DID THE MALAYSIAN CAPITAL CONTROLS WORK?

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I. Introduction

The Asian financial crisis of 1997-98 wreaked havoc with the economies of some of the world's most successful performers. Three of the worst affected countries (Thailand, South Korea, and Indonesia) were forced to call in the IMF and to embark on IMF-supported--and many would say IMF-designed--programs to cope with the financial crisis. In return for financial assistance from the IMF (and other multilateral and bilateral donors), these countries committed to float their exchange rates, raise interest rates, tighten fiscal policy (at least initially), open up their financial markets to foreigners, close troubled banks and financial institutions, and undertake a range of other structural reforms.

Malaysia took a different path. Instead of going to the IMF, the Malaysian authorities imposed sweeping controls on capital-account transactions, fixed the exchange rate at RM3.80 per US$ (a rate that represented a 10 percent appreciation relative to the level that the ringgit had been trading at), cut interest rates, and embarked on a policy of reflation.

Did the Malaysian gamble pay off? Malaysia has recovered nicely since the crisis, but so have Korea and Thailand, two countries that took the orthodox path. It is clear that some of the more pessimistic prognostications about the consequences of capital controls have not been borne out. But can we say something more concrete about the relative merits of the capital-controls option as a crisis-resolution strategy, at least in this particular case?

There has been increasing acceptance in recent years of capital controls as a prudential measure aimed at preventing a build-up of short-term foreign liabilities, particularly in lower-income countries that do not have the capacity to put in place sophisticated financial supervisory

regimes. In the words of Michael Mussa (2000), "[h]igh openness to international capital flows, especially short-term credit flows, can be dangerous for countries with weak or inconsistent macro-economic policies or inadequately capitalized and regulated financial systems."[1] But the use of capital controls as a crisis-resolution measure remains highly controversial, despite a clearcut economic rationale. As emphasized in "second-generation" models of currency crises, a country can be faced with creditor panic and a run on reserves even when it has strong fundamentals. In these situations, a temporary suspension of capital-account convertibility can stop the rush to the exits and provide time for policy makers to take corrective action—it can "rule out the bad equilibrium by *force majeure*," in Paul Krugman's (1999a) words. But the risk is that capital controls can prove ineffective, undercut market confidence even further, and be used to delay needed adjustments.

In trying to determine the relative success of the Malaysian response to the Asian crisis, we must evaluate the Malaysian controls from four different yet complementary perspectives.

The first issue is narrowly financial: were the controls effective in segmenting Malaysian financial markets from offshore and international capital markets? The increased sophistication of financial markets, and in particular the spread of derivatives (enabling speculators for example to disguise short-term flows as direct foreign investment), has led many observers to be skeptical of governments' ability to target specific types of balance-of-payments flows for restriction.[2] Indeed, one might have been doubtful ex ante that the Malaysian government's controls would have been effective in this sense.

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[1] Mussa precedes this statement by writing: "the experience in recent financial crises could cause reasonable people to question whether liberal policies toward international capital flows are wise for all countries in all circumstances. The answer, I believe, is probably not."

[2] See Garber (1998) for a useful discussion of the issues.

Such doubts seem to have been misplaced. The government had no difficulty in sharply lowering domestic interest rates, and making the fixed exchange rate stick without the appearance of a black-market premium for foreign currency. As an IMF report states, "there [were] only a few reports of efforts to evade controls, and no indications of circumvention through underinvoicing of overinvoicing of imports" (Kochhar 1999, p. 8). Another IMF staff report concludes that the controls were effective in eliminating the offshore ringgit market and choking off speculative activity against the ringgit despite the easing of monetary and fiscal policies (Ariyoshi et al. 1999, part II, section II, 50-51). More systematic evidence is presented by Kaminsky and Schmukler (2000), who find that the September 1998 controls reduced the co-movement of Malaysian overnight interest rates with regional interest rates.[3]

The second perspective is medium-term economic: did the controls (combined with fiscal and monetary reflation and a fixed exchange rate) allow a faster recovery from the economic crisis and a superior economic performance than would have been possible in their absence? In other words, was the financial segmentation put to good use? This is where considerable controversy remains. The question is essentially whether Malaysia would have been better off in the immediate aftermath of the crisis following the orthodox, IMF-prescribed route that the other countries in the region followed. This is the question on which our paper focuses.

Third, we have to contend with a broader political question, having to do with the interaction of capital controls with political developments in Malaysia. Opponents of capital controls often argue that controls enlarge the scope for domestic political mischief. The possibility of corruption is mentioned frequently. In Malaysia's case, there is no indication of an increase in petty corruption—the controls were implemented transparently and with remarkable

[3] Malaysia's controls were the only ones that had this result among all the cases that they studied. This may be attributed to the more comprehensive nature of the Malaysian capital controls.

efficiency--but many knowledgeable observers have complained about the intensification of the regime's cronyism. K.S. Jomo, for example, argues that the controls served mainly to bail out the regime's cronies:

> The window of opportunity offered by capital controls has been abused by certain powerfully-connected business interests, not only to secure publicly funded bail-outs at public expense, but even to consolidate and extend their corporate domination, especially in the crucial finance financial sector. Capital controls have been part of a package focused on saving friends of the regime, usually at the public's expense. (Jomo, n.d., p. 3)

It is also clear that the controls made it easier for Mahathir to sack and humiliate his political rival Deputy Prime Minister Anwar Ibrahim. In fact, Anwar was fired just hours after the ringgit was pegged on September 2nd. We shall not have much to say about this aspect of the capital controls, but we recognize that a broader evaluation has to take into account their potentially quite negative implications for political governance.

Finally, one needs also to maintain a long-term perspective. Even if controls are successful in the short-run, it is possible that their long-term economic consequences will prove damaging. If this were to prove the case, Malaysia's medium-term benefits would have to be juxtaposed against longer-term costs before determining whether the policies were ultimately worthwhile. In Malaysia's case, one has to worry especially about the impact on direct foreign investment (DFI). Such investment has played an important role in the country's successful economic development to date, and a substantial drop in DFI would likely be bad news.[4] The Malaysian authorities were quite careful to target short-term speculative capital flows, insulating DFI, but there nevertheless remains the possibility that the controls will have a long-term

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[4] According to Athukorala (1998, p. 20) DFI contributed 73% of net capital inflows to Malaysia between 1990 and 1994.

deterrent effect on long-term investors. We will not have much to say on this issue either. The controls are too recent to ascertain with any degree of certainty their long-term consequences.

With regard to the question that is our focus--did the controls help Malaysia recover faster?--the prevailing view is that the answer remains unclear. The imposition of capital controls in Malaysia coincided with a general improvement in the business climate in the region.[5] Most economic indicators for Thailand and, especially, South Korea sharply turned upward just as Malaysia was beginning its own recovery. By almost all measures, South Korea's rebound since late 1998 has been more impressive than Malaysia's.

We shall argue that this type of comparison misses an important point. In early September, 1998, neither Korea nor Thailand faced another imminent financial crisis. Both had gone through an IMF program (or series of programs), which, with some delay, had begun to restore market confidence in these economies. There was no reason to believe that their policy configurations on September 1st, 1998, were in any way unsustainable. In fact, sizeable improvements in key indicators of market sentiment had already taken place in the months preceding September: in both countries, interest rates had come down sharply, the currency had appreciated significantly, and--at least in Korea's case--there had been a large increase in foreign currency reserves.

Contrast that with Malaysia's situation. When the Malaysian authorities instituted capital controls on September 1st, 1998, they did so under the belief that their existing policies were unsustainable because of intense and continued speculative pressure against the ringgit. Indeed, a simple indicator of financial market pressure that we will discuss later in the paper shows that

[5] Though, in many ways, the environment in the world was not as good as it had been a year previously when Thailand and Korea were implementing their IMF programs. Shortly after the imposition of controls in Malaysia, both Brazil and Russia experienced severe crises. Also, whereas Japanese imports had been rising in late 1997, they were in decline again by late 1998.

pressure on the ringgit reached its peak just before the Malaysian authorities decided to implement capital controls. The most concrete form that the speculation took was a large differential between onshore and offshore interest rates for ringgit deposits. Unlike in Korea and Thailand, where interest rates had fallen to single-digit levels by the end of the summer, offshore ringgit deposits were paying rates in the range of 20-40 percent. Although domestic interest rates remained stable due to an interest rate ceiling of 2.5 percentage points over the government-determined base lending rate (Kochhar 1999, p. 62), the large onshore/offshore interest rate differential initiated massive capital flight and a subsequent credit crunch. There was widespread speculation in the market that Malaysia would be the next country to go to the IMF.

So when Malaysia altered its policies on September 1st, it did so because its existing policies were unsustainable and not working. It is hard to believe that Malaysia would have experienced Thailand's or Korea's economic performance in subsequent months while maintaining its existing policy configuration. We shall suggest a different counterfactual, namely that the alternative to the capital-controls strategy was to go to the IMF for assistance--i.e., to do what the other countries had done earlier. From this perspective, the appropriate counterfactual for Malaysia is the performance exhibited by the other countries subsequent to their resort to IMF assistance. Formally, this calls for a time-shifted difference-in-differences methodology to discern the economic consequences of the controls. In other words, we shall treat the timing of the before-after comparisons as country-specific, centering it on the date that each country called in the IMF or, as in Malaysia's case, imposed capital controls.

We discuss at length later on the identifying assumptions needed to make the time-shifting valid, and the efforts we have made to reduce possible biases. In particular, we try to control for the external environment to ensure that our results are not biased by differences in the

overall business climate in the region at the time that each of the countries resorted to their crisis-resolution policies. If one accepts the identifying assumptions and is persuaded by the robustness checks, the results are quite strong. We find that the Malaysian controls produced better results than the alternative on almost all dimensions. On the real side, the economic recovery was faster, and employment and real wages did not suffer as much. On the financial side, the stock market did better, interest rates fell more, reserves recovered more rapidly, and net financial flows turned around faster. However, we will also present conventional difference-in-differences estimates for the skeptic, which take September 1st, 1998, as the turning point for all the countries. These results are more mixed, but generally less favorable to Malaysia's policies than to policies pursued by Korea and Thailand.

The outline of the paper is as follows. In the next section we briefly review the nature of the Malaysian controls and summarize existing evaluations of their effectiveness. Section III is devoted to methodological issues, and discusses the appropriateness of time-shifted versus conventional difference in differences. In section IV we present evidence that the timing of the Malaysian financial crisis differed in significant details from the Korean and Thai crises. Section V presents the main empirical results. Section VI discusses some alternative interpretations of the evidence. Finally, we offer concluding remarks in section VII.

II. Malaysia's capital controls and previous evaluations

Malaysia entered the Asian financial crisis with relatively strong fundamentals, and (thanks to an earlier bout with restrictions on capital inflows in 1994) a much smaller share of

short-term external debt in total.[6] Table 1 shows some key financial data. Malaysia's short-term debt stood well below its foreign exchange reserves, which made it less prone to a run by foreign creditors. At the same time, as a country with a very high level of indebtedness overall, Malaysia was quite vulnerable to turnarounds in general market sentiment that would be reflected in an increase in interest rates or reduction in credit availability.

