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# Can Some of South Africa's Recent Exchange Rate Volatility Be Attributed to Contagion?

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# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# LIST OF ABBREVIATIONS

DTI                          Department of Trade and Industry
IMF                         International Monetary Fund
ARCH                    Autoregressive Conditional Heteroskedasticity

# ABSTRACT

South Africa has experienced considerable currency volatility during the past few years, despite strong economic fundamentals. Recently this resulted in the appointment of the Myburgh Commission of inquiry into the depreciation of the rand. From January 1, 1996 to May 29, 2002, the value of the rand depreciated from R3.64 per US$ to R9.85, reaching an all-time low of R13.002 on December 20, 2001. Policymakers and academics have increasingly wondered about the nature of these crises, the factors responsible for their spread and particularly whether a country with seemingly appropriate domestic and external fundamentals can suffer a crisis because of contagion. More specifically, why should a country like South Africa be affected if there are problems in Brazil, as these countries are hardly related? Or why do events in Zimbabwe continually "haunt" the rand? The answer to this question requires an examination of the channels through which disturbances are transmitted from one country to another (Hernandez and Valdès 2001:3).

Isolating the relevant contagion channels is key from a policy perspective, for appropriate prescriptions may vary substantially depending on what drives contagion. For instance, if trade linkages were to drive contagion, countries would have few alternatives other than to diversify their trade base or to fix irrevocably their foreign exchange rate. On the other hand, if financial links were to be blamed for contagion, countries should attempt other measures such as imposing prudential capital account regulations. Alternatively policymakers can attempt to protect foreign reserves with a policy of high interest rates. This can have detrimental consequences for the domestic economy.

The purpose of this paper is to analyse empirically the existence and extent of contagion in explaining volatility of the South African rand. Misfortunes in Zimbabwe and other emerging-markets countries (like Argentina) have often been blamed for the recent volatility. This implies the possible presence of financial contagion. On the other hand, declining economic activity in Zimbabwe can also result in contagion through trade linkages. We investigate two alternative contagion channels: (i) real interdependence (trade links) through bilateral trade and trade competition in third markets, and (ii) financial contagion.

Empirical results confirm the presence of contagion. This suggests that no open emerging-market country, even with relatively sound fundamentals and policies, is capable of insulating itself from events in the rest of the world. The difficult challenge still faced by emerging markets is how best to reap the benefits of a more open economy while minimizing the risk of becoming the victim of a potentially devastating financial crisis inherent in the liberalization process.

# EXECUTIVE SUMMARY

South Africa has experienced considerable currency volatility during the past few years, despite strong economic fundamentals. Recently this resulted in the appointment of the Myburgh Commission of inquiry into the depreciation of the rand.

From January 1, 1996 to May 29, 2002, the value of the rand depreciated from R3.64 per US$ to R9.85, reaching an all time low of R13.002 on December 20, 2001. Policymakers and academics have increasingly wondered about the nature of these crises, the factors responsible for their spread and particularly whether a country with seemingly appropriate domestic and external fundamentals can suffer a crisis because of contagion. More specifically, why should a country like South Africa be affected if there are problems in Brazil, as these countries are hardly related? Or why do events in Zimbabwe continually "haunt" the rand? The answer to this question requires an examination of the channels through which disturbances are transmitted from one country to another (Hernandez and Valdès 2001:3).

Economic literature suggests several channels of contagion. Real interdependence can either be explained through bilateral trade or through trade competition in third markets. A crisis in one country is more likely to spread to another economy if the two have a large degree of bilateral trade (income effects) or are strong competitors in third markets (price effects). Similar initial conditions, under which countries co-move in so far as they have similar macroeconomic (or other) characteristics, represent another possible channel. The work of Sachs et al. (1996) can be viewed in this light. They focus on three intuitively reasonable fundamentals: real exchange rate over-valuation; weakness in the banking system; and low international reserves (relative to broad money). Financial linkages explain contagion in several ways, each associated with one particular theory, namely: direct financial linkages; financial market institutional practices; foreign investors' liquidity problems; information asymmetries; and herd behaviour (Hernandez and Valdès 2001:6).

Isolating the relevant contagion channels is key from a policy perspective, for appropriate prescriptions may vary substantially depending on what drives contagion. For instance, if trade linkages were to drive contagion, countries would have few alternatives other than to diversify their trade base or to fix irrevocably their foreign exchange rate. On the other hand, if financial links were to be blamed for contagion, countries should attempt other measures such as imposing prudential capital account regulations. Alternatively, policymakers can attempt to protect foreign reserves with a policy of high interest rates. This can have detrimental consequences for the domestic economy.

The purpose of this paper is to analyse empirically the existence and extent of contagion in explaining volatility of the South African rand. Misfortunes in Zimbabwe and different emerging-market countries (like Argentina) have often been blamed for the recent volatility. This implies the possible presence of financial contagion. On the other hand, declining economic activity in Zimbabwe can also result in contagion through trade linkages. We try to shed some light on the question of which contagion channel is more important. We investigate two alternative contagion channels: (i) real interdependence (trade links) through bilateral trade and trade competition in third markets, and (ii) financial contagion. Even though these channels could be relevant simultaneously, we are interested in evaluating their relative importance. The empirical analysis incorporates the estimation of correlation coefficients and an ARCH model for financial variables. Regressions will also be run with dummy variables to capture the effect of news events and indices reflecting fundamentals in the different countries as explanatory variables.

Empirical results confirm the presence of contagion. This suggests that no open emerging-market country, even with relatively sound fundamentals and policies, is capable of insulating itself from events in the rest of the world. The difficult challenge still faced by emerging markets is how best to reap the benefits of a more open economy while minimizing the risk of becoming the victim of a potentially devastating financial crisis inherent in the liberalization process.

# 1.    INTRODUCTION AND AIM

South Africa has experienced considerable currency volatility during the past few years, despite strong economic fundamentals. This resulted in the appointment of the Myburgh Commission of inquiry into the depreciation of the rand. From January 1, 1996 to May 29, 2002, the value of the rand depreciated from R3.64 per US$ to R9.85, reaching an all time low of R13.002 on December 20, 2001. Policymakers and academics have increasingly wondered about the nature of these crises, the factors responsible for their spread and particularly whether a country with seemingly appropriate domestic and external fundamentals can suffer a crisis because of contagion. More specifically, why should a country like South Africa be affected if there are problems in Brazil, as these countries are hardly related? Or why do events in Zimbabwe continually "haunt" the rand? The answer to this question requires an examination of the channels through which disturbances are transmitted from one country to another (Hernandez and Valdès 2001:3).

Since 1998 South Africa has too often paid the price for the economic misfortunes of other countries. This includes several periods of financial distress in the group of emerging markets. Closer to home the political and economic woes of Zimbabwe are manifested in unsustainable public spending commitments, election-related tensions and output disruptions associated with the fast-track land resettlement programme launched in June 2000. By late 2000 the country was in the midst of a serious economic crisis and was saddled with a sizeable stock of public debt and external payment arrears, while unstable foreign reserves had dwindled and inflation was on an upward trend (IMF 2001). Since then, the socio-political and economic situation in Zimbabwe has not improved. On the contrary, conditions worsened during and after the 2002 elections with allegations of poll rigging, human rights violations, increased violence and food shortages.

As mentioned, South Africa has experienced considerable currency volatility during the past few years. In our period of study, January 1, 1996 to March 25, 2002, the value of the South African rand depreciated from R3.64 per US$ to R11.56 (reaching an all time low of R13.002 on December 20, 2001), despite strong economic fundamentals.[1] This currency volatility increased significantly during periods of emerging-market turmoil. Since the beginning of the crisis in Zimbabwe induced by the 2000 parliamentary elections and the land reform programme, the depreciation of the South African rand is often ascribed to "contagion" from that country. In its first Labour Markets and Social Frontiers bulletin the Reserve Bank said: "The rand continues to be haunted by problems of contagion due to investors' tendencies to perceive the South African and Zimbabwean experience from the same viewpoint" (Business Day, 28 May 2002).

The purpose of this paper is to analyse empirically the existence and extent of contagion in explaining volatility of the South African rand. Misfortunes in Zimbabwe and other emerging-markets countries (like Argentina) have often been

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[1] These strong fundamentals include low levels of private debt, prudent public finance, steady growth in labour productivity, stable and relatively low levels of inflation, and steady growth in exports.

blamed for the recent volatility. This implies the possible presence of financial contagion. On the other hand, declining economic activity in Zimbabwe can also result in contagion through trade linkages. We try to shed some light on the question of which contagion channel is more important. We investigate two alternative contagion channels: (i) real interdependence (trade links) trough bilateral trade and trade competition in third markets, and (ii) financial contagion. Even though these channels could be relevant simultaneously, we are interested in evaluating their relative importance. The empirical analysis incorporates the estimation of correlation coefficients and an ARCH model for financial variables. Regressions will also be run with dummy variables to capture the effect of news events and indices reflecting fundamentals in the different countries as explanatory variables.

## 2. AN OVERVIEW OF ECONOMIC DEVELOPMENTS IN ZIMBABWE

Faced with serious pressures on the currency in late 1997, spawned by large and abrupt increases in war veterans' benefits and uncertainties on the direction of land reform, the Zimbabwe government formulated an adjustment programme supported by the IMF. Performance under the programme was mixed, owing in part to a sharp worsening in the eternal environment, weaknesses in parastatal finances arising from delays in tariff adjustments, and the ripple effects on the financial system of a bank failure. Investor confidence was also jolted by the imposition of price controls on maize meal, continuing uncertainties about the direction of land reform, and the government's intervention in the Democratic Republic of Congo (DRC) conflict from August 1998 onwards. The policy drift was aggravated in 2000 by new and unsustainable public spending commitments, election-related tensions and output disruptions associated with the fast-track land resettlement programme launched in June 2000 (IMF 2000).

Zimbabwe also experienced serious problems in the banking sector despite initiatives to strengthen the regulatory capacity of the Zimbabwe Reserve Bank. For example, the share of non-performing loans in the total portfolio of commercial banks rose to 21% in September 2000, owing to the generalized deterioration in the solvency and liquidity of borrowers resulting from the contraction of activity and crowding out of the private sector mentioned above.

After a sharp depreciation of the currency in late 1998, sparked by the fallout from the emerging-market crisis and domestic confidence problems, the authorities fixed the exchange rate at Z\$38 per US dollar from January 1999 onward under an informal agreement between the Reserve Bank of Zimbabwe and the Commercial Bankers' Association. The Reserve Bank of Zimbabwe has announced several devaluations since, including a 24% step devaluation in August 2000. Subsequently, a crawling peg was introduced. Consequent periodic devaluations led to a 31% cumulative depreciation *vis-à-vis* the US dollar in the year to mid-November 2000. The IMF still regard the currency as significantly overvalued, and the private sector's access to foreign exchange for import or service payments has remained highly restricted.

While government has pegged the Zimbabwe dollar at 55 to the U.S. unit, foreign exchange is hardly accessible at traditional sources such as commercial banks, forcing industrialist to source the greenback from the illegal "parallel" market. Bankers estimate the parallel market transacts foreign currency deals totalling US$30 million per month at a time when the inter-bank market is virtually dormant (African Eye News Service, 15 May 2001).

