



Discussion Papers In Economics And Business

Monetary Transmissions Immediately after the Crisis
in East Asia

Masahiro ENYA and Akira KOHSAKA

Discussion Paper 04-05

Graduate School of Economics and
Osaka School of International Public Policy (OSIPP)
Osaka University, Toyonaka, Osaka 560-0043, JAPAN

Monetary Transmissions Immediately after the Crisis
in East Asia

Masahiro ENYA and Akira KOHSAKA

Discussion Paper 04-05

March 2004

この研究は財団法人学術振興野村基金研究プロジェクト「金融危機と東アジアの金融政策波及メカニズム」の成果の一部である。

Graduate School of Economics and
Osaka School of International Public Policy (OSIPP)
Osaka University, Toyonaka, Osaka 560-0043, JAPAN

Monetary Transmissions Immediately after the Crisis in East Asia

Masahiro ENYA* and Akira KOHSAKA**

February 2004

Abstract

We examine dynamic patterns of macroeconomic variables in East Asia immediately after the Asian financial crisis. Particularly, focusing on East Asia, we can identify their distinctive features from those of *aggregate* cross-country results. Also, we check with the financial crises in East Asia in the 1980s in order to make sure to what extent the contrast between the aggregate cross-country results and that of the Asian financial crisis comes from differences in time (external environment) or in country structure or both. Some distinctive features in East Asia include higher real interest rates in the crisis year, persistent output as well as investment slowdown, and different behaviors of trade and fiscal surpluses after the crisis. The results suggest that initial monetary tightening be responsible for the unexpectedly serious recession and that favorable external conditions and fiscal stimulus did contribute to the post-crisis real recovery even without credit recoveries.

JEL Classification: E5, O11, O53

Key words: macroeconomic dynamics, East Asia, financial crisis

* Lecturer, Faculty of Politics, Economics and Law Osaka International University (E-mail: enya@pel.oiu.ac.jp)

** Author to be contacted. Professor, Osaka School of International Public Policy, Osaka University, 1-31 Machikaneyama-cho, Toyonaka, Osaka, 560-0043, Japan. E-mail: kohsaka@osipp.osaka-u.ac.jp.

I. Introduction

There would be no doubt that the Asian financial crisis in 1997 was one of the most dramatic economic events in the last decade. The crisis surprised most of concerned observers and prompted them to reexamine their beliefs on stable macroeconomic management in the region. Not only this, however, the persistent and even intensifying crises immediately after the initial policy responses under the IMF-supported adjustment programs did lead us to the desperate need to reexamine these programs. Focusing on the overall strategy of crisis management for the Asian financial crisis, Boorman et al. [2000] denote that “financial sector vulnerability was at the root of the Asian crisis.”

It appears that the *vulnerability* of financial sectors in East Asia was suddenly highlighted after the Asian financial crisis in 1997. But are they really uniquely vulnerable? It has been recognized that financial institutions and systems have got into trouble world wide including developing as well as developed countries, along with the *financial globalization* (IMF [1999], Kohsaka [2000]), failing to adapt to the new financial environment (see Caprio and Klingebiel [1997], for example.). In this context, even the highlighted vulnerability can be regarded as one of universal adaptation failures to the financial globalization. With high economic growth and huge capital inflows under virtually pegged exchange rates, typical syndromes of the adaptation failures were brought about such as asset price boom-and-bust, excess investment and supply, and accumulation of short-term foreign debt unhedged against exchange rate risks.¹

Adjustments and structural reforms have been linked to constitute columns of the IMF prescription for developing economies in crisis. The linkage of these two measurements, however, has been sometimes criticized because overall structural reform plans, which in some cases had appeared to be unrealistically severe, may erode the confidence on the effectiveness of the prescription. Likewise, too harsh tightening macroeconomic policy could erode the basic confidence on the adjustment policies, thereby leading to a free fall of exchange rates. More concretely, at the apparent cost of deflationary impacts, excessive high-interest rate policies may not contribute to exchange rate stability (Furman and Stiglitz [1998]).

In this paper, we will examine the dynamic patterns of macroeconomic and financial variables in East Asia immediately after the Asian financial crisis in 1997 from the perspective of international comparison. Did changes in money and credits impose deflationary impact on real economies? If so, to what extent? And how different are they in comparison with developed and other developing economies?

¹ Boorman et al. [2000] name these two symptoms as two types of *vulnerability*, and claim that they helped set the stage for the crisis.

Using cross-country data covering more than 35 developed as well as developing countries, Demirguc-Kunt and Gupta [2000] examined the behaviors of monetary variables such as money, credits and interest rates, and real variables such as output and investment, after financial crises over the period of 1980 to 1995. We focus, instead, on five East Asian countries seriously hit by the Asian financial crisis in 1997, i.e. Indonesia, Korea, Malaysia, Philippines, and Thailand. This focus, we think, has a few merits. First, *aggregate*, or wide-ranged cross-country studies over different periods could not separate country effects from those of exogenous shocks across periods. Second, the aggregate cross-country results over the years from 1980 to 1995 of Demirguc-Kunt and Gupta [2000] may not be able to identify out the characteristics of the 1990s when *financial globalization* was accelerated significantly. In these respects, the focus on the five crisis-hit economies would enable us to presume common external shocks in the same period of the late 1990s, and relatively homogeneous economies in the same region. Thus, we may be able to obtain more representative patterns of dynamic adjustments then and there significantly different from the aggregate cross-country results.

The structure of this paper is as follows. After a brief literature survey on the related issues, Section II introduces an analytical framework and some stylized results on macroeconomic dynamics in financial crises across countries, drawing on Demirguc-Kunt and Gupta [2000]. In Section III, we examine 5 East Asian countries in the Asian financial crisis in the same framework, and compare the results with the aggregate cross-country case. We come up with some distinctive features in East Asia, which include higher real interest rates, persistent output as well as investment slowdown, and different behaviors of trade and fiscal surpluses. We, then, check with the financial crises in East Asia in the 1980s in a similar way in Section IV, in order to make sure to what extent the contrast between the aggregate cross-country results and that of the Asian financial crisis comes from difference in time (external environment) or in country (structure) or both. Thus, we will be able to identify some really unique features of macroeconomic dynamics in East Asia in the Asian financial crisis and to draw some implications on macroeconomic management after the crisis. Some policy arguments are extended as concluding remarks in Section V.

