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# Fiscal Multipliers over the Growth Cycle

## Evidence from Malaysia

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## Abstract

This paper explores the stabilisation properties of fiscal policy in Malaysia using a model incorporating nonlinearities into the dynamic relationship between fiscal policy and real economic activity over the growth cycle. The paper also investigates how output multipliers for government purchases may alter for different components of government spending. The authors find that fiscal policy in Malaysia has become increasingly pro-cyclical over the last 25 years and establish that the size of fiscal multipliers tend to change over the growth cycle. A 1 Malaysian Ringgit rise in government (investment) spending leads to a maximum output multiplier of around 2.7 during growth recessions, and around 2 in normal times. The returns to government spending in Malaysia are greater when the focus is on public investment, as opposed to consumption. Changes in tax policy are less effective in stimulating economic activity than direct government spending. These results provide empirical backing to conjectures in the recent literature implying that procyclicality in fiscal policy reduces the effectiveness of fiscal actions in emerging markets.

# Fiscal Multipliers Over the Growth Cycle: Evidence From Malaysia

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Khazanah Research and Investment Strategy

# 1 Introduction

After a couple of decades when the primary focus was on monetary policy, the 2008 financial crisis refocused the attention of economists onto discretionary fiscal policy as a potentially potent economic stabilisation tool. Despite the emergence

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[*]The views in this paper solely reflect those of the authors, and do not necessarily correspond to the views of Khazanah National Berhad.

of a large body of literature since then, surprisingly very little is known about the effects of fiscal policy on economic activity and on the short-versus long-run destabilising behaviour of fiscal policy in emerging market countries. This is notwithstanding the fact that during the height of the crisis the largest fiscal stimulus packages were enacted in emerging market economies.[1] Malaysia, for instance, passed a stimulus package of around 8.6 percent of GDP in 2009.

Emerging market economic cycles tend to be more volatile than developed countries' whilst being more susceptible to large shocks such as financial crises fiscal policy could play a central role in dampening economic fluctuations and promoting long-run growth.[2] Aghion, Angeletos, Banerjee and Manova (2010), for example, show that the ability of firms to finance investment falls during an economic downturn due to a fall in profits, which acts as a constraint on their borrowings. Indeed, the financial accelerator principle implies the credit worthiness of the borrower may change depending upon the stage of the economic cycle. In the presence of financial frictions the government, through undertaking counter-cyclical fiscal policy and pushing out the demand for goods and services for these firms, fiscal policy could have a positive impact on long-term investment and productivity.

As well as the habitual undulations in the economic cycle, it is particularly the role of fiscal policy during crisis times that should be of relevance to emerging market economies. As noted in Perotti (2005b), in the aftermath of the financial crises of the late 1990s, many emerging markets were perceived as sacrificing long-run growth in order to show signs of fiscal discipline. Since the crisis, affected economies - including Malaysia - have endured a downward shift in their long-run growth trajectory.

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[1] See Federal Reserve Bank of Dallas (2009).

[2] See Aguiar and Gopinath (2007), which discuss the characteristics of economic fluctuations in emerging market countries.
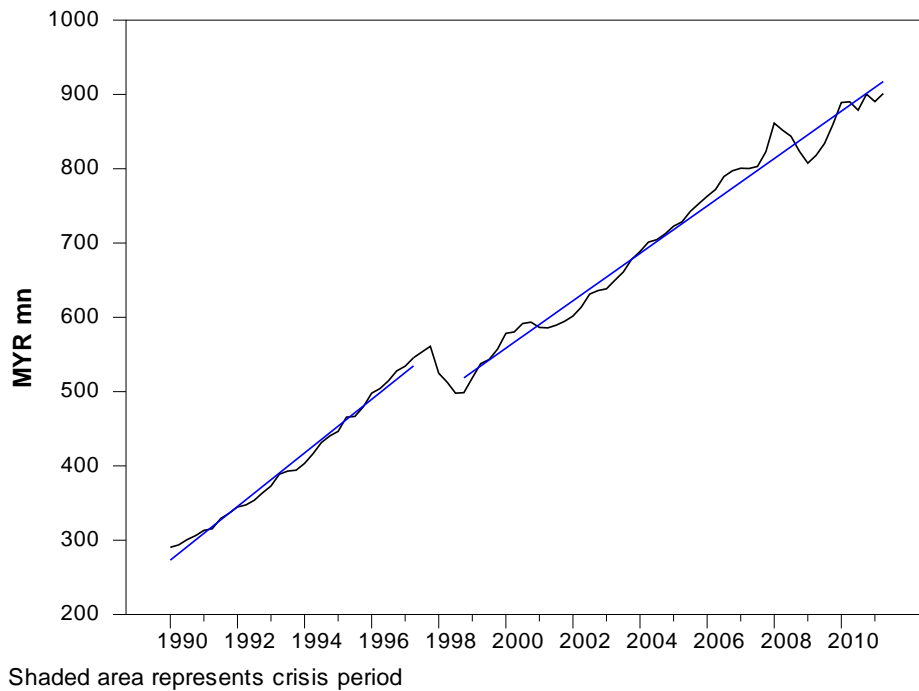
*Trend output growth pre- and post-Asian crisis*

If there is a negative shock to economic activity, policymakers need to know how the economy would respond so as to decide whether to make a discretionary change in, say, government consumption. In investigating these questions, much of the literature has focused on the advanced countries. From an analytical standpoint documenting empirical similarities and observing whether they are the same across different levels of income provide an empirical basis for devising fiscal policies that incorporate features and relationships that are particularly important for developing countries.[3]

If fiscal policy mainly has demand effects, and shifts out the demand for goods without crowding out private consumption, then clearly there is a role for a countercyclical fiscal policy during recessions, when individuals or firms are more likely to be credit constrained. On the other hand, if fiscal policy mainly has a negative wealth effect on labor supply, and a crowding out effect on private investment, then

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[3]Much of the literature measuring the size of fiscal multipliers has continued to focus on the advanced economies.

there is a role for procyclical fiscal policy. There is also currently little agreement on the effects of fiscal policy on private consumption.[4] This latter disagreement forms part of the more broader issue of whether consumers are Ricardian or not.[5]

Recent evidence has highlighted the asymmetric response of the economy to fiscal policy shifts as a result of whether the country is in boom or depression times.[6] Tagkalakis (2008), Christiano, Eichenbaum and Rebelo (2009) and Auerbach and Gorodnichenko (2010, 2011) find that economic downturns tend to raise the government spending multiplier on private consumption and output. Such findings have particular relevance for emerging market countries when seen in the context of studies documenting fiscal policy in developing countries to be procyclical, particularly the investment component of public spending.[7] Among many others, Kaminsky, Reinhart and Végh (2004) and Alesina, Campante and Tabellini (2008) find that fiscal policy in developing countries has tended to be overwhelmingly procyclical, partly because of political incentives for governments to be more generous and run large deficits in good times. Taken together, these recent findings imply that emerging market countries may not be maximising the 'bang for the buck' of fiscal policy by loosening fiscal discipline during boom times.

This paper explores how the size of fiscal multipliers may change depending upon the stage of the growth cycle. In contrast to Auerbach and Gorodnichenko (2010, 2011) who investigate how the multiplier changes depending upon whether the economy is in a technical recession or not, this paper explores how the size of multiplier may change depending upon the stage of the growth cycle. This approach is more relevant for emerging market countries whose economic cycles are characterised by less recessions in the classical sense and where absolute declines in economic activity are rarer episodes. Emerging market countries tend to experience more growth, as opposed to business, cycles.[8] The paper also contributes to the literature by investigating how output multipliers for government purchases may differ for different components of government spending. A number of findings

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[4]See Perotti (2005) and Galí, Lopéz and Vallés (2007) and Ramey (2009).

[5]In the standard neoclassical model expansionary government spending tends to crowd out private consumption due to the negative wealth effect on consumers induced by higher future tax payments.

[6]See Tagkalakis (2008) and Bachmann and Sims (2011).

[7]See Gavin and Perotti (1997) and Alesina, Campante and Tabellini (2008).

[8]See Stock and Watson (2002) and Aguiar and Gopinath (2007).

emerge:

- The paper finds that fiscal policy in Malaysia has been largely procyclical over the past 25 years. The time-varying correlation coefficients show that procyclicality accelerated following the Asian financial crisis in 1997/98.

- The effectiveness of fiscal policy varies over the growth cycle. Fiscal multipliers tend to increase (decrease) during periods of depressed (high) economic growth. The relative change in the size of state dependent fiscal multipliers also depends on the component of government spending. Additionally, changes in tax policy are less effective in stimulating economic activity than direct government spending.

- Government investment generates fiscal multipliers twice as large as government consumption spending in growth expansions and growth recession states. During a growth recession government investment spending generates a real output multiplier of around 2.7, compared with a multiplier value of around 1.8 for government consumption spending. There is also evidence that government consumption crowds out private consumption spending in 'normal' times. Multiplier values for tax cuts are below 0.3 for real output and private consumption.

- These results can be interpreted as evidence in support of the argument that higher fiscal outlays are particularly effective as a stabilisation tool in a sharp economic downturn. These results confirm conjectures in Alesina, Campante and Tabellini (2008), providing empirical backing for the idea that procyclicality in expenditures reduces the effectiveness of fiscal actions in emerging market countries.

The remainder of this paper is organised as follows. Section 2 presents the econometric specification, Section 3 sets out the data, model and structural identification scheme, Section 4 assesses fiscal policy in Malaysia and tests for procyclicality. Section 5 discusses the results from the model, including the size of the fiscal multipliers and policy implications. Section 6 concludes.

# 2  Econometric specification

Most recent studies have focused on the size of fiscal multipliers in a recession, classically defined, see Auerbach and Gorodnichenko (2010, 2011). However, for fast-growing emerging markets, absolute declines in economic activity tend to be the result of very rare sudden crisis episodes. Emerging markets economic cycles are typically characterised less by recessions in the technical sense and more by growth expansions and growth contractions. For Malaysia, over our sample period (1981:1 to 2010:4), there have been only three recessions in the classical definition sense.[9] This limits the number of observation in the alternate regime. This paper therefore explores how the size of multiplier may change depending upon the stage of the growth cycle. Recessions in this paper are defined as growth contractions. It is important to note that all classical recessions involve a growth contraction, but a growth contraction need not necessarily imply a classical recession.

