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The Role of Economic Fundamentals in Explaining Indonesian Currency Crisis

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THE ROLE OF ECONOMIC FUNDAMENTALS IN EXPLAINING INDONESIAN CURRENCY CRISIS

By

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April, 2002

THE ROLE OF
ECONOMIC FUNDAMENTALS IN EXPLAINING
INDONESIAN CURRECY CRISIS

by

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ABSTRACT

This paper examines the determinants of currency crisis, particularly the role of economic fundamentals in explaining the currency crisis in Indonesia in the 1990's. This study has an objective: to analyze the role of the ratio of M2 to reserves, the ratio of banks' claims on the private sector to Gross Domestic Product, the ratio of current account deficit to Gross Domestic Product, the growth rate of Gross Domestic Product, reserves to import ratio, exchange rate system in explaining the currency crisis in Indonesia during period of observation. Using time series quarterly data for Indonesia spanning the period of quarter one 1990 to quarter four 2001, this study employs a simple regression model modified from the previous research, in which the change in the rupiah exchange rate is a linear function of the economic variables that represent the economic fundamentals of Indonesian economy. By using the Statistical Package for Social Science (SPSS), the results of this study indicate that selected variables of economic fundamentals simultaneously contribute to the currency crisis. The value of coefficient determination (R^2) of 0.959 indicates "the goodness of fit" toward group of data, and implies that 95.9 % of the variation in the rupiah exchange rate during the period of observation can be explained by the chosen variables. The linkage between economic fundamentals and the currency crisis is also supported by regression model, in which the increase in the ratio of banks' claim on private sector to GDP and the increase in the ratio of current account deficit to GDP led to the depreciation of the rupiah exchange rate during the observation. Similarly, the growth rate of GDP has had a positive impact on the rupiah exchange rate, which means that growth rate of GDP led to an appreciation of rupiah exchange rate. The abandonment of the pegged exchange rate system resulted in the depreciation of the rupiah exchange rate. For this reason, it is reasonable to argue that there is a linkage between the weaknesses of economic fundamentals and currency crisis during observation. However, the ratio of M2 to reserves is statistically insignificant.

Keywords: Currency crisis, exchange rate

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I. INTRODUCTION

The phenomenon of currency crisis has become a worldwide problem with serious economic, political, and social implications for both developing countries and developed countries. The currency crisis in Indonesia, which started in July 1997, poses a gigantic menace to the development process in the form of constraining economic growth, eliminating job opportunities, reducing standard of living, and rising inflation level. Moreover, it can also push the country into a tremendous recession due to the dramatic collapse of the financial system and sudden reversal of foreign capital inflows.

1.1. Background

With the oil booming years since the 1970s, Indonesia's average economic growth was relatively high, 6 - 8% per year especially in the 1990's. However, after two decades of robust growth in gross domestic product (GDP), Indonesia's economy was jolted by the regional financial crisis in 1997 and contracted dramatically in 1998 (see table 1). At the same period, the countries in the Southeast Asian region had also developed their economies progressively. Some of them were hailed as new economic tigers and Indonesia, Malaysia and Thailand were categorized as Newly Industrializing Countries (NICs) and also considered as High Performing Asian Economies (HPAEs). This stable economic growth was supported by political stability, security control, and the confidence of foreign and domestic investors.

Table 1: Growth of Gross Domestic Product by Sector
Constant price of 1993, 1993-1998
(percent)

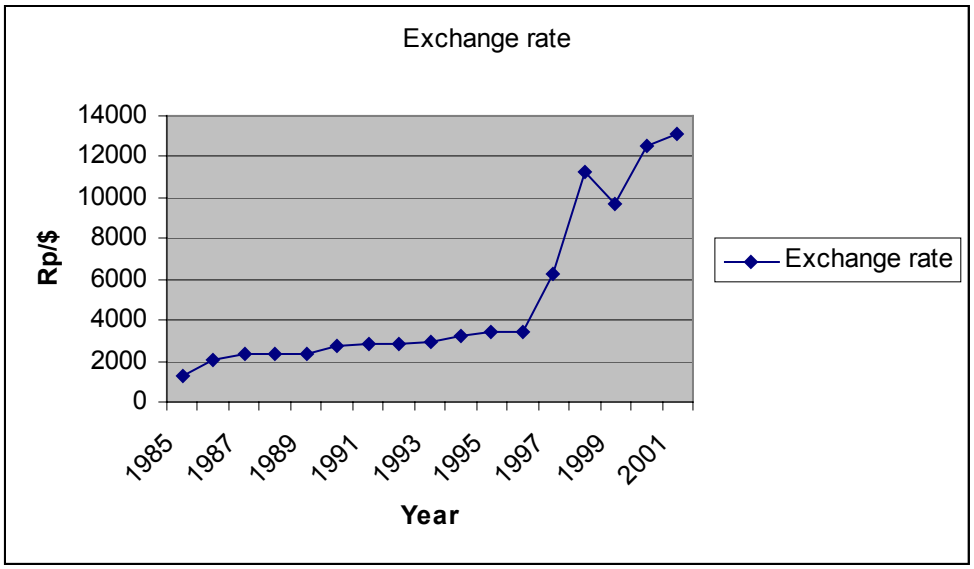
Sector	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
Agriculture	1.7	0.6	4.4	3.1	0.7	0.2
Industry	9.8	11.2	10.4	10.7	5.6	-15.6
Mining and Quarrying	3.4	5.6	6.7	6.3	1.7	-4.2
Manufacturing	11.4	12.4	10.9	11.6	6.4	-12.9
Electricity,Gas and Water	11.1	12.5	15.9	13.6	12.8	3.7
Construction	14.5	14.9	12.9	12.8	6.4	-39.7
Services	7.4	7.1	7.6	6.8	5.7	-16.8
Gross Domestic Product	**7.3**	**7.5**	**8.2**	**7.8**	**4.9**	**-13.7**

Source : Central Bureau of Statistic,1999.

Unfortunately, Indonesia and other Asian countries are now faced with an acute economic crisis. This currency crisis could have been triggered by external and internal factors (Corsetti,et.al.,1998). There has been an emerging pattern where international fund managers have made currency trading a new business field. These professional speculators were very active in Asian stock markets. Being aware that the Asian currencies - as a consequence of high economic growth - were overvalued, they started speculating. They bought or sold certain currencies with a wide profit margin. Meanwhile, among the internal factors was the weak economic base. When a country's economic base is weak, a currency crisis could lead to economic turbulence.

