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Balance of Payment Pattern and Global Financial Crisis: Evidence on ASEAN-5 Countries

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Abstract

The most important indicator of the impact of global economic crisis is a condition of balance of payments. The economic crisis will cause foreign reserves and current account depressed. So that it can be stated that the impact of the global financial crisis is a crisis of balance of payments. Meanwhile, the balance of payments crisis will certainly affect the macroeconomic conditions. The study will look at how the patterns of influence of the balance of payments crises on macroeconomic conditions in ASEAN-5. Based on studies using VAR or panel data model shows that for the ASEAN countries the role of government is an important factor to control the economic crisis mainly caused by the presence of a contagion effect of the global crisis. This conclusion is in accordance with the theory that emphasizes that the relationship of fiscal policy on the EMP is negative. In other words, government is the main actor to overcome the global crisis that plagued developing countries.

Keyword: Global Financial Crisis, Balance of Payment, VAR and Panel Data

Introduction

Discourse about the global crisis could not be released with conditions the balance of payments. This is as a consequence of the interaction of international trade that led to all countries connected to the other, and facilitate what is called a contagion effect in the global crisis. In other words, balance of payments condition is one of the most important factor in the cause of the global financial crisis (Kaminsky & Reinhart , 1999, 2000).

In a study of the BOP, we know are different views of Keynesian and Monetarist. Proponents of the monetary approach to the balance of payments have stated that the approach can be summarised by the proposition that the balance of payments is essentially a monetary phenomenon. Meanwhile, according to The Keynesian view of balance of payments dependent on trade and capital flows and the role of fiscal policy. Frenkel Gylfason and Helliwell (1980) develop the synthesis between monetarists and Keynesians approaches of BOP with the dependent variable is the foreign exchange reserves, while the independent variable is GDP, government expenditure, the exchange rate and domestic credit.

Meanwhile, separately, Girton & Roper (1977) is also developing an indicator of the economic crisis called the EMP, which is the sum of foreign exchange reserves and real exchange rates. Connolly & Silveira (1979) develop the economic crisis model with EMP as the dependent variable, whereas the independent variable is domestic credit, GDP and prices. Burdekin & Burkett (1990) and Tanner (2001) explore the EMP and BOP model to explain global economic crisis in 1990s and 2000s. Therefore this study will examine the relationship between the BOP and the EMP model is applied to ASEAN 5 countries

Literature Review

The study is based on balance of payment model synthesis between Keynesian and Monetarist view that was developed by Frenkel et al (1980) is written as follows:

$R = PB_T\,(Y^-, E^+/P) + F(r^+)$	Keynesian	(1)
$M_s = L\,(P, Y, r)$	LM equation	(2)
$M_d = m\,(DC+R)$	Demand for money	(3)
$\Delta R = \Delta\,[(1/m)L\,(P^+, Y^+, r^-)] - \Delta DC$	Monetarist	(4)
$Y = E\,(Y^+, r^-) + G + B_T\,(Y^-, e^+/P)$	IS equation	(5)
$Y = Y\,(P^+)$	Aggregate supply	(6)

Notation:

R = reserves
B_T = trade balance
e = exchange rate
p = price level
F = net capital inflow
r = interest rate
m = money multiplier
M_d = demand for money
M_s = money supply
Y = output
L = liquidity
DC = domestic credit
G = government expenditure
E = private expenditure

The model contains five endogenous variables: Y, r, P, R and M, in five equations and three exogenous control variables consist of G (fiscal policy), D (monetary policy) and e (exchange rate policy). The foreign price level P* is assumed to be fixed and equal to I. Equation (5) shows domestic output as the sum of private final expenditure (E), government expenditure (G), and net exports (T). Equation (g) is a standard aggregate supply function which can be derived from equilibrium conditions in the labour market for a given state of expectations. To focus the analysis on output and the balance of payments, the model may be solved for Y and R as follows. First, the aggregate supply equation (6) is solved for P by writing:

