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An Examination of the Causal Factors Contributing to Financial Contagion

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1. Introduction

Financial crises are not a new phenomenon in the world economy nor are the transmission of crises across countries. The Great Depression of the 1930s, which affected most countries, is often considered a benchmark against which other crises are evaluated. What is new to financial crises is the extent to which they may hit seemingly unrelated countries. In the recent past, the East-Asian Financial Crisis left many economies devastated, as it affected many countries unexpectedly. More recently, the so-called Sub-Prime Crisis has left economists puzzled over how it could spread so quickly from the United States to the rest of the world. For example Paul Krugman recently stated on National Radio[1]: "I berate myself for not understanding the extent to which we have these financial domino effects, I saw there would be a burst bubble and there would be a lot of pain, but I didn't realise how big the pain would be." When Krugman admitted that he underestimated the magnitude of the Sub-Prime Crisis, he, probably unintentionally, paraphrased one of the definitions of financial contagion.

The term contagion is an economic concept, which describes how financial crises spread from one country to another (Dornbusch 2000: p4). Much of the literature on contagion concentrates on the transmission of two very particular types of financial crises: currency and banking crises.[2] Currency crises occur when a currency experiences a significant depreciation usually as a result of an excessive current account deficit.[3] If, during the crisis, a government attempts to maintain a stable exchange rate there will be large and rapid losses of foreign currency. Banking crises, on the other hand, result from an inability of borrowers to repay loans, resulting in an increase in banks' bad debts. As a result of increasing bad debts banking capital is eroded. In a financial crisis both these types of crisis can occur simultaneously (Kaminsky and Reinhart 1999).[4] For this reason statistically determining the specific cause of the crisis and its transmission to other countries has proven difficult with many studies revealing strikingly different results.

[1] Interview with National Radio on 13th October 2008.
[2] For example Dornbusch (2000), Kaminsky & Reinhart (2000), Edwards (2000) and Hernandez and Valdes (2001).
[3] According to IMF (2008: p6) a currency crisis occurs when there is a nominal depreciation of the currency in excess of 30 percent and this depreciation is 10 percent greater in comparison to the previous year.
[4] Reasons for this phenomenon are: to stave off a currency crisis the central bank increases interest rates and in doing so raises the costs of private borrowers. If interest rates rise significantly this may result in non-payment and therefore bad debts. Alternatively during a banking crisis the central bank may print money to increase the liquidity of the banks, however in doing so it increases the money supply relative to money demand resulting in currency depreciation.

The rapid growth of global trade and financial integration has increased the volatility of financial crises. Hence an analysis of the transmission of crises is important if countries are to mitigate their effects and enjoy the full benefits of greater integration in the world economy. The paper is structured as follows: the next section provides a review of the key definitions of contagion and an analysis of the empirical evidence of the phenomenon. Sections three and four examine two broad categories accounting for contagion the fundamentals-based approach and investors' behaviour, respectively. Section five summarises the instruments countries can implement to protect themselves against contagion and section six concludes.

2. Contagion in Theory

The whole body of literature on economic contagion is still relatively young, the majority being written in the 1990s after a series of financial crises in developing economies. For this reason much of the current contagion literature neglects the developed economies as crisis epicentres. This situation is, however, likely to change in light of the current Sub-Prime crisis emanating from the United States.

2.1 Definitions of Contagion

Considering that the majority of contagion literature lies merely a decade in the past, it is not surprising that there is no uniform definition of contagion (Dornbusch 2000: p3). Definitions vary from very general descriptions to more ambitious approaches.

One of the definitions of contagion (Hernández & Valdés 2001: p3) to be found in the literature is "Country A gets into trouble because Country B is in trouble". Other authors have paraphrased this simple description as a spread of market disturbances. Less cryptic, yet still far from specific, is the next definition coined by Eichengreen [et. al.] (1996), according to which contagion is "a case where knowing that there is a crisis elsewhere increases the probability of a crisis at home". A less popular, but undoubtedly important, opinion seeks to capture the meaning of contagion in a more accurate way. By defining contagion as a situation where the extent and magnitude of a shock transmitted internationally exceeds what was expected ex ante (Edwards 2000: p6), it restricts its application to crises where all probable causes were accounted for and yet the crisis' magnitude is in clear excess of normal expectancy.

2.2 Empirical Evidence

As mentioned above, researchers have utilized different definitions of contagion and consequently have emphasized different causal factors. The following section provides a brief summary of the most important findings to enable a classification of contagion into two broad categories.

One of the earliest studies of contagion, Sachs & Torrnell & Velasco (1996), looks at the economic performance of 22 emerging countries in the aftermath of the Tequila Crisis (1994). They observe that countries with strong macroeconomic fundamentals have merely suffered a "hangover" (relative to weaker economies) from the Tequila Crisis and conclude that contagion is mainly driven by initial macroeconomic conditions.

