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The Instability of the Emerging Market Assets Demand Schedule

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This chapter addresses the nature of the demand schedule for emerging market assets in both its macroeconomic and microeconomic dimensions. The former is usually analysed in terms of the 'push factors' (such as interest rates or contagion) determining international capital flows; while the latter is normally approached through the portfolio composition decisions (such as herding or risk appetite) of investment managers. Bringing these two perspectives together contributes to an understanding of how sudden shifts in the demand schedule can cause large and asymmetric shocks for emerging market countries. Official interventions by agencies such as the IMF focus on 'supply' interventions (such as improving information or avoiding default) and neglect the need to stabilise demand. The chapter suggests that official intervention is required in order to stabilise and lengthen demand schedules, and thus construct an orderly international market in emerging market assets.

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1. INTRODUCTION

The expansion and contraction of portfolio capital flows and short-term bank lending from OECD countries in emerging markets during the past decade has generated a large and controversial literature. Most of this debate has focussed on the effect of these flows on emerging markets themselves, and the effect of host country policies on the attraction or retention of these flows. However, the process by which credit providers and portfolio investors make their decisions is much more than a simple decision to 'supply' a specific amount of capital to emerging markets at a given average risk and price, and then allocate this between individual emerging markets according to local risk and return characteristics – the so-called 'fundamentals'.

In any market, changes in both the level of transactions flows and the prices at which they take place must reflect shifts in either the demand schedule or the supply schedule (or both simultaneously) and that both these schedules will be affected by agents' expectations as to the future evolution of the market. Fortunately increasing attention is being paid to two dimensions of what this paper terms – as seems logical – *the demand for emerging market assets.* The first strand in the recent literature relates to what are frequently but somewhat misleadingly called 'push' and 'pull' factors determining capital flows at the macroeconomic level. The aggregate level of capital flows to emerging markets is held to be determined by the push factors, which include market conditions in the source country and the return on emerging markets as a whole. The pull factors are the conditions in the destination countries, which determine the allocation of the aggregate flow across the emerging markets. The second strand relates to the determinants of investors' decisions to purchase (or sell) emerging market assets at the microeconomic level. Portfolio choice models thus include source country conditions as determining the opportunity cost of capital (that is, the risk-free portion of the portfolio) and the overall asset stock; while destination country conditions determine the yield and risk of emerging market assets.

From the first strand it is apparent that shifts in aggregate asset demand (i.e. changes in the 'push factors') such as OECD interest rates and G3 exchange rate fluctuations account for at least half of the observed changes in capital flows, independently of the asset supply (i.e. 'pull') conditions – that is the so-called 'fundamentals' in emerging markets themselves. From the second strand it is clear that not only information about fundamentals matters to individual investors decisions, but also the way in which the information is used, endogenous cycles in risk appetite, and the effect of regulatory incentives –all of which are determined by conditions in the source country.

In effect, the demand schedule for emerging market assets is three-dimensional. As well as price (or yield) on one axis, so to speak, and the quantity of assets on another axis, there exists a third dimension that can be broadly termed 'quality' on another. This is no different in principle from the market for, say, automobiles – except, as we shall see, quality is not a stable or exogenous factor. Nor, as we shall see is it a 'market in lemons' where quality is unknown to the buyer alone. The supply schedule (i.e. emission or resale by government, company or bank concerned) has the same three dimensions. Ideally, quality is the given risk of debt default, dividend collapse or major devaluation as determined by 'fundamentals' of the country and its companies, so that interaction between stable demand and supply schedules will determine the price and quantity at which the market in assets clears. Changes in this

equilibrium over time are then the observed capital flows. Variations in asset quality as fundamentals alter due to external shocks or domestic politics will be reflected in changing prices and flows as markets adjust to the changed circumstances. The object of emerging market governments (and their international advisors) is then to improve asset quality by sound (or sounder) management so that either asset prices improve (i.e. yield spreads fall) or more assets can be supplied (i.e. capital inflows be attracted) at the going price.

Asset prices are the information directly available to the market, but only in the form past and current values and yields. However, the future prices (or indeed the appropriate long-term price trend) are an essential aspect of 'price' and are a matter of investor expectations rather than measurable data. Moreover, the quantity dimension is ambiguous, for two reasons. First, because what is recorded (e.g. in balance of payments statistics) is the value of the flows (price times quantity) made up of innumerable transactions, and while the number of securities transactions could in principle be counted there is no clear definition of the volume index to be used to aggregate them. Second, because the changes in the stocks of financial assets (which are what is recorded at the firm level) reflect not only new flows but also stock revaluations. Ideally then, we need records of asset stock volumes and prices, with the changes decomposed into flows and revaluations.[1]

The third dimension of 'quality' is the most difficult to define. It should reflect risk, of course, but this cannot be ascertained merely from the volatility of returns in the past because it also contains market expectations of future yields and volatility (which may vary not only with the underlying fundamentals but also with market beliefs about that future) on the one hand and the role of the asset in the investor's portfolio - including its covariance with other assets, their respective yields, and her degree of risk aversion – on the other. If markets cleared properly and price reflected quality fully then this would not present a practical measurement problem although it could still present an obstacle to the design of policy to reduce volatility.

In terms of elementary algebra, we have two equations (demand and supply) in three variables - price, quantity and quality (risk). This system cannot be solved without a third equation, of course. If a single stable relationship between price and risk exists, as financial textbooks suppose, then this constitutes the 'third equation' and the system solves – that is, there is market equilibrium. In practice, however, this stable relationship does not exist so in effect there is market failure.[2] The response of agents is to construct heuristic 'rules of thumb' that reflect practical experience about the observed relationships between quality and quantity. This response is made explicit in management rules for credit rationing and portfolio benchmarking at the microeconomic level. It is also implicit in asset bubbles and regional contagion observed at the macroeconomic level.

These kinds of quantity-quality linkages are a familiar characteristic of domestic financial markets. A 'backward sloping supply curve of credit' occurs where lenders are increasingly unwilling to lend to borrowers as their debt mounts, and that offer of higher yields (i.e. lower prices) does not stimulate more lending (i.e. asset demand) because it reduces the capacity of the borrower to pay. By extension, further lending to a single client will increase the investor's risk exposure thus affecting quality as well as price. Thus profit maximisation by lenders leads to a situation where the

demand for loans is not fully met at the current 'price' (that is return for a given risk class). In consequence shifts in the asset demand schedule (i.e. credit supply) that determine the credit flow. At the aggregate level, these credit shifts then have substantial effects on output – further affecting asset quality and amplifying the cycle.

