
Beyond Sequencing

What does a risk-based analysis of core institutions, domestic financial and capital account liberalization reveal about systemic risk in Asian Emerging Market Economies?

November 2002

James H. Chan-Lee

This paper presents an innovative approach to analyzing financial crises in emerging market economies, by focusing on capital account-cum-balance sheet stresses related to mismatches in foreign currency and maturity exposure.

Inherent systemic risk is gauged by assessing the “distance” between the quality of core institutions, domestic financial liberalization and the effective degree of capital account openness. The risk-based approach to financial liberalization is then illustrated for the People’s Republic of China.

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PREFACE

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Under this broad research project on development paradigms, the ADB Institute Research Paper Series will contribute to disseminating works-in-progress as a building block of the project and will invite comments and questions.

I trust that this series will provoke constructive discussions among policymakers as well as researchers about where Asian economies should go from the last crisis and recovery.

Masaru Yoshitomi
Dean
ADB Institute

ABSTRACT

The proliferation of financial crises provoked by volatile capital flows since the mid-1990s raises grave concerns. Unfortunately, existing theory is ill adapted to analysing capital account crises, when weak institutions and incomplete domestic financial liberalisation (DFL) interact with significant capital account opening (KAO).

A clear distinction between systemic capital vs. classic current account crises is needed. Good core institutions reduce systemic risk; well-staged DFL is also low risk, and both should be *established quickly*. Pragmatic FX liquidity management, effective prudential supervision and DFL are essential before full-scale KAO.

High-risk elements of KAO should be *avoided until* safeguards are in place, contradicting the “big bang” approach. Systemic risk is assessed here using Bank for International Settlements (BIS) indicators of external vulnerability and our indicators for core institutions, DFL and KAO. Pragmatic guidelines for the PRC are outlined using a risk-based approach (see also *APF Policy Recommendations* www.adbi.org/apf_main.html).

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Beyond Sequencing: What does a Risk-Based Analysis of Core Institutions, Domestic Financial and Capital Account Liberalization Reveal about Systemic Risk in Asian Emerging Market Economies?

James H. Chan-Lee

Overview

Policy analysts are unanimous in advising free trade in goods and services as a means of improving economic performance. Since the late 1980s, this advice has been extended to exchange and capital account controls. Real-economy and trade reform, followed by domestic financial and then capital account opening [hereafter (KAO)] in virtually all OECD member countries is widely viewed as a success. By contrast, the proliferation of financial crises provoked by volatile capital flows in emerging market economies (EMEs) raises serious doubts over the unconditional advocacy of KAO, common in the mid-1990s. Indeed, external crises are often treated as common phenomena, even though capital account crises differ radically from conventional current account crises. It is unsurprising that empirical analysis has failed to yield conclusive results of the benefits of KAO for EMEs, as the high frequency and costs of KAO-related financial crises might outweigh their benefits.

The rationale for KAO appeals to the most fundamental insights of welfare economics: that independent economic agents who engage in utility and profit maximising behaviour will also maximise the collective interest—or put another way, that free markets allocate resources in an efficient and socially acceptable way. While the results may not be perfect, the failed import substitution programmes in Latin America in the 1950-60s, and the implosion of central planning regimes in the Soviet Union, Eastern Europe, Cuba and North Korea provide vivid counterfactuals. But, despite a consensus that free trade and domestic financial liberalisation [hereafter (DFL)] are efficiency enhancing, there is a suspicion dating from the intellectual founders of the Bretton Woods system (Harry Dexter White and John Maynard Keynes) that domestic and international financial markets are quite different and that (volatile) capital flows should be constrained.

Fifty years later this distinction has become increasingly blurred with widespread DFL and the ubiquity of transnational firms. In fact, the efficiency arguments and initial conditions for DFL and KAO are basically the same; good institutions—as are their pitfalls: asymmetrical information, moral hazard, opaque transparency, “rational” herd behaviour, financial panic, etc.:

- International (domestic) financial decontrol promotes a more efficient allocation of resources from high-savings countries (entities) to low-savings countries [and reduces the user cost of capital];

- It allows a country (entity) to smooth the time profile of its consumption and investment over time [thus effective KAO can be seen as depending on efficient inter-temporal gains from trade]¹;
- It also allows firms and households to diversify away from country (individual or firm) specific risk [inter-spatial substitution] and offers an expanded choice set.

In short, the defining characteristic of international financial decontrol is the *stringent constraints it imposes on the consistency of overall economic policy*—i.e., the nexus between rational microeconomic and institutional structures, sustainable macroeconomic policies, sound banks and viable exchange rate regimes. Empirical evidence that the positive effects from KAO are confined to the OECD and higher-middle income EMEs appears to confirm the necessity of minimum standards of social infrastructure (i.e. rule of law, property rights, prudential supervision, financial transparency, etc.), adequate macroeconomic stability, and efficient financial systems before launching large-scale capital account liberalisation². These initial conditions qualify rather than vitiate the case for KAO, as they ultimately determine how and at what speed KAO is achieved.

Against this backdrop, assessing the specific risks attached to DFL and KAO, and especially systemic financial risks (i.e. the liquidity and structural risks that compromise the solvency of financial systems) is a pressing priority, as almost all EMEs have opted for some degree of capital account liberalisation since the late-1980s—usually out of necessity³. Indeed, given the irresistible attractions of foreign direct investment (FDI)⁴, the current policy debate focuses not on “if”—but on *how* and at *what speed* to implement KAO (Eichengreen 1998). The problem is the lack of an operational model, even though only a few policy analysts challenge the mainstream orthodoxy that KAO is beneficial to EMEs, under most conceivable circumstances (see Bhagwati 1998 and Rodrik 1998)⁵.

This controversy raises important issues. Is the “new orthodoxy” based on robust empirical evidence? Do all countries gain from international financial liberalisation? How important are initial conditions concerning macroeconomic stability, the rule of law, property rights, financial transparency, the quality of bank management and the sequencing of DFL and KAO?

¹ KAO facilitates inter-temporal substitution: capital account surpluses are merely the arithmetic counterpart of current account deficits i.e., an excess of domestic investment over domestic savings—that should be reversed in the future. Theoretical arguments for KAO are thus based on inter-temporal gains from trade; failures can similarly be related to their shortcomings.

² In Edwards’ estimates (2001), the inflection point when KAO has a positive impact on growth is when per capita GDP was achieved by advanced EMEs such as Hong Kong, China, Israel, Mexico, Singapore and Venezuela in the 1980s. These estimates may also reflect necessary conditions for social capital and polity, as these are highly correlated with per capita GDP (see Quinn et al. 2001).

³ Capital controls in EMEs are often subject to evasion or corruption. Moreover, financial globalisation, DFL and financial engineering considerably reduce the de facto scope for capital controls.

⁴ In 2000, the stock of FDI reached some \$6 trillion, about a fifth of which was found in EMEs. Of the 145 changes recorded by the UNCTAD in 1998, 94% of them liberalised the regulatory framework governing FDI. See the UN World Investment Report 1999 and 2000.

⁵ From 1985 to 1998 the number of IMF members embracing current account convertibility trebled to 151 countries. Capital account liberalisation moved in parallel.

Unfortunately, a statistical fog obscures this debate. Although core institutions are critical, few measures are available for EMEs. Informative indicators of capital account controls are even rarer. Moreover, most empirical studies have concentrated on the impact of KAO on economic growth, rather than on the pressing policy issues of systemic risk and crisis prevention. Last, but not least, our analytical tools were mostly developed for current account crises in an era of limited capital mobility, rather than for crises provoked by shifts in capital flows that are likely to dominate the start of the third millennium.

This paper is in six parts. Section 1 presents a survey of optimum policy sequencing and the role of KAO on economic performance. Indicators for DFL and KAO⁶, as well as our risk-based approach to their implementation are sketched out in Section 2. Mainstream views on capital controls and the neglect of initial conditions in “big bang” approaches to KAO are surveyed in Section 3. Section 4 presents an indicator of the quality of core institutions. This is then mapped vis-à-vis foreign debt leveraging, external liquidity constraints, and the effective degrees of DFL and KAO—for eleven crisis EMEs and an eclectic control group. Major characteristics of capital account crises are also outlined using a risk-based analysis. Section 5 presents simple empirical estimates of systemic risk using the BIS’s Early Warning System database for external vulnerability, FX pressure, and banking system stress, for 24-EMEs. A summary and conclusions are presented in Section 6.

1. Optimum Sequencing Theories

1.1. Earliest Views on Sequencing

A large literature concerning optimum sequencing of policy reforms has developed over the past 20-30 years. While the presumption that KAO affects growth positively is appealing, it appears to be borne out empirically mainly for the higher and middle-income countries. There is also considerable intuitive appeal in the idea that the positive benefits from KAO are contingent on a country’s stage of financial and institutional development (presumably furthest advanced in higher-income countries). Indeed, the costly crises in EMEs with poorly developed financial sectors, lacking adequate regulatory and supervisory oversight attest to the dangers of ill prepared or premature KAO. Hence, the links between financial sector development and capital account liberalisation are usually presented in the form of a sequencing argument: full KAO requires a prior strengthening of institutions and governance in the domestic

⁶ Their originality is a set of estimates for the *intensity* of exchange restrictions and capital account controls for 55-countries from 1958-2000. These estimates update earlier figures by Quinn (1997) to capture the turbulent 1990s and differ radically from the mere listing of restrictions used by the IMF (Ariyoshi et al 2000, p.85). Quinn’s and our indicators are inspired by Arrow’s (1973) seminal distinction between the greater distortionary effects of quantitative restrictions vs. market-based instruments. By contrast, the often-used IMF index is basically an inventory of the *presence or absence* of regulatory restrictions. (To date, only one detailed assessment of exchange controls has been made by the IMF for 1996, see Johnston et al 1999(b).) Our indicators take Quinn’s estimates for 1958 and 1988 as benchmarks. Independent estimates were made for 1968, 1978, 1991 and 1999, as well as recalibrating our 1988 scores. Annual estimates from 1994 to 2000 for the 24 EMEs shown in Appendix III-Table 1 were also made to facilitate pooled regressions. Estimates for Egypt and Rhodesia (now Zimbabwe) were not available for 1968 (owing to breaks in reporting) and were estimated using adjacent years. All estimates are based on a coding proposed by Quinn of the IMF’s Annual Report on Exchange Arrangements and Exchange Restrictions, various issues. Coding rules are outlined in Appendix I.

financial sector to develop the market depth and supervisory structures commensurate with the stresses associated with (and to obtain the benefits from) extensive and potentially volatile (short-term) capital flows.

In sum, the earliest views were that liberalising the capital account should *follow* the opening of the current account and DFL. Two lines of argument were advanced. The first was based on classic resource allocation grounds (see, McKinnon 1973, 1993 and Edwards 1984). When trade barriers “excessively” favour import substitution, liberalising the capital before the current account (and real economy) can attract rent-seeking foreign capital to sectors with no comparative advantage (Latin America). Under such circumstances, capital inflows might actually reduce economic growth and welfare in the long run (immiserizing growth), as servicing this foreign finance might exceed added output at world prices, as well as starving other sectors of resources. Moreover, dismantling capital controls before free trade in goods is consolidated could also attract excessive capital inflows and real exchange rate appreciation—that would in turn frustrate liberalisation of goods markets. By the same token, if domestic financial markets are repressed, premature capital account liberalisation could encourage domestic savings to seek higher financial rewards abroad.

The second line of argument advanced by James Tobin [(1984) following Keynes] was that goods markets should be sheltered from the vagaries and capriciousness of international capital markets. Since, capital market disturbances are not necessarily related to changes in fundamentals (e.g., moral hazard, asymmetrical information, etc.), “throwing sand in the wheels” in the form of a foreign exchange tax is the remedy for lengthening the time horizons of speculators⁷.

1.2. Limitations of the Earliest Views; the Evolution of the OECD Capital Account Codes

In short, the earliest views were that capital account decontrol was distinctly a concern best addressed at the end of the reform cycle. Despite a certain appeal, these views proved too compartmentalised and were never applied. In particular, exchange restrictions and capital account decontrols are *not an “all or nothing” proposition*. Rather decontrol is typically phased-in to differing degrees and speed—because capital controls should be considered as an important aspect of the overall prudential regulatory framework. Such controls cover a wide range of categories and instruments such as:

- FDI
- Portfolio equity investment
- Government and corporate bonds
- Other capital market instruments
- Trade credits
- Financial credits from banks and non-bank financial institutions
- Money and corporate money market instruments

⁷ Despite scant evidence that unilateral Tobin taxes have been successful in altering capital inflows (e.g. Chile, Malaysia) they remain on the policy agenda. In 1995, the Group of Rio (12 countries) adopted a resolution to “establish specific regulations to preclude the entry of flight capital”, see Valdés-Prieto and Soto, 1998. EU countries are still debating a transactions tax on capital flows with similar motives.

- Non-trade credits
- Financial derivatives

These categories refer to the chapter headings of the OECD capital codes and roughly coincide to starting with the real economy, trade-related finance and then financial flows. Each category has a variety of instruments and hence specific inherent risks.

As noted above, it is unclear why domestic financial markets should differ from international financial markets. Indeed, DFL usually introduces inescapable elements of KAO. Thus, a salient feature of DFL is its demands for higher skills, product innovation, technology and communications that permit profitable financial engineering. Such developments make it increasingly difficult to identify sources and uses of funds (in a balance-of-payments sense) further blurring the distinction between DFL and KAO. Hence, treating DFL and KAO as separate regulatory issues is artificial and East-Asian experience shows that it can lead to bad misassessment of new and systemic risk.

1.3. OECD Experience was Diverse

Interestingly, the successful KAO among core-OECD⁸ countries never followed a strict sequencing approach. Thus, Canada and Switzerland had historically open capital accounts, while the United States and Germany also maintained free capital movements throughout the post-war period reflecting their status as international financial centres. Hence, support for the earliest conventional sequencing views was largely based on the wave of KAOs of other OECD countries in the late 1980s (finished by the early 1990s) that followed DFL. The OECD capital codes⁹ aided this process by peer group review pressure and enforced a positive ratchet process¹⁰. This code strongly recommended liberalisation of FDI early in the reform process, with other categories following in roughly the order of the chapters listed above¹¹. Related payments (dividends, repatriation of profits and initial capital) were also typically liberalised along with accompanying inflows. The other core OECD countries basically followed this broad sequencing pattern, albeit with variations by category and speed¹².

⁸ Core OECD members exclude Turkey, Mexico, Korea, Poland, Hungary, the Czech Republic and Slovenia. This reflects their relatively low levels of IQFS at the time of their adhesion to the OECD (Chan-Lee and Ahn 2001).

⁹ The OECD capital code is an international treaty. Countries adhering to it accept the liberalisation obligations embodied in it, but may lodge reservations. Anything not subject to reservation is free, based on the “negative list” principle, which has the advantage of clarity. Countries adhering to the code can be sued by private entities, if items not on the reservations list are not legally honoured.

¹⁰ Another feature of the code is that although countries can file reservations, once a category is liberalised it cannot be revoked. This ratchet effect is important for investor confidence. Unfortunately, similar mechanisms do not exist in EMEs. Hence, the only thing worse than capital controls is their reimposition (Ariyoshi et al 2001). The list of reversals in our sample include: Malaysia (mild) in the early 1990s and 1998; Sri Lanka 1958-90; Thailand 1968-93 and 1997-98; Argentina 1968-89 and 2001; Chile (mild) 1988-89; Colombia 1958-88; Mexico 1978-88; Peru 1968-90; Venezuela 1978-99, Jordan 1958-78; Nigeria 1958-68; Kenya (minor) 1968-78, and Russia 1999.

¹¹ The fact that Korea failed to liberalise long-term direct and portfolio investment before short-term capital flows at the time of its adhesion to the OECD in 1996 is a matter of on-going controversy.

¹² A “big bang” approach was adopted in the UK, New Zealand, Australia, Denmark, Finland, Norway and Sweden, while other OECD countries adopted a step-by-step approach with varying speeds. While

1.4. Features of the OECD Capital Code

A salient feature of the OECD capital code for risk management is its encouragement for decontrolling long before short-term capital flows (i.e., FDI and portfolio equity, bonds, before trade-credits, bank loans, money market instruments, non-trade credits and financial derivatives)¹³. This strategy is based on the rationale that “labels” count and capital flows are not totally fungible. Thus long-term are viewed as being more stable than short-term flows and more conducive to growth, otherwise a phased approach makes little sense. Although a few analysts challenge this view (Claessens et al. 1995, Fernandez-Arias and Haussman 2000), the vast bulk of the available time series evidence supports the view of more stable behaviour of long-term as opposed to short-term capital flows, especially FDI (see Sarno and Taylor 1999); although there is some evidence of differing degrees of stability between asset categories and between OECD countries and EMEs (Wei 2000)¹⁴. Moreover, panel data estimates by Reisen

KAO is widely viewed as a success, many core OECD countries experienced banking crises following DFL (Portugal 1986-89, Finland 1991-94, Italy 1990-94, Norway 1987-93, Sweden 1990-93, the USA 1980-1992.)

¹³ Paradoxically, this pragmatic international pecking order contrasts sharply to the preferred sources of finance of the “representative domestic firm”, although the entities are not identical. Domestic firms typically favour internal cash flow and long-term bank loans—followed at some distance by equity and bonds. Although bank loans are “external”, long-term customer-bank relations can be seen as a “quasi-internal” source of finance, owing to their flexibility and access to privileged information (for a survey of issues, see Yoshitomi and Shirai 2001). Debt is usually preferred to equity finance, although excessive gearing increases the risk of bankruptcy because debt service is a fixed cost. By contrast, this international pecking order reflects the legacy of the 1980s EMEs debt crisis and the need to de-leverage national balance sheets and reduce risk. Another factor is the poor financial transparency, moral hazard and agency problems characterising EMEs. These and the chronic problem of asymmetrical information barriers across cultural-geographic divides explain the growing role of FDI. Indeed, as EMEs’ access to world bond and international bank finance has been sharply scaled back since 1997-98, FDI has been the only instrument capable of filling the void.

¹⁴ The view that capital account labels are irrelevant and that capital flows are totally fungible is based on a flawed study by Claessens et al 1995. This study uses (noisy) quarterly data for changes in net claims of FDI, portfolio equity, and long-term and short-term debt flows. It finds that labels do not provide any information about the volatility of capital flows, but fails to address the critical problem of the risk of reversibility or to differentiate between temporary and permanent capital flows. By contrast, Sarno and Taylor 1999 isolate the relative size and statistical significance of permanent and temporary components of US capital flows to Latin American and Asian countries from 1988-97 using Kalman filter techniques and variance analysis. They find relatively low permanent components in bond and equity flows and official finance. However, commercial bank credits appear to contain large permanent components and FDI flows are almost entirely permanent. Fernandez-Arias and Haussman (2000) have recently argued that FDI in Latin America has made no visible impact beyond that of short-term bank debt on growth. Hence, the solution to the region’s problems is not so much in attracting FDI, but in resolving the problems underlying “original sin”. However, Reisen 2000b and other participants at the OECD seminar pointed to major methodological and econometric flaws in this study, including the failure to control for supply-side factors related to the world boom in mergers and acquisitions and FDI. Moreover, Reisen and Soto (2001) and Wei (2000) provide strong empirical support to Sarno and Taylor’s findings that long-term capital flows (especially FDI) differ importantly from short-term capital with respect to stability, the risk of reversibility and contributions to growth. Finally, even if “original sin” is the crux of Latin America’s problems, it appears strange to downgrade the role that FDI and long-term equity flows can play in building institutions and promoting political change, see Rajans and Zingales 2001 and Quinn et al 2001.

and Soto (2001) strongly support the view that long-term capital flows are stable and have larger effects on growth¹⁵.

1.5. Macroeconomic Sustainability was Ignored

The other lacuna of early sequencing theories was its bizarre abstraction from the “political economy” aspects of achieving sustainable macroeconomic and exchange rate regimes. These issues were far from being resolved in many EMEs especially in (Latin America and Africa) in the 1980s, and may explain their poor subsequent economic record following KAO (Arteta et al. 2001). By the 1980s, the academic debate had finally evolved to recognize that major fiscal imbalances must be tackled first, and that a minimal degree of macroeconomic stability is necessary very early in the reform process¹⁶. (These were always standard conditions in IMF stand-by agreements illustrating how abstract early views on sequencing were).

1.5.1. Evolution of the Sequencing Debate

In summary, the earliest views on optimum policy sequencing were too narrow and compartmentalised to capture the multifaceted interfaces between microeconomic reform, sustainable macroeconomic policies, and especially exchange rate determination in the context of globalised financial markets. By contrast, “big bang” views prevalent in the late-1980s went to the opposite extreme. For example, Dornbusch 1998 argued that:

The McKinnon debate as to what should come first, free trade or the free flow of capital likewise misses the practical point. Both trade opening and financial opening involve industrial restructuring—in one case goods and services industries and in the other the financial sector. There is no presumption as to which should wait or which must come first. Since a protective situation wastes resources, the sooner the better is the answer on both counts. Since gradualism and sequencing are more likely to be hijacked by political pressures adverse to the best utilization of resources and a persuasive case for gradualism has never been made, full steam ahead is the right answer.

¹⁵ Reisen and Soto’s (2001) estimates for 44 EMEs from 1986-97 correct for standard growth determinants and estimate the independent growth effects of FDI, portfolio equity investment, bond flows, as well as short-term and long-term lending. These estimates are robust and suggest that FDI and portfolio equity stimulate long-term growth prospects in EMEs and that equity is preferred to debt finance. No allowance is made for capital controls. As Sarno and Taylor (1999) they find that portfolio bond investment is insignificant. Reisen and Soto’s estimates explain around 50% of the variance of income growth, which is high for estimates in difference form. Their results for debt are, however, sensitive to the accuracy with which BIS bank-lending data to EMEs have been classified. What actual distinction is made between short-term loans that are frequently rolled over vs. contractual long-term loans (over 1 year) is unclear

¹⁶ According to Edwards (1999), most analysts agreed by the late 1980s that the capital account should be liberalised only after the domestic financial sector had been reformed, and once the liberalisation of trade in goods had been consolidated. However, as noted below only a few countries actually followed this route.

This quotation sums up the weakest point of “big bang” views on policy sequencing in a nutshell, notably their total abstraction from the initial conditions necessary for successful DFL and KAO.

Once initial conditions are considered, optimal international sequencing concerns the order and speed of decontrol (Eichengreen 1998). Some analysts have recently stressed the importance of adequate social-infrastructure and regulatory standards, in the aftermath of recurring crises in EMEs (McKinnon and Pill 1997). This is uncontroversial, because poorly regulated and under-capitalised banks will intermediate capital inflows in an inefficient or corrupt way (Rossi 1999, Eichengreen 2001). Other concerns include the quality of core institutions and stages of economic development, thereby introducing the theory of the second best and information costs into sequencing issues (Chan-Lee and Ahn 2001). What is missing is a risk-based framework to make these concerns operational.

1.5.2. The IMF Integrated Approach

Ironically, if the earliest views on sequencing (and the IMF’s temp plate tendencies toward KAO) were too narrow, the latest IMF “integrated view” embraces virtually every conceivable aspect of microeconomic, structural, institution building, and macroeconomic policy cum exchange rate regime into the policy sequencing nexus (see Johnston 1999a, 1999b, and especially 1999c)¹⁷. The goal is to monitor and assess a country’s progress at each stage of the reform cycle. Although such an approach has the advantage of completeness, its operational value in EMEs—where quantitative indicators of microeconomic structures and institutions are sparse and financial markets incomplete—is debatable. Moreover, it ignores one of the most basic insights of the new institutional economics: that institutions have a natural hierarchy whereby higher levels impose increasingly stringent constraints on lower level behaviour [for an explanation, see Williamson (2000)¹⁸]. These constraints in turn introduce a number of political economy issues. Higher-level institutional reform takes much longer to have tangible effects than at lower levels, although their ultimate pay-off is far greater. Indeed, the classic problem of time inconsistency explains why measures targeted at the “play of the game” are often implemented *before* the more difficult institutional reforms that determine the basic “rules of the game”. The IMF’s integrated approach does little to resolve this dilemma.

Appendix II-schema 1 shows a stylised ordering of priorities at differing stages of the reform cycle presented to the IMF Executive Board in 2001. How specific

¹⁷ Some cynics have argued that as “everything depends on everything else”, the IMF’s “integrated approach” is a subterfuge for extending its dominance over policy areas that were previously beyond its remit.

¹⁸ An insightful way of putting social-economic institutions into operational perspective is proposed by Williamson (2000). Institutions are categorized into four functional operational levels in a policy matrix. These include in descending order: 1) social theory, 2) the economics of property rights, 3) transactions costs economics, and 4) neo-classical/agency theory. A key feature is that the higher the level, the stronger the constraints imposed on lower level behaviour, (even though there are feedbacks), but the longer is the operational time horizon. In short, this hierarchy reflects causality. These considerations are critical in designing effective reform programmes because the nature and the operational time horizon of instruments must be consistent with the policy goals—and explains why institutional reform is so politically difficult to deliver.

reform cycles can be defined remains unclear. The main feature of the IMF's integrated approach is the addition of pragmatic guidelines for successful KAO. Thus, while long-term capital flows should generally be liberalised first, which specific categories to address depends on circumstances¹⁹. Moreover, high priority is also assigned to upgrading institutions and social capital (i.e. legal systems, accountancy standards, prudential regulations, systemic liquidity arrangements, etc.) and microeconomic reform related to financial and corporate restructuring, early in the reform cycle. As noted above, while all these goals are laudable, this approach lacks:

- An integration of hierarchical institutional relations
- Hard data to monitor progress
- And a coherent analytical and real-time framework to make it operational

As this unnecessarily complex approach is unoperational, case studies are the only alternative. However, this risks quickly becoming a quagmire of “special cases” with little systemic logic.

1.5.3. A Risk-Based Approach to the Sequencing of DFL and KAO

By contrast, we propose a risk-based approach to analysing the sequencing of international financial liberalisation, in a framework stressing the key role of initial conditions reflecting the quality of core institutions, stages of economic development, the status of DFL, KAO and prudential regulatory capacities. We attempt to identify risks arising from specific aspects of DFL and KAO, as well as new risks²⁰, their interactions and implications for systemic financial risk. In sum, risk-based sequencing gauges the “distance” of specific new risks from systemic financial risk. The greater this distance, the earlier and easier the implementation of such measures should be (and vice versa).

The advantage of risk analysis is that the wide variety of paths taken to sequencing can be analysed in a coherent framework. Thus, many crisis Latin American economies had quite open capital accounts, despite the absence of sustainable macroeconomic policies and exchange rate regimes, owing to weak institutions and incomplete DFL. By contrast, the East Asian crisis economies had functioning institutions, stable macroeconomic policies, average DFL, and relatively low KAO, but this situation was sapped by large short-term capital flows and inconsistent exchange rate policies. Following costly financial crises here, how can systemic risk be reduced? Similarly, in countries with quite closed capital accounts (e.g. the PRC, India, Viet Nam, etc.) what are the priorities for establishing the preconditions for successful DFL and KAO? These issues are addressed below.

