THE RELATIONSHIP BETWEEN ECONOMIC OPENNESS AND GDP GROWTH VOLATILITY: IMPLICATIONS FOR THE ASEAN

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1. INTRODUCTION
The objective of this presentation is to test whether trade openness leads to economic volatility, keeping other relevant things constant. This theme has been investigated in various studies, as we shall show in the literature review. However, this particular study places the analysis within the vulnerability/resilience framework, proposed by Briguglio et al. (2009).

One would expect that if a country depends highly on economic conditions in other countries, its economic situation will also be highly exposed to external shocks, possibly leading to GDP growth volatility in the country in question. Likewise, a high dependence on imports is likely to lead to a high degree of exposure to economic conditions in the rest of the world. There are other reasons why trade openness leads to GDP growth volatility—these will be discussed in the section on the literature.
The hypothesis to be tested in this paper is that GDP growth volatility depends on trade openness, on economic governance and on political governance of a given economy, the latter variable possibly proxying GDP per capita (the stage of development) and social governance in the country concerned. The approach used to test this relationship is the regression method, using panel data.

This proposed relationship is an extension of the arguments put forward by Briguglio et. al (2009) and Briguglio (2016), where factors that lead to economic vulnerability were juxtaposed against factors that lead to economic resilience in order to assess the risk of a country being harmed by external shocks. These two studies were not based on regression analysis, but on observations of variables that lead to economic vulnerability and resilience, which enabled the authors to classify countries, in terms of the so-called vulnerability and resilience (V&R) framework. The present study attempts to statistically test this relationship.
The confirmation of the hypothesis of this study may help to explain the so-called “small state paradox” referred to in Briguglio et al. (2009), meaning that highly-open economies can and do generate high GDP per capita in spite of the fact that openness, by itself, tends to generate volatility, which is often considered to be harmful to growth.

The possibility that GDP growth volatility is influenced by economic, social and political governance, may also help to explain why some highly-open economies do not exhibit a high degree of GDP growth volatility, while economies which are not highly open to trade exhibit a high degree of volatility - the reason being that good economic, political and social governance may be conducive to the reduction of volatility.
The presentation is organised in five sections as follows.

Section 2, which follows this introduction, will present a brief literature review on the relationship between trade openness and GDP growth volatility.

Section 3 will explain the methodology utilised in this study to test the relationship between trade openness and GDP growth volatility, and will present the estimation results. The section will also report on some diagnostic tests relating to the validity of the results.

Section 4 will put forward a number of implications that are derived from the results presented in the previous section.

Section 5 will derive a few implications, specific to the ASEAN.
2. LITERATURE REVIEW
The themes covered in the literature review

This literature review is organised in four main sections as follows:

1. The opposing effects of trade openness
2. Openness and economic volatility
3. Openness and economic growth
4. The downsides of volatility
5. Equations to estimate the relationship
Trade openness is often thought to bring real benefits, including improved productivity and enhanced variety of goods at lower cost to consumers. In addition, producers would be able to sell on world markets, thus earning more than if the same products were sold only on the domestic market (Jensen, 2004). In this sense, it may be argued that trade openness is conducive to economic growth, ceteris paribus.

However, trade openness is also thought to usher in GDP growth volatility, which is considered to be a downside. Di Giovanni & Levchenko (2009), when investigating the channels through which trade openness affects volatility, distinguished between different economic sectors, and argued that trade openness is likely to lead countries to increase the degree of specialization, implying a higher risk due to having too many eggs in one basket.
Many authors associate openness with volatility, including Loayza & Raddatz (2007), Karras & Song (1996), Easterly & al. (2001), Di Giovanni & Levchenko (2006) and Krishna & Levchenko (2009). It will be shown later on in this literature review that GDP volatility is thought to likely harm growth.

Therefore, trade openness is often considered as good for GDP growth, but it also generates volatility which is thought to be bad for GDP growth. In the literature, one finds various papers that refer to these two opposing effects of openness. Easterly & Kraay (2000) refer to these tendencies when discussing small economies, which are often highly open to trade. These authors argue that the positive and negative effects of openness may offset each other in the case of small states.
Some authors consider that export concentration exacerbates the effect on trade openness on volatility. Jensen (2004) argues that this effect is increased if exports are concentrated in commodities, including oil, that are characterized by high price volatility.

