Spillovers from recent emerging market crises:

what might account for limited contagion from Argentina?

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The current crisis in Argentina has been notable for the lack of substantial spillovers to other emerging market economies (EMEs), particularly relative to earlier episodes of EME turbulence such as the crisis in Asia in 1997/98. This article considers factors that might account for this change. One is that investors have differentiated more between the crisis economy and other EME credits than during earlier crises, perhaps because of shifts in the composition of the EME investor base and widespread anticipation of the Argentine crisis. Another is that the vulnerability to shocks of those EMEs with close trade and financial ties to Argentina is lower than was the case in previous crises such as Thailand in 1997. Changes in investor behaviour may mean that contagious crises are less likely in the future. However if limited spillovers partly reflect the lower fragility of EMEs closely linked to Argentina, then future problems in other EMEs might still result in contagion.

SEEMINGLY ISOLATED crises in Mexico in 1994 and Thailand in 1997 quickly led to problems in other EMEs – including stock market collapses, banking panics, and balance of payments crises. By contrast, spillovers from the current crisis in Argentina have to date been much more limited.

Why do some crises quickly spread elsewhere, while others have a more limited wider impact? Part of the answer may lie in the existence of different channels of crisis propagation. In some cases, problems may spill over to EMEs having close economic or financial ties to the crisis economy. In others, crises can spread more widely without any such obvious linkages, for example because of shifting investor sentiment.

Regardless of the specific channel of shock transmission, the likelihood that spillovers lead to crises elsewhere will depend on structural features of EMEs. For example, macroeconomic or financial vulnerabilities may make EMEs more susceptible to shocks. The behaviour of EME investors can also have an important influence. EME creditors with sound balance sheets may help absorb shocks transmitted from crisis EMEs; conversely, investors with impaired balance sheets may make spillovers more likely. The nature of the initial crisis matters too. A sudden crisis may be more likely to have adverse impacts elsewhere if it leads to disorderly selling in illiquid markets. A well-anticipated crisis might cause less of a jolt as it may allow investors to rebalance their positions gradually in advance. Anecdotally, all of these factors – stronger balance sheets on the part of EMEs and their creditors and the lack of a surprise – help account for the relatively limited spillovers from the recent Argentine crisis.

This article considers these elements of crisis transmission in greater detail, focusing on the EME crises in Asia in 1997/98 and Argentina now. Previous studies, such as Kaminsky and Reinhart (2000), have suggested that trade and financial ties between Thailand and other Asian EMEs played some role in the spread of problems in the Asia crisis. This article adds to these studies by examining whether weaker trade and financial links from Argentina to other EMEs, and/or lower associated economic fragilities, might explain the more limited spillovers from this crisis. It also considers other factors that have reportedly played a key role in the differing evolution of these crises, including the behaviour of international investors.

Crisis propagation channels

Previous work, such as Claessens et al (2001), has considered both crisis propagation channels that operate through economic or financial ties between EMEs and those that stem from investor behaviour. In the latter case, problems in one EME might lead investors to revise their views about future investment returns in other EMEs, even if these economies have no clear economic or financial ties to the initial crisis economy. This might reflect perceived economic, financial or even political similarities between other EMEs and the crisis economy. It might also reflect a change in investors' expectations of potential support from the international community in future crisis situations.

Measuring these effects directly is problematic. For this reason, empirical studies of crisis propagation have instead often sought to measure the potential for transmission through easily quantifiable trade and financial channels. These channels also more readily lend themselves to *ex ante* evaluation.

Shocks may spill over via bilateral trade ties. For example, a collapse in the exchange rate of an EME and/or weaker growth may reduce its demand for imports from other EMEs. Developed economies also often import from a range of EMEs and so there may be important indirect trade linkages between EMEs via these economies. For example, a fall in the relative price of exports from a crisis EME because of a collapse in its exchange rate may raise competitiveness and reduce developed-economy demand for products from other EMEs. This may be particularly important when there are substantial overlaps in the composition of EME trade.

A second important set of linkages arises through direct or indirect financial interdependencies. Systematic evidence on direct intra-EME financial linkages is limited. Although these may be important in some cases – such as current links from Argentina to the Uruguayan banking system – the lower degree of financial development in most EMEs suggests that in general direct links are likely to be weak[1].