¹⁹ For example, if imbalances are predominantly in inefficient, overly protected industry, then liberalising FDI inflows (after trade liberalisation and privatisation) is likely to be effective. By contrast, if problems lie with developing the financial market, liberalising portfolio investment might be called for.

²⁰ Liberalising long before short-term interest rates raised systemic risk in Korea by shifting the yield curve favour of money market financing. This was exacerbated by freeing short-term before long-term FDI and portfolio flows. Short-term FX borrowing was also favoured by lower foreign rates leading to growing maturity and FX currency exposure.

1.6. Is KAO Beneficial for EMEs?

1.6.1. Capital Account Decontrol and Economic Growth

Estimating the impact of specific variables on economic growth is always difficult because socio-economic explanatory variables are highly correlated. Although there is a presumption that KAO will increase capital inflows, investment and growth, the empirical evidence is difficult to disentangle. Indeed, standard growth equations (augmented by capital account controls) may capture a host of parallel influences (notably prior trade and DFL, and the quality of institutions including the rule of law, property rights, prudential regulation and polity) that are all correlated with per capita GDP (see chart below). This problem can be addressed through instrumental variables, but is subject to conflicting interpretations and the empirical results do not permit strong conclusions (Arteta et al. 2001). Given the difficulties in finding tangible benefits from KAO for EMEs, it is surprising that the policy literature has paid so little attention to the costs and benefits of KAO—in light of the enormous cost of the financial crises in the 1990s.

1.6.2. Empirical Studies Using the IMF KAO Index—Bad Data, Uncertain Results

To some extent, the impact of KAO on EMEs remains controversial because the often-used crude IMF index appears to give misleading results (its weaknesses are discussed below). Thus, Grilli and Milesi-Ferretti (1995) find no relation between capital controls (in levels) and economic growth in a sample dominated by EMEs. A widely cited study by Rodrik (1998) produced the same results (as Grilli and Milesi-Ferretti) for a sample of almost 100 countries. Although Rodrik's findings have often been interpreted that capital account liberalisation has little or no statistical impact on growth, this interpretation is unwarranted on statistical grounds²¹. For example, Rossi (1999) finds that capital controls influence economic performance, when complementary information on the regulatory and supervisory framework are included. But his panel estimates are based on a small 15-country sample of EMEs. Similarly, Berkaert et al. (2000) find positive effects on growth in EMEs of capital account decontrol by adding the specific dating of decontrol to the IMF index. In sum, available empirical evidence suggests that the crude IMF index lacks sufficient information value in itself to allow firm conclusions on the role of KAO on economic performance.

²¹ Apart from poor data, Rodrik's 1998 paper is flawed because a null hypothesis or counter-factual is not clearly defined, i.e. what would the economic performance of countries with open (closed) capital accounts have been in their absence? Moreover, basic theory underscores that the presence (or absence) of a statistically significant regression coefficient cannot prove a hypothesis; statistical tests can only reject the null over a chosen confidence range. Rodrik has addressed the issue of a null hypothesis in a subsequent paper dealing with capital controls in Malaysia by building an IMF programme counter-factual; see Kaplan and Rodrik (2001). However, constructing a counter-factual for a fictive IMF programme is bound to be controversial.

1.6.3. Empirical Studies Proxying the Intensity of KAO—Better Data, Mixed but Better Results

By contrast, empirical tests using (changes) in a more informative indicator allowing for the *intensity* of capital controls developed by Quinn (1997) [and Quinn et al. 2001] find robust positive results on subsequent economic performance in high and middle income, but scant evidence for low-income EMEs²². Similarly, Edwards (2001) has reproduced Rodrik's estimates using the same set of controls, but with Quinn's more informative indicator of intensity. Edwards finds that capital account liberalisation boosts growth in high-income countries in the 1980s, but slows it in low-income countries. Arteta et al. 2001, also using Quinn's measure similarly find different effects between higher and lower income countries. However, they interpret their results as supporting the view that KAO is not contingent on openness to trade; rather they emphasise the absence of a large black market premium—which proxies macroeconomic imbalances. In the presence of such imbalances, KAO can hurt more than it helps.

Thus, although there is a presumption that Grilli and Milesi-Ferretti (1995) and Rodrik's (1998) results may reflect a defective indicator—the accumulating evidence on KAO pointing to differing effects between high and middle-income compared with lower income EMEs is hard to ignore²³. The central policy issue is why? Quinn et al. [(2001) using data to 1997] offer a political economy explanation. Their results suggest that while KAO raises economic growth, the benefits are largest for rich countries, while EME democracies without welfare states can actually suffer from KAO²⁴. Whether this explanation is a better (or complementary) explanation than Arteta et al's (2001) emphasis on prior conditions with respect to social infrastructure and the lack of macroeconomic imbalances is difficult to judge, as sample coverage and estimation techniques differ. More importantly, the competing explanatory variables are correlated—and throw little light on the critical question whether the expected benefits justify the greater costs and risks related to KAO in EMEs.

²² Edison and Warnock (2001) present a simple measure of the intensity of capital controls on equity investment in EMEs, using the ratio of the market capitalisation of equities in the IFC Investible to the IFC Global index of market capitalisation. The first reflects equity available to foreign investors allowing for legal restrictions and liquidity. Hence, one minus this ratio is the degree of restrictiveness faced by foreign portfolio investors. This measure is however narrow. Despite a big drop in recent years, bank flows and especially FDI outweigh equity flows to EMEs by several fold. Nonetheless, their measure confirms the timing and ranking of countries in Quinn's index. Moreover, along with Wei (2001) estimates of restrictions on FDI—these studies provide valuable complementary information on specific aspects of capital account restrictions.

²³ A feature of recent research is that social infrastructure may explain the favourable growth effects of financial liberalisation on OECD and middle-income countries compared with low income EMEs (Arteta et al. 2001). Quinn et al. 2001 by contrast find that the effects of KAO are not contingent on such prior conditions. Generally, empirical results are not robust to shifts in country coverage, time period and estimation technique, making a differentiation between competing hypotheses difficult.

²⁴ Quinn et al. argue that the adjustment costs from KAO in rich countries can be offset by direct transfer payments to losers, thereby facilitating structural change. By contrast, poor EMEs have limited resources. Hence, losers must be compensated for by non-market mechanisms that perpetuate inefficiency and hidden unemployment. As a consequence, poor EMEs may obtain few benefits from KAO, and this may explain why (EME) democracies with weak welfare systems resist structural change, globalisation and FDI on ideological grounds. Quinn's 1997 findings that KAO leads to greater income inequality are consistent with these results.

2. Indicators of Domestic Financial Development and International Capital Controls

2.1. Measurement of Domestic Financial Decontrol

This section describes indicators for the functional effectiveness of DFL, and exchange restrictions on current and capital account transactions from 1958-2000, for 33-EMEs and 22-OECD countries. DFL is usually gauged by the timing and degree of interest rate decontrol together with financial depth. These indicators are uncontroversial but limited. Like KAO, effective DFL depends on sound initial core institutions. Hence, *what distinguishes DFL from KAO is its lower systemic risk*. Badly executed DFL (with closed capital accounts) risks domestic financial crisis, but systemic risk is limited by the central bank's role of lender of last resort. By contrast, bad DFL combined with high KAO, run the twin risks of costly external liquidity *and* domestic financial crisis, because central banks cannot print FX reserves. This hierarchy of risks supports the view that DFL should follow trade liberalisation²⁵, but that DFL needs to be well advanced for KAO to be successful. But, if core institutions are neglected, relatively high DFL and KAO can lead to nasty "new" currency and maturity risks, precisely because institutional oversight is lacking. In sum, successful KAO demands much stricter prior conditions because it involves asymmetrical systemic risk.

2.1.1. A Risk-Based Approach to DFL

The goal of DFL is to establish a complete domestic market-based financial system, while limiting systemic risk. A risk-based approach orders the separate risk components of DFL vis-à-vis systemic stability. It is thus unsurprising that top priority is attached to establishing core institutions, good prudential oversight and adequate bank capitalisation, as these are key safeguards against financial crises (Demirguc-Kunt and Detragiache (1999)). Criteria for gauging such standards include: the rule of law, the presence of rules-based, prompt corrective action programme, the status of the BIS CAMEL guidelines, the independence of supervisory agencies, and accounting and disclosure standards. Other criteria are the enforcement of related lending and single borrower exposure limits, and active monitoring of credit to sensitive areas (e.g. real estate and equity markets) to prevent speculative asset bubbles.

Interest rate deregulation is the linchpin to effective DFL. However, this should be carefully phased to avoid eroding the franchise value and profitability of existing deposit banks that might otherwise encourage them to engage in high-risk lending and speculative activities. Hence, lending rates should generally be liberalised before deposit rates; and long-run deposit rates preferably liberated before short-term rates. Money market rates should also be liberalised with the goal of establishing a market based yield curve. But, sequencing should avoid biases that encourage excessive dependence on short-run debt, especially if this involves foreign exposure.

²⁵ The acceptance of current account convertibility (IMF Article VIII status) is used here as a simple gauge of the absence of major real-side microeconomic imbalances and hence of effective trade liberalisation.

Financial liberalisation is also synonymous with new banks, financial innovation and rapid growth of non-bank financial institutions (NBFIs). Owing to a shortage of credit risk and management skills, new entry was a factor behind excessively rapid credit growth and the pre-crisis deterioration of credit standards in East Asia. Hence, new (domestic) entry should be limited, with a strong bias towards encouraging foreign banks and other financial services, because they have the scarce requisite technology and management skills to upgrade financial systems (Liu 2002 and APF 2002). It is also critical that the same strict prudential oversight rules apply to new banks and NBFIs to avoid regulatory arbitrage. In sum, new entry should work in tandem with staged interest rate liberalisation to create strong banks, non-bank financial institutions, and deep financial markets, especially viable bond markets. Finally, some form of deposit insurance system is needed in a liberalised financial system to protect small savers, but this should be kept to a minimum to avoid moral hazard.

2.1.2. DFL and Real Interest Rates

Against this backdrop, deriving a simple representative indicator of DFL is a big challenge. Nonetheless, from the perspective of gauging effective DFL, the timing, degree and pattern of interest rate liberalisation is clearly key (Pill and Pradhan 1995, Levine and Zeros 1998, Gelbard and Leite 1999). Hence, our main indicator is based on the timing and sustainability of real interest rates (for deposits, bank lending and money market rates where available). Empirical evidence shows that suppressed financial systems are characterised by negative real interest rates (especially deposit rates that are more likely to be administered). Following DFL, real interest rates (especially lending and money market rates) inevitably turn positive—often substantially so—as non-price rationing mechanisms are eliminated. Moreover, real interest rates following DFL are usually higher than in an internationally liberalised system. Thus, another salient criterion for assessing effective DFL is medium-term sustainability relative to a “golden rule”. In short, a repressed financial system with sustained negative real interest rates will find it difficult to attract and maintain its deposit base. By contrast, excessively high real interest rates raise the risk that debtors will ultimately default. Hence, both extremes entail risks for domestic financial stability.

In sum, our index of effective DFL sketched out below is the product of two measures:

- The number of positive annual real interest rate observations²⁶ relative to the total sample from 1980-2000; and
- The proportion of real rates falling in the range of 0 to 7 per cent²⁷.

²⁶ These are ex-post real interest rates referring to the relevant deposit, lending and money market rates, deflated by contemporaneous annual changes in consumer prices from the IMF's IFS CD Rom 2001.

²⁷ BIS estimates of FX pressure and banking system vulnerability apply a 4 per cent cut-off (see Hawkins and Klau 2000). However, this appears to be a quite low threshold when allowance is made for transitory shocks and the “normal” non-linear impact of excess demand on real rates.

These indicators are squared to obtain an indicator of “effective DFL” (see Appendix II Tables 1 & 3). Albeit imperfect, this indicator is transparent and coincides well with other measures such as the stand-alone credit ratings of banking systems.

2.1.3. DFL and the Degree of Monetisation

A common complementary criterion of financial sector development is broad money supply to GDP. Of available measures, the ratio of private credit to GDP is by far the most appropriate, as it strips out the influence of government transactions on the monetary base. In fact, the correlation between our indicator of effective DFL and financial depth is high (R^2 .70 for 55 countries) and the latter appears to be a representative indicator at early and intermediate stages of financial development. However, it is not failsafe. Beyond a certain level, this ratio will decline. This is not a sign of financial regression, but the growing sophistication of money market instruments, long-term bonds and equity markets. The danger with credit indicators is their uncritical use in growth equations, as regression analysis will inevitably find that higher monetisation is favourable to growth (Levine and Zeros 1998 is typical of such first generation results). This may be generally true—but as illustrated in the 1997-98 Asian “débacle”, overly rapid credit growth²⁸ following domestic and international financial deregulation, in the absence of effective governance, prudential oversight, good transparency and well-capitalised banks, can be a time bomb.

2.1.4. Informational Quality of Financial Systems (IQFS)

The unanticipated severity of the 1997-98 Asian capital account crisis in the wake of excessive credit growth has centred much greater attention on the “quality” and role of institutions²⁹. The new institutional economics suggest that the heart of any financial system is its institutional-informational infrastructure and long-term contracting capabilities. These factors determine a system’s capacity to transform heterogeneous information into sufficiently homogenous units that allows uncertainty to be priced as diversified marketable risk. Chan-Lee and Ahn (2001) have assessed 27-microeconomic and institutional indicators to proxy IQFS for 34-EMEs and 21-OECD countries for 1995-98 (with preliminary estimates for 1985). Our indicator of IQFS is correlated with measures of financial liberalisation and depth, but its principal

²⁸ A number of factors explain rapid pre-crisis credit growth in East Asia. DFL typically leads to a surge in credit demand as quantitative controls are suppressed. On the supply-side, the entry of new banks and non-bank financial institutions (and new financial products) has typically led to a surge in credit growth. Moreover, international banks and foreign institutional investors may also contribute to surges of capital inflow and rapid credit growth, reflecting “euphoria” following long periods of macroeconomic policy stability and high growth. These factors were pronounced in periods of low interest rates in OECD countries, because financial institutions were encouraged to seek higher rates of return. Given the limited size of EMEs financial markets (small boats), surges in capital inflows and especially sudden, unexpected reversals can wreak havoc (violent seas), given their limited ability to intermediate short-term flows through under capitalised financial systems.

²⁹ This has led the IMF to include higher degrees of conditionality in their recent stand-by arrangements and loans to Indonesia, Turkey, Argentina and Brazil, targeted at improving corporate governance, establishing better court systems, improving bankruptcy legislation, fighting corruption, etc. Although these goals are laudable, it is debatable if these functions lie in the remit or competence of the IMF.

advantage is to avoid the fatal pitfall of “more credit is better” in EMEs with poor financial transparency and regulatory systems. For simplicity, six indicators of IQFS are used below as a benchmark for core institutions. This allows us to proxy the role of institutions, while testing for the impact of DFL and KAO on systemic risk.

2.1.5. A Risk-Based Approach to KAO

The goal of KAO is to create an internationally efficient financial system, while minimising systemic risk. Pragmatic risk management favours liberalisation of long before short-term capital flows. Empirical studies consistently show that long-term capital is more stable and less susceptible to reversal owing to strong real economy and trade sector links (c.f. 1.3. above). There is thus a direct link between KAO and systemic risk, as higher KAO is associated with larger short-term FX capital flows intermediated by the banking system. This assumes classic sequencing patterns. In fact, Korea, Thailand, and to a lesser extent Indonesia, liberalised short-term trade credit and banking flows *before* fundamental liberalisation of FDI and long-term portfolio flows. Thus, prior to 1997, KAO here understated systemic risk perhaps contributing to regulatory oversight. At a later stage, estimates for the restrictiveness of FDI regimes (Wei 2000) and market access to foreign portfolio investment (Edison and Warnock 2001) could be used to gauge these biases. Such a study could also analyse the risks in specific capital account elements and their “distance” to systemic risk³⁰. This could clarify policy priorities and set an operational time framework for establishing the preconditions for successful DFL and eventual KAO. Thus developing bond markets are critical for DFL, effective monetary policy, and reducing systemic risk from maturity and currency mismatch. But, such medium-term concerns need to be integrated into a policy agenda along with shorter-term initiatives.

A risk management approach is equally salient for countries with relatively low KAO (the PRC, India, Pakistan, Bangladesh, Nepal, Viet Nam, Cambodia, Lao P.D.R., etc.). Thus, what new risks arise vis-à-vis systemic risk, with higher KAO, is particularly relevant here. For instance, there is a consensus that new risks with respect to liberalising FDI and trade credit are quite distant from systemic financial risk. By comparison, new risks arising from liberalising international portfolio investment are somewhat less distant from systemic risk, unless banks are heavily involved in such transactions. By contrast new systemic risks from short-term capital liberalisation are pronounced, as these have often developed into serious maturity and currency mismatches in the absence of adequate safeguards. Finally, it is important to assess what new risks arise from inadequate core institutions and poorly executed DFL, as they interact with higher KAO (Section 5 below).

³⁰ Sarno and Taylor 1999, use Kalman filters and Cochrane non-parametric variance ratios to isolate permanent vs. transitory components of capital flows—the latter being a good proxy of systemic risk. Their estimates are that FDI and commercial bank flows (presumably related to trade credits) are the most stable element of capital flows. Variance analysis for Argentina and China shows that after 36 months only 7% and 3.8% of equity flows were permanent. The comparable figures for bond flows were 7.2% and 6.6% and official flows 8% and 14.5%. By contrast, the persistence of bank credit was 91.8% and 68%, while FDI was 101.2% and 98.6%. A limitation with these estimates is that the sample ends in 1997, just before a big cutback of international bank credit to EMEs. Another major problem is the inherent difficulty in separating bank-financed trade-credits (low risk) from non-trade credit related bank lending (high risk) with higher levels of DFL.

2.3. Measuring the Intensity of Exchange Restrictions and Capital Account Controls

Measuring international financial controls is far more complex than DFL³¹. Exchange restrictions on current transactions and capital account controls are difficult to quantify because of their sheer number and diversity. Controls range from outright bans, quotas, licences, review panels, and explicit taxes to multiple exchange rates; with the choice often related to current account convertibility and DFL. Moreover, when there is a mix of controls, judgement is needed on which are the most important. The ideal approach is to calculate “implicit tax rates” for each control; however, attempts for Chile illustrate the complexity of such estimates (see Valdés-Prieto and Soto 1998). Hence, the challenge is to find a tractable system that reflects the varying intensity of controls, without becoming mired in details that make inter-country and inter-temporal comparisons impossible.

Finding a tractable market-based algorithm (similar to interest rate liberalisation) for measuring these restrictions is a Herculean task given the labyrinth of non-price regulations in many EMEs. Thus, the widely used IMF indicator of exchange restrictions and capital account regulations goes to one extreme. It is a mere arithmetic count of how many restrictions are present relative to the total number possible (over time)³². This index is fatally flawed. Countries with quite different regimes and/or implementing steady liberalisation over time, risk receiving identical scores, as no distinction is made for the intensity of controls. Hence, our calculation of exchange restrictions on Turkish imports shows a three-fold increase in liberalisation from 1958-1999, while the IMF approach risks showing little or no change³³.

Given the IMF’s regulatory role, it is surprising that it has not used the more informative technique of Quinn (1997), drawing on Arrow’s (1973) seminal insights into the efficiency costs of controls, more extensively³⁴. This uses a system whereby

³¹ These differ from trade protection. Exchange restrictions on current account activities and capital account controls tend to be highly correlated (around 80%), reflecting the strong linkages between trade and finance; investment flows and real transfers mechanisms.

³² Thus, the IMF’s summary of the 1968 import licensing and exchange control system in Turkey contains over three pages of cryptic descriptions of quotas, licensing arrangements, duty rebates, related export subsidies, advance deposit schemes and other exchange controls and stamp taxes. These all varied by type of import and sector, leading to a bewildering number of combinations. These arrangements were simply shown as a “1” indicating “the presence of exchange restrictions” on imports in line E-2 of the summary table, the IMF’s Annual Report on Exchange Arrangements and Exchange Restrictions.

³³ The ideal method of estimating the impact of exchange restrictions is to calculate implicit taxes. This is difficult and time consuming. The IMF measure is binary, as restrictions are scored on a 0 or 1 basis. The problem is that as some minor restrictions on Turkish imports remained in 1999, this category could be scored as a “1” from 1958-1999. By contrast, we score imports on a 0 to 2 scale: covering the range from a total ban, to no restrictions, in half-point intervals. This scaling method assigns a score of 0.5 on exchange restrictions on Turkish imports from 1958 to 1987 (reflecting the partial ban on imports via quantitative restrictions (QRs)); a score of 1 from 1988 to the mid-1990s, when QRs were replaced by administrative approval; and a score of 1.5 in the late 1990s, when the previous system was transformed into (market-based) heavy taxes that were steadily and unilaterally reduced. By contrast, the IMF approach would show a “0” score only when all exchange related restrictions are removed. Coding rules used are outlined in Appendix I.

³⁴ A more detailed index was constructed for one observation [for 1996] by Johnston et al. (1999b). This used a detailed breakdown of 142 individual types of exchange and capital controls (aggregated into 16 categories) reported in IMF’s Annual Report of Exchange Arrangements and Exchange Restrictions 1997.

quantitative restrictions and administrative rules are coded as being more restrictive than taxation or market-based restrictions (e.g. multiple exchange rates), and allows one to proxy the “intensity” of exchange restrictions on current and capital account regulations by broad categories over time. Exports, imports, invisible payments and receipts and capital payments and receipts are all scaled on a zero to two bases (with 0.5 point intervals), so that the current account is scaled from zero to eight and the capital account from zero to four (see Appendix II-Tables 2 & 4). However, the distinction between current and capital account transactions is not hermetic. This coding system has greater information value than a simple binary system, but does not capture changes within categories. Hence, the unremunerated reserve requirements (URRs) on short-term capital inflows into Chile are scored as being less restrictive than an outright ban, a quota system or administrative approval procedures. But this system does not distinguish between the fine-tuning of URRs rates over time³⁵. Finally, judgement is inevitable when several regimes coexist.

3. Country Experience with Capital Controls and Stylised Facts

3.1. Is there a Role for Selective Capital Controls in EMEs?

The controversy over capital controls in EME includes their effectiveness under normal and crisis situations. The IMF has surveyed country experience with the use of capital controls (or decontrol) following the proliferation of crises in the late 1990s (Ariyoshi et al. 2000). These case studies provide useful background, but crucially lack an assessment of the initial conditions for successful KAO and an assessment of the systemic risks of alternative approaches to KAO. This section expands on these case studies using our indicators of core institutions, DFL, KAO and the BIS Early Warning System. We concur that KAO is a desirable goal, but differ on how to attain this compared with earlier IMF ‘temp plate’ tendencies³⁶, although these views have shifted post-1997.

The number of countries for which this information was, however, limited (41 in total). In addition, there is no time dimension owing to a lack of comparable data for prior or more recent years.

³⁵ As noted above, attempts at measuring the effects of URRs in Chile encountered a number of difficulties, notably isolating the substitution effects between taxed and non-taxed components of capital inflows and related financial engineering. The implicit tax rate varied daily, as interest rate spreads over foreign interest rates were used to calculate opportunity costs. Despite intensive research, there is scant evidence that the URRs were successful in their main purpose, i.e. to deter excessive capital inflow and an appreciation of the real exchange rate. However, there is evidence that the URRs were not totally evaded, and did help to change the composition of net inflows and to lengthen maturity structures, see Valdés-Prieto and Soto 1998.

³⁶ For the critics, the IMF’s endorsement of “big-bang” stabilisation programmes with strong elements of KAO—with scant attention to initial conditions—is evidence of a “temp plate” mind set to EME’s economic problems. The IMF denies this. However, its controversial policies of high interest rates and fiscal restraint for the Asian crisis economies in 1997-98 and its strong financial support of Argentina’s currency board in 2001 did little to raise the credibility of their position.

3.1.1. Long-Standing Quantitative Capital Controls

A classic situation is where domestic financial systems have serious shortcomings, social infrastructure is lacking, and long-standing quantitative capital controls are being phased out slowly. This approach appears uncontroversial, as establishing adequate core institutions is a precondition for operational DFL, and the sound banks and capital markets needed to cope with KAO³⁷. However, the status of initial conditions is difficult to judge in suppressed financial systems because systemic risk is masked by controls and other distortions (e.g. non-performing loans (NPLs)). Finally, weak initial conditions are often used as a subterfuge by vested interests to resist reform.

The PRC and especially India are prime examples of this situation. KAO has been cautious; and in conformity with the OECD capital code, long-term flows being liberalised before short-term flows. According to Wei (2000), the PRC's FDI regime (restrictions plus incentives) in 1999 was only slightly more attractive than India's. However, the PRC's success in attracting FDI and embracing trade liberalisation differs radically from India's: the PRC is by far the single largest EME host for FDI, followed by Brazil, reflecting its dynamic growth prospects and strong export orientation. By contrast India was 41st as a destination for FDI³⁸. Hence, basic real side reform is progressing much more rapidly in the PRC than in India.

In fact, India and the PRC avoided the worst excesses of the Asian financial crisis. Exchange market pressure in 1997-98 was among the mildest in Asia, reflecting limited external vulnerability and closed capital accounts that shielded weak banking systems³⁹. Despite such immunity to contagion, this is not a justification for slow reform. There are sound reasons to speed domestic structural reforms, thereby improving resource allocation, raising efficiency and enhancing competition, and creating the preconditions for effective DFL and eventual KAO. However, the key pragmatic question is: at what stage of DFL should other categories of the capital account be decontrolled? And, as KAO is being implemented what minimum safeguards need to be kept?

³⁷ Our estimates of effective DFL are 45% and 35% for India and the PRC respectively. The higher score for India largely reflects the earlier launching of DFL. Given the weak level of DFL, there is clearly limited scope for the use of market based, as opposed to quantitative capital controls.

³⁸ According to the World Competitiveness Report 2000, the stock of FDI in the PRC in 1998 was the world's third largest following the US and UK at \$261 bn. From 1990-98, FDI to the PRC accounted for over 90% of all capital inflows. By contrast, India was only 41st with \$13.2 bn. In 1998, Wei 2000 points out that some capital flows from Hong Kong reflect round tripping from the PRC to benefit from more favourable tax treatment and subsidies. Even so, FDI to the PRC has been able to tap a vast overseas Chinese diaspora. An interesting question is why India has not been able to do likewise? Wei argues that the PRC is not an over achiever if FDI is measured in per capita terms. The rationale for this normalisation is difficult to assess. Location theory implies that large countries have less external openness, because specialisation and economies of scale can be achieved domestically, rather than across borders.

³⁹ No credit ratings are available of the stand-alone credit ratings of the leading banks in India or the PRC, see Hawkins and Klau (2000). This reflects the dominant role of state-owned banks in the financial system.