II. Financial Crises and Macroeconomic Dynamics

Let us begin by touching on a few prior studies along with the similar concerns very briefly. Radelet and Sachs [1998] and Furman and Stiglitz [1999] are two of the well-known studies critical against the IMF prescriptions of conventional monetary tightening as well as structural reforms, because they might devastate not only the real economy but people's confidence on prompt economic recovery.

Admitting underestimation by IMF of the severity of initial economic downturns after

the crisis, Boorman et al. [2000] tried to answer three questions on monetary policy management in East Asia. How tight were monetary policies? Was there a credit crunch? Was monetary tightening counterproductive? Their conclusions are that the degree of monetary tightening was not extraordinary as compared to prior cases, that there was no evidence for credit crunch, and that, considering the basic trade-off between exchange rate stability and economic recovery, alternative policy options were hard to find.

Investigating the post-*currency-crisis* patterns of recovery and sustainable growth, Park and Lee [2001] find as a stylized pattern a quick recovery of output growth and significant contributions of IMF-supported adjustment programs to this recovery process across 160 currency crisis episodes over the years from 1970 to 1995. Furthermore, they claim that adjustments in East Asia after the Asian currency crisis fit the stylized cross-country patterns, although the degrees of initial contraction and following recovery were far larger.

Now, we would like to examine carefully the macroeconomic dynamics in East Asia immediately after the Asian financial crisis in the context of both international and historical comparisons.

1. An Analytical Framework

Demirguc-Kunt and Gupta [2000] examine changes in macroeconomic variables in 35 countries during 36 banking crises.^{2 3} They are concerned with which variables are affected more than the others by the crises, and how they behave after the crises. The basic idea is rather simple. They test whether concerned variables are significantly different from their average levels before the crises. To do so, they regress concerned variables on dummy variables of the crisis year and the post-crisis years. Namely, the estimated model is as follows:

$$y_{it} = \alpha + \sum_{t=T}^{T+K} \beta_t DT_t + \sum_{i=1}^N \gamma_i DC_i + u_{it}$$

where y_{it} : macroeconomic variable of country i ($=1,2,\dots,N$) in period t ($= T-K, T-K+1, \dots, T, T+1, \dots, T+K$), DT_t : a dummy variable of period t ($= T, T+1, \dots, T+K$), DC_i : a dummy variable of country i , u_{it} : an error term, β_t : a coefficient of a dummy variable of period t , γ_i : a coefficient of a dummy variable of country i . Then, the estimates of β_t shows to what extent

² The identified banking crises are Argentina (1995), Bolivia (1995), Colombia (1982), Chile (1980), Ecuador (1995), El Salvador (1989), Finland (1991), Guyana (1993), Indonesia (1992), India (1991), Israel (1983), Italy (1990), Jordan (1989), Japan (1992), Kenya (1993), Mali (1987), Malaysia (1985), Mexico (1982, 1994), Nigeria (1991), Norway (1987), Nepal (1988), Panama (1988), Papua New Guinea (1989), Paraguay (1995), Peru (1993), Philippines (1981), Portugal (1986), Sri Lanka (1989), South Africa (1985), Sweden (1990), Thailand (1983), Turkey (1991), United States (1981), Uruguay (1981) and Venezuela (1993).

³ A “banking crisis” is defined as a period in which significant segments of the banking system become illiquid or insolvent (Kaminsky and Reinhalt [1999]). Large scale bank failures, enactment of emergency measures by the government (deposit freezes, nationalizations, deposit guarantees, bank recapitalization plans), reports of significant depositor runs, the level of nonperforming loans and the costs of the bailout are among the evidences for a banking crisis.

the levels of the dependent variables in period t deviates from its K -year period average before the crisis as well as their dynamic pattern of changes after the crisis. Note, also, that country-specific effects are picked up with country dummies and that heteroskedasticity-consistent standard errors are used for hypothesis testing because of country-heterogeneity.

Coefficient estimates (β_t) of period dummies for each macroeconomic variable of concern are quoted to be shown in Table 1. Assuming $K = 3$, they show to what extent each macroeconomic variable deviates from its average level of the three years before the crisis. Denoting T as the crisis year, we are concerned with dynamic behaviors of macroeconomic variables over the period of years from T to $T+3$.

>>Table 1: Macroeconomic Dynamics after the Financial Crises: Cross-Country Data, 1980-95

2. Cross-Country Observations

The results obtained from this framework using cross-country data can be summarized as follows.

First, as to output and prices, output growth significantly declines in the crisis year and the next year, but recovers to the pre-crisis level thereafter. Inflation rates increase in the crisis year, and persist thereafter until the third year, significantly. Significant depreciations of nominal exchange rates take place and continue in and after the crisis.

Second, as to interest rates, real levels of policy interest rates such as short-term government bills do not significantly rise in and after the year of the crisis. This is also the case with real deposit interest rates. Meanwhile, real loan rates and spreads between loan and deposit rates increase significantly in the year of the crisis. Moreover, the spreads significantly remain higher than its pre-crisis levels until the third year from the crisis.

Third, as to bank deposits and credits, a growth of real demand deposits significantly falls in the year of the crisis, while a demand deposit ratio to GDP does not change significantly. Meanwhile, real *total deposits* (which include demand, term, saving and foreign currency deposits) are significantly larger than those in the pre-crisis years. Consequently, their ratios to output do significantly increase in and after the crisis year.⁴ After the crisis, large declines in real bank credit growth persist significantly. At the same time, however, a credit to GDP ratio significantly increases rather than decreases, because, apparently, a decline in GDP growth is larger than that of credits.

Finally, as to investment and policy variables, an investment to GDP ratio declines from the pre-crisis years, but significantly so only in the next year to the crisis. Fiscal deficits (negative surplus) do not significantly increase, and central bank loans as a ratio to bank assets

⁴ These situations could coexist with partial bank runs within the banking system and with short-lived runs within a year.

do not significantly increase after the crisis (not reported here). These facts suggest that fiscal and monetary measures are not significantly stimulating to the aggregate demand after the crisis.

3. Implications

These observed results can be summarized as follows:

We do not witness system-wise bank runs in the contemporaneous financial crises unlike in the Great Depression. This, however, does not contradict a large scale deposit transfers among banks (Domac and Ferri [1999]). Probable reasons would be that bank defaults are not system-wide and/or that depositors presume deposits as virtually insured by governments even without formal deposit insurance.

