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Changing Impact of Fiscal Policy on Selected ASEAN Countries

Hsiao Chink Tang, Philip Liu, and Eddie C. Cheung

No. 70 | December 2010

Asian Development Bank

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[+]Economist, Office of Regional Economic Integration, Asian Development Bank, 6 ADB Avenue, Mandaluyong City, 1550 Metro Manila, Philippines. Tel.: 632-632-5637, Email: hctang@adb.org

[++]Economist, Western Hemisphere Department, International Monetary Fund, 700 19th Street, NW, Washington, DC, US. Tel.: +1202-509-7776, Email: pliu@imf.org

[+++]Assistant Lecturer in Economics, School of Arts and Social Sciences, the Open University of Hong Kong, 30 Good Shepherd Street, Ho Man Tin, Kowloon, Hong Kong, China. Email: clcheung@ouhk.edu.hk

Asian Development Bank

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Abstract

This paper investigates the effectiveness of fiscal policy in five Association of Southeast Asian Nations (ASEAN) of Indonesia, Malaysia, the Philippines, Singapore and Thailand. Through a structural vector autoregression (VAR) model, government spending is found to have weak and largely insignificant impact on output, while taxes are found to have outcomes contrary to conventional theory. Extensions using a time-varying VAR model reveal the impact of taxes on output mainly reflect heightened concerns over public finances amid the Asian financial crisis and the recent global financial crisis. On the other hand, for Singapore and Thailand, there is evidence that government spending can at times be useful as a tool for countercyclical policy.

Keywords: ASEAN, fiscal policy, structural VAR, time-varying VAR

JEL Classification: C11, E62, H20, H30

1. Introduction

The flurry of fiscal stimulus packages implemented in the last few years both in the developed countries and developing countries in response to the sharp economic slowdown seem to suggest that there is unequivocal support for fiscal policy in stabilizing economic fluctuations. The reality is quite the opposite. A debate hosted by *The Economist* amid the global recession in early 2009 on whether "Keynesian principles" should dominate policymaking of the day ended with a vote of 63% against the motion.[1] Meanwhile, the massive $814 billion US government stimulus has not produced the desired outcomes.[2] The pace of recovery from the country's sharpest recession since World War II has not only been weak, but is also losing momentum. More disturbingly, the unemployment rate has remained stubbornly high above 9% since early 2009. In Europe, where governments generally take a more active approach to macroeconomic management, the voice, including financial markets, to wind back stimulative measures and to change the spendthrift habits of the last decades has grown louder. Fiscal consolidations are now touted as key to pave the way for future economic growth (Trichet 2010, and Alesina and Ardagna 2009).

In developing Asia, on the other hand, there has largely been an absence of the debate on the efficacy of fiscal stimulus. The fact that the region has recovered much faster than the rest of the world seems to suggest that the stimulative policies implemented have worked well. Yet surprisingly there is very little empirical evidence to conclusively say whether this is the case now or before.[3] Japan is an oft-cited classic case where despite the many and sizeable fiscal stimulus packages implemented since the burst of the bubble in the 1990s, the economy is still mired in anemic growth.

This paper asks the question whether since the 1990s fiscal policy in the five main Association of Southeast Asian Nations (ASEAN) (Indonesia, Malaysia, the Philippines, Singapore and Thailand) has been effective as a macroeconomic stabilizing tool. As part of the exercise, the paper also measures the size of each economy's fiscal multiplier—how much a dollar spent by the government translates into a change in output. The methodology adopted is the structural vector autoregression (SVAR) model of Blanchard and Perotti (2002). This model has been widely employed in the study of countercyclical fiscal policy in developed countries, but not in developing countries, particularly developing Asian economies. The model comprises three variables—taxes, government consumption/spending and output—which allows for a distinct examination of tax and government spending measures of an economy. This is particularly advantageous since fiscal policy measures often come in the form of both tax and spending changes. A notable drawback, however, is the inability of the model to examine a specific episode of countercyclical policy. Put differently, it only portrays an average estimate over the selected sample period. As an extension, a time-varying VAR is employed to investigate possible changes to the effectiveness of fiscal policy over time. This is perhaps the first

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1 See http://www.economist.com/debate/overview/140.

2 The size of fiscal stimulus was obtained from United States Congressional Budget Office (2010).

3 See ADB (2010, Part 2) for some recent work.

paper that applies a time-varying VAR model to study fiscal policy in developing countries.

To preview the results, government spending is found to have no immediate and statistically significant impact on output in all the countries studied here. Yet for Singapore and Thailand, there is some evidence to show a stronger impact during the Asian financial crisis and the current global financial crisis. For Indonesia too, there has been an improvement in the effectiveness of government spending since the Asian financial crisis. On other hand, somewhat surprisingly, tax increases generate output growth in all the countries (a phenomenon commonly known as expansionary fiscal contraction in the literature), but this is only statistically significant in Thailand and Indonesia. In general, there seems to be greater evidence of the phenomenon during the Asian financial crisis and the global financial crisis, particularly in the Philippines and to a lesser extent Malaysia. For Indonesia, however, the puzzle seems to have waned in the 2000s, after the Asian financial crisis.

The rest of the paper is structured as follows. Section 2 reviews the theoretical and empirical literature on the study of the effectiveness of fiscal policy. Section 3 introduces the SVAR and time-varying VAR methodologies, while section 4 delves on data and estimation issues. Section 5 presents and discusses the results, and section 6 concludes.

2. Literature on the Impact of Fiscal Policy

2.1 Theory

The effectiveness of fiscal policy as a tool of macroeconomic management has been widely debated, as many empirical studies find different and sometimes conflicting results. The theoretical literature itself prescribes different fiscal multiplier size. The Keynesian school generally argues that the fiscal spending multiplier is greater than one, while the neoclassical school says it is less than one. On the other hand, under certain conditions, the multiplier can turn negative. Table 1 summarizes the main theoretical results.

In standard Keynesian theory, government spending allows demand-constrained firms to boost output, which raises economy wide income and employment. Households then spend part of the higher income. As a result of subsequent rounds of spending, the fiscal multiplier becomes greater than one.[4] If stimulus is in the form of tax cuts, the multiplier will be lower because unlike government spending which directly feeds into the economy and increases income, households still have to decide whether to spend or save part of their income, therefore creating less new economic activity.

[4] Graphically in the textbook IS-LM framework, fiscal expansion shifts the IS curve to the right, output would have been larger had interest rates not changed (increased). (This larger output at constant interest rates is as per the standard Keynesian spending multiplier, see notes to Table 1). Interest rates rise because higher income increases the demand for money (and shift the money demand curve to the right) given a constant money supply. As a result, the rise in the interest rates crowds out investment.

In contrast, in the neoclassical model (for example, Baxter and King 1993), higher government spending reduces the lifetime income of households as a result of higher future tax liability. Responding to this, households reduce consumption and work more, raising labor supply and output that partially offsets the reduction in consumption. Although, the fiscal spending multiplier is positive, it will be less than one because of the negative wealth effect on lifetime income reduces consumption.

The standard Keynesian multiplier of greater than one does not always hold, and may vary depending on, among other factors, the degree of monetary policy accommodation, the exchange rate regime, an economy's trade openness, and the extent of financial development. For example, based on the IS-LM framework, if government spending which shifts the IS curve to the right is accommodated by monetary policy that maintains the initial level of interest rates, then the LM curve will shift to the right to ensure the standard Keynesian multiplier of greater than one is achieved. Similarly, in an environment where the nominal interest rates hit the zero-lower-bound, fiscal stimulus will be particularly effective since crowding out of investment from higher interest rates is largely absent, and the economy at this stage is likely to be operating at ample excess capacity. These results are also consistent with the microfounded new Keynesian models described by Woodford (2010). In addition, the author shows that the multiplier can be less than one if government spending increases inflation, and the central bank raises interest rates to alleviate the pressure on demand.

On the other hand, the exchange rate regime pursued by a country matters as well. In a flexible exchange rate regime, higher interest rates caused by higher government spending will lead to an appreciation of the domestic currency, which reduces exports at the expense of higher imports. Hence the multiplier is likely to be lower than the case of a fixed exchange rate regime, where interest rates are prevented from rising. On the other hand, if an economy is highly open, the leakage of government spending via higher imports will be larger, and leads to an even smaller multiplier.

A prominent view that argues that fiscal spending has no impact on output has come to be popularly known as Ricardian equivalence (Barro 1974). According to this view, households who are forward-looking know that debt-financed government spending now essentially means higher future taxes that will be imposed to pay for the higher debt. Since households have to pay for the higher government spending through the bonds they hold, their total wealth is effectively reduced. And given that the government will eventually have to pay off its debt by raising taxes, households will respond by reducing consumption as savings for the future tax burden—the fall in consumption completely offsets the increase in government spending and hence the multiplier stays at zero. Conversely, in the event of a tax cut, households know the current debt-financed tax cut means higher future taxes, which forces them to save the current extra disposable income to pay for higher future tax liability. As there is no change in total wealth, consumption remains unchanged. And since the lower government saving is offset by higher private saving, aggregate demand remains unchanged, the multiplier remains at zero.[5]

[5] Most economists agree that the Ricardian equivalence is premised on a set of key assumptions which are unlikely to hold in the real world: taxes (lump-sum) that are nondistortionary; forward-looking

Financial innovation and globalization is another factor that affects the size of the fiscal multiplier, although its overall impact is ambiguous (IMF 2008). For governments, the ability to borrow abroad means less potential for domestic crowding out through higher domestic interest rates, which improves the multiplier. On the other hand, firms and households with greater access to domestic and foreign funding make them less credit constrained, thus mitigating some of the impact of discretionary policy changes.

There is another literature that posits the multiplier can in fact be negative—the non-Keynesian or expansionary fiscal contraction (or conversely, contractionary fiscal expansion) effect.[6] Theories that explain this phenomenon appear to have followed the empirical work by, among others, Giavazzi and Pagano (1990) and Alesina and others (1997, 1998 and 2009). And they relate to several core ideas such as credibility of fiscal policy, uncertainty, debt sustainability, and risk premium over government bonds. Blanchard (1990) formulates a simple theoretical argument from the demand side that shows the benefit from early fiscal consolidation could raise households' total wealth by reducing the uncertainty for more costly and painful adjustment later on. As total wealth increases, consumption and aggregate demand will also rise.[7] Alesina and Ardagna (2009) add a further channel based on agents' expectations on changes in interest rate or risk premium on bonds. A credible commitment to avoid a debt default or build-up in debt lowers agents' expectations of interest rate levels and the risk premium on government bonds. This translates to lower cost of borrowing and higher financial wealth, which will in turn spur investment and consumption.[8] Miller et al. (1990) provide a theoretical sketch of higher fiscal expansion that leads to a build-up in government debt, which increases the risk premium on government bonds for fear of rising default and higher inflation risk, which through higher interest rates reinforce the crowding out effects. Hemming et al. (2002) argue that if a fiscal expansion is linked to increased uncertainty, precautionary behavior by households and firms will dominate and contribute to the fiscal multiplier turning negative. In an uncertain environment, the confidence effects are likely to be even more important and how agents respond will very much depend on a government's policy and credibility.

2.2 Empirics

Empirical studies on the effectiveness of fiscal policy are generally done via three ways: a structural macroeconomic model; a narrative approach; or using VAR models. There is a wide variation of fiscal multiplier estimates—from less than zero to over four—

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households who understand the intertemporal government budget constraint; perfect credit markets where households are not credit constrained and both the government and households face the same interest rate; and current households who are around to pay for future tax increases or care about their children. Yet as Elmendorf and Mankiw (1998) states that the Ricardian equivalence is particularly important because it "describe[s] the world, at least as a first approximation" and that it reminds "the rest of the profession that the conventional view of government debt is far from scientific certitude" (p. 43). More important is that the idea offers a theoretical foundation for further analysis just like what the Modigliani-Miller theorem has done on the irrelevance of a firm's debt and equity financing.

6 Occasionally, the term "anti-Keynesian" is also used, for example, Miller et al. (1990).

7 Blanchard provides a caveat that the effect is most likely in the face of high debt levels.

8 There is a supply side argument via the labor market, for more details see ibid, pages 4–5.

depending on the type of identifying assumptions, the type of fiscal instrument, the country under study and time periods (Spilimbergo et al. 2008).

