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ECONOMIC GROWTH OF INDONESIA: LARGE DOMESTIC DEMAND BUT STILL EXPORT-LED

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ABSTRACT

Trade policies nowadays must take into account that economies are now more open. This paper uses vector autoregression (VAR) model to assess whether the economic growth of Indonesia is export-led. Estimation results suggest that Indonesian economic growth has been stimulated by export performance, although domestic demand has contributed significantly. Indeed, our research indicates that exports also play a significant role in affecting variation in domestic demand, and thus suggests the importance for Indonesia of being more competitive in international trade to maintain economic growth.

Keywords: *International trade, Economic growth*

JEL Classification: *F43, F47*

I. INTRODUCTION

Over the past few years, Indonesia, a Southeast Asian developing country, has consistently enjoyed robust growth along with strong export performance. This growth has been achieved even at the peak of the global financial crisis (Bank Indonesia, 2009; World Bank, 2009; IMF, 2009). There are two factors behind this success: the first is the large productive population that keeps domestic demand strong. The second is that trade with China and India is healthy and continuing sustainably. Indonesia, along with several other ASEAN countries, has a trade agreement with China, the China–ASEAN Free Trade Agreement (CAFTA) to implement economic integration and endorse free trade between the signatory countries (Wong and Chan, 2003; Sheng, 2003). This suggests that it is important to assess the significance of the role that trade plays in Indonesia's economy.

Of the two contrary trade-growth strategies, import substitution and export-led growth, import-substitution

is consistent with protectionism rather than globalisation. Following an export-led growth strategy is consistent with promoting trade liberalisation and therefore allied to globalisation of the economy. Trade policies today, in the main, follow strategies that encourage and promote export-led growth (Medina-Smith, 2001).

Indonesia has increased the degree of openness of its economy by gradually introducing trade liberalisation measures, which are important for export-led growth (ELG) possibilities that have accompanied rapid democratisation. The trade liberalisation policies, among others, have led to reductions in tariffs over the period of 1990 to 2010 and, as well, to the lowering of other trade barriers such as quotas. Part of this economic openness stems from conditions and terms imposed by the IMF in return for its bailout facilities that helped support the Indonesian economy during the Asian financial crisis of 1997–98. Indonesia's commitment to trade liberalisation has been improved through several regional and international agreements with the World Trade Organization and with Asia–Pacific Economic Cooperation, and more recently under the ASEAN Free Trade Agreement (AFTA) and the China–ASEAN Free Trade Agreement (CAFTA). These agreements encourage increasing openness and lowering protection, and thus promoting trade among ASEAN members. Indonesia's significant improvement in international trade is discussed, *inter alia*, by Vanzetti et al. (2005), Soesastro and Basri (2005) and Amiti and Konings (2007). Indonesia is now, as a trading nation, an exporter of goods rather than protectionist and, for this reason, the export-led growth hypothesis needs to be evaluated and validated to ensure that arguments for trade policies that advocate import substitution do not gain ascendancy.

This paper investigates the validity of the export-led growth (ELG) hypothesis in explaining Indonesia's economic growth during the period of 1997 to 2009. Indonesia is a country that has made significant changes from strict trade policies to those more suited to an open economy. In the supply context, exports can enable many economic sectors to improve (for example, transport, services, trade); in the demand context, exports mean higher domestic demand, which can increase income and investment prospects, and thus boost consumption. The structure of this paper is as follows: an introduction, literature reviews of ELG, including former research, then followed by a discussion of method, an empirical assessment and a conclusion.

II. LITERATURE REVIEW

There is still controversy over the empirical relations between exports and economic growth, relations that are still unclear, even though they have been frequently discussed by

economic theorists (Medina-Smith, 2001). One positive possibility is that exports have a significant effect on economic growth (Kwan and Kwok, 1995). Marin (1992) explains that ELG works through two channels: by the exit of low-productivity firms and by improvements resulting from economies of scale that are a result of higher demand. Indonesian exporters with access to foreign markets will increase demand for resources, thus increasing competition among exporting firms. Hence, unproductive firms will leave and there will be increases in economies of scale for those more competitive firms that remain.

The export-led growth hypothesis has undergone much testing, although findings vary among countries, even among studies that use different methods for the same country.

