

## CHAPTER 5

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# A New and Better Measure of Capital Controls

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### 1 Introduction

There has long been a substantial controversy about the role of capital controls. The designers of the Bretton Woods postwar international monetary system anticipated that capital controls would be a permanent feature of the system. Over time, however, views of many economists and officials changed with capital controls becoming seen as having greater costs and freedom of capital flows as having greater benefits than before. These changes in view resulted in major shifts toward the liberalization of capital accounts, first in the industrial countries and then in many developing countries. With the recent rash of currency crises in emerging market countries in the 1990s, considerable support for limiting the freedom of international capital flows reemerged.<sup>1</sup>

Many blamed capital mobility, either directly or indirectly, rather than national policies, for the crises. During the 1997 crises, India and China were largely left untouched, and some argued this was because they had substantial controls; Willett et al. (2004), however, present estimates that these countries' fundamentals were sufficiently strong that they would not have faced substantial speculative attacks even in the absence of controls. Scholars such as Leblang (2001) and Glick and Hutchison (2000b) conducted empirical studies that found that countries with capital controls are more prone to currency attacks. Other studies such as Quinn (1997) and Rodrik (1998) have looked at



controls on capital inflows and those on outflows to have the same effects on the probabilities of currency and financial crises. In general, economists tend to be much more critical of controls on capital outflows than of controls on inflows, especially when the latter are based on prudential regulatory grounds and concerns with the potential disruptive effects on recipient developing countries of sudden stops in international financial flows (on these issues see Calvo 2003, etc.).

Economists have pointed to good reasons why capital controls might be positively associated with currency crises (see Bartolini and Drazen 1997; Wihlborg and Willett 1997). The prevalence of controls may be a signal of bad versus good economic policies. Thus the finding from studies such as Leblang (1997) and Glick and Hutchison (2000b) of positive associations between their measures of controls and the occurrence of currency crises is not surprising. A closer look at the evidence, however, suggests some problems with this analysis.

Following the logic of the signaling hypothesis, we would not expect capital control countries to be major recipients of financial capital inflows since the controls would be signaling bad economic policies. Both of the previously mentioned studies used binary, that is, 0–1 measures of capital controls that classified the Asian crisis countries as having controls. This can help explain the overall findings of positive correlations between controls and crises, but it does not fit the fact that prior to 1997 the Asian crisis countries had enjoyed large financial inflows based in part on perceptions that they were following good economic policies. The coding methods for these variables also do not coincide with the general perception that the early and mid-1990s had been a period of substantial capital account liberalization in most of these countries. Leblang (1997) and Glick and Hutchison (2000b) were not wrong in treating these countries as still having some level of capital controls, but such a 0–1 measure cannot hope to be very useful in helping to understand most of the relevant issues involved in the debate about capital controls.

Nitithanprapas, Rongala, and Willett (2002) found that the countries that were affected by the Asian crisis had relatively open capital accounts according to most observers, but were classified by most capital control measures as being largely closed. The high levels of capital inflows into these countries before the crisis suggest that the anecdotal evidence cited by Nitithanprapas et al. was more accurate than the major capital controls indices. It also suggests the importance of more systematically distinguishing between controls on capital inflows and on capital outflows. Rongala (2003) offers a detailed qualitative evaluation of the level of controls in seven Asian countries and concludes

that the capital control indices do tend to overstate—often substantially—the level of controls in these countries.

Fortunately, in recent years a number of new measures of capital controls have become available that improve in various ways on the old 0–1 measures. These give finer gradations of the degree of restrictiveness of capital controls, typically either by coding the extensiveness of controls across different types of capital flows (which we characterize in this chapter as the “breadth” of controls), or by coding the stringency of the controls (which we characterize as “intensity” of controls). In the following sections we briefly discuss these new measures and then present a still newer—and, we believe, superior—measure that combines both the breadth and intensity dimensions and also separately codes restrictions on capital inflows and outflows.

Until recently, the primary capital controls measures used were “binary measures,” which are the 0–1 dummy variables mentioned above that indicate the existence or nonexistence of any controls on capital flows and transactions. A notable variation of this type of measure is the Glick-Hutchison (2000b) measure. Glick and Hutchison’s study focused on a panel dataset of 69 developing countries over the 1975–1997 periods. Prior to 1996, when the IMF adopted a new AREAER format, Glick and Hutchison’s variable takes the standard 0–1 format capturing the existence of any controls on any form of capital flow. Following the IMF format change, the authors altered their coding to capture the existence of controls on more than 5 of the 13 AREAER capital transactions types. The control index thus still takes a binary form, but the pre-1996 and post-1996 values have different meanings: the former index is based on the imposition of any capital controls while the latter is based on the number of types of capital transactions restricted. Counting how many capital transactions are restricted does not provide an accurate picture of capital controls since some countries might have the same number of restrictions but on different capital transactions; the measure also treats countries with restrictions on as few as 5 of 13 capital categories as being the equivalent of fully closed capital accounts.

The Glick-Hutchison (2000b) measure was an interesting wrinkle on the heretofore traditional binary measures, replacing the previous “none” versus “any” capital controls dichotomy with a more intellectually intuitive “not many” versus “a substantial number” dichotomy. For all of its appeal, however, the 0–1 construction of the measure makes it no less blunt a tool than its predecessors. Fortunately, researchers now have an array of more sensitive tools at their disposal.



