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

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Working Paper Series 2017-12-045

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PRELIMINARY DRAFT

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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 and packing a fiscal surprise, the program has reportedly succeeded in improving fiscal expenditure performance until it was stopped by the Supreme Court based on constitutional prohibitions imposed on budgetary malpractices. The controversy has obviously tarnished the purportedly key role of the policy which, at that time, was to pump-prime the economy by simply improving the efficiency of fund disbursements. While there were official claims that it was effective in spurring growth, no empirical paper has been offered that investigates plausible mechanisms leading to expansions in output.

To contribute to the empirical macroeconomic literature, this study proposes the use of a DSGE model to simulate and compute simple fiscal multipliers in order to assess the effectiveness of DAP. The principal aim is to be able to capture some of the key features of the policy. We provide simulation-based evidence to track the impact of changes in model structure on multiplier estimates. Such simulation-based evidence may provide information as to how actual data-based estimates can be interpreted. The lessons learned from such exercises will be used to explain estimates using actual data.

1. Introduction

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) by the US Congress and the European Economic Recovery Program (EERP) by the European Union (EU) 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

[1] It is also important to acknowledge that fiscal policy effectiveness may depend on the development status of countries. As noted in Mendoza et al. (year??? Also consider naming all authors if there are less than 6 instead of et al.), 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.

expenditure program really matters. As noted in Coenen, Straub, and Trabandt (2013) [henceforth CST], accounting for the various components of a fiscal package is important.

As emphasized in a model strand started by Leeper, Walker, and Yang (2010) [henceforth LWY], spending program implementation and subsequent fiscal adjustments are critical. As clearly shown, a government may invest in or fund long- and short-run projects. High impact projects take time to be completed before generating social and economic benefits. This underscores the importance of integrating time to build assumptions in 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. However, most studies done in the US and EU assume 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 policy can enhance growth. 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 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 for infrastructure 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% percent 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]

In a memo to the President dated December 28, 2013, requesting for the termination of the program, DAP was branded as part of the fiscal reforms instituted by the Department of

[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 associated with DAP.

Budget and Management (DBM) as well as corrective actions to improve the rate at which government funds are being disbursed. The mechanism involves the transfer of funds labeled as savings and unprogrammed funds in the General Appropriations Act from one agency to another. Considered as a stimulus package, its program components were quite diverse, consisting of a range of projects that include 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 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. As a matter of fact, with the DAP, no tax increases have been implemented nor new loans contracted. Moreover, it was an initiative, the implementation of which was not divulged early, thereby mimicking the nature of unexpected government spending hikes.[3] Unfortunately, the DAP, which mandated the speedy release of funds, was declared unconstitutional. There are three problematic mechanisms, namely, (a) the creation of savings prior to the end of the fiscal year; (b) cross-border transfers of the savings from one department to another; and (c) allotment of funds not outlined in the appropriations act. The lifespan of operating expenses and capital outlay is two years. Savings are defined by the GAA as excess funds from completed projects, discontinued projects, and abandoned projects.[4]

Because of the adverse ruling, there is evidence that the government has decided to request for supplemental budget to finance on=going projects. Such ruling has affected the conduct of fiscal policy. Public officials became overly cautious and select legislative bodies demanded more oversight. As a surprise mechanism, 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.[5] 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 estimated impulse response functions.

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[3] The secrecy surrounding such an executive undertaking was broken when a member of the Senate divulged its existence during his privilege speech. Even most members of Congress expressed dismay and surprise as they felt left out of the process.

[4] An interesting account of various issues associated with DAP can be found on Rappler.com.

[5] 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.

This paper's structure is as follows: Section 2 reviews the relevant literature. Section 3 details the simple closed-economy model to show the dynamics of macroeconomic outcomes given a government's strong push to improve the rate of disbursements. Section 4 provides a preliminary discussion of the empirical strategy that will be used to estimate fiscal multipliers. Section 5 presents and analyzes the results. The last section offers some concluding remarks.

