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BANK 410

GRADUATION PROJECT

"CURRENCY CRISES IN TURKEY"

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ABSTRACT

In this study we tried to find which factors affecting the currency crises in Turkey between the years of 1983 and 2006. We used the macroeconomic factors in this study. Our variables are exchange rate, interest rate, real GDP growth GNP per capita, GNP growth rate, international reserves change in export, change in import, M1 growth, inflation rate and exchange regime. We used the Market Pressure Index and logit regression model to answer this question. We determined the crises benchmark by using the Market Pressure Index and logit regression model to analyze the explanatory variables and their impact on the currency crises in Turkey. In this study we just found, only the Fixed Exchange Rate is affecting the currency crises in Turkey.

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CHAPTER 1: INTRODUCTION

1.1 AIM OF THIS STUDY

The aim of this study is identifying the main source of currency crises in Turkey between the years of 1983 and 2006. Which factors affecting the currency crises? In order to answer this question we chose exchange rate, interest rate, real GDP growth GNP per capita, GNP growth rate, international reserves change in export, change in import, M1 growth, inflation rate and exchange regime as our variables between the years of 1983 and 2006.

1.2 BROAD PROBLEM AREA

Currency crises are an open topic to discuss in every time in the financial sector. In recent times; the repeat of currency crises is the main problem of the economy. The two important problems are; countries did not take lessons from previous crises and countries did not imply appropriate financial or economic policies. All currency crises do not have the same features, so currency crises divided into three categories which are first, second and third generation crises model. These entire crises model established because the existed model could not explain the new currency crises and its sources.

The aim of these study; explaining the 1994 and 2001 crises that occurred in Turkey and trying to forecast the currency crises which will be occurred in the future and which economical factors giving the currency crises signal in the existing market conditions.

1.3 METHODOLGY

In this study, we use Market Pressure Index to identify the currency crises benchmark that gives the currency crises signal we use exchange rates, interest rates and foreign exchange reserves to determine the Market Pressure Index (MPI). After the determining the MPI which is our benchmark for crises signal we used the logit regression to make analysis which factors can be used for currency crisis forecasting and which datas are significant which of them can be used for explaining the currency crises.

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1.4 STRUCTURE OF THE STUDY

The first chapter shows the aim of this study, broad problem area of the currency crises, methodology of this study and the structure of the study.

In the second chapter, we explained the currency crises in Turkey which were occurred in 1994, 2000 and 2001. The crises in 2000 was a liquidity crises but we include it into our study because three months after this crises the 2001 crises occurred it could have impacts on the 2001 crises.

In the third chapter, we mentioned about theoretical and empirical literature review. In the theoretical literature review we mentioned about the financial crises, currency crises, and currency crises models, examples of each model and the theories of speculative attacks. In the empirical literature review we mentioned about the studies which made to explain currency crises.

In the fourth chapter, we explained the methodology that used in this study, which are the Market Pressure Index (MPI) to identify the currency crises benchmark and the Logit regression model to make the analysis in this study.

In chapter five, we show the variables that used for this study and its expected signs for the currency crises. In the second part of this chapter we made the analysis of this study which is correlation and logit regression.

In the sixth chapter, we mentioned about the conclusion of the study, our finding and the recommendation about the study

CHAPTER 2: CRISES IN TURKEY; 1994 & 2000, 2001 CRISES

2.1 1994 Crisis in Turkey

Towards the end of 1993, Turkish government was trying to reduce the very high level of domestic public debt stock by cutting interest rates on Treasury bills (Celasun, 1998). Treasury started to rely on Central Bank's resources instead of domestic borrowing. Cancellation of several Treasury auctions and limited domestic borrowing via Treasury auctions as a result of this policy, led to an excess liquidity in the market and to pressure on the exchange rates in the last months of 1993, which continued in early 1994. This excess liquidity caused a run on foreign currency and loss of international reserves. The decrease in the international reserves started in November 1993 and continued until April 1994 as seen in Graph-1.





Parallel to these, the TL dropped from 14,500 in January 1st to 39,850 in April 7th against the US \$, depreciating by more than 100%. A stabilization program was launched on 5th of April and the new monetary program prepared in line with the IMF stand-by agreement was put into effect in May. With the taken measures, the pressure on the exchange rate started to be reduced starting in May as can be seen in Graph-2 by the appreciation of the exchange rate between May and August. The international reserves also started to increase from May onwards.

Graph-2



Looking at Graph-2 it is seen that the overnight interest rate in the interbank money market was raised a little bit in the last two months of 1993. In the first months of 1994, overnight rate was raised substantially from around 70% to 700% as a reaction to the pressure on the exchange rates. By the end of June 1994, overnight rate was reduced to about 30%.

2.1.2 2000 and 2001 Crisis in Turkey

In the last decade the Turkish economy was hit by two crises. The first one occurred at the beginning of 1994 when there was a managed float. The second crisis preceded by a financial turmoil that burst in the second half of November 2000 just at the midst of an exchange rate based stabilization program. As of the end of December 2000, the average interest rates were almost four times higher than their levels at the beginning of November and more than five times higher than the pre-announced year-end depreciation rate of the lira. This unsustainable situation ended on the February 19, 2001, when the prime minister announced that there was a severe political crisis. Three days later, the exchange rate system collapsed and Turkey declared that it was going to implement a floating exchange rate system.

In this section we talk about the reasons behind the latest crisis. Main conclusion is that the root cause of the crisis was the combination of a fragile banking sector and a set of triggering factors. The fragility of the banking sector is noted in other studies on the recent Turkish crises. Unlike other studies, we analyze the structural characteristics of the Turkish banking system a little bit and provide a precise definition for banking sector fragility in the context of Turkey right before the crisis.

There are so many evidence regarding the risk accumulation in the banking system in the period preceding the crisis: increase in currency and maturity mismatches and a rise in non-performing loans. Hence, the banking system was highly vulnerable to capital reversals. However, risk accumulation was not homogenous throughout the system. There were two different types of dichotomization: Private versus state banks and within the private banks.

The root cause of the fragility of the banking system was high public sector borrowing requirement and the way it was financed. The sustainability of this financing mechanism was conditional on the continuation of demand for government securities. In the absence of a program that reduces borrowing requirement, the upward trend in government debt instruments portfolios of the banks and their mode of financing in bank balance sheets increased the vulnerability of the banking system.

Macroeconomic Environment of Turkey between 1983 and 2006

In order to analyze macroeconomic environment of Turkey we must analyze foreign trade, real GDP growth, inflation rate, interest rate and exchange rate.

In this section we analyze all of these macroeconomic factors graphically we will show progress all of these macroeconomic factors graphically between 1983 and 2006





TABLE 2.2INFLATION



TABLE 2.3 REAL GDP GROWTH



TABLE 2.4 INTEREST RATES







CHAPTER 3: THEORATICAL & EMPRICAL LITERATURE REVIEW

3.1 FINANCIAL CRISES

A financial system performs the essential function of channeling funds to those individuals or firms that have productive investment opportunities. To do this well, participants in financial markets must be able to make accurate judgments about which investment opportunities are more or less creditworthy. Thus, a financial system must confront problems of asymmetric information, in which one party to a financial contract has much less accurate information than the other party. For example, borrowers who take out loans usually have better information about the potential returns and risk associated with the investment projects they plan to undertake than lenders do. Asymmetric information leads to two basic problems in the financial system (and elsewhere): adverse selection and moral hazard.

Adverse selection occurs before the financial transaction takes place, when potential bad credit risks are the ones who most actively seek out a loan. For example, those who want to take on big risks are likely to be the most eager to take out a loan, even at a high rate of interest, because they are less concerned with paying the loan back. Thus, the lender must be concerned that the parties who are the most likely to produce an undesirable or adverse outcome are most likely to be selected as borrowers. Lenders may thus steer away from making loans at high interest rates, because they know that they are not fully informed about the quality of borrowers, and they fear that someone willing to borrow at a high interest rate is more likely to be a low-quality borrower who is less likely to repay the loan. Lenders will try to tackle the problem of asymmetric information by screening out good from bad credit risks. But this process is inevitably imperfect, and fear of adverse selection will lead lenders to reduce the quantity of loans they might otherwise make.

Moral hazard occurs after the transaction takes place. It occurs because a borrower has incentives to invest in projects with high risk in which the borrower does well if the project succeeds, but the lender bears most of the loss if the project fails. A borrower also has incentives to misallocate funds for personal use, to shirk and not work very hard, and to undertake investment in unprofitable projects that serve only to increase personal power or

stature. Thus, a lender subjected to the hazard that the borrower has incentives to engage in activities that are undesirable from the lender's point of view: that is, activities that make it less likely that the loan will be paid back. Lenders do often impose restrictions (restrictive covenants) on borrowers so that borrowers do not engage in behavior that makes it less likely that they can pay back the loan. However, such restrictions are costly to enforce and monitor, and inevitably somewhat limited in their reach. The potential conflict of interest between the borrower and lender stemming from moral hazard again implies that many lenders will lend less than they otherwise would, so that lending and investment will be at suboptimal levels.

The asymmetric information problems described above provides a definition of what a financial crisis is:

A financial crisis is a disruption to financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunities.

A financial crisis thus results in the inability of financial markets to function efficiently, which leads to a sharp contraction in economic activity.

3.1.1 INITIAL STAGE: RUN UP TO THE CURRENCY CRISES

The first stage leading up to a financial crisis in emerging market countries has typically been a financial liberalization, which involved lifting restrictions on both interestrate ceilings and the type of lending allowed and often privatization of the financial system. As a result, lending increased dramatically, fed by inflows of international capital.

Of course, the problem was not that lending expanded, but rather that it expanded so rapidly that excessive risk-taking was the result which led to an increase in nonperforming loans. For example, In Mexico and the East Asian crisis countries, the estimated percentage of loans that were nonperforming increased to over ten percent before the financial crisis struck (Mishkin, 1996a, Goldstein, 1998, and Corsetti, Pesenti and Roubini, 1998), and these estimates were probably grossly understated. This excessive risk-taking occurred for two reasons. First, banks and other financial institutions lacked the well trained loan officers, riskassessment systems, and other management expertise to evaluate and respond to risk appropriately. This problem was made even more severe by the rapid credit growth in a lending boom which stretched the resources of the bank supervisors who also failed to monitor these new loans appropriately. Second, emerging market countries such as Mexico, Ecuador, the East Asian crisis countries and Russia were notorious for weak financial regulation and supervision. (In contrast, the no crisis countries in East Asia, Singapore, Hong Kong and Taiwan had very strong prudential supervision.) When financial liberalization yielded new opportunities to take on risk, these weak regulatory/supervisory systems could not limit the moral hazard created by the government safety net, and excessive risk-taking was one result. Even as government failed in supervising financial institutions, it was effectively offering an implicit safety net that these institutions would not be allowed to go broke, and thus reassuring depositors and foreign lenders that they did not need to monitor these institutions, since there were likely to be government bailouts to protect them.

It is important to note that banks were not the only source of excessive risk taking in financial systems of crisis countries. In Thailand, finance companies, which were essentially unregulated, were at the forefront of real estate lending and they were the first to get into substantial difficulties before the 1997 crisis (Ito, 1998). In Korea, merchant banks, which were primarily owned by the chaebols and were again virtually unregulated, expanded their lending far more rapidly than the commercial banks and were extremely active in borrowing abroad in foreign currency (Hahm and Mishkin, 2000). Banks in these countries also expanded their lending and engaged in excessive risk taking as a result of financial liberalization and weak prudential supervision, but the fact that they received more scrutiny did put some restraints on their behavior.