## 4 New Measures

### 4.1 *Disaggregated Measures of the Extent of Controls*

These variables are typically constructed to capture how many types of capital flows are "controlled" (i.e., at all) or "liberalized." Where binary measures typically capture the existence of *any* controls on capital, disaggregated measures look at the number of controlled capital flow types. These measures therefore generally are presented as either counts or ratios of controlled capital flow types. While, relative to simple binary measures, these measures provide a clearer picture of the breadth of the capital controls imposed by a given country, they cannot capture the intensity of those restrictions, nor can they address incremental changes in controls within the flow type.

#### 4.1.1 *Brune et al. (2001)*

Brune et al.'s (2001) Capital Account Openness Index (CAOI) is created by summing the number of types of flows subject to controls from a selection of nine categories of current and capital flow types. The overall index has a range of possible scores from 0 (fully closed) to 9 (fully open) and is available for 173 countries over the period 1973–1999. Although the CAOI includes the composition of controls on capital inflows and outflows, they analyze the index as a whole entity without considering the different impacts between controls on inflows and outflows. An additional drawback of simply summing the scores in each category is that the missing values in particular categories are scored as zeroes, implying controls in cases where controls may not actually be imposed. This could cause the CAOI to be biased toward greater capital account restriction.

#### 4.1.2 *Johnston-Tamirisa (1998)*

This method is the most disaggregated measure of capital control since it combines all the classifications (including all the subcategories) of the IMF's AREAER, but unfortunately it is only available for one year. It also distinguishes capital inflows from capital outflows and further between the different types of transactions by assigning zeros or ones to the presence of controls in each subsection (i.e., purchases and sales locally by nonresidents, purchases and sales abroad by residents, to residents from nonresidents, etc.) within the main 13 capital transaction categories. The data is available only for 1996 and includes 45 developing and transition countries.

#### 4.1.3 *Rossi (1999)*

Rossi's measure covers 15 developing economies over the period of 1990–1997; these countries include Argentina, Brazil, Chile, Colombia, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Philippines, South Africa, Thailand, and Venezuela. Rossi uses Johnston and Tamirisa's capital control measurement as a starting point to measure both inflow and outflow capital transactions. Two indices of capital controls are calculated. After a slight modification to account for an alternative classification of some of the items in the capital account, the 1997 index is then coded back to 1990 using an algorithm that mimics the main episodes in the process of capital account liberalization, based on AREAER information.

#### 4.1.4 *Miniane (2004)*

Miniane's (2004) capital restriction index is created by extending the 13 disaggregated capital transaction categories reported in the AREAER back from 2000 to 1983 for 34 developed and developing countries. Once again, the measure for a category takes a value of 1 if at least one restriction exists on that type of capital transaction, and takes a 0 otherwise.<sup>5</sup> He then adds a dummy variable for the existence of dual or multiple exchange rates, and takes the average of the values across all the variables to create the capital restriction index. The Miniane measure does not distinguish between inflow and outflow transactions.

There are some drawbacks of this method worth mentioning. First, as mentioned before, the binary coding method cannot capture the intensity of controls in each category; it can only capture changes from either having or not having controls to the opposite. Second, the details of regulation on capital market securities, money market instruments, collective investment securities, and derivatives and other instruments, for the previous format, are not stated.

#### 4.1.5 *Mody-Murshid (2005)*

The data cover 60 countries and the period of 1979–1999. The measurement of financial openness consists of four proxies for government restrictions that impact capital mobility. These four measures, which are available in the IMF's AREAER, comprise (1) the openness of the capital account; (2) the openness of the current account; (3) the stringency of requirements for the repatriation and/or surrender of export proceeds; and (4) the existence of multiple exchange rates for capital



account transactions. For each of these 4 factors, a 1 indicates a relatively open regime and a 0 otherwise. Then the value of the index is simply the sum of these four restrictions measures. As a result, the values of the index range between 0 and 4, where a 0 indicates that a country has closed capital and current accounts, places restrictions on its export receipts, and operates a system of multiple exchange rates; the value of 4 indicates a completely open regime. However, a problem might arise from simply summing four categories together when missing values are present since they will be counted as 0 as well.

#### 4.2 Measures of the Intensity of Controls

This type of measure seeks to capture not just the existence of controls on some/any types of flows, but also the intensity of the controls. The measures described in the previous section all seek to measure, in a variety of ways, the existence of controls on various types of capital flows. That having been said, most of them combine in some fashion binary variables at the flow type-level. As such, if a country should change the stringency of flows on any type of capital transaction, the change will not be captured by the previously discussed variables unless the change involved a movement to or from complete liberalization of that particular type of flow. In order to address this problem, some researchers have created measures focusing primarily on the intensity of controls, rather than the mere existence of controls, on particular types of flows.

##### 4.2.1 Quinn (1997)

Dennis Quinn (1997) made the first attempt to include the level of intensity in a capital restriction index. Quinn's openness index is the combination of international agreement (0-2), current account transactions (0-8), and capital account transactions (0-4). The score ranges from 0 (fully controlled) to 14 (fully liberalized). The rules of coding for current and capital account transactions are identical, and are based on government's approval and taxation requirements on the transactions. Quinn apparently duplicates the coding rule from a similar measure of current account openness,<sup>6</sup> which relies on tax information to distinguish between value of 1 (heavily taxed) and 1.5 (taxed). However, since taxes on capital transactions normally are not reported by countries, the coders had to use their individual judgments or find another source of information to replace the tax information. Quinn's criteria are well-suited to the current account category but not to the

capital account side due to this lack of information on the taxation on the capital transaction.

Quinn's capital restriction measurement is coded as follows:

- 0 Approval of transaction is required but rarely given, and surrender of receipts is required;
- 0.5 Approval is required and sometimes given;
- 1 Approval is required and frequently given; or if approval isn't required but capital is heavily taxed;
- 1.5 Approval isn't required but capital is lightly or moderately taxed;
- 2 Capital transactions are not restricted.

