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- Empirical Evidence for Brazil and Peru -

by

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November 1990

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Contents

I. Introduction

Since the beginning of the eighties there has been an upsurge in the empirical analysis of the political economy of trade restrictions in industrialized and developing countries. These studies, which have been surveyed by Anderson and Baldwin (1981) and Amelung (1989) attempted to explain the structure of protection and changes therein by establishing a causal relationship between government intervention and characteristics of firms and industries in order to derive the determinants of government behaviour with respect to the implementation of trade barriers. It has been shown, that those sectors in a position to form effective pressure groups were more successful in obtaining effective protection.

The ultimate aim of these studies was to develop further insights into the government's decision making process with respect to trade liberalization policies and structural adjustment programs. The key issue in designing a sustainable structural adjustment program concerns the appropriate trade-off between reducing the intensity of income redistribution effects and maintaining the efficiency of the adjustment process (Mussa (1986)).

However, the reduction and lifting of trade barriers comprises only one part of an economic liberalization program. In many countries regulations in the foreign trade regime are accompanied by regulations of the financial sector, i.e. fixing of lending and deposit rates, special government guarantees, preferential exchange rates and foreign exchange allocation for foreign loans, subsidized loans, quotas for credit allocation of financial intermediaries etc. These measures of "financial protection" which are not trade restrictions in the narrow sense, may also benefit particular economic sectors organized in politically influential interest groups.

This paper attempts to explain the structure of financial protection[1] as it has been done earlier in studies explaining the determinants of effective protection. The focus will be on the question whether economic sectors benefitting from high trade protection are also highly protected through financial regulations. In the second section it will be discussed how the degree of financial protection can be measured. Given the lack of data and theoretical concepts, financial protection will be measured in terms of credit allocation across industries. Since credit allocation differs across sectors even when capital markets are undistorted, section three will derive the economic determinants of credit allocation. Finally, in section four, the causal relationship between cross-sector credit allocation and various characteristics of the respective economic sectors will be analysed empirically in order to derive the degree of distortion in favour of specific sectors.

[1] For an early study on this subject cf. Kane (1984).

II. Measuring the Degree of "Financial Protection"

Before analysing the political and economic factors underlying the government's decisions on financial regulation and protection, one has to derive a variable measuring the outcome of such a decision making process.

In the empirical analysis of the political economy of trade policy one indicator - the effective rate of protection - is widely accepted as a measure for the government-induced distortions in each industry's position in international trade. In the case of financial markets analysis, the construction of such a variable is more difficult.

Basically, it should be possible to integrate the degree of financial subsidization into the concept of effective protection[1]. The underlying idea is that individuals engaging in the rent-seeking process view the supply of loans and other financial means as one of many input factors affecting their production costs.

The calculation of the effective rate of protection is based on information about sectoral input-output structure and indicators for the "direct" distortions of output prices in each industry, while distortions are measured in terms of deviations from world market prices. Corporate finance may be regarded as a service, the value of which is given by total interest payments. Hence, the protection indicator could be extended easily by adding another input-producing sector that provides financial services for all other industries and requires total national financial wealth as input factors.

But this conflicts with the treatment of financial services with-

[1] See Hiemenz/von Rabenau (1973), p. 107.

in the framework of the "System of National Accounts (SNA)"[1]. Accordingly, the financial sector produces intermediation services, the price of which is only a fraction of total interest payments, namely roughly the difference between credit rates and average deposit rates. The remaining bigger part of interest payments ("pure interest rate") of the industrial sectors is regarded as a part of value added of the respective sector, which is distributed as a factor income, similar to dividend payments and salaries. The method sketched above would lead to significant lower value added in each industrial sector and dramatically higher value added in the financial sector, which disqualifies this approach.

These considerations lead to a slightly modified method for a comprehensive protection indicator: If the prices for financial intermediation are distorted, for example by subsidizing the financial sector with cheap central bank refunding or tax exemptions, this should indeed be integrated as a protection of the financial sector. But if the "pure interest rate" or the credit allocation are distorted, for example by artificially lowered lending rates or quotas for credit allocation to the industrial sectors, this should be integrated as a subsidy-equivalent affecting protection of the respective sector, similar to any production-subsidy[2]. The crucial issue in this approach is the splitting of interest payments into intermediation costs and pure interest. In addition, these concepts seem to neglect all govern-

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[1] Cf. UN-Statistical Office (1986), pp. 72-74; for an overview of recent proposals for an SNA-review with respect to the treatment of the financial sector see G. Kopsch (1987).