The parallel market exchange rate is highly volatile. Having stood at around Z$320 to the United States dollar just before the presidential election in March, the parallel rate has depreciated by some 35 percent to about $430. This represents a premium of 682 percent on the official exchange rate of $55 to the US dollar (The Daily News (Harare) 7 June 2002). Rates on the parallel market dropped sharply at the weekend of 28-30 June 2002 with dealers offering as little as Z$150 for the greenback compared to Z$800 in the previous week. The slump in the rates has been attributed mainly to the government's threat to cancel licences for commercial banks and bureaux de change involved in illegal forex deals (The Herald (Harare) 1 July 2002). This confirms the view that speculation rather than market forces drove the black-market rates, and that black-market dealers create artificial shortages so as to increase the rates.

While the turmoil on the currency markets continued, foreign participation on the Zimbabwe stock exchange fell. Net portfolio outflows of US$1.2 million and US$104.9 million were recorded in 2000 and 2001 respectively. Foreign direct investment also declined from a peak of US$436 million in 1998 to US$5.4 million in 2001 – largely due to waning investor confidence and the country's poor economic performance. The decline in foreign flows has been mirrored in declining domestic investment, from 23.3% of GDP in 1996 to an estimated 11% in 2001. These developments have impacted negatively on the economy and the country's balance of payments. The capital account, historically a surplus account, recorded a deficit of US$424 million in 2001, following a US$298 million deficit in 2000. The country's external position thus remains under pressure, compounded by reduced access to trade finance and suspension of both project finance and balance of payments support (www.rbz.co.zw).

## 3.    CONTAGION

### 3.1 Defining contagion

"Contagion" has been one of the most debated topics in international finance since the Asian crisis. Strong agreement exists among economists on which events have constituted instances of contagion: the debt crises in 1982, the Mexican Tequila effect in December 1994, the Asian Flu in the last half of 1997, the Russian Cold in 1998, the Brazilian Sneeze in January 1999 and the Nasdaq Rash in April 2000. Paradoxically, there is no agreement on what contagion means (Rigobon 2001:4).

In the most general terms, contagion can be defined as the transmission of a crisis to a particular country due to its real and financial interdependence with countries that are already experiencing a crisis (Calvo and Reinhart 1996). According to Fratzscher (2000:1) contagion is the transmission of a crisis that is not caused by the affected

country's fundamentals (although, of course, the transmission has an impact on the country's fundamentals *ex post facto*) but by its "proximity" to the country where a crisis has occurred. Park and Song (2000) describe contagion as the spread of market disturbances from one country to another. It is observed through excessive co-movement of financial variables (such as exchange rates, stock market prices and interest rates) of a group of countries during a financial crisis.

In the context of assessing the determinants of a currency crisis, Eichengreen et al. (1996) define contagion as "a systematic effect on the probability of a speculative attack which stems from attacks on other currencies, and is therefore an additional effect above and beyond those of domestic fundamentals.…"

Other authors, like Forbes and Rigobon (1999), adopt a narrower definition in which such interdependencies need to intensify during crises, and the increase may not be related to similarities in fundamentals across countries in order to constitute contagion. To understand and evaluate these differences in definition, one needs to analyse the different transmission channels of currency crises.

## 3.2  Sources of contagion

Economic literature suggests several channels of contagion, namely real interdependence, similar initial conditions, and financial linkages. These channels are reviewed briefly below (Hernandez and Valdès 2001:4, Kumar and Persaud 2001:8).

Real interdependence can either be explained through bilateral trade or through trade competition in third markets. A crisis in one country is more likely to spread to another economy if the two have a large degree of bilateral trade (income effects) or are strong competitors in third markets (price effects). In the latter case, a financial crisis (and the associated depreciation of the exchange rate) in one country affects other countries that export to the same markets. Economic hardship can equally spill over to neighbours, reducing opportunities for labour emigration and earnings (Van Rijckeghem and Wedder 1999:5). Gerlach and Smets (1995) provide a theoretical model analysing these links, while Eichengreen , Glick and Rose (1999), and Fratzscher (1998) find some empirical evidence for the importance of real linkages in spreading recent crises across markets (Fratzscher 2000:3).

Another possible source of contagion is macroeconomic or financial similarity. A crisis may spread from the initial target to another if the two countries share various economic features from one country to another if both share certain economic features. The work of Sachs et al. (1996) can be viewed in this light. They focus on three intuitively reasonable fundamentals: real exchange rate over-valuation; weakness in the banking system; and low international reserves (relative to broad money). They find that these three variables can explain half the cross-country variation in a crisis index, itself a weighted average of exchange rate depreciation and reserve losses. They use data from 20 developing countries in late 1994 and early 1995. Along the same lines, similarity in structural characteristics of the economy are analysed in Rigobon (1998). Eichengreen and Rose (1998) found both "macroeconomic" and "trade" channels of transmission to be empirically relevant in a

large quarterly panel of post-1959 industrial country data. However; trade effects dominated.

Financial linkages explain contagion in several ways, each associated with one particular theory, namely: direct financial linkages; financial-market institutional practices; foreign investors' liquidity problems; and information asymmetries and herd behaviour (Hernandez and Valdès 2001:6). The relevance of factors such as herd behaviour among investors has been evident in the large swings in the degree of correlation among emerging-market assets in the last half of the 1990s – a pattern that cannot be explained by exogenous changes in "fundamentals."

Direct financial linkages refer to direct cross-country investments which tie corporate and financial sector returns. For example, a devaluation of the Thai baht drives stock prices down in Malaysia because it imposes losses on Malaysian corporations investing in Thailand (Hernandez and Valdès 2001:6). This also includes the common bank-lending channel. There are several possible simultaneous mechanisms by which banking centres can cause cross-border spillovers. Losses in one country could lead banks to sell off assets in other countries in an attempt to restore their capital-adequacy ratios. This problem can have especially serious consequences in the emerging-market context, due to the shortage of interrelated markets in such countries. In particular, the absence of well-functioning domestic bond markets implies an unhealthy dependence on bank financing, and an equally unhealthy reliance on bond issues in international financial markets.

Financial market practices refer to institutional arrangements whereby countries are treated as complementary assets and fund managers use simple "rules of thumb." In this setting, a negative shock in one country generates less demand for the assets of other countries. One simple transmission mechanism arises when fund managers maintain fixed weights in different countries. Hence, after the stock market declines in a particular country, managers will pull resources out of other countries in order to rebalance their portfolios. Finally, regulations involving ratings, such as regulations, which disallow holding of non-investment-grade securities, or link capital requirements to them, may also play a role. To the extent that downgrades occur more frequently in emerging markets after a crisis, this may well add to the sell- dynamic in a crisis (Van Rijckeghem and Wedder 1999:6).

As for liquidity problems, Valdés (1997) constructs a model in which emerging-market financial claims are illiquid, and bad news from a particular country generates a higher probability of a run against other emerging markets. Other theories include the behaviour of open-end mutual funds and hedge funds, which after suffering a shock – say a crisis in a particular country – sell off securities in other countries in order to raise funds (i.e., to increase liquidity) to finance redemptions by investors who decide to withdraw from the fund (Hernandez and Valdès 2001:6).

Exogenous shifts in investor behaviour (or "sunspots") constitute a final contagion channel. This can either be in terms of a change in investor appetite for risk, or a change in investor beliefs.

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A channel for contagion which has received less attention in academic literature, although it is given significant attention in market and policy circles, relates to shifts in investors ' appetite for, or aversion to, risk. In this form of contagion, investors share a common but changing appetite for risk. This may not be entirely inconsistent with the classical assumption that investors have different but fixed risk appetites. Investors may not have a single preference function or a continuously changing one, but it may be that at any moment in time investors' appetite for risk is in one of two states: risk-loving or risk-averse. When investors' appetite for risk falls, they immediately reduce their exposure to risky assets, which, consequently, fall in value together. When investors' appetite for risk rises, risky assets are in increased demand and rise in value together. This type of contagion has been called "pure" contagion because it runs along the lines of risk, not shared fundamentals, trade, or exchange-rate arrangements. While the long-term direction is different, periods of strength and weakness have been similar for perceived risky assets such as Brazilian bonds, the Thai baht, the South African rand and US junk bonds even though Brazil, Thailand, South Africa and the US share few macroeconomic trends (Kumar and Persaud 2001:6).

It is not always clear what functions as a "sunspot", co-ordinating shifts in investors ' appetite for risk. It may be the demand for quarterly returns which keeps investors from straying too far and for too long from the normal risk-return calculations. "Bounded rationality" may function as a "sunspot": investors may have a simple paradigm that governs their view of a particular country, region or sector and an event, or a series of events in quick succession, may bring the validity of this paradigm into question, inducing investors out of risky assets. A crisis often does the trick, but it would appear that a variety of events may serve as a "wake-up call" for investors, causing them to revise down their risk appetite and to reassess the situation in countries, sectors, etc, where they had previously been happy to take on risk, leading to further crises (Kumar and Persaud 2001:7).

If we accept that there may be changes in investors' appetite for, or willingness to bear, risk and that these changes can occur relatively quickly, it can be seen that such changes may cause, or facilitate, shifts from one equilibrium to another. Examples are abundant.

Throughout most of 1999 investors appeared to have a high appetite for risk and were willing to buy equity stakes in small technology companies which had no track record, current revenues or any near-term expectations of breaking even. These companies were able to raise new capital readily which further raised hopes of future revenues and attracted yet more investors. When investors ' appetite began to wane in late 1999 and turned sharply lower in the first quarter of 2000, the very same companies could not raise any new capital; and as they did not have sufficient revenues even to cover their operating costs, creditors began to pull the plug, leading to a collapse in equity prices and widespread bankruptcies (Kumar and Persaud 2001:6).

The view of south-east Asia in the early to mid-1990s was that the "tiger economies" were a group of countries with outward-oriented strategies, macroeconomic stability, hard-working people, and almost unlimited potential. Bountiful capital chased this vision up to early 1997 and helped to sustain investment, growth and consumption. However, following the devaluation of the Thai baht in July 1997, the perception of these economies changed overnight, and previously sanguine investors and bank loan

officers were gripped with concern over these countries'  short-term external liabilities and a variety of structural weaknesses. Capital flowed out just as indiscriminately as it had flowed in (Kumar and Persaud 2001:7).

These two examples illustrate the possibility that although different crises appear to have different proximate causes, they may each follow the underlying cycle of investors' appetite for risk. This is not inconsistent with the observation that the causes of crises, and therefore the nature and extent of any ensuing contagion, have not remained constant (Gregorio and Valdes 2000). While in the debt crisis of the 1980s many developing countries were affected by a common external shock, and faced similar macroeconomic problems as a result, contagion also spread because of a sudden reassessment by international banks of the credits on their books from developing countries. In the Asian crisis and its aftermath, contagion spread rapidly throughout east and south- east Asia before extending beyond the region to Russia and Brazil. This suggests that, while fundamental trade and financial linkages may initially have predominated, the behaviour of portfolio investors became increasingly important. Whether all previous contagious crises can be shown to be related to the evolution of investors ' appetite for risk or not, the enormous increase in the size and inter-linkages in global financial markets in the last two decades would suggest that investor behaviour may be becoming a more significant channel for contagion (Kumar and Persaud 2001:7).

