

NORGES HANDELSHØYSKOLE
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Financial Crises and IMF Intervention: *is there a mutual connection?*

by Rahman Mehraliyev

Advisor: Tore Leite

NORGES HANDELSHØYSKOLE

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Introduction

Financial crises seem to constitute an indispensable part of the economic history of the last three decades becoming worldwide phenomena. Both developing and developed countries have suffered from these “black days” in the financial markets. In the case of developed countries, financial crises have been costly to the economy. However the damage that was imposed on developing countries seems to be far greater and they became victims most of the time.

After a while conditions dictated necessity to correct apparent inefficiency of international markets in handling crises situations. Thus lenders of last resort notion came to the light. First domestic, which was mostly central banks of the countries, then in the view of spreading international financial crises, international lender of last resort appeared. In the latter case IMF was seen to take upon responsibility of stabilizing situations in case of ‘fire alarm’.

Taken in the context of international financial markets, there is an emerging argument that IMF-led funding packages to countries suffering from financial crises have undermined efforts to forestall such crises, typical example of moral hazard problem. Moral hazard occurs when transaction has already been carried out between parties in the financial market. The hazard is that borrower could have incentives to engage in activities that are undesirable from lender’s point of view, i.e. those activities that will make it much less likely that borrower’s money will be paid out. In this study, we will try to find the correlation level between IMF lending and moral hazard problem.

In the first part, historical review of the financial crises is given and theoretical explanation is presented. The second part of the work is about lenders of last resort, how they fit into the situation of financial distress, whether benefits from bailing out debtor is higher than the costs, in the face of moral hazard problem. Finally, in the last part of my thesis, I will evaluate correlation level between severity and frequency of financial crises and the IMF lending to the countries.

Part 1 Financial crises in economic history

1.1 Brief history of financial crises

Financial crises seem to constitute an indispensable part of the economic history of the last three decades becoming a worldwide phenomenon. Both developing and developed countries have suffered from these “black days” in the financial markets. In the case of developed countries, financial crises have been costly to the economy; however the damage that imposed on emerging countries seems to be far greater, becoming victims most of the time.

Economic or financial crises are not the products of modern times only. Starting from 16th and 17th centuries we can trace the tracks of financial distress and difficulties faced by different countries and small regions in some cases. However, the effect of globalization has made the most recent crises more visible and painful, as it affected the whole regions and distant countries from the original place, where the crisis started. For example, 1997 East Asian crisis was followed by a default in Russia in 1998, financial distress in Brazil and Argentina at the end of millennium, and finally in causing plummeting of the stock market in US in year 2002.

Giving formal definition to *financial crisis*, according to Mishkin (1992) we can characterize it as *a disruption to financial markets in which **adverse selection** and **morel hazard** problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunities.*¹

An alternative explanation of financial crisis is given by Schwartz (1986): *Financial crisis is where there is a threat to country's money supply.* This definition can be considered as the most operationally useful definition². Because banks in fractional reserves takes deposits and makes loans thus multiplying the stock of money. The danger of one bank failure pushes depositors to run to other banks trying to take out their savings in cash, thus opening way for other similar failings. This in its turn increases the probability of major collapse in the stock of money and a severe recession in the real economy. It can be more effectively illustrated by

¹ Frederick S. Mishkin (1992). Anatomy of financial crises. Evolutionary Economics

² Forrest Capie (1998). Can there be an International Lender-of-last-resort. International Finance 1:2 pp. 311-325

the formula of broad money supply. Broad money supply can be calculated as money base (money in circulation) times money multiplier:

$$M = \left[\frac{1 + \frac{C}{D}}{\frac{C}{D} + \frac{R}{D}} \right] * B$$

M - broad money

B – monetary base

$\frac{C}{D}$ - the public's currency/deposit ratio

$\frac{R}{D}$ - the bank's cash reserve/deposit ratio³

In this case the monetary authorities control B, the monetary base, which is determined via the balance of payments. So, during the financial crisis period depositors withdraw their funds and prefer holding cash instead. As a response to this rush into banks, financial institutions increase their cash holdings. Both actions when summed leads to detraction of money multiplier. Unless authorities controlling monetary base are involved with counteraction, collapse in the money supply is unavoidable.

Since financial crises comes about when there is a critical contraction in money supply, authorities handling monetary base can act as a **lender of last resort**, coming to the help. More detailed about lenders of last resort (both domestic and international) we will discuss in the second part of the thesis.

General pattern in historically recorded financial crises can be summarized as following: it all starts with the economy expanding, which might have different sources of the corresponding expansion. As a result of this expansion the optimism among investors is surging, the rate of growth of credit increases and the economic growth accelerates further. Seeing this improvement in the economy and mentally extrapolating it into the future, individuals decide to invest in papers that deliver short-term gains rather than to put money into assets where return is associated with the productivity of underlying assets. The increase in the supply of

³ Forrest Capie (1998). Can there be an International Lender-of-last-resort. *International Finance* 1:2 pp. 311-325

credit and the more prospective outlook of the economy leads to economic boom. As a result investments surge and household spending increases as personal wealth rises. Later there appear concerns that particular borrowers had become over-extended. Since those individuals' investments concentrate on assets with short-term gain in sight, certain external event may lead to reassessment of such creditors' solvency. Creditors may reconsider terms of the extended loans by increasing interest rates charged. Increased interest charges exceed the benefits coming from the gains in short term assets and investors start to sell their assets at hand. Prices following supply-demand rule begin to decline, thus leads to reduction in the value of assets used as guarantees or mortgages by the banks for their loans. Soon, banks feel distress in recovering extended loans.

This whole process resembles the growth of the soap bubble that can not be blown indefinitely; it should explode at one moment of time. That is why “bubble” term is used on many occasions as a synonym of Financial Crises. By definition it means non sustainable pattern of price changes or cash flows. History has shown that bubbles will always implode.

History is rich in small scale stories of financial distress, troubles spread to the all four corners of the world. Since speed of the spreading news was quite slow before the 20th century, those difficulties remained mainly of a local character. With the increasing pace of technological improvements and inventions it became much easier to have information transmitted from one part of the world to the other part within seconds. Considering extensive web of interconnected relations among regions and separate countries any bad news in one region are no longer a just a local ‘headache’.

We can take a historical look over the most important and painstaking financial crises, starting with the financial distress happened during the reign of Holy Roman Empire in the 17th century. They can be summarized in the following table as TOP 10 of financial crises. Alternatively this list can be called 10 biggest “explosions of bubbles”.

No	The description of historical incident	Period
1	Holy Roman Empire "good" money practice	1618-23
2	The Dutch Tulip Bulb bubble	1636
3	The South Sea and Mississippi bubble	1720
4	The late 1920s stock crash	1927-29
5	The surge in the bank loans to Mexico and other developing countries	1976-79
6	The bubble in real estate and stocks in Japan	1985-89
7	Bubble in real estate and stocks in Finland, Norway and Sweden	1985-89
8	Real estate and stock crash in East Asian countries	1992-97
9	The surge in foreign investment in Mexico	1990-93
10	The bubble in over the counter stocks in US	1995-2000

Table 1 Historical description of most effective financial distresses

Source: Charles P. Kindleberger, Robert Aliber (2005) Manias, panics and crashes p.8

During financial crisis period in the last 100 years extremely large deviations in the value of foreign exchanges was observed which cannot be inferred from the differences in the national inflation rates between the respective countries. The scope of “overshooting” and “undershooting” of national currencies were quite extensive and much larger than in any previous periods.

Also the number of bank failures during last 3 decades were much numerous than in any preceding periods. Several of these failures can be restricted as national events, which rooted in making large bets in exchange rate movements (Franklin National Bank in US, Herstatt AG in Germany), unreasonable increasing in the size of credit for gaining market share in short period of time (Credit Lyonnais, France), collapse of the junk bond market in the early 1990s, etc. But, most of the bank failures in 1980s and 1990s were systemic and involved all or most of the banks in that country. Such as implosion of asset price bubble in Japan, sudden depreciation of national currency in Mexico, Brasil, Argentina in the early 1980s, etc.

It is very complicated and tricky to differentiate which one leads to which. In some cases foreign exchange crises trigger bank crises, and in other cases bank crises lead to foreign exchange crises. The cost of these bank failures proves to be very high in terms of lost share of GDP, slowdowns in the rate of economic growth.

These recorded bank failures can be described as coming in three “waves”: at the beginning of 1980’s, at the beginning of 1990s, and in the second half of 1990s. These periods of financial crashes, that involved in bank failures, large changes in exchange rates and asset price bubbles were systematically related to rapid changes in the economic environment and with each other. For example, the implosion of the real estate bubble in Japan in the late 1980s led to an increase in the flow of money from Japan to East Asian countries and the US. Large flow of money lead to the appreciation of respective country currencies and brought forward an increase in the price of real estate and securities due to increased demand. When bubbles imploded in South East Asian countries freed money flew to another ‘safe harbor’ considered by investors in that time, which is to the US. As a result US dollar appreciated and the US trade deficit increased to 500 billion US dollar.

The increase in the flow of money to the country almost always results in increase of asset prices within the country. Due to increased demand local resident sell the asset they hold, and money received from the sale they spend to buy other securities from own domestic residents. That makes money received from foreign investors like a “hot potato”, nobody willing to keep it for a long time.

In the next chapter we will discuss the origin of financial crises, factors creating favorable conditions for their emergence or in short, we will examine the "anatomy" of financial crises.

1.2 Anatomy of a typical financial crisis, international contagion effect

Development of financial crises takes a certain path, and each of them has uniqueness of its own. As Leo Tolstoy mentioned 'Every happy family is the same. Every unhappy family is miserable in its own way'. Nevertheless, it is possible to track general framework for evaluating and analyzing crisis situations, sorting out reasons and causes, impacts on the economical and social levels.