This view is echoed by Haddad et al. (2010) who argue that export diversification (the obverse of concentration), both across products and markets, reduces growth volatility. The authors first discussed the mechanisms by which trade openness affects growth volatility, with one of the variables considered being export diversification indicators. They found evidence that export diversification reduces the effect of trade openness on growth volatility.

Diversification and volatility is also discussed in
Various authors, while admitting that trade openness leads to GDP growth volatility, also acknowledge the importance of domestic in attenuating or exacerbating volatility, including governance, institutional frameworks and domestic economic policy. For example, Easterly et al. (2001) contend that output volatility, while being affected by external shocks, is also influenced by the manner in which the economy reacts to such shocks.

Acemoglu et al. (2003), Fatás & Mihov (2013), Gavin & Hausmann (1996), and Malik & Temple (2009) refer to the effect of the domestic institutional quality on volatility, including the possibility that openness leads to a higher risk of policy mismanagement if political institutions are weak, which, according to Ahmed (2003) could intensify the negative effects of external shocks. On this matter see also Chang et al. (2009).
Some studies argue that the extent of volatility caused by trade openness depends on the stage of development. Abubaker (2015) found that trade openness increases output volatility, but countries with a higher level of development are affected to a lower extent in this regard. In the same vein, Jensen (2004) contends that GDP per capita has a significantly effect on income volatility. This may explain why particularly poor economies, like Least Developed Countries (LDCs), are also characterized by high income volatility, even though they do not tend to be characterized by particularly high levels of openness.

According to some authors, volatility in particularly intense when exports consist mainly or to a high degree of commodities (Koren & Tenreyro, 2007) which is characteristic of many developing countries, and institutional quality
Some studies distinguish between different types of trade openness, arguing that some forms of openness are highly destabilising. Jackman (2014) investigated the relationship between tourism specialization and output volatility in a sample of 34 small island developing states (SIDS). The conclusion is that there appears to be a positive relationship between tourism and output volatility, and that the impact of tourism on economic volatility depends greatly on the level of volatility in tourism.

Dabla-Norris & Srivasal (2013) examine the impact of financial depth on macroeconomic volatility and find that financial depth could lead to a dampening of output volatility, but only up to a point. They find that at very high levels, such as those observed in many advanced economies, financial depth amplifies volatility. On this matter see also Tornell et al. (2003).
A number of studies do not confirm the positive effects of openness to trade and volatility. A case in point is Cavallo (2007) who presents empirical evidence that suggests that, after appropriately accounting for the likely endogeneity of trade, the net effect of trade openness on output volatility is stabilizing. This view is echoed in Cavallo & Frankel (2008).

Bowdler & Malik (2005) argue that trade openness can reduce volatility through limiting recourse by shifting consumption and production towards goods for which the terms of trade are relatively stable.

Hegerty (2014), likewise concludes that trade openness appears to be correlated with a reduction in output volatility for LDCs.
Bejan (2005) argues that once one controls for government size and some measures of external risk, such as export concentration index, the effect of openness on the output volatility turns out to be negative.

Studies that associate openness with a lower degree of volatility also base their arguments on the possibility that international trade permits a country to better integrate into the world economy, further permitting the possibility of policy reforms that lead to stability.
Although, most studies conclude that trade openness generates GDP growth volatility, which is a downside, openness is generally found to be positively related to GDP growth. Studies that associate openness with growth often base their arguments on the possibility that international trade stimulates competitiveness, leading to increased productivity and innovation, improves resource allocation and lowers prices for consumers.

Such arguments are proposed by Winters (2004); Easterly & Kraay (2000). Some studies show that the positive effect of trade openness on economic growth, is particularly possible with a conducive institutional framework (Dollar and Kraay, 2003)
There are studies, however that show that the quality of institutions is an important consideration in assessing the effects of trade openness. Calderon & Fuentes (2006) argue that countries with strong institutions receive the largest benefit of trade openness.