Such shifts in investor beliefs are exogenous in the sense that they are neither related to country-specific or common fundamentals nor to interdependencies across economies. Herd behaviour is another form of institutional investor behaviour that can lead to contagion in financial markets. Information asymmetries and herd behaviour include a series of theories based on capital market distortions that, in turn, produce co-movement across countries. Calvo (1999) has proposed an explanation for contagion based on margin calls and asymmetric information. If banks are confronted with losses on their securities portfolio or a rise in non-performing loans in one country, they are likely to try to reduce their overall value at risk. Risk management techniques may then dictate a reduction in exposure in the riskiest markets or in credit lines in historically correlated markets. Herd behaviour, in turn, can be explained by the practice that fund managers' performance is compared to market performance and, therefore, it is very risky for them to deviate from what other managers do, even if the latter follow wrong investment strategies (Scharfstein and Stein, 1990). A related argument by Goldstein (1998) is that a crisis in one country may constitute a "wake-up call" for investors to reassess fundamentals in other countries, thus raising the degree of financial market co-movements and possibly spreading the crisis across economies (Fratzscher 2000:3).

Some of the literature has defined only this third type (financial interdependence) as "pure" contagion.  Pure contagion refers to those crises triggered by a crisis elsewhere which cannot be explained by changes in fundamentals. The first two of these categories (real interdependence or fundamentals-based contagion) are often referred to as merely interdependence or spillovers (Fratzscher 2000:4).

## 3.3 Empirical evidence of contagion

It is very likely that in reality, contagion occurs through different channels simultaneously. However, some channels might be more important during particular events. The empirical literature on contagion has attempted to identify the channels of transmission of shocks using alternative methodologies. Some papers have tried to identify the characteristics of those countries that show a relatively poor performance after a crisis occurs elsewhere. Sachs, Tornell, and Velasco (1996), identify the characteristics of those countries that performed worse after the 1994 Mexican crisis. They conclude that the initial real-exchange-rate overvaluation and the excess of bank-credit creation best explain the after-crisis cross-country performance. This finding could be extended to conclude that contagion is driven by initial macroeconomic fundamentals (Hernandez and Valdès 2001:6).

Kodres and Pritsker (1998) have developed a theoretical, multiple-asset, rational-expectations model of the determinants of contagion. They find that adverse effects of contagion depend on the sensitivity of the affected country to common macroeconomic risks, and to the level of asymmetric information prevailing in the economy. They also point out that in the presence of hedging mechanisms, contagion may occur without common macroeconomic risks in two countries if investors hedge by reducing their overall exposure to emerging markets. This seems to have been the experience of many Asian countries (IMF 2000:14).

Several studies have investigated the possible presence of contagion during the East Asian crisis. Baig and Goldfajn (1998) present evidence in favour of substantial contagion in the foreign debt markets, while the evidence on stock market contagion is more tentative. During a period of market instability, market participants tend to move together across a range of countries. Shocks originating from one market readily get transmitted to other markets, becoming a source of instability. The evidence of contagion in the foreign debt markets reinforces the view that there was an element of panic at the onset of the Asian crises. Forbes and Rigobon (1998) found that the turmoil of the Hong Kong stock market was not contagious to other East Asian countries. Park and Song (2000) present clear evidence that Taiwan's financial turbulence spread to both Hong Kong and Korea through the foreign exchange market. The crisis also became contagious through the stock market in the cases of Taiwan, Hong Kong and Singapore.

Furthermore, Easterly and Levine (1998) found a contagion effect that suggested that each African nation was at a significant disadvantage compared with each of the East Asian nations. The average African country had neighbours who were growing at 0.5% compared to 4.2% of Asia. They also found evidence that national economic policies are contagious. Neighbours with bad policies drag each other down. The perceived risk associated with investing in Africa not only depends on the credibility of the policies pursued in the country where the investment is planned, but also on the stability of neighbouring countries and the credibility of their policies.

Eichengreen, Rose, and Wyplosz (1997) analyse contagion in a group of 20 OECD countries. They define contagion as an increase in the likelihood of crisis in a particular country given that there is a crisis elsewhere. Crises in their sample are

identified as periods of extreme high pressure in the foreign exchange market. They conclude that contagion can be explained better in terms of trade links than macroeconomic similarities (Hernandez and Valdès 2001:6).

Kaminsky and Reinhart (1998) define crises by different criteria and consider the effect of crises in alternative clusters of countries on the likelihood of a crisis occurring in countries of that same cluster. They identify a bank-lending channel, a liquidity channel, and a trade channel. Then they proceed to form clusters of countries based on these channels and show hat these clusters tend to be regional, a fact that could explain regional contagion. In the case of bank lending, they distinguish a cluster of countries that borrows from Japanese banks and one that borrows from US banks. They show that the probability of a crisis in a certain bank-lending cluster conditional on crises having happened in that cluster tends to be higher than the unconditional probability of crisis. However, given the large overlap between lending clusters and regional clusters, the results do not constitute a definite case that the pattern of contagion is caused by a common bank- lender effect as opposed to a different type of regional effect, such as the trade channel. Caramazza, Ricci, and Salgado, using Bank for International Settlements data, define a common bank-lender for each crisis as the country that lent the most to the first country in crisis in each of the major crises (Van Rijckeghem and Wedder 1999:7). Van Rijckeghem and Wedder (1999:21) provide empirical evidence in support of the view that spillovers through common bank-lenders were important in transmitting the Thai currency crisis, and possibly the Mexican and Russian crises as well.

Using a related methodology, Gregorio and Valdés (1999) analyse the cross-country co-movement as an indicator of foreign exchange market pressure during the debt (1982), Mexican (1994) and Asian (1997) crises. Their approach consists of explaining the behaviour of the foreign exchange market pressure index (or the credit rating) in each country, with a specific weighted average of the same indicator in other countries. The weighted average is constructed to reflect a particular contagion channel and, again, contagion occurs if the average crisis indicator for other countries helps to explain the extent of the crisis in each country. They conclude that initial conditions only partially explain contagion, and that neighbourhood effects – which they consider as the financial channel – are more relevant than trade links and macroeconomic similarities. It could be argued, however, that the neighbourhood effect reflects institutional practices in the international financial system (i.e., institutional investors treat all countries in the same region as equal, without noticing the differences in their fundamentals)(Hernandez and Valdès 2001:7).

An alternative definition of contagion has been used by Glick and Rose (1999), which is based on the degree of countries' closeness to the so-called "ground-zero country", the country where the crisis starts. In this approach different closeness measures reflect alternative contagion channels. Following Sachs et al. (1996), they try to explain cross-country performance after particular crises. Van Rijckeghem and Weder (1999) use a similar approach that incorporates a measure of fund competition in banking centres between countries and the ground-zero country. They apply this approach to a more recent set of crises and conclude that the extent of fund competition is a more robust predictor of the incidence of crises (given that the

ground-zero crisis has occurred) than trade linkages and countries' macroeconomic characteristics (Hernandez and Valdès 2001:7).

In a study of 61 countries (emerging and industrial) Caramazza (2000:35) found that the regional pattern of crises could be explained by economic factors and not by referring, for example, to irrational herd behaviour of financial agents who assess financial stability on the basis of geographical proximity. In this regard trade spillovers, from the devaluations and output contractions of other crisis countries, are particularly relevant for countries with weak current account balances.

During the Asian crisis UNCTAD (1998) reported that trade was a key factor in spreading the crisis. The growth of world trade dropped well below the 1997 figure of 9.5%. Latin America, where on average 10% of exports had been going to East Asia, was particularly vulnerable. On the other side of the coin, the major industrial countries gained more from declining commodity prices and improving terms of trade than they have lost from cuts in exports to Asia.

Contrary to the above evidence, Qin (2000) found that in the case of Korea, contagion via financial market linkages was the most important infective channel, whereas contagion via trade linkages was found to be only a minor channel. He concluded from the identified sources of external shocks that contagion tended to come from neighbouring economies similar to, or weaker than, Korea in terms of financial structure and economic strength.

Thus, trade and financial ties and the vulnerabilities of associated emerging-market economies appear to help explain some of the spread of the crisis in Thailand to other emerging markets in 1997/8. In the more recent crisis in Argentina, a lower incidence of emerging-market countries 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 (Hall and Taylor 2002:5). Changes in the response of international investors to events in Argentina relative to earlier episodes of emerging-market stress – perhaps reflecting shifts in the merging market investor base and the widespread anticipation of the Argentine crisis – have also played an important role.

Looking for evidence of why currency crises are regional, Glick and Rose (1999) use cross-sectional data from 161 countries. Their evidence supports the hypothesis that currency crises spread because of trade linkages. Countries' currencies may be the target of speculative attacks because of the actions (or inaction) of their neighbours, who tend to be trading partners merely because of geographic proximity.

In sum, there has been a slow shift in what is considered the empirically most relevant contagion channel. While macroeconomic fundamentals were at first considered an important variable, later on trade links appeared to be more important. Recent papers have shown that financial links could even be a more relevant contagion channel (Hernandez and Valdès 2001:7).

These studies point to the existence of asymmetric information in financial markets as a source of contagion of financial crises from one country to another. This is of vital concern because more countries have liberalized their markets and are now highly

linked with other countries' markets. Through this channel, negative external shocks may be directly transmitted to countries with sound economic fundamentals.

## 4. EMPIRICAL STUDY

### 4.1 Trade contagion

#### *4.1.1 Defining trade contagion*

Different ways through which the international transmission of a crisis through the trade channel takes place are described in the literature. Caramazza (2000:43) distinguishes between price and income effects in this regard. The price effect is transmitted through the expected loss of competitiveness for each country arising from exchange rate crashes in other countries. If prices tend to be sticky, a nominal devaluation delivers a real exchange rate pricing advantage, at least in the short run. That is, countries lose competitiveness when their trading partners devalue (Glick and Rose 1999:604). The transmission can occur even if the two countries (in this case South Africa and Zimbabwe) do not trade with each other. The key feature is that their exports compete in other foreign markets. The strength of the transmission mechanism through the trade channel depends on the degree to which goods produced in different countries are similar to each other (Pesenti and Tille 2000: 8). The income effect measures the implied post-crisis export market changes because of expected output contractions of partner countries due to the crisis (Caramazza 2000:44).

#### *4.1.2 Empirical evidence on trade contagion from Zimbabwe to South Africa*

In looking for evidence of trade contagion originating in Zimbabwe, we will first consider the possibility of an income effect and then the possible price effect. The question to be answered in this regard is whether the economic misfortunes of Zimbabwe reduced our exports, firstly because of less bilateral trade and secondly because Zimbabwe's currency depreciation or devaluation earned them an exchange-rate pricing advantage.

#### 4.1.3.1 Income effect

The figures in table 1 show a decline in Zimbabwe's imports since 1998, both in terms of volume and value. In 2000 38.4% of all Zimbabwean imports came from South Africa (IMF 2002:39) and 15% of all exports went to South Africa. South Africa's importance as a trading partner thus increases the threat of trade contagion.