There are different views regarding explanation of financial crises. Up-to-date vision of the problem is divided into two camps, those associated with *monetarist view* (Friedman, Schwartz) versus more *eclectic view* shared by Kindleberger and Minsky. Members of the first 'camp' correlate financial crises with the banking panics. According to them, situation that involves banking system's crack can be linked to the emergence of the financial crises. Because only in this case there happens contraction in the money supply, which in its turn leads to the decline in the economic activity in the country. Friedman and Schwartz don't consider real estate price bubbles, asset price declines, business failures as per se financial crisis unless there is an involvement of banking panic and decline in the money supply, seeing them as 'pseudo financial crises'.

Contrary to the first view, Kindleberger and Minsky give more general framework than monetarists. They include sudden decline in asset prices, failure of large financial and non-financial companies, turmoil in the FOREX markets, or combination of all these under the term Financial Crises. As all above mentioned points have the potential of severely affecting the fundamentals of an economy, and therefore the authors propose more frequent government intervention during financial crises. Minsky highlighted the changes in the supply of credit, which increased during boom periods and declined during economic slowdowns. Since during expansion period investors become more optimistic about the future, they revise upwards their estimates of profitability of a wide range of investments and so they become more eager to borrow. At the same time, both the lenders' assessment and their awareness of the risk of individual investments decline and they become more willing to make loans, including some investments that previously seemed too risky. When economic conditions

slow, the investors become less optimistic and more cautious. At the same time, the loan losses of the lenders increase and they become much more cautious⁴

These changes in the supply of credit are believed to be one of the determining conditions leading to fragility of the systems, and subsequent financial crises. The start of the crises linked to some outside shock to the macroeconomic system that shifts expectations and economic outlook to the positive level, and company and individuals would borrow to take advantage of emerged profit opportunities. Investments will increase; demand will expand that exert power on the production capabilities leading to higher prices. This boom will be fueled by credit expansion. This process will continue spirally and increase in the prices will turn out to be unsustainable in the long run. Smart insiders will pocket profit from buying low selling high, while outsiders will bear the risk that one day they cannot realize the profit enough to cover interest charges on the loans that enabled them to buy those assets. The signal that precipitates crises could be a failure of a bank, uncovered fraud by an investor, bankruptcy of major financial or non-financial company. The rush on the money will spur price decline, since nobody wants to stay inside when ‘doors will be shut’.

In order to have more insight why financial crises occur, we need to do some taxonomy. By analyzing factors causing financial crises we can differentiate five factors⁵:

1. *Increases in the interest rate* – as a result of asymmetric information and adverse selection problem there can be credit rationing so that the candidates who applies for a loan are denied for the credit. Clearly clients with the highest riskiness of investment projects are willing to pay such high interest rates. Therefore, increase in the interest rate leads to even higher adverse selection problem which lifts up probability of bad loans. So, if the interest rate is driven up in the economy either because of higher demand for credit or contraction of the money supply, the possibility of lending to high risk investor increases as well. Therefore lenders will want to make fewer loans leading to decline in extended financing, resulting in lower investment and economic activity. Experience shows that even small rise of interest rates can lead to significant decline in lending or even to the start of financial collapse.

⁴ Charles P. Kindleberger, Robert Aliber (2005) Manias, panics and crashes. Wiley p. 21-22

⁵ Frederick S. Mishkin (1992). Anatomy of financial crises. Evolutionary Economics p.120-122

2. *Stock market declines* - Collateral serves as a tool decreasing adverse selection problem when debtor is provided with a loan, since creditor can cover up losses from unpaid loan by realizing collateral. When it comes to a company, the net worth of the company – real assets and future income streams – play a role of collateral, since creditors have priority in access to the company assets in case it goes bankrupt. When stocks of the company go down, as result of increasing interest rates, it makes the future stream of income of less value, or decreases value of real assets due to decrease in the economic activity, thus the net worth of those firms also shrinks. Because of less reliance on the net worth of debtors, creditors decrease lending, and firms engage in more risky investments as not much left to lose now. That is why sharp decline in the stock prices leads to reduced lending and economic activity.

3. *Increases in uncertainty* - Dramatic increase in uncertainty due to recession, collapse of high respected company, etc leads to even higher possibility of adverse selection, asymmetric information. Increasing inability to solve these problems brings about more reluctance to lend, causing decline in investment, and economic activity.

4. *Bank panics* – asymmetric information is the source of this effect. When uneasy times come, depositors fear about the soundness of their funds in the banks. Therefore, they rush to withdraw their savings from the banking system, causing multiple contractions in deposits, which further exacerbate lending abilities. As panic spreads out no difference is made between healthy and bankrupt banks, thus all banking system suffering from it. Banks increase the reserves in relation to loans trying to protect themselves from possible outflows. The net result is that lending is reduced, economics activity suffers.

5. *Unanticipated decline in the price levels* – it affects the net worth of the company, since extended loans are stated in nominal terms, however declining prices raise the value of liabilities in real terms without affecting the real value of the assets of the firm.

Considering the above mentioned factors' ability to interfere with the efficient functioning of financial markets we can draw a picture of a typical financial crisis now.

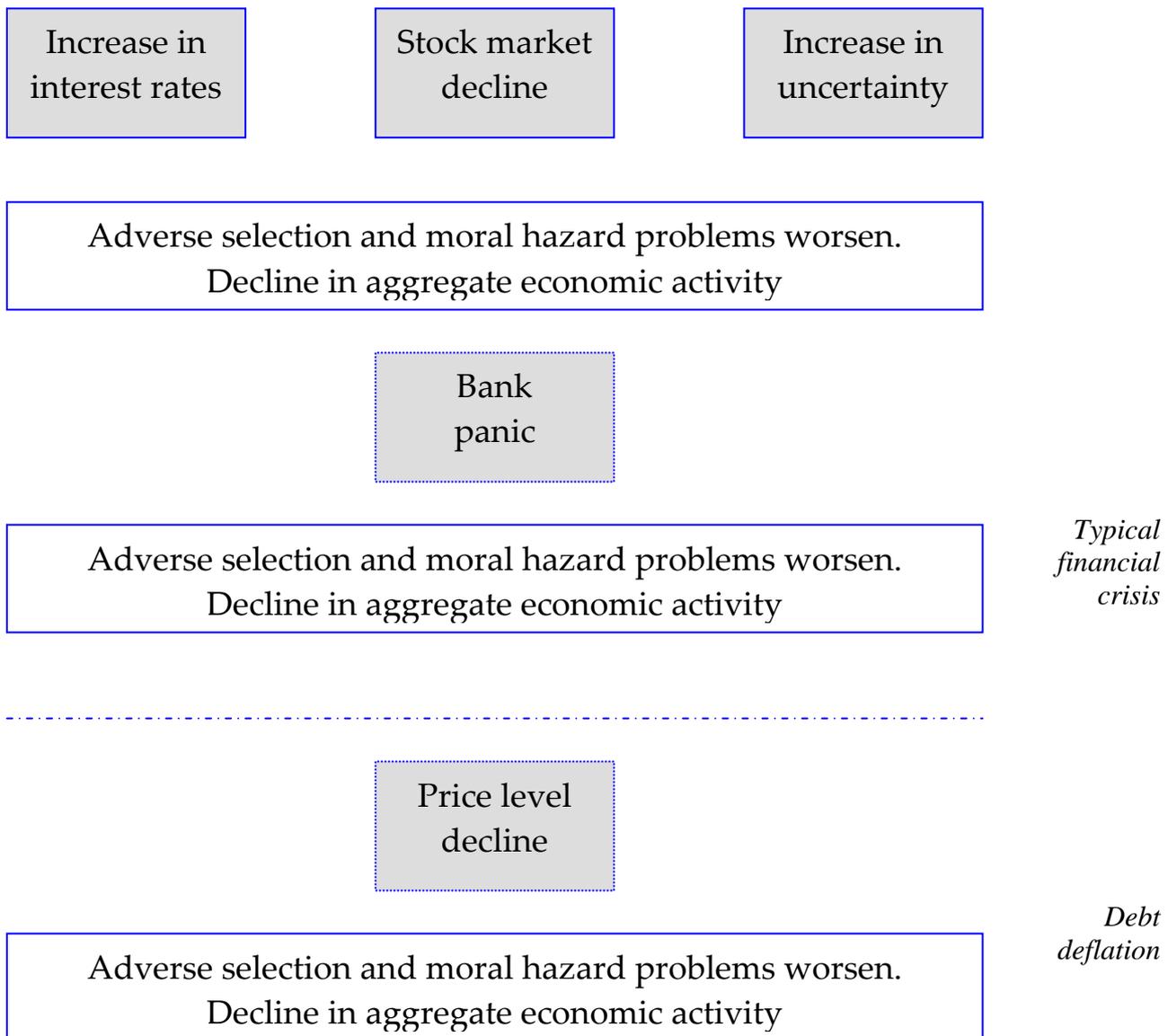


Figure 1 Sequence of events in a financial crisis.

Source: Anatomy of financial crises (1992), Frederick S. Mishkin

International Financial Crises -- With the advent of globalization, sophistication of telecommunication technology that enabled transfer of funds within different financial markets with the speed of light, international financial markets started to grow in the second half of the 20th century. It is not a wonder that the scale and impact of financial crises, happening in the last two decades of the millennium was of a regional, as well as of a global scale. We can say that international financial crisis phenomenon developed.

International financial crisis is a situation when the international dimension substantially worsens a crisis in ways that would not occur in a closed economy⁶. However it doesn't mean that domestic fundamental weaknesses should be underestimated when considering the sources of international financial crises.

