Important Measures Against Private Capital Out Flows: The Case of Indonesia

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Abstract

Tindakan kebijakan yang lemah serta pengawasan yang kurang memadai terhadap aliran dan konsumsi dana eksternal jangka pendek selama periode booming *(terutama di awal dan pertengahan tahun 1990-an) adalah memiliki peranan penting dalam terjadinya krisis ekonomi dan mata uang yang terjadi di Indonesia. Aliran keluar modal swasta dalam bentuk pelarian modal telah memperbesar intensitas dari krisis ekonomi baru-baru ini dikarenakan tindakan tersebut menghabiskan persediaan modal yang ada pada saat dimana modal tersebut sangatlah dibutuhkan. Pelarian modal diperkirakan dengan menggunakan ukuran tidak langsung (yang mulanya digunakan oleh World Bank, 1985) yang melibatkan residual dari beberapa variabel lain. Menurut pendekatan ini, pelarian modal dihitung sebagai akuisisi aset eksternal yang diidentifikasikan kecuali cadangan devisa resmi, ditambah dengan kesalahan dan penghilangan yang tercatat. Analisa ekonometri telah dilakukan untuk menentukan faktor-faktor yang mempengaruhi pelarian modal dari Indonesia. Dengan menggunakan Augmented Dickey-Fuller dan Phillip-Perron tests of unit root, disimpulkan bahwa semua variabel kecuali PMA, ketidakpastian dan diferensial tingkat suku bunga adalah non-stasioner. Pendekatan Johansen's digunakan untuk menguji co-integration dalam sistem multivariate yang mencakup estimasi jangka panjang dan jangka pendek. Hasilnya menunjukkan bahwa depresiasi nilai tukar, peningkatan dalam hutang luar negeri, PDB, PMA dan inflasi merupakan faktor penentu terhadap pelarian modal dari Indonesia. Tindakan-tindakan kebijakan untuk mencegah masalah pelarian modal di masa yang akan datang harus memperhitungkan dampak serta keterkaitan antara berbagai variabel makroekonomi. Tindakan kebijakan yang seimbang berdasarkan kebijakan fiskal dan moneter adalah penting dalam usaha untuk mempertahankan atau memperkuat kepercayaan masyarakat. Adalah penting untuk memonitor dengan saksama aliran dan konsumsi dari dana luar negeri terutama pada saat-saat kemakmuran ekonomi.*

1. INTRODUCTION

Following the 1997 crisis, Indonesia had faced the worst economic conditions since the past 32 years. The number of people living below the poverty line swelled from 22.5 million in 1996, to at least 80 million in 1998, and about 20 million possessed no purchasing power whatsoever. The currency crisis has caused a dramatic increase in the level of unemployment in Indonesia. By January, 1998, there were between 8 million (8.8%) and 8.5 million (9.4%) unemployed workers compared to about 4.4 million (4.9%) in the preceding year (Singapore International Media, Feb 5, 1998). The total workforce is around 90 million while the total country's population is about 204 million (in 1998). Substantial increase in the price level had become serious problem as the currency crisis took place. The rate of inflation in 1998 had drastically climbed up to around 60 % to 100 %.

The flaws in the country's fundamentals substantially explain the vulnerability of the economy to the extemal shock. From Table 1, it is quite obvious that the level of foreign reserve has been relatively low considering the large amount of Indonesian extemal debt (Table 1). During 1993-1997 period, the country's average level of external debt was US$107.1 billions while the average debt equity ratio during the same period was 31.94. The average level of foreign reserve during the same period was only US$15.12 billions. According to report by Bank of International Settlements (in August 1997), most of the private bank debt matures within one year (Thoenes, January 12, 1998). More importantly, most of the large companies involved in external borrowings did not hedge their foreign currency debt. Shortly after the Thailand's currency crisis (in June, 1997), foreign bankers started to call in their loans while hedge funds and other foreign speculators, being aware of the flaws in the economy, went into overdrive selling the rupiah short. The condition deteriorated as the panicky local companies with large foreign debt began to search for dollars and gave up their own rupiah. The collapse of the rupiah had caused a heavy burden on the Indonesian conglomerates that had been involved in the unhedged borrowings.