Yanikkaya (2003), goes as far as to show that openness may actually not be good for growth. The author shows through his estimation that trade barriers are positively and significantly associated with growth, especially for developing countries.

Some authors also distinguish between the long and short runs, referring to adjustment costs of trade openness in the short run, possibly leading to poverty and inequality (Goldberg & Pavcnik, 2004).
The arguments derived from the literature so far generally point out that while openness may be good for growth, (with a few dissenting voices), it also has negative effects by generating volatility. This leads to the question as to why volatility is undesirable.

There are various reasons for this, including that fluctuations can generate a welfare loss (Loayza et al., 2007) through the negative effect of uncertainty (economic, political, and policy-related). This matter is also discussed in Montalbano (2011).

In addition, volatility ushers in a higher risk of policy failure and weak economic governance (Fatás & Mihov, 2005, Gavin & Hausmann, 1996, and Rodrik, 1999), including fiscal and monetary policies that intensify rather than calm the trade cycle.
Some authors argue that volatility tends to lead to lower growth (Ramey and Ramey, 1995), particularly on poor countries (Easterly et al., 2000). Hnatkovska & Loayza (2005) for example, estimate that a one standard-deviation increase in macroeconomic volatility results in an average loss of 1.3 percentage points in annual per capita GDP growth.

On the other side of the coin, Kose et al. (2004) found that trade openness appears to attenuate the negative growth-volatility relationship. Specifically, they find that the estimated coefficients on interactions between volatility and trade integration are significantly positive, suggesting that countries that are more open to trade appear to be able to tolerate higher volatility without hurting their long-term growth.
García-Herrero & Vilarrubia (2006) building upon the general consensus that followed the study by Ramey and Ramey, (1995), namely that that the volatility of per capita GDP growth reduces growth, showed empirically that a moderate degree of volatility can be growth-enhancing, while very high volatility is clearly detrimental. These results point to the existence of a “Laffer curve” between volatility and growth.

Meschi and Vivarelli (2007) find that that of trade of developing countries with high income countries are destabilising as they worsen income distribution in developing country, both through imports and exports. This would seem to suggest that technological differentials between trading partners are important factors in explaining the affects of volatility that result from economic openness.

2. Literature review
In the literature, the procedure often used to estimate the relationship between openness and volatility is generally the regression method, often utilising panel data. GDP growth volatility is measured by the standard deviation of GDP growth, and openness is generally measured as the average of exports and imports, as a ratio of GDP (e.g. Hadded & et. Al., 2010).

The control variables utilised in the regression equations varied, as indicated in the preceding slides of this literature review, and included variables standing for policy and institutional frameworks, stage of development, export concentration, terms of trade, financial liberalisation, and geographical dummy variables.
3. ESTIMATION RESULTS
Growth Volatility Equation

To test the hypothesis that trade openness generates GDP growth volatility, we specified the following equation, using annual data for 172 countries spanning the years from 2010 to 2014 is used.

\[ VLT_{i,t} = \alpha + \beta \ OPN_{i,t} + \chi \ EGV_{i,t} + \delta \ PGV_{i,t} + \epsilon_{i,t} \]  \hspace{1cm} (1)

where VLT is GDP volatility, measured by the standard deviation of GDP growth rates, with a rolling window size of previous 10 periods, OPN refers to trade openness, EGV refers to economic governance and PGV refers to political governance, possibly also capturing the stage of development. The subscripts indicate that all variables refer to country \( i \) in year \( t \). Further, \( \epsilon_{i,t} \) is assumed to be normally distributed with mean 0 and constant variance.

We also estimated the same equation for 64 highly-open economies.

3. Estimation results
The basic assumption underpinning Equation (1) is that GDP volatility is influenced by trade openness, keeping the stage of development (also reflecting political and social governance) constant.

A priori, one expects that trade openness (OPN) has a positive effect on growth volatility. On the other hand economic governance (EGV) and political governance (PGV) have a negative effect on volatility, in that these two variable could attenuate the effect of trade openness.