Even though the financial crises bring forth persistent disruptions in the financial sector, their impacts on the real economy are relatively short-lived. Alternatively, slowdowns of output and investment might not be due to the financial crises, but to the negative shocks, which lead to the crisis. In fact, even when output growth recovers, credit growth remains low. In other words, the recovery of output after the crises is realized without that of credit growth.

If this is the case, the *credit crunch hypothesis* that the recovery of credit growth is indispensable for the output recovery may lose its rationale. As a matter of fact, with macroeconomic prospects improving, firms can economize bank credits and switch them to alternative sources such as suppliers' credits, self-finance, foreign credit lines, equity- and bond-issuances. This is said to be what happened in Mexico (Krueger and Tornell [1999]).

III. The Asian Financial Crisis in 1997

In this section, using the same analytical framework as in Demirguc-Kunt and Gupta [2000], we will examine deviations of relevant macroeconomic variables in and after the Asian financial crisis from their pre-crisis trends in East Asia, i.e. Indonesia, Korea, Malaysia, the Philippines and Thailand. The variables we focus are: output, prices, interest rates, deposits, loans, expenditures, and policy variables such as government consumption, budget balance, and central bank credits. The estimated result is reported in Table 2.

>>Table 2: Macroeconomic Dynamics after the Financial Crises: East Asia, 1997

1. Observations

Focusing on the differences from the results in Table 1, we will characterize the dynamic pattern of changes in these macroeconomic variables.

Output: A decline in output growth is statistically significant in the year of the crisis and persists until the third year of the post-crisis period. In the 1997 Asian crisis, the downward deviation of the output growth persists significantly longer than the cross-country result.

Prices: As to the differences from the cross-country pattern, two points are notable, i.e. we do not see significant increases in inflation, nor persistent exchange rate depreciation. We do not see significant increases in inflation either in the crisis-year nor the next year,⁵ which is contrasting to the cross-country pattern of significantly persistent inflation hikes throughout the post-crisis years. Furthermore, we detect even a deflationary impact in the second year after the crisis in East Asia. Meanwhile, exchange rate depreciation is significant only until the next year, which is relatively short-lived.

Interest rates: There is a bulk of debate on the effectiveness of high-interest-rate policy on macroeconomic stabilization after the Asian crisis (See Furman and Stiglitz [1998], World Bank [2000], and Lahny and Ghosh [2001], for example.). In fact, all three real interest rates for short-term asset, deposit and loan rise significantly in the crisis year by as large as 2 to 5 %, which is apparently different from the cross-country pattern, where only loan rates significantly rise in the crisis year. Note that there appears no expansion of loan-deposit interest spreads in the Asian financial crisis unlike in the cross-country data, where they persist significantly over the three post-crisis years.

Deposits: The dynamic patterns of bank deposits are roughly similar to the cross-country ones. In fact, demand deposits decline in real growth in the first year after the crisis, but not so with respect to ratios to GDP, though we see one year lag in this response compared to the cross-country case. Also, the growth rates of real total deposits significantly decline, but their ratios to GDP rise and persist during the post-crisis years.

Credits: The behavior of bank credits, too, looks fairly similar to the cross-country results. A decline of its real growth rates is significant, and persistent until the second year from the crisis, with one-year lag, though. Their ratios to GDP increase significantly from the pre-crisis levels, but the deviations gradually reduce in the three post-crisis years. Note, however, the growth rates of loans significantly increase instead of decrease in the very crisis year. This is not found in the cross-country results and may be due to good money after bad thrown in immediately after the crisis.

Expenditures: Among aggregate demand components, most conspicuous is the persistently lowered investment ratios to GDP, which are contrasting to the cross-country case. These significantly lowered investment ratios continue until the third year after the crisis. Meanwhile, the decrease in private consumption growth is short-lived only in one year after the crisis (not reported in Table 2). This is consistent with significantly persistent increases in trade surplus to GDP ratios, which straightforwardly reflect the severity of the declines in domestic absorption led by the stagnated investment demand.

⁵ Fact is that inflation increases barely insignificantly in the first year after the crisis.

Policy variables: Fiscal and monetary policy responses to the crisis are reflected on fiscal balances and central bank loans. Increases (decreases) in fiscal deficits (surplus) are significant and persistent throughout the post-crisis period, which is totally different from the cross-country pattern. This suggests that fiscal stimulus is resorted to in the post-crisis management in the Asian crisis. Meanwhile, central bank loans to the banking sector increase significantly in the crisis year (which is not significant in the cross-country case), which implies that the monetary authorities play the very role of the lender of last resort.

2. Implications

From the above observations, we would be able to summarize the characteristics of macroeconomic dynamics in the crisis-hit countries in East Asia as compared to the cross-country results, as follows:

In the 1997 Asian crisis, the slowdown of output growth prolonged significantly (by two full years) with persistent slowdown of bank credit growth, while domestic inflation did not significantly flared up after the crisis. In fact, there was even a symptom of deflation then.

All three real interest rates, i.e. short-term (policy), deposits and loan rates, rose immediately in the crisis year with loan-deposit interest rate spreads unchanged. By contrast, the cross-country data shows no significant increases in short-term as well as deposit rates, but increases in loan rates and loan-deposit spreads. Thus, this might suggest that the high-interest-rate policy in the Asian financial crisis was fairly conspicuous and that banks did not adjust risk premiums in supplying credits.

We saw no system-wide bank runs also in the Asian financial crisis. That is, there was no sign of reductions in total deposits, with the slowdown of their growth rates immediately after the crisis, but short-lived. Dynamic patterns of bank credits are also shared in common by the two cases, namely persistent slowdown of credit growth after the crisis.

As to the components of aggregate demand, however, we can see large differences between the two cases. Among others, persistent slowdown of domestic investment is conspicuous in the Asian financial crisis. Moreover, persistent increases in trade surplus and decreases in fiscal surplus are two additional conspicuous factors that characterize the macroeconomic dynamics in East Asia. In other words, while domestic demand slowed down due to persistently low investment, a combination of the resulting weak import demand, exogenous export recovery and deliberate fiscal expansion must have supported economic growth. For reference, actual figures for the above variables are shown in Figure 1.

>>**Figure 1. Macroeconomic Dynamics before and after the Asian Financial Crisis**

IV. Financial Crises in the 1980s in East Asia

So far, we had contrasted the dynamic responses of macroeconomic variables to financial crises between the cross-country case over the period from 1980 to 1995 and the East Asian case in 1997. The contrast may, however, come from either environmental differences between the two periods (*time effect*) or country-specific structural differences between East Asia and the others (*country effect*), or both. Therefore, in order to shed some more lights on these two considerations, we will check the macroeconomic dynamics of financial crises in East Asia in the 1980s, which is a sub-sample of the cross-country results. In other words, by looking at the East Asian case in the 1980s, we will try to pick up the country effect as compared to the cross-country case, and the time effect as compared to the 1997 East Asian case.