Table I
Important Economic Indicators for Indonesia

	1989	1990	1991	1992	1993	1994	1995	1996	1997
GDP	7.4	7.1	8.9	7.2	7.3	7.5	8.2	8.0	4.6
Inflation	6.5	7.4	9.4	7.5	9.7	8.5	9.4	7.9	6.6
Unemployment	NA	8.0	8.1	8.0	3.1	4.4	7.2	4.9	8.5
Current Account	-1.1	-4.2	-4.1	-3.7	-3.4	-2.8	-6.8	-7.6	-3.9
External Debt (US$)			76.1	84.4	90.3	89.1	107.8	120.2	128.1
Foreign Reserve	5.4	7.5	9.2	10.4	11.3	12.1	13.7	18.2	20.3
National Saving	37.5	37.1	32.9	31.7	32.8	31.9	31.4	33.7	35.2
Investment Rates	NA	36.1	35.5	35.9	29.5	31.1	31.9	32.1	NA
Openness (Trade)	NA	26.3	27.2	28.2	25.3	25.9	27.0	26.2	NA
Exchange Rates	1800	1843	1950	2030	2087	2161	2249	2349	5543
Stock Index	NA	417	247	274	588	469	513	637	594
Property Index	NA	NA	119	66	214	140	112	143	40

Note:

- GDP refers to the growth rates of Gross Domestic Product in For 1998, the expected growth rate for GDP is -15
- The rate of inflation for 1998 is expected to be around 60 % to 100 %.
- The level of unemployment by January, 1998 was between 8.8 % to 9.4
- Current Account refers to the national current account balance, (in US$ billions), positive value indicates surplus while negative indicates deficit.
- Foreign Reserve is valued in US$ billions.
- National Saving refers to the amount of saving as a % of GDP.
- Investment Rates refers to the rates of investment as a % of GDP.
- Openness refers to the degree of openness of the countries economy measured by (export + import)/2 as a % of GDP.
- Exchange Rates for Rupiah is calculated based on one US$.
- Stock Index refers to the overall stock market price index.
- Property Index is the stock market price index for the property sector.
- Sources: International Financial Statistics, National Reports and World Development Indicators, various issues.

In the light of the 1997 capital withdrawal shock and currency crisis, it is important to conduct a study on capital flight especially in terms of enhancing our understanding on the roots of the problems so that appropriate policy measures can be derived in order to avoid future problem. For the purpose of this paper, we would conduct an econometric analysis on the determinants of capital flight from Indonesia and subsequently suggest some policy implications on how to avoid the problem in the future.

2. METHODOLOGY

The conventional statistical measures like t-statistics and R^2 are the standard indicators to evaluate the degree of acceptance of the hypothesized model so long as the variables included in the ordinary least squares (OLS) behave as stationary. When those variables are non-stationary, such conventional measures do not anymore reflect the true performance of the hypothesized model. Models containing non-stationary variables normally lead to problem of spurious regression whereby the obtained statistical results indicate significant relationships between the variables in the equation when in actual fact they are only evidence of contemporaneous correlations instead of true causal relations. Removing the non-stationary (stochastic) trend by differencing the data is only part of the solution because differencing removes long run information even though the spurious regression problem is avoided. Analysis of cointegration enable researchers to deal with models involving non-stationary variables (Johansen, 1988[1]).

A time series is defined as weakly stationary if it has finite mean, finite variance and finite covariance, all of which are independent of time. Consider the following first order autoregressive or AR(l) process

$$Y_t = \alpha + \rho y_{t-1} + \varepsilon_t \quad \ldots\ldots (1)$$

where α and ρ are parameters and ε_t are assumed to be independently and identically distributed with zero mean and equal variance. If $-1 < \rho < 1$, the above AR(l) is said to be stationary. A series of observations generated by stationary process normally fluctuate around a constant level (i.e. the variance is finite) and there is no tendency for their spread to increase or decrease over time.

On the other hand, y is non-stationary if $\rho = 1$, and the above equation defines a random walk with drift. The variance of y increases with time and the unconditional variance is infinite. When $|\rho| > 1$, the

1 Johansen's approach is able to perform cointegration test even when there are more than two variables in die model and therefore there can be more than one cointegration relationsWp among the variables. This approach involves vector error correction model (VECM) which contains information on both shortas well as long-run adjustments to changes in variables. The stationary long-run relationship comprising cointegration vectors is decomposed from the non-stationary relationship comprising the common trends using die reduced rank regressions.

series is non-stationary and explosive (it tends to be either ± ϕ. Non-stationary series has different mean at different points in time and its variance increases with the sample size, A stationary series is said to be integrated of order zero I(0) while a non-stationary series is called integrated of order *d*, denoted by y ~ I(*d*) if after differencing *d* times, it becomes stationary. For example, a series which needs to be differenced once to become stationary is called integrated of order one noted as I(1). In order to determine the order of integration of the variable of interest, we can perform the unit root test.

2.1 Dependent Variable

For the purpose of this study capital flight is estimated using an indirect measure which involves a residual of some other variables. The measure was originally used by the World bank (World Bank, 1985 and Erbe, 1985) which measured capital flight as the identified acquisitions of external assets except official reserves, plus recorded errors and omissions. The measurement takes the inflows of capital in the form of increases in net foreign direct investment (FDI) as well as external debt, and then deducts the current account deficit and increase in official reserves from those inflows.