$$P = P(\overset{+}{Y}). \tag{7}$$

Then using equation (7) the income/expenditure equation (5) is solved for r by writing:

$$r = r(\overset{-}{Y}, \overset{+}{G}, \overset{+}{e}). \tag{8}$$

Substituting equations (7) and (8) into the two balance-of-payments equations (1) and (4) gives the following two approach Keynesian and Monetarist:

$$R = k_1^- Y + k_2^+ G + k_3^+ e + R_{-1} \quad \text{Keynesian Schedule} \tag{9}$$

$$R = m_1^+ Y + m_2^- G + m_3^+ e - D \quad \text{Monetarist Schedule} \tag{10}$$

In accordance with the purpose of these studies explore the relationship between balance of payments with the global crisis, the equation above BOP will be linked with the Exchange Market Pressure formula as developed by Girton & Roper (1977) and Connolly & Silveira (1979). EMP formula is

$$R + e = D + Y + P \quad (11)$$

where r is the change in foreign reserves (or the balance of payments) as a proportion of the money supply, e is the percentage appreciation of exchange rate, D is the change in domestic credit as a proportion of the money stock, and Y the rate of growth of permanent income, and P is the world rate of inflation. Based on the two models of Keynesian and Monetarist BOP synthesis and EMP it will be

$$EMP = b_1^- Y + b_2^- G + b_3^- D \quad (12)$$

where based on BOP model, theoretically the relationship between output (Y), fiscal policy (G), and domestic credit (C) of the EMP is negative. This means that if GDP, fiscal spending, and domestic credit increased then be able to reduce the economic crisis.

Methodology

Vector Autoregressions (VAR)

Vector Autoregression (VAR) was introduced as an alternative approach to multi-equation modeling. VAR makes minimal theoretical demands on the structure of the model (Sims, 1980a b). Characteristic of VAR are (1) the all variables are endogenous that are believed to interact and that hence should be included as part of the economic system one is trying to model and (2) the largest number of lags needed to capture most of the effect that variables have on each other (Pindyck and Rubinfeld, 1998).

$$x_t = A_0 + A_1 x_{t-1} + A_2 x_{t-2} + \ldots + A_p x_{t-p} + e_t \quad (13)$$

where

x_t = an (n x 1) vector containing each of the n variables included in the VAR

A_0= an (n x 1) vector of intercept term

A_i = (n x n) matrices of coefficients

e_t = an (n x 1) vector of error term

VAR have two tools of estimation are impulse response and variance decomposition. Impulse response formula is a vector stochastic process x of a VAR model can be expressed as

$$\mathbf{x}_t = \sum_{s=0}^{\infty} \mathbf{A}_s \mathbf{e}_{t-s} \quad (14)$$

where $e_t = x_t - E(x_t \mid x_{t-1}, x_{t-2}, \ldots)$ then choose given B is a diagonal matrix and Bet has a diagonal covariance matrix, such that $C = AB^{-1}$ and f=Be, therefore

$$x_t = \sum_{s=0} C_s f_{t-s} \qquad (15)$$

The coefficient C is the reported as " responses to innovations" or impulse response. Meanwhile, variance decomposition formula is the variance-covariance matrix of $x_t - E(x_t \mid x_{t-1}, x_{t-2}, ...)$, with k period-ahead forecast of x and is given as

$$V_k = \sum_{s=0}^{k} C_s Var(f_t) C_s^{'} \qquad (16)$$

Sims' methodology entails little more than a determination of the appropriate variables to include in the VAR and a determination of the appropriate lag length. The variables to be included in the VAR are selected according to the relevant economic models. Lag-length test select the appropriate lag length with many information criteria approaches like Akaike information criteria (AIC), Schwarz criterion (SC), and Hannan-Quinn criteria (HQ).

The issue of whether the variables in VAR need to be stationary exists. According Sims (1980a) and Doan (1992) recommend against differencing even if the variables contain a unit root. They argue that the goal of VAR analysis is to determine the interrelationships among the variables, not the parameter estimates. The main argument against differencing is that it "throws away" information concerning the comovements in the data such as the possibility of cointegrating relationships (Enders, 1995).