Reform in the PRC

In the PRC, the preconditions for full scale KAO are in the distant future⁴⁰. Hence, the top priority is to establish the rational incentive structures (via effective property rights and ownership diversification) necessary to deal with the banks' massive stock of NPLs and to avoid new NPLs [Asian Policy Forum (APF) 2002]⁴¹. Asset management corporations (AMCs) have been set-up to deal with the large *stock* of NPLs, and state-owned banks (SOBs) are being recapitalised and guidelines set for their reform. However, major obstacles remain to avoid *new* NPLs notably: defining viable ownership structures⁴², overcoming weak profit-making motives, poor internal controls and setting up a minimum deposit insurance system. WTO entry will have a salutary effect in this regard, by accelerating the adoption of better prudential regulation, accountancy and disclosure standards. Moreover, foreign entry should foster other financial services, competition and better management skills. Domestic banks will inevitably be faced with a keener competitive environment, as joint ventures and foreign banks enter the market. In short, establishing the preconditions for effective DFL is a top priority for avoiding new NPLs, but the missing element is clearer property rights. This could be achieved quickly, because DFL poses limited new systemic risk, if there is the political will to act.

Bank reform, to be sure is the tip of the iceberg. Restructuring and reform of loss-making state-owned enterprises (SOEs), the establishment of a minimum social safety net, funding the NPL problem, recapitalising the banking system (as well as the state pension system) will all have to be addressed to establish a viable financial system.

⁴⁰ Preliminary estimates below scale core institutions from 0 to 10, based on six criteria. The PRC had a score of 1.6 in 1998 compared with an average of 3.8 for EMEs, excluding the 6-best high income EMEs with an average of 7.5. The PRC has made big strides since 1998 to improve the rule of law, transparency, and disclosure rules. Nonetheless, further progress is needed in the areas of property rights, foreign bank entry and the quality of bank balance sheets. The PRC's score on functional DFL (34% out of 100%) is lower than crisis-hit EMEs (average of 39%) and the high income EMEs (average of 68.5%). However, it also has a low degree of KAO (1.5 scaled from 0 to 4) compared with 3.1 for crisis-hit EMEs and 3.3 for the higher income EMEs. These indicators support the view that, given the current status of core institutions and DFL, KAO should *not* be on the short-term policy agenda, even though systemic risk from external vulnerability is relatively limited. In sum, a strategy of quick resolution of the NPL problem and effective implementation of DFL to reduce systemic risk flowing from the banking sector is suggested. Effective DFL is a necessary precondition for eventual KAO. Without effective DFL, KAO would simply provide new excessive risk-taking opportunities to banks and non-bank financial institutions through the interactions of badly monitored DFL and KAO.

⁴¹ Official estimates of the banks' NPLs are 26.7% of total loans. This excludes NPLs placed with recently set-up asset management corporations (AMCs). An economic assessment needs to consider how this estimate compares with international definitions of NPLs and the expected recovery rate of bad loans placed with AMCs. Unofficial estimates are that the best state owned banks (SOBs) have NPLs (on international definitions) of some 30-40%, lending credence to private estimates placing the NPL problem at some 40% of GDP. Given its scale, the only feasible solution to its funding would be an exchange of private sector savings against the government's ownership, i.e. privatisation through ownership diversification. This is feasible given the present low level of government debt and the inherent profitability of the banking sector, see Liu 2002.

⁴² A number of possible ownership structures of SOBs are being debated, although all involve privatisation and ownership transfer: i) setting up share-holding companies with two-tier (headquarter and branches) legal entities; ii) restructure SOBs as private legal entities; iii) giving branches rather than headquarters stock listing priority; iv) all around stock listings and v) shareholding of banks by mutual funds.

As these reforms are put in place, the current fixed-exchange rate system will become increasingly ill adapted to future needs. The APF 2001 has recommended that a mid-position between a free float and currency-board-cum-dollarisation might be preferable in Asian EMEs to avoid future capital account crises. A more flexible regime could be feasible in the future, given the PRC's small foreign debt/GDP and debt service ratios (see Appendix II Table II-1), high levels of foreign reserves and dynamic growth prospects. However, controls on short-term capital flows and restrictions on offshore holdings of Yuan, as a safeguard against volatile capital flows may be required for some time. These restrictions would appear justified so long as domestic reform continues apace.

In summary, a risk-based approach to financial sequencing singles out domestic financial implosion arising from a vicious circle of slower growth, rising NPLs and a credit crunch, as the principal systemic risk facing the PRC. External systemic risk is presently quite limited. Nonetheless, KAO is *not* on the short-term policy agenda. Rather, top priority is attached to the establishment of effective property rights⁴³ and ownership diversification necessary for effective reform of the banking system. This will in turn help to create viable banks and efficient firms over time. In short, the issue in the PRC is not the speed of establishing KAO *per se*; rather it is to establish the necessary preconditions for DFL and KAO, as quickly as possible. Seven proposals for reform using a risk-based analytical framework have been developed by the APF (Liu 2002 and APF 2002). But this assumes that there is the political will to act.

Reform in India

Notwithstanding significant progress over the past 10 years, reform in India has been slow and cautious, especially with respect to large state-owned companies and banks. In marked contrast to the PRC, large scale, radical trade liberalisation and privatisation has been eschewed in favour of internal restructuring and sector-specific reform. This gradualist approach has had some success, but is limited by its inherent lack of rational incentives (see below). Weak core institutions, chronic fiscal deficits and bureaucratic red tape hamper private sector risk taking. Over-regulation of goods and labour markets is mirrored in weak competition, low private investment, a small export sector, poor productivity and hence scant attractions as a destination for FDI.

Large state-owned banks (SOBs) dominate India's banking sector. Following initiatives to strengthen India's capital markets in the 1980s, banking reform was launched in 1991. But, unlike reform in other former planned economies (Hungary, Poland, the Czech Republic), installing rational incentive structures through privatisation was rejected (Shirai 2001). Rather, India has chosen a gradual, cautious approach toward restructuring and enhancing competition through deregulating entry requirements (for foreign and domestic banks). Capital market development (through

⁴³ The adoption of the PRC "Company Law and Commercial Code" (2000) included significant improvements in creditor and shareholder rights. On paper, creditor rights score 2 out of 4 and shareholder rights 3 out of 4. However, these ratings are quite misleading. PRC's ICRG score on rule of law and corruption were only 5 and 2 (on a scale of 10) respectively. Moreover, exercising property rights in a system lacking transparency and adequate accountancy standards is virtually impossible. The stumbling block here is a lack of trained accountants and the virtual absence of qualified, independent auditors (as well as lawyers and judges). For details, see Allen et al. 2002.

interest rate deregulation since 1991 and better regulation for new financial products) has followed a similar path. Initiatives have also been taken to strengthen the banking system by a series of recapitalisations of SOBs, reinforcing the supervisory process and creating new mechanisms to overcome legal deficiencies and dispute settlements (Kohli, 2001). However, it is debatable how effective such measures can be: recapitalisation in the absence of sanctions for poor performance and especially management reform, run the risk of moral hazard; enhanced prudential standards without effective enforcement merely creates more red tape. Such considerations also apply to the PRC and other EMEs as well.

In summary, the risks facing India are more akin to the classic current account problems that characterise many EMEs, than the recent capital account crises in East Asia. India's reluctance to tackle its weak real-side fundamentals (i.e. external trade, goods and labour market reform) is regrettable as they entail low systemic risk. This failure is mirrored in a small exportable goods sector, an unflattering record in attracting FDI, chronic fiscal deficits and a bad-banking system. To be sure, the restructuring of SOBs and new entry has had some positive results: costs have been reduced and SOBs returned to profitability in 1997-2000. However, this better performance partly reflects cyclical factors and much more remains to be done. Plans to address the large stock of NPLs have yet to be announced. Despite a modest increase in foreign and new bank presence, SOBs in 2000 still represented some 80% of the banking system. In short, India's record of glacial real side reforms, rigid controls and repeated recapitalisation of loss-making SOBs have done little to avoid large scale recurring NPLs.

Systemic risk from external vulnerability is presently relatively limited. However, slow reform is open to other risks, notably a perpetuation of weak fundamentals. Hence, extensive capital controls did not prevent a classic current account crisis in the early 1990s. Paradoxically, even though DFL on paper is more advanced than in the PRC, the mind set for effective reform and preconditions for KAO in India may be even further away. Effective DFL and eventual KAO is basically contingent on a sea change in attitudes concerning the role of the public sector and radical supply side reforms—formidable tasks in a poor country with an over-developed welfare state mentality.

3.1.2. Imposing Controls on Outflows in Times of Crisis

A second classic situation is when controls are imposed on capital outflows in the context of financial crises (Malaysia 1998-99, Spain 1992, Thailand 1997-98, Argentina 2001). The consensus is that *such controls almost always fail, because they cannot "square the circle" of an inconsistent microeconomic, macroeconomic-exchange rate policy nexus* (Latin America and Africa). Moreover, even when imbalances appeared more manageable, currency devaluation has been difficult to avoid, despite controls on capital outflows (Spain).

At first blush, *Malaysia's 1998-99 experience confounds this mainstream consensus*, as its controls on capital outflows proved less catastrophic than predicted by its harshest mainstream critics⁴⁴. This raises the issue under what conditions controls on

⁴⁴ Merton Miller's reaction was typical: 'Malaysian capital controls are a failure', The Asian Wall Street Journal, 9 July 1999.

outflows can “work” in a crisis situation? Thus the reimposition of controls in September 1998 came *after* substantial capital outflows had already occurred and pressure on the exchange market and banking system had eased substantially⁴⁵. Moreover, Malaysia’s social infrastructure and financial system was more robust than the other Asian crisis economies. Further, the capital controls were designed to minimise economic disruption by exempting FDI and targeting short-term equity investment⁴⁶. These measures were transparent and seen as fair; and an efficient administration limited evasion (Krugman 1998a, 1998b and 2001). Finally, these controls bought the authorities time to implement microeconomic reforms to establish better initial conditions and to adopt macroeconomic policies that were diametrically opposed to the “orthodox” IMF medicine being applied in the other crisis economies.

Ironically, devaluation was not only avoided, but capital flight was limited even when controls were shifted to a progressive exit tax in late 1999 (abolished in May 2001). The reasons for Malaysia’s “relative success” remain controversial. In fact, Yoshitomi and Ohno (1999), Kaplan and Rodrik (2001), Krugman (2001), and especially Stiglitz (2000) and others have criticised the IMF for misassessing the “causes” of the East-Asian crisis (a confusion between private vs. public debt, and current vs. capital account disequilibria). According to them, there is a supposition that the IMF’s high interest rate and fiscal retrenchment policies exacerbated the financial crisis owing to its highly leveraged corporate sector. If the critics are correct, Malaysia’s refusal of the IMF’s medicine was its salvation⁴⁷. Quite apart from the validity of these criticisms—this experience raises the issue of what patients should do—if the doctor’s diagnosis is open to credible second opinions?

Finally, an analysis of EWS indicators (see below) shows strong evidence of “contagion”—with Malaysia moving in virtual lock step with the other Asian crisis economies. Hence, regardless of their timing, capital controls are unlikely to have had large effects faced with a “one in a century” regional event. However, the pragmatic policy question is: now that FX pressure in East Asia has eased and systemic external vulnerability is at its lowest level in 20 years—would a more “flexible” exchange rate system in Malaysia be preferable, the more so as capital controls have been removed?

⁴⁵ According to the BIS’s exchange market index, peak pressure on Malaysia occurred in the 4th quarter of 1997, and had dropped back close to a neutral reading by September 1998.

⁴⁶ The reimposition of capital controls in September 1998 aimed at eliminating the offshore ringgit market and stabilising short-term capital outflows. These draconian measures were replaced by an exit tax on equity holdings in September 1999 and abolished in May 2001. Quick modification and elimination of controls may have avoided the worst consequences on international confidence. Although it is too soon to judge longer-term effects, FDI and portfolio investment in 2001 was weak, but differed little from other EMEs.

⁴⁷ Krugman 2001 takes the recovery in the other East-Asian crisis economies as a benchmark and tempers the case for capital controls by arguing that Malaysia did no better than those following an orthodox IMF programme. However, he also points out that the dire consequences of re-imposing controls predicted by Malaysia’s severest critics did not materialise. By contrast, Kaplan and Rodrik 2001 argue that Malaysia’s subsequent economic recovery should be judged against a “fictive” IMF counterfactual. On these grounds, they argue that Malaysia’s experience was better than assumed by Krugman.

3.1.3. Limiting Short-term Capital Flows by Unremunerated Reserve Requirements (URRs)

A third situation is the use of unremunerated reserve requirements (URRs) to obtain greater independence for monetary policy, by segmenting financial markets. The goals of such policies have been to prevent excessive interest sensitive capital flows and real exchange rate appreciation (Brazil 1993-97, Chile 1991-98, Colombia 1993-98, Malaysia 1994, Thailand 1995-97). Commonly used instruments are some form of Tobin tax or URRs (Chile, Colombia), entrance taxes (Brazil) or administrative guidelines (Malaysia), and are consistent with the idea that short-term capital flows should be liberalised after long-term flows. Advocates of URRs also argue that targeted restrictions will favour a lengthening of maturity structures, and a more stable, growth friendly composition of capital flows. On balance, *controls on short-term capital inflows are less controversial* than on outflows. However, there is *doubt concerning their effectiveness*, (especially in countries with relatively developed financial markets) although there is some evidence that they may lengthen maturity structures, (see Valdés-Prieto, S. and Soto, M. (1998)). Tobin-type taxes to prevent outflows are generally viewed as ineffective even in normal conditions⁴⁸. In a crisis situation the tax would have to be comprehensive and probably prohibitive to be a deterrent. Nonetheless, URRs may play a useful role in capping “capital account euphoria”, following periods of economic liberalisation and strong economic growth. They may also help to shift inflows towards longer-term capital, and as a signal of the authorities’ intentions to avoid excessive short-term FX debt exposure.

3.1.4. Can a “Big Bang” Approach to KAO Enhance the Probability of Coherent Economic Policies?

A controversial policy strategy is the “big bang” approach to KAO (currency boards or dollarisation) as a high profile political commitment to credible macroeconomic policies following severe economic and/or political dislocation (Argentina 1991, Kenya 1991-95, Peru 1990-91, Ecuador 2000). IMF stand-by agreements, and structural adjustment financing facilities have almost always backed such radical initiatives (e.g. Argentina 2001). This strategy is consistent with the Fund’s long-standing advocacy of the benefits of KAO, as it tackles the political economy nexus head-on—by obliging conflicting vested interests to cooperate in adopting sound macroeconomic policies—because there is no other rational alternative. The problem is that this approach has high systemic risk in the absence of adequate core institutions and DFL. Moreover, there is no guarantee that it necessarily nurtures better institutions and microeconomic structures, or for that matter sustainable macroeconomic policies (e.g. Argentina 2001-02).

⁴⁸ The US interest equalisation tax (IET) in 1963 is an example of the limitations of partial capital controls. In 1965, the IET was extended to offshore short-term lending and was equivalent to around 1 percentage point. However, Canada and Japan were exempt, considerably reducing the effectiveness of the tax. The tax rate varied in subsequent years according to balance of payment requirements and was abolished in 1974 with the end of the Bretton Woods exchange rate system. This appears to be a classic example of regulation driving activity to unregulated markets (the creation of the off-shore Euro-dollar market) and spurring financial innovation that ultimately undermined the IET.

Unfortunately, reality is more complex than neoclassical theory. Thus, while “big bang” approaches have been successful in OECD countries with sound core institutions⁴⁹ (by avoiding reform capture by vested interests) the difficulty that EMEs, such as Kenya and Peru have had to achieve sustainable macroeconomic policies and economic growth underscores the risk that *KAO is not a sufficiently powerful vehicle to overcome failed governance and flawed institutions*. Moreover, the on-going financial chaos in Argentina following the collapse of its currency board system—reflecting its chronic fiscal situation and large dollar-denominated external debt—are stark reminders that “technical quick fixes” have weak reverse feedbacks on higher-level governance institutions (Chan-Lee and Ahn 2001). As Quian 2000 points out, successful reform relies on political support, which in turn depends on delivering tangible benefits to a large majority of the population. Economists usually blame “stupid politics” when their beautifully designed reform programmes are not implemented. But as political scientist Barry Weingast (1995) has commented: “An ironic aspect of the economists’ position is that they want individuals to pursue their self-interest in markets, but not in politics”.

In summary, the IMF survey of the use of capital controls in crisis situations in the 1990s provides useful insights into their failures. But, there is scant guidance for the difficult real world policy issues facing EMEs. Under what conditions are capital controls useful? Does this depend on initial conditions and whether the origins of crises stem from the current or capital account? What priorities and sequencing should be attached to establishing core institutions and DFL before phasing in KAO? Which specific institutions need top priority following a capital account crisis? At what stages of institution building and DFL should KAO start? And in what sequence? Which capital controls should be kept, if any, to guard against speculative attacks or market failure during this process? Can a cost-benefit analysis or trade-off between higher growth, KAO and crisis prevention be made for EMEs? Some of these issues are addressed below using a risk-based approach.

4. Mapping Financial Crises in EMEs Since the 1990s

This section gives a graphic portrayal of the institutional policy matrix presented by Williamson (2000), Chan-Lee and Ahn (2001). Higher level (causal) core structural indicators for 24-EMEs are “mapped” against operational levels of DFL and KAO. This exercise starts in the 1990s capturing the central role of volatile capital flows in recent crises. This does not imply that the causes of classic 1st and 2nd generation crises (chronic resource gaps, multiple equilibria, self-fulfilling expectations) have disappeared. Rather, it appears that such disequilibria may be more quickly transformed into FX market pressure in the presence of weak institutions and high KAO. According to the “new institutional economics”, institution building and structural reforms lower systemic risk. Thus, the correlations of specific aspects of DFL and KAO with core institutions, and the relation between DFL and KAO provide quantifiable measures of risk. Hence, the correlation between DFL and core institutions is relatively high—implying relatively low systemic risk for well-staged DFL (see text graphs). By

⁴⁹ A big bang approach was adopted successfully in the UK and New Zealand. Rapid liberalisation was also undertaken by Australia, Denmark, Finland, Norway and Sweden in the 1980s. But all of these countries had well-established institutions and financial systems.

contrast, the correlation between KAO and institutions is weak, implying that KAO risks poor outcomes in the absence of good institutions. Finally, the relation between DFL and KAO (which should be strongly positive) is an indicator of systems coherence, where incoherent interactions with institutions raise “new risks”.

The impact of core institutions, DFL and KAO on crises should be analysed using econometrics. But, empirical analysis is difficult owing to the limited number of “crisis” observations and classic identification problems in differentiating between competing hypotheses. Hence, mapping is an alternative. Eleven crisis economies are mapped against an eclectic control group of six better performers, and seven other EMEs, to isolate benchmarks and pitfalls to avoid.

4.1. Core Institutions

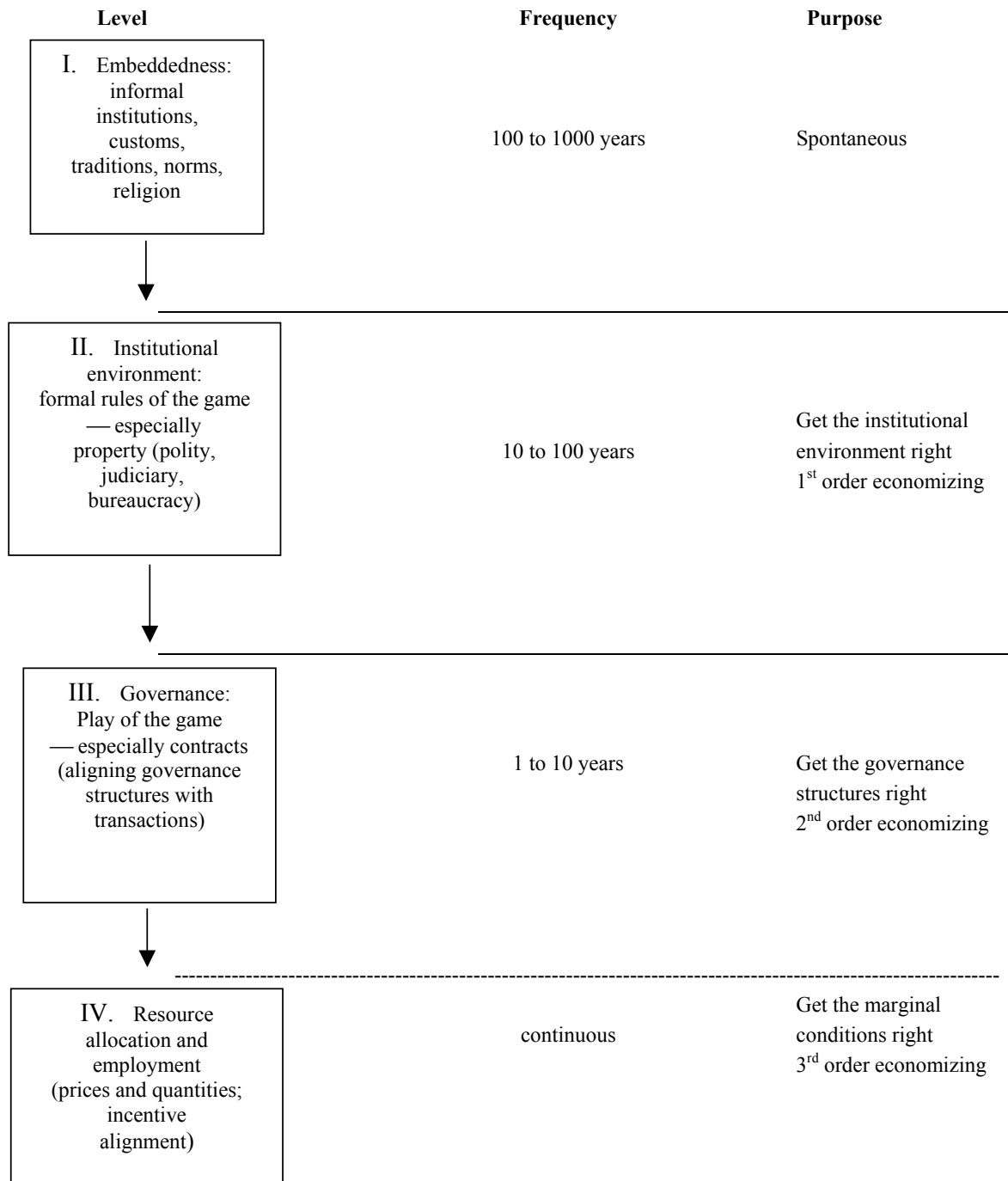
Our core indicator is a reduced-form proxy for the “quality” of institutions. This is a stiff challenge. The role of the “informational quality of financial systems” (IQFS) using 27-microeconomic-institutional indicators was noted above. However, a practical constraint is the time needed to update such a large database, when a rapid strategic assessment of risk may be needed. Moreover, it can be difficult to see why a county’s score changes over time or relative to peers with a weighted indicator⁵⁰. *Our core index is a six variable sub-set of the IQFS indicator*, and limited to the 24 largest EMEs monitored by the BIS. All indices are rescaled to a 0 - 10 scale for transparency. This reduced sample is internally consistent, but *restricting coverage explicitly assumes that EMEs differ from core-OECD countries*⁵¹.

A limitation of an indicators approach is how to proxy difficult to measure phenomena. Our indicators relate to differing aspects of systemic risk and are ranked by a causal hierarchy proposed by Williamson (2001). Hence, indicators in category [1] are salient to the risks of institutional and governance failure (top part of level II in schema 1 below); categories [2-3] refer to risks linked to the rules of the game and property rights (bottom part of level II); category [4] is germane to those associated with the enforcement of these rules (level III); while categories [5-6] refer to the interface between institutions, rules and economic agents, i.e. first order Pareto maximising conditions (level IV). The text table below shows a composite structural index (and 4 financial parameters), for 11-crisis EMEs, 7-other EMEs, and an eclectic control group. The institutional variables refer to the mid-to-end 1990s and change slowly. The database is shown in Appendix III-Table 1 and includes:

⁵⁰ The IQFS index is dominated by 8-9 qualitative indices that reflect wide statistical variation. The main variables excluded from our “core list” include the capitalisation and turnover of equity markets, capitalisation of private long-term debt markets and turnover of interest rate derivatives. The IQFS index also includes 14 binary cut-off criteria that have limited variation. These are useful as background for financial systems, but are time consuming to update and analyse.

⁵¹ The most important factor to analyse in this context would be the mean reversion characteristics of the exchange rate after shocks, to gauge inherent stability conditions.

Schema 1. Institutional relations



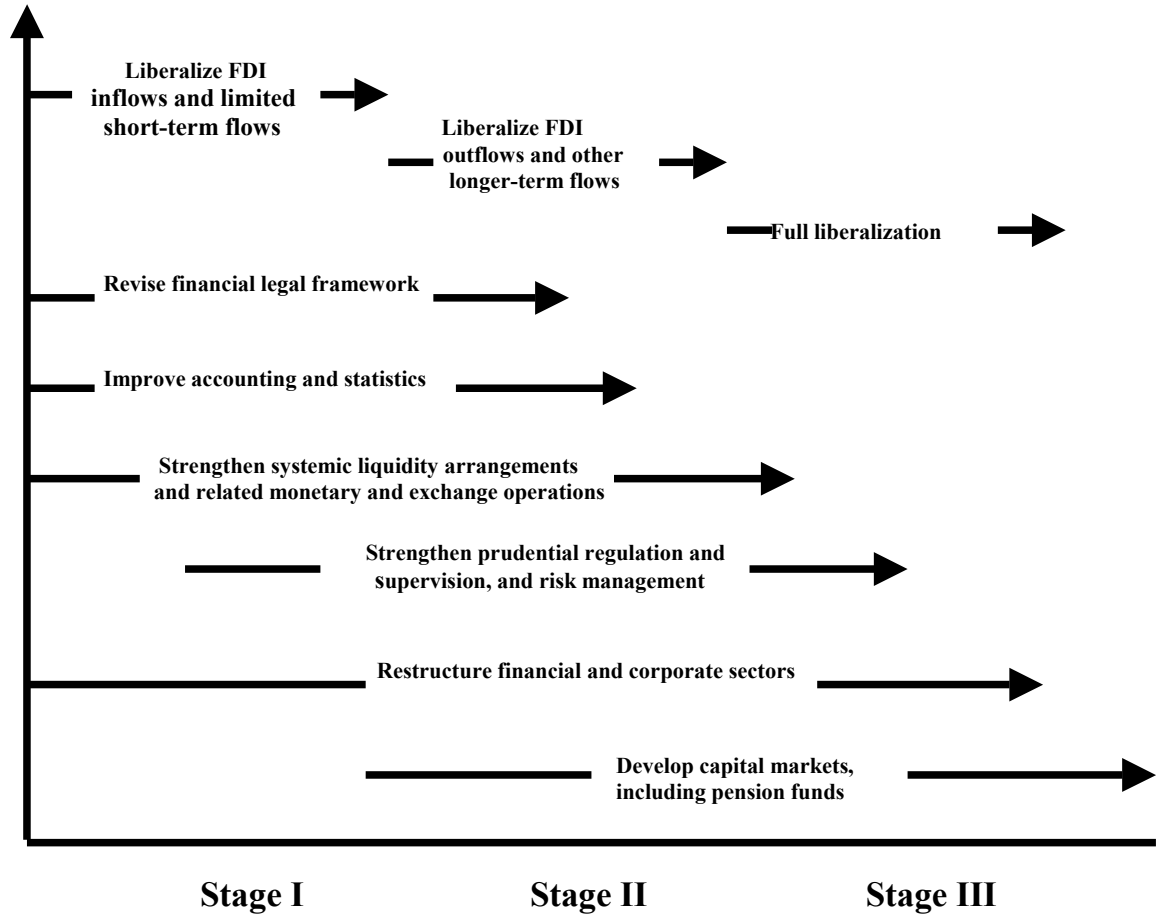
Level I: social theory

Level II: economics of property rights/positive political theory

Level III: transaction cost economics

Level IV: neoclassical economics/agency theory (Source: Williamson 2000, p. 597.)