To understand the indirect or residual approach of measurement, we recall the basic macroeconomic accounting identity for an open economy:

$$CAS + \Delta LTF + \Delta FDI - \Delta A_b - \Delta A_p - EO \approx \Delta ER \quad \text{..... (2)}$$

where

CAS = CurTent account surplus or equivalent to (minus current account deficit (-CAD))

ΔLTF = Net long-term capital inflows (long-term public and private sector net flows)

ΔFDI = Net direct foreign investment

ΔA_b = Net increase in (short-term) external asset of deposit money banks

ΔA_p = Net increase in (short-term) external assets of private non-banking

EO = Net errors and omissions

ΔER = Net change in official reserves net increase)

Rearranging the above equation, we can express the total capital outflows (which include net errors and omissions) as:

$$(\Delta Ab + \Delta AP + EO) = CAS + \Delta LTF + \Delta FDI - \Delta ER \quad \ldots\ldots\ldots\ldots \quad (3)$$

The World Bank's broad (indirect) measure of capital flight refers to the identified acquisitions of external assets except official reserves, plus recorded errors and omissions.

Statistically it is equal to gross capital inflow on account of foreign direct investment and external debt less the current account deficit less the acquisition of official reserves such that:

$$CFWB = \Delta EDT + \Delta FDI - CAD - \Delta ER \quad \ldots\ldots\ldots\ldots \quad (4)$$

where

CFWB = Capital Flight (World Bank measure)

ΔEDT = Change in the level of external debt (estimate for ΔLTF)

CAD = Current account deficit (-CAS)

ΔFDI = Net Foreign Direct Investment

ΔFER = Foreign Reserves Build up

The difference between those inflows and the extent to which they are used for financing the current account deficit as well as the increase in reserves is taken to reflect the increase in the net foreign claims. This definition of capital flight incorporates all the reported as well as unreported build-up of foreign assets for both public and private sectors (World Bank, 1985 and Erbe, 1985). This is quite appropriate especially if one thinks that most of the funds used for capital flight would have been utilized for more productive and beneficial domestic investment activities. In other words, foreign asset increase is mostly associated with national disutility due to capital flight.

Data on the above broad measure are collected from Balance of Payments yearbook (source A)[2]. Specifically, total foreign debt (ΔEDT) plus net FDI (source A, lines 49 - 52) minus sum of CAD (source A) minus ΔER (source A).

2 Source A refers to Balance of Payments yearbook, published by the huemational Monetary Fund.

2.2 Independent Variables

Many theoretical and empirical studies have interpreted capital flight as part of capital flows that are induced by source country factors which include national macroeconomic and regulatory policies (i.e. factors that capture the government's interventions) like higher tax rates, financial repression, price controls and bureaucratic restrictions all of which can cause capital flight (Lessard and Williamson, 1987). The selection of the independent variables is guided by previous findings of capital flight studies as well as by theoretical advances of capital flight. The following factors are expected to be important determinants of capital flight:

(1) Exchange rate changes (currency depreciation). Loss of holding assets associated with the currency depreciation is one of the most important sources of uncertainty. The presence of exchange rate policies that imply short-run real appreciation of domestic currency can lead to capital outflows as local investors seek to avoid capital losses when the over-valuation is corrected. In general, residents are more likely to acquire foreign assets when they perceive exchange rate policies that are inconsistent with fiscal and monetary policies in order not to be stuck holding local currency when it loses value. Researchers like Gibson and Tsakalotos (1993) used forward premium or discount while some economists such as Smit and Mocke (1991) used real exchange rate (REXR[3]) as a measure of exchange rate overvaluation. For the purpose of our study we will use real exchange rate (REXR) as a measure of exchange rate overvaluation since the data required (for the calculation of this measure i.e. REXR) are more readily available.

2) External Debt. The variable is intended to measure the risk of private asset expropriation. Previous studies conclude that there is a strong relationship between capital flight and external borrowing (Alesina and Tabellini, 1989; Dombusch, 1985; Harberger, 1985; and Dooley et.al., 1986). When the external debt is high, there is a possibility of future tax increases because the government needs to service its debt

3 Real exchange rate for two currencies is calculated as current exchange rate times the ratio of consumer price index (CPD country A over the CPI of country B (Currency,/Currency,) *(Cpll/CP'B). For example, the real exchange rate for United Kingdom versus the Ur~ted States is (BP/$)*(CPIUK/CPIUI)

and in an extreme case, residents fear that the government might decide to reduce its debt service burden through repudiation or default. Therefore, a positive relationship is expected between the external debt (including long term public debt) and capital flight. On a very special occasion, it is also possible that the increase in foreign borrowing leads to a lower pressure for example in terms of taxation of domestic assets and thereby decreases the likelihood of capital flight (Mikkelsen, 1991). The data are collected from the World Bank, World Debt Tables.