References to previous papers that discuss the empirical validity of the ELG hypothesis can be found in Medina-Smith (2001). Several papers support the ELG hypothesis including those of Begum and Shamsuddin (1998) and Awokuse (2003). Fewer papers support contradictive findings; papers in this group include those by Henriques and Sadorsky (1996) and Boltho (1996). Other writers have had qualified success in finding support for the ELG hypothesis, researchers such as Jung and Marshall (1985) and Afxentiou and Serletis (1991).

Jung and Marshall (1985) found that Indonesia is one of the four (of 37) developing countries whose economic growth appears to be consistent with the export-led growth hypothesis. They also apply the standard Granger causality test to assess the empirical relations of exports and economic growth. The data they use are annual growth rates of exports and GDP, with the observation period from 1966 to 1980. Their observations were taken over a different period from those used in this paper; our data begin with the first quarter of 1997, with the implication of possible different trade policies and trade patterns among countries. Moreover, Toda and Phillips (1993) pointed out that the use of the standard Granger causality test may be biased if the variables in the system are integrated because the test statistic does not have a standard distribution.

III. DATA AND METHODS

There is no assured empirical structure of the relations between exports and economic growth (Medina-Smith, 2001). Although there is some recent research that has tried to model ELG structurally, we chose to use non-structural econometric methods, which are often used to assess the validity of the ELG hypothesis. This paper assesses the validity of the ELG hypothesis by investigating the empirical relations between exports and economic growth using descriptive analysis and econometric assessment.

Vector autoregression (VAR), a non-structural model that was first

proposed by Sims (1980), may be used where there are complex simultaneous relations and structures among macroeconomic variables. VAR captures the evolution and interdependencies between multiple time series, generalising the univariate, autoregression models without imposing too many theoretical *a priori* restrictions. All variables in VAR are treated symmetrically by including equations explaining each variable's evolution based on its own lags and the lags of all the other variables in the model. A Granger causality test, as proposed by Granger (1969), is mostly done to test for the causal (two-way) relation between two variables.

Vector autoregression (VAR) and vector error correction model (VECM) methods followed by the Granger causality test are frequently used to investigate the ELG hypothesis because they facilitate non-structural model specifications. Researchers estimating ELG using this method are, to name a few, Marin (1992), Henriques and Sadorsky (1996) and Awokuse (2003).

Econometric estimation will be as follows: the first step undertakes an assessment of lag order integration of the data to prevent spurious regressions. If variables are integrated at that level, we can directly apply VAR and Granger causality test. We then cannot assess long-term relations of variables through the Johansen (1988) cointegration test. This is because cointegration itself appears when variables are non-stationary at that level.

If variables integrated at first difference, then we should apply the Johansen cointegration test to test long-term relations between considered variables. If those variables are found to be cointegrated, we will then apply VAR and the Granger causality test. Moreover, if variables do not cointegrate, we pursue analysis with VECM and multivariate Granger causality test because VECM corrects estimation errors and thus prevents spurious regression.

Alternatively, we can assess the ELG hypothesis by using VAR and Granger causality through the Toda and Yamamoto (1995) procedure. This procedure can provide consistent estimates to different orders of integration using a modified Wald test (MWald) rather than the standard Wald test that is usually exercised. As pointed out by Awokuse (2003), this procedure can bypass the need for unit-root tests and cointegration tests that are potentially biased.

Explicitly, the model specification will be as follows:

Where Y_t, X_t and R_t are economic growth, exports, and terms of trade respectively; a and c are constants; e denotes stochastic errors; p denotes p-th maximum order of lags, which will be derived from lag-length criteria.