To allow for differentiated responses in boom and recession episodes this paper employs a regime switching vector autoregressive model where transitions across states are smooth. The approach in this paper is similar to the smooth transition autoregressive (STAR) models developed in Granger and Terasvirta (1993). Moreover, following recent developments in the STVAR literature the model not only allows for differential dynamic responses but also differential contemporaneous responses to structural shocks.[10]

$$\mathbf{X_t} = (1 - F(z_{t-1})\mathbf{\Pi_E}(L)\mathbf{X_{t-1}} + F(z_{t-1})\mathbf{\Pi_R}(L)\mathbf{X_{t-1}} + \boldsymbol{\varepsilon_t} \tag{1}$$

$$\boldsymbol{\varepsilon_t} \sim N(\mathbf{0}, \mathbf{\Omega_t}) \tag{2}$$

$$\mathbf{\Omega_t} = \mathbf{\Omega_E}(1 - F(z_{t-1}) + \mathbf{\Omega_R}F(z_{t-1}) \tag{3}$$

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[9] The classical definition of the recession is defined as two quarters of absolute decline in real output.

[10] As noted in Auerbach and Gorodnichenko (2010), the advantage of STVAR models over their structural VAR contemporaries is that such models better exploit variation in the degree of a particular regime so that estimation and inference for each regime is based on a larger set of observation. Estimating a SVAR model for each regime separately may seriously limit the amount of observations in a regime, biasing the coefficient values.

$$F(z_t) = \frac{\exp(-\gamma z_t)}{1 + \exp(-\gamma z_t)}, \gamma > 0 \tag{4}$$

$$var(z_t) = 1, E(z_t) = 0 \tag{5}$$

The matrix $X_t$ is vector containing the endogenous variables with $\boldsymbol{\varepsilon_t}$ a normal error term. The model allows for two differences in the propagation mechanism via (a) contemporaneous via differences in covariance matrices for disturbances $\boldsymbol{\Omega_E}$ and $\boldsymbol{\Omega_R}$ and (b) dynamic via differences in lag polynomials $\boldsymbol{\Pi_E}$ and $\boldsymbol{\Pi_R}$. Variable $z$ is an index, which is normalised to have unit variance so that $\gamma$ is scale invariant, with positive $z$ indicating an expansion. Assuming that $\gamma > 0$, $\boldsymbol{\Pi_R}(L)$ and $\boldsymbol{\Omega_R}$ describe the behaviour of the variables in a growth recession ($F(z) \approx 1$), and $\boldsymbol{\Omega_E}$ and $\boldsymbol{\Pi_E}(L)$ as describing the behaviour of the system in a strong growth expansion ($1 - F(z) \approx 1$).

Economic theory or empirics unfortunately offers no guide on the choice of index $z$. Thus following Auerbach and Gorodnichenko (2010, $z$ is set equal to four-quarter moving average of output growth. The key advantages of using this measure of $z$ are: (a) it is possible to use the full sample for estimation, which makes the estimates as precise and robust as possible; (b) it is possible to consider dynamic feedback effects from policy changes to the state of the regime. Said differently, the model accounts for the fact that policy shocks could alter the regime, shifting the economy from a recession to an expansionary phase..

It is possible to estimate the $\gamma$ parameter using Newton Raphson grid search. Estimating $\boldsymbol{\Pi}_R(L), \boldsymbol{\Pi}_E(L), \boldsymbol{\Omega}_R$ and $\boldsymbol{\Omega}_E$ and $\gamma$ simultaneously suggests a point estimate for $\gamma$ between 8 and 13.5. These parameter values suggest that the model is best described as a model switching regimes at sharp thresholds. This is consistent with Aguiar and Gopinath (2007), who showed that business cycles in emerging market countries tend to be more volatile and more prone to sudden shifts, particularly when compared to economic cycles in the advanced economies. Auerbach and Gorodnichenko (2010), for instance, calibrate $\gamma = 0.8$ for the U.S. and $\gamma = 1.5$ for a panel of OECD countries, which is consistent with smooth transitions between expansions and recessions. However, for the data used in this paper we select $\gamma = 5$. This is because we prefer relatively smooth transitions between regimes than suggested by the grid search values, which amount to moderate val-

ues of $\gamma$. To better understand the type of nonlinearity involved Figure 1 plots the time profile of the transition function, $F(z_t)$, over the range of $z_t$.

# 3 Structural identification and data

This paper uses a unique quarterly dataset from Malaysia to identify government consumption and government spending shocks. The data runs from 1981:1 till 2010:4. The identification scheme is based on a generalised version of reduced form models in, amongst many others, Fatás and Mihov (2001), Blanchard and Perotti (2002), Perotti (2005), Cimadomo, Hauptmeier and Kirchner (2010), Corsetti, Meier and Müller (2010), Auerbach and Gorodnichenko (2010, 2011) and Bachmann and Sims (2011). The identification approach is based on a recursive identification scheme that aims to identify fiscal policy shocks on their timings within the system.

As in Blanchard and Perotti (2002) the basic model is computed using quarterly data and is composed of $\mathbf{X_t} = [G_t, T_t, Y_t]$. The variable $G_t$ represents government spending shocks. Just as output multipliers for government purchases may differ according to the regime in which they occur, they can also differ for different components of government spending.[11] Leeper, Walker and Yang (2009), for example, have shown how the short-run multiplier for government investment shocks are smaller than those for government consumption innovations, but are more effective in the longer-term.[12] Two types of government spending shocks are identified: consumption and investment.[13] The government consumption definitions follow Perotti (2005a). Thus, government consumption spending is defined as gov-

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[11] See Perotti (2005a, 2007).

[12] See Romp and de Haan (2007) for an in-depth survey on public capital and economic growth.

[13] Much of the recent literature, to capture the stance of fiscal policy, have utilised government consumption spending as defined as current real terms spending on goods and services. This is because such a measure contains little automatic cyclical component, thus helping to identify government spending shifts over and beyond those changes caused as a natural consequence of the business cycle. Furthermore, government purchases have no direct link to productivity, thus, limiting the number of channels through which government spending influences the real economy. This measure of fiscal policy is also less likely to be influenced by the automatic stabilisers channels, which operate primarily through tax revenue and transfer payments. Moreover, in economic downturns, it is politically easier to cut capital expenditure (public investment) than government consumption of goods and services, such as health care. For these reasons, the baseline model in this paper includes government consumption spending.

ernment consumption minus social security contribution and capital consumption allowances. Government investment spending is defined as development expenditure from the Ministry of Finance government spending accounts. The data on tax revenues, $T_t$, are also taken from the same source, and is defined as the sum of total indirect taxes , direct taxes on households, social security contributions and other capital transfers received. Finally $Y_t$ is the cyclical component of real output extracted by a Hodrick-Prescott filter. Following the definition laid out in Stock and Watson (2002), growth below trend is classified as a growth recession.[14] The real GDP data is taken from Abeysinghe and Gulasekaran (2004).

The ordering of the variables in $\mathbf{X_t}$ assumes that shocks in tax revenues and real output have no contemporaneous effect on government spending. As argued in Blanchard and Perotti (2002), this identifying minimum-delay assumption may be a sensible description of how government spending operates given that in the short-run government spending may be unable to adjust to spending in response to changes in the fiscal and macroeconomic conditions. On the other hand, Barro and Redlick (2011) argue that the government spending shock in a structural VAR is likely to be endogenous, as a higher GDP leads to higher taxes and therefore to more government spending. However, Barro and Redlick (2011) use yearly data and their argument, thus, is unlikely to hold at the quarterly frequency. Due to decision lags, contemporaneous discretionary government spending is unlikely to respond within a quarter to any news about the economy.

The identification of tax shocks is more problematic in the framework outlined in this paper. As noted in Blanchard and Perotti (2002) identification of tax shocks depend on purging innovations in revenues of automatic responses to output. This could be achieved by imposing a contemporaneous coefficient on the elasticity of revenue with respect to real output. However, as noted in Auerbach and Gorodnichenko (2010, 2011) this elasticity is likely to vary over the cycle, thereby, introducing a bias of unknown magnitude and direction in our time-varying specific estimates. Auerbach and Gorodnichenko (2011) have shown that output responses to tax shocks in different regimes are sensitive to the assumed elasticity.

Unlike monetary policy decisions, changes in government spending and taxes are typically decided and communicated well in advance of their implementation.

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[14]Robustness tests indicate that the fundamental conclusions remain unaltered should one use the detrended GDP growth rate.

The effects of fiscal policy, thus, show up immediately in interest rates and other financial variables. Thus, it is argued that such models suffer from the inability to recover the 'true' structural shock given the absence of news on future government spending. This has been termed the 'anticipation' or 'non fundamentalness problem'.[15] As a consequence it can be the case that the estimated innovations of a VAR are such only with respect to the information set of the practitioner, but not of the private sector. The implication being that government spending shocks may be misestimated. One way in which this problem could be overcome is by including observations on the present value of government spending forecasts directly in the specification. Such data is currently lacking for Malaysia. However, Perotti (2011) has shown how even without the exclusion of an expectations term the estimates from structural models need not be unduly biased.

Perotti (2005), based on data for a group of OECD countries, has shown that the identification scheme and choice of variables in the specification outlined should provide unpredictable government spending shocks. It is worth pointing out that whether fiscal shocks are truly anticipated or not matter only if anticipated and unanticipated fiscal policy actions have different effects. There is currently little agreement on this issue. Anticipation effects are unlikely to undermine the central point of this paper, which is to examine the size of the changes in fiscal multipliers given shifts in economic conditions. That being whilst anticipated fiscal policy might bias the estimated impulse response functions, it is not clear whether and why such effects change over the cycle.

In addition to the three baseline variables - government spending, taxes and output - in the fiscal policy literature real private consumption and an interest rate measure are also included in the model. The inclusion of consumption is based on the ongoing discussion on the crowding out effects of government spending on private consumption.[16] The impact of fiscal policy on interest rates is among the most debated issues in macroeconomics, and a key issue in times of high deficits (Perotti, 2005a). The treasury bill rate is used as the interest rate measure in the model. This also has the added advantage of being an information variable. Numerous studies have documented the superior predictive power of the term structure for real activity and inflation relative to a single measure of short-term

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[15] See Perotti (2011).