Panel Data

Panel data refers to pooling observation for *N* a cross section (e.g. countries, households, firms, individuals, etc.) over several *T* time periods (e.g. annually, quarterly, monthly, etc.). According to Baltagi (2003) explore several benefits of panel data. First, panel data can be controlling for individual heterogeneity usually panel data suggest that individuals, firms, states or countries are heterogeneous. Time-series and cross-section studies no controlling for this heterogeneity run the risk of obtaining biased result. Second, panel data give more informative data, more variability, less collinearity among the variables, more degree of freedom and more efficiency. Time series studies are plagued with multicollinearity. Third, panel data are better able to study the dynamics of adjustment. Cross sectional distribution that look relatively stable hide a multitude of change. Spells of unemployment, job turnover, residential and income mobility are better studied with panels. Panel data are also well suited to study the duration of economic states like unemployment and poverty, and if these panels are long enough. Fourth, panel data are better able to identity and measure affects that are simply not detectable in pure cross-section or pure time series data. Firth, panel data models allow us to construct and test more complicated behavioral models than purely cross-section or time data. Sixth, panel data are usually gathered on micro units, like individual, firms and households. Many variables can be more accurately measured at the micro level, and biases resulting from aggregation over firms or individuals are eliminated.

Meanwhile, according to Baltagi (2003) exhibits several limitations of panel data method. First, design and data collection problems include problems of coverage (incomplete account of the population of interest), non response (due to lack of cooperation of the respondent or because of interviewer error), recall (respondent not remembering correctly), frequency of interviewing, interview spacing, reference period, the use of bounding and time in sample bias. Second, short time series dimension problem because typical panels involve annual data covering a short span of time for each individual. This means that asymptotic argument rely crucially on the number of individual tending to infinity. Increasing the time span of the panel is not without cost either. In fact, this increase the chances of attrition and increases the computational difficulty for limited dependent variable panel data model.

The basic framework of the panel data is a regression model of the form

$$Y_{it} = \alpha_i + \beta X_{it} + u_{it} \qquad (17)$$

Where the variables Y and X have both *i* and *t* subscripts for i = 1,2,.., *N* sections and *t* = 1,2…, T time periods. The data set is called *balanced* if nest data both across section and across time is full. Otherwise, when observations are missing for the time periods of some of the cross sectional units then the panel is called *unbalanced*.

In general panel data divide two approach are static and dynamic model. In the static model consist of a common constant, fixed effect and random effect. The following will explain one by one:

The Common Constants Method

The common constants method also called the pooled OLS method as in equation (17). The assumption of the model are no differences among the data matrices of the cross sectional dimension (N). In others words the model estimates a common constant a for all cross sections or commons constant for countries.

Practically, this method implies that there are no differences between the estimated cross section and it is useful under the hypothesis that the data set is a priori homogeneous. However, this case is quite restrictive and case of more interests involving the inclusion of fixed and random effects in the method of estimation (Asteriou & Hall, 2007).

The Fixed Effects Method

According to Asteriou & Hall (2007), in the fixed effects method, the constant is treated as group or section specific. This means that the models allows for different constants for each group. The effects estimator is also known a the least squares dummy variables (LSDV) estimator because in order to allow for different constants for each group, it includes a dummy variable for each group. To understanding this better consider the following model:

$$Y_{it} = a_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \ldots + \beta_k X_{kit} + u_{it} \qquad (18)$$

which can be written in a matrix notation as:

$$Y = D_\alpha + X\beta^{'} + u \qquad (19)$$

where the dummy variable (*D*) is the one that allow us to take different group-spesifc estimates for each of the constants for every different section. The standard F-test can be used to check fixed effect against the simple common constants OLS method.