Schema 2. Some Stylised Guidelines towards Policy Sequencing



1. Creditor rights (a proxy for the risk of excessive credit expansion and reckless debt leveraging, measured by the incentive structures that underpin the credit culture necessary for vibrant banking systems and long-term private debt markets, as well as the effectiveness of insolvency procedures) [weight 3];
2. Shareholder rights (a proxy for the risk of exploiting minority shareholder rights, measured by specific shareholder safeguards that favour the development of equity markets, an equity culture and entrepreneurial risk taking) [weight 1];
3. Accountancy standards (a proxy for the risk of lax prudential oversight, measured by international accountancy standards; the latter being the bedrock for the transparency and disclosure standards that are the interface between institutions and the application of the rules of the game) [weight 2];
4. Quality of bank management (a proxy for the risk of bad management and abusive domestic-bank monopoly behaviour, measured by foreign bank presence. The latter emphasises the key role of new foreign entry, new financial products, better foreign management, the indirect application of international regulatory standards and keener foreign competition in developing sound banking systems in EMEs) [weight 1];
5. Quality of bank balance sheets (a proxy for the risk of chronic NPLs owing to government intervention, proxied by the inverse share of SOBs in the banking system; it also reflects the role of privatisation in promoting rational incentive structures, raising efficiency and improving the quality of bank loan books) [weight 1].

4.2. Weighted vs. Unweighted Core Indicators

A salient issue is whether a core indicator should be weighted? Proponents of the new institutional economics favour weighting to reflect the constraints imposed by higher-level institutions as emphasised by Williamson (2001). As indicated in the square brackets above, we place greatest weight in descending order on the rule of law, creditor rights and accountancy standards, than on the other three variables (Chan-Lee and Ahn 2001). To illustrate, our pecking order, while India and Colombia have strong shareholder rights, our hierarchy places low weight on these factors given weak rule of law⁵². In the event, weighting makes little difference once the volatile equity market is dropped from the core index⁵³. Thus *for transparency the unweighted index is used throughout*.

4.3. The BIS Early Warning System (EWS)

Since the late 1980s, the BIS, the IMF, the Institute of International Finance, central banks and academics have made over 50 studies, to find leading indicators of financial

⁵² In the same spirit, although high priority is universally placed on raising accountancy and disclosure rules in the current policy debate—the relation between transparency and crisis avoidance is ambiguous. Better transparency may actually heighten the risk of crises, by making unknown bad news publicly available.

⁵³ The correlation coefficient between the core structural and IQFS indicator is .89.

crises in EMEs⁵⁴. Calling these Early Warning Systems (EWS) is a misnomer. As FX markets are efficient, new information is quickly integrated into prices. Thus, EWSs cannot predict sudden, unforeseeable crises (Thailand 1997, Russia 1998), because if the information existed the event would in theory already have occurred. Conversely, they may predict crises that never occur, because authorities monitoring FX reserves, monetary growth and other data take appropriate corrective action, which is, of course, the *raison d'être* of EWSs.

Market efficiency ensures that EWSs are at best coincident indicators. EWSs (and econometric models) are often criticised as being able to predict the last, but never the next crisis—but these criticisms miss the point. The external environment is constantly changing. Hence, the “twin mismatch” phenomenon did not exist 20 years ago, simply because EMEs did not have sufficient access to international capital markets or high KAO. Thus, crises are not spontaneous, random events, but reflect disequilibria or systemic weaknesses that are exacerbated by economic or political shocks. EWSs can thus be a useful filter or a checklist for crisis avoidance. Finally, they can reflect key transmission channels between core institutions, KAO, DFL and their impact on market behaviour via incentive structures. The differing roles of structural factors and KAO on FX market pressure and external vulnerability in the Asian crisis economies are sketched out below.

4.4. Mapping General Structural Characteristics in EMEs

A key feature of a mapping exercise is how differing characteristics suggest critical thresholds. These characteristics include inter alia:

- Core institutional strength of the crisis economies [4.6] was lower than our control group of best performers [7.5], but somewhat better than other EMEs [3.8] who avoided crises in the 1990s. The *relation between core institutional strength and KAO is loose* (see scatter diagram below) implying that KAO embodies high systemic risk for virtually all EMEs. Moreover, in crisis situations strong core institutions can be overshadowed by shocks and political events.

⁵⁴ Kaminsky et al. (1998) review 28 studies of currency crises that test 105 possible indicators, of which 43 are significant in at least one study. This survey has been updated by Hawkins and Klau (2000).

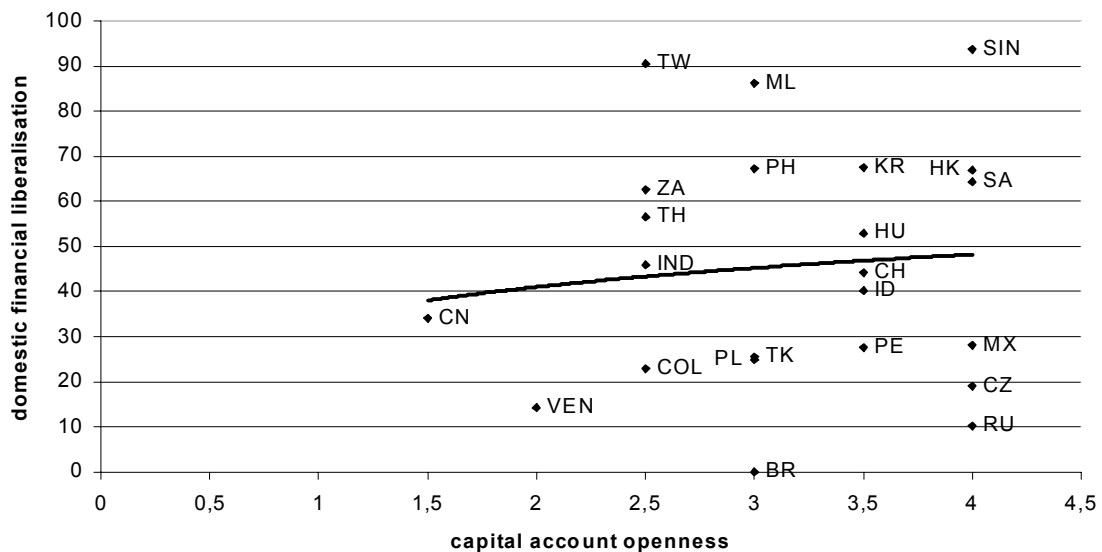
4.4. Diagrams

Mapping Crisis Economies Since the 1990s

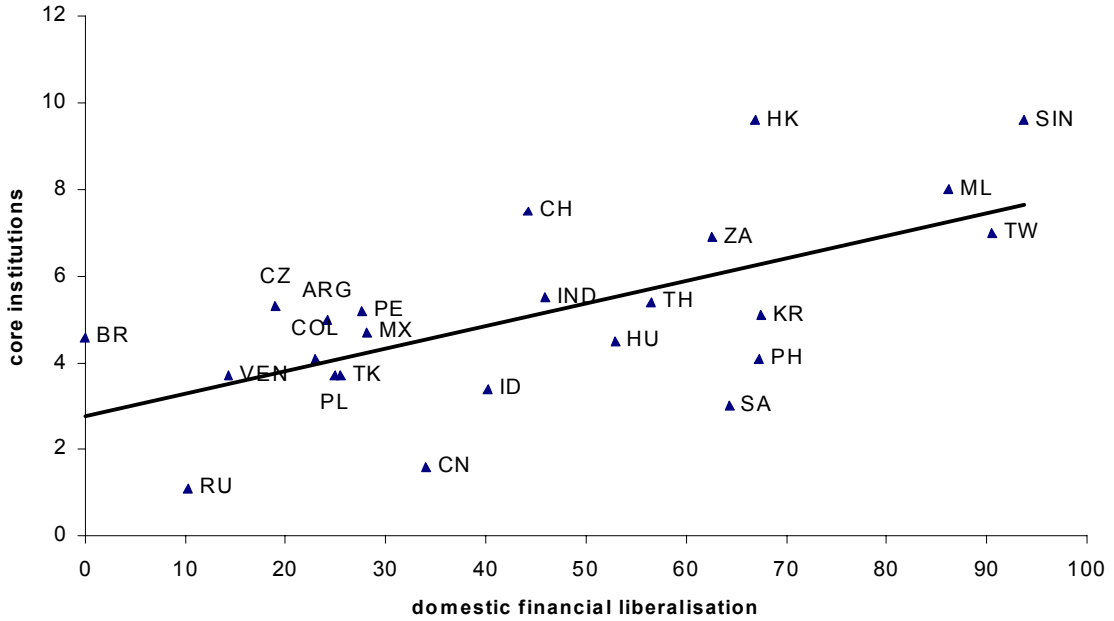
Economies	Composite	Int'l Leveraging	External Liquidity Constraints		
	Structural	Int'l bond & bank	Short-term	Functional	KAO
	Index	debt/GDP %	debt/FX reserves %	DFL %	1998-99
	Scale 0 to 10		Sept 1998	since the 1980s	Scale 0 to 4
Argentina	5.0	23.1	159.0	24.2	2.5
Brazil	4.6	17.3	114.0	0.0	3.0
Peru	5.2	13.2	74.0	27.6	3.5
Mexico	4.7	26.0	82.0	28.1	4.0
Indonesia	3.4	42.2	75.0	40.2	3.5
Korea	5.1	29.9	173.0	67.5	3.5
Malaysia	8.0	36.5	27.0	86.2	3.0
Philippines	4.1	28.3	64.0	67.3	3.0
Thailand	5.4	40.8	480.0	56.5	2.5
Turkey	3.7	24.3	101.0	25.5	3.0
Russia	1.1	16.1	140.0	10.3	4.0
Crisis Economies	4.6	27.1	135.4	39.4	3.2
Other EMEs	3.8	16.0	31.1	32.2	2.8
Control Group	7.5	11.8	59.7	68.5	3.3

Note : Other EMEs include the PRC, India, Colombia, the Czech Republic, Poland, Saudi Arabia and Venezuela. The Control group includes Hong Kong, China, Singapore, Taipei, China, Chile, South Africa and Hungary.

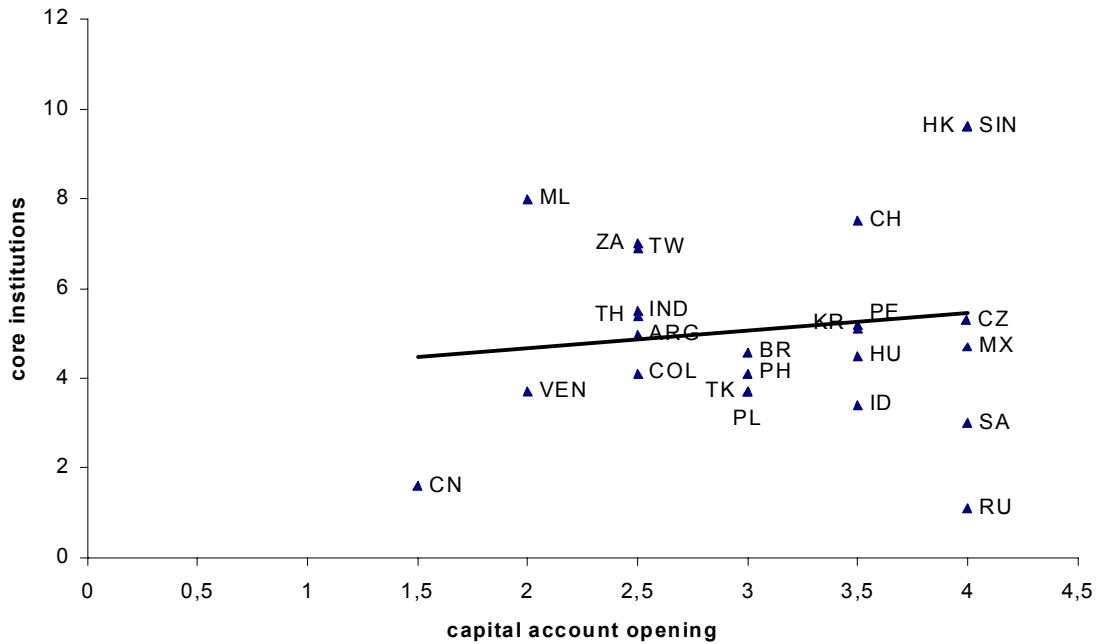
Domestic Financial Liberalisation and Capital Account Openness, late 1990s



Domestic Financial Liberalisation and Core Institutions in the Late 1990s



Core Institutions and Capital Account Opening in the Late 1990s



- There is a somewhat stronger correlation between core institutions and DFL, suggesting that DFL in itself has low systemic risk, and that establishing good initial conditions quickly is central to assuring effective DFL (see diagram). The degree of DFL in the crisis EMEs [39.4%] in the late 1990s was very low relative to their high degree of KAO [3.2]. DFL shortcomings were especially stark vis-à-vis the control group [68.5%] despite virtually identical levels of KAO [3.2 vs. 3.3]. Hence, the scatter diagram plotting DFL and KAO reveals a virtually horizontal relation ($R^2 .70$)—whereas sensible international financial sequencing argues for a strong positively sloped relation⁵⁵. EMEs in the south-east quadrant of the diagram below, with low DFL and high KAO scores, clearly have inconsistent international financial sequencing and high risk (Mexico, Russia, the Czech Republic, Indonesia, Peru, Turkey, Brazil and to a lesser extent Colombia and Venezuela);
- Further, the crisis EMEs had much greater external financial leveraging (international bank and bond debt to GDP, i.e., currency mismatch) and dangerous short-term FX liquidity constraints (i.e. the ratio of short-term foreign debt to FX assets) compared to the other groups. This suggests that liquidity risk management is central to avoiding FX crises and contagion, but that the twin mismatch problem is a medium-term structural issue;
- Finally, the crisis economies had a much higher incidence of KAO reversal [7 of 11] compared with the other EMEs [2 of 7] and the control group [1 of 6]. KAO reversal raises the perceived risk of arbitrary government behaviour (debt default) or political discontinuities (social unrest, coup d'état) that deter long-term investor relations, inherent in FDI and stable portfolio investment.

Against this backdrop, what factors explain the excessive degree of FX debt leveraging and surprisingly low quick asset ratios prevalent in the Asian crisis economies in 1997-98? These economies were ironically victims of their own success. They had very strong economic growth and sufficiently functional institutions to attract large capital inflows, as KAO was relatively high. But, all lacked the deep long-term domestic debt markets that are needed to limit national balance-sheet currency and maturity mismatch. Moreover, strong economic growth and high domestic real interest rates (reflecting incomplete DFL and higher trend growth)⁵⁶ attracted large (short-term) capital inflows that were inefficiently intermediated by weak banking systems, leading to asset price inflation, rising real exchange rates and a large build-up of unhedged short-term FX debt.

With the benefit of hindsight, notwithstanding strong economic growth, lax prudential supervision, bad corporate governance, weak bank credit monitoring, and opaque transparency proved to be East Asia's Achilles heel. Weak core institutions failed to check excessive FX (and domestic) debt leveraging (exacerbated by aggressive international bank lending) leaving national balance sheets astoundingly vulnerable to

⁵⁵ The correlation R^2 between DFL and KAO in 1998-99 was only .014, i.e. essentially random.

⁵⁶ Incomplete DFL and high trend growth in Thailand, Korea and Indonesia meant that domestic real interest rates were systematically higher than international rates. Against a backdrop of strong capital inflows and upward pressure on the exchange rate, the temptations for unhedged borrowing abroad were evident, a process abetted by international banks who preferred to lend 'short' partly on account of weak transparency.

abrupt stops in capital inflows. Moreover, a critical issue is why such low foreign reserves were held relative to short-term liabilities? Albeit unclear, this may have reflected an outmoded mindset based on current account “transactions demand” criteria, rather than on risk-based criteria appropriate to high KAO and global financial markets. This is, however, one clear lesson that has been learned from the Asian crisis.

By contrast, the “other EMEs” had poorer institutions, weaker levels of DFL and tighter restrictions on overall capital movements—that combined to discourage short-term capital inflow and aggressive FX debt leveraging. Finally, the control group, had virtually the same degree of KAO as the crisis economies, but escaped the worst of the crisis owing to better core institutions and prudential supervision, strong banks, higher DFL, less short-term foreign debt leveraging, and last but not least, in the case of Taipei, China, Hong Kong, China and Singapore, massive FX reserves.

4.5. What does a Mapping of the Asian Crisis Economies Show about New Risks?

A mapping exercise illustrates that there is no single rule that guarantees immunity from financial crises. Even the best-managed countries with world-class social infrastructure can encounter crises owing to bad macroeconomic policies, speculative bubbles, excessive credit growth, and lax prudential supervision (the United States in early 1980s, Sweden and Finland early 1990s, Japan in the 1990s, etc.). As regards Thailand and Korea, they were initially victims of short-term liquidity mismanagement. But, as these factors are common in current account crises, what new risks provoked such virulent capital account crises? Further, what are the defining differences between current account and capital account crises? Our distinctions are not hermetic, but include:

- Following devaluation and a classic current account crisis, the exchange rate will normally stabilise once the market “thinks” that the new rate will suffice (demand-switching) to maintain a sustainable current account position (i.e. classic Marshall-Lerner conditions and the “J” curve), adequate FX reserves or IMF credit lines have been re-established and that credible macroeconomic (demand-reducing) policies have been taken;
- Some aspects of 2nd generation crises (self-fulfilling expectations and multiple equilibria) may also be found in 3rd generation crises, but the policy implications may be broadly similar to 1st generation crises;
- By contrast, 3rd generation capital account crises are possible whenever there is a combination of high systemic risk (reflecting the “twin mismatches” of foreign currency and maturity exposure, i.e. excessive reliance on short-term FX debt financing) exacerbated by a high real exchange rate. *In East Asia, these new risks were masked by strong economic growth and “euphoric” capital inflows*, that took on Ponzi game characteristics. Under these circumstances, any shock that dents “euphoric” growth expectations can prompt a spiralling crisis, if these spark abrupt shifts in short-term capital flows. Worse, devaluation fears in the presence of severe currency and maturity mismatch can be the catalyst for a currency run, a scramble for liquidity and a “credit crunch”. Finally, currency depreciation provokes immediate large losses in wealth that feed capital flight; thereby

swamping the post “J” curve benefits of devaluation. Unfortunately, classic 1st generation remedies (depreciation and high interest rates) exacerbate FX market stability, as quick adverse wealth effects swamp slower-acting substitution elasticities, thereby feeding capital flight and provoking financial implosion in the presence of large “twin mismatches”.

In sum, systemic financial risk is a multifaceted concept with *liquidity* and *structural* dimensions. If our analysis is correct, prudent short-term risk management, i.e., holding ample short-term assets relative to liabilities is a necessary condition for avoiding liquidity-related crises⁵⁷. Such crises can be costly, but can usually be resolved by adequate injections of FX liquidity and tight macroeconomic policies, if the underlying fundamentals are sound (the analogy is the lender of last resort facility in response to a run on a sound bank). By contrast, the structural dimensions of systemic risk related to excessive FX debt leveraging, FX maturity mismatch and weak core institutions are medium-term issues. These can be resolved by preventing the problem from occurring in the first place by building sound institutions; by achieving effective DFL, before full-scale KAO (or using selected capital controls in the interim); or by alleviating the “twin mismatch” problem by creating good domestic bond markets and the necessary governance and prudential standards to accompany them. First generation classical remedies, for 3rd generation crises, risk doing much more harm than good.

4.6. Thailand and Korea as Benchmark Prototypes

To illustrate systemic risk in East Asia, the BIS EWS financial indicators are compared to our measures of core structural strength, DFL and KAO. The BIS’s indicators have the advantage of simplicity and transparency⁵⁸; these are grouped into three indices covering FX market pressure, banking system stress and external vulnerability, and are graphed by regional groupings, and for Asian countries relative to the 5 Asian crisis economies in Appendix III. We regard FX pressure as being closely related to first (and

⁵⁷ Fixing short-run liquidity ratios, as priorities do not contradict the importance of core institutions. The role of risk management is to maintain stability in order to create the necessary conditions for reform. Hence, strong core institutions are a necessary, but not sufficient condition for crisis avoidance. For example, for EMEs the correlation between core institutions and KAO fell from 20.2 to 13.5 between 1994 and 1998-99.

⁵⁸ For a description of these indices and their characteristics, see Hawkins and Klau (2000). The BIS EWS consists of 3 separate indices. Each index is a simple sum of the scores of individual indicators, normalised for the number of indicator so that the maximum value is 10. The foreign exchange market pressure index includes four indicators: the change in the nominal exchange rate over 3 and 12 months, to give greater weight to recent changes, and to discount reversals of sharp movements a year earlier; the real interest rate and changes in FX reserves. The external vulnerability index includes the real effective exchange rate, the current account deficit and recent export growth as indicators of competitiveness. Three other indicators capture external financial constraints: international bond and bank debt as a % of GDP and its change, and the ratio of short-term foreign debt as a % of foreign reserves. The latter played a prominent role in the Asian crisis. Finally, banking system vulnerability is very difficult to define or measure. One would prefer accurate, standardised measures of NPLs, the quality of prudential supervision and management. As these are unavailable, 5 proxies are used: growth of domestic bank credit; growth of borrowing from international banks; external borrowing by banks as a % of domestic credit; the level of real interest rates and the ‘stand-alone credit ratings’ of leading banks.

possibly second) generation crises, while external vulnerability is most relevant for assessing the systemic risk aspects of capital account crises.

Thailand and Korea are analysed first because they provide striking examples of:

- The dangers of reckless leveraging and gross mismanagement of external liquidity constraints,
- The role of opaque transparency in fuelling uncertainty and herd behaviour,
- And unfinished business in establishing viable banking systems and a credit culture.

The Asian financial crisis is usually dated from the floating of the *Thai baht* in July 1997, following a reversal of short-term capital flows in response to growing external vulnerability (a large current account deficit, slowing export growth, a rising *real* exchange rate, and mounting short-term FX debt that spilled over into rapid credit growth). In the case of a “classic” current account crisis, currency devaluation and lower domestic absorption are called for. But, Thailand was not a standard textbook problem, nor was East Asia. Prudential supervision had ignored the steady build-up of short-term FX debt [reflecting perverse KAO (the Bangkok facility⁵⁹) and strong capital inflow].

Worse, foreign reserves were rundown to dangerous levels in a futile attempt to defend an over-valued exchange rate peg, before the IMF was called in (short-term foreign liabilities were almost five-fold useable FX reserves in September 1998)⁶⁰. Hence, Thailand became a classic victim of “original sin”, that is borrowing short-term cheaply in FX and lending unhedged, long-term domestically—necessarily creating a twin mismatch (in maturity and a currency exposure) in the nation’s aggregate balance sheet position⁶¹. In the event, the “unexpected” floating of the baht provoked capital flight and spiralling exchange rate depreciation that degenerated into national bankruptcy, as highly leveraged, mismatched balance sheet positions imploded⁶². This phenomenon then took on regional-cum-global dimensions, as international banks led a general “flight to quality” by cutting sharply their credit lines to other Asian⁶³ and EMEs banks with *similar risk characteristics*.

⁵⁹ International claims of foreign banks on Thailand grew from almost \$23 bn. in 1992 to \$70 bn. in 1996, compared to GNP of \$177.5 bn. in 1996.

⁶⁰ The published ratio of short-term debt to FX reserves was a manageable 45% in September 1998. But, useable reserves were only \$3bn. out of a total of \$32bn., owing to forward sales and swaps to defend the baht. Hence, the actual debt to FX reserve ratio was 480%, but became public months after the height of the crisis.

⁶¹ BIS data indicate that almost two-thirds of foreign borrowing by Asian EMEs was short-term, but 90% of their counterpart lending was long-term in 1996-97.

⁶² If countries imprudently borrow short in FX and lend long in domestic currency, the impact of devaluation and capital flight on highly leveraged balance sheet positions is devastating and quick. Such situations were prevalent in Asian EMEs underscoring the risk of destabilising devaluations in capital account crises. In Thailand, balance sheet implosions and serial bankruptcies raised bank NPLs to almost 50% in 1998. Similarly, some 2/3rds of Indonesian firms and 40% of Korean listed-companies were technically bankrupt in 1998. Balance sheet vulnerability was thus the central factor in the Asian crisis, in marked contrast to current account crises, where large public sector deficits and over-valued exchange rates are prominent.

⁶³ BIS data indicate that G-10 banks claims on the 5 crisis Asian economies rose from \$117.5 bn in December 1993 to a peak of \$274.5 bn. in June 1997, of which 64% were of a maturity of less than 1

Given the scale of capital flight, other East Asian economies soon found themselves in the same predicament, owing to close trade and financial links, similar characteristics of FX maturity and currency mismatch and quasi-fixed exchange rates. In fact, *Korea's* financial system was in some ways more vulnerable than Thailand's, as its chaebols probably had among the highest domestic debt leveraging in Asia. Moreover, Korea's KAO was also perverse [favouring short-term trade and bank debt to the detriment of FDI and long-term equity flows], the published ratio of short-term foreign debt to FX reserves of 59 % was higher⁶⁴ than Thailand's; and its NPLs were high, rising and their veracity doubtful⁶⁵. But, what was truly amazing was how quickly the financial systems of economies that were previously regarded as stellar performers, imploded.

4.7. Short-term Financial Ratios have now been Repaired, but the Twin Mismatches Remain

In retrospect, *ex post* revelations of the astonishing “actual” crisis levels of short-term liquidity constraints in Thailand and Korea illustrate the scale of policy failure. In essence, the monetary authorities failed to integrate the basic textbook implications of Mundell's “unholy policy trinity”, by adapting monetary and exchange rate policy, to a situation of heightened capital mobility and open capital accounts⁶⁶. Moreover, they failed to monitor the systemic risk of rising external vulnerability starting in 1994 (reflecting appreciating real exchange rates, and big rises in FX external debt to GDP ratios that eventually spilled over into “excessive” credit growth and asset price inflation, Appendix III-Chart 3⁶⁷). That said, monetary authorities do not have perfect foresight: indeed, EWSs typically warn of impending crises only after they have already started. To be sure, three decades of unending economic growth and large capital inflows had fostered lax monitoring and excessive

year. By December 1998 and 2000, this exposure had been cut back to \$218.2 bn. and \$171.3 bn. respectively i.e. a 60% reduction in exposure over 3 1/2 years. In 1997, the stock of foreign bank claims was equivalent to over 25% of the 5-crisis economies GDP, indicating the “euphoric” nature of international bank lending. The cutback of G-10 bank claims on Hong Kong, China, Taipei, China, Singapore and the PRC in the 2-years ended December 2000, was even larger, but these countries weathered the pull back owing to very high levels of foreign reserves.