As mentioned above, not only did this currency crisis overwhelm the Indonesian rupiah, but it also affected the currencies in other Asian countries. However, the downfall of the rupiah was more severe than the downfall of other

Asian currencies. On October 7, 1997, the rupiah had lost 55% of its value against the US dollar, as compared to other Asian currencies which fell comparatively less (within the range of 11 - 41%) (Usmanto,1997).



The fall of Indonesian rupiah has caused 20% domestic inflation, which quickly absorbed the foreign reserves further affecting the economic crisis. Facing this reality one could no longer say that the Indonesian economy was fundamentally firm. The Indonesian economy which had been built for 30 years, collapsed in just a few months.

Eventually, the crisis slowed the economic growth, which resulted in decreased aggregate demands. Industries went bankrupt and were shut down because - as is usual in the industries of developing countries - the raw and basic materials were still imported. It pushed production costs upward. When these two diametrically opposed factors - the decrease of demands and the increase of production costs - interact, crisis is expected. According to the recent

International Monetary Fund (IMF) calculation, the 1998 economic growth of Indonesia would be -5%, compared to that of 1997 which was +5% (Susastro,1999). This figure should not be called 'economic growth rate', but rather 'economic decline or recession. Naturally, when the economic decline or growth rate becomes –5%, more businesses will be closed down. This implies that more people will become unemployed.

With the currency crisis, it will be very hard for the unemployed to find a new job. In the past, the unemployed could afford to fulfill most of their secondary needs, but today they find it very difficult to meet even their basic needs. The goods, though still available in the market, are priced prohibitively. The average annual economic growth rate, which used to be 8 percent since 1970 until 1996, declined significantly to -14 percent in 1998. One of the results of the negative economic growth is the increasing number of unemployed. According to M. Djuhari Wirakartakusumah (1999), the number of unemployed workers in 1998 was about 32 million people or 34 percent of the nation's 94 million labor force. It consists of 13.5 million job seekers and new labor entrants from earlier years and 18.5 million as critical unemployment due to the sharp drop in construction and manufacturing activities, especially among unskilled workers.

Based on the background above, the problems this paper addresses could be formulated as follows: “What is the role of economic fundamentals such as the ratio of M2 to reserves (M2TR), the ratio of bank’s claims on the private sector to Gross Domestic Product (BCGDP), the ratio of current account deficit to Gross Domestic Product (CAGDP), the growth rate of Gross Domestic Product (GRGDP), and reserves to import ratio (RESIMP), in explaining the currency crisis in Indonesia?”

1.2. The purpose of study

This study is intended to explore and analyze critically the economic fundamentals in explaining the Indonesian currency crisis. Particularly, the objective of this study is to analyze the role of the ratio of M2 to reserves, the ratio of banks' claims on the private sector to Gross Domestic Product, the ratio of current account deficit to Gross Domestic Product, the growth rate of Gross Domestic Product, reserves to import ratio, on the currency crisis in Indonesia during period of observation.

1.3. Scope and Limitation

Some theories argue that currency crisis can be explained by many factors, however, this study focuses on economic fundamentals in order to analyze the role of the ratio of M2 to reserves, the ratio of banks' claims on the private sector to Gross Domestic Product, the ratio of current account deficit to Gross Domestic Product, the growth rate of Gross Domestic Product, and the reserves to import ratio, in explaining the currency crisis in Indonesia during the period of observation.

II. THE THEORETICAL AND EMPIRICAL LITERATURE

2.1. The Theoretical Literature

The theoretical literature on currency crises can be classified into three categories. The first category, which is known in the literature as a first generation model, is one which views currency crises as the inevitable consequence of macroeconomic policies that are inconsistent with the maintenance of a fixed exchange rate (Agnor et.al,1992). Krugman (1979) 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 loss 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.

The second theory is called the second generation model. This theory supports 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 the economy is high, the monetary authority will be less willing to defend its currency against speculative attacks by raising interest rates because it might aggravate

the unemployment rate problem in the economy. Obstfeld (1994) and Bensaid and Jane (1994), also argue that an increase in unemployment or the public debt will increase the cost to the government of defending the peg, thereby increasing the probability of speculative attack on the currency. The government might also be reluctant to defend the peg by raising interest rates due to concern about the effects of this policy of the probability of a banking crisis and the associated fiscal cost of a bail out (Obstfeld, 1996). The main implication of these models is emphasis on the idea that changes in economic fundamentals are necessary but not sufficient in explaining currency crises.

The third category, labeled contagion models, differs from the two previous theories in the sense that it argues that a currency crisis in a domestic economy will affect crises in other countries. Gerlach and Smets (1994) present a two-country model of contagious currency crises. They argue that speculative attacks on one country could spill over to another country. A currency crisis in one country that results in a devaluation affects the competitiveness of that country's trading partners thereby forcing these countries to devaluate in order to avoid a loss of competitiveness. Usually, the currency crisis could easily spread to other countries with similar macroeconomic structure and policies.

Some articles have offered the causes of a number of explanations of the Asian crisis. Two main hypothesis and interpretations have emerged in the aftermath of the crisis. According to one view, sudden shifts in the market expectations and confidence were the key sources of the initial financial turmoil, its propagations over time and regional contagion (Radelet and Sachs,1998).

According to the other view, the crisis reflected structural and policy distortions in the countries of the region. Fundamental imbalances triggered the currency and financial crisis in Asia. The financial crisis is a symptom or a consequence of some fundamental distortion in economic system and policy applied in the affected countries (Liang-Shing Fan and Chuen-mei Fan, 1998).

It seems reasonable that the risk of crisis depends on macroeconomic imbalances; countries with sound economic fundamentals are less likely to be affected by currency crisis. Strong fundamentals imply, for instance, less uncertainty for foreign investor and less vulnerability to a fall in government revenues or export revenues. A study conducted by the IMF confirms the importance of the economic fundamentals and shows that several countries affected by financial crises during the 1990's shared similar weakness (IMF, 1999). In particular, real effective exchange rate appreciations, high current account deficits, and large short-term debts have been identified as important factors associated with a currency crisis (Reiny Iriana and Fredrik Sjoholm, 2001). However, Corsets (1998) explains that central to a full understanding of the roots of Asian crisis is the multifaceted evidence regarding the structure of incentives under which the corporate and financial sectors operated in this region in the context of regulatory inadequacies and close links between public and private institutions.