There have been several major international financial crises during the 1990s: Mexico in 1995, Thailand, Indonesia, and South Korea in 1997-1998, Russia in 1998, and Brazil in 1998-99. Notwithstanding the difference between these crises, some common elements can be defined for all of them:

- ✚ after a period of substantial capital inflows, investors (both domestic and international) decide to reduce the stock of their assets in the affected country in response to a change in its fundamentals;
- ✚ after this process went on for some time, investors shifted their focus from evaluating the situation in the country to evaluating the behavior of other investors;
- ✚ withdrawal of capital and the associated sharp swing in the exchange rate and reduced access to capital exacerbated fundamentals weakness, in turn exacerbating the financial market response.⁷

Another feature of 1990s turmoil is the presence of international contagion. There are many different models and explanation of the 'contagion' effect.⁸

- ✚ It can be due to common shocks hurting the commodity exporting countries in the same time;

⁶ Lawrence H. Summers (May, 2000) International Financial Crises: causes, prevention and cures. *The American Economic Review*, Vol 90 no 2

⁷ Lawrence H. Summers (May, 2000) International Financial Crises: causes, prevention and cures. *The American Economic Review*, Vol 90 no 2

⁸ Ibid p. 6

- ✚ Strong relations between countries leads to transfer price and income shocks, a.k.a. 'spillover' effect;
- ✚ Competitive devaluations among countries that compete among themselves;
- ✚ Financial linkage: the country that invests in assets of another country is affected by the bad news from the latter;
- ✚ Market illiquidity can be the cause: when faced with margin calls and liquidity issues they can be forced to withdraw funds from other countries, reducing their position and feeding the contagion;
- ✚ Irrationality of investors, such as panic, herding, positive feedback trading, may induce them to withdraw money from other countries as well without making careful analysis of the fundamentals.

1.3 The role of moral hazard and adverse selection phenomena in financial crises

Existence of effectively functioning financial market is crucial in achieving economic growth and development in emerging markets. Financial system plays an important function in the economy by enabling movement of freely available funds from individuals and entities with excessive capital and lack of productive opportunities to individual and entities that have such opportunities. If any disruption happens in the system, it means that allocation of funds is not optimal any more, contraction of economic activity is expected and achievement of economic growth and welfare is under threat.

What can cause the disruption in the financial system? The reason can be the asymmetric information phenomenon, which is cited as imperfection of the market economy. Asymmetric information takes place when one party to the financial contract has much less accurate information than the other party. When loan is taken a borrower will usually have much better information about the riskiness and return on the investment that is financed with the money provided by lender, who in its turn has much less information, unless additional efforts is spend by him on finding out more information.

Asymmetric information leads to the following basic problems: *moral hazard* and *adverse selection*. In this chapter we will discuss the role of moral hazard and adverse selection problems in causing financial crises situations.

Moral hazard is the effect of insurance on insured's behavior.⁹ Moral hazard has been a long-time concern in insurance industry, however in the wake of relatively recent events it has been recognized as a concern in banking and other financial industries as well. For example, government guarantees of bank deposits, explicit or implicit, reduce the incentives for depositors to monitor the banks where their money is invested. And this lack of monitoring can affect banks in such a way that they can take excessive amount of risk. Moral hazard can also be a valid cause when financial institutions are considered as "too big to fail". With expectation to be bailed-out these institutions do not hesitate investing in excessive risky assets.

⁹ Edward S. Prescott. A primer on Moral-Hazard Models (1999) Economic Quarterly Volume 85/1

Moral hazard occurs when transaction *has already been carried out* between parties in the financial market. The HAZARD is that borrower could have incentives to engage in activities that are undesirable from lender's point of view, i.e. those activities that will make it much less likely that borrower's money will be paid out.

The role played by moral hazard problem during financial crises reveals itself in the fact that lax domestic regulation leads to excessive risk taking by financial institutions. Furthermore, the expectation of IMF bail-outs to the developing country bank sector gives foreign investors an incentive to invest in those risky assets. First one is the example of debtor moral hazard, whereas second example is the creditor moral hazard.

Moral hazard problem is usually formulated in terms of contract between a principal and an agent who works for him, which can be a person or an institution. With regard to moral hazard problem in financial crisis situation, we can point out that principal in this case is the IMF that gives explicit and implicit guarantees, and the agent is the banks and other financial institutions that expect the help to be extended during bank runs or investors expecting their risky investments to be bailed out.

Adverse selection – occurs *before* the transaction between parties has been carried out. The problem is that potential bad risks are the ones who most actively seek out a loan, those who are most likely to produce ADVERSE outcome are most likely to be chosen. In particular, insurance system will often not be profitable, if buyers have better information about their risk of claiming the damage than seller does. When there is an adverse selection, clients who know that they have higher risk of claiming the damage than the average of the group, they will be more eager to buy the insurance. Whereas those who have below-average risk may decide it is too expensive to be worth buying. In this case, premiums set according to the average risk will not be sufficient to cover the claims that eventually arise, because among the people who have bought the policy more will have above-average risk than below-average risk. Putting up the premium will not solve this problem, because as the premium rises the insurance policy will become unattractive to more of the potential clients who know that they have a lower risk of claiming. One way to reduce adverse selection is to make the purchase of insurance

compulsory, so that those for whom insurance priced for average risk is unattractive are not able to opt out.¹⁰

In the financial system, the same can be translated into loans market. The classic “lemons problem” is a part of this adverse selection problem which was first described by Akerlof (1970). Lemons problem occur in the debt and equity markets when it is hard to distinguish whether a lender has good investment opportunities with low risk that is *good risk*, or alternatively has bad investment opportunities with high risk, that is *bad risk*. Therefore in this situation lender will only be willing to pay the price that reflects the average quality of the securities to be issued. Managers of high quality security issuing company understand that the assigned price is lower than ingenious value of the security and will not sell their securities. On the other hand, the securities that will be offered for sale in the market will be those of lower quality firms, because they know that the price offered is higher than value of the security.

Combining these two problems together, we can see that they lead to inefficiencies in the financial system. As we have seen in the definition of financial crisis (p.5) exactly the disruption in the financial markets causes the creation of situations suitable for financial distress and crisis.

Certain rules and regulations have been introduced by government authorities to curb the negative effect stemming from adverse selection and moral hazard, such as safety net for depositors, restrictions on bank asset holdings, capital requirements, disclosure requirements, chartering, and bank examinations (with intention to decrease adverse selection and moral hazard). However, not always these measures have been successful, sometimes leading to the exacerbation of the situation even more.

Banks and financial institutions aim at decreasing the problem with asymmetric information, reducing the risk of moral hazard and adverse selection by extending selective private loans and controlling creditworthiness of borrowers. However, they create another asymmetric information problem because this time depositors are lacking information about the quality of private loans, which may result in bank panics explained above as one of the reasons of

¹⁰ www.economist.com

financial crises. When external shock hits the country, some percentage of the banks will be insolvent due to large loan losses deriving from bad loans. But depositors do not know which banks have bad loans and which do not have. Therefore, there will be bank runs, everybody trying to get out their money as soon as possible until bank has enough funds to return all 100 cent per dollar deposited. Thus even solvent banks will be in trouble because of huge amount of cash outflow which can not be covered with current funds available.

Government safety net, deposit insurance being one of its forms, can short bank runs. Since depositors believe that even if banks will have large losses, deposit insurance enables to get back all deposited funds. Another way of assuring that bank runs can be handled is government playing a role of lender of last resort, directly providing funds to troubled institutions so that depositors can receive their money. The degree of moral hazard may differ among the named two types of government safety net. Deposit insurance protects all depositors, regardless whether shock happened in banking system is systematic or idiosyncratic (affecting only single bank); all depositors will be paid back. When it comes to implicit promise by government to act as a lender of last resort, the decision to bail out troubled banks may depend on the level of shock, if it is idiosyncratic there is no full assurance that one bank will be bailed out. Therefore, banks will keep in mind that in case such situation happens, depositors will be willing to withdraw their deposits. Thus in terms of safety net based moral hazard we can say that it may differ depending on the type chosen.

The most serious drawback of both deposit insurance and lender of last resort stems from MORAL HAZARD problem, because existence of insurance in any form increases incentives towards risk taking that can result in insurance payoff. Depositors will not care much about exerting control over the riskiness of banks loans, imposing the discipline of the marketplace on the banks. Therefore banks provided with safety net can take on greater risks than they otherwise would have done. Another problem rising with safety net solution is the adverse selection problem, where the people who are most likely to produce adverse outcome will be the ones who wants most of all to take advantage of the insurance.

We are not going into detail regarding other types of bank regulations that keep negative effect of adverse selection and moral hazard down. Our focus will be more on the moral hazard problem arising from IMF's provision of implicit safety net guarantees to emerging countries in the form of bail out loans, thus playing a role of an international lender of last

resort. As we have seen in our explanation already, moral hazard problem and in particular adverse selection may result in situations stimulating financial crisis.

The next step in our research will be an attempt to quantify the effect of moral hazard in development of financial crises situations. With this purpose we will look into EMBI spreads, and determine correlation between these two.

Part 2 Lenders of last resort, intervention plans

2.1 Lender of last resort: domestic and international

According to Kindleberger (2005) “the lender of last resort stands ready to halt a run out of real assets and illiquid financial assets into money by supplying as much money as may be necessary to forestall the run; the concept of elastic supply of money that expands to meet the demand in panics.” But there are still questions left to be answered: How much money? To whom? On what terms? and When?