Malaysia had the world's highest stock market capitalization ratio (310 percent of GDP, compared to 116 percent in the U.S., and 29 percent in Korea). The rise in equity prices had in turn contributed to a domestic lending boom, leaving Malaysia in mid-1997 with a domestic debt-GDP ratio (170 percent) that was among the highest in the world (Perkins and Woo 2000, 237). Private sector indebtedness was higher than in Thailand, and more than double the ratio in Korea. At moments of financial panic, potentially all short-term liabilities, regardless of whether they are of residents or non-residents, become claims against the government's liquid foreign assets. From this perspective, Malaysia looked even less well protected. The stock of M2 was equal to GDP (much higher than corresponding ratios for Korea and Thailand).

In response to the Thai crisis and the reversal of capital flows to the region, Malaysian authorities at first implemented an orthodox adjustment policy.[7] Interest rates were raised to stem the decline of the ringgit, and in December 1997 a drastic cut (18 percent) in government spending was announced. This policy package mimicked IMF programs elsewhere, and was pushed through by Deputy Prime Minister Anwar Ibrahim. Anwar also made clear that he was committed to exchange-rate flexibility and that capital controls would not be implemented.

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[6] In response to a surge of speculative inflows in late 1993 betting on an appreciation of the ringgit, the Malaysian government imposed restrictions on the sale of short-term securities to foreigners in January and February 1994. These restrictions resulted in a sharp reduction in short-term liabilities. See Rodrik and Velasco (forthcoming).

[7] This paragraph and the next are based on Haggard and Low (2000) and Perkins and Woo (2000).

Meanwhile Prime Minister Mahathir was blowing off steam against financial market "speculators," and sending very different signals.

The Malaysian economy failed to respond to the orthodox policies. Consumption and investment demand plunged as a result of capital outflows, high interest rates, and a pessimistic outlook. This gave the opponents of Anwar's policies the upper hand, and at the end of June, 1998, Mahathir appointed Daim Zainuddin, a former finance minister, as minister in charge of "tasks relating to economic development." Daim was told to fomulate an alternative to Anwar's policies. Daim and Mahathir were intent on reflating the economy through cuts in interest rates and credit expansion, but there was little effective change in monetary policies over the ensuing months. The attempt to reduce domestic interest rates was undercut by growing speculation against the ringgit in offshore markets. Offshore institutions (mainly in Singapore) borrowed ringgit at premium rates (double or triple the prevailing interest rates in Malaysia) to purchase dollars and bet in favor of the ringgit's collapse. The economy's decline continued. This was the background against which the controls were instituted on September 1st.

The primary objective behind the capital controls was to end speculation against the ringgit. Most of that speculation was coming from short-selling of the ringgit in offshore (mainly Singaporean markets). These markets were offering high interest rates to attract ringgit deposits that in turn served to fund the shorting of the currency. To shut down offshore trading, the government mandated that all sale of ringgit assets had to go through authorized domestic intermediaries, effectively making offshore trading illegal. All ringgit assets held abroad had to be repatriated. Worried that these measures would lead to an outflow of capital and further depreciation of the currency, the Malaysian government also banned for a period of one year all repatriation of investment held by foreigners. Simultaneously, in an attempt to revive aggregate

demand, Malaysia lowered the 3-month Bank Negara Intervention Rate from 9.5% to 8% and on September 16th, the liquid asset ratio was reduced from 17% to 15% of total liabilities. On February 15th, 1999, the Central Bank of Malaysia changed the regulations on capital restrictions, shifting from an outright ban to a graduated levy and replacing the levy on capital with a profits levy for future inflows. The controls are described more fully in the accompanying box.

Malaysian Controls on Capital and Exchange Controls Sept. 1-2, 1998

(1.) Malaysia fixed the exchange rate at RM 3.80 per $US
(2.) Prior approval was required for nonresidents to be able to buy or sell ringgit forward.
(3.) All sale of ringgit assets was required to be transacted through approved domestic intermediaries. This effectively shut down the operation of the offshore ringgit market.
(4.) Nonresidents were required to obtain BNM approval to convert ringgit held in external accounts into foreign currency, except for the purchase of ringgit assets in Malaysia or for the purposes of conversion and repatriation of sale proceeds of investment made by foreign direct investors.
(5.) Settlements of imports and exports became required to be settled in foreign currency. However, free exchange was maintained for all current account transactions in addition to supply of trade credit to non-resident exporters of Malaysian goods.
(6.) Credits to External Accounts were limited to sale of foreign currency, ringgit instruments, securities or other assets in Malaysia; salaries, wages, rentals commissions, interest, profits, or dividends.
(7.) Debits to External Accounts were restricted to settlement for purchase of ringgit assets and placement of deposits; payment of administrative and statutory expenses in Malaysia; payment of goods and services for use in Malaysia; and granting of loans and advances to staff in Malaysia.
(8.) Domestic nationals were forbidden to export more than RM10,000 during any travels abroad. Foreign nationals were forbidden to export more than RM1000 upon leaving Malaysia.
(9.) After September 1, 1998, nonresident sellers of Malaysian securities were required to hold on to their ringgit proceeds for at least 12 months before repatriation was to be allowed.
(10.) Ban on the provision of domestic credit to non-resident correspondent banks and stockbroking companies.

1999 Changes in Controls

(1.) As of February 15, 1999, the year-long moratorium on repatriation of investments was replaced with a graduated tax. All capital having entered Malaysia before February 15, 1999 were subject to the following levies on the capital being removed: (a.) 30% if repatriated within the first 7 months after entering Malaysia, (b.) 20% if repatriated between 7 and 9 months after entry, (c.) 10% if repatriated between 9 and 12 months of entering, and (d.) no levy if repatriated after one year of entry.
(2.) For funds entering Malaysia after February 15, 1999, capital was free to enter and leave without taxation; however, profits were taxed at the rate of 30% if repatriated within one of entry and 10% if repatriated after one year of entry

The government was concerned about the impact of the controls on future capital inflows, particularly of direct foreign investment (DFI) on which the Malaysian economy is highly dependent. The authorities therefore took pains to ensure that the controls would not affect DFI or current account transactions. Repatriation of profits and dividends from (documented) DFI activities were freely allowed. Foreign currency transactions for current-account purposes (including the provision of up to 6 months of trade credit for foreigners buying Malaysian goods) were also not restricted.

Early reactions to the controls ranged from cautious to hostile. The IMF did not openly condemn Malaysian policies, but it did not hide its views about their inappropriateness either. An IMF spokesman was quoted as saying "the IMF believes that any restrictions imposed on the movement of capital (are) not conducive to building investor confidence" (quoted in "IMF Suggests Malaysian Move is a Disincentive," Asian Wall Street Journal, 9/2/98, p. 2). Other observers were less circumspect. Oxford Analytica declared "Exchange controls will undermine Malaysian growth" (headline of September 15, 1998 report). An article in Forbes International predicted “Foreign investors in Malaysia have been expropriated, and the Malaysians will bear the cost of their distrust for years” (Roche 1998). Moody's downgraded Malaysian securities. Morgan Stanley dropped Malaysia from its international index, stating that Malaysia would permanently be excluded from it and that its previous inclusion had been a mistake in the first place.[8] Spreads rose more than 200 basis points for Malaysian bonds in September, while they declined for other East Asian countries (with the exception of Indonesia).

Early prognostications of impending doom were gradually replaced by more upbeat projections, as it became clear that Malaysia was recovering rather than sinking deeper into

[8] This is reported in Kochhar (1999, p. 11). A year later, Morgan Stanley announced that it would reinstate Malaysia in its index, explaining that many investors had remained in the Malaysian market.

crisis. It is instructive to follow the transformation from the pages of successive World Economic Outlooks of the IMF:

> "[T]he introduction by Malaysia in early September of exchange and capital controls may also turn out to be an important setback not only to that country's recovery and potentially to its future development, but also to other emerging market economies that have suffered from heightened investor fears of similar actions elsewhere" (WEO, October 98, p. 4).
>
> "Despite stimulative monetary and fiscal policies introduced last year, however, domestic demand is expected to strengthen only gradually…. " (WEO, May 1999, p. 19).
>
> "… a strong economic recovery is also now underway in response to fiscal and monetary stimulus and the pegging of the exchange rate a competitive level." (WEO October 1999, p. 19).

In May 1999, Malaysia went back to the international market with a $1 billion bond issue, paying a premium of 330 points above U.S. Treasurys. By June 1999, the Wall Street Journal would editorialize that "there never was any doubt that preventing money from fleeing Malaysia could provide short-lived relief" (WSJ, June 25, 1999, A18).

The Wall Street Journal notwithstanding, whether (and the extent to which) Malaysian controls contributed to economic recovery remains a highly debated matter. Some scholars, such as Merton Miller, continue to view the controls as an unmitigated disaster.[9] The mainstream view is that it is hard to attribute much success to the capital controls since Korea and Thailand also recovered around the same time without using capital controls. Linda Lim's (1999)'s account is worth quoting at length, as it is representative:

> Following the imposition of capital controls, economic indicators in Malaysia did indeed start improving. But they also improved at the same time in the other crisis-hit countries which did not impose such controls but maintained open capital accounts. All the crisis-hit countries' currencies stabilized and strengthened, their inflation and interest rates fell,

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[9] Miller was quoted in the Asian Wall Street Journal as saying that "… the experiment with controls was at best useless… The bad news is that the episode was actually harmful to Malaysia and its citizens" (Asian Wall Street Journal, July 9, 1999.)

> their current accounts moved from deficit into substantial surplus and private capital inflows increased, contributing to the replenishment of previously depleted foreign exchange reserves. Their stockmarkets started climbing, and the decline in their GDP growth rates moderated sharply and have now reversed with positive growth predicted for 1999 as a whole everywhere except Indonesia. Until very recently, the recovery in Malaysia actually lagged behind that of its neighbors who were IMF patients, particularly in inflows of foreign direct investment which fell in 1998 whereas they increased in the other countries (except Indonesia). My own opinion is that capital controls in Malaysia were neither necessary nor sufficient for economic recovery, just as they have obviously not been necessary in the equally if not more impressive recovery of the other crisis-hit Asian countries which followed the more conventional IMF policy prescriptions. Indeed, given Malaysia's much stronger macroeconomic fundamentals and financial institutions before the crisis, one would have expected its recovery to be faster and stronger than that of the other countries. That this has not happened suggests that capital controls—or the heightened political risk which accompanied their imposition--may be exerting a drag on recovery through the discouragement of some foreign capital inflow.

Even sympathizers of capital controls have taken a cool attitude towards the success of Malaysian policies (Krugman 1999b, Jomo n.d.), on essentially the same ground: there was a recovery even in the countries that did not impose controls. Krugman (1999b) writes “the market panic of 1997-98 was, it turns out, coming to an end just about the time that Malaysia decided to make its big break with orthodoxy."

