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Why Do Countries Use Capital Controls?

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Abstract

Recourse to controls on capital flows among developing economies is generally quite pervasive. This paper examines the structure and determinants of capital controls based on a cross-sectional study of developing and transition economies. It identifies categories of capital transactions that can be aggregated for analytical purposes. Controls are found to be related to the balance of payments, macroeconomic management, market and institutional evolution, prudential and other factors. The relationship with the balance of payments, however, is not robust to simultaneous equation analysis.

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Contents Page

SUMMARY

This study presents initial systematic evidence on the structure of capital controls and their determinants in a cross-section of 45 developing and transition economies. It first examines the structure of controls on individual capital transactions and the extent to which it would be appropriate to aggregate the individual transactions for the purposes of analysis. The paper then reviews the various motivations for controls on capital movements that are generally suggested in the literature. Finally, the paper examines empirically the extent to which the different motivations can explain the use of controls on different groups of transactions.

The research indicates that balance of payments and macroeconomic management, market and institutional evolution, prudential, and other factors are important in explaining countries' recourse to capital controls. The results point, however, to significant differences in the importance of these factors in explaining controls on inflows and outflows and on different types of capital transactions. For example, macroeconomic variables appear primarily to motivate controls on capital inflows, while institutional and market structure appear to motivate financial regulations related to the operation of banks and institutional investors. The relationship of capital controls to the balance of payments is not robust to simultaneous equation analysis. These findings generally support the view that capital controls have a limited role in balance of payments management, that controls on inflows are used to support macroeconomic objectives, and that recourse to capital controls reflects the overall framework for economic regulation and the degree of financial market development.

The paper concludes that the design of capital account liberalization program requires proper understanding of the factors motivating the network of capital controls, which is likely to require a more disaggregated analysis of capital controls than has been the case to date.

I. INTRODUCTION

This study presents initial systematic evidence on the structure of capital controls and their determinants in a cross-section of 45 developing and transition economies. To the best of our knowledge, it is the first study that examines the detailed structure of controls on capital movements. It has been facilitated by the information that is now reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)*. Beginning in 1996, data in the AREAER was expanded to cover capital movements in a comprehensive manner and was presented in a new tabular format.

In the wake of the Asian currency crisis, there has been renewed interest in the use of capital controls. The nature of transactions and structure of regulation that can influence international capital movements are, however, potentially numerous and highly complex. In some countries the use of capital controls is pervasive, while in others it is selective. In some countries the structure of controls appears to be a legacy of the past, while other countries appear to use controls as active instruments of macroeconomic and structural policy. In order to design programs of liberalization of the capital account, or the regulatory frameworks for capital movements, it would be helpful to know what factors have generally led to the regulation or deregulation of components of the capital account. In designing such programs, it would also be useful to know if the regulation or deregulation of certain capital transactions has generally been associated with the regulation or deregulation of other transactions. Answering these questions requires a detailed study of the structure of individual capital controls and their relationship with economic and structural variables. This is the purpose of this study; the study does not examine in detail whether capital controls have been effective in achieving their objectives.[2]

By considering economic factors explaining the structure of capital controls, the study complements earlier research on determinants of the capital regime as a whole. Alesina, Grilli, and Milesi-Ferretti (1994) and Grilli and Milesi-Ferretti (1995) found that capital controls are more likely to exist in countries with fixed or managed exchange rate regimes, lower per capita incomes, larger government consumption as a ratio to GDP, less independent central banks, and larger current account deficit. Focusing on the political economy of the capital regime in OECD countries, Quinn and Inclán (1997) created measures of financial openness including controls on current and capital transactions and showed that financial openness is linked to the weakness of left-wing governments and independence of the central bank. Johnston and others (1999) constructed relatively comprehensive indices of capital controls and showed that restrictive capital regimes, as measured by the indices, are associated with

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[2]The literature on the effectiveness and efficiency of capital controls generally concludes that such controls have not been very effective in achieving their objectives and introduce new distortions. For a recent survey, see, for example, Eichengreen and others (1998). Concern about the distortionary effects of such controls is, of course, one of the key reasons for liberalizing the capital account.

low levels of economic development, high tariff barriers, large black market premia, and high volatility of the exchange rates. Unlike the previous studies, this study focuses on the structure of capital controls rather than the overall capital regime.

The paper is organized as follows. Data on capital controls and stylized facts concerning the structure of capital controls are described in Section II. Section III reviews theoretical explanations of the use of capital controls. Section IV describes a simple empirical model of capital controls that synthesizes the existing explanations, and Section V discusses findings concerning determinants of capital controls. Section VI concludes.

II. Data and Stylized Facts Concerning Capital Controls

This section describes the classification of and data on capital controls that are used in this study and presents some stylized facts concerning the structure of capital controls that are supported by the data.

A. Data on Capital Controls

The study uses disaggregated measures of capital controls based on the classification and data in the IMF's AREAER. The framework for collecting and classifying information on controls on capital movements in the AREAER is summarized in Table 1. The classification scheme distinguishes between a number of different types of transactions, which contribute to capital movements such as securities, money market instruments, credit operations, direct investment, etc. The scheme also distinguishes between capital inflows and outflows, and between the different types of specific transactions, which can result in such flows, e.g., for inflows through securities, purchases of local securities by nonresidents and sales or issues of securities abroad by residents; and for outflows, purchases of securities abroad by residents and the sale or issue of securities locally by nonresidents. In addition, the database covers a number of provisions specific to commercial banks and institutional investors that can influence capital movements (such as reserve requirements discriminating between resident and nonresidents deposits, or open foreign position limits imposed asymmetrically with regard to short or long currency positions or vis-à-vis residents and nonresidents).

The information in the database is intended to be comprehensive and to include regulations that affect capital flows. The inclusion of information in the database does not imply any judgement of whether a measure is considered restrictive[3] or would be justified by the relevant circumstances, nor does the database seek to distinguish the purpose of controls, e.g., whether they are motivated by prudential or balance of payments considerations.

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[3]The determination of whether a measure is restrictive would depend on the precise jurisdictional framework that is used to assess the particular measure. The *OECD Code of Liberalization of Capital Movements* could, for example, provide a basis for determining whether a measure is restrictive.

Table 1. Types of Capital Transactions Possibly Subject to Controls

INFLOWS	OUTFLOWS
Capital and Money Markets	
Shares or other securities of a participating nature	
Purchase locally by nonresidents	Sale or issue locally by nonresidents
Sale or issue abroad by residents	Purchase abroad by residents
Bonds or other debt securities	
Purchase locally by nonresidents	Sale or issue locally by nonresidents
Sale or issue abroad by residents	Purchase abroad by residents
Money market instruments	
Purchase locally by nonresidents	Sale or issue locally by nonresidents
Sale or issue abroad by residents	Purchase abroad by residents
Collective investment securities	
Purchase locally by nonresidents	Sale or issue locally by nonresidents
Sale or issue abroad by residents	Purchase abroad by residents
Derivatives and other instruments	
Purchase locally by nonresidents	Sale or issue locally by nonresidents
Sale or issue abroad by residents	Purchase abroad by residents
Credit operations	
Commercial credits	
To residents from nonresidents	By residents to nonresidents
Financial credits	
To residents from nonresidents	By residents to nonresidents
Guarantees, sureties, and financial backup facilities	
To residents from nonresidents	By residents to nonresidents
Direct investment	
Inward direct investment	Outward direct investment
	Controls on liquidation of direct investment
Real estate transactions	
Purchase locally by nonresidents	Purchase abroad by residents
	Sale locally by nonresidents
Provisions specific to commercial banks	
Nonresident deposits	Deposits overseas
Borrowing abroad	Foreign loans
Personal capital movements: deposits, loans, gifts, endowments, inheritances, and legacies	
To residents from nonresidents	By residents to nonresidents
Settlements of debts abroad by immigrants	
Transfer into the country by immigrants	Transfer abroad by emigrants
Provisions specific to institutional investors	
	Limits (max.) on securities issued by nonresidents and on portfolio invested abroad
	Limits (max.) on portfolio invested locally

The information used in this study refers to a sample of 45 developing and transition countries, which, first, have close to complete data in the AREAER,[4] and, second, represent various geographical regions, levels of economic development, and experiences with capital account liberalization (see Appendix I for the list of countries).

B. Stylized Facts Concerning the Structure of Capital Controls

Summary statistics for aggregate measures of the extent of capital controls are presented in Table 2. These measures refer to:

- overall controls on capital movements;
- overall controls on capital inflows and overall controls on capital outflows;
- controls on inflows and controls on outflows pertaining to capital and money market securities, collective investment securities and derivative instruments;
- controls on inflows and controls on outflows pertaining to commercial and financial credits and guarantees and sureties;
- controls on inflows and controls on outflows related to direct investment and real estate; and
- provisions specific to commercial banks and other financial institutions.

Table 2 shows that controls on capital outflows are more prevalent than controls on inflows on all types of transactions, except in the case of direct foreign investment and real estate purchases. The incidence of measures specific to commercial banks and other financial institutions is lower than that of other types of capital controls in the country sample.

Tables 3–4 present correlation matrices for aggregate and individual measures of capital controls respectively. These tables illustrate a number of regularities between uses of different capital controls. Such regularities correspond to high and medium correlations, defined as correlation coefficients of 0.8–1.0 and 0.5–0.7, respectively. The following main conclusions emerge:

Concerning correlations between aggregate measures of capital controls (Table 3):

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[4]Nonavailable data are assumed to correspond to unregulated transactions.

Table 2. Summary Statistics for Aggregate Measures of Capital Controls 1/

Types of Capital Control	Mean	Standard Deviation	Mean as a Percent of Maximum Number of Controls
Overall Measure of Capital Controls	17.96	11.68	42.9
Controls on outflows	7.24	5.14	51.4
Controls on inflows	5.40	4.18	41.5
Controls on capital, money market and collective investment securities, and derivatives			
Controls on outflows	4.20	3.27	52.5
Controls on inflows	3.02	2.97	37.5
Controls pertaining to commercial and financial credits, and guarantees and sureties			
Controls on outflows	2.02	1.64	50.0
Controls on inflows	1.27	1.23	43.3
Controls on direct investment and purchases of real estate			
Controls on outflows	1.02	0.97	50.0
Controls on inflows	1.11	0.78	55.0
Provisions specific to commercial banks and other financial institutions 2/	1.87	1.58	31.7

1/ Total number of controls in the respective category, as classified and reported in AREAER.

