

Indicators of Financial Instability

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Abstract

A global Slowdown, rising oil prices, and monetary tightening in industrial countries may lead to net capital outflows which accentuate high ratios of short-term to total external debt.

This paper focuses on finding consistent indicators of financial instability. Knowledge of these indicators should assist attempts to implement institutional financial reform and improve an economy's resilience to shocks. It is highly useful to provide policy-makers with tools that measure financial crises, and in particular, to examine how macroeconomic aggregates behave during episodes of financial instability cycles. This is the objective of what follows and these indicators signal the variables that need to be monitored for effective policy responses to emerging financial difficulties.

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1-Introduction

Since the mid-1980s the global economy has been characterised by generally robust growth accompanied by credit, asset price and investment booms, often followed by financial difficulties. Crises in Latin America and Asia stand out in indicating the severity of the resulting economic dislocation and how quickly it can spread to other countries (Prasad, Rogoff, Wei & Kose, 2003). Given these painful experiences, suffered particularly over the last decade, it is important to monitor indicators of financial instability, to develop institutions for reducing global financial instability (Rogoff, 1999) and to know if economies have now become more resilient to shocks. A number of economic indicators look promising in this last respect. Countries seem less committed to rigid exchange rate targets, inflation, current account and fiscal policy positions seem sustainable, foreign reserves are at high levels and financial sector supervision seems stronger. Yet a recent Annual Report of Bank for International Settlements (BIS 2005: 34) suggests that these observed gains may be the result of favourable cyclical factors. A global slowdown, rising oil prices, and monetary tightening in industrial countries may lead to net capital outflows which accentuate high ratios of short-term to total external debt.

This paper focuses on finding consistent indicators of financial instability. Knowledge of these indicators should assist attempts to implement institutional financial reform and improve an economy's resilience to shocks. It is highly useful to provide policy-makers with tools that measure financial crises, and in particular, to examine how macroeconomic aggregates behave during episodes of financial instability cycles. This is the objective of what follows and these indicators signal the variables that need to be monitored for effective policy responses to emerging financial difficulties.

2- Identifying and Timing of Financial Crises

A measure of external market pressure was first introduced by Girton and Roper (1977) and it consisted of two components, changes in official reserves and changes in exchange rates. The authors showed that the measure of foreign exchange market pressure is not sensitive to its components, implying that it can exogenously indicate the volume of foreign exchange market intervention required to keep the exchange rate at a target level. Subsequently Eichengreen, Rose and Wyplosz (1995) adopted this measure for identifying the timing of speculative attacks. They argued that a speculative attack on a currency is associated with a loss of foreign reserves, a rise in domestic interest rates and a depreciation of the currency. Accordingly, a weighted average of foreign reserves, interest rate and exchange rate changes can indicate the extent of speculative attack on the local currency. In their measure, Eichengreen, Rose and Wyplosz assigned the highest weight to the reserve changes and the lowest weight to the interest rate changes.

In a separate study, Kaminsky and Reinhart (1998) constructed an index for indicating the severity of the currency crises. They argued that generally, currency crises are associated with a significant depreciation of the exchange rate after the crises and a substantial loss of central bank reserves, prior to the crises. The index of currency market turbulence is presented in equation 1.

$$I = \Delta e / e - \partial e / \partial r * \Delta r / r \quad (1)$$

In (1), e , r , ∂e and ∂r are the exchange rate (price of foreign currency), the reserves, the standard deviation of the rate of change in the exchange rate and the standard deviation of the rate of change in reserves respectively. The change in e appears with a positive sign and the change in r takes a negative sign. The weight $\partial e / \partial r$, ensures that the index is equally influenced by volatilities of both components. The higher standard deviations of I indicate more turbulence in the currency market.

According to Eichengreen, Rose and Wyplosz (1995), a period of crises is identified when the index moves two standard deviations above or below the mean.

We plot the indices for Australia and six countries that experienced major financial crises during the past three decades in Figures 1-7. In most of the cases, these figures tend to identify the timing of turbulences accurately. They indicate sharp fluctuations during the late 1990s for the four South East Asian countries and in the early 1980s for Australia when the Australian dollar was devalued by 10%. Mexican crises of the 1980s and the mid 1990s and Argentine's crises of 1990s and the early 2000s are also revealed by Figures 1-7.

In the construction of the index of currency turbulence, fluctuations of the reserves are given a larger weight than fluctuations of the exchange rate. This development implies that during periods of financial crises the central banks attempt to offset the volatility of the exchange rate by depletion or accumulation of reserves. The standard deviations of reserves and the exchange rates are shown in table 1 and the greater volatility of the reserves is illustrated for all countries except Argentina.