Finally, the way in which investors assess asset quality also depends on the *way* in which the information is used – not just the asymmetry in its availability to buyer and seller that the textbooks assume. The path-dependent formation of expectations and difficulties in assessing future contract compliance limit the ability of investors to adopt an optimal portfolio position defined entirely by expected returns and measurable volatility. Indeed the widespread 'benchmark' approach, by defining a range and a central position for portfolio composition, itself implies that an objective definition of asset quality is not available to be priced. Limits on exposure to a particular country by a single bank across all its asset purchases have a similar effect. This is the aspect of the demand function that is most difficult to assess, particularly because the way in which investing institutions use information (public or private) to reach this conclusion can change as well as the circumstances themselves.

This chapter is therefore structured as follows. Section 2 attempts to derive the main macroeconomic characteristics of the emerging market asset demand schedule from the literature on 'push' factors in capital flows, which emphasises the asymmetric effect of changes in monetary conditions on OECD markets and 'pure contagion'. Section 3 reviews recent work on portfolio composition decisions by fund managers in order to establish the key microeconomic characteristics, particularly the roots of herding and risk appetite in bounded rationality. Bringing these two perspectives together in Section 4 provides the basis for a critique of official market interventions for their limited effect on demand conditions. Finally, Section 5 concludes by suggesting that more determined efforts to stabilise and lengthen demand schedules may be necessary in order to restore an orderly market in emerging market assets.

2. PUSH FACTORS AND CREDIT CYCLES – THE MACROECONOMIC DIMENSION OF THE ASSET DEMAND SCHEDULE

Changing investor perceptions are clearly related to international capital market instability. For instance, before the Asian crisis, five factors were considered to determine market access - or rather 're-entry' after the debt crisis of the 1980s (IMF 1992, pp. 45 et seq.). First, sound macro policies to reduce perceptions of country transfer risk. Second structural reforms such as privatisation and financial liberalisation in order to provide attractive assets in the form of equities and treasury bills. Third, the restructuring of existing commercial debt in order to reduce the disincentive effect of large debt burdens on private investment. Fourth, a solid record of servicing claims since 1982 crisis to enhance reputation among investors. And fifth, the reduced transactions cost implied by modern technology and integrated markets.

These were all essentially issues related to the quality and supply of assets rather than the demand for them, despite the fact that the ERM crisis had recently demonstrated that private sector behaviour could be highly destabilising, and that self-fulfilling

speculative attacks could be encouraged by the availability of bank credit for this purpose (IMF 1993 – in particular Section 4 'private sector behaviour during crisis'). In particular, the role of highly leveraged institutions such as hedge funds and the proprietary trading desks of investment banks could create rapid changes in the demand for particular asset classes and thus destabilise particular markets (IMF 1994). Further it also became clear that speculative activities across the interstices of the international financial system were not simple arbitrage but actually created systemic settlement and liquidity risks (IMF pp. 34-7 and 120-38).

This somewhat belated recognition[3] of the destabilising potential of endogenous investor behaviour (despite the fact that *domestic* financial regulation takes this for granted) led in turn to urgent official attention to the need to regulate international banking on a cross-border basis (IMF 1997); to the problem of herding behaviour by portfolio investors – particularly fund managers – and contagion there from between emerging markets (IMF 1998 pp. 69 – 71); and finally the need for ratings agencies to take into account the exposure of private banks as well as macroeconomic data (IMF 1999 pp. 101-115 and 180 –203). This overdue acceptance by the Fund of the fact that demand schedule shifts are a major cause of instability in capital flows and beyond the control of emerging markets themselves, has not however been matched by any corresponding initiative to stabilise that demand.

In consequence, formal analytical modelling of international capital markets in aggregate (as opposed to the microeconomics of portfolio behaviour) has made little progress – in sharp contrast to the valuable contributions of trade theory to the formulation of international trade policy in practice. Sticky prices, market segmentation, heterogeneous investors, persistent currency misalignments despite arbitrage and the cost of scarce information all need to be accounted for if the model is even to approximate the real world in a useful way (Dumas, 1994). Indeed the divergence of asset prices from their fundamental values is a systemic characteristic of all capital markets and while it is a zero sum game for the financial agents directly involved the effects on the real economy are far from negligible, and must be taken into account by regulators (Tobin 1998, Chapter 6).

As the demand for and supply of emerging market assets does not come into equilibrium, an explicitly disequilibrium econometric framework is clearly required in practice as well (Agenor, 1998). Models of 'credit crunches' are a familiar approach to the analysis of domestic capital markets (Blinder, 1987), but not generally used in international finance. These models would imply that a 'pecking order' of FDI, debt and equity would also be required for such a framework, consistent with asymmetric information and finance theory (Razin, Sadka and Yuen 1998). Above all, the effect of demand changes on asset prices and flows is likely to be asymmetric in the sense that an increase (or decrease) in demand would not affect all assets equally, but rather prices and quantities stable the safer the asset.

One of the few instances of this approach is the detailed examination of capital flows to four emerging markets - Brazil, Mexico, Thailand and Korea - by Mody and Taylor (2001). They find that the 'short' side of the market, which can vary over the cycle, determines the level of the flows. It is thus possible to determine instances of 'international capital crunch' where flows are curtailed because of lender rationing. In particular, the results show that higher *US* yield-spreads are associated with credit

crunches for emerging markets. Their analysis also highlights the role of asymmetric information (as distinct from default risk) in conditioning capital flows. There is also ample evidence that domestic investors are better informed about payoffs in their own market than foreign investors in both Europe (Gehrig, 1993) and Japan (Kang and Stulz, 1994), leading to home bias. There is also evidence of domestic investors moving out of markets in crisis before foreigners do in the cases of in Korea (Kim & Wei, 1999) and Mexico (Frankel and Schmukler, 1996). This leads Brennan and Cao (1997) to suggest that while foreign equity purchases may be an increasing function of returns, due to the cumulative information advantage, news will cause foreign investors' to revise their positions more than domestic ones would.

The relative role of push and pull factors taken separately in determining fluctuations in capital flows has been researched empirically, particularly for the outward surge of the early 1990s, although there was no general consensus on the relative roles played by these factors at that time. However Calvo, Leiderman and Reinhart (1993) stress external factors because reforming and non-reforming countries were similarly affected and at same time. The key factor is the poor return on safe assets in G3 (especially the US) that leads to an incentive to search for higher return. By the mid-1990s, Fernandez-Arias (1996) can conclude that the 'push' factor predominated on the weight of the evidence by the mid-1990s, falling US interest rates being the key. By extension, sustained US asset price growth in the late 1990s would explain the decline in demand – as well as supply quality problems in merging markets themselves. Montiel and Reinhart (2001) can thus conclude that the key push factors are those that reduce the attractiveness (risk-return characteristics) of industrial country debtors and thus relate the demand for emerging market assets. This is related to the business cycle: the collapse of Japanese asset prices on the one hand, and low US and European interest rates on the other are cited for early 1990s. Longer-term push (i.e. demand) factors include changes in financial structure in industrial countries, such as rise of mutual funds, where the small emerging market share in their growing portfolios allows for longer-term upward trend. According to these authors, at least half of observed variations in capital flows during the 1990s can be explained by these 'push' factors.