The moral hazard problem in Asia magnified the financial vulnerability of the region during the process of financial markets liberalization in the 1990's,

exposing its fragility *vis a vis* the macroeconomic and financial shocks. The problems exhibited three different, yet strictly interrelated dimensions at the corporate, financial, and the international level (Krugman,1998). At the corporate level, political pressures to maintain high rates of economic growth had led to a long tradition of public guarantees to private projects, some of which were effectively undertaken under government control, directly subsidized, or supported by policies of directed credit to favored firms and industries (IMF,1997).

Another explanation about the currency crisis is offered by Roberto Chang (1999). In his paper, Chang shows two categories of views which try to explain the currency crisis. The first view is t*he bad policy view*. In this view, a particular government guarantees the private sector's borrowing and stimulates the private sector to excessively borrow and invest in a non-productive or high-risk investments. This mechanism, according to the bad policy view, led to an accumulation of implicit government obligations and causes the collapse of the regime. The advocates of bad policy theory (bad policy view) are convinced that crises that happened are inevitable because of wrong or bad government policy, whereas the proponents argue that policies in crisis countries were bad but at the same time, it is unusual that their effects did not shows up in conventional macroeconomic measures. Governments, implicitly or explicitly, guarantee domestic private debts despite the fact that it would stimulate private sector to borrow and invest in a risky investment. It may look like the government will successfully absorb any of loss incurred in bad debt but this can only hold

temporarily, i.e. as long as the government still has enough funds to continue to do so. However, at some point, the accumulated bad debt will reach its peak, i.e. at that time the government will no longer be able to support it and to absorb the losses.

Bad policy view is also confirmed with two notable facts which preceded the crises. First, the countries that went into crises had experienced a radical reform and liberalization in their financial sectors, including the deregulation of interest rates, the easing of reserve requirements, and the promotion of entry and competition in financial sectors. Second, by eliminating controls (minimum supervision) and regulation, financial liberalization may have allowed the debtors to take excessive risk in its investments.

The other view is *financial panic view,* which argues that the cause of the crises is a maturity mismatch of assets and liabilities. It also points out that the countries which fell into crises had banks and financial institutions that borrowed a short-term debt to finance their long-term investments. When crises occurred, suddenly all the creditors panicked and demanded the debtor to honor their debts. This created a sudden need for liquidity. The financial panic view argues that economic fundamentals in crisis countries, including government policies, are not sufficiently sound. The crisis caused the international creditors who lost their confidence to roll over their funds in the country's financial system. It then caused the country to look for short-term funds and in the end, resulted in costly liquidations, asset price collapses, domestic bank runs, and non-performing

loans or bad debt. It is argued that if the foreign creditors had not panicked, the financial system would have had to endure the credit shocks.

The financial panic view gets more empirical support when compared to the bad policy view. The bad policy view has not been able to identify where and when crises may happen. Some data suggests that bad policies and crises may not be related after all. The existence of bad policies is probably strongly correlated with lack of transparency and government corruption.

Part of the literature has focused on a long list of structural distortions in the pre-crisis Asian financial and banking sectors: lax supervision and weak regulation; low capital adequacy ratio; lack of incentive-compatible deposit insurance schemes; insufficient expertise in the regulatory institutions; distorted incentives for project selection and monitoring; outright corrupt lending practices; non-market criteria of credit allocation. All these factors contributed to the build up of severe weaknesses in the undercapitalized financial system, whose most visible manifestation was eventually a growing share of non-performing loans (Corsetti et.al, 1998).

One factor that might have been important in explaining the Indonesian economic crisis is contagion from other countries. Contagion here refers to the spread of economic difficulties across countries that often manifests itself as a co-movement, for instance, exchange rate and stock prices (Reiny Iriana and Fredrik Sjoholm, 2001). As mentioned by the Governor of Central Bank of

Indonesia, Soedrajad Djiwandono (1999), the Indonesian crisis developed from a combination of an external contagion and structural weaknesses of the national economy. It started as an external shock which originated from Thai baht rapid depreciation in early July 1997, which turned into a regional financial panic that hit the Indonesian currency market and caused the Rupiah to depreciate drastically. Facing the shock, the national economy that was embedded with weaknesses in the banking sector as well as real sector started disintegrating. A contagious process developed whereby a currency shock very quickly spread to become a banking crisis, and soon after, an economic crisis.

Contagion effect has in recent years received increased attention from academic economists and policy makers throughout the world. The reason is that a number of economic crisis during the 1990's were characterized by economic problems from other countries, followed by similar problems in other countries within the same region. The crisis that happened in Finland within 1992-1993 had spread quickly to several other European countries. Similarly, the Peso crisis of 1982-1983 that originated in Mexico then ultimately permeated most parts of Latin America. Through a process of contagion a currency crisis in an economy spreads to different countries at a high speed through different transmission mechanisms. The process of contagion worked very rapidly through different innovations in techniques of financial inter-mediation and financial institutions, supported by rapid liberalization in the world economy.

2.2. The Empirical Literature

Empirical models of currency crises adopt either a structural or non-structural methodology. Meese and Rose (1996) and Melick (1996) are examples of papers that employ a structural estimation approach. They use two structural models of speculative currency attacks by using quarterly data for eight European countries, in order to predict the exchange rate regime that will prevail in the next quarter. Their models perform very well in sample, but don't yield reliable forecasts of currency crises one quarter ahead. Melick (1996) tries to estimate a speculative attack model of exchange rate crises using Mexican data. Empirical results from his research are disappointing in the sense that the collapse probabilities generated from his model are inconsistent with observed collapses.