We shall challenge the view that the financial crisis in Malaysia was about to abate in September 1998, and that an economic recovery was around the corner. Financial market indicators suggest that pressure on the Malaysian currency remained high in Malaysia, months after the Korean and Thai currencies had begun to appreciate. It is clear that the Malaysian authorities acted because they believed a sharp change in policies was “needed to avert an imminent financial panic" (Liu 2000, 284). The situation in which Malaysia found itself on September 1st, 1998, was more akin to that which had forced Thailand and Korea to call in the IMF quite a while back (in July and October 1997, respectively). And if it is the case that the timing of the financial crisis was different in Malaysia, the fact that Korea and Thailand began to

recover at the same time that Malaysia did is not very informative about the effectiveness of the Malaysian controls.

III. Methodological considerations

In evaluating the consequences of the Malaysian capital controls, it is natural to use as a counterfactual the experience of the other Asian countries affected by the crisis. This is in fact the strategy adopted by the authors cited above, albeit informally and often implicitly. A difference-in-differences specification is the appropriate framework for thinking about this question.[10] Let y_{it} denote some measure of economic performance of interest, where t stands for time and i stands for one of our four countries (i = Malaysia, Korea, Thailand, Indonesia). Consider the following representation:

$$y_{it} = \sum_i \alpha_i d_i + \beta d_{t>t} + \gamma d_M d_{t>t} + u_{it} \quad (1)$$

where:

d_i is a country-specific dummy variable (d_M = 1 when i = Malaysia and 0 otherwise, and so on);

$d_{t>t}$ is a time-varying dummy variable that takes the value 1 during the 12 months (or four quarters) that follow t = September 1, 1998 (i.e., during the one-year period subsequent to the imposition of capital controls in Malaysia), and is 0 otherwise; and

u_{it} is the error term.

This specification allows y_{it} to have a country-specific, time-invariant intercept (captured by α_i). It also allows y_{it} to be influenced by a common underlying factor during the period that the capital controls were in use in Malaysia (i.e., while the "treatment" is in effect). This time-

[10] See Meyer (1994) for a good discussion of the methodological issues in difference-in-differences estimation.

varying, but common effect is captured by the coefficient β. The coefficient of greatest interest is the one on the interaction term $d_M d_{t>t'}$, γ, which captures the differential effect of the capital controls in Malaysia. With this specification, the average post-September 1998 performance of the comparators (relative to their earlier performance) becomes the counterfactual used in estimating the effectiveness of the Malaysian policies.

Equation (1) represents the conventional application of the difference-in-differences approach to this case. It has the merit that it controls for ("differences out") the effects of both country-specific and time-varying influences that might otherwise be attributed to the use of capital controls. In particular, a common improvement across countries in fundamentals that coincides with the use of capital controls in Malaysia gets washed out by the term $\beta d_{t>t'}$. We shall present empirical estimates using this approach later on.

However, there is a serious problem with conventional difference-in-differences. For γ to be an unbiased estimate of the effect of the capital controls, an essential identifying condition must hold: β must be identical for all the countries. This requires us to believe that Malaysia would have experienced the same economic recovery as the other countries in the months following September 1998 had capital controls not been imposed.

This is implausible for three reasons that we shall elaborate at greater length later in the paper: (1) The timing of the financial crisis was somewhat different in Malaysia. During the summer of 1998, market pressure on Malaysia's currency remained very high whereas the crisis had already abated in Korea and Thailand. (2) The policy configuration that prevailed in Malaysia until September 1998 was unsustainable, in view of the ongoing speculation against the ringgit. Doing nothing may not have been a relevant counterfactual in the way that the

difference in differences assumes. (3) One can presume that Mahathir was intent on sacking Anwar, his chief political rival, sometime towards the end of 1998. Since Anwar was viewed as the guardian of economic orthodoxy in Malaysia, the consequence would likely have been even greater financial panic. Indeed, in the absence of one or more of these factors, it is very hard to make sense of why the Malaysian government abruptly changed course, introducing capital controls and fixing the exchange rate.

We will discuss these issues further in the next section. For now, let us simply assume that the Malaysian crisis was deepening in late summer 1998 and that the prevailing policies were unsustainable. Consider the implications for our empirical methodology of the difference in the timing of the crisis and policy response. We would like to know what Malaysia's performance would have been in the absence of capital controls. The answer requires specifying a counterfactual policy response. Luckily, we have a natural counterfactual: going to the IMF for help. This is the course of action that the other countries took once they reached a point in the crisis that required emergency measures. This way of specifying the counterfactual provides us with an alternative identifying assumption: in the absence of capital controls, Malaysia would have had to request IMF assistance to shore up confidence, and its post-September 1998 economic performance would have exhibited the same change that the other economies experienced subsequent to their request for IMF assistance.

This calls for a time-shifted difference-in-differences specification, of the following form:

$$y_{it} = \sum_i \alpha_i d_i + \beta d_{t>t_i} + \gamma d_M d_{t>t_i} + u_{it} \quad (2)$$

The main difference from before is that the time-varying post-"treatment" dummy is now country specific (i.e., $d_{t>t_i}$ instead of $d_{t>t}$), which reflects the argument that the treatment was applied in

different countries at different times. $d_{t>t_i}$ equals 1 during the 12-month period following country *i*'s first appeal for IMF assistance (and in the case of Malaysia, during the 12-month period following the imposition of capital controls), and is 0 otherwise.

With this change, the parameters β and γ acquire somewhat different interpretations than in the conventional difference-in-differences: β captures the effect of undergoing IMF treatment during an economic crisis (relative to outcomes in more normal times), while γ captures the differential effect of capital controls in Malaysia (compared to an IMF program). The specification does not allow us to gauge the effects of an IMF program per se, because we observe an IMF program only during a crisis. So β picks up a mix of IMF and crisis effects. This is not a major concern since our main interest, once again, is in the parameter γ. Under the assumption that Malaysia implemented its capital controls at a stage in the financial crisis that is comparable to that at which the other countries called in the IMF, γ is an unbiased estimate of the effect of the Malaysian controls relative to the counterfactual of an IMF program. Note moreover that γ picks up the effects of not just the capital controls, but of the entire post-September 1998 Malaysian package--including the fixed exchange rate, reflation via interest-rate cuts, and so on.[11]

A simple analogy helps provide the basic intuition behind the time-shifted difference-in-differences approach we have just outlined. Suppose that two twin sisters both catch a virus, which left untreated, will just continue. Assume that one of the sisters, Corinne, receives a standard treatment on Sunday. Assume further that May receives no treatment until Wednesday but then receives a special treatment. If we do a standard difference-in-difference analysis,

[11] This is not cause for worry, since these additional policies were enabled in large part by the imposition of capital controls.

ignoring that the two sisters fell ill on different days, we might look at the difference in the fevers of the two sisters on, say Friday versus Wednesday. We would then attribute the change in the difference between the sisters' fevers to the medicine that May received. However, such a calculation would be almost certain to lead to the conclusion that the special medicine made the patient worse off. By Wednesday, Corinne has started to recover, while the medicine that May took may not have worked fully.

In this particular case, the disease is the same across individuals and the individuals are assumed to react to both the disease and any potential medication in an identical manner. Therefore, it is obvious that a more fruitful approach is to compare the time path of the disease after application of the conventional medicine with the time path of the disease following the application of the special treatment. In other words, we would want to time shift across sisters to match the application of the medicine. Replace Corinne with Korea, and May with Malaysia, and the logic of our approach becomes identical.

While time shifting corrects the type of bias just discussed, it creates the potential of another bias. The main risk that we run by doing a time-shifted difference in differences is that there might a correlation between the external economic environment and $d_{t>t_i}$. More concretely, Malaysia may have imposed its controls in a much more favorable environment than prevailed at the time that Korea (or Thailand or Indonesia) implemented their IMF programs, and this in turn may account for a substantial part of the speedier recovery in the former country. We cannot entirely rule this possibility out, but we make the following points in our defense.

First, as we shall show below, it is not at all obvious that the external environment was improving for Malaysia during the second half of 1998 in the way that it had been for Thailand and Korea. Pressure on the ringgit remained very strong, even though the Korean won and Thai

baht had already started to appreciate. Interest rates in both Korea and Thailand had declined significantly, whereas offshore interest rates on ringgit deposits remained in double digits. The recession in Korea and Thailand had already bottomed out by September 1998, with Korea in particular exhibiting a healthy rebound; but there were no indications of a similar easing up in Malaysia. Second, it is not obvious that an improvement in the external environment, to the extent that it did take place, would have produced much benefit for a country that actually cut itself off from international financial markets by implementing capital controls.[12] To the extent that the controls were effective, they would have insulated Malaysia from an improvement in market sentiment (which is in fact an argument that the opponents of capital controls have made). Finally, we shall try to reduce the scope for spurious correlation by introducing in our time-shifted difference-in-differences regressions several time-varying indicators related to the external context--namely, U.S. interest rates, inflation, and economic activity, and (in the quarterly regressions) a measure of net financial flows to the region.

IV. Timing and Magnitude of the Malaysian financial crisis

Financial indicators for the period suggest that the Malaysian economy was not as hard hit as Thailand, Korea, and Indonesia at the outset of the Asian financial crisis, but that things got progressively worse for Malaysia even as the pressure eased in Korea and Thailand. We show this using a simple indicator of financial market "pressure" for the three countries.

The financial market pressure index is calculated as a weighted average of the (log) exchange rate, (log) foreign currency reserves (with declines in reserves contributing positively to the index), and the interest rate. This is similar to the speculative pressure index constructed

[12] Indonesia, for one, did not benefit very much from the return of investor confidence to the region, for reasons that are specific to its own circumstances.

by Eichengreen, Rose, and Wyplosz (1995). The idea is that financial market pressure must be reflected in a decline in the value of the home currency, a decline in reserves, or an increase in interest rates. As weights, we use the inverse of the monthly standard deviations of each of the indicators, pooling the data for the three countries over the 1989-2000 period. This serves to underweight the more volatile components of the index. In Malaysia's case, we use the offshore interest rate rather than the onshore rate, as the latter is the more relevant indicator of speculative pressure. (Offshore markets did not play a significant role in the other two countries.)

Figure 1 shows our financial market pressure index for the 1996-2000 period. It is clear from the figure that the speculative attacks differed in their timing. Thailand was hit first, with the peak of the crisis occurring in September 1997. Korea followed with a few months lag, reaching a peak in January 1998. Malaysia was behind both countries, and it began to experience a sustained increase in the index only during the early months of 1998. The peak value of the index for Malaysia is reached in August 1998, just before the imposition of the capital controls. (The sharp decline in the Malaysian index in September 1998 is due to the closing off of the offshore market and the fixing of the ringgit at an appreciated rate). Note that throughout 1998, the financial pressure index for Malaysia moves in the opposite direction from that for Thailand and Korea. This is a rather clear indication that speculative pressure continued to build up in Malaysia at a time when the other two countries were beginning to breathe easier.

