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Afghanistan: Balancing Social and Security Spending in the Context of Shrinking Resource Envelope

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Abstract

For Afghanistan, the dual prospect of declining donor support and high ongoing security spending over the medium term keeps the government budget tight. This paper uses a general equilibrium model to capture the security-development tradeoff facing the government in its effort to rehabilitate macroeconomic stability and welfare. In particular, it considers strategic policy options for counteracting and minimizing the negative macroeconomic impact of possible aid and revenue shortfalls. We find that the mobilization of domestic revenues through changes in tax policy is the preferred policy response for Afghan central government. Such a response helps to place its finances on a sustainable path and preserve most of the growth potential. Cutting expenditures balances public finances, but causes the economy to permanently shrink. Debt financing helps to preserve much of the economy size but can jeopardize the sustainability of public finances.

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I. INTRODUCTION

Afghanistan shares the common challenge of many low income and developing economies: large development needs and limited resources. While the choices are not new or unique, Afghanistan faces additional complications from the development and maintenance of a large security infrastructure, which diverts scarce funds from other important capital spending. Furthermore, the prospect of declining donor support and the need for high ongoing security spending over the medium term means that the security-development tradeoff is unlikely to ameliorate over the next decade. This paper aims to model this tradeoff and illustrates the implications of policy choices. There are no easy answers. The model presented here abstracts from a myriad of political and institutional elements which are unique to Afghanistan and complicate the outlook beyond the tradeoff we explore.

The macromodeling framework used in this paper is an adaptation of the workhorse model used by the IMF to analyze policy challenges in low-income countries (Buffie et al., 2012). The adapted framework is used here to trace the impact of exogenous shocks – such as a decline in foreign aid – or policy failures – such as a lower domestic revenue yield – on the fiscal stance, economic output, and ultimately poverty reduction.

The key methodological contribution is the explicit focus on the public policy choices between investment and security spending both of which are growth enhancing. The government supplies security services with the aim of ensuring a stable socio-political climate conducive to growth by enforcing the rule of law. The government also provides public infrastructure which equates to capital spending for development needs. Both public services affect the economy with a positive externality, and the government's objective is to maximize social welfare through provision of these services.

The central finding points to the mobilization of domestic revenue resources as the government's best response to an exogenous shock that shrinks the resource envelope. The negative impact of exogenously reducing the government's pool of funds on growth is best minimized by raising additional taxes. Although taxes have distortionary effects on private consumption, the additional revenue helps to offset partially the shortfall in foreign aid and maintain supply of public services near original levels. Policy options like debt financing or cutting public expenditures would sacrifice either fiscal sustainability or supply of public services and output.

The next section outlines the economic situation in Afghanistan. Section 3 describes the macromodeling apparatus, including the decision-making process in the government sector. Section 4 then analyzes the behavior of the public sector, where the focus is on the optimal allocation of public resources between infrastructure and security investment. A reader less interested in the technical aspects of the macromodeling framework may skip directly to Section 5 that looks at fiscal experiments and evaluates possible policy responses to (i) a possible shortfall in foreign aid and (ii) a possible increase in tax avoidance. Section 6 concludes with the discussion of policy implications.

II. AFGHANISTAN'S ECONOMIC LANDSCAPE

Since 2001, Afghanistan received substantial donor support to assist the country's recovery from 30 years of conflict and the country remains heavily reliant on foreign donor grants. Out of an estimated total public spending of 52 percent of gross domestic product (GDP)¹, the IMF estimates that donors financed 31 percent of GDP via extra-budgetary operations ('off-budget') in addition to providing 10 percent of GDP in grants directly to the Afghan budget ('on-budget').² The remaining 11 percent of GDP of public spending came from domestic revenue collection. In other words, only one-fifth of Afghan public spending was funded from domestic means.

Such levels of donor support – while needed in a post-conflict situation – are unlikely to be sustained indefinitely. As such, the Afghan government needs to find ways to balance the takeover of externally-financed expenditures while increasing pro-poor and development outlays as international engagement gradually declines. In particular, economic development over the medium term will depend on the impact of the envisaged draw-down of a large foreign military architecture ('transition') and foreign civilian engagement ('transformation'), the former having begun in 2012 and expected to be largely finalized by 2014. In the case of Afghanistan, donor support has already started to decline, and may decline further as the military presence shrinks further. Notwithstanding, donors pledged US\$16 billion through 2016 at the 2012 Tokyo Conference – a significant level of support.