In studies using structural macroeconomic models, the short-term multiplier is often positive, the spending multiplier is larger than the tax multiplier, and both are larger when fiscal expansion is accommodated by monetary policy. However, in the long-term, the multiplier can be negative because of the crowding out effects. These results are to be largely expected in line with the many new Keynesian elements in the models. Hemming et al. (2002) summarize the results based on, among others, some well-known models such as the IMF Multimod model, the OECD Interlink model and the McKibbin-Sachs (MSG) model on the US, Germany and Japan.[9] They find that the short-term multiplier ranges from 0.6 to 1.4 for the spending multiplier, and 0.3 to 0.8 for the tax multiplier. More recently, using the IMF Global Integrated Monetary and Fiscal Model (GIMF), Freedman et al. (2009) find that when all regions undertake fiscal stimulus together—global policy coordination—the world spending multiplier is 1.7 and tax multiplier is 0.3.[10] If monetary policy accommodates fiscal expansion, the multipliers increase to 2.8 and 0.5 respectively. For all the regions, if each undertakes its own fiscal expansion even with monetary policy accommodation, the multipliers decline. For example, for emerging Asia, the spending multiplier declines to 1.1 from 2.9. That said, in the long-run, if there is a permanent increase in the ratio of debt-to-GDP in the world as a result of the fiscal expansion, there will be a permanent 1.3% contraction in GDP. Even in the short-run, if there is a perception of a permanent increase in fiscal deficit coupled with an increased in the US risk premium—due to the lack of policy credibility and fear of fiscal sustainability—the multiplier in the US will be barely positive. In their review of other studies, Hemming et al. (2002) also highlight the same point but from the opposite case of highly credible fiscal consolidations, which can lead to negative multipliers.

Findings from the VAR based approach are generally positive but less than one for the spending multiplier and an even lower value for the tax multiplier. For developing countries, the multipliers are even lower. Blanchard and Perotti's (2002) SVAR for the US shows an impact spending multiplier of 0.9 and a tax multiplier of 0.7. Mountford and Uhlig's (2009) sign-restriction VAR produces lower values of 0.6 and 0.3 respectively. Perotti (2004) analyzes five OECD countries dividing them into two periods, and find that only in the US is the spending multiplier larger than one in the pre-1980 period. That said, in all the countries, the multiplier has declined over time. Ilzetzki, Mendoza and Vegh (2009) look at 45 countries (20 advanced and 25 developing) and find the impact spending multipliers from different experiments to be consistent with theories: advanced countries (0.24) versus (0.04) developing countries; fixed exchange rate regime (0.2) versus (-0.04) flexible exchange rate regime; and closed economies (0.26) versus (-0.05) open economies. In addition, the more indebted developing countries (debt-to-

[9] See also Coenen et al. (2010) who examine a variety of more recent national and global macro models on the US and the euro area/European Union and draw similar conclusions.

[10] Only the first year multiplier is presented here. GIMF comprises five countries/regions: the US, the Euro area, Japan, Emerging Asia and the Rest of the World. The authors simulate the model with two years of fiscal stimulus based on four different fiscal instruments: lump sum transfers; labor income tax; government investment; and targeted transfers. With monetary accommodation, the targeted transfers multiplier is 1.1, and the lump sum transfers, 0.5.

GDP ratio above 50 percent) have a spending multiplier that turns negative after only four quarters.

To sidestep the difficulty in identifying fiscal shocks from a VAR approach, some researchers have relied on historical record of legislations and public statements to identify events that are exogenous from output fluctuations. Romer and Romer (2010) identify the exogenous tax events in the US as those aimed at "addressing an inherited budget deficit and promoting long-term growth" (page 799). They find that tax increases are highly contractionary giving a multiplier of three. Meanwhile, Ramey (2009, and Ramey and Shapiro 1998) examines military build-ups as an indicator of government spending based on information from *Business Week* and other newspaper sources. She finds that the multiplier is around one including World War II or around 0.6 to 0.8 when World War II is excluded.[11] This number however is not markedly different from the VAR estimates.[12] Despite being resource intensive, a particular drawback is that the specificity of these studies means the results cannot be easily applied to a general case of discretionary fiscal spending.

In terms of the studies that examine Asia, they are only a few. Eskesen (2009) and Jha et al. (2010) are closest to our study from a methodological perspective.[13] Eskesen only examines Singapore using the Blanchard and Perotti SVAR, while Jha et al. use the Mountford and Uhlig sign restrictions VAR on a larger sample of 10 developing Asian countries including those in our sample. They find a largely weak and insignificant impact of government spending on output.[14] Jha et al. also find an expansionary fiscal contraction (in terms of a positive tax shock) on output in the People's Republic of China; Singapore; Taipei,China; and Thailand. In Eskesen's paper, although the response of output to a tax shock presented shows a rise, the author makes no reference to whether this relates to an expansionary fiscal contraction or that a negative tax shock has been invoked.

In the rest of this section, we look more closely at the empirical evidence that supports the expansionary fiscal contraction phenomenon or the non-Keynesian effect and factors that may explain it.[15] Giavazzi and Pagano (1990) is one of the foremost papers

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[11] See also Barro and Redlick (2009).

[12] Ramey also has another issue with the VAR identification approach. She shows the failure of the VAR approach to take account the announcement effects of fiscal policy is the reason for the observed rise in consumption from a spending shock commonly found in a VAR model as opposed to a fall in consumption in the narrative approach. That is, the VAR approach only captures the actual policy changes when implemented, and not agents' behavioral change associated with the policy announcement itself.

[13] We also found two other studies which use a different methodology. Chang et al. (2002) use a cointegration approach and find that for the three countries they study (Thailand, Republic of Korea and Taipei,China), fiscal policy has no impact on output growth. Ducanes et al. (2006) apply a structural model on four countries (Bangladesh, People's Republic of China, Indonesia and the Philippines). They find that government spending is more useful than tax cuts, and it is more effective in the Philippines than in Indonesia, but even so, all multipliers are less than one.

[14] Eskesen's results did not include the confidence interval band.

[15] To be specific, these studies mostly deal with episodes of large fiscal imbalances. Hence, the non-Keynesian effects should not be generalized to apply at all times.

supporting the non-Keynesian result based on the fiscal consolidation experiences in Denmark and Ireland in the 1980s. An earlier work is by Fels and Froenlich (1987) on Germany's experience in early 1980s. The authors cite "psychological crowding out" of the private sector as a key reason for the outcome. Alesina and Ardagna (2009) is an update of their earlier work on episodes of fiscal stimuli and fiscal adjustments in the OECD countries from 1970 to 2007. The authors find that fiscal adjustments on the spending side can be expansionary on the economy (tax hike is still contractionary).[16] In a study that looks at low-income economies in the 1990s, Gupta et al. (2002) find cutting current (rather than development) expenditures are most conducive to growth, especially if the initial fiscal positions are already weak. In IMF (2008), the authors single out downturns, and find that the impact of discretionary fiscal stimulus, regardless in advanced or emerging economies tend to be negative (contractionary). Furthermore, the impact is worse in highly indebted countries.[17]

Interest rates are the main conduit of crowding out and they have been found to be affected by levels of budget deficit, debt, financial openness, risk premium and credibility. In Aisen and Hauner (2008), the authors find that higher budget deficits lead to higher interest rates based on a panel of 60 advanced and emerging economies from 1970 to 2006. The relationship is more robust and larger in the emerging economies than the advanced economies. Overall, the relationship tends to be significantly positive if the budget deficits are high; when they are domestically financed; when they interact with high domestic debt; interest rates are liberalized; and when financial openness and financial depth are low. Separately, Baldacci et al. (2008) examine a panel of 30 emerging market economies from 1997 to 2007 using the sovereign bond spreads as a measure of risk premium. They find that bond spreads increase with higher levels of political risk, but decrease with fiscal consolidation efforts especially in countries with prior defaults.

Credibility also has important influence on fiscal policy effectiveness. Kandil and Morsy (2010) use international reserves as a measure of credibility. They look at 34 emerging economies with data as early as 1960s and obtain a number of interesting results. First, fiscal policy appears to be procyclical, meaning a positive output gap leads to greater discretionary fiscal stimulus. Yet the presence of high reserves can mitigate this effect—discretionary fiscal policy can be countercyclical. They then examine the impact of fiscal policy on output under different scenarios. For high-reserves economies, there seems to be some stimulatory impact of fiscal policy in the short-run, but not in the long-run. For high-inflation economies, there is a contractionary impact in the short-run, and not in the long-run.[18] For high-debt countries, the contractionary impact prevails both in the short- and long-run. The exchange rate system and trade openness do not seem to have an impact in either the short- or long-run.

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[16] IMF (2010, Chapter 3) took particular issue with the way the authors identify the periods of fiscal adjustments, which according to the IMF have contributed to the misleading results.

[17] See IMF (2008, Table 5.4).

[18] In an environment of high inflation, fiscal spending increases inflation expectations and borrowing costs, affecting policy credibility and hence fiscal policy effectiveness.

3. Methodology

3.1 Blanchard and Perotti SVAR

A distinguishing feature of the Blanchard and Perotti SVAR framework is that it relies on institutional information on the tax and transfer system and the timing of tax collections to separate the automatic response of taxes and spending to economic activity, and in doing so, isolate the effects of discretionary fiscal shocks. There are two particular strengths to this approach. First, discretionary fiscal policy is generally exogenous to output. Unlike monetary policy, fiscal variables are affected by many factors of which output stabilization is seldom the main driver. Second, at high enough frequency and because of the long lags of fiscal policy implementation, there will be very little or no discretionary response of fiscal policy to unexpected contemporaneous economic activity within the quarter.

The identification restrictions of the Blanchard and Perotti SVAR can be expressed as a class of AB SVAR model in Amisano and Giannini (1997) in matrix form:

$$A\varepsilon_t = BU_t,$$

$$\begin{pmatrix} 1 & 0 & a_{13} \\ 0 & 1 & a_{23} \\ a_{31} & a_{32} & 1 \end{pmatrix} \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{pmatrix} = \begin{pmatrix} b_{11} & b_{12} & 0 \\ b_{21} & b_{22} & 0 \\ 0 & 0 & b_{33} \end{pmatrix} \begin{pmatrix} u_{1t} \\ u_{2t} \\ u_{3t} \end{pmatrix}.$$

A is a n×n matrix of contemporaneous relations among the variables; ε_t is the vector of the normally independently distributed reduced form residuals with variance-covariance. $\mathrm{E}(\varepsilon_t \varepsilon_t') = \sum$; B is a n×n matrix that allows some shocks to affect more than one endogenous variable in the model; and U_t is the vector of structural shocks of policy and non-policy variables, where $U_t \sim N(0, \mathrm{I}_n)$ and $\mathrm{E}(U_t U_s) = 0$ for $t \neq s$.

Expanding the above matrix and denoting the three variables as taxes (tx), government spending (s), and real GDP (y) gives:

$$\varepsilon_t^{tx} = a_{13}\varepsilon_t^{y} + b_{11}u_t^{tx} + b_{12}u_t^{s}, \quad (1)$$

$$\varepsilon_t^{s} = a_{23}\varepsilon_t^{y} + b_{21}u_t^{tx} + b_{22}u_t^{s}, \quad (2)$$

$$\varepsilon_t^{y} = a_{31}\varepsilon_t^{tx} + a_{32}\varepsilon_t^{s} + b_{33}u_t^{y}. \quad (3)$$

Equation (1) says that unexpected movements in taxes in the current quarter (ε_t^{tx}) are related to unexpected movements in economic activity (ε_t^{y}), structural shocks to taxes (u_t^{tx}), and structural shocks to government spending (u_t^{s}). The same applies to Equation (2), for unexpected movements in government spending. Equation (3) relates

unexpected movements in economic activity (ε_t^y) to unexpected movements in both taxes and government spending, as well as its own structural shocks (u_t^y) .