Studies of financial relationships between EMEs, such as Van Rijckeghem and Weder (2001), have focused on indirect linkages via shared developed-economy bank creditors. These 'common creditors' may respond to a loss on their exposure to one EME by reducing their lending to other EMEs. For example, losses may mean the lender needs to replenish liquidity or recapitalise to restore balance sheet health. This is most likely to occur when the initial financial position of the common creditor is relatively poor, or when the loss is unexpected and there is little time to adjust.

These common creditor links may also operate via non-bank investors. Although systematic data on EME capital market exposures by creditor are generally unavailable, aggregate information on investors' exposures may help identify those EMEs most susceptible to spillovers through these channels.

Emerging market economy vulnerabilities

Studies of leading indicators of crisis, including so-called "early warning systems" (EWS), have focused on the role of EME vulnerabilities[2]. Country-specific fragilities may influence whether the transmission of a shock from one EME leads to a crisis in others. In particular, interactions between propagation channels and specific vulnerabilities can play an important role. Countries with both strong links and high vulnerabilities are more susceptible to spillovers.
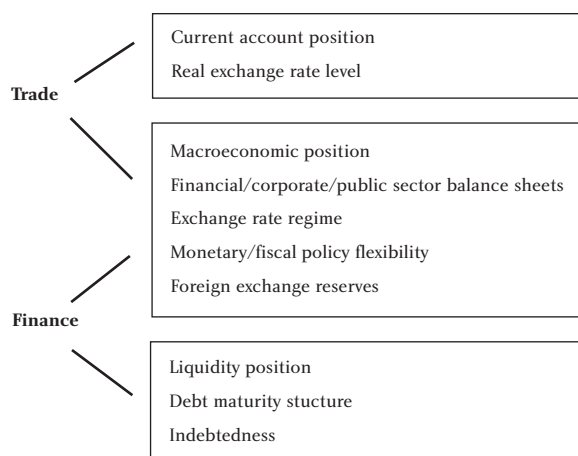
The current account position and the level of the real effective exchange rate are vulnerabilities that could be exposed in countries with strong trade links to crisis EMEs (Diagram 1). For countries with strong financial ties, indicators of financial system fragility – such as liquidity, indebtedness and the maturity structure of obligations – are perhaps the most relevant factors. Vulnerabilities in EME sectoral balance sheets may also affect the transmission of both real and financial shocks.

Domestic policy – particularly the scope for adjustment to shocks through fiscal, monetary and exchange rate policies – can also often influence the impact of transmitted shocks. For example, active and pre-emptive policy responses appear to have had a material impact in reducing spillovers in some countries in previous EME crises, despite relatively

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1: Fratzscher (2000, p.13) notes that direct financial linkages are likely to have been relatively unimportant in recent crises since developed economies provide most funds to EMEs.

2: See, for example, Kaminsky et al (1998) and the International Monetary Fund (IMF) review of EWS models in the *Global Financial Stability Report* (2002).

Diagram 1:

Examples of EME vulnerabilities related to trade or financial spillover channels

Trade

- Current account position
- Real exchange rate level

- Macroeconomic position
- Financial/corporate/public sector balance sheets
- Exchange rate regime
- Monetary/fiscal policy flexibility
- Foreign exchange reserves

Finance

- Liquidity position
- Debt maturity stucture
- Indebtedness

strong pre-crisis ties and apparent vulnerabilities. In the Asian crisis, Corsetti et al (1999) suggest that the Hong Kong authorities' willingness to adjust interest rates sharply helped maintain the currency board in the face of speculative pressures.

Finally non-EME vulnerabilities, for example weaknesses in developed-economy investors' balance sheets, may increase the likelihood that shocks spread to other EMEs. This is discussed in more detail below.

Case studies – Asia and Argentina

To what extent can we identify in advance countries likely to be hit by spillovers from crisis EMEs? Following previous studies, this section presents

estimates of readily measurable trade and financial linkages between Thailand – the first to face severe problems in the Asia crisis – and other EMEs with significant involvement in global capital markets[3]. This article adds to earlier studies by examining the extent of these ties in the Argentine crisis. It then examines whether linkages from crisis economies, in conjunction with vulnerabilities of other EMEs, help explain differences in crisis dynamics.

