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THE IMPACT OF GOVERNMENT DEBT ISSUANCE ON SHORT-TERM INTEREST RATES IN INDONESIA*

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This paper analyzes whether the expansionary fiscal policy funded by issuing debt instruments in financial markets will increase short-term interest rates. If the expansionary fiscal policy increases interest rates, which decrease private spending especially investment, crowding out occurs. This is interesting because global economic crisis has encouraged many countries to run large budget deficits to stimulate the economy. Indonesia has also run budget deficit during this crisis and even in years before. The impact of such a policy can be significant because Indonesia's debt market is still narrow and shallow. Therefore, its capability of absorbing the government debt instruments without influencing the private sector funding is limited. This study tests whether the crowding out occurs in Indonesia using a time series econometric model inspired by Cebula and Cuellar's model. The Cointegration Regression and Error Correction Model (ECM) are used in this study. Monthly data from April 2000 to December 2008 are used for overnight real interbank call money interest rates, real net government bond issues in trading, real narrow money supply, real rate of one-month

* Data used in this paper are collected from Statistik Ekonomi Keuangan Indonesia (SEKI) Bank Indonesia 2000-2008 or by URL: http://www.bi.go.id/web/id/Statistik/Statistik Ekonomi dan Keuangan Indonesia/Versi HTML/

Certificate of Bank Indonesia, growth of Gross Domestic Product, and real net international capital flows. This empirical study shows that the crowding out problem occurred in Indonesia during the period. This indicates that financing budget deficit in Indonesia by issuing debt instruments in the financial markets has a negative impact on the private sector.

Keywords: crowding out; ECM; government debt instrument

Introduction

An economic crisis carries the same consequence for both developing and developed countries, which is an increase in government spending to prevail over the crisis. The large increase in government spending in a short period of time has made fiscal deficit increase rapidly. The size of the deficit has also created an increase in national debt, especially if the economic recovery process takes a long time and huge costs. Indonesia, which required a long process to recover from the Asian crisis, even had to spend more than 50 percent of its GDP to foster its banking industry in the 1997/ 1998 crisis, which greatly increased its national debt. It was worsen by the fact that as an emerging market, Indonesia did not have broad and deep financial markets. Its fixed-income assets were undeveloped and its sovereign debt market had just started when the government issued government bonds for bank restructuring. Therefore, it will be interesting to learn the impacts of sovereign debt issuance on private sectors in shallow and narrow financial markets, such as those in Indonesia.

The impact of excessive use of sovereign debt policy on corporate access to external financing has long been the center of public debates. The recent economic crisis, believed to be the most severe since the Great Depression of 1930s, has made the issue even more relevant as many countries have been forced to issue fiscal stimulus packages in their efforts to prevent their economies from larger economic contraction. There is little doubt that the use of fiscal stimulus packages by many governments may unexpectedly worsen economic performance so as to have negative implications for public finance. This is because while the economic crisis has lowered state income especially from tax revenues, expenditure has soared due to the need for stimulating the economy. Large state budget deficits raise concerns over crowding out private investment. This topic has been a common concern among economists as an article in The Economist on June 13 -19 (2009: 11) testifies. The article expresses such concern by noting that:

> *Governments' thirst for funds will eventually crowd out private investment and reduce economic growth.*

It is a stance that the IMF Staff Position Note (2009) takes.

Large government debts have been a public issue in Indonesia over the last decade. Indonesia's debt in 1999 was IDR940 trillion, increased to IDR1,229.5 trillion in 2004 and reached IDR1,700 trillion in March 2009 (Directorate General of Debt Management 2009). In the last five years, net issuance of government securities reached more than IDR80 trillion annually, 90 percent of which was in IDR (Rupiah) and the rest was in other currencies. Regarding the thin bond market in Indonesian financial markets, worries are now coming to the fore that the increasingly large public financing funded by issuing debt instruments will adversely affect fund availability to the non-financial sector (real sector). Such concerns have not been allayed by the fact that, in just a decade after the 1997 economic crisis, the highest economic growth rate of the Indonesian economy was registered at 6.3 percent in 2007, lower than the average growth per annum before the 1997 crisis (around 7.5 percent). Indonesia's debts also continue to rise, although its share to GDP has shown a downward trend from 89 percent in 2000 to 33 percent in 2008. Outstanding government debts for the period of 2004-2009 are shown in Table 1.