The estimated results are shown in Table 3, where five episodes of financial crises in five countries are covered.⁶

>>Table 3: Macroeconomic Dynamics after the Financial Crises, East Asia, 1980s

1. Observations

Output: A decline in output growth appears to persist over three years in and after the crisis, longer than in the cross-country case. Prices: The inflationary impact does not show up, or rather, there is in fact a deflationary impact in the first year after the crisis. This looks a common feature in East Asia through the 1980s and 90s. As for exchange rate depreciation, which was not endogenous then, we cannot trace it in this case, at least within two years after the crisis.⁷ Interest rates: Policy interest rates as well as deposit and loan rates do not appear to respond to the crisis, while their spreads increase in the first and second years after the crisis.

Deposits: A real growth in demand deposits declines in the crisis year and their ratios to GDP decline persistently after the crisis, the latter of which cannot be seen in the previous two cases. Total real deposit growth remains unchanged, but its ratio to GDP increases after the crisis, which appears common with the other cases. Credits: A real growth in bank credits does not respond to the crisis in East Asia in the 1980s, while its GDP ratios increases as in the previous cases.

Expenditures: Investment ratios to GDP decline, but only in the first year after the crisis, which appears similar to the cross-country case. Consumption growth rates decline in the crisis year only, while its GDP ratios decline over the three years after the crisis, which cannot be

⁶ They are Thailand (1983), Malaysia (1985), the Philippines (1981), Indonesia (1992) and Singapore (1982) (Lindgren et al. [1996]). Since the five countries are not identical to the five in the 1997 Crisis case, it follows that we implicitly assume that they are more similar to each other than to the others. Note that omitting Singapore did not change the result in a significant way.

⁷ In Table 3, we find significant exchange rate depreciation in the year T+2, although we do not suppose it is a lagged response of exchange rates to the financial crisis.

found in the 1997 crisis. Trade surplus does not appear to respond to the crisis here. Policy variables: We do not find responses of fiscal surplus to the crisis, as in the cross-country case. Again, actual figures for the above variables are shown in Figure 2.

>>**Figure 2. Macroeconomic Dynamics before and after the Financial Crises, East Asia, the 1980s**

2. Summing Up

Now, what do we come up with, comparing these three sets of financial crises cases? Table 4 summarizes the above features in macroeconomic dynamics after the financial crises for the exposition purpose. First, we focus on the similarities in East Asian cases. Two common features across the two periods are there. One is that the negative impact on output growth of financial crises is more persistent than in the cross-country case. And, two, interesting is that the impact is not significantly inflationary, but somehow deflationary. This is quite contrasting to the cross-country case, and would provide one of the reasons why exchange rate depreciation is more persistent in the cross-country case, but rather short-lived in East Asia.

>>**Table 4: Macroeconomic Dynamics after the Financial Crises: Summary**

Second, we find three common features shared beyond the time and country effects. One is an incipient decline of real total deposit growth on the one hand, and a persistent increase in total deposits to GDP ratios on the other, after the financial crises. Two is also a persistent increase in bank credits to GDP ratios after the crises. From the first feature, we would be able to say that there seems no bank runs on the banking system as a whole at the financial crises since the 1980s. The third feature is the negative impact of the crisis on the investment to GDP ratios, though the impact looks remarkably more persistent in the 1997 Asian crisis.

Eventually, we are winding up with most conspicuous features of the 1997 Asian crisis. Apparently, the unique features of the crisis are dynamics in real interest rates, real bank credits, and components of aggregate demand to GDP ratios. Significantly high interest rate policies in the crisis year come first as a unique feature of the 1997 crisis. A persistent slowdown of real bank credit growth is the second unique feature, because this is not the case in the crisis in the 1980s in East Asia. The third unique feature consists of persistent slowdown of domestic investment to GDP ratio on the one hand, and of persistent increases of trade surplus and persistent decreases of fiscal surplus as ratios to GDP on the other. Surely, the latter offset at least partially the negative effect of the former on economic activity levels.

V. Concluding Remarks

Having identified the most unique features of the macroeconomic dynamics in East Asia

immediately after the Asian financial crisis, we cannot but be inclined for the criticism against excessively tight monetary policy immediately after the financial crisis in East Asia. It appears difficult to claim that the high-interest-rate policy has little to do with persistent slowdowns of output, bank credits, and domestic investment. These slowdowns must have put a deflationary instead of inflationary impact. High interest rates helped deteriorate corporate balance sheets and lower their creditworthiness, and banks must have resorted to quantitative restrictions in loan provision. It would be fine with no systemic bank runs on the deposit side any more, which, however, could hardly prevent from credit crunch. Banks seemed to have lost appetite for supplying credits, which might be reflected on no significant expansion of interest rate spreads. There seem to be reasons for the credit crunch hypothesis that the shortage of bank credits led to output and investment slowdown and that the recovery of credits is indispensable for the *autonomous* recovery of crisis-hit economies.

Now, how tight were monetary policies in the Asian financial crisis? As a matter of fact, the degree of monetary tightening in the Asian financial crisis turned out to be significantly larger than in the prior crises. Policy (real) interest rates were significantly higher. The slowdown of real credit growth was significant and significantly persistent.

Then, was there a credit crunch? We would not be able to prove whether credit crunch took place in East Asia, because it would be generally hard to disentangle among possible causes of persistent slowdowns of credit growth. We can think of not only monetary tightening, but strengthened prudential controls, rising risk perceptions, to name a few. In addition, intrinsically, aggregate data on credits can tell very little about their shifts among heterogeneous borrowers. That we could not prove the existence of credit crunch, however, does not necessarily mean there was no credit crunch.