We can get some insight into why the indices for the three countries behave so differently by observing the trends in the components of the index. Figure 2 shows interest rates, with both onshore and offshore rates displayed for Malaysia. Note the very rapid rise in offshore rates for ringgit after May 1998, at a time when Korean and Thai interest rates were receding from the heights reached in late 1997-early 1998. Just prior to September 1998, the offshore market was

offering ringgit rates of between 20-40 percent to attract domestic ringgit (compared to the 11 percent offered by banks in Malaysia). These ringgit deposits were used to fund the short ringgit positions that offshore banks, hedge funds, and portfolio institutions held in expectation of a sharp depreciation.[13] The consequent leakage of ringgit abroad was a major reason why the desired credit expansion within Malaysia failed to take place and why the investment rate plummeted.

Figure 3 displays foreign currency reserves. Here the difference between Malaysia and South Korea is especially striking. Korean reserves sharply rebounded in early 1998, while Malaysia's reserves continued to fall. There is no increase in Malaysian reserves until after September 1998. This is also reflected in currency values, as the ringgit continued to depreciate from the end of March (after a rebound in the first quarter of the year) while the won steadily appreciated (Figure 4).

By the summer of 1998, Malaysia was viewed from the outside as a country in deep trouble. The media and financial markets were rife with speculation that Malaysia was next in line for an IMF program. The headline of an article in Barron's is representative: "Malaise-ia: While Kuala Lumpur is in Denial, it may be next for IMF aid" (7/6/ 1998, p. 28). The trouble was attributed variously to the sidelining of Anwar, the intemperate remarks of Mahathir about the international financial system, and the unsustainability of the reflation policies in view of the pressure on the currency. Far from being out of the woods, the Malaysian economy in late August 1998 was still mired in a financial quagmire. Whether this was partly its own doing is

[13] See the description of the foreign exchange markets in BNM (1999, 572-577).

irrelevant from our current perspective.[14] The crucial point is that Malaysia's policy framework in September 1998 looked as unsustainable as Thailand's had been in July 1997 or Korea's in November 1997.

Moreover, the impending dismissal and jailing of Anwar--assuming Mahathir was intent on getting rid his one-time ally regardless of economics--would surely have made the financial crisis significantly worse. As Perkins and Woo (2000, 230) note

> Mahathir had foreseen that Anwar's expulsion would lead to violent street demonstrations that, in turn, would induce large capital outflow, given the extreme nervousness among investors in the midst of the financial crisis….. If the capital control shad not been in place when the street demonstrations began, the Malaysian ringgit (MR) and the Kuala Lumpur stock market would most likely have gone into a free fall in the manner that the Indonesian rupiah and the Jakarta stock market did in May 1998, just before Soeharto stepped down from the presidency.

As we pointed out above, financial markets viewed Anwar as the guardian of economic orthodoxy in Malaysia and an important counterweight to Mahathir. His removal--whether accompanied by riots or not--would have been an occasion for a run on the ringgit.

This is important insofar as it suggests that the relevant counterfactual for how the Malaysian economy would have evolved absent capita controls must include the consequences of Anwar's sacking. Therefore, not only was Malaysia in dire financial straits on the eve of the imposition of capital controls, but also there is good reason to believe that the worst was yet to come.

[14] One ought to remember also that neither Thailand, with its explosive current account deficit and off-balance sheet sales of its reserves, nor Korea, with its huge and partly disguised short-term foreign liabilities, had been paragons of financial virtue.

V. Empirical results

The basic regression we estimate is an augmented version of equation (2) discussed previously:

$$(3) \qquad y_{it} = \sum_i \alpha_i d_i + \beta d_{t>t_i} + \gamma d_M d_{t>t_i} + \sum_j \delta_j X_{it}^j + \sum_k \phi_k Z_t^k + u_{it}$$

where

y_{it} is a measure of economic performance that is of interest (for example, growth);

d_i is a set of country dummies;

$d_{t>t_i}$ is the "treatment-period" dummy which equals 1 during the 12-month (or 4-quarter) period following country *i*'s first appeal for IMF assistance or, in the case of Malaysia, during the 12-month (4-quarter) period following the imposition of capital controls, and is 0 otherwise;

$d_M d_{t>t_i}$ is the interaction term of the Malaysia dummy with $d_{t>t_i}$;

X_{it}^j is a set of country-specific time-varying variables (country-specific monthly or quarterly dummies, and a country-specific time trend);

Z_t^k is a set of time-varying variables capturing the external economic conjuncture (U.S. interest rates, U.S. inflation, and a measure of U.S. economic activity--monthly industrial production index or quarterly real GDP--and in the case of quarterly regressions, a measure of net private financial flows to the region); and

u_{it} is the error term.

Note that the specification includes country-specific monthly or quarterly dummies (to guard against possible spurious correlation arising from seasonality in the timing of treatment in different countries), as well as country-specific time trends. The external economic environment

is controlled for by the inclusion of Z_t^k. The parameter β establishes the baseline post-treatment response, while γ is our estimate of the difference that is attributable to capital controls in Malaysia.[15]

The data come mostly from the International Financial Statistics of the IMF. Stock market data are from the Emerging Markets Database, and Malaysian employment and wage data are from the Monthly Manufacturing Statistics of Malaysia. Where possible, we use monthly data. But since many indicators of real economic activity are available only on a quarterly basis, we supplement the monthly regressions with quarterly regressions as well. The regressions cover the period 1993 through 2000 for the most part, although in some cases data availability dictates a shorter time span.

Table 2 shows the timing of the "treatment" windows for each country. Our focus is on the one-year period following the seeking of IMF assistance or the imposition of capital controls. This seems to us to be the relevant time span for answering our central question about the speed and vigor of the recovery. In the case of Malaysia, this corresponds to the September 1998-August 1999 period (1998:IV-1999:III in the quarterly regressions). For the other countries, we pick a starting point that follows as closely as possible the date at which the country first requested IMF assistance. We pick that date rather then the date of program announcement or IMF Board approval (also shown in Table 2), because the time lag between these dates, reflecting the bargaining and negotiation with the IMF, seems to us to be a relevant part of the

[15] Note that with the inclusion of other covariates on the left hand side of our regression, the difference-in-differences coefficient is a difference that is conditional on the covariates.

counterfactual.[16] But it would have made little difference had we used the latter dates as the starting point. Note that the timing is necessarily more precise with the use of monthly data.

We shall focus on comparisons with Korea. That is in the first instance due to more complete data availability in Korea (in comparison with Thailand and Indonesia) on real indicators. But Korea also has the advantage that it is considered to be the IMF's most successful patient in the region. Since our results indicate that Malaysian controls were also quite successful, it is useful to subject them to a particularly demanding test. Showing that Malaysia did better with its policies than Indonesia did with an IMF program would be hardly convincing, as one might credibly argue that Indonesia's failure arose from possibly idiosyncratic reasons.

Table 3 shows the core results, using both time-shifted and conventional difference in differences. We present only the coefficient estimates for β and γ and their standard errors for each version of the regression, suppressing other regression output for ease of readability. The way to read the table is as follows. Consider the first row, which shows the results for industrial production. The numbers indicate that in the 12-month period subsequent to calling in the IMF Korea witnessed a reduction in its industrial output growth relative to trend of 20.4 percentage points ($\beta = -0.204$). In Malaysia, the reduction in growth following the imposition of capital controls was 9.8 percentage points lower than in Korea ($\gamma = 0.098$), or 10.6 percentage points (= 20.4-9.8). Both numbers are estimated quite precisely, and are statistically significant at the 1% level. Note that these are estimates that are conditional on the other controls in the regressions, namely country-specific time and seasonal dummies and the time-varying external variables listed previously.

[16] Had Malaysia gone to the IMF, the implementation of policies would be delayed because a certain amount of time would be lost in negotiations with the IMF on the design of the program. With capital controls, Malaysia was free to implement its policies instantaneously.

The last two columns show the corresponding estimates for conventional difference in differences. These results are quite different, and quite unfavorable to Malaysia. They suggest that Malaysia's post-September 1998 growth lagged significantly behind Korea's during the same period--a difference in fact of 15 percentage points. Remember however that this comparison is valid only under the maintained assumption that Malaysia would have grown as rapidly as Korea after September 1998 in the absence of capital controls.

The remaining rows repeat the exercise for other variables of interest. The time-shifted difference in differences yield consistently strong (and virtually in all cases statistically significant) results in favor of capital controls. Compared to Korea, Malaysia suffered smaller reduction in manufacturing employment (a difference of 7.5 percent), smaller drop in real wages (a difference of 12.9 percent), smaller drop in the stock market (a difference of 30.2 percent), larger reduction in interest rates (a difference of 6.2 percentage points), less currency depreciation (a difference of 27.1 percent), larger increase in reserves (a difference of 14.9 percent), and a smaller increase in inflation (a difference of 0.29 percent on a monthly basis). Except for inflation, all of these estimates are statistically significant.

Once again, the conventional difference in differences paint a different picture, although the general pattern is less uniform than in the time-shifted case. Fewer results are statistically significant, and in some cases they agree with the previous estimates (in particular with regard to employment). The most striking discrepancies arise for the stock market (a relative decline in Malaysia of 26.3 percent) and interest rates (a relative rise in Malaysia of 4.01 percentage points).

The bottom panel of Table 3 redoes the regressions using as comparators all three countries (Korea, Thailand, and Indonesia) wherever data are available. The coefficients b and g

now have to be interpreted as pertaining to averages for the comparators as a group. The general pattern of results is quite similar to those just reported. Malaysia comes out looking very good in the time-shifted regressions, and not so good in the conventional ones. The presence of Indonesia in the comparator sample has a large influence on some of the outcomes--note for example the whopping interest rate and inflation results in the time-shifted regressions.[17]

In Table 4, we present similar estimates (using time-shifted difference in differences) with respect to performance measures that are available only on a quarterly basis. For comparison purposes, we also repeat the exercise using quarterly versions of some of the monthly series we discussed above (industrial production, manufacturing employment, real wages, and the stock market index). The estimates of g for real wages and stock prices are no longer statistically significant, but otherwise the results are essentially unchanged. With regard to the new variables, we find very strong effects for real GDP growth (a difference in favor of Malaysia of 13.7 percentage points), private consumption growth (a difference of 20.1 percentage points), and import growth (a difference of 28.9 percentage points). We also find a larger reduction in the government surplus and a stronger turnaround in net financial inflows (including DFI, loans, and portfolio inflows), although these are not statistically significant at conventional levels.

How do we interpret these results? Critics of the IMF have argued that the IMF programs in the region aggravated the crisis and exacerbated financial panic (at least during the initial months) by calling for excessively contractionary monetary and fiscal policies, by mandating bank closures, by overreaching in structural reforms, and by not putting enough

[17] An alternative approach, to "fix" this, would be to add country-specific interaction terms for Thailand and Indonesia, in which case the same difference-in-differences coefficients can be recovered by subtracting the gs across countries. Since we are interested mainly in the outcomes for Malaysia vis-à-vis the rest of the countries, we do not report those results.

pressure on creditors for an early standstill on debt repayment.[18] Our findings are consistent with this critique. Taken together, the time-shifted difference-in-differences estimates suggest that the Malaysian policy was more successful in accomplishing an immediate reduction in interest rates, stabilizing the currency, and stemming financial panic. This eased, for the short term at least, worries that the banking system would go under and that there would be a devaluation spiral. The turnaround in market confidence was correspondingly more rapid. In addition, fiscal policy was on balance more expansionary. All these in turn spurred consumption (and to a lesser extent investment) and economic activity.

