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A New Set of Measures on Capital Account Restrictions

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This paper extends the IMF's post-1996 disaggregated capital account indices back to 1983 for a representative sample of 34 countries. All the information used to construct the indices comes from IMF's Annual Report on Exchange Arrangements and Exchange Restrictions *and is widely available. It is shown that the disaggregated indices do a better job than the pre-1996 single dummy in reflecting both global trends toward capital account liberalization and country-specific liberalization episodes that occurred during the period. Given the frequency of IMF reporting procedures, the disaggregated indices still fail to accurately track temporary control programs designed to fight off crises. Moreover, the lack of systematic information on enforcement means that the indices remain de jure. Some tentative solutions to these limitations are suggested.* [JEL C82, F02, F33]

The Asian crisis of late 1997 and the subsequent collapses in Russia, Brazil, and Argentina have sparked a vigorous debate about how best to improve the current global financial architecture. In this context, recent papers by De Gregorio, Edwards, and Valdés (2000), Edison and Reinhart (2001), and Miniane and Rogers (2003) have tried to assess the effectiveness of capital controls in shaping the size and maturity of capital flows.

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One fundamental limitation in the capital controls literature has been the lack of a reliable measure of capital account openness. Capital controls can take many different forms, making it time-consuming to track all changes in restrictions within a single country. Moreover, the construction of any capital controls index raises the problem of aggregation. By how much should a measure drop if a country relaxes one of its many restrictions? Last but not least, the effectiveness of capital controls depends crucially on the government's willingness and ability to enforce them. Assuming one has qualitative evidence on enforceability, how should it be weighted in the index?

As a result of the lack of a reliable index of capital controls, many studies trying to assess the ability of capital controls to affect financial flows have followed a case-study approach.[1] Papers that have attempted to study the effects of capital controls cross-sectionally, such as Grilli and Milesi-Ferretti (1995), have commonly relied on the 0/1 IMF dummies. The pre-1996 editions of IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (*AREAER*) provide dummies for all member countries in six separate categories: bilateral payments arrangements with members and nonmembers, restrictions on payments for current account transactions, restrictions on payments for capital account transactions, import surcharges, advance import deposits, and surrender or repatriation requirements for export proceeds. Besides the obvious limitations of a dichotomic dummy, Eichengreen (2001) has pointed out that the dummy for capital account transactions accounts only for restrictions on residents, not on nonresidents.

To remedy the lack of suitable capital control measures, the IMF changed reporting procedures starting with the 1996 edition of the *AREAER*.[2] For each of the above mentioned categories, the "new" *AREAER* provides dummies in not one but several different subcategories of transactions. In the case of capital account transactions, there are 13 such subcategories, some of which are in turn further disaggregated.[3] Moreover, a distinction is now made between controls on inflows and outflows.

The new reporting procedures have prompted several authors, some within the IMF's staff, to build capital control indices based on the disaggregated *AREAER* classification (Table 1).[4] Barry Johnston and Natalia Tamirisa are rightly credited with initiating this trend (Johnston and Tamirisa, 1998; Tamirisa, 1999 and 2003). The authors build indices for 45 countries by averaging over all

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[1]See Dooley (1996), Eichengreen (2001), and Edison and others (2002) for surveys of the capital controls literature.

[2]Note that the new reporting procedures covered only 52 countries in the first year and were subsequently extended to all the member countries.

[3]The following subcategories are related to capital account transactions: capital market securities, money market instruments, collective investment securities, derivatives and other instruments, commercial credits, financial credits, guarantees, sureties, and financial backup facilities; direct investment, liquidation of direct investment, real estate transactions, personal capital movements, provisions specific to commercial banks and other credit institutions; and provisions specific to institutional investors. These subcategories are in turn disaggregated in the new *AREAER*.

[4]Table 1, based on a similar table by Edison and others (2002), summarizes the main features of various indices presented in this paper.

Table 1. Summary of Alternative Capital Control Measures

	Name	Information Source	Coverage	Coding	Advantages	Disadvantages
Based on *AREAER* information	IMF dummy	*AREAER*	All IMF member countries, 1967–1995.	0/1 dummy depending on whether country has controls on outflows.	Extensive coverage.	– Accounts only for controls on outflows. – Single dummy is too limited.
	Johnston and Tamirisa (1998)	*AREAER*	45 countries for the year 1996.	Average of all possible 0/1 dummies in the new *AREAER*.	– Discriminates between controls on inflows and outflows. – Most disaggregated among *AREAER* indices.	Coverage restricted to post-1996 period.
	Rossi (1999)	*AREAER,* others nonspecified.	15 countries, 1989–1997.	For 1997, average of 0/1 dummies over all disaggregated categories of transactions. For 1989, three possible values depending on whether 1997 value is high, intermediate, or low. In between, linear interpolation if country had gradual change, or one-time change otherwise.	Discriminates between controls on inflows and outflows.	– 1989 index can take only three values. – 1989 index depends on 1997 index. – Values in between 1989 and 1997 are computed through linear interpolation or one-time change. – Limited coverage.
	Brune and others (2001)	*AREAER*	173 countries, 1973–1999.	Sum of all 0/1 dummies over five disaggregated categories, four of which separate controls on inflows and outflows.	– Extensive coverage. – Discriminates between controls on inflows and outflows.	– Not publicly available. – Only five categories of transactions. – Pervasive lack of information in the *AREAER?*

	Quinn (1997)	*AREAER*	63 countries, 4 years publicly available: 1958, 1973, 1982, and 1988.	For capital account receipts and payments, assigns a value between 0 and 2 in increments of 0.5 depending on severity of the restrictions.	– Takes into account the severity of restrictions. – Discriminates between inflows and outflows.	– Limited public availability. – Limited disaggregation. – Aggregation over different degrees of severity is problematic.
	Miniane (2004)	*AREAER*	34 countries, 1983–2000.	Average of all possible 0/1 dummies over 13 categories of capital account transactions.	– Substantial disaggregation. – Indicates systematically when coding is done by induction rather than through explicit information.	– Limited country coverage. – No distinction between controls on inflows and outflows.
De facto measures	Edison and Warnock (2003)	Standard and Poor's/IFC.	29 emerging economies, 1988–present.	Computes the share of domestic equities (measured in market capitalization) that are open for foreign purchase.	– Monthly measure. – Metric is very appropriate.	– Restrictions on domestic equity purchases by foreigners are a limited subset of all possible restrictions.
	Lane and Milesi-Ferretti (2001)	Authors' own calculations.	67 countries, 1970–1998.	Computes portfolio and direct investment assets and liabilities as a share of GDP.	– Measure is direct mapping of the common trade openness measure.	– Changes in asset prices can lead to changes in the measure with no corresponding change in positions and/or in de jure restrictions. – Low values in the index may be because of factors other than capital account closeness.

possible 0/1 dummies in the new *AREAER*. Theirs may be the most disaggregated de jure measure yet, but it is limited by the fact that it covers only the post-1996 period.[5] Rossi (1999) tries to extend period coverage for a small sample of 15 countries. He builds Johnston and Tamirisa-style indices for 1997 as well as a "subjective" index for 1989. Values for intermediate years are approximated by a linear interpolation if the country experienced a gradual change in restrictions between the endpoints, or by a one-time change otherwise. Brune and others (2001) can only be praised for the coverage of their measure: 173 countries for the period 1973–1999. The index is a sum of 0/1 dummies over 5 different categories, which are in turn an aggregation of the 13 subcategories in the new *AREAER*.[6] Four of the five categories separate controls on inflows and outflows. The main drawback of Brune and others' data is that they are not publicly available. Also, early editions of the *AREAER* often lack information to code all five categories, let alone inflows and outflows separately.[7] It remains an open question how the authors tackled this problem.

Parallel to these de jure, *AREAER*-based efforts, researchers have been constructing de facto indices of capital account openness.[8] Edison and Warnock (2003) compute the ratio of total market capitalization of equities that are available for purchase by foreign investors over total market capitalization.[9] While their index has the great advantage of being both monthly and readily interpretable, restrictions on capital inflows for equity purchases are a small subset of possible capital controls. Another de facto index is based on the work of Lane and Milesi-Ferretti (2001) on countries' net external wealth and consists of the ratio of a country's portfolio and direct investment assets and liabilities over GDP. This is, in a sense, a capital account counterpart to the trade openness measures commonly used in the literature.

This paper builds on the tradition of disaggregated *AREAER*-based measures initiated by Johnston and Tamirisa. Specifically, I use text information in the *AREAER* to extend this methodology back to 1983 for a sample of 34 countries,

[5]Tamirisa (2003) also exploits the Organization for Economic Cooperation and Development's (OECD) *Code of Liberalization of Capital Movements* for years back to 1990. This publication provides information similar to what appears in the *AREAER* and is equally disaggregated. The main drawback is that the data are restricted to OECD countries.

[6]One of the categories deals with proceeds from invisible transactions, which is separate from capital transactions in the *AREAER*.

[7]As will become clear, many of the dummies in my sample did indeed lack explicit information. Given the coverage of Brune and others (2001) of very poor countries with sparse information and their separation of controls on inflows and outflows, the problem is likely to be even more pervasive in their sample.

[8]There are also measures that take advantage of de jure *AREAER* information without following the disaggregated methodology. A good example is Quinn (1997), who does not disaggregate over several subcategories of transactions but takes into account the severity of restrictions. This is an important step, but severity is a subjective concept, as is the aggregation over restrictions that vary in their degree of restrictiveness. Also, note that most of Quinn's data is not publicly available.