**Table 1: Trends in trade 1997-2000**

| % CHANGE IN | 1997 | | 1998 | | 1999 | | 2000 | |
|---|---|---|---|---|---|---|---|---|
| | Zim | SA | Zim | SA | Zim | SA | Zim | SA |
| X value | -2.9 | | -20.6 | | -0.1 | | -6.8 | |
| X volume | 0.1 | 5.5 | -11.3 | 2.2 | 4.6 | 1.3 | -6.6 | 8.2 |

| M value | 18.1 | | -23.9 | | -17.1 | | -9.2 | |
|---|---|---|---|---|---|---|---|---|
| M volume | 23.2 | 5.4 | -15.5 | 1.1 | -18.4 | -7.4 | -13.8 | 7.4 |

Source: IMF 2002

In rand terms, exports to Zimbabwe declined from R5 575 682 000 in 1997 to R5 309 163 000 in 2000 (ABSA). South African exports, on the other hand, are constantly increasing, despite the decline in exports to Zimbabwe. The reason for this is that Zimbabwe is not one of South Africa's major trading partners. For the period 1991-2000 on average 32.2% of South Africa's exports went to Europe and 46% of our imports came from there (ABSA 2002). Only 11.8% went to Africa and 2.6% came from Africa. Zimbabwe's share of our total exports increased from 2.44% in 1992 to 4.32% in 1996 then declined again to 2.16% in 2001 (DTI 2002). Zimbabwe's share of total South African imports declined from 1.66% in 1992 to 0.67% in 2001. The trade figures thus show no net evidence of trade contagion. Decreased exports to Zimbabwe were more than made up for by increased exports to other markets.

### 4.1.3.2  Price effect

For the price effect to be relevant, the two countries have to compete in export markets, and Zimbabwe should experience a relative price advantage because of a weaker currency. This does not seem to be the case. Comparing the export baskets of the two countries, South Africa and Zimbabwe are not competing in the same export markets. In 2000 42.5% of Zimbabwe's exports were agricultural products, 21.6% mineral products and 31.6% manufacturing (IMF 2002). South Africa on the other hand was exporting 71.2% manufacturing goods, 10.1% gold and 13.1% services (ABSA 2002). Comparing the ten leading products exported by the two countries (obtained from the TRADE MAP data base), only one category appears on both lists: ferro-chromium. It is third on Zimbabwe's list and fourth on South Africa's. However, South Africa supplied 56% of the total ferro-chromium world exports in 2000 and Zimbabwe only eight percent. In 2000 it accounted for 7.4% of Zimbabwe's total export earnings and 3.1% for South Africa. The difference in the two countries' export baskets thus nearly rules out the possibility of trade contagion.

### *4.1.4  Conclusion*

The question whether Zimbabwe enjoys a relative price advantage because of currency depreciation/ devaluation is almost irrelevant in the light of the above findings. It is however worth noting that South Africa's currency also depreciated significantly since 1999, and as a result the country definitely gained in terms of export volumes.

Figure one indicates how export volumes (XVOLUME) increased while the real effective exchange rate of the rand (REFEX) decreased. This visual evidence is confirmed by an econometric study that showed that South African exports are highly sensitive to real exchange rate changes – with the exchange rate elasticity ranging between 1.8 and 2.0 (Tsikata 1999).

**Figure 1: Export volumes and the exchange rate**
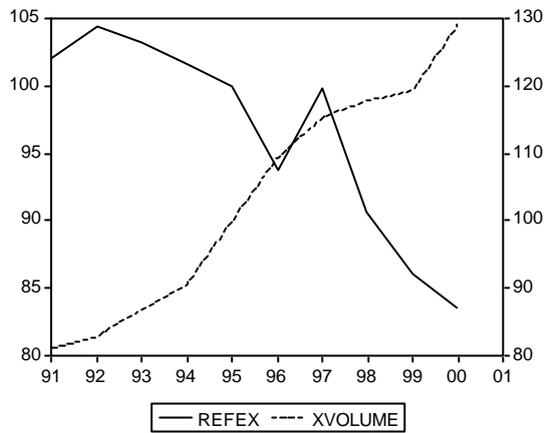


The above evidence does not point to the presence of trade contagion between Zimbabwe and South Africa. Zimbabwe's share of South Africa's total exports is much too small to have a significant impact on our overall export performance, the two countries are not competing in the same product groups, and the South African currency depreciation (partly because of financial contagion) increased competitiveness and boosted the country's exports.

## 4.2 Financial contagion

Three different techniques are used to test empirically for evidence of financial contagion, namely correlation coefficients, ARCH estimation, and employing dummy variables to test for the impact of news events. Due to the change in the Zimbabwean exchange rate regime it is not possible to use all three tests for the entire period.

### 4.2.1 Currency market correlations

The analysis starts with estimating correlation coefficients of the daily change in nominal exchange rates between the South African rand and the Zimbabwe dollar. Both are expressed as currency per US$. The sample period starts on January 2, 1996 and end on January 15, 1999, the last day before the Zimbabwe Dollar was pegged to the US$. Two months were excluded from the data set, July 1997 and August 1998, to account for the Asian and Russian crises. To some extend two distinct periods of crisis can be identified for Zimbabwe. The first was late in 1997 when large and abrupt increases in war veterans' benefits and uncertainties on the direction of land reform put serious pressures on the currency. Instability intensified as violence erupted in the period before and after the June 2000 elections.

**Table 2: Correlation between South African rand and Zimbabwe dollar**

|  | CORRELATION COEFFICIENT | T STATISTIC |
|---|---|---|
| Whole period: 1 Jan 1996 – 15 Jan 1999 | 0.1198* | 3.25 |
| Before crisis: 1 Jan 1996 – 15 Dec 1997 | -0.0023 | -0.05 |
| Crisis period: 18 Dec 1997 – 15 Jan 1999 | 0.1537* | 2.48 |

\* Significantly different from 0 at 99%

Table 2 indicates that there is a significant positive correlation between changes in the two currencies for the whole period. This is mainly caused by the positive correlation during the 1997 Zimbabwe crisis. No significant correlation was found for the period before 18 December 1997. Therefore, the calculated correlation coefficients give some indication of contagion.

### 4.2.2 Variance estimation

The second type of test estimates volatility among financial markets (Edwards, 1998 and Park and Song, 1998). This approach examines whether conditional variances of financial variables are related to each other among markets in different countries during a crisis period. An ARCH type model is used in this approach. The mean equation is estimated as:

$$DLNRAND_t = a_0 + \sum_{i=1}^{4} a_i DLNRAND_{t-i} + \circ_t \quad (1)$$

and the variance equation as:

$$h_t = \alpha_0 + \alpha_1 \varepsilon^2_{\tau-1} + \beta \, DLNZIM_t \quad (2)$$

where DLNRAND and DLNZIM is the log first difference of the two exchange rates.
In equation (2) it is assumed that the variance depends on lagged squared values of the error terms in equation (1) and the percentage change in the Zimbabwe dollar. The question is whether the variance of the South African rand is increased by increased volatility in the Zimbabwe dollar. If this is the case, the estimated coefficient of DLZIM should be significantly positive.

Table 3 summarizes the results of the estimated variance equation. The estimated value of $\beta$ is positive in all three cases. During the crisis, however, it has the highest

**Table 3: Estimates from variance equation**

|  | WHOLE PERIOD (1/96-1/99) | BEFORE CRISIS (1/96-12/97) | CRISIS PERIOD (12/97-1/99) |
|---|---|---|---|
| $\alpha_1$ | 1.400774 | 0.516365 | 1.749352 |
| prob | 0% | 0% | 0% |
| $\beta$ | 0.000133 | 0.000009 | 0.000239 |
| prob | 0.09% | 39.88% | 0% |

* prob: the probability of committing a type I error.

value and is statistically highly significant. The same cannot be said about the period before the crisis. This positive and statistically significant estimate implies that increased volatility in the Zimbabwe dollar will be mirrored in increased volatility of the rand. This confirms the presence of financial contagion during the crisis period starting late in 1997.

### 4.2.3 News events study

The use of the aforementioned two tests was limited to the period January 1996 to January 1999, due to the change in exchange rate regime in Zimbabwe discussed previously. One possibility is to use the parallel market exchange rate in empirical tests. Since such data were unavailable, and the fact that these rates are highly volatile and driven by speculative factors (see Section 2), it was decided not to pursue this course of action.

During the past two years financial analysts in South African often said that Zimbabwe was the cause of the weakening rand. Following Ganapolsky and Schmukler (1998), Kaminsky and Schmukler (1998), and Baig and Goldfajn (1998), dummy variables are used to quantify the impact of policy announcements and other news events on the South African exchange rate. For both South Africa and Zimbabwe a set of two dummy variables is created, representing good news and bad news in each country (see Appendix for details). For South Africa its own domestic news is a proxy for changes in fundamentals, whereas changes in the fortune of Zimbabwe is a potential source of contagion.

In addition to news events regarding Zimbabwe, the Hang Seng and S&P500 indices are included in the regressions to examine whether foreign news affects the South African currency. Being part of the emerging-markets group of countries, South African financial variables (like share prices and exchange rate) are often affected by happenings in other emerging-market countries. Including the Hang Seng is an attempt to capture this effect.

The list of variables used in the regression analysis is as follows:
DLNRAND    First difference in log of rand per US$
SAGOOD     Dummy with value of 1 for good news regarding SA
SABAD      Dummy with value of 1 for bad news regarding SA
ZIMGOOD    Dummy with value of 1 for good news regarding Zimbabwe

ZIMBAD          Dummy with value of 1 for bad news regarding Zimbabwe
DLNHS          First difference in log of Hang Seng closing value
DLNSP          First difference in log of S&P500 closing value

The regressions reported in table 4 were estimated on daily data from January 4, 2000 to March 25, 2002 as well as for three sub-periods. Both the dummies indicating bad news and their lagged values are included as explanatory variables. The inclusion of the lags is due to the fact that the impact of bad news on financial markets is often spread over more than one day. Data on the exchange rate was obtained from the South African Reserve Bank. The news events were found on the sites of Business Day and IRIN News. The two indices are from Mini Share-Friend for Windows.

All the coefficients reported in regression 1 were estimated with the expected sign, except for ZIMBAD. Only the constant, SAGOOD, SABAD(-1) and ZIMBAD(-1) are marginally statistically significant. Good news in South Africa tends to lower the rand per US dollar exchange rate and local bad news increase this value. Good news in Zimbabwe is positive for the rand, although this coefficient is the least significant of all estimates. Bad news has the expected opposite effect, although only a day after the news event has been published. The negative coefficients of the two indices indicate that if share prices go down, one US$ becomes more expensive in South Africa. Regression 2 was run without ZIMGOOD and ZIMBAD. It however, did not affect the performance of the other variables.

