Managing Growth: The Role of Export, Inflation and Investment in three ASEAN Neighboring Countries

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ABSTRACT

This study investigates the relationship between export, inflation, investment and economic growth for three ASEAN countries namely Indonesia, Malaysia, and Thailand. In general, the results revealed that export has a positive impact on growth. As for, Malaysia and Thailand, inflation has a negative impact on growth; while for Indonesia it has a positive impact. The inflation rate for Indonesia is almost consistent for a several years, which have lead to a positive relationship between inflation and growth. However, there is also a modest increase in the rate of inflation for certain years. The results also shows that investment have a positive impact on growth for Indonesia, Malaysia and Thailand.

Keywords: Economic growth, export, inflation, investment, ASEAN

1. INTRODUCTION

The issue of the export promoting growth has been a central theme for the international trade economists and policy makers. Numerous studies have been conducted dealing with different aspects of this impact toward the economic growth[1]. Many of these studies have focused on testing whether export leads to improvement in economic growth performance. Causal inspection of export and economic growth in developing market economies reveals that these two time series tends to move together (Bahmani-Oskooee and Alse, 1993; Ahmad and Harnhirun, 1995; Ghatak *et al.,* 1997; Biswal and Dhawan, 1998; Baharumshah and Rashid, 1999; Hossain and Karunaratne, 2004; Mamun and

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Nath, 2005; Tang, 2006, Siliverstovs and Herzer, 2007, among others). Empirically these authors argued that the export-led growth strategy which support the export expansion seem to promote high economic performance and vice-versa.

In addition to export-growth relationship, economists particularly, have long reason to wonder whether inflation is generally conducive or detrimental to the economic growth. There are still substantial disagreement among the empirical researchers, however, about how quantitatively important are the growth depressing effects of inflation and at what levels of inflation these effects begin to appear. Some economists have been concerned by rates of inflation of three or four percent while others have been unconcerned by rates of twenty or thirty percent. Taking for instance, Mallik and Chowdhury (2001) shows that low inflation is positively correlated to economic growth in a particular country. However, Gylfason (1999) indicate that an increase in inflation from 5 to 50 percent a year from one country to another reduces the growth of GDP. In addition, Hodge (2006) found that inflation drags down growth in South Africa over the longer period of time. Lim (2004) on the other hand, highlight the need for inflation management in order to attain short run stabilization as well as long-term inflation goals for the South East Asian Central Banks (SEACEN) countries.

Given the importance of the sound macroeconomics fundamental in the economy, it is an essential need to identify the important variables that could influence the performance of an economy. In this sense, both inflation and export plays an important role to determine the economic growth of particular country. Hence, the aim of this paper is to empirically

investigate the dynamic interrelationships between economic growth with the macroeconomics variable of export, inflation and investment in the ASEAN-3 (Indonesia, Malaysia, and Thailand) economies. This present paper extends the line of research by examining a cluster of three crisis-affected economies. These three countries lapsed into severe financial crises in 1997 and the aftermath impact is yet to be seen. Besides answering this policy question, we are also interested in ascertaining the causal direction between these variables. The purpose is to provide constructive information and suggestion for policy makers to formulate appropriate policy measures in attaining sustainable economic growth and development strategies for these countries. The experience of these countries will contribute to the scarcely debated issue of managing growth in literature, particularly on developing countries.

The structure of this paper is as follows. Section 2 describes the econometric strategy and data description adopted in the paper. Section 3 reports the empirical findings, while concluding remarks and further implications for empirical research are presented in Section 5 of the paper.

2. ECONOMETRIC STRATEGY AND DATA DESCRIPTION

2.1 Univariate Unit Root Testing Procedures

The standard ADF (see Said and Dickey, 1984) and DFGLS (see, Elliott *et al*., 1996) testing principles share the same null hypothesis of a unit root. Their differences however are centered on the way the latter specified the alternative hypothesis and treats the presence of the deterministic components in a variable's data generating process (DGP).