In the last five years, the Indonesian government has become increasingly dependent on the financial markets in the form of treasury bonds and bills to finance its deficit. Prior to the period, the Indonesian government used external debts such as the World Bank, Asia Development Bank, and bilateral loans from Japan, France,

Table 1. **Outstanding Government Debts, 2004-2009**

	2004	**2005**	**2006**	**2007***	**2008****	**March 2009*****
Total central government debt (in billion US$)	139.88	133.60	144.36	147.51	149.47	146.87
Total central government debt (equivalent in billion IDR)	1,229.50	1,313.29	1,302.16	1,389.41	1,636.74	1,700.00
Securities in IDR (trillion)	653.03	658.67	693.12	737.13	783.86	803.64
Exchange rate (IDR/US$1)	9.290	9.830	9.020	9.419	10.950	11,575

Source: Directorate General of Debt Management, Ministry of Finance Indonesia (2009)
Note: * Preliminary; ** Very Preliminary; *** Very very preliminary, as of March 2009

Table 2. **Size and Composition of Emerging East Asian Local Currency Markets in 2008 (% of GDP)**

	Total	Government	Corporate
People Republic of China	52.4	46.4	6.1
Hong Kong, China	39.4	9.1	30.4
Indonesia	13.6	12.3	1.3
Republic of Korea	85.7	38.6	47.0
Malaysia	76.0	41.4	34.6
Philippines	34.2	30.9	3.3
Singapore	66.8	37.8	29.0
Thailand	52.4	41.9	10.4
Vietnam	14.2	13.7	0.6
Total Emerging East Asia	54.0	40.2	13.8

Source: Asia Bond Monitor, First Quarter (2009), ADB

Germany, and U.S. The change in deficit financing strategy from using external debts to issuing government bonds, from the political vantage point, is very popular among Indonesians as they mostly oppose external debts. They suspect that loans are never free from political interests of creditor countries, and some hold the view that conditionality which often accompanies the disbursement of external loans does not benefit Indonesia. However, the recent budget deficit of around one percent to two percent of GDP is financed by issuing debt instruments in the financial markets. To that end, it is imperative to have a good understanding of the impacts that financing deficit by issuing debt instruments in the financial markets have on the Indonesian economy. This is particularly true given the fact that bond market in Indonesia is still thin. Table 2 shows that the size of Indonesia's bond market is the smallest in emerging East Asia. The development of bond market in Indonesia started a decade ago when the government issued bonds tailored to recapitalize banks, in the aftermath of the banking crisis.

Literature Review

Crowding out is defined by Investopedia as (2009):

> *An increase in interest rates due to rising government borrowing in the financial markets.*

When expansionary fiscal policy increases interest rates, which decrease private spending especially investment, crowding out occurs. In a full employment economy, crowding out can occur easily, and in this case it is a full

crowding out. In the classical case, an increase in government deficit leads to full-fledged crowding out. However, in an economy below the full employment level, crowding out occurs not in the form of a full crowding out. The rise in interest rates occurs even in an economy characterized by unemployed resources. This is because whenever a rise in the aggregate demand leads to an increase in income, the increase in income induces a rise in savings. However, the rise in savings can not finance a larger budget deficit without completely displacing private borrowing. In this way, interest rates will rise as the budget deficit increases. As a result, crowding out occurs even in an unemployment economy. In an unemployment economy, there is a possibility that even if the budget deficit increases, crowding out may not occur. In this case, there is a possibility that the deficit induces an increase in output, which precludes a rise in interest rates. This happens if the monetary authority accommodates fiscal expansion by raising the money supply, which in turn prevents a rise in interest rates. Such a policy is referred to as monetizing budget deficit (Dornbusch and Fisher 1990:149-157). So far, the discussion on crowding out has focused on the demand side. However, from the classical perspective, supply side is also used as an explanation for the crowding-out effect. In this case, fiscal expansion is posted to increase demand, which leads to firms experiencing excess demand for goods, sparking an increase in prices rather than output. The firms increase prices until excess demand is eliminated and reaches the full employment level of output. At such a level of output, real balances decrease while interest rates rise induces a reduction in private spending to make rooms for an increase in government spending (Dornbusch and Fisher 1990:219-257).