On the other hand, non-structural models of currency crises are generally based on non-parametric tests and on probit regressions. The con-parametric approach was popularized by Eichengreen, Rose and Wyplosz (1995). Using quarterly data for members of the exchange rate mechanism (ERM) of the European Monetary Union and non-ERM developing countries, they compared the behavior of macroeconomic variables during periods of speculative pressure to the behavior of the same variables during periods of tranquility. They argue that a finding that the behavior of macroeconomic variables differs between both periods will provide some support to the view that currency crises are caused by inconsistent macroeconomic policies. However, the finding that there is no

significant difference in the behavior of these variables between both periods will suggest that currency crises may be due to arbitrary shifts in expectations. The non-ERM sub sample, the behavior of budget deficits, inflation, domestic credit growth, export to import ratio, and the international reserves are all found to differ between crisis and non-crisis periods.

Moreno (1995) applies the same technique to Pacific Basin Economies. He finds that periods of depreciation tend to be associated with larger budget deficits and a growth in the domestic credit, while Kaminsky, Lizondo and Reinhart (1997), using a signals approach, try to identify variables that have the best record in anticipating currency crises. They find that output, exports, deviation of the real exchange rate from the trend, equity prices, and the ratio of broad money to gross international reserves are reliable indicators of currency crises.

Frankel and Rose (1996), using a panel of annual data for developing countries examine the determinant of currency crisis. They find that currency crises are associated with the high foreign interest rate, low output growth, high domestics credit growth and low ratio of foreign direct investment to debt. An interesting finding is that neither current accounts nor government budgets are related to currency crashes, yet these are variables that first generation models suggest should be important.

Sachs et.al. (1996) analyzed the period immediately after the crash of the Mexican peso in December 1994 and found that the countries hit by the Tequila

effect have experienced lending booms, over-valued exchange rates, and low reserves. They find that low international reserves relative to broad money, real exchange rate appreciation, and a weak banking system explain about 70 percent of the variance of their crises index, a composite measure of the change in reserves and the nominal depreciation.

As with Nugroho (2000), the statistical investigation reveals that the weakness in the banking sectors led to the Indonesia currency crisis. He also investigated the variables of foreign reserves to import ratio and the ratio of current account deficit to GDP that reflects Indonesia's economic fundamentals. The statistical result is significant, which means that these variables have affected currency crisis in Indonesia.

Corsetti et al. (1998) develop an interpretation of Asian Meltdown which focuses on moral hazard as the common source of over investment, excessive external borrowing and current account deficits to the extent that foreign creditor, government, unprofitable projects and cash shortfalls are re-financed crises, within which the eventual refusal of foreign creditors to refinance the country's cumulative losses forces the government to step in and guarantee the outstanding stock of external liabilities. Their results support the notion that crises are systematically related to the fundamental weaknesses individuated in the model.

This is consistent with Diaz Alijandro's (1985) interpretation of the Chilean crisis in terms of the inconsistency between a policy of rapid liberalizations of

domestic and international capital flows and the lax supervision of financial institutions.

III. RESEARCH METHODOLOGY

In dealing with Indonesian economic fundamentals, this study uses as a main source of data the secondary data, which emphasizes the variables below (*see model*) such as "*Critical descriptive analyze*" and "*Quantitative analyze".*

3.1. Conceptual Framework

(See Appendix)

3.2. The Model Specification

The simple regression model will be used in this research based on the evidence of the Nasution and Hadad (1999), who, in the descriptive investigation, revealed that the weakness in the banking sector led to the Indonesian currency crisis. Frankel and Rose (1996) also examine the determinants of currency crises and they found that currency crises are associated with high foreign interest rates and low output growth. However, it is important to test whether this linkage is acceptable in terms of a statistical approach. For this purpose, this study employs a simple equation modified from the previous research, in which the change in the rupiah exchange rate is a linear function of the economic variables that represent the economic fundamentals of Indonesian economy.

$$Er_t = \beta_0 + \beta_1 M2TR_t + \beta_2 BCGDP_t + \beta_3 CAGDP_t + \beta_4 GRGDP_t + \beta_5 RESIMP_t + \beta_6 REZIM + \beta_7 DMCRS + e$$

Based on this model specification, this study hypothesizes that economic fundamentals such as the ratio of M2 to reserves (M2TR), the ratio of bank's claims on the private sector to Gross Domestic Product (BCGDP), the ratio of current account deficit to Gross Domestic Product (CAGDP), the growth rate of Gross Domestic Product (GRGDP), and the change of reserves to import ratio (CRESIMP), caused the currency crisis in Indonesia.

III.3. Data and Variables

The data on all variables used in the empirical analysis were obtained from IMF's International Financial Statistic. The choice of variable used in the estimations is based on theoretical consideration, previous empirical research and also data availability. Following the methodology suggested in previous studies, Mark Kruger et al.(1998), Nugroho (2000), Sach et al. (1996) and Kaminsky et al. (1998), using quarterly data for Indonesia in period from 1990 to 2001, the variables used in the analysis are :

(a) The Exchange Rate (EXR), as dependent variable
(b) the ratio of M2 to reserves (M2TR)
(c) the ratio of bank's claims on the private sector to Gross Domestic Product (BCGDP)
(d) the ratio of current account deficit to Gross Domestic Product (CAGDP)
(e) the growth rate of Gross Domestic Product (GRGDP)

(f) change of reserves to import ratio (CRESIMP)

(g) dummy variable of Exchange rate system (REZIM)

(h) dummy variable of Crisis (DMCRS), as independent variables.

The variable of exchange rate is reflecting the currency crisis and in this study, currency crisis is defined as in Frankel and Rose (1996) where it is the nominal exchange rate depreciation of at least 25 percent from the mean rate in the bilateral exchange rate vis-a-vis the U.S dollar. A currency crisis exists only when there is an abrupt change in the nominal exchange rate. The economic fundamentals are reflected by the rest of the variables. Furthermore, the soundness of banking system is reflected by the ratio of M2 to reserves (M2TR), and the ratio of bank's claims on the private sector to Gross Domestic Product (BCGDP) variables. As in Sachs et al. (1996), I choose the ratio of M2 to international reserves. These variables worked well in previous empirical studies and have been identified as leading indicators of currency crisis. The ratio of M2 to reserves is a measure of reserve adequacy. The use of a broad measure of money, as opposed to monetary base, in the definition of the reserve adequacy variable, can be rationalized 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 banks' claims on private sector is a measure of the health of the domestic banking system and is known as a lending boom variable. Sachs et al

(1996) argued that lending boom increases the ratio of bad loans to total assets, thereby weakening the banking system. A weak banking system increases the probability of a speculative attack because investors know that the government will be reluctant to resist an attack by increasing interest rates, since this would result in bankruptcies and recession. Kaminsky and Reinhart (1996) identify that lending booms could cause currency crisis. They argue that in a banking crisis, as the central bank bails out the trouble of financial institutions, its ability to maintain the prevailing exchange rate commitment erodes. If the bail out is financed through monetary expansion, the central bank will lose international reserves and ultimately abandon the peg.