3) The domestic GDP growth rate. Mikkelsen (1991) used domestic GDP growth rate as a measure for real rate of return of the economy. The variable also reflects the macrocconomic performance of the country[4]. A negative relationship is expected between capital flight and domestic GDP growth rate. Data on domestic GDP growth rate are collected from IW, International Financial Statistics.

(4) Inflation. In the presence of inflation or expected inflation, people foresee the overall prices to go up including the price of foreign exchange (i.e. people foresee deterioration in the exchaqge rate) resulting in an increase in the expected return to and demand for the foreign currency. This will lead to excess supply of domestic currency and thus exchange rate depreciating (in the presence of flexible exchange rate policy). In the case where exchange rate is not free to move, the domestic currency will then be overvalued (Krugman and Obsfeld, 1994). Inflation can also be perceived as an indicator for how much the government has resorted to taxing domestic financial assets through money creation (sometimes it is called inflation tax policy). It shows that the government is experiencing difficulties in generating revenue which can contribute to the risk of investment and holding domestic financial assets (Dooley, 1988). For the purpose of our study, inflation is calculated as changes in the consumer price index or CPI. Data for CPI are collected from International Monetary Fund, International Financial Statistics IFS, line 64.

4 Smit and Mocke used the average real growth rate over the past three years in order to measure the economic perfonnance of the country in their study on Capital Hight from South Africa.

(5) Interest rate differentials. Relatively low and unattractive domestic interest rates can be a reflection of domestic financial repression that can stimulate capital outflows especially when they are at the levels that create significant interest differential (after making adjustment for exchange rate changes) in favour of foreign assets. The continuous capital outflows can be considered as capital flight as they adversely affect the capability of the state to finance its fiscal plans. Monetary financing of the deficits can lead to inflation and further stimulate the capital flight as real interest yields fall lower and the local currency depreciates. For the purpose of our study, interest rate differentials will be taken as the differences between rates of interest in Inclonesia and the United States interest rates. Data on interest rates (call or money market interest rates are used for the proxies of domestic interest rates) are collected from EMF, International Financial Statistics.

6) Uncertainty. Domestic instability and social pressures can cause capital flight because of the increase in risks and losses that they impose. For example, change in policy regime associated with the election of left-wing government which may have very different goals and priorifies can lead to increase in taxation (such as wealth tax), financial instability, inflation, and increase in interventionist economic policies like nationalization and confiscation of assets. It is quite difficult to find a good proxy for uncertainty for an econometric analysis. In fact, it is also argued that an uncertainty proxy can hardly be distinguishable from expectations about exchange rate movements. However, this is quite a narrow conceptualization of the uncertainty role in capital outflows. Researchers in the past have used different proxies for it, for example Smit and Mocke (1991) used number of tourists coming to the country and the number of emigrants moving out to reflect domestic uncertainty and instability. Gibson and Tsakalotos (1993) employed a polifical proxy[5] which incorporates both changes that

[5] For more details about the political proxy, please refer to the appendix 2, page 162 -164, Gibson and Tsakalotos (1993). Generally, their political proxy seeks to capture the discrete political events rather than the political stability of the system over the long run. Values of either one (+ 1), zero (0) or minus one (-l) was assigned to, each year within the period under study, for example (+ 1) for such years when there were events

either increase or (reduce) uncertainty which can encourage or (discourage) the capital flight. For this study, we will use deviations of exchange rate or alternatively real GDP from their 3 year moving averages as proxy for uncertainty[6].

7) Foreign direct Investment (FDI). Inclusion of FDI in the study of capital flight determinants has never been done in the past. The main question is whether FDI flows into Indonesia actually facilitate capital flight (used as a source of fund for capital flight like private external borrowings) or mark a reduction in capital flight. The only available study (Kant, 1996) is on the simple correlation between FDI and capital flight among groups of countries i.e. East Asia and the Pacific, Latin America and the Caribbean, Europe and the Mediterranean and Developing Countries. Even though he basically found that FDI flows can be associated with a reduction in capital flight for most of those groups, we cannot be sure that the result for an individual country would be the same. Data for FDI are collected from the International Financial Statistics (IFS), line 77bad.

The U.S. dollar is used in most of the calculations in order to reduce the impact distortions originated from the exchange rate changes. All of the dependent and independent variables are transformed into log form to minimize the heteroscedasticity problem. Log transformation can reduce heteroscedasticity because it compresses the scales in which the variables are measured.

Based on the above discussion regarding the various capital flight determinants, we may write a general model of capital flight function as:

$$LWBM = f(LREXR, LCEDT, LGDP, LINF, LDINT, LUNC, LFDI) \quad \ldots(5)$$

where

LWBM = Capital flight (World Bank's measure)
LREXR = Real exchange rates

like adoption of stabilization plans by the new (left wing) government which reflected severe conflict over the course of economic policy-making prior to the change of government. (-1) was assigned to the years when there was event such as election victory for the right which reflected a clear shift in the policy direction.