Its difficult past and geopolitical importance has meant that Afghanistan's security needs have grown relatively large for an economy of its size. At present, the government spends an estimated 4 percent of GDP in 2012 of its own resources on security, while an additional 20 percent of GDP is funded by donors. Compared to other fragile economies, Afghanistan's total military expenditures stand out. As a result, the lion share of donor support was for security. In 2011, donors funded 60 percent of the on-budget costs of the Afghan security forces – military and police. In addition, donors directly paid for the costs of foreign troops in Afghanistan to the tune of US\$ 12 billion (60 percent of GDP in 2011).

From a medium-term policy perspective, the speed of the military transition is the key determinant for how much security spending would need to be funded from the country's own budgetary resources. The exact trajectory of support from the international community, including via grants from such bodies as the NATO Training Mission and the Law and Order Trust Fund Afghanistan, will determine how much fiscal space the government has for other spending priorities.³ Many policymakers expect that domestically produced security services will eventually be cheaper than foreign security services and therefore there will be more fiscal space for non-defence expenditures.

In addition to taking over security spending, the Afghan government will also have to shoulder projects and investment spending currently run by donors; this includes the capital stock put in place by donors (for example, roads, bridges, schools or hospitals). As donor-financed development projects

¹IMF Country Report (2011).

²The World Bank (2012) estimates that donors spent close to 100 percent of GDP in the same year under the label of Afghanistan, though not all of this money was actually spent inside of the country. In this case, the Afghan contribution is that much smaller at 10 percent.

³Even though donors expect the country to shoulder a larger share of the costs, the 2012 Chicago NATO summit nevertheless generated significant support over the coming decade, with Afghanistan agreeing to contribute up to 23 percent of its security costs.

are surrendered to the Afghan government, the tight resource envelope will force the government to evaluate the viability of this capital stock. The IMF and World Bank conservatively estimate the cost of maintaining this capital stock at 15 percent of GDP.

Domestic revenue effort is the main means by which the government can loosen its own budget constraint. Successive administrations have achieved impressive improvements in revenue collection in the space of five years (a quadrupling in absolute terms between 2005/06 and 2010/11). Realizing further gains depends heavily on the speed and determination with which the fiscal reform agenda is implemented, as well as exogenous political and economic developments. Mining revenues and a broadening of the domestic tax base (e.g., the introduction of a value-added tax and excise duties) would generate vital fiscal space. It would also help to wean the country off a reliance on import duties and other border taxes, the proceeds of which can be victim to misappropriation. At present, the IMF estimates that, assuming a stable security outlook, domestic revenues will be around 17 percent of GDP by 2025, while donor support may still account for a respectable 23 percent of GDP.

In most countries, shortfalls in resources could be debt financed. However, the Afghan government is still in the process of building a government bond market based on *sukuk* securities⁴. The success of any future *sukuk* issuance depends on a number of factors, ranging from the ability to tap a relatively young domestic banking sector for liquidity to foreign investor appetite for holding claims on an economy with a unique security profile and outlook. The latter depends on the ability of the government to fund security in the first instance, and therefore the government's fiscal constraint indirectly becomes a function of its security provision.

In the years ahead, the government of Afghanistan thus has to balance the need to maintain and improve security while advancing the country's growth and development. This must be achieved using a very limited domestic revenue base, and donor support that will decline from its elevated levels in the immediate post-conflict period.

III. MACROECONOMIC MODEL

This section summarizes the modeling framework used, which is inspired by Buffie et al. (2012). Here the formal part of the Afghan economy is characterized by four basic sectors: the households, the producers, the government, and the rest of the world.⁵ The model structure is schematically depicted in Chart 1. The rest of the section details the behavioral characteristics of individual economic agents and sectors.

[C H A R T 1]

⁴*Sukuk* is a financial instrument structured to comply with the Islamic law.