EME linkages to Thailand and Argentina

Trade channels can be mapped using merchandise trade data from the IMF Direction of Trade Statistics. Previous empirical studies have developed a range of indices from these data. Table 1 presents two measures, showing linkages from Thailand to other EMEs in 1996, the year before the start of the Asian crisis, and from Argentina in 2000.

The first measure focuses on bilateral exports and illustrates the joint importance of these exports for the crisis economy and the other EME. It is calculated as the sum of their bilateral exports divided by the sum of their total exports to all markets. But direct trade is only part of the picture, given that around 60% of developing economy exports go to industrial countries. To calibrate potential indirect trade effects, the second measure in Table 1 gauges overlap between EMEs' trade in third markets (weighted by the relative importance of each market in the total exports of the two EMEs)[4]. The index rises from zero to one as the pattern of shared

Table 1:

Trade linkage indicators

	Bilateral trade index		Shared market trade index	
	Thailand: 1996	Argentina: 2000	Thailand: 1996	Argentina: 2000
1	Singapore (7.7%)	Brazil (15.8%)	China (0.94)	Brazil (0.72)
2	Malaysia (3.9%)	South Africa (0.9%)	Malaysia (0.90)	Colombia (0.61)
3	Hong Kong (2.1%)	India (0.9%)	Indonesia (0.90)	India (0.57)
4	Korea (2.0%)	China (0.5%)	Korea (0.89)	Venezuela (0.55)
5	Philippines (1.8%)	Colombia (0.5%)	Hong Kong (0.86)	Korea (0.55)
6	Indonesia (1.6%)	Venezuela (0.4%)	Singapore (0.85)	China (0.54)
7	China (1.5%)	Korea (0.3%)	Philippines (0.83)	South Africa (0.53)
8	India (0.8%)	Thailand (0.3%)	India (0.75)	Thailand (0.52)

Sources: IMF Direction of Trade Statistics and Bank calculations.

3: The 18 countries included in the study are: Argentina, Brazil, China, Colombia, Hong Kong, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Poland, Russia, Singapore, South Africa, Thailand, Turkey and Venezuela. At end-April 2002 countries from this sample had combined weights of 85% and 78% in the JP Morgan Chase & Co Emerging Markets Bond Index (EMBI) Global and the Morgan Stanley Capital International (MSCI) Emerging Markets Free (EMF) equity index respectively. Hong Kong and Singapore are not included in either of these EME indices, but are considered in this study given their trade and financial linkages to EMEs. However, Uruguay, which has experienced some spillovers from problems in Argentina (as discussed in the Emerging Market Economies section earlier in this *Review*), is not included given its very low weight or omission from these indices.

4: This index was developed by Glick and Rose (1999). In Table 1 it is calculated on the basis of similarity in export shares in eight markets – the European Union, Japan, the United States, developing Europe, developing Africa, developing Asia, developing Middle East and developing Western Hemisphere.

Table 2:
Common creditor indicators

	Dependence on major common creditor[a]		Common creditor index	
	Thailand: 1996	**Argentina: 2000**	**Thailand: 1996**	**Argentina: 2000**
1	Indonesia (39.3%)	Colombia (23.0%)	Indonesia (0.88)	Colombia (0.87)
2	China (32.1%)	Philippines (22.2%)	Korea (0.78)	Brazil (0.85)
3	Malaysia (30.8%)	Korea (21.8%)	China (0.75)	Venezuela (0.76)
4	Singapore (27.4%)	Brazil (21.8%)	Malaysia (0.75)	Mexico (0.67)
5	Hong Kong (27.1%)	India (18.6%)	Singapore (0.68)	Korea (0.63)
6	Korea (23.8%)	South Africa (17.6%)	Hong Kong (0.65)	Philippines (0.57)
7	India (16.8%)	Mexico (17.5%)	India (0.61)	Turkey (0.54)
8	Philippines (10.3%)	Venezuela (15.6%)	Turkey (0.53)	India (0.52)

Sources: Bank for International Settlements (BIS) and Bank calculations.

(a) Japan is the largest BIS-area bank creditor for Thailand, 1996 Q4 data. United States is the largest creditor for Argentina, 2000 Q4 data. Calculated using BIS foreign claims data.

market export shares between the two countries becomes more similar.