[2] One may consider another method, that integrates investment goods into the protection measure; financial market distortion would enter via "user costs of capital", which includes prices for investment goods, "economic depreciation" and costs of finance. But this does not allow for separating the protection via capital goods from protection via preferential finance conditions.

ment interventions affecting the savings behaviour, i.e. the total supply of loanable funds.

Apart from that, it is necessary to determine an undistorted situation serving as a point of reference and as a basis for the measurement of distortions. Following the concept of trade protection indicators, one could take world market prices for financial services as an undistorted reference point. However, there are strong arguments against this approach. Interest rates (in nominal and in real terms) vary widely among countries. Even under strong assumptions (absence of barriers to entry, capital transfer controls and of arbitrage costs) interest rate parity must not hold because of country specific risk premiums due for currency depreciation risk, corporate default risk, inflation risk etc. Since this risk premium is not directly observable, interest rate differences cannot be regarded as government-induced market distortions. As an alternative concept, the structure of financial sources of the corporate sector in an undistorted country can be taken as a reference point. This approach can be challenged, because the impact of differences in legal accounting framework and in the characteristics of financial institutions[1] cannot be quantified.

Moreover, the construction of a measure of financial protection suffers from a lack of comparability of financial services, since corporate finance comprises a variety of very heterogeneous products. The only solution to this is to split up the financial sector into various industries and/or "products" (debt contracts), as there are many different finance needs on the demand side and many different actors on the supply side. A grouping of products should be done along characteristics like term structure, type of interest rate (fixed or variable) and default risk of the respective borrower.

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[1] This includes prudential regulation and supervision of financial institutions as well as legal procedures for the enforcement of debt contracts.

Data problems, however, do not allow for a high degree of disaggregation, especially because information on interest rates for different borrowers is not available. This may lead to a less comprehensive analysis, either because the number of different contracts has to be restricted or because only average costs of finance for each industry can be estimated.

Finally, potential borrowers may face barriers-to-entry, on stock markets or for long-term credit supply. This "non-price rationing" cannot be captured by an indicator based on a pure comparison of prices on official markets, neglecting spill-over effects to unregulated ("unofficial") credit markets.

The approach chosen in this paper circumvents some of the above mentioned problems. Instead of measuring all distortions for intermediate goods and for corporate finance in one composite indicator a partial analysis of distortions in one type of financial markets will be applied, although this makes it more difficult to give a complete picture of the impact of industrial policy. The method used in this paper is based on an analysis of the sectoral structure of credit allocation. Such an analysis may reveal a pattern of discrimination among sectors that can be attributed to government-induced distortions, even though the latter are measured in terms of quantity effects rather than price effects. This avoids the above mentioned problem of the "pure interest rate"-concept as well as the difficult intertwining of the choice of the appropriate finance pattern with investment and production related decisions.

In order to estimate the quantity effect of distortions, a hypothetical undistorted and country specific structure of credit allocation has to be derived for each of the respective countries by using econometric methods. This can be done by deriving the determinants of sectoral credit allocation in an undistorted situation, as it will be done in the next section. Thereafter, government-induced distortions will be measured as an additional variable affecting the sectoral credit allocations. This avoids

many of the problems caused by the "world market prices"-method. To estimate the impact of economic and political parameters correctly one has to make sure, that the time series data cover both periods with and without capital market regulations.

III. Determinants of the Corporate Capital Structure

The calculation of a hypothetical undistorted county-specific pattern of corporate finance across different industries is based on mainstream microeconomic theory, especially on the theory of corporate finance[1].

According to the traditional theory of corporate finance the following determinants of a corporation's demand for credit can be derived:

1) investment opportunities in terms of expected profitability and risk of future investments;

2) availability of internal finance, i.e. accumulated profits from the past and future growth expectations in terms of cash flow;

3) expected credit costs (or conditions for raising equity respectively);

4) the volatility of interest rates and

5) financial "rules of thumb", relating term structure of debt and investment period (or liquidity of assets respectively).