We would therefore hypothesize that there were two channels through which the capital controls worked. One was the standard Keynesian policy of demand reflation, implemented through expansionary monetary and fiscal policies. The other, and perhaps more operative channel, was the removal of the substantial uncertainty about the financial system and the exchange rate, which had previously depressed confidence and business activity. In other words, capital controls worked to revive demand not only because they allowed the government greater monetary and fiscal autonomy, but probably also because they enabled the return of a modicum of stability to financial markets.[19] However, we need further research before we can make a strong case for either of these channels.

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[18] Critics differ in their weighting of these different factors. For a variety of critical views, see Krugman (1999a), Radelet and Sachs (2000), Feldstein (1998), and Furman and Stiglitz (1998), and UNCTAD (2000) among others.

[19] With a precautionary motive for saving, reduced uncertainty should lead to increased consumption.

VI. Some alternative interpretations

We have argued that the time-shifted difference in differences provide a more accurate estimate of the effects of Malaysia's capital controls because the most likely alternative to them was not to sit tight and wait for recovery to take hold, but to undergo an orthodox program similar to that implemented in the other countries some months earlier. We shall now review some alternative readings of the evidence that are less favorable to the controls.

Malaysia simply benefited from the improvement in the external environment. This represents the standard view of the Malaysian recovery, and we have already given some reasons to be skeptical of it. First, it is not at all clear that Malaysia was benefiting much from the return of investor confidence to the region, which was already under way in September. As we have seen, financial indicators in Malaysia were moving in the direction opposite to those in Korea and Thailand. Even leaving aside Anwar's forthcoming political demise, there is no reason to presume that things would have gotten better for Malaysia anytime soon. They certainly did not for Indonesia. Nor did they for Russia or Brazil, which were hit by financial panic some months later.

Secondly, even if one thinks that the pressure against the ringgit was about to ease up, it is not clear why Malaysia would have benefited from the improvement in investor sentiment after having imposed capital controls to insulate itself from financial market conditions. This is a problem especially if one is predisposed towards open capital accounts as a general rule. It is difficult to argue that capital controls isolate an economy from the benefits of financial markets while maintaining that one gets the same benefits regardless of whether one has capital controls or not.

Finally, as we have already pointed out, we do include a direct measure of investor sentiment in the region in our quarterly regressions (Table 4).[20] This measure is total net financial flows to four countries in the region (South Korea, Philippines, Indonesia, and Thailand), and it is shown in Figure 5. The net outflow from these countries averaged $8.0 billion in the first four quarters after Korea went to the IMF, but only $1.7 billion in the first four quarters of the Malaysian controls. Since we control for this difference, our results must be interpreted as the effect of capital controls after netting out the impact of this improvement.[21]

Regardless of the external environment, Malaysia would have recovered anyhow. A related argument is that the IMF-type policies that Malaysia followed while Anwar was still in charge of economic policy were bearing fruit, and that the recovery is attributable to the delayed effect of these policies rather than the controls. As we mentioned above, there is in fact scarce evidence that the real economy was about to turn around in Malaysia. If anything, the economy was sinking deeper as time went on.

While it is impossible to be definitive on this score, it is instructive to compare Malaysia's performance prior to September 1998 with Korea's. Figure 6 shows a measure of the "output gap" in industry for the two economies, calculated as the residual from a regression of the industrial output index on a time trend and monthly dummies. The first thing that is clear from the picture is that the recessions in the two economies were not perfectly synchronized: Malaysia's recession lagged behind Korea's, which supports our argument that the timing of the

[20] Since financial flows are available only on a quarterly basis, we could not include a similar measure in the monthly regressions. The latter do include other proxies for the external environment though—namely, U.S. interest rates, inflation, and industrial production.

[21] Flows to the region are obviously endogenous, but introducing this variable in the regressions biases the results against the Malaysian policies: if the large outflow while countries were under IMF programs is the result in part of the poor performance of those economies, "controlling" for these outflows makes the IMF programs look more successful. Removing flows from the quarterly regressions generally works to the advantage of the Malaysian controls.

crisis was different in these countries. More to the point in the current context, it is clear that Korea's turning point came in July of 1998 while Malaysia continued to deteriorate. (Malaysia was not the only country in the region for which this was true: Indonesia continued to experience severe decline throughout 1998 and into 1999.) The Malaysian economy bottomed out months later, in January 1999. In other words, by September 1998 one could have been reasonably confident that the Korean recovery had begun. There were no such signs in Malaysia.

Malaysia made things worse for itself by delaying decisive policy action, and by taking a combative stance against international capital markets markets. We do not dispute the fact that the ringgit took a beating everytime Mahathir made a derogatory statement about George Soros. And we have little disagreement with the view that Malaysia would have been better off had it been able to resolve its difficulties before September 1998. But both of these are largely irrelevant to the question at hand, and not simply because all the countries in the region experienced their share of self-inflicted harm.

Would Malaysia have been wiser by going to the IMF in late 1997 instead of waiting for another year and reacting as it did in late 1998? Perhaps. But, on the basis of the evidence presented here, one might also argue that the controls would have worked better if they had been imposed sooner—better than earlier IMF remedy, and better than they did subsequently. There is presumably less of a downside to capital controls when capital is leaving the region (as in 1998) than when it is coming back (as in 1999). Furthermore, to the extent that delay makes the eventual policy adjustments more costly, our results must underestimate the relative advantage of capital controls.

Our results are biased by the fact that Malaysia experienced a drawn out recession prior to the use of capital controls. It is true that compared to Korea in November 1997 (and to lesser

extent Thailand in July 1997) Malaysia's real economy was in worse shape in September 1998. We have already argued above that there is no reason to presume that Malaysia's recession was about to end. Nor is there much reason to believe that the recessions experienced by Korea and Thailand during their IMF programs were unrelated to the policies they implemented. But it is still possible that our before-after comparisons are affected by this difference. In particular, Malaysia's post-September 1998 recovery might look especially good in comparison to the recession the country had been undergoing prior to that date.

As a robustness check, we remove from the sample the 12-month (or 4-quarter) period prior to the imposition of the capital controls (and prior to the IMF program in Korea's case), and rerun the time-shifted difference in differences accordingly.[22] Table 5 shows the results. In general, these are little different from the results shown earlier in Tables 3 and 4. As expected, the point estimates of g tend to be smaller, and in two cases (stock prices and reserves) turn statistically insignificant. However, the positive effects of the Malaysian controls on output, employment, and real wages are still strong and significant. Moreover, two indicators that were insignificant previously (the government surplus and financial inflows) are now significant—indicating that the Malaysian policies produced a smaller government surplus and a swifter turnaround in financial outflows.

Therefore the fact that Malaysia was engulfed in a deeper recession at the time of its controls does not appear to bias our results systematically in favor of the Malaysian controls.

[22] We start the sample a year earlier for each country (i.e., from 1992), to make up for lost observations.

VII. Concluding remarks

We posed three questions at the outset about the short-term consequences of the Malaysian capital controls. Were the controls effective in segmenting financial markets, and providing breathing room for monetary and financial policies? Did they allow a speedier recovery than would have been possible via the orthodox/IMF route? Did they allow the leadership to do politically nasty things? We have given affirmative answers to all three questions. The longer-term question about the country's access to DFI and other forms of external finance is harder to answer with the available evidence, and we have not said much about it.[23]

This paper's main contribution has been to recast the comparison between Malaysia and the other countries in the region in a manner that, to our mind, makes more sense. Previous comparisons have asked how Malaysia did relative to Korea or Thailand after September 1998. We have asked instead how Malaysia did compared to Korea or Thailand when the latter were undergoing their IMF programs (while making allowance for changes in the external environment.) We have shown that the first approach yields answers that on balance make the capital controls look bad. The second approach yields answers that make the controls look very good.

Our preferred counterfactual is based on the view that Malaysian policies in the summer of 1998 were unsustainable, that the pressure against the ringgit was building up, that the economic decline was not about to be reversed on its own, and that the realistic alternative to the capital controls was an IMF program of the type that the other countries signed. For our results

[23] There are indications that DFI into Malaysia may have slowed down, and that bond spreads have remained a bit higher in relation to other countries in the region (Liu 2000).

to be credible, it must also be the case that we have adequately controlled for the external environment. On the other hand, the conventional counterfactual requires us to believe that the intense offshore speculation against the ringgit was about to stop, that the Malaysian economy was about to turn the corner even without any fundamental change in policies, and that the Malaysian authorities resorted to a draconian set of measures for essentially no good reason.

In closing, we simply invite the reader make up his or her mind about which of these counterfactuals make more sense, and to form conclusions accordingly.

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Table 1

Financial and debt indicators, 1996

	Malaysia	S. Korea	Thailand
external debt/GDP	0.39	0.32	0.55
external debt/exports of goods and services	0.41	0.98	1.32
short-term debt/GDP	0.11	0.20	0.21
short-term debt/reserves	0.42	2.84	1.03
M2/GDP	1.00	0.46	0.79
M2/reserves	3.64	6.21	3.86
claims on private sector/GDP	1.45	0.66	1.42
current account balance (% of GDP)	-4.9	-4.7	-7.9
stock market capitalization (% of GDP)	310	29	54

Source: IIF (1998), except for stock market capitalization which comes from the World Bank (http://wbln0018.worldbank.org/psd/compete.nsf/e376d12c87889e8685256490006610ce?OpenView).

Table 2

Timing of "treatment" windows

country	date of first official announcement that country will seek IMF assistance	date of IMF Executive Board approval of program	"treatment" windows: monthly regressions	"treatment" windows: quarterly regressions
Thailand	July 28, 1997	August 20, 1997	8/97-7/98	97Q3-98Q2
Indonesia	October 8, 1997	Novermber 5, 1997	10/97-9/98	97Q4-98Q3
South Korea	November 21, 1997	December 4, 1997	12/97-11/98	98Q1-98Q4
Malaysia	n.a.	n.a.	9/98-8/99	98Q4-99Q3

Source: Dates are from "Chronology of the Asian Currency Crisis and its Global Contagion" on Nouriel Roubini's web site (http://www.stern.nyu.edu/~nroubini/asia/AsiaHomepage.html) and the IMF web site (www.imf.org).