⁶⁴ In fact, Korea's actual short-term external liquidity constraints were almost three times worse than published in September 1998, as some 2/3rds of the Bank of Korea's official reserves of \$28 bn. had been deposited abroad to meet external obligations of overseas branches of Korean banks at the height of the crisis in November 1998.

⁶⁵ In 1996 there were concerns over Korea's deteriorating external competitiveness (following a drop in the Yen and weak semi-conductor prices). Moreover, there were growing bank NPL problems, following a series of high profile insolvencies, and problems with its badly regulated, shaky merchant banks. In mid-1997, Korean statistics indicated that bank NPLs were lower than those in Hong Kong. And even though NPLs had been rising since 1996, loan loss provisions were stated as being adequate. To a great extent these NPL problems were a legacy of past government intervention, but the risks were masked by implicit guarantees. However, rising KAO led to new risks, related to currency and maturity mismatch, as the cyclical upturn was heavily financed by short-term dollar denominated bank loans.

⁶⁶ The unholy trinity is that with capital mobility: the monetary authorities can attain only two of three policy objectives, an independent monetary policy, a fixed exchange rate or open capital accounts.

⁶⁷ Individual graphs of the crisis economies illustrating the EWS indicators vis-à-vis the 5-crisis economies are available on request. Appendix III shows these indicators for major groups and geographic zones.

complacency—but the role of international banks were hardly laudable—as their reactions transformed severe national shocks into regional financial chaos.

But, what has been learned? Has necessary corrective action been taken? How can euphoric capital inflows induced by economic success be sensibly moderated to avoid subsequent abrupt reversals? Over the two years to end-2000, BIS data indicate sharp reductions in foreign debt/GDP ratios in Korea, Thailand and to a lesser extent Indonesia; modest rises in Malaysia and the Philippines, but large increases in Argentina, Brazil, Turkey and Russia. (Action has also been taken to remove the previous bias against long-term capital inflows [Thailand and Korea]. Further, with the exception of Malaysia, Hong Kong (China) and the PRC, a general move to more flexible exchange rate regimes may help to damp euphoria). There was also a sharp increase in liquidity preference among almost all Asian EMEs. Indeed, a further build up of FX reserves reinforced the ultra-conservative short-term liquidity ratios of Hong Kong, China, Singapore and Taipei, China⁶⁸. By contrast, many Latin American economies experienced large FX reserve losses.

By end-2000, Korea's and Thailand's international debt levels had been reduced to 20-30% of GDP and short-term liability/FX reserve ratios to the 34-35% range. These ratios can be seen as prudent and were lower than most other EMEs⁶⁹, with similar profiles of DFL, KAO and external vulnerability. For the eleven crisis countries, as a group, international bond and bank debt levels relative to GDP was roughly unchanged at 27.9% of GDP (twice the level of the control group). By contrast, their ratio of short-term liabilities to FX reserves was cut by around 50%, but the level was still 69% (reflecting the adverse impact of devaluation on debt/GDP ratios) in Latin America, and deteriorated in Peru and Turkey. Subsequent devaluations in Turkey, Argentina and Venezuela show that these latter constraints were unsustainable.

4.7.1. A Numerical Example of National Risk Preference or Risk Aversion

Assessing prudent FX reserve benchmarks is complex because this requires an analysis of the underlying domestic and foreign risks inherent in national balance-sheet positions and the probability of a speculative exchange rate attacks. One problem is vast standardised information needs, especially when financial derivatives play a big role. In fact, making such calculations are akin to the problems faced by the designers of the new Basle bank capital adequacy requirements. Most risk can be analysed by statistical techniques. But, “one in a century” events are obviously rare (major wars, “force majeure”, natural calamities); hence, what form of capital provisioning should be made here? Moreover, “one size fits all” standards make little sense when the volatility of country balance sheet positions differs totally. But, notwithstanding such differences,

⁶⁸ It is unclear why Hong Kong, China, Taipei, China and Singapore hold such enormous FX reserves. At end 2001, they held FX reserves of \$111.2 bn ; \$122.2 bn. and \$75.8 bn. respectively. With the benefit of hindsight, these were highly useful, albeit expensive insurance for unpredictable (greater than 2-3 standard deviation) events such as the 1997-98 crisis. Hence, these are arguably outliers in terms of setting benchmarks for prudence.

⁶⁹ The % change in international bond and bank debt as a % of GDP had been scaled back by 34% and 60% over two years by Thailand and Korea (leaving the absolute levels at 31% and 22% respectively)—while the ratio of short-term foreign debt to reserves was scaled back to 35 and 34 % respectively. By comparison, these ratios for our control group in 1998 were 12 and 59.7%.

setting country-specific guidelines quickly becomes a nightmare of exceptions and special circumstances (e.g. special exemptions for mortgage lending and small and medium-size business, etc.). The first Basle guidelines set standard, minimum risk-weighted capital adequacy requirements for core-OECD countries, but higher “suggested” ratios for EMEs facing more volatile conditions.

An area for future research is whether such an approach could yield practical results for setting benchmarks for FX reserves and external debt/GDP ratios for the Asian EMEs (and the risks of separate elements of DFL and KAO)? Such an approach could use AGE models and independent assumptions concerning the probability distribution of expected exchange rate changes⁷⁰? However, a major difficulty would be to sort out what is exogenous and endogenous in such an exercise. Moreover this approach is confined to the demand side, while supply-side shifts in capital flows are likely to play a dominant role in the future. Nonetheless, to illustrate the spirit of such an approach we take Thailand and Korea in 1997 as an example. Assume that the expected probability distributions of FX changes are bell shaped, with skewed right hand tails⁷¹; and that the mode of our hypothetical distribution is zero, with a 70% probability that changes will be within +/- 10% of zero.

As international bond and bank debt to GDP ratios were 30% and 40% in Korea and Thailand respectively, this implied that a 20% devaluation had a 6-8% chance of raising international debt/GDP levels by 7.5 and 12 percentage points respectively; very large, but manageable shocks, so long as real interest rates could be held in the 4-7% range by credible policies. However, devaluations of 40% had a 1% probability, but could raise debt/GDP ratios by 20 and 27.5 percentage points respectively—thereby provoking balance sheet implosions. By end-2000, debt levels, real exchange rates and most likely FX probability distributions had been adjusted significantly. International bond and bank debt for Korea and Thailand was reduced to 21.9 and 31.4% of GDP respectively. On *ceteris paribus* assumptions, actual debt levels “revealed” a preference for lower leveraging risk of around a quarter to a third. But, this is an underestimate: lower “real exchange rate” levels reduce down-side risks on competitiveness grounds (more important in Asia than in Latin America); moreover, lower debt levels reduced the scale of potential adverse wealth effects by a third, thereby shifting the mode of the probability distribution to the left and/or making its right hand tail less skewed.

In summary, our hypothetical example suggests that the preference for lower external leveraging risk could have been some 50-60% for Korea and Thailand, but broadly unchanged *ex post* for EMEs as a group. Similarly, data for FX reserves would imply a radical shift towards risk aversion of 90% for Korea and Thailand; and large,

⁷⁰ If such a model could be calibrated the key issues to be addressed are whether interest rates will satisfy the conditions for stable debt/GDP ratios after a large devaluation (given initial debt levels), as well as assessing potential output growth and the finance able public sector deficit. However, exogenous assumptions, possibly using macro model simulations, would still be needed to derive the probability distribution of future devaluations. The standard reference for calculating the finance able public sector deficit is Anand and Wijnbergen (1989). An example of a simple computable general equilibrium model for Turkey is presented in Appendix II of the OECD Economic Survey of Turkey 1995.

⁷¹ We also assume that expectations for an appreciation against the dollar of > 20% had a 10% probability; while an appreciation of 0-10% had a probability of 35%. Similarly, the perceived probability of devaluation of 0 -9.99% was 35%; 10-19.9% (10%); 20-39.9 (9%) and changes > 40% had a 1% probability.

albeit more modest shifts in the other Asia EMEs. By contrast, lower actual FX reserves levels in Argentina, Venezuela, Peru and Turkey probably reflected on-going capital flight rather than a preference for higher liquidity related risk⁷². While these “ball park” estimates could clearly be refined, they illustrate a possible approach to assessing FX risk aversion and benchmarking. By end-2000, the financial ratios noted above for Korea, and to a lesser extent Thailand, easily satisfied commonsense guidelines of prudence.

4.7.2. *But External Vulnerability was Also Radically Eased by Supply Side Changes*

At the same time, the estimates above are confined to country preferences for risk aversion. In fact, financial market globalisation implies that capital flows will increasingly drive current account developments. Hence, a large part of the drop in Korea and Thailand’s foreign debt/GDP ratios reflected big general cutbacks in exposure to EMEs by international lenders. There were similar effects in other EMEs. Thus, the necessity to build-up FX reserves in Latin America post-1997 was partly alleviated by supply-side driven reductions in external vulnerability. In fact, end-2000 saw the sharpest 2-3 year *market-supply-driven* improvement in external vulnerability since BIS data were calculated in 1989 (Appendix III- Chart 3)⁷³. Post-1997, there was a major realignment of EMEs *real* exchange rates, including sharp declines in Russia following its 1998 debt default and in Brazil⁷⁴. These adjustments were of course the mirror image of the sharp reversal in autonomous capital flows to EMEs (reflecting cuts

⁷² An alternative way of looking at revealed risk preference is to estimate the probability of exchange rate crises via probit calculations. This is akin to asking how large a wealth effect the economy could absorb (say 5% of GDP) and fixing tolerance levels for this event (say 1%). In theory, the ex post debt levels and short-term debt/FX levels would be consistent with these choices, if one had information on the probability distribution of *future* exchange rate changes. ARIMA models can generate estimates of the latter, but the relevance of this approach is debatable. Backing out a probability distribution might be possible via AGE simulations, but would be a formidable exercise, as estimates would be needed for the other key EMEs, if contagion were important. In the event, the Korean and Thai authorities must have made such calculations when deciding to rebuild their FX levels. In September 1998, Korea and Thailand reported FX reserves of \$24 and \$32 bn. respectively, but only a third of Korean reserves and \$3 bn. of Thai reserves were readily useable.

By end-2001 FX reserves in Korea had quadrupled to \$104.3 bn. and those for Thailand rebuilt to \$32.4 bn. Using our numerical example, Korea’s reduction in short-term financial constraints could have shifted the .01% probability of 40% devaluation to one chance in 500. Reserves data for other Asian countries indicate similar aggressive efforts to build FX reserves. Over the same period, Malaysia increased FX reserves from \$20.7 to \$30.5 bn.; the Philippines from \$9.0 to \$14 bn.; Indonesia from \$19.7 to \$27.3bn.; Hong Kong, China from \$88.6 to \$111.3 bn.; Singapore from \$68 to \$75.3bn.; Taipei, China from \$83.7 to \$123.6 bn.; and the PRC from \$143.7 to \$211.8bn. respectively. In marked contrast, Argentina’s reserves declined from \$24 bn. to \$14.6 bn.; Brazil’s from \$43.9bn to \$35.8bn. and Venezuela from \$10.1 to \$9.4bn.

⁷³ Obtaining data for earlier years is difficult because some of the transition countries were not political entities prior to 1990s.

⁷⁴ A critical issue is why nominal devaluations in the 1990s have been more reflected as real exchange rate changes than in the past? This success probably reflects the sea change in attitudes concerning the adoption of sound macroeconomic policies and market oriented structural policies since the 1980s. A simple gauge of this is the number of EMEs facing hyperinflation in the 1990s compared to the 1970s and 1980s.

in international bank exposure, a drying up of portfolio bond and equity flows and a big drop in M&A activity).

Argentina and Venezuela were clear outliers: Argentina kept its currency board until December 2001, when it defaulted on its debt, despite draconian capital and bank controls and subsequently floated; Venezuela floated its currency in February 2002. In short, supply-side driven currency realignments and more prudent international lending behaviour imply that EME's external vulnerability is at its lowest level since 1989; and these shifts need to be integrated into the liquidity risk evaluation exercise sketched out above.

4.8. Opaque Transparency was a General Problem

Serious efforts have also been made over the past several years to improve accountancy, disclosure and stock market listing standards in EMEs. And some of these initiatives are paying dividends. Indeed, a big post-1998 accomplishment has been the strengthening of the IMF's Special Data Dissemination Standards that considerably improve the timeliness and reliability of international financial data. Thus, such politically sensitive international statistics, as the short-term foreign debt to foreign reserve ratios, inflation, and the money supply can now be taken as reliable, even though trustworthy data for bank NPLs and the quality of bank management are rare. As noted above, better transparency is always welcome; although its impact on crisis prevention is ambiguous, improving transparency should help to reduce contagion related to 'rational herding behaviour'⁷⁵.

4.9. Were Malaysia, the Philippines and Indonesia Victims of Contagion?

Against a backdrop of cautious, better informed international lenders, a salient question remains: why were some countries more susceptible than others to contagion? As regards Malaysia⁷⁶, the Philippines and Indonesia, levels of international bond and bank debt to GDP were 36.5%, 28.3% and 42.2% respectively in September 1998—within the range of those for Thailand and Korea [40.8% and 29.9%]. Similarly, published ratios for short-term foreign debt to foreign exchange reserves were 27%, 64% and 75% respectively. Malaysia and the Philippines had financial constraints somewhat, but not significantly better than Thailand's; Malaysia's external debt level was higher than the Philippines, but had a much more comfortable short-term FX position, and vice versa. In fact, the Philippines avoided large-scale capital flight, while Malaysia was more affected by volatile equity flows, although both had relatively high KAO. By contrast, Indonesia had high debt, tighter financial constraints, and a very open capital account from the late 1980s [3.5], despite weak core institutions. Finally, Indonesian and Malaysian capital controls were more liberal vis-à-vis capital payments than receipts, reflecting previous efforts to curb excessive capital inflows and currency appreciation.

⁷⁵ A situation where investors fearing that a situation is far worse than admitted (in the presence of opaque transparency)—exit an entire asset class (country) or related asset classes (countries)—because they think other investors will behave in the same "rational" manner.

⁷⁶ These data exclude foreign equity, which was particularly important in Malaysia.

Notwithstanding these differences financial markets made few distinctions during the crisis. Thailand led the cycle of FX pressure by a little more than a quarter: peak FX pressure on Thailand was in the July quarter of 1997, while peak regional FX pressure on the other Asian crisis economies came three months later. Moreover, FX pressure and external vulnerability for the 5-Asian crisis economies moved in lock-step from mid-1997 to end-1998, indicating the virulence of contagion (see Appendix III). Hence, Malaysia, and to a lesser extent the Philippines appear to have been “victims” of regional contagion⁷⁷. Finally, Indonesia was a special case—an accident waiting to happen. Owing to its fragile core institutions, such a large external shock raised large risks of political instability and discontinuities—that were amplified by its tradition of a relatively open capital account.

In summary, the experience of these countries underlines that there are no guarantees against crisis. DFL was relatively high in Malaysia and the Philippines, but low in Indonesia. Thus, the common denominator for contagion was relatively open capital accounts and weak regional transparency⁷⁸. Finally, Indonesia’s experience suggests that sound institutions, good prudential supervision and viable banks are critical before widespread KAO. To the extent that these preconditions are absent, then very high FX reserves must be held to guard against volatile short-term capital flows; these factors are salient to the shift to higher regional FX reserves held post 1997-98.

4.10. EME Banking Systems remain Problematic

Although dangerous financial leveraging and external liquidity constraints were the proximate causes of the Asian crisis, the underlying causes go deeper. Hence, 3 to 4 years after the crisis, stress on Asia and EMEs banking systems remains pronounced (Appendix III-Chart 2). This is unsurprising. Raising prudential supervision standards, recapitalising the banks, cleaning-up NPLs, improving management standards, and establishing credit cultures and viable banking systems require considerable time and skilled human resources. In retrospect, the absence of the preconditions for successful DFL (and KAO) in Thailand, Korea (and elsewhere in East Asia) lies at the heart of the problem of creating good banking systems, and the establishment of the functioning private bond markets necessary to alleviate maturity and currency mismatch. Since 1997-98, progress has been made in improving DFL via improving prudential supervision and liberalising interest rates⁷⁹. However, much more needs to be done to create dynamic banking systems⁸⁰.

⁷⁷ That said, neither was a paragon of financial virtue or transparency. Nonetheless, their levels of effective DFL (86.2% and 67.3%) were well above the crisis economies average. Moreover, Malaysia had encouraged the development of an active offshore ringgit market, and over the counter trading of its shares in Singapore. Ultimately, Malaysia’s ambitions (as Thailand) to become an international financial centre may have been its Achilles heel, and perhaps a motivation for imposing exchange controls in September 1998. In the event, these countries had the bad luck to be close to the epicentre of a “once in a century shock”, that was exacerbated by the international banks.

⁷⁸ CALPERS (California public employers pension retirement service) the world’s largest pension fund managing \$151 bn. in assets liquidated its entire equity holdings in Indonesia, Thailand, the Philippines and Malaysia, and has no plans to invest until the government improves the low quality of financial regulation, the Wall Street Journal 27/02/02.

⁷⁹ From 1980-2000, real money market rates in Korea and Thailand were some 40% higher than comparable US rates. This gap has closed modestly in recent years, while the process of KAO was

As regards *supply-side shifts*, maturity and currency mismatch was reinforced by international bank lending practices that favoured lending “short” (owing to poor transparency) to high growth regions. Hence, large international institutional investors (banks, mutual and pension funds, etc.) apparently grouped EMEs by regions or by similar risk profiles, because the costs of accurately monitoring individual countries are so high (given poor data, unreliable information and asymmetrical information costs). Such procedures favour herding behaviour thereby reinforcing contagion. However, international capital flows to EMEs’ have undergone a sea change post-1997. Hence, the Institute for International Finance estimates that bank loans, bonds and portfolio equity investment flows to the 29 largest EMEs for the 4 years ending 2001 totalled just \$19 bn. In 2001, there was an estimated outflow of \$30 bn., largely reflecting capital flight from Turkey and Argentina. By contrast, between 1994-97, the comparable figure was an inflow of \$655bn.⁸¹ Despite this hiatus, there have been encouraging signs of greater maturity in the bond markets’ pricing of EMEs sovereign risk. Notwithstanding generalised pressure on EMEs’ risk premia prior to Argentina’s December 2001 debt default, there has been a clearer distinction between countries with better fundamentals, such as Chile. Moreover, following Argentina’s devaluation (2002), Brazil, Turkey, Malaysia and the Philippines have issued new sovereign debt, events that would have been quite unlikely a decade ago.

In summary, capital flows to EMEs have dried-up since 1997. This is discouraging news for capital poor EMEs. Nonetheless, good quality borrowers still have access to bond finance, as a much clearer distinction is being made between good and bad borrowers. Moreover, long-term institutional investors are demanding higher levels of disclosure and transparency before committing long-term portfolio investments. Such market driven changes are welcome, as they create the incentives for better transparency and corporate governance, as well as commitments to on-going economic liberalisation and stable macroeconomic policies. Further, most EMEs [Hong Kong, China and Malaysia being exceptions] have adopted ‘floating’ exchange rates. Even though most EMEs still shadow the dollar in the short-run, implicit moral hazard has been reduced. In short, better pricing of risk helps to reduce contagion, as well as creating rational incentive structures, whereby sound micro and macroeconomic policies are reflected in credit ratings and better access to capital markets.

virtually completed in Korea and to a lesser extent in Thailand. However, using real interest rate differentials as a measure of KAO, in line with the ‘law of one price’ is problematic (Eichengreen 2001). Data for interest differentials are available only for countries with well-developed offshore markets and sufficiently developed forward currency markets. In the absence of these conditions, it is unclear what factors drive real interest rates in most EMEs and drawing generalisations on KAO on this basis is risky.

⁸⁰ Large NPLs persist in the Asian crisis economies. Viable small-medium sized enterprises still have difficulties in obtaining credit, while the pace of restructuring poorly performing banks and large, loss-making enterprises has been glacial. Moreover, Asian EMEs lack the deep long-term private debt markets that would allow “good borrowers” to obtain long-term finance in their own currency. Although progress is being made in fostering longer-term public debt markets, experience in Spain, Portugal and Greece shows that it takes decades to establish private debt markets. In the interim, Asia’s commercial banks could help this process by issuing medium and long-term non-subordinate debt; but such an initiative would also require accelerated bank reform.

⁸¹ Cited in ‘Is globalisation at risk?’ *The Economist*, February 2-8, 2002, p. 62.

4.11. Can Benchmarks be Derived from the Asian Crisis Economies Experience?

Finally, can benchmarks for crisis avoidance be derived from a mapping of the Asian crisis economies? A somewhat surprising finding is that good core institutions are an insufficient condition for damping FX market pressure. While good institutions are welcome, imprudent liquidity risk management can swamp their impact on FX markets. Hence, benchmarking core institutions is a very tricky proposition. The weak “counter-intuitive” relation between core institutions and KAO and the non-relation between DFL and KAO are illustrated in the scatter diagrams above (Diagrams for 4.4.). Tests for the impact of core institutions on systemic risk (proxied by external vulnerability) in Section 5 also suggest weak, and even perverse results. The role of institutions is not in question here. Rather it appears that their positive influence on reducing FX markets and systemic risk is blocked by incomplete DFL juxtaposed onto KAO with no systemic coherence.

By contrast, financial constraints are key in FX crisis prevention and pragmatic benchmarks can be approximated using AGE models and/or probability analysis. A plausible benchmark could be: what FX bond and bank debt to GDP ratio and short-term FX reserves to FX liability ratios would be needed if the authorities accepted the risks of a maximum wealth loss of 5% of GDP with a .01% probability? Korea has been the most aggressive in lowering this type of risk. These two financial parameters were 20% and 30% respectively at end 2000—perhaps reducing potential wealth loss effects to the 2-3% of GDP range, with say a .01% probability. An in-depth analysis would require using AGE and macro econometric models, as well as consultations with the competent national authorities. Finally, Korea had repaid all its IMF borrowings by 2001—several years in advance—and its sovereign debt status had been restored to investment grade. Using Korea as a yardstick, Thailand, Malaysia and the Philippines have also made significant, albeit less progress. By contrast, by end-2000, this process was far from complete in Indonesia, Argentina, Peru, Brazil and Turkey. Finally, while international liquidity constraints are important in avoiding FX market crises, it is difficult to quantify their influence (along with core institutions, DFL and KAO) in avoiding systemic risk using a country-specific approach. This argues for a general model approach using panel regression.

5. The Impact on External Vulnerability of Core Institutions, DFL and KAO

This section presents panel regressions for External vulnerability (Ext-vul) and FX market pressure in 24-EMEs, using quarterly data from 1994 to 2000. Our goal is not maximum R²s; rather, it is to reproduce an appealing panel regression [following Hawkins and Klau 2000, hereafter (H&K)]—to see how core institutions, KAO and DFL affect this baseline. Two sets of regressions are presented. The first set (Appendix III-Table 2-top panel) refers to the BIS indicator for external vulnerability, as this variable is a good proxy for systemic risk. The second set (bottom panel) refers to the indicator of FX market pressure. While the latter is more relevant to current account type crises, it is instructive to see how similar structural factors affect short-run FX vs. medium-run systemic constraints.

5.1. The Baseline Panel Regression

The following fixed-effect panel equation⁸² was run on quarterly data from 1994-2000 for 24-EMEs and provides a plausible theoretical format for explaining external vulnerability in EMEs [1]. We use the same approach as H&K [1 bis] but focus on external vulnerability as the dependent variable rather than FX market pressure:

$$\text{Ext-vul} = a_0 + a_1 \text{FX-1} + a_2 \text{Bnk} + a_3 \text{Ext-vul} -1 + \mu \quad [1]$$

By comparison H&K 1st generation baseline regression:

$$\text{FX pressure} = a_0 + a_1 \text{FX-1} + a_2 \text{Bnk} + a_3 \text{Ext-vul} + \mu \quad [1 \text{ bis}]$$

In fact, our estimates suggest that systemic risk and FX market pressure respond to core institutions and KAO in similar ways (Appendix III-Table 2). A feature of H&K results is that crises are not random events, but an accumulation of past FX pressure, banking system stress [Bnk] and external vulnerability [Ext-vul], i.e., where there is smoke, there is a risk of fire. As EMEs gradually abandon rigid pegs to the dollar and move to more flexible exchange rate regimes (concomitant with greater KAO), the Mundell-Fleming model predicts that monetary policy (via the exchange rate) takes on greater significance. An appealing feature of the BIS's EWS is that it incorporates significant transmission channels for interest and exchange rate changes. The Ext-vul index appears to be a good proxy for systemic risk as it includes the real exchange rate, large current account deficits (above 4% of GDP), and recent export growth, as indicators of competitiveness. It also includes three salient indicators of currency and maturity mismatch namely, the level of international bond and bank debt as a percentage of GDP, and its change, as well as the ratio of short-term foreign debt to FX reserves. By contrast, the FX pressure index focuses on nominal exchange rate changes. Hence by examining Ext-vul and FX pressure, one can also see how large short-run nominal devaluations have translated into medium-term *real* devaluations post-1997 (owing to continuing commitments to macroeconomic stability, open market, intense competition for FDI) which is a rather novel channel of transmission.

5.2. Testing for Core Structural Variables

Our baseline panel regression uses Ext-vul as the dependent variable and fixed-effect country intercepts that impose similar coefficients on the independent variables (see Appendix III-Table 2 Equation [1]). As might be expected, given the large "stock" elements of Ext-vul, the high coefficient on the lagged dependent variable implies that lags are much longer than those for FX pressure (Equation 1 bis). Equation [1] fitted from 1994 to 2000⁸³ yield adjusted R²s (.83) and suggests that systemic risk in EMEs is

⁸² Fixed effects assume that the slope coefficients are the same across countries by estimating the intercepts separately for each country.

⁸³ Complete data for 1993 are not available in the BIS data bank. Owing to incomplete data (often reflecting changes in political entities or the recent nature of some data series) 83 data points for earlier periods were estimated using the RAS method. This method estimates individual observations by using all available information concerning observed column and row totals. These are then scaled by individual

well explained by lagged Ext-vul, contemporaneous stress of the banking sector and lagged FX pressure (all variables are significant at a 99% level of confidence). In the long run, FX pressure and banking stress are fully reflected in Ext-vul. (Equation 1 bis suggests similar patterns for FX market pressure, but these are clearly more volatile.)

H&K suggest that if additional information is available these could be used to estimate the intercepts. Core institutions are an ideal candidate, as they in principle should lead to lower systemic risk. Equations [2 & 3] show how introducing core institutions affect the baseline. Equation [2] adds core institutions to the baseline with a common intercept. This has the wrong sign theoretically and a 30% probability of significance. Equation [3] repeats the estimate with no intercept. Core institutions are again wrong signed, but have weak effects on Ext-vul. (By contrast better institutions have a statistically significant perverse effect on FX pressure, see Equation [3 bis].) These simple tests appear to contradict the central role of institution building in IMF structural reform programmes. But, as noted earlier, this test was restricted to EMEs—whereas the decisive role of institutions in empirical studies largely reflects large differential effects *between* OECD and EMEs.