Since this approach assumes that decision on investment and finance projects are made simultaneously, a given set of investment opportunities leads to the demand for total corporate

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[1] See for example Copeland/Weston (1983).

finance means, depending on credit supply conditions. The firm's demand for external finance can be obtained by subtracting internal funds available for financing these investment projects from total financial needs. The actual volume of external finance is derived by equalizing credit supply and demand for external finance, i.e. where the marginal efficiency equals the interest rate. In addition, the financial "rules of thumb" have to be integrated in this decision making process, because both owners of firms and banks have raised traditional beliefs concerning an optimal balance sheet structure. These guidelines do also enter credit conditionalities, enforced by banks or other creditors. Together with the structure of relative prices (i.e. the costs of different forms of finance), the "rules of thumb" determine the corporate capital structure.

In addition to these mainstream arguments, the modern theory of corporate finance[1] provides as determinants[2]:

6) distortions through the tax system (e.g. investment tax credits, depreciation allowances etc.);

7) potential "costs of financial distress" and

8) "agency costs", including the costs of monitoring the actions of managers and providing collaterals for credit suppliers.

In the seventies and eighties, many empirical studies[3] supported these theoretically derived relationships, although they differed

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[1] Cf. T.E. Copeland and J.F. Weston (1983), Ch. 13.

[2] These determinants are closely related to the concrete terms of the financial system, some of which may already be shaped by political influences in the broad sense (i.e. tradition and ideology, pressure groups as well as self-interested bureaucrats and politicians).

[3] For example R.R. Spies (1974); R. Schmidt (1976); R.A. Taggart (1977), A Jalilvand and R.S. Harris (1984); J. Tybout and T. Bark (1988); S. Titman and R. Wessels (1988) or D. van der Wijst (1989).

in terms of aggregation level (firms or industries), valuation concepts (book value or market value of assets, corrections for the impact of inflation) and complexity of the decision-making process (endogeneity of investment decisions and production technology). Most of these studies model a firm's or an industry's decision as a partial adjustment path to financial targets ("optimal capital structure"). However, none of the mentioned studies consider aspects of capital supply, which is equivalent to the assumption of perfectly elastic supply of capital at the given interest rate.

A more realistic analytical framework should consist of supply and demand functions, differentiated for industry (index i) and debt contracts (index j)[1]. The framework shows some similarities to common portfolio-models for financial markets. The main difference is that portfolio optimization takes place both on demand and supply side ("two-sided portfolio approach"). The supply functions equal

$$(1) \quad CS_{ij} = CS_{ij}\,(IR,\ VR_i,\ AFS_i,\ IS_i,\ AS_i,\ ER_i,\ PI_i);$$

$$IR = (IR_1,\ IR_2,\ \ldots),$$

where the arguments denote (net) supply of <u>new</u> credit (CS), a vector of interest rates for the different debt contracts (IR), the volatility of returns in the i-th industry (VR), the average firm size (AFS), the industry size (IS), the firm's asset structure (AS), the equity ratio (ER) and political influences in favour of this industry (PI)[2]. An undistorted structure of credit allocation prevails when PI equals zero. Moreover, the demand functions equal

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[1] One industry-index may be reserved for government finance and some debt contracts-indices may be reserved for foreign borrowing to differentiate for different currencies.

[2] This may be extended to PI_{ij}, if one can assume, that political influence differs across industries <u>and</u> forms of debt contracts.

(2) $CD_{ij} = CD_{ij}\ (IR,\ ERI_i,\ IO_i,\ GIF_i,\ IS_i)$,

where the arguments denote (net) demand for <u>new</u> credit (CD) expected return on investment (ERI), investment opportunities (IO), generation of internal funds (GIF).

These functions are subject to the following restrictions:

(3) $\sum_j CD_{ij}$ = planned corporate investment (gross)
./. generation of internal funds (= corporate saving)

which denotes the cumulated balance sheet identity of all firms in the i-th industry

(4) $\sum_i CS_{ij} = \sum_i CD_{ij}$

which is the condition for equilibrium in each market,

(5) $\sum_{i,j} CS_{ij}$ = household savings
./. household investment (in real capital)
+ net foreign savings

which denotes the balance sheet identity of the sector of private households, and

(6) adding up-restrictions on partial derivatives.

