. Such a move may be well-suited to divert the public attention from the government's own responsibility for economic crises. At the same time, however, such debtor behaviour renders it extremely difficult to improve the efficiency of international capital transfers and to reduce sovereign risk in international lending.

It is also worthwhile to address the question whether it is easier to cope with sovereign risk when foreign direct investment is substituted for debt finance. Such a restructuring of development finance might be favourable since equity participation is essentially private in nature, while currently Third World indebtedness is primarily a matter of governments or their agencies. The shift to private financing may increase efficiency in the use of funds, but it is not without risk [Picht, Stüven, 1990]. Expropriation risk may substitute for willful default on debt.

Appendix: Definition of Variables

As far as the dependent variable is concerned, i.e., the incidence of default on foreign debt, we refer to World Bank information on debt reschedulings in the 1981–1984 period [World Bank, c, p. 28].²⁰ The variable is “1” for countries for which multilateral debt renegotiations with the Paris Club and other aid consortia, commercial banks, or both private and public creditors are reported; otherwise the variable is “0”.

Data on debt outstanding in 1980 and on the average ratio of total debt service to GNP in 1978–1980 is from World Bank [a]. If not otherwise stated, the figures cover public and publicly guaranteed credits as well as non-guaranteed private debt. The share of private creditors in total debt, applied as a measure to discriminate between important subgroups of the overall sample of 53 countries, is calculated on the basis of public and publicly guaranteed debt. Per-capita income of 1980 (US\$), the second discriminating variable, is presented in World Bank [b, Statistical Annex, Table 1]. Growth rates of GDP per capita (period averages, in real terms) are taken from UNCTAD [1987]. The standard deviations of the residuals, considered as indicators of the degree of short-term fluctuations in per-capita income and nominal exports, are derived from trend estimates for the 1970–1980 period; the underlying data on GDP

²⁰ For the methodological problems involved, see Section IV.

per capita (in constant prices of domestic currency) and merchandise exports (in US\$, fob) are published in IMF [b].

The remaining three variables supposed to explain willful default are defined as period averages for 1978–1980:

- Development aid per capita of the debtor country's population includes grants and net ODA-loans, both bilateral and multilateral, as presented in OECD [various issues].²¹
- Import dependency is calculated as the percentage share of (nominal) imports in (nominal) GDP. For both variables we refer to the national accounts section in IMF [b], where both imports and GDP are given in national currency.²²
- The shares of the sample countries in developed countries' total exports are proxied by the imports of each of the 53 developing economies from the European Community, Japan, and the United States, expressed as a percentage share of the latter countries' total exports as published in IMF [a].

The calculation of the external-shock variable (N) has to be explained in some more detail.²³ In order to separate exogenous world-market effects on the balance-of-payments situation of the sample countries from influences arising from domestic policies, the sample countries are assumed to be "small economies"; i.e., the determination of export and import prices, international interest rates, as well as real world-market demand cannot be influenced by any individual debtor country. Hence, N encompasses terms-of-trade effects (N_{tot}), interest-rate effects (N_{ir}), and real world-demand effects (N_{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).²⁴

$$N / (X + M) = (N_{\text{tot}} + N_{\text{wd}} + N_{\text{ir}}) / (X + M). \quad (\text{A1})$$

The three elements of N are calculated for the 1978–1980 period; the preceding years serve as the reference period. The terms-of-trade effects are defined as follows:

²¹ For Venezuela, see Bundesministerium für Wirtschaftliche Zusammenarbeit [1980; 1983].

²² Where necessary, World Bank [d] serves as a supplementary source.

²³ For further methodological procedures, see Balassa [1981, pp. 142 ff.]; Nunnenkamp [1986, pp. 51 ff.].

²⁴ N is calculated relative to the value of external trade since the absolute US\$-amount of external shocks strongly depends on the overall size of the sample countries. Principally, it seems more appropriate to relate N to the debtors' GDP, since this measure presents a better indication of the exposure to external shocks. Nonetheless, we select the former measure since multicollinearity problems are reduced in this way.

$$N_{\text{tot}} = \sum_{t=1978}^{1980} (MV_t \cdot \Delta P_M - XV_t \cdot \Delta P_t^X) \quad (\text{A2})$$

$$\Delta P_t^M = P_t^M - P_{75-77}^M \quad (\text{A3})$$

$$\Delta P_t^X = P_t^X - P_{75-77}^X, \quad (\text{A4})$$

where:²⁵ MV = import volume; XV = export volume; P^M = import prices (unit values); P^X = export prices (unit values); P₇₅₋₇₇ = reference prices; average of 1975–1977.