The estimation of Equation (1) was carried out using panel data, assuming fixed effects, following the application of the Hausman test for panel data estimation. This test decisively favours the use of “Fixed Effects” estimator over “Random Effects”.

3. Estimation results
Notes on the Data...1

The data covered a period of five years (2010 to 2014).

**Trade openness (OPN)** was measured as \[\frac{(\text{Exports} + \text{Imports})}{2}\] /GDP. The data was sourced from the UNCTAD statistics. The cut-off point chosen for selection high export-oriented countries was a trade openness of 50% of GDP or higher.

**Economic governance (EGV)** was measured by the average of two indices, namely (i) debt as a ratio of GDP and (ii) current account imbalances as a ratio of GDP. The data was sourced from the IMF World Economic Outlook database. Following Briguglio et al. (2009) and Briguglio (2016), these indicators were chosen because they were thought to be policy induced and thus are closely related to economic governance. These two variables are intended to capture domestic balance (debt) and external balance (current account).

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Notes on the Data...2

The debt ratio and the current account ratio observations were rescaled using the Min-Max formula\(^3\), so as to permit averaging these variables, which are individually measured in different scales.

**Political governance** (PGV) was measured by the Rule of Law indicator of the so-called Kaufman Index.\(^4\) This variable may also capture the stage of development, because this index is highly correlated to GDP per capita. Had we used the two variables separately we risked the chance of multicollinearity, given the high correlation between these two variables.

\(^3\) The Min-Max formula for a variable X be expressed as:
\[
X_{RS_i} = \frac{(X_i - X_{\text{min}})}{(X_{\text{max}} - X_{\text{min}})}
\]
where \(X_{RS_i}\) is an array of rescaled values an array of observed values \(X_i\), \(X_{\text{min}}\) is the minimum value in the array of observations and \(X_{\text{max}}\) is the maximum value in the same array. This formula rescales all the observed values within a range of 0 \((X_{RS_{\text{min}}})\) and 1 \((X_{RS_{\text{max}}})\).

\(^4\) http://info.worldbank.org/governance/wgi/index.aspx#home
Using the available data, these estimation results were obtained:

172 Countries:

\[
VLT = 12.15 + 0.06 \text{ OPN} - 9.18 \text{ EGV} - 11.92 \text{ PGV}
\]

\[t \text{ statistics} \ (3.91) \quad (2.65) \quad (-3.53) \quad (-2.88)\]

R-squared = 0.83

Number of observations = 860

64 highly trade-open countries:

\[
VLT = 7.66 + 0.04 \text{ OPN} - 4.06 \text{ EGV} - 6.82 \text{ PGV}
\]

\[t \text{ statistics} \ (5.11) \quad (2.24) \quad (-2.76) \quad (-3.35)\]

R-squared = 0.83

Number of observations = 320

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5 The IMF database, from which the volatility data was sourced, contained 187 politically independent states. Sixteen countries were omitted due to missing data. These are Chad, Eritrea, Kosovo, Marshall Islands, Mongolia, Montenegro, Palau, Syria, Timor-Leste, Tonga, Turkmenistan, Cyprus, Kiribati, Liberia, Trinidad and Tobago.

6 These are countries with a trade ratio equal to or higher than 50% of GDP
The estimated parameters are in line with a priori expectations. The numbers in parentheses are the t-statistics and indicate that the estimates of the coefficient on the explanatory variables are statistically different from zero at the 95% level.

The results confirm that, everything else remaining constant, trade openness does intensify GDP growth volatility.

Nevertheless, this does not automatically imply that more open economies face a higher degree of growth volatility. Indeed, the regression results verify that well-managed economies could mitigate the effects of openness. In addition, the stage of development could also dampen growth volatility, possibly because GDP per capita is closely correlated to political and social governance.
4. CONCLUSIONS AND IMPLICATIONS
This study has tested the relationship between trade openness and GDP growth volatility, using a sample of 67 countries, and keeping other relevant variables constant.

The regression equation was kept as simple as possible, reflecting the possibility that GDP growth volatility is influenced by trade openness, economic governance and political governance, the latter variable also proxying the stage of development.