More recently attention has turned to the downturn in the capital flows cycle at the turn of the century. As Figure 1a indicates, the cumulative stock positions for emerging market bonds, loans and equity seem to indicate that a stable position was approached in the second half of the decade after the rapid stock expansion of the first half. In addition, within these totals it is clear that towards the end of the decade there has been a shift towards higher-quality assets such as syndicated loans to affiliates of multinational corporations, investment grade bonds and corporate equity traded on international exchanges. This might imply that the boom was in fact a stock re-adjustment following an earlier decline in demand due to deterioration of asset quality (that is the 'debt crisis') on the one hand, and the expansion of asset supply due to utilities privatisation and financial liberalisation on the other. The recent 'drought' would then reflect deteriorating asset quality and a reduced supply of assets as privatisations are completed and sovereign issuers reduce their public sector borrowing under adverse circumstances (IMF, 2001).

However, Figure 1b indicates another possible explanation. It is clear that in the case of US mutual funds at least, demand for emerging market assets is closely correlated

for the demand for international assets more generally. In other words, the 'push' factors determining the latter – including relative returns, portfolio diversification and home bias – are dominating the 'pull factor'. A similar pattern can be observed for international bank portfolios, which have kept on growing at the end of the decade while the emerging market share has steadily declined (IMF, 2001, p. 23). The divergence in the late 1990s can then be attributed to asset quality decline (that is, the successive emerging market crises) although it should be remembered that this too is related to the previous upsurge of demand creating an asset bubble. Similar effects have been detected in the bubble in technology stocks, with which emerging market equities and bonds appear to constitute a single asset risk-return class for many institutional investors.

[Insert Figure 1 about here]

In addition, as Figure 1c demonstrates, there is also evidence of increasing cross-correlation of emerging market assets in times of crises due to broad selling. For this high and variable degree of contagion "common external factors and lack of investor discrimination are the more likely explanators" (IMF, 2001, p. 18). In downswings, the lack of safe havens within an asset class also appears to increase cross-correlation. Eleven 'droughts' of varying length are identified by the authors between 1993 and 2001, defined as periods when the primary dollar market is effectively closed to the main non-investment grade borrowers. Rate spread widening and market volatility are found to be key factors preceding such market closures: markets tend to reopen when spreads stabilise or narrow again; these factors also cause issuers to delay issuing – so there is a supply effect as well. However, closure tends to be sudden and opening gradual because "while there has typically been a key discrete event that closes markets, there has typically not been a clearly identifiable discrete event that reopens them." (IMF 2001, p. 20).

In sum, it is clear from the macroeconomic evidence on capital flows that that shifts in the demand schedule for emerging markets assets have disproportionate effects on both prices (yields) and quantities (flows), causing major macroeconomic shocks that in turn affect asset supply in terms of both asset quality (i.e. economic stability and default risk) and asset supply. The factors that cause these shifts include the cost (interest rates) and availability of capital – that is the OECD business cycle - on the one hand, and changes in risk aversion on the other. Risk aversion itself depends on home market conditions, but also the experience of previous crises and the contagion of whole asset classes, independently of the underlying 'fundamentals' – which in turn change over time as collective perceptions of the causes of emerging market instability change. However, to understand the changes in risk aversion it is necessary to turn to the microeconomic evidence on investor behaviour.

3. MOMENTUM TRADING AND RISK APPETITE – THE MICROECONOMIC DIMENSION OF THE ASSET DEMAND SCHEDULE

For some time it has been clear that the microeconomic logic of investment behaviour in response to particular financial incentives, and the way that investors use

information, can have severe consequences for the pricing of developing country stocks, quite independently of the underlying 'fundamentals'.[4] The consequent asset bubbles can have a serious impact on the real economy in both developed and developing countries even in the presence of low inflation, fiscal balance and monetary rectitude (IMF, 2000).

The principles of investor valuation in terms of risk and return of assets in a portfolio are well known, but also the question of the liquidity of emerging market assets (almost a form of contract uncertainty) is relevant in view of the possibility of market collapse. Liquidity then relates to the perception of other buyers' reactions to news (herding and contagion), and also to the anticipated actions of public authorities (so-called 'moral hazard'). In consequence, asset valuation methods and portfolio composition rules in practice tend to be rather crude, being largely based on considerations of liquidity and exit possibilities (Clark, Levasseu and Rousseau, 1993).

However, there are limitations to the use of yield spreads on emerging market bonds as evidence of markets perception of asset quality in the form of underlying default risk. A measure of yield dispersion as well as of co-movements is necessary in order to see if the effects of shocks are common to all the bonds surveyed, and the time profile of risk is also needed to detect investor demand for liquidity. Moreover, "care is needed in interpreting yield spreads, since they are influenced by a variety of factors other than the perceived creditworthiness of the borrower including investors' appetite for risk and the liquidity of particular instruments" (Cunningham, Dixon and Hayes, 2001, p.175). In particular "changes in risk appetite follow from change in preferences or institutional factors, such as the need to adjust portfolios following losses incurred on holdings of other risky assets" (*op. cit.* p.185).

Yield dispersion has increased over time as well as increasing after crises, which can be interpreted as growing investor discrimination in a cumulative learning process. However, it is still the case that beyond investment grade[5], the relationship between risk (as reflected in ratings) and price (reflected in yield spreads) tends to break down – particularly during droughts when credit rationing reduces transactions volume severely. Moreover, to the extent that the yield spread term structure slopes upward (because default risk increases into the future) then average yield measures will be distorted when composition changes through the cycle according to liquidity preference.

Moreover, we understand very little about how information is actually used in these investment decisions. In particular, perceptions of risk cannot reliably be based on econometric analysis of past trends, due to both the lack of data and the persistence of structural breaks. Under conditions of uncertainty not only is the most recent and 'timely' information used (such as reserve levels or asset price trends – by chartists) rather than more informative data, but also judgement is strongly affected by the implicit models used by investors. Moreover, in view of the cost of information (i.e. research), its untimeliness, and its uncertainty portfolio investors logically prefer to mover quickly in response to news instead. Finally, the incentives faced by fund managers themselves (such as quarterly performance bonuses based on performance relative to the industry average) are widely considered to exacerbate this behaviour.