[6] Let GDP, be gross domestic product for period t, uncertainty for period t (UNQ can be written as: $UNC_t = GDP_t - (GDP_{t-1} + GDP_t + GDP_{t+1}) / 3$.

LCEDT = Change in the external debt
LGDP = Real gross domestic product growth rates
LINF = Inflation
LDINT = Interest rate differentials
LUNC = Uncertainty
LFDI = Foreign Direct Investment

3. COINTEGRATION ANALYSIS IN MULTIVARIATE SYSTEM

Table 2 and **Table 3** present the results of Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests of unit roots. The reported statistics shows that with the exception of LFDI, LDINT and LUNC, the rest of the variables are nonstationary i.e. I(I). In the light of this information on unit root, variables LFDI, LDINT and LUNC are included in the short run estimation as 1(0) variables[7].

As for the nonstationary variables, we proceed with cointegration tests by employing Johansen's (1988) method which allows testing for cointegration in a system of equations. The earlier method by Engle and Granger (1987) provides a procedure of testing for cointegration in a single equation framework. The single equation method can be misleading especially when there are more than one cointegration relationships in the system. In the case of more than two variables ($n > 2$) when the number of cointegrating vectors is unknown and given the need to allow all variables to be potentially endogenous, it would be better to adopt the Johansen's approach which involves vector error coffection model (VECM). The VECM takes the following form:

$$\Delta z_t = \Gamma_1 \Delta z_{t-1} + \ldots + \Gamma_{k-1} \Delta z_{t-k+1} + \Pi z_{t-k} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots \quad (6)$$

7 LFDI, LDINT and LUNC are not entered in the long run model (of cointegration analysis) because the series is stationary and does not have the same order of integration as the other variables i.e. I(I). As mentioned earlier, the standard cointegration model requires that all variables included in the regression must be of the same order of integration. Baffes (1997) has considered a model with stationary dependent variable while explanatory variables being nonstationary and has tried to evaluate the performance of such an unbalanced regression (a term used by Banerjee et al., 1993) model which contains variables of different orders of integration.

Where zt is vector of (n x 1) potentially endogenous variables. $\Gamma_i = -(I - A_1 - A_i)$, (i = 1, ..., k-1), and Γ_i is an (n x n) matrix which indicates short-term adjustments among variables across n equations and A is an n x n matrix of parameters. $\Pi = -(I-A1 ...- Ak) = \alpha\beta'$ where α represents speed of adjustment to disequilibrium while β is a matrix of long run coefficients (cointegrating vectors) such that the term $\beta' z_{t-k}$ embeded in the above equation. Matrices oc and β are of dimension (nxr). ε_t is an (nx1) Gaussian white noise residual vector while k indicates lag structure.

Table 2
Results of (Augmented) Dickey FuHer Unit Root Tests

	Levels	First Difference	Second Difference
LWBM (intercept, lag =2)	-2.368	-4.386**	-5.795**
LREXR (none,lag =2)	0.169	-2.232*	-5.471
LCEDT (intercept, trend, lag=2)	-2.589	-4.933**	-5.620**
LGDP (intercept, lag = 2)	-0.483	-3.329*	-3.997**
LFDI (intercept, trend, lag=1)	-3.830*	-6.435**	-7.563**
LINF (intercept, lag=2)	-1.194	-3.370*	-5.081
LDINT (intercept, lag = 1)	-3.036*	-3.535*	-5.687**
LUNC (intercept, lag=2)	-3.377*	-6.583**	-8.054**

Note:
denotes significant at 1% level
indicates significant at 5% level

The above values were compared to the MacKinnon (1990) critical values for rejection of hypothesis of a unit root. The econometric package used in our study reports the ADF -r-statistics for various specified lag-length. The decision to include the intercept, time trend terms varies across the equations while the number of augmentations (lag of differenced dependent variable) is chosen such that there is no problern of autocorrelation as indicated by the Lagrangean Multiplier (LM) tests at 5% significance level ranging from the first to the fourth order. Following

Dickey and Pantula (1988), we provide three different orders of unit root tests starting from second difference (assuming that the order of integration of each series is at most 2), first difference and levels even though most of the macroeconomic time series are said to be I(1).