Shortly after, Eichengreen [et. al] (1996) look at contagious currency crisis in a sample of 20 OECD countries and defines contagion as an increased probability of a speculative attack in the domestic country when there has been one elsewhere. They conclude that trade linkages rather than macroeconomic similarities are the most important channel of transmission for contagion and that attacks on foreign currencies increase the probability of an attack on the domestic currency by approximately 8%.

Following a similar methodology, Kaminsky & Reinhart (2000) test a larger sample of countries and over a greater time period for the effects of contagion from trade and financial linkages. According to their analysis, contagion behaves in a non-linear way. While a single country in crises does not pose an immediate threat to other countries, a cluster of infected core countries raises the probability of a domestic crisis sharply. Furthermore, it suggests that contagion is regional rather than global with the financial channels being of higher importance than trade linkages. However, since countries tend to be linked via both real and financial channels, it is difficult to distinguish between the two.

Glick & Rose (1998) try to provide further evidence for the importance of trade channels in explaining contagious currency crises. They analyze the performance of 161 countries during five recent episodes of currency instability, using a definition of contagion based on the degree of closeness to a so-called "ground-zero" country. According to their analysis, trade linkages are best at explaining contagion and why contagious crises tend to be regional.

However, they admittedly include common shocks, which are usually not deemed evidence of contagion (Hernández & Valdés 2001: p3).

Following a similar methodology DeGregori and Valdes (2001), look at co-movements of indicators of foreign exchange market indices during the Latin American Debt, Tequila and Asian Financial Crises. They conclude that initial macroeconomic fundamentals and trade links are insufficient in explaining contagion and that neighbourhood effects can be explained by financial links between countries. However, they neglect that such neighbourhood effects arguably reflect practices of international investors treating countries from the same region as equal in spite of fundamental differences.

Van Rijckeghem & Weder (2000) look at one of the possible causes of contagion stemming from the behaviour of investors. They exclusively focus on bank lending and in particular on the existence of a common lender to two or more countries, whose portfolio revaluations following losses in one country may adversely affect other debtors. Following Glick & Rose (1998) they regress data of eleven creditor countries and 30 emerging markets during the Thai, Mexican and Russian financial crises particularly testing for a common lender effect. They conclude that the countries' competition for funds is a more robust predictor of contagion than trade linkages and macroeconomic similarities.

Conversely, Froot & O'Connell & Seasholes (1999) study the behaviour of institutional investors in and out of 44 countries in between 1994 and 1998. Their primary contribution to the contagion literature is evidence of positive feedback trading (trend following) by international investors. Further, portfolio flows tend to be correlated within regions, and this correlation rose over time during the Asian Financial Crises (1997). Their findings indicate that the behaviour of institutional investors can be a channel of contagion.

Kaminsky & Lyons & Schmukler (2001), who analyze the investment behaviour of mutual funds during crisis and non-crisis periods, confirm the findings of Froot & O'Connell & Seasholes (1999). They observed an increase in contemporaneous momentum trading during crisis periods in contrast to lagged momentum trading during non-crisis periods. In addition, such investors utilize contagion investment strategies that involve selling assets in a country as a response to a crisis in another country.

In reality, it is very likely that contagion occurs through several channels simultaneously, complicating the task of policymakers (Hernández & Valdés 2001: p6). Following the analysis of Dornbusch (2000) this paper classifies the factors accounting for contagion into two main categories, the fundamentals based approach and investors' behaviour. Fundamental based contagion emphasizes spill-over shocks that are the result of real linkages between countries. The second category emphasizes effects that cannot be traced to macroeconomic fundamentals, trade or financial linkages. Here, contagion is the result of irrational investors' behaviour, thus it is usually referred to as irrational-based or investors-based contagion.[5] In the following two sections the fundamental-based and irrational-based categories of contagion are explored in greater detail.

3. Fundamental-Based Approach

The fundamental based approach refers to real linkages among economies accounting for contagion, of which the most common are trade links and competitive devaluations, and direct financial linkages. Whilst investors' behaviour is crucial for each of these mechanisms to transmit a crisis it differs from the section below, investors' based contagion, in that there are real and specific macroeconomic links between the crisis countries. The most important real macroeconomic links are examined below.

3.1 Trade Links and Competitive Devaluations

Dornbusch (2000), and Hernández & Valdés (2001) examined two specific trade links through which a currency crisis may spread to other countries. The first mechanism may be termed direct trade links and the second indirect trade links and competitive devaluations.