2/ Includes differential reserve and liquid asset requirements, and interest rate and credit controls; investment regulations, and open foreign exchange position limits.

Table 3. Correlations Between Aggregate Measures of Capital Controls 1/

Type of Capital Control	Notation	IN	OUT	OCM	ICM	ICR	OCR	ODFI	IDFI	FIN
Controls on inflows	IN	1.0								
Controls on outflows	OUT	0.8	1.0							
Controls on outflows pertaining to capital and money market securities	OCM	0.7	0.9	1.0						
Controls on inflows pertaining to capital and money market securities	ICM	1.0	0.8	0.8	1.0					
Controls on outflows pertaining to commercial and financial credits, and guarantees and sureties	ICR	0.5	0.7	0.5	0.5	1.0				
Controls on inflows pertaining to commercial and financial credits, and guarantees and sureties	OCR	0.7	0.5	0.4	0.5	0.6	1.0			
Controls on outward direct foreign investment and purchase of real estate abroad by residents	ODFI	0.7	0.9	0.8	0.7	0.5	0.5	1.0		
Controls on inward direct foreign investment and purchase of real estate locally by nonresidents	IDFI	0.6	0.3	0.4	0.5	0.2	0.2	0.2	1.0	
Provisions specific to commercial banks and other financial institutions 2/	FIN	0.5	0.4	0.4	0.5	0.2	0.1	0.4	0.4	1.0

1/ Total number of controls in the respective category, as classified and reported in AREAER.

2/ Includes differential reserve and liquid asset requirements, and interest rate and credit controls; investment regulations, and open foreign exchange position limits.

Table 4. Correlations Between Individual Measures of Capital Controls 1/

Types of Capital Control		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)
Surrender requirements	(1)	1.0																												
Capital market securities: purchase locally by nonresidents	(2)	0.1	1.0																											
Capital market securities: sale or issue locally by nonresidents	(3)	0.2	0.4	1.0																										
Capital market securities: purchase abroad by residents	(4)	0.3	0.3	**0.5**	1.0																									
Capital market securities: sale or issue abroad by residents	(5)	0.3	0.4	**0.5**	0.4	1.0																								
Money market securities: purchase locally by nonresidents	(6)	0.2	**0.6**	**0.5**	**0.5**	0.3	1.0																							
Money market securities: sale or issue locally by nonresidents	(7)	0.3	0.3	**0.6**	**0.6**	**0.5**	**0.5**	1.0																						
Money market securities: purchase abroad by residents	(8)	0.4	0.2	**0.5**	**0.8**	0.4	**0.6**	**0.7**	1.0																					
Money market securities: sale or issue abroad by residents	(9)	0.3	0.4	**0.5**	**0.5**	**0.6**	**0.6**	**0.8**	**0.7**	1.0																				
Collective investment securities: purchase locally by nonresidents	(10)	0.1	**0.6**	0.3	0.2	0.2	**0.6**	**0.5**	0.3	**0.5**	1.0																			
Collective investment securities: sale or issue locally by nonresidents	(11)	0.2	0.1	**0.6**	0.4	0.3	0.4	**0.7**	**0.6**	0.4	0.4	1.0																		
Collective investment securities: purchase abroad by residents	(12)	0.3	0.2	0.4	**0.8**	0.4	**0.6**	**0.7**	**0.9**	**0.6**	0.4	**0.5**	1.0																	
Collective investment securities: sale or issue abroad by residents	(13)	0.4	0.4	**0.5**	**0.5**	0.4	**0.7**	**0.7**	**0.7**	**0.9**	**0.5**	**0.6**	**0.6**	1.0																
Derivatives: purchase locally by nonresidents	(14)	0.2	0.4	**0.5**	**0.5**	0.3	**0.7**	**0.6**	**0.6**	**0.6**	**0.6**	**0.5**	**0.5**	**0.6**	1.0															
Derivatives: sale or issue locally by nonresidents	(15)	0.2	0.4	**0.6**	**0.6**	0.4	**0.6**	**0.7**	**0.7**	**0.5**	**0.5**	**0.6**	**0.6**	**0.5**	**0.7**	1.0														
Derivatives: purchase abroad by residents	(16)	0.4	0.4	**0.5**	**0.6**	**0.6**	**0.6**	**0.6**	**0.7**	**0.5**	0.4	0.4	**0.7**	**0.5**	**0.5**	**0.7**	1.0													
Derivatives: sale or issue abroad by residents	(17)	0.4	0.4	**0.6**	**0.5**	**0.6**	**0.5**	**0.6**	**0.6**	**0.6**	**0.5**	0.4	**0.5**	**0.5**	**0.6**	**0.7**	**0.8**	1.0												
Commercial credits: by residents to nonresidents	(18)	0.1	0.3	0.1	0.2	0.2	0.3	0.2	0.1	0.2	0.2	-0.1	0.2	0.1	0.1	0.1	0.3	0.2	1.0											
Commercial credits: to residents from nonresidents	(19)	0.3	**0.5**	0.1	0.2	0.2	0.4	0.3	0.2	0.3	0.3	0.1	0.2	0.4	0.4	0.2	0.3	**0.5**	0.3	1.0										
Financial credits: by residents to nonresidents	(20)	0.2	0.1	0.3	**0.6**	0.3	0.3	**0.6**	**0.6**	0.4	0.1	0.4	**0.5**	0.4	0.4	0.4	**0.6**	**0.5**	**0.6**	0.4	1.0									
Financial credits: to residents from nonresidents	(21)	0.4	0.4	0.2	0.4	0.3	0.4	0.3	0.3	0.4	0.3	0.1	0.3	0.4	**0.5**	0.3	0.3	**0.5**	**0.5**	**0.7**	**0.5**	1.0								
Guarantees and sureties: by residents to nonresidents	(22)	0.2	0.3	0.3	0.3	0.2	**0.5**	0.4	0.4	0.3	0.3	0.2	0.4	0.3	0.3	0.4	**0.6**	**0.5**	**0.7**	0.4	**0.7**	**0.5**	1.0							
Guarantees and sureties: to residents from nonresidents	(23)	0.2	0.1	0.1	0.2	0.2	0.3	0.4	0.3	0.3	0.2	0.3	0.3	0.4	0.3	0.1	0.2	0.2	0.3	**0.5**	**0.5**	**0.5**	**0.5**	1.0						
Outward direct investment	(24)	**0.5**	0.4	**0.5**	**0.8**	**0.5**	**0.6**	**0.5**	**0.8**	**0.5**	0.3	0.4	**0.8**	**0.6**	**0.5**	**0.6**	**0.7**	**0.6**	0.4	0.4	**0.6**	**0.5**	**0.5**	0.3	1.0					
Inward direct investment	(25)	0.0	0.3	**0.5**	0.0	0.3	0.3	0.2	0.1	0.3	0.3	0.3	0.0	0.3	0.2	0.2	0.1	0.2	0.1	0.3	0.0	0.1	0.1	0.2	0.1	1.0				
Liquidation of direct investment	(26)	0.1	0.3	0.3	0.2	0.2	**0.6**	0.3	0.3	0.3	0.4	0.2	0.3	0.4	0.2	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.4	**0.5**	0.4	0.4	1.0			
Real estate: purchase abroad by residents	(27)	**0.5**	0.3	**0.5**	**0.7**	**0.5**	**0.7**	**0.6**	**0.8**	**0.6**	0.3	**0.5**	**0.8**	**0.7**	**0.6**	**0.6**	**0.6**	**0.6**	0.2	0.3	**0.5**	**0.5**	0.4	0.4	**0.8**	0.1	0.4	1.0		
Real estate: purchase locally by nonresidents	(28)	0.0	0.3	0.4	0.3	0.3	0.2	0.4	0.2	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.3	-0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.2	0.2	0.3	1.0	
Real estate: sale locally by nonresidents	(29)	0.0	**0.5**	0.1	0.3	0.3	0.4	0.4	0.2	0.4	0.4	0.2	0.3	0.4	0.4	0.3	0.2	0.2	0.1	0.3	0.2	0.4	0.2	0.4	0.4	0.2	**0.5**	0.4	**0.5**	1.0
Banks: borrowing abroad	(30)	0.2	0.4	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.2	0.2	0.4	**0.5**	0.4	**0.5**	**0.6**	0.2	**0.5**	0.4	0.4	0.3	0.3	**0.5**	0.2	0.3	0.4	0.2	0.2
Banks: maintenance of accounts abroad	(31)	0.2	0.3	0.3	0.3	0.1	**0.6**	0.4	0.4	0.4	0.3	0.3	0.3	**0.5**	0.4	0.3	0.3	0.3	0.2	0.4	0.4	0.3	0.3	0.4	0.3	**0.5**	0.4	0.4	0.1	0.1
Banks: lending to nonresidents (financial or commercial credits)	(32)	0.1	0.2	0.4	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.2	0.3	0.4	0.3	0.4	0.4	0.4	0.3	0.5	0.4	**0.6**	0.4	0.4	**0.5**	0.3	0.3	0.0	0.1
Banks: lending locally in foreign exchange	(33)	0.1	0.2	0.4	0.3	0.4	0.3	0.4	0.4	0.3	0.3	**0.5**	0.3	0.3	0.4	**0.6**	**0.6**	**0.6**	0.2	0.3	0.4	0.2	0.3	0.2	0.4	0.2	0.2	0.4	0.0	0.1
Banks: purchase of locally issued securities denominated in foreign exchange	(34)	0.2	0.2	**0.5**	0.1	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.3	0.2	0.2	0.1	0.4	0.1	0.3	0.4	0.4	0.3	0.0	-0.1
Banks: differential reserve requirements	(35)	0.2	0.3	0.2	0.2	0.2	0.4	0.2	0.3	0.4	0.4	0.1	0.3	0.4	0.3	0.2	0.2	0.3	-0.1	0.1	0.0	0.0	0.1	0.0	0.2	0.2	0.2	0.3	0.1	0.1
Banks: differential liquid asset requirements	(36)	0.0	0.2	0.1	0.1	0.0	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.1	0.1	0.2	0.2	0.0	0.2
Banks: differential interest rate controls	(37)	0.1	**0.5**	0.2	0.1	0.0	**0.5**	0.3	0.2	0.3	0.4	0.2	0.3	0.3	0.4	0.3	0.1	0.2	0.1	0.3	0.2	0.2	0.3	**0.5**	0.2	0.4	**0.5**	0.3	0.2	**0.5**
Banks: differential credit controls	(38)	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.0	0.1	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.4	0.2	0.2
Banks: investment regulations	(39)	0.2	0.3	0.3	0.2	0.3	0.3	0.4	0.3	0.3	0.1	0.2	0.2	0.3	-0.1	0.1	0.3	0.2	0.3	0.1	0.2	0.0	0.3	0.0	0.3	0.3	0.3	0.3	0.2	0.2
Banks: open foreign exchange position limits	(40)	0.1	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.3	0.1	0.1	0.2	0.2	0.3	0.4	0.4	**0.5**	-0.1	0.1	0.2	0.1	0.1	-0.1	0.2	0.2	0.1	0.3	0.2	0.1
Institutional investors: limits (max.) on portfolio invested abroad	(41)	0.1	0.0	0.3	0.2	0.3	0.1	0.4	0.2	0.4	0.2	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.1	0.1	0.3	0.3	0.2	0.2	0.3	0.4	0.2	0.2	0.1	0.1
Institutional investors: limits (min.) on portfolio invested locally	(42)	0.1	0.0	0.3	0.2	0.1	0.1	0.2	0.3	0.3	0.2	0.4	0.3	0.3	0.2	0.0	0.1	0.2	-0.1	-0.1	0.0	0.1	0.0	0.1	0.1	0.2	-0.1	0.1	0.0	-0.1
Institutional investors: currency matching regulations on assets/liabilities composition	(43)	-0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.2	-0.1	-0.1	-0.1	-0.1	0.1	-0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.1
Other controls imposed by securities laws	(44)	-0.1	0.0	0.0	0.2	0.1	0.0	0.3	0.3	0.1	0.1	0.3	0.3	0.1	0.0	0.1	0.3	0.2	0.0	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