A dangerous dynamic emerged. Once financial liberalization was adopted, foreign capital flew into banks and other financial intermediaries in these emerging market countries because they paid high yields in order to attract funds to rapidly increase their lending, and because such investments were viewed as likely to be protected by a government safety net, either from the government of the emerging market country or from international agencies such as the IMF. The capital inflow problem was further stimulated by government policies of keeping exchange rates pegged to the dollar, which probably gave foreign investors a sense of lower risk. In Mexico and East Asia capital inflows averaged was over 5 percent of GDP in the three years leading up to the crises. The private capital inflows led to increases in the

banking sector, especially in the emerging market countries in the Asian-Pacific region (Folkerts-Landau et al., 1995). The capital inflows fueled a lending boom which led to excessive risk-taking on the part of banks, which in turn led to huge loan losses and a subsequent deterioration of banks' and other financial institutions' balance sheets.

The inflow of foreign capital, particularly short-term capital, was often actively encouraged by governments. For example, the Korean government allowed chaebols to convert finance companies they owned into merchant banks which were allowed to borrow freely abroad as long as the debt was short-term. A similar phenomenon occurred in Thailand which allowed finance companies to borrow from foreigners. The result was substantial increases in foreign indebtedness relative to the country's holding of international reserves: Mexico, Thailand, Korea and Indonesia all ended up with ratios of short-term foreign debt relative to reserves exceeding 1.5. The high degree of illiquidity in these countries suggests that they were vulnerable to a financial crisis (Radelet and Sachs, 1998).

This deterioration in financial sector balance sheets, by itself, might have been sufficient to drive these countries into financial and economic crises. As explained earlier, deterioration in the balance sheets of financial firms can lead them at a minimum to restrict their lending, or can even lead to a full-scale banking crisis which forces many banks into insolvency, thereby nearly removing the ability of the banking sector to make loans. The resulting credit crunch can stagger an economy.

Another consequence of financial liberalization was a huge increase in leverage in the corporate sector. For example, in Korea debt relative to equity for the corporate sector as a whole shot up to three hundred and fifty percent before the crisis, while it was over four hundred percent for the chaebols. The increase in corporate leverage was also very dramatic in Indonesia where their corporations often borrowed directly abroad by issuing bonds, rather than borrowing from banks. This increase in corporate leverage increased the vulnerability to a financial crisis, because negative shocks would now be far more likely to tip corporations into financial distress.

Stock market declines and increases in uncertainty were additional factors precipitating the full-blown crises in Mexico, Thailand and South Korea. (The stock market declines in Malaysia, Indonesia and the Philippines occurred simultaneously with the onset of the crisis.) The Mexican economy was hit by political shocks in 1994 that created uncertainty, specifically the assassination of Luis Donaldo Colosio, the ruling party's presidential candidate, and an uprising in the southern state of Chiapas. By the middle of December 1994, stock prices on the Bolsa (stock exchange) had fallen nearly 20 percent from their September 1994 peak. In January 1997, a major Korean chaebol (conglomerate), Hanbo Steel, collapsed; it was the first bankruptcy of a chaebol in a decade. Shortly thereafter, Sammi Steel and Kia Motors also declared bankruptcy. In Thailand, Samprosong Land, a major real estate developer, defaulted on its foreign debt in early February 1997, and financial institutions that had lent heavily in the real estate market began to encounter serious difficulties, requiring over \$8 billion of loans from the Thai central bank to prop them up. Finally, in June, the failure of a major Thai finance company, Finance One, imposed substantial losses on both domestic and foreign creditors. These events increased general uncertainty in the financial markets of Thailand and South Korea, and both experienced substantial declines in their securities markets. From peak values in early 1996, Korean stock prices fell by 25 percent and Thai stock prices fell by 50 percent.

As we have seen, an increase in uncertainty and a decrease in net worth as a result of a stock market decline increase asymmetric information problems. It became harder to screen out good from bad borrowers, and the decline in net worth decreased the value of firms' collateral and increased their incentives to make risky investments because there is less equity to lose if the investments are unsuccessful. The increase in uncertainty and stock market declines that occurred before the crisis, along with the deterioration in banks' balance sheets, worsened adverse selection and moral hazard problems and made the economies ripe for a serious financial crisis.

3.1.2 THE SECOND STAGE OF FINANCIAL CRISES "CURRENCY CRISES"

The deterioration of financial and nonfinancial sector balance sheets is a key factor leading to the second stage, a currency crisis. A weak banking system makes it less likely that the central bank will take the steps to defend a domestic currency because if it raises rates, bank balance sheets are likely to deteriorate further. In addition, raising rates sharply increases the cost of financing for highly leveraged corporations, which typically borrow short term, making them more likely to experience financial distress. Once investors recognize that a central bank is less likely to take the steps to successfully defend its currency, expected profits from selling the currency will rise and the incentives to attach the currency have risen. Also the recognition that the financial sector may collapse and require a bailout that would produce substantial fiscal deficits in the future also makes it more likely that the currency will depreciate (Burnside, Eichenbaum and Rebelo 1998).

The weakened state of the financial and nonfinancial balance sheets along with the high degree of illiquidity in Mexico and East Asian countries before the crisis, then set the stage for their currency crises. With these vulnerabilities, speculative attacks on the currency could have been triggered by a variety of factors. In the Mexican case, the attacks came in the wake of political instability in 1994 such as the assassination of political candidates and an uprising in Chiapas. Even though the Mexican central bank intervened in the foreign exchange market and raised interest rates sharply, it was unable to stem the attack and was forced to devalue the peso on December 20, 1994. In Thailand, the attacks followed unsuccessful attempts of the government to shore up the financial system, culminating in the failure of Finance One. Eventually, the inability of the central bank to defend the currency because the required measures would do too much harm to the weakened financial sector meant that the attacks could not be resisted. The outcome was therefore a collapse of the Thai baht in early July 1997. Subsequent speculative attacks on other Asian currencies led to devaluations and floats of the Philippine peso and Malaysian ringgit in mid-July, the Indonesian rupiah in mid-August and the Korean won in October. By early 1998, the currencies of Thailand, the Philippines, Malaysia and Korea had fallen by over 30 percent, with the Indonesian rupiah falling by over 75 percent.

3.1.3 THIRD STAGE: CURRENCY CRISES TO FULL-FLEDGED FINANCIAL CRISES

Once a full-blown speculative attack occurs and causes currency depreciation, the institutional structure of debt markets in emerging market countries --the short duration of debt contracts and their denomination in foreign currencies -- now interacts with the currency devaluation to propel the economies into full-fledged financial crises. These features of debt contracts generate three mechanisms through which the currency crises increased asymmetric information problems in credit markets, thereby causing a financial crisis to occur.

The first mechanism involves the direct effect of currency devaluation on the balance sheets of firms. As discussed earlier, the devaluations in Mexico and East Asia increased the debt burden of domestic firms which were denominated in foreign currencies. This mechanism was particularly strong in Indonesia, the worst hit of all the crisis countries, which saw the value of its currency decline by over 75 percent, thus increasing the rupiah value of foreign-denominated debts by a factor of four. Even a healthy firm is likely to be driven into insolvency by such a shock if it had a significant amount of foreign-denominated debt.

A second mechanism linking the financial crisis and the currency crisis arises because the devaluation of the domestic currency led to further deterioration in the balance sheets of the financial sector, provoking a large-scale banking crisis. In Mexico and the east Asian countries, banks and many other financial institutions had many liabilities denominated in foreign currency which increased sharply in value when a depreciation occurs. On the other hand, the problems of firms and households meant that they were unable to pay off their debts, also resulting in loan losses on the assets side of financial institutions' balance sheets. The result was that banks' and other financial institutions' balance sheets were squeezed from both the assets and liabilities side. Moreover, many of these institutions' foreign-currency denominated debt was very short-term, so that the sharp increase in the value of this debt led to liquidity problems because this debt needed to be paid back quickly. The result of the further deterioration in banks' and other financial institutions' balance sheets and their weakened capital base is that they cut back lending. In the case of Indonesia, these forces were severe enough to cause a banking panic in which numerous banks were forced to go out of business.

The third mechanism linking currency crises with financial crises in emerging market countries is that the devaluation can lead to higher inflation. The central bank in an emerging market country may have little credibility as an inflation fighter. Thus, a sharp depreciation of the currency after a speculative attack that leads to immediate upward pressure on import prices, which can lead to a dramatic rise in both actual and expected inflation. This is exactly what happened in Mexico and Indonesia, where inflation surged to over a 50 percent annual rate after the currency crisis. (Thailand, Malaysia and South Korea avoided a large rise in inflation, which partially explains their better performance relative to Indonesia.) The rise in expected inflation after the currency crises in Mexico and Indonesia led to a sharp rise in

nominal interest rates which, given the short-duration of debt, led to huge increases in interest payments by firms. The outcome was a weakening of firms' cash flow position and further weakening their balance sheets, which then increased adverse selection and moral hazard problems in credit market.

All three of these mechanisms indicate that the currency crisis caused a sharp deterioration in both financial and non-financial firm balance sheets in the crisis countries, which then translated to a contraction in lending and a severe economic downturn. Financial markets were then no longer able to channel funds to those with productive investment opportunities, which led to devastating effects on the economies of these countries.

Note that the 1999 Brazilian crisis was not a financial crisis of the type described here. Brazil experienced a classic balance of payments crisis of the type described in Krugman (1979) in which concerns about unsustainable fiscal policy led to a currency crisis. The Brazilian banking system was actually quite healthy before the crisis because it had undergone substantial reform after a banking crisis in 1994 to 1996 (see Caprio and Klingbiel, 1999). Furthermore, Brazilian banks were adequately hedged against exchange rate risk before the devaluation in 1999 (Adams, et al, 1999). As a result, the devaluation did not trigger a financial crisis, although the high interest rates after the devaluation did lead to a recession. The fact that Brazil did not experience a financial crisis explains why Brazil fared so much better after its devaluation than did Mexico or the East Asian crisis countries.

Russia's financial crisis in 1998 also had a strong fiscal component, but was actually a symptom of widespread breakdown of structural reform and institution-building efforts (see International Monetary Fund, 1999). When the debt moratorium/restructuring and ruble devaluation was announced on August 17, Russian banks were subject to substantial losses on \$27 billion face value of government securities and increased liabilities from their foreign debt. The collapse of the banking system and the negative effects on balance sheets on the nonfinancial sector from the collapse of the ruble then led to a financial crisis along the lines outlined above.

3.2 THE THEORATICAL LITERATURE

3.2.1 FIRST GENERATION CRISES MODEL

The theoretical literature on currency crises can be classified into three categories. The first category, known in the literature as first-generation models, views currency crises as the inevitable consequence of macroeconomic policies that are inconsistent with the maintenance of a fixed exchange rate. Although there are different versions of first-generation models, the seminal paper by Krugman (1979) provides the basic intuition behind these models. Krugman argues that currency crises are caused by high budget deficits that are financed through the expansion of domestic credit. In his model, attempts by the monetary authority to finance fiscal deficits through an expansion of domestic credit lead to reserve losses that ultimately make it impossible for the authorities to maintain the peg. Because these models rely on the premise that currency crises are caused by changes in economic fundamentals, the policy implication is that authorities can avert currency crises by implementing policies that are consistent with the maintenance of a peg.

3.2.1.1 DEBT CRISES OF MEXICO AND LATIN AMERICA 1980s

The primary reasons behind the debt crisis that hit Mexico and other Latin American economies in the early 1980s were the oil price shocks of the 1970s. After the first oil price shock in the early 1970s, the current account deficits of many developing countries increased dramatically in the face of substantial oil imports. Even after the crisis had ended, the developing countries continued to run substantial budge deficits in an attempt to keep their economies from sliding into recession. These budget deficits, as well as the current account deficits were financed by borrowing from abroad, resulting in the accumulation of foreign debt. The external position of these countries was worsened by the second oil price shock, which hit in 1979. The current account deficits of developing countries was hit badly again as imports of oil rose substantially.