In addition to finding reasonable answers to above stated question, lenders of last resort also face the following phenomenon: if investors believe that banks and other selected borrowers will be supported in the moments of distress by a lender of last resort, they will be less cautious, less risk averse when extending loans during the next economic boom periods. The public good of the lender of last resort weakens the responsibility of private lenders to ensure that they make sound loans (example of a moral hazard problem). However, if a rush from sales of securities and commodities into money cannot be halted, the fallacy of composition takes center stage. The sale of these assets by investors in an effort to minimize losses leads to declines in the asset prices, with the consequences that a large number of otherwise solvent and well-capitalized firms may become bankrupt.¹¹

Therefore, moral hazard problem is anticipated to be a side effect when lender of last resort is involved to the process of salvation of crisis affected financial system. So, the questions arise: whether there is a need at all for the lender of last resort and how benefits from having such an instance of last resort are not outweighing the costs of introducing it?

Domestic lender of last resort

As it was explained previously, contraction of money base would cause financial distress. Depositors in a panic worrying about probable insolvency of all financial institutions will create bank runs, taking out their savings in cash, thus leading to reduction in broad money available to the market. This problem can be eroded by intervention from the lender of last resort, which can maintain the overall broad money indicator in equilibrium by increasing

¹¹ Charles P. Kindleberger, Robert Aliber (2005) *Manias, panics and crashes*. Wiley

monetary base. In most countries the sole right of printing money is in the hands of Central Banks, so logically they are supposed to act as a domestic lender of last resort.

But there are still questions to be answered, such as *when* is the right time for the lender of last resort to engage in mitigating effects of financial crisis, *what amount* the bailout should be, and *who* should receive help? These are the questions that pose the most challenge for lenders of last resort, incorrect answers to which may lead to even more severe crises in the future.

However, opinions are divided on these issues. Regarding timing of intervention in a market, the most optimal way is said to wait long enough for the insolvent firms to fail after the financial crash, but not too long as to let the crisis to spread to the solvent firms that need liquidity. On the amount of funds to be injected to market, according to Bagehot's rule (who was the editor of *the Economist* in the end of 19th century) lending should be carried out freely at a penalty rate. Freely means that only to solvent borrowers and with good collateral, subject to inevitable exceptions¹². The method of supply of money might be conducted via open market purchases rather than through discount mechanism. Quoting the same Bagehot, it is suggested that loans for bail-out should be granted to all comers on the basis of sound collateral as largely as public asks for them. But the dilemma about collateral is that its soundness rooted in how long has the panic progressed; the longer the panic is continued, the sharper the decline in prices will be, and less sound the collateral will be assessed. In this case the look at the character of the borrower becomes more important. This last advice was used by J.P. Morgan quite widely during financial crises periods.

The role of lender of last resort appears when certain institution accepts responsibility for the stability of the banking system as a whole, which should override any concern with its own private profitability. There are different views on the role of this institution. First, should it involve the rescue of individual institution? Second, should it mean the rescue of the market as a whole? It is not wise to commit oneself to giving support to any individual bank that will face problems with liquidity. As we have seen it would involve too much moral hazard problem. Therefore, the main point is that the lender should not try to rescue each and every

¹² Charles P. Kindleberger, Robert Aliber (2005) *Manias, panics and crashes*. Wiley, p. 208

bank that stays in the edge of bankruptcy as a result of insolvency, but rather should provide liquidity to the market instead.

International Lender of Last Resort

Primary responsibility of the domestic lender of last resort is to make sure that there is enough liquidity when sudden financial distress and precautionary selling leads to insolvency problem. Whereas, international lender of last resort takes responsibility over the provision of liquidity for improving the scope of necessary changes in the exchange rate to make sure that they match with the long-run equilibrium values, but not to prevent changes that are required by the fundamentals. Another remedy provided by international lender of last resort is to stand in the way of transmission of deflationary pressure from one country to another, so called contagion problem.

International lender of last resort has no domestic counter parts, since national currencies and central banks are all different, and making changes in exchange rate inevitable. When it comes to the financial crises at the international level, domestic lenders of last resort cannot help much. As there are national currencies with national central banks in each country, changes in the exchange rates and the possibility of international contagion calls for involvement of international lender of last resort.

The possibility of coordination problems among creditors is the main argument in favor of international lenders of last resort.¹³ When country faces illiquidity problem it is not easy to get new loans in a short period of time. This is not because there is a shortage in the financial markets, but rather, a) there isn't large enough private investor to be able to take upon coordination problem of providing funds for covering illiquidity, b) uncertainty about fundamentals of economy develops doubts about the solvency of the debtor country.

But experience shows that pure liquidity problem is not the sole problem during financial crises. As a rule weak fundamentals and unsound policy precedes liquidity shortages in crises affected countries. Our next discussion will cover the reasons countries approached IMF, who we see as an organization to play the role of international lender of last resort, and how these reasons changed over time.

¹³ Giancarlo C., Bernardo G., and Nouriel R. (Dec. 2003). International lending of last resort: a model of IMF's catalytic finance. *NBER working paper*

2.2 IMF's role in resolving financial crises: historical review

International Monetary Fund (IMF) was established in 1944 to enable extension of credits among countries and aid in combating foreign exchange crises. However until the Mexican 'tequila' crisis in 1994 there wasn't clear sign if IMF can be international lender of last resort.

Since the day of its foundation IMF has showed considerable development, both geographically and functionally. Currently, the Fund has more than 180 member countries, with total quota equaling to 317 billion USD, and current outstanding loan in the level of 28 billion USD to 74 countries.¹⁴

Article I of the Articles of Agreement sets out the IMF's main responsibilities as the following:

- promoting international monetary cooperation;
- facilitating the expansion and balanced growth of international trade;
- promoting exchange stability;
- assisting in the establishment of a multilateral system of payments;
- making its resources available (under adequate safeguards) to members experiencing balance of payments difficulties.¹⁵

Making a historical review of IMF activities, starting from the moment of its initiation, we can receive an insight into how IMF and its role in dealing with financial crises evolved throughout time, and whether IMF can really be considered as the international lender of last resort in the modern time.

IMF's Article of Agreements described above, was drafted at Bretton Woods in 1944. The purpose standing behind creation of this institution was the intention to prevent upheaval of autarky type of governance that so many countries resorted to after the First World War. The kind of governance that were seen as a reason for depression in 1930s, stifling international trade. Another reason for the establishment of IMF was international finance perspective. As

¹⁴ <http://www.imf.org/external/np/exr/facts/glance.htm>

¹⁵ Ibid

it was stated by one of the founders of IMF by John Maynard Keynes: "...make unnecessary those methods of restriction and discrimination which countries adopted... as measures of self protection from disruptive outside forces". The stipulation tied with this premise was that capital outflows should be related to the need of financing trade on the current account. There was a fear that autonomous and speculative capital outflows would lead to unsustainable reserve losses in countries that would seek to offset it by borrowing from the IMF. It was stated that only when capital exports are net, large, sustained, and motivated chiefly by the desire for speculative profit the Fund is likely to require a restriction of capital exports as a condition for continued use of Fund's borrowing. Article VI of the Articles of Agreements reflects these views. IMF refused from financing large and unsustainable financial flows, encouraged countries to impose controls on such movements of capital and reserved a right to deny credits to those countries that fail to exercise necessary control measures. However in the wake of globalization of international financial flows this clause was a kind of impediment and only in 1997 did the amendment of the article took place, thus giving IMF mandate for full promotion of free capital flow.

During the first ten years of its life as international financial institution, IMF extended lending to the countries with the aim to retain currency convertibility for current account transactions at fixed exchange rates.

The first time when the Fund was asked for help during crisis period was in 1956, in the aftermath of Suez Canal crisis. After Egypt nationalized the Suez Canal, France, England and Israel evoked attack on Egypt with the intention to get back authority to Suez International Company. After 2 month of confrontation all four countries turned to IMF for help. Apparently it was more of a political crisis than a financial crisis. Still IMF was seen as a crisis manager. Because of military operations there was a strain on the economic situation in all countries participating in Suez Canal crisis, which affected the status of their current accounts. IMF allocated tranches for those countries that was involved into the conflict, and allocated amount was intended for solving current account deficits, for all except the UK. Because the UK was suffering speculative short term capital outflows that were threatening depreciation in the exchange rate. IMF came to the conclusion that if not helped now, imposing exchange restriction later would eventually lead to suppression in trade, affecting current account anyway. Total amount drawn by all these countries in tranches was equal to 1.7 billion US dollar.

The capital account as an independent issue became more important at the beginning of 1960s, when most developed countries has reestablished convertibility for current account transactions. During this period industrialized countries started to take apart obstacles in the way of free capital movement, which was only welcomed by IMF. But after this event took place most industrial countries saw short-term capital outflows from their own “pockets”. This urged them to impose additional restriction on the way of capital outflows, such as interest equalization tax by the United States. Established measures were effective and capital outflow seemed to slow down.

However, those disruptive capital flows lead to the second major international economic crisis which was the collapse of the Gold Pool in 1968. Price of the gold was decided to be kept stable at 35\$ per ounce by the central banks of eight developed countries. Inflationary pressure and rising demand was very insisting on price changes, which were suppressed for some time by the usage of foreign exchange reserves. When losses on reserves were too high to be acceptable, it was decided to abandon official Gold Pool. The most affected country from this gold price maintenance, whose resources were not strong enough to withstand the onslaught, was the UK that was forced to devaluate its currency and take 1.4 billion USD worth credit from IMF.

What was more striking about the late 1960s, viewed from the perspective of 1990s, is that the role of IMF was confined to the realm of economic policy and was linked only indirectly to the events in financial markets¹⁶. It was apparent that IMF did not involve in directly solving the crises. But IMF did help in persuading British government that devaluation of pound was inescapable, evaluated the necessary size of parity changes.