[9]There are some adjustments for cross-holdings of equities, state ownership, and so forth. Note that the Edison and Warnock index can be related to the measures by Bekaert and Harvey (2000) or Henry (2000), who construct dummies to date stock market liberalization periods.

thus extending period coverage significantly. As will be shown in the paper, the disaggregated indices do a better job than the standard pre-1996 dummy at tracking both global trends towards capital account liberalization as well as country-specific liberalization episodes. Unlike the Johnston and Tamirisa data, my indices do not disaggregate beyond the 13 main subcategories of capital account transactions in the post-1996 classification. Moreover, they do not separate between controls of inflows and outflows despite a priori advantages of doing so, since it is questionable whether the pre-1996 editions of the *AREAER* contain enough text information for such a disaggregation. The indices are very transparent in this regard, as I have systematically indicated when the coding of a dummy was done through explicit information in the text and when it was the result of logical induction as explained further in the paper. To see why this is relevant information, note that a full 25 percent of the dummies for the early 1980s were coded through logical induction because of a lack of explicit indications.

The paper is organized as follows. Section I presents and justifies the choice of sample countries and explains in detail the sources of information and the methodology used in the construction of the indices. Section II compares the index with the pre-1996 IMF single dummy, as well as with the de facto measure by Lane and Milesi-Ferretti (LMF).[10] Section III addresses the limitations of the post-1996 methodology. In particular, the indices miss temporary capital control programs designed to fight off external crises, and their purely de jure nature says nothing about countries' enforcement of controls. Some possible solutions are suggested. Section IV contains concluding remarks.

I. Sample and Methodology

Countries and Period Covered

The choice of countries in the data set is somewhat arbitrary. The original impulse behind this project was to improve on the existing IMF single dummies to better study whether capital controls insulate countries from foreign monetary shocks (see Miniane and Rogers, 2003). Country selection for the indices was thus restricted by the availability of data necessary to pursue Miniane and Rogers's research. The list of countries includes Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Denmark, Ecuador, Finland, France, Germany, Greece, Hong Kong, India, Italy, Japan, Korea, Luxembourg (pooled with Belgium before 1996), Malaysia, Mexico, the Netherlands, Norway, the Philippines, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. The data are annual and cover the period 1983 to 2000.[11]

[10]Comparison with the Rossi (1999) and Johnston and Tamirisa (1998) measures is not possible because of their different country/period coverage. Quinn has made only four years of data publicly available, and the Brune measure is not available at all.

[11]The paper later discusses a possible method to make the indices monthly in a relatively time-efficient manner.

Despite the arbitrariness of the list, it is worth noting that the sample is diverse along several lines. The five main continents are represented, with particular emphasis on Europe, Asia, and the Americas. Countries range from poor (India, Ecuador) to very rich (Germany, Japan, etc.), with intermediate cases like Chile or Mexico. The whole spectrum of exchange rate arrangements is covered, from a full-blown currency board in Hong Kong, to a managed float in countries like Chile, to a free float in several OECD countries. It is hoped that this diversity somewhat compensates for the relative shortness of the list.[12]

Information Sources

There are many sources of information on capital controls, including country bulletins on laws enacted. A notable source is the *AREAER,* which not only contains the previously mentioned dummies but also contains very detailed reports on each country's exchange arrangement, administration of control, prescription of currency, regulations on import and import payments, payments for invisibles, exports and export proceeds, proceeds from invisibles, capital account transactions, and gold. For each country there is also a section called "Changes," where the date and details of any change in regulations in any of these categories is registered. As we shall see, the "Changes" section played a crucial role for the construction of my data.

I have decided to use the *AREAER* as the sole source of information. The reasons for this decision are twofold. First, the *AREAER* is the only publication that records and classifies the information in a systematic way, both throughout the years and, more importantly, throughout the countries. The same cannot be said about local publications, and this becomes an important consideration when constructing an index. Second, the *AREAER* is easy to access to verify the indices or their extension to a wider sample of countries or years.

Methodology

The "new" *AREAER* introduced in 1996 subdivides capital account transactions into 13 subcategories, to which I added a fourteenth as explained below:

- Capital market securities: shares or other securities of a participating nature, and bonds and other securities with an original maturity of more than one year.
- Money market instruments: securities with an original maturity of one year or less, such as certificates of deposit, Treasury bills, and so forth.
- Collective investment securities: share certificates or any evidence of investor interest in an institution for collective investment, such as mutual funds.
- Derivatives and other instruments: refers to operations in other negotiable instruments and nonsecuritized claims not covered under the previous three items.
- Commercial credits: covers operations directly linked to international trade transactions.
- Financial credits: credits other than commercial credits.

[12]The medium-term goal is to extend the data to a wider sample of countries.

- Guarantees, sureties, and financial backup facilities: securities pledged for payment of a contract, such as warrants, letters of credit, and so on.
- Direct investment.
- Repatriation of profits or liquidation of direct investment.
- Real estate transactions.
- Personal capital movements: not considered in this paper because of a lack of consistent information in past editions of the *AREAER.*
- Provisions specific to commercial banks and other credit institutions: regulations that are specific to these institutions, such as monetary and prudential controls.
- Provisions specific to institutional investors: one common example is a limit on the share of the institution's portfolio that may be held in foreign assets.
- Multiple exchange rate arrangements. These are not part of the capital account subdivision of the *AREAER,* but I felt it was an important form of capital control. The *AREAER* systematically provides information on multiple exchange rate regimes.

The rules to construct dummies in each category are as follows:

- The starting point is the disaggregated dummies provided by the 1996 to 2001 editions of the *AREAER.* Note that these dummies correspond to the period 1995 to 2000, since each edition reports on restrictions existing as of December 31 of the previous year.
- Using text information in the 1995 edition, I fill as many of the 13 subcategories as possible for the year 1994. The rule is always the following: one if at least one restriction for that item, zero otherwise.
- The next step is the "Changes" sections of both the 1995 and 1996 editions. For instance, the text in the 1995 edition might not mention anything about subcategory *X* in 1994, but the "Changes" section in the 1996 edition might refer to the elimination of some restriction in *X* during 1995. If one subcategory remains blank after completing this process, I assign it the same value it had in 1995. I call this rule "filling by default."
- In the rare case that a subcategory has an NA (not available) value for 1995, I keep the NA unless the text has some explicit information for 1994.
- Once the 1994 indices have been completed, the process is repeated for 1993, 1992, . . . , back until 1983.

Other elements in the construction of the indices are worth mentioning. First, whereas the post-1996 editions clearly distinguish between controls on inflows and outflows, the text information in pre-1996 editions may not always contain information on both types of flows. My indices then account for restrictions on inflows *and* outflows without systematically discriminating between the two. This is in contrast with the pre-1996 IMF dummies, which, as noted earlier, are limited to restrictions on outflows. Second, some countries have restrictions on foreign equity participation in some sectors. The new *AREAER* will compute this as a double restriction in both capital market securities and in foreign direct investment (FDI). I believe this to be double counting and thus compute the measure as a single restriction on FDI. Since no approach is unambiguously correct, I indicate these sensitive cases with a note in the relevant cell on the spreadsheet. Third, many countries have restrictions on foreign investment in sectors related to defense and public order. Contrary to the *AREAER,*

I chose not to consider these as capital controls. I again indicate these sensitive cases with a note.[13]

Finally, given that the *AREAER* fails to provide consistent information on whether countries enforce their restrictions, I attribute a value of 1 whenever a control exists, regardless of whether it is enforced. These are fully de jure measures. An exception happens whenever the *AREAER* indicates explicitly that a given restriction has never been used or enforced. In this case I consider it as nonexistent.[14] Once again, I report these rare situations with a note in the relevant cell.

II. Comparison with Alternative Measures

Space considerations prevent a display of the 13 dummies for all countries and all years in the paper. An average over the 13 dummies for each country and each year is presented in Table 2. Tables 3 and 4 present the IMF single dummy and the LMF measure, respectively.[15]

Global Trend Toward Capital Account Liberalization

Most economists agree that in the past two decades the world has slowly but steadily moved toward greater capital account openness. While this trend may have been deeper in developed countries, it was not necessarily restricted to them.[16] To see whether the disaggregated indices capture this trend, I computed a global index for each year by simply averaging over the individual country indices. I also computed a global index from the single dummies and the LMF measure.[17] As can be seen in Figure 1, the disaggregated global index (labeled "Miniane" index in the figure) exhibits a pronounced and continued downward trend, from a peak near 0.7 in 1983 to a low around 0.41 in 1999–2000. It is also interesting to note that the downward trend seems to accelerate from the late 1980s to early 1990s. As I show in the next subsection, this is precisely the period during which many European and some Latin American countries were opening their capital accounts.

The single-dummy and LMF measures exhibit a similar downward trend despite a reversal in the mid- to late 1990s for the former.[18] An important difference between

(text continues on page 291)

[13]These small changes explain why my disaggregated indices may differ slightly from those published by the IMF for the years 1995–2000.

[14]One such example is restrictions on FDI instituted in the United Kingdom in 1973.

[15]No dummies are provided for Switzerland before 1995. There are no data for Greece in the LMF measure, and Luxembourg is pooled with Belgium.

[16]The following section addresses specific liberalization episodes in both developing and developed countries. Also, in the words of Michel Camdessus, then the IMF's managing director: "There is also a considerable amount of work to be done at the national and international level to ensure that the preconditions for the freedom of capital movements are in place. But the big picture is clear: there is an irreversible trend toward capital account convertibility. . . ." (Camdessus, 1998).