In effect, as Keynes pointed out a long time ago, uncertainty cannot be reduced to risk or probability, rather it is related to the strength or degree of belief. Thus "people evaluate the probability of events by the degree to which these events are representative of the relevant model or process" (Kahneman, Slovic and Tversky 1982, p. 97). Perceptions of risk under circumstances that are difficult to imagine (low 'availability') or have not been experienced before, are systematically underestimates as the event is felt to be unlikely. In general, "although the language of probability can be used to express any form of uncertainty, the laws of probability theory do not apply to all variants of uncertainty with equal force" (*op. cit* p. 519).

An interesting application of this insight is provided by de Grauwe's model of the 'band of agnosticism' in exchange rates, within which demand is stable, but once breached leads to large demand shifts. This reflects 'rational behaviour in an uncertain world' (de Grauwe 1996, pp. 181–206). He argues that "the idea that economic agents compute a future exchange rate based on a model they believe in, then telescope it back into the present, is of little use in a world where economic agents have great difficulty in working out what the true model of the world is" (o*p. cit*. p. 189). Under these circumstances, surprisingly small information costs will lead to quite large asset price bands of this type.[6] De Grauwe also suggests that "the band of agnosticism is also a breeding ground for fads which, in the absence of credible alternatives, are elevated to important theories" (*op.cit*. p. 202) and concludes that "movements of real exchange rates are, within certain bounds, inexplicable" (*op.cit.* p. 209) – all one can do is to make probabilistic statements about them.

Another direction is provided by recent work on herding by investors, which indicates that three causes can be involved. First, payoff externalities where payoff to an agent adopting an action is positively related to the number of agents adopting the same action. Second, principle-agent considerations such that a manager, in order to maintain or gain reputation when markets are imperfectly informed, may prefer either to 'hide in the herd' to avoid evaluation or 'ride the herd' in order to improve reputation. And third, information cascades where later agents, inferring information from the actions of prior agents, optimally decide to ignore their own information (Devenow and Welck, 1996). Here too the *use* of information is as important as its availability.

The macroeconomic variables discussed in the previous section of this chapter also enter into standard models of portfolio optimisation as the basis for asset allocation by fund managers (Disyatat and Gelos, 2001). Clearly higher home interest rates, lower volatility in home assets, higher covariance between these and emerging market assets, and higher risk aversion will all reduce demand for emerging market assets independently of the supply conditions. Further, the benchmarking model explains pervasive herding behaviour and thus the 'momentum' effect of demand for an asset becoming a positive function of the quantity (capital flow) itself. These models take both the risk aversion of investors and the characteristics of assets themselves as given. There is however good reason to see risk aversion (or 'risk appetite') as a variable in itself which is not only changing but also path dependent, varying with past experience of yields and bubbles and thus potentially strongly pro-cyclical. Thus the prevalence of 'home bias', particularly under conditions of uncertainty, is clearly part of the problem for emerging markets as an asset class, and not just a structural factor.

US pension funds hold between 1.5 and 2.0 percent of their portfolios in emerging market assets, mainly through mutual funds: these mutual funds in turn account for about 10 percent of market capitalisation in the host countries (Kaminsky, Lyons and Schmukler (2000b).[7] Econometric analysis of this evidence clearly indicates that funds' momentum trading in emerging market equities is positive – they systemically buy winners and sell losers (Kaminsky *et al.* 2000a). Contemporaneous momentum (buying winners and selling losers) is stronger during crises; lagged momentum trading (buying past winners and selling past losers) is stronger during non-crises. Investors also engage in contagion trading, that is they sell assets from one country when asset prices fall in another. This World Bank study also found differences between the behaviour of fund managers and direct investors, with managers more likely to engage in momentum trading, partly because individuals flee mutual funds during crises even of fundamentals do not warrant it.

In a similar vein, an IMF research study explores the portfolio data for dedicated US mutual funds to assess whether they follow benchmarks or portfolio rebalancing rules (Disyatat and Gelos, 2001). The authors find that benchmarking explains observed behaviour better than a rebalancing rule implied by the standard mean-variance optimisation model, but do not explore variations in risk aversion over time. None the less, the Fund does recognise that risk appetite changes over time in practice, and uses for this purpose the JP Morgan 'Global Risk Aversion Index (IMF 2001) which measures monetary liquidity and credit premia (see Figure 2). The Bank of England, however, warns that "it is difficult to construct robust indicators of risk appetite" because of the problem of separating out the effects of pure contagion and underlying fundamentals in aggregate indicators[8] (Cunningham, Dixon and Hayes, 2001, p.185).

[Inset Figure 2 somewhere near here]

It is thus necessary to construct a model of risk aversion (or risk appetite) that suspends the CARA assumption, allowing for the observed cyclical behaviour in risk appetite and asymmetry through the cycle with risk aversion rising suddenly in a crisis and only slowly declining afterwards. Kumar and Persaud (2001) suggest how this might be done, by arguing that observed spreads should not be explained in terms of the difference between global risk (α) and the variance of the asset price (σ^2) as is conventionally done, but rather the product of risk appetite (K) and the standard deviation of the asset price (P). This in turn defines the expected return $E(R)$, which is measured as the difference between the long-term asset price $LR(P)$ and the current price P.

This formulation has two advantages: first, it allows risk appetite to be separately estimated, and second, it reflects the fact that variations in risk appetite will have proportionately larger effects on riskier asset prices.

$$E(R) = \alpha + K\log(\sigma^2)$$

$$E(R) = LR(P) - P$$

$$P = LR(P) - \alpha - K\log\sigma^2$$

This formulation has the attractive property that the effect of global risk is symmetrical on emerging market asset prices, but the effect of risk appetite varies with the riskiness of the asset price itself:

$$\partial P/\partial \alpha = -1 \qquad \partial P/\partial K = 2\log \sigma$$

It also means that K can be estimated separately as a coefficient in the regression of the volatility of an asset on its price. Empirical tests by the authors on leading emerging market currencies clearly demonstrate the cyclical behaviour in risk appetite (*K*) and support the hypothesis that the more volatile (riskier) an asset is, the greater the rise in expected return in relation to the general level of risk. That is, demand *schedule* for emerging market assets will be both steeper and more volatile than that for home assets.

