RESEARCH ARTICLE

Legal Setbacks, Disbursement Sudden Stops, and Fiscal Stimulus: An Empirical Characterization of a Recent Philippine Fiscal Experience

Lawrence B. Dacuycuy* and Mariel Monica R. Sauler
De La Salle University, Manila, Philippines
lawrence.daculcuy@dlsu.edu.ph

Abstract: Recognizing the importance of expanding fiscal spending programs and improving disbursement rates, the Aquino administration implemented the Disbursement Acceleration Program (DAP) in 2011. Acting as a fiscal stimulus but packing a fiscal surprise, the program has reportedly succeeded in improving fiscal expenditure performance until the Supreme Court stopped it based on constitutional grounds. While there were official claims that it was effective in spurring growth, no study has been offered to investigate plausible mechanisms leading to expansions in output. This study proposes the use ofa dynamic stochastic general equilibrium (DSGE)model to stochastically simulate and compute simple fiscal multipliers to understand and identify plausible model structures within the DAP. The principal aim is to be able to interpret some of the key features of the said initiative in strictly positive terms. We provide simulation-based evidence to track the impact of changes in model structure on fiscal multiplier estimates. We find that relatively higher multipliers are associated with persistent shock processes and the pre-announcement effects do enhance fiscal multipliers but not authorized budget multipliers, implying that government announcements may be essential in influencing the dynamics of government consumption but not government investment. Finally, the study confirms that shorter implementation delays lead to relatively higher fiscal multipliers.

Keywords: Fiscal multipliers, disbursements, government investments, Philippines, DSGE

JEL Clssifications: H31, E62

Fiscal spending remains a potent policy tool in counteracting crisis episodes and,usually, proposed initiatives can easily muster overwhelming legislative or executive support.[1] This was demonstrated by the enactment of the American Recovery and Reinvestment Act (ARRA, 2009) by the U.S. Congress and the European Economic Recovery Program (EERP, 2008)by the European Commission in response to the financial crisis that has spawned serious and prolonged recessionary episodes. Technical assessments of the impacts of the crisis have revealed two important findings. First, the effectiveness of fiscal stimulus depends on program composition. Second, the degree of efficiency in the implementation of the expenditure program matters. As noted in Coenen, Straub, and Trabandt (2013), accounting for the various components of a fiscal package is important.

As emphasized in a literature strand started by Leeper, Walker, and Yang (2010), spending program implementation and subsequent fiscal adjustments are critical. A government may invest in or fund long- and short-run projects. High impact projects take time to be completed before social and economic benefits are generated. This underscores the importance of integrating time to build assumptions into real business cycle models.

When a project is approved and subsequently authorized, the rate at which funds are disbursed becomes critical. Disbursement bottlenecks delay the early realization of fiscal policy benefits. Most studies done in the U.S. and E.U. assumed that there are no irregularities in the conduct of disbursement, implying that if there are delays, they may pertain only to the operational aspects of the project. Political realities in developing countries, however, may provide opportunities to bypass legally mandated mechanisms for budgetary allocation. This may give rise to legal challenges and may result in full or partial disbursement sudden stops.

Legal setbacks, in the form of judicial interventions, may also contribute to unwarranted delays. Projects are awarded to winning bidders but, sometimes, losing bidders exercise legal options to block the awarding or implementation of the project. Such setbacks may be costly.

Several years ago, the Philippines' executive department recognized the urgency of developing a strategy to speed up the rate of disbursements. Just like other economies, there is a firm belief that activist fiscal policies can enhance growth performance. Low disbursement rates and implementation delays in existing projects have been correctly tagged as the primary causes of dismal fiscal spending growth.

To counteract the slump,the Philippines introduced the disbursement acceleration program (DAP), the intention of which, is to speed up public spending. As reported,it was observed that during the first three quarters of 2011, national government disbursements contracted by 7.3% year-on-year(Abad, Purisima, & Balisacan, 2013). Spending on in frastructure and maintenance, operating, and other expenditures (MOOE)was shown to be inadequate. As claimed by supporters of the initiative, infrastructure spending recovered from a 29% contraction in 2011 to a 34% growth at the end of September 2013 (Abad et al., 2013). The growth of MOOE has improved from 11% to 21%.Under the DAP, social services have greatly expanded in terms of budgetary allocation from 28.8% in 2003 to 34.9% in 2013.[2]

The mechanism involves the transfer of funds, labeled as savings in the General Appropriations Act (2010), from one agency to another. Considered as a stimulus package, its program components were quite diverse, consisting of a range of projects that have included capital infusions into public corporations and the Central bank, conditional cash transfers (Pantawid Pamilyang Pilipino Program), development funds to local government units, rehabilitation programs for rail transits, research funds, health benefit transfers, to name a few.

Compared with the EERP and the ARRA, the stimulus package appeared to be largely financed through savings and the mechanism allowed for the reallocation of savings to other programs. This has an added benefit of relaxing,by a bit, the stabilization requirement since savings are already available (but not realized yet per official definitions) and do not arise from the imposition of new tax levies, which can lead to output contractions. Unfortunately, the DAP, which mandated the speedy release of funds was declared unconstitutional.

Because of the adverse ruling, the DAP lost its ability to surprise economic agents; and because of the heightened oversight of legislative bodies, it may be difficult to implement such a plan again.

Subscribing to a positive approach, this paper's main objective is to capture some critical features of the initiative involving public investments to estimate fiscal multipliers.[3] No attempt to tackle normative aspects of the program will be made. As part of the usual results, dynamics will also be examined by focusing on impulse response functions.

This paper is only limited to providing fiscal multiplier estimates based on impulse response functions (IRFs) generated through stochastic simulation. One drawback of this exercise is that there is no parameter uncertainty, leading to IRFs not bounded by confidence bands. This feature, unfortunately, extends to fiscal multiplier estimates.

Effects of Fiscal Stimulus: A Brief Review[4]

Because of limited lags relative to monetary policy, fiscal policy initiatives are ideal for counteracting demand shortfalls during periods of crisis. Traditionally, fiscal stimuli are associated with government expenditures on consumption goods and services. This is the reason why fiscal policy has been deemed as a better alternative to monetary policy. Fiscal policy tools usually consist of tax cuts, government investment and consumption, labor market initiatives, and transfers, to name a few.

The extent of uncertainty precipitated by the December 2007 recession in the U.S. prompted policymakers to enact the ARRA(2009). It is a US$787 billion package, dominated by spending provisions on infrastructure.

As mentioned, policymakers need to ensure that fiscal stimuli are effective in increasing output and other key variables. As governments are constrained by budget rules and limited public funds, the main gauge to determine fiscal policy effectiveness is the fiscal multiplier, which measures the extent to which key macroeconomic variables will be affected by changes in the magnitude of a fiscal variable. Several researchers have already ascertained the degree to which stimuli have succeeded. Zubairy (2014) reportedthat the median multiplier of fiscal spending is 1.07, indicating that a dollar spent in implementing the fiscal stimulus yields 1.07 dollar in output increase. In contrast, the median multipliers associated with labor and capital tax reduction appear to be far less in terms of output effects. Ilzetzki et al. (2013) constituted a quarterly dataset of 44 countries to implement the structural vector autoregression (SVAR) to determine how features of economic systems affect the magnitude of fiscal multipliers. Such features include the income status of a country, the prevailing exchange rate regime, and the degree of indebtedness. The study confirmedthat fiscal multipliers in industrial countries are higher than developing ones. In terms of the degree of openness, closed economies have lower fiscal multipliers. Countries operating under predetermined exchange rates have higher fiscal multipliers relative to those that adopt flexible exchange rates. Finally, indebted countries face non-positive fiscal multipliers, consistent with the notion that implementing fiscal stimuli may be counterproductive in such countries.