Finally, given the vulnerabilities in the financial as well as corporate sectors in East Asia, was monetary tightening counter-productive? Whether the high-interest-rate policy leads to exchange rate depreciation or appreciation in the financial crisis has attracted some interests among policy makers and academics (Furman and Stiglitz [1999]). Only if monetary tightening could prevent from further exchange rate depreciation, it would be able to prevent from further deterioration of balance sheets of financial as well as corporate sectors. Note, however, that monetary tightening itself affects negatively those balance sheets directly by raising capital costs of the corporate sector and indirectly by making the financial sector more cautious in provision of credits. While this *exchange rate-interest rate nexus* (Basurto and Ghosh [2000]) is related to the secondary burden on the real sector, monetary tightening definitely does have the primary negative effect through significantly slower credit growth. The monetary tightening, in turn, proved to be counterproductive, dampening domestic investment and putting a deflationary impact on the real economic activity in East Asia. As such, the economic recovery in East Asia

has not been supported by recoveries of domestic investment as well as of bank credits. As Park and Lee [2001] correctly pointed out, only fiscal stimulus and external factors such as export demand growth helped break through the deflationary situations brought about by the initial policy programs.

References

Basurto, Gabriela and Atish Ghosh [2000], "The Interest Rate-Exchange Rate Nexus in the Asian Crisis Countries," *IMF Working Paper*, WP/00/19, February 2000.

Bernanke, Ben S. and Mark Gertler [1995], "Inside the Black Box: The Credit Channel of Monetary Transmission," *Journal of Economic Perspective*, Volume 9, Number 4, Fall 1995.

Boorman, Jack, Timothy Lane, Marianne Schultze-Ghattas, Ales Bulir, Atish R. Ghosh, Javier Hmann, Alexandros Mourmouras, and Steven Philipps [2000], "Managing Financial Crises: The Experience in East Asia," *IMF Working Paper*, WP/00/107, June 2000.

Caprio, Gerard Jr., and Daniela Klingebiel [1997], "Bank Insolvency: Bad Luck, Bad Policy, or Bad Banking?" *Annual World Bank Conference on Development Economics 1996*, 1997.

Demirguc-Kunt, Asli, Enrica Detragiache, and Poonam Gupta [2000], "Inside the Crisis: An Empirical Analysis of Banking System in Distress," *IMF Working Paper*, WP/00/156, October 2000.

Ding, Wei, Ilker Domac, and Giovanni Ferri [1998], "Is There a Credit Crunch in East Asia," *World Bank Policy Research Working Paper* 1959, 1998.

Furman, Jason and Joseph E. Stiglitz [1998], "Economic Crises: Evidence and Insights from East Asia," *Brookings Papers on Economic Activity*, 2:1998.

Ghosh, Swati R. and Atish R. Ghosh [1999], "East Asia in the Aftermath: Was There a Crunch?" *IMF Working Paper*, WP/99/38, March 1999.

International Monetary Fund [1999], *World Economic Outlook*, October 1999.

Kaminsky, Graciela L. and Carmen M. Reinhart [1999], "The Twin Crises: The Causes of Banking and Balance-of-Payments Problems," *American Economic Review*, June 1999.

Kohsaka, Akira [2000], "A Quest for A New International Financial Architecture: An Asian-Pacific Perspective," Paper presented at the *PAFTAD26 on Globalization in the new*

Millennium, KIEP, Seoul, Korea, June 14-16, 2000.

Lindgren, Carl-Johan, Gillian Garcia, and Matthew I. Saal [1996], *Bank Soundness and Macroeconomic Policy*, International Monetary Fund, 1996.

Park, Yung Chul and Hong-Wha Lee [2001], “Recovery and Sustainability in East Asia,” *NBER Working Paper* 8373, July 2001.

Radelet, Steven and Jeffrey D. Sachs [1998], “The Asian Financial Crisis: Diagnosis, Remedies, Prospects,” *Brookings Papers on Economic Activity*, 1:1998.

World Bank [2000], *East Asia: Recovery and Beyond*, Washington, D.C., 2000.

Table 1. Macroeconomic Dynamics after the Financial Crises: Cross-Country, 1980-1995

	Output	Prices		Interest rates			
	Real GDP Growth	Inflation Rate	Exchange Rate Depreciation	Short-term (real)	Loan (real)	Deposit (real)	Spread
T	-3.913 *** <i>1.004</i>	19.166 ** <i>6.816</i>	28.714 *** <i>8.274</i>	5.501 <i>6.768</i>	10.504 ** <i>4.685</i>	1.806 <i>2.036</i>	10.079 ** <i>4.899</i>
T+1	-3.519 *** <i>0.896</i>	27.785 ** <i>13.408</i>	36.968 ** <i>14.415</i>	6.918 <i>11.525</i>	21.312 <i>17.007</i>	0.827 <i>3.359</i>	22.332 <i>15.696</i>
T+2	-0.950 <i>0.662</i>	23.820 ** <i>10.449</i>	30.384 *** <i>11.121</i>	-7.239 <i>8.279</i>	16.249 <i>10.043</i>	-3.291 <i>3.686</i>	21.016 <i>13.483</i>
T+3	0.398 <i>0.829</i>	18.177 *** <i>5.830</i>	23.232 *** <i>6.707</i>	-3.078 <i>4.548</i>	3.827 <i>5.685</i>	-4.903 <i>4.023</i>	10.906 ** <i>4.899</i>

	Deposits		Credits		Expenditures			
	Demand Deposit Growth	Ratio to GDP	Total Deposit Growth	Ratio to GDP	Bank Credit Growth	Ratio to GDP	Investment Ratio to GDP	Fiscal Surplus Ratio to GDP
T	-5.798 *** <i>2.019</i>	0.286 <i>336.000</i>		2.920 ** <i>1.382</i>	-6.761 *** <i>2.261</i>	6.046 *** <i>1.705</i>	-0.428 <i>0.551</i>	-0.494 <i>0.594</i>
T+1	-2.397 <i>1.761</i>	0.333 <i>0.398</i>		5.554 *** <i>1.881</i>	-7.390 *** <i>2.331</i>	7.849 *** <i>2.675</i>	-1.067 ** <i>0.564</i>	-0.803 <i>0.512</i>
T+2	-3.676 <i>2.814</i>	0.734 <i>0.466</i>		5.177 *** <i>1.292</i>	-7.178 *** <i>2.199</i>	6.748 *** <i>2.062</i>	-0.724 <i>0.621</i>	-0.041 <i>0.713</i>
T+3	-4.280 <i>2.608</i>	0.878 * <i>0.509</i>		0.233 *** <i>1.451</i>	-5.687 ** <i>2.334</i>	5.646 ** <i>2.180</i>	-0.854 <i>0.698</i>	0.974 <i>1.015</i>

Source: Demircuc-Kunt and Gupta [2000]

Notes: 1. OLS estimation. Standard errors are adjusted for hetero-scedasticity based on White.