At the microeconomic level, we can draw together the factors discussed above in a simple way by exploring a simple framework for asset allocation in a portfolio made up of two[9] asset classes, the emerging market asset (*1*) and the 'home' asset (*2*), with expected returns (*r*) and risk profiles (σ^2) such that

$$r_1 > r_2 \quad \sigma_1^2 > \sigma_2^2$$

The share (*w*) of emerging market assets in the portfolio and the covariance between the two asset classes ($\acute{o}_{12}$) then determines its overall return (*R*) and variance ($\acute{O}^2$) characteristics

$$R = r_1 w + r_2(1-w)$$

$$\Sigma^2 = w^2\sigma_1^2 + (1-w)^2\sigma_2^2 + 2w(1-w)\sigma_{12}$$

The investor's problem is then to maximise her objective with respect to portfolio composition, which is defined as follows

$$\max_w = R - \tfrac{1}{2}A\Sigma^2$$

where *A* is the risk aversion coefficient. This then solves for the optimal value of the share of emerging market assets (w^*) in the portfolio

$$w^* = \frac{1}{\sigma_1^2 + \sigma_2^2 - 2\sigma_{12}}\left[\frac{r_1 + r_2}{A} + (\sigma_2^2 - \sigma_{12})\right]$$

From our point of view, the key feature of this standard textbook result is that it enables us to construct an implicit asset demand schedule on the basis of the same characteristics of the asset demand schedule identified in the previous section of this chapter. In other words, the positive (negative) effect on the demand for emerging market assets of a decrease (increase) in the home rate of return r_2, an increase (decrease) in the riskiness of home assets $\acute{o}_2$, a fall (rise) in pure contagion $\acute{o}_{12}$ and above all an increase in risk aversion *A*.

In sum, both empirical evidence and analytical insights indicate that the emerging market asset schedule is relatively unstable and can respond to exogenous changes in risk appetite. In addition, momentum trading and investor herding both combine to create asset bubbles quite independently of changes in the supply conditions or 'fundamentals'. The effect of these demand fluctuations on individual emerging markets is asymmetric in the sense that demand is disproportionately more unstable for higher-risk assets. This evidence supports our interpretation of the nature of the asset demand schedule at the aggregate level, but also implies that *changes* in aggregate risk aversion should be made endogenous in a dynamic formulation.

4. 'AN ORDERLY MARKET' – THE EFFECTS OF OFFICIAL INTERVENTIONS ON THE ASSET DEMAND SCHEDULE

In combination, the two previous sections of this chapter imply that if the market is to become more 'orderly' and if capital flows to developing countries are to be increased in both volume and maturity, supply-side measures alone will not be sufficient. To the issue of intervention in asset demand we must now turn, therefore.

Where a full set of prices does not exist, or there is not perfect information about them, even if firms and households act perfectly competitively (taking prices as parametric) then the market equilibrium – if it exists – is not welfare maximising (Atkinson and Stiglitz, 1980). This is particularly true of financial markets, because a full set of futures markets, and of markets for all risks, usually does not exist. Again, the existence of externalities such as the liquidity effect of major agents leaving the market can also lead to market failure or 'absence of markets'. Firms (or individuals, or governments) cannot issue unlimited bonds at given risk premium over current interest rates, because the risk premium depends on the amount borrowed and the collateral available.

Lenders will not lend even at higher interest rates (or even more collateral) because this would both increase the risk and dissuade good borrowers. The profit maximising loan book for a bank thus takes the form of rationing – that is a limit on the overall level of loans to particular classes of borrowers or type of assets. Asymmetric information (where borrowers have more knowledge of the likelihood of default than lenders) will also lead to a situation where assets may be sound, but no one is willing to lend – a 'collapsed market' (Hiller, 1997). Under these circumstances, a small increase in the perceived risk for some borrowers, or a reduction in the overall supply of funds, can cause the credit market for a whole class of borrowers to collapse (Mankiw, 1986). The consequences for macroeconomic stability in a single economy are now widely recognized (Stiglitz and Weiss, 1992). They are logically even more significant for international capital markets. Specifically, the absence of full market clearing leads to the serious problem of 'market access': low-income countries do not have access to international bond markets (at whatever premium) while middle-income countries can easily lose access due to regional contagion or political events (World Bank 2000).

Asymmetric information problems are to some extent resolved by ratings agencies – although their record has been very mixed (IMF 1998, 1999). Externalities also exist in the form of overheating on market upswings and liquidity problems on downswings; both of which may justify supervisory oversight and last resort lending. Contract risk in the case of equities is not great, and the legal costs of transactions are reduced by the use of American or Global Depository Receipts being traded on developed country markets. However, in the case of bonds there are serious externality and contract problems created in cases of bond default and debt workouts, where the interests of individual bondholders may not coincide – causing a 'common action' problem. In the case of bank lending, information problems should be less, because of the banks' expertise and information provided by their branches. The risk of default, however, remains high due to liquidity problems and financial fragility in emerging markets, so banks tend to lend short-term and preferably to banks and multinational affiliates. What is more, bank lending tends to be highly volatile in

reaction to political and regional events, and to be strongly pro-cyclical as well; so it does not provide support in times of economic difficulty, while tending to increase credit availability during macroeconomic booms.

Broadly speaking, we can identify three traditional existing forms of public intervention in the flow of private capital into emerging markets:

a) Intermediation between developed country lenders (i.e. global capital markets) and developing countries, based on particular advantages of information, diversification or contract enforcement that such institutions may have over the private sector in order to provide longer-term loans than the market is willing to offer, or to gain access for countries considered not to be credit worthy; this being the role of the World Bank and the other (regional) Multilateral Development Banks.

b) Efforts to ensure that financial contracts are more likely to be enforced, either by improving the economic and institutional strength of the borrowing country, or by using international leverage to ensure that contracts are honoured in debt workouts; and for longer-term lending to offer investment insurance facilities and export credit guarantees on the same principle.

c) Provision of counter-cyclical finance as a lender of last resort in situations where the borrower is fundamentally solvent but there is a liquidity shortage due to market expectations which become self-fulfilling where the maturities of borrowers' assets and liabilities are mismatched (the role of the IMF); helping to restructure and refinance outstanding developing country liabilities where longer-term solvency obtains, and to allocate the costs of writing off debt when the borrower is insolvent – equivalent to bankruptcy proceedings in national private sectors.

All three forms of intervention thus relate to what we have defined as the *supply* schedule for emerging market assets. More recently, the dissemination of reliable information to capital markets on the quality of assets and borrowers and thus reducing the asymmetric information problem has become the key element of the G7 Financial Stability Forum's 'Compendium of Standards'[10] for the strengthening and extension of existing systems of global financial supervision, increasing the availability and timeliness of information (mainly of official statistics) to the markets.

The positive incentive for compliance despite the high administrative cost is that those emerging markets that adhere to the new rules will enjoy enhanced market access, although this is only a potential benefit. The specific penalties for non-compliance are clearer: financial regulators in OECD countries can apply penalties or constraints such as capital requirements on investors acquiring assets in non-compliant countries; and official lenders (particularly the IMF) could refuse in advance to support non-compliant countries. These disincentives might be effective in reducing foreign interest in non-compliant countries, but they would also tend to reinforce the cyclical nature of investor interest in emerging markets and thus undermine sustainable growth in developing countries.