For Thailand in 1996, the bilateral trade measure indicates relatively widespread linkages with other Asian EMEs. By contrast, Argentina had very strong direct trade linkages with Brazil in 2000, but other direct linkages with EMEs were more limited. The shared market trade index indicates that Asian EMEs had the most similar patterns in export destinations to Thailand in 1996. In particular, all four of the other Asian crisis countries (Indonesia, Korea, Malaysia and the Philippines) are included in Thailand's top eight. For Argentina in 2000, similarities in EME export patterns were less apparent, although again Brazil ranked highest on this measure.

Financial linkages via shared developed-economy bank creditors can be illustrated using the foreign claims data from the Bank for International Settlements (BIS)[5]. The primary creditor of the crisis country can be identified (ie the BIS reporting country with the highest share of foreign claims on the crisis economy). The dependence of another EME upon this primary creditor (relative to total BIS-area banks' claims on the EME) can then be calculated (Table 2). This provides a very simple indicator of the potential for spillovers via the main common creditor (which, for example, ignores the financial health of creditors). Such spillover channels may also operate via other bank creditors of the crisis economy. The second index in Table 2 attempts to illustrate this

feature. It measures the similarity of an EME's borrowing pattern to that of the crisis country across all common creditors[6].
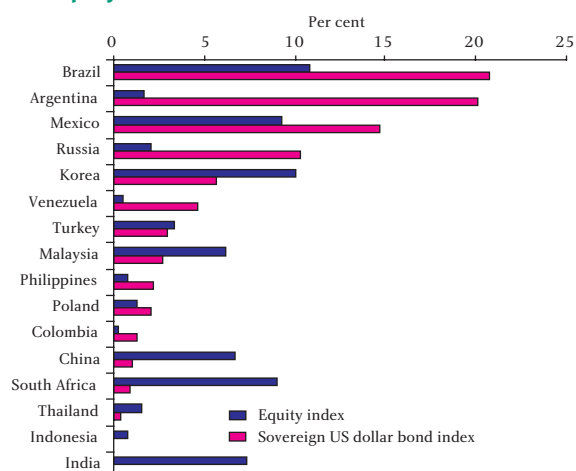
Japanese banks had the highest proportion of total BIS foreign claims on Thailand at end-1996 (51%); and the United States had the highest share of foreign claims on Argentina at end-2000 (27%), slightly ahead of Spain (25%). Japan was a key external bank creditor for a number of other Asian EMEs. US debtors were more geographically dispersed. But overall, dependence was less marked than that of economies on Japan in the Asia crisis. In terms of relative similarity of their bank borrowing patterns to Thailand, Asian EMEs all ranked highly in 1996. This was also true for several Latin American EMEs in the case of Argentina.

Systematic data on non-bank financial holdings, broken down by creditor, are not readily available. However, country weights in widely tracked international equity and bond indices provide one illustration of the relative importance of different EMEs to global investors – and hence the potential for intra-EME linkages via international investors. Latin American EMEs are major players in US dollar sovereign bond markets. Asian EMEs generally have higher relative equity market capitalisation, although this is also significant in Brazil, Mexico and South Africa (Chart 1). Given Thailand's low weight in international equity and bond indices, propagation via capital markets would appear to have been an

5: Box 3 in the December 2001 *Financial Stability Review*, p. 47, outlines the nature of the BIS data and the gaps in its coverage. The foreign claims data include BIS-reporting banks' cross-border claims in all currencies and their foreign affiliates' local claims in both local and foreign currencies.

6: This index was developed by Van Rijckeghem and Weder (2001) and is analogous to the Glick and Rose (1999) trade measure. It ranges from zero to one, with a higher value indicating greater similarity in borrowing patterns. The total claims on an EME used to calculate the index in Table 2 are those of 13 major published reporting BIS common creditors (Belgium, Canada, Finland, France, Germany, Italy, Japan, Netherlands, Spain, Sweden, Switzerland, United Kingdom and United States). This modified approach has been used to overcome problems of breaks in the reporting sample.