This paper uses real gross domestic product (GDP) at base year 2000,

$$\begin{bmatrix} Y_t \\ X_t \\ R_t \end{bmatrix} = \begin{bmatrix} c_1 \\ c_2 \\ c_3 \end{bmatrix} + \begin{bmatrix} a^1_{1,1} & a^1_{1,2} & a^1_{1,3} \\ a^1_{2,1} & a^1_{2,2} & a^1_{2,3} \\ a^1_{3,1} & a^1_{3,2} & a^1_{3,3} \end{bmatrix} \begin{bmatrix} Y_{t-1} \\ X_{t-1} \\ R_{t-1} \end{bmatrix} + \cdots + \begin{bmatrix} a^p_{1,1} & a^p_{1,2} & a^p_{1,3} \\ a^p_{2,1} & a^p_{2,2} & a^p_{2,3} \\ a^p_{3,1} & a^p_{3,2} & a^p_{3,3} \end{bmatrix} \begin{bmatrix} Y_{t-p} \\ X_{t-p} \\ R_{t-p} \end{bmatrix} + \begin{bmatrix} e_{1,t} \\ e_{2,t} \\ e_{3,t} \end{bmatrix}$$

real exports, and terms of trade. The observation period begins at the first quarter of 1997 and continues until the third quarter of 2009. Real GDP and real exports are computed with GDP deflator index (2005=100). As standard data of terms of trade are not available for Indonesia, this paper uses proxy terms of trade that are computed by dividing export value by import value, or by assuming the volume of exports and imports is constant. Data are taken from the International Financial Statistics (IFS) of the IMF via ESDS International, on a quarterly data basis.

These three variables are employed because they are key variables in determining export-led growth validity by considering competitiveness in international trade. Real exports and real GDP growth are key variables in determining the validity of the export-led growth hypothesis, and are used in many papers related to ELG studies as discussed in Medina-Smith (2001). We follow Henriques and Sadorsky (1996) and Awokuse (2003) in employing terms of trade as a control variable because it directly measures the relative competitiveness of a nation's products in international trade.

Those econometric specifications allow us to test the extent to which the variable of exports causes economic growth, which can be interpreted as export-led growth (Kwan and Kwok, 1995). As alternative hypotheses, estimation results can suggests that economic growth causes exports to increase, often called growth-driven exports, as proven by Awokuse (2003). Moreover, they can show some combination of the two, that is, a bi-directional relation between exports and economic growth. Thus, there are three possible conclusions that can be inferred from the estimations: exports affect growth, growth affects exports or bi-directional relation.

IV. EMPIRICAL ASSESSMENT

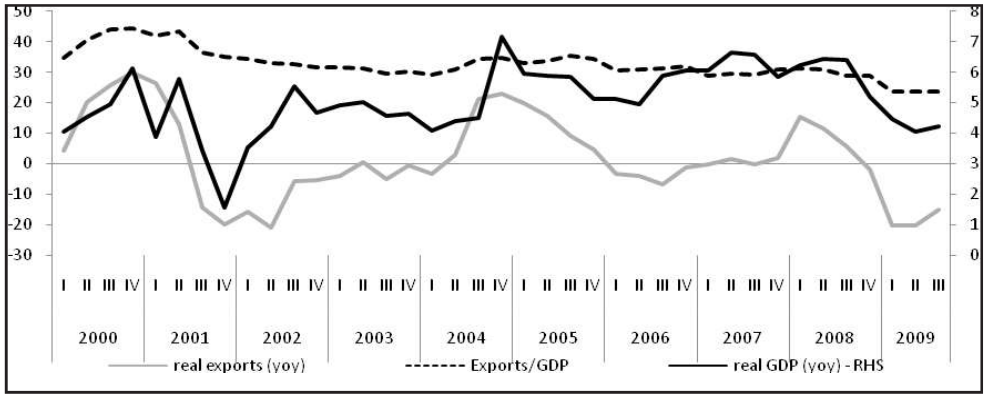
The time series data from 2000 to 2009, taken from the IMF's international finance statistics, shows that the behaviour of Indonesia's economy seems to support the export-led growth hypothesis. Figure 1 shows that movement in real exports growth has been followed by the movement of real GDP growth in the same direction, especially in 2004 and 2008. However, the change of real GDP growth is quantitatively smaller compared to the change in real export growth (please note that real export growth is shown on the left axis and real GDP growth on the right axis). For example, the real export growth rate fell from 26.3 per cent in the first quarter of 2001

to 12.9 per cent in the second quarter of 2001, followed by a fall in the real GDP growth rate from 5.8 per cent in the second quarter of 2001 to 3.4 per cent in the third quarter of 2001. Moreover, the real export growth rate increased from 2.9 per cent in the second quarter of 2004 to 21.2 per cent in the third quarter of 2004, followed by an increase in the real GDP growth rate from 4.5 per cent in the third quarter of 2004 to 7.2 per cent in the fourth quarter of 2004. It is also important to note that the ratio of exports to GDP has been gradually falling since 2001 and fell below 30 per cent in 2009, at the time of the global financial crisis. Figure 1 then indicates that Indonesian data support the export-led growth hypothesis, although the share of domestic demand has been increasing gradually.