As has theoretically been established, the variables of the ratio of current account deficit to Gross Domestic Product (CAGDP), the growth rate of Gross Domestic Product (GRGDP), and reserves to import ratio (RESIMP) are arguably the reflection of the soundness in Indonesian economic fundamentals (real sector). The dummy variable of Exchange rate system (REZIM) is to test the relationship between the abandonment of the semi-pegged system and the rapid depreciation of the rupiah exchange rate, which is constructed by taking a value of zero on the observation period before the abandonment and one afterward. Furthermore, the rupiah exchange rate is measured by rupiah/USD, which implies that a rise in the exchange rate means depreciation, while a decline reflects the appreciation of the rupiah against the US dollar. Lastly, the dummy

variable of Crisis (DMCRS) is intended to capture the relationship between the period of crisis and rapid depreciation of the rupiah exchange rate.

IV. THE EMPIRICAL RESULTS AND ANALYSIS

4.1. Overview of Indonesia's Financial Policy Prior to Crisis

This chapter presents the overview of financial policy and its implications on Indonesian economics, which had been implemented by Indonesia's government before suffering from the crisis in July 1997.

Phase 1: Pre deregulation (1971-1982)

The Indonesian government started freeing up controls on foreign capital in 1971. The rationale for this policy was the scarcity of internal resources for the administrative control of capital flows. However, the disadvantages of this policy included capital flight, huge loans, and consequently, growing current account deficit. During this period, the deficit was partly offset by the large inflows from the oil price boom, which represented about 80% of Indonesia's total export value until the early 1980s (Goeltom, 1996). When the world oil price went down, the value of export decreased drastically. The deficit situation persisted long after oil price went down, but the deficit was offset by foreign aid and loans.

Before June 1983, the banking sector was still heavily regulated, even as entry was restricted. The market was dominated by state banks, with the Central Bank accounting for 35 percent of the total assets of the entire financial system,

with other state banks holding another 40 percent. The Central Bank of Indonesia set ceilings on banks' credit for individual banks and also channeled substantial amounts of low interest liquidity credits from oil earnings to strategic industries in the private sector. Banks were instructed to finance certain types of investment, particularly import substitution and backward integration of heavy industries, during times of economic boom (Goeltom, 1996). This strategic policy turned out to the root of subsequent failure in credit assessment in the banking sector.

Phase II: Financial Deregulation Phase (1983-1992)

After the oil price shock, the financial system was deregulated in two stages. The first package was introduced in June 1983 (Pakjun), and removed interest rate controls and credit ceilings for all banks, reduced the liquidity credit, and replaced the ineffective credit ceiling with monetary tools and Bank Indonesia Certificates. The second package was introduced in October 1988 (Pakto 88). These policies increased the deposit rate and lending activities, and also encouraged the opening of new banks and intensified competition between banks, which led to higher interest rates. Another package of reforms was introduced in December 1988 (Pakdes 88), which deregulated capital market, reduced the role of government in the stock exchange, and allowed foreigners to buy stocks on the Indonesian stock exchange (Pangestu,1990). During this period, the financial liberalization was introduced and in July of 1992, the banking law was passed, and ratified in October 1992.

Phase III: Pre-crisis (1993-1997)

A liberalization package was unveiled in October 1993, which dealt with import tariff reductions and the simplification of existing investment procedures. This reform included opening up sectors for foreign investment, relaxing

ownership and divestment rules, and lifting minimum capital requirements. The relaxation of banking regulations had a tremendous impact on credit expansion. Between 1987 and 1996, private bank's share of total credit more than doubled, from 23 percent to 49 percent, while the foreign banks' combined market share more than tripled, from 3 to 10 percent (Indonesia Bank Statistic)

4.2. Analysis of Results and Discussion

The regression results on the determinants of currency crisis in Indonesia are presented in the following table.

Table 4.1

Statistical Result

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.979[a]	.959	.952	1015.64971	.959	134.086	7	40	.000	1.797

a. Predictors: (Constant), M2TRB, GRGDP, DMCS, BCGDP, FRSIMP, CAGDP, REZIM

b. Dependent Variable: EXR

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1095.261	1616.683		.677	.502
	BCGDP	1578.821	194.336	.440	8.124	.000
	CAGDP	1.791E-05	.000	.433	6.009	.000
	FRSIMP	553.064	272.807	.120	2.027	.049
	GRGDP	-13244.2	5258.307	-.091	-2.519	.016
	REZIM	2400.968	730.218	.258	3.288	.002
	DMCS	-2954.265	687.197	-.279	-4.299	.000
	M2TRB	-2.1E+08	3.0E+08	-.052	-.696	.490

a. Dependent Variable: EXR

Source: Statistical Result, 2002

The F-value of 134.086 is statistically significant at the 1 percent level of significance. This implies that selected variables of economic fundamentals simultaneously contribute to the currency crisis during the period of observation. The value of coefficient determination (R^2) of 0.959, which indicates "the goodness of fit" towards a group of data, implies that 95.9 % of the variation in the rupiah exchange rate during the period of observation can be explained by the chosen variables. In terms of the currency crisis in Indonesia during that period of observation, the ratio of M2 to reserves (M2TR), the ratio of banks' claims on the private sector to Gross Domestic Product (BCGDP), the ratio of current account deficit to Gross Domestic Product (CAGDP), the growth rate of Gross Domestic Product (GRGDP), the change of reserves to import ratio (CRESIMP), the dummy variable of Exchange rate system (REZIM), and the dummy variable of Crisis (DMCRS) could explain the currency crisis.