On the other side of the Atlantic, the E.U.has implemented the EERP, which was enacted to counter the financial crisis. Coenen et al. (2013) used and extended the new area wide model (NAWM), an open economy DSGE model, to evaluate the effectiveness of the EERP. As part of the usual routine, fiscal multipliers were estimated and evaluated. The model recognizes the presence of non-Ricardian households, nonseparability of government consumption, time to build technology for public capital, distortionary tax rates, and fiscal rules for endogenous fiscal policy. The results indicated a high degree of complementarity between public and private consumption and capital. Coenen et al. (2013) evaluated the fiscal multipliers based on estimated impulse responses and found that government consumption and investment have the highest multiplier effect on impact. Taxes such as consumption, labor income, and social security taxes appear to have minimal effects on output. Over a period spanned by 16 quarters, government consumption and investment registers sustained multiplier effects, with its value on the 16th quarter still high at 0.98 and 0.74, respectively. The multipliers after 16th quarters for tax-based fiscal policies do not show small improvements relative to initial impacts, validating several studies like Villaverde (2010) and Uhlig (2010).

While fiscal policy shocks may impact the economy sooner compared with monetary policy, it is important to realize that its effectiveness may be dampened due to implementation delays and, to a certain extent, the exercise of fiscal foresight by rational agents. Because public investment programs may include massive provisions on public capital expenditures, delays can have material effects on growth prospects and may exacerbate business cycles. This is precisely what Leeper et al. (2010)have argued. Because of implementation delays, output multipliers may be low on impact but may eventually increase after the completion of the project. Leeper et al.(2010) computed present value cumulative multipliers given an increase in government investment and low government efficiency parameter at 0.05. With a one quarter delay, cumulative output effect is 0.39. Consumption and investment effects are both negative. With a 3-year delay, output effects are reduced to -0.31, and both consumption and investment remain in negative territory. Highlighting the importance of achieving a high degree of government efficiency, an increase in the efficiency parameter leads to higher output and consumption multiplier effects. As a result of implementation delays, cumulative investment multiplier remains negative.

As an extension, Dacuycuy (2016) introduced authorized budget shocks that are orthogonal to investment shocks and assumes that there may be setbacks that result in sudden stops in disbursement flows. Motivated by a recent fiscal experience of the Philippines, he explored a neoclassical model's properties when a shock structure that introduces shocks to authorized budget alongside unanticipated government investment shocks is integrated into the model.

Sudden stops in disbursement flows are rare events, considering the experience and expertise of legislative departments in formulating fiscal measures the right way. Thus, it can be remarked that rarely do large-scale government spending programs suffer from legal setbacks due to strict adherence to constitutionally mandated processes. Experiencing sudden stops in disbursement flows may alter model dynamics, and results show that preference structures have a role to play. Though sudden stops in disbursement flows are not modeled probabilistically, results indicate that there are indeed macroeconomic consequences. Disbursement shocks are not immediately expansionary but may provide additional sources of growth in output and private consumption. What is clear is that even with authorized budget shocks, a sudden stop to disbursement flow will still yield lower government investments. Given that stops are ruled out, government investment shocks also have the advantage of increasing public investments much earlier than when implementation delays are present.

Aside from implementation delays, other aspects may be of importance in understanding the impact of fiscal policy. Leeper, Plante, and Traum (2010) highlighted the importance of accounting for the effects of ballooning debt. It also shows the critical role of fiscal policy rules in improving the fit of the model. Embedding distortionary elements onto fiscal instruments also yield different responses of key macroeconomic aggregates.

There are also temporal differences in the way fiscal instruments react to debt. Leeper et al. (2010), for instance, pointed out that retiring the debt early—a strategy to prevent destabilizing debt accumulation—may defeat the purpose of stimulating the economy. This is also supported by Zubairy (2014) who found that the speed of retiring government debt associated with the stimulus is more important for longer horizons relative to shorter ones. In a related study, Uhlig (2010) pointed out that while fiscal stimulus may yield output gains in the short-run, one must not ignore its cost in terms of future output loss. He calculated that for every dollar of extra government spending, about \$3.40 of future output would be lost.

The Model

The model platform follows Leeper et al. (2010) and Dacuycuy (2016) which are both neoclassical in the sense that markets do not exhibit hints of monopolistic competition leading to nominal rigidities. This economy consists of a continuum of households and firms. Households are not differentiated in terms of skill type and compared with their New Keynesian counterparts. They do not have the market power to bargain for higher wages when they offer labor services to firms. Firms hire labor and capital services at market rates and are assumed to produce final goods. Finally, the government is represented by fiscal policymakers.

Households

Because of the importance of cash transfers to poor households in the Philippines, we will appeal to Coenen et al. (2013) by introducing Ricardian and non-Ricardian households. Both types of households have the same preference structure and labor supply behavior but differ with respect to the specification of their respective budget constraints, as non-Ricardian households are limited to consumption and labor market activities. Such households also choose consumption based on their nominal constraint and the relative share in government transfers are determined using a transfer rule from Coenen et al. (2013).

Ricardian households maximize utility that integrates external habit formation in consumption $c_{h,t}$ defined in equation (1).[5]

$$E_t\left[\sum_{k=0}^{\infty}\beta^{t+k}\,\epsilon_{t+k}^{C}\left(\frac{(c_{t+k}-hc_{t+k-1})^{1-\zeta}}{1-\zeta}-\frac{l_{t+k}^{1+\eta}}{1+\eta}\right)\right] \tag{1}$$

where l_t is labor supply, ζ representing the inverse of the relative risk aversion parameter, η is the inverse of the Frisch substitution elasticity, ϵ_t^C and represents a preference shock.

The budget constraint of the Ricardian household is given by:

$$(1+\tau_t^C)c_t + i_t + B_t = (1-\tau_t^K)r_t^k u_t k_{t-1} + (1-\tau_t^l)w_t l_t + r_{t-1}B_{t-1} + TR_t^R \tag{2}$$

In the budget, households are levied consumption taxes τ_t^C, pay labor earnings taxes $\tau_t^l w_t l_t$, and capital taxes $\tau_t^K r_t^k u_t k_{t-1}$ as well. They also receive transfers TR_t^R. The utilization rate of capital, u_t with $u_t = \rho_u u_{t-1} + \epsilon_t^u$ matters. Households use part of their budget to purchase domestic bonds. Previous earnings from said bonds, $r_{t-1}B_{t-1}$, however, are not subject to tax.

On the other hand, non-Ricardian household's nominal consumption is given by

$$c_t^{NR} = \frac{(1-\tau_t^l)w_t l_t + TR_t^{NR}}{(1+\tau_t^C)} \tag{3}$$

It is explicit that the amount of labor supplied by both types of households supply the same amount of labor but receive different amounts of transfers based on the following transfer rule.