Crowding out creates problems when the government spends more money and finances it by borrowing money in the financial markets using debt securities. These induce a rise in market interest rates, which leads to private sector difficulties in raising external financing. This occurs because government debts are considered risk-free assets coupled with the fact that the government pays the market interest rates. Nonetheless, at some point, as government borrowing increases, the private sector and individuals no longer obtain sufficient funds in the market. In that event, competition pushes market interest rates higher. Temporary government deficit due to the issuance of debt instruments in the market, which will induce an increase in interest rates in the event of an increase in government consumption, substitutes private consumption as long as the substitution is less than one for one (Barro 1986).

Many economists have made extensive research on whether increasing government budget deficit influences the private sector (Carlson and Spencer (1975), Plosser (1982), Hoelscher (1983), Barth et al. (1985), Evans (1985), Tanzi (1985), Barro

(1986), Barth et al. (1986), Hoelscher (1986), Barro (1988), Zahid (1988), Cukierman and Meltzer (1989), Ostrosky (1990), Cebula (1997), Arteta and Hale (2006), Cebula and Cuellar (2009), Trebesch (2009)). Some economists find that there are some impacts while some others find no influence of the deficit on the private sector. Research on the impact of state budget deficit on the rate of interest has also received extensive attention. In a study by Cebula and Cuellar (2009) using quarterly data for the period of 1973.1-2004.4 in the U.S., it is revealed that the federal budget deficit, expressed as a percent of GDP, has a positive and statistically significant impact on the ex-ante real interest rate yielded on Moody's Baa-rated corporate bonds. Plosser's (1982) study using U.S. data also indicates that the capital markets are not indifferent with respect to the level of government expenditures as higher interest rates are associated with increases in government purchases. Carlson and Spencer's (1975) study shows that crowding out occurs in real rather than nominal terms. Tanzi's (1985) study in the U.S. (1960-1984) shows that fiscal deficit and (possibly) the level of public debt positively influence interest rates. Lower fiscal deficit levels are generally associated with somewhat lower interest rates or at least being equal. Hoelscher (1986) shows that larger deficit increases the slope of the yield curve in the U.S. However, no relationship between short-term rates and deficits is found, while long-term rates increase with higher deficits. Therefore, deficits push private borrowers into short-term markets for funds. Consequently, long-term capital spending projects are reduced and the rate of economic growth suffers. Zahid (1988) shows that between 1971 and 1980 in the U.S. when government budget deficit was defined appropriately to reflect the government excessive demand for funds from the non-government public, and the counter-cyclical variations in the deficit figures were adjusted, a significantly positive impact of deficits on real interest rates is established. Cebula's (1997) empirical results (U.S. 1973-1995) show that federal budget deficits have a positive and significant impact on the ex-ante real interest rate yielded on ten-year Treasury notes, Moody's Aaa-rated long-term bonds, and Moody's Baa-rated long-term corporate bonds. To the extent that private capital formation is sensitive to such interest rates, the above findings imply the possibility of at least some degree of "crowding out". Nonetheless, the results of the subject have differed among researchers. Some studies find no impact of government deficit on private sectors spending. Barro (1988) in his research using U.S. data for the period of 1983-1987 shows that Ricardian equivalence theorem, which shows the substitution of a budget deficit for current taxes (or any other rearrangement of the timing taxes), has no impact on the aggregate demand for goods. In other words, budget deficits and taxation have equivalent effects on the economy.