**Table 4: Regression results: OLS estimates with dependant variable DLNRAND**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Constant | 0.0008263 | 0.0007558 | 0.0005494 | 0.0042956 | -0.0009884 |
| | (11.8%) | (12.9%) | (45.9%) | (4.9%) | (74.1%) |
| SAGOOD | -0.0029604 | -0.0029138 | -0.0084366 | -0.0043288 | -0.0074221 |
| | (15.8%) | (16.3%) | (1.1%) | (49.1%) | (44.0%) |
| SABAD | 0.0019337 | 0.0019786 | 0.0026829 | -0.0030154 | 0.011307 |
| | (32.7%) | (31.5%) | (32.2%) | (65.2%) | (25.5%) |
| SABAD(-1) | 0.0027285 | 0.0027691 | | 0.0067080 | 0.0042239 |
| | (16.7%) | (16.0%) | | (32.2%) | (68.4%) |
| ZIMGOOD | -0.0007323 | | | | |
| | (78.1%) | | | | |
| ZIMBAD | -0.0004039 | | 0.0011899 | -0.0035790 | |
| | (76.9%) | | (43.8%) | (46.6%) | |
| ZIMBAD(-1) | 0.0023105 | 0.0022695 | 0.000964 | -0.000844 | 0.0083244 |
| | (9.5%) | (9.8%) | (54.0%) | (87.3%) | (15.2%) |
| DLNHS | -0.012284 | -0.012115 | -0.066802 | 0.061479 | -0.022783 |
| | (64.9%) | (65.3%) | (3.3%) | (41.5%) | (87.0%) |
| DLNSP | -0.021004 | -0.020750 | | | |
| | (57.0%) | (57.3%) | | | |
| DLNSP(-1) | | | | -0.16078 | |

| | | | | (21.5%) | |
|---|---|---|---|---|---|
| Observations | 551 | 551 | 114 | 57 | 74 |

* Probability of committing a type 1 error in parentheses

As can be expected, the $R^2$ values for both regressions are low, but the diagnostic tests are healthy – with no indication of serial correlation. Further testing, however, does confirm the presence of ARCH-effects. Estimating the relationship in regression 2 by means of an ARCH(1) specification, further improves the statistical significance of the explanatory variables. The coefficient of ZIMBAD has a probability of only 1.5%, SAGOOD zero percent and DLNHS 0.1%. This underlines the immense impact of happenings in other emerging-market countries on the South African currency.

Regression 3 was estimated for the period April 17 to October 2, 2000. Looking at the list of Zimbabwean news events, especially those indicating bad news, we see a concentration of events. This was the period before and after the June elections when violence erupted on a regular basis. During this period the rand depreciated by nine percent against the US$. In this regression both ZIMBAD and ZIMBAD(-1) show the expected positive relationship with the exchange rate – although their statistical significance is doubtful. On the other side, SAGOOD and DLHS are highly significant.

Regression 4 captures the situation from September 11, 2001 until November 30, 2001. The variable representing S&P500 was lagged, because of the time difference between South Africa and the US. The coefficient of DLNSP(-1) was estimated with the correct sign, but is not significant. However, measured against the significance of the other variables, it puts up the best performance. The other explanatory variables, however, lose their predictive power. SAGOOD is not significant anymore, while SABAD, ZIMBAD, ZIMBAD(-1) and DLNHS suddenly display the wrong signs. This regression clearly reflects the turmoil in financial markets since September 11, 2001.

Regression 5 is estimated for the period December 1, 2001 to March 25, 2002. This covers the build-up to as well as the actual elections in Zimbabwe during March 2002. ZIMBAD(-1) is statistically more significant than during the first election period (regression 3), but still no more significant than for the whole sample period.

### 4.2.4  Conclusion

Our empirical results provide evidence of financial contagion.[2] The spillover effect of the 1997 Zimbabwe economic crisis is reflected in an increased correlation between the South African rand and the Zimbabwe dollar. In the same period, changes in the

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[2] This accords with the findings of the Myburgh Commission that "one of the reasons for the negative sentiment which added to the downward pressure on the rand was contagion through similarity. South Africa and Argentina, for example, are grouped together as emerging markets. Consequently, South Africa and its currency, the rand, were negatively impacted by the Argentinean crisis in 2001. A further way in which contagion operated negatively for the rand was by South Africa's proximity to Zimbabwe."

daily value of the Z$ has a positive and statistically significant impact on the volatility of the rand. The news events study suggests that bad news from Zimbabwe negatively impacts on the exchange rate of the South African rand. These contagion effects do not seem to intensify during the two election periods covered by the sample. On the contrary, it is statistically more significant for the whole period than for the different sub-samples. Following the "pure contagion" (financial interdependence) versus "spillovers resulting from 'real' inter-linkages" classification of contagion, the empirical evidence is consistent with the pure contagion hypothesis.

The Zimbabwe effect cannot, however, be blamed for all the increased volatility of the rand. The statistical significance of the Hang Seng index (in the regressions) confirms the possibility of contagion from other emerging markets. The combination of South Africa's sophisticated and efficient financial markets and our status as an emerging-market country leaves the currency vulnerable for speculative attacks.


# 5.  CONTAGION MANIFESTED IN CAPITAL FLOWS

The above evidence indicates that the movement of the rand can be linked with events in Zimbabwe and movements in the Hang Seng. Exactly how these events affect demand and supply of rands and consequently the exchange rate is not sure. Capital flows, especially portfolio flows (and to a lesser extend FDI), can reflect this kind of herd behaviour. Signs of speculation against the currency are much more difficult to trace. For example, the Bank of England informed the SARB that it is not possible to trace information on transactions between foreign banks trading rands for other currencies (Volksblad 24 July 2002).

Capital flow figures provide some evidence of financial contagion among emerging-market countries. Net private capital flows to all emerging economies have declined since 1997 and were practically zero in 2001 (IMF World Economic Outlook). This pattern cannot be explained solely by changes in fundamentals and is indicative of herd behaviour among investors.

Barry Eichengreen argues that
> changes in technology, policy, and market structure have created an enormous pool of liquid funds ready to move at the first hint of devaluation risk. Foreign asset positions are actively managed by institutional investors. Fund managers in the business of monitoring current developments are able to alter the composition of their portfolios at low cost. Improvements in trading and information systems and back-office clearing and settlement systems have increased the speed and reduced the cost at which transactions can be undertaken. The extent of the resources that the markets can bring to bear makes it difficult to hold out in the face of speculative pressures (Eichengreen 1994, 64).

Under these circumstances, even countries with entirely defensible domestic fiscal and monetary policies can find themselves under the gun. Several observers believe that this was indeed the case for South Africa towards the end of 2001. The fact the South African rand was in the 13th place of most traded currencies in the world –

while the South African economy is only the 35th largest – was stated as motivation in this regard.

The nature and extent of capital flows to and from South Africa (since 1991) are indicated in table 5. Since 1992 the largest part of capital inflows was in the form of portfolio investment. These are not long-term funds and are withdrawn at the slightest indication of uncertainty. Foreigners had been net buyers of South African bonds from 1991-1997 and again in 1999. This pattern was reversed in 1998 and 2000 (Gidlow 2001). On the other hand, foreigners have been net buyers of South African shares from 1993-2000. Whereas some emerging-market economies are plagued by unstable flows of international bank finance, in the case of South Africa the element of international capital flows which has proven to be unstable in recent years has been flows of international bond finance.

The inflow of foreign direct investment (FDI) reached a peak in 1997, but declined again after the 1998 Asian crisis.

**Table 5: Composition of South African capital flows – annual figures (R millions)**

| Year | Net direct investment | Net portfolio investment | Net other investment |
|------|------|------|------|
| 1991 | 111 | 666 | |
| 1992 | -5514 | 4950 | |
| 1993 | -941 | 2417 | |
| 1994 | -3040 | 10008 | -2609 |
| 1995 | -4557 | 9020 | 15318 |
| 1996 | -970 | 9576 | 4788 |
| 1997 | 6756 | 30580 | -10287 |
| 1998 | -6737 | 20375 | 3662 |
| 1999 | -475 | 52346 | -19356 |
| 2000 | 4280 | -13835 | 11775 |
| 2001 | 85921 | -67626 | -29305 |

Source: SARB Quarterly Bulletin, December 2001, June 2002.

**Table 6: Composition of South African capital flows – quarterly figures (R millions)**

| | Net direct investment | Net portfolio investment | Net other investment |
|------|------|------|------|
| 1999 Q2 | -944 | 15114 | -4485 |
| 1999 Q3 | -1105 | 23771 | -12932 |
| 1999 Q4 | 2624 | 11065 | -7280 |
| 2000 Q1 | 3891 | -4346 | -908 |
| 2000 Q2 | -4229 | -5667 | 10189 |
| 2000 Q3 | 6315 | 1115 | 5622 |
| 2000 Q4 | -2143 | -4937 | -2929 |
| 2001 Q1 | -5680 | 2882 | -8485 |
| 2001 Q2 | 95313 | -64335 | -19858 |

| 2001 Q3 | 3589 | -2763 | 886 |
| 2001 Q4 | -7301 | -3410 | -1848 |
| 2002 Q1 | 633 | -1366 | 14438 |

Source: SARB Quarterly Bulletin, June 2001, June 2002.

The other alarming factor evident from table 5 is the net outflow of FDI for almost the entire period and net inflow of portfolio investment. This pattern in capital flows is not unique to South Africa. Indeed, net private capital flows to all emerging economies were virtually zero in 2000 and 2001.

As regards an explanation of the evolution of equity flows to developing countries, the nineties were described by one fund manager as "a history of two halves." In the first half of the nineties, there was great optimism about the prospect for emerging markets, with the expectation that higher returns would compensate for higher risks, and with the perception that emerging markets offered an interesting opportunity for portfolio diversification due to their low correlation with developed economies. As a result equity flows to EMs grew systematically (Griffith-Jones and Leape 2001: 15).

However, since the East Asian and other crises, this optimism has declined, and so have the equity flows. The main reasons given are that in the second half of the 1990 s, volatility in emerging markets was very high, returns were not only very low, (and on occasions negative), but also lower than in the developed markets. As these stock markets become more integrated into global financial markets, correlation between emerging and developed markets increased; thus the gains from diversification declined. The promise that emerging markets would offer higher economic growth and therefore higher returns was not fulfilled. There was no compensation for higher risk, and the risks were certainly seen as high, as one crisis in emerging markets followed another with alarming speed (Griffith-Jones and Leape 2001: 16).

There emerged also an additional, more structural factor that inhibited equity flows. This relates to the fact that – from the point of view of portfolio investors – there are not "sufficient" large companies left to invest in. Many of the most attractive, large and profitable companies (e.g. in telecoms and energy) have already been sold to foreign direct investors; this is particularly the case in Latin America. As a result, there is no room for portfolio investors (Griffith-Jones and Leape 2001: 16).

An important new trend is that a growing proportion of the issuing and trading of developing country stocks takes place in New York and London, via issuance of American and Global Drawing Rights (ADRs and GDRs). As a consequence, a smaller proportion of this activity takes place in the stock markets of developing countries themselves. It could be said that, to some extent, developing countries are exporting their stock markets (Griffith-Jones and Leape 2001: 17).

There are also important structural factors, which suggest that investors will continue to be biased towards more liquid – and therefore larger – markets. A key factor is that the "crowd" of international investors has grown; there is great concentration in huge institutional investors, who argue they are "too large" for the market's liquidity. As a result, if they switch a significant part of their funds, they can have large effects on prices. A second factor is that particularly cross-border investors herd more;

according to Persaud (2001), the tendency to herd has increased both due to greater uncertainty on valuation (as the new economy is based on ideas and knowledge, which are more difficult to value than bricks and mortar), and due to the encouragement by regulators of short-term, market-sensitive risk management systems, which encourage investors with different mandates to act in a similar way (Griffith-Jones and Leape 2001:17).