The Random Effect Method

According to Asteriou & Hall (2007), the random effect method is an alternative method of estimating a panel data model. The difference between the fixed effect and the random effects method is that the latter handles the contains for each section not as fixed, but as random parameters. Hence the variability of the constant for each section comes from the fact that:

$$a_i = a + v_i \qquad (20)$$

where v_i is zero mean standard random variable. The random effect model takes the following form:

$$Y_{it} = (a + v_i) + \beta_1 X_{1it} + \beta_2 X_{2it} + \ldots + \beta_k X_{kit} + u_{it} \qquad (21)$$

$$Y_{it} = a + \beta_1 X_{1it} + \beta_1 X_{1it} + \ldots + \beta_k X_{kit} + (v_i + u_{it}) \qquad (22)$$

In general, the difference between the two possible ways of testing panel data models is this the fixed effect model assume that each country differs in its intercept term, whereas the random effect assume that each country differs in its error term. Usually, when the panel is balanced or contains all existing cross sectional data, one might expect that the fixed effects model will work best. In other case, where the sample contains limited observations of the existing cross sectional units, the random effect model might be more appropriate. In the random effect model used to the Breusch-Pagan test is the counterpart to the F-test.

In making a choice between the fixed effect and random effect approaches used to the Hausman tests. This test investigates whether random effect estimation could be almost good. Thus we actually test H_o, that random effects are consistent and efficient, versus H_1 that random effects are inconsistent, as the fixed effect will be consistent. A large value of the Hausman statistic, so we reject the null hypothesis that the random effect

Data

The data used for estimating the model on each country in this study consist of annually observations for the period of 1981 to 2009. In this research used to five data are exchange market pressure (total reserves + real exchange rate), GDP riel, government expenditure riel, domestic credit riel. All data is processed is the growth data. The all data source are taken from the International Financial Statistic (IFS) International Monetary Fund (IMF) data base extracted from the IMF web: www.imf.org. Year of 1981 is chosen as the beginning of the sample, because this year is the milestone of implementation of the financial liberalization in ASEAN-5 countries.

Results and Analysis

VAR

As described above this research uses growth data, all data are stationary in levels, so the data does not need to be derived again. By using the AIC and SC to get the optimal lag for the VAR model is estimated lag 2 for all countries. Based on results of impulse response analysis, in general the results of this study indicate that the shock of government expenditure and GDP against EMP is negative, while domestic credit shock results of the EMP is negative. This suggests that meningkatnnya kebjakan fiscal and GDP will be able to reduce the economic crisis.

Panel Data

Results of panel data models indicate that only government spending (GOV) a significant test of his t test in both the PLS model, Fixed Effects, and Random Effect. Even more encouraging that the results show a negative relationship between government spending against EMP. This suggests that if government spending increases, the crisis will decrease. In other words the fiscal policy is very big role in efforts to tackle the economic crisis.

Conclusion

Based on studies using either VAR or panel data model shows that the role of government is an important factor to control the economic crisis mainly caused by the presence of a contagion effect of the global crisis for the ASEAN 5 countries. This conclusion is in accordance with the theory that emphasizes that the relationship of fiscal policy on the EMP is negative. In other words, government is the main actor to overcome the global crisis that plagued developing countries.

References

Asteriou, D & Hall, S.G (2007). *Applied Econometrics: A Modern Approach*. New York: Palgrave Macmillan.

Baltagi, B. (2003). *Econometric Analysis of Panel Data*. Chichester: John Wiley & Sons.

Burdekin, R.C.K. & Burkett, P. (1990). "A Re-Examination of the Monetary Model of Exchange Market Pressure: Canada, 1963-1988." *The Review of Economics and Statistics*, 72 (4): 677-681.

Girton L. & Roper, D. (1977). Connolly, M & Silveira, J.D. (1979). "Exchange Market Pressure in Postwar Brazil: An Application of the Girton-Roper Monetary Model." *The American Economic Review*, 69(3): 448-454.

Enders, W (1995). *Applied Econometric Time Series*. Denver: John Wiley & Sons.

Frenkel, J.A., Gylfason, T.,. Helliwell, J.F. (1980). A Synthesis of Monetary and Keynesian Approaches to Short-Run Balance-of- Payments Theory. *The Economic Journal, 90* (359), 582-592.