To confirm preliminary indications of export-led growth shown by Figure 1, this paper conducted an econometric investigation using model specification as formerly discussed.

As a first step, we undertook a unit root test using an augmented Dickey–Fuller (1979) method (ADF) on terms of trade and logarithmic forms of real GDP and real exports. This test is to investigate the integration degree across these variables.

ADF tests on the three variables reject the hypothesis of the existence of unit root. Thus it indicates that those variables are integrated at the 1% critical level or I(0) (please see Table 1). As they are shown to be stationary at that level, estimations of long-run relations are not possible through a Johansen cointegration test.



Source: International Finance Statistics – IMF, ESDS International (March 2010)
Note: data in per cent. Yoy denotes year-on-year or annual growth and RHS denotes right-hand side.

Figure 1. Exports and economic growth in Indonesia

Four of the six tests suggest lag five as an appropriate order: Akaike information criterion (AIC), Hannan–Quinn (HQ) information criterion, sequential modified LR test statistic, and final prediction error (please see Table 2). Thus, we chose lag order 5 in estimating VAR. In this VAR model, lag order 5 fulfils stability conditions as indicated by the value of all AR roots modulus below 1 (see Figure 2).

Table 1. Unit root tests

Variable	Level	First difference
Log (GDP)	-8.949***	-2.533
Log (Export)	-4.386***	-6.907***
TOT	-4.326***	-6.428***

*** indicates significance at 1% critical level

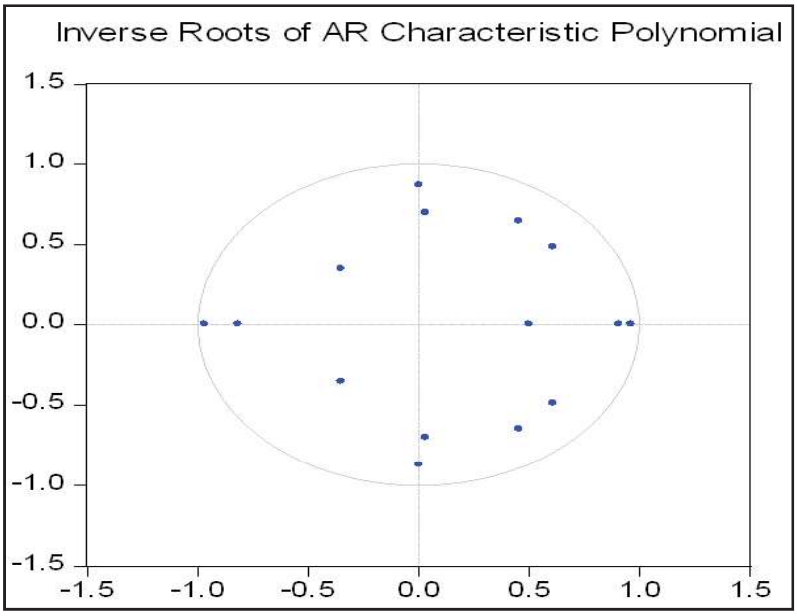
A Granger causality test shows that exports significantly affect GDP at a 99 per cent degree of confidence (please see Table 3). Hence, we can conclude that the export-led growth hypothesis appears to be valid for Indonesia. On the other hand, the Granger causality result rejects the growth-driven exports hypothesis. Furthermore, the feedback effect is statistically insignificant and thus indicating that exports are exogenous. This standard Granger causality test has been employed also by Jung and Marshall (1985), and thus this paper, using the same methods but with a different period of observations, provides the same indications that the economy of Indonesia is consistent with the ELG hypothesis. As a comparison, a pairwise Granger causality test, based on VAR, also indicates exogeneity of exports.