Chart 1:

Emerging market weights in US dollar sovereign bond and equity indices[a]

Per cent

Brazil, Argentina, Mexico, Russia, Korea, Venezuela, Turkey, Malaysia, Philippines, Poland, Colombia, China, South Africa, Thailand, Indonesia, India

Equity index
Sovereign US dollar bond index

Sources: MSCI and JP Morgan Chase & Co.

(a) Equity index is MSCI Emerging Markets Free and sovereign US dollar bond index is EMBI Global. Weights as at Jan. 2001 (pre-Argentina crisis).

Chart 2:

Thai and Argentine crises – shared market trade linkage and current account vulnerability[a]

Linkage: shared market trade index, inverted scale

1996
2000

Brazil, India, Philippines, Hong Kong, Korea, Indonesia, Malaysia, China, Singapore

Vulnerability: current account as a percentage of GDP

Sources: IMF, IMF Direction of Trade Statistics and Bank calculations.

(a) Asia crisis economies' positions in 1996 indicated in italics.

Chart 3:

Thai and Argentine crises – dependence on major common creditor linkage and foreign exchange reserve coverage of short-term BIS debt vulnerability[a]

Linkage: debtor dependence, per cent, inverted scale

Philippines, Brazil, India, Korea, Colombia, Singapore, Hong Kong, Malaysia, China, Indonesia

1996
2000

Vulnerability: reserves to short-term BIS debt, per cent

Sources: IMF, BIS and Bank calculations.

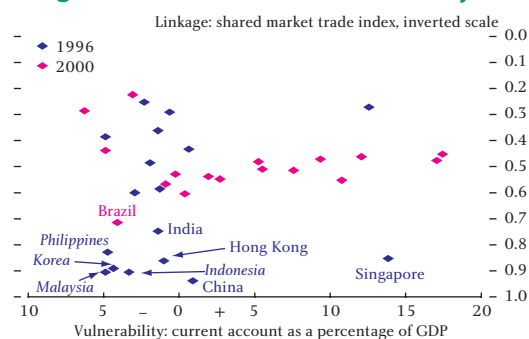(a) Asia crisis economies' positions in 1996 indicated in italics.

unlikely spillover channel from its crisis to other EMEs. By contrast, Argentina's relatively high weighting in the EME external sovereign bond market prior to its crisis suggested potential for spillovers to other major sovereign external bond debtors such as Brazil, Mexico and Russia[7].

EME vulnerabilities in the Asian and Argentine crises

Empirical EWS models typically employ a range of vulnerability and policy flexibility indicators to assess the probability of impending crisis in an EME. These models sometimes incorporate 'contagion' variables which raise the probability of crisis (for given vulnerabilities) if there has been a crisis elsewhere. A more structural approach, which looks explicitly at how specific shocks and linkages can interact with pre-existing vulnerabilities, may provide further insights on variations in crisis dynamics.

Does the evidence suggest that the interaction of trade and financial ties with related vulnerabilities was a contributory factor in the initial spread of the Thai crisis? Charts 2 and 3 present a selection of some key economic and financial ties and associated vulnerabilities for major EMEs. The blue markers in Chart 2 denote the strength of shared market trade linkages to Thailand and the related current account vulnerability of major EMEs in 1996. Similarly, Chart 3 shows EMEs' dependence on bank lending
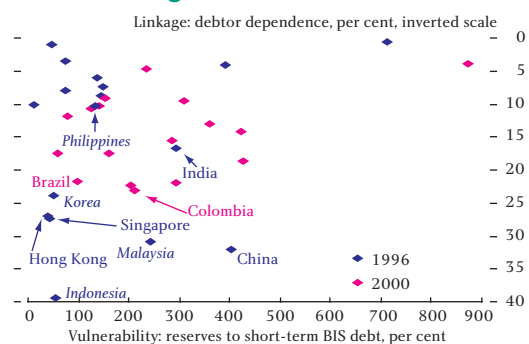
from Japan (the major common creditor in the crisis) against their related vulnerability of foreign exchange reserves coverage of short-term foreign currency debt. Economies located closer to the bottom left hand corner of each chart would perhaps be expected to face greater spillovers given the conjunction of a strong linkage and high relevant vulnerability.