Considering the t-value of each of the variables, except the coefficient of the variable of the ratio of M2 to reserves (M2TR), all coefficients of the variables are statistically significant and have expected signs, except for the foreign reserve to import ratio which has a positive sign. The Durbin-Watson statistic of 1.797 indicates that there is no positive or negative autocorrelations, which means that the model specifications are methodologically acceptable and unbiased. The coefficients of correlation between the explanatory variables are

also at the normal level, meaning that there is no multicollinearity between the explanatory variables.

However, concerning partial regressors, it is noticed that the coefficient of bank claim on private sector to gross domestic product (BCGDP) ratio is 1578. This implies that an increase in the ratio of bank claim on private sector to gross domestic product by 0.01 leads to an increase of 15.78 rupiah per dollar. This means that the rupiah has depreciated as much as this value, holding other variables constant. This is not surprising since this ratio reflects the measurement of the health of the domestic banking system and is known as a lending boom variable. However, the variable of the ratio of M2 to reserves (M2TR) is statistically insignificant. These two variables actually reflect the soundness of banking sectors. This finding is consistent with Sachs et al (1996), who argue that the lending boom increases the ratio of bad loans to total assets, thereby weakening the banking system. A weak banking system increases the probability of speculative attack because investors know that the government will be reluctant to resist an attack by increasing interest rates, since this would result in bankruptcies and a recession.

Kaminsky and Reinhart (1996) identify that lending booms could cause a currency crisis. They argue that in a banking crisis, as the central bank finances the bail out of troubled financial institutions, its ability to maintain the prevailing exchange rate commitment erodes. If the bail out is financed through monetary

expansion, the central bank will lose international reserves, and ultimately abandon the peg. They also identify other channels through which developments in the banking sector could cause a currency crisis.

Since October 1988, the Indonesian government implemented the deregulation of the banking system (Pakto 88). This policy increased the deposit rate and lending activities, encouraged openings of new banks, and intensified competition between banks, which led to a higher interest rate (see table 4.2).

Table 4.2

The Development of Banks in Indonesia

Tahun	Persero Bank		National Priv. Bank		Foreign Bank		Total of Nat. Bank	
	TB	TO	TB	TO	TB	TO	TB	TO
1988	7	1.034	66	631	11	22	111	1.957
1992	7	1.434	144	2.855	30	63	208	5.495
1993	7	1.455	161	3.036	39	78	234	5.773
1994	7	1.490	166	3.203	40	86	240	6.026
1995	7	1.635	165	3.458	41	90	240	6.590
1996	7	1.707	164	3.964	41	94	239	7.314
1997	7	1.843	144	4.150	44	100	222	7.860
1998	7	1.875	1.304	4.150	44	106	208	7.661
1999	7	1.853	92	4.150	40	104	164	7.113

Source :Central Bank of Indonesia,2000

Concerning the development of banks in Indonesia since the deregulation of banks in 1988, the number of national banks doubled in 1997. The data above shows that there was a rapid growth of the national banking system during that period and makes an important point inst of these banks are related to certain groups of business or conglomerates (see table 4.3). The authorizing of banks by the conglomerates has an important role in the soundness of banking sector in

Indonesia, and therefore makes them fall down and leads to a higher probability of currency crises.

Table 4.3

Major Conglomerate with Close Inter-Linkages with Local Banks

Group	Business	Assets,1996 (RpTrn)	#Companies	Affiliated Banks
Salim	Cements, Finance,Automotive,Food	43.1	600	BCA,B.Windu,Alfa,RSI
Astra	Automotive,AgrobBusiness	23.7	125	Universal,Pertiwi
Sinar Mas	Agro-Industries, Paper,Finance	41.1	200	BII,Credit Lyonnais,Fuji BII
Lippo	Finace, Property	21.1	70	Lippo, Bahari,BNP Lippo,Tokai Lippo,B.Dagang Industry, Alfa
Bimantara	Trading,Property,Manufacturing	4.04	50	B.andromeda
GajahTunggal	Tyre Industry,Finance,Property	36.3	80	BDNI,Namura Internusa, SGP
Ongko	Property, Finance	12.9	55	BUN
Nusamba	Wood,Agri-business,finance	6.7	90	BUN,Bukopin,Tugu,Muamalat

Source : Warta Ekonomi, Nov 1997

In addition, Indonesia's financial sector is still dominated by banks rather than by other financial institutions. The banks are closely related to the corporate sector, as most corporations own banks and banks channel huge loans to these corporations. A large proportion of these huge loans were used to finance the property boom before the crisis. Therefore, the subsequent property crash and corporate bankruptcies led to the fall of the banking system. On the other hand, the banking system was essential in helping to develop the corporations. This was especially true of the private banks, which served as an extension of corporations.

The banking deregulations packages of 1988 lowered the barrier to new market entrants. Since then, private banks have started to dominate the market.

The deregulation policy has been double-edged. The growth of the number of new banks' licenses and branches, and the expansions of commercial credit had been extraordinary, before the currency crisis put a sudden end to it.

I agree that the currency crisis was not caused by economic factors alone, but a combination of the economic and the political, domestic, and international factors. However, financial mismanagement was one of the major causes. Banking and corporate sectors (economic fundamentals), which had been booming since the 1980's, became the core problems that triggered the long crisis.

Key issues in the financial system revealed by the crisis included the over expansive corporate debt, bad bank loans, failure of credit assessment, the lack of monitoring, and inconsistent government policies. These problems were further compounded by speculative attacks and capital flight. The private sector had been experiencing distortions in resource allocation, in the form of wealth concentration in some conglomerates with monopolistic and rent-seeking behavior. Economic inefficiencies were widespread during the 5 years of rapid investment and production growth prior to the currency crisis (see table 4.5).

Indonesia should restructure its banking system first, instead of resolving the debt overhang of its corporate sectors, because in the close connection lying between corporations and banks in Indonesia: (i) corporations were not only accumulating debt in foreign currency, but they had also accumulated domestic debt owed to domestic private banks, (ii) many conglomerate groups

circumvented banking regulations by opening their own banks as “money machines” for tapping into public funds. High interest and savings rates under a competitive banking system enabled these banks to access the large pool of domestic savings, to finance the corporate groups’ projects and business.