Mexico was affected somewhat differently than the other Latin American countries. Why? Because sometime between the first oil price shock and the second oil price shock, Mexico had actually become an oil producer/exporter. So Mexico did quite well in the late 1970s as the price of oil rose in world markets. However, Mexico also embarked on a spending boom that proved unsustainable when oil prices collapsed - causing current account deficits to reappear, budget deficits to rise and threats of a BOP crisis started to appear. To make things worse, the early 1980s was the period when Paul Volcker was tightening interest rates in the United States. Higher interest rates were driving the United States into recession and causing an appreciation of the dollar.

Most of the borrowing that these countries had undertaken from developed countries consisted of adjustable-rate loans, that is to say that the interest rates would change as some key world interest rate changes. The most common rate used was the LIBOR (the London Interbank Offered Rate), a key British interest rate. Loans made by developed countries to developing countries were linked to the LIBOR rate. As interest rates in the U.S. and the rest of the world rose with monetary tightening, the interest rate that developing countries had to pay on their foreign borrowing rose as well. This further weakened the current account balances of these countries and put more pressure on their currencies.

Many countries were adversely affected by the steep appreciation of the dollar that took place in the early 1980s. Since the foreign borrowing came not just with a variable interest rate but also with a requirement that that the debt be repaid in dollars. The appreciation of the dollar further increased the amount of interest payments that countries had to make and worsened the current account balances even further. Between 1977 and 1982 debt service payments for the South and Central American region as a whole increased by almost 250%. The final straw that broke the camel's back was the worldwide recession of the early 1980s precipitated mostly by the tight monetary policy. The recession resulted in a general fall in demand for developing country goods in the developed world and served to make the current account balance even more precarious.

By the summer of 1982, the external debt of several Latin American countries had reached crisis levels. The growing current account deficit coupled with lack of private inflows of capital spelled a BOP crisis in the making. The first government to run out of reserves was Mexico, which announced that it could no longer meet payments on its \$80 billion foreign debt and would therefore need an IMF loan, rescheduling of payments, debt forgiveness and help from other foreign central banks in order to survive. Note that the Mexican economy cannot devalue and get out of the BOP crisis because they have this mountain of dollar denominated debt. Any attempts to devalue would add to the amount of interest payments that Mexico had to make and further worsen the current account balance. The 1980s were a disastrous time for the Mexican economy. There were a series of exchange rate devaluations,

stagnant growth, rising unemployment, stock market collapses and spiraling inflation. The exchange rate went from 26 pesos/\$ at the end of 1982 to 2209 pesos/\$ at the end of 1987, a depreciation of 8400%.

In 1987, the Mexican government embarked on an ambitious reform program that was known as "the Pacto": an agreement between the government, business, unions and agriculture to cooperate on price and wage setting. The peso was devalued, trade was liberalized, stateowned firms were privatized and steps taken to encourage private investment. Some of these steps were unpopular and the Mexican government had to resort to widely derided rigging of elections to elect Carlos Salinas as their new President. Salinas took steps to pursue reforms but also to help Mexico get out from under their existing debt burden. Under the leadership of U.S. Treasury Secretary Nicholas Brady, Mexico's U.S. creditors embarked on a plan whereby bank loans were converted into 30 year bonds. The U.S. government guaranteed the bonds (in exchange for Mexican oil revenue as collateral) making them attractive assets. This was a win-win situation, with Mexico being able to delay payments for 30 years, the banks getting bad loans of their books immediately in exchange for cash and for the U.S. government, which for minimal risk (given Mexico's oil revenues) was able to make Mexico more stable. The Brady plan, along with improved macroeconomic policies and financial restructuring helped Mexico get back on their feet and attract renewed capital inflows by the late 1980s and the early 1990s. The lowering of interest rates in the United States in 1991 coupled with the possibility of the creation of NAFTA promising access to the vast U.S. market meant that Mexico became the destination of choice for capital flows to Latin America in the early 1990s.

3.2.2 SECOND GENERATION CRISES MODEL

The second category, labeled second-generation models, questions the idea that monetary authorities abandon their pegs due to the depletion of international reserves. It argues that a monetary authority might abandon a peg if it were concerned that economic policies necessary to maintain the peg might have adverse effects on other macroeconomic variables. For instance, Ozkan and Sutherland (1993) show that if the unemployment rate in an economy is high, the monetary authority will be less willing to defend it's currency against speculative attacks by raising interest rates because it might aggravate the unemployment problem. Obstfeld (1994), and Bensaid and Jeanne (1994) also argue that an increase in

unemployment or the public debt increases the cost to the government of defending the peg, thereby increasing the probability of a speculative attack on the currency. The government might also be reluctant to defend the peg by raising interest rates due to concern about the effect of this policy on the probability of a banking crisis and the associated fiscal costs of a bail-out (Obstfeld 1996). These models also suggest that the contingent nature of the macroeconomic policy rule may give rise to multiple equilibria in which speculative attacks on currencies are self-fulfilling. The main implication of these models is that it is difficult to explain currency crises as entirely due to changes in economic fundamentals.

3.2.2.1 THE MEXICAN CRISES OF 1994

The Mexican government liberalized the trade sector in 1985, adopted an economic stabilization plan at the end of 1987, and gradually introduced market-oriented institutions. Those reforms led to the resumption of economic growth, which averaged 3.1 percent per year between 1989 and 1994. In 1993 inflation was brought down to single-digit levels for the first time in more than two decades. As its economic reforms advanced, Mexico began to attract more foreign investment, a development helped by the absence of major restrictions on capital inflows, especially in the context of low U.S. interest rates. Indeed, large capital inflows began in 1990, when a successful foreign- debt renegotiation was formalized. The devaluation of the peso in December 1994 put an abrupt end to these capital inflows and precipitated the financial crisis.

3.2.3 THIRD GENERATION CRISES MODEL "BANKING & CURRENCY CRISES"

The third category, labeled contagion models, differs from the other two in the sense that it links currency crises in a domestic economy to crises in other countries. Gerlach and Smets (1994) present a two-country model of contagious currency crises. They show that speculative attacks on one country could spill over to another country if the international reserves available to defend the peg in the second country are small. In their model, a currency crisis in one country that results in devaluation affects the competitiveness of that country's trading partners thereby forcing these countries to devalue in order to avoid a loss of competitiveness. In this framework, the collapse of one currency conveys information that another currency might collapse. Contagious currency crises can be warranted or unwarranted depending on whether or not it can be justified by economic fundamentals. For instance, if a currency crisis in a domestic economy spreads to a foreign country with similar macroeconomic structure and policies, this would be described as warranted contagion. However, when a currency crisis in one country spreads to another country that otherwise would not have had a speculative attack, this would be described as unwarranted contagion.

3.2.3.1 1997 ASIAN CRISES

The Asian Financial Crisis was a period of financial crisis that gripped much of Asia beginning in July 1997, and raised fears of a worldwide economic meltdown (financial contagion). It is also commonly referred to as the IMF crisis.

The crisis started in Thailand with the financial collapse of the Thai baht caused by the decision of the Thai government to float the baht, cutting its peg to the USD, after exhaustive efforts to support it in the face of a severe financial overextension that was in part real estate driven. At the time, Thailand had acquired a burden of foreign debt that made the country effectively bankrupt even before the collapse of its currency. As the crisis spread, most of Southeast Asia and Japan saw slumping currencies, devalued stock markets and other asset prices, and a precipitous rise in private debt.

Though there has been general agreement on the existence of a crisis and its consequences, what is less clear were the causes of the crisis, as well as its scope and resolution. Indonesia, South Korea and Thailand were the countries most affected by the crisis. Hong Kong, Malaysia, Laos and the Philippines were also hurt by the slump. The People's Republic of China, India, Taiwan, Singapore and Vietnam were less unaffected, although all suffered from a loss of demand and confidence throughout the region.

Foreign debt-to-GDP ratios rose from 100% to 167% in the four large ASEAN economies in 1993-96, and then shot up beyond 180% during the worst of the crisis. In Korea, the ratios rose from 13-21% and then as high as 40%, while the other Northern NICs fared much better. Only in Thailand and Korea did debt service-to-exports ratios rise.

Although most of the governments of Asia had seemingly sound fiscal policies, the International Monetary Fund (IMF) stepped in to initiate a \$40 billion program to stabilize the currencies of South Korea, Thailand, and Indonesia, economies particularly hard hit by the crisis. The efforts to stem a global economic crisis did little to stabilize the domestic situation in Indonesia, however. After 30 years in power, President Suharto was forced to step down in

May 1998 in the wake of widespread rioting that followed sharp price increases caused by a drastic devaluation of the rupiah. The effects of the crisis lingered through 1998. In the Philippines growth dropped to virtually zero in 1998. Only Singapore and Taiwan proved relatively insulated from the shock, but both suffered serious hits in passing, the former more so due to its size and geographical location between Malaysia and Indonesia. By 1999, however, analysts saw signs that the economies of Asia were beginning to recover.

Until 1997, Asia attracted almost half of the total capital inflow to developing countries. The economies of Southeast Asia in particular maintained high interest rates attractive to foreign investors looking for a high rate of return. As a result the region's economies received a large inflow of money and experienced a dramatic run-up in asset prices. At the same time, the regional economies of Thailand, Malaysia, Indonesia, the Philippines, Singapore, and South Korea experienced high growth rates, 8-12% GDP, in the late 1980s and early 1990s. This achievement was widely acclaimed by financial institutions including the IMF and World Bank, and was known as part of the "Asian economic miracle".

In 1994, noted economist Paul Krugman published an article attacking the idea of an "Asian economic miracle" He argued that East Asia's economic growth had historically been the result of capital investment, leading to growth in productivity. However, total factor productivity had increased only marginally or not at all. Krugman argued that only growth in total factor productivity, and not capital investment, could lead to long-term prosperity. Krugman's views would be seen by many as prescient after the financial crisis had become full-blown [neutrality disputed], though he himself stated that he had not predicted the crisis nor foreseen its depth.

The causes of the debacle are many and disputed. Thailand's economy developed into a bubble fueled by "hot money". More and more was required as the size of the bubble grew. The same type of situation happened in Malaysia, although Malaysia had better political leadership, and Indonesia, which had the added complication of what was called "crony capitalism". The short-term capital flow was expensive and often highly conditioned for quick profit. Development money went in a largely uncontrolled manner to certain people only, not particularly the best suited or most efficient, but those closest to the centers of power. At the time of the mid-1990s, Thailand, Indonesia and South Korea had large private current account deficits and the maintenance of fixed exchange rates encouraged external borrowing and led to excessive exposure to foreign exchange risk in both the financial and corporate sectors. In the mid-1990s, two factors began to change their economic environment. As the U.S. economy recovered from a recession in the early 1990s, the U.S. Federal Reserve Bank under Alan Greenspan began to raise U.S. interest rates to head off inflation. This made the U.S. a more attractive investment destination relative to Southeast Asia, which had attracted hot money flows through high short-term interest rates, and raised the value of the U.S. dollar, to which many Southeast Asian nations' currencies were pegged, thus making their exports less competitive. At the same time, Southeast Asia's export growth slowed dramatically in the spring of 1996, deteriorating their current account position.

Some economists have advanced the impact of China on the real economy as a contributing factor to ASEAN nations' export growth slowdown, though these economists maintain the main cause of the crises was excessive real estate speculation. China had begun to compete effectively with other Asian exporters particularly in the 1990s after the implementation of a number of export-oriented reforms. Most importantly, the Thai and Indonesian currencies were closely tied to the dollar, which was appreciating in the 1990s. Western importers sought cheaper manufacturers and found them, indeed, in China whose currency was depreciated relative to the dollar. Other economists dispute this claim noting that both ASEAN and China experienced simultaneous rapid export growth in the early 1990s.