Moreover, as we have seen, the market does not always use information effectively, as much depends upon the models that are used to analyse statistical data. These models are generally backward looking (which leads to 'over-shooting'), while traders react to 'news' that does not reflect the underlying fundamentals. Those rules proposed by the FSF that attempt a definition of 'best practice' in the policies of emerging markets related to economic reform and policy conduct are problematic because the nature of 'sound fundamentals' is not always agreed (e.g. the acceptability of capital controls) and indeed tends to change over time.[11] Precisely because, capital markets do not function well on their own, which is why a high degree of prudential regulation of their own national capital and banking markets is maintained by developed countries themselves in order to ensure the integrity of markets by regulating creditors as much as - if not more than - debtors (Goodhart et al 1998). Nonetheless, international measures to stabilise capital flows that affect source countries have been very limited. The increased role of rating agencies in rating countries or companies proposed by the Basle Committee could even risk increasing negative pro-cyclical features of bank lending and make it more difficult for poorer countries (and companies in those countries) to get access to bank lending. Current proposals on banks would also lead to greater role of banks' own value-at-risk (VAR) models in setting the regulatory capital requirements, which may strengthen – rather than decrease – the propensity to boom-bust flows and the bias against emerging markets.

Proposals for the revision of bond contracts so as to permit majority bondholder decisions (so-called 'collective action clauses') in situations of debt restructuring are an important step forward, but they do not constitute a measure to alter the demand schedule. In effect, such measures alter bond quality by making the consequences of default more certain and thus allowing better risk pricing. This is in marked contrast to OECD markets, where fiscal and regulatory incentives are used to encourage institutional investors to take longer-term positions (Davis, 1995).

Table 1 shows key elements of investment regulation on pension funds for a number of industrialised countries (OECD 2001). It is clear that UK and US pension funds are among the least closely regulated in the developed world. The pressure for more active portfolio allocation to manage risk and the need for higher returns to support an ageing population mean that emerging market assets are potentially a valuable component of portfolios if the market were less cyclical. There is no explicit regulatory constraint on pension funds holding securities issued by (or backed by assets of foreign investors in) developing countries. In contrast, other EU pension funds are much more closely regulated with considerable restrictions on their portfolio composition - mainly designed to reduce the risk of the fund failing but also to generate a market for long-term domestic government and corporate debt on the one hand and for property mortgages on the other.

[Insert Table 1 about here]

In sum, despite the fact that demand shifts account for a large part of emerging market instability, due to their asymmetric effects, official intervention has been concentrated almost entirely on asset on supply conditions alone. Those interventions that might affect demand – such as new information standards and bank capital adequacy rules – will probably have little effect at best and further destabilise demand at worst.

5. CONCLUSIONS

This chapter has set out to demonstrate how shifts in the demand schedule for emerging market assets affect asset prices, asset quality (e.g. default risk) and asset stocks – and thus capital flows. In doing so we have identified a number at points at which macroeconomic theory and evidence on aggregate flows and microeconomic evidence and theory on portfolio adjustment can be brought together to define the key components of this demand schedule. We have established that shifts in this demand schedule itself, independently of conditions in emerging markets, account for a large part of the changes in observed capital flows. But this task is far from complete, for we still lack a formal analytical definition of this schedule; after which a corresponding definition of the supply schedule - including the determinants of borrowing decisions and interactive effect of the flows themselves on asset quality – would also be needed before a well-grounded reduced form estimation model be constructed for econometric testing on the data.

None the less some tentative policy conclusions can be drawn from our argument so far. The first is to suggest that G3 governments should pay more attention to the negative effects on emerging markets of volatility within OECD capital markets. Relatively small fluctuations in G3 interest rates and exchange rates (and the related capital account variations resulting from investment-saving imbalances) cause absolute shifts in the emerging market asset demand schedule that are very large in relation to the economies of the host countries. However, the fact that the G3 is unwilling (or unable) to adopt mutual macroeconomic coordination rules in order to sustain their own economies implies that they unlikely to do so in order to help developing countries.

Given the inevitability of macroeconomic cycles within the G3 zone there would appear to be two other lines of possible policy development in order to stabilise capital flows towards emerging markets from the 'demand perspective'. The first would be to encourage – by a combination of regulatory changes and tax incentives – G3 institutional investors to acquire and hold emerging market assets of a longer maturity than at present. This would in effect both shift the demand 'upwards' and reduce its volatility over the cycle by increasing risk appetite on a structural basis. The advantages to institutional investors would, of course, be higher long-term yields without the excess risk generated by the market instability of the past decade.

The second would be to create greater liquidity in the market by encouraging 'market makers' (which could be the international financial institutions themselves) to make an explicit commitment to counter-cyclical intervention so as to stand ready to buy assets from the private sector in the downswing of the cycle (when risk appetite declines) and sell in the upswing. This form of provision of liquidity would probably be more effective than the present efforts at last-resort lending once crises have occurred, particularly since it would reduce the ex ante volatility of emerging market assets and thus enhance their attractiveness to institutional investors.

References

Agenor, P-R. (1998) 'The surge in capital flows: analysis of push and pull factors' *Int. Jour. Finance and Economics* 3: 39-57

Atkinson, A.B. and J.E. Stiglitz (1980) *Lectures on Public Economics* (New York: McGraw-Hill).

Bllinder, A.S. (1987) 'Credit rationing and effective supply failures' *Economic Journal* Vol 97

Brennan, M.J. and H.H. Cao (1997) 'International Portfolio Investment Flows' *Journal of Finance* 52: 1851-80

Calvo, G.A., L. Leiderman and R.M. Reinhart (1993) 'Capital flows and real exchange rate appreciation in Latin America' *IMF Staff Papers* 40(1) 108-51

Caouette, J.B., E.I. Altman and P. Narayan *Managing Credit Risk: the Next great Financial Challenge* New York: Wiley

Clark, E., M. Levasseu and P. Rousseau (1993) *International Finance* London: Chapman and Hall

Cunningham, A., L. Dixon and S. Hayes (2001) 'Analysing yield spreads on emerging market sovereign bonds' *Bank of England Financial Stability Review*, December 175-86

Davis, E.P. (1995) *Pension Funds: Retirement-Income Security and Capital Markets* Oxford: Clarendon Press

De Grauwe, P. (1996) *International Money 2nd edn*. Oxford: OUP

Devenow, A and I. Welck (1996) 'Rational herding in financial economics' *European Econ Rev* 40 603-15

Disyatat, P. and R. G. Gelos 'The Asset Allocation of Emerging Market Funds' *IMF Working Paper WP/01/11* (August 2001).