Quinn's measure is based on an earlier version of the AREAER consisting of only two sections: Capital Receipts and Capital Payments; the coding rules are based on the aggregated information of the capital transactions. These rules are difficult to apply to the new post-1996 disaggregated AREAER format, since each subcategory of capital transaction may not be subject to the same policy; that is, a country might put more controls on money market transactions than portfolio investment transactions. As a result, it is difficult for a coder to decide what value to assign to particular levels of restrictions; this can in turn lead to inconsistencies in the dataset. Quinn partially ameliorates this problem by coding the index twice using two independent coders and cross-checking their findings.

Following Quinn's methodology, Van Den Handel (2002) increased the sensitivity of the measure to control for intensity by separately scoring inflow and outflow transactions and recombining them in the overall index. The new measure covers 48 countries from 1996 to 1999. The scale of capital control ranges from 0 (fully liberalized) to 4 (fully restricted). The rules of coding were as follows:

- 0 No restrictions
- 0.5 Taxes
- 1.0 Approval
- 1.3 Approval and taxes
- 1.5 Repatriation required or quantitative restrictions on institutional investors or on foreign participation
- 1.7 Unspecified combination of restrictions, or a combination of approvals, quantitative restrictions, or blocked flows
- 1.9 Repatriation and graduated surrender requirements
- 2.0 100% surrender required



Both the original Quinn measure and the Van Den Handel revision provide reasonably good approaches toward measuring intensity. It should be noted, however, that the overall Quinn measure may not be the most appropriate measure of capital account restrictions *per se*, as it is heavily skewed toward the financing of current account transactions; 8 of the 12 components of the overall index reflect restrictions on financing the current account. It should also be noted that both the Quinn and Van Den Handel use essentially arbitrary coding methods for quantifying the relative intensities of the restrictions, though this may perhaps be forgiven due to the lack of theoretical or empirical bases for determining exactly how the weightings should be done.

### 4.3 Composite Measures

#### 4.3.1 Chinn-Ito (2002)

Chinn and Ito (2002) have created an openness index using principal component analysis of 4 main categories of controls, consisting of multiple exchange rates, restrictions on current account, share of a 5-year period of capital account restriction, and surrender of export proceeds to generate the openness index by calculating the score of the first principal component that has a mean of 0. Higher values indicate more openness.

One advantage of this index constructed by Chinn and Ito is that it is available for 105 countries for the period 1970–1997. This index covers a large number of countries with a long range period of samples. Chinn and Ito also seek to address the overall intensity of the capital account restrictions through the consideration of four different types of restrictions in their analysis. While this is not an unreasonable approach, it is questionable whether the flow type binary variables used in the analysis are sensitive enough to generate meaningful results. It is conceivable that countries may regularly adjust the stringencies of flow type controls, but short of the moving to or from a complete absence of controls on a given flow type, the binary variable for that flow type registers no change. Because of this, the Chinn-Ito measure is agnostic to the intensity of restrictions on particular flow types; its approach to intensity relies on the number of types of flows restricted, though in a way that is different from the disaggregated measures described earlier.

#### 4.3.2 Edwards (2005)

Edwards (2005), created a capital mobility index by combining information of Quinn (2003) and Mody and Murshid (2005), with the data coverage

of 1970–2000, with 163 countries has a scale from 0 to 100, where higher numbers denote a higher degree of capital mobility; a score of 100 denotes absolutely free capital mobility. Missing values of the new index are imputed based on the following inputs: the two original indices (Quinn; Mody and Murshid), their lagged values, openness as measured by import tariffs collections over imports, the extent of trade openness measured as imports plus exports over GDP, and GDP per capita. Finally, country-specific data is used to revise and to refine the control measure created by the imputation procedure. This measure has the largest country sample coverage and longest range of year coverage.

### 4.4 Behavioral Measures

We refer to measures that seek to indirectly measure the existence/intensity of capital controls by looking at the observed capital flows or stocks themselves, or at other similar economic data, as “behavioral” measures. While such measures may enable the researcher to avoid the weighting problems faced by nearly all of the aforementioned measures, these measures may be less useful in econometric studies that seek to use the measures in conjunction with other variables that may have been used previously in the construction of the controls indices themselves.

#### 4.4.1 Aizenman (2004)

Aizenman proxies for financial openness using the sum of total capital outflows and inflows as a percentage of GDP. The capital flows assessed include FDI, portfolio, and other investment capital. Their dataset covers 83 developing and Organization for Economic Cooperation and Development (OECD) countries from 1982 to 1998. They create this measure alongside an analogous measure of trade openness, and test to feedback between the two.

#### 4.4.2 LMF

Edwards (2006) utilizes the data on international assets positions from Lane and Milesi-Ferretti (2006). He computes the sum of total external assets plus total external liabilities as a proportion of GDP as a proxy for capital controls. The data covers 147 countries from 1970 to 2004. A high value denotes that the country is integrated to world financial markets (i.e., fewer controls on capital flows). This measure should perhaps be considered as a measure of capital mobility, rather than capital restrictions. However, it is included in this study for sensitivity analysis purposes.



#### 4.5 Subjective Measures

While all measures of capital controls involve subjective elements to varying degrees, there are some measures for which the coding methodology turns heavily on the judgment of the coding researcher. One example of such a measure is the inflow controls proxy used in a 1999 study by Reinhart and Montiel; beyond the existence of capital controls, their measure also depends on whether or not a country also imposed restrictions on the foreign indebtedness of domestic institutions in a form considered by the researchers as “in excess of commonly used prudential measures.” Most of these measures are study-specific, which is to say that they are constructed specifically for use in a particular study. In such cases, the measures are perhaps of limited use to those seeking to consider capital controls more generally.