We follow the simple law of motion of private capital given by

$$k_t = [1-\delta]k_{t-1} + i_t \tag{4}$$

Firms

Firms' production processes are assumed to benefit from government capital K_t^G. Integrating government capital into the firm's production function, we have

$$y_t = z_t[u_t k_{t-1}]^{\alpha}[l_t]^{1-\alpha}(K_{t-1}^G)^{\alpha^G} \tag{5}$$

where z_t is given by the autoregressive processes $z_t = \rho_z z_{t-1} + \epsilon_t^z$ and $u_t = \rho_u u_{t-1} + \epsilon_t^u$. ϵ_t^u and ϵ_t^z are the utilization and technology shocks, respectively. Output now depends on private capital, labor supply, and government capital. The responsiveness of output to government capital is given by α^G.[6]

Returns in capital and labor markets are given by equations (6) and (7), respectively.

$$r_t^k = \frac{\alpha Y_t}{K_{t-1}} \tag{6}$$

$$w_t = \frac{(1-\alpha)Y_t}{L_t} \tag{7}$$

Government

Expenditures on government consumption and investment and payment for bond issuances and transfers should be matched by tax collections.

$$\tau_t^C C_t + \tau_t^K r_t^k u_t K_{t-1} + \tau_t^l w_t l_t + B_t = G_t^c + G_t^I + r_{t-1}B_{t-1} + TR_t \tag{8}$$

where

$$TR_t = \theta TR_t^R + (1-\theta)TR_t^{NR}$$

In terms of feasibility, we have

$$G_t^c + G_t^I + C_t + I_t = Y_t \tag{9}$$

where G_t^c and G_t^I represent government consumption and implemented investment, respectively. Government capital evolves based on capital replacement rate and authorized spending process given by A_{t-N}, where N denotes the period needed to finish the project. As Leeper et al. (2010) mentioned, A_t can be interpreted as the flow of investment from the budget stock, meaning, when a project is officially funded, it will not be built right away. Instead, it will take years before the project starts generating social benefits. Government's capital accumulation is thus given by the following process:

$$K_{t-1}^G = (1 - \delta_G)K_{t-2}^C + A_{t-N} \tag{10}$$

where $A_t = \rho_A A_{t-1} + \mu_t^A, \mu_t^A \sim N(0,1)$

Public investments evolve based on the following dynamics:

$$G_t^I = \sum_{n=0}^{N-1} \phi_n A_{t-n} + \left(1 - \varrho_{G^I}\right)\xi_t^{G^I} + \varrho_{G^I}\xi_{t-1}^{G^I} \tag{11}$$

where $\xi_t^{G^I} = \rho_{\xi,G^I}\xi_{t-1}^{G^I} + \epsilon_t^{\xi,G^I}$, ϱ_{G^I} represents the weight associated with pre-announcement effects and the sequence of disbursement rates $\{\phi\}_{i=0}^{N-1}$ sum up to 1. As defined in Mountford and Uhlig (2009), pre-announcement effects imply that changes in fiscal policy instruments may affect fiscal policy variables in the future but not current outcomes. The impact of authorized spending shocks depends on the values of the outlay or disbursement parameters ϕ_n.. Given smaller values of the parameters for initial periods after project commencement, it is possible that impact multipliers start out smaller first, followed by increasing impact as horizons become longer.

In the model, two shocks may matter for government investment. One is initiated by sudden, unanticipated changes in implemented government investment $\xi_t^{G^I}$. The other one has to do with authorized spending shocks μ_t^A, which may expedite the flow of investments to government capital. The two shock dynamics are expected to differ from each other. Despite their expected dissimilarities, they may provide insights, though, thereby enabling us to understand which one yields better dynamics.

We offer two probable scenarios to the above base model. First, there is a possibility that disbursements may suddenly stop because of a rare legal setback that abrogates the basis of the project.[7] This may mean thatparameter values may be small and become zero after the initial period/s of commencement.

$$G_t^I = \phi_0 A_t + \phi_1 A_{t-1} + \sum_{n=2}^{N-1} 0. A_{t-n} + \left(1 - \varrho_{G^I}\right)\xi_t^{G^I} + \varrho_{G^I}\xi_t^{G^I},$$
$$\phi_1 > 0 \; where \frac{\phi_1}{\sum_{n=0}^{N-1}\phi_n} < 1; \; \phi_0 = \phi_2 = \cdots = \phi_{N-1} = 0 \tag{12}$$

The effect will be transmitted to output because authorized spending affects the stock of public capital which is used in the firm's production. Since other variables like private consumption depend on output, it means that a permanent stop to disbursement flow will affect them as well. Because of automatic stabilizers on fiscal tools, a dramatic stop in disbursement flows would also reduce government consumption.

Second, it is possible that the legal setback is temporary, which implies that authorized spending or disbursements will flow for a period and then stop pending the resolution of the legal issue. The high-resolution rate means that disbursement flows will then resume until the completion of the project.

$$G_t^I = \phi_0 A_t + \phi_1 A_{t-1} + \sum_{n=2}^{k} 0.A_{t-n} + \sum_{n=k+1}^{N-1} \phi_n A_{t-n} + \left(1-\varrho_{G^I}\right)\xi_t^{G^I} + \varrho_{G^I}\xi_t^{G^I},$$
$$\phi_0 > 0; \phi_1 > 0; \phi_n > 0;\ \phi_0 + \phi_1 + \sum_{n=k+1}^{N-1}\phi_n = 1 \tag{13}$$

Finally, we integrate automatic stabilization policies following Leeper et al. (2010) and Coenen et al. (2013). The main characterization is the following: $\hat{s}_{t-s}^B$ is the ratio of government debt to output s periods ago. Had it been contemporaneous to the fiscal instrument, and it would mean that fiscal adjustments to debt expansions would occur one period after spending spikes. However,this may be counterproductive and infeasible considering the lags of government expenditures. Legislative provisions may reflect this.

Transfers must be reduced in reaction to an increase in debt-output ratio. $\xi_t^{TR} = \rho_{\xi,TR}\xi_{t-1}^{TR} + \epsilon_t^{\xi,TR}$ is an unanticipated shock to transfers, representing discretionary fiscal policy. $\epsilon_t^{\xi,TR}$ is given by an autoregressive process.

$$TR_t = -\psi_Z y_t - \gamma_Z s_{t-s}^B + (1-\varrho_{TR})\xi_t^{TR} + \varrho_{TR}\xi_t^{TR} \tag{14}$$

Tax rates will eventually adjust upwards in order to stabilize the budget. The process is given by the following:

$$\tau_t^l = \psi_Z y_t + \gamma_Z \hat{s}_{t-s}^B + \left(1-\varrho_{\tau^l}\right)\xi_t^{\tau^l} + \varrho_{\tau^l}\xi_t^{\tau^l}, \tag{15}$$

where $\xi_t^{\tau^l} = \rho_{\xi,\tau^l}\xi_{t-1}^{\tau^l} + \epsilon_t^{\xi,\tau^l}$ and $\epsilon_t^{\xi,\tau^l} = \rho_{\xi,\tau^l}\epsilon_t^{\xi,\tau^l} + \mu_t^i$

Finally, government spending needs to be reined in to generate surplus needed to stabilize the budget.

$$G_t^c = \rho_{G^c}G_{t-1}^c - \gamma_G s_{t-s}^B + (1-\varrho_G)\xi_t^G + \varrho_G\xi_t^G, \tag{16}$$

where $\xi_t^G = \rho_{\xi,G}\xi_{t-1}^G + \epsilon_t^{\xi,G}$and $\epsilon_t^{\xi,G} \sim N(0,1)$.$\varrho_{TR}$, ϱ_{τ^l}, and ϱ_G represent weights associated with pre–announcement effects.