Comparable data to expand this test to OECD countries are not available in the BIS data bank. However, empirical results testing the relation between institutions and/or KAO and growth (Edwards 2001, Arteta et al. 2001 and Quinn 2001) are consistent with a sharp dichotomy between OECD and EMEs⁸⁴. Similarly, Chinn and Ito's (2002) tests for the relation between financial development, core institutions and capital account opening for 105 countries yield a sharp dichotomy between OECD and EMEs. Moreover, there are marked differences between EMEs (as classified by the IFC) and less developed countries, consistent with the presence of institutional thresholds. Our tests with core structural institutions can be interpreted in the same spirit. However, it is by no means clear whether EMEs should be treated as a homogeneous sample, as the triggers for financial crises in Latin America and elsewhere appear to differ markedly from those in East Asia. These issues will be pursued in future research.

5.3. Testing for the Effects of DFL and KAO

Indicators of DFL and KAO can also be used as intercepts or interactive variables to test for their effects on Ext-vul (and FX pressure). Introducing DFL with no intercept shows that it had little impact on Ext-vul. This is surprising given the key role of DFL⁸⁵, but is easily explained as its central component, 'real interest rates' is included in the FX pressure index and the bank stress index. Indeed, when the banking system index is suppressed, DFL had a 12% probability of significance and was wrong signed (results not shown).

country's observed variance relative to mean sample variance. 23 bnk, 31 ext-vul and 29 FX datum were estimated using this method. Albeit imperfect, this technique is regarded as "doing" the least violence to the data, and allows us to use 187 actual observations (out of a potential of 672) that would otherwise be lost.

⁸⁴ Eichengreen's (2001) survey of the empirical literature on KAO and growth concludes, "that there is little evidence that the growth effects of KAO are shaped in robust or predictable ways by a country's level of financial and institutional development".

⁸⁵ The correlation R^2 between DFL and core institutions was .635.

By contrast, KAO has little in common with the other explanatory variables (although the direction of causality is unclear). Our estimates show that introducing annual KAO estimates from 1994 to 2000 have insignificant and mixed effect on Ext-vul depending on what specification is used for the constant term [Equations 4 & 6]. Hence, there appears to be many other factors driving Ext-vul than KAO. By contrast, KAO has large significant *positive* effects (t value 3.3) on FX market pressure [Equation 4 bis], i.e. higher KAO from 1994-2000 was associated with greater FX pressure. Finally, when DFL is introduced as an interactive variable with KAO, this was insignificant [Equation 5].

These alternative tests suggest that from 1994-2000, as EMEs adopted progressively greater KAO, a greater volume of short-term flows was intermediated by inefficient banking systems⁸⁶. Over this period, core institutions, DFL and KAO had no effect on reducing systemic risk. Hence KAO has proved a poisoned chalice, the more so as all three-raised FX market pressure. These results do not undermine the case for KAO. In fact, KAO appeared to have nebulous effects on Ext-vul and systemic risk. In sum, Ext-vul is dominated by stock variables (the level of the real exchange rate, the international foreign bond and bank debt to GDP ratio (and its change), short-term FX liabilities to FX assets ratio). Reducing systemic risk is a medium-term structural task that depends importantly on establishing quickly the preconditions for effective DFL and KAO, notably good core institutions. Ineffective DFL juxtaposed onto high KAO can clearly lead to short-run FX market pressures that impedes this process by undermining the development of the banking system and the formation of deep financial and especially good long-term bond markets.

6. Summary and Conclusions

Starting in the mid-1990s, a series of devastating financial crises punctuated by capital flight, collapsing currencies, soaring NPLs, balance-sheet implosions and serial bankruptcies virtually eliminated the benefits of a decade or more of economic growth and poverty reduction in some EMEs—raising grave concerns over ill prepared capital account opening (KAO). These events differed markedly from previous current account crises, as their focus was on capital flight, following large-scale short-term FX borrowing facilitated by KAO. The emergence of severe maturity and currency mismatches has prompted serious doubts over the sequencing of international financial liberalisation in EMEs, and debate over the soundness of the existing “international financial architecture”.

The 1997-98 East Asian crisis proved to be a quintessential flash point, provoking sharp controversy over the quality of the IMF’s diagnosis and policy advice. Recommending, let alone applying classic current account remedies to fundamentally different “underlying causes” led to heated, and often confused debate, as scant distinction was made between current vs. capital account crises (Yoshitomi and Ohno

⁸⁶ From 1994-2000 KAO in EMEs rose from 2.7 to 3.1. As classical sequencing patterns favour long-term (FDI and long-term equity) before short-term capital flows, on-going KAO implied intermediating larger proportions of short-term banking flows from the mid-1990s. The correlation between KAO and core institutions was, however, only .202% and .135% in 1994 and 1998-99 respectively, indicating that KAO essentially continued irrespective of initial conditions.

1999). This controversy underscores the need for an adequate database for analysing the causes of capital account crises, a clear distinction between differing types of external crises, and a “new” approach to crisis avoidance. This paper has two goals: to collate a database for 24-EMEs, and to develop an analytical framework with operational risk-based guidelines for international financial sequencing. These are tough challenges because most of our analytical tools deal with current account crises, and data limitations bedevil strong policy conclusions.

6.1. Building an Operational Institutional-Cum-Financial Database

Core institutions are the bedrock of effective domestic financial liberalisation (DFL) and KAO. Our choice of indicators, their advantages and limits are sketched out in Section 2 and include:

- Six core institutions drawing on Chan-Lee and Ahn (2001) to represent the essential preconditions for effective DFL and eventual KAO, based on a causal hierarchy and operational time framework proposed by Williamson (2001)
- The effective degree of DFL, focusing on the degree and effectiveness of interest rate liberalisation since the 1980s (Pill and Pradhan 1995, Gelbarde and Leite 1999)
- The intensity of capital controls or degree of KAO over time [constructed by the author] for 55-countries using a coding methodology proposed by Quinn (1997)
- Financial parameters salient to gauging the “twin maturity and currency mismatch” phenomenon in EMEs, i.e. international bond and bank debt to GDP, and the ratio of short-term FX liabilities to assets (Hawkins and Klau 2000)

We do not regard the role of core institutions as a mere listing of ideal attributes (i.e. rule of law, creditor rights, shareholder rights, accountancy standards, foreign bank presence and the proportion of the banking system dominated by state-owned banks). Rather, we take these as proxies for the risks attached to other hard to measure phenomena that underpin the quality of financial and economic systems (i.e., governance failures, excessive credit expansion, exploitation of minority shareholder rights, lax prudential oversight, abuse of domestic bank monopoly power, chronic NPLs, etc.). These core indicators are a first attempt and better data, especially for prudential regulation and NPLs, would improve our analysis. Nonetheless, peer comparison via a mapping exercise is a simple, objective way of benchmarking, and is being explored by the ADBI as Forum Secretariat for the Asian Policy Forum (APF) in deriving policy priorities for the PRC’s next stage of economic reforms (Liu 2002 and APF 2002).

6.2. Developing a New Risk-Based Analytical Framework

Our second goal is to develop a framework for analysing international financial sequencing, by examining the interactions between core institutions, DFL, KAO and the “twin mismatches”. Unfortunately, the optimal policy sequencing literature is too compartmentalised and sterile to provide operational content. Moreover, the adoption of sensible international financial sequencing was too often over-ridden (in the late

1980s) by simplistic IMF “temp plate” views on the incontestable advantages of KAO. These views have evolved post-1997 to an “integrated approach”. However, this goes to the opposite extreme of bureaucratic complexity. In fact, policy analysis is reduced to case studies of specific situations, with no overarching analytical framework, leaving pressing systemic policy questions unanswered. Our strategy has four steps: we outline key differences between current and capital account crises; essential institutional, financial and structural parameters are mapped to reveal benchmarks for crisis avoidance; this is followed by panel regressions to see whether our guidelines are supported by the data; finally a risk-based approach to the international sequencing of reform is presented using the PRC as an example.

6.3. What is the Defining Distinction between Current and Capital Account Crises?

Initially, Thailand and Korea were clear victims of severe liquidity constraints in 1997, as short-term FX liabilities far exceeded liquid FX assets. But, as liquidity constraints are also common to current account crises, what new risks provoked such virulent capital account and exchange rate reactions here? Our distinctions include:

- 1st generation external crises typically refer to classic savings-investment gaps. Thus, following depreciation, the exchange rate will stabilise once the market “thinks” that the new rate suffices to maintain a sustainable current account position (i.e. the classic Marshall-Lerner conditions and “J” curve effects), that adequate FX reserves and/or IMF lines of credit and credible restrictive macroeconomic policies are in place
- Some aspects of 2nd generation crises (self-fulfilling expectations and multiple equilibria) may also be found in 3rd generation crises, but the policy implications may be broadly similar to 1st generation crises
- By contrast, 3rd generation capital account crises are characterised by high systemic financial risk (reflecting the “twin currency and maturity mismatches” inherent in short-term FX borrowing) often exacerbated by a high real exchange rate. In East Asia, these “new risks” were masked by strong economic growth and “euphoric” capital inflows. Problems arise when shocks or reality damp “euphoria” resulting in sudden stops in capital inflows and FX pressure. Worse, devaluation fears can spark a currency run and a scramble for liquidity, culminating in a credit crunch. Finally, devaluation can, in turn, provoke quick losses in wealth that feed capital flight and a vicious circle
- A dangerous pitfall is the application of classic 1st generation IMF remedies (viz. currency devaluation, fiscal retrenchment and high interest rates) that transform liquidity constraints in the presence of 3rd generation systemic risk into outright national insolvency. Depreciation and higher interest rates further exacerbates the balance-sheet positions of firms with high levels of domestic and FX debt. And as wealth losses escalate, these can swamp the substitution effects of currency devaluation, provoking collapsing exchange rates, accelerated capital flight, balance-sheet implosion and serial bankruptcy⁸⁷

⁸⁷ Cases that appear to fit these characteristics include *inter alia*: Mexico (1994), Thailand, Korea, Indonesia, Malaysia (1997-98), Russia 1998, Brazil 1999 and Argentina (2001-02). The Philippines,

- What are needed in the short-term are ample FX reserves and large prearranged, unconditional international lines of credit, and perhaps selective market-based capital controls that discourage volatile short-term capital inflows in the first place
- In the event that macroeconomic policy must be tightened (which was unclear in East Asia in 1997-98) this should preferably be done through fiscal policy with clear primary budget surplus targets, pre-announced contingency plans, and transparent trigger clauses to build policy credibility (e.g. Turkey 1994). Such an approach also needs to be backed-up by an independent Central Bank with clear, credible inflation targets—while a more flexible exchange rate regime becomes an integral part of the inflation targeting process (e.g. as in the United Kingdom, Canada, Sweden, etc.)
- Last but not least, strong commitments are needed to quickly establish the preconditions for effective DFL. These are also essential to the creation of the good long-term bond markets that are in the end, the most effective solution to the “twin mismatch” problem and effective KAO

6.4. What does a Mapping of the East Asian Economies reveal about Systemic Risk?

For many East Asian EMEs, DFL launched in the early 1980s was slow, incomplete and poorly executed. DFL broadly reflected the mediocre status of core institutions (Appendix II-table 3, and text chart)⁸⁸. However, our indicator of DFL flatters Asian economies, as the legacy of directed lending and moral hazard is difficult to capture. East Asian banks (new banks and especially non-banks) were under-capitalized, laxly regulated and badly managed. At the same time, (apart from Malaysia and Indonesia which had high KAO)—East Asian EMEs adopted a slow, cautious approach to current and long-term capital account decontrol (Appendix II—charts 1, 2 & 3)⁸⁹. Even so, by

Hong Kong, China, Taipei,China, Singapore (1997-98) and perhaps Turkey (2001) appeared to be subject to similar albeit less acute 3rd generation crisis symptoms. The crises in Mexico and Thailand were originally sparked by weak fundamentals. Even so, the severity of the subsequent spill-over effects on other EMEs cannot be easily explained via trade, financial and other linkages.

⁸⁸ Excluding Hong Kong, China, Singapore and Taipei,China, the effectiveness of DFL for the other Asian countries was just over 50%, and reality was probably worse. Even though our DFL indicators fail to capture this, the same can be said for Japan. Interest rates were liberalised in Japan in the early 1980s and DFL appears on paper to have been quite effective. However, it is impossible to capture so-called cultural features such as administrative guidance and supposed “Confucian ethics” that blunt market mechanisms. Indeed, Bakker and Chapple drawing on Japanese literature point out that some controls on interest rates were removed only in 1994 (in 1993 in Korea). As a consequence Asia’s capitalistic system differs in many important respects from the “Anglo-Saxon” model as its financial system is in fact highly “socialised” (see, Rajans and Zingales 1998).

⁸⁹ Our estimates for Taipei,China are based on IMF sources for 1968 and 1978. Later years are estimated using press and the Bank of China’s Annual Reports. Quinn’s data set for 1958 did not include Taipei,China. Taipei,China ceded its place at the IMF to the PRC in 1980, thereby limiting the availability of internationally comparable information on exchange arrangements and capital account restrictions. Other sources indicate that it has no exchange restrictions on current account activities and repatriation of profits, dividends or original capital. FDI is subject to administrative approval. Portfolio equity investment has been limited to approved mutual funds and can be withdrawn under a variety of restrictions, ranging from none to heavy, depending on how the investment was made. FDI abroad is free up to \$50 million; and there is a ban on lending in local currency for foreign exchange dealings. On this data, Taipei,China’s current and capital account exchange restrictions would currently be in the 7 to 8 and

the mid-1990s, short-term capital-flows had been liberalised, although FDI and portfolio investment faced important barriers (e.g. Korea, Thailand and Malaysia).

6.5. Reckless External Financial Constraints Sparked the Crisis, but have been Repaired

The BIS EWS indicators support the view that the proximate cause of the Asian crisis was the interface between naive management of FX reserves and liquidity needs with reckless foreign debt leveraging. Low FX reserves were probably based on outmoded 1st generation current account criteria—lacunae that were exacerbated by lax prudential supervision, poor bank and corporate governance and aggressive international bank lending⁹⁰. Nonetheless, by end-2000, the East Asian crisis economies (especially Korea) had sharply reduced these liquidity constraints by aggressively building-up FX reserves, thereby reducing the risk of devaluation-related wealth effects.

Such adjustments were accelerated by a sea change in international capital flows⁹¹. These supply-side shifts lowered FX debt leveraging sharply in Korea and Thailand; but for other EMEs their mirror image was a big generalised drop in (real) exchange rates (that increased external competitiveness, but raised FX debt/GDP ratios). For EMEs as a group, end-2000 represented the lowest level of external vulnerability since 1989. These big post-1997 shifts illustrate how current account and exchange rates can be driven by capital account swings, underlining the necessity for a pragmatic risk-based approach to KAO, and greater exchange rate flexibility in this new environment.

6.6. But, the Crux of the Problem was Incomplete DFL Juxtaposed onto High KAO

A mapping of the 1997-98 Asian crisis economies strongly suggests that the crux of the problem is weak core institutions relative to high KAO, and incomplete DFL juxtaposed onto KAO without systemic coherence. Indeed, there is a glaring absence of the positive relation between DFL and KAO presumed in sensible international financial sequencing patterns, although the Asian economies were not the worst offenders⁹². Nonetheless, the massive capital-inflows attracted by Asia's strong, unending growth and progressive KAO—took on ever-larger short-term elements. These were badly or corruptly intermediated by laxly monitored, under-capitalised banks and financial systems, spilling over into excessive credit growth, asset price inflation, and growing

2 to 2.5 range. A major easing of controls that would allow FDI flows directly to the PRC (rather than via Hong Kong, China has recently been announced, including an end to the \$50 million limit.

⁹⁰ G-10 commercial bank claims on the 5-crisis Asian economies rose from \$117.5bn. in December 1993 to \$274.5 bn. in June 1997; the latter equivalent to 25% of these economies GDP (see above).

⁹¹ In the 4-years ending 2001, international bank lending, portfolio bond and equity flows to the 29 largest EMEs was \$19 bn.; with a net outflow of \$30 bn. in 2001. By contrast, from 1994-97 there had been an inflow of \$655 bn.

⁹² Hong Kong, China and Singapore are exceptions, as they have world-class core institutions and banking systems. However, the Asian Financial Crisis has raised reservations concerning the advantages of being an international financial centre. Recently, Singapore has adopted regulations to limit the holdings of its currency in non-resident accounts.

currency-maturity mismatch⁹³. Worse, this Ponzi game phenomenon masked Mundell’s “unholy trinity”—i.e., the inconsistency between quasi-pegged exchange rate systems, and trying to run an independent monetary policy with free capital movements and more open capital accounts. With the benefit of hindsight, East Asia’s balance sheet positions proved amazingly vulnerable to shifts in investor sentiment in 1997-98.

6.7. Is Benchmarking Possible for Crisis Avoidance?

Against this backdrop, can benchmarks for crisis avoidance be derived from a mapping approach? While good institutions are always welcome, imprudent liquidity risk management can swamp them. Hence, benchmarking core institutions is very tricky, as illustrated by their weak relation with KAO, and the non-relation between DFL and KAO. By contrast, pragmatic FX benchmarks can be approximated using AGE models and probability analysis. A plausible benchmark could be: what international bond and bank debt to GDP ratio and short-term FX reserves to liability ratios would be needed if the authorities accepted the risks of a maximum wealth loss of 5% of GDP with a .01% probability? Korea has been the most aggressive in lowering this type of risk. Using it as a yardstick, Thailand, Malaysia and the Philippines have made significant, albeit less progress. By contrast, this process was incomplete in Indonesia, Argentina, Peru, Brazil and Turkey.

6.8. Empirical Tests Support the Main Implications of Our Mapping Exercise

To date, most empirical analysis has analysed the impact of KAO on capital flows, investment and economic growth. These studies have usually proved inconclusive, with positive effects typically confined to OECD and higher income EMEs. However, for EMEs the main policy focus should be on crisis prevention, given their drastic costs in terms of lost output, social stability and poverty. The BIS’s EWS is a useful vehicle to test the impact of core institutions, DFL and KAO on systemic risk as measured by external vulnerability (Ext-vul). Quarterly, fixed effects⁹⁴ panel regression results suggest that systemic risk (Ext-vul) in 24-EMEs can be well explained by lagged Ext-vul, contemporaneous stress of the banking sector and FX market pressure from 1994-2000, with full pass-through effects in the long-run. As regards core institutions, these are ideal candidates for adding additional information to the baseline, as theory argues that they unambiguously lower systemic risk. In fact, core institutions are wrong signed and have insignificant effects on Ext-vul, although these results undoubtedly reflect problems of endogeneity. Core institutions also have statistically significant perverse effects on FX market pressure. These simple tests appear to contradict the central role of building institutions in IMF structural adjustment programmes. But, this test was restricted to EMEs—whereas the decisive role of institutions in empirical studies

⁹³ The weakness of long-term government and private bond markets in the East Asian crisis economies also appears critical. Their absence limited the scope for sterilised intervention, as well as the potential for allowing domestic economic agents to offset maturity and currency mismatches in their balance sheets.

⁹⁴ Fixed effects assume that the slope coefficients are the same across countries by estimating the intercepts separately for each country.

mainly reflects large differential effects *between* OECD and EMEs—as well as between EMEs and LDCs. Moreover, it is unclear whether the EMEs should be treated as a homogeneous sample, as the triggers for financial crises in Latin America, and elsewhere, appear to differ substantially from those in East Asia. These issues will be explored in future research.

Other tests, introducing DFL and KAO, were also made; but the results suggest that from 1994-2000, as EMEs adopted progressively greater KAO, a larger volume of short-term flows was intermediated by shaky banking systems. Thus, neither core institutions, DFL nor KAO had the expected effect of lowering systemic risk. By contrast, all three of these structural variables *raised* FX market pressure. These results underscore the systemic risks of incoherent international financial sequencing. Given the weak preconditions for effective DFL and KAO in Asian EMEs, higher KAO has indeed proved to be a poisoned chalice. However, these results *qualify rather than vitiate the case for KAO*. Reducing systemic risk is a medium-term structural task that depends critically on quickly establishing the preconditions for effective DFL and KAO, i.e. better core institutions. Ineffective DFL, juxtaposed onto high KAO is a recipe for the on-going FX market pressure and financial instability that saps the development of dynamic banking systems and deep long-term bond markets.

6.9. What does a Risk-based Approach to the Sequencing of DFL and KAO imply?

Against this chequered backdrop, this paper proposes a pragmatic risk-based approach to analysing the sequencing of international financial liberalisation. This is framed stressing the central role of initial conditions for the quality of core institutions, stages of economic development, the status of DFL (low risk), KAO (higher risk) and prudential regulatory capacities. Our approach attempts to identify risks arising from specific aspects of DFL and KAO, as well as new risks, their interactions and implications for systemic risk.

Put another way, a risk-based approach to sequencing gauges the “distance” of specific new risks from systemic financial risk. The greater is this distance, the earlier and easier the implementation of such measures should be (and vice versa), thereby spelling out a pragmatic operational hierarchy for policy reforms. To illustrate:

- Building better institutions or structural reforms that directly reduce systemic risk should always receive top priority. The problem here is overcoming vested interests, as reform can take two or more parliamentary terms. One solution is better transparency and peer pressure that encourages greater probity in the public debate. Thus, publication (following consultation among experts to build a better database) of the ADBI core indicators in its Annual Report could be a first step, as would the adoption of yearly Appendixes to national budgets—giving the status of core institutions *vis-à-vis* peers, progress made, and future commitments;
- The importance of core institutions as preconditions cannot be under-emphasised, as they are the same for effective DFL and KAO. Thus, Korea, Thailand, Indonesia, the Philippines, etc., had relatively advanced DFL despite mediocre institutions. But, this resulted in third-rate banks characterised by glaring governance failures, lax prudential oversight, excessive credit expansion, asset

price bubbles, exploitation of minority shareholder and creditor rights, abusive domestic bank monopoly power and chronic NPLs. Paradoxically, a mix of advanced DFL, high KAO and neglected institutions can be the worst of all possible worlds (e.g. the East Asian crisis economies). High DFL encourages financial engineering and imprudent risk taking, high KAO facilitates excessive short-term foreign gearing, while bad governance and prudential oversight turns a blind eye to rising systemic risk to protect vested interests;

- As regards DFL, it is inherently low risk, as the individual risks of specific elements of DFL are quite “distant” from systemic financial risk. Hence, in the Asian crisis economies, effective DFL should be achieved as quickly as possible, in tandem with improving core institutions in the medium-term. This is also the case for the PRC, where in addition, establishing the clearer property rights needed for diversifying ownership out of the government’s hands is a high priority for resolving the NPL problem;
- For DFL at an operational level, care should be taken while phasing-in interest rate liberalisation, not to distort the yield curve, thereby inadvertently encouraging borrowers to rely excessively on short-term FX debt (e.g. Korea). Similarly, new bank entry should have a strong bias towards foreign banks and other foreign financial services, to protect the franchise values of domestic banks. This would be akin to importing scarce world-class management skills and technology, while discouraging domestic banks from taking too much risk to maintain profitability, for which they are ill adapted (Liu 2002 and APF 2002);
- As regards KAO, its defining characteristic is the stringent constraints it imposes on the consistency of overall economic policy—i.e., the nexus between rational microeconomic and institutional structures, sustainable macroeconomic policies, sound banks and viable exchange rate regimes: it is inherently high risk compared with DFL because it imposes asymmetrical (domestic and foreign) systemic risk;
- For KAO at an operational level, FDI and related trade credits have low specific risk vis-à-vis systemic risk. Owing to their strong real economy links, empirical estimates suggest that FDI and trade credits are almost totally permanent, and 10 to 15 times less susceptible to reversal than portfolio investment flows⁹⁵. Such flows should thus be the first elements liberalised (although trade credits should be closely monitored). Portfolio equity and other investments have somewhat less distant specific risk from systemic financial risk, unless they are financed by banks and would be the next elements to liberalise. (Hence, the necessity for the active monitoring of credit to sensitive sectors to avoid asset price bubbles in real estate and stock market speculation.) Finally, short-term international bank loans,

⁹⁵ Samo and Taylor (1999) estimates confirm the consensus view that FDI and commercial bank flows (presumably related to trade credits) are the most stable elements of capital flows and hence low risk. Variance analysis for Argentina and PRC shows that after 36 months only 7% and 3.8% of equity flows were permanent. The comparable figures for bond flows were 7.2% and 6.6%, while official flows were 8% and 14.5%. By contrast, the persistence of bank-financed trade-credits was 91.8% and 68%, while FDI was 101.2% and 98.6% respectively. These estimates suggest that FDI and trade credits are some 10 to 15 times less susceptible to reversals than equity and bond portfolio investment. The main limitation with these estimates is that the sample periods ends in 1997, after which there was a massive cutback of international bank credit to EMEs. Separating bank trade-credit related finance from non-trade credit flows is, however, very difficult with rising DFL.

non-trade credits and other short-term financial instruments clearly have the highest systemic risk and should be liberalised only after all the other elements are in place (good prudential supervision, sound banks, ample FX reserves, functioning bond markets) and stress tested⁹⁶;

- Successful financial liberalisation also requires good preparation and prudence, because new risks will inevitably arise from unforeseen interactions of DFL and KAO. Moreover, higher DFL inevitably leads to de facto, if not de jure KAO, as financial innovation undermines the effectiveness of capital controls (e.g. the distinction between trade-credits and other bank credits becomes blurry); and
- Finally, putting in place the preconditions to achieve effective DFL and KAO takes time. In the interim, some EMEs (e.g. Thailand and Indonesia) will necessarily have quite open capital accounts. It would thus be prudent to hold ample FX reserves relative to short-term FX liabilities, to establish pre-agreed lines of international credit and/or to actively discourage large scale, short-term FX capital flows via market-based instruments, such as unremunerated reserve requirements.

6.10. Conclusions

In conclusion, this risk-based approach differs radically from the operationally sterile “optimum sequencing” literature and the IMF’s overly complex “integrated approach”. Although our analytical framework needs to be fleshed-out with country specific microeconomic indicators in future work, it provides pragmatic guidelines for international financial sequencing and crisis avoidance⁹⁷. Moreover, this framework is adaptable to the wide variety of paths taken to sequencing. Thus, for the Asian crisis economies, well advanced in terms of DFL and KAO, this framework assesses systemic financial risk and ways to reduce it. By contrast, for countries with relatively closed capital accounts (e.g. the PRC, India, Viet Nam, etc.) this approach singles out areas of

⁹⁶ This pecking order of capital account liberalisation is similar to the OECD capital code. However, portfolio equity is usually treated as part of short-term capital flows in interpreting the code, whereas we classify it as among the second group to liberalise.