Table (1): Standard Deviation of Changes in Reserves and Exchange Rates

Country	Argentina	Australia	Indonesia	Korea	Malaysia	Mexico	Thailand
Reserves	0.33	0.17	0.16	0.16	0.09	0.22	0.09
Ex. Rate	0.36	0.05	0.11	0.07	0.04	0.11	0.05

Note: The above results are based on annual data 1970-2002. All data for the tables and figures in this paper come from the IMF International Financial Statistics CD-ROM (2002). The data for Tables 2 and 3 are quarterly series.

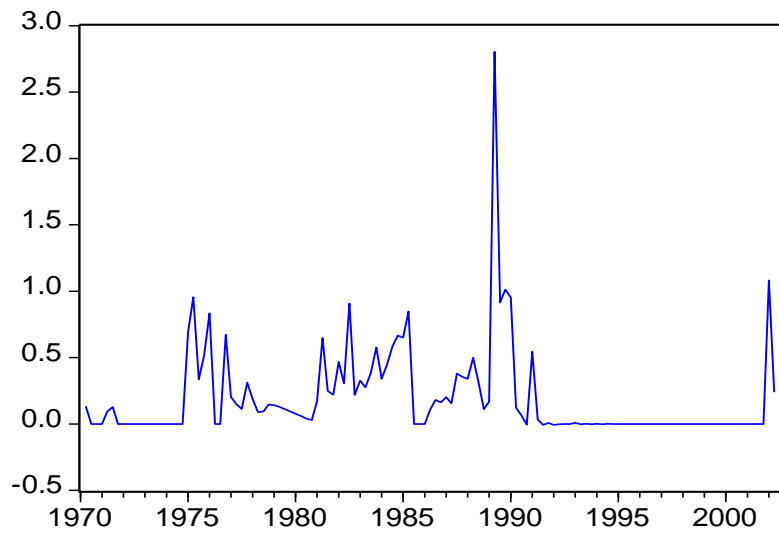
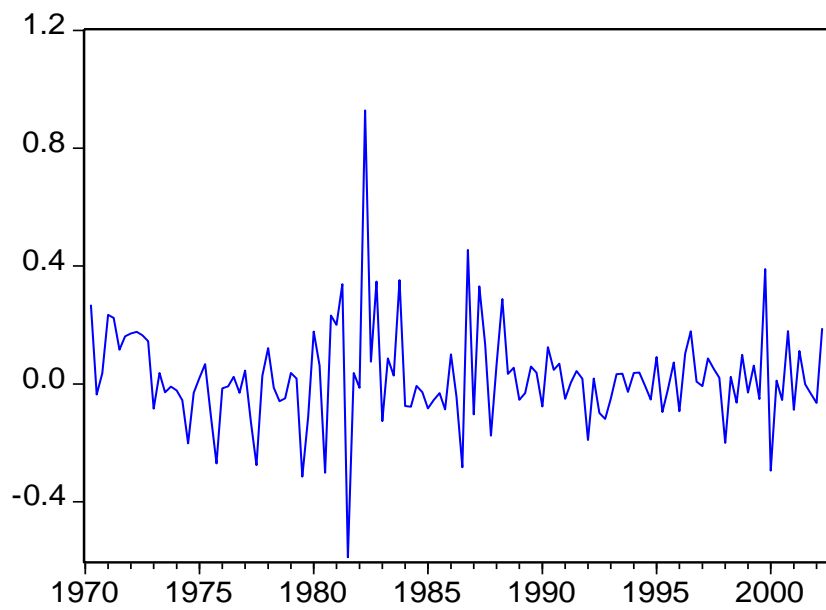
Figure (1): Argentina*Figure (2): Australia*