Multivariate VAR-based Granger causality, best known as the block exogeneity test, also shows some indication of support for the export-led growth hypothesis (please see Table 4). This is because joint lags of export variables are indicated to be weakly

Table 2. VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	98.37912	NA	2.89e-06	-4.239072	-4.118628	-4.194171
1	206.1808	196.4387	3.59e-08	-8.630259	-8.148482*	-8.450658
2	220.4373	24.07765	2.86e-08	-8.863881	-8.020772	-8.549579
3	228.1071	11.93073	3.08e-08	-8.804759	-7.600318	-8.355756
4	240.5899	17.75334	2.71e-08	-8.959551	-7.393777	-8.375846
5	258.6399	23.26449*	1.90e-08*	-9.361775*	-7.434668	-8.643369*
6	266.5256	9.112322	2.15e-08	-9.312249	-7.023810	-8.459142

* indicates lag order selected by the criterion
Endogenous variables: T, LX, LY — Exogenous variables: C
Sample: 1997:1 2009:3 — Included observations: 45
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error — AIC: Akaike information criterion
SC: Schwarz information criterion — HQ: Hannan–Quinn information criterion



Note: If there is any point outside the circle, the VAR system is indicated to be unstable.

Figure 2. AR roots graph

Table 3. Standard pairwise Granger causality tests

Sample: 1997:1 2009:3
Lags: 5

Null hypothesis:	Obs	F-Statistic	Prob.
LY does not Granger cause LX	46	1.00885	0.4271
LX does not Granger cause LY		9.48678	9.E-06
T does not Granger cause LX	46	0.45014	0.8103
LX does not Granger cause T		2.35478	0.0607
T does not Granger cause LY	46	1.24725	0.3084
LY does not Granger cause T		3.39730	0.0132

exogenous. These estimation results confirmed the data plot analysis of real export growth and real GDP growth. Additionally, these standard Wald tests are identical with modified Wald tests suggested by Toda and Yamamoto (1995) because the maximum order of integration is zero ($d(max)=0$), which implies $k=(k+d(max))$.

Although VAR impulse response suggests that exports are significantly proven to be an exogenous factor and positively affect GDP, it is crucial to note that the result is quantitatively

small. To be more precise, export's impulse response on GDP creates positive shock in the same period, followed by negative effects in periods after, until it eventually has a positive effect again (see Figure 3).

Variance decomposition of GDP shows that exports contribute 25.0 per cent of variations of GDP after one period and contribute 19.0 per cent after two quarters. The contribution increases to 20.4 per cent in the third and to 21.1 per cent in the fourth quarter after exports shock. In all, ten periods were observed, although terms of trade are indicated as a minor contributor to GDP variations, their contribution increases over time, and thus indicates that the terms of trade have lagged effects in affecting economic growth. Moreover, GDP itself is consistently indicated as a major contributor in the ten periods of observations (please see Table 5). This provides an indication that GDP is constructed by factors other than external trade. Because GDP is only affected by external trade and domestic demand, it is indicated to be mainly dependent on domestic economic activities and multiplier effects. This paper does not elaborate on that issue; it is outside the trade and development context.