Specifically the DFGLS procedure relies on locally demeaning and/or detrending a series prior to the implementation of the usual auxiliary ADF regression. The use of the DFGLS tests statistics is likely to minimize the danger of emerging erroneous inferences when the series under investigation has a mean and/or linear trend in its DGP. This is so because these statistics have been shown to achieve a significant gain in power over their conventional ADF counterparts (Elliott *et al*., 1996). In contrast, the KPSS (Kwiatkowski *et al*., 1992) semi-parametric procedure tests for level (η_μ) or trend stationarity (η_τ) against the alternative of a unit root. In this sense, the KPSS principles involve different maintained hypothesis from the ADF and DFGLS unit root tests.

2.2 Cointegration Procedure

The system-based cointegration procedure developed by Johansen and Juselius (1990) to test the absence or presence of long run equilibrium is adopted in this paper. One advantage of this approach is that the estimation procedure does not depend on the choice of normalization and it is much more robust than Engle-Granger test (see Gonzalo, 1994). Phillips (1991) also documented the desirability of this technique in terms of symmetry, unbiasedness and efficiency. Their test utilizes two likelihood ratio (LR) test statistics for the number of cointegrating vectors: namely the trace test and the maximum eigenvalue test. As this procedure become a standard in the time series literature the detail explanation are not presented here.

2.3 Granger Causality Tests

If cointegration is detected, then the Granger causality must be conducted in vector error correction model (VECM) to avoid problems of misspecification (see Granger, 1988). Otherwise, the analyses may be conducted as a standard first difference vector autoregressive (VAR) model. VECM is a special case of VAR that imposes cointegration on its variables where it allows us to distinguish between short run and long run Granger causality. The relevant error correction terms (ECTs) must be included in the VAR to avoid misspecification and omission of the important constraints. The existence of a cointegrated relationship in the long run indicates that the residuals from the cointegration equation can be used as an ECT as follows

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{m} \beta_{1,i} \Delta GDP_{t-i} + \sum_{i=1}^{n} \beta_{2,i} \Delta EXP_{t-i} + \sum_{i=1}^{p} \beta_{3,i} \Delta IVN_{t-i} + \sum_{i=1}^{q} \beta_{4,i} \Delta INF_{t-i} + \mu_1 ECT_{t-1} + \zeta_{1t} \quad (3)$$

$$\Delta EXP_t = \delta_0 + \sum_{i=1}^{m} \phi_{1,i} \Delta GDP_{t-i} + \sum_{i=1}^{n} \phi_{2,i} \Delta EXP_{t-i} + \sum_{i=1}^{p} \phi_{3,i} \Delta IVN_{t-i} + \sum_{i=1}^{q} \phi_{4,i} \Delta INF_{t-i} + \mu_2 ECT_{t-1} + \zeta_{2t} \quad (4)$$

$$\Delta INV_t = \chi_0 + \sum_{i=1}^{m} \gamma_{1,i} \Delta GDP_{t-i} + \sum_{i=1}^{n} \gamma_{2,i} \Delta EXP_{t-i} + \sum_{i=1}^{p} \gamma_{3,i} \Delta IVN_{t-i} + \sum_{i=1}^{q} \gamma_{4,i} \Delta INF_{t-i} + \mu_3 ECT_{t-1} + \zeta_{3t} \quad (5)$$

$$\Delta INF_t = \eta_0 + \sum_{i=1}^{m} \rho_{1,i} \Delta GDP_{t-i} + \sum_{i=1}^{n} \rho_{2,i} \Delta EXP_{t-i} +$$

$$\sum_{i=1}^{p} \gamma_{3,i} \Delta IVN_{t-i} + \sum_{i=1}^{q} \gamma_{4,i} \Delta INF_{t-i} + \mu_3 ECT_{t-1} + \zeta_{4t} \quad (6)$$

where Δ is the lag operator, α_0, δ_0, χ_0, η_0, β's, ϕ's, γ's and ρ's are the estimated coefficients, m, n, p and q are the optimal lags of the series gross domestic product (GDP), export (EXP), investment (INV) and inflation (INF), ζ_{it}'s are the serially uncorrelated random error terms while μ_1, μ_2, μ_3 and μ_4 measure a single period response to a departure from equilibrium of the dependent variable. Take for example, to test whether EXP does not Granger cause movement in GDP, H_0: $\beta_{2,i} = 0$ for all i and $\mu_1 = 0$ in Equation (3)[2]. The rejection implies that EXP causes GDP. Similarly, to test that GDP does not Granger cause movement in EXP the null hypothesis H_0: $\phi_{2,i} = 0$ for all i and $\mu_2 = 0$ in Equation (4). In the case where cointegration is absence, the standard first difference vector autoregressive (VAR) model is adopted. This simpler alternative of causality is feasible through the elimination of ECT from both equations above. In other words, it only contains the short run causality information.