Simulating Multiplier Sensitivities

We use stochastic simulation in Dynare to determine the relationships among shock structures, the proportion of non-Ricardian households, government investment shock persistence, the period of implementation, and fiscal multipliers. To analyze the role of fiscal policy, the unit of analysis is the impulse response function realized given one standard deviation shock.

Multiplier estimates,which are computed based on impulse response functions, will be presented. The objective of this is to analyze the impact of shocks in a controlled setting using impulse response function estimates(Coenen et al., 2013; Mountford & Uhlig, 2009; Uhlig, 2010). Understanding simulation evidence may provide clues as to how dynamic effects can be interpreted, given that fiscal multipliers may be sensitive to changes in structural model components, parameters, and stochastic processes. This simulation experiment aims to provide information as to how estimates based on actual data can be interpreted.

To capture the impact of government spending shocks as well as other fiscal tools, we compute the multipliers. Following Uhlig(2010) and Mountford and Uhlig (2009), the present value multiplier at time t, $\mathcal{M}_t^{PV}$ is given by

$$\mathcal{M}_t^{PV} = \left(\sum_{s=0}^{t}(1+rr)^{-s}(\Delta y_s)\right)\Bigg/\left(\sum_{s=0}^{t}(1+rr)^{-s}(\Delta g_s)\right) \quad (17)$$

where rr denotes steady state real interest on government debt.

In contrast to Coenen et al. (2013) and Leeper et al. (2010), we do not estimate the parameters. Parameters are calibrated, implying that there is no parameter uncertainty. Hence, it is not possible to construct confidence bands for the impulse response function. The approach is consistent with Villaverde (2010) and Uhlig (2010). This is an acknowledged limitation of the stochastic simulation method. In the mentioned studies, the 5th and 95th percentiles of the fiscal multipliers can be computed from the posterior distribution of estimated parameters. For instance, Coenen et al. (2013) computed present-value fiscal multipliers based on estimated impulse responses computed at the posterior mode estimates of the model parameters.

Simulation Design

Given the recent fiscal experience, our task is to map salient features of the fiscal initiative with respect to government investments and consumption, to the set of plausible simulation design components. Through simulations, we attempt to understand the role of shock structures, pre-announcement effects, the persistence of authorized budget shocks, correlation of shock structures, and the proportion of non-Ricardian households.

Capturing the process that generates persistence is important. In the model, the fiscal spending process G_t^c has two dynamic components. One shows how the past value of G_t^c affects its future realizations (ρ_{G^c}) and the other one pertains to the degree of persistence $(\rho_{\xi,G})$ in the shock process. In terms of representation variants, one assumes that the shock evolves following an AR process $\xi_t^G = \rho_{\xi,G}\xi_{t-1}^G + \epsilon_t^{\xi,G}$. When $\rho_{\xi,G} = 0$, we expect that shocks are uncorrelated, implying that no matter how significant they are, they do not generate realized government consumption expenditures that behave persistently over time. It turns out that the parameter value has a material or influential effect on the magnitude of the fiscal spending multiplier. This feature may prove to be important in differentiating expenditure program components that embody persistence from those that do not.[8]

Second, we consider changing the value of the proportion of non-Ricardian households from 0.5 to 0.8. The importance of this is to simulate the impact of an increase in the proportion of non-optimizing households who, because of their relative inability to adjust to shocks, are usually the target of intervention programs designed to uplift welfare states. Since is used to purchase goods and services, we conjecture that a higher proportion may lead to higher multipliers.

Third, we correlate authorized budget and government consumption shocks. This may be plausible, as the fiscal authority may deem necessary to supplement a sudden increase in investment expenditures. There are two possibilities. The shocks may either be strongly or weakly correlated. We assume that as more investment funds are needed, a positive shock to government consumption may also occur, thereby enhancing multiplicative effects.

Fourth, to ascertain whether it is beneficial not to divulge the policy initiative, announcement effects are incorporated into fiscal policy.[9]

Fifth, we will also examine how implementation delays affect multiplier estimates, subject to the factors considered above. However, this necessitates the computation of authorized budget multipliers.

Fiscal Multipliers

Results are in Tables A1 to A5 in the Appendix for reference.[10] Tables A1 (no announcement effects) and A2 (with announcement effects) present fiscal spending multipliers based on one quarter completion of a representative project. The correlation between present and lagged government consumption may be low or high, and the proportion of non-Ricardian households is either 0.5 or 0.8. Given the short delay in implementation, we expect that investment and consumption multipliers are relatively large, compared with situations dominated by long delays.

Tables A3 and A4 show authorized budget multipliers. For our computations, it is now necessary to vary project completion to ascertain the response of multipliers. Multipliers are calculated based on delays of 1, 4, or 8 periods or with a sudden stop.

Table A5 reports multipliers when authorized budget and government consumption shocks are assumed to be correlated (low or high). The correlation between current and past government consumption may be low or high.

We now extract particular cases of interest from Tables A1 to A5, and we plot these cases in the accompanying Figures. Figures 1.1 and 1.2 are extracted from Table A1. Figures 2.1 and 2.2 are from Table A2.

Here are our observations. First,as shown in Figures 1.1, 1.2, 2.1, and 2.2, moderate persistence of past government consumption expenditures yields relatively low fiscal multipliers than when persistence of past government consumption is high. This applies whether there are announcement effects (Figures 1.1 and 1.2) or not (Figures 2.1 and 2.2) and when the proportion of non-Ricardian households is moderate (ω = 0.5) or high (ω = 0.8). For the same degree of persistence of past consumption expenditures, it can be noted that persistent shocks are important in accounting for higher multiplier effects. Highly persistent shocks robustly yield non-negative multipliers within the 12 quarters period. In terms of policy implications, this highlights the role and nature of government consumption shocks, which are expected to generate more persistent levels of spending.

Second, there is room for pre-announcement effects to influence government consumption multipliers. This is evident in Table A2, and in comparing Figures 1.1 and 2.1 and Figures 1.2 and 2.2., after controlling for the proportion of Ricardian households and persistence parameters. The inclusion of announcement effects does have a significant impact on the magnitude of multiplier estimates. Even with 0.5 assigned as weights, this change results in a doubling of the multiplier. This may simply point to the effects of fiscal foresight, with agents generally counteracting or internalizing the impact of known fiscal policies. The impact of a change in the proportion of non-Ricardian households appears to be negligible. However, as can be observed when we compare Figures 1.1,1.2, 2.1, and 2.2, the differences between the multipliers are very small.

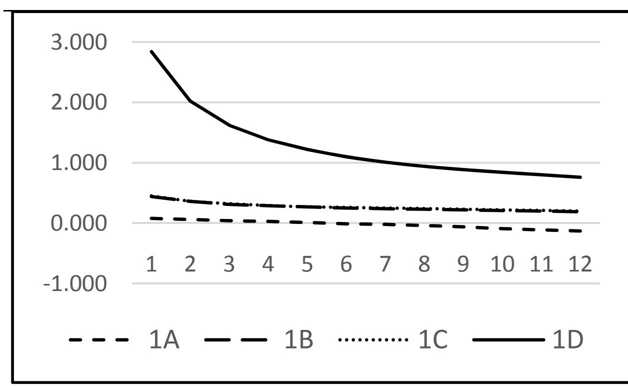

Figure 1.1. Fiscal Multipliers, Q1 to Q12. No Announcement Effects. Proportion of Non-Ricardian Households (ω) is equal to 0.5. This figure shows present value multiplier estimates based on four different cases, namely: Case 1A ($\rho_{G,\xi} = 0.5, \rho_{G^c} = 0.5$); Case 1B ($\rho_{G,\xi} = 0.5, \rho_{G^c} = 0.95$); Case 1C ($\rho_{G,\xi} = 0.95, \rho_{G^c} = 0.5$); Case 1D ($\rho_{G,\xi} = 0.95, \rho_{G^c} = 0.95$).