[17]In Table 4 we can see that a higher value of the LMF measure means more openness, in contrast to the other two indices. For comparability purposes the LMF global index is computed from 1 minus the original LMF value.

[18]Even though the LMF index appears to have the most pronounced downward trend, cardinal comparisons between indices are not possible since they measure very different things.

Table 2. Disaggregated Indices

	Argentina	Australia	Austria	Belgium	Brazil	Canada	Chile	Colombia	Denmark	Ecuador	Finland	France	Germany	Greece	Hong Kong SAR	India
1983	0.917	0.5	0.692	0.615	1	0.231	1	1	0.692	0.846	0.923	0.692	0.231	0.923	0.077	0.917
1984	0.917	0.5	0.692	0.615	1	0.231	1	1	0.615	0.769	0.923	0.692	0.308	0.923	0.077	0.917
1985	0.917	0.5	0.692	0.615	1	0.231	1	1	0.615	0.846	0.923	0.692	0.231	0.923	0.077	0.917
1986	0.917	0.5	0.692	0.615	1	0.231	1	1	0.615	0.692	0.923	0.692	0.231	0.846	0.077	0.917
1987	0.750	0.5	0.692	0.615	1	0.231	1	1	0.615	0.692	0.923	0.692	0.231	0.846	0.077	0.917
1988	0.750	0.5	0.692	0.615	1	0.231	1	1	0.154	0.615	0.923	0.538	0.231	0.846	0.077	0.917
1989	0.667	0.5	0.538	0.615	1	0.231	1	1	0.154	0.615	0.846	0.385	0.231	0.846	0.077	0.917
1990	0.500	0.5	0.538	0.538	1	0.231	1	1	0.077	0.615	0.615	0.385	0.231	0.615	0.077	0.917
1991	0.500	0.5	0.308	0.538	1	0.231	1	1	0.077	0.538	0.308	0.385	0.231	0.615	0.077	0.917
1992	0.500	0.5	0.308	0.538	1	0.231	1	1	0.077	0.538	0.231	0.385	0.231	0.538	0.077	0.917
1993	0.417	0.5	0.308	0.538	1	0.231	1	1	0.077	0.538	0.231	0.385	0.231	0.462	0.077	0.917
1994	0.417	0.5	0.308	0.538	1	0.231	1	1	0.077	0.462	0.231	0.308	0.231	0.077	0.077	0.917
1995	0.417	0.5	0.308	0.538	1	0.077	1	1	0.077	0.462	0.231	0.308	0.231	0.077	0.077	0.917
1996	0.308	0.5	0.308	0.462	1	0.077	1	0.833	0.077	0.462	0.231	0.308	0.231	0.077	0.077	0.917
1997	0.385	0.5	0.308	0.462	0.923	0.077	1	0.833	0.077	0.462	0.231	0.308	0.308	0.077	0.077	0.923
1998	0.462	0.462	0.308	0.462	0.846	0.077	1	0.846	0.231	0.462	0.231	0.231	0.231	0.077	0.231	0.923
1999	0.462	0.462	0.308	0.154	0.846	0.154	0.923	0.846	0.231	0.462	0.231	0.231	0.077	0.077	0.231	0.923
2000	0.462	0.462	0.308	0.154	0.846	0.154	0.923	0.846	0.231	0.385	0.154	0.308	0.077	0.154	0.231	0.923
Average	**0.592**	**0.494**	**0.462**	**0.513**	**0.970**	**0.188**	**0.991**	**0.956**	**0.265**	**0.581**	**0.517**	**0.440**	**0.222**	**0.500**	**0.103**	**0.918**
1983–91	0.759	0.5	0.615	0.598	1	0.231	1.000	1.000	0.402	0.692	0.812	0.573	0.239	0.821	0.077	0.917
1992–00	0.425	0.487	0.308	0.427	0.940	0.145	0.983	0.912	0.128	0.470	0.222	0.308	0.205	0.179	0.128	0.920

Note: For a given country and year, the index represents the average over the 13 different dummies.

Table 2. *(concluded)*

	Italy	Japan	Korea	Luxemburg	Malaysia	Mexico	Netherlands	Norway	Philippines	Portugal	Singapore	S. Africa	Spain	Sweden	Switzerland	Turkey	U.K.	U.S.
1983	0.769	0.692	0.846	. . .	0.846	0.923	0.462	0.769	0.923	0.923	0.231	0.769	0.923	0.846	0.308	0.923	0.077	0.4615
1984	0.769	0.538	0.846	. . .	0.846	0.923	0.462	0.692	0.923	0.923	0.231	0.769	0.923	0.769	0.308	0.923	0.077	0.3077
1985	0.769	0.538	0.846	. . .	0.846	0.923	0.462	0.692	0.923	0.923	0.231	0.846	0.923	0.769	0.308	0.923	0.077	0.3077
1986	0.769	0.538	0.846	. . .	0.846	0.923	0.077	0.692	0.923	0.538	0.231	0.846	0.846	0.846	0.231	0.923	0.077	0.3077
1987	0.769	0.538	0.846	. . .	0.846	0.923	0.077	0.692	0.923	0.538	0.231	0.846	0.846	0.769	0.231	0.923	0.077	0.3077
1988	0.462	0.462	0.846	. . .	0.846	0.923	0.077	0.692	0.923	0.538	0.231	0.846	0.846	0.769	0.231	0.923	0.077	0.3077
1989	0.462	0.462	0.846	. . .	0.846	0.923	0.077	0.231	0.923	0.615	0.231	0.923	0.833	0.462	0.231	0.846	0.077	0.2308
1990	0.231	0.462	0.846	. . .	0.846	0.923	0.077	0.231	0.923	0.538	0.231	0.923	0.833	0.462	0.231	0.615	0.077	0.2308
1991	0.231	0.462	0.846	. . .	0.846	0.846	0.077	0.231	0.923	0.462	0.231	0.923	0.750	0.462	0.231	0.615	0.077	0.2308
1992	0.231	0.462	0.846	. . .	0.846	0.846	0.077	0.231	0.846	0.308	0.231	0.923	0.250	0.308	0.231	0.615	0.077	0.2308
1993	0.231	0.462	0.846	. . .	0.846	0.846	0.077	0.231	0.846	0.308	0.231	0.923	0.250	0.308	0.231	0.615	0.077	0.2308
1994	0.231	0.462	0.846	. . .	0.846	0.846	0.077	0.231	0.846	0.308	0.231	0.846	0.250	0.308	0.231	0.615	0.077	0.2308
1995	0.231	0.462	0.846	. . .	0.846	0.846	0.077	0.231	0.917	0.308	0.231	0.846	0.250	0.308	0.154	0.615	0.077	0.2308
1996	0.231	0.385	0.846	0.077	0.846	0.833	0.077	0.231	0.846	0.231	0.231	0.846	0.308	0.308	0.154	0.750	0.077	0.2308
1997	0.231	0.385	0.846	0.077	0.846	0.833	0.077	0.231	0.846	0.231	0.308	0.846	0.308	0.308	0.154	0.750	0.077	0.2308
1998	0.231	0.231	0.769	0.077	0.846	0.833	0.077	0.231	0.846	0.231	0.385	0.846	0.308	0.308	0.154	0.750	0.077	0.2308
1999	0.231	0.154	0.769	0.077	0.846	0.833	0.077	0.231	0.846	0.154	0.385	0.846	0.231	0.308	0.154	0.750	0.077	0.2308
2000	0.231	0.154	0.769	0.077	0.846	0.846	0.077	0.231	0.846	0.231	0.462	0.846	0.231	0.308	0.154	0.750	0.077	0.2308
Average	**0.406**	**0.436**	**0.833**	**0.077**	**0.846**	**0.877**	**0.141**	**0.389**	**0.889**	**0.462**	**0.265**	**0.859**	**0.562**	**0.496**	**0.218**	**0.768**	**0.077**	**0.26**
1983–91	0.581	0.521	0.846	. . .	0.846	0.915	0.205	0.547	0.923	0.667	0.231	0.855	0.858	0.684	0.256	0.846	0.077	0.2991
1992–00	0.231	0.350	0.821	0.077	0.846	0.840	0.077	0.231	0.854	0.256	0.299	0.863	0.265	0.308	0.179	0.690	0.077	0.2308

Source: Author's own data.