Many economists believe that the Asian crisis was created not by market psychology or technology, but by policies that distorted incentives within the lender-borrower relationship. The resulting large quantities of credit that became available generated a highlyleveraged economic climate, and pushed up asset prices to an unsustainable level. These asset prices eventually began to collapse, causing individuals and companies to default on debt obligations. The resulting panic among lenders led to a large withdrawal of credit from the crisis countries, causing a credit crunch and further bankruptcies. In addition, as investors attempted to withdraw their money, the exchange market was flooded with the currencies of the crisis countries, putting depreciative pressure on their exchange rates. In order to prevent a collapse of the currency values, these countries' governments were forced to raise domestic interest rates to exceedingly high levels (to help diminish the flight of capital by making lending to that country relatively more attractive to investors) and to intervene in the exchange market, buying up any excess domestic currency at the fixed exchange rate with foreign reserves. Neither of these policy responses could be sustained for long. Very high interest rates, which can be extremely damaging to an economy that is relatively healthy, wreaked further havoc on economies in an already fragile state, while the central banks were hemorrhaging foreign reserves, of which they had finite amounts. When it became clear that the tide of capital fleeing these countries was not to be stopped, the authorities ceased defending their fixed exchange rates and allowed their currencies to float. The resulting depreciated value of those currencies meant that foreign currency-denominated liabilities grew substantially in domestic currency terms, causing more bankruptcies and further deepening the crisis.

Other economists, including Joseph Stiglitz and Jeffrey Sachs, have downplayed the role of the real economy in the crisis compared to the financial markets due to the speed of the crisis. The rapidity with which the crisis happened has prompted Sachs and others to compare it to a classic bank run prompted by a sudden risk shock. Sachs pointed to strict monetary and contractionary fiscal policies implemented by the governments on the advice of the IMF in the wake of the crisis, while Frederic Mishkin points to the role of asymmetric information in the financial markets that led to a "herd mentality" among investors that magnified a relatively small risk in the real economy. The crisis had thus attracted interest from behavioral economists interested in market psychology. Another possible cause of the sudden risk shock may also be attributable to the handover of Hong Kong sovereignty on July 1, 1997. During the 1990s, hot money flew into the Southeast Asia region but investors were often ignorant of the actual fundamentals or risk profiles of the respective economies. The uncertainty regarding the future of Hong Kong led investors to shrink even further away from Asia, exacerbating economic conditions in the area (subsequently leading to the devaluation of the Thai baht on July 2, 1997).

The foreign ministers of the 10 ASEAN countries believed that the well co-ordinated manipulation of currencies was a deliberate attempt to destabilize the ASEAN economies. Former Malaysian Prime Minister Mahathir Mohamad accused George Soros of ruining Malaysia's economy with "massive currency speculation", an accusation which few economists took seriously.[citation needed] (Soros appeared to have had his bets in against the Asian currency devaluations, incurring a loss when the crisis hit.) At the 30th ASEAN

Ministerial Meeting held in Subang Jaya, Malaysia, they issued a joint declaration on 25 July 1997 expressing serious concern and called for further intensification of ASEAN's cooperation to safeguard and promote ASEAN's interest in this regard. Coincidentally, on that same day, the central bankers of most of the affected countries were at the EMEAP (Executive Meeting of East Asia Pacific) meeting in Shanghai, and they failed to make the 'New Arrangement to Borrow' operational. A year earlier, the finance ministers of these same countries had attended the 3rd APEC finance ministers meeting in Kyoto, Japan on 17 March 1996, and according to that joint declaration, they had been unable to double the amounts available under the 'General Agreement to Borrow' and the 'Emergency Finance Mechanism'. As such, the crisis could be seen as the failure to adequately build capacity in time to prevent currency manipulation. This hypothesis enjoyed little support among economists, however, who argue that no single investor could have had enough impact on the market to successfully manipulate the currencies' values. In addition, the level of organization necessary to coordinate a massive exodus of investors from Southeast Asian currencies in order to manipulate their values rendered this possibility remote.

Such was the scope and the severity of the collapses involved that outside intervention, considered by many as a new kind of colonialism, became urgently needed. Since the countries melting down were among not only the richest in their region, but in the world, and since hundreds of billions of dollars were at stake, any response to the crisis had to be cooperative and international, in this case through the International Monetary Fund (IMF). The IMF created a series of bailouts ("rescue") packages for the most affected economies to enable affected nations to avoid default, tying the packages to reforms that were intended to make the restored Asian currency, banking, and financial systems as much like those of the United States and Europe as possible. In other words, the IMF's support was conditional on a series of drastic economic reforms influenced by neoliberal economic principles called a "structural adjustment package" (SAP). The SAPs called on crisis-struck nations to cut back on government spending to reduce deficits, allow insolvent banks and financial institutions to fail, and aggressively raise interest rates. The reasoning was that these steps would restore confidence in the nations' fiscal solvency, penalize insolvent companies, and protect currency values. Above all, it was stipulated that IMF-funded capital had to be administered rationally in the future, with no favored parties receiving funds by preference. There were to be adequate government controls set up to supervise all financial activities, ones that were to be independent, in theory, of private interest. Insolvent institutions had to be closed, and

insolvency itself had to be clearly defined. In short, exactly the same kinds of financial institutions found in the United States and Europe had to be created in Asia, as a condition for IMF support. In addition, financial systems had to become "transparent", that is, provide the kind of reliable financial information used in the West to make sound financial decisions.

However, the greatest criticism of the IMF's role in the crisis was targeted towards its response. As country after country fell into crisis, many local businesses and governments that had taken out loans in US dollars, which suddenly became much more expensive relative to the local currency which formed their earned income, found themselves unable to pay their creditors. The dynamics of the situation were closely similar to that of the Latin American debt crisis. The effects of the SAPs were mixed and their impact controversial. Critics, however, noted the contractionary nature of these policies, arguing that in a recession, the traditional Keynesian response was to increase government spending, prop up major companies, and lower interest rates. The reasoning was that by stimulating the economy and staving off recession, governments could restore confidence while preventing economic pain. They pointed out that the U.S. government had pursued expansionary policies, such as lowering interest rates, increasing government spending, and cutting taxes, when the United States itself entered a recession in 2001.

Although such reforms were, in most cases, long needed, the countries most involved had ended up undergoing an almost complete political and financial restructuring. They suffered permanent currency devaluations, massive numbers of bankruptcies, collapses of whole sectors of once-booming economies, real estate busts, high unemployment, and social unrest. For most of the countries involved, IMF intervention had been roundly criticized. The role of the International Monetary Fund was so controversial during the crisis, that many locals called the financial crisis the "IMF crisis". To begin with, many commentators in retrospect criticized the IMF for encouraging the developing economies of Asia down the path of "fast track capitalism", meaning liberalization of the financial sector (elimination of restrictions on capital flows); maintenance of high domestic interest rates in order to suck in portfolio investment and bank capital; and pegging of the national currency to the dollar to reassure foreign investors against currency risk. In other words, that the IMF itself was the cause.

3.2.2 THAILAND

From 1985 to 1996, Thailand's economy grew at an average of over 9% per year, the highest economic growth rate of any country at that time. In 1996, an American hedge fund had already sold US\$400 million of the Thai currency. From 1978 until 2 July 1997, the baht was pegged at 25 to the dollar.

On 14 May and 15 May 1997, the Thai baht was hit by massive speculative attacks. On 30 June 1996, Prime Minister Chavalit Yongchaiyudh said that he would not devalue the baht. This was the spark that ignited the Asian financial crisis as the Thai government failed to defend the baht, which was pegged to the U.S. dollar, against international speculators. Thailand's booming economy came to a halt amid massive layoffs in finance, real estate, and construction that resulted in huge numbers of workers returning to their villages in the countryside and 600'000 foreign workers being sent back to their home countries. The baht devalued swiftly and lost half of its value. The baht reached its lowest point of 56 units to the US dollar in January 1998. The Thai stock market dropped 75% in 1997. Finance One, the largest Thai finance company until then, collapsed.

Thailand's administration eventually floated the local currency, on 2 July 1997. On 11 August 1997, the IMF unveiled a rescue package for Thailand with more than \$17 billion, subject to conditionalities such as passing laws relating to bankruptcy (reorganizing and restructuring) procedures and establishing strong regulatory frameworks for banks and other financial institutions. The IMF approved on 20 August 1997, another bailout package of \$3.9 billion.

Thai opposition parties claimed that former Prime Minister Thaksin Shinawatra had profited from the devaluation, although subsequent opposition party-led governments did not investigate the issue.

By 2001, Thailand's economy had recovered. The increasing tax revenue allowed the country to balance its budget and repay its debts to the IMF in 2003, four years ahead of schedule. Even after the military coup d'état the Thai baht continued to appreciate to 36.5 Baht to the Dollar, to 33 Baht to the Dollar in May 2007 and to 31 Baht to the Dollar in May

2008. The present government is trying to boost the Thai economy to a growth rate of 6% throughout 2008.

3.2.3 INDONESIA

In June 1997, Indonesia seemed far from crisis. Unlike Thailand, Indonesia had low inflation, a trade surplus of more than \$900 million, huge foreign exchange reserves of more than \$20 billion, and a good banking sector. But a large number of Indonesian corporations had been borrowing in U.S. dollars. During the preceding years, as the rupiah had strengthened respective to the dollar, this practice had worked well for these corporations; their effective levels of debt and financing costs had decreased as the local currency's value rose.

In July 1997, when Thailand floated the baht, Indonesia's monetary authorities widened the rupiah trading band from 8% to 12%. The rupiah suddenly came under severe attack in August. On 14 August 1997, the managed floating exchange regime was replaced by a free-floating exchange rate arrangement. The rupiah dropped further. The IMF came forward with a rescue package of \$23 billion, but the rupiah was sinking further amid fears over corporate debts, massive selling of rupiah, and strong demand for dollars. The rupiah and the Jakarta Stock Exchange touched a historic low in September. Moody's eventually downgraded Indonesia's long-term debt to 'junk bond'.

Although the rupiah crisis began in July and August 1997, it intensified in November when the effects of that summer devaluation showed up on corporate balance sheets. Companies that had borrowed in dollars had to face the higher costs imposed upon them by the rupiah's decline, and many reacted by buying dollars through selling rupiah, undermining the value of the latter further. The inflation of the rupiah and the resulting steep hikes in the prices of food staples led to rioting throughout the country in which more than 500 people died in Jakarta alone. In February 1998, President Suharto sacked the governor of Bank Indonesia, but this had proved insufficient. Suharto was forced to resign in mid-1998 and B. J. Habibie became President. Before the crisis, the exchange rate between the rupiah and the dollar was roughly 2000 rupiah to 1 USD. The rate had plunged to over 18000 rupiah to 1 USD at various points during the crisis. Indonesia lost 13.5% of its GDP that year.

3.2.4 SOUTH KOREA

Macroeconomic fundamentals in South Korea were good but the banking sector was burdened with non-performing loans as its large corporations were funding aggressive expansions. During that time, there was a haste to build great conglomerates to compete on the world stage. Many businesses ultimately failed to ensure returns and profitability. The Korean conglomerates, more or less completely controlled by the government, simply absorbed more and more capital investment. Eventually, excess debt led to major failures and takeovers. For example, in July 1997, South Korea's third-largest car maker, Kia Motors, asked for emergency loans. In the wake of the Asian market downturn, Moody's lowered the credit rating of South Korea from A1 to A3, on November 28, 1997, and downgraded again to B2 on December 11. That contributed to a further decline in Korean shares since stock markets were already bearish in November. The Seoul stock exchange fell by 4% on 7 November 1997. On November 8, it plunged by 7%, its biggest one-day drop to that date. And on November 24, stocks fell a further 7.2% on fears that the IMF would demand tough reforms. In 1998, Hyundai Motor took over Kia Motors. Samsung Motors' \$5 billion dollar venture was dissolved due to the crisis, and eventually Daewoo Motors was sold to the American company General Motors (GM).