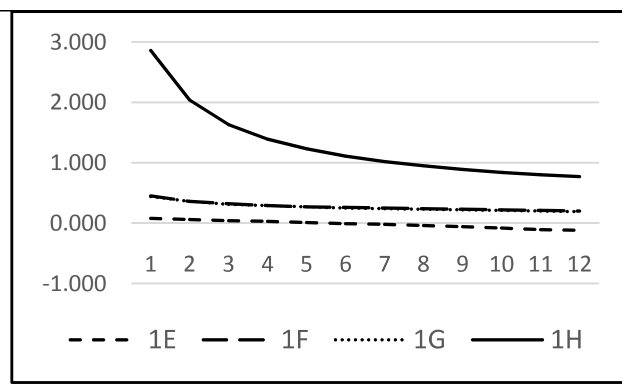

Figure 1.2. Fiscal Multipliers, Q1 to Q12. No Announcement Effects. Proportion of Non-Ricardian Households (ω) is equal to 0.8. This figure shows present value multiplier estimates based on four different cases, namely: Case 1E ($\rho_{G,\xi} = 0.5, \rho_{G^c} = 0.5$); Case 1F ($\rho_{G,\xi} = 0.5, \rho_{G^c} = 0.95$); Case 1G ($\rho_{G,\xi} = 0.95, \rho_{G^c} = 0.5$); Case 1H ($\rho_{G,\xi} = 0.95, \rho_{G^c} = 0.95$).

Third, we compute for the output multiplier associated with authorized budgets. Based on the Tables A3 and A4, we have Figures 3.1 and 3.2 for when there are no announcement effects and Figures 4.1 and 4.2 are for when there are announcement effects. It is apparent from all cases, whether announcement effects exist or not and when the persistence of the disbursement process is low (ρ_A = 0.5) or high (ρ_A = 0.95), that shorter implementation delays give rise to relatively higher multipliers. Initially, the multipliers are negative or small, which shows the impact of implementation delays in the short-run and announcement effects appear to be negative, as far as authorized budgets are concerned. With sudden disbursement stops,multipliers react negatively.

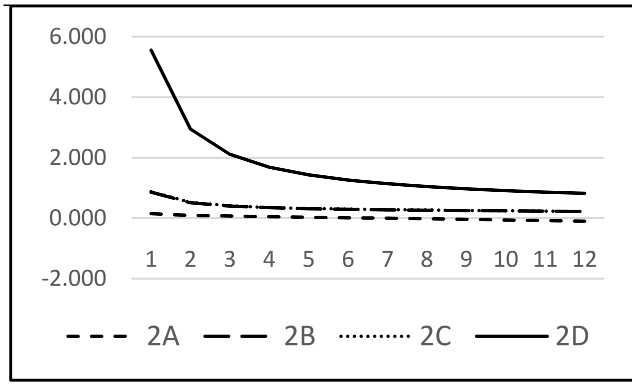

Figure 2.1. Fiscal Multipliers, Q1 to Q12. With Announcement Effects. Proportion of Non-Ricardian Households (ω) is equal to 0.5. This figure shows present value multiplier estimates based on four different cases, namely: Case 2A ($\rho_{G,\xi} = 0.5, \rho_{G^c} = 0.5$); Case 2B ($\rho_{G,\xi} = 0.5, \rho_{G^c} = 0.95$); Case 2C ($\rho_{G,\xi} = 0.95, \rho_{G^c} = 0.5$); Case 2D ($\rho_{G,\xi} = 0.95, \rho_{G^c} = 0.95$).

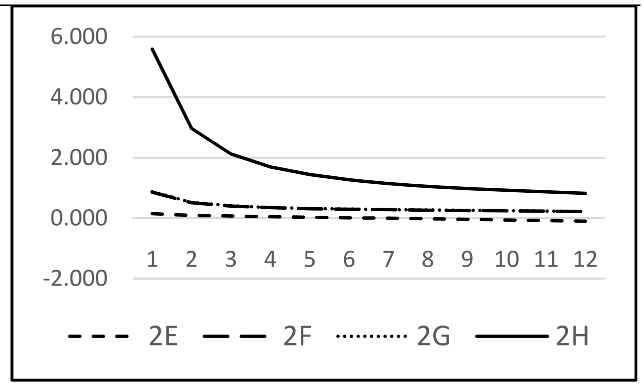

Figure 2.2. Fiscal Multipliers, Q1 to Q12. No Announcement Effects. Proportion of Non-Ricardian Households (ω) is equal to 0.8. This figure shows present value multiplier estimates based on four different cases, namely: Case 2E ($\rho_{G,\xi} = 0.5, \rho_{G^c} = 0.5$); Case 2F ($\rho_{G,\xi} = 0.5, \rho_{G^c} = 0.95$); Case 2G ($\rho_{G,\xi} = 0.95, \rho_{G^c} = 0.5$); Case 2H ($\rho_{G,\xi} = 0.95, \rho_{G^c} = 0.95$).

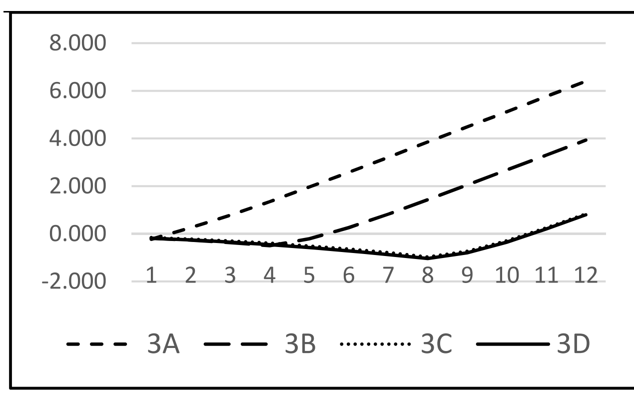

Figure 3.1. Authorized Budget Multipliers, Q1 to Q12. With Announcement Effects. Proportion of Non-Ricardian Households (ω) is equal to 0.5. This figure shows present value multiplier estimates based on four different cases, namely: Case 3A ($N = 1$); Case 3B ($N = 4$); Case 3C ($N = 8$) and Case 3D (*Sudden Stop*)

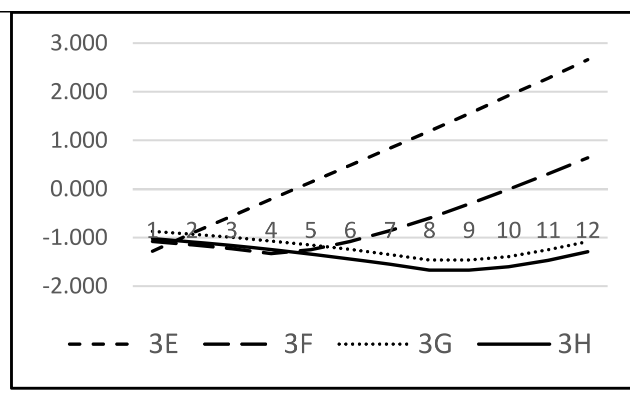

Figure 3.2. Authorized Budget Multipliers, Q1 to Q12. No Announcement Effects. Proportion of Non-Ricardian Households (ω) is equal to 0.8. This figure shows present value multiplier estimates based on four different cases, namely: Case 3E ($N = 1$); Case 3F ($N = 4$); Case 3G ($N = 8$) and Case 3H (*Sudden Stop*)