#### 4.6 Event Study Measures

Some researchers, most notably Peter Blair Henry (2000, 2006), have analyzed liberalization from an event study perspective, and have therefore found variables identifying the dates of liberalization episodes to be of more use than variables that look at the extent of controls imposed or lifted. Henry, for example, creates measures of both capital account and stock market liberalizations; he identifies liberalization dates from policy announcements or, failing that, the establishment of the first closed-end country fund.

#### 4.7 A New Combined Measure of Extensiveness and Intensity

As available data has increased in recent years, it has become possible to construct new, separate indices for outflow and inflow capital transaction. Following the methodologies of Quinn, Johnston and Tamirisa, and Miniane, these new indices could more usefully describe the effects of restrictions, since each type of control must by nature have different effects on different issues as it is being enforced. While one might think that capital inflows are generally preferable to outflows since they bring in capital for developing a country's economy and lead to higher living standard of its people, this is only one side of the coin; it leaves out the potential for macroeconomic instability as a result of overwhelming capital surges followed by sudden reversals. This could wipe the accumulated wealth out within a short period of time when capital flows out of the country, as some Asian and Latin American countries experienced.

A new measure constructed by Potchamanawong (2007) combines both breadth and intensity of controls in a single index. The Potchamanawong measure draws on the new disaggregated AREAER reporting to construct a measure that takes into account both the existence of controls on particular types of capital flows and the intensity of said controls. Separate indices are constructed for controls on inflows and outflows. The coding rules for this measure are as follows: the value in each capital transaction (except dual/multiple exchange rate arrangement) ranges from 0 to 1, with 0.25 intervals, with a higher value representing higher degree of restriction.<sup>7</sup>

- 0 Capital transaction is allowed freely (no restrictions); possibly requiring reporting or notification of authorities after transactions take place;
- 0.25 Prior approval is not required, but requires supporting evidence or registration. Transactions are required to be made through authorized banks or exchange houses;
- 0.5 Prior approval is not required, but quantitative restrictions exist, that is, limited ownership, or limited transfer amounts per period of time;
- 0.75 Prior approval is required before engaging in any transaction and is approved on a case-by-case basis;<sup>8</sup>
- 1.0 Flow type is not allowed or transaction is not permitted.

The measure is intended to reflect the costs an individual or firm has to bear in dealing with government agencies when trying to conduct capital transactions. These would be costs related to paperwork, gaining the necessary approvals before the transactions take place, and quantitative restrictions of capital transaction to individuals and enterprises. These processes and requirements could discourage and slow down the capital mobility both from inflows and outflows.

#### 4.8 Constructing Separate Measures for Controls on Inflows and Outflows

Besides capturing both the breadth and intensity of controls, this measure also separately codes controls on inflows and outflows, allowing for more versatility of use in research studies. However, due to limited availability of disaggregated information on capital transaction within AREAER, the indices could not be constructed for periods prior to 1995. The inflow and outflow measures do tend to be highly correlated, but not so much that we cannot test for whether the inflow and outflow



measures have different effect.<sup>9</sup> And indeed they do—at least on the probability of currency crises.

In a test of the new measures, Potchamanawong analyzed the association of his new inflow and outflow measures with currency crises for 26 developing and emerging market countries over the period 1995–2004. He found that controls on capital inflows tended to a decreased probability of crises, while controls on outflows tended to increase the likelihood of crises. This lends a measure of support both to the signaling hypothesis and to the hypothesis that prudential regulation of inflows can help to prevent the onset of crises by limiting a country's exposure to potentially volatile capital flows.

### 5 Comparison of Measure Results

While most of the commonly used measures of capital controls are constructed from information from the same source—the IMF's AREAER as shown in table 5.1—the calculated values of the measures are highly sensitive to the specific information used and the calculation method. Different measures can vary substantially in their assessments of the levels and/or intensity of controls for a given country at a given time. Because of this, we find considerable differences across the measures. Table 5.2 provides a sampling of reported capital control measures for a selection of Asian crisis countries in 1996, the year just prior to the onset of the Asian currency crises.<sup>10</sup> As illustrated in figures 5.1 through 5.4, we also see that there are substantial differences in the patterns of behavior shown by the different measures. For instance, in the case of Malaysia, the Potchamanawong index shows that the government had been trying to generally loosen restrictions after the crisis hit the country, especially controls on capital inflows; anecdotal evidence lends support to this. It also indicates that Malaysia raised control on capital outflows in 1998, right after the crisis. Miniane's index does not reflect this situation, showing instead a flat level of controls during the crisis period. The Chinn-Ito control index shows that restrictions on capital flows had been increasing since 1996 and peak at 2000. The new Potchamanawong measure reflects the actual situation quite well, in comparison to the other measures. Similarly, the Potchamanawong indices show that Korea reduced its controls on capital flows significantly right after undergoing the crisis. Neither Miniane nor Chinn-Ito reveal significant reduction of capital control restrictions by Korea until 2001. The Potchamanawong indices reveal a downward slope of capital restrictions during 1995–2004. This pattern is different from the other indices that are almost flat lines over time. In our final example, the Potchamanawong inflow and outflow

indicators also illustrate that India has been gradually liberalizing its capital account since 1997. The liberalizing trend illustrated by the new measures fit the Reserve Bank of India's intention of achieving full capital account convertibility, as shown in the report of the Committee on Capital Account Convertibility by the Reserve Bank of India (Tarapore Report) in 1997 (Kletzer 2004). However, the Edwards and Chinn-Ito measures show a sharp drop in 2000 with restrictions returning to the initial levels a couple of years later, while Miniane's measure does not capture the changes in the controls of India at all.