1/ Dummy variables based on AREAER.

Types of Capital Control		(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)
Surrender requirements	(1)															
Capital market securities: purchase locally by nonresidents	(2)															
Capital market securities: sale or issue locally by nonresidents	(3)															
Capital market securities: purchase abroad by residents	(4)															
Capital market securities: sale or issue abroad by residents	(5)															
Money market securities: purchase locally by nonresidents	(6)															
Money market securities: sale or issue locally by nonresidents	(7)															
Money market securities: purchase abroad by residents	(8)															
Money market securities: sale or issue abroad by residents	(9)															
Collective investment securities: purchase locally by nonresidents	(10)															
Collective investment securities: sale or issue locally by nonresidents	(11)															
Collective investment securities: purchase abroad by residents	(12)															
Collective investment securities: sale or issue abroad by residents	(13)															
Derivatives: purchase locally by nonresidents	(14)															
Derivatives: sale or issue locally by nonresidents	(15)															
Derivatives: purchase abroad by residents	(16)															
Derivatives: sale or issue abroad by residents	(17)															
Commercial credits: by residents to nonresidents	(18)															
Commercial credits: to residents from nonresidents	(19)															
Financial credits: by residents to nonresidents	(20)															
Financial credits: to residents from nonresidents	(21)															
Guarantees and sureties: by residents to nonresidents	(22)															
Guarantees and sureties: to residents from nonresidents	(23)															
Outward direct investment	(24)															
Inward direct investment	(25)															
Liquidation of direct investment	(26)															
Real estate: purchase abroad by residents	(27)															
Real estate: purchase locally by nonresidents	(28)															
Real estate: sale locally by nonresidents	(29)															
Banks: borrowing abroad	(30)	1.0														
Banks: maintenance of accounts abroad	(31)	0.4	1.0													
Banks: lending to nonresidents (financial or commercial credits)	(32)	0.3	0.4	1.0												
Banks: lending locally in foreign exchange	(33)	**0.5**	0.3	0.4	1.0											
Banks: purchase of locally issued securities denominated in foreign exchange	(34)	0.3	0.4	0.3	0.4	1.0										
Banks: differential reserve requirements	(35)	0.3	0.3	0.2	0.0	0.2	1.0									
Banks: differential liquid asset requirements	(36)	0.1	0.2	0.2	0.2	0.2	**0.5**	1.0								
Banks: differential interest rate controls	(37)	0.3	**0.5**	0.3	0.0	0.3	0.3	0.3	1.0							
Banks: differential credit controls	(38)	0.2	0.2	0.1	0.3	0.4	0.3	**0.5**	0.3	1.0						
Banks: investment regulations	(39)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.2	1.0					
Banks: open foreign exchange position limits	(40)	0.4	0.4	0.0	0.3	0.2	0.3	0.1	0.1	0.3	0.1	1.0				
Institutional investors: limits (max.) on portfolio invested abroad	(41)	0.2	0.3	**0.5**	0.3	0.1	0.0	0.0	0.1	0.1	0.0	0.2	1.0			
Institutional investors: limits (min.) on portfolio invested locally	(42)	-0.2	0.1	0.2	0.0	0.0	0.3	0.0	-0.1	-0.1	-0.1	-0.1	0.4	1.0		
Institutional investors: currency matching regulations on assets/liabilities composition	(43)	-0.1	0.0	0.1	0.0	0.1	0.1	0.3	0.1	0.0	0.1	-0.3	0.1	0.4	1.0	
Other controls imposed by securities laws	(44)	0.1	0.2	0.0	0.3	0.1	0.0	0.2	-0.1	0.0	0.1	0.2	0.4	0.4	0.2	1.0

1/ Dummy variables based on AREAER.

- There are *high* correlations between controls on inflows and outflows pertaining to capital and money market operations, suggesting that these are imposed together. There are also high correlations between outflows of foreign direct investment and real estate and controls on outflows (and inflows) pertaining to money and capital market transactions, suggesting fungibility between these transactions.

- There are *medium* correlations between controls on inflows and outflows pertaining to credit operations; between controls on inflows of direct investment and inflows through capital and money market securities; and between controls on inflows and outflows of credits and controls on inflows and outflows through capital and money market securities.

- There is generally limited correlation between controls on inflows and outflows related to direct investment and real estate, and between provisions specific to commercial banks and other financial institutions and other capital controls. This would suggest that these controls are normally imposed for different purposes. Inflows of direct investment, for example, are often regulated for noneconomic reasons (i.e., social, sectoral, and strategic).[5]

Concerning correlations between controls on individual transactions (Table 4):

- There are *high* and *medium* correlations between controls on purchases abroad by residents of capital market securities, money market securities, collective investment securities and derivative products and the issue locally of those by nonresidents. This is the group of transactions that makes up the aggregate category "controls on outflows pertaining to capital and money market securities, collective investment securities and derivative instruments". Similarly, high and medium correlations are found between the individual components making up the category "controls on inflows pertaining to capital and money market securities, collective investment securities and derivative instruments". These correlations suggest that controls on inflows and outflows related to capital and money markets tend to be applied consistently regardless of the maturity of the transaction, possibly reflecting substitutability among the respective transactions. High and medium correlations also exist between the individual components comprising the category "controls on inflows and outflows pertaining to commercial and financial credits, guarantees and sureties". Controls on outward direct investment and real estate purchases abroad are also highly correlated; there is medium correlation between controls on liquidation of direct investment and sales of real estate locally by nonresidents. All in all, high and medium correlations between controls on individual transactions provide a statistical basis for the respective aggregate measures discussed above.

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[5]Most members of the OECD maintain reservations under the *OECD Code of Liberalization of Capital Movements* on direct investment inflows.

- Correlations between the individual controls that pertain to commercial banks and institutional investors and other capital controls are generally *low*. For instance, there is little correlation between the use of differential reserve requirements on resident and nonresident liabilities and controls on other transactions or measures pertaining to other activities of banks and institutional investors. However, correlations exist between controls on banks' open position limits, on their lending locally in foreign exchange and controls on derivative transactions more generally; and between differential interest rate controls and controls on various underlying capital transactions. This suggests that certain bank regulations complement other types of capital controls, or vice versa.

III. Theoretical Explanation of Capital Controls

A number of different motivations have been suggested for maintaining controls on capital movements. While there is some overlap between the motivations, they can generally be classified into those related to: (1) balance of payments and macroeconomic management; (2) underdeveloped financial markets and regulatory systems (referred to as market and institutional evolution reasons); (3) prudential; and (4) other reasons. The latter may include international and national security, structural considerations related to economic size, openness to trade, etc.; and social, sectoral, and strategic considerations. These reasons are discussed in more detail below.

A. Balance of Payments and Macroeconomic Management

Historically, capital controls have most often been justified as one of the instruments for balance of payments and macroeconomic management. Thus, the classic rationale for the use of exchange controls has referred to countries with *weak balance of payments* which sought to prevent an outflow of capital by imposing capital controls. The evidence that controls have protected the balance of payments in developing countries against outflows is, however, generally weak (see Johnston and Ryan (1994)).

This balance of payments argument is also variously presented in terms of preserving a *shortage of domestic savings* for domestic uses, or of preserving a capacity to finance the domestic fiscal deficit through an *inflation tax*. If a country faces problems in financing the fiscal and balance of payments deficits, capital controls may have an the objective of reducing the domestic debt-servicing costs and preserving the domestic inflation base by keeping domestic interest rates low (Drazen (1989)). The role of capital controls in debt financing, however, is likely to be limited, partly because, by depressing domestic interest rates, capital controls penalize investors in domestic assets and discourage domestic saving.