The analysis of both direct and indirect trade links is based on a country having an excessive current account deficit. Investors believe that the current account deficit is unsustainable and will be corrected by depreciating the currency which will make exports more and imports less competitive. In anticipation of a currency devaluation the investors sell assets in the particular country.[6] In the next step there is capital flight as investors withdraw their capital to mitigate losses from the depreciating currency. It should be borne in mind that in believing the

[5] Global shocks or simultaneous bad luck are generally not considered contagion (Hernándes & Valdés 2001: p3).
[6] If the assets sales are particularly dramatic it may lead to asset price deflation raising problems for the domestic banking sector.

currency will depreciate the sudden and dramatic withdrawal of capital by investors causes the devaluation, thus the prophecy is self-fulfilling.

The currency crisis is then transmitted directly to the country's trading partners. This occurs because investors realise that if the crisis country is to return to balance there must be a worsening of the current account balance for its trading partners. If the current account balances of the trading partners are expected to significantly reduce it will lead investors to sell assets in these countries creating asset price deflation, capital flight and a currency crisis. Thus whilst investors' behaviour is crucial to the spread of the crisis, as it creates the capital flight which forces the currency to depreciate, the contagion is based on real observable factors – the current account.

Much of the current contagion literature, such as Pesenti and Tille (2000), focuses on the terms of trade, the price of a country's exports relative to its imports, as creating the currency crisis rather than being a transmission mechanism. This may be because much of the current contagion literature concerns developing countries, which are unlikely to be able to significantly impact commodity prices due to the relatively small size of their economies. However, if we consider the current financial crisis emanating from the USA, it is clear that crises in developed countries can significantly impact the terms of trade of commodity exporting countries.

Throughout the first half of 2008 oil prices rose dramatically from approximately $100 per barrel to over $140, evident in Figure 1. It was only in the middle of 2008 as the banking crisis in Western Europe and the USA intensified that most economists realised that it would significantly affect world aggregate demand. The realisation that the demand for oil was unlikely to increase in accordance with previous forecasts eroded the foundation of the oil price boom. Oil prices declined dramatically to just over $60 per barrel by late October 2008.

Figure 1: Price per Barrel of Brent Crude Oil

Source: www.ADVFN.com

For countries, such as Russia, which are heavily reliant on oil exports for foreign exchange earnings the decline in the price of oil represents a severe worsening of the terms of trade. As the demand for commodities, such as oil, tends to be relatively inelastic any anticipated current account deficit will need to be corrected by a sharp reduction in imports. To achieve the required reduction in imports the currency depreciation will need to be particularly dramatic.

Whilst Russia has not yet posted a current account deficit there has been severe asset price deflation. This is evident in Figure 2, which shows a near 80 percent fall in the value of the main Russian stock index as the financial crisis intensified. This asset price deflation has been accompanied by significant downward pressure on the Russian Rouble with the Russian Central Bank reducing its foreign exchange reserves from $598bn in early August to $438bn in late December (Central Bank of the Russian Federation, 2008) as it seeks to defend its policy of a strong Rouble. Thus whilst no currency crisis has yet materialised it is clear that this situation can only last for as long as the central bank has adequate foreign exchange reserves, and for this reason we can conclude that the terms of trade can act as a crisis transmission mechanism.

Figure 2: Main Russia Stock Index

Source: www.ADVFN.com

The second crisis transmission mechanism analysed by Dornbusch (2000) and Hernandez and Valdes (2001) is that of indirect trade links and competitive devaluations. In this analysis a country has an excessive current account deficit, which results in a currency crisis. Whilst the currency crisis is viewed as vital to return the country back to trade balance it will have negative effects upon countries competing in the same export markets, leading to a deterioration of their current accounts.

The governments of the competitor nations may view the expected worsening of their current accounts as a threat, and so attempt to devalue their currencies to maintain export market share. Investors anticipate such a government policy and as a result withdraw capital from these countries. The capital flight can lead to a currency depreciation, regardless of the government's true intent, if the central bank has insufficient foreign exchange reserves to stabilise the currency. Thus the expectations that the government will seek to preserve export competitiveness can cause a currency crisis to spread.

The most famous example of competitive devaluations occurred in the Great Depression, however there is some debate as to whether this spread or merely intensified the world financial crisis. More recently, according to Corsetti et al (1998), the East-Asian financial

crisis (1997) provides evidence of competitive devaluations. It is claimed that Taiwan, which had a current account surplus and large foreign exchange reserves, could have defended the exchange rate. However, the authorities decided against intervention because “the Singaporean [depreciation] was perceived as an important threat to the competitive position of Taiwan (Corsetti et. al. 1998: p50). Thus a currency crisis can be spread by competitive devaluations as governments attempt to maintain export competitiveness.