[16] See Galí, Lopéz and Vallés (2007), Ramey (2009) and Corsetti, Meier and Müller (2010).

interest rates. Bianchi *et al.* (2009) use the term structure as a proxy for inflation expectations in the U.K. Additionally, Fama (1990), Plosser and Rowenhorst (1994) and Adrian, Estrella and Shin (2010) all find a link - to varying degrees - between the term structure and inflation/real activity.

# 4 Pro-cyclical government spending

Alesina, Campante and Tabellini (2008) show government spending in emerging market countries to be much more pro-cyclical than in the advanced economies. This section explores the extent to which changes in government spending have been historically correlated with domestic economic conditions.

The correlation coefficients are based on the cyclical components which are extracted by using a bandpass filter. This has the advantage of allowing one to extract cyclical fluctuations at business cycle frequencies (6 - 32 quarters). Economic theory also implies that changes in the persistence in fiscal policy actions may lead to altering real economic outcomes.[17] For this reason, correlation coefficients are also estimated using frequencies greater and less than the standard business cycle frequencies.

The rolling correlation is calculated from a linear version of the reduced form VAR($p$) from equation (1),

$$\mathbf{X_t} = \mathbf{\Pi}(L)\mathbf{X_{t-1}} + \boldsymbol{\varepsilon_t}, \quad \text{where } E(\boldsymbol{\varepsilon_t}\boldsymbol{\varepsilon_t'}) = \mathbf{\Sigma} \tag{6}$$

where $\mathbf{X_t}$ is a $n \times 1$ vector containing government spending and real output fluctuations. This model forms the basis for the factor model estimated in subsequent sections. Following Stock and Watson (2005), the spectral density matrix of quarterly government spending is given as $S_{hp}(\omega) = \mathbf{C}(e^{i\omega})\mathbf{\Sigma}\mathbf{C}(e^{-i\omega})'/2\pi$, where $\mathbf{C}(L)^{-1} = [\mathbf{I} - \mathbf{\Pi}(L)]$ is the moving average of the reduced form model. The implied spectral density matrix is $|1 + e^{i\omega} + e^{2i\omega} + e^{3i\omega}|^2 S_{YY}(\omega) = [s_{ij}(\omega)]$, so that $s_{ij}(\omega)$ is the cross variable spectrum between variable $i$ and variable $j$ at frequency $\omega$. Using bandpass-filtered series changes the spectral density matrix. In this case the spectral matrix of real house prices is $|b(e^{i\omega})/(1-e^{i\omega})|^2 S_{YY}(\omega) = [s_{ij}(\omega)]$, where $b$ is the bandpass filter, so that $|b(e^{i\omega})|^2 = 1$ for $\omega_0 \leq \omega \leq \omega_1$, where the frequencies $\omega_0$ and $\omega_1$ correspond to periodicities of between six and 32 quarters, with

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[17]See Monacelli and Perotti (2006).

$|b(e^{i\omega})|^2 = 0$ otherwise. The contemporaneous correlation, denoted $\rho_{ij}$, between variables $i$ and $j$ can be estimated by

$$\rho_{ij} = \frac{\int_{-\pi}^{\pi} s_{ij}(\omega)d\omega}{\left(\int_{-\pi}^{\pi} s_{ii}(\omega)d\omega\right)^{1/2}\left(\int_{-\pi}^{\pi} s_{jj}(\omega)d\omega\right)^{1/2}} \tag{7}$$

It is widely acknowledged in the economics profession that government spending as a fraction of GDP ought to remain constant over the cycle (Alesina, Campante and Tabellini, 2008). Following such a rule would lead to an implicit adoption of a counter-cyclical fiscal policy rule. Figure 3 reports the rolling correlation between government spending as a fraction of GDP and real output growth, along with the one-standard deviation credible sets. The estimates show that fiscal policy in Malaysia has become increasingly pro-cyclical over the last 25 years. This fact appears consistent at all three business cycle frequencies. The estimates show that during the 1980s and early 1990s fiscal policy became progressively more procyclical, although not to any significant degree. Following the Asian financial crisis, however, the median estimate shows the procyclicality of government spending rose. By 2007 the correlation coefficient had reached 0.5. The estimates imply that government spending has grown in excess of real output growth since the Asian financial crisis in 1997/98.

# 5   State-dependent fiscal multipliers

The response functions are calculated using Koop, Pesaran and Potter (1996) non-linear impulse response functions are defined as:

$$IRF_{t+h} = E_t[y_{t+h}|\varepsilon_t, \psi_t] - E_t[y_{t+h}|\varepsilon_t] \tag{8}$$

where $h$ is the forecast horizon, $y_{t+h}$ contains the forecasts of the endogenous variables at horizon $h$, $\psi_t$ represents the current information set and $\varepsilon_t$ is the current disturbance term. In the linear case, the impulse response functions are time invariant, so that $\psi_t = 0$. In the non-linear case the impulse response functions are conditioned on a particularly history. In the linear case, the expectation of the path of output following the government spending shock, conditional on future shocks, is equal to the path of output when future shocks are set to their expected values. Therefore, future shocks can be set equal to zero for convenience. This is

not the case for linear models. Future shocks are drawn from some distribution and their effects averaged out over a large number of draws. The non-linear response functions are calculated using a six step Monte Carlo procedure set out in Weise (1999).

## 5.1  Regime-switching impulse responses functions

The impulse responses are expressed in terms of their deviation from steady-state. Since the IRFs are nonlinear, they will depend on the initial value of the index $z$ and the size of the government policy shock. For example, the more deep the initial recession, and the less positive the spending shock, the less important future regime shifts out of the recession will be. Therefore, we must specify the initial conditions and the size of the policy experiment in order to estimate the response functions. Figures 4 - 6 illustrate the response of the macroeconomy and the size of the fiscal multipliers to an unanticipated 1 percent increase in government spending (investment and consumption) and a 1 percent cut in personal income taxes. The real output and private consumption multiplier values are calculated as in Woodford (2011), which allows the size of the multiplier value to depend on the persistence of fiscal shocks.[18] Finally, the responses from the nonlinear model are compared to a linear model. Three key findings are uncovered:

1.     In general, Figures 4(a) and 5(a) illustrate the nonlinear framework to have estimated public expenditure to be more effective in growth recessions than in 'normal' times. This is most clearly elucidated by the response of real output to changes in government consumption spending in expansionary and recessionary episodes. Figure 5(a) shows that during expansionary periods discretionary government consumption spending has a crowding out effect on real output. In times of depressed economic growth, however, the 6-to-12 month response of real

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[18]Changes in the hysteresis of government spending may, theoretically, have important implications for the size of the fiscal multipliers. The more persistent a budget deficit is expected to be, the more likely it is that current individuals will not be around before taxes are raised, and therefore the larger is the wealth effect and the multiplier. On the other hand, Monacelli and Perotti (2006) showed in a New Keynesian dynamic general equilibrium model with perfect foresight that more persistent positive government spending shocks lead to a fall in real output. Although, this has the disadvantage of tying the model to historical experience concerning the persistence of shocks, and therefore may not apply to policies either less or more permanent.

output to a government consumption shock is positive. Figure 4(a) shows that the size of the response of real output and private consumption to discretionary government investment spending is greater during periods of depressed economic growth. Finally, the response of economic activity in Figure 6(a) shows that there is little difference in the to a 1 percent tax cut in either state of nature.

Fixed coefficient structural VARs tend to predict a rise in private consumption in response to a government spending disturbance. In contrast, event based studies, such as Ramey and Shapiro (1998) and Ramey (2009), report a decline in private consumption to a discretionary spending shock. This, it has been pointed out, is due to fiscal anticipation effects which lead to mismeasurement of the timing of spending shocks. The findings in this paper imply the response of private consumption to discretionary government spending in fixed coefficient models is dependent upon the component of government expenditure and the nature of the regime. For instance, the estimates show that under an expansionary growth state, discretionary government consumption crowds out private consumption.

2. It is instructive to look at the multiplier values. Comparing the response of real output and private consumption to government investment and government consumption shocks in Figures 4(b) and 5(b), the results show that government stimulus spending is more effective - as measured by the size of the multiplier values - when the focus is on discretionary government investment spending. Conforming to (old) Keynesian theory a 1 dollar rise in government investment spending leads to a more than 1 dollar rise in real output. Figure 4(b) illustrates a peak median real output multiplier of around 2.7 during the recessionary state and a multiplier of around 2 during normal time to a government investment shock. The corresponding multiplier values for private consumption are 1.2 and 1.4, respectively. That the response of private consumption is more damped relative to real output is consistent with the permanent/life-cycle hypothesis. In contrast to Leeper, Walker and Yang (2009), the estimates appear to display little evidence of a negative short-run multiplier in response to a government investment shock.

Figure 5(b) reports the dynamic multiplier values to discretionary government consumption spending. Relative to the response for government investment spending, the long-run confidence intervals for real output and private consumption are

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much wider, implying greater uncertainty. The dynamics multiplier values for real output during to government consumption innovations are negative in normal times. However, in the recessionary state there is a short-run (six month) positive rise in real output, with a peak multiplier value of around 2 after six months. The effect on real output is completely dissipated after one year.

In the short-run discretionary government consumption innovations have a positive impact on private consumption, with multiplier values of around 1. Bouakez and Rebel (2003) show that, even in a neoclassical model, private consumption may rise following a public consumption shock if the two are complements. Our estimates show, however, that the positive effect of government consumption spending on private consumption dissipates within six months in either regime. In the expansionary state private consumption becomes crowded in the medium-term to discretionary government consumption spending.

That government consumption spending has a negligible long-run effect on private consumption for Malaysia is consistent with Kwan (2007), which showed private consumption to be completely crowded out in the long-run. Cochrane (1994) and Bachmann and Sims (2011) note that changes in private consumption spending proxy for news that consumers receive about future productivity. More persistence/permanent movements in consumption and income reflect corresponding shifts in the long-run productivity potential of the economy. Such shifts are potentially unaffected by animal spirits. On the other hand, if fiscal policy contained no news about future fundamentals and the relationship between fiscal policy and subsequent activity only reflected animal spirits, this would be consistent with a transitory response of private consumption to a discretionary fiscal policy action. The persistent − almost random walk like − long-run response of the real output and private consumption multiplier to government investment spending in Figure 4(b) is consistent with investment spending having a permanent impact on real economic activity. As a contrast, the multiplier values illustrated in Figure 5(b) show that government consumption spending has a transitory impact on real output and private consumption, implying no permanent effect on income.