### 6 Conclusion

Since we have no unambiguous "true" measures of the severity of capital controls, there is room for experts to differ about which of the various measures offer the best picture of actual developments. Based on our review of the cases discussed above, we believe that the Claremont-Potchamanawong measure does the best job for the post 1995 period—but we are hardly unbiased evaluators. We invite other researchers to make their own judgments.<sup>11</sup>

### Appendix

#### Malaysia

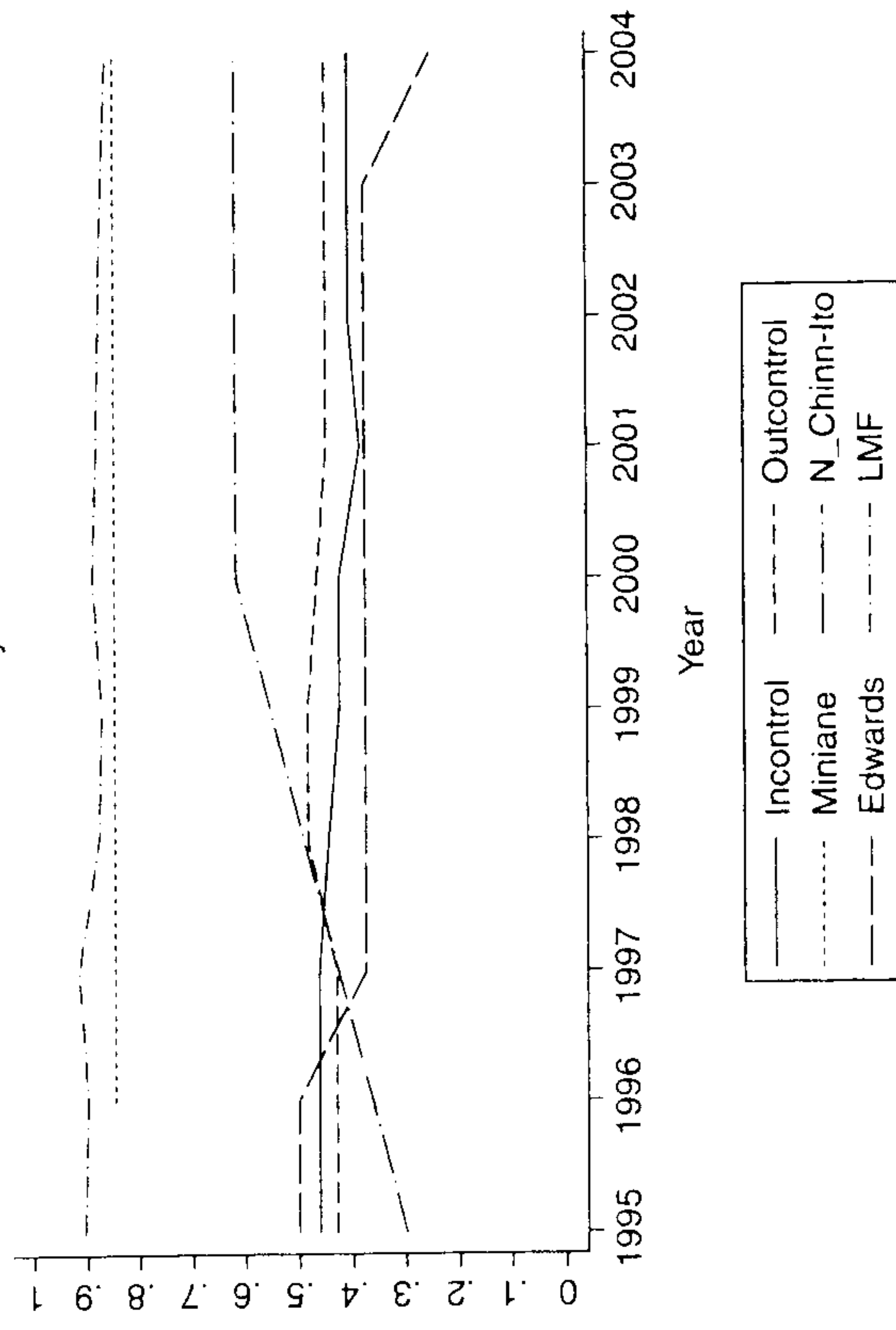


Figure 5.1 Malaysia

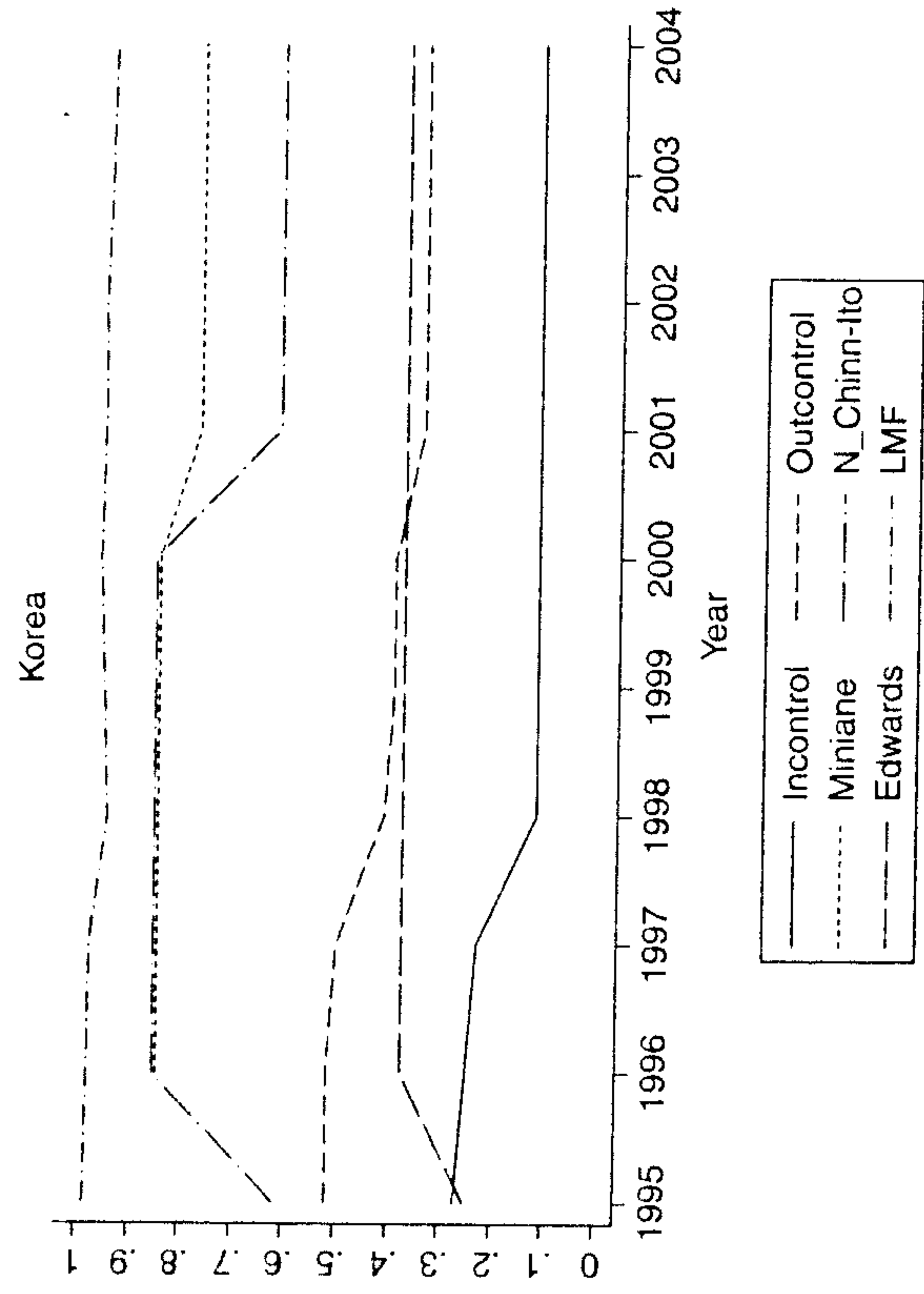


Figure 5.2 Korea

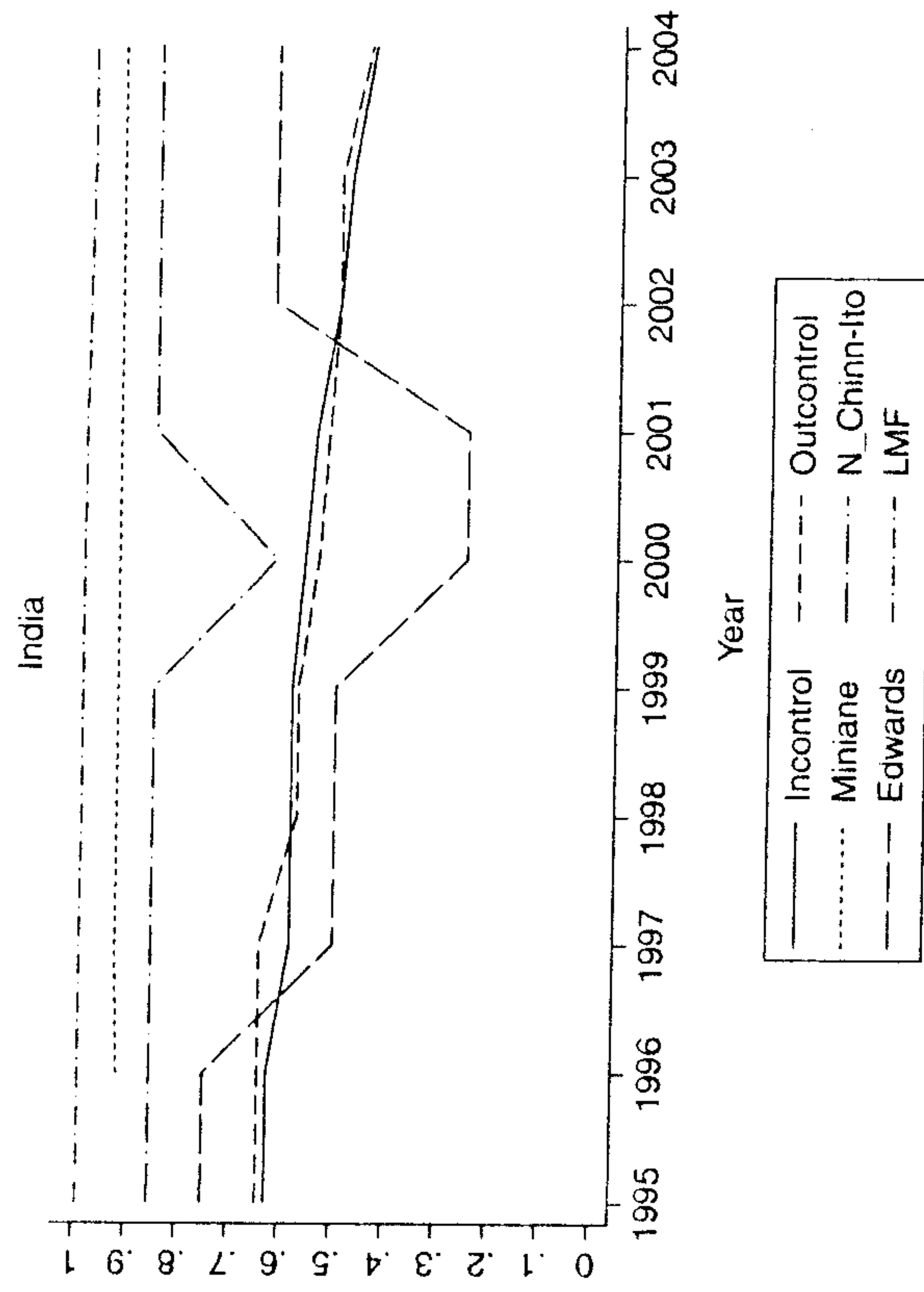


Figure 5.3 India

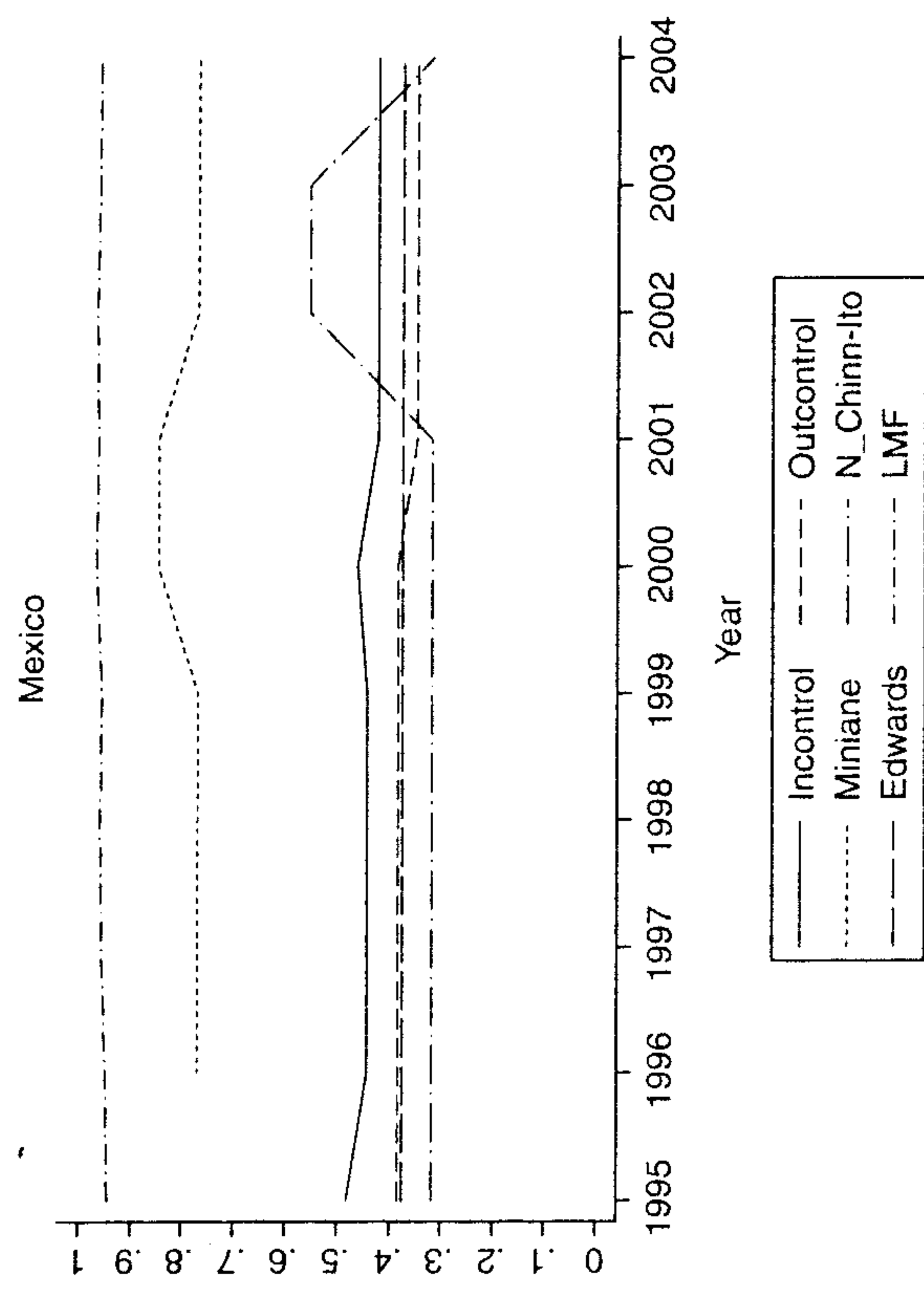


Figure 5.4 Mexico



Table 5.1 IMF AREAER Components

Restriction Type	Description of AREAER Category (Selected)
Controls on capital market securities	Covers shares or other securities of a participating nature, and bonds and other securities with an original maturity of more than one year.
Controls on money market instruments	Covers securities with an original maturity of one year or less, such as certificates of deposit, Treasury bills, and so forth.
Controls on collective investment securities	Covers share certificates or any evidence of investor interest in an institution for collective investment, such as mutual funds.
Controls on derivatives and other instruments	Refers to operations in other negotiable instruments and nonsecuritized claims not covered under the previous three items.
Controls on commercial credits	Covers operations directly linked to international trade transactions.
Controls on financial credits	Covers credits other than commercial credits.
Controls on guarantees, sureties, and financial backup facilities	Covers securities pledged for payment of a contract, such as warrants, letters of credit, and so on.