Table 3. IMF Single-Dummy Indices

	Argentina	Australia	Austria	Belgium	Brazil	Canada	Chile	Colombia	Denmark	Ecuador	Finland	France	Germany	Greece	Hong Kong SAR	India
1983	1	1	1	0	1	0	1	1	1	0	1	1	0	1	0	1
1984	1	0	1	0	1	0	1	1	1	0	1	1	0	1	0	1
1985	1	0	1	0	1	0	1	1	1	0	1	1	0	1	0	1
1986	1	0	1	0	1	0	1	1	1	1	1	1	0	1	0	1
1987	1	0	1	0	1	0	1	1	1	1	1	1	0	1	0	1
1988	1	0	1	0	1	0	1	1	0	0	1	1	0	1	0	1
1989	1	0	1	0	1	0	1	1	0	0	1	1	0	1	0	1
1990	1	0	1	0	1	0	1	1	0	0	1	0	0	1	0	1
1991	1	0	0	0	1	0	1	1	0	0	0	0	0	1	0	1
1992	1	0	0	0	1	0	1	1	0	0	0	0	0	1	0	1
1993	0	0	0	0	1	0	1	1	0	1	0	0	0	1	0	1
1994	0	0	0	0	1	0	1	1	0	1	0	0	0	1	0	1
1995	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0	1
Average	**0.769**	**0.077**	**0.615**	**0**	**1**	**0**	**1**	**1**	**0.385**	**0.308**	**0.615**	**0.538**	**0**	**1**	**0**	**1**
1983–88	1	0.167	1	0	1	0	1	1	0.833	0.333	1	1	0	1	0	1
1989–95	0.571	0	0.286	0	1	0	1	1	0	0.286	0.286	0.143	0	1	0	1

Table 3. *(concluded)*

	Italy	Japan	Korea	Malaysia	Mexico	Netherlands	Norway	Philippines	Portugal	Singapore	S. Africa	Spain	Sweden	Switzerland	Turkey	U.K	U.S.
1983	1	0	1	0	1	0	1	1	1	0	1	1	1	. . .	1	0	0
1984	1	0	1	0	1	0	1	1	1	0	1	1	1	. . .	1	0	0
1985	1	0	1	0	1	0	1	1	1	0	1	1	1	. . .	1	0	0
1986	1	0	1	0	1	0	1	1	1	0	1	1	1	. . .	1	0	0
1987	1	0	1	0	1	0	1	1	1	0	1	1	1	. . .	1	0	0
1988	1	0	1	0	1	0	1	1	1	0	1	1	1	. . .	1	0	0
1989	1	0	1	0	1	0	1	1	1	0	1	1	1	. . .	1	0	0
1990	0	0	1	0	1	0	1	1	1	0	1	1	1	. . .	1	0	0
1991	0	0	1	0	1	0	1	1	1	0	1	1	1	. . .	1	0	0
1992	0	0	1	0	1	0	1	1	1	0	1	1	1	0	1	0	0
1993	0	0	1	0	1	0	1	1	0	0	1	1	0	0	1	0	0
1994	0	0	1	0	1	0	1	1	0	0	1	0	0	0	1	0	0
1995	0	1	1	0	1	0	0	1	0	0	1	0	0	0	1	0	0
Average	**0.538**	**0.077**	**1**	**0**	**1**	**0**	**0.923**	**1**	**0.769**	**0**	**1**	**0.846**	**0.769**	**0**	**1**	**0**	**0**
1983–88	1	0	1	0	1	0	1	1	1	0	1	1	1	. . .	1	0	0
1989–95	0.143	0.143	1	0	1	0	0.857	1	0.571	0	1	0.714	0.571	0	1	0	0

Table 4. Lane and Milesi-Ferretti Indices

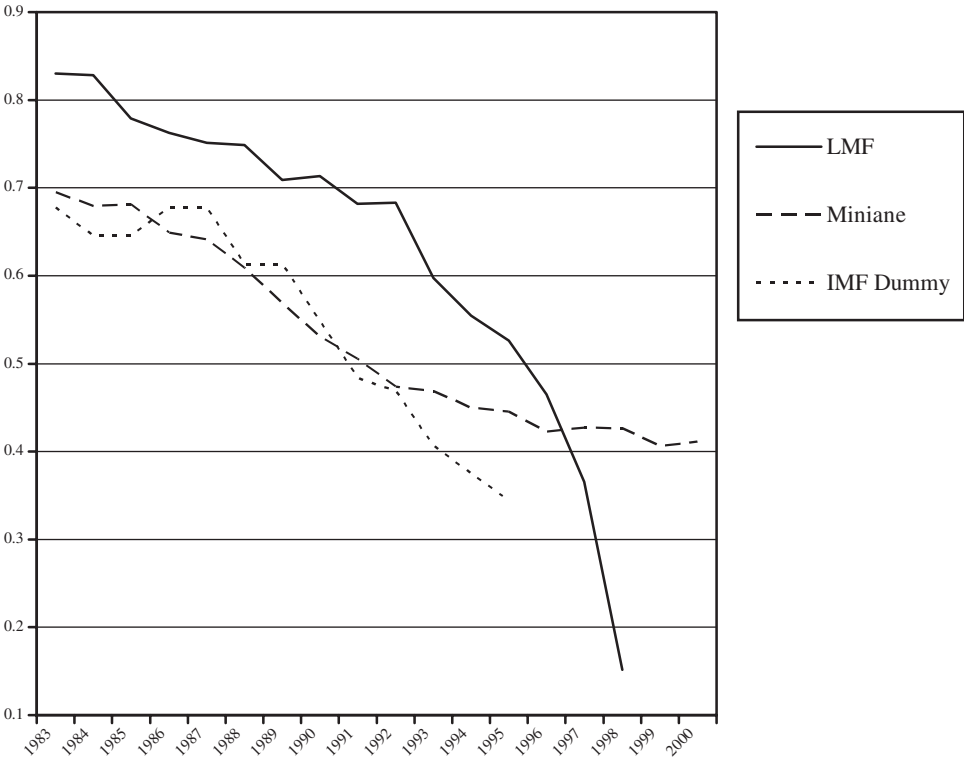
	Argentina	Australia	Austria	Belgium	Brazil	Canada	Chile	Colombia	Denmark	Ecuador	Finland	France	Germany	India	Italy	Japan
1983	0.027	0.217	0.061	0.183	0.099	0.330	0.084	0.078	. . .	0.087	. . .	0.119	0.111	0.005	. . .	0.060
1984	0.038	0.190	0.064	0.179	0.098	0.326	0.089	0.087	. . .	0.086	. . .	0.125	0.116	0.004	. . .	0.059
1985	0.046	0.248	0.088	0.235	0.099	0.346	0.076	0.107	. . .	0.063	. . .	0.167	0.185	0.004	. . .	0.076
1986	0.047	0.342	0.087	0.242	0.104	0.388	0.094	0.122	. . .	0.080	0.066	0.173	0.187	0.004	. . .	0.080
1987	0.041	0.387	0.092	0.272	0.093	0.418	0.126	0.127	. . .	0.084	0.081	0.182	0.163	0.006	. . .	0.080
1988	0.057	0.427	0.095	0.339	0.090	0.409	0.154	0.120	. . .	0.096	0.097	0.197	0.172	0.006	. . .	0.090
1989	0.047	0.438	0.136	0.538	0.090	0.417	0.183	0.127	. . .	0.112	0.123	0.258	0.236	0.007	0.094	0.119
1990	0.124	0.434	0.130	0.538	0.094	0.405	0.209	0.133	. . .	0.119	0.138	0.251	0.199	0.007	0.099	0.119
1991	0.110	0.484	0.136	0.730	0.108	0.436	0.234	0.138	0.207	0.122	0.146	0.304	0.203	0.006	0.105	0.136
1992	0.131	0.487	0.130	0.950	0.124	0.450	0.249	0.138	0.196	0.136	0.143	0.302	0.190	0.009	0.088	0.120
1993	0.166	0.593	0.162	1.418	0.134	0.533	0.292	0.149	0.236	0.171	0.236	0.370	0.235	0.016	0.122	0.123
1994	0.174	0.606	0.187	1.588	0.175	0.576	0.424	0.185	0.322	0.194	0.334	0.401	0.255	0.033	0.135	0.139
1995	0.208	0.641	0.190	1.682	0.144	0.634	0.421	0.174	0.341	0.193	0.305	0.408	0.260	0.033	0.151	0.148
1996	0.231	0.655	0.233	1.996	0.165	0.713	0.444	0.228	0.389	0.203	0.384	0.452	0.311	0.046	0.155	0.177
1997	0.265	0.640	0.293	2.654	0.195	0.783	0.511	0.260	0.513	0.242	0.505	0.538	0.414	0.064	0.198	0.197
1998	0.267	0.783	0.383	4.381	0.209	0.936	0.592	0.305	0.636	0.263	1.066	0.683	0.587	0.063	0.282	0.259
Average	**0.124**	**0.473**	**0.154**	**1.120**	**0.126**	**0.506**	**0.261**	**0.155**	**0.355**	**0.141**	**0.279**	**0.308**	**0.239**	**0.019**	**0.143**	**0.124**
1983–90	0.053	0.335	0.094	0.316	0.096	0.380	0.127	0.112	. . .	0.091	0.101	0.184	0.171	0.005	0.097	0.086
1991–98	0.194	0.611	0.214	1.925	0.157	0.633	0.396	0.197	0.355	0.190	0.390	0.432	0.307	0.034	0.154	0.162