Girton L. & Roper, D. (1977). "A Monetary Model of Exchange Market Pressure Applied to the Postwar Canadian Experience." *The American Economic Review*, 67 (4): 537-548.

Kamas, Linda. 1986. "The Balance of Payment Offset to Monetary Policy: Monetarist, Portfolio Balance, and Keynesian Estimates for Mexico and Venezuela." *Journal of Money, Credit, and Bankiing*, 18(4), pp. 467-481.

Kaminsky, G. L. & Reinhart C. (1999). The Twin Crises: The Causes of Banking and Balance-of-Payments Problems, *The American Economic Review*, 89(3), 473-500

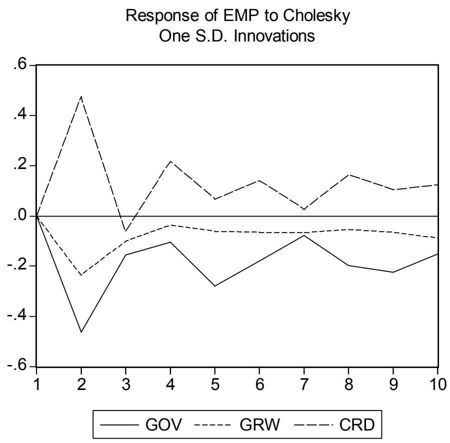
Kaminsky, G. L. & Reinhart C. (2000). On crises, contagion, and confusion. *Journal of International Economics*, 51 145-168

Sims, C.A. (1980a). Macroeconomic and Reality. *Econometrica,* 48 (1), 1- 48.

Sims, C.A. (1980b). Comparison of Interwar and Postwar Business Cycles: Monetarism Reconsidered. *American Economic Review*, 70, 250-257.

Tanner, E. (2001). "Exchange Market Pressure and Monetary Policy: Asia And Latin America In The 1990s." *IMF Staff Papers* 47(3):311-333.

A. VAR Results



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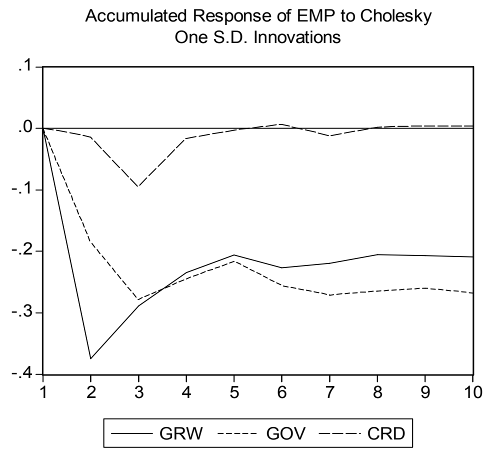

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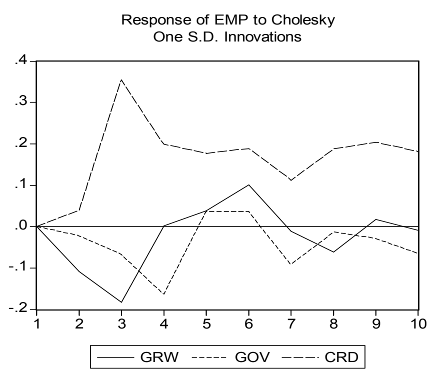

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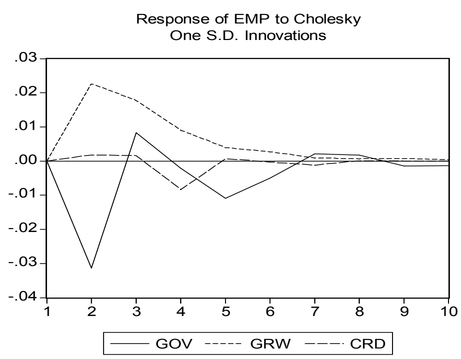