Table 3
Results of PhiHips-Perron Unit Root Tests

	Levels	First Difference	Second Difference
LWBM (intercept, trend, truncation lag=4)	-3.820	-8.338**	-10.964**
LREXR (intercept, truncation lag = 2)	-1.039	-3.160*	-8.607**
LCEDT (none, truncation lag=4)	0.396	-12.638**	-19.864**
LGDP (intercept, truncation lag=2)	-0.764	-4.002**	-8.417**
LFDI (intercept, truncation lag=4)	-3.361	-11.481**	-18.775**
LINF (intercept, truncation lag=4)	-0.994	-5.511	-7.921
LDINT (intercept, truncation lag = 1)	-3.035*	-3.571	-5.468**
LUNC (intercept, trend, truncation lag 6)	-9.491	-16.358**	-23.909**

Note:
denotes significant at 1% level
indicates significant at 5% level

The above Phillips-Perron test statistics are compared to the MacKinnon (1990) critical values for rejection of hypothesis of a unit root. Unlike the ADF test, there are no truncation lagged difference terms. Instead of specifying the number of lagged difference terms, the truncation lag for the Newey-West correction is specified, that is, the number of periods of serial correlation to be included. The equation is estimated using ordinary least squares (with the optional inclusion of constant and time trend) and then the t-statistic of the coefficient is corrected for serial correlation in t. Our statistical package (Eviews) uses the Newey-West procedure for adjusting the standard errors. For a full technical discussion of these issues, see Hamilton (1994) and Newey and West (1987).

Table 4
Results of Johansen Procedure,
VAR with 2 lags. Sample period: 1971 - 1995 (25 observations)

I. Eigenvalues: 0.776 0.523 0.417 0.299 0.088

Test statistics for the number of co-integrating vectors:

	λ max			Trace		
Ho:rank= r	T	T-nk	95%	T	T-nk	95%
r = 0	35.88**	20.93	30.0	77.37**	45.13	59.5
r ≤ 1	17.78	10.37	23.8	41.49*	24.2	39.9
r ≤ 2	12.96	7.558	17.9	23.72	13.83	24.3
r ≤ 3	8.55	4.988	11.4	10.76	6.276	12.5
r ≤ 4	2.209	1.289	3.8	2.209	1.289	3.8

II. ESTIMATED CO-INTEGRATING VECTOR

LWBM	LREXR	LCEDT	LGDP	LINF
1.0000	-1.7019	-2.2931	3.3932	-6.8309

III. ESTIMATED ADJUSTMENT MATRIX

LWBM	LREXR	LCEDT	LGDP	LINF
-0.2247	0.0553	0.5050	0.0260	0.0158
[10.1447]	[0.0240]	[0.1267]	[0.0184]	[0.0433]

IV. RESTRICTED CO-INTEGRATING VECTOR

LWBM	LREXR	LCEDT	LGDP	LINF
1.000	-1.0000	-1.9144	2.2680	-4.8356

LR-test $\chi^2(1) = 0.51351$ [0.4736]

V . APROPRIATE LAG LENGTH (2)

Serial Correlation:	LWBM	LREXR	LCEDT	LGDP	LFDI
$\chi^2(1)$	0.27[0.60]	9.24[0.002]**	0.51[0.48]	0.79[0.88]	0.77[0.40]
F (1,12)	0.15[0.71]	8.14[0.01]**	0.28[0.60]	0.44[0.52]	0.43[0.52]
Norinafity: $\chi^2(2)$	4.46[0.11]	0.62[0.73]	2.29[0.32]	1.06[0.58]	1.07[0.58]

Vector AR 1-1 F (25, 20) = 1.288 [0.2844]

Vector norinality $\chi^2(10)$ = 11.924 [0.2901]

VI. EXOGENEITY TESTS

Ho: $\alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$ $\chi^2_{0.05}$ with 4 d.f. = 23.462 [0.0001]

Ho: $\alpha_2 = 0$ $\chi^2_{0.05}$ with 1 d.f. = 4.456 [0.0348]

Ho: $\alpha_3 = 0$ $\chi^2_{0.05}$ with 1 d.f. = 12.125 [0.0005]**

Ho: $\alpha_4 = 0$ $\chi^2_{0.05}$ with 1 d.f. =1.973 [0.1601]

Ho: $\alpha_5 = 0$ $\chi^2_{0.05}$ with 1 d.f. = 0.1586 [0.6904]

Note:

** denotes significant at 1 % level].

* indicates significant at 5 % level.

Figures in square parentheses [ ] refer to marginal significance level.

4. LONG RUN AND SHORT RUN ESTIMATIONS

Result of Johansen's test (Table 4) suggests that one cointegrating vector exists based upon the λ_{max} test at 1% level (Panel 1). The trace statistic suggests rejection of zero cointegrating vector in favor of one at 1% level while at 5% level, the trace statistics rejects the existence of one cointegration vector in favour of two. In this case, we decide to follow the approach of Johansen and Juselius (1990) who appear to favour $_{max}$ test and conclude that there is one cointegrating equation. Using two lags, we found no serious problems of auto-correlation for all variables other than the LREXR which indicates serial correlation problem in the single equation test (Panel V). The vector test of autocorrelation however does not show any problem of autocorrelation (for all variables). No normality problem seems to arise as indicated by the individual variables as well as vector tests for normality. Following restriction tests on the independent variables, we finally attain the following long run capital flight function:

$$LWBM_t = LREXR_t + 1.914LCEDT_t - 2.268GDP_t + 4.836LINF_t \quad \ldots\ldots\ldots\ldots\ldots (7)$$

The results show that currency depreciation and increase in external debt yield are associated with an increase in capital flight (with elasticities of unity and 1.91 respectively) while GDP growth yields negative impact on capital flight in the long run (with an elasticity of -2.268). It is also found that inflation yields positive influence on the flight of capital with an elasticity of 4.836.