3.2. Direct Financial Links

The last of the major fundamental based factors outlined by Dornbusch (2000), is direct financial linkages, which refers to capital flows between countries for trade and investment. The direct financial links focussed upon in this paper are foreign direct investment (FDI), common lender, and trade credits.

Foreign direct investment (FDI) is an international capital flow in which a domestic firm invests capital to create or expand a subsidiary in a foreign country. FDI is particularly attractive for countries with current account deficits compared to other forms of capital flows because it is relatively illiquid meaning it cannot easily be withdrawn. This is in contrast to other capital flows, such as portfolio flows whereby investors buy equity stakes often in pursuit of short-term profits, which are liquid and can be subject to sudden and dramatic changes in direction and magnitude. However the reliance of countries on FDI to finance current account deficits can act as a crisis transmission mechanism.

The mechanism functions as follows: a crisis occurs in a country and domestic firms are unable or unwilling to provide continued FDI in other countries. If the reduction in the magnitude of FDI flows is dramatic and the receiving country is unable to find alternative means of finance it will be forced to depreciate its currency reducing its imports and increasing its exports. Thus a financial crisis in one country can lead to a currency crisis in another if the latter is heavily reliant on net FDI inflows from the former to finance its current account deficit.

The common lender factor, outlined in section 2, refers to the reliance of a group of countries for finance from one particular source. In this scenario one of the receivers of finance experiences an economic crisis. Those providing the finance then curtail the flow of capital to other countries, due to rising bad debts realised in the crisis epicentre. If the other recipients

are particularly reliant on finance from the common lender to stimulate economic growth, the reduction in capital flows will adversely affect asset prices and currency values spreading the crisis.

This phenomenon was observed during the East-Asian financial crisis, when Japanese banks reversed the flow of capital to the emerging economies in this region. In the current crisis the phenomenon has also been observed in Central and Eastern Europe. Many of the banks in Central and Eastern Europe are either owned or reliant on Western European banks for financing. Since the start of the current financial crisis there has been growing concern as to whether the Western European banks can or will maintain their financial flows to Central and Eastern Europe (Wagstyl 2008)

Any significant reduction in capital flows poses significant threats to Central and Eastern European economies. Credit expansion and economic growth will decline and substantial currency depreciations will be required to correct the large current account deficits if alternative sources of financing cannot be found.[7] Thus it is possible that the banking crisis can spread from Western to Central and Eastern Europe as a result of a dependency of the latter on the former for capital inflows.

Trade credits may also act as a crisis transmission mechanism. Trade Credits occur when a firm agrees to sell a good or service and demand payment at a later date. This allows importers a period of time over which to repay a sum of money. If the companies from a country are no longer able to extend trade credits, due to a domestic financial crisis, to firms in a foreign country it means that just like in the preceding two examples the latter will be forced to find other means of financing imports. If this is not possible then a currency depreciation will result and again if this is significant enough it can lead to a currency crisis.

In each of the above fundamentals based mechanism investors assume a key role in spreading the crisis. However the actions of investors are based on real observable links between economies. The next section examines investors' behaviour, which may transmit crises to countries, which have no real economic linkages.

[7] Hungary has applied to the IMF for $15.7 billion to help finance its current account deficit due to the collapse in inter bank lending.

4. Investors' Behaviour

In the previous section the transmission of a crisis was explained through trade and financial linkages under the broad heading fundamental linkages. However, several crises, especially in the last decade, showed symptoms of contagion, which cannot be explained by fundamental factors. The turbulent years following the Asian Crisis in 1997 caused deterioration in confidence in global financial markets, particularly emerging markets. As a result the crisis spread from a mainly regional crisis in the beginning towards a global crisis. The crisis resulted in Russia defaulting on its foreign debt, in turn bringing down the biggest Hedge Fund at the time, Long-Term Capital Management, and adversely affected many Latin American countries. In the end, the global financial turmoil "triggered recessions in many developing countries [and] two-fifths of global economy sank into recession in 1999" (Dornbusch 2000: p177).

Most of the countries, which were adversely affected during that period, did not share direct trade or financial links with one another. This sparked an increase in academic literature focusing on investors' behaviour, whether rational or irrational, causing a "true" contagion. In the following sub-sections a summary is provided detailing the different channels through which a real shock in one country can be spread to another country, based on investor's behaviour.

4.1 Liquidity & Incentive Problems

One of the channels through which contagion occurs can be based on individual rational behaviour. Contagion can occur as a result of rational behaviour if individual investors follow their given policies and procedures and contagion ensues (Pritsker 2000).