Therefore, there is no effect on investment, and no burden of public debt. On the other hand, Hoelscher (1983) shows that there is no measurable correlation between government borrowing and short-term rates. There is no evidence of significant relationship between federal borrowing and short-term interest rates for the post-WWII period in the U.S. The principal determinants of short-term rates are: expected inflation, monetary factors, and economic activities in the economy. Private expenditure is sensitive only to short-term rates, meaning that federal borrowing does not have financial crowding out effects. Evans (1985), using three-period data during Civil War, World War I, World War II, and post-war periods in the U.S., shows that evidence does not substantiate the paradigm that large deficits produce high interest rates. Evidence shows strong supports for a negative association between the two variables rather than a positive one. This paper should not be considered to be supporting deficit spending, as Barro reveals that the government ought to run whatever deficit or surplus necessary to flatten the expected future profiles of its marginal tax rates. Barro (1986) shows that, using British data from early 1700s through World War I, because of the exogeneity of the deficits, interest rates showed no special movement at that time. Ostrosky (1990) shows that, unlike the finding of Cebula (1997), the federal deficit did not have a significant impact on the nominal interest rate in the U.S. 1955-1984.

In light of this foregoing, it is evident that the impact of government deficit on interest rates to this day is far from clear. Some studies indicate that increasing government debts in the financial markets induces a rise in interest rates, while others show no impact. Therefore, the impact of government debt on interest rates remains a debatable point. There is still a need for better knowledge of the impact of government debt acquired through the issuance of debt instruments in the financial markets on interest rates and the economy. Therefore, to achieve high economic growth in the future, it is important for Indonesia to have a better understanding of the influence that the issuance of government debt instruments has on the economy.

Methodology

Model

The model used this study is inspired by previous studies on the subject, especially the one developed by Cebula and Cuellar (2009). Cebula and Cuellar provide recent empirical evidence on the impact of federal budget deficit on ex-ante real interest rate yielded on Moody's Baa-rated corporate bonds. Cebula and Cuellar 's model uses ex-ante real short-term interest rate, M_1 money supply, net international capital inflows, and unemployment rate as variables. Developed from the model, the basic model to be employed in this study is as follows:

$$yield_t = \beta_0 + \beta_1 rgb_t + \beta_2 m1_t + \beta_3 sbi_t + \beta_4 gpdb_t + \beta_5 nci_t + \varepsilon_t \quad \text{.....(1)}$$

where:

- $yield_t$ = real average interest rate yield (%),
- rgb_t = real net government bond issues (billions of Rupiah),
- $m1_t$ = real M1 money supply (billions of Rupiah),
- sbi_t = real rate of one-month Certificate of Bank Indonesia/ Sertifikat Bank Indonesia (SBI) (%)
- $gpdb_t$ = real growth of Gross Domestic Product (GDP) (%)
- nci_t = real net international capital flows (total of financial and capital accounts) (billions of Rupiah)
- ε_t = the error term

This study uses overnight interbank call money interest rate as the proxy for real market interest rate (variable). This is deemed necessary because of insufficient data on yielded rate of corporate bonds traded in Indonesia. The rates reflect short-term market rates, hence they can be used to proxy market rates that should be paid by the private sector when borrowing funds in the market. As the proxy for government external financing in the market or real net government bond issues (variable), we use the outstanding government bonds portfolio in trading purpose. Therefore, the basic model (Equation 1) is estimated as follows:

$$puab_t = \delta_0 + \delta_1 dagang_t + \delta_2 m1_t + \delta_3 SB1_t + \delta_4 gpdb_t + \delta_5 nci_t + \lambda_t \quad \text{.....(2)}$$

where:

- $puab_t$ = real interbank call money interest rate (%)
- $dagang_t$ = real net government bond issues in trading (billions of Rupiah)
- $m1_t$ = real M1 money supply (billions of Rupiah)
- $SB1_t$ = real rate of one-month Certificate of Bank Indonesia/ *Sertifikat Bank Indonesia* (SBI) (%)
- $gpdb_t$ = real growth of Gross Domestic Product (GDP) (%)
- nci_t = real net international capital flows (billions of Rupiah)
- λ_t = the error term