Controls on direct investments	Covers creation or extension of a wholly owned enterprise, subsidiary, or branch and the acquisition of full or partial ownership of a new or existing enterprise that results in effective influence over the operations of the enterprise.
Controls on repatriation of profits or liquidation of direct investment	
Controls on real estate transactions	Covers the acquisition of real estate not associated with direct investment. The investments of a purely financial nature in real estate or the acquisition of real estate for personal use.
Controls on personal capital movements	
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	For example, a limit on the share of the institution's portfolio that may be held in foreign assets.
Multiple exchange rate arrangements	

Table 5.2 Capital Control Indices in 1996 by Country

Country	Porchamnanawong	Chinn-Ito	Miriane	IMF Matrix	Quinn	Johnston	Edwards	LMF	Glick-Hutchison	Inflows	Outflows
China	0.54	0.68	0.85	0.77	0.83	0.63	0.73	0.625	0.98	-	-
Hong Kong	0.04	0.04	0.00	0.08	0.08	0.00	-	0.11	1.00	0	0
India	0.63	0.64	0.85	0.92	1.00	0.50	0.87	0.75	0.99	1.00	1.00
Indonesia	0.50	0.50	0.06	0.85	0.92	0.25	0.50	0.375	0.96	1.00	1.00
Korea	0.25	0.52	0.85	0.92	0.85	0.38	0.70	0.375	0.98	1.00	1.00
Malaysia	0.46	0.43	0.36	0.92	0.92	0.38	-	0.5	0.90	1.00	1.00
Philippines	0.37	0.43	0.55	0.85	0.92	0.25	0.47	0.25	0.95	1.00	1.00
Singapore	0.12	0.11	0.00	0.23	0.25	0.00	-	0	0.69	0	0
Thailand	0.31	0.48	0.62	0.69	0.75	0.63	0.63	0.5	0.94	1.00	1.00

Note: Dual Exchange Rate Category is included in Porchamnanawong Inflow and Outflow measures.



## Notes

1. For examples of these debates and discussion of the evolution of views on capital controls see Abdelal (2007), Eichengreen et al. (1999), and Ries and Sweeney (1997).
2. For a more detailed survey and evaluation see Potchamanawong et al. (forthcoming).