In the current crisis a lot of investors experienced significant losses on their equity investments in the U.S.A. and at a later stage in Europe as well. The negative impact on their portfolio was even further distorted by highly volatile exchange rates. It would be rational for an investor to hoard or at least increase his cash position and therefore sell high-risk assets, which are still liquid. He will do so in anticipation of a higher frequency of redemptions[8] and margin calls.[9]

[8] The repayment of the principal amount of a debt, security or investment at or before maturity
[9] A broker's demand on an investor using margin to deposit additional money or securities so that the margin account is brought up to the minimum maintenance margin. You would receive a margin call from a broker if

During the current crisis most hedge funds were forced to sell securities during September, as "concern [was] rising in the industry that panicking investors could rush for the door" (MacKintosh 2008). The selling triggered by margin calls and redemptions of professional institutional investors put asset prices especially in emerging markets under pressure, not only spreading the crisis further, but also sending price signals for less informed market participants to follow the trend (Calvo 1999).

Lenders on the other hand will decrease their exposure in troubling regions or correlated countries, therefore reducing the overall risk of their portfolio. In the end, the individual rational behaviour of those financial agents will spread the crisis to other - mostly developing - countries.

The tendency of investors to sell stocks in many different markets at the same time can also be due to the incentive structure. A significant change in asset prices in one particular market could distort the portfolio structure or the weight of a country in his portfolio.[10] In order to maintain certain proportions of country's or a region's stock in the portfolio, he needs to sell off his holding in other markets.

The individual rational behaviour is clearly not the reason for a cross-market crisis; however it is an important channel of crisis transmission with unpleasant dynamics in other markets caused by co-movement based on the individual rational decision of investors. This phenomenon can lead to significant declines in different markets and regions at the same time as illustrated in the Figure 3.

The liquidity and incentive problems described above should be of concern to all types of investors, but pose greater difficulties to highly leveraged investors facing greater risks of margin calls, such as hedge funds and investment banks with significant activities in proprietary trading.[11]

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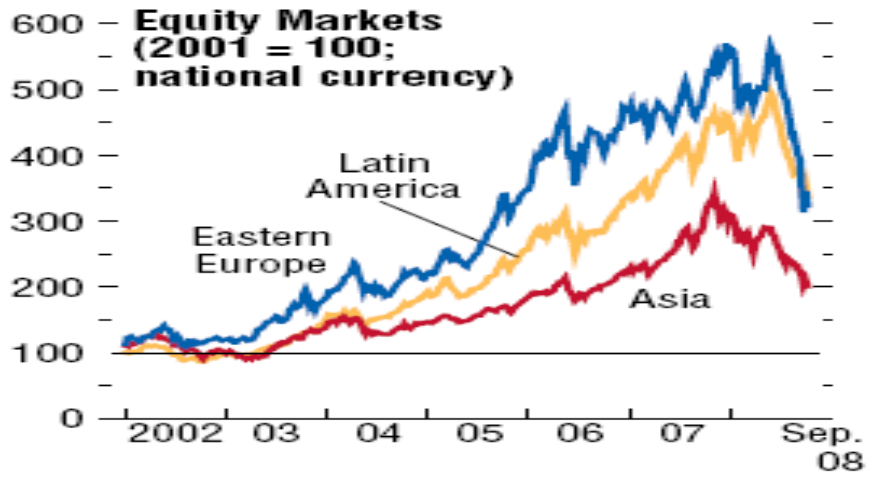
one or more of the securities you had bought decreased in value past a certain point. You would be forced either to deposit more money in the account or to sell off some of your assets. – Source: Investopedia.com

[10] The weight or structure of one country in the investor's portfolio is related to his benchmark and tactical asset allocation.

[11] Transactions made by a securities firm that affect the firm's account but not the accounts of its clients. Source: investorwords.com

Figure 3



Source: FT.com

4.2 Asymmetric Information & Coordination Problems

An important assumption in neo-classical theory is perfect competition and perfect information in capital markets. Perfect information is a precondition for perfect competitive markets, which can be seen as a desirable outcome, even though it cannot be achieved. The idea refers to a game theory situation where all players are informed about all moves every player undertakes in the game.

The assumption of perfect information has, however, been criticized by many well-know economists, such as Joseph Stiglitz. The “theoretical developments in imperfect capital markets over the last quarter century […] provide an explanation for why capital-market liberalization may lead to instability and not promote growth.” (Stiglitz 2004: p59).

In markets with asymmetric information investors can be divided into three categories: informed, less informed and uninformed investors (Dornbusch 2000: p183). These three categories refer to the level of information investors have about the country in which they invest. Most investors are in the latter two categories, less informed and uninformed. That is mainly due to the fact that gathering information is costly. As the number of markets has increased so has the cost of gathering information. Therefore less informed investors could find it more profitable (less costly) to follow informed investors. This kind of herd behaviour may even follow the idea of rational behaviour, since following informed investors can be “an outcome of optimal portfolio diversification that becomes more prevalent as securities markets grow” (Calvo and Mendoza 1998).