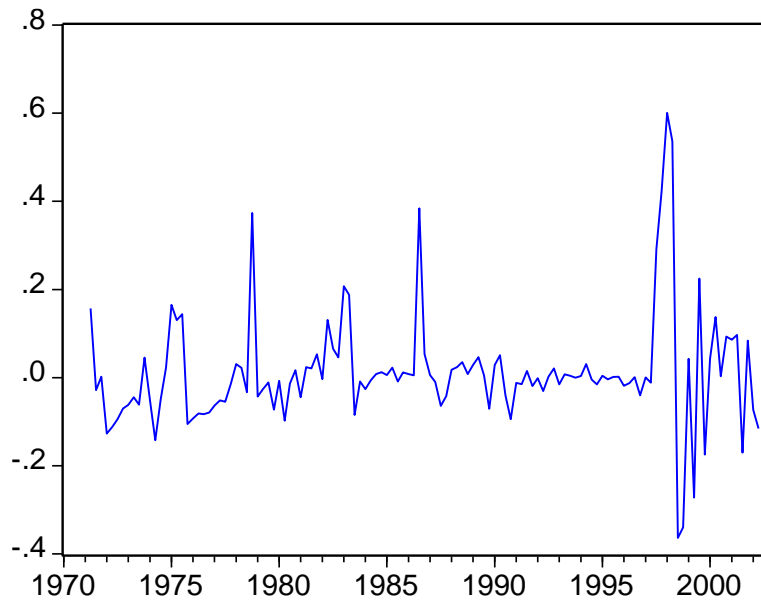
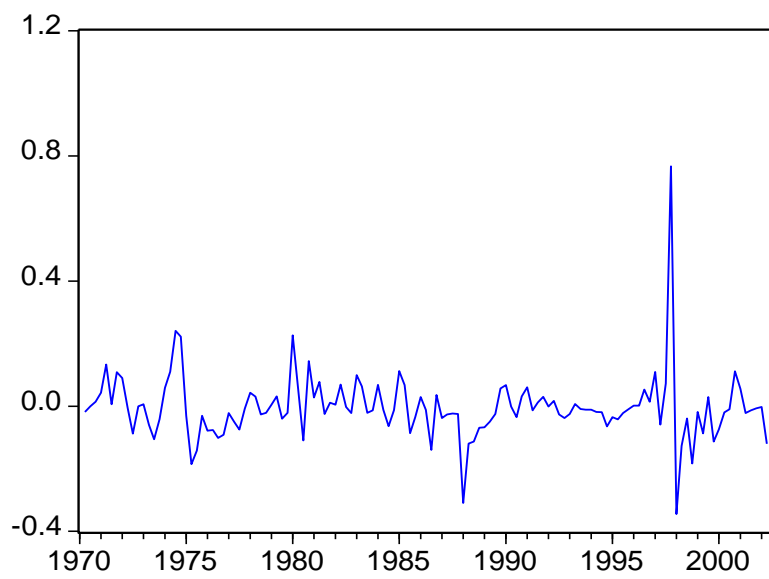
Figure (3): Indonesia*Figure (4): Korea*

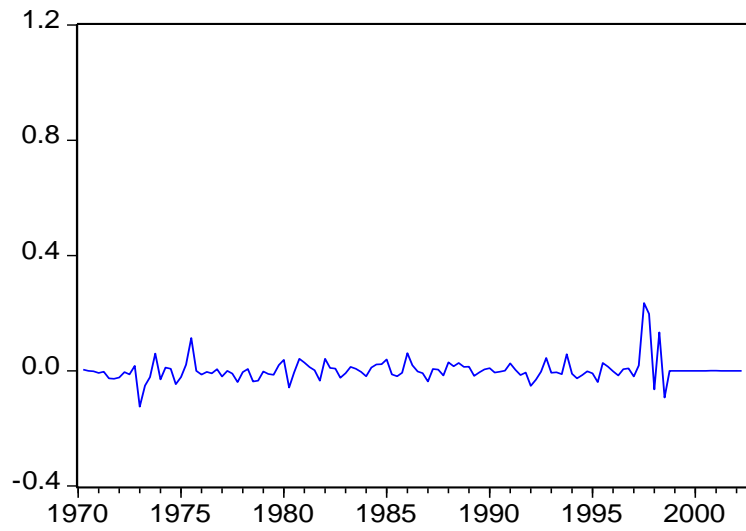
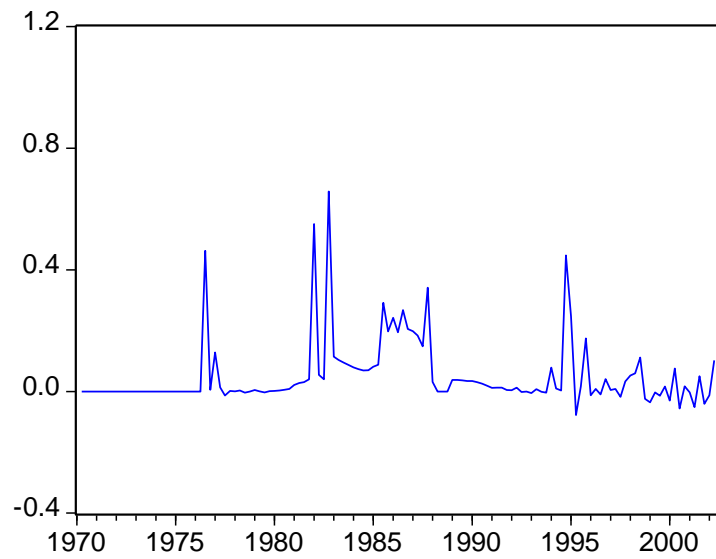
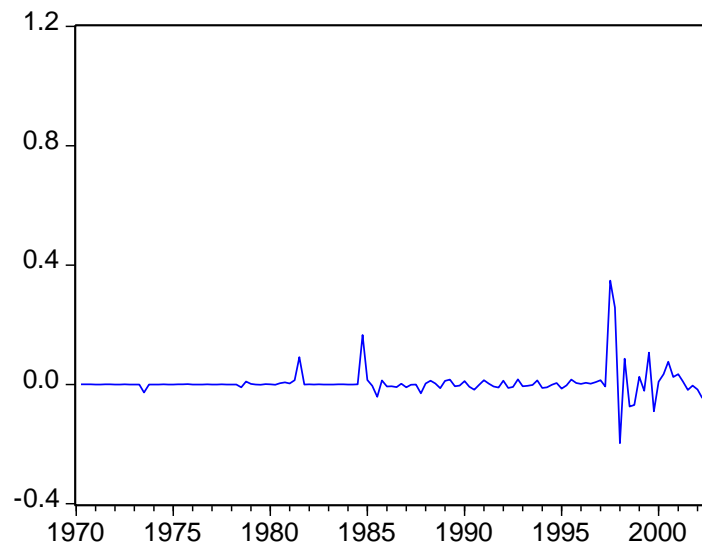
Figure (5): Malaysia*Figure (6): Mexico*