The Korean won, meanwhile, weakened to more than 1,700 per dollar from around 800. Despite an initial sharp economic slowdown and numerous corporate bankruptcies, Korea has managed to triple its per capita GDP in dollar terms since 1997. Indeed, it resumed its role as the world's fastest-growing economy -- since 1960, per capita GDP has grown from \$80 in nominal terms to more than \$21,000 as of 2007. However, like the chaebol, South Korea's government did not escape unscathed. Its national debt-to-GDP ratio more than doubled (app. 13% to 30%) as a result of the crisis.

3.2.5 PHILIPPINES

The Philippine central bank raised interest rates by 1.75 percentage points in May 1997 and again by 2 points on 19 June. Thailand triggered the crisis on 2 July and on 3 July, the Philippine Central Bank was forced to intervene heavily to defend the peso, raising the overnight rate from 15% to 24%. The peso fell significantly, from 26 pesos per dollar at the start of the crisis, to 38 pesos in 2000, and to 40 pesos by the end of the crisis.

The Philippine economy recovered from a contraction of 0.6% in GDP during the worst part of the crisis to GDP growth of some 3% by 2001, despite scandals of the administration of Joseph Estrada in 2001, most notably the "jueteng" scandal, causing the PSE Composite Index, the main index of the Philippine Stock Exchange, to fall to some 1000 points from a high of some 3000 points in 1997. The peso fell even further, trading at levels of about 55 pesos to the US dollar. Later that year, Estrada was on the verge of impeachment but his allies in the senate voted against the proceedings to continue further. This led to popular protests culminating in the "EDSA II Revolution", which finally forced his resignation and elevated Gloria Macapagal-Arroyo to the presidency. Arroyo managed to lessen the crisis in the country, which led to the recovery of the Philippine peso to about 50 pesos by the year's end and is now trading at around 41 pesos to a dollar by end 2007. The stock market also reached an all time high in 2007 and the economy is growing by at least more than 7 percent, its highest in nearly 2 decades.

3.2.6 HONG KONG

Although the two events were unrelated, the collapse of the Thai baht on July 2, 1997, came only 24 hours after the United Kingdom handed over sovereignty of Hong Kong to the People's Republic of China. In October 1997, the Hong Kong dollar, which had been pegged at 7.8 to the U.S. dollar since 1983, came under speculative pressure because Hong Kong's inflation rate had been significantly higher than the U.S.'s for years. Monetary authorities spent more than US\$1 billion to defend the local currency. Since Hong Kong had more than US\$80 billion in foreign reserves, which is equivalent to 700% of its M1 money supply and 45% of its M3 money supply, the Hong Kong Monetary Authority (effectively the city's central bank) managed to maintain the peg.

Stock markets became more and more volatile; between 20 October and 23 October the Hang Seng Index dropped 23%. The Hong Kong Monetary Authority then promised to protect the currency. On 15 August 1998, it raised overnight interest rates from 8% to 23%, and at one point to 500%. The HKMA had recognized that speculators were taking advantage of the city's unique currency-board system, in which overnight rates automatically increase in proportion to large net sales of the local currency. The rate hike, however, increased downward pressure on the stock market, allowing speculators to profit by short selling shares. The HKMA started buying component shares of the Hang Seng Index in mid-August.

The HKMA and Donald Tsang, then the Financial Secretary, declared war on speculators. The Government ended up buying approximately HK\$120 billion (US\$15 billion) worth of shares in various companies, and became the largest shareholder of some of those companies (e.g. the government owned 10% of HSBC) at the end of August, when hostilities ended with the closing of the August Hang Seng Index futures contract. The Government started selling those shares in 2001, making a profit of about HK\$30 billion (US\$4 billion).

3.2.7 MALAYSIA

Before the crisis, Malaysia had a large current account deficit of 5% of its GDP. At the time, Malaysia was a popular investment destination, and this was reflected in KLSE activity which was regularly the most active stock exchange in the world (with turnover exceeding even markets with far higher capitalization like the NYSE). Expectations at the time were that the growth rate would continue, propelling Malaysia to developed status by 2020, a government policy articulated in Wawasan 2020. At the start of 1997, the KLSE Composite index was above 1,200, the ringgit was trading above 2.50 to the dollar, and the overnight rate was below 7%.

In July 1997, within days of the Thai baht devaluation, the Malaysian ringgit was "attacked" by speculators. The overnight rate jumped from under 8% to over 40%. This led to rating downgrades and a general sell off on the stock and currency markets. By end of 1997, ratings had fallen many notches from investment grade to junk, the KLSE had lost more than 50% from above 1,200 to under 600, and the ringgit had lost 50% of its value, falling from above 2.50 to under 3.80 to the dollar.

In 1998, the output of the real economy declined plunging the country into its first recession for many years. The construction sector contracted 23.5%, manufacturing shrunk 9% and the agriculture sector 5.9%. Overall, the country's gross domestic product plunged 6.2% in 1998. During that year, the ringgit plunged below 4.7 and the KLSE fell below 270 points. In September that year, various defensive measures were announced in order to overcome the crisis. The principal measure taken was to move the ringgit from a free float to a fixed exchange rate regime. Bank Negara fixed the ringgit at 3.8 to the dollar. Capital

controls were imposed while aid offered from the IMF was refused. Various task force agencies were formed. The Corporate Debt Restructuring Committee dealt with corporate loans. Danaharta discounted and bought bad loans from banks to facilitate orderly asset realization. Danamodal recapitalized banks.

Growth then settled at a slower but more sustainable pace. The massive current account deficit became a fairly substantial surplus. Banks were better capitalized and NPLs were realized in an orderly way. Small banks were bought out by strong ones. (Unfortunately, this was an excuse for the government-linked banks, which were actually in a weak financial position to force the smaller banks out of the market. Ironically, it was the smaller banks, managed in a sound financial manner, that were dissolved, instead of the larger politically-favored banks.) A large number of PLCs were unable to regulate their financial affairs and were delisted. Compared to the 1997 current account, by 2005, Malaysia was estimated to have a US\$14.06 billion surplus. Asset values however, have not returned to their pre-crisis highs. In 2005 the last of the crisis measures were removed as the ringgit was taken off the fixed exchange system. But unlike the pre-crisis days, it did not appear to be a free float, but a managed float, like the Singapore dollar.

3.2.8 SINGAPORE

As the financial crisis spread the economy of Singapore dipped into a short recession. The relatively short duration and milder effect on its economy was credited to the active management by the government. For example, the Monetary Authority of Singapore allowed for a gradual 20% depreciation of the Singapore dollar to cushion and guide the economy to a soft landing. The timing of government programs such as the Interim Upgrading Program and other construction related projects were brought forward. Instead of allowing the labor markets to work, the National Wage Council pre-emptively agreed to Central Provident Fund cuts to lower labor costs, with limited impact on disposable income and local demand. Unlike in Hong Kong, no attempt was made to directly intervene in the capital markets and the Straits Times Index was allowed to drop 60%. In less than a year, the Singaporean economy fully recovered and continued on its growth trajectory.

3.2.9 CHINA

The Chinese currency, the renminbi (RMB), had been pegged to the US dollar at a ratio of 8.3 RMB to the dollar, in 1994. Having largely kept itself above the fray throughout 1997-1998 there was heavy speculation in the Western press that China would soon be forced to devalue its currency to protect the competitiveness of its exports vis-a-vis those of the ASEAN nations, whose exports became cheaper relative to China's. However, the RMB's non-convertibility protected its value from currency speculators, and the decision was made to maintain the peg of the currency, thereby improving the country's standing within Asia. The currency peg was partly scrapped in July 2005 rising 2.3% against the dollar, reflecting pressure from the United States.

Unlike investments of many of the Southeast Asian nations, almost all of China's foreign investment took the form of factories on the ground rather than securities, which insulated the country from rapid capital flight. While China was relatively unaffected by the crisis compared to Southeast Asia and South Korea, GDP growth slowed sharply in 1998 and 1999, calling attention to structural problems within its economy. In particular, the Asian financial crisis convinced the Chinese government of the need to resolve the issues of its enormous financial weaknesses, such as having too many non-performing loans within its primitive and inefficient banking system, and relying heavily on trade with the United States.

3.2.10 UNITED STATES & JAPAN

The "Asian flu" had also put pressure on the United States and Japan. Their markets did not collapse, but they were severely hit. On 27 October 1997, the Dow Jones industrial plunged 554 points or 7.2%, amid ongoing worries about the Asian economies. The New York Stock Exchange briefly suspended trading. The crisis led to a drop in consumer and spending confidence (see October 27, 1997 mini-crash). Japan was affected because its economy is prominent in the region. Asian countries usually run a trade deficit with Japan because the latter's economy was more than twice the size of the rest of Asia together as about 40% of Japan's exports go to Asia. The Japanese yen fell to 147 as mass selling began, but Japan was the world's largest holder of currency reserves at the time, so it was easily defended, and quickly bounced back. GDP real growth rate slowed dramatically in 1997, from 5% to 1.6% and even sank into recession in 1998, due to intense competition from cheapened rivals. The Asian financial crisis also led to more bankruptcies in Japan. In addition, with

South Korea's devalued currency, and China's steady gains, many companies complained outright that they could not compete.

Another longer-term result was the changing relationship between the U.S. and Japan, with the U.S. no longer openly supporting the highly artificial trade environment and exchange rates that governed economic relations between the two countries for almost five decades after World War II.

3.2.11 CONSEQUENCES

3.2.11.1 ASIA

The crisis had significant macro-level effects, including sharp reductions in values of currencies, stock markets, and other asset prices of several Asian countries. The nominal US dollar GDP of ASEAN fell by US\$9.2 billion in 1997 and \$218.2 billion (31.7%) in 1998. In Korea, the \$170.9 billion fall in 1998 was equal to 33.1% of the 1997 GDP. Many businesses collapsed, and as a consequence, millions of people fell below the poverty line in 1997-1998. Indonesia, South Korea and Thailand were the countries most affected by the crisis.

The economic crisis also led to political upheaval, most notably culminating in the resignations of President Suharto in Indonesia and Prime Minister General Chavalit Yongchaiyudh in Thailand. There was a general rise in anti-Western sentiment, with George Soros and the IMF in particular singled out as targets of criticisms. Heavy U.S. investment in Thailand ended, replaced by mostly European investment, though Japanese investment was sustained. Islamic and other separatist movements intensified in Southeast Asia as central authorities weakened.

More long-term consequences included reversal of the relative gains made in the boom years just preceding the crisis. Nominal US dollar GDP per capital fell 42.3% in Indonesia in 1997, 21.2% in Thailand, 19% in Malaysia, 18.5% in Korea and 12.5% in the Philippines. The CIA World Fact book reported that the per capita income (measured by purchasing power parity) in Thailand declined from \$8,800 to \$8,300 between 1997 and 2005; in Indonesia it declined from \$4,600 to \$3,700; in Malaysia it declined from \$11,100 to \$10,400. Over the same period, world per capita income rose from \$6,500 to \$9,300. Indeed, the CIA's analysis asserted that the economy of Indonesia was still smaller in 2005 than it had been in 1997,

suggesting an impact on that country similar to that of the Great Depression. Within East Asia, the bulk of investment and a significant amount of economic weight shifted from Japan and ASEAN to China and India.

The crisis has been intensively analyzed by economists for its breadth, speed, and dynamism; it affected dozens of countries, had a direct impact on the livelihood of millions, happened within the course of a mere few months, and at each stage of the crisis leading economists, in particular the international institutions, seemed a step behind. Perhaps more interesting to economists was the speed with which it ended, leaving most of the developed economies unharmed. These curiosities have prompted an explosion of literature about financial economics and a litany of explanations why the crisis occurred. A number of critiques have been leveled against the conduct of the IMF in the crisis, including one by former World Bank economist Joseph Stiglitz. Politically there were some benefits. In several countries, particularly South Korea and Indonesia, there was renewed push for improved corporate governance. Rampaging inflation weakened the authority of the Suharto regime and led to its toppling in 1998, as well as accelerating East Timor's independence.