These charts suggest that trade and bank linkages, together with vulnerabilities, go some way towards identifying those Asian economies – Indonesia, Korea, Malaysia and the Philippines – that experienced the most severe spillovers from the Thai crisis. They all had both relatively strong trade links with Thailand and large current account deficits. As Corsetti et al (1999) note, many also had managed exchange rate systems and had seen appreciations in their real exchange rate positions prior to crisis. The crisis Asian EMEs also tended to have strong banking sector

7: The value of Argentina's external sovereign bond weighting has since fallen sharply with the move to default (to 1.7 % at 27 May 2002).

dependencies on Japan (Thailand's main BIS-area bank creditor) which may have interacted with generally low reserve coverage of short-term debt.

Other economies were relatively strongly linked to Thailand but were perhaps less vulnerable. For example, China and India had relatively high reserves to short-term debt and were less vulnerable to exchange rate pressures given their capital controls. Singapore, and particularly Hong Kong, which had relatively strong trade and bank creditor ties with Thailand, faced speculative pressure during the crisis but had liquid and well-capitalised financial systems which may have helped them to contain spillovers.

How strong are relationships between trade and banking sector ties and EME vulnerabilities in the current crisis in Argentina? For the examples in Charts 2 and 3, the pink markers indicate that there were relatively fewer instances of EMEs with both close trade or banking linkages to Argentina and related vulnerabilities – EMEs appear less frequently in the lower left portions of the charts. There were some important exceptions. In particular, Brazil appears to have relatively strong ties and vulnerabilities, and perhaps has other linkages to Argentina via shared bond market creditors as already noted. But Brazil and some other strongly linked EMEs have also moved in the direction of more flexible macroeconomic policy regimes, better able to withstand shocks. For example, many EMEs have adopted floating exchange rate regimes that may provide an additional buffer in the event of spillovers (Chart 4).

Investor behaviour

Analysis of the interactions of trade and banking sector links with vulnerabilities appears to be a useful starting point for assessing the potential for crisis spillovers. But it is only a starting point. It is subject to two types of error: first, it may predict spillovers when none is realised; and, second, it may miss them when they do occur.

One reason for these errors may be that the selection of readily measurable trade and financial ties and vulnerabilities presented here are a subset, albeit an important one, of the full range of linkages and vulnerabilities. In practice, a wider set of vulnerability

Chart 4:
Exchange rate regimes(a)
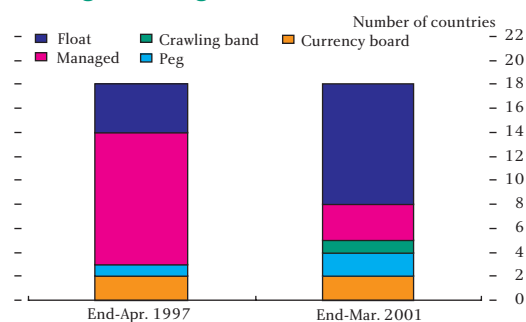
Source: IMF.

(a) The 18 EMEs discussed in this article are shown. Peg: conventional fixed peg arrangements other than currency board. Band: pegged exchange rates within horizontal bands. Managed: managed floating with no pre-announced path for the exchange rate. Float: independently floating.

indicators are probably relevant – including less readily measurable indicators of structural reform and balance sheet characteristics. On trade linkages, the potential for product level spillovers is not examined. For financial linkages, intra-EME financial relationships have not been captured and off-balance sheet bank exposures (say via credit default swap markets) are not considered. Furthermore, evidence on the potential for non-bank spillovers via shared creditors is only partial. Although an increasing number of empirical studies have attempted to examine these various additional channels in more detail, further research could provide important insights into the potential for EME crisis spillovers[8].

Another reason why the analysis above of pre-existing economic and financial linkages and vulnerabilities can only offer a partial explanation of crisis dynamics is that it does not explicitly consider investor behaviour. For example, the financial linkage measures provide information on the scale of investor exposures to EMEs, but do not indicate their actual portfolio behaviour in a crisis. Furthermore investor behaviour may open up spillover channels unrelated to pre-crisis intra-EME economic or financial linkages. For example, a crisis could prompt an investor with no exposure to the crisis EME to reassess its exposure to other EMEs.