The test for weak exogeneity suggests rejection of the null hypothesis that all of the independent variables in the VvB's equation are weakly exogenous (Panel VI). Further analysis indicates that LREXR and LCEDT are not weakly exogenous while LGDP and LINF are both weakly exogenous within our model.

Based on the long run analysis which concludes that one cointegrating vector exists, we proceed with the short run estimation using the single equation generalized unrestricted model (GUM) applying the instrumental variable technique (as two of the independent variables are, not weakly exogenous). Table 5 shows the details for the short run (reduced form) capital flight function. The findings are generally quite consistent with those of the long run. It is quite clear from the reduced model that exchange rate depreciation, changes in total external debt, inflation and FDI significantly affect the activities of capital

flight. It is shown that exchange rate depreciation, increase in total external debt and inflation yield positive impact on the capital outflow in the short run with elasticities estimated at 3.27, 1.00 and 1.63 respectively. On the contrary, FDI inflows significantly reduce the capital flight in the short run with estimated elasticities of -0.33.

Our final specification is remarkably superior over the initial unreduced model in terms of standard error of regression and explanatory power despite the slight reduction in the parameters (from 20 to 13 variables). The estimated coefficients are generally significant and the estimated equation could pass the battery of diagnostic tests for autocorrelation, autoregressive conditional heteroscedasticity (ARCH test), normality of residuals, tests for functional form misspecifications and joint significance of all the explanatory variables.

Table 5
Results of Short Run Reduced Form GUM TSLS

I. D(LWBM) = = -0.525ECWBM(-l) - 0.353D(LCEDT(-l)) - 0.383D(LCEDT(-2)) – 6.404D(LGDP(-2)) + 1.649D(LINF(-l)) + 1.911D(LINF(-2)) + 1.633D(LINF) + 3.271D(LREXR) + 1.006D(LCEDT) - 0.328LFDI + 0.530LFDI(-l) - 0.560LDINT + 0.622LDINT(-l)

II. Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECWBM(-l)	-0.524766	0.095971	-5.467938**	0.0003
D(LCEDT(-l))	-0.352698	0.176674	-t.996328	0.0738
D(LCEDT(-2))	-0.383561	0.133406	-2.875133*	0.0165
D(LGDP(-2))	-6.404482	2.486338	-2.575869*	0.0276
D(LINF(-l))	1.649412	0.527251	3.128327*	0.0107
D(LINF(-2))	1.911161	1.108081	1.724748	0.1153
D(LINF)	1.633347	0.499326	3.271104**	0.0084
D(LREXR)	3.271892	1.057213	3.094828*	0.0114
D(LCEDT)	1.006520	0.283079	3.555611**	0.0052
LFDI	-0.328506	0.109164	-3.009291*	0.0131
LFDI(-l)	0.529942	0.123208	4.301178**	0.0016
LDINT	-0.559836	0.278328	-2.011422	0.0720
LDINT(l)	0.621630	0.264577	2.349524*	0.0407

Adjusted R-squared	0.862524	S.E. of regression	0.230803
Sum squared resid	0.266350	F-statistic	8.700143*
Prob(F-statistic)	0.012724		

III. Autocorr (Breusch-Godfrey Serial Correlation LM Test): () indicates lag
χ^2 (1) = 1.90[0.16]; χ^2 (2) = 4.54[0.10]; χ^2 (3)= 4.37[0.22]; χ^2 (4) = 2.48 [0.64]
F(1)= 7.59[0.051]; F(2)= 3.31[0.17]; F(3)= 1.47[0.43]; F(4)= 0.76[0.68]
Norinality: χ^2 (2) = 1.479 [0.4773]

ARCH:	χ^2 (1)	0.59 [0.45]	χ^2 (2) = 1.92 [0.38]
	χ^2 (3)	1.91 [0.59]	χ^2 (4) = 2.42 [0.66]
	F(l)	0.54 [0.47]	F(2) = 0.90 [0.42]
	F(3)	0.56 [0.65]	F(4) = 0.50 [0.73]

Functional Forin: Number of fitted terms = 1 : F(1)= 0.016[0.904];

IV. Instruments: ECWBM(-1) D(LWBM(-1)) D(LWBM(-2)) D(LCEDT(-1)) D(LCEDT(-2)) D(LGDP(-1)) D(LGDP(-2)) D(LINF) D(LGDP) D(LINF(-1)) D(LINF(-2)) LFDI LFDI(-1) LFDI(-2) LUNC1 LDINT1 LDINTI(-1)

V. Inforination on the Full Unreduced Model: (20 parameters)

Adjusted R-squared	0.660171	S.E. of regression	0.362876
F-statistic 3.202500		Prob(F-statistic)	0.264522

Note: "* denotes significant at l% level.
* denotes significant at 5% level.
Figures in square parentheses [ ] refer to marginal significance level.