2. Effects of Fiscal Stimulus: A Brief Review[6]

Because of limited lags relative to monetary policy, fiscal policy is ideal for counteracting demand shortfalls during periods of crisis. Traditionally, fiscal stimuli are associated with government expenditures on consumption of goods and services. This is the reason why fiscal policy is 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 US prompted policymakers to enact the American Recovery and Reinvestment Act of 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. Many researchers have already ascertained the degree to which stimuli have succeeded. Zubairy (2014) reported that the median multiplier of fiscal spending is 1.07, indicating that a dollar spent in implementing the fiscal stimulus yields $1.07 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.

On the other side of the Atlantic, the EU has implemented the EERPlan, which was enacted to counter the financial crisis. CST 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 indicate a high degree of complementarity between public and private consumption and capital.

While fiscal policy shocks may impact the economy sooner compared with monetary policy, it is important to realize that its effectiveness may be adversely affected by 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 affect business cycles. This is precisely what LWY have argued. Because of implementation delays, output multipliers may be low on impact but may eventually increase after the completion of the project.

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

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 constitutional 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. Disbursements 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 yield lower government investments. Given that stops are ruled out, government investment shocks also have the advantage of increasing investment 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. Introducing distortionary elements in fiscal instruments also yield different responses of key macroeconomic aggregates.

There are also temporal differences in the way fiscal instruments react to debt. LWY, 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 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 will be lost.

3. The Model

The model platform follows LWY 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 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 and monetary policymakers.

3.1. Households

Because of the importance of cash transfers to poor households in the Philippines, we will appeal to CST 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 CST.

Ricardian households maximize utility that integrates external habit formation in consumption $c_{h,t}$ defined below.[7]

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

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

The budget constraint of the Ricardian household is given by

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

In the budget, households are levied consumption taxes τ_t^C, and 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 the 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

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

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

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

3.2. Firms

[7] There is an extensive branch of the fiscal literature where the dominant preference specification integrates deep habits. As mentioned in LMR, using deep habits can lead to robust fiscal multipliers.

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

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

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.[8]

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

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

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

3.3. 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 represents 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 or the time delay. As LWY 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:

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

[8] LWY admitted that estimating the parameter α^G is difficult.

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. 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, there are two shocks that 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.[9] This may mean that parameter values may be small and become zero after the initial period/s of commencement.

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

The effect will be transmitted to output because authorized spending affects the stock of public capital which is used in a 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.

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

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

Finally, we integrate automatic stabilization policies following LWY and CST. 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, it would mean that fiscal adjustments to debt expansions would occur one period after spending spikes. But this may be counterproductive and infeasible considering the lags of government expenditures. Legislative provisions may simply 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 $\epsilon_t^{\xi,G} \sim N(0,1)$.

ϱ_{TR}, ϱ_{τ^l}, and ϱ_G represent weights associated with pre-announcement effects.

4. Simulating Multiplier Sensitivities

We use simulated data 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 a 1 standard deviation shock.

Multiplier estimates, which are based on stochastic simulation, 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. The aim of this simulation experiment is 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 multipliers. Following Uhlig (2010) and Mountford and Uhlig (2009), the present value multiplier at time t, $\mathcal{M}_t^{PV}$ is given by

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

,

where rr denotes steady state real interest on government debt.

4.1. Simulation design

Given the recent fiscal experience, our task is to simply 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 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. The best candidate that exhibits this feature is the Pantawid Pamilyang Pilipino Program, the allocation for which rose from Php10.9 billion budget in 2010 to 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.

Second, we consider changing the value of the proportion of non-Ricardian households from 0.5 to 0.8. The importance of this is simply 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 G_t^c 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.

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

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

4.2. Fiscal multipliers

Results are given in Tables 1 to 5. Tables 1 and 2 present fiscal spending multipliers based on one quarter completion of a representative project. Tables 3 and 4 show authorized budget multipliers. For our computations, it is now necessary to vary project completion to ascertain the response of multipliers. Table 5 reports multipliers when authorized budget and government consumption shocks are assumed to be correlated.