Figure (7): Thailand

3-Timing of the Financial Crises

Figures 1-7 show the movement of the indices during the past three decades. We do not attempt to explain the performance of each country here as there is a detailed literature available (for example, McLeod & Garnaut 1998). For the sake of simplicity and avoiding having too many periods of crises, the remainder of the analysis concentrates only on the period since 1990. As we noted earlier, Eichengreen et al (1995) suggested that a period is considered to be financial crises when the index changes by 2 standard deviations above or below the mean. Applying this criterion, Table 2 shows periods of financial crises for all seven countries since 1994.

Table (2): Periods of Financial Crises

Country	Arg	Aus	Ind	Kor	Mal	Mex	Thail
Periods	2002(1)	98(2)	97(3,4)	97(4)	97(1,2,3,4)	94(4)	97(3,4)
			98(1,2,3,4)	98(1)	98(1,2,3)		98(2,4)
			99(2,3,4)				
			2001(3)				

(Numbers in brackets refer to quarters).

Table 2 indicates that among the four Asian countries, Indonesia and Malaysia experienced more persistent crises relative to the other 2 countries. For three of these countries the crisis lasted only two years but for Indonesia the crisis dragged on. Korea's crises were the shortest. Mexico's crisis of 1994, and Argentina's currency board crisis of the early 2000s, are revealed by the table.

Australia's short period of financial crisis consists of a period of sharp depreciation coupled with the loss of foreign reserves in 1998. The Australian financial system was severely tested by the activities of large hedge funds in mid-1998. The major hedge funds established very large 'short' positions in the Australian dollar. They were selling not only their own holdings of Australian dollars, but entering into contracts to sell currency they did not yet own, to drive the \$A down. They would then buy it back up at a lower price, settle the amounts they had borrowed and make a large profit on the transactions. Their estimated borrowing was \$12 billion in May 1998. They let the rest of the market know that they intended to attack the \$A and concentrated sales in periods of thin trading. This led to classic herd-behavior on the part of other market participants. The Reserve Bank of Australia intervened and spent \$2.6 billion in three days buying Australian currency. This, in addition to the cut off of credit to hedge funds from the banking system in the context of the collapse of Long Term Capital Management, stabilized the foreign exchange market. This episode is well documented by Bob Rankin (in Gruen & Gower 1999) and in HRSCEFPA (2001).

All of the periods of crises shown in table 2, occur during periods ranked as financial liberalization by Abiad & Mody (2005) who have constructed an index of financial liberalization for 35 countries. The link between financial liberalization and financial instability has been explored extensively (for example, Stiglitz (2002), Gruen & Gower (1999), Monadjemi & Lodewijks (2004)).