⁵The model is designed to gauge economic output that is captured by GDP estimates excluding an informal sector. According to some measures, the informal sector is about two thirds of the actual economy so a large part of the economy remains outside the purview of the framework developed. The existence of the informal sector may support more favorable economic and fiscal policy outcomes than the model predicts; by helping to buffer adverse economic shocks and smooth national income.

A. Household sector

The economy is populated by two types of households: households that are rich enough to save part of their income and households that live on a day-to-day basis. The former group of households will be called *savers* and the latter will be called *hand-to-mouth* households. The two groups face the following decision problems.

1. Savers

The savers' objective is to maximize their lifetime welfare from consumption, C_t^s , and leisure, $1 - N_t$,

$$\max_{\{C_t^s, N_t^s, K_t^s, I_t^s\}} E_0 \sum_{t=0}^{\infty} \beta^t \left[(1 - \xi) \log(C_t^s - \bar{C}_t^s) - \frac{1}{1 + \eta} (N_t^s)^{1 + \eta} \right]$$

by optimally choosing the level of consumption, time spent working N_t^s , capital K_t^s and investment I_t^s . The decisions are subject to the nominal income constraint

$$\begin{aligned} W_t N_t^s + R_{k,t-1} K_{t-1}^s + R_{l,t-1} B_{t-1} F X_t + R_{t-1} D_{t-1} + T_t^s + \Pi_t = \dots \\ \dots (1 + \tau_t) P_t C_t^s + P_t I_t^s \left[1 + \xi_I \left(\frac{I_t^s}{I_{t-1}^s} - 1 \right) \right] + B_t + D_t. \end{aligned}$$

Savers accumulate savings in the form of physical capital, invest in domestic one-period government *sukuks*, D_t , and in foreign one-period foreign *sukuks*, B_t , valued at the nominal exchange rate, $F X_t$. While their utility from consumption is influenced by how much they consumed in the past (external habit formation, \bar{C}_t^s), savings allow them to smooth consumption through good and bad times by intertemporally reallocating their assets. Consumption is taxed at a time-varying rate τ_t set by the government. P_t is the domestic price level, W_t the hourly wage, $R_{k,t}$ the gross rental rate on capital, $R_{l,t}$ the gross interest rate paid on the foreign bonds, and R_t the gross risk-free interest rate paid on domestic government bonds. Savers also receive transfers from the government, T_t^s , and dividends from firms, Π_t .

Savers are endowed with an initial physical capital stock, $K_0^s > 0$. The stock depreciates at the rate $0 < \delta < 1$ following the law of motion of

$$K_t^s = (1 - \delta) K_{t-1}^s + I_t^s,$$

where I_t^s is investment in period t .

The first-order conditions that solve the savers' maximization problem imply the following equilibrium law of motions

$$\begin{aligned}
\frac{1 - \xi}{C_t^s - \bar{C}_t^s} &= (1 + \tau_t)\lambda_t P_t, \\
(N_t^s)^\eta &= \lambda_t W_t, \\
\lambda_t P_{k,t} &= \beta[(1 - \delta)E_t P_{k,t+1} + R_{k,t}]E_t \lambda_{t+1}, \\
\lambda_t &= \beta R_{l,t} E_t \lambda_{t+1}, \\
\lambda_t F X_t &= \beta R_{l,t} E_t \lambda_{t+1} F X_{t+1}, \\
P_{k,t} &= P_t \left\{ 1 + \xi_I \left[\left(\frac{I_t^s}{I_{t-1}^s} - 1 \right) - \beta \left(\frac{E_t I_{t+1}^s}{I_t^s} - 1 \right) \right] \right\}.
\end{aligned}$$

Where λ_t is the shadow price of consumption. The price of capital, $P_{k,t}$, is a function of the shadow price of consumption and the rental costs of physical capital. Without capital adjustment costs $P_{k,t}$ would be equal to P_t . \bar{C}_t^s is the external consumption habit, which simply depends on the past consumption level, $\bar{C}_t^s = \xi C_{t-1}$ with $0 < \xi < 1$.