From matrices A and B, there are nine parameters that need to be estimated based on six knowns (given $\sum$ has n(n+1)/2 unique elements), which means further three restrictions have to be imposed. First, Blanchard and Perotti estimate a_{13} ,the elasticity of taxes to GDP separately. They follow the calculations of Giorno et al. (1995), which depend on the summation of the elasticity of each tax category weighted by the tax base. Here, due to the lack of information on different tax categories, a_{13} is estimated from a simple regression of taxes on GDP. Second, they assume a_{23}, the elasticity of government spending to GDP, is zero. This essentially assumes there is no automatic feedback from economic activity to government purchases of goods and services within the quarter. It is important to recognize that both a_{13} and a_{23} can potentially be affected by the discretionary fiscal policy changes with respect to economic shocks. Yet realistically due to the lag in policy implementation, it is unlikely either a_{13} or a_{23} can capture the discretionary fiscal policy effects especially with the use of quarterly data.[19] Third, they decide to let b_{12} be zero, implying that tax decisions are made before spending decisions. This means a tax shock affects spending contemporaneously and not the reverse. Since there is no straightforward way to determine this, they also try the reverse, that is, by letting b_{21} be zero so that b_{12} can be estimated. Their results as in our case are robust to this change.[20] Hence, for simplicity, we continue to let b_{12} be zero.

We also present the case of Cholesky VAR in our results as comparison to the Blanchard and Perotti SVAR. In the Cholesky VAR, the endogenous variables are positioned in the same order as in the Blanchard and Perotti SVAR—tx, s and y—A becomes a lower triangular matrix with the value of one at the diagonal elements and, B, a diagonal matrix. Hence, $A0 = A^{-1}B$ become the famous lower triangular matrix of Cholesky decomposition, with the diagonal elements being the standard deviation of each structural shock.

3.2 Time-Varying VAR Model

To investigate the time-varying effects of fiscal policy over the sample, the VAR model outlined above is extended in two important dimensions. First, we allow for time variation in the autoregressive coefficients of the VAR model. Second, we allow for stochastic volatility of the reduced-form error terms. The reduced-form time-varying VAR can be summarized as:

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[19] Theorectically, a13 and a23 can capture both the automatic effects of economic activity on taxes and government spending as well as the discretionary fiscal response to unexpected economic events. Nevertheless, the use of quarterly data effectively implies only the automatic effects of economic activity are accounted for. And since a23 is assumed to be zero in the model, a13 essentially captures only the automatic effects of economic activity on taxes.

[20] These results are not presented for brevity but can be obtained from the authors.

$$Y_t = B_{1,t}Y_{t-1} + ... + B_{p,t}Y_{t-p} + \varepsilon_t \equiv X_t'\theta_t + \varepsilon_t \quad . \tag{4}$$

Following Cogley and Sargent (2005) and Primiceri (2005), the VAR's time-varying parameters, collected in the vector θ_t, are postulated to evolve as a random walk such that:

$$\theta_t = \theta_{t-1} + \eta_t \ , \tag{5}$$

with $\eta_t \sim N(0, Q)$. The VAR's reduced-form innovations in (5) are postulated to be zero-mean and normally distributed, with time-varying covariance matrix Ω_t which can be factored as

$$Var(\varepsilon_t) \equiv \Omega_t = A_t^{-1} H_t (A_t^{-1})' . \tag{6}$$

The time-varying matrices H_t and A_t are defined as:

$$H_t = \begin{bmatrix} h_{1,t} & 0 & 0 \\ 0 & h_{2,t} & 0 \\ 0 & 0 & h_{3,t} \end{bmatrix} \text{ and } A_t = \begin{bmatrix} 1 & 0 & 0 \\ \alpha_{21,t} & 1 & 0 \\ \alpha_{31,t} & \alpha_{32,t} & 1 \end{bmatrix} ,$$

with $h_{i,t}$ evolving as geometric random walks,

$$\ln h_{i,t} = \ln h_{i,t-1} + v_{i,t} \quad . \tag{7}$$

Following Primiceri (2005), we postulate the non-zero and non-one elements of the matrix A_t (collected in the vector $\alpha_t \equiv \left[\alpha_{21,t}, \alpha_{31,t}, \alpha_{32,t}\right]'$) to evolve as driftless random walks,

$$\alpha_t = \alpha_{t-1} + \tau_t \ . \tag{8}$$

Finally, we assume the vector of error terms $[u_t', \ \eta_t', \ \tau_t', \ v_t']'$ of the system to be distributed as

$$\begin{bmatrix} u_t \\ \eta_t \\ \tau_t \\ v_t \end{bmatrix} \sim N(0, V) \Bigg] , \text{ with } V = \begin{bmatrix} I_3 & 0 & 0 & 0 \\ 0 & Q & 0 & 0 \\ 0 & 0 & S & 0 \\ 0 & 0 & 0 & Z \end{bmatrix} \text{ and } Z = \begin{bmatrix} \sigma_1^2 & 0 & 0 \\ 0 & \sigma_2^2 & 0 \\ 0 & 0 & \sigma_3^2 \end{bmatrix} , \tag{9}$$

where u_t is the structural error terms of the VAR such that $\varepsilon_t = A_t^{-1} H_t^{1/2} u_t$. The block-diagonal structure of V assumes that the idiosyncratic error terms of the system are uncorrelated with each other. Lastly, we also adopt the additional simplifying assumption of postulating a block-diagonal structure for S, namely,

$$S \equiv Var(\tau_t) = \begin{bmatrix} S_1 & 0_{1\times 2} \\ 0_{2\times 1} & S_2 \end{bmatrix}, \tag{10}$$

with $S_1 \equiv Var(\tau_{21,t})$, and $S_2 \equiv Var([\tau_{21,t}, \tau_{32,t}]')$. This implies that the non-zero and non-one elements of A_t belonging to different rows (equations of the VAR) evolve independently. As discussed in Primiceri (2005), this assumption drastically simplifies inference and allows the estimation procedure to apply Gibbs sampling on the non-zero and non-one elements of A_t equation by equation.

We estimate Equations (4)–(10) using Bayesian methods. The basic steps of the algorithm are as follows.[21] First, given the initial values for A_t and H_t, simulate the VAR parameters and hyperparameters. Next, conditional on the VAR parameters, draw the stochastic volatilities $(h_{i,t})$. Finally, conditional on all other parameters, draw the elements of A_t equation by equation. The algorithm uses 250,000 Gibbs sampling replications and discards the first 200,000 as burn-in. We retain 1,000 draws after the burn-in sample (by skipping every 50th draw) for the computation of the impulse response functions. The posterior moments vary little over the retained draws providing evidence of convergence.

4. Data and Estimations

Quarterly data from mostly 1990:1 to 2009:4 for the five main ASEAN countries (Indonesia, Malaysia, Philippines, Singapore and Thailand) are collected from various sources such as the CEIC databases, the World Bank's *World Development Indicators* and websites of national statistical offices/central banks (for detailed data sources and descriptions, please see Appendix I). Blanchard and Perotti (2002) define net taxes as total tax revenue minus grants and interest payments. Nonetheless, due to data limitations and the fact we try to use the longest available series, none of our tax variable meets this definition. Therefore, for Indonesia, the tax variable refers to total government revenue; Malaysia and the Philippines, total tax revenue minus interest payments; and Singapore and Thailand, total tax revenue. For GDP and government spending, the data are obtained from the respective national accounts. Due to the unavailability of the breakdown on government investment, government consumption is taken to mean government spending.[22]

Following Blanchard and Perotti, all data are expressed in natural logarithm, real and per capita terms. We seasonally adjust all the data in their natural log form using the standard X11 methodology. Then we express them in per capita terms. The annual population data from *World Development Indicators* are converted to quarterly data

[21] See Kim and Nelson (1999) for more details.

[22] Quarterly investment data from national accounts are only available for Thailand. In the spirit of Blanchard and Perotti, we did not use current and development expenditure data from fiscal accounts. Jha et al. (2010) use the latter and produce largely similar results to ours especially in the context of government spending shock on output. (Both our tax data were from the fiscal accounts).

using a simple linear interpolation. Since the population data end in 2008, the 2009 projection is based on the average growth rate from 2003 to 2008. GDP deflator obtained from taking the ratio of nominal and real GDP are subsequently used to deflate the data. Lastly, the data are linearly detrended—hence, variations in the transformed data are in essence movements around a long-run equilibrium.

In both the Cholesky and SVAR estimations, the same lag length is used based on the most commonly recommended lag order by the standard information criteria of sequential modified likelihood ratio, Final Prediction Error, Akaike, Schwarz and Hannan-Quinn. For Indonesia, the lag order is one; Malaysia, Philippines and Thailand, two; and Singapore, three. Both the Cholesky and SVAR are also estimated with a constant.

The estimated elasticity of taxes to GDP, based on a simple regression between the two variables, for Indonesia is 0.63; Malaysia, 1.61; Philippines, 1.04; Singapore, 1.10; and Thailand, 1.90. As robustness checks, we also compare the results when the elasticity is 0.5, a number Eskesen (2009) uses for Singapore.

5. Results

5.1 Basic Model

Figures 1 to 5 show each country's impulse response function of GDP to the three shocks of taxes ("Shock 1" in the plot), government spending ("Shock 2") and GDP ("Shock 3") respectively. Each shock is normalized to have a contemporaneous impact of one-percentage point increase. As comparison, results from three VAR specifications are presented: the Cholesky VAR; the Blanchard and Perotti SVAR with an estimated elasticity of taxes to GDP; and the Blanchard and Perotti SVAR with a chosen elasticity of net taxes to GDP (a_{13}) of 0.5.

In general, the overall results are not sensitive to any particular specification type. And whether the elasticity of net taxes to GDP is estimated or assumed to be 0.5 does not seem to matter a great deal. That said, three key results can be gleaned. First, the impulse response of GDP to a positive tax shock produces a rise in GDP in all economies. The effect seems particularly strong for Indonesia and Thailand, as they are both significant for ten quarters and peak at between two to four quarters across different model specifications. Second, in all countries, by and large, the impulse responses of GDP to a government spending shock are close to zero and statistically insignificant. Statistical insignificance aside, there are notable variations in the dynamics of the impulse response which will be discussed below. Third, from Tables 2 and 3, the impact fiscal multiplier of either the tax shock or the government spending shock is generally very small and less than one. The result is significant only in case of the tax shock, and only in Indonesia, Thailand and Malaysia (when the elasticity of net taxes is calculated). The only multiplier greater than one, be it tax or spending, is that of Thailand with respect to the tax shock and when a_{13} is estimated.

It is unclear why we only find a consistent expansionary impact on output with the positive tax shock, but not with spending cut. One reason could be that fiscal

adjustments have been more commonly carried out through tax changes. Makin (2005) argues that there is less scope for most of these countries to curtail growth-enhancing or productivity driven expenditures such as transport infrastructure, power, telecommunications and education. Being developing countries, these expenditures are essential to future economic development. In contrast, the revenue shares of these countries are much lower than international standards. Hence, there is ample room to broaden revenue bases through new tax policies and administrative reforms.

For small and open economies, the leakage of fiscal spending through higher imports is a key channel that negates the stimulative effects. This factor is likely to be most relevant for Singapore, Malaysia and Thailand, each being a small and highly open economy with a share of total trade to GDP of 283% (in 2009), 146% and 108% respectively. Philippines's ratio is slightly lower at 51%, and Indonesia's, 39%. This is in line with the findings by Ilzetzki et al. (2009). In their study, an open economy is defined as having a share of total trade to GDP of over 60%. For this group, they find both the impact and the long-run responses of output to a government spending shock are not statistically different from zero.

The choice of exchange rate regime may have also weakened the multiplier effects. Apart from Malaysia which fixed its exchange rate for a brief period of time, most other countries have adopted a more flexible exchange rate regime particularly since the Asian financial crisis.[23] Finding by Ilzetzki et al. lends support, where the output response to a government spending shock of economies adopting a flexible exchange rate regime are found to be weakly negative and statistically insignificant.