4-Financial Crises and Macroeconomic Variables

Eichengreen and Wypolysz (1995) showed that macroeconomic variables tend to behave differently during periods of exchange rate crises as compared to tranquil periods. The authors graphically examined the behavior of 16 macroeconomic variables for 21 OECD countries within 2 quarters before and 2 quarters after the crises including the period of crises.

We have adopted a different approach. Standard deviations (SD) of 10 macroeconomic variables for six countries that experienced financial crises during the 1990s and Australia are compared with standard deviations of the same variables during tranquil periods. Periods of financial crises are those that were earlier reported in Table 2. Of the ten variables, six proved highly inconsistent and unreliable indicators of financial instability. These were the growth of credit, nominal GDP, monetary aggregates, inflation, average weekly earnings and a stock market index. Only four indicators proved generally reliable in charting the course of financial crises in five of the countries. Table 3 shows the SDs of these four selected macroeconomic variables during periods of financial crises and during more tranquil periods. Tranquil periods are all of the quarters outside of periods of crises since 1990. These four macroeconomic variables generally become more volatile during crises, with Australia and Argentina demonstrating a typical behavior.

Table (3): Standard Deviation of Macroeconomic Variables during Crises

Country Variable	Arg	Aus	Indon	S. Kor	Malays	Mexico	Thail
Current account	0.36 0.97	143.5 250.5	1333.8 623	5.87 2.66	NA	276.2 129	230.6 92.4
% ch ex. rate	47.11 0.16	0.06 0.04	0.25 0.005	0.21 0.01	0.09 0.02	0.22 0.02	0.16 0.009
Interest Rate	24.6 747.7	0.03 3.28	20.8 3.14	6.13 2.11	1.36 1.19	33.3 4.65	7.04 2.57
% ch reserve	0.14 0.24	0.11 0.08	0.07 0.07	0.21 0.06	0.09 0.13	0.52 0.07	0.08 0.04

Note: Bold figures represent periods of crises. NA indicates unavailability of quarterly data. All of the current account figures, except for Indonesia, are percentages of GDP. Quarterly data for GDP in Indonesia is not available. The exchange rates are national currencies per US dollar. The interest rates are money market rates except for Argentina, due to excessive volatility, the deposit rates were used. The current accounts are percentages of GDP except for Indonesia. The reserves are non-gold foreign reserves of the central bank.

The four selected variables in Table 3 – the current account balance, exchange rate, interest rate and foreign reserves - are the most sensitive macroeconomic variables to external shocks. Table 3 provides support for the volatility of these macroeconomic variables during crises. In the case of the four Asian economies, all of the variables (with the exception of reserves in Indonesia) were more volatile during periods of crises.

The unusual experiences of Argentina and Australia require some comment. In the former case, the peculiarities of the currency board system and its collapse account for much of the data peculiarities. The Argentina's case is complicated by the currency board which was in effect from 1991 to 2001. A high standard deviation of the change in the exchange rate is reflective of movement from the currency board to a floating exchange rate system after 2001. The Australian data behave contrary to the hypothesis; they are more volatile in tranquil periods than in crises. We have discussed this 'surprising' episode elsewhere

(Lodewijks & Monadjemi 2004) and it is apparent that capital flows became larger and more volatile after the deregulation of financial markets in mid 1980s. However, the average growth of GDP was higher and more stable during the period when capital mobility was more volatile. Caballero, Cowan & Kearns (2004) argue that there are at least three ingredients that helped Australia during the recent episode: (i) Australia had no concern (at least in relative terms) with capital flow reversals; (ii) Australia could count on *ex-ante* external hedging against exchange rate fluctuations; and (iii) Australian banks had access to a deep currency derivatives market to insulate themselves (and their borrowers) from exchange rate fluctuations.

It is interesting to note that unlike South East Asian economies, increased capital mobility in Australia has been associated with more stability of the economy. Prasad et al. (2003) show that with well developed financial institutions international financial integration can promote growth and reduce volatility in industrial countries. The Australian evidence is consistent with this finding.

5-Conclusion

Financial crises can have significant perverse affects on economic activity leading to significant losses to community welfare. Avoiding such instability through better financial institutions and appropriate economic policies are welfare improving. Discovering better indicators of impending financial problems are key ingredients to this effect and that has been the purpose of this paper. Four indicators – the current account balance, exchange rate, interest rate and foreign reserves – appear the most sensitive macroeconomic variables to external shocks, particularly in less sophisticated financial systems.

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