In the case of imperfect information (asymmetric information) a crisis in one country can lead investors to believe that other countries might face the same problems. As a result, investors reduce their investments in the countries they anticipate to be affected. This decision could be rational, if in fact the countries share the same fundamental or structural weaknesses; or irrational (in the absence of perfect information) if their opinion does not reflect the true conditions of those countries.

Herding occurs if uninformed or less informed investors simply follow informed investors, hence following trends or readjustments of investors seen as fully or better informed. Pritsker and Kodres (2001) argue that information asymmetries can explain why especially developing countries are "hit hard by contagion" (Pritsker & Kodres 2001: p24) and that it can account for market movements, which cannot be justified by their macroeconomic fundamentals (Pritsker & Kodres 2001: p33). They argue "more information asymmetry within a country's asset market increases the magnitude of that market's price response to contagion abroad" (Pritsker & Kodres 2001: p29).

4.3 Multiple Equilibriums

Asymmetric information as an explanation for contagion might not satisfy every author dealing with causes of contagion, since this justification relies on market imperfection, irrationality or inability to exploit profit opportunities in distressed market environments (Masson 1999). Masson argues in favour of the existence of "multiple equilibriums", where the market suddenly can jump from a good equilibrium towards a bad one, on the basis of a sudden shift in market expectations.

This model provides a more general explanation of contagion. A crisis in one country leads to a sudden shift of investors' expectations in different markets, forcing the equilibrium in those markets to change from good to bad. The sudden cloudiness of investors' expectations in a particular market can be seen as self-fulfilling prophecy. It is important to understand that relationship; therefore we exemplify that principle using the example of a bank-run.

In this particular case, some rumours occur in the news (papers, TV, radio), that a certain Bank, named "Fuld-Bank" might be close to file for bankruptcy. Obviously, the Fuld-Bank would publicly announce, "it has no solvency or liquidity problems and that the Fuld-Bank

will work hard to achieve a positive outcome under the current challenging market conditions." The depositors of that bank have two possible decisions to make. Firstly, they trust the bank and believe it will overcome the current difficulties and therefore keep their deposits with the Fuld-Bank or, secondly, they do not trust the public statement and start to withdraw their deposit.

The latter would force the bank share price suddenly to move to a bad equilibrium in a self-fulfilling manner. As a result, when the first people run to the bank to withdraw their money other people (which have not taken the same decision yet) might change their opinion and also withdraw, since they are concerned that if they do not there won't be any money left. At the end of the day nearly every depositor would run and withdraw their deposits. That in turn would make it now really hard for the bank to survive, as deposits decline as well as the equity value on their balance sheet. Therefore the prophecy that the Fuld-Bank will file for bankruptcy becomes self-fulfilling.

A typical characteristic of a market which has fallen to a bad equilibrium is an increase in the volatility of stock & bond markets, as investors suddenly withdraw from a country as they fear that if they do not they will be too late and face illiquid market conditions with distressed asset values. Bad equilibria in emerging markets are characterized by declining asset prices, sudden capital outflows (capital flight), and sharp devaluations of the domestic currency, which are often accompanied by defaults on foreign debt.

The major cause of contagion in this scenario is a rapid shift in market expectations. In the case of equity investors that implies a sudden shift in their expectations of future returns and/or they apply higher country risk premiums. The equities will fall towards the bad equilibrium reducing companies' values and equities on balance sheets of financial institution, which could eventually interrupt the credit channel in the real economy spreading the crisis further.

The idea of multiple equilibriums is troubling for many economists, since it "acknowledges that asset prices are less predictable than implied by unique equilibrium models, but recent experience suggests that this corresponds to reality rather than being an inconvenient property of a theoretical model" (Masson 1999: p2). If that is the case, an economy can eventually fall into a bad equilibrium, caused by falling asset prices, if there is a dramatic and significant

decline in investors' confidence from optimism to pessimism. However, usually "bank-runs" never happen out of the blue, therefore some writers argue that a crisis in one country generates a "wake-up" call and the sudden adjustment towards a new equilibrium follows the underlying fundamentals that have already changed incrementally over a longer period or in fact never had been in a "shiny" mode.

4.4 Changes in the Rules of the Game

As a final point, reassessment by investors can also be forced by *changes in the rules of the game* under which domestic and international markets operate.