Generally, there might have been some degree of monetary policy accommodation, yet interest rates were never allowed to fall too much due to other concerns and they were never close to the zero bound. This lack of monetary policy accommodation could have mitigated or even reversed the expansionary fiscal impact. While it is true that policy interest rates in the ASEAN5 were reduced in the face of the current global financial crisis, they were however not as large as the reductions in the US, which have hit zero bound since late 2008. Meanwhile, during the Asian financial crisis, interest rates were kept relatively high even up to the end of 1998 to allay fears of further capital outflows and to reinforce confidence in domestic asset holdings. This happened in spite of an already contracting output seen as early as the second quarter of 1997 in Thailand and, in the first half of 1998 in the other countries. Interest rates did fall but they happened too late. And the recovery from the crisis for these countries was largely driven by the quick turnaround in external demand, where domestic interest rates had little or no influence.

There is some evidence that the underlying financial conditions in some of the countries may have facilitated the crowding out effects through greater upward pressures on interest rates.[24] In particular, Indonesia and the Philippines can be considered as low financial depth countries, less so Malaysia, Thailand and Singapore (Figure 8). In low financial depth countries, funding competition between the private sector and the

[23] See for example ADB (2007, Box 2).

[24] Recall, Aisen and Hauner (2008) find financial depth, repression and openness all have important influence on interest rates (see Section 2.2).

government in a smaller pool of funds puts greater upward pressures on interest rates, which intensifies the crowding out effects. In fact, the effects seem to have worsened after the Asian financial crisis, whereby the financial depths in most countries have yet to recover to their pre-crisis levels. Separately, the extent of financial repression also matters. If financial repression is high as when interest rates are controlled, chances of interest rates rising when government borrowing increases will be lower. Financial repression as proxied by interest rate liberalizations indicate that interest rates in the ASEAN5 have largely been liberalized, suggesting greater potential for crowding out (Figure 9). On the other hand, greater financial openness works against the crowding out effects. In terms of capital account liberalization, a measure of financial openness, capital account in most of the countries has been largely liberalized, thus mitigating some of the crowding out effects (see Figure 10).

Persistent and large budget deficit to GDP balances will increase the debt levels and bring the issue of debt sustainability to the forefront especially during times of crisis. Apart from Singapore, the budget balance-to-GDP ratios of the other countries have remained in deficit since the Asian financial crisis (see Figure 11). While they may not be very large, they have persisted and have worsened during the global financial crisis. This is true even before the 1990s, again with the exception of Singapore and, to a lesser extent, Thailand. That said, Indonesia and Thailand, in contrast to Malaysia and the Philippines, had made greater gains in reducing the deficits in recent years, despite being the worst hit countries during the Asian financial crisis.

Considering even for the developed countries where fiscal situations can deteriorate markedly very quickly, the overall evidence does not provide overwhelming support that the countries have put paid to the issue of debt sustainability. There is no one acceptable yardstick that differentiates whether a country is or is not likely to face a sovereign debt problem. The 60% total debt to GDP rule used for countries in the euro system would suggest that most of the ASEAN5 are generally safe (see Figure 12). Yet this rule is too lenient for developing countries, which tend to have poorer tax administration and expenditure management, poorer governance, more volatile revenue bases, and longer lags affecting fiscal policy (Hemming et al. 2002). As noted by IMF (2003), this rule would have failed to capture the majority (55%) of the defaults in emerging economies. Even among the developed (euro) countries currently facing sovereign debt concerns, their debt-to-GDP levels prior to the global financial crisis were not particularly alarming—around 60% or below—Portugal (63% in 2007), Ireland (25%), Spain (36%), except Greece (96%). A more conservative/reasonable yardstick is adopted by IMF (2008), whereby above 25% is considered high debt emerging economies. Based on this threshold, clearly all the ASEAN5 countries are in a less comfortable zone.

Fiscal credibility matters as much as the stock of debt at any point in time. Past record of fiscal conservatism and probity burnish credibility and instill more confidence among agents that allow debt levels to drift higher without causing too much concern. In a debt sustainability study on the ASEAN4 countries minus Singapore by Makin (2005), the Philippines and Indonesia, in particular, are found to require the accumulation of larger primary balances in order to lower public debt to more prudent levels to avoid a potential crisis. Makin uses data up to 2003, which since then has seen improved fiscal position in

Indonesia, but a weakened position in Malaysia. Still, as late as 1999, Indonesia defaulted on and restructured its debt, and the same happened to the Philippines much earlier in 1983 (Sturzenegger and Zettelmeyer 2006).[25] Philippines's public debt to GDP ratio is among the highest, and it has hovered around the 60–80% range since 1985, although it has improved somewhat in recent years (see Figure 12). Indonesia's position worsened amid the Asian financial crisis due to efforts by the government to tackle the problems emanating from the private sector and the failed banks. Thailand's only aberration was during the Asian financial crisis in an otherwise relatively low public debt environment. Malaysia took more than a decade to reduce its public debt ratio of over 100% since the twin-deficit crisis in the mid-1980s to less than 40%. Nevertheless, despite the good economic years before the global financial crisis, its ratio has stayed above 40%. Singapore's rising debt ratio throughout the 1990s, now reaching over 100%, looks "worrying". In times of uncertainty, where early exit is at a premium and headline numbers grab attention, Singapore can be susceptible to the same contagion as other high debt countries.[26]

5.2 Time-Varying VAR

Figures 6.1 and 7.1 plot the time-varying response of GDP to a positive one-unit tax and government spending shock across the five countries respectively. Figures 6.2 and 7.2 present the cumulative GDP response at the one- and two-year horizons to show the cumulative impact more clearly. The overall results are summarized in Table 4.

In Indonesia, the largely positive impact on output of a tax shock in the 1990s may have to do with the accommodative monetary policy stance taken by the central bank. As Nasution (2003) points out that "the central bank can assist fiscal sustainability by maintaining relatively low interest rates to encourage economic recovery and lighten the government's interest burden without sacrificing monetary objectives" (page 155). Our Cholesky VAR result incorporating an additional policy rate variable supports this as a positive tax shock coincides with a decline in the policy rate.[27] Since 2000, however, the expansionary impact on output from a tax shock has gotten smaller and turned to be somewhat contractionary. This may likely reflect the improved public administration and reforms undertaken following the Asian financial crisis (ibid). On the other hand, the smaller contraction (improvement) in output response to a spending shock since 2000

[25] See Reinhart (2010, Table 1.1, page 9) provided an even longer history of defaults particularly external defaults. In Indonesia's case, three in total: 1966 to 1970; 1998 to 2000; and 2002; and the Philippines's, one: 1983 to 1992. Malaysia and Singapore have never defaulted, although Thailand came close in 1997/98.

[26] Net instead of gross public debt to GDP (as reported here) would be a better gauge of a government's financial strength. Nonetheless, this number is not as commonly available. We found the availability of net debt for the OECD countries from the statistical annex tables in the OECD Economic Outlook. Singapore's gross public debt is indeed very high. But its large bond issuance is to meet the investment needs of compulsory savings through the Central Provident Fund and to serve as benchmark for the development of the domestic bond market.

[27] Nasution also makes the point Indonesia's fiscal policy has been directed to maintain a balanced budget. If this means when output growth rises too much, hence government spending is reduced and taxes are increased accordingly, then there is some evidence from the Cholesky VAR to support this.

may also reflect the improved macroeconomic management and economic fundamentals of the country since the period.

In Malaysia, the expansionary response of output to a tax shock is most evident during the two major crisis periods. In normal times, however, the standard evidence of a contractionary impact on output largely prevails. Taken together, it is quite clear that the overall result from the Blanchard and Perotti SVAR is dominated by the crisis effects. And more important, during crisis when there is greater uncertainty and heightened risk premium, the tax cuts may have been interpreted as weakening the fiscal resolve of the government with which agents' response with excessive belt tightening (see Hemming et al. 2002). On spending shock, the output response is largely muted plausibly due to leakage through the high trade openness as mentioned above. Interestingly, the implementation of capital controls in 1998 to insulate the economy from external disturbances did not seem to have any notable impact on the government's intended efforts to jump-start the economy during the Asian financial crisis. On the contrary, there is evidence to suggest the opposite since then.

Similarly in the Philippines, the expansionary of output to a tax shock is also most prevalent during the two crisis periods. Yet in the Philippines's case, the effect is more pronounced—lasting more than a few years around the crisis periods. This seems to reflect agents' greater weariness of the perennial Philippine fiscal weakness and high level of public debt vis-à-vis to say Malaysia's. In addition, there is evidence from the standard VAR suggesting that taxes are procyclical to output growth as the impact of a positive output shock leads to rising taxes. IMF (2009) also reinforces this, where it is shown that negative fiscal stance (deficit) often corresponds with a positive output gap. This means with the exception of a few years after the Asian financial crisis, where the output gaps turned negative, had higher taxes were implemented during the good times, output would have been boosted further as households and firms see these as real commitments to better manage the country's fiscal balance and the high-debt level. In terms of the spending shock, the largely negative output response after 2000 (compared with the earlier decade) coincides with the period of higher public debt, especially after the Asian financial crisis and larger budget deficit. From 1994 to 1997, the country actually enjoyed a rare period of fiscal surplus, while the deficit in the early 1990s was smaller around 1–3% of GDP (see Figure 11). Interestingly, the improvement in the output response in recent years (Figure 7.2) has also coincided with the improvements in the public debt level and the budget deficit.

In Singapore, the expansionary response of output to a tax shock is most evident during the recent global financial crisis, which also happens to be the sharpest recession in its history. Given this extreme uncertain environment already affected by an export collapse, there was undoubtedly a heightened fear and anxiety which forced households to save more, firms to lay off workers and to reduce spending and investment. Tax cuts implemented could reinforce this negative sentiment and pull output down. On spending shock, there is some evidence to show that when the government did spend, especially during the two crisis periods, it had some marginal impact on output. Nonetheless, due to the country's very high openness, the likelihood of leakage was generally very high.

In Thailand, too, the expansionary response of output to a tax shock is most evident during the recent global financial crisis. However, in Thailand's case, it was the second most severe recession in history after the Asian financial crisis. Coupled with the long-drawn political crisis, the same loss of confidence and heightened fear as in Singapore would also be prevalent which possibly explains the evidence of a larger output expansion during this period. There is some evidence that government spending during the Asian financial crisis is more effective especially at the one-year horizon. This being the deepest recession in its history clearly suggests that there was ample capacity in the economy and widespread job losses, which provided a bigger stimulus bang for fiscal policy.

6. Conclusion

In this paper, we have attempted to answer the question of whether fiscal policy is an effective macroeconomic tool in influencing output in the main five ASEAN countries. It is the counterpart to the role of monetary policy in influencing output and/or inflation. Surprisingly, there has been very little empirical work done on these countries. And judging from the active use of discretionary fiscal stimulus especially during the recent global financial crisis, it would seem that policymakers have unequivocal confidence in its efficacy. What we find, however, is quite different. Our Blanchard and Perotti SVAR model shows for government spending, the overall impact on output is largely benign—the impact fiscal multiplier is very much less than one and statistically insignificant. This is true in all ASEAN5. And in the case of tax measures, a consistent pattern of output expansion with fiscal contraction is observed, although the result is only statistically significant in Indonesia and Thailand.

The literature offers several explanations. Being small and highly open economies, Singapore, Malaysia, Thailand, and to a lesser extent the Philippines and Indonesia, are very susceptible to fiscal stimulus that leaks out through higher imports. Coupled with the adoption of a more flexible exchange rate regime especially after the Asian financial crisis, the leakage would have been greater. In addition, the combination of low financial depth and largely liberalized interest rate environment particularly in the Philippines and Indonesia facilitate the crowding out effects through greater upward pressures on interest rates. And when monetary policy accommodation is not forthcoming, the crowding out effects would be even larger.

More important, fiscal credibility characterized by a good track record of budget balances and low public debt level is key to policy effectiveness. The lack of fiscal credibility is a major factor that contributes to the expansionary fiscal contraction phenomenon observed in many other studies. Among the ASEAN5, many have run persistent budget deficits with the exception of Singapore. Their public debt levels may be considered as comfortable for developed countries, but not for developing countries epitomized by weak fiscal management and institutions, and a small tax base. The Philippines's fiscal weaknesses are well known and including Indonesia are two countries that have faced sovereign debt problems and restructured their debt. Thailand came close during the Asian financial crisis and Malaysia has shown signs of weaknesses. Singapore's headline debt level of over 100% of GDP is startling but misleading.