In the 1970s current account deficits weren't anymore short term problems for the most industrialized countries. These outflows were blamed on ‘hot’ money speculations, and the cause was explained by overly expansionary macroeconomic policies. The reason was economical; however effects were both economical and financial. Combined with the oil deficit in 1974, those current account deficits were not able to be financed at the current system of exchange rates. These deficits were financed in increasing extent by short-term

¹⁶ James M. Boughton (2000). From Suez to Tequila: the IMF as a crisis manager. *The Economic Journal*, 110 January

capital flows from Eurocurrency markets. The exchange market crisis in 1973 brought in the era of floating exchange rates. As a result both the UK and Italy developed negative balance of payments and turned to IMF for substantial financial help.

But IMF still was not involved directly into resolving the crisis situations. The fund provided technical assistance for establishing new set of exchange rate rules. Allowing currencies to float freely obviated a direct financing role of IMF and paved way for dealing with financial crises in more direct ways.

Two oil price shocks facilitated the flow of additional fund which started to pile up in oil exported countries, to the bank accounts in industrialized countries. Now, oil importing countries experienced current account deficit amounting 25% of their export, and their debt service ratio has risen to 19%. But capital were still flowing freely to developing countries, but now at more steadily increasing prices, thus increasing the burden to the borrowers.

The major turning point both for the international financial system and for the crisis management role of the IMF came in 1982. The debt crisis started in 1980s when industrial countries stopped extending new credits and rolling over existing credits to the developing countries. Those developing countries were characterized as supporting increased domestic spending with the borrowed money, also with deficiencies in administration and public policy. This is was a pure financial crisis, compared to the previous ones, which were seen as economical and short term.

IMF, the only institution with authority and resources stepped forward. This rationale of IMF taking on of crisis manager role had different elements to be considered:

- those heavily indebted developing countries would have defaulted if help didn't arrive;
- this default would be a big threat to international financial system;
- giving new loans were a sound strategy if combined with healthy macroeconomic policies;
- neither financing nor reforms can be obtained without intervention.

So both IMF's role and debt strategy evolved between the start of crisis and its resolution in 1989. When Mexican and Asian crises erupted in 1990s most elements of the role that IMF

should have played were all in place. In order to be able to apply large loans IMF developed exceptional circumstances clause.

Considering that IMF didn't act as a lender of last resort with using funds exceeding the quota of the country several times until 1990s, it gives us the possibility to uncover relations between IMF sponsored lending to provide liquidity to financially distressed countries and moral hazard problem. By making comparisons before and after the IMF intervention, starting from Mexican crises, we can track any existing correlations. Here we will take a smooth passage to the last part of my thesis where this problem will be investigated and results uncovered.

Part 3 Analytical framework for detecting level of correlation between IMF interventions and subsequent financial crises

3.1 IMF funding during financial crisis period and moral hazard

There is an emerging argument that IMF-led financial packages to countries suffering from financial crises have undermined efforts to forestall such crises, typical example of moral hazard problem. This argument is gaining “weight” in the view of increased number of cases when emerging countries and less but not the least developed countries, is strike by financial distress and crises situations.

In the international financial markets two types of moral hazard can be differentiated: *debtor* and *creditor*. *Debtor moral hazard* means that the provision of financial bail-outs has induced governments of developing countries not to follow sound, but costly policies. *Creditor moral hazard* deals with the prospects of international bail-outs leading creditors to these emerging countries to be less cautious in their assessment of insolvency, thus lending at lower spreads than they would have done without any expectation of bail-out by IMF or any other financial institution. But this distinction cannot be absolute, since in the case of international capital flows it is hard to distinguish how much the possible moral hazard effect was due to debtor or creditor misbehavior, since both borrowers and creditors interact together.

If we look into the history of IMF-led bail out packages or concerted lending of commercial banks or other financial institutions (table 2), we can see that these financing started to take the large scale effect only with the beginning of Mexican financial crisis in 1995. Before this period IMF engaged only in partial support through financing current account deficits, and providing financial help rarely exceeding assigned quotas of the countries. This observation will help us in carrying out our testing of the effect of moral hazard in stimulating financial crises, since we can compare indicators prior to year 1995 and the ones after year 1995 to make conclusions whether IMF-led exceptional funding really leads to distortion of incentives in home countries. However we will extend these discussions in the next chapter.

Country	Headline package	IMF loan
Mexico 1995	\$48.8 billion	\$17.8 billion (690% of quota)
Thailand 1997	\$17.2 billion	\$3.9 billion (500% of quota)
Indonesia 1997	\$33.0 billion	\$10.1 billion (490% of quota)
Korea 1997	\$55.0 billion	\$21.0 billion (1940% of quota)
Russia 1998	\$22.6 billion	\$11.2 billion (210% of quota)
Brazil 1998	\$41.6 billion	\$18.1 billion (600% of quota)
Argentina 2000	\$39.7 billion	\$13.7 billion (500% of quota)
Turkey 2000	\$13.8 billion	\$10.4 billion (830% of quota)
Brazil 2001		\$15.0 billion (400% of quota)
Turkey 2002		\$16.0 billion (1330% of quota)
Brazil 2002		\$35.0 billion (900% of quota)
Uruguay 2002		\$3.0 billion (700% of quota)
Argentina 2003		\$12.5 billion (420% of quota)

Table 2 Exceptional IMF led support packages: 1995-2003

Source: Steven B. Kamin (2004) Identifying the role of moral hazard in international financial markets

Almost in every single case of significant international level crises IMF provided support in several times exceeding the assigned quota of the country in IMF, which was not the case before year 1995. The frequency with which financial crises started to emerge could be a sign that both debtors and creditors might be relaxed due to the expectation of support packages from IMF, thus allowing them to behave in ways that makes a crisis more likely. Also reduction in the spreads when lending to emerging countries could be an additional proof of moral hazard.

It is inherently plausible that IMF's financing packages generate some elements of moral hazard. The presence of IMF funds would encourage investors to take upon such risks that they would not otherwise take. But, it is not necessarily "evil", because named policy exactly in line with Article I of the IMF's Article of Agreements which states that one of the purposes of IMF is "giving confidence to members by making the general resources of the Fund temporary available to them under adequate safeguards... without resorting to measures

destructive of national or international prosperity"¹⁷. What we should be concerned about is whether the availability of funds from IMF encourages imprudent risks to be taken and whether these additional risks weights heavier than benefits associated with IMF financing in curbing costs of crises.

First, let us consider how exactly moral hazard problem could be a side effect of IMF's financial support. As we already discussed, moral hazard arises when the provision of insurance increases the probability of the event being insured against, usually by diminishing the incentives for the insured party to take preventive actions. Any type of insurance is subject to moral hazard as long as the behavior of the insured party can influence the probability of the event insured against and investor cannot respond fully (by adjusting terms or canceling coverage) to behavior that leads to increase in event's probability. Another feature of moral hazard problem is that investors are taking risks now based on the assessment of the support that they are supposed to get in the future when "things will go wrong".

How different is the possible moral hazard from IMF financing from conventional insurance related moral hazard? One of the major differences is that Fund's financial support is not pure cash payout, but on the contrary it is a loan that should be paid back with accrued interests. So, what lures investors in decreasing risks that they take, is the insurance benefit paid by the Fund, which is reflected in the difference of interest rate at which country could otherwise borrow during financial crisis period (which usually very high) and the rate charged by IMF (which is tied to market rates in the industrial countries).

Therefore, it is more useful to compare the role played by the IMF with that played by national central bank as a lender of last resort, because in both cases the financing intends to temporarily address liquidity rather than insolvency issues. When central banks' role as a lender of last resort induce banks to hold fewer cash and reserves, in the same way IMF's intended role of international lender of last resort may similarly reduce countries' thrust to hold international reserves. Just like central banks' expected support during liquidity problems of the banks may lead depositors to be less cautious in investing with these banks, IMF's financial support to crises affected countries may increase the incentive of investors to these countries to take risky and unsustainable policies.

¹⁷ <http://www.imf.org/external/pubs/ft/aa/aa01.htm>

But, comparing with domestic lender of last resort there are some very important differences. Central banks have in principle unlimited resources, which is reflected in their ability to print money when needed. Here we will not judge whether it is sound or not to have such a tool. However, IMF's financing source is created as a result of pooling of funds from member countries and the procedure of increase of total available funds could be painstaking and long enough. As we have witnessed, such a problem was faced during the change in the size of IMF's total resources in 1997, which were held open until US congress ratified it.

Also central banks have certain tools in their arsenal that could limit moral hazard resulting from unlimited financing; such as supervisory and regulatory responsibilities to uncover imprudent behavior, and power to close the banks engaged in risky investment and evaluated as being not solvent. When it comes to IMF, its surveillance may play similar role in detecting countries which break the boundaries of prudent behavior, and its terms of conditionality of the loans provided under the umbrella of IMF facilitate expected policy adjustments. However, these tools are considerably weaker than tools used by central banks and IMF definitely cannot afford itself to "shut down" countries deemed to be insolvent.

One practical difficulty arises during the assessment of the effect of availability of IMF's financing on the emergence of moral hazard: it is the difficulty in specifying the counterfactual. If IMF support were not available then crises affected country would probably resort to other alternatives, such as a larger depreciation of its currency thus leading to inflation of its local currency debts, and also chance of default on its external debt. It is also possible to show more complex channels through which IMF financial support may lead to moral hazard: such as by underwriting implicit guarantees that make it possible to support investors at the expense of its own taxpayers, i.e. using future tax revenues for financing current bail outs.

The most important question to be answered is whether IMF financing to emerging countries induces any moral hazard which in its turn leads to increased probability of financial crises, and if the answer is yes, then whether it is of practical importance to be major concern?

The questions asked here: whether there exists moral hazard problem or not, is not just pure curiosity, it has special implications for the policy developments. Taking into account these

and some other factors we will try to “dig deep” finding out the relations between these two mentioned effects.