2.4 Data Description

All the annually data are expressed in nominal terms and collected from various issues of *International Financial Statistics* published by International Monetary Fund obtained in Bank Negara Malaysia (BNM), the South East Asian Central Banks (SEACEN) Research and Training Centre and Department of Statistics Malaysia (DOS). The sample size of this study covers the period of 1976 to 2005.

3. EMPIRICAL RESULTS

3.1 Non-stationarity and Stationarity Tests

The variables under investigation must be a stationary time series as the prelude to any cointegration and VAR testing procedure. For this purpose, we test with two unit root and one stationary test discuss earlier on the series of GDP, EXP, INV and INF in level and their first differences in order to discriminate the conclusion of stationarity and non-stationarity of these series. Overwhelmingly, the results of ADF, DFGLS and KPSS tests suggest the existence of unit root or nonstationarity in level or *I(1)* for these variables. The findings that all the variables have the same order of integration allowed us to proceed with the Johansen cointegration analysis. To conserve space, we do not report these results but are available from the authors on request.

3.2 Cointegration Test

The outcome of the cointegration procedure is sensitive to the choice of lag length. For this purpose, multivariate generalization of Akaike Information Criteria (AIC) proposed by Gonzalo and Pitarakis (2002) were used to determine the optimal lag length for the vector autoregressive (VAR). The multivariate generalization of AIC criteria indicate VAR(4) for Indonesia, VAR(3) for Malaysia while VAR(5) is more appropriate for Thailand lag structure. Results of the cointegration procedure are presented in Table 1. The null hypothesis of no cointegrating vector (r=0) was soundly rejected at 5 percent significance level for the countries. On the basis of these test results, we can interpret that a unique cointegrating relationship has emerged in all these ASEAN countries. In other

words, there is at least on stochastic trend shared among the four variables in the system for Malaysia, Indonesia and Thailand.

[Insert Table 1 here]

Next, we proceeded with the estimation of the long run parameters of the model by normalizing the GDP. There is only one significant vector detected in each case and so we do not have the problem of identification the equation that presents the GDP. Table 2 reports the long run parameters of the model. First, the results show that a positive and significant relationship between EXP and GDP for all the countries. Taking for example, it is seen that the export has a positive sign where the elasticity is 2.056, which implies that the Indonesian GDP is elastic to the export changes. For Malaysia and Thailand the elasticity was 0.942 and 0.182 respectively. The positive sign on the export variable advocates that increase in export leads to an improvement in economic growth in the long run supporting the export led-growth thesis. Second, the elasticity with respect to inflation is 0.818 (Indonesia), -0.072 (Malaysia) and -1.061 (Thailand) respectively, in which inflation brings negative impact to Malaysia and Thailand. In the case of Indonesia, inflation bought about positive impact to the country. These contradicting results further support the ambiguous previous literature on inflation and economic growth. Third, investment seems to boost up the economic performance in all the studied countries. This is an important especially in regard to the debate on investment led economic growth literature.

[Insert Table 2 here]

The estimated model that appears in Table 2 seems to be robust from the standard regression assumptions. The LM test for autocorrelation attempts to show that the lag length does not change the results significantly. Ramsey general specification test (RESET) suggests that all the current account equations are adequately specified while autoregressive conditional heteroskedasticity (ARCH) fail to detect the effects. Furthermore, Jarque-Bera test indicates that the results are robust even from normality and the absence of heteroskedasticity of residuals using the White test[3].