3.2.11.2 OUTSIDE ASIA

After the Asian crisis, international investors were reluctant to lend to developing countries, leading to economic slowdowns in developing countries in many parts of the world. The powerful negative shock also sharply reduced the price of oil, which reached a low of \$8 per barrel towards the end of 1998, causing a financial pinch in OPEC nations and other oil exporters. Such sharply reduced oil revenue in turn contributed to the Russian financial crisis in 1998. Which in turn caused Long-Term Capital Management in the United States to collapse, after losing \$4.6 billion in 4 months. A wider collapse in the financial markets was avoided when Alan Greenspan and the Federal Reserve Bank of New York organized a \$3.625 billion bail-out. Major emerging economies Brazil and Argentina also fell into crisis in the late 1990s (see Argentine debt crisis).

The crisis in general was part of a global backlash against the Washington Consensus and institutions such as the IMF and World Bank, which simultaneously became unpopular in developed countries following the rise of the anti-globalization movement in 1999. Four major rounds of world trade talks since the crisis, in Seattle, Doha, Cancún, and Hong Kong, have failed to produce a significant agreement as developing countries have become more assertive, and nations are increasingly turning toward regional or bilateral FTAs (Free Trade Agreements) as an alternative to global institutions. Many nations learned from this, and quickly built up foreign exchange reserves as a hedge against attacks, including Japan, China, South Korea. Pan Asian currency swaps were introduced in the event of another crisis. However, interestingly enough, such nations as Brazil, Russia, and India as well as most of East Asia began copying the Japanese model of weakening their currencies, restructuring their economies so as to create a current account surplus to build large foreign currency reserves. This has led to an ever increasing funding for US treasury bonds, allowing or aiding housing (in 2001-2005) and stock asset bubbles (in 1996-2000) to develop in the United States.

3.3 THE EMPRICAL LITERATURE

3.3.1 Mark Kruger, Patrick N. Osakwe and Jennifer Page

The variables used in the analysis were: the ratio of external debt to GDP; the ratio of M2 to reserves; the ratio of current account deficit (surplus) to GDP; the ratio of government budget deficit (surplus) to GDP; the growth rate of domestic credit; the growth rate of per capita GDP; the ratio of banks' claims on the private sector to GDP; the CPI inflation rate; the real exchange rate; and a foreign interest rate variable. The external debt variable is a measure of a country's vulnerability to external shocks while the ratio of M2 to reserves is a measure of reserve adequacy. The use of a broad measure of money, as opposed to the monetary base, in the definition of the reserve adequacy variable can be rationalised on the grounds that it measures the potential amount of liquid monetary assets that agents can try to convert into foreign exchange. The ratio of the current account deficit (surplus) to GDP and the real exchange rate are indicators of external competitiveness. Fiscal and monetary policies are captured by the ratio of budget deficit (surplus) to GDP and the growth rate of domestic credit respectively.

Using pooled annual data for 19 developing countries, they estimate a probit model linking macroeconomic variables and a measure of contagion to the crisis index by maximum likelihood. Since estimated coefficients in probit models are difficult to interpret, we report the effects of one-unit changes in the regressors on the probability of a crisis (in percentage points), evaluated at the mean of the data. They also report the p-values associated with each coefficient. Following Eichengreen, Rose and Wyplosz (1996), we estimate an equation of the form:

$Crisis_{i,t} = \theta R (Crisis_{j,t}) + \lambda I(L)_{i,t-1} + \varepsilon_{i,t}$

They use a panel of annual data for 19 developing countries spanning the period 1977-1993, to examine the determinants of currency crises in developing countries. They consider the roles played by economic fundamentals and contagion in speculative attacks on fixed exchange rates in developing countries. The empirical findings indicate that lending booms, real exchange rate misalignment and reserve inadequacy increase the probability of a speculative attack on a currency. The results also provide support for the idea that currency crises could be contagious. The finding of a significant and robust regional contagion effect is interesting in the light of the recent experiences of countries in East Asia. In particular, it is consistent with the observation that the recent currency crisis in Thailand spread to Indonesia, Malaysia, the Philippines and South Korea.

3.3.2 Charles Wyplosz

Wyplosz, Charles (1998) "Speculative Attacks and Capital Mobility", Graduate Institute Of International Studies, Geneva and CEPR

Using the terminology of statistical tests, leading crisis indicators face Type I errors when they fail to predict attacks which occur, and Type II errors when they predict attacks which do not occur. If our understanding of what trigger crises is sketchy, Type I errors are likely to be frequent. If crises are largely self-fulfilling, type II errors will be widespread. Preliminary testing of such indicators by Kaminsky, Lizondo and Reinhart (1997) reveal that both types of errors are prevalent.

To further explore this issue, He use the crisis models estimated by Eichengreen, Rose and Wyplosz (1995) for the OECD countries, and by Frankel and Rose (1996) for emerging market economies. In each case He take the preferred specification which includes both lagged and leading variables (as these papers were trying to identify both causes and effects of currency crises). He then suppress the leading variables as is proper when building a leading indicator, eliminate the right hand-side variables which do not enter significantly, and produce within-sample predictions with the resulting regression. This procedure is biased towards making the indicators appear better than they would if they were used, as intended, for out of sample predictions. The bad results that follow are therefore better than they would be in a real forecasting context.

Crisis criterion:	2 standard deviations	1.5 standard deviation	l standard deviation
		0.20	0.50
Crisis in previous period		-0.39	-0.58
		(-1.87)	(-3.43)
	1 40	0.06	0.00
Capital controls	-1.44	-1.24	
	(-14.29)	(-14.92)	
Phase and it any with	0.00	4.70	
Domestic credit growth	-4.84	-4.70	
	(-1.20)	0.07	
1.0.0	0.12	0.07	24 41
Inflation	- 20.32	-11.1.2	- 24.41 6.1.4.545
	(-4.39)	(-2.41)	(-14.24)
CDD	0.00	0.02	14.80
G DP growth	-14.39		-14.0%
	(-1.60)		(-3.01)
	0.11	4° 57 57	0.05
Employment	-8.23	-0.88	
	(-2.55)	(-2.02)	
1.1	0.01	0.01	0.01
Unemployment			(1.05)
			(1.95)
There are the law or			0.05
Budget parance			-7.10
			(-3.30)
Current account			0.00
c un em account			(5.53)
			0.00
S.E. of regression	0.273	0.325	0.432
Sum squared resid	106.41	150.13	311.86
N. of observations	1430	1430	1679
Obs with Dep=0	1389	1338	[44]
Obs with Der=1	41	02	238

Table 1. Probit model of currency crises in OECD countries Quarterly observations, 1959-93

Notes: Dependent is 1 = crisis, 0 = no crisis.

Regressors are 4 quarter equally weighted moving averages. In brackets: z-statistic for no significant effect, below the corresponding pvalue.

Table 1 reports the preferred probit regressions for 20 OECD countries over the period 1959-93. It uses the quarterly dataset fully described in Eichengreen, Rose and Wyplosz (1995). The dependent variable is binary, taking the value of 1 when a crisis occurred and 0 when there was no crisis. Crises are identified using an index of market pressure constructed as the weighted average of exchange and interest rate changes and foreign exchange reserves losses, the weights being inversely proportional to the standard deviation of each of the three variables. This index captures either a successful attack (a sharp devaluation), or a successful defense (the exchange rate remains unchanged but the monetary authorities deter an attack by

a combination of interest rate increases and foreign exchange market interventions), or an unsuccessful defense (all three variables move sharply). The index signals a crisis whenever the index departs form its sample mean by more than x standard deviations, x being alternatively set at 2, 1.5 and 1. For x = 2, the index identifies 41 crisis episodes and 1389 tranquil quarters. With x = 1, as many as 238 crises are identified.

CHAPTER 4: METHODOLOGY

4.1 MARKET PRESSURE INDEX

The Exchange Market Pressure (EMP) Index, developed by Eichengreen (1994), is widely used to study currency crises as a tool to signal whether pressures on a currency are softened or warded off through monetary authorities' interventions or whether a currency crisis has originated.

Currency crises in emerging and developing economies have been extensively analyzed in the literature with a variety of analytical tools proposed to identify crisis episodes. One of the indexes that are most widely adopted to signal the break up of a crisis is the Exchange Market Pressure, EMP hereafter, introduced in a seminal paper by Girton and Roper [1977] to investigate independence of and interventionist stance by a Central Bank as a simple average of exchange rate changes and a foreign reserve depletion indicator. An extension was suggested by Eichengreen, Rose and Wyplosz (1994 – henceforth ERW), adding the interest rate spread to the index, to describe possible monetary policy responses to a disequilibrium in the foreign exchange market. Their index is a weighted average to take into consideration the different variability in the three variables.

ERW were the first to employ the EMP as a basis for the analysis of currency crises: in their application on exchange market behaviour for developed countries, when the EMP passes over a threshold, excess pressure is flagged and a binary variable takes on a value of one.

The EMP index is meant to capture depreciations but also the type of pressure on a currency (as would happen in the presence of depreciation expectations) which is softened or diverted through monetary authority interventions, and does not necessarily show up in the observed behaviour of nominal exchange rate dynamics (i.e. `Peso Problem' type, Evans [1996]). In this view, crisis episodes occur even if speculative attacks are not successful.

The EMP proposed by ERW is defined as:

$$EMP_t = \propto \Delta_{\%} e_t + \beta \Delta (i_t - i_t^f) + \gamma \Delta (r_t^f - r_t)$$

that is a weighted average (with positive weights α , β and γ) of three variables: $\Delta_{\%}e_t$ is the

percentage change in the nominal exchange rate against a reference currency, $\Delta(i_t - i_t^f)$ represents the variation in the spread between the domestic interest rate and the foreign interest rate and finally $\Delta(r_t^f - r_t)$ is the change in the spread between foreign reserves (relative to monetary base) abroad and at home. The EMP index can take values on the real line, with high positive values associated to a pressure on the domestic currency, as a combination of a nominal depreciation, a widening of the interest rate spread or a loss of foreign reserves.

4.2 BINARY DEPENDENT VARIABLE

There are many economic contexts in which the dependent variable represents a dichotonomy, that is, has only two distinct possible values. Without of loss generality, the two outcomes can be coded as Y=1 and Y=0, giving us a *binary dependent variable*. As usual we are primarily interested in the conditional expectation of Y given one or more conditioning variables ("dummy X's") can be used freely in linear regression models, binary dependent variables ("dummy Y's) cannot, for reasons that will soon become clear. In a sense, we will be considering yet onther violation of the classical regression model, one in which the conditional expectation function is not linear.

4.2.1 LINEAR REGRESSION MODEL

Linear Probability Model is not logically a very attractive model because it assumes that $P_i = E(Y = 1 | X)$ increases linearly with X, that is, the marginal or incremental effect of X remains constant throughout. This seems sometimes very unrealistic. Therefore, there is a need of a probability model that has two features: (1) as X increases, $P_i = E(Y = 1 | X)$ increases but never steps outside the 0-1 interval, and (2) the relationship between P, and X_i is non-linear, that is, approaches "one" which approaches zero at slower and slower rates as X_i gets small and approaches one at slower and slower rates as X gets very large.

4.2.2 THE LOGIT REGRESSION MODEL

Logit regression (logit) analysis is a uni/multivariate technique which allows for estimating the probability that an event occurs or not, by predicting a binary dependent outcome from a set of independent variables.

