PANOECONOMICUS, 2012, 3, pp. 283-292
Received: 15 June 2011; Accepted: 26 October 2011.

UDC 336.76:004
DOI: 10.2298/PAN1203283E
Original scientific paper

Makram El-Shagi

University of Mannheim,
Germany

elshagi@rumms.uni-mannheim.de

Initial Evidence from a New Database on Capital Market Restrictions

Summary: One of the key obstacles to the empirical analysis of capital controls has been the unavailability of a detailed set of indicators for controls that cover a broad set of countries over a range of years. In this paper, we propose a new set of indicators derived from the *Annual Reports on Exchange Arrangements and Export Restrictions*. Contrary to most earlier attempts to construct control indicators from this source, our set of indices allows one to analyze the control intensity separately for inflow, outflow and repatriation controls. An additional set of indicators features information on the institutional design of controls. At first glance, the data show that the financial crisis caused a surge in capital market restrictions, most notably concerning the derivatives market. This reflex, which is not justified by the scarce empirical evidence on the success of controls, shows the importance of having a valid measure to allow an econometrically sound policy evaluation in this field. The data are available from the author upon request.

Key words: Capital controls, Database.

JEL: G15, G28.

Capital allocation played a role in some of the worst crises of the past decades, such as the dotcom bubble, the Asian flu and, most notably, the recent financial crisis that started with the collapse of the bubble in the U.S. mortgage market. Thus, it not surprising that all these crises caused a call for tighter controls on international capital flows.

However, it is by no means clear whether capital market regulation truly stabilizes a country, and even if it does, there might be substantial costs in terms of growth (see, e.g., Dennis P. Quinn 1997; Areendam Chanda 2005; and Quinn and Maria A. Toyoda 2008). Theoretical evidence on these issues is very heterogeneous. Seemingly small adjustments of assumptions can topple the conclusions of some models. At the same time, empirical evidence is scarce. While there are a number of case studies, there are very few panel studies (including the references above).

In part, this is due to the difficulties in appropriately measuring capital controls. In our paper, we build on Makram El-Shagi (2010) and El-Shagi (2010b), which propose a number of indices that allow one to identify the intensity of controls for capital import and export controls separately.

We enhance the original measure in a number of ways. First, we provide separate indices for equity market and general capital market restrictions. Second, we propose various sets of indices that are fine-tuned to specific types of economic prob-

lems. Third, highly important for the applied researcher, we extend the dataset to the current margin (2009). Fourth, we add indicators of institutional quality by measuring the share of controls with bureaucratic discretion. With these additions, we provide the first panel dataset of this magnitude that allows for analyzing the role of capital market restrictions while controlling for the institutional arrangement.

The remainder of the paper is structured as follows. Section 1 reviews the literature on capital control measurement. Section 2 outlines the indices we propose. Section 3 summarizes the development of capital controls in the past decades. Section 4 concludes the paper.

1. Measurement of Capital Controls in the Literature

Most attempts to measure capital controls for a broad panel of countries encode the data found in the *Annual Reports on Exchange Arrangements and Exchange Restrictions* (*AREAER*) published by the International Monetary Fund (IMF).

Early studies, e.g., Alberto F. Alesina, Vittorio Grilli, and Gian Maria Milesi-Ferretti (1993), use a simple dummy that indicates whether a member state violates Article VIII of the IMF agenda. However, the majority of changes in capital market regulations do not affect this dummy. Thus, while allowing some basic cross-country studies, this indicator is unsuitable for most time series or panel analysis.

Dani Rodrik (1998) proposed to take averages of this control dummy over time to achieve more diversity in the cross-country dimension. Nevertheless, the fundamental problem of the original dummy, namely, the lack of precision, remains, yet this indicator is still used in the literature, e.g., Chanda (2005).

More sophisticated approaches thus attempt to distinguish controls by intensity. James D. Gwartney and Robert Lawson (2001) and Jaques Miniane (2004) exploit the division of controls into thirteen subcategories that have been reported in the appendix tables of the *AREAER* since 1996. The share of controls that are implemented (or some measure derived from this share) is interpreted as control intensity in their approaches. Gwartney, Lawson, and Walter Block (1996) propose an index that is constructed from the text of the *AREAER* for the period 1975 to 1995 (in 5 year intervals). While the construction of this index differs substantially from the index in the post-1996 period, the authors show that there is a remarkably high correlation between both indices in a test sample for which both have been constructed.