3.3 Vector Error Correction Model (VECM) Results

3.3.1 Indonesia

Given the presence of a unique and single cointegrating vector for the four-dimensional VARs following the cointegration test, this provided us with one error correction term (ECT) to construct the vector error correction model VECM for each country. Table 3 present the results of the causality test in the environment of VECM. Form Panel A, the χ^2-statistics suggest that, in short-run, we fail to find any causality pattern from/to other variables. The GDP equation is the only one in the system where the ECT is statistically significant. This suggests that GDP solely bears the brunt of short run adjustment to bring about the long run equilibrium in Indonesia. In other words, the GDP acts as the initial receptor of any exogenous shocks that disturb the equilibrium system. This also highlight that BD, IR and EXC are strongly exogenous in the system (see Urbain, 1993). The

speed of adjustment as measured by the ECT coefficient is 0.091 that need about eleven years to adjust to the long run equilibrium due to the short run adjustments.

3.3.2 Malaysia

Panel B shows that inflation and investment does Granger cause GDP in the short run. When examining the ECT in model, only INV solely bears the brunt of short run adjustment to bring about the long run equilibrium. These are suggested by the significance of ECT coefficient and negative supporting the one cointegrating vector reported earlier. The coefficient of ECT, indicate 17% of adjustment occurs in a year, which takes about 5 years to adjust to the long run equilibrium. Looking into the export equation, inflation and investment Granger cause export. Bi-directional causality are detected between inflation and investment.

3.3.3 Thailand

From Panel C, we found the existence of uni-directional causality running from EXP, INF and INV towards GDP. There is bi-directional causality between economic growth and investment. We further acknowledge the existence of uni-directional causality from export to investment, implying that export performance brings positive enhancement to investment activities in Thailand. The coefficient of the ECT measuring the speed of the temporal adjustment to the long run equilibrium in the system is denoted by the cointegration relationship. From Panel C, Table 3, we found that the speed of adjustment to long run equilibrium following a disturbance is rather fast with 28% adjustment in a year compared to both Indonesia and Malaysia.

4. CONCLUSIONS AND POLICY IMPLICATIONS

There have been drastic changes in the world especially with in the technological advancement that related to the trade pattern and diversification. The ever changing of technologies may improve the capabilities to produce goods and services and this affect the export patterns and later enhance the economic growth. This brings about the new dimension of management in an economy. This paper empirically studies on the role of export, investment and inflation towards economic growth in three neighboring ASEAN countries of Indonesia, Malaysia and Thailand.

The empirical results are summarized as follows. First, we found that all the variables are denoted as an *I(1)* classification. Second, we found one stable cointegrating vector amongst these variables in all the three countries. Third, the normalization of the long run equation indicates that the export and investment brings positive impact to these economies throughout the estimation period. In this sense, we should encourage a larger scale of export to enhance the economic growth to a higher rate. As a nation grow it will create numerous job opportunities which increase their per capital earnings and standard of living. We also found that negative impact of inflation in two of the three countries proven that inflationary state is not favorable to the growth of the nation. In view of this, the government should take necessary steps to reduce inflationary pressure. A recent increase in international oil price brought fear of inflationary pressure for countries around the globe. In line with this, Malaysian government increased the domestic petroleum product prices in order to reduce the government's burden from the price subsidy. By reducing the price subsidy the government expects to save RM4.4 billion a

year, and this saving will be spent on other development projects mainly for improving the public transportation systems. The authorities should pay close attention to this phenomenon.

Fourth, from the temporal causality estimation using VECM, we found that export, investment and inflation cause GDP in Thailand while there is an absence of causality in any direction for Indonesia. In Malaysia, inflation and investment is the driving force for GDP and export. The findings are useful for the future management of these countries. In order to enhance economic growth the government can take positive steps to increase export base diversification. Liberalization of the trade policy will promote greater competition for these countries in the globalize world. Besides that, they should restructure its export subsidy policy and offer further export allowances to the local and foreign investor. With the complexity of the global economy, it is clear that the formulation of appropriate policies would not only promote economic growth but the macroeconomic stability, which is the main thrust of the management of an economy.