4.2.2.1 FEATURES OF LOGIT REGRESSION MODEL

- 1. As P goes from 0 to 1, the logit L goes from $-\infty$ to $+\infty$. That is, although the probabilities lie between 0 and 1, the logits are not so bounded.
- 2. Although L is linear in X, the probabilities themselves are not
- 3. The interpretation of the logit model is as follows: β_2 , the slope, measures the change in L for a unit change in X, i.e it tells how the log odds in favour of owning a house change as income changes by a unit. The intercept β_1 is the value of the log odds in favour of owning a house if income is zero.
- Given a certain level of income, say X', if we actually want to estimate not the odds in favour of owning a house but the probability of owning a house itself, this can be done directly (1) once the estimates of β1 and β2 are available.
- 5. The linear probability model assumes that P_i is linearly related to X_i, the logit model assumes that the log of odds ratio is linearly related to X_i

4.2.3 THE PROBIT REGRESSION MODEL

In order to explain the behavior of a dichotomous dependent variable we have to use a suitably chosen Cumulative Distribution Function (CDF). The logit model uses the cumulative logistic function. But this is not the only CDF that one can use. In some applications, the normal CDF has been found useful. The estimating model that emerges from the normal CDF is known as the Probit Model or Normit Model. Let us assume that in home ownership example, the decision of the ith family to own a house or not depends on unobservable utility index I_i, that is determined by the explanatory variables in such a way that the larger the value of index I_i, the greater the probability of the family owning a house.

The index I_i can be expressed as $I_i = \beta_1 + \beta_2 X_i$, where X_i is the income of the ith family.

For each family there is a critical or threshold level of the index (I_{i^*}), such that if I_{i} exceeds I_{i^*} , the family will own a house otherwise not. But the threshold level I_{i^*} is also not observable. If it is assumed that it is normally distributed with the same mean and variance, it is possible to estimate the parameters of (5) and thus get some information about the unobservable index itself.

In Probit Analysis, the unobservable utility index (I,) is known as normal equivalent deviate (n.e.d) or

simply Normit. Since n.e.d. or I_i will be negative whenever $P_i < 0.5$, in practice the number 5 is added to the n.e.d. and the result so obtained is called the Probit i.e; Probit = n.e.d + 5 = I_i + 5

In order to estimate β_1 and β_2 , (5) can be written as $I_i = \beta_1 + \beta_2 X_i + U_i$

4.2.4 LOGIT VERSUS PROBIT MODEL

- 1. The chief difference between logit and probit is that logistic has slightly flatter tails.
- 2. Qualitatively, logit and probit models give similar results, the estimates of parameters of the two models are not directly comparable.



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CHAPTER 5: VARIABLES & ANALYSIS

5.1 VARIABLES (EXPECTED SIGNS)

Variable Name	Definition	Expected Sign
Macroeconomic Variables:		
GDP	The growth rate of real GDP	_
Inflation (INE)	The inflation rate	+
Real Interest Rate (RIR)	The real interest rates	+
External Conditions:		
Real Exchange Rate (RER)	The real exchange rate	+
Terms of Trade (TT)	The Terms of Trade Change	-
Market Pressure	The Market Pressure Index in Turkey	+

5.2 EXPLANATORY VARIABLES

A number of macro factors are considered by theory as good indicators of currency crises.

5.2.1 MACROECONOMIC ENVIRONMENT

To capture macroeconomic characteristics the real GDP growth, the inflation rate, the real interest rates considered. It is expected that low GDP growth, high inflation, high real interest rate will increase the probability of currency crises.

5.2.1.1 THE GROWTH RATE OF GDP

Economic analysts argue that currency crises are commonly preceded by a significant contraction in real GDP growth. An increase in real GDP growth rate is negatively related to the probability of currency crises. This variable is also used by "Eichengreen, Rose, and Wyplosz (1995)", "Frankel and Rose (1996)".

5.2.1.2 THE INFLATION RATE

High inflation tends to be associated with an increased probability of currency crises. It has long been recognized that sudden changes in inflation can have a negative impact on interest rates. This causes to increase in the risk of currency crises. This variable is also used by "Eichengreen, Rose, and Wyplosz (1995)", "Krugman (1996)".

5.2.1.3 THE REAL INTEREST RATES

An increase in real interest rates is likely to raise the probability of currency crises. Real interest rates would signal an impending liquidity problem in the financial system and also potentially to result in a slowdown in the rate of economic growth. Hence, in such circumstances it is expected that an increase in interest rates would serve to increase. This variable is also used by "Eichengreen, Rose, and Wyplosz (1995)", "Frankel and Rose (1996)", "Kaminsky and Reinhart (1996)".

5.2.2 THE EXTERNAL CONDITIONS

5.2.2.1 THE REAL EXCHANGE RATE

Foreign shocks such as high real exchange rate are likely to increase the probability of crises. In principle, "volatility in real exchange rate can cause difficulty for financial system". This variable also used by "Eichengreen, Rose, and Wyplosz (1995)", "Frankel and Rose (1996)", "Kaminsky and Reinhart (1996)", "Sachs, Tornell, and Velasco (1995)".

5.2.2.2 THE TERMS OF TRADE

There is a fair amount of evidence suggesting that some crises are proceed by negative trade shocks (Edward (1989)). This variable is used by "Kaminsky and Reinhart (1996)".

5.2.2.3 THE MARKET PRESSURE INDEX

The market pressure index is an important factor that determines currency crises. The existence of contagious currency crises is constructed as an index of exchange market pressure, which is weighted average of changes in interest rates, international reserves and the nominal exchange rate. Following the approach of Eichengreen, Wyplosz and Rose (1996) for contagious crises, an index of money market pressure is proposed by identifying crises in Turkey.

5.2 ANALYSIS

5.2.1 CORRELATION MATRIX

Including highly correlated macro variables in a model could result in significant bias to level of the parameters. For this reason, in order to prevent the collinearity problem, the models formed in this research do not include correlated variables in the same model. Table 5.2 tabulates the correlation matrix for macro factors in Turkey. Explaining the correlation between variables and taking into account practical aspects help in making a decision concerning what variables should be dropped from a model. The correlation between GDP growth and change in exchange rate (-0,6377), GNP growth and change in exchange rate (-0,6236), change in import and change in exchange rate (-0,6242), MPI and change in exchange rate (0,8617), GDP growth and GNP growth (0,9932), GDP growth and change in import (0,8196), GDP growth and term of trade (-0,7202), change in import and inflation (-0,7125), GNP growth and term of trade (-0,8427) were remarkably high. Therefore, in order to prevent these highly correlated variables from causing multicollinearity problems, one variable needed to be dropped from the logistic model.

TABLE 5.1 CORRELATION MATRIX

	CHANGE IN	REAL		GNP		CHANGE	CHANGE	TERM			FOREIGN	
	EXCHANGE	INTEREST	GDP	PER	GNP	IN	IN	OF	M1		EXCHANGE	
	RATE	RATE	GROWTH	CAPITA	GROWTH	EXPORT	IMPORT	TRADE	GROWTH	INFLATION	RATE	MPI
CHANGE IN EXCHANGE RATE	1,0000											
REAL INTEREST RATE	0,2831	1,0000										
GDP GROWTH	-0,6377	-0,1693	1,0000									
GNP PER CAPITA	-0,3882	0,5140	0,2467	1,0000								
GNP GROWTH	-0,6236	-0,1546	0,9932	0,2483	1,0000							
CHANGE IN EXPORT	-0,2540	0,2083	0,2925	0,1464	0,2988	1,0000						
CHANGE IN IMPORT	-0,6242	0,0053	0,8196	0,3600	0,8168	0,4312	1,0000					
TERM OF TRADE	0,5351	0,1185	-0,7271	-0,3087	-0,7202	0,1224	-0,8427	1,0000				
M1 GROWTH	0,4051	0,3065	-0,1206	0,0375	-0,1119	-0,4177	-0,0914	-0,1487	1,0000			
INFLATION	0,4670	-0,4904	-0,0603	-0,7125	-0,0452	-0,4358	-0,2548	0,0202	0,2441	1,0000		
FOREIGN EXCHANGE RATE	0,1646	0,0623	-0,2966	-0,0242	-0,3602	-0,1201	-0,1420	0,0846	-0,0417	-0,1610	1,0000	
MPI	0,8617	0,2329	-0,4816	-0,4576	-0,4871	-0,0872	-0,5546	0,5580	0,1762	0,4807	0,2357	1,0000

5.2.2 LOGIT ANALYSIS

This section presents the results of the logit model, which estimates how a particular macro variable changes the probability of the occurrence of the event when all other variables are constant.

Some variables are perfectly correlated so we do not include these variables in the logit regression model and we run the logit regression for all variables separately. In the logit regression analysis; just the fixed exchange rate is significant and fixed exchange rate increases the currency crises risk. Significance level of fixed exchange rate is 90%. The R^2 is between the 0.0045 and 0.2951. In order to increase R^2 we must add more variables to the regression analysis.

TABLE 5.2 LOGIT ANALYSIS (MACROECONOMIC FACTORS)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Macroeconomic Variables: Real Interest Rates	-0,1316975 (0,170)					
GNP per Capita		-0,0008182 (0,432)				
Change in Export			2,209826 (0,738)			
M1 Growth				1,281185 (0,645)		
Inflation					-0,006460 (0,802)	
Fix Exchange Rate						2,995732 (0,086)*
Constant	-3,669825 (0,042)	-0,352287 (0,883)	-2,661602 (0,033)	-3,124242 (0,104)	-1,945791 (0,261)	-2,995732 (0,003)
Pseudo R ² Number of Observations	0,295 23	0,0537 23	0,0081 23	0,0149 23	0,0045 23	0,2043 23

Notes: (1) * indicates significance at the 10 percent level respectively

CHAPTER 6: CONCLUSION & RECOMMENDATIONS

6.1 CONCLUSION

In the results of the regression we just have one significant variable which is fixed exchange rate. The other variables are not significant for our study. The other variables have not enough significance level. We will make the conclusion for just fixed exchange rate.

In this study, the logit regression shows us the fixed exchange rate affects the currency crises in Turkey. The fixed exchange rate is an exchange rate system that must be forsaken by monetary authority from speculative attacks. Shadow exchange rate is an indicator for speculators. What is shadow exchange rate? When a speculative attack begins the exchange reserves of a country decreases to the critical level because the monetary authority tries to stabilize the exchange rate this action decreases the reserves and speculators buys the remaining reserves and then monetary authority cannot continue with the fixed exchange rate regime and declares that the currency of the country will be float against the foreign currencies and the there will be a new exchange rate which is "shadow exchange rate".

There are, however, many instances of speculative attacks that are unsuccessful. A well known one is the case of Hong Kong in 1997-98 in which the Hong Kong Monetary Authority (HKMA) maintained its US dollar-based currency board arrangement despite intense and sustained speculative attacks on the currency via sharp interest rate hikes. Other countries have defended their currencies against bearish pressures by allowing a drain in reserves (Argentina 1995 is one of many cases in point).

In order to capture such "unsuccessful" currency attacks, economists have developed a so-called "exchange market pressure" (EMP) index which is a composite variable incorporating at least two of the following three variables, the exchange rate, international reserves and interest rates.

This study shows us the currency crises and fixed exchange regime highly correlated. Fixed exchange rate prevents bubbles generated by speculative activities in the markets. This regime offers credibility through transparency, and leads to low inflation, low interest rates and financial stability and, hence, it contributes to economic growth. But in order to continue the fixed exchange regime the monetary authority mush have enough reserves. If the monetary authority does not have enough credibility or reserves, fixed rates can lead to currency crises.

6.2 **RECOMMENDATIONS**

In this study we just found that the fixed exchange rate related with currency crises. In order to found significant values for the currency crises;

- We must increase the number of countries in the regression model and if we increase the number of countries in the regression we can find the contagious effect of the currency crises.
- In the study we must increase the number of observations. We must use the semiannual, monthly or quarterly datas in the regression.
- We must increase the number of variables. In order to have good results we must include microeconomic factors, political factors and financial factors in the regression analysis.