Here are our observations. First, as shown in Tables 1 and 2, it appears that persistence in both government spending process and the degree of correlation in shocks are jointly important in accounting for higher multiplier effects. Highly persistent shocks robustly yield non-negative multipliers within the 12-quarter period. In terms of policy implications, this simply 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 2, after controlling for the proportion of Ricardian households and persistence parameters. The inclusion of announcement effect does have a significant impact on the magnitude of multiplier estimates. Even with ½ assigned as weights, the 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, though.

Third, we compute for the output multiplier associated with authorized budgets. Based on Tables 3 and 4, it is apparent 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. Announcement effects appear to be negative, as far as authorized budgets are concerned. With disbursement sudden stops, multipliers react negatively.

Fourth, we examined what happens to multipliers when authorized budget and government consumption shocks are correlated. There are two regimes, namely, high and low shock correlations. The idea is that positive shocks to authorized budgets may also lead to higher government spending. Results shown in Table 5 indicate that multipliers are positively affected by a correlated shock structure.

5. 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 did it need 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 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 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.

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	YEAR 1				YEAR 2				YEAR 3			
Main persistence parameter:0.5	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
$\rho_{G^c} = 0.000$	0.040	0.030	0.010	-0.010	-0.030	-0.050	-0.060	-0.080	-0.110	-0.140	-0.160	-0.180
$\rho_{G^c} = 0.500$	0.080	0.060	0.040	0.030	0.010	-0.010	-0.020	-0.040	-0.060	-0.090	-0.110	-0.130
$\rho_{G^c} = 0.950$	0.440	0.360	0.310	0.290	0.270	0.250	0.240	0.230	0.220	0.210	0.200	0.190
Main persistence parameter:0.95												
$\rho_{G^c} = 0.000$	0.230	0.220	0.220	0.210	0.200	0.200	0.190	0.180	0.170	0.170	0.160	0.150
$\rho_{G^c} = 0.500$	0.450	0.360	0.320	0.290	0.270	0.260	0.250	0.240	0.230	0.220	0.210	0.200
$\rho_{G^c} = 0.950$	2.840	2.020	1.620	1.380	1.220	1.100	1.010	0.940	0.890	0.840	0.800	0.760
Main persistence parameter:0.5; omega=0.8												
$\rho_{G^c} = 0.000$	0.040	0.030	0.010	-0.010	-0.030	-0.040	-0.060	-0.080	-0.110	-0.130	-0.150	-0.17
$\rho_{G^c} = 0.500$	0.080	0.060	0.040	0.030	0.010	-0.010	-0.020	-0.040	-0.060	-0.080	-0.110	-0.12
$\rho_{G^c} = 0.950$	0.440	0.360	0.310	0.290	0.270	0.250	0.240	0.230	0.220	0.210	0.200	0.19
Main persistence parameter:0.95; omega=0.8												
$\rho_{G^c} = 0.000$	0.230	0.220	0.220	0.210	0.200	0.200	0.190	0.190	0.180	0.170	0.160	0.15
$\rho_{G^c} = 0.500$	0.450	0.360	0.320	0.290	0.270	0.260	0.250	0.240	0.230	0.220	0.210	0.2
$\rho_{G^c} = 0.950$	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 1 Fiscal multipliers: No announcement effects