Dumas, B. 'Partial equilibrium versus general equilibrium models of the international capital market' pp. 301 – 334' in F van der Ploeg ed (1994) *The Handbook of International Macroeconomics* Oxford: Blackwell.

Fernanadez-Arias, E. (1996) 'The new wave of private capital flows: push or pull' *Journal of Development Economics* 48(2) 389-418

FitzGerald, E.V.K. (1996) 'International markets and open economy macroeconomics: a Keynesian view' *International Review of Applied Economics* 10 (1) 141-156

FitzGerald, E.V.K. (2001) 'Short-term capital flows, the real economy, and income distribution in developing countries' in Griffith-Jones, S., M.F. Montes and A. Nasution (eds) *Short-term Capital Flows and Economic Crises* Oxford: Oxford University Press for UNU/WIDER pp. 29-51

Frankel, J. and S. Schmukler (1996) 'Country Fund Discounts, Asymmetric Information and the Mexican crisis of 1994: did local investors turn pessimistic before international investors?' *NBER Working Papers* 5714

Gehrig, T. (1993) 'An Information Based Explanation of the Domestic Bias in International Equity Investment' *Scandinavian Journal of Economics* 97-1009

Goodhart, C., P. Hartmann, D. Llewellyn, L. Rojas-Suarez & S. Weisbrod, 1998, *Financial Regulation*, London: Routledge (in association with the Bank of England).

Hiller, B. (1997) *The Economics of Asymmetric Information* Basingstoke: Macmillan

IMF (1992-1999) *International Capital Markets: Developments, Problems and Key Policy Issues* Washington DC: International Monetary Fund

IMF (1995) *Private Market Financing for Developing Countries* Washington DC: International Monetary Fund

IMF *World Economic Outlook* Washington DC: International Monetary Fund (May 2000)

IMF (2001) *Emerging Market Financing* Washington DC: International Monetary Fund (November)

Kahneman, D., P. Slovic and A.Tversky (1982) *Judgement Under Uncertainty: Heuristics and Biases* Cambridge: Cambridge University Press

Kaminsky, G. , R.K. Lyons and S. Schmukler (2000a) 'Managers, investors and crises: mutual fund strategies in emerging markets' *NBER Working Paper 7855*

Kaminsky, G. , R.K. Lyons and S. Schmukler (2000b) 'Mutual Fund Investment in Emerging Markets: an overview' *World Bank Economic Review* 15(2) 315-340

Kang, J-K., and R.M. Stulz (1994) 'Why is there a Home Bias? An analysis of foreign portfolio equity ownership in Japan' *Journal of Financial Economics*

Kim, W. and S-J. Wei (1999) 'Foreign Portfolio Investors Before and During a Crisis' *NBER Working Paper* 6968

Kumar, M.S. and A. Persaud 'Pure contagion and investors shifting risk appetite: analytical issues and empirical evidence' *IMF Working Paper WP/xxxxx* (August 2001)

Lane, P and G.M. Lilesi-Ferretti (1999) 'The External Wealth of Nations: Measures of foreign Assets and Liabilities for Industrial and Developing Countries' *IMF Working Paper 99/115* Washington DC: International Monetary Fund

Luttick, J. (1998) *Accounting for the Global Economy: measuring world trade and investment linkages* Basingstoke: Macmillan

Mankiw, N.G. (1986) 'The allocation of credit and financial collapse' *Quarterly Journal of Economics* 101: 455-70

Mody, A. and M.P. Taylor (2001) 'International capital crunches: the time-varying role of informational strategies' *IMF Working Paper* 02/43

Montiel, P. and C.M. Reinhart (2001) 'The dynamics of capital movements in emerging economies during the 1990s' in Griffith-Jones, S., M.F. Montes and A. Nasution (eds) *Short-term Capital Flows and Economic Crises* Oxford: Oxford University Press for UNU/WIDER pp. 3-28

OECD (2001), *Survey of Investment Regulation of Pension Funds,* Paris: Organisation for Economic Co-operation and Development.

Razin, A, E. Sadka and C.W. Yuen (1998) 'A pecking order of capital inflow and international tax principles' *Jour Internat. Econ*. 44: 45-68

Stiglitz, J. and A. Weiss (1992) 'Asymmetric information in credit markets and its implications for macroeconomics' *Oxford Economic Papers* vol 44

Tobin J. (1998) *Money Credit and Capital* New York: McGraw Hill

Figure 1 Aggregate Trends in Emerging Market Asset Demand

Figure 1a Trends in Emerging Market Asset Stocks

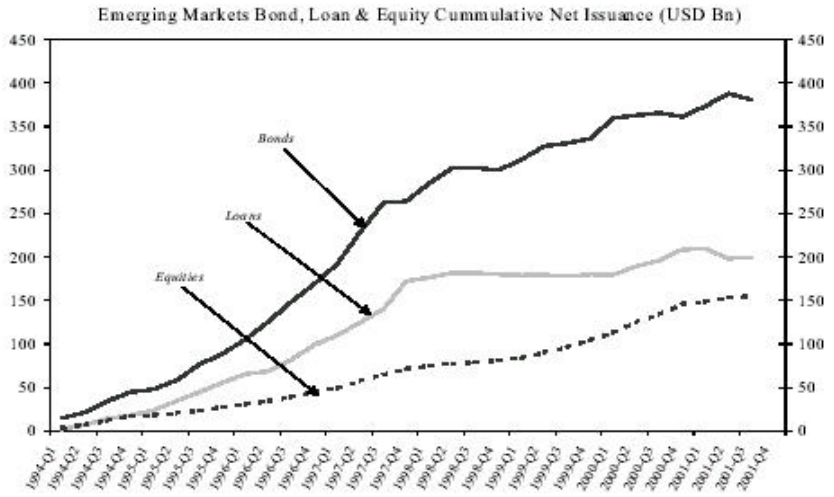
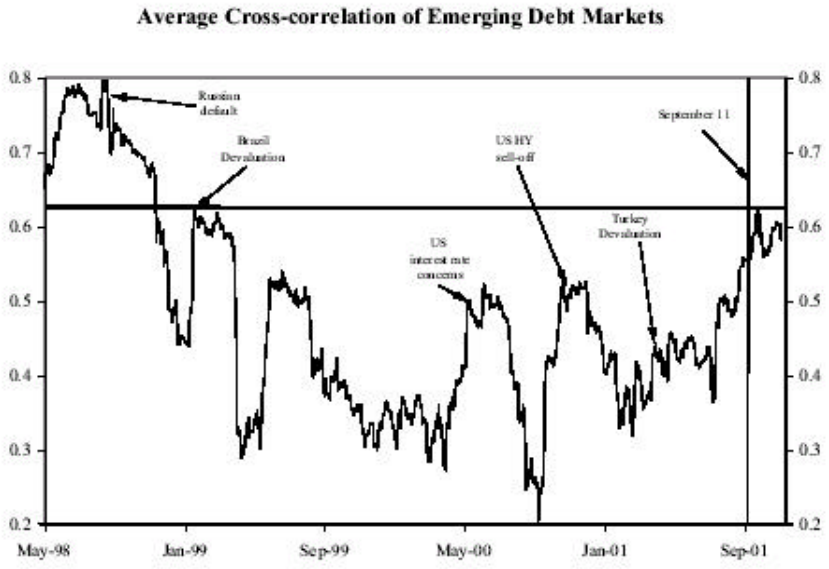