Table 3

Estimates of the Effects of Malaysian Capital Controls (monthly data)

		method			
		time-shifted difference-in-differences		conventional difference-in-differences	
variable	comparators	baseline effect (β)	difference in Malaysia (γ)	baseline effect (β)	difference in Malaysia (γ)
industrial production index (log difference, annual)	Korea	-0.204* (0.022)	0.098* (0.033)	0.051*** (0.030)	-0.150* (0.40)
manufacturing employment (log)	Korea	-0.078* (0.010)	0.075* (0.014)	-0.048* (0.013)	0.036** (0.017)
real wages (log)	Korea	-0.135* (0.017)	0.129* (0.026)	-0.021 (0.025)	0.010 (0.031)
stock market index (logs, deflated by CPI)	Korea	-0.543* (0.077)	0.302* (0.114)	0.024 (0.098)	-0.263** (0.128)
interest rates (money market, %)	Korea	6.44* (0.86)	-6.20* (1.26)	-4.36* (1.04)	4.01* (1.36)
exchange rate (HC/$) (logs)	Korea	0.294* (0.029)	-0.271* (0.043)	0.014 (0.041)	0.012 (0.054)
foreign reserves (logs)	Korea	-0.167* (0.056)	0.149*** (0.082)	0.098 (0.062)	-0.103 (0.081)
inflation rate (CPI, monthly%)	Korea	0.28** (0.13)	-0.29 (0.20)	-0.17 (0.15)	0.13 (0.19)
industrial production index (log difference, annual)	Korea, Thailand	-0.179* (0.016)	0.071* (0.029)	0.038*** (0.021)	-0.147* (0.034)
stock market index (logs, deflated by CPI)	Korea, Thailand Indonesia	-0.317* (0.053)	0.162 (0.107)	-0.151** (0.060)	-0.053 (0.107)
interest rates (money market, %)	Korea, Thailand Indonesia	16.67* (1.63)	-16.75* (3.27)	0.28 (2.00)	0.65 (3.59)
exchange rate (HC/$) (logs)	Korea, Thailand Indonesia	0.390* (0.032)	-0.422* (0.065)	0.042 (0.041)	-0.045 (0.074)
foreign reserves (logs)	Korea, Thailand Indonesia	-0.121* (0.030)	0.136** (0.060)	0.021 (0.033)	-0.009 (0.058)
inflation rate (CPI, monthly%)	Korea, Thailand Indonesia	1.87* (0.21)	-1.86* (0.42)	-0.75* (0.025)	0.73*** (0.044)

Source: See text.

Notes: Standard errors in parentheses. Levels of statistical significance are indicated as follows:
* 1% level; ** 5% level; *** 10% level.

Table 4

Estimates of the Effects of Malaysian Capital Controls
(quarterly data)

		method	
		time-shifted difference-in-differences	
variable	comparators	baseline effect (β)	difference in Malaysia (γ)
real GDP (log increase, annual)	Korea	-0.121* (0.026)	0.137* (0.041)
industrial production index (log increase, annual)	Korea	-0.205* (0.037)	0.177* (0.059)
manufacturing employment (log)	Korea	-0.070* (0.016)	0.073** (0.033)
real wages (log)	Korea	-0.112* (0.020)	0.063 (0.042)
stock market index (logs, deflated by CPI)	Korea	-0.443* (0.138)	0.224 (0.221)
government surplus (% of GDP)	Korea	-1.50 (1.23)	-3.24 (1.98)
financial inflows (% of GDP)	Korea	-1.88 (3.94)	7.54 (6.33)
real private consumption (log increase, annual)	Korea	-0.125* (0.045)	0.201* (0.069)
real investment (log increase, annual)	Korea	-0.201*** (0.112)	0.290 (0.180)
real government consumption (log increase, annual)	Korea	-0.002 (0.074)	0.213*** (0.118)
real imports (log increase, annual)	Korea	-0.159** (0.060)	0.289* (0.096)
real exports (log increase, annual)	Korea	0.226* -0.054	-0.064 -0.087

Source: See text.

Notes: Standard errors in parentheses. Levels of statistical significance are indicated as follows:
* 1% level; ** 5% level; *** 10% level.

Table 5

Estimates of the Effects of Malaysian Capital Controls
(excluding observations for the year prior to IMF program or capital controls)

			method	
			time-shifted difference-in-differences	
variable	frequency of data	comparators	baseline effect (β)	difference in Malaysia (γ)
industrial production index (log difference, annual)	monthly	Korea	-0.249* (0.020)	0.090* (0.027)
manufacturing employment (log)	monthly	Korea	-0.068* (0.011)	0.056* (0.015)
real wages (log)	monthly	Korea	-0.112* (0.022)	0.099* (0.030)
stock market index (logs, deflated by CPI)	monthly	Korea	-0.631* (0.072)	0.125 (0.100)
interest rates (money market, %)	monthly	Korea	7.73* (0.88)	-6.51* (1.23)
exchange rate (HC/$) (logs)	monthly	Korea	0.280* (0.027)	-0.167* (0.038)
foreign reserves (logs)	monthly	Korea	-0.266* (0.063)	0.094 (0.087)
inflation rate (CPI, monthly%)	monthly	Korea	0.38** (0.15)	-0.15 (0.21)
real GDP (log increase, annual)	quarterly	Korea	-0.158* (0.021)	0.080** (0.030)
government surplus (% of GDP)	quarterly	Korea	-2.16 (1.61)	-4.43*** (2.28)
financial inflows (% of GDP)	quarterly	Korea	4.78 (3.97)	14.03** (5.78)

Source: See text.

Notes: Standard errors in parentheses. Levels of statistical significance are indicated as follows:
* 1% level; ** 5% level; *** 10% level.

Figure 1

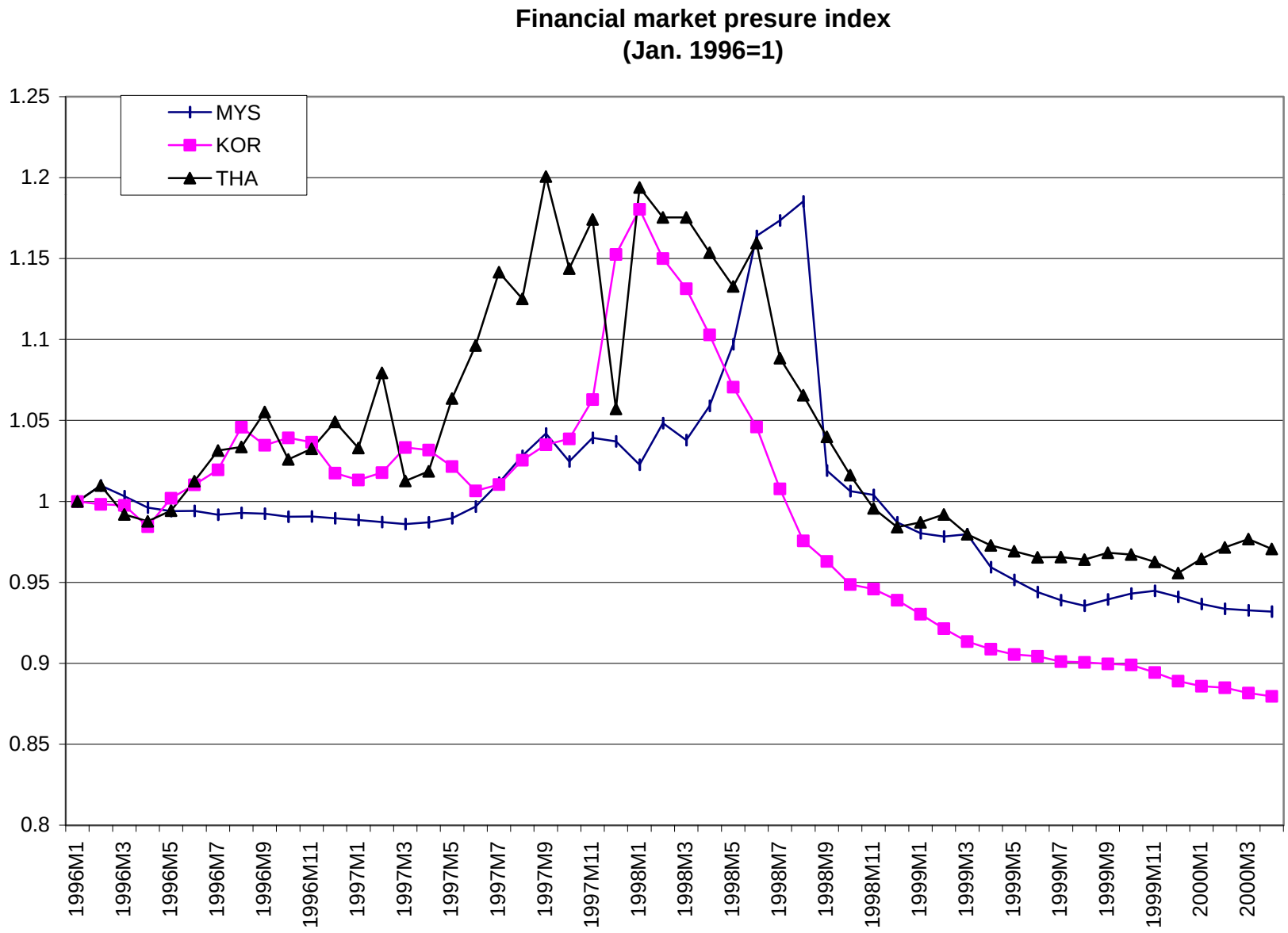

Financial market presure index
(Jan. 1996=1)
MYS
KOR
THA
1.25
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
0.8
1996M1
1996M3
1996M5
1996M7
1996M9
1996M11
1997M1
1997M3
1997M5
1997M7
1997M9
1997M11
1998M1
1998M3
1998M5
1998M7
1998M9
1998M11
1999M1
1999M3
1999M5
1999M7
1999M9
1999M11
2000M1
2000M3