Still there are some possible improvements:

a) especially in developing countries there should be undertaken a correction for effects of inflation on balance sheet items[1].

b) volume of savings and/or investment may be treated endogenous.

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[1] Cf. J. Tybout and T. Bark (1988); J. Tybout (1984).

c) aspects of stock-flow-dynamics may be incorporated (for example the impact of actual investment on generation of internal funds in future periods).

d) impacts through the tax system may be incorporated.

IV. Preliminary Evidence for Brazil and Peru

1. Specification of Hypotheses

In order to yield a testable model, the comprehensive model of financial flows in the corporate sector, as it was presented in the previous section has to be reduced to a single equation. There are several reasons for that. First, the lack of data, especially industry-specific interest rates for different forms of debt, does not allow the modelling of the total finance process. Second, long-term credit in many developing countries can be considered to be a limiting factor for investment decisions, that can hardly be substituted by other types of finance. Therefore, the analysis concentrates on the cross-sector allocation of long-term bank credit (LBC), as it is featured in the following equation.

$$\underset{}{LBC_i} = f\ (\underset{(-)}{IR_i},\ \underset{(-)}{GIF_i},\ \underset{(+)}{AS_i},\ \underset{(+)}{IS_i},\ \underset{(?)}{PI_i}) \cdot LBC_{total}$$

The share of an industry in total net disbursement of long-term bank credits depends on the value of five variables. The expected signs of the influence of the variables are denoted under the abbreviations in the formula above.

For estimation purposes, the equation has been transformed to:

$$\frac{LBC_i}{LBC_{total}} = a_o + a_1 \cdot IR_i + a_2 \cdot GIF_i + a_3 \cdot AS_i + a_4 \cdot IS_i + a_5 \cdot PI_i$$

LBC is defined as net volume of new provided long-term bank credits of the i-th industry and of the total manufacturing sec-

tor, respectively. Foreign credits, exchange rate effects and restrictions for capital transfer have been omitted. Due to a lack of data, no correction for inflation effects on balance sheet items, interest rates and investment returns has been performed. Short time series did not allow the calculation of reliable figures for the variability of returns. Therefore, no variable measuring business risk is included in the test equation.

IR denotes the average interest rate on both long-term and short-term bank credits, which was estimated for each industry by dividing interest expenses through total credit outstanding (average of beginning-of-period and end of period values)[1]. The credit share is expected to be higher, the lower the value of IR. Multicollinearity problems may arise from the inclusion of the interest rate into the list of variables, because political influence probably affects the volume of credit and the level of interest rates. Therefore, separate estimations have been made, where IR has been excluded from the list of variables.

GIF denotes the return on equity in the previous period, which serves as a proxy for generation of internal funds. The credit share of an industry is the lower, the higher the accumulation of funds has been, i.e. the higher GIF. It was calculated by dividing corporate after-tax income through total book value of equity. One could think of corrections for average dividend payments or for generation of "silent reserves", but sample data did not allow for that.

AS denotes the value of fixed assets net of depreciation in per cent of total assets, which serves as an indicator for the long-term finance requirements in the respective industry. The credit share of an industry is the higher, the higher the value of AS. On the firm level, this variable could be also interpreted in a different way, since it allows for identifying the credit capacity in terms of collateral value. However, this is less plau-

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[1] Spill-over effects due to credit rationing are to some extent captured by this method.

sible on aggregated industries level. In addition, the use of balance sheet data may result in overestimations of the credit capacity in case of asset overvaluation (e.g. due to low capacity utilization).

IS denotes the share of the industry in value added of the manufacturing sector, which is a measure of industry size. The credit share of an industry is the higher, the higher the value of IS. Gross sales share has been considered as an alternative measure. In any case, simultaneity problems may arise, because it cannot be ruled out, that certain industries have grown because of above-average credit allocation.

PI denotes the difference between the effective rate of protection of the respective industry and the average effective rate of protection as an indirect measure for political influence in favour of this industry. This method has been chosen instead of working with proxies for the preferences and the strength of influence of a number of pressure groups[1], because it needs only one variable. Hence the (hypothetical) undistorted reference situation can be obtained by setting the effective rate of protection equal to the average rate of protection across the industries in the sample ($PI_i = 0$), assumed that the time series data cover both distorted and undistorted periods.