Data

This study uses monthly data (2000.4 – 2008.12) collected from the Economic and Financial Statistics (SEKI) of Bank Indonesia 2000-2008 or on website: http://www.bi.go.id/web/id/Statistik/Statistik Ekonomi dan Keuangan Indonesia/Versi HTML/ All data are monthly data, except the data of Net Capital Inflow (NCI) and GDP, which are quarterly. Consequently, NCI and GDP data should be interpolated to be monthly data before being analyzed. However, NCI data are available only from 2000, so the interpolation can only be conducted from the fourth month of the year 2000. The

interpolation method used is as follows (Insukindro 1992):

$$PDB_{Jan2000} = 1/3\,[PDB_{firstquarter\ of\ 2000} + (-1/3)\,x\ (PDB_{firstquarter\ of\ 2000} - PDB_{fourth\ quarter\ of\ 1999})]$$

$$PDB_{Feb2000} = 1/3\,[PDB_{first\ quarter\ of\ 2000} + (0)\,x\,(PDB_{first\ quarter\ of\ 2000} - PDB_{fourth\ quarter\ of\ 1999})]$$

$$PDB_{Mar2000} = 1/3\,[PDB_{first\ quarter\ of\ 2000} + (1/3)\,x\,(PDB_{firstquarter\ of\ 2000} - PDB_{fourth\ quarter\ of\ 1999})]$$

$$PDB_{Dec2000} = 1/3\,[PDB_{fourth\ quarter\ 0f\ 2000} + (1/3)\,x\,(PDB_{first\ quarter\ of\ 2000} - PDB_{third\ quarter\ of\ 1999})]$$

Data of all variables are in IDR (Rupiah), except of NCI which are in USD. Thus, NCI data on mid-rate USD-Rupiah must be transformed into Rupiah. Values of all variables are real values. Real GDP, NCI, government bond position, and M1 are calculated by dividing data with consumer price index in 2002 as the base year and multiplying them with 100, whereas real interbank rate and SBI rate are calculated by subtracting them with inflation.

Analysis Results

The model used in this research is Engle-Granger's Error Correction Model (ECM). The first step of conducting Engle-Granger's ECM is to carry out the unit root test, which aims at establishing whether data are stationary or otherwise. If a time series is stationary, its mean, variance, and autocovariance (at various lags) remain the same no matter at what point we measure them (Gujarati 2003:798). One of the unit root tests often used is the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF). Unit root test of level data produces a unit root for all variables used in the study (Table 3). This implies that there is a need for conducting the first-difference unit root test.

Table 3. **Unit Root Test: Level**

Variable	Lags	DF	ADF	Inference
Dagang	0	-1.710321	-2.445721	unit root
Gpdb	0	-2.380182	-2.512023	unit root
m1	0	-1.066644	-3.562887	unit root
Nci	12	-2.782624	-1.136428	unit root
Puab	0	-2.811254	-3.327313	unit root
Sbi0	0	-2.827895	-3.301796	unit root

Table 4. **Unit Root Test: First Difference**

Variable	Lags	DF	ADF	Inference
Dagang	0	-10.61843	-10.71710	stationary
Gpdb	0	-8.934028	-9.006258	stationary
m1	0	-13.26436	-13.21142	stationary
Nci	11	-6.148201	-6.883129	stationary
Puab	0	-10.70347	-10.69508	stationary
Sbi	0	-9.777403	-9.773303	stationary

Table 5. **Cointegration Test**

Dependent Variable: puab		
Independent Variables	**Coefficient**	**t statistic**
Constant	1.674453	1.384397
Dagang	0.001683	3.338502
m1	-0.002544	-2.822957
Sbi	1.092917	21.10779
Gpdb	-6.801420	-3.057900
Nci	-0.004448	-1.686256
CRDW = 0.821035	DF = -5.237478	ADF = -3.613978

Results in Table 4 show that the first-difference unit root test produces significant estimates, leading to the inference that the data are stationary. To ensure that the model produces valid and unbiased estimates, the next step involves a co-integration test. Granger Represent Theorem underlines that if all variables used in the estimation are co-integrated, the correct dynamic model to employ is an ECM (Engle and Granger 1987). Co-integration test is done using Dickey Fuller (DF) test and Augmented Dickey Fuller (ADF) test.