Figure 2

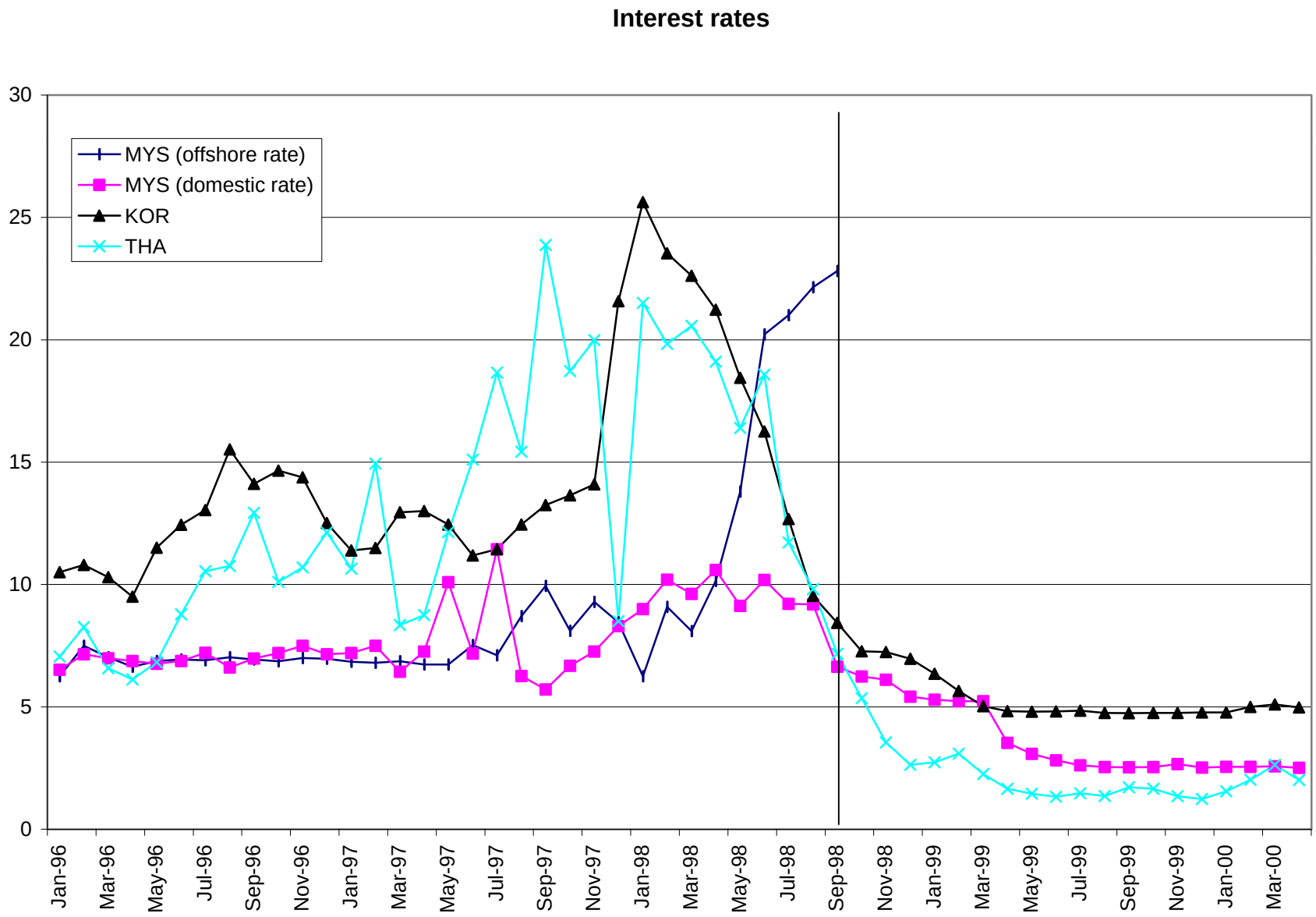

Interest rates
MYS (offshore rate)
MYS (domestic rate)
KOR
THA
30
25
20
15
10
5
0
Jan-96
Mar-96
May-96
Jul-96
Sep-96
Nov-96
Jan-97
Mar-97
May-97
Jul-97
Sep-97
Nov-97
Jan-98
Mar-98
May-98
Jul-98
Sep-98
Nov-98
Jan-99
Mar-99
May-99
Jul-99
Sep-99
Nov-99
Jan-00
Mar-00

Figure 3

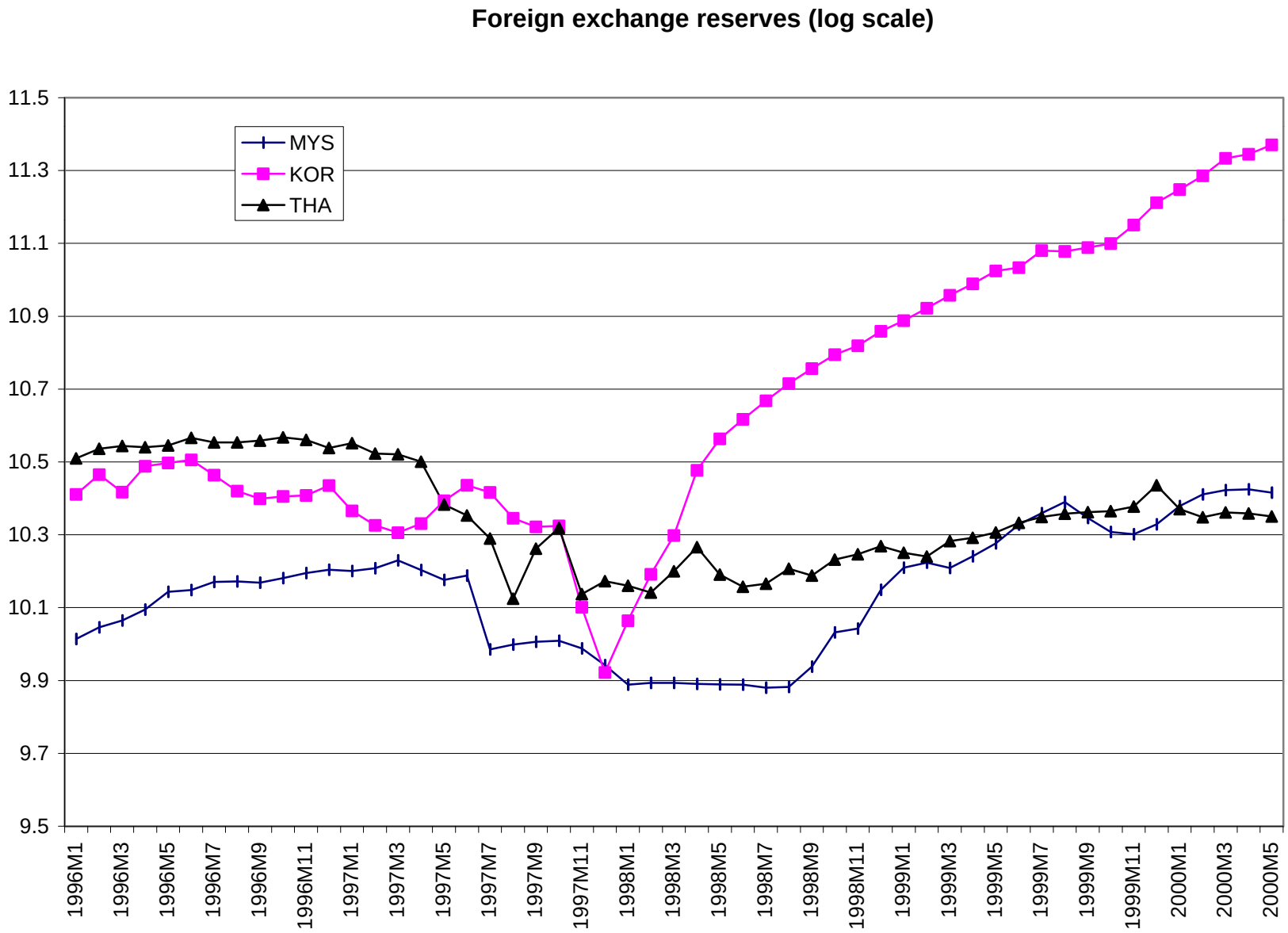
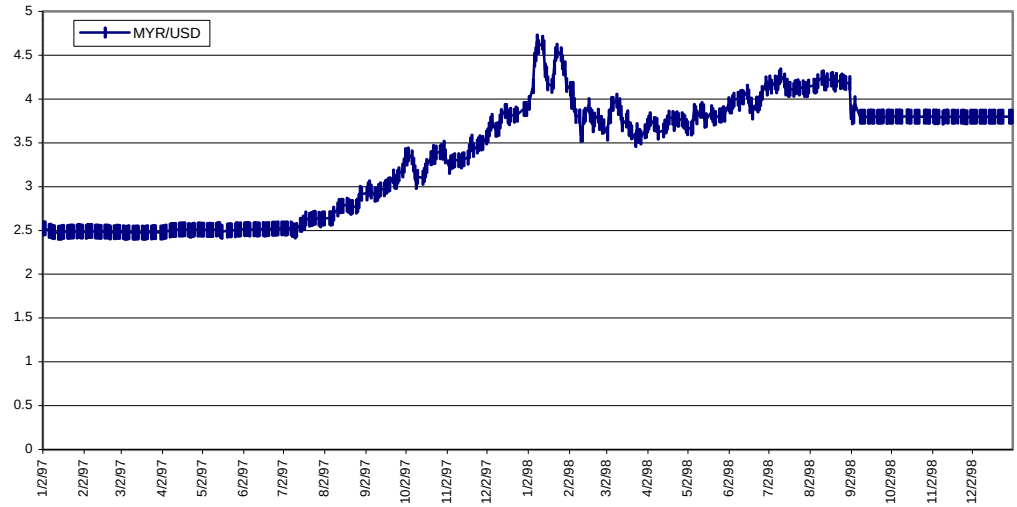

Foreign exchange reserves (log scale)
MYS
KOR
THA
11.5
11.3
11.1
10.9
10.7
10.5
10.3
10.1
9.9
9.7
9.5
1996M1
1996M3
1996M5
1996M7
1996M9
1996M11
1997M1
1997M3
1997M5
1997M7
1997M9
1997M11
1998M1
1998M3
1998M5
1998M7
1998M9
1998M11
1999M1
1999M3
1999M5
1999M7
1999M9
1999M11
2000M1
2000M3
2000M5

Figure 4


MYR/USD
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1/2/97
2/2/97
3/2/97
4/2/97
5/2/97
6/2/97
7/2/97
8/2/97
9/2/97
10/2/97
11/2/97
12/2/97
1/2/98
2/2/98
3/2/98
4/2/98
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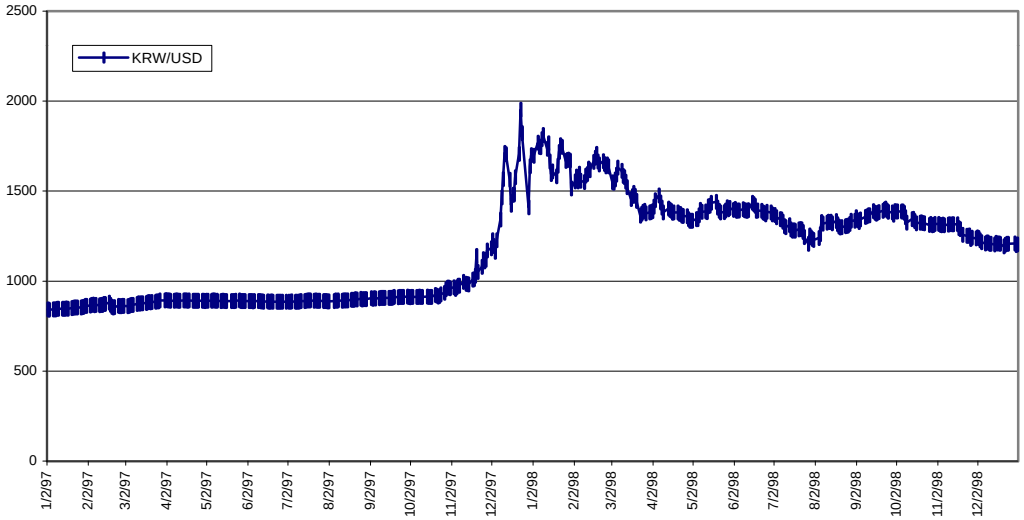
7/2/98
8/2/98
9/2/98
10/2/98
11/2/98
12/2/98