Table 4. *(concluded)*

	Korea	Malaysia	Mexico	Netherlands	Norway	Philippines	Portugal	Singapore	S. Africa	Spain	Sweden	Switzerland	Turkey	U.K.	U.S.
1983	0.017	0.278	0.092	0.654	0.097	0.033	. . .	0.672	0.055	0.087	0.121	0.403	0.011	0.484	0.121
1984	0.016	0.256	0.100	0.695	0.097	0.036	. . .	0.653	0.066	0.097	0.122	0.431	0.012	0.486	0.115
1985	0.024	0.293	0.089	0.942	0.128	0.040	. . .	0.819	0.086	0.130	0.174	0.724	0.013	0.643	0.132
1986	0.038	0.326	0.121	0.908	0.160	0.042	. . .	0.942	0.082	0.148	0.202	0.763	0.013	0.719	0.161
1987	0.042	0.301	0.134	0.906	0.175	0.047	. . .	1.044	0.072	0.174	0.220	0.723	0.014	0.779	0.188
1988	0.043	0.270	0.160	0.887	0.177	0.067	0.088	1.045	0.067	0.179	0.244	0.729	0.016	0.758	0.201
1989	0.043	0.287	0.147	1.111	0.230	0.072	0.136	1.089	0.066	0.216	0.327	0.925	0.024	0.914	0.221
1990	0.047	0.302	0.156	1.008	0.241	0.071	0.161	1.113	0.057	0.218	0.370	0.748	0.026	0.863	0.220
1991	0.050	0.373	0.197	1.106	0.247	0.092	0.188	1.168	0.063	0.250	0.446	0.861	0.032	0.936	0.244
1992	0.062	0.437	0.218	1.004	0.200	0.092	0.179	1.103	0.072	0.227	0.388	0.874	0.036	0.853	0.242
1993	0.090	0.477	0.279	1.169	0.244	0.115	0.213	1.358	0.087	0.292	0.577	1.199	0.045	1.098	0.275
1994	0.106	0.498	0.189	1.270	0.302	0.143	0.251	1.496	0.105	0.335	0.700	1.225	0.059	1.105	0.291
1995	0.108	0.492	0.293	1.301	0.312	0.149	0.236	1.579	0.158	0.355	0.841	1.354	0.056	1.200	0.332
1996	0.107	0.527	0.340	1.477	0.361	0.183	0.277	1.758	0.198	0.378	0.899	1.568	0.060	1.313	0.363
1997	0.088	0.460	0.379	1.780	0.418	0.136	0.379	1.837	0.301	0.451	1.119	2.265	0.081	1.301	0.396
1998	0.238	0.721	0.357	2.235	0.546	0.225	0.485	2.481	0.442	0.620	1.455	2.684	0.071	1.560	0.475
Average	**0.070**	**0.394**	**0.203**	**1.153**	**0.246**	**0.096**	**0.236**	**1.260**	**0.124**	**0.260**	**0.513**	**1.092**	**0.035**	**0.938**	**0.249**
1983–90	0.034	0.289	0.125	0.889	0.163	0.051	0.129	0.922	0.069	0.156	0.222	0.681	0.016	0.706	0.170
1991–98	0.106	0.498	0.282	1.418	0.329	0.142	0.276	1.598	0.178	0.363	0.803	1.504	0.055	1.171	0.327

Source: Author's own computations using data provided by Gian-Maria Milesi-Ferretti.
Note: The indices are computed as portfolio and direct investment assets and liabilities as a share of GDP.

Figure 1. Evolution of Global Indices—All Countries

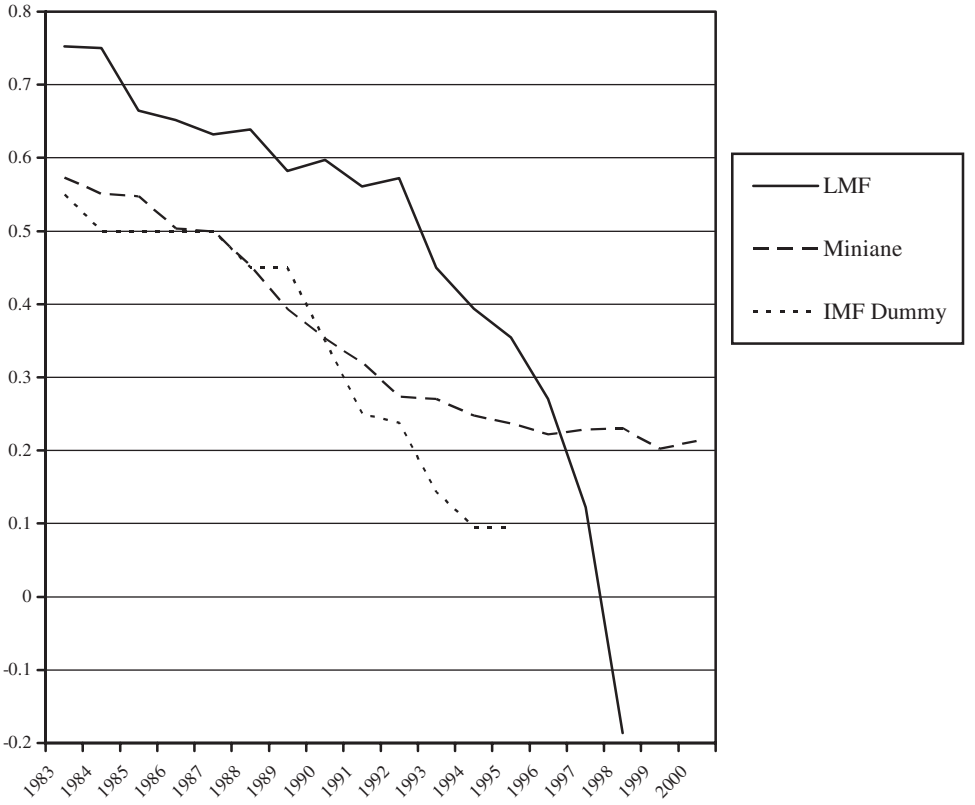


the three processes is that, in the case of the IMF dummy, the trend is driven solely by developed countries. To illustrate this, Figures 2 and 3 repeat the exercise in Figure 1 by constructing developing and developed countries subindices for each of the three measures.[19] All of them fall considerably throughout the period for the group of developed countries, but only the disaggregated and LMF measures fall for developing nations. The IMF dummy is flat (or increases) for much of the period and falls only in the last year of the sample.

Showing a more detailed perspective, Table 5 computes pairwise time-series correlations between global indices. While these are generally high (above 75 percent), they fall substantially to around 50 percent in the case of the developing countries' single-dummy subindex. Table 5 also computes for each of the three measures the share of countries for which the country-specific index was higher on average in the first half than in the second half of the period. That share is 100 percent, 82 percent, and 36 percent for the LMF, disaggregated, and single-dummy measures, respectively. In the case of developing countries, the IMF single dummy falls from

[19]I used two criteria for categorizing countries: whether the country is considered "emerging" and included in JP Morgan's Emerging Markets Bond Index (EMBI), and the World Bank's World Development Indicators, which classify a country as high income if annual GNP/capita exceeds US$9,076. Both criteria lead to the same selection except for South Korea, which was categorized as developing following the EMBI.

Figure 2. Evolution of Global Indices—Developed Nations



the first to the second half in just 17 percent of the countries. In short, the single dummies belie the fact that liberalization has also occurred in developing nations, albeit at a slower rate than in developed ones.

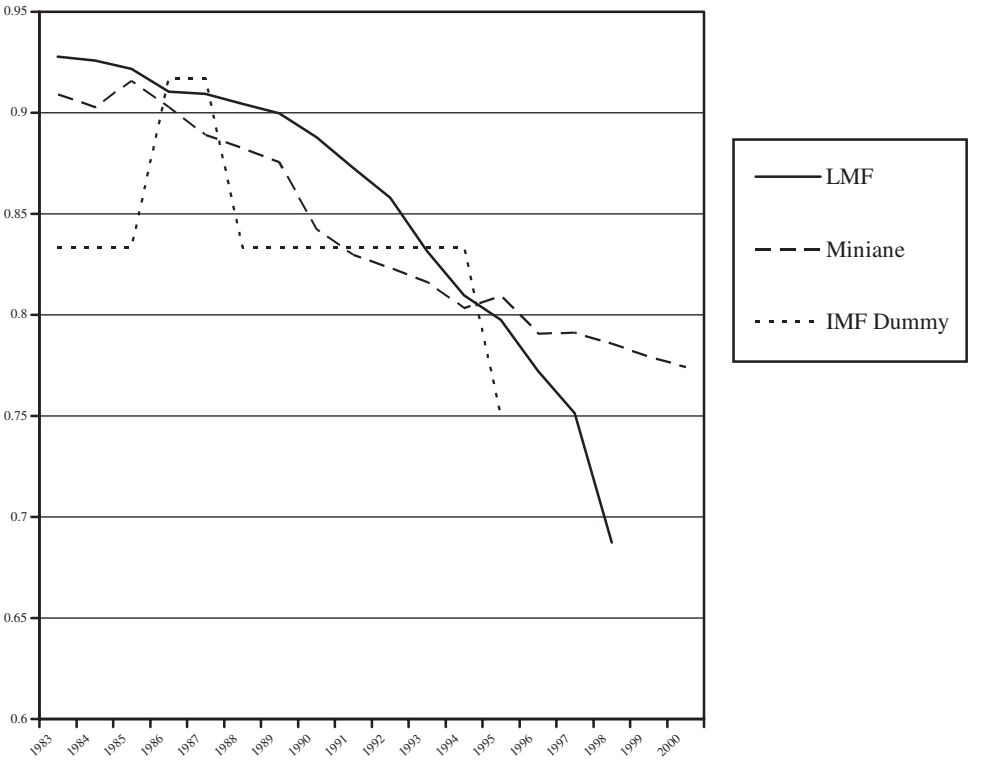
Cross-Sectional Comparisons

To compare the indices not through time but cross-sectionally, Table 6 ranks the countries from most to least open according to the three measures. For each measure, a country's index is computed as the average value across all years in the sample. Note that, in the case of the single dummies, all countries up to the United States rank as equally open, and all countries below Brazil as equally closed.[20] Reassuringly, the rankings are pretty similar across measures. If one decomposes the sample in three groups according to the IMF single dummy (above the United States, between the United States and Brazil, and below Brazil), then five out of nine countries in the top group also rank among the top nine in the two other measures.[21]

[20] See Table 3 for country details. This bundling of countries results from the crudeness of the 0/1 dummy. No two countries are tied in the disaggregated and LMF measures.