Finally, the rise in interest rates to a government investment shock, as opposed to the fall recorded for government consumption spending, is consistent with im-

proved optimism over future economic prospects in response to new discretionary government investment spending.

3.     Cuts in taxation also appear less effective in stimulating real output and private consumption than government spending.    The size of the short-run multipliers for real output and private consumption are considerably smaller than their government spending equivalents.    Figure 6(b) shows that in an economic downturn a 1 ringgit cut in direct taxation leads to around a 0.25 sen rise in private consumption after six months.    The analogous short-run estimate for normal times is 0.12.    That the impact of a tax cut for private consumption doubles in effectiveness during times of slow economic growth is consistent with the idea that the proportion of liquidity constrained individuals, with reduced access to financial markets, rises during an economic downturn.    In contrast to private consumption, the short-run real output multiplier to a discretionary tax shock is negative in both states of nature.    According to neoclassical predictions in Baxter and King (1993) a tax cut may lead private consumption and real output to move in opposite directions.    In this instance, a tax cut leads to a rise in private wealth.    This has the effect of pushing in the labour supply curve, leading output (and employment) to fall.    However, the same positive wealth effect implies that private consumption must rise.    Thus, consumption and real output move in opposite directions.    After 6-to-9 months the real output multiplier rises, reaching a peak multiplier value of around 0.15.    Within the year, however, the positive stimulus has completely dissipated.

The long-run effect of a tax cut on real output and private consumption is negligible, as reflected in the posterior error bands.    These findings are perhaps unsurprising given the narrow tax base in Malaysia, coupled with the fact that a significant proportion of government revenues are attained from commodities. There is scant evidence of the supply-side effects arising from a tax cut predicted by standard neoclassical growth models.    Standard real-business-cycle (RBC) models predict that a tax cut lead agents to substitute leisure for work, pushing out the labour supply curve, raising real output and investment.    Finally, the decline in public spending to a tax cut shock illustrated in Figure 6(a) is consistent with the 'starve the beast' hypothesis in Romer and Romer (2009).    This suggests that

further reducing corporate income tax in Malaysia, unless it's matched by savings from a rationalisation of the fiscal incentives system, may lead to a reduction in public spending.

It must be noted that the difference between the regime-based multipliers may be exaggerated due to the assumption that the parameters in the two states - growth and expansion - are constant. Regimes are disentangled based on strong growth expansions and recessions. Hence, as noted in Auerbach and Gorodnichenko (2010), one should interpret reported magnitudes of the multipliers for the two regimes as bounds from polar settings rather than routinely encountered values. More realistic situations will fall between these values. If there is a positive probability of the economy shifting from a recessionary to expansionary phase in future periods, then the multipliers starting in recession (or expansion) should be a mix of those estimated for the separate regimes .

Economic downturns are usually characterised by a rise in the number of liquidity constrained households and looser monetary policy conditions. Galí, López and Vallés (2007) have shown that as the fraction of 'rule of thumb' (ROT) consumers, which are characterised by their inability to save or borrow, increases in government spending will have more of an impact on aggregate demand. Under such circumstances it would be optimal for government spending to counteract the decline in economic activity and private consumption by increasing government consumption. This would have a positive effect on the disposable income of individuals by pushing out of the demand curve for goods and services. These effects are likely to be larger in emerging market economies, which in general have less sophisticated financial markets whilst containing greater frictions.

As reporetd for the OECD countries in Auerbach and Gorodnichenko (2011) the results support predictions in the IS-LM-AS model. During an economic downturn (upturn), the AS curve flattens (steepens) implying greater slack (tightness) in the economy. In such a scenario a fiscal stimulus that pushes out the IS curve would have a larger real economic impact compared with an environment where the economy is operating near capacity (steeper AS curve). Recent empirical evidence, mainly based on the advanced economies, shows fiscal multiplier to vary over the traditional business cycle. Christiano, Eichenbaum and Rebelo (2009)

derive real output fiscal multipliers that exceed a value of two and sometimes three in a deeply depressed economic environment and rising ROT consumers. Inconjunction with this finding Hall (2009), Corsetti, Meier and Müller (2010), Erceg and Lindé (2010) and Woodford (2011) have all reported the multiplier value to increase during times of high financial stress. Eggertsson and Woodford (2003) have also previously shown that the size of fiscal multipliers increase when monetary policy is in a liquidity trap.

The findings also corroborate a consensus which has begun to emerge in the fiscal policy literature regarding the growth-enhancing effect of government investment spending. General equilibrium models (see Baxter and King (1993), Pappa (2005) and Straub and Tchakarov (2007)) and in the recent empirical literature (see Auerbach and Gorodnichenko (2010) and Cimadomo, Hauptmeier and Kirchner (2010)) find that government investment spending tends to generate larger fiscal multipliers than discretionary government consumption innovations. Conventional explanations imply that government investment spending not only generates the usual aggregate demand effect but also a positive additional aggregate supply effect through enhancing production and the marginal productivity of labour (Auesher, 1989). The positive and persistent response of private consumption to government investment is consistent with standard neoclassical predictions, which imply that shocks about future productivity induce positive comovement in macroeconomic variables and persistent responses in private consumption.[19]

## 5.2 Policy Discussion

The findings in this paper clearly underscore the case for countercyclical fiscal policy, which implies preserving and strengthening fiscal buffers in good times. However, fiscal risks in Malaysia have grown over recent years. Malaysian fiscal policy has become increasingly pro-cyclical, setting the stage for large deficits during the recent crisis. Additionally, the negative multiplier values for the responses drawn for some of the estimates imply that not all types of government expenditures have credible stimulative effects when the economy is in an economic slump. The results show that discretionary government investment spending to

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[19]See Cochrane (1994) and Barksy and Sims (2011).

be a more effective way of stimulating economic activity than changes in tax policy or discretionary changes in government consumption spending.

The larger returns to government investment spending, particularly when compared with estimates for the advanced economies, are perhaps unsurprising given that returns to capital are often higher in emerging market countries relative to the advanced economies. However, Figure 8 shows that investment spending has declined in Malaysia over the last decade. Correspondingly Figure 7 illustrates government spending plus transfers and subsidies to have become increasingly more procyclical and expansionary. Reducing the number of investment projects or slowing down their implementation is often politically and socially easier to implement than reducing current outlays such as subsidies. The patterns of spending in Malaysia over the past decade are consistent with the 'voracity effect', and indicative of a political agency problem.

In Malaysia, a multi-ethnic society, rent seeking is high and access to information is limited including on contingent liabilities.[20] Due to the political agency problem, voters have tended to demand higher utility for themselves in good times, which was very evident between 2002 and 2008 (see Figure 7). These demands came in the form of pressures to maintain, and in some cases increase, subsidies for food and petrol in the pre-2008 crisis period, pressures to postpone implementation of GST (government sales tax) despite the need to expand the tax base and reduce oil dependence and volatility of government revenues, and an increased unwillingness to pay and pressures to freeze, lower or eliminate toll on major highways. Past governments have been generous moving away from the path of fiscal consolidation in good times. As a consequence, subsidies and debt increased between 2002 and

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[20]Contingent liabilities in Malaysia emanate from a number of factors, including government exposure to large scale PPPs infrastructure projects. The expansive toll roads program was the main source in the past. More recently, the new wave of projects under the Economic Transformation Program (ETP) may have increased government exposure in a considerable way. The government can expect to face large pay out if a number of unfavorable factors coincide such as low ridership, higher than anticipated costs or change in traffic flows. An additional source of coningent liabilities is subsidised lending and government's commitment to various subsidies which will still have to be paid even in the event of a downturn. The World Bank (2000) has estimated that if ridership was about half of the projections, then the expected costs to the Government for one of the projects could be as high as about two-thirds of project costs. To date, to our knowledge, there is no comprehensive system to account for the Malaysian government's contingent liabilities.

2008. Subsidies increased by 642 percent, whilst the corresponding figure for the stock of debt is 109 percent.

As noted in the introduction, it is the role of fiscal policy during periods of slower growth or crises times that should be of relevance to policymakers in emerging market economies. The findings in this paper suggest that a large fiscal stimulus during an economic downturn like the 199/98 Asian financial crisis - precisely when the number of balance-sheet/liquidity constrained agents were on the rise - could have loosened economic conditions and precipitated a faster economic recovery. These findings provide evidence in support of the argument that higher fiscal outlays are particularly effective as a stabilisation tool in a sharp economic downturn. Thus, a recession could be further aggravated if it forces the government to retrench spending in the midst of the downturn.

A key criticism of the International Monetary Fund's advice, during the 1997/98 financial crisis that ravaged countries in South-East Asia, including Malaysia, was the stress put on fiscal tightening. These countries were seen as sacrificing long-run growth in order to show signs of fiscal discipline. Tight fiscal policy implemented during the crisis reduced the country's net worth, by cutting productive government spending and causing a downward shift in their long-run growth trajectory. The implication of the findings is that expansionary fiscal policy during crisis periods may also help prevent long-term growth damage to the economy. The estimates in this paper show that government investment spending has long-run effects on real economic growth in Malaysia. These results appear more consistent with the predictions of (old) Keynesian theory, and hard to reconcile with those of the neoclassical paradigm. Eggertsson and Krugman (2010) recently argued that a fiscal expansion - even through an increase in (public) debt - could help alleviate a problem caused by high (private) debt and a resulting deleveraging shock due to a sharp economic downturn or economic (financial) crisis.

# 6    Conclusion

This paper investigates changes in the size of fiscal multipliers over stages of the growth cycle, which is more relevant for emerging market countries, for Malaysia.

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We also contribute to the literature by investigating how output multipliers for government purchases may differ for different components of government spending.

This paper shows that fiscal policy in Malaysia has become increasingly procyclical over the last 25 years, especially after the 1998 East Asian financial crisis. Using a non-linear model to estimate the dynamic relationship between discretionary fiscal policy and economic activity, it is established that the size of fiscal multipliers tend to increase (decrease) during periods of slow (faster) economic growth.