APPENDIX

TABLE 7.1 OTHER STUDIES FOR CRISES

least 10 percent

Study, Sample and Frequency	Country Covarage	Indicators	Comments		
Eichengreen, Rose, and Wyplosz (1995) 1959-1993, quarterly	20 industrial countries; 78 crises, 33 successful defences	The authors mention that many of (1)-(16) are defined with respect to the same variable in Germany, but do not specify which of them. Change in international reserves, real effective exchange rate, credit growth, M1 growth, bond yield, interest rates, stock prices, inflation, wage growth, GDP growth, unemployment rate, employment growth, fiscal deficit/GDP, current account/GDP, change in exports, change in imports, government, victory, government loss, elections, change in government, capital controls, left-wing government, new finance minister, past exchange market crisis, past exchange market event	The behavior of (1)-(16) is examined during the four years around crises and events compared to the evolution of these variables around periods of tanquility. "Events" include significant changes in exchange arrangements (such as devaluations, decisions to float and widening of exchange rate bands) "crises" overlap with events but include unsuccessful speculative attacks and exclude changes in exchange arrangements not associated with market pressures. The association between (17)-(23) and foreign exchange market events is also examined. A subset of (1)-(25) is then used to estimate the probability of successful defence, devaluation, revaluation floating fixing and		
Frankel and Rose (1996) 1971-1992, annual	105 developing countries; 117 devaluations of at least 25 percent; for hihg-inflation countries these must exceed the previous year by at	Credit growth, fiscal deficit/GDP, per capita GDP growth, external debt/GDP, reserves/imports, current account/GDP, deviations from PPP in the bilateral real exchange rate, OECD GDP growth, foreign interest rate. The following variables as a share of	other events (1)-(16) are examined to provide a broad characterization of currency crashes. The evolution of these indicators around crises is compared to the bahavior during tranquil periods. The indicators are used to predict the probability of a crash		

total debt: commercial loans, concessional loans, variable rate debt, short-term debt, public sector debt, multilateral

development bank loans, flow of

FDI

Kaminsky and Reinhart (1996) 1970-1995, monthly

20 countries; 5 industrial and 15 developing; 76 currency crises and 26 banking crises

export growth, import growth, bilateral real exchange rate deviation from trend, terms of trade changes, change in reserves, money demand/supply gap, change in bank deposits, real interest rates, lending-deposit spread, domestic-foreign real interest rate differential, M2 money multiplier, M2/international reserves, growth in domestic credit/GDP, changes in stock prices, output growth, financial liberalization, banking crises, bilateral real exchange rates, real exchange rate squared

Krugman (1996) France, Italy, Spain 1988-1995, annual, quarterly, some daily **ERM** crises

Sweden, and the United Kingdom during the 1992-93 unemployment rate, output gap, inflation, public debt/GDP

The behavior of (1)-(15) is examined 18 months before and after the crises and compared to the bahavior of these indicators during "tranquil" periods. (16)-(17) are used in predicting the probability of crises. The usefullness of all the indicators is assessed by; (a) determining whether they gave a signal on crises-by-crises basis; (b) tabulating the probability of crisis conditioned on a signal from the individual indicator; and (c) tabulating the probability of false signals

While the bulk of the paper is theoretical, evidence on the trends of (1)-(4) is used to support the argument that the ERM episode does not provide evidence of self-fulfilling crises

Sachs, Tornell, and Velasco (1995) 1985-95, monthly and annual

20 emerging markets

real exchange rate, credit to the private sector/GDP, M2/international reserves, saving/GDP, capital inflows/GDP, short-term capital inflows/GDP, government consumption/GDP, current account/GDP

The emphasis is on explaining why some countries were more affected by the Mexican crisis than others

TABLE 7.2 MARKET PRESSURE INDEX DATAS

Years	Exchange Reserves	Change in Reserves	Exchange Rates	Ch. in Exc. Rates	Interest Rates
1983	2089	-	0,00022403	-	45
1984	3482	66,68262326	0,00036485	62,85765299	45
1985	3279	-5,829982769	0,00051834	42,06934357	55
1986	4346,9	32,56785605	0,0006694	29,14303353	48
1987	5212,1	19,90383952	0,00085569	27,82939946	58
1988	6428,4	23,33608334	0,00142076	66,03676565	83,9
1989	9283,2	44,40918424	0,00212078	49,2708128	58,8
1990	11387,1	22,6635212	0,00260762	22,95570498	59,4
1991	12250	7,577873207	0,00416985	59,9101863	72,7
1992	15252,2	24,5077551	0,00688751	65,17404703	74,2
1993	17761,4	16,45139718	0,010985962	59,50557434	74,8
1994	16514,3	-7,02140597	0,029704332	170,3844316	95,56
1995	23316,8	41,19157336	0,04567345	53,76023297	92,32
1996	24965,9	7,072582859	0,08108361	77,52898018	93,77
1997	27138,1	8,700667711	0,151429	86,75660839	96,6
1998	29498,6	8,698103404	0,26004012	71,72412154	94,8
1999	33751,3	14,41661638	0,420126152	61,56205127	46,7
2000	34159,4	1,209138611	0,623703996	48,45636079	45,6
2001	30192	-11,61437262	1,22541182	96,47329949	62,5
2002	38051	26,03007419	1,505839525	22,88436429	48,19
2003	44956,9	18,1490631	1,49306776	-0,848149141	28,59
2004	53785,4	19,63769744	1,42234123	-4,736993986	22,1
2005	68743,5	27,81070699	1,34079	-5,733591088	20,38
2006	90740,3	31,99837076	1,4311	6,735581262	23,72

Years		Ch. in Intr. Rates	Std. Exc. Reserves	MPI(FER)	Std. Exc. Rate	MPI(ER)
19	83	-	17,85809501		38,86105731	
19	84	0		3,73403E-08		1,617497129
19	85	22,222222222		-3,26462E-09		1,082557799
19	86	-12,72727273		1,8237E-08		0,74992894
19	87	20,83333333		1,11456E-08		0,716125588
19	88	44,65517241		1,30675E-08		1,699304282
19	89	-29,91656734		2,48678E-08		1,267871046
19	90	1,020408163		1,26909E-08		0,59071227
19	91	22,39057239		4,24338E-09		1,541650853
19	92	2,063273728		1,37236E-08		1,677104202
19	93	0,808625337		9,21229E-09		1,531239095
19	94	27,7540107		-3,93178E-09		4,384451469
19	95	-3,390539975		2,30661E-08		1,383395949
19	96	1,570623917		3,96044E-09		1,995029991
19	97	3,018022822		4,87211E-09		2,23248178
19	98	-1,863354037		4,87068E-09		1,845655305
19	99	-50,73839662		8,07287E-09		1,584157799
20	000	-2,355460385		6,77082E-10		1,246912997
20	001	37,06140351		-6,5037E-09		2,482518477
20	002	-22,896		1,45761E-08		0,588876482
20	003	-40,67233866		1,01629E-08		-0,021825167
20	004	-22,70024484		1,09965E-08		-0,121895645
20	005	-7,78280543		1,55732E-08		-0,14754078
20	006	16,38861629		1,79181E-08		0,173324692

Years	Std. Int. Rates	MPI(IR)	MPI	Av MPI	STDev MPI	Sdav	Crises
1983	23,605152					3,860915	
1984		0	1,617497092	1,317412085	1,695668744		0
1985		0,94141415	2,023971952				0
1986		-0,539173559	0,210755363				0
1987		0,882575766	1,598701343				0
1988		1,891755503	3,591059772				0
1989		-1,267374592	0,00049643				0
1990		0,043228201	0,633940458				0
1991		0,948546075	2,490196924				0
1992		0,087407779	1,764511967				0
1993		0,03425631	1,565495396				0
1994		1,175760827	5,5602123				1
1995		-0,143635604	1,239760322				0
1996		0,066537341	2,061567328				0
1997		0,127854423	2,360336197				0
1998		-0,078938454	1,766716846				0
1999		-2,149463004	-0,565305213				0
2000		-0,099785868	1,147127128				0
2001		1,570055836	4,052574319				1
2002		-0,969957827	-0,38108136				0
2003		-1,723028181	-1,744853358				0
2004		-0,961664927	-1,085500585				0
2005		-0,529707942	-0,477248737				0

TABLE 7.3REGRESSION DATAS

Years	Exchange Rates	Interest Rates	Real GDP Growth	GNP per Capita \$	Gr Rate ^b wth	International	Change in	Change in	MI		Exchange	MPI
1983	0,00022	45	5	1.297	(GNP)	Reserves	Export	Import	Growth	Inflation	Regime	
1984	0,00036	45	6,7	1.229	*,2	2.089			0,44643	100,5	0	
1985	0,00052	55	4,2	1.346	/,I	3.482	0,2454345	0,164797	0,16058	95,7	0	-3386,1352
1986	0,00067	48	7	1.484	4,3	3.279	0,1155658	0,054523	0,42440	96,1	0	-3182,8455
1987	0,00086	58	9,5	1.661	0,8	4.347	-0,0629932	-0,021034	0,63777	79,5	0	-4267,4210
1988	0,00142	83,9	2.1	1.693	9,8	5.212	0,3665563	0,274926	0,64204	73,6	0	-5138,2251
1989	0,00212	58,8	0.3	1.953	1,5	6.428	0,1444553	0,012544	0,31087	70,6	0	-6357,7875
1990	0,00261	59,4	9.3	2.684	1,6	9.283	-0,0031984	0,101616	0,72900	76,4	0	-9206,6984
1991	0,00417	72,7	0.9	2.639	9,4	11.387	0,1148073	0,412231	0,60540	85,7	0	-11300,9878
1992	0.00689	74.2	6	2.726	0,3	12.250	0,0489378	-0,056277	0,49032	87,2	0	-12162,8563
1003	0.01099	74.8	8	3.031	б,4	15.252	0,0824806	0,086658	0,67421	83,7	0	-15168,4133
1993	0.02970	95.56	-5.5	2.148	8,1	17.761	0,0428415	0,286718	0,64776	89,7	0	-17671,4133
1005	0.04567	92.32	5,5 7.2	2.750	6,1	16.514	0,1799271	-0,209267	0,78830	66	0	-16448,5093
1006	0.08108	93.77	7,2	2.892	8,0	23.317	0,1950116	0,534551	0,68157	71,5	0	-23244,7654
1007	0.15143	96.6	75	2.972	7,1	24.966	0,0733697	0,221728	1,31038	72,3	0	-24893,3783
1008	0.26004	94.8	3.1	3.080	8,3	27.138	0,1307499	0,113050	0,76306	77,3	0	-27060,6869
1000	0.42013	46.7	-47	2.794	3,9	29.499	0,0271466	-0,054312	0,62058	85	0	-29413,6543
2000	0.62370	45.6	74	2.963	6,1	33.751	-0,0143388	-0,114328	0,82682	89,3	0	-33662,1143
2000	1.22541	62.5	-7.5	2.134	6,3	34.159	0,0446711	0,340082	0,61268	100	0	-34059,0599
2001	1.50584	48.19	7.9	2.662	19,5	30.192	0,1281406	-0,240425	0,50595	81,5	1	-30110,7404
2002	1 49307	28.59	5.8	3.425	7,9	38.051	0,1507947	0,245296	0,39220	88,6	1	-37962,1547
2003	1 42234	22.1	8.0	4.256	5,9	44.957	0,3104311	0,344992	0,45406	93,3	1	-44863,2550
2004	1.34079	20.38	0,9 7 A	5.042	9,9	53.785	0,3367875	0,406695	0,25111	96,4	1	-53688,5933
2005	1 43110	23,72	6.1		7,6	68.744	0,1632023	0,197195	0,45029	107,3	1	-68636,0028
2000	1,70110	20,12	0,1			90.740	0,1587729	0,173479	0,13726	106,7	1	-90633,4265

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