	YEAR 1				YEAR 2				YEAR 3			
Main persistence parameter:0.5	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
$\rho_{G^c} = 0.000$	0.080	0.050	0.030	0.010	-0.010	-0.020	-0.040	-0.060	-0.090	-0.110	-0.130	-0.150
$\rho_{G^c} = 0.500$	0.150	0.090	0.070	0.050	0.030	0.010	0.000	-0.020	-0.040	-0.060	-0.080	-0.100
$\rho_{G^c} = 0.950$	0.860	0.510	0.400	0.350	0.310	0.290	0.270	0.260	0.250	0.240	0.230	0.220
Main persistence parameter:0.95												
$\rho_{G^c} = 0.000$	0.460	0.300	0.270	0.250	0.240	0.230	0.220	0.210	0.200	0.190	0.180	0.170
$\rho_{G^c} = 0.500$	0.880	0.520	0.410	0.350	0.320	0.300	0.280	0.270	0.250	0.240	0.230	0.220
$\rho_{G^c} = 0.950$	5.560	2.950	2.110	1.680	1.430	1.260	1.140	1.040	0.970	0.910	0.860	0.820
Main persistence parameter:0.5; omega=0.8												
$\rho_{G^c} = 0.000$	0.080	0.050	0.030	0.010	-0.010	-0.020	-0.040	-0.060	-0.080	-0.110	-0.130	-0.15
$\rho_{G^c} = 0.500$	0.150	0.090	0.070	0.050	0.030	0.010	0.000	-0.020	-0.040	-0.060	-0.080	-0.1
$\rho_{G^c} = 0.950$	0.860	0.510	0.400	0.350	0.310	0.290	0.280	0.260	0.250	0.240	0.230	0.22
Main persistence parameter:0.95; omega=0.8												
$\rho_{G^c} = 0.000$	0.460	0.310	0.270	0.250	0.240	0.230	0.220	0.210	0.200	0.190	0.180	0.18
$\rho_{G^c} = 0.500$	0.880	0.520	0.410	0.350	0.320	0.300	0.280	0.270	0.260	0.240	0.230	0.22
$\rho_{G^c} = 0.950$	5.590	2.970	2.120	1.690	1.440	1.270	1.140	1.050	0.980	0.920	0.870	0.82

Table 2 Fiscal multipliers: With announcement effects

	YEAR 1				YEAR 2				YEAR 3			
N=1	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
$\rho_{G^c} = 0.000$	-0.120	0.610	1.290	1.970	2.640	3.300	3.960	4.610	5.260	5.890	6.530	7.160
$\rho_{G^c} = 0.500$	-0.230	0.260	0.780	1.350	1.960	2.580	3.210	3.850	4.490	5.120	5.760	6.400
$\rho_{G^c} = 0.950$	-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												
$\rho_{G^c} = 0.000$	-0.100	-0.210	-0.340	-0.500	0.160	0.830	1.490	2.140	2.790	3.420	4.050	4.670
$\rho_{G^c} = 0.500$	-0.190	-0.270	-0.370	-0.500	-0.210	0.260	0.820	1.430	2.050	2.680	3.300	3.930
$\rho_{G^c} = 0.950$	-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												
$\rho_{G^c} = 0.000$	-0.08	-0.17	-0.27	-0.39	-0.53	-0.68	-0.85	-1.04	-0.39	0.26	0.89	1.53
$\rho_{G^c} = 0.500$	-0.16	-0.22	-0.3	-0.39	-0.51	-0.64	-0.79	-0.97	-0.73	-0.29	0.25	0.83
$\rho_{G^c} = 0.950$	-0.87	-0.93	-0.99	-1.07	-1.15	-1.24	-1.35	-1.46	-1.46	-1.39	-1.25	-1.08
with sudden stop N=8												
$\rho_{G^c} = 0.000$	-0.1	-0.2	-0.32	-0.45	-0.59	-0.75	-0.91	-1.09	-0.43	0.23	0.88	1.53
$\rho_{G^c} = 0.500$	-0.19	-0.26	-0.35	-0.46	-0.58	-0.72	-0.88	-1.04	-0.8	-0.35	0.2	0.8
$\rho_{G^c} = 0.950$	-1.02	-1.09	-1.16	-1.25	-1.34	-1.44	-1.55	-1.67	-1.67	-1.6	-1.47	-1.29