The world-demand effects can be written as:

$$N_{\text{wd}} = \sum_{t=1978}^{1980} [WMS_{75-77} \cdot (XVW_t^{\text{tr}} - XVW_t^{\text{act}})], \quad (\text{A5})$$

where:²⁶ 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 1971–1977 period (6.6 per cent); WMS₇₅₋₇₇ = average world-market shares of the sample countries in the 1975–1977 period; calculated on the basis of export values.

Finally, the interest-rate effects are calculated as follows:

$$N_{\text{ir}} = \sum_{t=1978}^{1980} (\Delta i_t D_{t-1}) \quad (\text{A6})$$

$$\Delta i_t = i_t - i_{75-77}, \quad (\text{A7})$$

where:²⁷ i = average interest rate on foreign debt; calculated as interest payments in t, relative to debt outstanding and disbursed at the end of t-1; D = debt outstanding and disbursed at the end of the period.

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²⁵ Export and import values of merchandise trade as given in IMF [b], deflated by unit-value indices of exports and imports (1980=100) as presented in UNCTAD [1987].

²⁶ Merchandise exports of sample countries and all world-market suppliers as given in IMF [b].

²⁷ All data are from World Bank [a]; since sufficient information on private non-guaranteed debt is not available for the mid-1970s, the calculations are based on public and publicly guaranteed debt exclusively.

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Zusammenfassung: Willkürliche Zahlungseinstellung von Entwicklungsländern in den achtziger Jahren: Eine Querschnittsanalyse wichtiger Determinanten. – Sollen Souveränitätsrisiken im internationalen Kreditgeschäft abgebaut werden, müssen zunächst die Determinanten willkürlicher Zahlungseinstellung identifiziert werden. Dies geschieht in dem vorliegenden Artikel, indem verschiedene Variablen, die den Nutzen und die Kosten willkürlicher Zahlungseinstellung widerspiegeln, einer Logit-Analyse unterzogen werden. Es zeigt sich, daß die Wahrscheinlichkeit einer Zahlungseinstellung sinkt, wenn die Gläubiger ein solches Verhalten mit wirksamen Sanktionen belegen können. Die Aussagekraft der Schätzungen reicht jedoch nicht aus, um Zahlungseinstellungen zuverlässig vorhersagen zu können. Entscheidungen über Zahlungseinstellungen werden nicht ausschließlich von gesamtwirtschaftlichen Wohlfahrtsüberlegungen bestimmt; offensichtlich hängen sie auch von den Eigeninteressen der Regierungen und einflußreichen Gruppen in den Schuldnerländern ab.

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Résumé: Suspension de paiements intentionnelle des pays en voie de développement dans les années 80: une analyse transversale des déterminants importants. – Si les risques de souveraineté aux opérations de crédit international doivent être diminués, il faut d'abord identifier les déterminants des suspensions de paiements intentionnelles. Cela arrive dans cette étude d'une analyse logit des variables différentes qui indiquent les avantages et les désavantages d'une suspension de paiements intentionnelle. Les résultats montrent que la probabilité d'une suspension de paiements se réduit si les débiteurs peuvent répondre à un tel comportement avec des sanctions effectives. Mais la qualité

des estimations ne suffit pas pour prévoir avec sûreté les suspensions de paiements. Les décisions concernant les suspensions de paiements ne sont pas seulement déterminées par des considérations macro-économiques du bien-être. De toute évidence elles dépendent aussi des intérêts propres du gouvernement et des groupes d'intérêts puissants dans les pays débiteurs.

*

Resumen: Moratorias arbitrarias de países en desarrollo en los años ochenta: un análisis de determinantes importantes. – Para poder controlar los riesgos de soberanía en el mercado crediticio internacional hay que primeramente identificar las determinantes de moratorias arbitrarias. Esto se realiza en este trabajo en el marco de un análisis Logit de diferentes variables que reflejan los costos y beneficios de moratorias arbitrarias. Se muestra que la probabilidad de una moratoria disminuye si el acreedor logra establecer sanciones efectivas. Las estimaciones, empero, no permiten pronosticar moratorias con certeza. La toma de decisiones sobre moratorias no está determinada solamente por el bienestar de un país, sino también por los intereses propios de los gobiernos y de grupos de presión importantes de los países deudores.