3.2 Analysis of correlation between IMF intervention and the degree of moral hazard.

Supporters of the view that moral hazard problem exists and has an important impact on the emerging market countries, shows as an evidence the sharp reduction in interest rate spreads on credits provided to emerging countries after Mexican crisis, and sudden increase in capital flows to emerging market countries during the period between years 1996 – 99. They support their arguments by pointing out that it led to relaxed attitude of investors toward inherent risk in those countries, because investors became confident that IMF's provision of exceptional financing, just like in Mexican crisis, wouldn't let them to default. While in their point of view, on the contrary, failure of IMF to prevent Russian default in 1998 significantly reduced the degree of moral hazard in the system which caused a surge in spreads and reduction in capital flows into emerging countries, however not eliminating the moral hazard entirely.

Based on these conclusions IMF critics show a big concern whether exceptional financial packages for developing countries experiencing financial distress, which exceed the quotas several times, should be curtailed. They note that much more effort should be devoted to private creditors, by urging them to bear the part of the burden by rolling over, rescheduling or even reducing the face value of their loans.

However up-to-date it has been difficult to present full support for the prevalence of creditor moral hazard in the international markets. Studies dedicated to moral hazard issue show dominantly not in the favor of existence of moral hazard in the system, since according to these studies signs of moral hazard, such as reduction in spreads, have not been find out. However it is too early to make final conclusions before taking into account additional elements that have impact in formation of interest rate spreads; otherwise final conclusion would fail to include factors that help to keep up the spreads high, thus making the model not consistent or biased.

In this section empirical testing of moral hazard in the international financial markets will be conducted. As a benchmark, certain indicators will be used as a basis for comparison. I will use the concept that before 1995 Mexican crisis IMF programs did not offer enough financing to bail-out foreign investors completely (see part 3.1.), therefore in that period investors

couldn't think of IMF financing as a source for support to recover credits when government would default on their debts. Hence, I presume that financial indicators we are going to look at did not include any degree of moral hazard before year 1995. Therefore, making comparison by using data from selected indicators gives us possibility to trace the trend whether there was a change since Mexican crisis, thus supporting moral hazard concept. We can rely on this method as long as we control for other factors affecting comparison of the financial indicators pre 1995 and after 1995 events.

As it was elaborated in the second part of my thesis, IMF's role evolved throughout the last 30 years. If we take into account international debt crisis in developing countries during 1980s, at that times IMF's role in resolving crisis situation was restricted to providing funds for financing current account deficits and did not extend enough amounts for financing whole repayments. In order to prevent default, concerted approach of private financial institutions, creditor and debtor country governments was required. As a result of these efforts some part of the debt was restructured, and partly provided money for covering interest payment for due payments. Until the end of the 1980s under Brady plan the restructuring and reduction in the face value of bank loans were provided, which were collateralized by the Treasury bonds. Therefore bail-out of private investors was not the case during 1980s international debt crisis.

Whereas during 1995 Mexican crisis official support package reached 48.8 billion USD, out of which 17.8 billion USD was provided by IMF. This loan exceeded Mexico's quota almost 700%. Private investors couldn't have anticipated such bail-out from IMF, therefore we can develop the idea that financial indicators present prior to 1995 were "moral hazard free" which means that they were not effected somehow by moral hazard concerns, considering we control the result by assessing the impact of other relevant factors.

3.2.1 Indicators used for assessing the effect of moral hazard

In this paper Emerging Market Bonds Index developed by JP Morgan will be used as a main tool for measuring potential moral hazard related to IMF financing of crises affected countries. The Emerging Markets Bond Index Plus (EMBI+) tracks total returns for traded external debt instruments in the emerging markets. The instruments include external-currency-denominated Brady bonds, loans and Eurobonds, as well as U.S. dollar local

markets instruments. The EMBI+ expands upon Morgan's original Emerging Markets Bond Index, which was introduced in 1992 and covers only Brady bonds. In addition to serving as a benchmark, the EMBI+ provides investors with a definition of the market for emerging markets external-currency debt, a list of the instruments traded, and a compilation of their terms.

The EMBI+ is concentrated in instruments from the three major Latin American countries (Argentina, Brazil, and Mexico), reflecting the size and liquidity of these external debt markets. The non-Latin countries are represented in the index by Bulgaria, Morocco, Nigeria, the Philippines, Poland, Russia, and South Africa.¹⁸

The J.P. Morgan Emerging Markets Bond Index Global (EMBI Global), which currently covers 27 emerging market countries, is the newest and most comprehensive emerging markets debt benchmark to the moment. Included in the EMBI Global are U.S.-dollar-denominated Brady bonds, Eurobonds, traded loans, and local market debt instruments issued by sovereign and quasi-sovereign entities. Below the details the EMBI Global's country weights, as well as its regional weights.

The EMBI Global was created in response to investor demand for a benchmark that includes a broader array of countries than its predecessor. It expands upon the composition of the Emerging Markets Bond Index Plus (EMBI+), by using a different country selection process and admitting less liquid instruments.

Instead of selecting countries according to a sovereign credit-rating level, as is done with the EMBI+, the EMBI Global defines emerging markets countries with a combination of World Bank-defined per capita income brackets and each country's debt-restructuring history.

These two criteria allow the EMBI Global to include a number of higher-rated countries that international investors have nevertheless considered part of the emerging markets universe.

The EMBI Global – like the EMBI+ – will only consider for inclusion emerging markets issues denominated in U.S. dollars, with a minimum current face outstanding of US\$500 million and at least 2½ years to maturity. However, the EMBI Global does not require that its

¹⁸ <http://www2.jpmorgan.com/MarketDataInd/EMBI/embi.html>

“candidate instruments” satisfy the EMBI+’s series of additional liquidity tests (a minimum bid/ask price spread and a specific number of inter-dealer broker quotes). Instead, it only requires that easily accessible and verifiable daily prices should be available for the given instrument.¹⁹

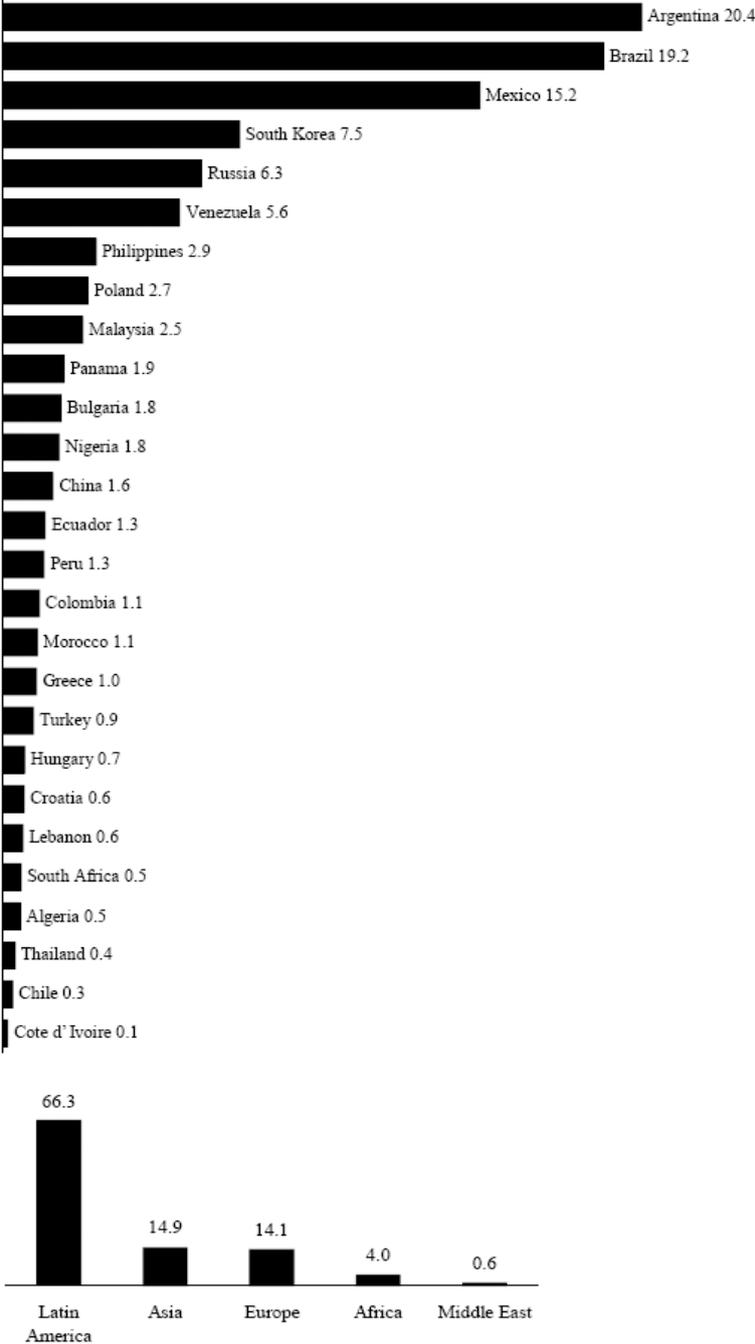


Figure 2 EMBI Global: Country and regional compositions

Source: JP Morgan Securities

¹⁹ JP Morgan Website: Methodology of EMBI calculation

When controlling for the factors that may have affected emerging market spreads, we take as a basis 3-month and 10-year US Treasury bond yields; Merrill Lynch high yield corporate spreads, and Moody’s average credit rating of emerging countries.

3.2.2 Conducting analysis of collected data

For conducting our analysis we take the indicator of spread of EMBI over the US Treasury 3 month T-Bills as a major tool (Figure 3). The average index spread from the period of 1992 until November 1994 is about 320 basis points. According to our methodology if we take average EMBI spread before the Mexican crisis of 1995, and compare it with the spread after crisis period we can notice that for the most part EMBI after the crisis period is above the average line.