The estimation of residuals shown in Table 5, generated by the equations using DF and ADF tests at 1 – 10 percent significance levels, produces stationary outcomes which clear the way for using the Engle-Granger's ECM (Engle and Granger 1987). DF table for 1, 5, and 10 percent are 5.18, 4.58, and 4.26, respectively, whereas ADF table for 1, 5, and 10 percent are 4.98, 4.36, and 4.06, respectively.

The following dynamic regression equation uses the co-integrated regression in the long run and ECM regression in the short run. The ECM model used in this study is as follows:

$$D(puab_t) = \delta_1 D(dagang_t) + \delta_2 D(m1_t) \\ \delta_3 D(SBI_t) + \delta_4 D(gpdb_t) \\ \delta_5 D(nci_t) + \delta_6 et2_{t-1}$$

The results of the estimation using cointegration regression and ECM are presented in the Table 6.

Table 6 shows that the ECM equation can be analyzed further because an absolute value of ET2 (-1) is smaller than 1 and significant, which implies that the equation is valid and therefore can generate robust estimates (Engle-Granger 1987). In the short run, real SBI rate and real net government bond issues have positive and significant influences on real interbank rate. Other variables have no significant influence on the rate. In the long run, they have the same results (positive impacts).

The ECM results show that an increase in real SBI by 1 percent induces an increase in real interbank rate of 0.9 percent, and an increase in real government bond by IDR1 billion induces an increase of 0.002 percent in real interbank rate.

The ECM estimation, afterwards, is tested through Jarque-Bera's normality test, Breusch-Godfrey's Correlation LM autocorrelation test, Ramsey's Reset linearity test, White No Cross Term homoskedasticity test, and multicollinearity test with Koutsoyiannis approach. The tests show that the ECM estimation is free from specification error, auto-correlation, hetereoskedasticity, and multicollinierity. However, the residuals of ECM are not normally distributed as the data are limited, but it is believed that the series will be distributed normally if the number of observation increases by the Central Limit Theo-

Table 6. **The Results of Estimation**

	ECM			Long-run	
Variable	**coefficient**	**t statistic**	**Variable**	**Coefficient**	**t statistic**
D(DAGANG)	0.001812 ***	1.680374	C	1.674453	1.384397
D(M1)	-0.001131 -	1.083675	DAGANG	0.001683	3.338502
D(SBI)	0.907813 *	12.56098	M1	-0.002544	-2.822957
D(GPDB)	-0.603643	-0.124212	SBI	1.092917	21.10779
D(NCI)	-0.000941	-0.331776	GPDB	-6.801420	-3.057900
ET2(-1)	-0.385960 *	-4.866394	NCI	-0.004448	-1.686256

Note: significance: *=1 percent, **=5 percent, ***=10 percent

rem (Gujarati 2003:890). Therefore, this study assumes that the residual is normaly distributed.

Conclusion

This empirical study shows that the crowding out effect was evident in Indonesia between 2004 and 2008. It indicates that financing state budget deficit in Indonesia by issuing debt instruments in financial markets has a negative impact on the private sector. Increasing state budget deficit by issuing more debt instruments in the market will increase real short-term interest rates. The results show that there is a limit on the capacity of the financial markets to absorb debt instruments. The government of Indonesia should manage its debt issuance better by considering the capacity of the market to absorb the debt instruments without creating a negative influence on the private sector. As discussed earlier, the Indonesian bond market is still thin, which implies that the issuance of government debts should be constrained by the absorbing capacity of the financial markets if Indonesia does not want to hamper economic growth when issuing government debts in the market.