Quinn (1997) and Quinn and Toyoda (2008) also construct an index on capital control intensity that is derived from the text of the *AREAER*. By concentrating on information that has been supplied for an extended time period, they are able to produce a remarkably detailed control index that goes back to 1955 in its most recent edition (Quinn and Toyoda 2008).

El-Shagi (2010, 2010b) and Martin Schindler (2009) independently of one another proposed to analyze the more detailed information that is available from 1996 onward in the text section of the *AREAER* to construct separate intensity indicators for capital import and capital export controls. In this paper, we extend this approach.

A different approach that has been tried in the literature is focusing on the de facto measures instead of the de jure measures. Duane Swank (1998) uses capital flows. Lieven Baele et al. (2004) employ interest rate differentials as a proxy for

capital market integration. The idea follows the distinction between de facto and de jure regimes in the literature on exchange rate regimes (see Carmen M. Reinhart and Kenneth S. Rogoff 2004). However, contrary to exchange rate policy, there is no policy indicator (such as foreign reserves in the exchange rate case) that can be observed when constructing de facto capital control indicators. This makes the de facto approach highly unreliable. Additionally, it is obviously impossible to analyze the impact of capital market restrictions on capital markets while using capital market variables themselves as indicators of control intensity.

2. Measuring Capital Controls

2.1 The Set of Possible Controls

Our dataset is based on a set of 26 dummy variables that are constructed based on the *AREAER*.

The *AREAER* provides information on five different asset markets and three credit markets, and the discussion of each market allows for distinguishing several types of controls.

The asset markets considered include the following: (i) shares (and other securities of participating nature); (ii) bonds (and other debt securities); (iii) money market instruments (MMI); (iv) collective investment securities (CIS); (v) derivatives and other instruments.

For each of these five markets, controls are divided into those on purchase locally by nonresidents (PLNR), sale or issue locally by nonresidents (SLNR), purchase abroad by residents (PAR) and sale or issue abroad by residents (SAR). Both SAR and PLNR controls restrict capital imports; SLNR and PAR controls restrict capital exports. Thus, we can identify 10 different capital import and export controls that affect asset markets.

One might want to consider a further subdivision of capital export controls. Because repatriation controls on foreign capital increase the risk to foreign investment in the domestic market, they might ward off foreign capital in the first place. After a new repatriation control is implemented, the lock in of foreign capital imported in the pre-control era might succeed for some time. However, in the long run, the deterrence of foreign capital might dominate the total impact of repatriation controls. It is possible to approximate repatriation controls by exclusively considering SLNR for a special index on repatriation controls and correspondingly define export controls (in a narrow sense) as PAR controls. However, this approach only approximately captures repatriation controls. While SLNR controls cover repatriation controls on portfolio investment exhaustively, they also include controls on assets issued by nonresidents.

In addition to the asset market restrictions, the *AREAER* covers three credit markets: (a) commercial credit; (b) financial credit; (c) credit guarantees.

Again, the reports allow for distinguishing between controls on credits from residents to nonresidents (i.e., capital exports) and credits from nonresidents to residents (i.e., capital imports). Therefore, we have three further import controls and three additional export controls (in the narrow sense) to consider for our indicators.

We consider every text entry in the respective sections that does not represent a mere obligation for reporting to be a control, unless it states the absence of controls explicitly.

Because asset transactions outweigh credit markets in importance for many issues, we provide overall capital control indicators, including credit market restrictions, and versions of the indicators that focus on asset market restrictions. A summary of the dummies that are included in the indices is found in Table 1.

Table 1 Inclusion of Restrictions in the Control Indices

		All markets				Asset markets			
		Capital imports	Capital exports	Capital exports (narrow)	Repatriation	Capital imports	Capital exports	Capital exports (narrow)	Repatriation
Shares, Bonds, MMI, CIS, Derivatives	PLNR	X				X			
	SLNR		X		X		X		X
	PAR		X	X			X	X	
	SAR	X				X			
Commercial credit, financial credit, credit guarantee	From R to NR		X	X					
	From NR to R	X							
Controls considered		13	13	8	5	10	10	5	5

Note: X marks the inclusion of the controls indicated by the row of the respective index (indicated by the column).

Source: The author.

2.2 The Treatment of Nonexistent Markets

A key issue in the construction of an index from the set of dummies outlined in Section 2.1 is the treatment of nonexistent markets. Because the appropriate treatment strongly depends on the economic question of interest, we supply three slightly different versions of the indices on capital market restrictions that are each tailored towards a specific set of economic problems.