Given that these latter factors are part of more long-term trends, this implies that liquid markets will become more liquid while illiquid markets will become less liquid. This has been a growing complaint in developing countries, such as Chile and South Africa, where large local companies either issue ADRs or switch primary listings altogether. This further undermines liquidity in these developing-country markets, as overseas investors no longer need to invest there (Griffith-Jones and Leape 2001:18).

Since the mid 1990 s there has been a sharp reduction of so-called dedicated investors: this refers both to emerging-market country funds, which have practically disappeared, and to a decline in regional emerging-market funds. This latter trend seems particularly clear for Sub-Saharan Africa funds. A far higher proportion of equity flows go to emerging markets via so called "cross-over investors," that is those originating from global funds, where a very small proportion of their portfolios goes to emerging markets. This trend is problematic, because dedicated investors tend to have a more long-term commitment than cross-over investors, and therefore have lower rotation and volatility (Griffith-Jones and Leape 2001: 14).

## 6.  POLICY IMPLICATIONS

Evidence of financial contagion that negatively impacted on the external value of the South African rand was provided in section 4.  This is also evident in the capital flow figures provided in section 5. In this regard, several policy responses are possible. The appropriate policy response depends on the nature of the channel of crisis transmission. If crises are transmitted largely through temporary channels that only exist after a crisis, then short-run isolation strategies, such as capital controls, could he highly effective in reducing the effect of a crisis elsewhere in the world. On the other hand, if crises are transmitted mainly through permanent channels which exist in all states of the world, then these short-run isolation strategies will only delay a country's adjustment to a shock and not prevent it from being affected by the crisis in the first place (Forbes and Rigobon 2000:32).

### 6.1 Political and macroeconomic stabilisation

Political and macroeconomic stabilisation in emerging-market countries is a necessary condition for crisis prevention. However, such measures are only the first steps that governments must take. The need for a range of measures aimed at risk reduction is recognised in the New Partnership for Africa's Development (NEPAD). The NEPAD proposal that countries undertake audits of regulation and legislation, followed up by monitored action plans to address any weaknesses, deserves the strongest support. But it must, at the same time, be recognised that existing systems and practices have evolved in response to political and social pressures and cannot simply be changed

overnight. Even a sustained effort to tackle these issues is likely to be fully successful only in the medium to long term.

The expansion of global capital markets needs to be better anchored in stronger trade integration and thus growth in debtor countries. Since the late 1980s the degree of integration of developing countries – as a group – into global capital markets (measured by foreign assets and liabilities as a ratio to GDP) has doubled, while trade openness (measured as the ratio of exports and imports to GDP) has increased relatively little with the important exception of Asia. We need to view this imbalance as a fundamental problem and therefore need a better balance between the opening of capital accounts and the expansion of trade. The advanced countries have the main responsibility, in particular to open up their markets and phasing out trade-distorting subsidies (Kohler 2002:116).

## 6.2 Policies aimed at stabilising capital flows to emerging-market countries

Attributing the volatility of capital flows to emerging-market countries solely to inappropriate domestic policy is a simplistic and misleading view of financial markets and market pricing. Crucially, it ignores factors on the demand side – such as herding behaviour, changes in risk aversion, and speculative attacks – that have a substantial and sometimes decisive influence on asset prices. For example, a country as important as France, with all the help France could summon in an emergency, was unable to maintain the exchange value of its currency in the face of attack in 1993 although the currency was not in fact overvalued. French policies were in fact sound, and values returned to just about their previous level in a matter of months after the attack ended (Mayer 1999:35).

Furthermore, the experience of the 1990s – with the very large scale of international funds compared to the size of developing-country markets – leads us to question whether measures by recipient countries to discourage excessive short-term flows are sufficient to deal with capital surges and the risk of their reversal. This necessitates the introduction of measures aimed at source countries. Such measures ideally would change the composition and magnitude of international capital flows.

### 6.2.1 Indirect policy measures aimed at source countries

At present there is no international regulatory framework for taking account of market or credit risks on flows originating in institutional investors, such as mutual funds (and more broadly for flows originating in non-bank institutions). This represents an important regulatory gap. Institutional investors, given the very liquid nature of their investments, can play an important role in contributing to developing-country currency crises. It seems important, therefore, to introduce some counter-cyclical regulation to discourage excessive surges of portfolio flows. This could perhaps best be achieved by a variable risk-weighted cash requirement for institutional investors, such as mutual funds. These cash requirements would be placed as interest-bearing deposits in commercial banks. Introducing a dynamic risk-weighted cash requirement for mutual funds (and perhaps other institutional investors) is in the mainstream of current regulatory thinking and would require that standards be provided by regulatory authorities and/or agreed internationally.

The aim of such regulatory changes is to help smooth capital flows to emerging markets, without discouraging them excessively. This is in contrast with views based

on a belief that crises in emerging markets are due only to moral hazard, and that the appropriate way to combat such moral hazard is by scaling down the role of the IMF in providing financial packages before and during crises. The latter view has acquired some prominence in developed countries, particularly but not only in the US. In particular, the majority Meltzer Report to the US Congress took such views to the extreme. However, such a reduction of the role of the IMF could make crises even more costly and/or lead to a sharp reduction in private flows to developing countries. These are both highly undesirable effects which could significantly diminish welfare, particularly but not only in the developing economies, as well as undermine support for open economies and market-based economic policies in developing economies. Therefore, an approach based on better regulation is clearly better and more welfare-enhancing than one which cuts back the role of the IMF.

### 6.2.2 Direct control measures: capital controls

With regard to capital flows, another policy option is to consider direct control measures. Some analysts have argued that the imposition of capital controls provides an effective way for reducing the probability of crises. The recent turmoil in currency markets in Asia, Latin America, and Europe and the explosion of international capital flows that preceded these crises have ignited, once again, the debate on whether restrictions to international capital mobility can help reduce the perhaps excessive euphoria of investors, attenuate the severity of the crises, or limit contagion. Many have argued that globalisation has gone too far, with international capital markets becoming extremely erratic after liberalization. Even controls on capital outflows, not long ago dismissed as ineffective, have become fashionable again. It can be argued that they may help in managing, at least temporarily, an otherwise disorderly retreat of investors. This includes the views of Joseph Stiglitz (1999), until recently the World Bank's chief economist, who has said: "Volatile markets are an inescapable reality. Developing countries need to manage them. They will have to consider policies that help stabilize the economy. These could include Chilean-style policies that put some limits on capital flows." Others have challenged these views, arguing that financial repression is a symbol of a bygone era that promotes corrupt and unstable financial systems and is incapable of preventing massive speculative capital attacks against a domestic currency.

It is generally accepted that controls on inflows may change the composition of capital flows, but that over the longer term they have little effect on the volume of capital since over time evasion increases. Changing the composition of flows is in itself a desirable outcome. Moreover if capital controls have even temporary effects on total flows (in other words they temporarily slow down inflows in good times, and outflows in bad times) then they will have acted as smoothing mechanisms, a desirable outcome (Islam 2000).

There are many versions of a tax on inflows: from a mild Tobin tax on all international financial transactions, to those which tax only short-term borrowings, and those which entail a reserve requirement on all (non-equity) inflows or on certain types of inflows. From a theoretical perspective Davidson (1997) doubts the efficiency of transaction tax to constrain speculative behaviour. The Tobin tax, and any other small transaction cost, can stop speculation on small movements in the exchange rate. The imposition of a Tobin tax per se will not significantly stifle even very short-run speculation if there is any whiff of a weak currency in the market. Any

Tobin tax significantly less than 100% of the expected capital gain is unlikely to stop the sloshing around of hot money. The Tobin tax can have a significantly larger impact on stemming international trade and arbitrage activities than its impact on a speculative round-trip. Country experience has shown that small taxes do little to affect the direction and magnitude of capital flows. Also, taxes and reserve requirements need to be broadly defined in order to work; those which affect only short-term flows can be evaded by a simple matter of relabelling short-term flows. This has been demonstrated by the experiences of Chile and Columbia (Islam 2000).

The extreme form of controls on inflows is not allowing any external borrowing. Some countries have allowed only "authorized" institutions to borrow abroad. This way external borrowing could be restricted to "safe" institutions. Another suggestion that has recently been espoused is that countries should return to closed end mutual funds as the preferred alternative for foreign investment in domestic equities. The advantage of these funds is that wholesale dumping of individual companies might be limited or at least slowed down considerably. These funds used to be the preferred mechanism for investment in emerging markets (Islam, 2000).

Controls on capital outflows exist in many countries and more recently have been an issue for discussion in countries that had previously liberalized their capital accounts. In such countries, which face a potentially large outflow, such controls may be used to slow down outflows, or may enable the authorities to have some control over monetary policy in order to limit the output effects of short-run changes in capital flows. Like controls on inflows, those on outflows are subject to leakages which may increase over time (Islam 2000).

Three objections are often raised against capital controls: that they are ineffective, costly, and that they fail to protect an economy from panic by all relevant players. We briefly discuss each in turn.

Any claim about the ineffectiveness of capital controls must be tempered by the observation that such policies are vehemently opposed by the very market participants whose actions the controls are supposed to influence. Perhaps bankers and arbitrageurs denounce the taxes and ceilings they can presumably avoid with the stroke of a key out of simple public-mindedness, or because of a deep-seated reluctance to break the law (Rodrik and Velasco 1999). Furthermore, there is an obvious tension between emphasizing, on the one hand, improved prudential regulation and transparency as an important part of the solution, and maintaining, on the other, that capital controls cannot work because they can be easily evaded through corruption, financial engineering or other mechanisms. If financial markets can evade controls of the latter kind, they can surely evade controls of the former kind as well. Regulatory ineffectiveness may undercut the argument for capital controls, but it undercuts even more seriously the emphasis on financial standards that pervades the G7's approach to the international financial architecture (Rodrik and Velasco 1999).

In theory, capital controls prevent risk-spreading through global diversification of portfolios. They result in an inefficient global allocation of capital. And they encourage irresponsible macroeconomic policies at home. This issue was examined systematically in Rodrik (1998), by relating capital account liberalization to three indicators of economic performance: per-capita GDP growth, investment (as a share of GDP), and inflation. The indicator of capital account liberalization used was the proportion of years for which the capital account was free of restrictions (according to

IMF classifications). The exercise covered a post-1975 sample of around 100 countries. The study found no evidence that countries without capital controls have grown faster, invested more, or experienced lower inflation (Rodrik and Velasco 1999).

Furthermore, specific episodes of capital controls do not reveal significant real costs either. Chile is a success case of the 1990s, in no small part because it has managed to avoid the de-stabilizing influence of short-term capital flows. Even in Malaysia, where the imposition of restrictions in January 1994 resulted in a massive turnaround in capital flows, growth was unaffected (in fact, the Malaysian economy grew faster in 1994 and 1995 than in 1993).

The other very important caveat is that foreigners are not the only short-term creditors. Hence, imposing controls and reducing external short-term debt is neither a necessary nor a sufficient condition for ruling out crises. As Krugman (1999) has stressed, inflow controls still leave all holders of domestic claims on the commercial and central banks ready to run. There is one important distinction, however, between this type of capital flight and the reversal of short-term external flows. Governments are allowed under the existing rules of the IMF (Art. VI) to close the foreign-exchange window so as to prevent capital outflows by domestic residents. Hence, a run on a country's domestic short-term liabilities can in principle be prevented by legal means. But refusal to pay back short-term foreign debt would abrogate existing debt contracts and would put the country into default. In any case, we view this argument not as one against capital controls *per se*, but rather as a plea to complement them with other policies. Bank regulation and the exchange rate regime are central in this regard.