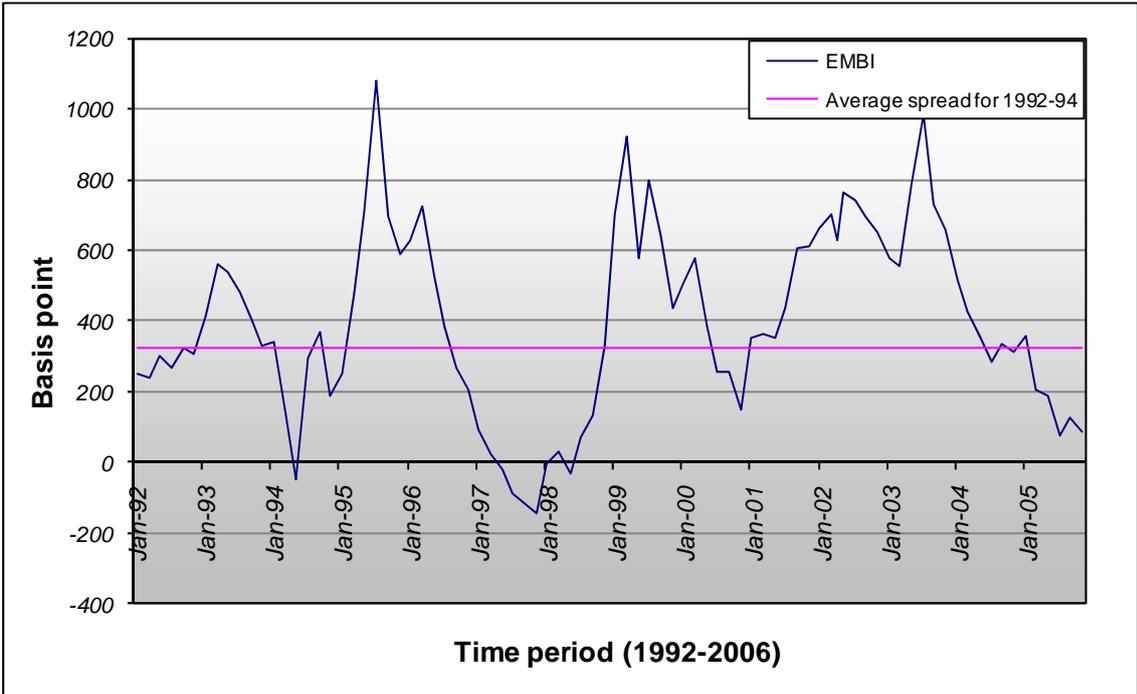


Figure 3 EMBI Global spreads 1992-2003

Source: JP Morgan

As we can notice during observed period of time EMBI spreads fall below the average line of pre-1995 spreads few times: from late 1996 till July 1998, shortly during year 2000 and in year 2003. Even if we exclude the effect of Argentinean debt where spreads has skyrocketed

as a result of default in 2001, (Figure 4) EMBI spread still would have been above the average line.



Figure 4 EMBI Spread Argentina vs. Global, 1998 - 2006

Source: <http://www.latin-focus.com/latinfocus/countries/argentina/argembisprd.htm>

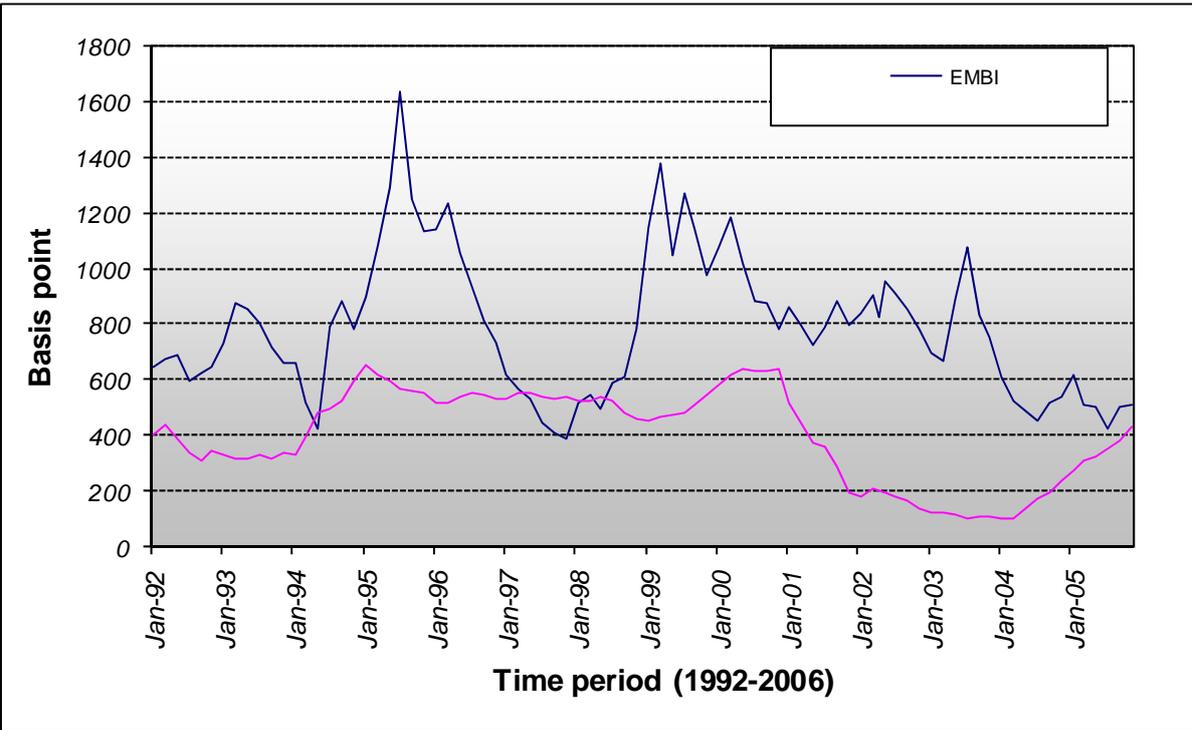
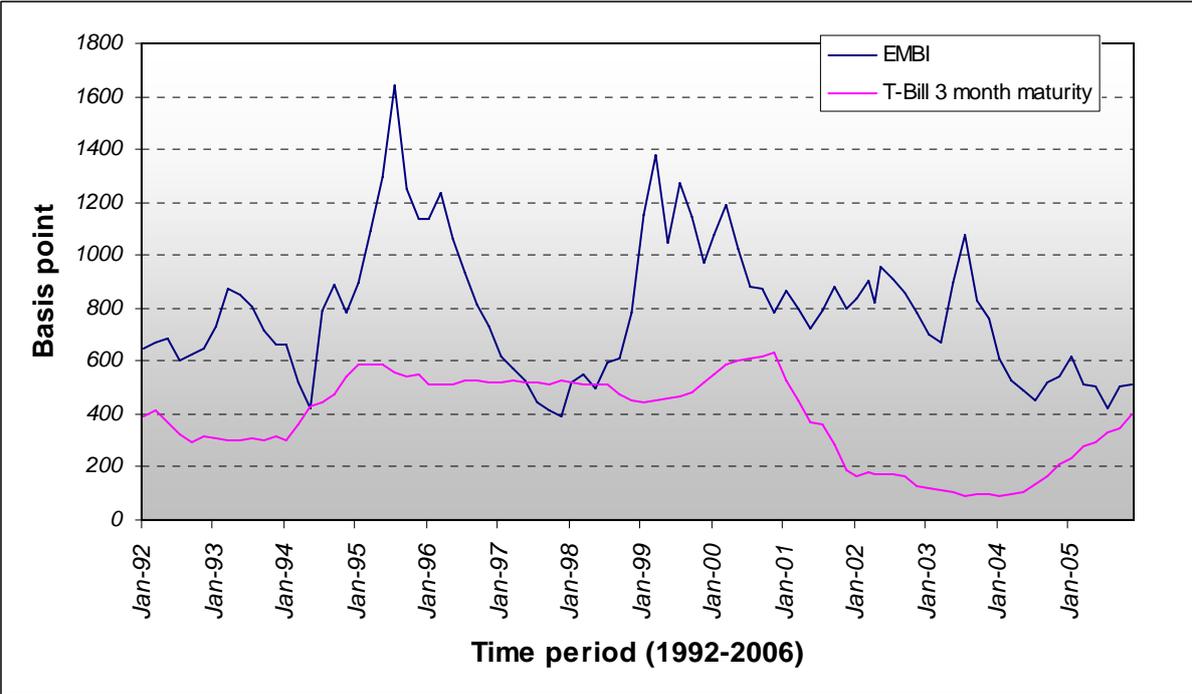
Relying on the result of analysis of above stated figures we can make initial consideration that the outcome we received is not in line with the hypothesis that Mexican crisis has led to moral hazard problem among investors and debtors.