The returns to discretionary government spending also differ depending upon the components of government spending. Multiplier values are larger when the focus is on public investment, as opposed to consumption. A 1 Malaysian Ringgit rise in government investment spending leads to a maximum median output multiplier of around 2.7 during the recessionary state and a around 2 in normal times. The corresponding multiplier values for private consumption are 1.2 and 1.4, respectively. Our estimates suggest that government investment spending has a permanent impact on the real economic activity, while government consumption spending in Malaysia has a transitory long-run impact. Finally, changes in tax policy are less effective in stimulating economic activity than direct government spending. These results confirm conjectures in the literature by providing empirical backing for the idea that procyclicality in fiscal policy reduces the effectiveness of fiscal actions in emerging countries.

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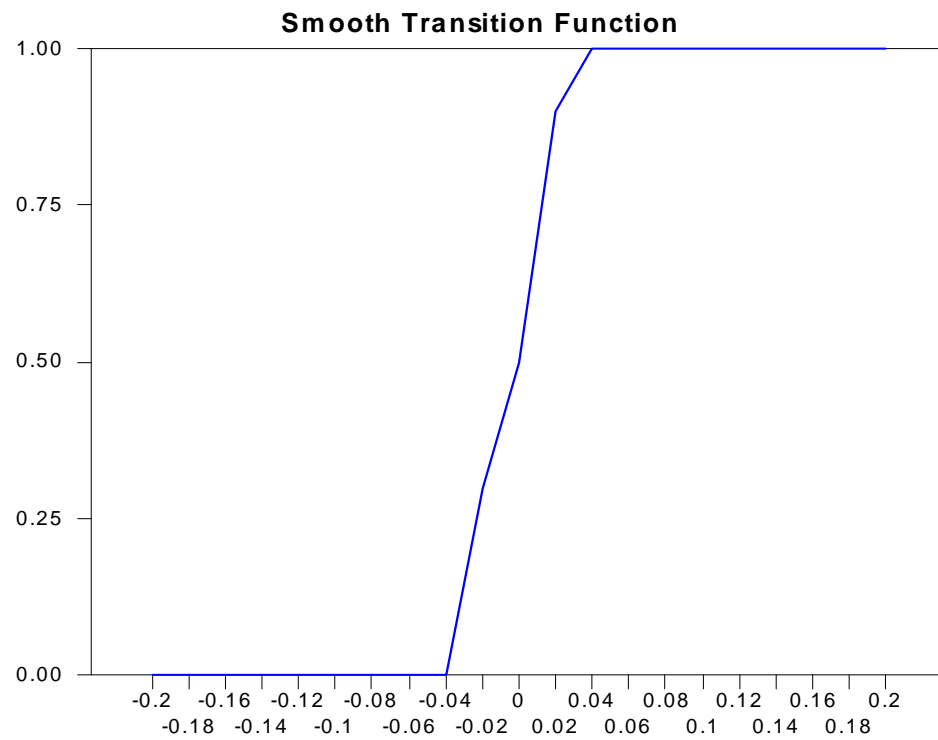
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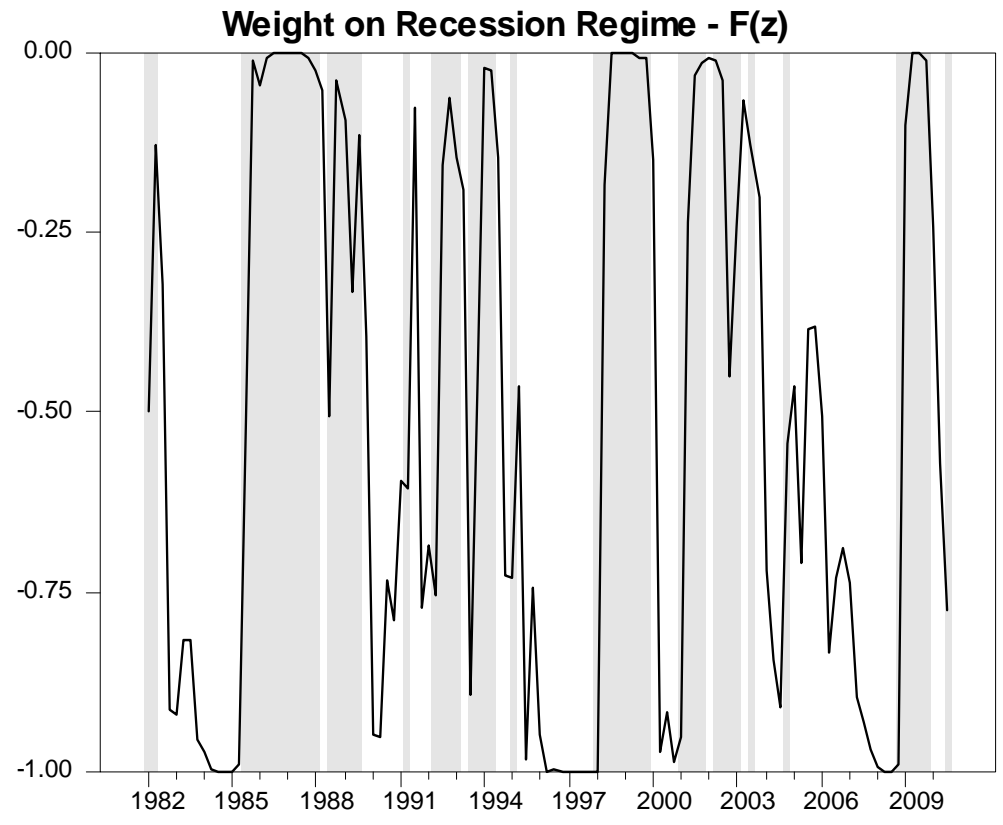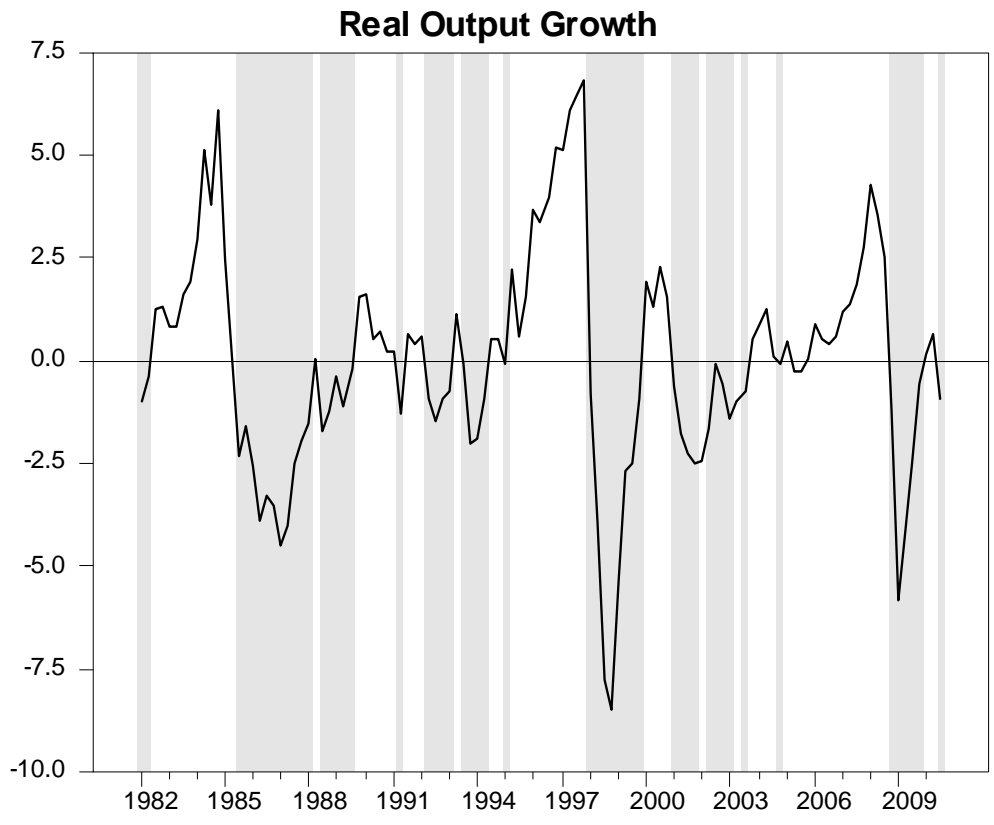
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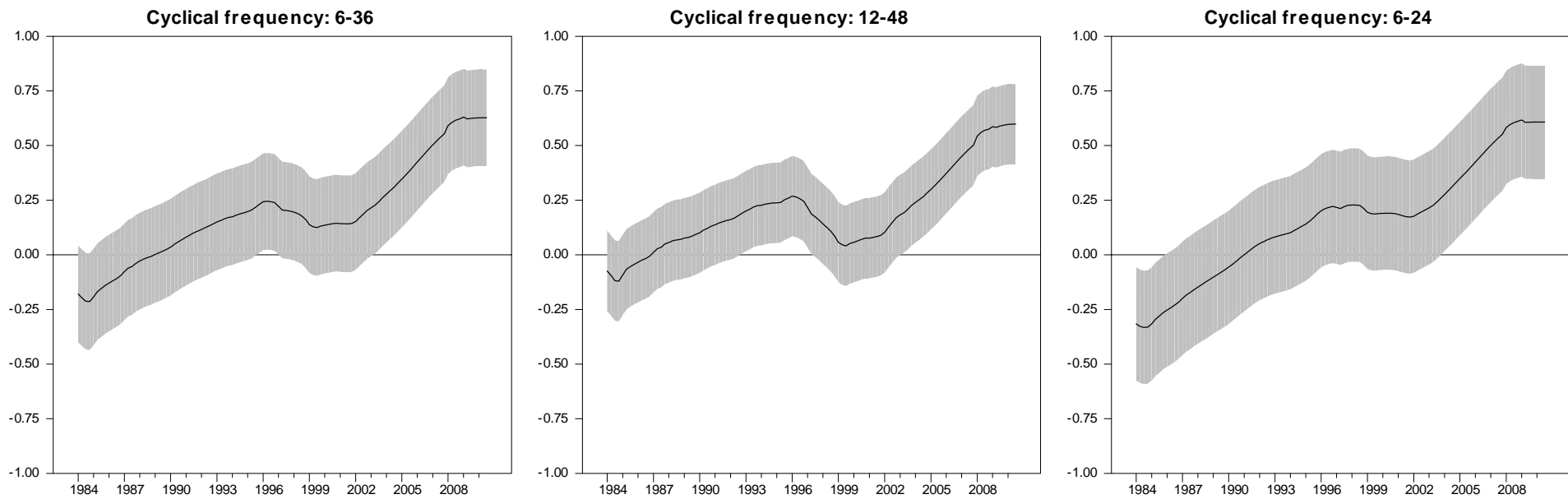
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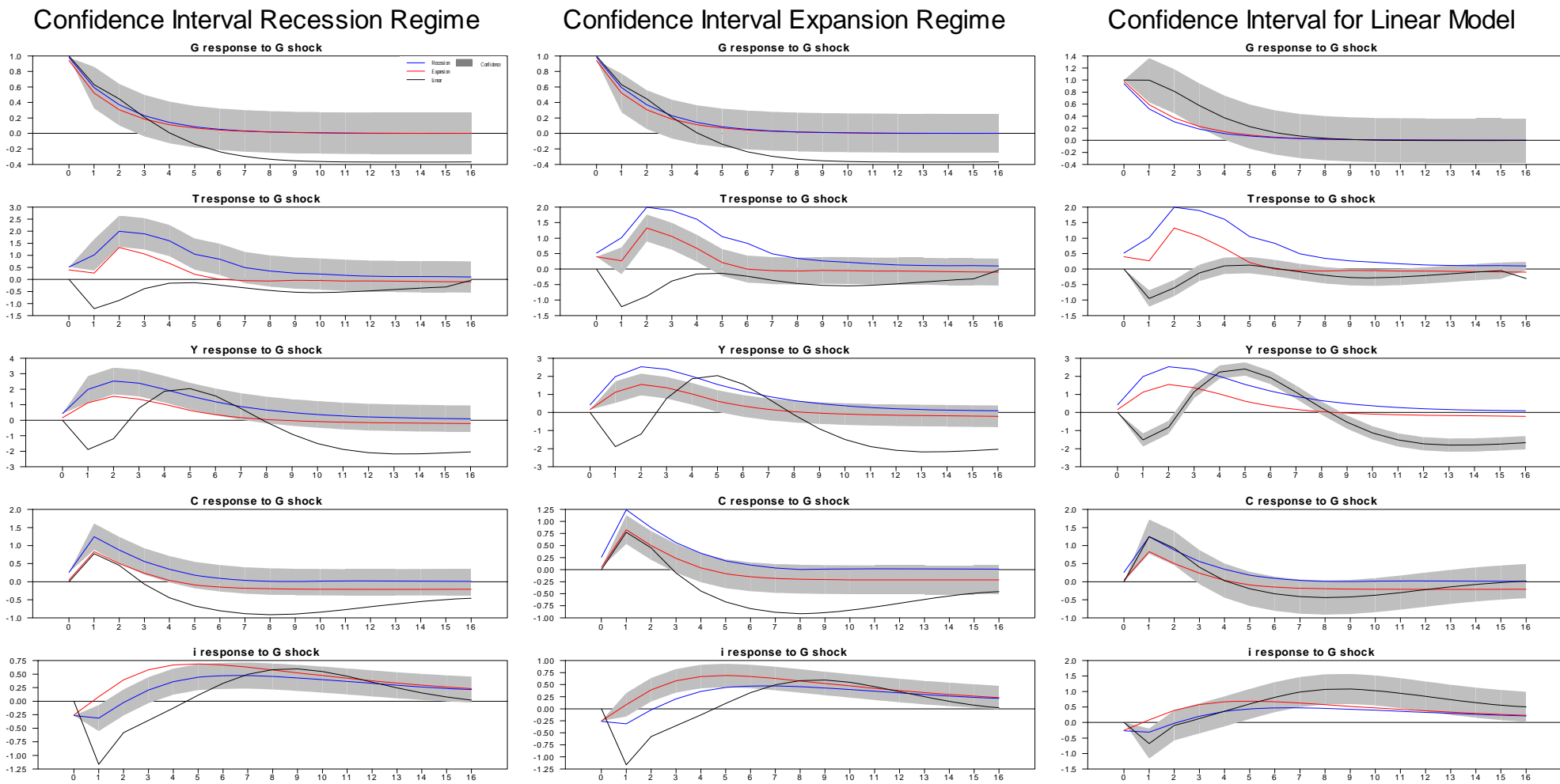
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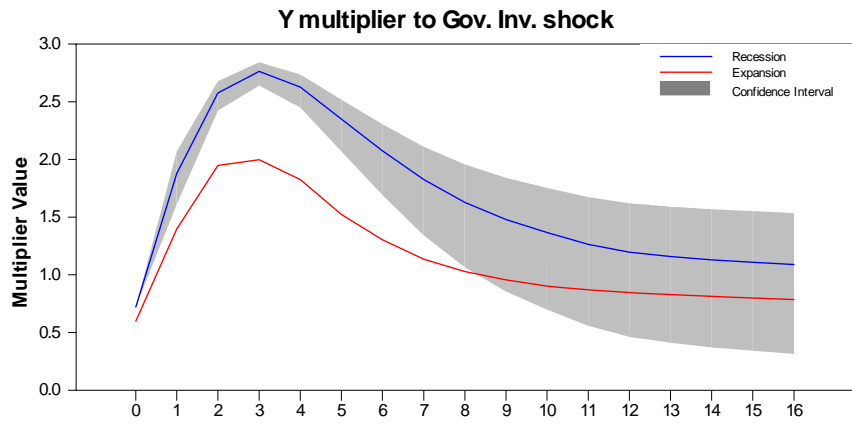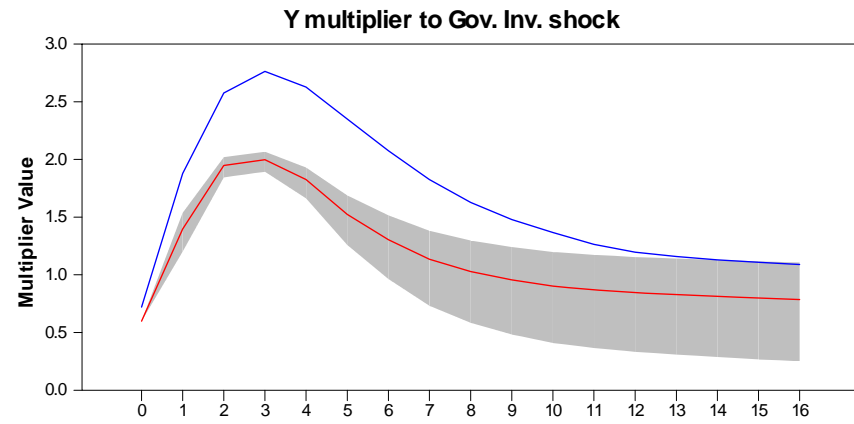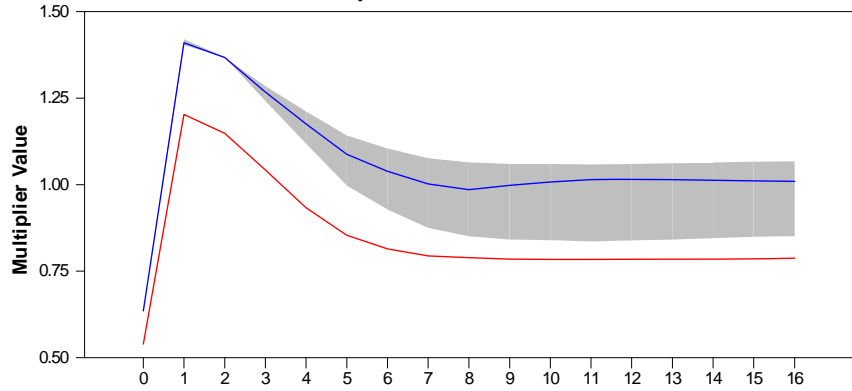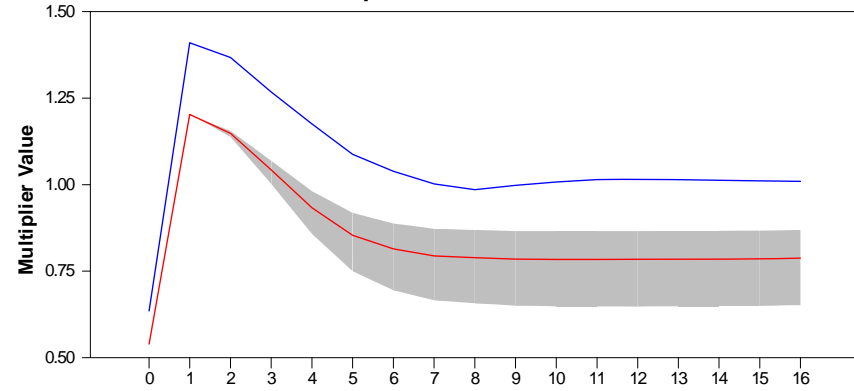