3. See, for example, Aizenman and Noy (2004).
4. A summary of the components of capital account restrictions recorded in AREAER is given in table 5.2.
5. However, Miniane omits the control on personal capital movement category because of a lack of consistent information in past editions of the AREAER.
6. The decision rules for goods and invisibles payments and receipts are as follows. If all receipts or payments are necessarily surrendered or blocked, then  $X = 0$ . If transfers require approval (unless automatic), then  $X \leq 1$ . If transfers require approval (usually automatic) and are heavily taxed, then  $X = 1$ . If transfers are effected through the market mechanism and taxed, then  $X \geq 1$ . The degree of taxation determines  $Y$ , where  $X = 1 + Y$ . If transfer are free, then  $X = 2$  (Quinn 1997, p. 544).
7. As stated, the Potchamanawong measure is based on the methodologies of Quinn and Miniane, and as such retains the drawback of Quinn's measure that the coding schema is determined in an essentially arbitrary fashion. It may be that there are more optimal weighting rules may exist, but the means by which the rules may be determined is far from clear.
8. The existence of dual/multiple exchange rate arrangements is also given a value of 0.75.
9. While unable to "cure" the collinearity problem, Potchamanawong (2007) uses joint confidence regions to statistically separate out the different inflow and outflow effects. In general, the results of the analysis provide evidence of distinct effects of the inflow and outflow measures.
10. The values reported in table 5.1 have been standardized to vary between bounds of 0 and 1, and have been converted where necessary so that values closer to one reflect higher reported levels of capital controls.
11. The Claremont-Potchamanawong measure for 26 countries from 1995 to 2004 is available free of charge from the Claremont Graduate University Web site.