A somewhat more sophisticated version of the rationale for capital controls concerns their use to help maintain or achieve a degree of monetary and exchange rate *policy autonomy*. In essence, capital controls are used in an attempt to reconcile the use of interest

rates and the exchange rates to pursue, simultaneously, at least partially inconsistent internal and external balance objectives. Generally, outflow controls seek to avoid nominal currency depreciation pressures without the tightening of monetary conditions or other difficult policy measures otherwise needed. Inflow controls, conversely, are used as a way to minimize nominal exchange rate appreciation pressures in the face of substantial capital inflows, without sacrificing control over domestic monetary conditions. Policy autonomy, however, often comes at the expense of policy discipline.

Capital controls are sometimes justified for macroeconomic reasons by *asymmetric information problems* and herding behavior in capital markets (e.g., see Tobin (1978), Dornbusch (1986), Tornell (1990), Mishkin (1996), and Eichengreen and Mussa (1998)), and the need to reduce the volatility of short-term capital flows and the associated volatility of exchange rates.

Capital controls have also been linked to the objective of *protecting a fixed exchange rate regime*. If exchange rates are pegged, free short-term movements of capital could lead to large fluctuations in international reserves, interest rates, and even a collapse of a fixed exchange rate regime. Capital controls may serve as a short-term line of defense (see for example, Krugman (1979), Flood and Garber (1984), Grilli (1986), and Obstfeld (1986)).

Capital controls may also be motivated by the overall framework for macroeconomic and balance of payments management in *financially repressed economies* (Johnston and Sundararajan 1999). Such economies are generally characterized by widespread restrictions on interest rates, high reserve requirements, credit ceilings, government directed credit, weak financial sector competition, and capital controls.

B. Market and Institutional Evolution

A second rationale for capital controls is linked to the insufficient level of development of domestic financial markets and institutions. Controls on inflows are sometimes justified by the need to *protect infant industries* and less developed financial markets. Two different versions of the infant industry argument can be found in the trade literature. One version states that, when protected by a tariff, infant industries will gain economies of scale and thus achieve a higher level of output. The second version notes that domestic industry will be able to lower its production costs thanks to learning by doing. Both versions try to justify temporary tariffs. However, the existence of economies of scale or learning effects is not sufficient to justify protection, since the initial high cost of production could be borne by the firm as a kind of investment financed via the capital market. A case for infant industry protection could be made when the capital market does not work efficiently. Direct subsidization, development of the capital market or government loans to the industry would be superior because such measures would deal directly with the original distortion and avoid the adverse effects of trade protection on consumption and other domestic industries. Besides, there is a risk that temporary protection would become permanent. Similar issues arise in the application of the infant industry argument to financial markets. By restricting the introduction

of new financial products and limiting competition in the domestic financial system, capital controls may hinder rather than facilitate the development of financial markets and institutions.

More generally, the infant industry argument for trade protection belongs to the category of the *second-best solutions* in welfare economics. The basic idea of the second best is simply that if an economy is assumed to suffer from one distortion and it is difficult to tackle this distortion directly, it might be possible to increase welfare by adding another, off-setting distortion (see Dooley (1996)). The first-best solution, of course, would be to address the underlying distortion. In emerging countries sources of distortions may include information problems, weak or insolvent banking systems, moral hazard problems related to official guarantees and the absence of developed financial markets.[6]

Capital mobility reduces the *effectiveness of direct credit and interest rate controls* maintained for monetary policy reasons because of the increased scope for the circumvention of such controls through capital flows (see Johnston (1998)). Thus, a country might seek to limit capital movements when its indirect monetary control instruments are nascent and time is needed to develop the instruments, markets, and institutional capacity to rely on indirect measures. Such instruments can, nevertheless, often be introduced quickly through "open market-type" operations (see Johnston and Sundararajan (1999)).

C. Prudential Reasons

A third general motivation for the use of capital controls is their role as prudential measures. It is generally recognized that international transactions may involve *different types of risk* from those affecting comparable domestic transactions. These different types of risk include, inter alia, transfer risk, sovereign risk, and country risk. Differential requirements for the listing and trading of foreign securities in domestic markets could also be justified because of different supervisory and accounting standards, or greater difficulties in enforcement in the context of different national jurisdictions (see Johnston (1998)).

The use of capital controls is also justified by the need to preserve *systemic stability*. To the extent that capital controls help limit excessive foreign exchange exposure of domestic institutions, or help lengthen the maturity of liabilities of financial institutions, they could help protect the stability of the financial system. However, the prudential role of capital controls

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[6]One impediment to the efficient functioning of the financial system is asymmetric information (see Mishkin (1997)). For example, borrowers have generally superior information on the likely returns and risk of their planned investment than the lender. Asymmetric information can lead to adverse selection before the transaction occurs and to moral hazard afterwards and thus to an inefficient equilibrium. A related problem is the free-rider problem that can evolve because market participants avoid spending resources on information gathering and instead try to make use of information other market participants (presumably) have. This free-rider problem can lead to sub-optimal levels of financial transactions and to herd behavior.

may be limited: by preventing portfolio diversification, capital controls tend to increase investment risk, and, by slowing down the development of financial markets, they reduce liquidity and hence the quality of financial assets. Capital controls are also ill-designed for addressing specific financial risks, and the circumvention of the controls may result in the channeling of transactions through the instruments or institutions that are more risky and less well regulated, thereby increasing systemic risks.

Imposing capital controls is often a less efficient and less effective way of controlling financial risks than an oversight of the internal capacity of supervised institutions to manage risk and greater public disclosure of information; such prudential measures would have little, if any, restrictive impact on capital movements. Nevertheless, in the countries that are in the process of developing their prudential and supervisory arrangements, and where there is a limited capacity to adequately design, implement, or enforce prudential measures, the authorities may need to rely on capital controls for prudential reasons. An example would be prohibitions imposed by countries on the issue of securities by nonresidents on their local financial markets because of their limited supervisory capacity or an inadequate regulatory framework for such issues. Restrictions aimed at limiting the volume of capital inflows or changing the composition of such inflows might also be justified where the financial system is unsound and the member needs time to restructure the banking system and to introduce, implement, and strengthen the enforcement of minimal prudential standards.

D. Other Reasons

In addition to the reasons listed above, the use of capital controls could be motivated by a variety of other factors. These include economic size, and openness; the general features of the regulatory system; and social, sectoral, and strategic concerns, particularly as regards controls on inward direct investment. *Larger countries*, it is argued, have more opportunities for the diversification of investment, and hence have less incentives to open their capital account than smaller countries. The *overall openness* of the economy may affect the intensity of capital controls: on one hand, more open economies tend to be more prone to external shocks and may introduce exchange and capital controls to mitigate such shocks; on the other hand, there are more opportunities for circumventing capital controls in a more open economy, and, more generally, the liberalization of certain components of the capital account, such as trade finance, is complementary to trade liberalization. Widespread capital controls may also reflect the government's philosophy about the *optimal extent of intervention* in the economy in general, weakening public and corporate governance and reducing transparency. Inflows of direct foreign investment to important or sensitive sectors could also be controlled for security, national sovereignty and cultural reasons.

IV. A Simple Empirical Model of Capital Controls

The synthesis of the theoretical explanations of capital controls points to a possible conceptual framework for modeling capital controls. Consistent with the motivations discussed above, capital controls are likely to depend on factors related to balance of

payments and macroeconomic management, market and institutional evolution, prudential, and other reasons. Thus, a general *single-equation model* of capital control of type k could be constructed as follows:

$$Y_k=\alpha_k+\beta_{BOP}X_{BOP}+\beta_{MACRO}X_{MACRO}+\beta_{INST}X_{INST}+\beta_{PRUD}X_{PRUD}+\beta_{OTHER}X_{OTHER}, \quad (1)$$

where Y_k represents a measure of the intensity of capital control of type k, X_{BOP} is a vector of regressors representing balance of payments factors, X_{MACRO} represents macroeconomic management factors, X_{INST} is market and institutional evolution factors, X_{PRUD} is prudential factors, and X_{OTHER} captures other factors.

The following types of capital control are examined:

- overall controls on capital movements (denoted by *CC*);
- overall controls on capital inflows and outflows (*IN* and *OUT*, respectively);
- controls on inflows and outflows pertaining to capital market, money market and collective investment securities and derivative instruments (*ICM* and *OCM*, respectively);
- controls on inflows and outflows pertaining to commercial and financial credits, and guarantees and sureties (*ICR* and *OCR*, respectively);
- controls on inflows and outflows pertaining to direct foreign investment and real estate transactions (*IDFI* and *ODFI*, respectively); and
- provisions specific to commercial banks and other financial institutions (*FIN*).

The regressors that are candidates for explaining capital controls include:

- X_{BOP}: overall balance as a ratio to GDP (denoted by *BOP*), current account deficit as a ratio to GDP (*CURDEF*), external borrowing as a ratio to GDP (*EXTBOR*), and gross international reserves in months of imports (*RESIM*);
- X_{MACRO}: government deficit as a ratio to GDP (denoted by *GOVDEF*), inflation (*INF*), Eurodollar rate spread (*INTEURO*), real interest rate (*REALINT*), an index representing the de facto exchange regime (*ERDF*), an index representing official exchange regime (*EROFF*), a dummy variable indicating an exchange rate peg (*PEG*), average annual change in nominal effective exchange rate (*NEER*), absolute value of average annual change in nominal effective exchange rate (*NEERABS*), and average annual change in real effective exchange rate (*REER*);

- X_{INST}: bank deposits as a ratio to GDP (denoted by *DEPBK*), intermediation spread (*INT*), value of stocks traded as a ratio to GDP (*STOCKVAL*), a dummy variable indicating the existence of a forward market (*FORWARD*), and a dummy variable indicating the existence of a treasury bill market (*TB*);

- X_{PRUD}: a dummy variable indicating the recent problems in the banking sector (denoted by *BKPROB*); and

- X_{OTHER}: trade as ratio to GDP (*EXIM*), an index of economic freedom in banking (*FRBK*), an index of economic freedom in tax policy (*FRTAX*), an index of economic freedom in domestic regulation (*FRREG*), gross domestic product (*GDP*), GDP per capita (*GDPPC*), and a dummy variable indicating oil-producing countries (*OIL*).