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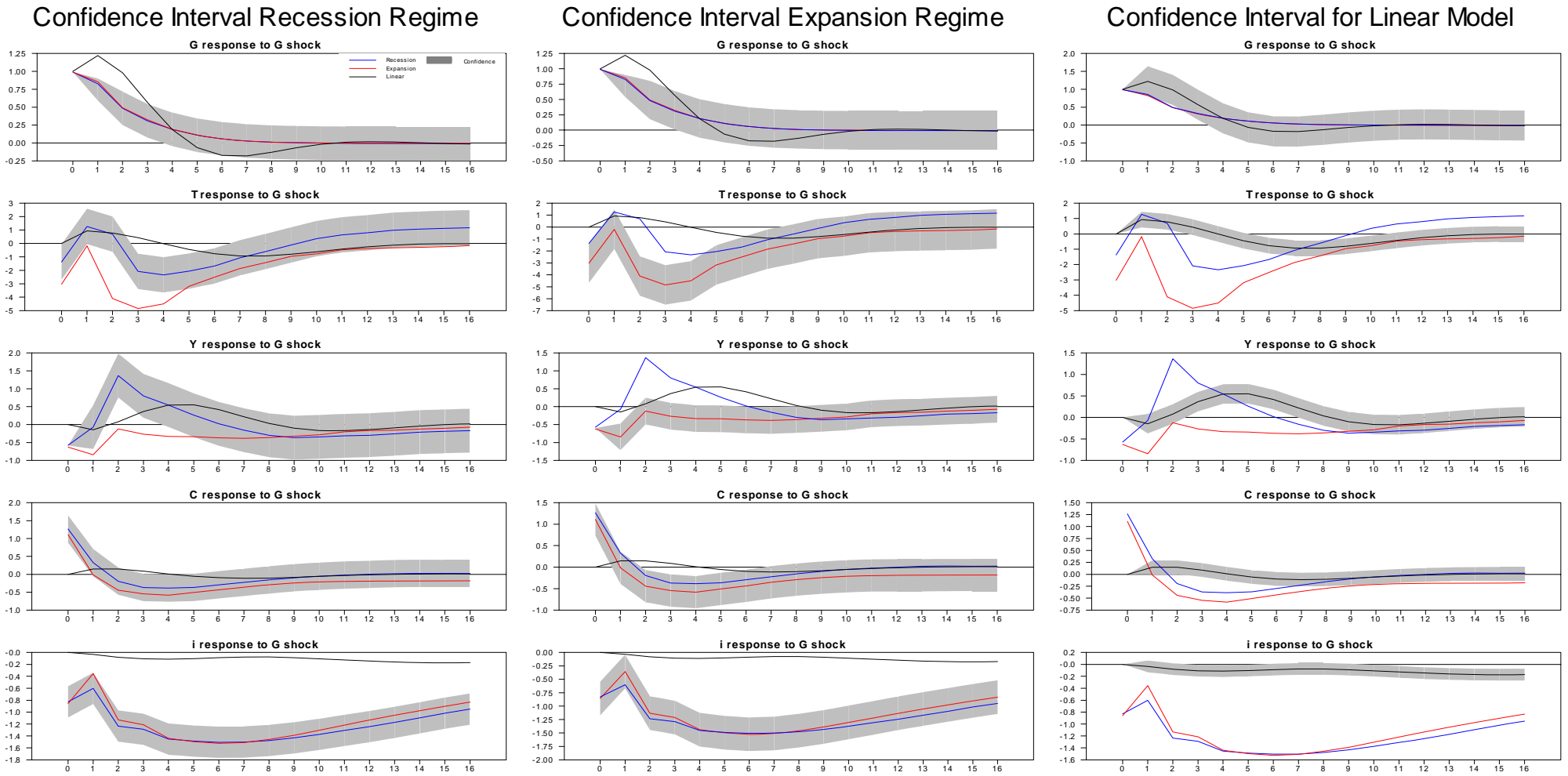
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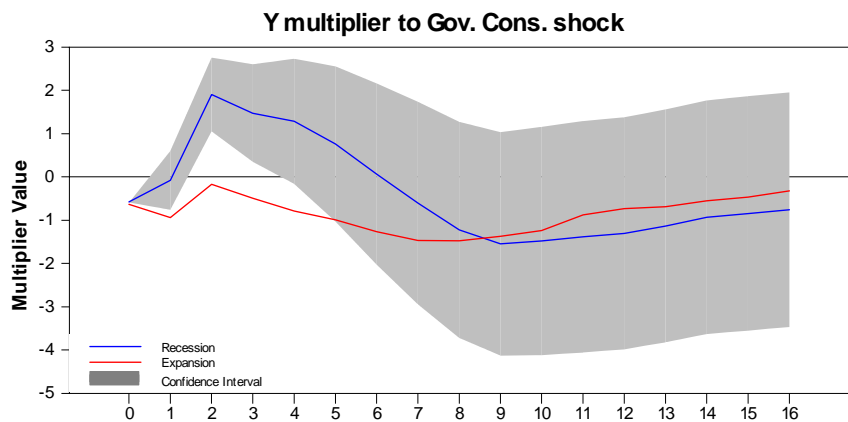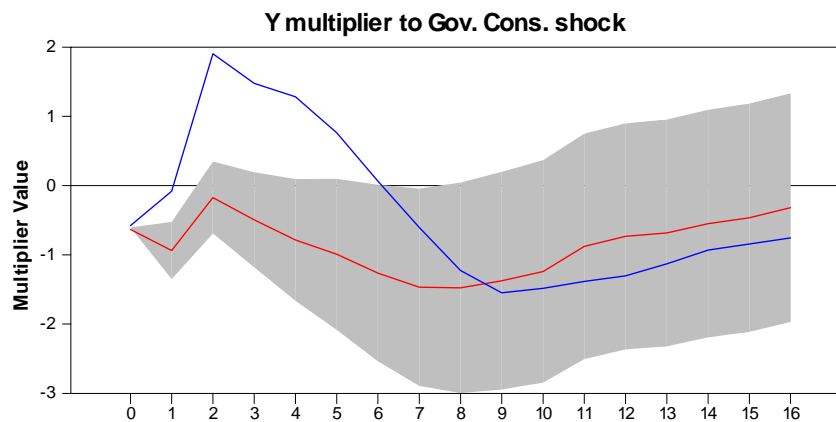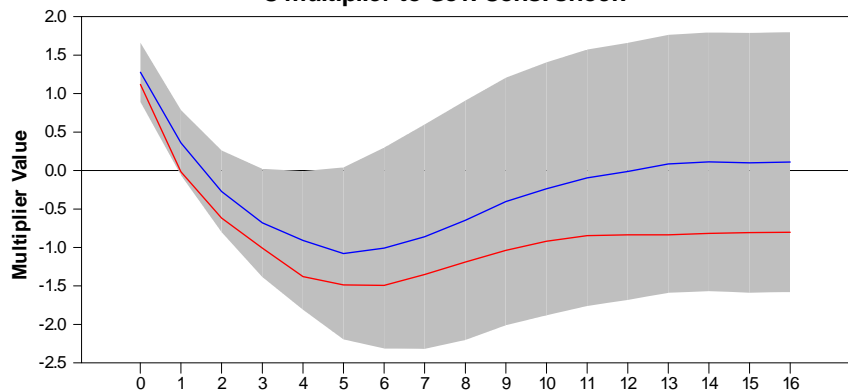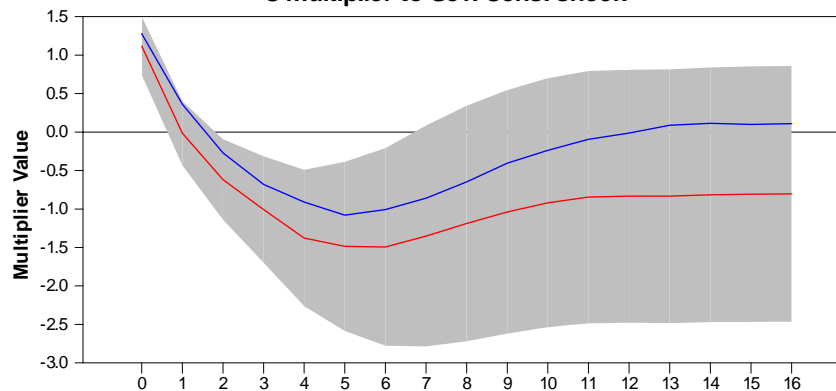
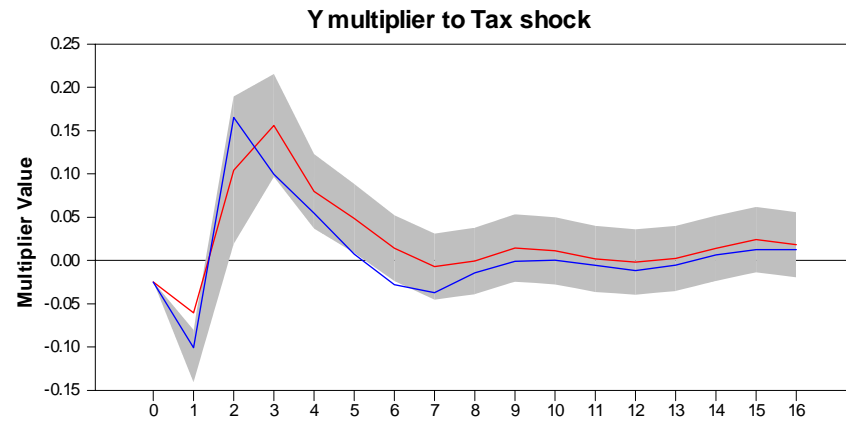Figure 5(b): Fiscal multipliers to a government consumption spending shock
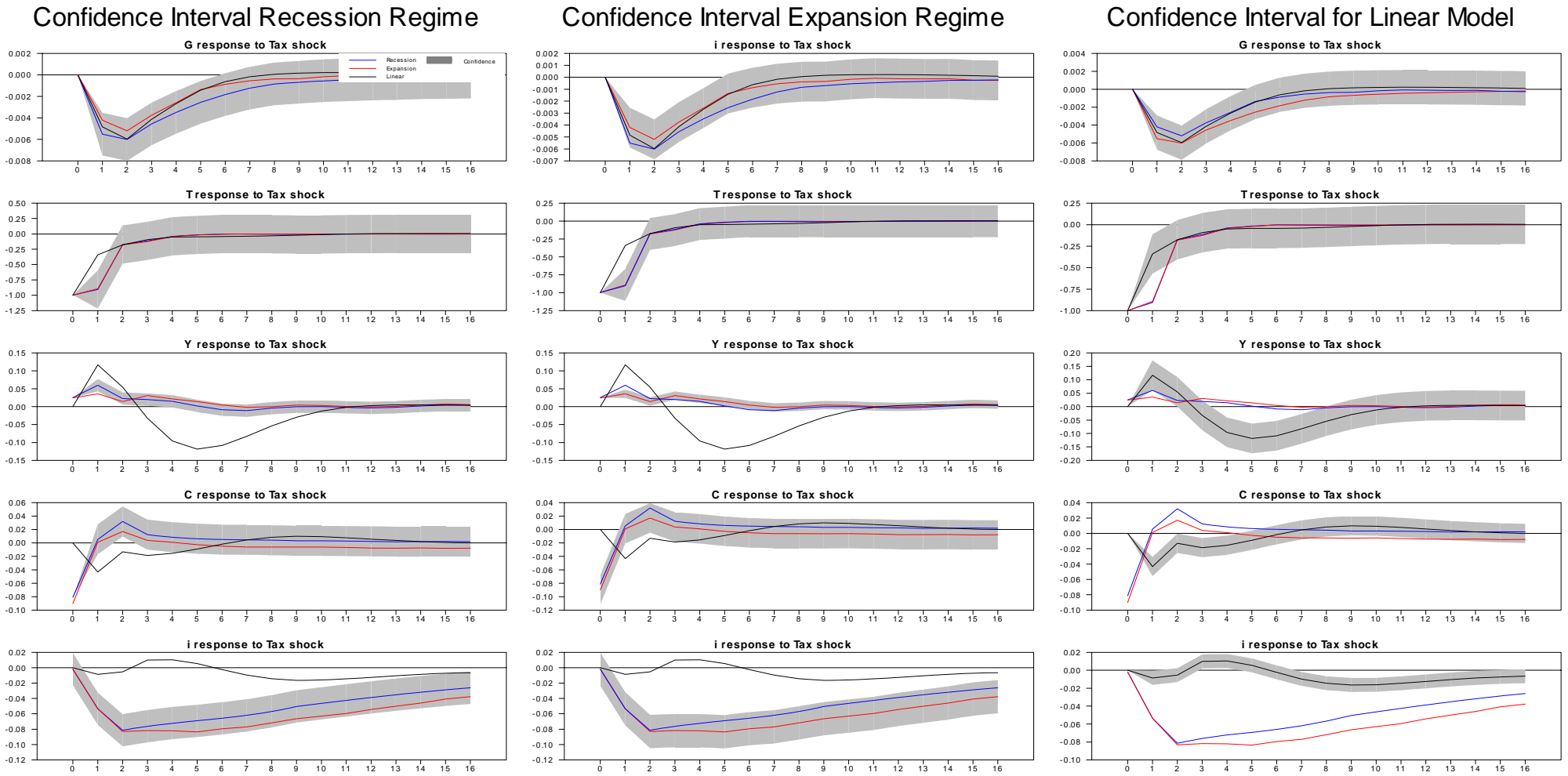
Figure 6(a): Responses to 1 percent tax cut shock
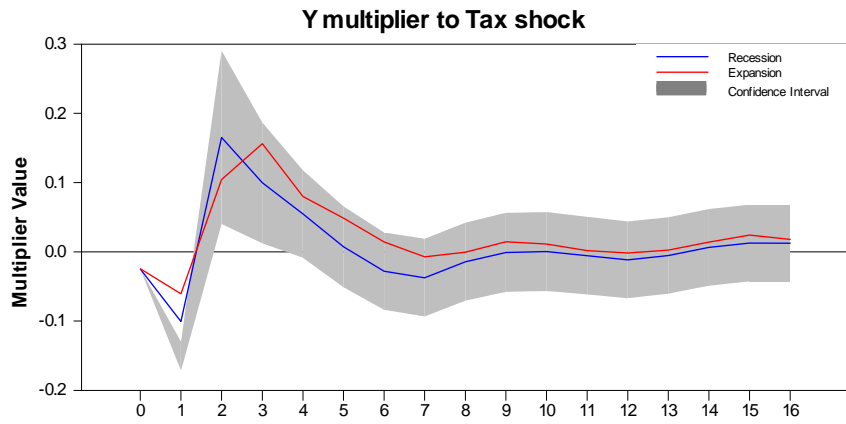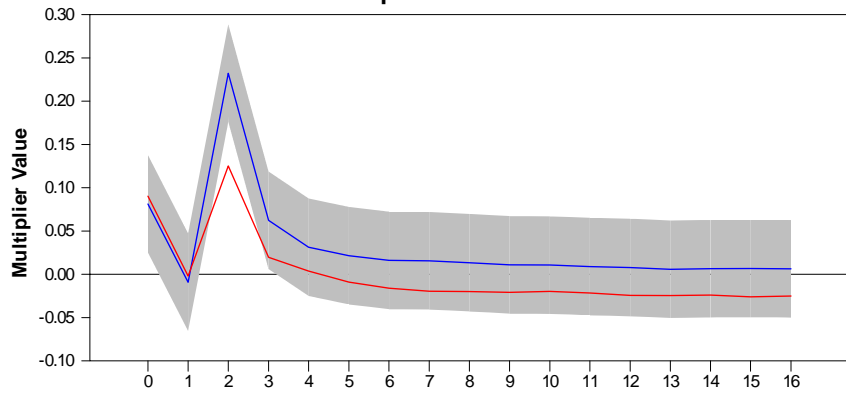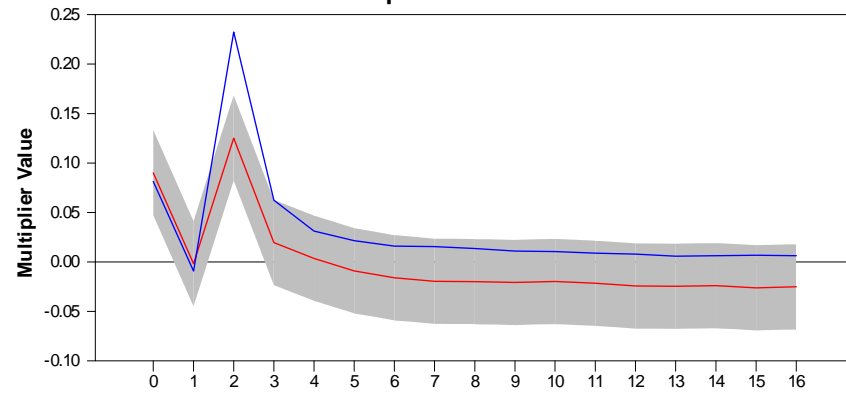
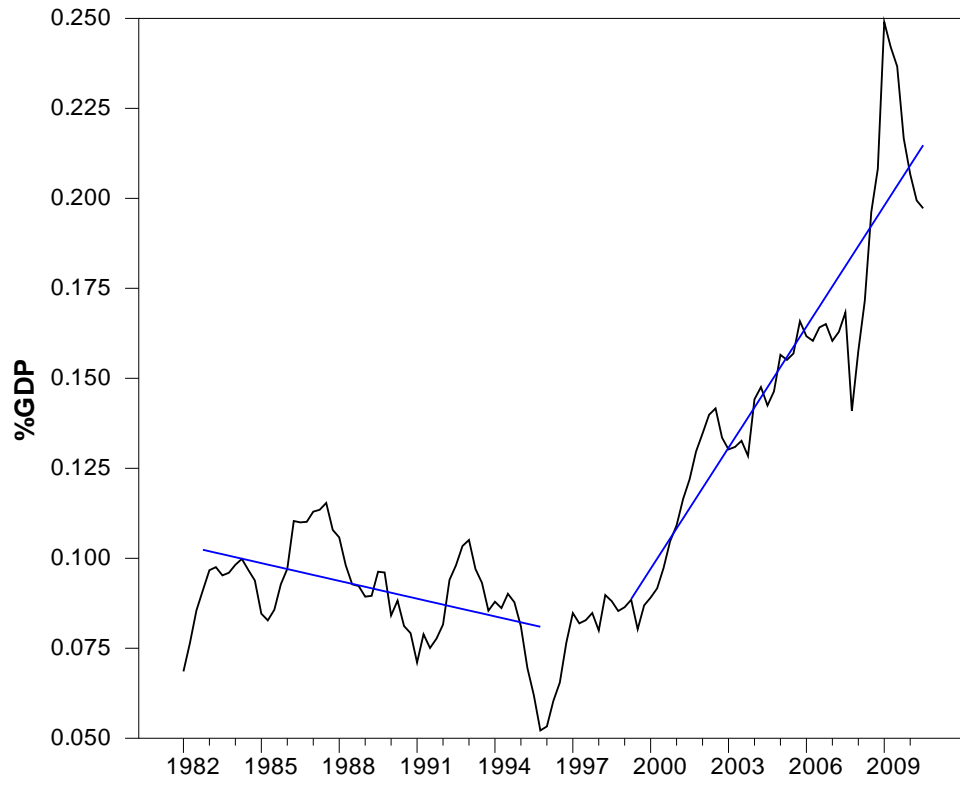Figure 6(b): Fiscal multipliers to a tax cut shock