⁹⁷ Currency and financial crises are usually analysed using probit regression. However, this technique is limited, as it evaluates the marginal influences of specific factors, while holding other explanatory variables at their mean values. In reality, crises occur because specific variables pass critical threshold values provoking a confluence or unforeseen interaction of events. The probability of specific crisis events is difficult to analyse, but can be analysed using binary-recursive decision trees. This approach uses an algorithm that splits the sample between crisis and non-crisis observations by choosing specific explanatory variables that automatically order them. Although an explanatory variable at the top of the tree is more “important”, it may be only the proximate trigger for deeper structural problems. Explanatory variables may thus appear several times along various sub-branches of the decision tree, albeit at differing threshold values. A decision tree also captures interactions between explanatory variables and isolates threshold effects that may be critical with slowly changing institutional variables. Moreover, this approach is robust vis-à-vis outliers and is invariant to monotonic transformations of variables, which is an important property of structural variables that are often rank indices. However, owing to their complex nature, their mathematical properties are not well known, see Ghosh and Ghosh 2002. Their major weakness is the lack of a transparent way of hypothesis testing. Hence, the ‘split variables’ chosen on the basis of one’s priors (which are critical in determining the shape of ensuing decision trees) are inevitably open to all the biases associated with data mining.

highest potential systemic risk (e.g. NPLs and the risks of implosion of the banking sector in the PRC). It then assesses the key missing factors for establishing the preconditions for successful DFL and KAO via a diagnosis of each core institutional element.

In short, it is not the speed of KAO that is important *per se*, but rather the speed that the preconditions for effective DFL and KAO are put in place in EMEs. Our approach is thus diametrically opposed to the “big bang” paradigm that was successfully applied to advanced economies with sound core institutions.

Indeed attempts to graft “big bang” and other “Washington consensus”-type paradigms onto EMEs with inadequate core institutions, and fragile social and political structures have been notable for their singular lack of success. A pragmatic risk-based approach would thus appear to have considerable advantages, by providing a coherent framework for assessing international financial sequencing that focuses on underlying causes rather than ephemeral effects.

Appendix I

Coding Rules for Measuring Exchange Restrictions and Capital Account Controls

The coding rules used in this paper follow Quinn (1997, p. 544) on the subject. The only difference in our approach is that we have not scored international membership, as this variable is already included in Chan-Lee and Ahn 2001 as an indicator of prudential supervision and the structural strength of banks. Quinn's coding draws on Arrow's (1973) seminal distinction between the welfare and efficiency losses of quantitative as opposed to market-based instruments, whereby administrative rules and quantitative restrictions are more restrictive than taxation or multiple currency practices. Exchange and capital account restrictions on imports, exports, invisible payments and receipts and capital payments and receipts are all scaled on a 0 to 2 scale. This means that current account restrictions are scaled on a 0 to 8 basis, while capital account controls are scaled from 0 to 4.

Higher scores are indicative of greater freedom. For example, 0 means that import payments are forbidden and 2 means they are unrestricted. The range of 0 to 0.5 reflects laws that impose quantitative or other restrictions such as licenses, which completely (0) or partially (.5) forbid certain activities. Regulations that require exchange transactions to be approved by the authorities or are subject to multiple exchange rates and/or heavy taxes are scored as a 1. A score of 1.5 is when the exchange is taxed; while 2 is when the exchange is free.

The rules for goods and invisibles payments and receipts are: If all receipts or payments are necessarily surrendered or blocked, then $X = 0$. If transfers require approval (unless automatic) then $X < 1$. If transfers require approval (usually automatic) and are heavily taxed $X = 1$. If transfers are made through the market and taxed X is a range from 1 to 1.5, depending on the degree of taxation. If transfers are free $X = 2$.

For controls on capital payments and receipts, the following coding was applied. If approval is rare and surrender of receipts is required then $X = 0$. If approval is required and sometimes granted, $X = .5$. If approval is required and frequently granted or if approval is not required and receipts are heavily taxed $X = 1$. If approval is not required and receipts are taxed $X = 1.5$. If approval is not required and are not taxed $X = 2$. Preliminary results using this coding technique for selected Asian countries are shown in Appendix II.

Appendix II

Table 1. Domestic Financial Liberalisation: selected economies

	Dating		Functional effectiveness %	Private credit to GDP %			Private bonds % GDP 1997	IQFS 1998	Domestic Financial Liberalisation (DFL) relative to Capital Account (KA) opening
	start	end		1960	1988	1997			
USA	1974-79	1980-81	88.3	77.7	135.9	188.9	62.6	9.1	DFL complete < KA historically been open
Japan	1982	1984	88.9	57.7	124.9	203.8	33.3	6.7	DFL complete > KA opened slowly from late 80s
Germany	1980	1982	73.4	39.1	76.9	110.7	47.5	6.5	DFL complete < KA historically been open
France	1982	1985	84.3	41.5	83.1	79.8	36.6	6.5	DFL complete > KA opened from late 80s
United Kingdom	1981	1983	90.4	16.1	25.0	120.0	22.6	9.5	DFL complete > KA opened from late 80s
Italy	1983	1986	69.1	..	61.6	50.4	33.3	5.2	DFL complete > KA opened from late 80s
Canada	1980	1983	90.6	32.4	67.9	86.4	11.5	7.7	DFL complete < KA historically been open
Sweden	1981	1986	76.0	53.6	83.9	57.4	57.4	7.0	DFL complete > KA opened from late 80s
OECD-core- (22) members	1980-81	1983-84	75.5	40.8	83.5	94.2	..	..	DFL complete early 1980s > KA opening completed early 90s

Notes and sources: starting date of domestic liberalisation from published sources or the start of 5 consecutive years of positive real lending rates.

End-period, sustained positive real deposit and lending interest rates. Data from *IFS CD Rom 2001*.

Functional effectiveness: is the proportion of annual positive real lending and deposit interest rates from 1980-2000

multiplied by the proportion of positive observations falling in the range 0 to 7%. Private credit to GDP and private bonds to GDP ratios from World Bank Beck et al. 1999.

IQFS reading from *Chan-Lee and Ahn 2001*.

Table 2. International Liberalisation: selected countries

	Article VIII status	Capital account controls				International openness: current + capital account					
		1958	1978	1988	1999	1958	1978	1988	1999		
		scale 0-4				scale 0-12					
USA	1948	4.0	4.0	4.0	4.0	12.0	12.0	12.0	12.0		
Japan	1964	1.0	1.5	2.0	3.5	2.5	3.5	5.5	10.0		
Germany	1961	4.0	4.0	4.0	4.0	11.0	11.0	11.0	11.5		
France	1961	2.5	2.5	3.0	3.5	7.0	7.0	7.5	11.0		
United Kingdom	1961	1.5	1.5	3.5	4.0	4.5	4.5	7.0	11.5		
Italy	1961	2.0	2.0	3.0	4.0	7.5	7.5	9.5	11.0		
Canada	1952	4.0	4.0	4.0	4.0	12.0	12.0	12.0	12.0		
Sweden	1961	0.5	2.0	2.5	4.0	6.5	8.0	8.5	12.0		
OECD-core-(22) members	..	2.0	2.3	3.0	3.7	6.8	6.8	8.3	10.8		

Current and capital account openness: Chan-Lee 2001, based on *IMF Annual Reports on Exchange Arrangements and Exchange Restrictions*. Estimates for 1958 and 1988 are from Quinn (1997).

Table 3. Domestic Financial Liberalisation: selected economies

	Dating		Functional effectiveness %	Private credit to GDP %			Private bonds % GDP 1997	Core Institutions 1998	Domestic Financial Liberalisation (DFL) relative to Capital Account (KA) opening
	start	end		1960	1988	1997			
Argentina	1994	1999	24.2	20.3	12.0	18.3	11.3	5.0	DFL partial <KA has been historically open, some reversal
Brazil	1996	pending	0.0	n.a.	18.4	29.7	9.8	4.6	DFL started recently <KA mostly open in 90s
Chile	1980	1997	44.2	6.2	42.0	68.2	30.0	7.5	DFL advanced <KA mostly open in 90s, some reversal
Mexico	1989	pending	28.1	19.2	9.4	15.8	1.5	4.7	DFL partial <KA historically open (New York effect), some reversal
Indonesia	1983-85	pending	40.2	n.a.	22.4	53.8	0.0	3.4	DFL incomplete < KA quite open since late 80s
Korea	1982-93	1993	67.5	n.a.	74.7	142.7	34.1	5.1	DFL well advanced > KA opening lagged until late 90s
Malaysia	1978	1983	86.2	6.1	86.5	144.9	41.5	8.0	DFL well advanced < KA quite open until late 1980s
Philippines	1982-84	1999	67.3	14.4	17.4	55.8	0.0	4.1	DFL well advanced > KA opening lagged until early 90s
Thailand	1983-90	1989	56.5	n.a.	56.9	149.7	2.8	5.4	DFL advanced > KA opening lagged until mid-1990s
Hong Kong, China	1980	1992	66.9	n.a.	n.a.	159.3	12.6	9.6	DFL complete < KA opened since late 1970s
Singapore	1980	1982	93.7	n.a.	89.9	114.4	2.4	9.7	DFL complete < KA has historically been open
PRC	1996	pending	34.0	n.a.	76.0	93.5	3.4	1.6	DFL started recently <KA opening cautious and selective
India	1991	pending	45.9	8.8	30.6	23.4	9.6	5.5	DFL slow, incomplete < KA cautiously open
Pakistan	1998	pending	28.6	7.8	25.5	23.3	0.0	5.6	DFL partial < KA cautious opening
USA	1974-79	1980-81	88.3	77.7	135.9	188.9	62.6	..	DFL complete < KA historically been open
OECD--22core-members	1980-81	1983-84	75.5	40.8	83.5	94.2	..	..	DFL completely early 1980s > KA opening completed early 90s

Notes and sources: Starting date of domestic liberalisation from published sources or the start of 5 consecutive years of positive real lending rates.

End- period, sustained positive real deposit and lending interest rates. Data from *IFS CD Rom 2001*.

Functional effectiveness: is the proportion of annual positive real lending and deposit interest rates from 1980-2000 multiplied by the proportion of positive observations falling in the range 0 to 7%. Private credit to GDP and private bonds to GDP ratios from *World Bank, Beck et al. 1999*.

IQFS reading from *Chan-Lee and Ahn 2001*.

Table 4. International Liberalisation: selected countries

	Article VIII status	Capital account controls				International openness: current + capital account				External Debt US \$billion 1998	Debt service % exports g&s 1998	Vulnerability 2001
		1958	1978	1988	1999	1958	1978	1988	1999			
		scale 0-4				scale 0-12						
Argentina	1968	3.0	3.0	2.0	2.5	8.5	10.0	6.5	10.0	144.1	58.2	high
Brazil	1999	1.5	1.5	2.0	3.0	5.0	4.5	5.0	7.0	232.0	74.1	high
Chile	1977	3.0	3.0	2.5	4.0	7.0	7.0	6.5	10.5	36.3	22.3	average
Mexico	1946	4.0	4.0	3.0	4.0	11.5	10.5	9.5	11.0	160.0	20.8	average
Indonesia	1988	1.5	2.0	2.0	3.5	2.5	6.0	6.0	10.0	150.9	33.0	>average
Korea	1988	1.0	1.5	2.0	3.5	2.5	4.0	4.5	9.0	139.1	12.9	modest
Malaysia	1968	3.0	3.0	3.0	2.2	9.5	10.0	10.0	9.2	44.8	8.7	low
Philippines	1995	0.0	1.0	1.0	3.0	1.0	3.0	3.0	11.0	47.8	11.8	modest
Thailand	1990	2.0	1.5	1.5	2.5	6.0	5.5	5.5	6.5	86.2	19.2	average
Hong Kong, China	1961	3.0	4.0	4.0	4.0	9.0	12.0	12.0	12.0	..	..	nil
Singapore	1968	4.0	4.0	4.0	4.0	12.0	12.0	12.0	12.0	..	..	nil
PRC	1996	0.0	1.0	1.5	1.5	0.0	3.0	4.5	5.5	154.6	8.6	low
India	1994	1.5	1.5	1.5	2.5	5.0	5.0	5.0	7.0	98.2	20.6	average
Pakistan	1994	0.5	0.5	1.5	2.0	4.0	3.5	4.5	7.0	32.2	23.6	average
USA	1948	4	4	4	4	12	12	12	12	..	..	nil
OECD-22-core-members	..	2	2.3	3	3.7	6.8	6.8	8.3	10.8	..	..	nil

Sources: External debt and debt service ratios, *World Bank Development Indicators 2000*;

Current and capital account openness: author's estimates based on *IMF Annual Reports on Exchange Arrangements and Exchange Restrictions*. Estimates for 1958, 1988, are from Quinn 1997.

Chart 1: Current account convertibility for selected country groups

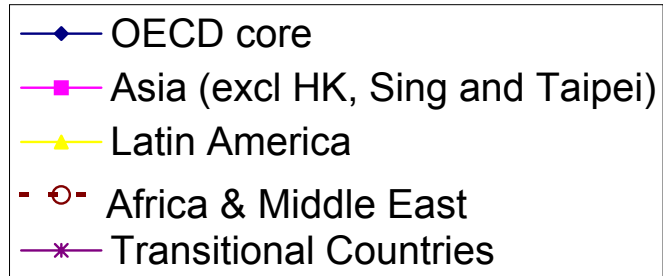
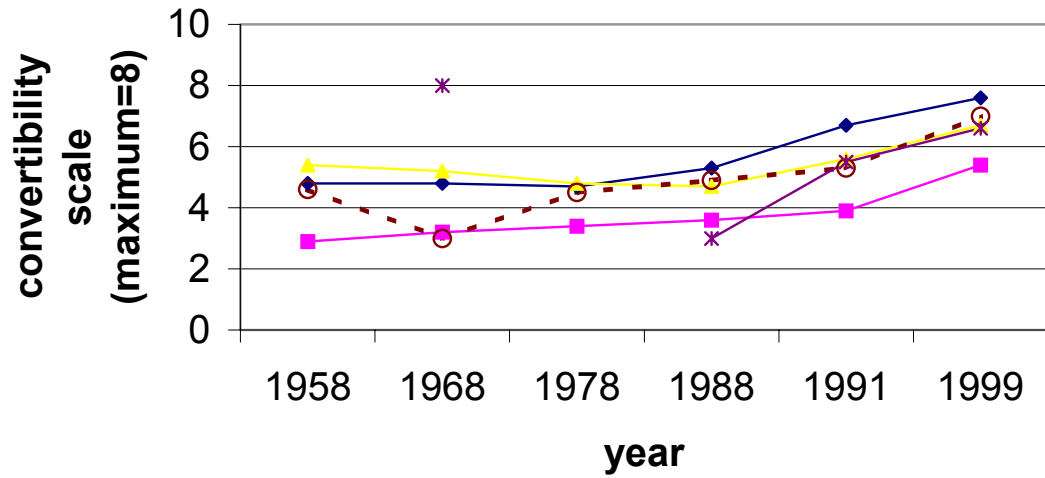