[21] Countries that appear in the same group in all three measures are marked with an asterisk in Table 6.

Figure 3. Evolution of Global Indices—Developing Nations



For the middle and lower groups, this number is 6 out of 13 and 6 out of 10 respectively. In other words, the measures agree pretty closely about which countries are very open or very closed and less so about the middle ground.

If one computes cross-country correlations (also in Table 6), the correlation is highest between the two *AREAER*-based measures (73 percent). This is not surprising given that they share a common source of information. Correlations remain relatively high (around 60 percent) with respect to the LMF measure. Finally, note that many countries in the single-dummy classification are shown as having no restrictions in any year (see Table 3). This is a fallacy that is refuted by the text in the *AREAER* itself. Indeed, no country in the disaggregated sample ever shows an index of zero for any year. This can be partly explained by the fact that the single dummies account only for controls on outflows as noted by Eichengreen (2001).

Country-Specific Liberalization Episodes

So far, comparisons between measures have dealt with general time-series or cross-sectional trends. The purpose of this section is to study specific liberalization episodes and show how these episodes are tracked by the disaggregated index but not by the single dummy. The LMF measure cannot be used to date liberalization

Table 5. Summary Statistics for Global Trends

		Correlation Between Global Indices		
		Miniane	LMF	IMF dummy
All countries	**Miniane**	1		
	LMF	82%	1	
	IMF dummy	95%	94%	1
Developed	**Miniane**	1		
	LMF	77%	1	
	IMF dummy	95%	93%	1
Developing	**Miniane**	1		
	LMF	90%	1	
	IMF dummy	48%	54%	1
		Liberalization Measure		
All countries	**Miniane**		82%	
	LMF		100%	
	IMF dummy		36%	
Developed	**Miniane**		86%	
	LMF		100%	
	IMF dummy		48%	
Developing	**Miniane**		75%	
	LMF		100%	
	IMF dummy		17%	

Source: Author's own computations.

Note: The liberalization measure computes the percentage of countries in which the value for the second half of the period was lower than for the first half.

episodes, as it shows a rather smooth opening throughout the period for all countries in the sample. Table 7 summarizes the measures undertaken during 16 liberalization/tightening episodes captured by the disaggregated index.[22]

Japan's Big Bang

One of the most talked about liberalization processes has been Japan's Big Bang. Launched in late 1995, the Big Bang is a staggered but far-reaching reform of the financial sector, which policymakers hope will help the country tap more efficiently into its deep reserves of savings. The list of liberalizing measures pertaining to

(text continues on page 302)

[22] A liberalization is defined as a decline of at least 0.3 in the index. The set of liberalizations is quite robust to reasonable changes in this value. Note that some noteworthy capital control programs are not summarized in the table, as they are not captured by the index. These are mostly programs put in place in the midst of external crises. The next section addresses this issue in detail.

Table 6. Cross-Sectional Comparison

Ranking of Countries

Miniane	LMF	IMF Dummy
United Kingdom	Singapore	Belgium
Netherlands	Netherlands	Canada*
Canada	Belgium	Germany
Switzerland	Switzerland	Malaysia
Germany	United Kingdom	Netherlands*
Denmark	Sweden	Singapore*
Singapore	Canada	Switzerland*
United States	Australia	United Kingdom*
Norway	Malaysia	United States
Italy	Denmark	Australia
Japan	France	Japan
France	Finland	Ecuador
Austria	Chile	Denmark
Portugal	Spain	France*
Australia	United States	Italy*
Sweden	Norway	Finland*
Greece	Germany	Austria*
Belgium	Portugal	Sweden
Finland	Mexico	Portugal*
Spain	Colombia	Argentina
Ecuador	Austria	Spain*
Argentina	Italy	Norway
Turkey	Ecuador	Brazil*
Korea	Brazil	Chile
Malaysia	Japan	Colombia
South Africa	Argentina	Greece
Mexico	South Africa	India*
Philippines	Philippines	Korea*
India	Korea	Mexico
Colombia	Turkey	Philippines*
Brazil	India	South Africa*
Chile		Turkey*

Cross-Sectional Correlation

Miniane	LMF	IMF dummy
1		
59%	1	
73%	66%	1

Source: Author's own computations.

Notes: The ranking is from most to least open. In the IMF dummy ranking, all countries above the United States are tied with the United States, and all countries below Brazil are tied with Brazil. An asterisk denotes that the country appears in the same group in all three measures (see text for details).

Table 7. Summary of Main Liberalization/ Tightening Episodes Captured in the Data

Country	Changes in the Index	Summary of Main Measures Undertaken
Argentina	Drops from 0.92 in 1986 to 0.31 in 1996	– September 1 and November 9, 1989: Liberalization of FDI, which can now be undertaken without prior approval and is subject to the same laws as those governing resident investors. – December 20, 1989: Foreign borrowing and lending are liberalized and proceeds from all loans are transacted in the free exchange market. – September 8, 1993: Elimination of remaining restrictions on the repatriation of capital and profits.
Austria	Drops from 0.69 in 1988 to 0.31 in 1991	– February 1, 1989: All restrictions on long-term transfers are abolished, except the issuance of securities on foreign capital markets and of foreign securities in domestic markets. – November 4, 1991: Foreign exchange controls are abolished.
Belgium	Drops from 0.46 in 1998 to 0.15 in 1999	– April 5, 1999: Most controls on transactions with securities of non-EU origin are eliminated.
Denmark	Drops from 0.69 in 1983 to 0.08 in 1990	– January 1, 1984: Purchases by residents of foreign shares listed on the stock exchange are freed, as are investments by nonresidents in futures markets. – June 11, 1985: The length of period allowed for residents' foreign exchange accounts in Danish banks is extended from one to three months. FDI of less than DKr 10 million no longer requires permission, compared with an earlier ceiling of DKr 5 million. Finally, the minimum maturity for finance loans contracted abroad is lowered from five years to one year. – October 1, 1988: Elimination of all remaining restrictions on inward and outward capital movements, excepting some real estate transactions.
Ecuador	Drops from 0.85 in 1983 to 0.39 in 2000	– April 5, 1983: Foreign loans with maturity of 18 months or more are authorized by the Central Bank. – January 9, 1984: Authorization is granted for FDI in the insurance, reinsurance, commercial banking, and financial companies sectors. Moreover, the limit on repatriation of profits is raised from 20 percent to 30 percent. – July 29, 1987: Relaxation of ceilings on nonresidents' equity participation in domestic companies despite setbacks in sectors such as communications or internal transport.

(*continued*)

Table 7. *(continued)*

Country	Changes in the Index	Summary of Main Measures Undertaken
		– June 13, 1991: Limits on profit remittances are abolished. – December 29, 1993: Income tax rates on foreign companies are aligned with those of domestic companies. – January 25, 1994: Public sector foreign loan disbursements are no longer subject to commission. – January 27, 2000: Unification of reserve requirements for foreign currency-denominated and sucre-denominated accounts.
Finland	Drops from 0.92 in 1988 to 0.15 in 2000	– June 1, 1989: Regulations on FDI in the financial and insurance sectors are liberalized. – September 1, 1989: Regulations on outward and inward capital transfers are broadly liberalized. – December 19, 1989: Issues of markka-denominated bonds and shares abroad by residents or at home by nonresidents are liberalized. – September 1, 1990: Residents are allowed to purchase and sell derivative instruments on foreign shares. – January 1, 1991: Foreign exchange controls are abolished except those regarding the raising of loans abroad by private individuals. – January 1, 1992: Nonresidents are allowed to own shares in Finnish investment trusts. – January 1, 1993: Nonresidents are allowed to purchase Finnish securities and own Finnish corporations without restriction. Real estate transactions are liberalized. – January 1, 2000: Final relaxation of real estate transactions.
France	Drops from 0.69 in 1987 to 0.23 in 1998	– June 1, 1988: Restrictions on foreign borrowing are abolished. Domestic enterprises are allowed to operate foreign currency accounts in France or abroad. – September 24, 1988: EC residents are no longer required to obtain authorization for direct investments, except when there is actual acquisition of the firm. – March 9, 1989: All exchange restrictions for capital transactions by banks and enterprises are abolished. Residents of all OECD countries are allowed to issue foreign securities in France. – January 1, 1990: Firms based in OECD countries are permitted to issue securities in France. – October 31, 1998: The issuance of euro-franc securities is liberalized. – December 31, 1998: The issuance of certificates of deposits is liberalized.