Fourth, we examine what happens to multipliers when authorized budget and government consumption shocks are correlated. There are two regimes, namely: low and high shock correlations. Low correlations are in Cases 5A and 5C in Figure 5.1, and in Cases 5E and 5G in Figure 5.2. High correlations are in Cases 5B and 5D in Figure 5.1, and in Cases 5F and 5H in Figure 5.2. The idea is that positive shocks to authorized budgets may also lead to higher government spending. Results shown in Table A5 and Figures 5.1 and 5.2 indicate that multipliers are positively affected by a correlated shock structure. We also note that in Figure 5.1, case 5B, the multipliers follow a different trajectory. This can also occur in other cases not shown below but can be noted in Table A5. For this particular case, where there is a high correlation and a moderate persistence of shock, we note that there is probably a certain degree of persistence in government consumption that yields increasing multipliers, given that government consumption shocks are positively correlated with authorized budget shocks. However, beyond this level of correlation, multipliers decrease over time (as in case 5D).

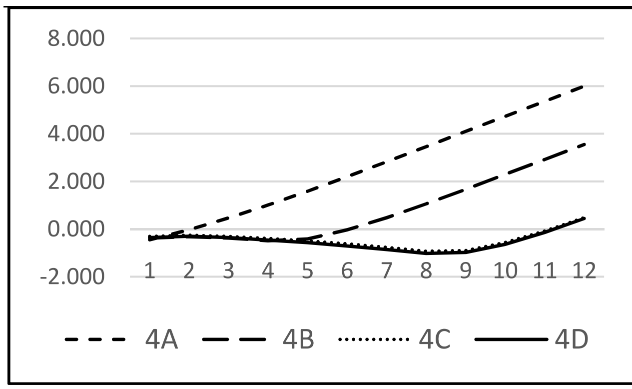

Figure 4.1. Authorized Budget, Q1 to Q12.With Announcement Effects. Proportion of Non-Ricardian Households (ω) is equal to 0.5. This figure shows present value multiplier estimates based on four different cases, namely: Case 4A ($N = 1$); Case 4B ($N = 4$); Case 4C ($N = 8$) and Case 4D (*Sudden Stop*)

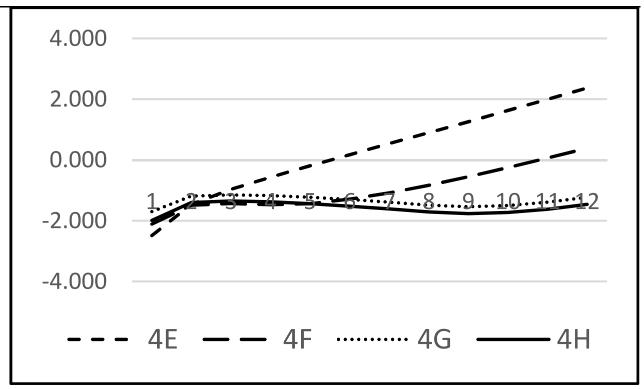

Figure 4.2. Authorized BudgetMultipliers, Q1 to Q12. No Announcement Effects. Proportion of Non-Ricardian Households (ω) is equal to 0.8. This figure shows present value multiplier estimates based on four different cases, namely: Case 34E ($N = 1$); Case 4F ($N = 4$); Case 4G ($N = 8$) and Case 4H (*Sudden Stop*)

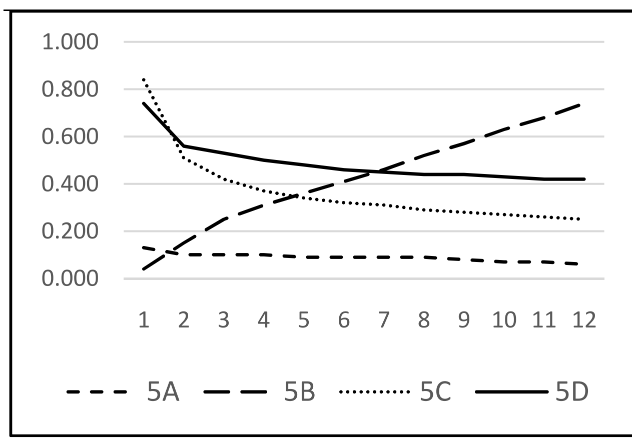

Figure 5.1. Fiscal Multipliers with Correlated Authorized Budget and Government Consumption Shocks, Q1 to Q12.$\rho_{G^c} = 0.5$.This figure shows present value multiplier estimates based on four different cases, namely: Case 5A ($\rho_{G,\xi} = 0.5, low\ correlation$)
Case 5B ($\rho_{G,\xi} = 0.5, high\ correlation$)
Case 5C ($\rho_{G,\xi} = 0.95, low\ correlation$)
Case 5D ($\rho_{G,\xi} = 0.95, high\ correlation$)

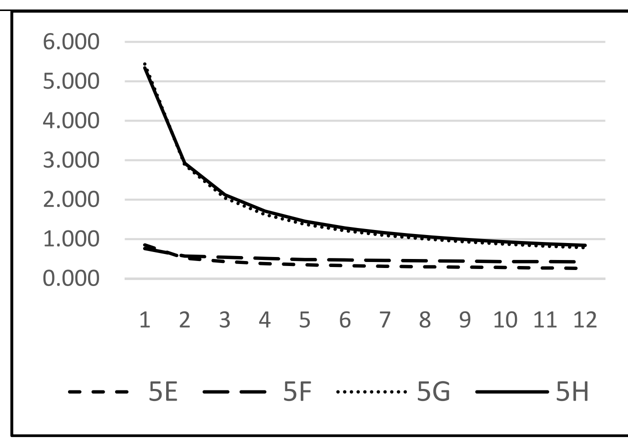

Figure 5.2. Fiscal Multipliers with Correlated Authorized Budget and Government Consumption Shocks, Q1 to Q12. $\rho_{G^c} = 0.95$.. This figure shows present value multiplier estimates based on four different cases, namely: Case 5E ($\rho_{G,\xi} = 0.5, low\ correlation$)
Case 5F ($\rho_{G,\xi} = 0.5, high\ correlation$)
Case 5G ($\rho_{G,\xi} = 0.95, low\ correlation$)
Case 5H ($\rho_{G,\xi} = 0.95, high\ correlation$)

Concluding Remarks

This note was set up to map some aspects of the DAP, particularly government investments, to simulation designs. The DAP was a fiscal initiative to facilitate the movement of funds labeled as savings to proposed projects that can be easily implemented and completed. Because it relied on existing funds, the stimulus package was not debt-financed, nor it needed distortionary taxation to raise funds.