The panel data analysis, convincingly shows that openness does lead to economic growth volatility, but good governance could attenuate and even reverse this effect.
Implications of the results

The main implication of these results is that countries that are highly dependent on international trade, including most small states, would be exposed to GDP growth volatility, which has various downsides, as explained in the literature review.

However, it does not necessary follow that highly trade-open economies - small states in particular - are the ones that experience the highest degree of GDP growth volatility, if these countries adopt appropriate policies. In other words it is possibly that highly-open economies do not exhibit a high degree of GDP growth volatility, while economies which are not highly trade-open may exhibit a high degree of volatility - the reason being that good economic and political governance may be conducive to the reduction of such volatility.
**Implications of the results**

The major implication that can be derived from this study is the following:

**Highly trade-open countries, in particular small states, are those countries which mostly need to adopt good economic, social and political governance, if they are to counteract growth volatility, with all its downsides.**

This is in line with the vulnerability/resilience framework, proposed in Briguglio et. Al (2009) and Briguglio (2016), where factors that lead to economic vulnerability were juxtaposed against factors that lead to economic resilience in order to assess the risk of a country being harmed by external shocks. This framework was used to show that small economically vulnerable states, can, and do, adopt policies that enable them to withstand the downsides of economic vulnerability.
5. Implications for the ASEAN
The relation between volatility (SD of real GDP growth) and trade openness \([(\text{exports + imports})/\text{GDP}*2)\] between 2005 and 2014) shown in the diagram, exhibits a positive slope but with a very low correlation coefficient.

\[y = 1.8683x + 41.821\]
\[R^2 = 0.0177\]

However, as argued in this paper GDP growth volatility is not only affected by trade openness (exposure to external factors) but also to internal factors, notably economic and political governance, which could attenuate or exacerbate the effects of trade openness.

5. Implications for the ASEAN
According to our hypothesis, countries can be grouped into four stylised categories: (H=Highly; S = Slightly; O = Open; V = Volatile):

1. **HO&HV**: Economies that are highly trade open and register a high degree of volatility. According to our hypothesis this is likely to be the case for small countries that are relatively not well governed.

2. **HO&SV**: Economies that are highly trade open and do not register a high degree of volatility. According to our hypothesis this is likely to be the case for small countries that are relatively well governed.

3. **LO&HV**: Economies that are not highly trade open and register a high degree of volatility. According to our hypothesis this is likely to be the case for large countries that are relatively not well governed.

4. **LO&SV**: Economies that are not highly trade open and register a low degree of volatility. According to our hypothesis this is likely to be the case for large countries that are relatively well governed.

Obviously these are general tendencies, and may not be the case for specific countries.

5. **Implications for the ASEAN**
With regard to the ASEAN, the relation between volatility (SD of real GDP growth, 2005-14) and trade openness [(exports + imports)/GDP*2)] is shown in the diagram, with a positive slope but with a low correlation coefficient.

5. Implications for the ASEAN
Again here, the diagram would seem to suggest that in the ASEAN, GDP growth volatility could have been related to exposure to external factors represented by openness, but there may have been other factors at play, notably economic and political governance.

In the table below, the ASEAN countries are grouped under the four types mentioned above (in line with the arbitrary cut-off point shown in the diagram of the previous slide (High Volatility = SD over 2; High openness = a ratio of over 50% of GDP):

<table>
<thead>
<tr>
<th>Type</th>
<th>Openness</th>
<th>Volatility</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High</td>
<td>High</td>
<td>Singapore, Cambodia, Malaysia, Thailand, Brunei</td>
</tr>
<tr>
<td>2</td>
<td>High</td>
<td>Low</td>
<td>Vietnam</td>
</tr>
<tr>
<td>3</td>
<td>Low</td>
<td>High</td>
<td>Myanmar</td>
</tr>
<tr>
<td>4</td>
<td>Low</td>
<td>Low</td>
<td>Indonesia, Philippines, LaoPDR</td>
</tr>
</tbody>
</table>

5. Implications for the ASEAN
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