Changes in investor behaviour, along with the lower coincidence of high vulnerabilities and close linkages, may have contributed to the absence of spillovers from the Argentine crisis. What might explain this

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8: For example, Froot et al (2000) examine data on portfolio flows into developed and emerging markets, whilst Kaminsky et al (2001) analyse the behaviour of emerging market mutual funds.

shift in behaviour? One argument might be that policy initiatives by both the IMF and EMEs following previous crises have led to improvements in country surveillance. For example, increased EME data dissemination may mean that it is now easier for investors to discriminate between EME credits. Evidence from the dispersion of spreads on internationally traded EME bonds, noted in the December 2001 *Review*, supports the view that investors have differentiated between Argentina and other EME debtors, particularly relative to earlier crisis periods[9].

Notwithstanding increased differentiation between credits, sudden crises can lead to disorderly selling in thin markets, making spillovers more likely. By contrast, when the probability of crisis rises gradually over time, investors can make adjustments to their portfolios in a more orderly manner. Evidence from the behaviour of spreads and ratings downgrades in various economies in the period around crises (Chart 5) suggests that current events in Argentina were much more widely anticipated than earlier crises, such as those in Russia in 1998 and Korea in 1997.

Chart 5:
Ratings downgrades during crises[a]
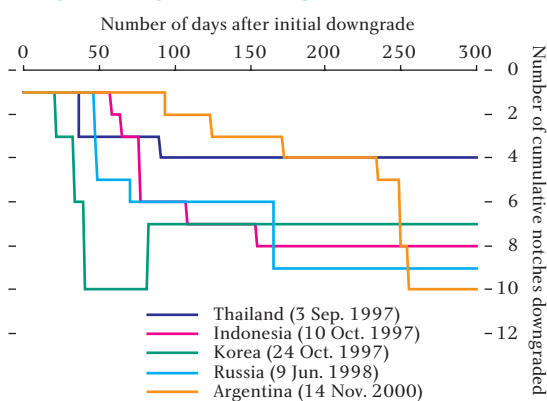
Source: Standard & Poor's.

(a) Indicates cumulative movement during period. Initial downgrade (date in brackets) is the first downgrade in the period leading up to crisis (with previous rating change in all cases over 18 months earlier than this change).

The lack of substantial spillovers from the crisis in Argentina may also reflect a shift in the composition of the EME investor base in recent years. For example, Japan was the main bank creditor of Thailand and other Asian EMEs in 1996, whereas more recently the United States and Spain were the principal creditors of Argentina. The Spanish and US banking systems in the period leading up to the Argentine crisis appeared to have relatively strong initial financial positions (both rated between B and C+ by Moody's for average financial strength at October 2000)[10]. By contrast, losses on exposures to Thailand may have weakened already poor balance sheet positions of Japanese banks (with an average Moody's financial strength rating of D+ in 1997). Finally, in global capital markets, market anecdote suggests a decline in the involvement of leveraged creditors such as hedge funds. In recent years IMF reports have also pointed to an increased prominence of 'buy-hold' institutional investors in EME capital markets[11]. The former may be forced into liquidating positions with short-term sales in a crisis, for example in order to meet margin calls. By contrast, the latter may be less vulnerable to reduced asset returns because they tend to be less leveraged and have longer horizons.

Conclusion

Trade and financial ties and associated EME vulnerabilities appear to help explain some of the spread of the crisis in Thailand to other Asian EMEs in 1997/98. In the more recent crisis in Argentina, a lower incidence of EMEs with both strong links to Argentina and high associated vulnerabilities to shocks may go some way towards explaining why the crisis has had a less marked impact elsewhere. Changes in the response of international investors to events in Argentina relative to earlier episodes of EME stress – perhaps reflecting shifts in the EME investor base and the widespread anticipation of the Argentine crisis – have also played an important role.

If shifts in investor behaviour explain the limited spillovers from Argentina, contagious crises may be less likely in the future. However if they partly reflect lower fragilities of EMEs closely linked to Argentina, future EME problems might still result in contagion. Further work disentangling these alternative factors is needed given their very different implications for public policy.

9: See Box 3 in the June 2001 *Review*, p. 61.

10: Banks rated B display strong intrinsic financial strength, those rated C display adequate intrinsic financial strength and those rated D display modest intrinsic financial strength.

11: See IMF International Capital Markets, September 2000, p. 63.

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