The sign of the partial derivative with respect to PI is a priori unclear, because the structure of distortions in trade and in credit markets may be in the same direction ("parallel", positive sign) or in the opposite direction ("antiparallel", negative sign) or without any parallels (sign not significant). In the first case, the more (less) influential pressure groups in trade policy are also the more (less) influential in financial market regulations, which leads to this "parallel" outcome. This outcome indicates that financial regulation and import protection cannot be treated as separate political markets. This is especially the

[1] This method is due to G.S. Becker (1983).

case, when the institutional framework for political decision-making is the same for both forms of protection. Due to their political power interest groups can benefit from both forms of protection without concentrating their rent-seeking activities on only one form of protection. In addition, those sectors which are highly protected may favour financial protection, since trade protection becomes redundant[1] once it exceeds the level of prohibitive protection. In the second case, pressure groups are successful only in influencing one policy decision, whereas they incur losses in the other area. This antiparallel result is very likely when government decisions on protection are subject to rent-seeking activities on two different political markets. These markets can be separated in the sense that there is a different set of economic agents, i.e. ministries, government institutions, firms, banks etc., so that rent seekers have to specialize on one political market. Anti-parallel outcomes are especially likely in the secondary stage of import substitution, in which the effective protection given to final producers is exceedingly eroded by growing protection given to producers of intermediate and capital goods. If trade protection for final good producers is prohibitive, their declining effective protection can be compensated by growing financial protection, which may lead to an anti-parallel outcome.

2. Data Base

Almost every empirical analysis of capital structure - even for industrialized countries - has to rely on sample data. This creates new problems, because small firms are underrepresented and - in case of large conglomerates or transnational corporations - problems with the grouping in industries arise.

In the case of Brazil data were taken from the annual sample of 1.000 corporations (IBRE) based on balance sheet data; the period

[1] See Amelung, Sell (1989)

covers the years 1981-85. Aggregation level is very high: in the manufacturing sector only 10 sectors are identified, one of which was separated, because the sample size is too small. The sampled corporations cover roughly 30% of total sales in the manufacturing sector. Estimates for the effective rate of protection in 1985 are taken from Kume (1988), whose calculations were based on price comparisons ("implicit rate").

In the case of Peru data were taken from an irregularly undertaken sample of about 1.000-1.300 corporations (CONASEV), based on balance sheet data for 1985 and 1986. Though the level of disaggregation is very high (ISIC 4-digits), the sample size had to be reduced because of the lack of respective data on effective protection. The latter were taken from Hanel (1988) and were calculated for 1985 and 1986 by including protection resulting from tariffs and subsidies.

Estimations with (net) changes of credit volume were not possible in the case of Peru due to different sample sizes for every year; therefore amount of credits outstanding was chosen as the dependent variable, scaled by the number of firms in the respective industry (N_i; in hundreds).

3. Empirical Results

The estimated coefficients are presented in Table 1 (Brazil) and in Table 2 (Peru).

In the case of Brazil, all coefficients show the expected signs and are significant except the interest rate variable. The estimated coefficient of the protection indicator (PI) is stable in size and significant and shows a positive sign; this supports the hypothesis of "parallel" influence in trade policy and financial markets distortions.

Gross sales shares have been tested as an industry size variable (instead of value added share); the results were almost unchanged

Table 1 - Parallel distortions in trade policy and financial markets in Brazil (1980-85)[a]

Dep. var.	Const.	IR	GIF	AS	IS	PI	adj.R^2
$\frac{LBC_i}{LBC_{total}}$	-30.67***	-	-0.378	0.873***	1.579***	0.081***	71.0
	(-4.820)		(-1.522)	(4.820)	(4.181)	(2.741)	
-- " --	-12.50	-0.095	-0.654**	0.620**	1.484***	0.096***	72.0
	(-1.293)	(-1.533)	(-2.155)	(2.553)	(3.942)	(3.125)	
MV[b] = 9.93		66.8	8.95	33.6	9.27	51.0	
SD[c] = 17.85		37.8	6.92	10.8	4.95	55.1	

[a] t-values in parentheses. - [b] MV = mean value. - [c] SD = standard deviation. - * significant at the 10 percent level, ** significant at the 5 percent level. *** significant at the 1 per cent level.

with respect to size and significance of estimated coefficients. Average firm size (value added per firm or gross sales per firm) has not been added to the list of variables, since it was not significant.