The Russian default in 1998, for example, increased concern that other countries might follow similar unilateral policies regarding the treatment of foreign private creditors or that international financial institution might not bail such creditors out as expected. The discussion on the international financial architecture itself following the East Asian financial crisis may have caused changes in the way investors viewed the rules of the game and weighed the odds of official bailouts.
(Dornbusch 200:, p185)

Additionally, it would be interesting and important for investors to observe the current regulatory discussion after the Financial Turbulence in the last year. It might be that the rules of game will be changed and consequently investors have to adjust their expectation according to a new investment environment.

5. Options for the Prevention of Contagion

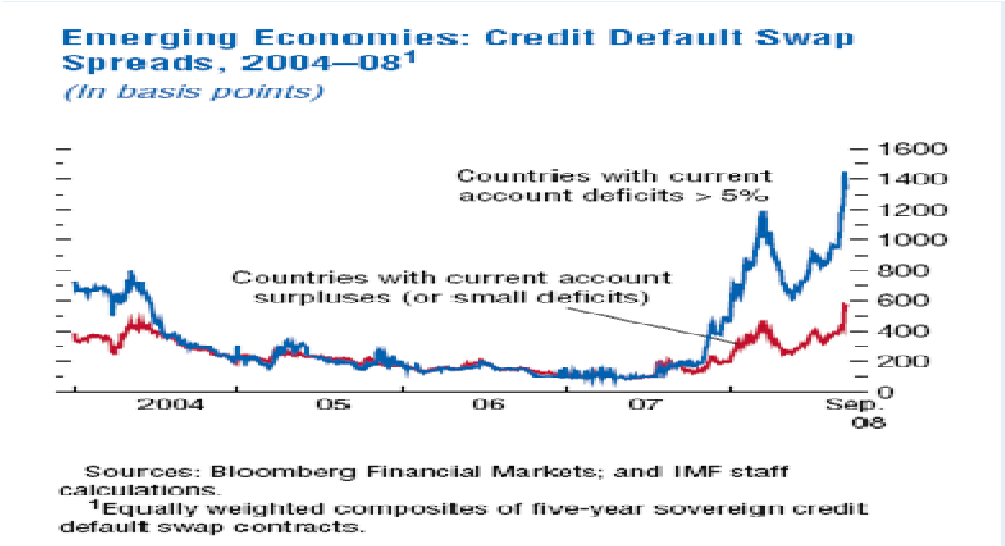
The devastating effects of contagion on economies, where seemingly unrelated countries were hit by an outside shock during a financial crisis in previous decades, has reopened the debate about capital account controls. However it is necessary and important for politicians and economists to understand what the different channels of contagion are and how they affect countries. The Tequila Crisis, Asian Crisis and the current financial crisis all highlight the different channels and underlying fundamental factors, which are responsible for contagion.

Clearly, contagion based on fundamental factors, such as direct trade and/or direct financial links, are unavoidable. Still, countries can reduce the risk by introducing sound fiscal policies and limiting current account deficits. Whilst there is a certain degree of inevitability that

developing countries will have current account deficits the presence and persistence of unsustainable deficits will naturally endanger economic stability and development. Figure 4 suggests international investors see countries with current account deficits in excess of 5% as riskier, making them more vulnerable to external shocks and sudden capital outflow.

Additionally, policies aimed at reducing the dependency on one major trade partner or source of funding of foreign debt can encourage a more stable economic environment. Foreign debts in particular seem to have played a crucial role, increasing the vulnerability of countries. For that reason, limiting the amount of gross foreign currency liability and avoiding maturity mismatches seems to be an important tool, reducing the risk of unfavourable financial instability and sudden capital outflows. Moreover, some authors argue that banks should be required "to hold more liquid foreign exchange assets relative to total foreign exchange liabilities" (Dornbusch 2000: p191).

Figure 4



Admittedly, even if countries follow these recommendations and increase the transparency as well as building a strong and stabile domestic financial sector, it will not protect them completely from contagion. The current financial crisis clearly shows that even developed countries, with sound fiscal and financial systems, can be hit unexpectedly by a crisis generated by an outside shock. The behaviour of investors is impossible to regulate, some channels of contagion, therefore will never be closed.

Still, complete capital account controls should not be the solution, as it will exclude and deprive a country from economic integration, hence limiting the economic and political development of countries. A recent empirical study by Charles Wyplosz suggests, "by itself, [capital account] liberalization does not pose a lethal threat to the balance of payments, and may carry significant long-term gains" (Wyplosz 2001: p17).

However, it is clear that if a crisis occurs in the developing world the social costs are far higher than in the developed world, where governments have higher fiscal resources available to mitigate the social impacts of a crisis. That means if we include the welfare outcome and social costs in our economic models it seems to be clear, that liberalisation of the capital account should not be undertaken to 'create economic development'. Rather it should be implemented incrementally in line with the development process towards an advanced economy including a sophisticated liberal goods market, trade openness and a deep, mature domestic financial system.