The basic index

Our basic approach closely follows El-Shagi (2010) and Schindler (2009), who first used the detailed information from the AREAER to construct separate indices for capital inflows and outflows. The basic control index C_b concerning controls of type number i is defined as:

$$C_b^i = \frac{\sum_{j=1}^{26} D_j P_j^i}{\sum_{j=1}^{26} P_j^i},$$

where

$$D_j = \begin{cases} 1 \text{ if sector j is restricted} \\ 0 \text{ otherwise} \end{cases}$$

and

$$P_j^i = \begin{cases} 1 \text{ if sector j is included in control index i} \\ 0 \text{ otherwise} \end{cases}.$$

This basic index is a normalization of the number of controls (of the type of interest) to the interval from 0 to 1. This formulation is appropriate for most questions in which the number of controls matters; it simplifies a reasonable interpretation and enables comparisons between different types of controls.

The control density index

Especially where political economy questions are concerned, one might be interested in the degree to which potential regulation is exploited. In this case, nonexistent markets should not be considered in the denominator of the index because the government does not have the option to regulate these markets.

For this type of research issue, we propose a set of control density indices C_d given by:

$$C_d^i = \frac{\sum_{j=1}^{26} D_j P_j^i}{\sum_{j=1}^{26} P_j^i (1 - NA_j)},$$

where

$$NA_j = \begin{cases} 1 \text{ if sector j does not exist} \\ 0 \text{ otherwise} \end{cases}.$$

The capital market separation index

Finally, for most questions where capital market openness is concerned, capital market development (i.e., the existence of markets) should be considered to be equally important to liberalization (i.e., the absence of controls).

The capital market separation indices C_s are thus defined as:

$$C_b^i = \frac{\sum_{j=1}^{26} (D_j + NA_j) P_j^i}{\sum_{j=1}^{26} P_j^i}.$$

A market segment that does not exist is treated as restricted, as are market segments that are controlled by the authorities. Thus, this index focuses on whether there are obstacles to capital flows rather than whether the policy makers explicitly decided to restrict capital flows.

2.3 Measuring Institutional Quality

Chanda (2005) has shown that it is possible to identify clearly the negative impact of capital controls on growth through controlling for the institutional framework and the interaction of institutional variables with the control indicator. In a survey of the lit-

erature, Hali J. Edison et al. (2004) found that the impact of capital controls often disappears when controlling for institutional quality. Thus, Chanda's (2005) contribution was to prove that the inclusion of adequate interaction terms reestablishes the negative correlation of capital market restrictions and growth. His findings indicate that it is not only the intensity of controls that matters but also their quality.

Therefore, it seems worthwhile to find an appropriate indicator of institutional quality. A key aspect of institutional quality is that the public is protected from governmental arbitrariness. Most common indicators for political institutions, such as civil liberty indices or property right protection indicators, essentially focus on this issue. Jarita Duasa and Paul Mosley (2006) propose what they call a "smart" control indicator, essentially an interaction term of control intensity (roughly following Gwartney, Lawson, and Block 1996) and institutional indicators. However, because they do not address the quality of capital controls directly, their indicator cannot discriminate between the impact of controls and the impact of institutions in general.

Thus, we propose an indicator that specifically measures the institutional quality of capital controls by identifying the potential for arbitrary decisions of bureaucrats or politicians in capital market transactions. To this end, we construct an additional set of dummy variables for each indicator outlined in Section 2.1 that captures whether a specific control requires approval by a government agency.

Based on this dummy, we construct a bureaucracy index B for each control intensity indicator following this rule:

$$B^i = \begin{cases} \frac{\sum_{j=1}^{26} A_i * P_j^i}{\sum_{j=1}^{26} D_i * P_j^i} \text{ if } \sum_{j=1}^{26} D_i * P_j^i > 0 \\ 0 \text{ otherwise} \end{cases}$$

where

$$A_i = \begin{cases} 1 \text{ if there is potential for arbitrary decisions in sector i} \\ 0 \text{ otherwise} \end{cases}.$$

2.4 Examples

To provide a better understanding of the encoding procedure, this section lists some examples from the *AREAER 2008*.

Lao People's Democratic Republic, Controls on commercial credits from residents to nonresidents

Approved loan must be registered, and the performance of the loan, from disbursement to full repayment through the banking system, must be reported to the BOL.

Because this entry states only the necessity to register, it is not considered a control under our definition. Thus, D=0 and A=0.

Malaysia, Controls on derivatives (…), SAR

Residents must obtain permission from the COFE to issue or sell financial instruments abroad.