To determine whether there is crowding out in the commercial banks' credit markets disbursement, the author also checks the effect of government debt issuance on real rates of investment credit in Indonesia's commercial banks. The results indicate that despite its positive sign, the issuance has no significant effect on the credit rates. This is presumably because the rates of commercial bank investment credit are not only influenced by market interest movement but also by various components. Some components that allegedly affect the formation of investment credit rates are risk premiums, administrative costs, long maturity, and bank profits. In this way, the development of market interest rates is not automatically reflected in the development of commercial banks' investment credit rates. It is estimated that the impact of crowding out on the credit rates will be noticeable when using the data of shorter period and small risk money market interest rates.

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APPENDICES

Table of Data Analysis

Cointegration

Dependent Variable: PUAB
Method: Least Squares
Date: 05/29/09 Time: 10:34
Sample: 2000:04 2008:12
Included observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C1.674453	1.209517	1.384397	0.1693	
DAGANG	0.001683	0.000504	3.338502	0.0012
M1-0.002544	0.000901	-2.822957	0.0058	
SBI1.092917	0.051778	21.10779	0.0000	
GPDB	-6.801420	2.224213	-3.057900	0.0029
NCI-0.004448	0.002638	-1.686256	0.0949	

R-squared	0.903474	Mean dependent var	0.411714
Adjusted R-squared	0.898599	S.D. dependent var	3.716581
S.E. of regression	1.183491	Akaike info criterion	3.230259
Sum squared resid	138.6644	Schwarz criterion	3.381914
Log likelihood	-163.5886	F-statistic	185.3261
Durbin-Watson stat	0.821035	Prob (F-statistic)	0.000000

DF Test for Cointegration

Dependent Variable: D(ET2)
Method: Least Squares
Date: 06/15/09 Time: 13:49
Sample(adjusted): 2000:05 2008:12
Included observations: 104 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ET2(-1)	-0.415690	0.079368	-5.237478	0.0000

R-squared	0.210157	Mean dependent var	-0.014634
Adjusted R-squared	0.210157	S.D. dependent var	1.051241
S.E. of regression	0.934271	Akaike info criterion	2.711467
Sum squared resid	89.90473	Schwarz criterion	2.736894
Log likelihood	-139.9963	Durbin-Watson stat	2.322254

ADF Test for Cointegration

Dependent Variable: D(ET2)
Method: Least Squares
Date: 06/15/09 Time: 13:50
Sample(adjusted): 2000:06 2008:12
Included observations: 103 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ET2(-1)	-0.312890	0.086578	-3.613978	0.0005
D(ET2(-1))	-0.267532	0.095017	-2.815634	0.0059
R-squared	0.272132	Mean dependent var		-0.017528
Adjusted R-squared	0.264925	S.D. dependent var		1.055965
S.E. of regression	0.905347	Akaike info criterion		2.658231
Sum squared resid	82.78505	Schwarz criterion		2.709390
Log likelihood	-134.8989	Durbin-Watson stat		1.917594

ECM

Dependent Variable: D(PUAB)
Method: Least Squares
Date: 05/29/09 Time: 10:38
Sample(adjusted): 2000:05 2008:12
Included observations: 104 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DAGANG)	0.001812	0.001078	1.680374	0.0961
D(M1)	-0.001131	0.001044	-1.083675	0.2812
D(SBI)	0.907813	0.072272	12.56098	0.0000
D(GPDB)	-0.603643	4.859789	-0.124212	0.9014
D(NCI)	-0.000941	0.002837	-0.331776	0.7408
ET2(-1)	-0.385960	0.079311	-4.866394	0.0000
R-squared	0.666849	Mean dependent var		-0.113462
Adjusted R-squared	0.649851	S.D. dependent var		1.526362
S.E. of regression	0.903200	Akaike info criterion		2.690215
Sum squared resid	79.94542	Schwarz criterion		2.842776
Log likelihood	-133.8912	Durbin-Watson stat		2.317062