For each type of capital control, a parsimonious model is developed through general-to-specific modeling. The modeling of a given type of capital control starts from a general, unrestricted multivariate regression model incorporating a multitude of proxies for each group of factors. The general model is estimated by the ordinary-least-squares method (OLS)[7] and subjected to an array of diagnostic tests. The model is sequentially respecified until diagnostic tests point to a satisfactory, parsimonious model. The diagnostic tests include F and t tests for omitted and irrelevant variables, Chow tests for the constancy of parameters and the model as a whole (including 1-step, break-point, and forecast F-tests), and Durbin-Watson test. If a diagnostic is significant, it is interpreted as indicating misspecification.

Next we model capital controls as *systems of equations* to reflect the simultaneity of decision-making about various types of capital control. Three systems are considered:

- System I, with equations for overall capital controls (*CC*) and financial controls (*FIN*);

- System II, with equations for overall controls on inflows and controls on outflows (*IN* and *OUT*, respectively); and

- System III, with equations for controls on inflows and controls on outflows related individually to capital and money markets, credit operations, and direct foreign investment (*ICM, ICR, IDFI, OCM, OCR, ODFI* respectively).

The systems of equations are estimated using full-information maximum-likelihood methods (FIML). Starting with a general system, we sequentially impose zero restrictions on coefficients. Testing the validity of restrictions points to a parsimonious, encompassing model of capital controls.

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[7]Series for measures of capital controls are smoothed by a natural cubic spline, with correlation coefficients between smoothed and original series being close to 0.9999. This allows one to estimate models using OLS.

The estimation of the above models requires data on various proxies of balance of payments, macroeconomic, institutional and other factors that could explain the use of capital controls. Data and notation for the explanatory variables are described in Appendix II. Summary statistics are presented in Table 5. The explanatory variables characterized by relatively large short-term fluctuations (mainly macroeconomic variables) are averaged. For the dependent and explanatory variables related to institutions and regulations that tend to change over medium to long term, averaging is not critical. However, as discussed below, the results need to be interpreted cautiously because of the potential endogenous relationship between the use of controls and some of the explanatory variables. A simple check for such feedback effects is performed by examining capital controls as part of a simple simultaneous equation framework, including equations for the balance of payments, macroeconomic variables and capital controls.

V. Empirical Explanation of Capital Controls

The single-equation and system estimates of determinants of capital controls are presented in Tables 6–7. The models of overall capital controls and controls on inflows have a better fit and relatively high R-squares of about 0.55–0.68, compared to the models of controls on outflows and financial controls. F-statistics for all models are significant at the 95 percent level (except for the model of controls on outflows pertaining to credit operations). Residuals are found to be homoscedastic.[8] For all models, the Durbin-Watson statistic is close to 2, indicating that there is no problem of association between adjacent residuals. Chow tests imply the constancy of coefficients and models (based on rankings with respect to the variables excluded from the parsimonious models), except for the models of controls on outflows pertaining to credit operations.

A. Broad Indicators of the Capital Control Regime

Overall, ***controls on capital movements*** appear to be imposed because of the factors that reflect most of the reasons cited above. The estimates indicate significant relationships with the following factors: the balance of payments (as measured by the level of international reserves in months imports); macroeconomic management (the government deficit as a percent of GDP, high real interest rates, and real exchange rate appreciation); institutional and market evolution factors (the size of the domestic banking system as measured by the ratio of

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[8]The hypothesis of residuals' normality is narrowly rejected, possibly reflecting the discrete nature of the original data on capital controls that cannot be fully eliminated by smoothing. Hence, the OLS estimator is the best estimator only among linear (rather than all) unbiased estimators. Test statistics are likely to have an asymptotic distribution equivalent to the respective tabulated distributions.

Table 5a. Descriptive Statistics

	BKPROB	BOP	CURDEF	DEPBK	ERDF	EROFF	EXIM	EXTBOR	FORWARD	FRTR	FRREG	FRTAX	FRBK	GDP	GDPPC	GOVDEF	INF	INT	INTEURO	NEER	NEERABS	PEG	REALINT	REER	RESIM	STOCKVAL	TB	OIL
Mean	1.00	-0.18	4.69	36.72	4.00	4.00	60.84	4.25	1.00	4.00	4.00	4.00	3.00	85.55	2136.60	3.99	63.76	15.21	13.58	-2.92	11.25	1.00	5.44	1.26	4.40	9.11	1.00	1.00
Minimum	0.00	-21.31	-13.97	4.84	1.00	1.00	14.00	-3.50	0.00	1.00	1.00	1.00	1.00	0.37	180.10	-2.80	2.20	-1.45	-2.72	-100.68	0.00	0.00	0.00	-11.64	0.85	0.00	0.00	0.00
Maximum	1.00	5.21	41.42	120.96	5.00	5.00	194.40	26.40	1.00	5.00	5.00	5.00	4.00	623.21	16976.00	15.10	1011.90	217.49	95.99	57.44	100.68	1.00	11.76	15.52	13.39	172.05	1.00	1.00
Count	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45.00	45	45	45	45	45	45	45	45	45	45

Table 5b. Correlations

	BKPROB	BOP	CURDEF	DEPBK	ERDF	EROFF	EXIM	EXTBOR	FORWARD	FRTR	FRREG	FRTAX	FRBK	GDP	GDPPC	GOVDEF	INF	INT	INTEURO	NEER	NEERABS	PEG	REALINT	REER	RESIM	STOCKVAL	TB	OIL
BKPROB	1.00																											
BOP	0.13	1.00																										
CURDEF	-0.15	-0.63	1.00																									
DEPBK	-0.14	-0.12	0.14	1.00																								
ERDF	0.27	0.00	-0.05	-0.35	1.00																							
EROFF	0.16	-0.10	0.14	-0.21	0.93	1.00																						
EXIM	0.12	-0.04	-0.04	0.33	-0.01	-0.05	1.00																					
EXTBOR	-0.10	-0.41	0.82	0.07	-0.02	0.13	0.08	1.00																				
FORWARD	-0.14	0.06	0.07	0.19	0.05	0.07	0.11	0.07	1.00																			
FRTR	-0.01	-0.10	-0.04	-0.35	0.14	0.03	-0.26	-0.09	0.01	1.00																		
FRREG	0.23	-0.08	0.07	-0.27	0.18	0.15	-0.19	0.03	-0.03	0.45	1.00																	
FRTAX	0.43	0.10	-0.03	-0.13	0.03	-0.09	0.04	-0.12	-0.15	0.29	0.25	1.00																
FRBK	0.23	0.11	-0.17	-0.15	0.20	0.10	-0.09	-0.04	-0.03	0.41	0.48	0.12	1.00															
GDP	0.16	0.09	-0.20	-0.10	0.13	0.09	-0.37	-0.22	-0.04	0.09	0.06	0.11	0.25	1.00														
GDPPC	-0.24	0.08	-0.31	0.41	-0.29	-0.28	0.04	-0.23	0.00	-0.39	-0.56	-0.50	-0.10	0.13	1.00													
GOVDEF	-0.05	-0.23	0.38	0.13	-0.14	-0.04	-0.02	0.39	-0.27	0.08	0.16	0.11	0.06	-0.17	0.02	1.00												
INF	0.18	0.11	-0.07	-0.21	0.13	0.11	-0.21	-0.08	0.15	0.03	0.06	0.09	0.09	0.46	0.01	-0.03	1.00											
INT	0.19	0.02	-0.08	-0.23	0.07	0.05	-0.13	-0.12	-0.13	-0.02	0.01	0.09	0.08	0.31	-0.02	0.13	0.39	1.00										
INTEURO	0.22	0.11	-0.04	-0.37	0.29	0.28	-0.21	-0.02	-0.10	-0.04	0.07	0.09	0.13	0.39	-0.06	0.13	0.52	0.84	1.00									
NEER	-0.02	-0.13	0.09	0.05	-0.03	-0.01	0.06	0.18	-0.19	-0.19	-0.04	-0.27	-0.19	-0.08	0.03	-0.03	-0.45	-0.19	-0.28	1.00								
NEERABS	0.14	0.20	0.05	-0.43	0.13	0.10	-0.12	0.05	-0.07	-0.08	0.00	0.12	0.06	-0.11	-0.16	0.09	0.41	0.29	0.32	-0.40	1.00							
PEG	-0.40	0.04	-0.13	0.28	-0.76	-0.75	0.03	-0.12	-0.01	-0.16	-0.18	-0.10	-0.14	-0.13	0.31	-0.08	-0.18	-0.16	-0.39	0.06	-0.18	1.00						
REALINT	-0.15	0.10	-0.21	0.00	0.33	0.33	-0.20	-0.23	0.06	0.06	0.20	-0.14	0.14	0.03	-0.03	-0.24	-0.37	-0.30	-0.15	0.11	-0.17	-0.11	1.00					
REER	0.08	0.12	-0.04	0.19	0.01	0.13	-0.07	-0.10	0.12	-0.20	-0.15	-0.09	-0.20	0.19	-0.01	-0.01	0.41	0.37	0.34	-0.20	0.08	-0.24	-0.27	1.00				
RESIM	-0.13	-0.07	0.21	0.29	-0.01	0.13	-0.23	0.16	0.22	-0.12	-0.21	-0.19	-0.16	0.15	0.18	0.01	0.07	0.04	-0.07	0.30	-0.14	-0.14	0.01	0.34	1.00			
STOCKVAL	0.02	0.00	-0.02	0.34	0.08	0.05	0.44	-0.02	0.20	-0.15	-0.29	-0.16	0.10	0.14	0.18	-0.30	-0.04	-0.10	-0.16	0.04	-0.17	-0.02	0.06	0.00	0.02	1.00		
TB	0.14	-0.11	-0.06	0.06	0.20	0.18	0.02	-0.08	0.06	0.05	0.26	-0.17	0.20	0.02	0.13	0.16	-0.04	0.11	0.15	0.07	-0.21	-0.36	0.24	0.04	-0.09	0.04	1.00	
OIL	-0.05	0.22	-0.28	-0.13	0.08	0.00	-0.30	-0.31	0.25	0.03	-0.03	-0.06	0.03	0.38	0.23	-0.19	0.23	0.15	0.20	-0.25	0.19	-0.19	0.19	0.08	0.11	0.17	0.14	1.00
CC	-0.04	0.22	-0.18	-0.17	0.15	0.06	-0.12	-0.16	0.22	0.20	-0.01	0.18	0.31	0.35	-0.06	-0.04	0.20	0.15	0.15	-0.38	0.18	-0.06	0.18	0.10	-0.21	0.20	0.06	0.34
IN	0.02	0.21	-0.23	-0.28	0.22	0.12	-0.22	-0.23	0.21	0.27	0.12	0.09	0.41	0.40	-0.07	-0.05	0.25	0.19	0.21	-0.40	0.22	-0.19	0.24	0.16	-0.13	0.17	0.16	0.46
OUT	-0.08	0.20	-0.11	-0.06	0.07	0.00	-0.02	-0.08	0.20	0.12	-0.11	0.23	0.20	0.27	-0.05	-0.02	0.13	0.10	0.09	-0.33	0.14	0.05	0.11	0.04	-0.26	0.20	-0.02	0.20
OCM	-0.05	0.22	-0.17	-0.09	0.11	0.01	-0.03	-0.12	0.18	0.04	-0.20	0.18	0.16	0.24	0.04	-0.10	0.08	0.09	0.08	-0.28	0.12	0.08	0.15	0.01	-0.27	0.23	-0.04	0.17
ICM	0.04	0.18	-0.20	-0.25	0.25	0.17	-0.25	-0.25	0.16	0.22	0.04	0.08	0.32	0.38	-0.05	-0.04	0.23	0.19	0.20	-0.38	0.17	-0.16	0.22	0.21	-0.14	0.15	0.09	0.33
OCR	-0.08	0.11	0.02	0.10	-0.07	-0.06	0.01	0.03	0.23	0.11	0.01	0.19	0.12	0.29	-0.08	0.13	0.20	0.10	0.10	-0.29	0.10	0.02	-0.05	0.10	-0.08	0.04	-0.02	0.26
ICR	-0.01	0.19	-0.19	-0.21	0.22	0.14	0.01	-0.12	0.31	0.27	0.33	0.06	0.42	0.22	-0.23	-0.06	0.21	0.08	0.19	-0.31	0.22	-0.25	0.33	0.08	-0.15	0.20	0.30	0.46
ODFI	-0.14	0.11	-0.05	-0.18	0.14	0.05	-0.04	-0.07	0.07	0.34	0.08	0.30	0.28	0.13	-0.22	0.02	0.11	0.06	0.05	-0.29	0.13	-0.01	0.14	0.01	-0.29	0.22	0.07	0.07
IDFI	-0.03	0.15	-0.19	-0.23	-0.09	-0.20	-0.26	-0.11	0.04	0.19	-0.06	0.11	0.30	0.34	0.18	-0.04	0.11	0.14	0.05	-0.22	0.18	-0.01	-0.04	-0.07	0.04	0.02	0.02	0.48
FIN	0.07	0.13	-0.06	-0.21	0.21	0.17	-0.28	-0.05	-0.01	0.27	0.04	0.12	0.16	0.15	-0.12	-0.15	0.09	-0.04	-0.09	-0.25	0.20	-0.08	0.06	-0.08	-0.06	-0.02	-0.21	0.18