2. Figures are estimated coefficients of period dummies and their standard errors (Italic).

3. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

4. Explanatory variables are period-dummies for the year of the crisis (=T) and after.

Table 2. Macroeconomic Dynamics after the Financial Crises: East Asia, 1997

	Output	Prices		Interest rates			
	Real GDP Growth	Inflation Rate	Exchange Rate Depreciation	Short-term (real)	Loan (real)	Deposit (real)	Spread
T	-0.027 *** <i>0.016</i>	-0.005 <i>0.638</i>	0.174 *** <i>0.000</i>	5.194 *** <i>0.009</i>	2.049 ** <i>0.028</i>	2.082 *** <i>0.018</i>	-0.033 <i>0.933</i>
T+1	-0.146 *** <i>0.000</i>	0.156 <i>0.121</i>	0.797 *** <i>0.019</i>	-3.376 <i>0.252</i>	-10.845 <i>0.218</i>	-9.164 <i>0.191</i>	-1.681 <i>0.353</i>
T+2	-0.022 * <i>0.085</i>	-0.027 * <i>0.077</i>	-0.112 <i>0.140</i>	1.173 <i>0.358</i>	2.630 <i>0.161</i>	2.553 <i>0.131</i>	0.077 <i>0.871</i>
T+3	-0.010 * <i>0.090</i>	-0.018 <i>0.224</i>	0.037 <i>0.458</i>	-2.486 *** <i>0.002</i>	-0.810 <i>0.592</i>	-1.430 <i>0.329</i>	0.621 <i>0.477</i>
Adjusted R-square	0.749	0.329	0.424	0.349	0.053	0.090	0.279
Sample size	45	45	45	45	45	45	45

	Deposits				Credits		Expenditures		
	Demand Deposit		Total Deposit		Bank Credit		Investment	Trade Surplus	Fiscal Surplus
	Growth	Ratio to GDP	Growth	Ratio to GDP	Growth	Ratio to GDP	Ratio to GDP	Ratio to GDP	Ratio to GDP
T	-0.114 <i>0.198</i>	-0.003 <i>0.515</i>	0.015 <i>0.527</i>	0.110 *** <i>0.000</i>	0.045 ** <i>0.040</i>	0.237 *** <i>0.000</i>	-0.011 <i>0.381</i>	0.009 <i>0.437</i>	-0.007 <i>0.199</i>
T+1	-0.238 ** <i>0.046</i>	-0.008 <i>0.135</i>	-0.118 *** <i>0.019</i>	0.171 *** <i>0.000</i>	-0.310 *** <i>0.000</i>	0.208 *** <i>0.000</i>	-0.135 *** <i>0.000</i>	0.136 *** <i>0.000</i>	-0.034 *** <i>0.000</i>
T+2	0.061 <i>0.122</i>	0.001 <i>0.841</i>	-0.035 <i>0.440</i>	0.206 *** <i>0.000</i>	-0.168 *** <i>0.009</i>	0.171 *** <i>0.001</i>	-0.146 *** <i>0.000</i>	0.132 *** <i>0.000</i>	-0.040 *** <i>0.000</i>
T+3	0.068 <i>0.296</i>	0.005 * <i>0.097</i>	-0.049 <i>0.209</i>	0.220 *** <i>0.000</i>	-0.066 <i>0.335</i>	0.164 *** <i>0.002</i>	-0.119 *** <i>0.000</i>	0.117 *** <i>0.000</i>	-0.041 *** <i>0.000</i>
Adjusted R-squared	0.164	0.957	0.159	0.918	0.468	0.860	0.845	0.746	0.727
Sample size	45	45	45	45	45	45	45	45	45

Notes: 1. OLS estimation. Standard errors are adjusted for hetero-scedasticity based on White [1978].

2. Figures are estimated coefficients of period dummies and their p-values (Italic). The coefficients stand for deviations from the pre-crisis averages.

3. *, **, and *** stand for significance levels of 10%, 5%, and 1%, respectively.

4. Explanatory variables are period-dummies for the year of the crisis (=T) and after.

Table 3. Macroeconomic Dynamics after the Financial Crises: East Asia, 1980s

	Output	Prices		Interest rates			
	Real GDP	Inflation	Exchange Rate	Short-term	Loan	Deposit	Spread
	Growth	Rate	Depreciation	(real)	(real)	(real)	
T	-0.025 * <i>0.076</i>	-0.011 <i>0.493</i>	0.021 <i>0.292</i>	-0.002 <i>0.999</i>	2.097 <i>0.343</i>	2.163 <i>0.229</i>	-0.066 <i>0.927</i>
T+1	-0.017 <i>0.129</i>	-0.051 ** <i>0.038</i>	0.021 <i>0.137</i>	3.122 <i>0.199</i>	5.810 ** <i>0.025</i>	4.582 * <i>0.097</i>	1.228 ** <i>0.028</i>
T+2	-0.012 ** <i>0.037</i>	-0.021 <i>0.305</i>	0.082 ** <i>0.045</i>	0.314 <i>0.888</i>	1.967 <i>0.399</i>	0.453 <i>0.871</i>	1.514 ** <i>0.018</i>
T+3	-0.038 <i>0.127</i>	0.053 <i>0.434</i>	0.105 <i>0.151</i>	-4.775 <i>0.246</i>	-4.496 <i>0.332</i>	-5.588 <i>0.271</i>	1.092 <i>0.115</i>
T+4	-0.024 <i>0.281</i>	-0.002 <i>0.926</i>	0.020 <i>0.185</i>	-0.127 <i>0.950</i>	0.333 <i>0.859</i>	-0.437 <i>0.753</i>	0.770 <i>0.519</i>
Adjusted R-square	0.226	0.329	0.238	0.163	0.301	0.295	0.147
Sample size	45	45	45	45	45	45	45