The debate has not been merely theoretical. Some countries have reversed their earlier liberalization attempts, while others have resisted turning back the clock to the times of capital controls. Prominent among the first group are Malaysia's, Chile's and Colombia's restrictions on capital inflows in the early 1990s. Argentina and Peru, by contrast, have refrained from reintroducing capital account controls even in the presence of severe speculative attacks against their domestic currencies.

Although there is a growing empirical literature on the effectiveness of capital controls, the answer is far from clear. Substantial evidence suggests that controls (of very different kinds) applied by countries such as Chile, Colombia and Malaysia altered the maturity composition of loans from abroad without – at least in the South American cases – reducing the overall volume of flows (Rodrik and Velasco 1999). In any case, there is growing evidence that controls can indeed be effective. Both Chile and Malaysia have at some point successfully managed short-term capital inflows.

Chile first imposed a 20% non-remunerated reserve requirement whose holding period was differentiated by the maturity of the loan. For example it had to be held for 90 days for 90 day credits but for one year for credits of maturity greater than one year in the currency in which the debt was denominated. Several changes were made in order to close loopholes. For example, the reserve requirement was later increased to 30%, and was extended to renewed borrowing, and to foreign currency deposits held in domestic banks. The maturity requirement was changed (there was a one year holding period for all debt) because of the difficulty of distinguishing between different maturities The deposit was required to be made in dollars only, and secondary market transactions in ADRs became subject to the requirement. Most

recently the reserve requirement has been abolished in the face of tightened liquidity conditions. Foreign direct investment was exempt from the controls in Chile. Most analysts have concluded that the Chilean policy was successful in changing the composition of capital inflows to longer maturity inflows. A recent paper (Hernandez, Schmidt-Hebbel, 1999) finds that these controls also lowered the total volume of inflows and had persistent effects on the interest rate. In 1998, faced with capital outflows, Chile relaxed and eventually set the required reserve to zero. While it was in force, the reserve requirement had the effect of creating a severe disincentive for short-term capital inflows. Several authors find that the restrictions have affected the maturity composition of flows, though not their overall volume or the course of the real exchange rate (Rodrik and Velasco 1999).

In January 1994, the Malaysian government imposed a prohibition on the sale to non-residents of a wide range of short-term securities (including banker's acceptances, negotiable instruments of deposit, Bank Negara bills, treasury bills or other government securities with a remaining maturity of one year or less). These restrictions were widened in February (to cover swop transactions in the currency market), and complemented by an interest charge on short-term deposit accounts placed in domestic commercial banks by foreigners. The restrictions began to be lifted in August 1994, and were largely eliminated by the end of that year (Rodrik and Velasco 1999).

The background to these restrictions was that there had been a huge surge of short-term speculative capital inflows in late 1993 following a surprise six percent depreciation of the ringgit. Hedge funds and others expecting a quick recovery in the currency flooded the Malaysian market. The result was a sharp increase in short-term liabilities, which reached a peak of 37 percent of total debt at the end of 1993. The restrictions imposed at the beginning of 1994 were remarkably effective. The ratio of short-term debt in the total fell sharply to 26 percent in 1994 and to 23 percent in 1995, beginning to recover only in 1996. The overall debt burden fell as well, from 59 percent of GDP in 1993 to 41 percent in 1995 (Rodrik and Velasco 1999).

As we know too well by now, these policies did not prevent Malaysia from getting into serious trouble during the 1997/98 Asian crisis. One possible explanation is that the controls were lifted too soon: the short term debt-to-reserves ratio rose between 1994 and 1997, and the same happened to the share of short-term debt in total debt.

The Malaysian authorities responded to this crisis by imposing controls on capital outflows in September 1998. These comprised limits on investments abroad (prior approval being required) and control of offshore markets in the ringgit. Furthermore all ringgit earnings had to be held in the domestic currency for a year until conversion was allowed. There was concern in many circles that these actions would lead to a dramatic decline in investor confidence. Others felt that such a move enabled Malaysia to partially insulate the economy from excessive short-run volatility, whose negative consequences for growth would have entailed a greater loss in investor confidence. Given the tightening in international capital markets that has persisted since this time, it is hard to attribute any change in access for Malaysia to the implementation of capital controls. By February 1999, Malaysia had modified its quantitative controls on capital to a price-based system by adopting exit taxes (Islam 2000).

As a result of these measures, Malaysia has been able to pursue a more independent (and expansionary) monetary policy and maintain an interest rate differential (at least in the short run) at a time when its banking sector has been hard hit by tightened liquidity conditions in global markets. It has earned itself some breathing space during which time it can implement reforms in the financial and corporate sectors.

The cases of Chile and Malaysia illustrate the importance of the policy regime in influencing the maturity structure of foreign debt. But policy is not all-powerful. One constraint comes from the growing role of derivatives in international capital flows. As Garber (1998) has stressed, derivatives can help circumvent controls and they render interpretation of standard balance of payments categories problematic. But it is not clear that derivatives can always undo the intended effects of policy. As Garber writes: "Market sources ... report serious, though as yet unsuccessful, financial engineering research efforts to crack directly the Chilean tax on capital imports in the form of an uncompensated deposit requirement" (Rodrik and Velasco 1999).

### 6.2.3 Indirect policy measures aimed at recipient countries

Due to the uncertainty regarding the effectiveness of capital controls, indirect policy measures aimed at restoring stable private capital flows to emerging-market countries are of the utmost importance. These include initiatives aimed at mitigating risks faced by investors. The demand for such instruments was demonstrated by the rapid expansion of private political risk insurance as private investment into developing-country infrastructure projects grew in the 1990s. Political risk insurance and investment guarantees (full and partial) are provided by multilateral development banks, export credit agencies and investment insurers, as well as private insurers (MAP CFI: 32).

The NEPAD Private Capital Flows Initiative proposes that consideration be given to supplementing this traditional risk insurance in three ways. The first is the possible establishment of an African currency convertibility fund to address the transfer and convertibility risk of projects that do not produce foreign exchange. The second is the greater use of "B-loans", whereby multilateral banks leverage private funding by syndicating, to private banks, a portion of their loans. The third is the eventual establishment of an African derivative market to enable investors to unbundle the various risks of cross-border investment (MAP CFI: 34). Much work is needed before it will be clear whether these initiatives, especially the first and third, are worth pursuing. But the potential benefits in each case are clearly sufficient to justify proceeding with the initial evaluation. The NEPAD proposals also include measures to accelerate the harmonising of financial markets. The initiative recognises that attracting private capital will require reliable and increasingly sophisticated financial and legal systems, which can only be achieved through the harmonising of Africa 's financial markets.

The role of imperfect information in impeding investment and, especially, in triggering instability has attracted considerable attention in recent years. Indeed, perhaps the only concrete achievement of the extensive discussions of financial stability and international financial architecture has been the development and implementation of international codes and standards. This initiative reflected the view that a lack of transparency regarding country policies and data had played an important role in the crises in Mexico and Thailand, among others. These crises illustrated how imperfect information on a country' s macroeconomic and financial

position can contribute to the misallocation of investment flows, aggravating booms and delaying necessary policy adjustments (although other factors can play an equally important role).

The spread of international codes and standards has, to an extent, been supported by an increase in the demand for information by investors. The growth of emerging-market research departments at major international banks in the mid-1990 s and the associated proliferation of weekly and monthly publications highlighted the demand not only for comprehensive and accurate information, but for timely, high frequency data as well. It is telling that the downturn in flows to emerging markets in the past two years has been associated with heavy retrenchments in these research departments and their publications.

The data dissemination standards have highlighted the need for improved data capture and analysis of private capital flows. Effective monitoring and analysis is essential not only to data dissemination, but also to informed policy decisions. Indeed, a lack of capacity in this area increases the risk of bad policy while also obscuring potential economic risks. There is considerable mis-measurement and non-recording of private capital flows in developing countries, and a lack of the human and financial resources needed to address these problems effectively.

Thus, in addition to implementing codes and standards, developing countries need support in their efforts to improve their capacity to monitor and analyse private capital flows. Only if such capacity is strengthened significantly can the benefits of transparency be realised. More importantly, only if such capacity is strengthened will policy-makers be in a position to manage effectively the challenges posed by volatile capital flows.

There are particular categories of actors – such as fund managers, and especially pension fund trustees and pension fund consultants – who have especially limited information on developing countries, and who also seem at present, due to many recent crises, to have an exaggerated perception of developing-country risk. It may therefore be useful to organize meetings/conferences with these market actors, developing-country representatives and some experts on developing countries, to improve information and knowledge on these countries. However, as many analysts have noted, improved information is not, in many circumstances, sufficient to improve the efficiency of the allocation of capital flows (Griffith-Jones and Leape 2001:3).

One important measure to consider is that of creating regional or sub-regional stock markets. Important lessons can be here learned from Europe, where the smaller stock markets are uniting to pool liquidity. Another important measure is that, given that large companies may leave, smaller exchanges may need to focus on trying to help raise foreign capital for relatively smaller, but potentially dynamic, companies.

The possibility of using tax incentives also needs to be evaluated carefully, both in source and recipient countries. For example, could tax relief in developed countries to savers for pensions be somewhat higher, if that pension fund invested a somewhat higher proportion in long-term investments in developing countries, perhaps with a minimum holding period. This would be particularly justified if evidence emerges that on average returns on those countries were higher than on other investments. Or could

other mechanisms, such as moral arguments for ethical funds, which are an increasingly important share of pension fund assets, also play a role?

An innovative suggestion to create countervailing forces to the market's tendency to be volatile and pro-cyclical is to attempt to create market stabilisers, via for example greater use of insurance instruments. Similarly, to deal with liquidity holes in emerging markets – either temporary or permanent – there is a need to create market makers.

However, it must be recognised that even if such measures are successful, developing countries, especially low-income countries, are likely to remain higher risk environments. In part, this stems from the lack of diversification in the production side of most of these economies, which renders them more vulnerable to changes in world prices and in technology. In part, it stems from the restricted set of instruments for risk management in these countries, which makes a broader range of risks undiversifiable. And in part, it stems from their vulnerability to the knock-on effects of policy or behavioural changes in developed countries.

It must also be recognised that the global financial deregulation that began in earnest in the 1980s, and the ensuing increases in cross-border capital flows, may have increased the channels through which contagion occurs. Policymakers recognize this and try to judge the relative importance of different types of factors when responding to a crisis. But given deep uncertainties over the nature and determinants of investor and creditor behaviour, there is an understandable emphasis on the fundamental factors. This is despite the burgeoning literature on contagion. In particular, the "pure" form of contagion, unrelated to fundamentals, remains ill-defined, poorly measured and is often treated as a residual when all the familiar fundamentals have been accounted for (Kumar and Persaud 2001:4).

## 7. CONCLUSION

This paper is a first attempt in trying to understand the contagion phenomenon in a South African context. We found no evidence of trade contagion between South African and Zimbabwe. We did, however, find evidence of financial (true) contagion from Zimbabwe and other emerging-market countries, including Argentina, that negatively impacted on the external value of the South African rand.