Table 6. Empirical Explanation of Capital Controls: Single-Equation Modeling 1/

	CC	FIN	IN	OUT	ICM	ICR	IDFI	OCM	OCR	ODFI
Constant	3.7234	2.1161***	1.2524	2.1294	2.4131	-2.2991***	-1.5128**	2.6161	1.1374**	-1.3383
Balance-of-payments factors										
BOP	-	-	-	-	-	-	-	-	-	-
CURDEF	-	-	-	-	-	-	-	-	-	-
EXTBOR	-	-	-	-	-	-	0.0317* 4/	-	-	-
RESIM	-1.4569**	-	-0.5269***	-0.7497***	-0.4097***	-	-	-0.4356***	-	-0.1062**
Macroeconomic factors										
ERDF	-	0.4326**	-	-	-	-	-	-	-	-
EROFF	-	-	-	-	-	-	-	-	-	-
GOVDEF	0.8201**	-	0.3702***	-	0.2866***	-	-	-	-	-
INF	-	-	-	-	-	0.0020**	-	-	-	-
NEER	-	-0.0239**	-	-	-	-	-	-	-	-
NEERABS	-	-	-	-	-	-	-	-	-	-
PEG	-	-	-	-	-	-	-	-	-	-
REALINT	0.9362***	-	0.4035***	-	0.3387***	0.0935**	-	-	-	-
REER	0.5872***	-	0.3281***	-	0.2602***	-	-	-	-	0.0478**
Institutional and market evolution factors										
DEPBK	-0.1149**	-	-0.0705***	-	-0.0539***	-	-0.0113***	-	0.0163 5/	-0.0080* 2/
FORWARD	7.4915***	-	2.5782***	3.1635**	1.9594***	-	-	1.8549**	-	-
INT	-	0.0218*	-	-	-	-	0.0127**	-	-	-
INTEURO	-0.1389*	-0.0692**	-0.0743**	-	-0.0537**	-	-0.0305***	-	-	-
STOCKVAL	-	-	-	-	-	-	-	-	-	0.0143***
TB	-	-0.7710 3/	-	-	-	0.5050*	-	-	-	-
Prudential factors										
BKPROB	-	0.3603	-	-3.0827**	-	-0.6435**	-	-	-	-1.0820***
Other factors										
FRREG	-5.3162***	-	-1.5895**	-2.3945***	-1.3679***	-	-	-2.0067***	-	-
FRBK	5.1263**	-	2.9923***	2.3067*	1.7242**	0.7291***	0.3825**	1.7384**	-	0.4525**
FRTAX	2.7857*	-	-	2.6058***	-	-	0.3707***	1.2015**	-	0.6404***
EXIM	-	-0.0160**	-	-	-	0.0119***	-	-	-	-
GDP	0.0223***	-	0.0086**	0.0099**	0.0081***	-	-	-	-	-
GDPPC	-	-	-	-	-	-0.0002***	0.0001**	-	-0.0002 6/	-
OIL	-	-	1.9768**	-	-	1.1748***	0.7045***	-	1.1685**	-
R^2	0.60	0.36	0.68	0.45	0.60	0.68	0.55	0.35	0.14	0.51
F	4.44***	3.03**	6.52***	4.34***	5.06***	9.33***	5.52***	4.24***	2.27*	5.46***
DW	1.66	1.54	1.66	2.00	1.82	2.06	2.32	1.87	1.87	1.72
Observations	45	45	45	45	45	45	45	45	45	45

1/ *** (**, *) indicates significance at the 99 (95, 90) percent level.
2/ Significant at the 89.5 percent level.
3/ Significant at the 88.5 percent level.
4/ Significant at the 94.8 percent level.
5/ Significant at the 87.9 percent level.
6/ Significant at the 88.2 percent level.

Table 7. Empirical Explanation of Capital Controls: System Modeling 1/

	System I		System II		System III					
	CC	FIN	IN	OUT	ICM	ICR	IDFI	OCM	OCR	ODFI
Constant	0.6614	2.0016***	1.8361	7.6522**	0.1611	-2.3471**	-1.3594**	1.8308	0.1273	-1.5395*
Balance-of-payments factors										
BOP	-	-	-	-	-	-	-	-	-	-
CURDEF	-	-	-	-	-	-	-	-	-	-
EXTBOR	-	-	-	-	-	-	0.0407***	0.0503 5/	-	-
RESIM	-1.3191***	-	-0.4815***	-0.8660***	-0.2296**	-	-	-0.4002***	-	-0.0731*
Macroeconomic factors										
ERDF	-	0.3184**	-	-	-	-	-	-	-	-
EROFF	-	-	-	-	-	-	-	-	-	-
GOVDEF	0.8196***	-	0.3178**	0.3354*	0.1460**	-	-	-	-	-
INF	-	-	-	-	-	0.0013**	-	-	-	-
NEER	-	-0.0183*	-	-	-	-	-	-	-	-
NEERABS	-	-	-	-	-	-	-	-	-	-
PEG	-	-	-	-	-	-	-	-	-	-
REALINT	1.0135***	-	0.3613***	0.3310 3/	0.2963***	0.1094***	-	0.2736**	-	0.0515*
REER	0.6033***	-	0.2185***	-	0.1358***	-	-	-	-0.0662**	0.0478**
Institutional and market evolution factors										
DEPBK	-0.1019***	-	-0.0516***	-	-0.0311***	-	-0.0117***	-	0.0323***	-0.0047 7/
FORWARD	7.3558***	-	2.5160***	3.9782***	1.0793**	-	-	1.1846**	-	-
INT	-	-	-	-	-	-	0.0099**	-	-	-
INTEURO	-0.1219*	-0.0314**	-0.0424*	-	-0.0241 4/	-	-0.0257***	-	-	-
STOCKVAL	-	-	-	-	-	-	-	-	-0.0315***	0.0100***
TB	-	-0.6622 2/	-	-	-	0.4096*	-	-	-	-
Prudential factors										
BKPROB	-	0.7453*	-	-	-	-0.5787**	-	-	-0.7927*	-0.7079***
Other factors										
FRREG	-4.6609***	-	-1.1366*	-2.2451**	-0.6040*	-	-	-1.5600***	-0.5390*	-
FRBK	4.4793***	-	1.9681***	-	1.5299**	0.7300***	0.3709**	1.3015*	0.6992 6/	0.4640**
FRTAX	3.0981***	-	-	1.2736**	-	-	0.3435***	0.9248**	-	0.5179***
EXIM	-	-0.0156*	-	-	-	0.0123***	-	-	0.0182**	-
GDP	0.0199***	-	0.0091***	0.0132***	0.0029*	-	-	-	0.0038***	-0.0012**
GDPPC	-	-	-	-	-	-0.0002***	0.0001***	-	-0.0003***	-
OIL	-	-	1.9434***	-	-	1.1539***	0.5672***	-	1.4041***	-
Observations	45	45	45	45	45	45	45	45	45	45
Log likelihood	-78.61		-80.13		61.55					

1/ *** (**, *) indicates significance at the 99 (95, 90) percent level.
2/ Significant at the 87.6 percent level.
3/ Significant at the 89.6 percent level.
4/ Significant at the 88.3 percent level.
5/ Significant at the 86.3 percent level.
6/ Significant at the 87.7 percent level.
7/ Significant at the 89.6 percent level.

bank deposits to GDP, the existence of a forward exchange market and the domestic Eurodollar interest rate spread); and other factors (the general degree of freedom to conduct transactions in the domestic economy, the extent of intervention in the banking system, the restrictiveness of the tax system, and the size of the economy).