While the Blanchard and Perotti SVAR only summarizes the dominant influence over time, we suspect there may be times when either the government spending or tax change is more or less effective. To do this, we employ a time-varying VAR model. We find that the expansionary impact of output to a positive tax shock in most countries is most prominent during crisis periods. In the Philippines, for example, this is most obvious, in both the Asian financial crisis and the global financial crisis lasting quite a few years. Similar, evidence is found in Malaysia, but not as long lasting, and in Thailand and Singapore, mostly during the global financial crisis. In Indonesia, this phenomenon is most prevalent before the Asian financial crisis, but has improved in line with the fiscal reforms undertaken since then.

On the other hand, in terms of the impact on output of a government spending shock, Indonesia's fiscal policy effectiveness appears to have improved since the Asian financial crisis in line with improved macroeconomic management. The Philippines meanwhile follow the opposite path of deteriorating government spending impact on output. Given its weak fiscal credibility and further rise in public debt level and persistent budget deficit since the Asian financial crisis, these actions do not bode well with market confidence. In Malaysia, too, while the impact on output of a government spending shock is small but largely positive before the Asian financial crisis, it has turned somewhat negative since then. This may have to do with the introduction of capital controls during the Asian financial crisis and subsequent fiscal weaknesses. In Thailand and Singapore, there is more evidence to show government spending can be countercyclical when it is tried during crisis periods. (Singapore's case is most obvious during the global financial crisis, while Thailand's also includes the Asian financial crisis period). Perhaps the difference in potency is due to the relatively closed Thai economy vis-à-vis the very open Singaporean economy.

In sum, we do find that fiscal spending can be effective at times in some countries, yet the evidence is by no means overwhelming and that the multiplier is less than one. In contrast, tax cuts do not seem to have the same effect. On the contrary, tax hikes seem to boost output especially during crisis periods. Perhaps these actions are interpreted as greater fiscal responsibility and credible efforts that boost confidence which in turn spur private consumption and investment. Reductions in government spending may not have the same impact because government spending is often viewed as essential for development and future economic growth. Yet, because of the differences in economic development and fiscal strengths, these reasons cannot satisfactorily explain the results for both Singapore and say the Philippines together. Admittedly, this is one area where future research can be done through a case study approach looking at specific tax measures in individual countries and examines their impact on consumption, investment and/or growth.

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Table 1: Theoretical Predictions of Fiscal (Spending) Multiplier

Scenario	Size of Multiplier
Keynesian	
1. Standard Keynesian spending multiplier	>1
(Tax multiplier)*	<1 or >1
Simple Keynesian Extensions	
2. Accommodative monetary policy	>1
3. Liquidity trap (interest rate at the zero bound)	>1
4. Flexible exchange rates	<1
5. Pegged exchange rates	>1
6. Highly open economy	<1
Neoclassical	
7. Neoclassical model	<1
Other considerations	
8. Complete Ricardian equivalence	0
9. Debt/fiscal sustainability issues	<1
10. Financial innovations	Ambiguous
11. Expansionary fiscal contractions	<0

* The standard Keynesian spending multiplier is equal to 1/(1-MPC), where 0<MPC (marginal propensity to consume)<1. Hence, the spending multiplier is ≥1. On the other hand, the tax multiplier=-MPC/(1-MPC). Hence, it is larger than 1 if MPC>0.5, and smaller if MPC<0.5.

Sources: Baxter and King (1993), Barro (1974), Mankiw (2000), Hemming et al. (2002), IMF (2008), Alesina and Ardagna (2009), and Woodford (2010).

Table 2: Impact Fiscal Multiplier from a Tax Shock

	Cholesky VAR	Blanchard and Perotti SVAR with Estimated a_{13}	Blanchard and Perotti SVAR with a_{13} = 0.5
Indonesia	0.37*	0.45*	0.43*
Malaysia	0.24	0.52*	0.33
Philippines	0.09	0.10	0.12
Singapore	0.28	0.81	0.53
Thailand	0.68*	1.40*	0.90*

Note:
To calculate the impact fiscal multiplier, the impact response of GDP to the tax shock is divided by the ratio of average net tax revenue to average GDP over the sample period. For Indonesia, the ratio is 0.17; Malaysia, 0.14; Philippines, 0.10; Singapore, 0.15; and Thailand, 0.19. * Indicates the impact impulse response is statistically significant from zero at the 5% level.

Table 3: Impact Fiscal Multiplier from a Spending Shock

	Cholesky VAR	Blanchard and Perotti SVAR with Estimated a_{13}	Blanchard and Perotti SVAR with a_{13} = 0.5
Indonesia	-0.01	-0.42	-0.34
Malaysia	0.28	0.20	0.25
Philippines	0.41	0.42	0.42
Singapore	-0.17	-0.23	-0.20
Thailand	-0.35	-0.37	-0.37

Note:
To calculate the impact fiscal multiplier, the impact response of GDP to the spending shock is divided by the ratio of average government consumption to average GDP over the sample period. For Indonesia, the ratio is 0.08; Malaysia, 0.12; Philippines, 0.11; Singapore, 0.10; and Thailand, 0.11. * Indicates the impact impulse response is statistically significant from zero at the 5% level.

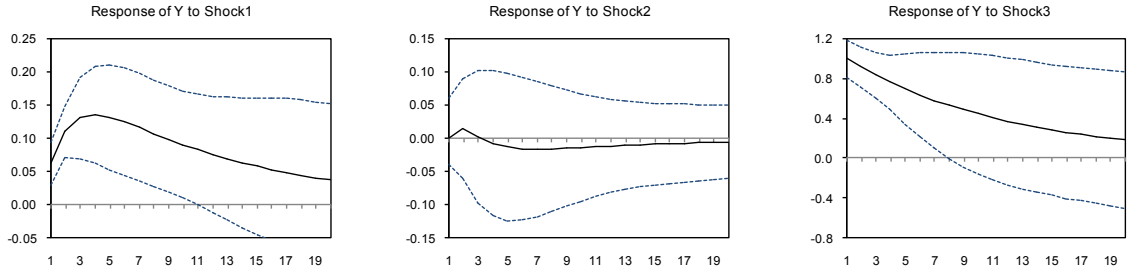
Table 4: Summary of Overall Results – Impulse Response of Output

	Indonesia	Malaysia	Philippines	Singapore	Thailand
Blanchard and Perotti SVAR (Impact Response)					
Tax shock	+*	+	+	+	+*
Spending shock	-	+	+	-	-
Time-Varying VAR					
Tax shock	Positive in the 1990s, close to zero or somewhat negative afterward	Most prominent during the two crises	Same as Malaysia but more pronounced	Most prominent during current crisis	Same as Singapore, but only at the one-year horizon
Spending shock	Mostly negative but has improved in 2000s	Not much impact	Opposite to Indonesia	Mostly negative, somewhat better during the two crises	Not much impact but better during the Asian crisis at the one-year horizon

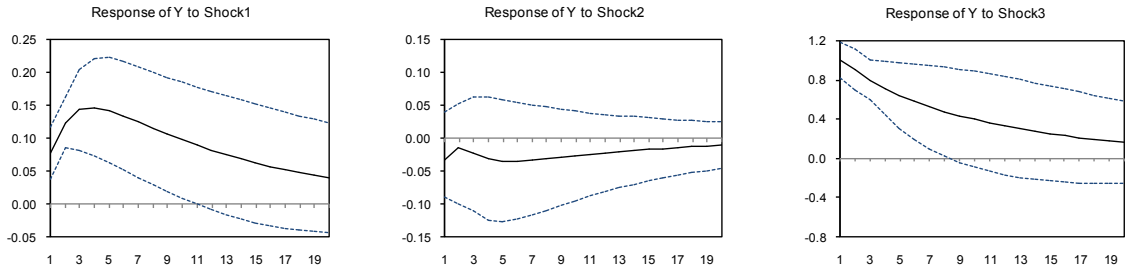
Note: * refers to being statistically significant.

Figure 1: Impulse Response Functions of GDP to All Shocks, Indonesia

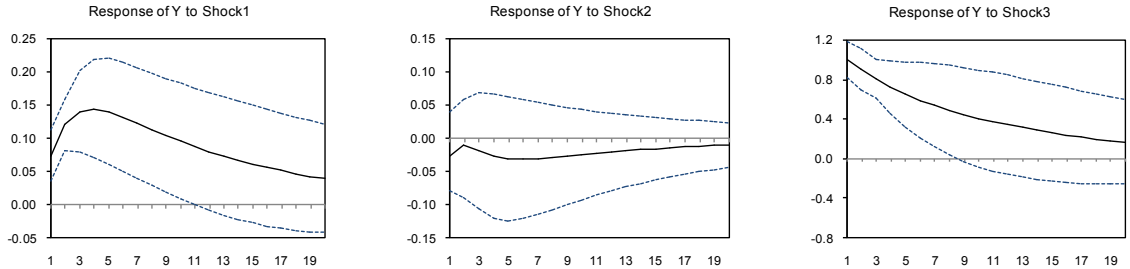
Cholesky VAR



Blanchard and Perotti SVAR: a_{13} = 0.63



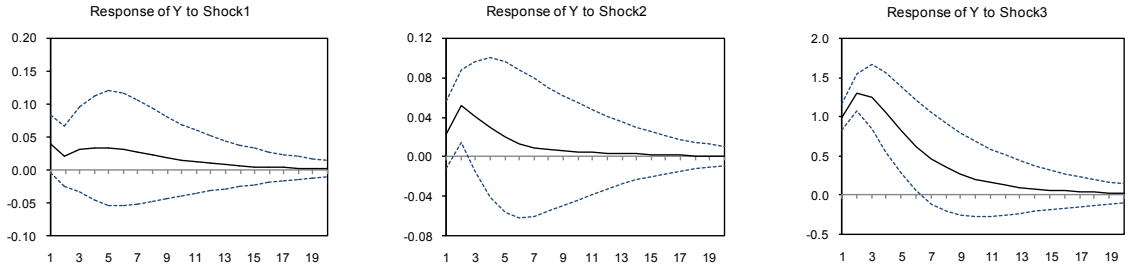
Blanchard and Perotti SVAR: a_{13} = 0.5



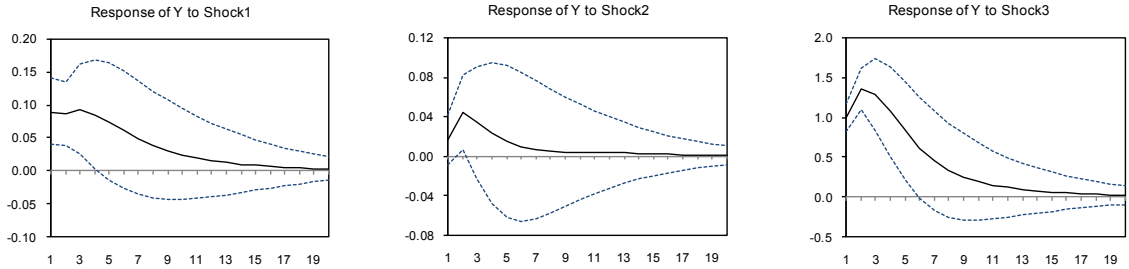
Note: The size of shock is one unit or one percentage point. The spaced lines refer to the ± two asymptotic standard-deviation error bands. The unit on the y-axis is in percent and, x-axis, quarter. "Shock 1" refers to the tax shock, "Shock 2", spending shock; and "Shock 3", GDP shock.