Chart 2: Capital account convertibility for selected country groups

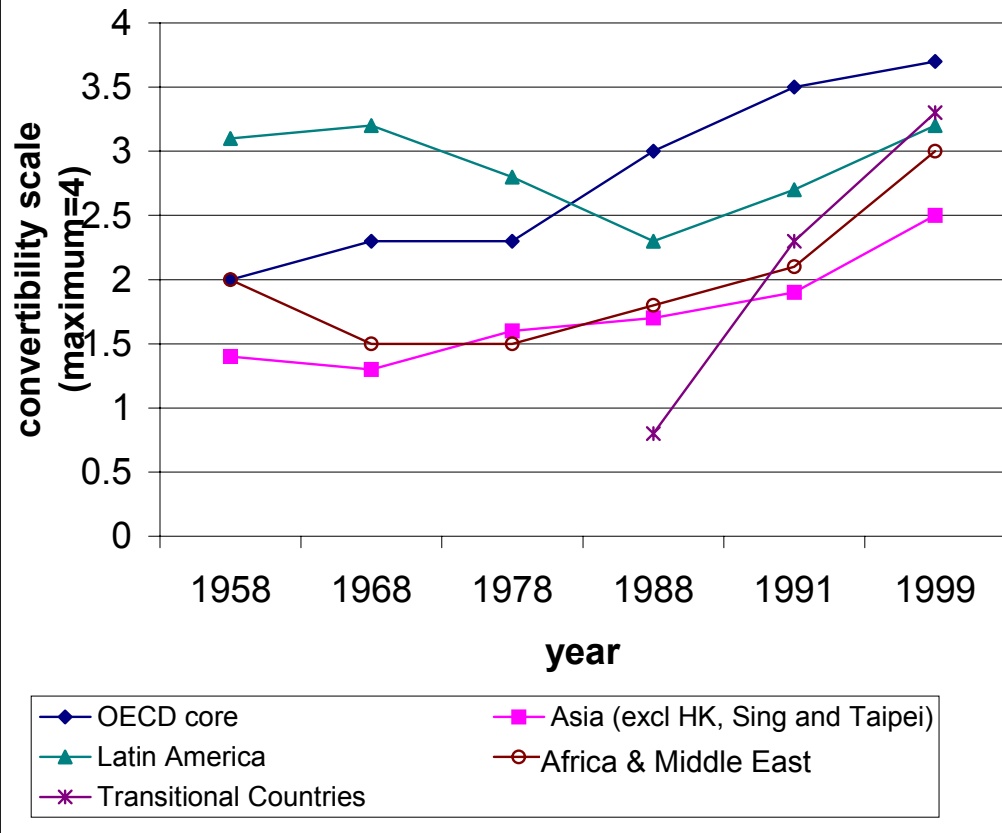


Chart 3: Current and capital account controls for Asian countries

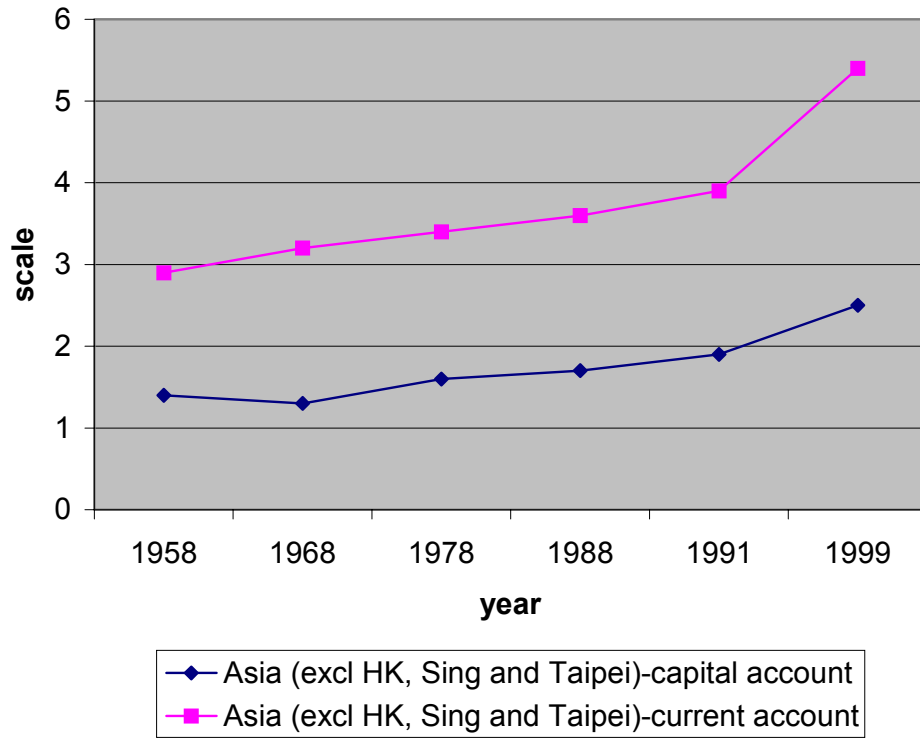


Chart 4: Current and capital account controls: PRC

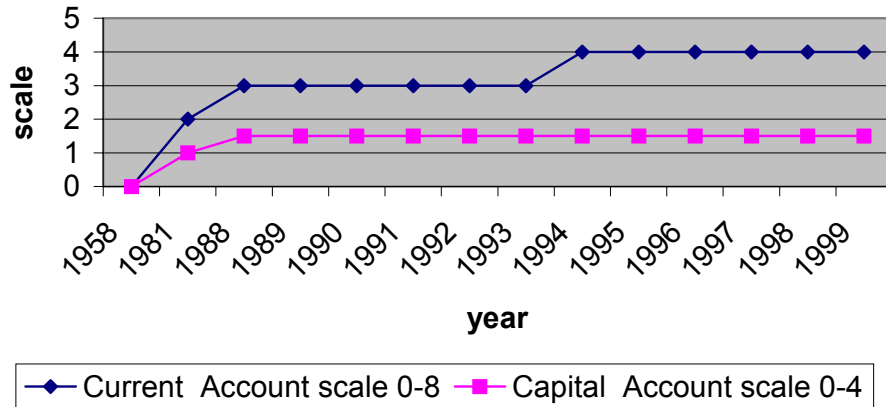


Chart 5: Current and capital account controls: Hong Kong, China

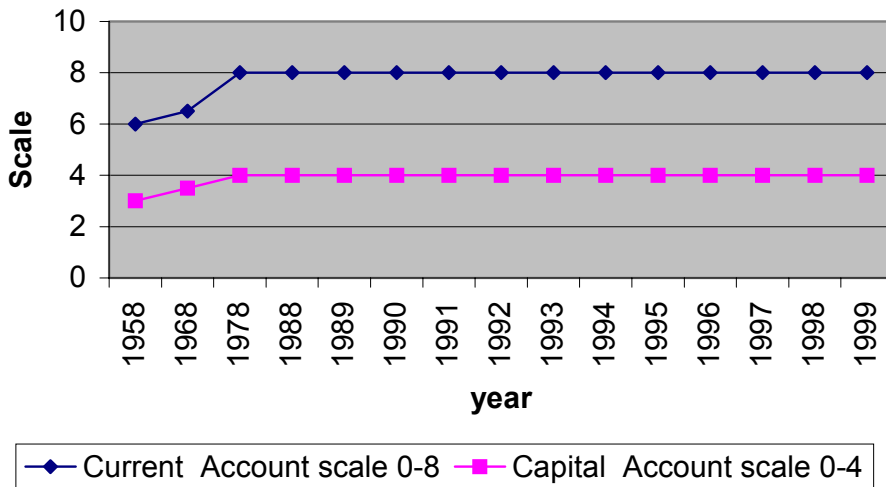


Chart 6: Current and capital account controls: India

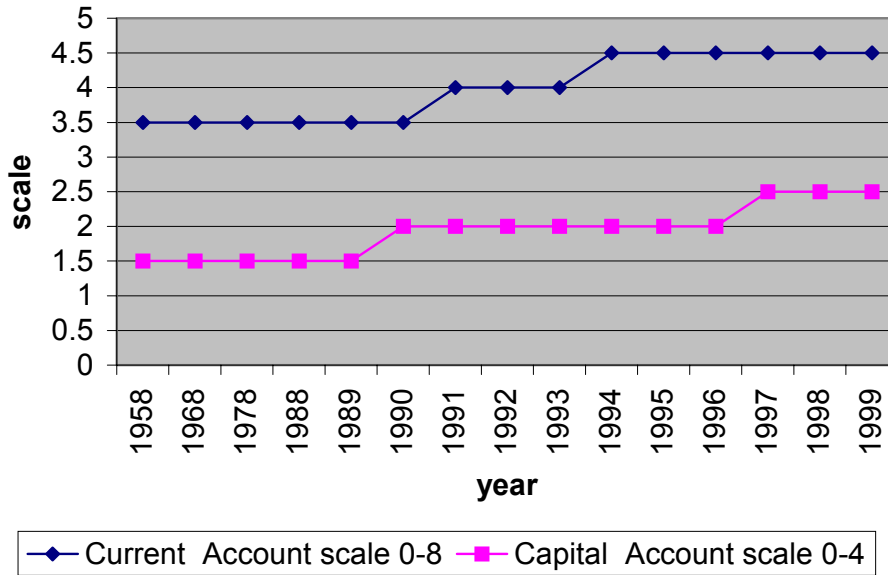


Chart 7: Current and capital account controls: Indonesia

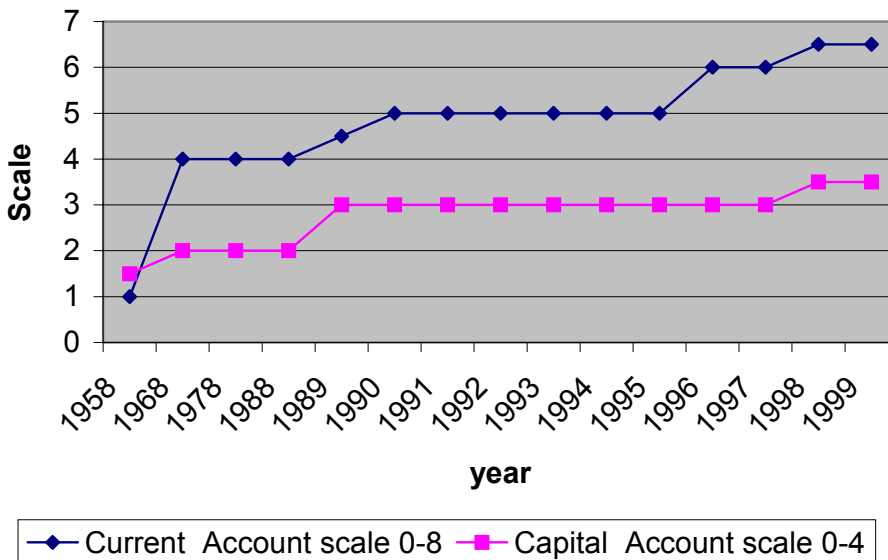


Chart 8: Current and capital account controls: Korea

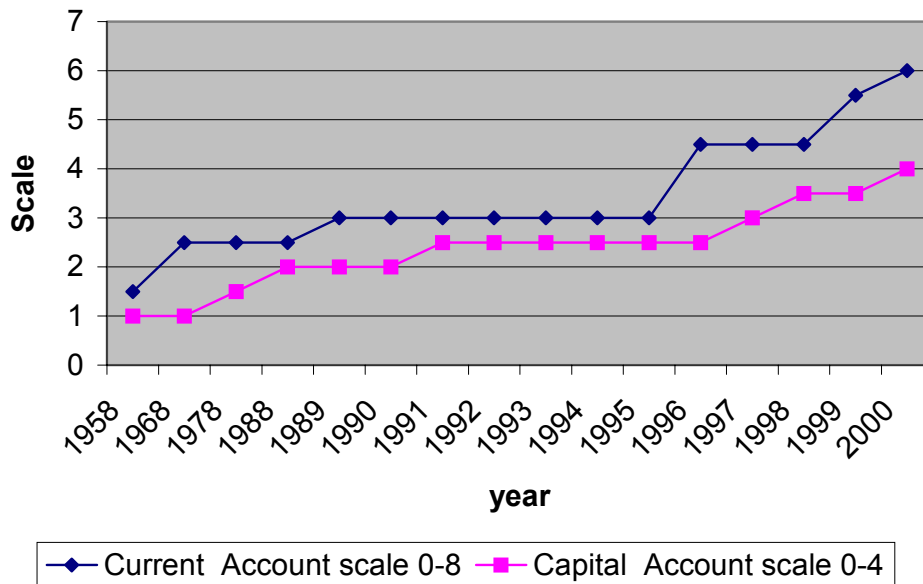


Chart 9: Current and capital account controls: Malaysia

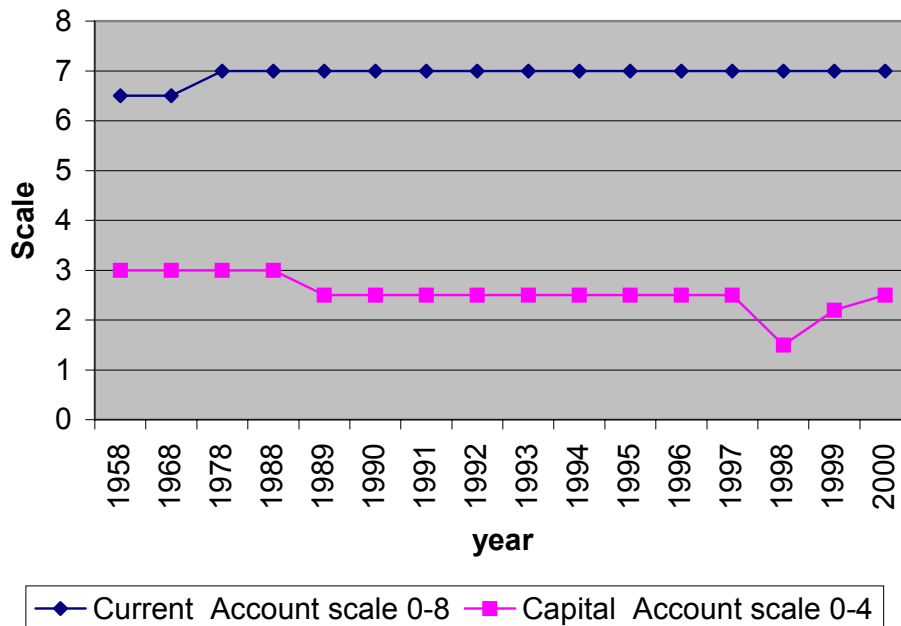


Chart 10: Current and capital account controls: Pakistan

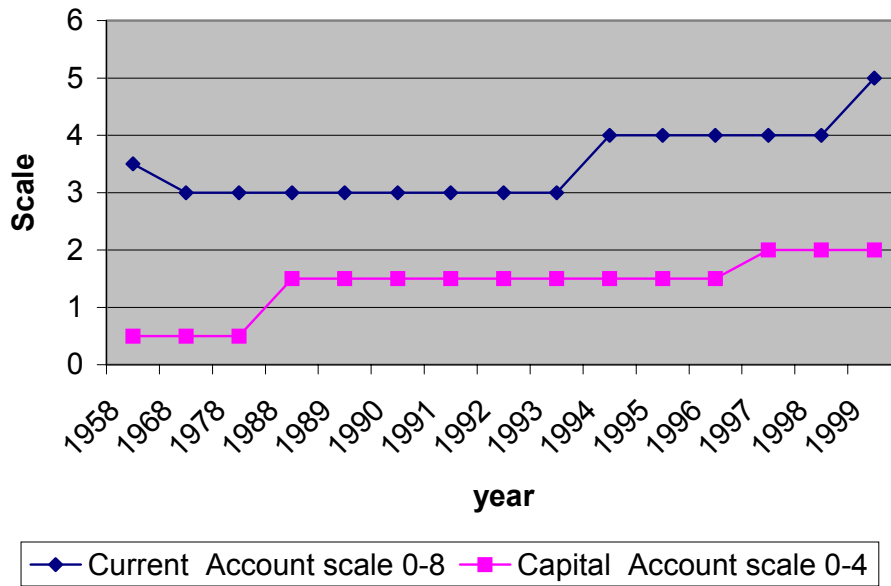


Chart 11: Current and capital account controls: Philippines

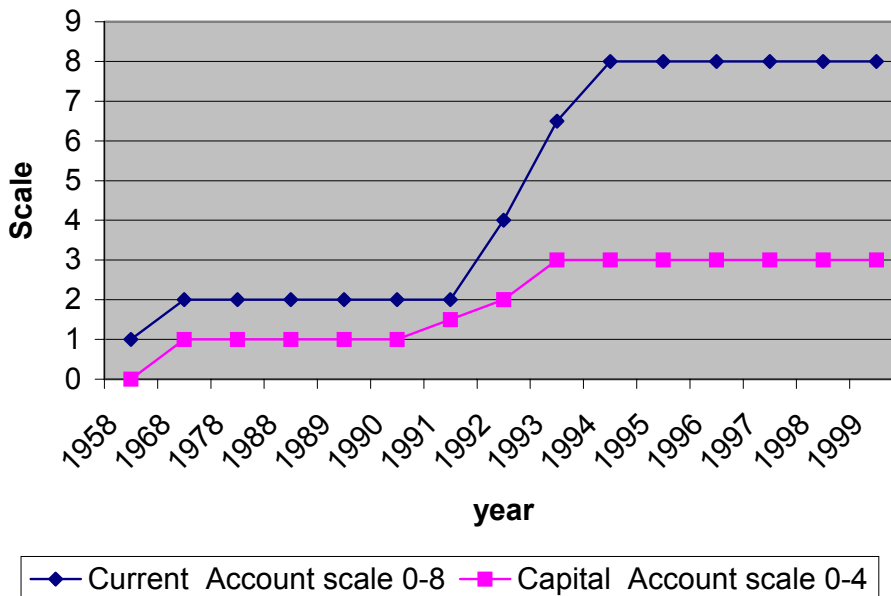


Chart 12: Current and capital account controls: Singapore

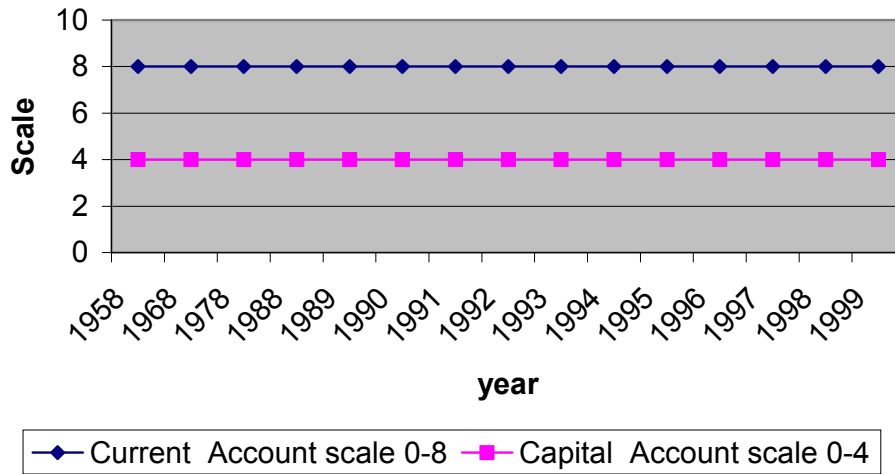


Chart 13: Current and capital account controls: Sri Lanka

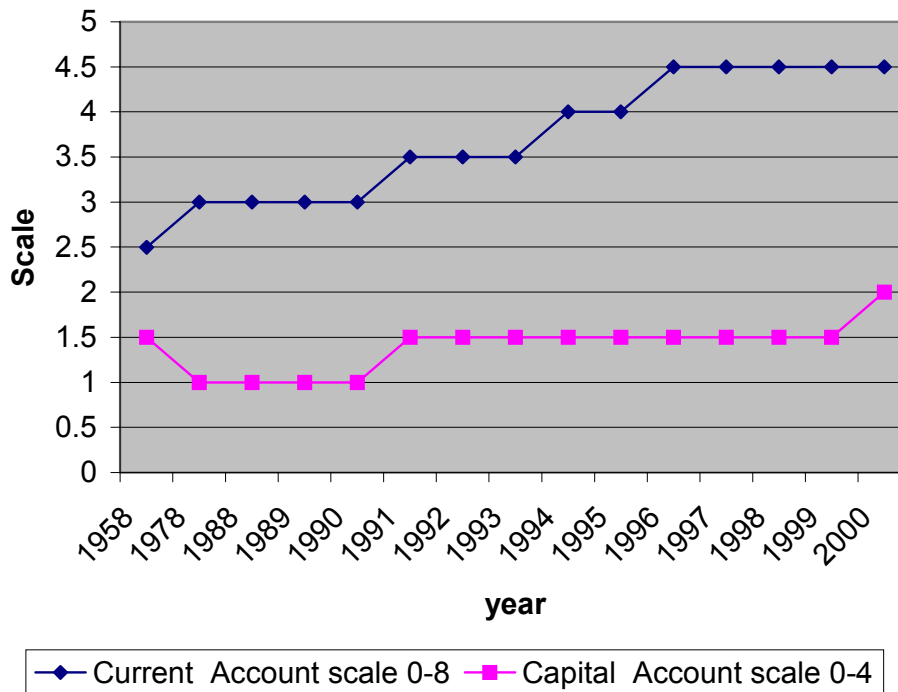
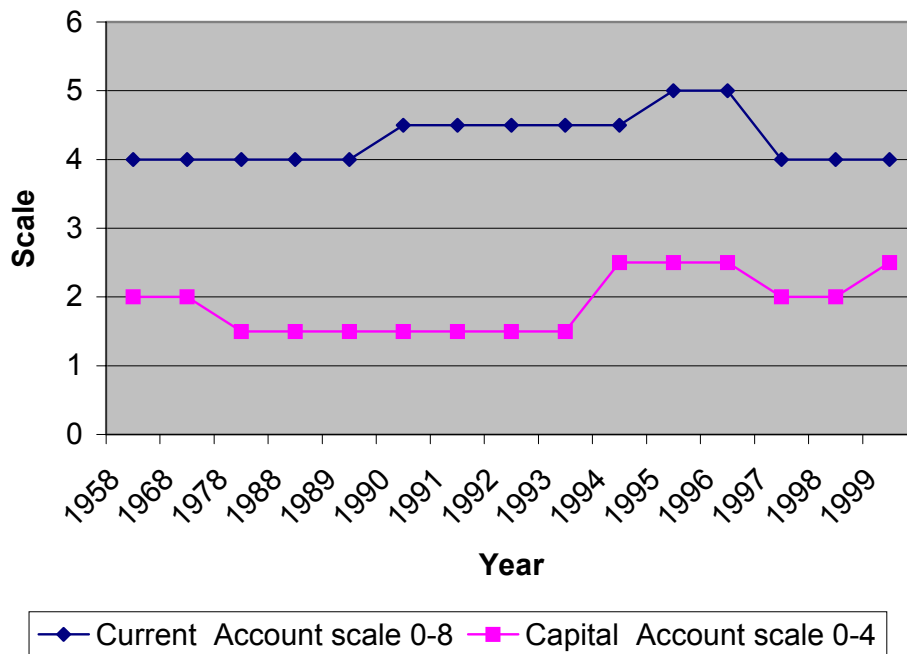


Chart 14: Current and capital account controls: Thailand



Appendix III

Table 1. Mapping Crisis Economies since the 1990s

Country	Date	Rule of Law scaled 0-10 (weight:5)	Property rights Creditors rights 0-10 (weight: 3)	Shareholder rights 0-10 (weight 1)	Accountancy standards 0-10 (weight 2)	Foreign bank presence 0-10 (weight: 1)	% State-Owned Banks 1998 0-10 (weight: 1)	Composite Structural Index Unweighted	International bond & bank debt/GDP %	Short-term Foreign debt/ FX reserve ratio Sept 1998	Functional DFL since the 1980s	KAO 1998-99	KAO reversal or debt default
Crisis Economies 1990s													
Argentina	1988, 2000-01	5.1	2.5	8.0	4.3	6.7	3.3	5.0	23.1	159	24.2	2.5	yes
Brazil	1998-99	6.5	2.5	6.0	5.9	3.3	3.3	4.6	17.3	114	0	3	yes
Peru	1983-90	0.8	0.0	6.0	7.8	6.7	10.0	5.2	13.2	74	27.6	3.5	yes
Mexico	1994-95	5.1	0.0	2.0	7.6	3.3	10.0	4.7	26	82	28.1	4	yes
Indonesia	1992-94, 97-98	3.0	10.0	4.0	0.0	0.0	3.3	3.4	42.2	75	40.2	3.5	
Korea	1997-98	5.2	7.5	4.0	7.2	0.0	6.7	5.1	29.9	173	67.5	3.5	
Malaysia	1985-88, 97-98	7.3	10.0	8.0	9.7	3.3	10.0	8.0	36.5	27	86.2	2	yes
Philippines	1981-87, 97-98	1.1	0.0	6.0	7.8	3.3	6.7	4.1	28.3	64	67.3	3	
Thailand	1983-87, 97-98	6.4	7.5	4.0	7.6	3.3	3.3	5.4	40.8	480	56.5	2.5	yes
Turkey	1991, 94-95, 2001	4.8	5.0	4.0	5.3	0.0	3.3	3.7	24.3	101	25.5	3	
Russia	1998	3.0	0.0	0.0	0.0	3.3	0.0	1.1	16.1	140	10.3	4	yes
Other EMEs													
PRC		4.2	0.0	2.0	0.0	0.0	3.3	1.6	10.2	13	34	1.5	
India		3.3	10.0	10.0	6.4	0.0	3.3	5.5	6.7	28	45.9	2.5	
Colombia		0.0	0.0	6.0	5.2	6.7	6.7	4.1	21.1	70	23	2.5	yes
Czech Republic		6.1	5.0	4.0	3.4	6.7	6.7	5.3	20	41	19	4	
Poland		6.1	0.0	6.0	3.4	3.3	3.3	3.7	9	25	24.9	3	
Saudi Arabia		4.4	0.0	0.0	3.4	0.0	10.0	3.0	15.5	„	64.3	4	
Venezuela		6.7	0.0	2.0	3.4	6.7	3.3	3.7	29.6	41	14.3	2	yes
Control Group													
Hong Kong, China		9.4	10.0	10.0	8.4	10.0	10.0	9.6	„	„	66.9	4	
Singapore		10.0	10.0	8.0	10.0	10.0	10.0	9.7	„	„	93.7	4	
Taipei, China		9.8	5.0	6.0	7.8	3.3	10.0	7.0	9.6	15	90.5	2.5	
Chile		7.6	5.0	10.0	5.5	6.7	10.0	7.5	30.9	49	44.2	3.5	yes
South Africa		3.6	7.5	10.0	10.0	0.0	10.0	6.9	18.9	232	62.6	2.5	
Hungary		6.1	0.0	4.0	3.4	6.7	6.7	4.5	11.2	62	52.9	3.5	
Crisis Economies		4.4	4.1	4.7	5.7	3.0	5.5	4.6	27.1	135.4	39.4	3.1	
Other EMEs		4.4	2.1	4.3	3.6	3.3	5.2	3.8	16.0	31.1	32.2	2.8	
Control Group		7.8	6.3	8.0	7.5	6.1	9.4	7.5	11.8	59.7	68.5	3.3	
core OECD countries											75.5	3.7	

Sources: Hawkins and Klau (2000) and Chan-Lee and Ahn (2001) and author's estimates. For details on Korean and Thai FX reserves see text.

Table 2. Panel Regressions: Dependent variable: External Vulnerability 24 EMEs 1994-2000

	C	FX-1	FX-2	Bnk	Bnk-1	Ext-vul-1	Social Infra-str	KAO	KAO*DFL	Adjusted R ² s	SEE	DW
<i>Equation Ext-vul</i>												
(1) Fixed Effects			-0.132 (-4.62)	0.126 (2.69)		0.877 (39.4)				0.83	1.48	1.99
(2) Common Intercept	-0.17 (-3.68)		-0.103 (-3.68)	0.093 (2.74)		0.91 (48.6)	0.032 (1.04)			0.829	1.49	1.97
(3) No intercept			-0.107 (-3.94)	0.078 (3.45)		0.918 (52.1)	0.0157 (1.11)			0.83	1.49	1.97
(4) No intercept			-0.102 (-3.68)	0.083 (3.32)		0.916 (51.55)		0.009 (.273)		0.829	1.49	1.96
(5) No intercept			-0.097 (-3.570)	0.091 (2.65)		0.914 (39.85)			-0.003 (-.716)	0.829	1.49	1.96
(6) Fixed Effects			-0.13 (-4.61)	0.124 (2.65)		0.878 (39.85)		-0.16 (-.70)		0.83	1.48	1.99
<i>Equation FX</i>												
(1 bis) Fixed Effects		0.402 (10,1)	0.037 (.95)	0.542 (6,65)	-0.209 (-2,53)	0.057 (2,25)				0.469	1.69	2.0
(2 bis) Common Intercept	0.22 (0,63)	0.492 (12,9)	0.091 (2,2)	0.522 (6,46)	-0.364 (-4,4)	0.067 (3,1)	0.058 (1,55)			0.445	1.73	2.1
(3 bis) No Intercept		0.492 (12,9)	0.095 (2,35)	0.534 (6,8)	-0.35 (-4,3)	0.062 (3,03)	0.079 (4,4)			0.445	1.73	2.1
(4 bis) No intercept		0.503 (13,7)	0.1 (2,45)	0.538 (6,73)	-0.37 (-4,4)	0.06 (2,88)		0.132 (3,29)		0.44	1.74	2.1
(5 bis) No intercept		0.502 (13,2)	0.105 (2,6)	0.552 (6,9)	-0.356 (-4,3)	0.061 (3,0)			0.0017 (3,2)	0.44	1.74	2.1

t values in brackets

balanced panel regressions 624 quarterly observations

Source: author's estimates

Chart III.1: Indicators of Exchange Market Pressure by Region

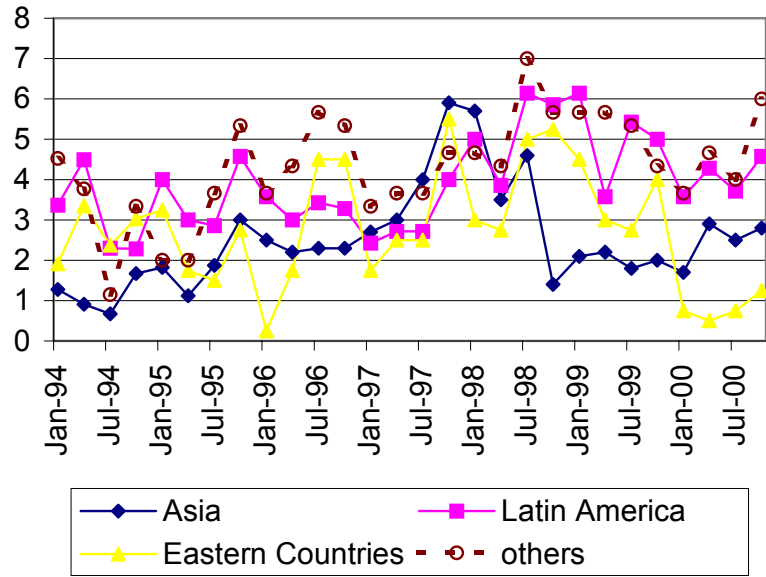


Chart III.2: Indicators of Banking System Pressure by Region

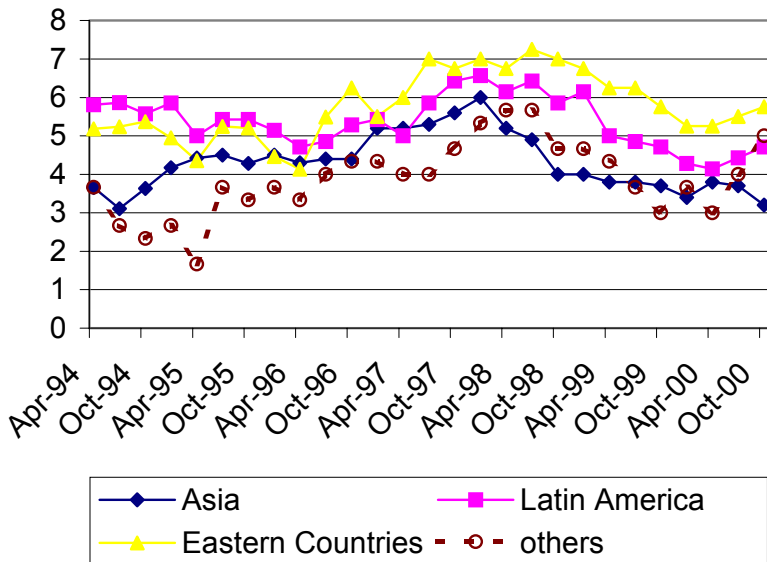


Chart III.3: Indicators of External Vulnerability by Region

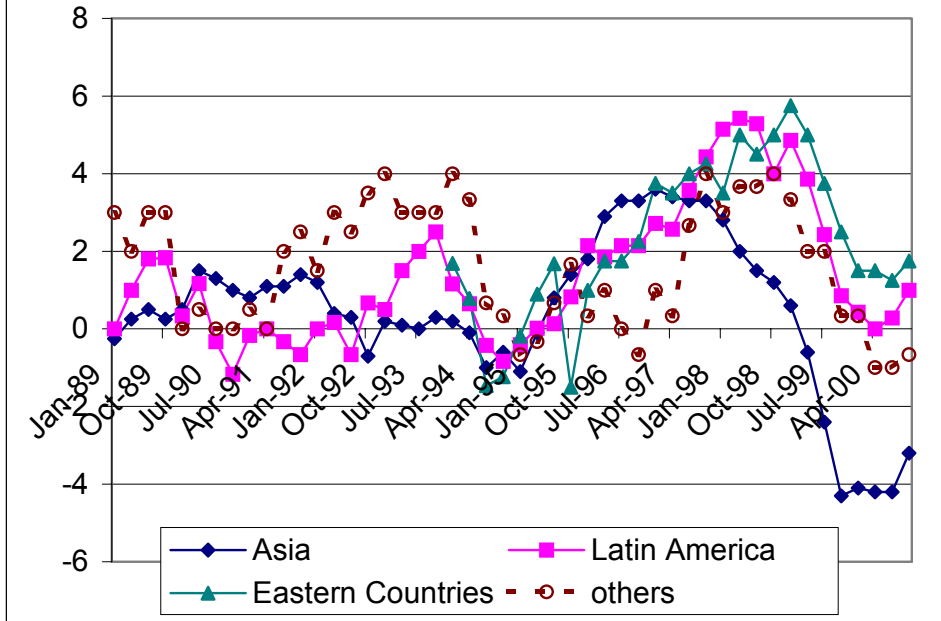


Chart III.4: EWS Indicators for Asia

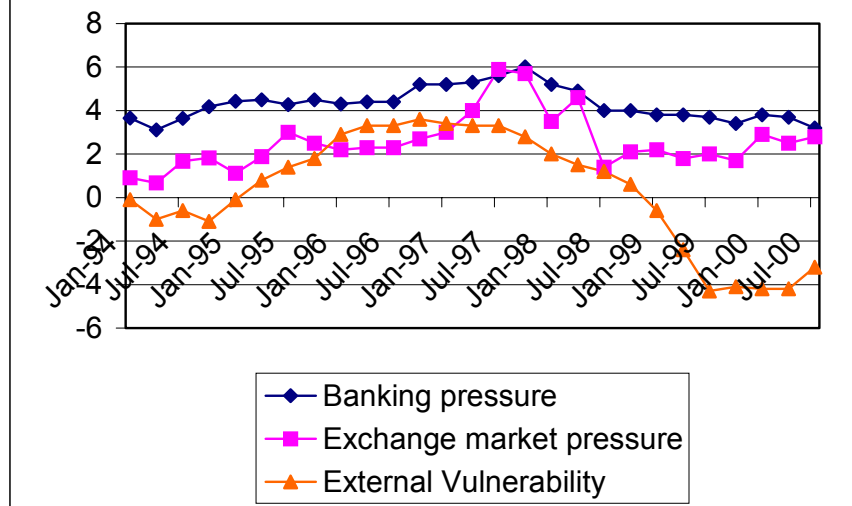


Chart III.5: EWS Indicators for Latin America

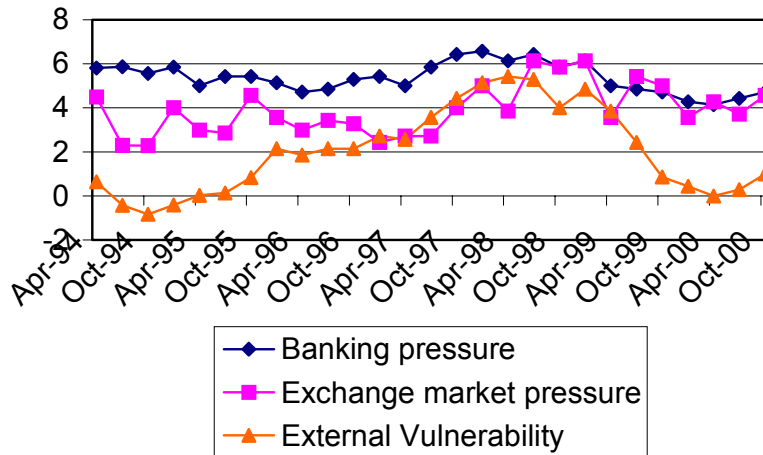


Chart III.6: EWS Indicators for Eastern Countries

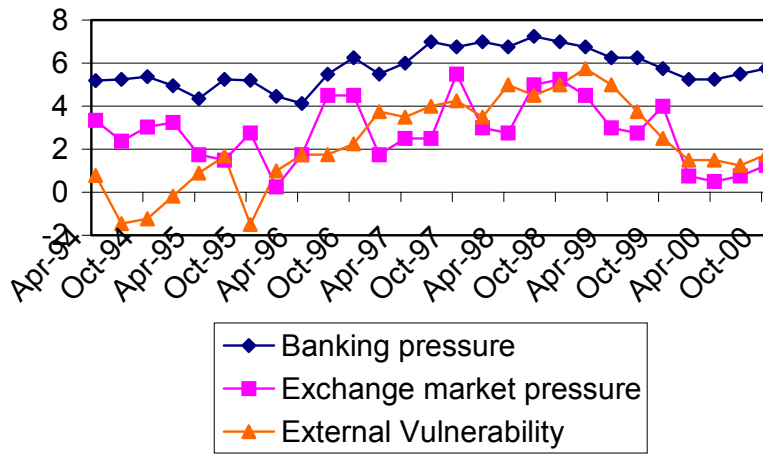
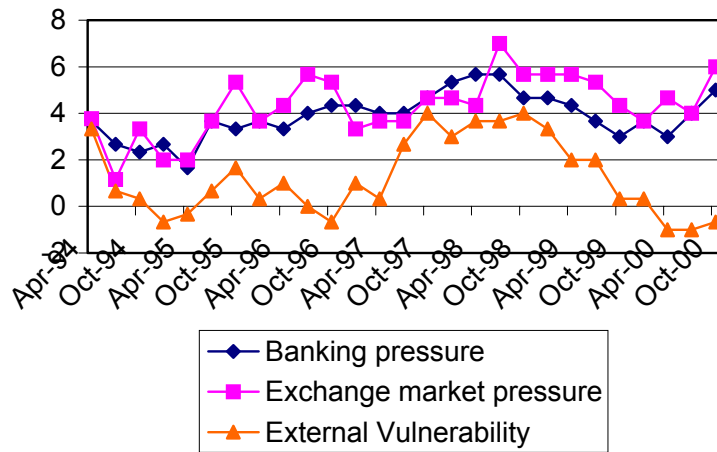


Chart III.7: EWS Indicators for Other EMEs



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