As mentioned, the program components of DAP are quite diverse but major components pertain to government investments in the form of priority projects, consumption expenditures on social and development programs of local government units, and corporate transfers. Its principal aim is to fund projects quickly, thereby improving the rate of disbursements. Because it aims to make disbursements more efficient, government investments have grown quickly. This may have translated into higher GDP growth based on our model. However, it may also be asserted that due to the composition of the DAP, growth has increased due to government consumption shocks, as the DAP included many approved projects pertaining to the purchase of consumption goods.

Based on the results, there are several takeaways. First, persistence matters. This implies that projects that are of limited scale may not deliver high multiplier effects as they are not persistent. This complicates the analysis as many project components are considered limited like the PDAF projects of members of the legislature. Incidentally, the DAP includes many expenditure programs that have less persistent effects. Second, pre-announcement effects do enhance fiscal multipliers but not authorized budget multipliers, implying that government announcements may be essential in influencing the dynamics of government consumption but not government investment. This may justify why DAP was not announced in the first place. Third, delays do matter as they do in other studies. As a budget reform initiative, DAP was able to increase efficiency in terms of completion of projects. Finally, we need to pay attention to the correlation structure.

Endnotes

[1] It is also important to acknowledge that fiscal policy effectiveness may depend on the development status of countries. As noted in Ilzetzki, Mendoza, and Vegh (2013), developed countries tend to register non-negative impact multipliers compared to their developing country counterparts. This means that it is likely that the multipliers may not be as high as we think.

[2] The actual figures for disbursement performance, infrastructure investments, and MOOE were reported in a memo penned by then DBM Secretary Florencio Abad, DOF Secretary Purisima, and NEDA Director General Balisacan. The said memo revisited the legal precedents and rationale for the DAP's mechanism, highlighted growth effects, and enumerated budgetary reforms undertaken under DAP.

[3] Due to the diversity of programs funded through the DAP, it is deemed impossible to capture all features using a DSGE model. We opted to focus on government investments because, clearly, there are some projects which were not implemented completely due to legal setbacks that arose from the Supreme Court decision.

[4] While there are many significant crises documented before the 2007 financial meltdown, this review will abridge the literature by focusing on the U.S. recession that started in December 2007.

[5] There is an extensive branch of the fiscal literature where the dominant preference specification integrates deep habits. As mentioned in Leith et al. (2013), using deep habits can lead to robust fiscal multipliers.

[6] Leeper et al. (2010) admitted that estimating the parameter α^G is difficult.

[7] This is more pronounced in developing countries where the incidence of corruption is quite high, leading to procurement issues as well as bidding irregularities.

[8] The best candidate that exhibits this feature is the Pantawid Pamilyang Pilipino Program, the allocation for which rose from a PhP10.9 billion budget in 2010 to 4.3 million household beneficiaries with a Php62.6 billion budget by 2014. In contrast, a one-time local project may not offer much persistence compared to a program that achieves national or regional significance.

[9] This may be relevant since no prior announcements were made before the implementation of the DAP. For instance, it was only after the DAP was revealed that the executive department divulged hundreds of projects that benefited from the DAP in 2013.

[10] As stated earlier, estimates are IRF based; since they rely on stochastic simulations, there is no parameter uncertainty, implying that no confidence bands are estimated for each of the multipliers computed.

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Appendix

Table A1
Fiscal Multipl iers: No Announcement Effects

	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
$\rho_{G^c} = 0.5$ $\omega = 0.5$												
$\rho_{G,\xi} = 0.00$	0.040	0.030	0.010	-0.010	-0.030	-0.050	-0.060	-0.080	-0.110	-0.140	-0.160	-0.180
$\rho_{G,\xi} = 0.50$	0.080	0.060	0.040	0.030	0.010	-0.010	-0.020	-0.040	-0.060	-0.090	-0.110	-0.130
$\rho_{G,\xi} = 0.95$	0.440	0.360	0.310	0.290	0.270	0.250	0.240	0.230	0.220	0.210	0.200	0.190
$\rho_{G^c} = 0.5$ $\omega = 0.5$												
$\rho_{G,\xi} = 0.00$	0.230	0.220	0.220	0.210	0.200	0.200	0.190	0.180	0.170	0.170	0.160	0.150
$\rho_{G,\xi} = 0.50$	0.450	0.360	0.320	0.290	0.270	0.260	0.250	0.240	0.230	0.220	0.210	0.200
$\rho_{G,\xi} = 0.95$	2.840	2.020	1.620	1.380	1.220	1.100	1.010	0.940	0.890	0.840	0.800	0.760
$\rho_{G^c} = 0.5$ $\omega = 0.8$												
$\rho_{G,\xi} = 0.00$	0.040	0.030	0.010	-0.010	-0.030	-0.040	-0.060	-0.080	-0.110	-0.130	-0.150	-0.170
$\rho_{G,\xi} = 0.50$	0.080	0.060	0.040	0.030	0.010	-0.010	-0.020	-0.040	-0.060	-0.080	-0.110	-0.120
$\rho_{G,\xi} = 0.95$	0.440	0.360	0.310	0.290	0.270	0.250	0.240	0.230	0.220	0.210	0.200	0.190
$\rho_{G^c} = 0.5$ $\omega = 0.8$												
$\rho_{G,\xi} = 0.00$	0.230	0.220	0.220	0.210	0.200	0.200	0.190	0.190	0.180	0.170	0.160	0.15
$\rho_{G,\xi} = 0.50$	0.450	0.360	0.320	0.290	0.270	0.260	0.250	0.240	0.230	0.220	0.210	0.2
$\rho_{G,\xi} = 0.95$	2.860	2.040	1.630	1.390	1.230	1.110	1.020	0.950	0.890	0.840	0.800	0.77

Table A2
Fiscal Multipliers: With Announcement Effects

	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
$\rho_{G^c} = 0.5$ $\omega = 0.5$												
$\rho_{G,\xi} = 0.00$	0.080	0.050	0.030	0.010	-0.010	-0.020	-0.040	-0.060	-0.090	-0.110	-0.130	-0.150
$\rho_{G,\xi} = 0.50$	0.150	0.090	0.070	0.050	0.030	0.010	0.000	-0.020	-0.040	-0.060	-0.080	-0.100
$\rho_{G,\xi} = 0.95$	0.860	0.510	0.400	0.350	0.310	0.290	0.270	0.260	0.250	0.240	0.230	0.220
$\rho_{G^c} = 0.5$ $\omega = 0.5$												
$\rho_{G,\xi} = 0.00$	0.080	0.050	0.030	0.010	-0.010	-0.020	-0.040	-0.060	-0.090	-0.110	-0.130	-0.150
$\rho_{G,\xi} = 0.50$	0.150	0.090	0.070	0.050	0.030	0.010	0.000	-0.020	-0.040	-0.060	-0.080	-0.100
$\rho_{G,\xi} = 0.95$	0.860	0.510	0.400	0.350	0.310	0.290	0.270	0.260	0.250	0.240	0.230	0.220
$\rho_{G^c} = 0.5$ $\omega = 0.8$												
$\rho_{G,\xi} = 0.00$	0.080	0.050	0.030	0.010	-0.010	-0.020	-0.040	-0.060	-0.080	-0.110	-0.130	-0.150
$\rho_{G,\xi} = 0.50$	0.150	0.090	0.070	0.050	0.030	0.010	0.000	-0.020	-0.040	-0.060	-0.080	-0.100
$\rho_{G,\xi} = 0.95$	0.860	0.510	0.400	0.350	0.310	0.290	0.280	0.260	0.250	0.240	0.230	0.220
$\rho_{G^c} = 0.5$ $\omega = 0.8$												
$\rho_{G,\xi} = 0.00$	0.460	0.310	0.270	0.250	0.240	0.230	0.220	0.210	0.200	0.190	0.180	0.180
$\rho_{G,\xi} = 0.50$	0.880	0.520	0.410	0.350	0.320	0.300	0.280	0.270	0.260	0.240	0.230	0.220
$\rho_{G,\xi} = 0.95$	5.590	2.970	2.120	1.690	1.440	1.270	1.140	1.050	0.980	0.920	0.870	0.820