Figure 2: Impulse Response Functions of GDP to All Shocks, Malaysia

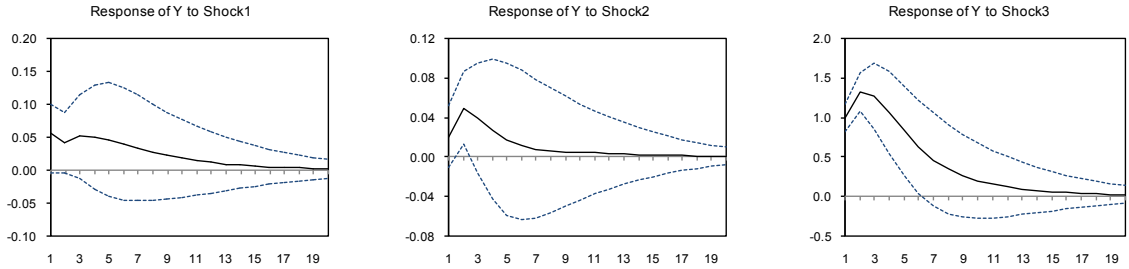
Cholesky VAR



Blanchard and Perotti SVAR: a_{13} = 1.61



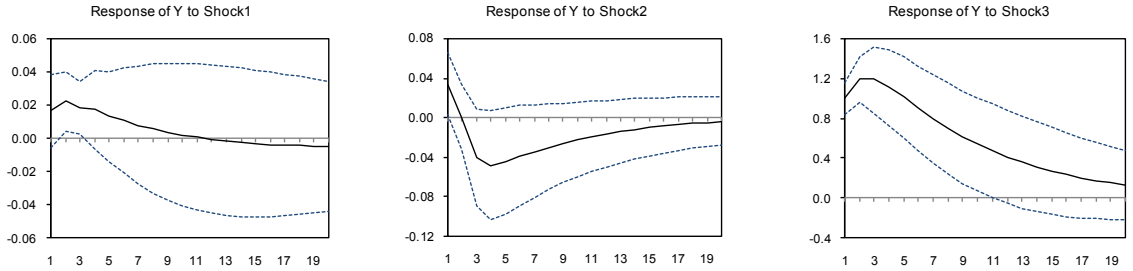
Blanchard and Perotti SVAR: a_{13} = 0.50



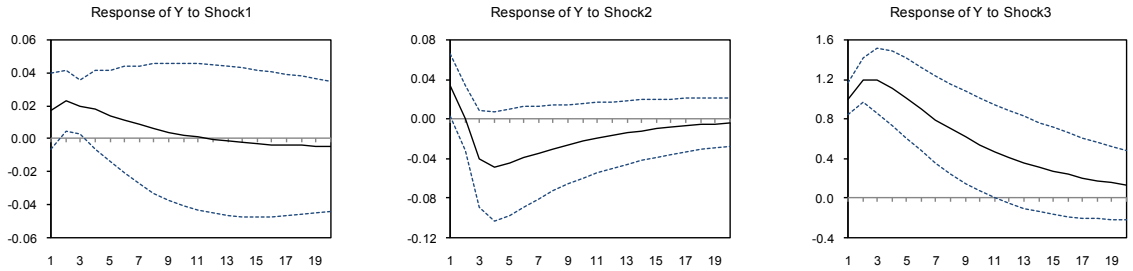
Note: The size of shock is one unit or one percentage point. The spaced lines refer to the ± two asymptotic standard-deviation error bands. The unit on the y-axis is in percent and, x-axis, quarter. "Shock 1" refers to the tax shock, "Shock 2", spending shock; and "Shock 3", GDP shock.

Figure 3: Impulse Response Functions of GDP to All Shocks, Philippines

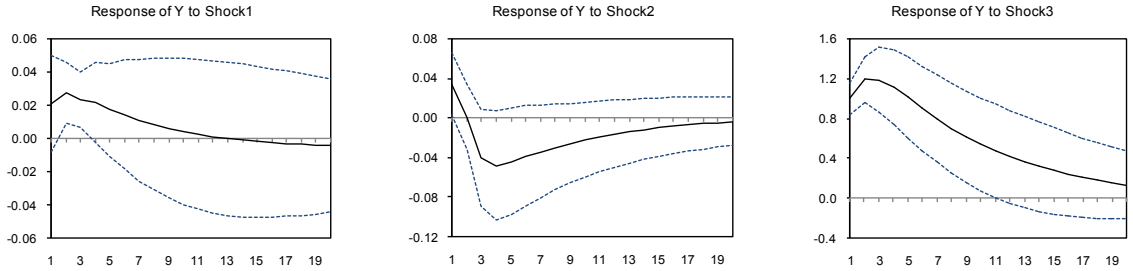
Cholesky VAR



Blanchard and Perotti SVAR: a_{13} = 1.04



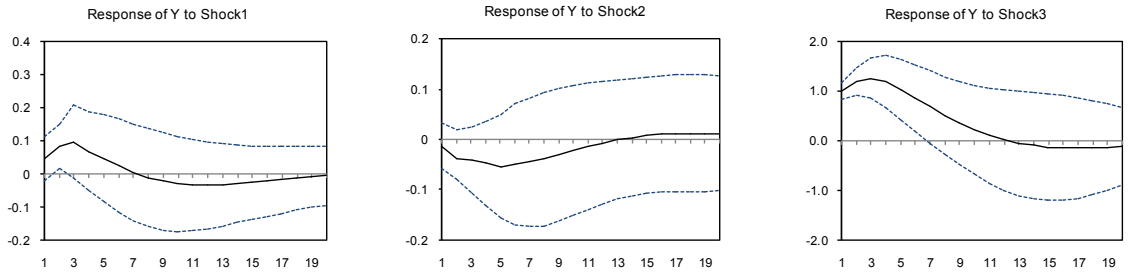
Blanchard and Perotti SVAR: a_{13} = 0.50



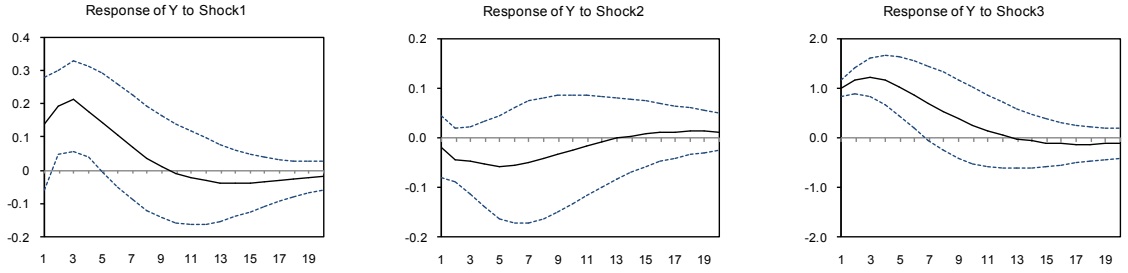
Note: The size of shock is one unit or one percentage point. The spaced lines refer to the ± two asymptotic standard-deviation error bands. The unit on the y-axis is in percent and, x-axis, quarter. "Shock 1" refers to the tax shock, "Shock 2", spending shock; and "Shock 3", GDP shock.

Figure 4: Impulse Response Functions of GDP to All Shocks, Singapore

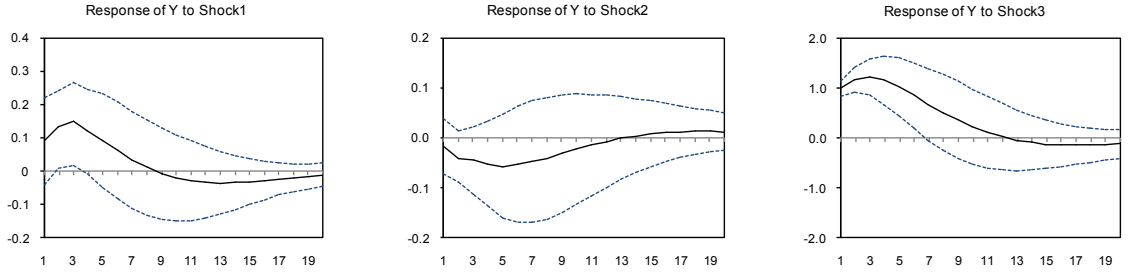
Cholesky VAR



Blanchard and Perotti SVAR: a_{13} = 1.10



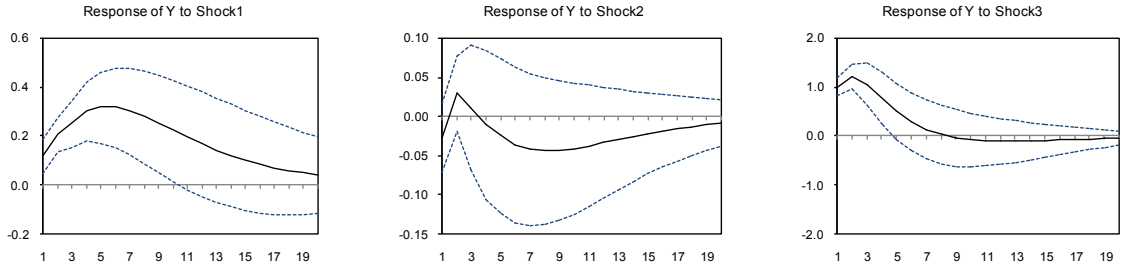
Blanchard and Perotti SVAR: a_{13} = 0.5



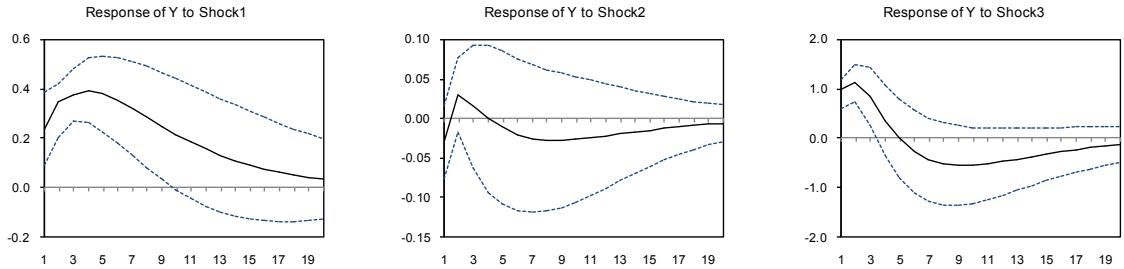
Note: The size of shock is one unit or one percentage point. The spaced lines refer to the ± two asymptotic standard-deviation error bands. The unit on the y-axis is in percent and, x-axis, quarter. "Shock 1" refers to the tax shock, "Shock 2", spending shock; and "Shock 3", GDP shock.

Figure 5: Impulse Response Functions of GDP to All Shocks, Thailand

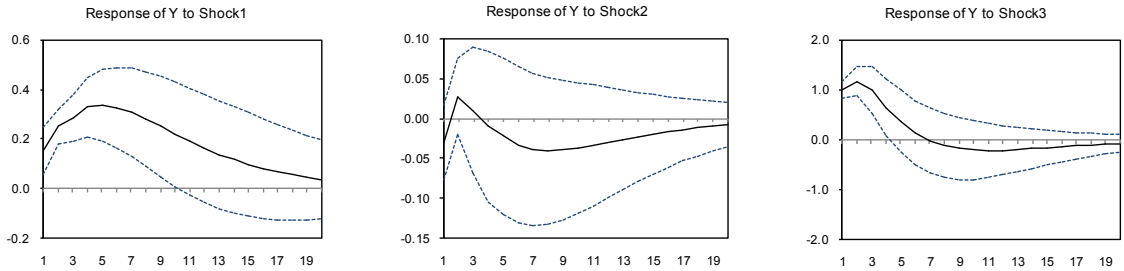
Cholesky VAR



Blanchard and Perotti SVAR: a_{13} = 1.90



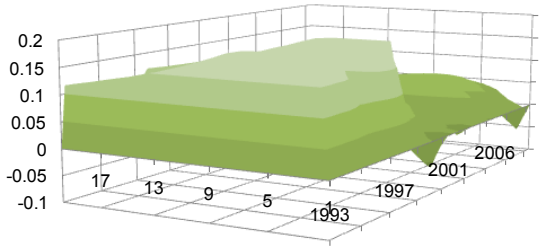
Blanchard and Perotti SVAR: a_{13} = 0.50



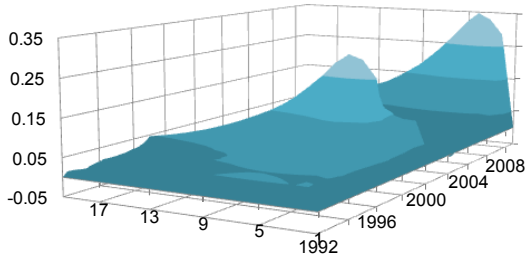
Note: The size of shock is one unit or one percentage point. The spaced lines refer to the ± two asymptotic standard-deviation error bands. The unit on the y-axis is in percent and, x-axis, quarter. "Shock 1" refers to the tax shock, "Shock 2", spending shock; and "Shock 3", GDP shock.