Financial controls on capital flows pertaining to banks and institutional investors appear to be determined primarily by *institutional and structural characteristics of the financial system*. The significant explanatory variables include the degree of flexibility in the exchange regime, the intermediation spread, the stage of development of the treasury-bill market, a dummy for whether there have been problems in the banking sector in the recent past, and the degree of openness of the trade regime. Thus, financial controls tend to be more extensive in countries with more flexible exchange rate regimes, perhaps because there is a greater acknowledgment of foreign exchange risk under such regimes; inefficiency of the banking system (as reflected in a large intermediation spread), recent problems in the banking sector; the absence of a treasury-bill market, perhaps owing to concerns to protect the domestic financial system; and a closed trade regime.

Separating between controls on capital inflows and outflows:

- ***Controls on inflows*** tend to be imposed in countries because of balance of payments and macroeconomic factors —low gross reserves in months of imports, the large size of the government deficit as a share of GDP, high real interest rates, and real exchange rate appreciation; the stage of development of domestic financial institutions and markets—the size of the banking system (as measured by bank deposits as a share of GDP), the existence of functioning forward exchange markets, and the differential between domestic and international rates; and other factors related to the general degree of domestic regulation, the extent of intervention in the banking system, the size of the economy, and whether the country is an oil producer.

- ***Controls on outflows*** are generally associated with balance of payments concerns—low gross international reserves in months of imports; macroeconomic factors— large government deficit and high real interest rates; the existence of functioning forward exchange markets; the extent to which the general regime of domestic regulation and tax regulation is restrictive, and the size of the economy.

The results suggest that the mapping between motivations and capital controls is not one-to-one: a given capital control addresses several concerns. Relatively speaking, however, controls on outflows appear to be linked primarily to balance of payments factors, while controls on inflows are related to balance of payments and macroeconomic management, and the stage of development of the financial system. These findings are broadly consistent with the general motivations discussed above. Questions of causality are nevertheless an issue, since capital controls may discourage foreign inflows or encourage capital flight and thus weaken the balance of payments, and, not surprisingly, the relationship of capital controls with

balance of payments variables fails to be robust to simultaneous equation estimation with endogenous international reserves and real interest rates (see Section C below).

Functioning forward markets may be associated with controls on inflows and outflows, in part because forward markets provide an institutional channel for capital flows. More generally, being part of a broader regulatory framework, capital controls tend to support the overall structure of banking, tax and other domestic regulations. In addition, larger countries tend to maintain more extensive systems of controls on inflows and outflows than smaller countries.

B. Structure of Capital Controls on Categories of Transactions

The impact of balance of payments, macroeconomic, institutional and other factors is examined further in the equations that model the structure of capital controls in a more disaggregated manner (Tables 6 and 7, System III).

Balance of payments factors are a significant determinant of controls on inflows and outflows pertaining to capital and money markets, and controls on outflows of direct foreign investment. Both single-equation and system modeling indicate that countries with low gross international reserves in months of imports tend to impose controls on inflows and outflows pertaining to capital and money markets and controls on outflows of direct foreign investment. (The robustness of these results, however, is an issue in view of the findings reported in Section C below.) Countries characterized by a large ratio of external borrowing to GDP tend to impose controls on inflows of direct foreign investment; however, the direction of causality may again be an issue, since the countries that restrict direct investment inflows may have to rely to a greater extent on external borrowing.

Controls on inflows related to capital and money markets, and credit operations tend to be imposed for ***macroeconomic management*** reasons. Controls on inflows pertaining to capital and money markets are extensive in countries with large government deficits as a ratio to GDP, high real interest rate and appreciated real exchange rates. Controls on inflows pertaining to credit operations are often found in countries with high inflation and real interest rates. Controls on outflows related to capital and money markets are more prevalent in countries with high real interest rates. The finding on the relationship between high real interest rates and capital controls appears to be robust to simultaneous equation testing (see Section C below). Controls on outflows of credit tend to be lower in countries with more appreciated real exchange rates. Controls on outflows of direct foreign investment are often associated with large real exchange rate appreciation. The latter result may reflect an attempt to prevent the relocation of production abroad through foreign direct investment in response to a loss of competitiveness owing to the appreciation of the exchange rate.

The intensity of capital controls depends on the extent of ***development of financial markets and institutions*** in the economy. A low ratio of bank deposits to GDP is associated

with more extensive controls on inflows pertaining to capital and money markets, and controls on direct foreign investment. Somewhat surprisingly, there is a positive relationship between the stage of development of the domestic banking system and controls on outflows pertaining to credit operations. This might be explained by the fact that banks in underdeveloped financial systems are generally very little involved in international credit business, and thus regulations on their activities only become relevant when banks reach a certain stage of development. In that event, an infant industry policy pursued by national authorities, trying to promote the development of the domestic financial system, may explain these controls. Countries with forward markets tend to maintain controls on inflows and outflows pertaining to capital and money markets. As noted above, this may reflect the role of such markets in facilitating capital flows. The existence of forward markets, however, is not a factor in the control of credit operations; the liberalization of the latter is quite often a precondition for the development of the former. More developed stock markets tend to be associated with more extensive controls on outflows pertaining to direct foreign investment, perhaps reflecting a concern to channel domestic issues into local investments. Controls on outflows pertaining to credit operations tend to be more extensive in countries with underdeveloped stock markets, perhaps reflecting an infant industry policy pursued by the authorities. Controls on inflows related to credit operations tend to be higher when treasury bill markets are developed; such controls may seek to limit short-term capital inflows into treasury bills through bank credits that seek to take advantage of interest differentials. This also suggests that, as financial markets develop, the authorities may expand capital account regulations to cover new instruments and institutions.

Recent ***banking sector problems*** tend to imply fewer controls on inflows and outflows pertaining to credit operations, and lower controls on outflows of direct foreign investment. Questions of the direction of causality may again be an issue here. Recent banking sector problems explain the increased use of financial sector controls.

A number of other institutional and structural factors explain the intensity of capital controls. More restrictive systems of ***domestic regulations*** tend to be associated with fewer controls on inflows and outflows pertaining to capital and money markets and controls on outflows related to credit operations, suggesting some substitution between an effective system of domestic regulation and the need to resort to capital controls. ***Restrictions on activities of banks*** are associated with more extensive controls on inflows and outflows pertaining to most categories of transactions. Since this variable measures the extent of direct control over banking activities, i.e., the degree of financial repression, it indicates that more extensive capital controls tend to be associated with a greater degree of financial repression. High ***taxes*** are often supported by more extensive controls on inflows and outflows on direct foreign investment, and controls on outflows pertaining to capital and money markets, suggesting that capital controls are often used to maintain the domestic tax base. Countries with more ***open trade regimes*** tend to have higher controls on inflows and outflows related to credit operations, possibly reflecting infant industry policies aimed at promoting trade financing through domestic institutions. Relatively ***more developed countries*** (as measured by

GDP per capita) tend to have fewer controls on inflows and outflows related to credit operations and more extensive controls on inflows of direct foreign investment. The former result could be due to the lower effectiveness of capital controls in more developed economies, while the latter result might reflect social, sectoral, and strategic concerns, which could take on greater significance at higher levels of development. ***Larger countries*** tend to maintain more extensive capital controls on inflows through capital and money markets and outflows through credit operations, but fewer controls on outflows of direct investment. ***Oil-producing countries*** tend to maintain more extensive controls on inflows related to credit operations and direct foreign investment and outflows through credit operations.

One conclusion from the above is that different types of capital control are explained by different factors. To confirm this, we conduct Wald tests for the equality of coefficients in the respective equations (specifically, equations for overall capital controls and provisions specific to banks and other financial institutions; overall controls on inflows and outflows; controls on inflows pertaining to capital and money markets, credit operations and direct foreign investment, and the respective controls on outflows). The null hypothesis that the coefficients are the same is rejected for all models.

C. Simultaneous Determination of the Balance of Payments, Real Interest Rate and Capital Controls

Although the detailed analysis of the effectiveness of capital controls is beyond the scope of this paper, we perform a simple check of the robustness of the results concerning balance of payments and macroeconomic factors by modeling the relevant proxies as endogenous variables. We first construct single-equation models of *RESIM* and *REALINT* and estimate them using OLS. Next, building on System II, we develop a simple simultaneous-equation model of overall controls on capital inflows and outflows, gross reserves in months of imports, and real interest rates (*IN, OUT, RESIM* and *REALINT* respectively) through general-to-specific modeling and estimate it using FIML.

The results are reported in Tables 8–9 respectively. In single-equation models, controls on inflows and outflows are found to have insignificant effects on the balance of payments variable (*RESIM*). Controls on inflows, but not controls on outflows, have a significant positive effect on real interest rates (*REALINT*). When the feedback of controls on inflows and outflows on the balance of payments and macroeconomic variables is taken into account in a simultaneous equation framework, these variables are no longer significant determinants of controls on inflows and outflows. Other macroeconomic and institutional and market evolution variables remain significant determinants of controls on inflows but not of controls on outflows. Other variables, however, are found to be robust determinants of both controls on inflows and outflows.