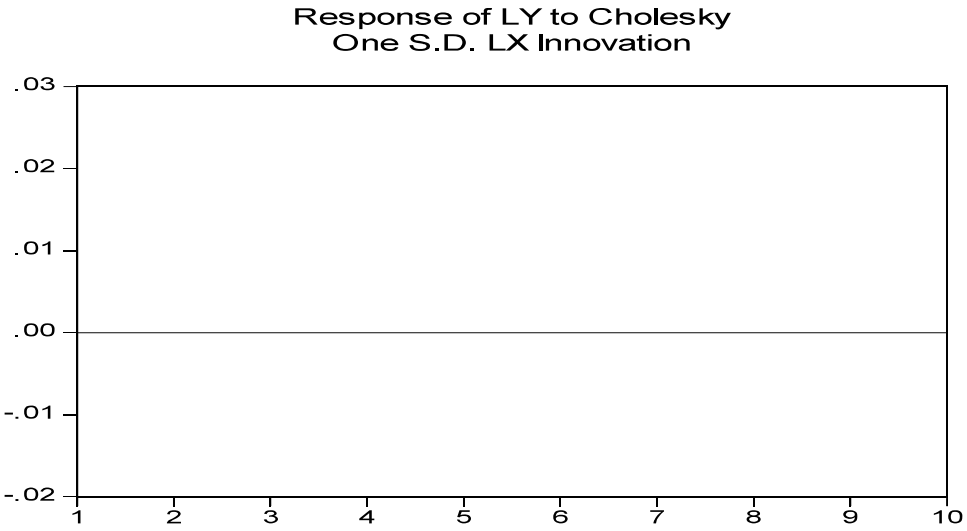
This assessment already indicates that the export-led growth hypothesis is valid for Indonesia from the first quarter of 1997 until the third quarter of 2009. This conclusion arises from our assessments undertaken through descriptive analysis (data plotting), the standard Granger causality test and a VAR-based Granger causality test. This conclusion is the same as that of the study by Toda and Yamamoto (1995) using maximum order of integration on the data. Because Toda and Yamamoto allow econometric procedures to bypass unit root tests, it is still acceptable if unit-root tests

Table 4. VAR Granger causality/block exogeneity Wald tests

Sample: 1997:1 2009:3
Included observations: 46

Dep. Var: T		Dep. Var: LX		Dep. Var: LY	
Excluded	Chi-sq	Excluded	Chi-sq	Excluded	Chi-sq
LX	9.483878*	T	1.256564	T	5.969041
LY	13.88405**	LY	3.600609	LX	41.90439***
All	28.64655***	All	5.761318	All	54.71625***

*** indicates significance at 1% critical level
** indicates significance at 5% critical level
* indicates significance at 10% critical level



Source: Authors' calculation

Figure 3. Impulse response of GDP on export innovation

formerly conducted are biased. The assessment also rejects growth-driven exports hypothesis and bi-directional relations between exports and economic growth.

However, the effect of exports on economic growth is quantitatively small as shown by data plotting, impulse response of VAR, and variance decomposition of GDP. Moreover, variance decomposition suggests that GDP has been more affected by itself than exports, hence affected by factors other than external trade. Because GDP is determined by domestic demand and external trade only, this might imply preliminary indications that domestic demand is the primary factor affecting economic growth.

V. CONCLUSION

The literature shows that empirical export-led growth studies generate various results. Some papers support the ELG hypothesis, some not; and some find it only partly valid. The main variables assessed are exports and GDP; and usually include some control variables such as terms of trade, imports, labour, productivity and capital. Methods normally used are Granger causality, VAR–VECM and ordinary least squares.

Our findings for Indonesia support the ELG hypothesis through the use of standard Granger causality tests. The test is applicable because variables are integrated at that level, and also produce the same indications through

Table 5. Variance decomposition of GDP

Period	SE	T	LX	LY
1	0.066009	0.442995	25.04682	74.51018
2	0.084393	0.892484	18.97411	80.13341
3	0.085162	0.691707	20.43587	78.87242
4	0.089837	1.481168	21.09692	77.42191
5	0.092265	4.905899	15.33266	79.76144
6	0.092881	6.081427	12.44403	81.47454
7	0.094111	6.675147	10.22655	83.09831
8	0.094808	7.240321	9.118840	83.64084
9	0.095176	8.107638	9.250017	82.64234
10	0.095658	8.732057	8.132647	83.13530

VAR Granger causality and through the Toda and Yamamoto (1995) procedure. This finding that the ELG hypothesis is valid for Indonesia is consistent with Jung and Marshall (1985), though they use a different time period for their observations. Although the effect of exports on economic growth seems to be quantitatively small, it can initiate economic growth significantly. Moreover, estimation results also indicate that the feedback effect of growth on exports is insignificant, and therefore does not support the growth-driven exports hypothesis and bi-directional relations between exports and growth.

Because international trade tends to liberalise gradually, small, open economies have to anticipate external shocks. Our findings suggest the importance for Indonesia to be more competitive in international trade to maintain the level of economic growth. This can be completed by lessening costs of production and increasing the efficiency of the domestic economy. In a policy context, this shows the urgency of increasing the quality of infrastructure, particularly transport.

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