Table 4.4

Top-50 Largest Debtor of State Banks

Debtor companies	Owner	Debt(Rp bn)	Debt(US$bn)
Bank Bumi Daya			
Great River Int’l	Sunjoto Tanuwijaya	11.4	
indofood Sukses Makmur	Sudono Salim	10.7	
Timor Putra Nasional	Tommy Suharto	1500	
Sempati Plus Humpuss	Tommy Suharto	1100	
Catur Swasakti+Seamless Pip	Aburizal Bakrie	2500	
Arooban	Prajogo Pangestu	500	
Trans Paific Petrochemical Ind	Hashim S.Dj	64.8	
Astra Intl’	Public	598.6	
Apac Centertec Corp	Bambang Tri	105.8	
PT.Maharani Putra Prima	Hari darmawan	17.4	
TOTAL		**6408.7**	**0.2**
Bank Dagang Negara			
Barito Pacific Timber	Prajogo Pangestu	102.3	
HM Sampoerna	Putera Sampoerna	77.3	
Indofood Sukses Makmur	Sudono Salim	37.9	
Astra Int’l	Public	993	
Mustika Ratu	Moorjati Soedibjo	3.7	
Hanson Industri Utama	Benny Tjokro	41	
timor Putra Nasional	tommy Suharto	-	0.1
sumalindo Lestari Jaya	Astra Intl’	694	
Bimantara Citra	Bambang Tri	10	
Plaza Indonesia Realty	Bambang Tri	150.5	
bankrie Brothers	Aburizal Bakrie	21.4	
Smart Corp	Eka Tjipta Wijaya	79.8	
Bukaka Teknik Utama	Ahmad Kalla	67.2	
TOTAL		**2278.1**	**0.1**
Bapindo			
Golden Key	Eddy Tansil	1300	
Astra Int’l	Public	97.9	
Ciputra Development	Ciputra	103.4	
Apac Centertec Corp	Bambang Tri	865.4	
Bimantara Citra	Bambang Tri	1.6	
Indofoof Sukses Makmur	sudono Salim	49.7	
Bukit sentul	Tommy Suharto	208.1	
Indocement Tunggal Prakarsa	Sudono Salim	50.2	

Bakrieland Development	Aburizal Bakrie	46	
TOTAL		2722	0
Bank Exim			
putra Surya Perkasa	Triyono Gondo K	1111	
Argo Manunggal Group	The Nin King	355.4	
Timor Putra Nasional	Tommy Suharto		0.1
Argo Pantes	The Nin King	165.4	
dharmala Sakti Sejahtera	Suhargo Gondo K	15.3	
Astra Int'l	Public	17.8	
Apac Centertec Corp	bambang Tri	32.8	
Indofood Sukses Makmur	sudono Salim	3	
Bakrie Brothers	Aburizal Bakrie	20.4	
Modern Photo	Samadikun Hartono	4.6	
TOTAL		**1726**	**0.1**
Syndicate of Four State Banks			
BPPC	Tommy Suharto	900	
Chandra Asri	Bambang Tri Cs.		2.7
CMNP	Tutut suharto	145	
Ciputra Development	Ciputra	1375	
Duta Pertiwi	Eka Cipta W	386.2	
Duta Anggada	Dasuki Angko S	361.7	
Bimantara Citra	Bambang Tri	259	
TOTAL		**3426.9**	**2.7**
GRAND TOTAL		**16562**	**3.1**
GRAND TOTAL (in US$)			**5.17**
GRAND TOTAL (in Rp trillion)			**41.5**

Source: Kompas, 23 February 1999

The coefficient of ratio current account deficit to GDP is 1.791E-05. This means that increasing the ratio by 1 will lead to a decrease in the rupiah exchange rate as much as 1.791E-05 rupiah per dollar. The estimated coefficient of this variable is too small, which means it is economically meaningless, even though it is statistically significant. It has been widely accepted that the variables of the ratio of current account deficit to GDP could influence the currency crisis; however, in this case the magnitude is so small. The rise in the ratio of current account deficit to GDP is associated with the depreciation of the rupiah exchange rate, suggesting that such a deficit during the pre-crisis period had been financed

by a large amount of capital inflows, which then made the Indonesian economy vulnerable to the currency crisis.

An important indicator for the soundness of open economy is the current account position. Current account measures the performance of export and import of the country. A surplus of current account in any given country implies that this country has a good performance of the economy since they have a chance to accumulate more currency reserves. For example, Singapore, Taiwan, and Hong Kong were saved from the financial crisis in 1997. On the other hand, a current account deficit in any given country implies that it has a problem because its imports are greater than its exports. To finance its imports, this country should have more direct investments, accumulate foreign debt, or make use of capital markets. The Indonesian economy has a current account deficit at a dangerous level because the ratio to GDP exceeds the tolerance level of 2.5% (see table).

Table 4.5

Percentage of Current Account Deficit to GDP (Selected Countries)

Negara	1992	1993	1994	1995	1996
Indonesia	-2.6	-1.5	-1.7	-3.4	-3.6
Malaysia	-3.4	-4.8	-6.3	-8.6	-6.0
Thailand	-5.7	-5.9	-5.6	-8.1	-8.2
Filipina	-1.9	-5.5	-4.6	-4.4	-4.3
Korea Selatan	n.a	0.1	-1.2	-2.0	-4.8
Taiwan	n.a	7.4	2.0	-2.0	1.3
Hongkong	n.a	3.0	2.6	-1.9	2.7
Meksiko	n.a	-5.8	-7	-0.3	-0.5
Singapura	11.3	7.2	15.9	17.7	15.7

Source : World Bank,1998

The coefficient of the variable of foreign reserve to import ratio is statistically significant. However, this variable has an unexpected sign. Theoretically, the higher ratio leads to an appreciation of rupiah exchange rate. The higher import implies the higher demand of foreign currency. However, in the short run since there is an expectation that the domestic currency will always depreciate steadily at 5% because of peg system, it leads to a postponement of import payment. This causes the exchange rate to end up being not so volatile.

The coefficient of growth rate of GDP is statistically significant at the 5% level, which has the value of –13244.2. This implies that an increase by 0.01 in the growth rate of GDP will lead to a decrease by 132.44 rupiah per dollar. This means that the rupiah has appreciated as much as this value, holding other variables constant. This result is also consistent with Frankel and Rose (1996), who used a panel of annual data for developing countries to examine the determinant of currency crashes. They find that currency crashes are associated with a high foreign interest rate, low output growth, high domestics credit growth, and low ratio of foreign direct investment to debt.