Figure 1b Aggregate Asset Demand Composition

Figure 1c Trends in Contagion



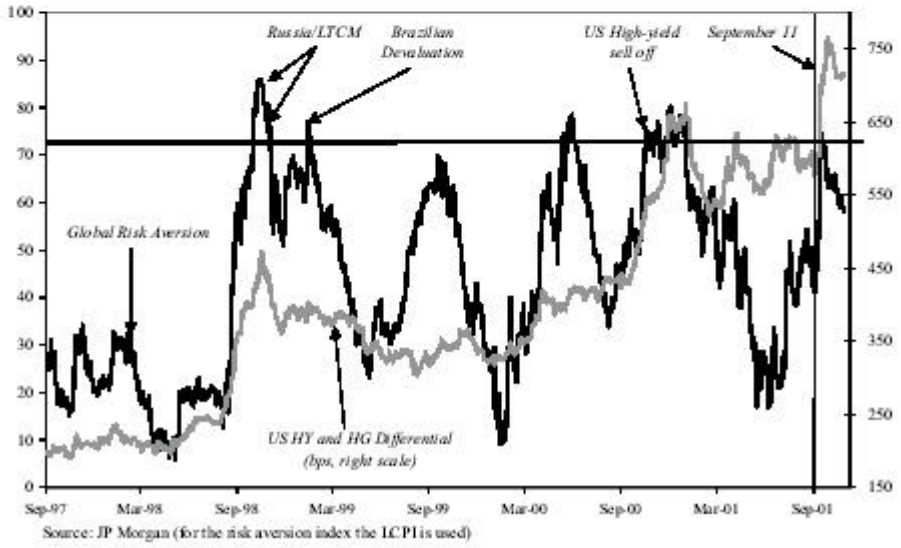
Source: IMF (2001)

Figure 2 : Global Risk Aversion

A definition of JP Morgan's LCPI

The LCPI has two broad sub-components measuring liquidity and credit premia respectively. The indicators of a liquidity premia consist of the spread between on- and off-the-run US treasuries and US swap spreads. The credit premia indicators consist of US high-yield spreads, an emerging market bond index (the EMBI), JP Morgan's Global Risk Aversion Index, and implied volatilities of the major exchange rates. An overall index is constructed by equally weighting the different sub-components of the indicators.

Global Risk Aversion, US High Yield and High Grade Spread Differential 1



Source: JP Morgan (for the risk aversion index the LCPI is used)

Source: IMF 2001

Table 1: Investment regulation of pension funds in nine OECD countries, 2001

Country	Direct limits on domestic asset holding (%)						Direct limits on foreign investments
	Equity	Real estate	Corporate bonds	Investment funds	Loans	Bank deposits	
Austria	50	20	*	*	*	*	Non-Euro investments and foreign property investments 50% max.
Belgium	65**q**; 30**u**	40[1]	*	30	40[1]	*	Localisation requirement: only assets located in EC, but includes securities issued by authorised institutions. 65% OECD equities, 5% foreign investment funds, non-OECD equities barred.
France	65**q**; 0.5**u**	0	*		10		
Germany	30**q**; 10**u**	25	50	30	50**m**; 50**o**	50	30% EU equity, 25% EU property, 6% non-EU equity, 5% non-EU bonds.
Italy	*	*	*	20	*	20	Debt and equity securities not traded in regulated markets: OECD 50%, non-OECD barred. Non-OECD traded in regulated markets 5%.
Japan	*	*	*	*	*	*	*
Spain	***q**; 10**u**	*	*	*	10[2]	15	No limits for OECD countries.
UK	*	*	*	*	No employer-related loans	*	*
US	*	*	*	*	*	*	*

Source: OECD (2001), correct as at May 2001, abridged by Alex Cobham, FTPRC.
Notes: 1. Joint limit. 2. If no mortgage guarantee.
Key: ***** indicates no limits, **q** quoted equity, **u** unquoted, **m** mortgage loans, **o** other.

Endnotes

[1] This problem is discussed in depth in Luttick (1998), who also addresses the problem of the major inconsistencies between asset-liability and inflow-outflow statistics recorded by the countries of origin and destination.

[2] We return to this issue in section 3 of this chapter.

[3] Not that this had been absent from the critical economics literature, of course, from Keynes through Kindelberger.

[4] See IMF (1995) – in particular Section 5 (pp. 37-44) 'Institutional investor behaviour and the pricing of developing country stocks'.

[5] According to the Bank of England, the spread/rating curve tends to the origin, moves through 250 basis points at Moody's A2 and 500 basis points at B3, becoming asymptotic to infinity beyond B3 (Cunningham, Dixon and Hayes, 2001).

[6] The size of the band (that is, the speculative estimate of future exchange rate minus forward price) must logically be greater than the square root of the volatility multiplied by the risk aversion coefficient and the cost of information. An increase of 1 percent in information costs as a proportion of the gain from the transaction can widen the bandwidth by 20 percent under reasonable parameter assumptions.

[7] These are World Bank estimates for 1997; the total assets involved totalling $50-70 bn.

[8] Such as J.P. Morgan's *EMBI Global Index* (IMF 2001).

[9] In fact it would be more realistic to build a 'decision tree' in the way that trade modellers do (deriving in fact from models of aggregate consumption) allowing for successive stages of disaggregation. Thus the first division would be between home and international assets, the second within international assets between OECD and emerging markets, the third within emerging markets between regions, and so on. But the essence of the model would be similar.

[10] The FSF *Compendium of Standards* contains the work of six separate bodies: the Basle Committee on Banking Supervision (BCBS), the Committee on Payment and Settlement Systems (CPSS), the International Association of Insurance Supervisors (IAIS), the International Monetary Fund (IMF), the International Organisation of Securities Commissions (IOSCO) and the Organisation for Economic Co-operation and Development (OECD).

[11] As has, for that matter, the content of and support for the so-called 'Washington Consensus'.