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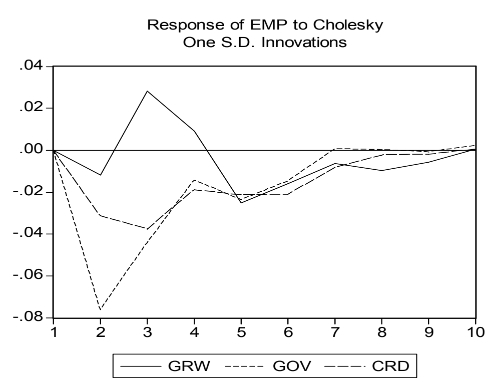

B. Panel Data Results

(1) Pooled Least Square

Dependent Variable: EMP?
Method: Pooled Least Squares
Date: 11/20/11 Time: 15:51
Sample: 1981 2009
Included observations: 29
Cross-sections included: 5
Total pool (balanced) observations: 145

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.245765	0.056279	4.366884	0.0000
GOV?	-1.260723	0.459122	-2.745944	0.0068
GROWT?	-0.260983	0.840746	-0.310419	0.7567
CRED?	0.304832	0.761420	0.400347	0.6895

R-squared	0.160326	Mean dependent var	0.223002
Adjusted R-squared	0.142460	S.D. dependent var	0.435639
S.E. of regression	0.403417	Akaike info criterion	1.049505
Sum squared resid	22.94706	Schwarz criterion	1.131622
Log likelihood	-72.08914	Hannan-Quinn criter.	1.082872
F-statistic	8.974086	Durbin-Watson stat	2.261321
Prob(F-statistic)	0.000018		

2) Fixed Effect

Dependent Variable: EMP?
Method: Pooled Least Squares
Date: 11/20/11 Time: 15:52
Sample: 1981 2009
Included observations: 29
Cross-sections included: 5
Total pool (balanced) observations: 145

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.227239	0.064752	3.509391	0.0006
GOV?	-1.248203	0.463706	-2.691800	0.0080
GROWT?	-0.614564	1.042386	-0.589575	0.5564
CRED?	0.643146	0.965042	0.666444	0.5062
Fixed Effects (Cross)				
_INA--C	-0.035581			
_MAL--C	0.085583			
_PHIL--C	-0.030678			
_SING--C	-0.018147			
_THAI--C	-0.001177			

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.169450	Mean dependent var	0.223002
Adjusted R-squared	0.127013	S.D. dependent var	0.435639
S.E. of regression	0.407034	Akaike info criterion	1.093752
Sum squared resid	22.69770	Schwarz criterion	1.257985
Log likelihood	-71.29700	Hannan-Quinn criter.	1.160485

F-statistic	3.992995	Durbin-Watson stat	2.288735
Prob(F-statistic)	0.000527		

(3) Random Effect
Dependent Variable: EMP?
Method: Pooled EGLS (Cross-section random effects)
Date: 11/20/11 Time: 15:52
Sample: 1981 2009
Included observations: 29
Cross-sections included: 5
Total pool (balanced) observations: 145
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.245765	0.056784	4.328076	0.0000
GOV?	-1.260723	0.463239	-2.721541	0.0073
GROWT?	-0.260983	0.848285	-0.307660	0.7588
CRED?	0.304832	0.768247	0.396789	0.6921
Random Effects (Cross)				
_INA--C	0.000000			
_MAL--C	0.000000			
_PHIL--C	0.000000			
_SING--C	0.000000			
_THAI--C	0.000000			

Effects Specification

	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.407034	1.0000

Weighted Statistics

R-squared	0.160326	Mean dependent var	0.223002
Adjusted R-squared	0.142460	S.D. dependent var	0.435639
S.E. of regression	0.403417	Sum squared resid	22.94706
F-statistic	8.974086	Durbin-Watson stat	2.261321
Prob(F-statistic)	0.000018		

Unweighted Statistics

R-squared	0.160326	Mean dependent var	0.223002
Sum squared resid	22.94706	Durbin-Watson stat	2.261321