Figure 6.1: Time-Varying Response of GDP to Tax Shock

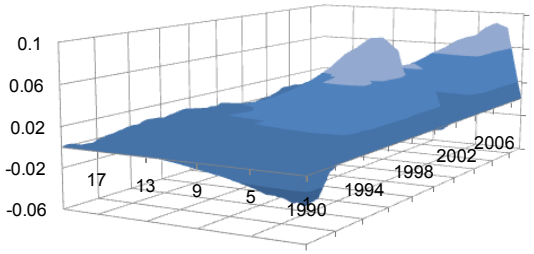
Indonesia



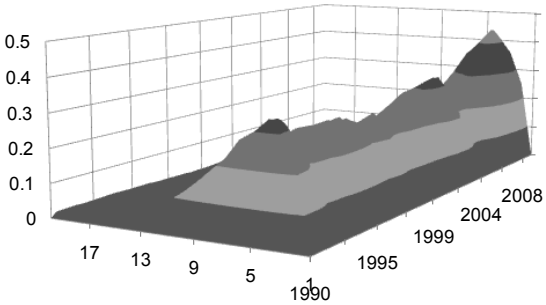
Malaysia



Philippines



Singapore



Thailand

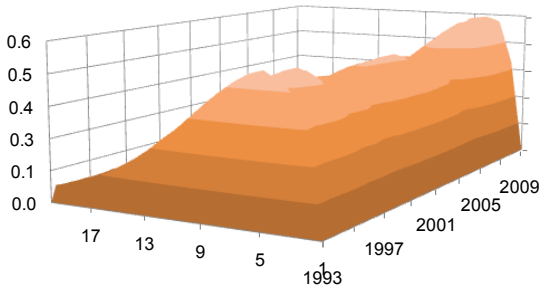
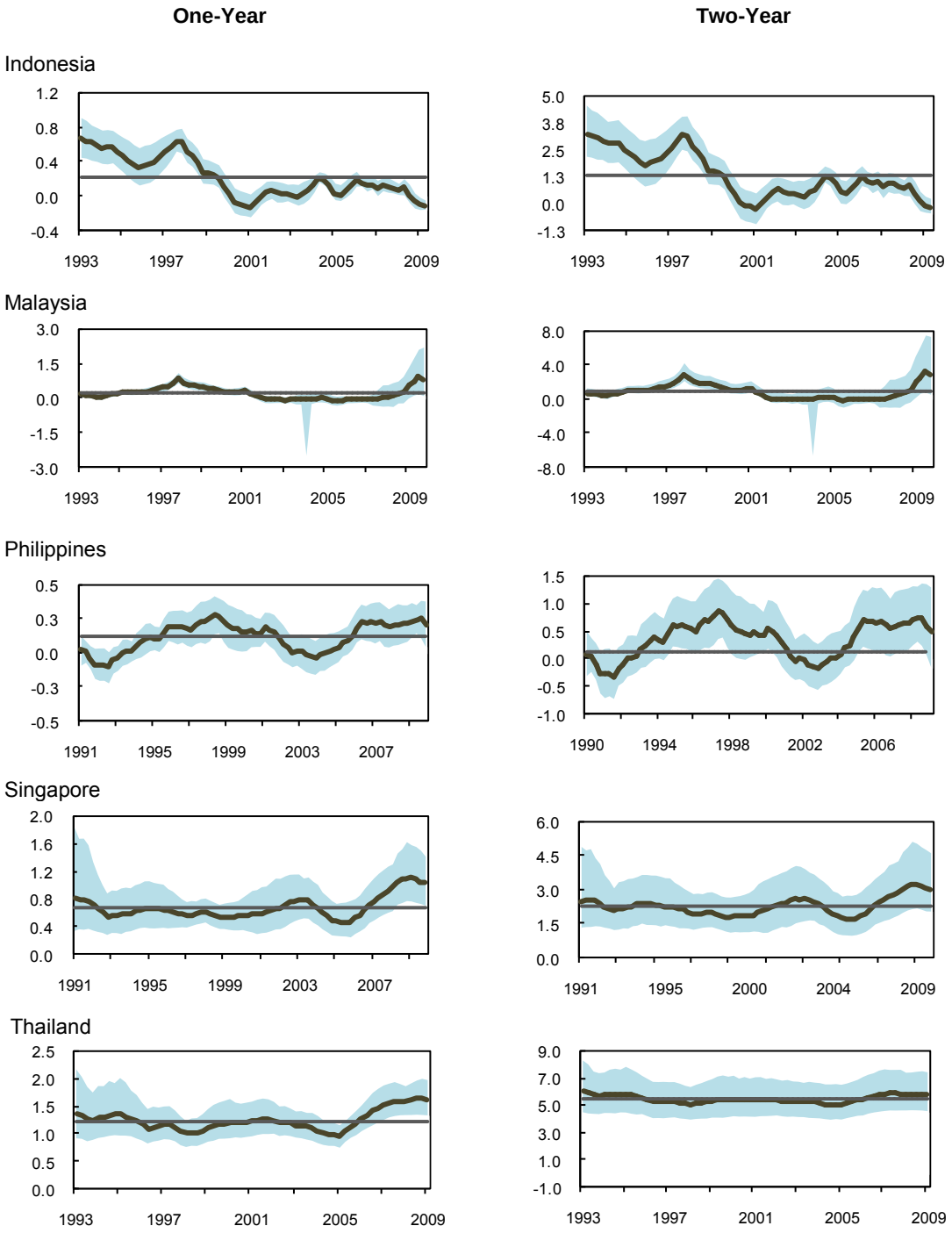


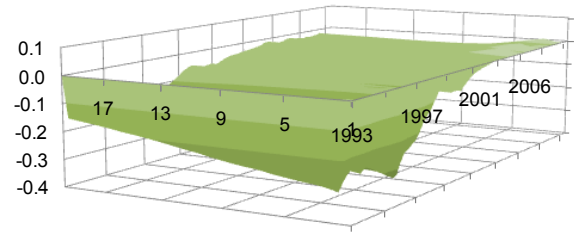
Figure 6.2: Cumulative Response of GDP to Tax Shock



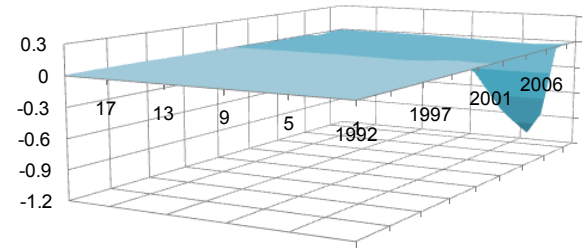
Note: The left and right hand columns show the cumulative response of GDP after one- and two-year respectively. The horizontal line in each plot refers to the average cumulative response over the sample period. The error bands are the 95% confidence intervals. The kinked error bands and impulse responses for Malaysia are modeling discrepancies due to draws being very close to unit root.

Figure 7.1: Time-Varying Response of GDP to Government Spending Shock

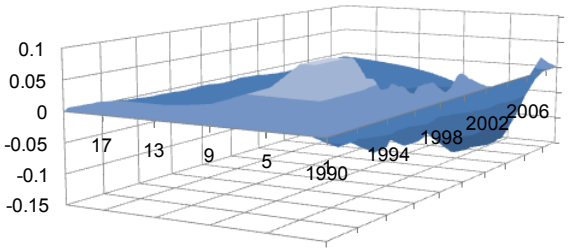
Indonesia



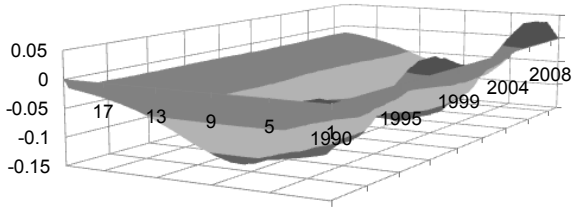
Malaysia



Philippines



Singapore



Thailand

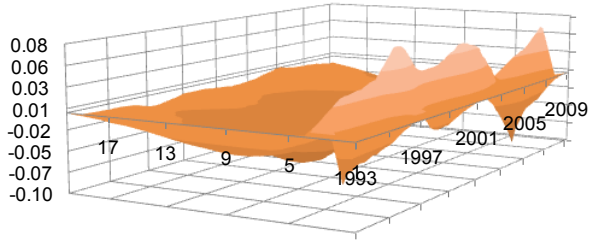
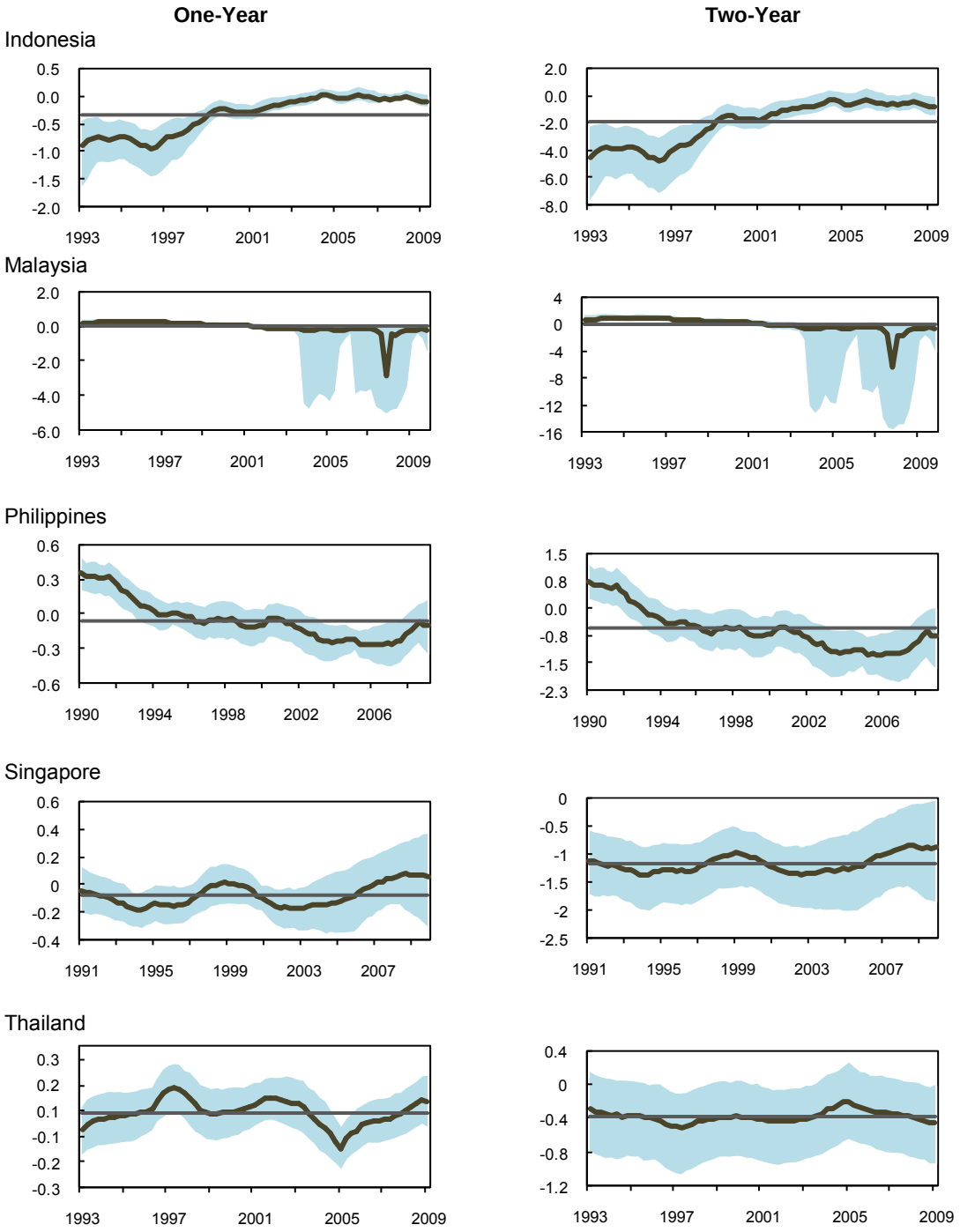
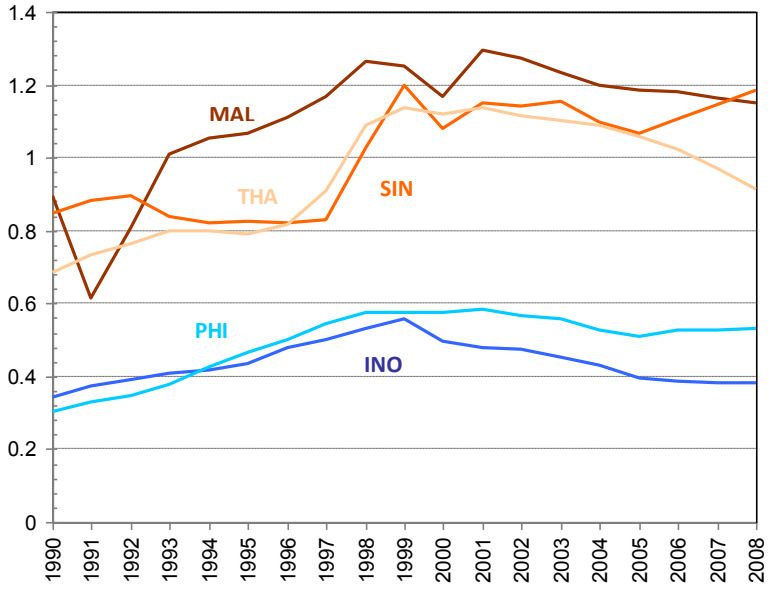