Table 8. Effectiveness of Capital Controls 1/

	RESIM	REALINT
Constant	3.7826***	3.5952**
CURDEF	0.0787*	-
ERDF	-	0.7099**
GOVDEF	-	-0.2028*
INF	-	-0.0082***
INT	-	-
REALINT	0.1600	-
REER	0.1943***	-0.1174
IN	-0.0147	0.4623**
OUT	-0.1556	-0.1283
FIN	0.1806	-0.4408
R^2	0.27	0.46
F	2.38**	4.47***
DW	2.03	1.52
Observations	45	45

1/ *** (**, *) indicates significance at the 99 (95, 90) percent level.

Table 9. Empirical Explanation of Capital Controls: System Modeling with Endogenous Balance of Payments and Macroeconomic Factors 1/

	IN	OUT	RESIM	REALINT
Constant	-2.9524	-1.4828	2.8688	4.2189**
Balance-of-payments factors				
BOP	-	-	-	-
CURDEF	-	-	0.0497	-0.0594
EXTBOR	-	-	-	-
RESIM	0.4142	0.9795	-	-
Macroeconomic factors				
ERDF	-	-	-0.1069	0.7312**
EROFF	-	-	-	-
GOVDEF	0.2612 5/	0.2428	-0.0582	-0.1354
INF	-	-	-	-0.0074**
NEER	-	-	-	-
NEERABS	-	-	-	-
PEG	-	-	-	-
REALINT	0.4569	0.6357	-0.1559	-
REER	0.2165**	-	0.0639	-0.1064
Institutional and market evolution factors				
DEPBK	-0.0494***	-	-	-
FORWARD	1.4366*	1.7725	-	-
INT	-	-	-	-
INTEURO	-0.0490**	-	-	-
STOCKVAL	-	-	-	-
TB	-	-	-	-
Prudential factors				
BKPROB	-	-	-	-
Other factors				
FRREG	-0.8249 4/	-1.6417 2/	-	-
FRBK	2.0870***	-	-	-
FRTAX	-	1.1217 3/	-	-
EXIM	-	-	-	-
GDP	0.0053*	0.0051	-	-
GDPPC	-	-	-	-
OIL	1.9717***	-	-	-
Capital controls				
IN	-	-	0.1629	0.3024
OUT	-	-	0.2493	-0.2282
Observations	45	45	45	45
Log likelihood	-161.58			

1/ *** (**, *) indicates significance at the 99 (95, 90) percent level.
2/ Significant at the 89.4 percent level.
3/ Significant at the 88.8 percent level.
4/ Significant at the 86.1 percent level.
5/ Significant at the 85.3 percent level.

All in all, the results imply that the use of capital controls for balance of payments purposes is a fragile proposition, once allowance is made for the simultaneous determination of capital controls and the balance of payments. The results may suggest disillusionment about the effect of capital controls on the balance of payments, given the scope for the circumvention of capital controls and the impact they have in discouraging foreign investment.

VI. Conclusions

For a cross section of developing and transition economies, this study derives stylized facts concerning the structure of capital controls and analyzes their determinants using a simple empirical model intended to capture the main motivations for such controls.

Statistical analysis suggests that it would be appropriate to group together capital controls on certain types of transactions. The groupings examined refer to the following transactions, separated into controls on inflows and outflows:

- capital, money market and collective investment securities, and associated derivative instruments;
- commercial and financial credits, guarantees and sureties;
- direct foreign investment and real estate; and
- financial regulations pertaining to banks and institutional investors.

Econometric analysis points to significant differences in the factors explaining recourse to capital controls on these different categories of transactions and on inflows and outflows. The following factors are found to be significant in motivating the use of capital controls on different transactions:

- *balance of payments,* for capital inflows and outflows;
- *macroeconomic management*, primarily for capital inflows;
- *institutional and market evolution,* explaining recourse to financial regulations and controls on most types of inflows and outflows;
- *weak domestic regulatory systems* and *financial repression,* explaining the overall use of capital controls; and
- the *size and stage of development* of the economy.

The findings are broadly consistent with what would be predicted by economic theory, and point to some factors and conditions that are of concern to developing and transition economies in the orderly liberalization of international capital flows.

Certain of the results raise questions about the direction of causality between capital controls and some of the explanatory variables. Initial analysis suggests that the results concerning controls on inflows appear be more robust than those concerning outflows, and that the motivating role of balance of payments factors is found to be fragile possibly reflecting the limited effectiveness of the controls and the negative impact they have on international investor sentiment. These results also point to the need to undertake a more detailed simultaneous equation analysis when assessing the relationship between capital controls, the balance of payments, financial market development, and macroeconomic conditions. This is clearly an area for further work.

LIST OF COUNTRIES

1. Argentina
2. Bangladesh
3. Bolivia
4. Brazil
5. Bulgaria
6. Chile
7. China
8. Cote d'Ivoire
9. Czech Rep.
10. Djibouti
11. Ecuador
12. Egypt
13. El Salvador
14. Gambia
15. Ghana
16. Guyana
17. Hungary
18. India
19. Indonesia
20. Jamaica
21. Jordan
22. Kazakhstan
23. Kuwait
24. Kyrgyz Rep.
25. Latvia
26. Lebanon
27. Malawi
28. Malaysia
29. Mauritius
30. Mexico
31. Moldova
32. Nicaragua
33. Pakistan
34. Peru
35. Philippines
36. Poland
37. Russian Fed.
38. Senegal
39. Slovak Rep.
40. South Africa
41. Sri Lanka
42. Thailand
43. Uganda
44. Venezuela
45. Zambia

DATA AND NOTATION

A. Capital Controls

CC total number of capital controls, 1996, *AREAER*.

IN (OUT) total number of controls on inflows and outflows respectively, 1996, *AREAER*.

ICM (OCM) total number of controls on inflows and outflows pertaining to money market, capital market, collective investment and derivative securities respectively, 1996, *AREAER*.

ICR (OCR) total number of controls on inflows and outflows pertaining to commercial and financial credits, and guarantees and sureties respectively, 1996, *AREAER*.

IDFI (ODFI) total number of controls on inflows and outflows pertaining to direct foreign investment and real estate respectively, 1996, *AREAER*.

FIN total number of measures pertaining to commercial banks and institutional investors, 1996, *AREAER*.

B. Balance of Payments Factors

BOP overall balance as a ratio to GDP, average, 1993–96, *International Financial Statistics (IFS)*.

CURDEF current account deficit as a ratio to GDP, average, 1993–96, *IFS*.

EXTBOR external borrowing as a ratio to GDP, average, 1993–96, *World Economic Outlook (WEO)*.

RESIM gross international reserves in months of imports, average, 1993–96, *IFS*.

C. Macroeconomic Management Factors

GOVDEF government deficit as a ratio to GDP, average 1993–96, *WEO*.

INF inflation, average 1993–96, *IFS*.

REALINT real interest rate, average 1993–96, *IFS*.

ERDF index representing de facto exchange regime, 1996, Exchange Regime and Market Operations Division, Monetary and Exchange Affairs Department, IMF. The index takes integer values from 1 (fixed exchange rate) to 5 (free floating exchange rate).

EROFF index representing official exchange regime, 1996, Exchange Regime and Market Operations Division, Monetary and Exchange Affairs Department, IMF. The index takes integer values from 1 (fixed exchange rate) to 5 (free floating exchange rate).

PEG dummy variable indicating a pegged exchange rate regime, 1996, Exchange Regime and Market Operations Division, Monetary and Exchange Affairs Department, IMF.

NEER average annual change in nominal effective exchange rate, average 1993–96, *IFS.*

NEERABS absolute value of average annual change in nominal effective exchange rate, average 1993–96, *Effective Exchange Rates Database.*

REER average annual change in real effective exchange rate, average 1993–96; *Effective Exchange Rates Database.*

D. Market and Institutional Evolution Factors

DEPBK bank deposits as a ratio to GDP, 1995, *IFS.*

INT intermediation spread, i.e., lending minus deposit rate, 1995, *Aremos database.*

INTEURO Eurodollar rate spread, i.e., domestic demand deposit rate minus off-shore rate, 1995, *Aremos Database.*

STOCKVAL value of stocks traded as a ratio to GDP, 1995, Financial Systems and Banking Division, Monetary and Exchange Affairs Department, IMF.

FORWARD dummy variable indicating the existence of a forward market, 1996, *AREAER.*

TB dummy variable indicating the existence of a treasury bill market, 1996, Financial Systems and Banking Division, Monetary and Exchange Affairs Department, IMF.

E. Prudential Factors

BKPROB dummy variable indicating problems in the banking sector during 1993–96, constructed on the basis of Lindgren, Garcia, and Saal (1996).

F. Other Factors

EXIM trade (imports and exports) as a ratio to GDP, average, 1993–96, *IFS.*

GDP nominal gross domestic product, average, 1993–96, *IFS.*

GDPPC nominal GDP per capita, average, 1993–96, *IFS.*

FRBK index of economic freedom in banking, 1996; Johnson, Holmes, and Kirkpatrick (1998). The index summarizes information on government ownership of banks, restrictions on the ability of foreign banks to open branches and subsidiaries, government influence over the allocation of credit; government regulations, such as deposit insurance; freedom to offer all types of financial services, such as buying and selling real estate, securities, and insurance policies. The index is increasing in the extent of restrictiveness.

FRTAX index of economic freedom in tax policy, 1996; Johnson, Holmes, and Kirkpatrick (1998). The index summarizes information on top income tax rate, tax rate that applies to the average income level, top corporate tax rate, and other taxes. The index is increasing in the extent of restrictiveness.

FRREG index of economic freedom in domestic regulation, 1996; Johnson, Holmes, and Kirkpatrick (1998). The index summarizes information on licensing requirements to operate a business, ease of obtaining a business license, corruption within the bureaucracy; labor regulations, such as established work weeks, paid vacations, maternity leave, and selected labor regulations; environmental, consumer safety and worker health regulations; regulations that impose a burden on businesses. The index is increasing in the extent of restrictiveness.

FRTR index of economic freedom in trade policy, 1996; Johnson, Holmes, and Kirkpatrick (1998). The index summarizes information on the average tariff rate, nontariff barriers, and corruption in the customs service. The index is increasing in the extent of restrictiveness.

OIL dummy variable indicating oil-producing countries, 1996; staff reports, IMF.

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