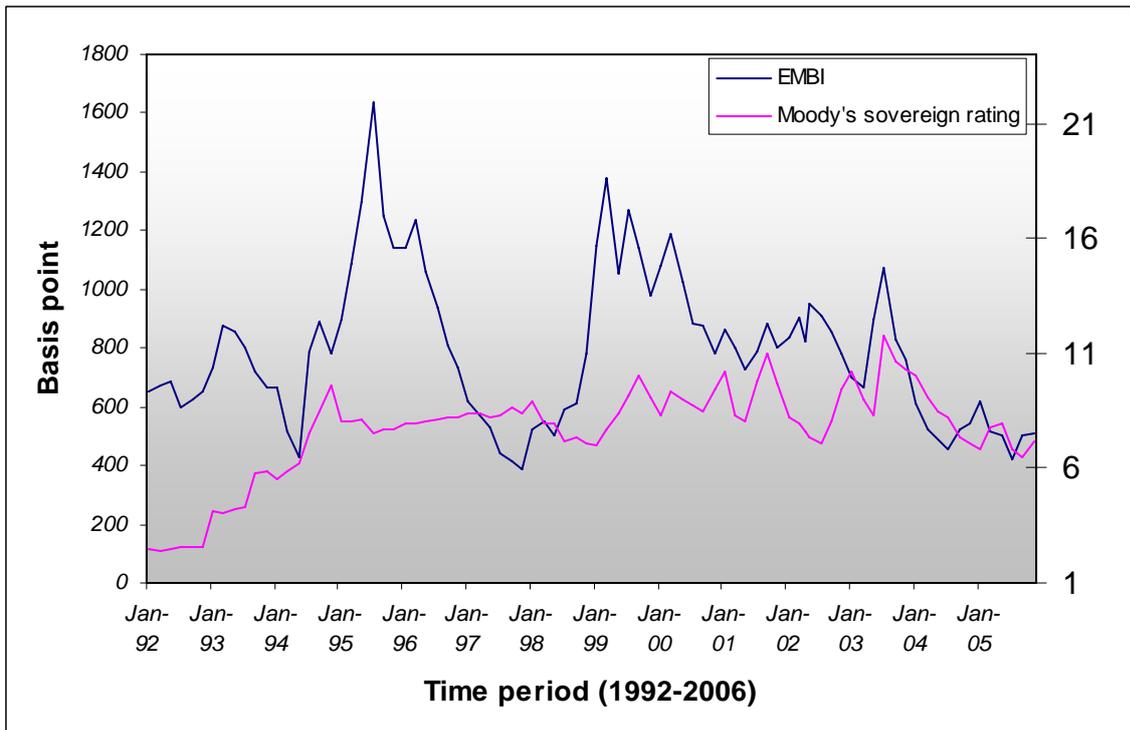
However it is possible that other additional elements have helped in pushing up the spreads, thus not allowing us to have a clear picture of the real effect of moral hazard. Therefore, we will plot the EMBI against the factors that are believed to push emerging market spreads up.

We can summarize the factors as following:

- ✚ US Treasury bond yields;
- ✚ US high yield corporate spreads;
- ✚ The perceived riskiness of emerging market bonds (capitalization weighted average of Moody's sovereign credit ratings for countries included in EMBI index).

In our opinion these are the factors that could have the most relevant effect on the emerging market bond prices.





High Yield Spreads over U.S. Treasuries as of 11/30/03



Source: Pioneer Investments (www.uspioneerinvestments.com)

Figure 5 EMBI yields and external elements

Analyzing results of comparison of EMBI yields with effects of other factors in determining moral hazard, we face with mixed evidences. Both 3 month T-bills and 10-year Treasury Bond yields are well below of their average in 1992-94, which means that it would not have caused increasing EMBI spreads. US high yield corporate spreads throughout the measured period were in line with 10 year Treasury index. We have already concluded that Treasury bond yields did not much impact with pushing the EMBI yield up. Therefore we logically can

infer that US high yield corporate yields also did have little impact on EMBI yields. Also Moody's average credit ratings²⁰ may have posed some pressure in pushing up the EMBI spreads, but it is not critical.

In order to finalize our results by looking at the possibility that above mentioned factors were pushing EMBI up thus offsetting the effect of moral hazard, the simulation of long run values of EMBI implied by the values of US Treasury yields, corporate spreads, and the average credit ratings based on the model's estimated parameters will be tested. That means we will estimate the model up till 1994, and then simulate it throughout the period 1995-2003, the period where IMF linked moral hazard is supposed to present according to the assumptions we have made at the beginning. Then we will compare actual spreads based on the real figures with our simulated index of EMBI spreads that represents no moral hazard benchmark. If moral hazard was not important before 1995, but substantially depressed spreads afterwards, then the actual spreads should have overpredict spreads in pre 1995, and underpredict spreads in post 1995.

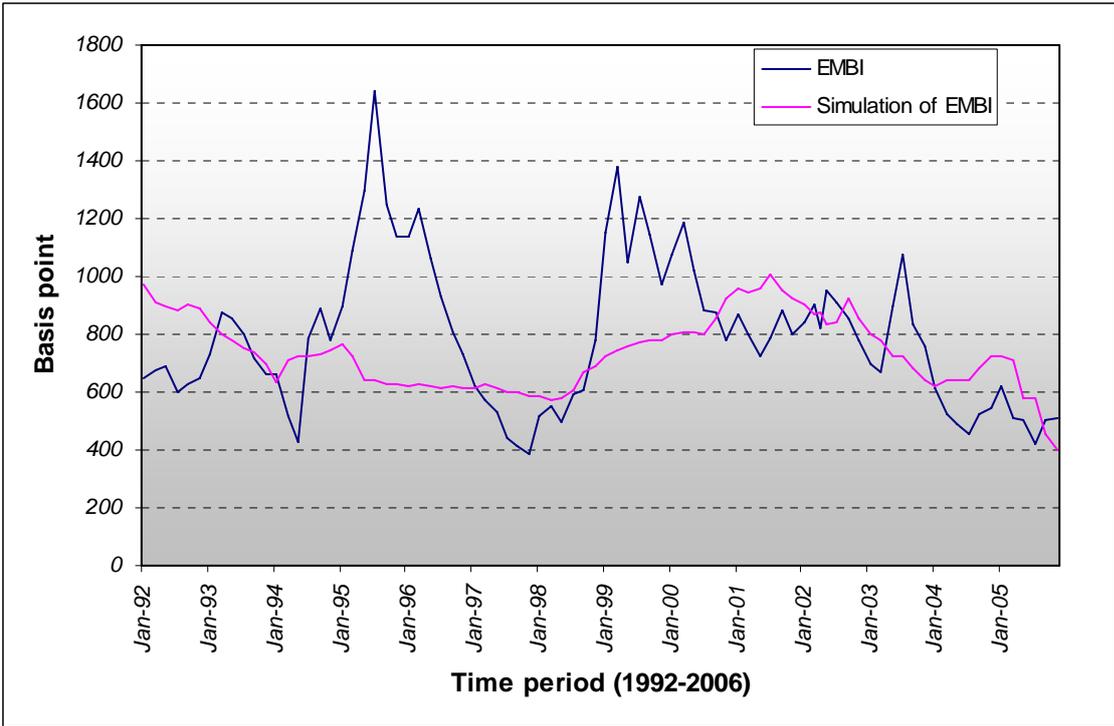


Figure 5 Simulation of EMBI spreads

²⁰ When designing Moody's average credit rating, I took the average of country ratings, assigning numbers to certain degrees of riskiness: from 1 to 24. 24 being the most risky, 1 the least risky (from Ba1 to Caa2). Country weights used during calculation were in accordance with their current weights in EMBI.

Actual spreads has shown significant deviations from the average line throughout the observed period, mostly explained with sharp rise and falls of US high yield corporate securities spreads. But, for the most we can notice that actual spreads have been fairly in line with the predicted spreads by the simulation. The decline in the level of actual spreads below the predicted level of spreads during years 2001-03 is no greater than upswings over the predicted values in the pre 1995 period.

Hence, we can find little support here as well that controlling for the relevant factors, moral hazard has resulted in reduced spread levels.

3.3 Results and implications

The increase in the number of financial crises in the last decades of the 20th century and later on into the new millennium spurred the attention to financial crises phenomenon and stimulated researchers to start looking for the reasons for such upswing. Some researchers came up with the following conclusion: moral hazard phenomenon when nurtured can lead to emergence of financial crises or distress situations, and this is recognizable in the actions by IMF with providing exceptional financing to emerging countries.

Starting from 1995 Mexican crisis, world witnessed generous support from IMF and the US government in mitigating liquidity problem faced by the Mexican government. Before ‘tequila’ crisis IMF had never extended credits to the countries that exceeded their quota in the organization. However, when crisis hit Mexico the US hurried to the help together with IMF, whose big share of total available capital is injected by the US. Considering Mexican economy to a certain degree interrelated with the United States economy, Clinton administration did not want to run the risk of inducing spreading effect of the crisis on the US economy. Therefore, to some extent pressured by the US, IMF decided to lend 17 billion US\$, which exceeded quota of Mexico by 700 %, thus acting as a lender of last resort. Overall amount of loans and credits to Mexican government reached 52 billion US\$.

Our suggested framework for analyzing the effect of moral hazard in inducing financial crisis situations is following: it is possible to find the track of moral hazard existence by comparing pre-1995 indicators when apparently no moral hazard effect was present due to the fact that investors and debtors did not expect IMF to bail out countries in trouble. Therefore, if there should be any kind of moral hazard effect, it should be reflected on the decrease in interest rates on loans to emerging countries, the increase in the amount of funding, etc.

In our analysis we used EMBI as a major tool that depicts lending pattern to emerging markets. Overall observation of EMBI yields in comparison with pre-1995 level showed no sign of reduction in the interest rate spreads to emerging countries after Mexican financial crisis. In some small time intervals during observed time period (1992-2006) EMBI yields fell

below average line of 1992-94 levels, however it was not significant when compared to upswings the rest of the time.

Afterwards, we compared EMBI yield with four different factors (US 3 month and 10 year Treasury Bonds, Merrill Lynch high yield corporate spreads, and Moody's sovereign credit rating). In all cases we did not detect statistically significant effect on pushing up EMBI.

Finally we looked into the simulation of EMBI by relying on the factors indicated above from 1992-94 levels. Simulation of EMBI then was compared with actual EMBI index. Comparison results also gave no support to the idea that EMBI spreads were reduced as a result of moral hazard effect.

As a result of our findings we came to the conclusion that IMF financing packages have not resulted in creating moral hazard effect, and there is little support that IMF financing led to increased probability of the next financial crises.

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