	Deposits				Credits		Expenditures		
	Demand Deposit		Total Deposit		Bank Credit		Investment	Trade Surplus	Fiscal Surplus
	Growth	Ratio to GDP	Growth	Ratio to GDP	Growth	Ratio to GDP	Ratio to GDP	Ratio to GDP	Ratio to GDP
T	-0.186 *** <i>0.002</i>	-0.009 *** <i>0.005</i>	-0.056 <i>0.102</i>	0.056 *** <i>0.000</i>	-0.047 <i>0.230</i>	0.101 *** <i>0.000</i>	-0.010 <i>0.417</i>	-0.080 <i>0.175</i>	0.015 <i>0.125</i>
T+1	-0.015 <i>0.765</i>	-0.010 *** <i>0.000</i>	-0.005 <i>0.898</i>	0.096 *** <i>0.000</i>	-0.025 <i>0.509</i>	0.158 *** <i>0.000</i>	-0.026 * <i>0.096</i>	-0.177 <i>0.228</i>	0.004 <i>0.632</i>
T+2	-0.039 <i>0.564</i>	-0.011 *** <i>0.001</i>	-0.029 <i>0.716</i>	0.102 *** <i>0.000</i>	-0.079 <i>0.206</i>	0.164 *** <i>0.000</i>	-0.025 <i>0.208</i>	0.113 <i>0.334</i>	0.019 ** <i>0.023</i>
T+3	-0.082 <i>0.544</i>	-0.013 *** <i>0.003</i>	-0.144 ** <i>0.041</i>	0.105 *** <i>0.000</i>	-0.224 *** <i>0.008</i>	0.142 *** <i>0.000</i>	-0.051 *** <i>0.000</i>	-0.159 <i>0.253</i>	0.024 ** <i>0.033</i>
T+4	0.051 <i>0.551</i>	-0.007 <i>0.182</i>	-0.059 <i>0.157</i>	0.132 *** <i>0.000</i>	-0.147 ** <i>0.017</i>	0.140 *** <i>0.001</i>	-0.065 *** <i>0.004</i>	-0.007 <i>0.828</i>	0.028 ** <i>0.013</i>
Adjusted R-square	0.064	0.953	0.077	0.913	0.316	0.919	0.780	-0.034	0.702
Sample size	45	45	45	45	45	45	45	45	45

Notes: 1. OLS estimation. Standard errors are adjusted for hetero-scedasticity based on White [1978].
 2. Figures are estimated coefficients of period dummies and their p-values (Italic). The coefficients stand for deviations from the pre-crisis averages.
 3. *, **, and *** stand for significance levels of 10%, 5%, and 1%, respectively.
 4. Explanatory variables are period-dummies for the year of the crisis (=T) and after.

Table 4. Macroeconomic Dynamics after the Financial Crises: Summary

	Cross-Country	East Asia, 1980s	East Asia, 1997
Output Growth	(-)	(-)	(-) <i>persistent</i>
Inflation	(+) persistent	(-)	(-)
Depreciation	(+) persistent	none	(+)
Policy Interest Rate	none	none	(+)
Loan Rate	(+)	none	(+)
Deposit Rate	none	none	(+)
Spread	(+) persistent	(+)	<i>none</i>
Demand Deposit Growth	(-)	(-)	(-)
Demand Deposit/ GDP	none	(-) persistent	none
Total Deposit Growth	NA	(-)	(-)
Total Deposit/ GDP	(+) persistent	(+) persistent	(+) persistent
Bank Credit Growth	(-) persistent	none	(-) persistent
Bank Credit/ GDP	(+) persistent	(+) persistent	(+) persistent
Investment/ GDP	(-)	(-) persistent	(-) <i>persistent</i>
Trade Surplus/ GDP	NA	none	(+) <i>persistent</i>
Fiscal Surplus/ GDP	none	none	(-) <i>persistent</i>

Note: 1. Signs of significant deviations from the pre-crisis levels. "none": no significant deviations.

2. "Persistent" implies prolonged deviations over the entire post-crisis period.

3. "NA": not available.

Figure 1. Macroeconomic Dynamics before and after the Financial Crisis, East Asia (T=6)