Table 3 Authorized budget multipliers: No announcement effects

	YEAR 1				YEAR 2				YEAR 3			
N=1	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
$\rho_{G^c} = 0.000$	-0.230	0.190	0.890	1.570	2.240	2.900	3.560	4.210	4.860	5.490	6.120	6.760
$\rho_{G^c} = 0.500$	-0.450	-0.030	0.470	1.010	1.590	2.200	2.830	3.460	4.100	4.730	5.360	6.000
$\rho_{G^c} = 0.950$	-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												
$\rho_{G^c} = 0.000$	-0.200	-0.210	-0.330	-0.480	-0.230	0.440	1.090	1.750	2.400	3.030	3.660	4.290
$\rho_{G^c} = 0.500$	-0.380	-0.320	-0.380	-0.490	-0.410	-0.030	0.480	1.060	1.670	2.300	2.920	3.550
$\rho_{G^c} = 0.950$	-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												
$\rho_{G^c} = 0.000$	-0.16	-0.17	-0.26	-0.38	-0.51	-0.65	-0.81	-0.99	-0.77	-0.12	0.52	1.15
$\rho_{G^c} = 0.500$	-0.31	-0.26	-0.31	-0.39	-0.5	-0.62	-0.77	-0.93	-0.9	-0.56	-0.08	0.48
$\rho_{G^c} = 0.950$	-1.7	-1.19	-1.15	-1.17	-1.23	-1.3	-1.39	-1.49	-1.54	-1.5	-1.39	-1.23
with sudden stop N=8												
$\rho_{G^c} = 0.000$	-0.19	-0.2	-0.31	-0.44	-0.58	-0.73	-0.89	-1.06	-0.82	-0.17	0.49	1.14
$\rho_{G^c} = 0.500$	-0.36	-0.3	-0.36	-0.46	-0.57	-0.71	-0.86	-1.02	-0.98	-0.64	-0.14	0.44
$\rho_{G^c} = 0.950$	-1.99	-1.4	-1.35	-1.38	-1.44	-1.52	-1.61	-1.71	-1.77	-1.73	-1.62	-1.46

Table 4 Authorized budget multipliers: With announcement effects

	YEAR 1				YEAR 2				YEAR 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
$\rho_{G^c} = 0.000$	0.060	0.060	0.080	0.100	0.110	0.120	0.140	0.150	0.160	0.160	0.170	0.190
$\rho_{G^c} = 0.500$	0.130	0.100	0.100	0.100	0.090	0.090	0.090	0.090	0.080	0.070	0.070	0.060
$\rho_{G^c} = 0.950$	0.840	0.510	0.420	0.370	0.340	0.320	0.310	0.290	0.280	0.270	0.260	0.250
Main persistence parameter:0.95												
$\rho_{G^c} = 0.000$	0.430	0.320	0.300	0.300	0.290	0.280	0.280	0.270	0.270	0.260	0.250	0.250
$\rho_{G^c} = 0.500$	0.850	0.520	0.430	0.380	0.350	0.330	0.310	0.300	0.290	0.280	0.270	0.260
$\rho_{G^c} = 0.950$	5.440	2.880	2.040	1.620	1.370	1.210	1.090	1.000	0.930	0.870	0.820	0.780
Main persistence parameter:0.5 +correlated shocks 50%												
$\rho_{G^c} = 0.000$	-0.040	0.120	0.300	0.440	0.580	0.720	0.860	1.000	1.130	1.260	1.390	1.53
$\rho_{G^c} = 0.500$	0.040	0.150	0.250	0.310	0.360	0.410	0.460	0.520	0.570	0.630	0.680	0.74
$\rho_{G^c} = 0.950$	0.740	0.560	0.530	0.500	0.480	0.460	0.450	0.440	0.440	0.430	0.420	0.42
Main persistence parameter:0.95												
$\rho_{G^c} = 0.000$	0.340	0.370	0.450	0.490	0.510	0.520	0.530	0.540	0.540	0.540	0.550	0.55
$\rho_{G^c} = 0.500$	0.760	0.570	0.540	0.510	0.480	0.470	0.460	0.450	0.440	0.430	0.430	0.42
$\rho_{G^c} = 0.950$	5.340	2.920	2.120	1.710	1.450	1.280	1.160	1.060	0.990	0.930	0.880	0.84

Table 5 Correlated Authorized Budget and Government Consumption Shocks