Table A3
Authorized Budget Multipliers: No Announcement Effects

	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
$N = 1$												
$\rho_A = 0.00$	-0.120	0.610	1.290	1.970	2.640	3.300	3.960	4.610	5.260	5.890	6.530	7.160
$\rho_A = 0.50$	-0.230	0.260	0.780	1.350	1.960	2.580	3.210	3.850	4.490	5.120	5.760	6.400
$\rho_A = 0.95$	-1.280	-0.910	-0.560	-0.210	0.140	0.490	0.840	1.190	1.550	1.920	2.280	2.660
$N = 4$												
$\rho_A = 0.00$	-0.100	-0.210	-0.340	-0.500	0.160	0.830	1.490	2.140	2.790	3.420	4.050	4.670
$\rho_A = 0.50$	-0.190	-0.270	-0.370	-0.500	-0.210	0.260	0.820	1.430	2.050	2.680	3.300	3.930
$\rho_A = 0.95$	-1.080	-1.150	-1.230	-1.330	-1.250	-1.080	-0.860	-0.600	-0.310	-0.010	0.310	0.640
$N = 8$												
$\rho_A = 0.00$	-0.080	-0.170	-0.270	-0.390	-0.530	-0.680	-0.850	-1.040	-0.390	0.260	0.890	1.530
$\rho_A = 0.50$	-0.160	-0.220	-0.300	-0.390	-0.510	-0.640	-0.790	-0.970	-0.730	-0.290	0.250	0.830
$\rho_A = 0.95$	-0.870	-0.930	-0.990	-1.070	-1.150	-1.240	-1.350	-1.460	-1.460	-1.390	-1.250	-1.080
sudden stop												
$\rho_A = 0.00$	-0.100	-0.200	-0.320	-0.450	-0.590	-0.750	-0.910	-1.090	-0.430	0.230	0.880	1.530
$\rho_A = 0.50$	-0.190	-0.260	-0.350	-0.460	-0.580	-0.720	-0.880	-1.040	-0.800	-0.350	0.200	0.800
$\rho_A = 0.95$	-1.020	-1.090	-1.160	-1.250	-1.340	-1.440	-1.550	-1.670	-1.670	-1.600	-1.470	-1.290

Table A4
Authorized Budget Multipliers: With Announcement Effects

	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
$N = 1$												
$\rho_A = 0.00$	-0.230	0.190	0.890	1.570	2.240	2.900	3.560	4.210	4.860	5.490	6.120	6.760
$\rho_A = 0.50$	-0.450	-0.030	0.470	1.010	1.590	2.200	2.830	3.460	4.100	4.730	5.360	6.000
$\rho_A = 0.95$	-2.490	-1.460	-0.970	-0.570	-0.190	0.170	0.540	0.900	1.260	1.630	2.000	2.370
$N = 4$												
$\rho_A = 0.00$	-0.200	-0.210	-0.330	-0.480	-0.230	0.440	1.090	1.750	2.400	3.030	3.660	4.290
$\rho_A = 0.50$	-0.380	-0.320	-0.380	-0.490	-0.410	-0.030	0.480	1.060	1.670	2.300	2.920	3.550
$\rho_A = 0.95$	-2.110	-1.490	-1.430	-1.470	-1.440	-1.290	-1.080	-0.830	-0.550	-0.250	0.070	0.390
$N = 8$												
$\rho_A = 0.00$	-0.160	-0.170	-0.260	-0.380	-0.510	-0.650	-0.81	-0.990	-0.770	-0.120	0.520	1.150
$\rho_A = 0.50$	-0.310	-0.260	-0.310	-0.390	-0.500	-0.620	-0.77	-0.930	-0.900	-0.560	-0.080	0.480
$\rho_A = 0.95$	-1.700	-1.190	-1.150	-1.170	-1.230	-1.300	-1.39	-1.490	-1.540	-1.500	-1.390	-1.230
sudden stop												
$\rho_A = 0.00$	-0.190	-0.200	-0.310	-0.440	-0.580	-0.730	-0.890	-1.060	-0.820	-0.170	0.490	1.140
$\rho_A = 0.50$	-0.360	-0.300	-0.360	-0.460	-0.570	-0.710	-0.860	-1.020	-0.980	-0.640	-0.140	0.440
$\rho_A = 0.95$	-1.990	-1.400	-1.350	-1.380	-1.440	-1.520	-1.610	-1.710	-1.770	-1.730	-1.620	-1.460

Table A5
Correlated Authorized Budget and Government Consumption Shocks

	Year 1				Year 2				Year 3			
	Q1	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
$\rho_{G^c} = 0.5$ **correlated shocks 10%**												
$\rho_{G,\xi} = 0.00$	0.060	0.060	0.080	0.100	0.110	0.120	0.140	0.150	0.160	0.160	0.170	0.190
$\rho_{G,\xi} = 0.50$	0.130	0.100	0.100	0.100	0.090	0.090	0.090	0.090	0.080	0.070	0.070	0.060
$\rho_{G,\xi} = 0.95$	0.840	0.510	0.420	0.370	0.340	0.320	0.310	0.290	0.280	0.270	0.260	0.250
$\rho_{G,\xi} = 0.95$ **correlated shocks 10%**												
$\rho_{G,\xi} = 0.00$	0.430	0.320	0.300	0.300	0.290	0.280	0.280	0.270	0.270	0.260	0.250	0.250
$\rho_{G,\xi} = 0.50$	0.850	0.520	0.430	0.380	0.350	0.330	0.310	0.300	0.290	0.280	0.270	0.260
$\rho_{G,\xi} = 0.95$	5.440	2.880	2.040	1.620	1.370	1.210	1.090	1.000	0.930	0.870	0.820	0.780
$\rho_{G^c} = 0.5$ **correlated shocks 10%**												
$\rho_{G,\xi} = 0.00$	-0.040	0.120	0.300	0.440	0.580	0.720	0.860	1.000	1.130	1.260	1.390	1.530
$\rho_{G,\xi} = 0.50$	0.040	0.150	0.250	0.310	0.360	0.410	0.460	0.520	0.570	0.630	0.680	0.740
$\rho_{G,\xi} = 0.95$	0.740	0.560	0.530	0.500	0.480	0.460	0.450	0.440	0.440	0.430	0.420	0.420
$\rho_{G,\xi} = 0.95$ **correlated shocks 10%**												
$\rho_{G,\xi} = 0.00$	0.340	0.370	0.450	0.490	0.510	0.520	0.530	0.540	0.540	0.540	0.550	0.550
$\rho_{G,\xi} = 0.50$	0.760	0.570	0.540	0.510	0.480	0.470	0.460	0.450	0.440	0.430	0.430	0.420
$\rho_{G,\xi} = 0.95$	5.340	2.920	2.120	1.710	1.450	1.280	1.160	1.060	0.990	0.930	0.880	0.840