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## CHAPTER 6

# Measuring Welfare

Bryan Roberts

### 1 Measuring Welfare: An Overview

Welfare measures are arguably the most important member of the political economy indicator family. They are used routinely to craft economic and social policies and evaluate the success or failure of communities and societies. They are also beset with theoretical and methodological controversies and challenges.

This chapter will review the basic approaches that have been taken to both conceptualizing and measuring welfare experienced at the level of the individual and the nation-state: real income, extended national accounts, composite social indicators (the physical quality of life and human development), subjective well-being, and objective happiness.<sup>1</sup> Welfare has traditionally been viewed as being determined by the levels of various inputs (consumption of goods, services, and leisure) and preferences over these inputs. Real income and extended national accounts are exemplars of this tradition. Composite social indicators first emerged in the 1970s and generally seek to measure welfare outcomes as opposed to inputs. Sen's capabilities approach appeared in the 1980s. In the 1990s and 2000s, attention has increasingly been paid to subjective well-being and objective happiness, measures that attempt to directly evaluate individuals' well-being through responses to questions about its level.<sup>2</sup>

During this review, four paradoxes are identified that raise interesting and troubling questions about these indicators. A concluding section summarizes the dramatic differences in what these indicators imply about actual welfare growth and degree of inequality in its distribution across countries. These paradoxes and differences help explain why we