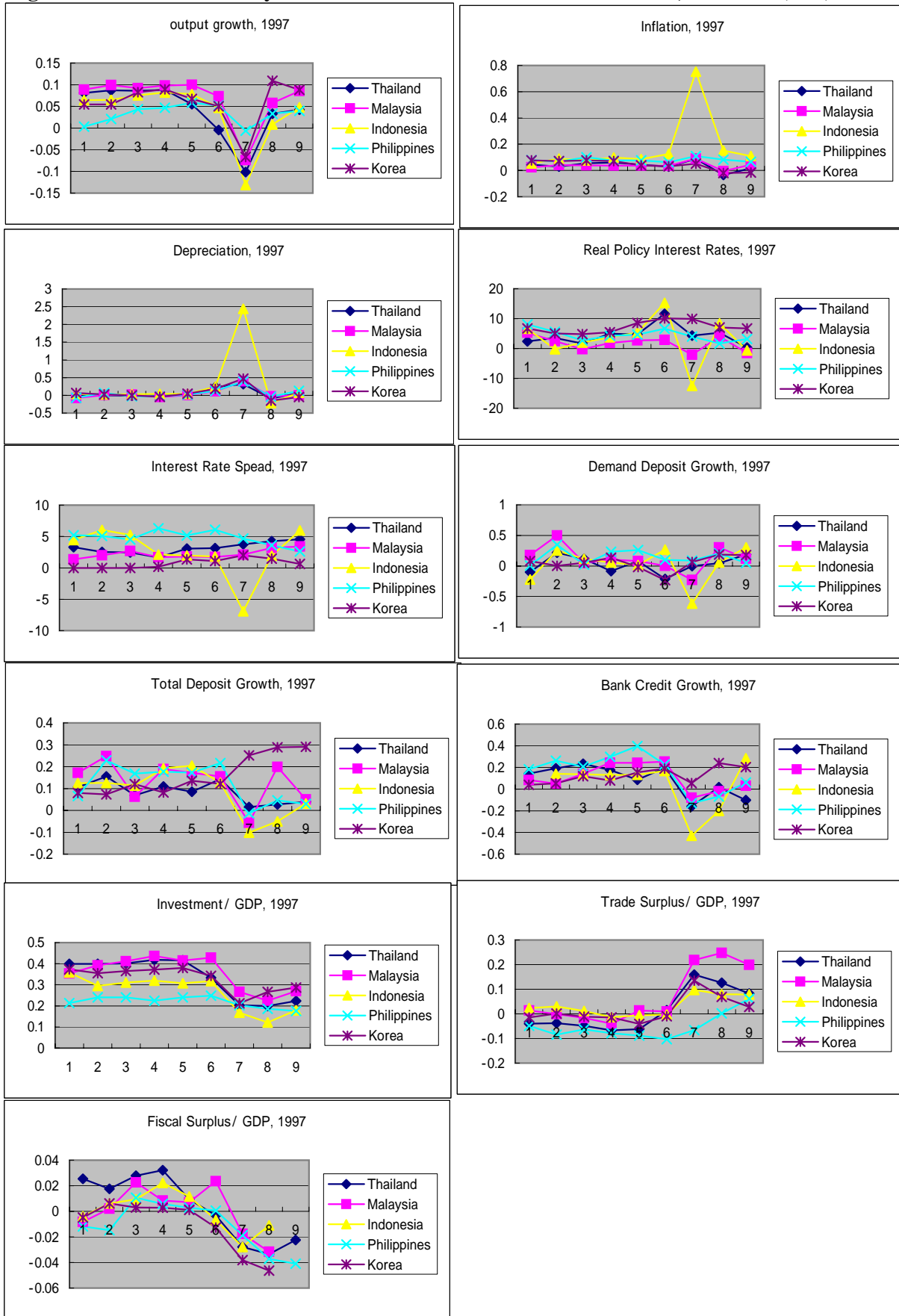
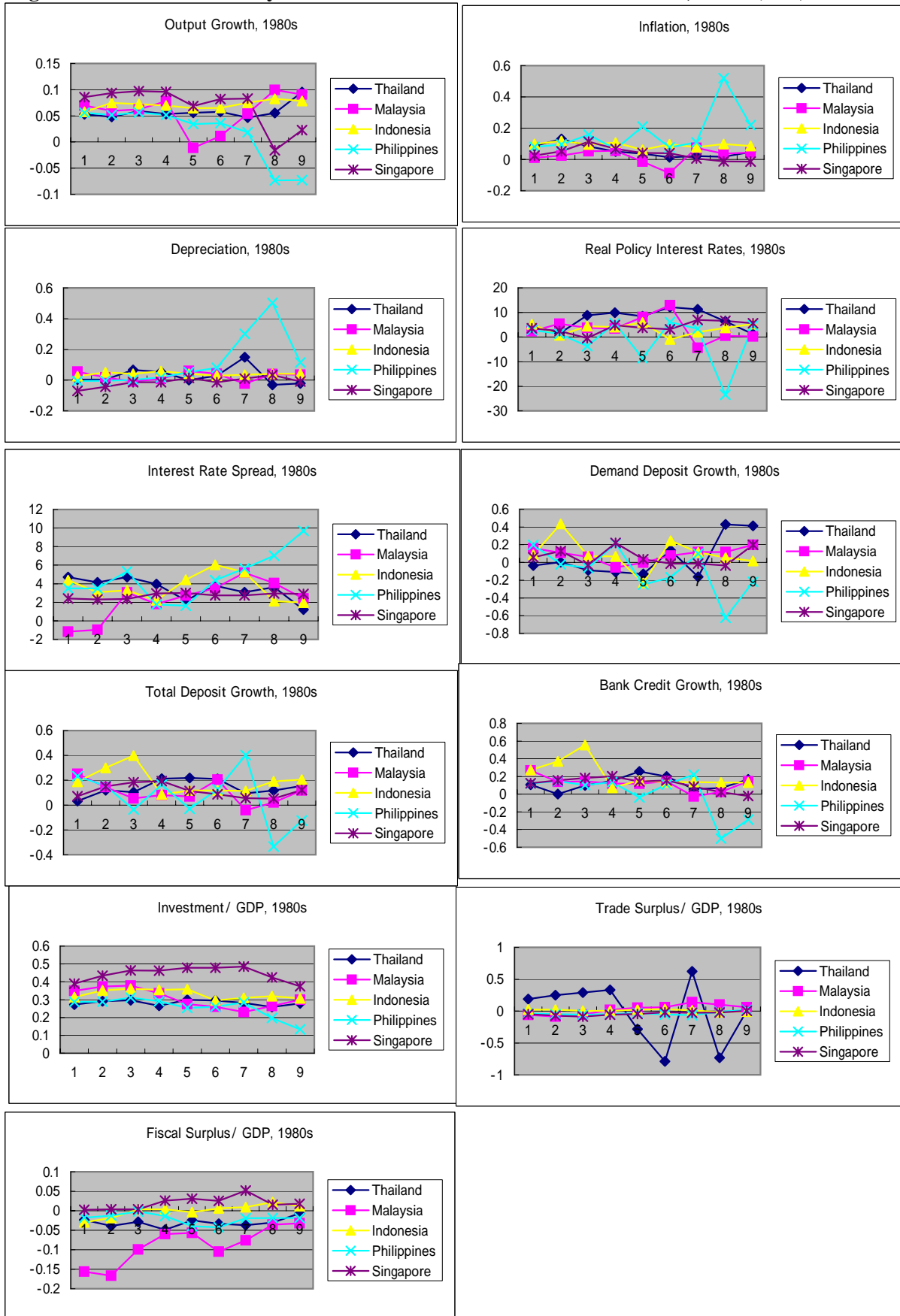


Figure 2. Macroeconomic Dynamics before and after the Financial Crises, 1980s (T=5)



Appendix. Data Sources and Definitions

	Variable	Definition	Data Source
Output	1 Output Growth	Growth Rate of Real GDP	IFS 99b.p
Prices	2 Inflation	Growth Rate of GDP Deflator	IFS 99b
	3 Exchange Rate Depreciation	Depreciation of Nominal Exchange Rate (annual average)	IFS rf
Interest Rates	4 Short-Term Interest Rate	Nominal Short-Term Interest Rate minus Inflation	IFS 60b or 60c
	5 Loan Rate	Nominal Loan Interest Rate minus Inflation	IFS 60p
	6 Deposit Rate	Nominal Deposit Interest Rate minus Inflation	IFS 60l
	7 Spread	Nominal Loan Rate minus Nominal Deposit Rate	
Bank Deposits	8 Demand Deposit Growth	Growth Rate of Real DMB Deposits	IFS 24
	9 Demand Deposit/ GDP	DMB Demand Deposits/ GDP	IFS
	10 Total Deposit Growth	Growth Rate of Real DMB Total Deposits	IFS 24+25
	11 Total Deposit/ GDP	DMB Total Deposits/ GDP	
Bank Credits	12 Bank Credit Growth	Growth Rate of Real DMB Credits	IFS 22
	13 Bank Credit/ GDP	DMB Credits/ GDP	
Expenditures	14 Investment/ GDP	Investment/ GDP	IFS 93
	15 Trade Surplus/ GDP	Exports minus Imports of Goods & Services	IFS 90c, 98c
	16 Fiscal Surplus/ GDP	Fiscal Surplus/ GDP	IFS 80

Source: IMF, *International Financial Statistics*, CD-ROM, June 2001.