5. SUMMARY AND POLICY IMPLICATION

The results of Johansen procedure for Indonesia reveal the existence of cointegration between capital flight on one hand and exchange rate movements, changes in extemal debt, real GDP growth and inflation on the other. Our analysis shows that one cointegrating equation exists. Thus, we have employed single equation general to specific procedure in order to derive the short run capital flight functions of which generally could withstand a battery of diagnostic tests. Since there exist independent variables which are not weakly exogenous, we have therefore adopted instrumental variable technique in the short run estimations. The long run equation indicates positive impact of exchange rate depreciation, increase in external debt and inflation on capital flight while positive economic (GDP) growth is associated with a decrease in capital flight. In line with the long run estimates, exchange rate depreciation, increase in extemal debt and inflation significantly increase capital flight. Our results also show that FDI can be associated with a decrease in capital flight.

The national authorities should therefore ensure not only the stability of exchange rates but at the same time try to reduce external debt build-up, promote steady economic growth, encourage more FDI and monitor the rates of increase in the general price level. It is essential that the national authorities not only achieve currency stability but also strengthen the credibility of exchange rates. A seemingly strong and stable currency (perhaps superficially induced by certain macroeconomic or exchange rate policies) but weak and unsustainable in reality can be more harmful than a weak but non-manipulated currency. The recent currency crisis provides an important lesson on how the collapse of an exchange rate actually originates from the belief that the existent exchange rate is no longer sustainable. Since macroeconomic variables are interrelated, introducing exchange rate policies in order to stabilize the currency would require a simultaneous parallel fiscal adjustment program and settlement of extemal debt problem.

A more preferred and effective strategy would be to implement balanced policy measures without trying to concentrate only on one or certain aspects of macroeconomic fundamentals such as price stability, steady economic growth or exchange rate stability. Policymakers should not ignore other aspects of economic fundamentals in trying to achieve a

specific macroeconomic goal because other factors can be equally important determinants of capital flight. For example, knowing that strong economic growth is associated with a decline in capital flight, a country should not blindly abandon other factors such as inflation and external debt in order to achieve certain targets of economic growth. We might be able to attain our targets in terms of economic growth, but if the growth is generated through heavy external financing and causing tremendous increase in the general price level, then the adverse effects of high foreign debt and inflation can result in an increase in capital flight.

Since the level of external debt and debt servicing ratio are very high, it is very important for the Indonesian authorities to make proper and definite plans on servicing its external debt and avoid further foreign borrowings. To achieve this, the reserve position needs to be strengthened, possibly through export promotion. To avoid problems in the future, it is strongly urged that the government promote greater transparency in the overall sector especially the state agencies like Pertamina (national petroleum company) because poor transparency can aggravate the sentiment of uncertainty which has been an important element of the recent currency crisis in Indonesia.

As stated by Stiglitz (1998), the past success and the subsequent currency crisis can be explained by the financial liberalization and capital account opening with the absence of commensurate strengthening of regulation and supervision. The affected countries had liberalized their financial markets and allowed a large scale inflows of not only long-term but also short-term capital into the countries. Some countries had reduced reserve requirements, eased the rules governing non-bank financial institution, expanded scope of capital market activities (like permitting banks to finance equity purchases on margin), and increased access to off-shore borrowing. However, one important thing that we tend to overlook is that financial liberalization would not automatically lead to deep, efficient and robust financial systems without government's involvement and supervision. An obvious manifestation of the inadequate financial regulation was the overbuilding in commercial real estate. Stopping the flows of short-term funds altogether is also not a wise idea and can be counter-productive but careful supervision on the amount of the flows and on where the funds are channeled would be more useful. In fact, a country might want to consider some kind of

capital controls cluring the boom and bullish period when large amount of (especially short-term) capital tends to move into the country. However, we tend to make a mistake by implementing capital controls when the crisis or sign of crisis has already taken place.

As a matter of fact, the currency crisis can be understood as a "crisis of success", caused by a boom of international lencling followed by a sudden withdrawal of funds. At the core of the crisis there were large-scale foreign capital inflows into the financial systems that became vulnerable to panic. Wolfenson (1 998) stresses that what has happened is a crisis which has been caused not only by government policy, but by the private sector excesses, not by government action, but to a certain extent by government inaction in terms of supervising and controlling the financial and corporate sectors.

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