6. Conclusion

This paper provided a brief overview of the current contagion literature and as mentioned there is still a great debate regarding the definition of contagion. This is partly because different causal factors of crisis transmission can be witnessed depending on the definition used. In addition the contagion literature is still relatively young and has mainly focussed on crisis transmission in developing countries. This paper used the definition put forward by Edwards (2000) that contagion refers to the transmission of a crisis to a greater extent and magnitude than predicted *ex ante*. Several reasons, under the broad headings fundamental-based and investor's behaviour contagion, were outlined. The main problem when analysing the causal factors is that often many aspects occur simultaneously distorting the results from statistical models. Finally we provided a brief policy discussion on mitigating contagion. It would appear that contagion can never be eradicated; however, controlling the size of the fiscal and current account deficits, and well-enforced regulation may help mitigate the worst aspects of contagion.

Bibliography

Calvo, G.	(1999)	"Contagion in Emerging Markets: when Wall Street is a carrier", Working Paper, Mimeo, University of Maryland.
Calvo, G. & Mendoza, E.	(1998)	"Rational Herd Behavior and the Globalization of Securities Markets", Working Papers 97-26, Duke University, Department of Economics.
Central Bank of the Russian Federation	(2008)	"International Reserves of the Russian Federation in 2008", http://www.cbr.ru/eng/print.asp?file=/eng/statistics/credit_statistics/inter_res_08_e.htm; last accessed 13th January 2009.
Corsetti, G. & Pesenti, P. & Roubini, N.	(1999)	"What caused the Asian currency and financial crisis?", Japan and the World Economy, Elsevier, vol. 11(3), pp. 305-373.
De Gregorio, J. & Valdés, R. O.	(2001)	"Crisis Transmission: Evidence from the Debt, Tequila, and Asian Flu Crises"; World Bank Economic Review, vol. 15(2), pp. 289-314.
Dornbusch, R. [et. al.]	(2000)	"Contagion: How it spreads and how it can be stopped", The World Bank Research Observer, vol. 15(2).
Edwards, S.	(2000)	"Contagion", World Economy Lecture, delivered at the University of Nottingham in 1999.
Eichengreen, B. [et. al.]	(1996)	"Contagious Currency Crises", NBER Working Paper 5681.
Froot, K. A. & O'Connell, P. & Seasholes, M. S.	(1999)	"The Portfolio Flows of International Investors", NBER Working Papers 6687.
Glick, R. & Rose, A. K.	(1998)	"Contagion and trade: why are currency crises regional?", Pacific Basin Working Paper Series 98-03, Federal Reserve Bank of San Francisco.
Hernández, L. F. & Valdés, R. O.	(2001)	"What drives Contagion?", International Review of Financial Analysis, vol. 10(3), pp. 203-218.
Kaminsky, G. L. & Reinhart C. M.	(2000)	"On Crises, Contagion, and Confusion", Journal of International Economics, vol. 51, no. 1, pp. 145-168.
Kaminsky, G. L. & Lyons, R. & Schmukler, S.	(2001)	"Mutual fund investment in emerging markets - an overview", Policy Research Working Paper Series 2529, The World Bank.
Laeven, L. & Valencia, F.	(2008)	"Systemic Banking Crises: A New Database", IMF WP/08/224.
Masson, R.	(1999)	"Multiple Equilibria, Contagion, and the Emerging Market Crises", IMF WP/99/164.
MacKintosh, J.	(2008)	"Redemption fears encircle industry", Financial Times Monday 29th September 2008
Pesenti, P. & Tille, C.	(2008)	"The Economics of Currency Crises and Contagion: An Introduction", Economic Policy Review, Federal Reserve Bank of New York, Vol. 6(3), pages 3-16.
Pritsker, M.	(2000)	"The Channels for Financial Contagion", In: International Financial Contagion: How It Spreads and How It Can Be Stopped. World Bank.
Pritsker, M. & Kodres, L.	(2001)	"A Rational Expectations Model of Financial Contagion", Journal of Finance, American Finance Association, vol. 57(2), pp. 769-799.
Sachs, J. & Tornell, A. & Velasco, A.	(1996)	"Financial Crises in Emerging Markets: The Lessons from 1995", NBER Working Papers 5576, National Bureau of Economic Research.
Stiglitz, J.	(2004)	"Capital-Market Liberalization, Globalization, and the IMF" Oxford Review of Economic Policy, Vol.20, No. 1.
Van Rijckeghem, C. & Weder, B.	(2000)	"Spillovers Through Banking Centers - A Panel Data Analysis", IMF WP 00/88.
Wagstyl, S.	(2008)	"Call for west Europe to support east", The Financial Times, Monday 20th October 2008.