Table 7. *(continued)*

Country	Changes in the Index	Summary of Main Measures Undertaken
Greece	Drops from 0.92 in 1985 to 0.08 in 1994	– May 19, 1986: All restrictions applying to EC residents on the liquidation of investments and repatriation of profits are eliminated. – November 23, 1988: FDI laws pertaining to EC residents are liberalized. Personal capital transfers to EC residents are completely liberalized. – March 9, 1989: Exporting firms are allowed to contract foreign exchange loans of maturity less than six months. – July 1, 1989: Remaining restrictions on direct investments by EC residents are abolished. – August 20, 1990: Restrictions are lifted on the repatriation of profits, dividends, interest, amortization, or liquidated capital for non-EC residents. – June 11, 1992: Residents are allowed to acquire shares and bonds issued by non-EC entities under the same terms and conditions as those applied in EC member countries. – June 17, 1992: Credit institutions are allowed to lend to individuals permanently residing abroad. – March 23, 1993: All capital transactions with EU countries are liberalized, except credits with maturity of less than one year. – June 30, 1993: All capital transactions with non-EU countries are liberalized with some individual exceptions. – May 16, 1994: Remaining controls on short-term capital movements are abolished.
Hong Kong	Increases from 0.08 in 1997 to 0.23 in 1998	– September 7, 1998: The Hong Kong Stock Exchange reinstates the tick rule for short-selling and reviewed the list of securities eligible for short-selling. – August 31, 1998: The Hong Kong Futures Exchange imposes a special margin on open positions exceeding 10,000 contracts.
Italy	Drops from 0.77 in 1987 to 0.23 in 1990	– October 1, 1988: All but some restrictions on commercial and financial transactions by residents with nonresidents are abolished. – January 19, 1990: Residents are allowed to purchase short-term bonds and money market securities issued or payable abroad. – May 14, 1990: The remaining restrictions on banks' foreign exchange management are lifted.

Table 7. *(continued)*

Country	Changes in the Index	Summary of Main Measures Undertaken
Japan	Drops from 0.69 in 1983 to 0.15 in 1999	– April 1, 1983: Banks are allowed to issue bonds abroad through their subsidiaries. – June 6, 1983: Liberalization of short-term euro-yen lending by Japanese banks. – April 1, 1984: Restrictions on sales of yen-denominated securities by foreign banks are eased. – August 1, 1984: Japanese brokers are allowed to enter international brokerage excepting transactions between the yen and the U.S. dollar. – July 1, 1985: Authorization is granted to foreign banks to participate in the trust banking business in Japan, including the management of corporate pension funds. – April 1, 1986: The ceiling on foreign currency-denominated assets purchases by pension funds is eased. – August 15, 1986: A similar easing is approved for the insurance sector. – May 22, 1987: Certain banks and securities companies are allowed to transact financial futures abroad for their own accounts. – January 9, 1988: Issuance of commercial paper by nonresidents is permitted. – June 16, 1989: The issuance of yen-denominated bonds abroad by nonresidents is fully liberalized. – July 30, 1990: Foreign deposit accounts are liberalized. – April 26, 1991: Reporting requirements for FDI are eased. – January 1, 1993: Further liberalization of FDI reporting requirements. With some exceptions, foreign investors are now required to report their investments only ex post. – August 2, 1995: Wide-ranging measures to promote overseas investments and loans by institutional investors, including liberalization of foreign currency-denominated loans and removal of restrictions of yen-denominated external loans. – January 1, 1998: Limits on pension funds' foreign exchange investments are removed. – April 1, 1998: The prior notice requirement for portfolio and direct investments abroad by residents is abolished. – April 1, 1998: The waiting period for loans extended to nonresidents is abolished.

Table 7. *(continued)*

Country	Changes in the Index	Summary of Main Measures Undertaken
Netherlands	Drops from 0.46 in 1985 to 0.08 in 1986	– January 1, 1986: Restrictions on capital movements are lifted.
Norway	Drops from 0.77 in 1983 to 0.23 in 1989	– June 8, 1984: Foreign banks are allowed to operate in Norway subject to the same general conditions as Norwegian banks. – June 15, 1984: Residents are allowed to purchase (quoted) foreign shares as well as foreign bonds. – May 9, 1988: Nonresidents are allowed to purchase long-term bonds denominated in Norwegian kroner. – June 14, 1988: Residents are allowed to incur or provide commercial and financial guarantee obligations abroad. – June 30, 1989: Residents are allowed to acquire shares of foreign collective investment funds without prior authorization. – December 8, 1989: Individuals are allowed to obtain foreign currency loans abroad subject to a license. Legal entities are allowed to engage in financial leasing in foreign currencies with Norwegian banks without prior authorization and with foreign banks with liberally granted authorization.
Portugal	Drops from 0.92 in 1985 to 0.15 in 1999	– January 1, 1986: Most capital transactions with EC residents are freed. – July 18, 1986: Authorization procedures for FDI are eased. – February 2, 1989: Limits above which medium- and long-term capital transactions require approval are raised. – July 1, 1990: Investment in foreign securities listed in recognized exchanges are fully liberalized. – June 14, 1991: Restrictions on direct and real estate investment abroad by residents are eased. – September 1 and November 26, 1992: Financial credits from abroad are liberalized. – December 16, 1992: Easing of restrictions on escudo deposits for nonresidents, demand and term deposits abroad by residents, acquisition of money-market instruments by nonresidents, short-term lending in escudos to nonresidents, and foreign exchange operations between nonbank residents and nonresidents. – November 28, 1995: Remaining restrictions on FDI are lifted.

(*continued*)

Table 7. *(continued)*

Country	Changes in the Index	Summary of Main Measures Undertaken
		– March 1, 1999: Abolition of controls on the introduction of foreign securities issued by residents of a non-EU member country that were not quoted on the issuer's country or on the country of issuance.
Spain	Drops from 0.92 in 1985 to 0.25 in 1992	– April 1, 1986: Easing of restrictions on residents' foreign currency-denominated financial loans. – June 27 and September 25, 1986: Authorization is no longer required for FDI in oil refining, mining, sea transport, and insurance. – November 7, 1986: Investments abroad by residents are liberalized, including portfolio investments. – March 13, 1987: Limits on foreign loans not related to merchandise trade are raised to pesetas 1.5 million. – May 25, 1987: Investments abroad are further liberalized, with real estate investments partially liberalized for the first time. – June 10, 1988: The minimum maturity period of foreign currency borrowing not subject to authorization is raised to three years. – December 19, 1988: Direct investments abroad in companies engaged in portfolio and real estate investment activities are permitted. – April 4, 1990: Remaining restrictions on purchases of foreign monetary instruments by residents are removed. – June 22, 1990: Residents are allowed to purchase securities denominated in pesetas and issued in Spain by nonresidents. – July 8, 1990: Nonresidents are allowed to freely purchase securities in Spanish exchanges. – December 27, 1990: Most remaining regulations limiting portfolio investments by residents abroad and by nonresidents in Spain are abolished. – April 16, 1991: Residents are allowed to maintain accounts in foreign currency in authorized banks. – July 1, 1992: Most remaining controls on capital transfers are abolished.
Sweden	Drops from 0.85 in 1983 to 0.31 in 1992	– February 21 and May 22, 1984: Restrictions on the maturity and amount of foreign currency borrowing are eased. – April 14 and June 24, 1986: Restrictions on direct investment abroad by residents are eased. – March 25, 1986: Residents are allowed to purchase derivative instruments on foreign securities.

(*continued*)

Table 7. *(concluded)*

Country	Changes in the Index	Summary of Main Measures Undertaken
		– March 1, 1987: Further easing of restrictions of foreign borrowing. – January 9, 1989: All restrictions on the acquisition of foreign equity are abolished. – July 1, 1989: Virtually all remaining currency regulations are abolished, but transactions must still be carried through an authorized Swedish bank or broker. – January 1, 1992: Transactions need no longer be carried through authorized currency traders. – December 31, 1992: Residents are authorized to deposit funds in foreign banks.

various items in the capital account includes the following:[23] elimination of the approval period for outward direct investments in all but some sectors, elimination of the 5-3-3-2 rule for pension fund managers,[24] elimination of the waiting period to resell yen-denominated securities issued abroad to Japanese residents, elimination of the waiting period for loans extended by residents to nonresidents, and liberalization of foreign currency-denominated external loans by insurance companies.

The disaggregated index drops by 50 percent during the short period under consideration, from 0.46 in 1995 to 0.23 in 1998. Japan still had restrictions left at the end of 1998, such as ceilings on the investment in foreign currency-denominated bonds by credit cooperatives, limits on the share of their total assets insurance companies can invest in securities issued by nonresidents, and controls on inward direct investment, which prevented the index from dropping even further. Strikingly enough, the single dummy shows Japan as having no controls before the Big Bang. This is obviously erroneous in light of what has been said, even accounting for the fact that the dummy tracks only controls on outflows.

Liberalization episodes in Europe

Parallel to the creation of the European single market in goods and services, Articles 56 and 57 of the European Union Treaty call for the lifting of all restrictions on capital movements among Member States and between Member States and third countries, the latter with some qualifications. This pushed many European countries to liberalize their capital accounts in the mid- to late 1980s.

One such country is Austria. In 1989, the country started by eliminating virtually all restrictions on long-term capital transfers and pursued its efforts through

[23] A more detailed account appears in various editions of the *AREAER* publication.

[24] This rule required managers to hold 50 percent or more of assets under management in bank deposits, bonds, or loans; 30 percent or less in stocks; 30 percent or less in foreign currency-denominated assets; and 20 percent or less in real estate property.

1991 when it abolished all remaining foreign exchange controls. Some restrictions on inward direct investment and the establishment of foreign banks remained. The disaggregated index for Austria does indeed fall from 0.69 in 1988 to 0.31 in 1991. Another interesting case is Denmark, which opted for a one-shot rather than a staggered approach, and on October 1, 1988, eliminated all restrictions on inward and outward capital transfers while maintaining some prudential measures regulating net positions in foreign currencies. Once again, the disaggregated index reflects the nature of these changes and falls from 0.62 in 1987 to 0.15 in 1988.