Obviously, there are SAR controls on derivatives in Malaysia. Hence, D=1. These controls are not clearly defined requirements but include applying for permission at a government institution. Thus, A=1.

Namibia, Controls on shares (…), PAR

These transactions are permitted up to the N\$2 million foreign investment limit of resident individuals.

While there are restrictions to PAR of shares in Namibia (D=1), the law clearly defines the conditions under which it is legal to invest in foreign stock. Thus, A=0.

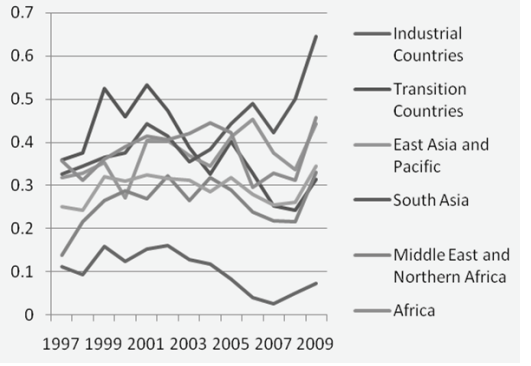
3. Recent Developments of Controls

In the wake of the financial crisis, capital controls experienced a renaissance that is unprecedented in recent economic history.

Figure 1 outlines the development of the average inflow control baseline index from 1997 to 2009 for six country groups. The increase in control intensity after 2007 can be observed across all regions of the world.

The reflex to increase capital market regulation is understandable from a political economy perspective because of the obvious role of financial market frictions in the recent crisis. However, there is no conclusive empirical evidence that capital market restrictions truly help stabilize economic growth.

Additionally, although the media suggest otherwise, there is no evidence of a global trend of ”deregulation” preceding the crisis. Between 1997 and 2007, a clear deregulation trend can only be observed in the industrialized economies and the transition economies of the former Warsaw Pact. In Asia, Latin America and Africa, we observed instead a sideways movement before the recent events.

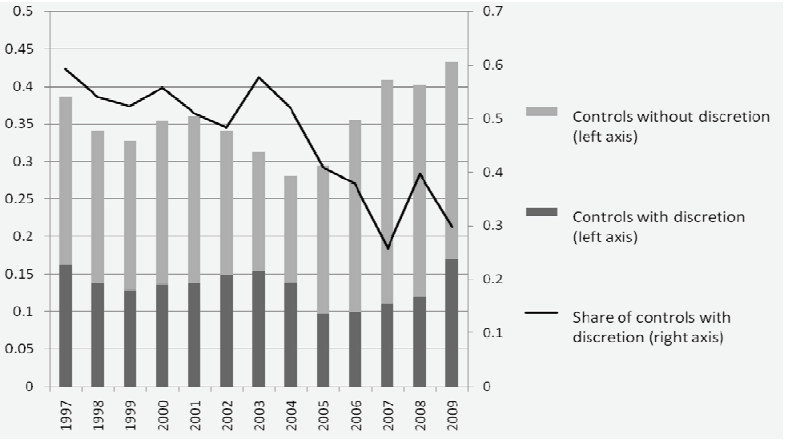


Source: The author.

Figure 1 Capital Inflow Controls (Basic Index) from 1997 to 2009

While we do not observe a trend in overall regulation density, we see slight improvements in overall institutional quality, i.e., the share of controls that are subject to bureaucratic discretion is slowly declining. However, in some cases, this im-

provement is due to an increasing number of "good" controls rather than a decline in "bad" controls. This can be observed, for example, in the Latin American capital export restrictions, as depicted in Figure 2.



Note: The reported average share of controls with discretion is an average of individual country statistics and not the total share of controls. That is, a country A with low regulation (control index 0.1), where all controls are subject to discretion (bureaucracy index 1.0), and a highly regulation country B (control index 1.0), where all controls follow strict rules (bureaucracy index 0.0), would produce an average of 0.5, even though the majority of controls are not subject to discretion.

Source: The author.

Figure 2 Capital Controls with and without Discretion in Latin America from 1997 to 2009

Beyond the most recent development, there is one remarkable similarity that many countries share. In most country groups we consider, capital export controls are far more widespread than capital import controls. This strongly contrasts with most economic recommendations on capital market regulation; even the advocates of tight capital market regulation in the economics profession usually use capital import controls to limit excessive risk exposure by fine-tuning the maturity structure of foreign debt. However, it seems that the key incentive for actually implementing capital market regulation has been the possibility of increasing domestic capital supply rather than forfeiting capital supply in return for stability. The only exception is South Asia, which was hit by a substantial financial crisis due to excessive exposure to foreign currency risk in 1997.