As expected, the dummy for crisis (DMCS) and dummy variable of exchange rate system (REZIM) are statistically significant. The positive sign of the coefficient of dummy for exchange rate system means that the abandonment

of the pegged exchange rate system in August 1997 resulted in the depreciation of the rupiah exchange rate. This is not surprising, as it has theoretically been established that the abandonment of the semi-pegged system has largely contributed to the successful attacks of currency speculator on the rupiah, leading to the massive depreciation of the rupiah exchange rate. This result is consistent with Krugman (1979), who argues that financing fiscal deficits through an expansion of domestic credit lead to reserve loss that ultimately makes it impossible to maintain the peg system. This finding is also consistent with the second generation model of currency crisis theory, which views the idea that monetary authorities abandon their pegs due to the depletion of international reserves. It argues that 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.

V . CONCLUSIONS and POLICY IMPLICATIONS

5.1. Conclusions

The Indonesian currency crisis has received much interest due to its depth, and because it was unanticipated. The weakness of economic fundamentals (banking sector and corporate sectors) has been associated with the currency crisis in Indonesia during 1990's.

The linkage between economic fundamentals and the currency crisis is also supported by the regression model, in which the increase in the ratio of banks' claim on private sector to GDP and the increase in the ratio of current account deficit to GDP leads to the depreciation of the rupiah exchange rate during the observation. Similarly, the growth rate of GDP had a positive impact on the rupiah exchange rate, which meant that the growth rate of GDP led to an appreciation of the rupiah exchange rate. The abandonment of the pegged exchange rate system resulted in the depreciation of the rupiah exchange rate. For this reason, it is reasonable to argue that there is a linkage between the weaknesses of economic fundamentals and the currency crisis during observation. However, the ratio of M2 to reserves is statistically insignificant.

5.2. Policy Implications

The government should reduce current account deficit, aiming for maintenance of the sustainable balance of international reserves.

Since the ratio of bank claims to GDP is very high, the lending boom on the corporate sector that might weaken the banking sector should be limited because it deals with non-performing loans. In this sense, the lending allocation should be targeted to the productive sector, and allocations that are based on ad hoc consideration should be prohibited.

Furthermore, the government should try to reduce national foreign debt and maintain the debt position that is considered sustainable, in order to prevent the debt trap from happening.

Finally, the government should expand nationally based industries instead of relying on imports in order to maintain reserves.

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Regression

Descriptive Statistics

	Mean	Std. Deviation	N
EXR	6236.0283	4634.45113	48
BCGDP	2.4882	1.29263	48
CAGDP	3.7E+07	111998678.0	48
FRSIMP	1.9837	1.00947	48
GRGDP	.0052	.03183	48
REZIM	.4167	.49822	48
DMCS	.2500	.43759	48
M2TRB	.0000	.00000	48

Correlations

		EXR	BCGDP	CAGDP	FRSIMP	GRGDP	REZIM	DMCS
Pearson Correlation	EXR	1.000	.740	.891	.707	-.258	.834	.438
	BCGDP	.740	1.000	.468	.468	-.358	.659	.694
	CAGDP	.891	.468	1.000	.701	-.064	.767	.284
	FRSIMP	.707	.468	.701	1.000	-.020	.740	.553
	GRGDP	-.258	-.358	-.064	-.020	1.000	-.168	-.268
	REZIM	.834	.659	.767	.740	-.168	1.000	.683
	DMCS	.438	.694	.284	.553	-.268	.683	1.000
	M2TRB	-.878	-.604	-.739	-.744	.213	-.778	-.405
Sig. (1-tailed)	EXR	.	.000	.000	.000	.038	.000	.001
	BCGDP	.000	.	.000	.000	.006	.000	.000
	CAGDP	.000	.000	.	.000	.334	.000	.025
	FRSIMP	.000	.000	.000	.	.446	.000	.000
	GRGDP	.038	.006	.334	.446	.	.127	.033
	REZIM	.000	.000	.000	.000	.127	.	.000
	DMCS	.001	.000	.025	.000	.033	.000	.
	M2TRB	.000	.000	.000	.000	.073	.000	.002
N	EXR	48	48	48	48	48	48	48
	BCGDP	48	48	48	48	48	48	48
	CAGDP	48	48	48	48	48	48	48
	FRSIMP	48	48	48	48	48	48	48
	GRGDP	48	48	48	48	48	48	48
	REZIM	48	48	48	48	48	48	48
	DMCS	48	48	48	48	48	48	48
	M2TRB	48	48	48	48	48	48	48

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	M2TRB, GRGDP, DMCS, BCGDP, FRSIMP, CAGDP, REZIM[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: EXR

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F
1	.979[a]	.959	.952	1015.64971	.959	134.086	7	40	

a. Predictors: (Constant), M2TRB, GRGDP, DMCS, BCGDP, FRSIMP, CAGDP, REZIM

b. Dependent Variable: EXR

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.68E+08	7	138315811.3	134.086	.000[a]
	Residual	41261773	40	1031544.324		
	Total	1.01E+09	47			

a. Predictors: (Constant), M2TRB, GRGDP, DMCS, BCGDP, FRSIMP, CAGDP, REZIM

b. Dependent Variable: EXR

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1095.261	1616.683		.677	.502
	BCGDP	1578.821	194.336	.440	8.124	.000
	CAGDP	1.791E-05	.000	.433	6.009	.000
	FRSIMP	553.064	272.807	.120	2.027	.049
	GRGDP	-13244.2	5258.307	-.091	-2.519	.016
	REZIM	2400.968	730.218	.258	3.288	.002
	DMCS	-2954.265	687.197	-.279	-4.299	.000
	M2TRB	-2.1E+08	3.0E+08	-.052	-.696	.490

a. Dependent Variable: EXR

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	711.6913	17413.69	6236.0283	4538.74732	48
Residual	-1909.66	2426.2117	.0000	936.96855	48
Std. Predicted Value	-1.217	2.463	.000	1.000	48
Std. Residual	-1.880	2.389	.000	.923	48

a. Dependent Variable: EXR