KRW/USD
2500
2000
1500
1000
500
0
1/2/97
2/2/97
3/2/97
4/2/97
5/2/97
6/2/97
7/2/97
8/2/97
9/2/97
10/2/97
11/2/97
12/2/97
1/2/98
2/2/98
3/2/98
4/2/98
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7/2/98
8/2/98
9/2/98
10/2/98
11/2/98
12/2/98

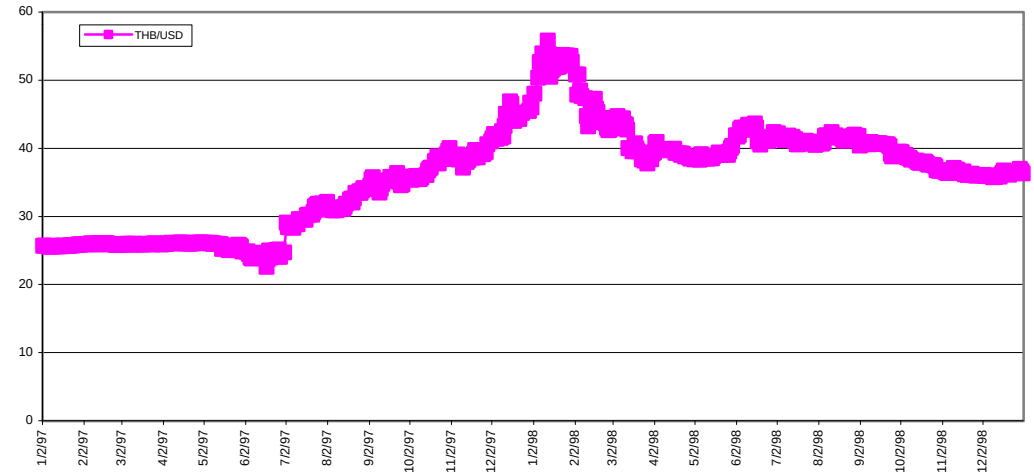

THB/USD
60
50
40
30
20
10
0
1/2/97
2/2/97
3/2/97
4/2/97
5/2/97
6/2/97
7/2/97
8/2/97
9/2/97
10/2/97
11/2/97
12/2/97
1/2/98
2/2/98
3/2/98
4/2/98
5/2/98
6/2/98
7/2/98
8/2/98
9/2/98
10/2/98
11/2/98
12/2/98

Figure 5

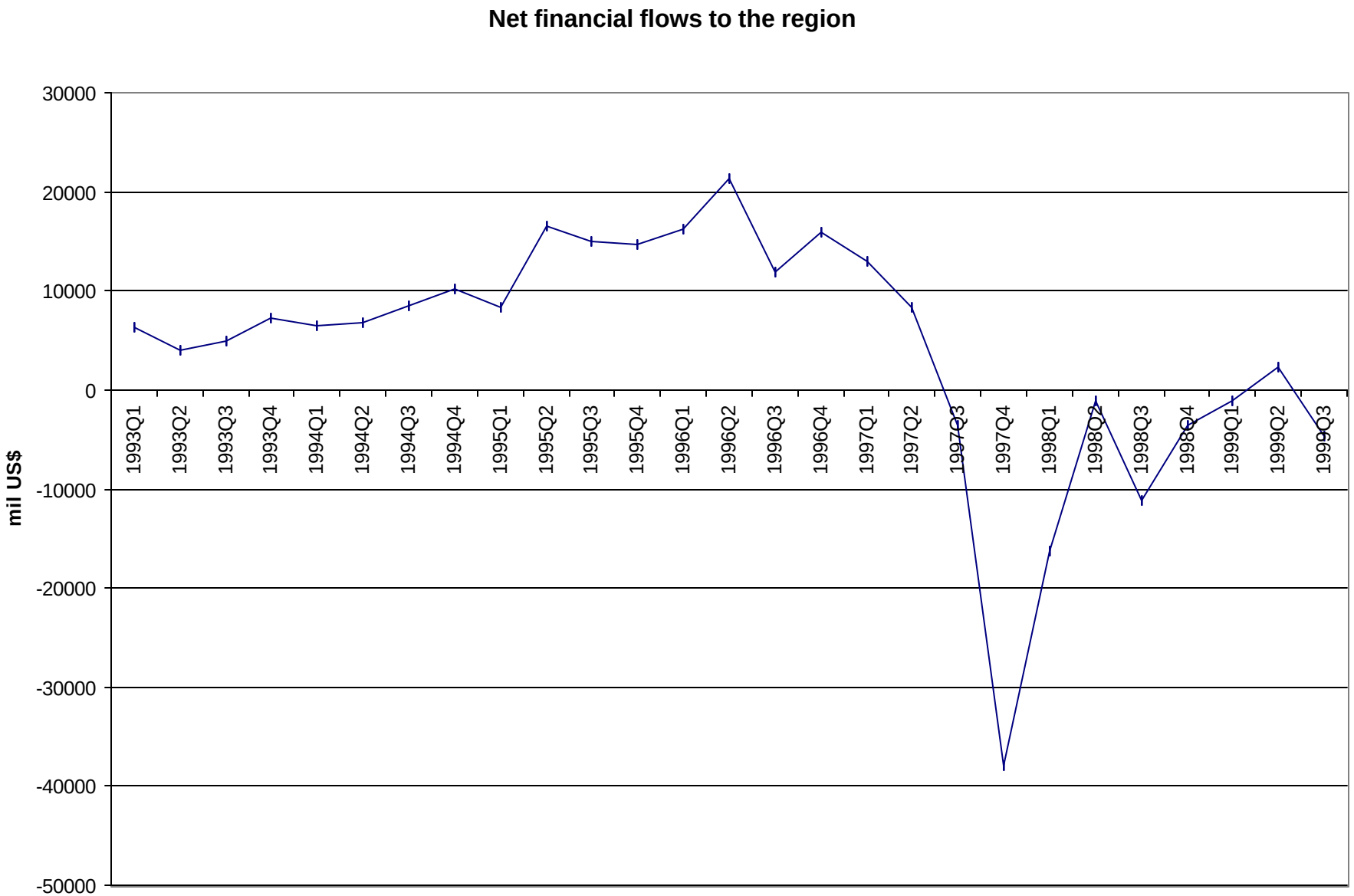
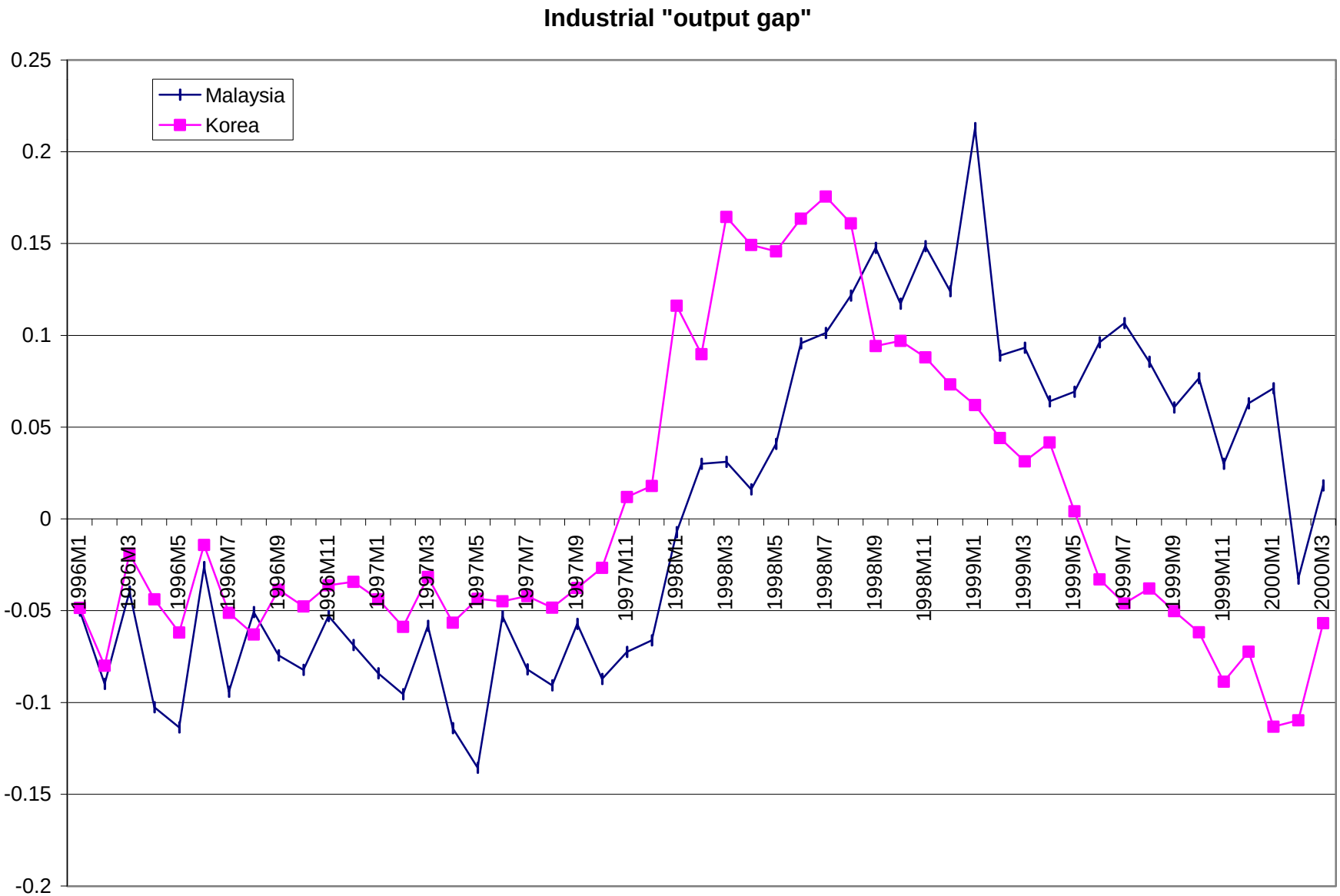

Net financial flows to the region
mil US$
30000
20000
10000
0
-10000
-20000
-30000
-40000
-50000
1993Q1
1993Q2
1993Q3
1993Q4
1994Q1
1994Q2
1994Q3
1994Q4
1995Q1
1995Q2
1995Q3
1995Q4
1996Q1
1996Q2
1996Q3
1996Q4
1997Q1
1997Q2
1997Q3
1997Q4
1998Q1
1998Q2
1998Q3
1998Q4
1999Q1
1999Q2
1999Q3

Figure 6


Industrial "output gap"
Malaysia
Korea
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
1996M1
1996M3
1996M5
1996M7
1996M9
1996M11
1997M1
1997M3
1997M5
1997M7
1997M9
1997M11
1998M1
1998M3
1998M5
1998M7
1998M9
1998M11
1999M1
1999M3
1999M5
1999M7
1999M9
1999M11
2000M1
2000M3