From a political economy perspective, the findings summarized above are crucial. After every financial crisis, capital market liberalization is heavily criticized by a small group of economists. Using their arguments as "scientific" justification for their policy, an entirely different kind of capital market regulation is pursued. Instead of clear rules that limit the exposure to foreign risk, we find that capital outflows are strongly hindered, often using institutional setups that allow for arbitrariness and thereby create numerous rent-seeking opportunities. Even if the kind of capital control that advocates propagate were truly useful (and this is far from uncontroversial), it should be noted that what they get differs substantially from what they want.

Table 2 Inflow and Outflow Controls in 2007

	Inflow controls	Outflow controls	Difference
Western industrialized economies	0.03	0.08	0.05
Transition economies	0.28	0.37	0.09
East Asia	0.44	0.45	0.01
South Asia	0.53	0.48	-0.05
Middle East North Africa	0.32	0.45	0.13
Sub-Saharan Africa	0.45	0.59	0.14
Latin America	0.31	0.31	0.00

Source: The author.

4. Conclusions

In this paper, we presented a new database on capital market regulation. The database, covering almost 200 countries for 13 years, is the first panel database to distinguish the intensity of controls separately for inflow and outflow restrictions while simultaneously controlling for the institutional quality of the implemented restrictions.

Looking at the initial evidence from this database, we find that politicians around the globe responded to the recent financial crisis by tightening the rules for international capital flows. Given the lack of evidence that capital market restrictions can truly help shield countries from adverse global macroeconomic conditions, this raises concern.

This concern is deepened when considering capital controls in detail. We find that capital market controls are mostly abused to increase capital supply locally and that more than half the controls in emerging markets and developing countries are subject to bureaucratic discretion, thereby creating rent-seeking potential.

Our new database provides the information to analyze these issues in depth econometrically.

References

Alesina, Alberto F., Vittorio Grilli, and Gian Maria Milesi-Ferretti. 1993. "The Political Economy of Capital Controls." National Bureau of Economic Research Working Paper 4353.

Baele, Lieven, Annalisa Ferrando, Peter Hördahl, Elizaveta Krylova, and Cyrill Monnet. 2004. "Measuring European Financial Integration." *Oxford Review of Economic Policy*, 20(4): 509–530.

Chanda, Areendam. 2005. "The Inuence of Capital Controls on Long Run Growth: Where and How Much?" *Journal of Development Economics*, 77: 441-466.

Duasa, Jarita, and Paul Mosley. 2006. "Capital Controls Re-examined: The Case for 'Smart' Controls." *The World Economy*, 29: 1203-1226.

Edison, Hali J., Michael W. Klein, Luca Antonio Ricci, and Torsten Slok. 2004. "Capital Account Liberalization and Economic Performance: Survey and Synthesis." *IMF Staff Papers*, 51: 220-256.

El-Shagi, Makram. 2010. "Capital Controls and International Interest Rate Differentials." *Applied Economics*, 42: 681-688.

El-Shagi, Makram. Forthcoming. "The Distorting Impact of Capital Controls." *German Economic Review.*

Gwartney, James D., and Robert Lawson. 2001. *Economic Freedom of the World - 2000 Annual Report.* Vancouver, BC: Fraser Institute.

Gwartney, James D., Robert Lawson, and Walter Block. 1996. *Economic Freedom of the World, 1975-1995.* Vancouver, BC: Fraser Institute.

Miniane, Jaques. 2004. "A New Set of Measures on Capital Account Restrictions." *IMF Staff Papers*, 51: 276-308.

Quinn, Dennis P. 1997. "The Correlates of Change in International Financial Regulation." *American Political Science Review*, 91: 531-551.

Quinn, Dennis P., and Maria A. Toyoda. 2008. "Does Capital Account Liberalization Lead to Growth?" *Review of Financial Studies*, 21: 1403-1449.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2004. "The Modern History of Exchange Rate Arrangements: A Reinterpretation." *The Quarterly Journal of Economics,* 119: 1-48.

Rodrik, Dani. 1998. "Who Needs Capital-Account Convertibility?" In *Essays in International Finance 207*, ed. Peter Kenen, 55-65. Princeton: Princeton University Press.

Schindler, Martin. 2009. "Measuring Financial Integration: A New Dataset." *IMF Staff Papers*, 56: 222-238.

Swank, Duane. 1998. "Funding the Welfare State: Globalization and the Taxation of Business in Advanced Market Economies." *Political Studies*, 46: 671-692.