The findings of this paper underline the difficult challenge still faced by emerging markets of how best to reap the benefits of a more open economy, while minimizing the risk of becoming the victim of a potentially devastating financial crisis. The risk of such crisis is inherent in the liberalization process. We have to live with financial markets that are prone to herding, panics, contagion, and boom-and-bust cycles. The reaction to currency crises has often been to call for more prudent monetary and fiscal policies, and greater supervision and transparency in local financial markets. But appropriate macroeconomic policies and financial standards can go only so far in reducing the risks. The current emphasis on strengthening domestic financial systems also glosses over the practical difficulties. Putting in place an adequate set of prudential and regulatory controls to prevent moral hazard and excessive risk-taking in the domestic banking system is easier said than done. Even the most advanced countries fall considerably short of the ideal, as their bank regulators will readily tell

you. Indeed, banking crises have recently taken place in countries as well off as Sweden and Japan.

While sound policies and reforms are undoubtedly necessary for improving underlying economic performance, they may not be sufficient to limit contagion. If the agent of contagion is not only, and perhaps not even mainly, local or international economic factors and risks, but is also a reduction in investors' appetite for risk, then a different policy response to the threat of crisis is needed. Attention also should be paid to aspects of the global financial architecture which can make countries susceptible to crises even when they are pursuing sound policies.

Being part of the new financial architecture South Africa, on its own, does not have control over the implementation of this solution. Individual proposals cannot be taken in isolation. We need a wider package of reform to create an international financial system for the twenty-first century that recognises the new realities of open, not sheltered, economies; international, not national, capital markets and global, not local competition. All governments, international financial institutions and the private sector must accept their responsibilities to make this system work for both stability and growth (IMF 2002: 123).

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APPENDIX

News events: South Africa
Good news

| | |
|---|---|
| 6 January 2000 | Net open foreign currency position dropped |
| 31 January 2000 | Larger than expected December trade surplus |
| 2 February 2000 | Strong data paint rosy picture for SA, SA foreign exchange reserves |
| 30 March 2000 | Record exports |
| 31 May 2000 | Better than expected money supply and credit figures |
| 19 June 2000 | Mbeki reassures whites on land, property |
| 5 July 2000 | Improved open currency position |
| 14 August 2000 | Healthy surplus on Balance of Payments |
| 3 January 2001 | Upgrading of SA's sovereign rating |
| 15 March 2001 | Current account improves sharply |
| 16 May 2001 | CPIX drops |
| 21 May 2001 | Gold price at 15-month high |
| 4 June 2001 | Dramatic improvement in SARB net open currency position |
| 1 August 2001 | Trade surplus |
| 19 September 2001 | Inflation boost hope for rate cut |
| 26 September 2001 | Balance of Payments surplus |
| 26 September 2001 | PPI up slower than expected |
| 19 October 2001 | Moody's and Fitch give SA the nod |
| 19 October 2001 | Moody's review SA credit rating |
| 1 November 2001 | Healthy trade surplus |
| 9 November 2001 | SA Reserves leap |
| 21 November 2001 | CPIX bios hope for rate cut |
| 4 December 2001 | Vehicle sales up 11% in November |
| 17 January 2002 | Manufacturing sector looks healthy |
| 1 February 2002 | SA exports up and imports down |
| 5 February 2002 | Local demand looking up |
| 21 February 2002 | Economy gets R15bn injection |
| 27 February 2002 | SA economy holds up well in slowdown |

Bad news

| | |
|---|---|
| 16 February 2000 | Considerably higher than expected CPI |
| 18 April 2000 | Worse than expected Consumer Inflation |
| 5 May 2000 | Afro-pessimism takes hold of financial markets |
| 25 May 2000 | Disappointing PPI data |
| 2 June 2000 | Weak data depressed economy |
| 18 July 2000 | Bomb explosion rocks Cape Town International Airport |
| 27 September 2000 | Crude prices impact on SA PPI |
| 5 October 2000 | Strikes cause huge losses |
| 25 October 2000 | PPI figure fanned higher by oil |
| 23 November 2000 | Tanzania bans meat imports |
| 30 November 2000 | Mpumalanga struck by foot-and-mouth |
| 19 March 2001 | SARB warns it may fail on inflation target |
| 2 May 2001 | SARB racks up R9bn forward book loss in past fiscal year |
| 18 May 2001 | Rampant dollar pounds rand to a new record low, interest hike |

|                    | in US                                                                  |
| 29 May 2001        | Disappointing GDP figures                                              |
| 27 June 2001       | Land group calls for Zim-style land invasions                          |
| 10 July 2001       | Argentina inability to service debt                                    |
| 25 July 2001       | Unexpectedly high PPI                                                  |
| 30 July 2001       | NUM issue notice of gold mine strike                                   |
| 29 August 2001     | Two day national strike begins, COSATU                                 |
| 2 October 2001     | Massive strike looms, wage talks between government and public sector collapsed |
| 5 October 2001     | Strikes cause huge losses                                             |
| 28 November 2001   | Economy grows at sluggish 1.2%                                        |
| 29 November 2001   | Worrying producer inflation data                                     |
| 19 December 2001   | Consumer inflation exceeds 6% target                                 |
| 16 January 2002    | Bank sets scene for interest rate hikes                              |
| 21 February 2002   | Rand's fall will push inflation over target range, minister admits    |
| 26 February 2002   | Analysts expect sluggish growth                                      |
| 28 February 2002   | Rand pushes up producer prices                                       |

News events: Zimbabwe
Good news

| 14 February 2000     | SA and Zim to wider trade links                          |
| 18 February 2000     | SA considers bond issue in Rand to rescue Zim            |
| 9 May 2000           | US offers to help on land issue                          |
| 18 May 2000          | SA UK closer to accord on crisis in Zim                  |
| 23 May 2000          | UN body pins hopes on land reform plan                   |
| 30 May 2000          | Zim police acts for the first time to evict invaders     |
| 16 June 2000         | Mugabe pledges access to farms for observers             |
| 26 June 2000         | Parties promised to respect poll results                 |
| 4 July 2000          | UN will help Zim                                         |
| 1 August 2000        | Appointment of minister ray of hope for economy          |
| 4 August 2000        | SA government extend credit cover                        |
| 9 August 2000        | Inflation down/ Banker says economy set to recover       |
| 12 December 2000     | IMF says country may soon win back aid                   |
| 13 December 2000     | Zimbabwe signs power deal with SA company                |
| 20 September 2001    | Zim government to spend US$121.6 million on services and housing |
| 2 November 2001      | Makoni presents election budget                          |
| 22 January 2002      | Signs of progress – ZimRights                            |
| 31 January 2002      | Commonwealth ministers decide against suspension         |

Bad news

| 13 January 2000      | Zimbabwe defaults on payment to UK                       |
| 18 January 2000      | Zim must face internal debt crunch                       |
| 11 February 2000     | Constitutional referendum                                |
| 17 April 2000        | Mugabe fails to deliver on pledge to besieged farmers    |
| 3 May 2000           | Commonwealth to send its CE to Harare over violence      |

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| 3 May 2000 | Britain halts arms sales to Zim |
| 9 May 2000 | Norway freezes aid to Zim |
| 10 May 2000 | New regulations will scare investors |
| 16 May 2000 | Bank suspends loans to Zim |
| 17 May 2000 | World Bank suspends loans to Zim |
| 18 May 2000 | Renewed violence claims another life in Zim |
| 23 May 2000 | Conditions for fair poll do not exist |
| 24 May 2000 | Election observers alledges beating in Zim |
| 7 June 2000 | US passes legislation to suspend aid to Zim |
| 7 June 2000 | Mugabe wants more farms |
| 21 June 2000 | Mugabe urges retalliation EU shocked at violence |
| 22 June 2000 | Business sentiment in Zim at its lowest/ ZANU PF tells US and UK to stay out of the country's affairs |
| 11 July 2000 | Zim mines at risk of closure |
| 12 July 2000 | Gold mines face electricity shortages |
| 26 July 2000 | Zim increases fuel price by 26% |
| 2 August 2000 | Diesel shortage continues |
| 7 August 2000 | Last week's strike cost economy US$12 million |
| 16 August 2000 | Food prices spiral |
| 28 August 2000 | Currency devaluated by 3% |
| 8 September 2000 | Budget deficit hits 22%/ Land crisis could force GDP down by 8% |
| 13 September 2000 | IMF demands economic and political reforms |
| 2 October 2000 | World bank classify Zimbabwe as one of world's "economic pariahs" |
| 13 December 2000 | IMF voices deep concern about economic condition |
| 17 December 2000 | Finance minister presents tough budget |
| 4 January 2001 | 2000 civil servants retrenched |
| 12 February 2001 | Government orders banks to sell all foreign currency |
| 15 February 2001 | US$75 million fuel deal flops |
| 16 February 2001 | Tobacco production to fall |
| 20 March 2001 | No end to fuel crisis |
| 21 March 2001 | IMF concerned at Zimbabwe's deepening economic crisis |
| 22 March 2001 | Inflation over 50% |
| 10 April 2001 | Currency devaluation on the agenda |
| 15 May 2001 | EU considers economic sanctions |
| 3 July 2001 | Nationwide strike over fuel prices |
| 24 July 2001 | Outlook grim, says EIU/ Makoni acknowledges economic crisis (in London) |
| 31 August 2001 | Mugabe admits to economic problems |
| 4 September 2001 | Bread price rise by between 20 and 50 % |
| 20 September 2001 | Economy likely to shrink by 8% |
| 25 September 2001 | IMF declares Zimbabwe ineligible for future funding |
| 5 October 2001 | Japanese bank cancels US$1million loan |
| 11 October 2001 | Company invasions cost economy millions of dollars |
| 12 October 2001 | Price controls trigger shortages of key products |
| 18 October 2001 | Government declares new minimum wage, without agreement with labour and business |
| 13 November 2001 | Zim president amends Land Acquisition Act |

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| 20 November 2001 | Harare deals another blow to farmers |
| 4 December 2001 | Supreme Court endorses land reform |
| 14 December 2001 | Opposition leader freed after short detention |
| 31 December 2001 | Christmas demand leads to maize shortages |
| 25 January 2002 | Zimbabwe hunts down journalists |
| 28 January 2002 | EU agrees sanctions deadline |
| 30 January 2002 | EU gives Zim until Sunday to meet demands on human rights |
| 11 February 2002 | EU awaiting accreditation for observers |
| 12 February 2002 | Independent Zimbabwean paper attacked |
| 15 February 2002 | Political violence casts doubts on poll validity |
| 20 February 2002 | US moves to slap sanctions on Mugabe |
| 22 February 2002 | Shots fired at opposition leader |
| 26 February 2002 | MDC leaders charged, youth brigades attacked |
| 28 February 2002 | More political unrest reported |
| 11 March 2002 | Allegations of poll rigging |
| 12 March 2002 | Summary of irregularities during voting/ Election flawed – observers |
| 14 March 2002 | Police break up labour meeting |
| 19 March 2002 | Government dismisses impact of strike action |
| 20 March 2002 | Zimbabwe's suspension elicits mixed reactions/ Zimbabwe police vow to crack down on protests |