The single dummy also captures these liberalization events, as can be seen in Table 3, even though the values of 1 and zero overstate the level of restrictiveness before liberalization and understate it after. But for other European countries, the single dummy completely missed the liberalization episode. In the case of Greece, the dummy keeps a value of 1 up to 1995. However, Greece had previously undergone major reform starting in 1986 with the elimination of all restrictions applying to residents of other European Community (EC) countries and moving to the authorization granted in 1987 to repatriate capital and profits in respect to borrowings from non-EC countries; the full liberalization in 1989 of direct investments in EC countries by residents of Greece; the authorization granted in 1992 to acquire dividends, bonds, and shares issued in non-EC countries under the same conditions applied to EC member countries; and culminating in 1994 with the elimination of all remaining controls on short-term capital movements. Contrary to the common IMF measure, the disaggregated index in Table 2 closely tracks liberalization, falling from 0.92 in 1985 to 0.62 in 1990 to 0.08 in 1994.

Norway is another case where the disaggregated index picks up the opening of the capital account missed by the single dummy. Among other measures passed by Norway in 1989 one finds authorization granted to residents to provide commercial and financial guarantee obligations abroad with no permission from the Bank of Norway, authorization granted to nonresidents to issue bonds denominated in kroner in Norway subject to a license, and authorization for nonresidents to purchase bonds with a maturity of at least one year. While the disaggregated index falls from 0.69 in 1988 to 0.23 in 1989, the *AREAER* dummy remains equal to 1 up until the introduction of disaggregated indices.

Liberalization episodes in Latin America

Argentina is a well-known case of liberalization in an emerging economy. Starting with Carlos Menem's rise to power in 1989, Argentina embarked on a far-reaching liberalization of the economy, including an opening of the capital account.[25] Among the measures undertaken one can find the liberalization of international credit operations in December of 1989, or the liberalization of FDI contained in the Economic Emergency Law of September 1989. Indeed, the disaggregated measure falls from 0.75 in 1988 to 0.31 in 1996. The latter figure can be explained by the fact that Argentina left some restrictions in place: for example, mutual funds could not

[25] Argentina has reversed this trend in the past couple of years following the country's financial collapse. Reversal is not captured in the indices since it occurred after the end of the sample period.

invest more than 25 percent of assets under management in non-Mercosur securities, and issues of derivatives by nonresidents required approval above and beyond that requested from domestic residents. Liberalization was also tracked by the IMF dummy, with one major caveat: the change in the dummy was recorded in 1993, a full four years after the main package of liberalization measures. And once again, the zero value of the index post-1993 overstates the degree of capital account openness.

Another Latin American country to have experienced an opening of its capital account between 1983 and 2000—albeit more gradually and with some setbacks—is Ecuador. Opening measures spread across many years have included a relaxation of foreign equity participation ceilings in July 1987 and the elimination of limits on profit remittances in June 1991. As of December 2000, Ecuador still retained controls on the issue of money market and collective investment instruments by nonresidents and required approval from the Central Bank for all foreign loans. When one looks at the disaggregated measure, it falls gradually from 0.85 in 1983 to 0.39 in 2000, with an increase in 1985. Puzzlingly enough, the IMF dummy has a value of zero in 1983–85, not at all consistent with the text information in the *AREAER,* which does signal substantial controls on inflows and outflows. After increasing in 1986 (consistent with the change in 1985 in the disaggregated measure), the IMF dummy falls back to zero in 1988. This is once again contradicted by the text information. Finally, the single dummy becomes 1 in 1993 at a time of partial easing of restrictions. The value of the IMF dummy does not seem close to representing actual policies in the country.

III. Limitations of the Measure (and Some Possible Solutions)

This section addresses some of the obvious and not so obvious limitations of the disaggregated measure and proposes tentative solutions. Arguably, the single greatest liability of the measure is that it does not discriminate between controls on inflows and outflows; the reasons for this choice on a pre-1996 *AREAER*-based measure have already been discussed.[26]

Missing on Liberalization and Tightening Episodes

A limitation of the data is that they miss important capital control programs instituted in the midst of external crises. Indeed, part of the reason why capital controls are back in vogue is the perception that Malaysia escaped a harsher fate during the recent Asian crisis by imposing a one-year holding period for nonresidents' portfolio capital in September 1998.[27] As can be seen in Table 2, these controls are not "recorded" in the indices. Similarly, the indices do not show any evidence of the

[26] Quinn's measure does not discriminate between the two types of flow either. Edison and Warnock (2003) measure only controls on inflows. One could, in principle, separate assets and liabilities in the Lane and Milesi-Ferretti measure, but the fact that one side is greater than the other may not mean different degrees of restrictiveness for inflows and for outflows.

[27] See Edison and Reinhart (2001) and Kaplan and Rodrik (2001) for formal analyses of Malaysia's experience.

temporary control programs instituted in Portugal, Spain, or Sweden at the height of the 1992 exchange rate mechanism (ERM) crisis, such as Spain's imposition of a compulsory one-year, non-interest-bearing deposit to be held at the Central Bank.[28] There are two main reasons why the data fail to capture these episodes. First, the *AREAER* shows restrictions in place as of December 31 of each year: measures that are put in place for some months and then removed may not get factored into the index. Second, controls that are still in place as of December 31 of the year will not affect the index if they come on top of other existing restrictions in that subcategory. This is what happened in the case of Malaysia, a country that already had restrictions in all capital markets' subcategories.

Besides emergency tightenings, the data also miss some noteworthy liberalizations. For instance, Brazil's index value remains equal to 1 up until 1997, when it drops slightly to 0.92. But Brazil underwent an opening of its capital account before 1997. Starting in 1992, the country liberalized the participation by foreigners in the privatization process, nonfinancial residents were permitted to invest up to US$1 million abroad without prior approval, corporations established in Brazil were authorized to issue and place abroad securities that could be converted into equity, prepayment of foreign borrowing and import financing was permitted, and the minimum period for the renewal and extension of foreign credit was lowered. But why didn't the index fall? Consider the possibility to invest up to US$1 million abroad with no approval. This is certainly less restrictive than the previous situation where every single investment required authorization, but absence of full liberalization means the FDI category will still show a value of 1. The same happens with the lowering of the minimum period for renewal of foreign credit.

One possible solution to the problems recorded in this subsection would be to follow Cardoso and Goldfajn's (1997) methodology. They track every single capital control enacted in Brazil from 1983 to 1995. Every time a new control is put in place or an existing one becomes more stringent, their index goes up by 1, and the opposite happens following the relaxation or abandonment of existing measures. However, such a time-consuming undertaking may not be realistic for a sample of 34 countries.

Enforcement of Controls

Besides the severity of controls, the question remains as to what extent the controls are effectively enforced. In this respect, de facto measures such as Edison and Warnock's and Lane and Milesi-Ferretti's provide only partial answers. An alternative solution would be to weight the disaggregated indices by indirect proxies for enforcement, such as Transparency International's Corruption Perceptions Index. Even though some relatively uncorrupted countries may lack the means to enforce controls effectively, corruption indices are likely to be a good proxy for enforceability. The Transparency International measures are available for all the countries

[28] See Fielecke (1994) and Edison and Reinhart (2001) for an analysis of controls implemented during the ERM crisis.

in the sample. They cover only the past eight years, but this is a small price to pay given that corruption is a relatively slow-changing phenomenon.

Data Frequency

There is no denying that a monthly rather than an annual index could be of great use for many research projects. It is theoretically possible to construct a monthly index from the yearly *AREAER* data in a reasonably time-efficient manner. Take for a given country its yearly index. If there is no change between years t and $(t + 1)$, then all months of $(t + 1)$ stay equal to the yearly $(t + 1)$ index. Whenever there is change from year to year, one can identify the subcategories where the change occurred from the disaggregated information in the yearly index. The "Changes" section of the year $(t + 1)$ edition of the *AREAER* will then specify the exact date of change in those subcategories. It remains to be seen whether one would obtain enough monthly variance for such an index to be of any use.

Are All Categories Relevant Throughout the Sample Period?

There is a risk that some of the post-1996 subcategories rendered important through financial innovation may have been irrelevant at the beginning of the sample period. This problem can be measured indirectly by computing the proportion of times that a given subcategory was filled by default rather than through explicit information. Indeed, for the year 1983, the categories "collective investment securities" and "derivatives and other instruments" were filled by default in 50 percent of the cases, versus 25 percent for all categories combined. There is no easy answer to this problem, but the usefulness of explicitly stating how a dummy was coded again becomes apparent. A researcher using the data can easily weight each subcategory by the proportion of countries in which the subcategory was coded through explicit information. This would indeed have assigned the smallest weight to the two categories mentioned above. Alternatively, one could exclude a subcategory if it was filled by default in more than x percent of the cases and examine the robustness of the final indices to reasonable changes in x.

IV. Conclusion

This paper adds to the growing list of capital control measures that build on the post-1996 disaggregated methodology. The indices, nominally 13 times more precise than the common IMF single dummy, do a better job at tracking both world trends toward greater capital account openness and specific liberalization episodes that occurred in various countries under study. The indices could be improved in several directions: greater country/year coverage, greater disaggregation, better consideration of the severity of the controls or their actual enforcement, better tracking of temporary capital control measures to fight speculative attacks, and more careful distinction between controls on inflows and outflows. As they stand, they are an important step forward relative to the previous IMF measures. They complement without substituting other indices recently published in the literature,

sometimes through better country coverage and sometimes through greater disaggregation or explicit consideration of missing information. Together with these other indicators they can be of considerable help for researchers trying to quantify the costs and benefits of capital controls, a major issue in the current reformulation of the global financial architecture.

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