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Table 1: Multivariate Cointegration Test Results

Indonesia					
Null	Alternative	k=4 r=1			
		λmax		Trace	
		Test Statistics	95% C.V.	Test Statistics	95% C.V.
r = 0	r = 1	49.952*	31.460	84.244*	62.990
r<= 1	r = 2	22.893	25.540	34.291	42.440
r<=2	r = 3	10.857	18.960	11.397	25.321
r<=3	r = 4	0.540	12.250	0.540	12.250
Malaysia					
Null	Alternative	k=3 r=1			
		λmax		Trace	
		Test Statistics	95% C.V.	Test Statistics	95% C.V.
r = 0	r = 1	27.278*	23.800	42.655*	39.890
r<= 1	r = 2	11.212	17.890	15.377	24.310
r<=2	r = 3	4.0551	11.440	4.165	12.250
r<=3	r = 4	0.1102	3.840	0.110	3.840
Thailand					
Null	Alternative	k=5 r=1			
		λmax		Trace	
		Test Statistics	95% C.V.	Test Statistics	95% C.V.
r = 0	r = 1	33.151*	23.800	50.259*	39.890
r<= 1	r = 2	12.915	17.890	17.108	24.750
r<=2	r = 3	4.184	11.440	4.192	12.530
r<=3	r = 4	0.008	3.840	0.008	3.840

Notes: k is the lag length and r is the cointegrating vector(s). Chosen r: number of cointegrating vectors that are significant under both tests. Critical values for both the trace and maximum eigenvalue tests are tabulated in Osterwald-Lenum (1992). Asterisks (*) denotes statistically significant at 5 percent significance level.

Table 2: Normalizing Cointegrating Vectors

Variables	**GDP**	**EXP**	**INV**	**INF**
Indonesia	-1.000	2.056	0.015	0.818
Malaysia	-1.000	0.942	0.241	– 0.072
Thailand	-1.000	0.182	0.845	–1.061

Note: The estimated coefficients were obtained by normalizing the GDP variable. The notations are described in the main text.

Table 3:Temporal Causality Based on Vector Error Correction Model

Dependent Variables	ΔGDP	ΔEXP	ΔINF	ΔINV	ECT	
	χ^2-statistics				Coefficient	t-ratio (p-value)
A: Indonesia						
ΔGDP	-	1.631	0.000	0.130	-0.091	-3.660*
ΔEXP	0.604	-	0.018	0.476	-0.016	-0.495
ΔINF	0.697	1.214	-	1.036	0.071	3.400*
ΔINV	4.439	2.132	0.018	-	0.065	2.487*
B: Malaysia						
ΔGDP	-	4.318	23.417*	20.384*	0.651	6.191*
ΔEXP	2.872	-	23.396*	20.396*	0.652	6.188*
ΔINF	5.943	6.507	-	32.240*	0.100	7.372*
ΔINV	2.605	3.909	14.664*	-	-0.167	-4.671*
C: Thailand						
ΔGDP	-	12.520*	16.410*	14.5764*	-0.283	-2.593*
ΔEXP	4.639	-	7.333	6.4705	-0.831	0.315
ΔINF	4.660	4.007	-	2.4991	0.050	0.569
ΔINV	13.640*	14.569*	7.381	-	0.021	0.851

Note: The χ^2 statistics tests the jointly significance of the lagged values of the independent variables. The significance of the error correction term (ECT) is evaluated with t-statistics. Δ is the first different operator and asterisks (*) denotes statistically significant at 5 percent level.

Endnotes

[1] The role of exports on growth is theoretically rooted by the Keynesian growth theory in which the rate of economic growth is influenced by the rate of demand growth. In this relation, export growth represents a means of growing demand, and thereby raising economic growth (Tang, 2006, p.33). For the comprehensive survey of review of literature on this subject matter one could refer to Giles and Williams (2000a and 2000b) over the last two decades.

[2] The F-test or Wald χ^2 of the explanatory variables (in first differences) indicates the short run causal effects ($\phi_{2,i} = 0$ for all i) while the long run causal ($\mu_2 = 0$) relationship is implied through the significance of the lagged ECT which contains the long run information.

[3] Full sets of results of diagnostic tests are made available upon request