As in the case of Brazil, estimations for the case of Peru show the expected signs and are significant (except for the interest rate).

The estimated coefficient of the protection indicator (PI) is stable in size and significant, but shows a negative sign; this supports the hypotheses of "compensatory" influences in trade policy and financial market distortions.

There are obviously a number of critical points in the applied method, some of which have already been mentioned above. In addition, the statistical method applied (ordinary least squares) may raise some doubts concerning the estimation results. First, it has not been tested for heteroskedasticity within the "cross-sector-dimension" of these pooled cross section time series analysis, because time series were too small. Second, some variables are probably not normally distributed, in which case the significance-criteria do not work.

Table 2 - Compensatory distortions in trade policy and financial markets in Peru (1985/86)[a]

Dep. var.	Const.	IR	GIF	AS	IS	PI	adj.R^2
$\frac{LBC_i}{N_i \cdot LBC_{total}}$	-5.34	-	-0.140*	0.383**	2.236**	-0.055*	46.1
	(-0.053)		(-1.807)	(2.722)	(2.106)	(-1.814)	
-- " --	-6.962	-12.64	-0.180**	0.451***	2.729**	-0.055*	51.0
	(-0.915)	(-1.646)	(-2.317)	(3.214)	(2.586)	(-1.908)	
MV[b] = 12.8		60.9	4.0	37.6	1.90	103.3	
SD[c] = 13.3		58.2	28.6	15.9	2.08	72.3	

[a] t-values in parentheses. - [b] MV - mean value. - [c] SD = standard deviation. - * significant at the 10 percent level, ** significant at the 5 percent level. *** significant at the 1 per cent level.

V. Summary and Conclusions

The reduction and lifting of trade barriers comprises only one part of an economic liberalization program. In many countries regulations in the foreign trade regime are accompanied by regulations of the financial sector, which may also benefit particular economic sectors. The structure of distortions in the capital markets in a country may be in the same ("parallel distortions") or in the opposite direction ("compensatory distortions") as the distortions through trade policy, or without any observable parallels. In order to analyse these possible causalities empirically, this paper develops a method to measure the degree of protection in financial markets. The first section discusses some of the methodological problems of analysing distortions in financial markets. Although an extension of the concept of effective protection seems to be the more satisfactory method to measure the degree of protection on financial markets, there remain a number of conceptual problems to be solved.

For this reason, another approach had to be chosen. Finance decisions can be simulated under (hypothetical) undistorted financial market conditions; the differences to the observed capital structure may then be interpreted as influenced by governmental regulation. This method provides a country specific, endogenous reference situation and avoids the problems of "world market"-reference. The most important restrictions in this methods are the omission of foreign credits, the one-equation-approach neglecting supply side arguments and lack of proxies for some unobservable determinants of credit demand (e.g. investment risk).

Empirical analysis on industry-level has been undertaken for the case of long-term bank credit supply in Brazil and Peru. Although the results should be interpreted carefully, especially because the time series cover only periods with a high level of financial regulation, they lend some preliminary support to the hypotheses, that there is parallel influence on trade policy and financial market distortions in Brazil and antiparallel (compensatory) influence in Peru.

This would lead to the conclusion, that simultaneous implementation of trade liberalization and financial deregulation should be politically more sustainable in Peru than it is the case in Brazil. The losses of income in those industries previously gaining from high effective protection can be neutralized on the political level, if the distortions in the financial sector are removed in the same moment, which hits other industries. In Brazil, there is no chance for such a political neutralization, because the removal of trade restrictions hits just the same group of industries as the drawing back of preferential conditions for corporate finance; in that case, the government has to accept a negative trade-off between fostering the adjustment process and maintaining the structure of income distribution, which needs a (political) compromise.

A more careful analysis should consider the whole process of corporate finance and investment (as it has been sketched in the third section), although data shortcoming will remain a serious problem. In a parallel attempt, one should try to develop possible solutions for an extended protection indicator.

Finally, the degree of political influence on capital market regulation should be analysed in more specific forms (i.e. by identifying pressure groups and their strength). The recommendations for the "timing and sequencing" of structural adjustment programs could then be based on more detailed arguments concerning income distribution-effects and political opposition to be expected.

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