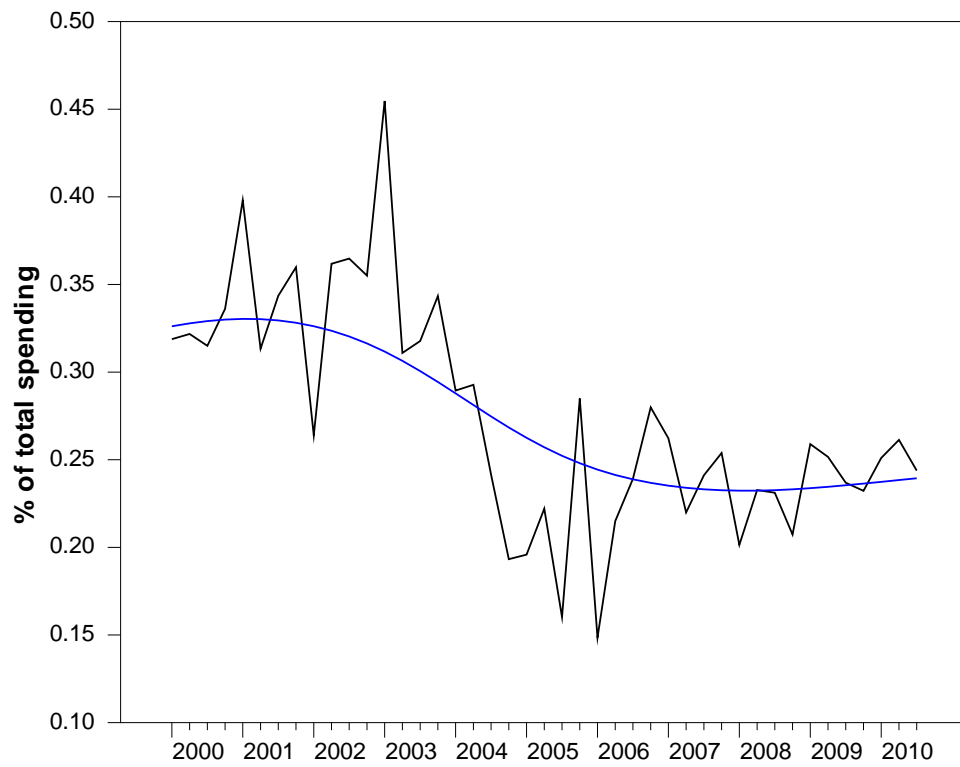Figure 7: Govenment consumption spending plus transfers as %GDP



Figure 8: Investment expenditures as % of total spending