Figure 7.2: Cumulative Response of GDP to Government Spending Shock



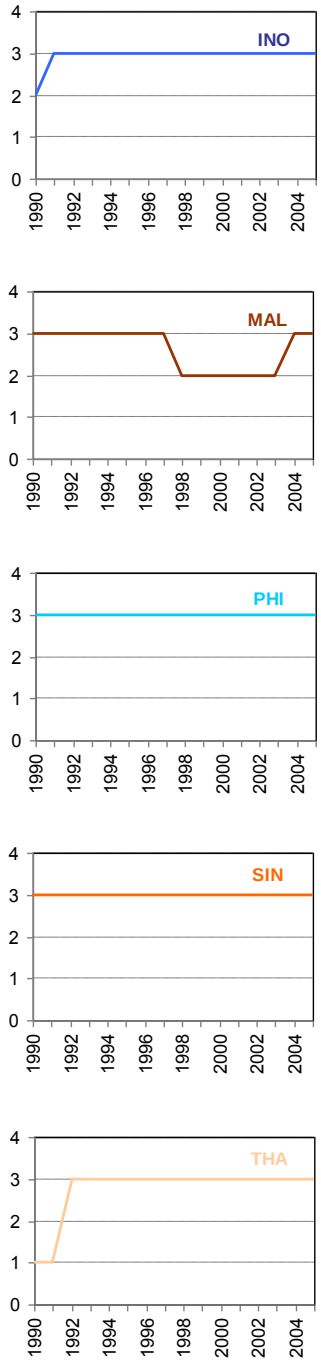
Note: The left and right hand columns show the cumulative response of GDP after one- and two-year respectively. The horizontal line in each plot refers to the average cumulative response over the sample period. The error bands are the 95% confidence intervals. The kinked error bands and impulse responses for Malaysia are modeling discrepancies due to draws being very close to unit root.

Figure 8: Financial Depth – Liquid Liabilities to GDP (%)



Source: Beck and Demirgüç-Kunt (2009).

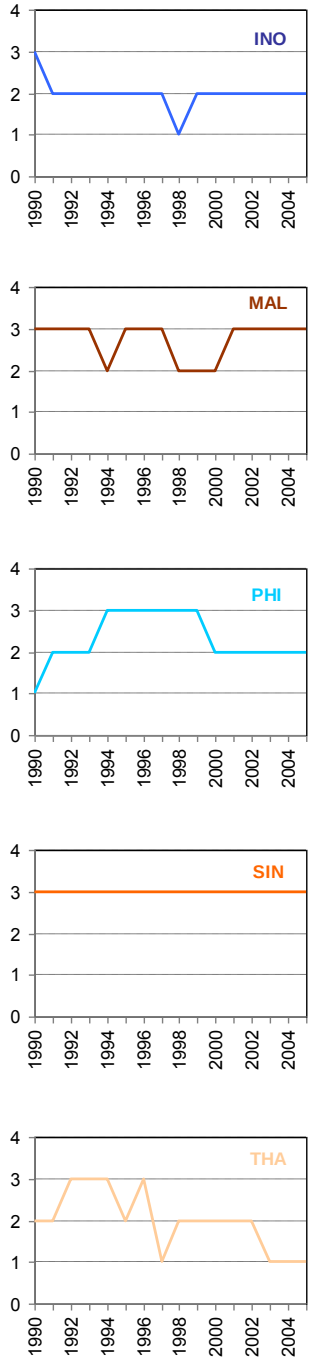
Figure 9: Interest Rate Liberalization



Note: The scale on the y-axis refers to the degree of interest rate liberalization. Fully repressed (0); partially repressed (1 and 2); largely liberalized (3); and fully liberalized (4).

Source: Abiad et al. (2008).

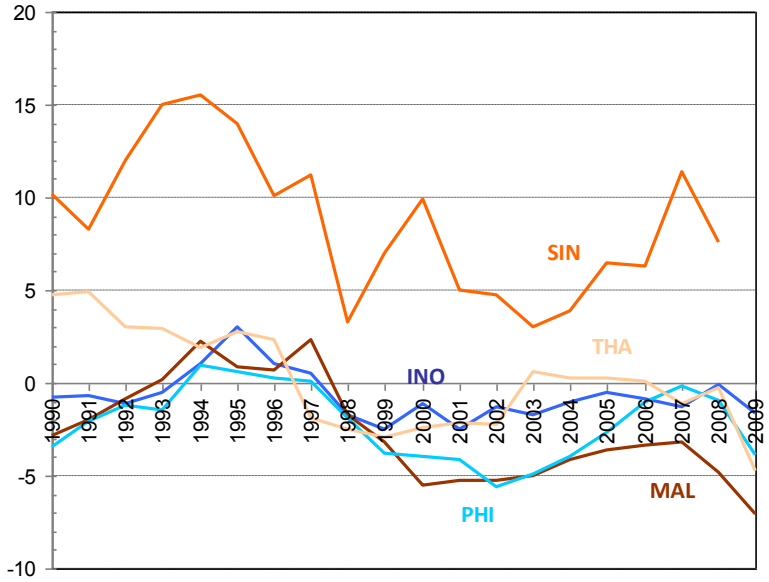
Figure 10: Capital Account Liberalization



Note: The scale on the y-axis refers to the degree of capital account liberalization. Fully repressed (0); partially repressed (1); largely liberalized (2); and fully liberalized (3).

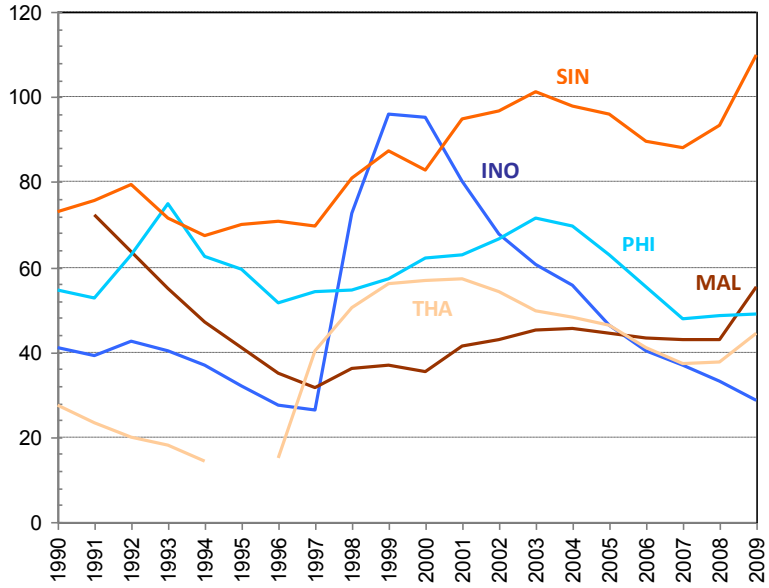
Source: Abiad et al. (2008).

Figure 11: Overall Budget Balance to GDP (%)



Sources: *ADB Key Indicators* (various issues) for Singapore, and CEIC for the rest.

Figure 12: Public Debt to GDP (%)



Source: Abbas et al. (2010).

Appendix I

Data Description and Sources

Sources and descriptions of variables used are shown below. The population data of all countries are obtained from World Bank's *World Development Indicators*.

Country	Period	GDP and Government Consumption	Taxes
Indonesia	Q1:1993-Q4:2009	CEIC: Table ID.A01: Gross Domestic Product: By Expenditure: Current Price; Table ID.A02: Gross Domestic Product: By Expenditure: 2000 Price; and Table ID.A04: Gross Domestic Product: By Expenditure: 1993 Price.	CEIC: Table ID.F05: Central Government Operations: Total Revenue (M1:2000-M12:2009). Note: Data prior to 2001 were sourced from Jha et al. (2010). Using a temporal disaggregation method, the authors converted the annual data to quarterly based on the quarterly government consumption available from national accounts.
Malaysia	Q1:1992-Q3:2009	CEIC: Table MY.A01: 2000 Base: GDP By Expenditure: Current Price; Table MY.A03: 2000 Base: GDP by Expenditure: 2000 Price; Table MY.A13: 1987 Base: GDP By Expenditure: Current Price; and Table MY.A15: 1987 Base: GDP by Expenditure: 1987 Price.	*Monthly Statistical Bulletin*, Bank Negara Malaysia: Table 6.2 Federal Government Revenue (http://www.bnm.gov.my/files/publication/msb/2009/11/xls/6.2.xls); and Table 6.3 Federal Government Expenditure (http://www.bnm.gov.my/files/publication/msb/2009/11/xls/6.3.xls) Note: Data not available on the website are obtained separately from Bank Negara Malaysia.
Philippines	Q1:1990-Q4:2009	CEIC: Table PH.A01: GDP by Expenditure: Current Price; and Table PH.A02: GDP by Expenditure: 1985 Price.	CEIC: Table PH.F01: National Government Revenue, Expenditure and Financing.
Singapore	Q1:1990-Q4:2009	CEIC: Table SG.A03: GDP by Expenditure: 2000 Price: Chain Linked; Table SG.A06: GDP by Expenditure: 1995 Price: Chain Linked; and Table SG.A10: GDP by Industry: SSIC 2005: Current Price.	CEIC: Table SG.F04: Government Operating Revenue.
Thailand	Q1:1993-Q4:2009	CEIC: Table TH.A01: Gross Domestic Product: By Expenditure: Current Price; and Table TH.A03: Gross Domestic Product: By Expenditure: 1988 Price.	CEIC: Table TH.F01: Government Revenue: Ministry of Finance.

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Changing Impact of Fiscal Policy on Selected ASEAN Countries

In this paper, Hsiao Chink Tang, Philip Liu and Eddie Cheung investigate the effectiveness of countercyclical fiscal policy in five ASEAN countries of Indonesia, Malaysia, the Philippines, Singapore and Thailand. Through a structural vector autoregression (VAR) model, government spending is found to have weak and largely insignificant impact on output, while taxes are found to have outcomes contrary to conventional theory. Extensions using a time-varying VAR model reveal the impact of taxes on output mainly reflect heightened concerns over public finances amid the Asian financial crisis and the recent global financial crisis. On the other hand, for Singapore and Thailand, there is evidence that government spending can at times be useful as a tool for countercyclical policy.

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