Savers' (as well as hand-to-mouth consumers') consumption basket, C_t^s , consists of domestically produced, $C_{d,t}^s$, and imported foreign consumption goods, $C_{f,t}^s$. Both goods are assumed to be consumed as complements at fixed proportions

$$\begin{aligned}
C_{d,t}^s &= \omega C_t^s, \\
C_{f,t}^s &= (1 - \omega) C_t^s,
\end{aligned}$$

where $0 < \omega < 1$ is the share of domestically produced goods in the basket. The complementarity assumption implies that the consumption goods will be demanded at fixed portions regardless of their relative prices. Given what will follow in sections 4 and 5, it captures the belief that over the medium-term the variety of domestically produced goods will remain limited and households will largely maintain their demand for foreign goods regardless of their price.

The Leontieff structure of the consumption basket implies that the aggregate price level is a weighted average of the prices of the two consumption goods

$$P_t = \omega P_{d,t} + (1 - \omega) P_{m,t}.$$

2. Hand-to-mouth consumers

Hand-to-mouth households are less fortunate than savers. They maximize the same lifetime utility function

$$\max_{\{C_t^h, N_t^h\}} E_0 \sum_{t=0}^{\infty} \beta^t \left[\log(C_t^h) - \frac{1}{1 + \eta} (N_t^h)^{1 + \eta} \right],$$

but they lack the opportunity to smooth their consumption by saving or investing, or they exhibit no consumption habits. Hand-to-mouth households do not own any physical or financial assets. Their income constraint simply equates labor income and government transfers to (after tax) expenditures on consumption goods

$$(1 + \tau_t) C_t^h P_t = W_t N_t^h + T_t^h.$$

Whatever income hand-to-mouth consumers earn is consumed.

The first-order conditions imply that hand-to-mouth consumers maximize their welfare when the marginal utility of work is adequately compensated by the real wage, W_t/P_t ,

$$\frac{W_t}{P_t} = (1 + \tau_t)C_t^h(N_t^h)^\eta.$$

Similar to savers, hand-to-mouth households consume domestic and foreign consumption goods at a fixed share ω

$$\begin{aligned} C_{d,t}^h &= \omega C_t^h, \\ C_{f,t}^h &= (1 - \omega)C_t^h. \end{aligned}$$

3. Aggregation

In the model economy, there is a fraction f of hand-to-mouth consumers and a fraction $(1 - f)$ of savers. The aggregate consumption demand, labor supply, investment and capital demand of an average household is then given as a weighted sum of the respective demand and supply functions of savers and hand-to-mouth consumers

$$\begin{aligned} C_t &= (1 - f)C_t^s + fC_t^h, \\ C_{d,t} &= (1 - f)C_{d,t}^s + fC_{d,t}^h, \\ C_{f,t} &= (1 - f)C_{f,t}^s + fC_{f,t}^h, \\ N_t &= (1 - f)N_t^s + fN_t^h, \\ I_t &= (1 - f)I_t^s, \\ K_t &= (1 - f)K_t^s. \end{aligned}$$

B. Domestic producers

Following Buffie et al. (2012), a representative producer operates in a perfectly competitive environment.⁶ She maximizes her profits by optimally using the production factors of labor, N_t , physical capital, K_{t-1} , and imported intermediate goods, M_t^y . To use these resources, the producer has to pay the nominal wage, W_t , the rental rate of capital, $R_{k,t}$, and the price for imports, $P_{m,t}$. The nominal profit function

$$\max_{\{N_t, K_{t-1}, M_t^y\}} \Pi_t = P_{d,t}Y_t - W_tN_t - (R_{k,t} - 1)K_{t-1} - P_{m,t}M_t^y$$

⁶The assumption of perfect competition appears appropriate because the model time period is annual and there is free entry to the industry.

is maximized subject to a CES Cobb-Douglas production function

$$Y_t = A(N_t)^{\alpha_n}(K_{t-1})^{\alpha_k}(M_t^y)^{1-\alpha_n-\alpha_k}G_t^\psi,$$

where A is total factor productivity, and $0 < \alpha_n, \alpha_k < 1$ and $\alpha_n + \alpha_k = 1$. Except for the production factors listed above, real output Y_t also depends on the level of public services $G_t > 0$ that enter in the form of a positive externality (similarly to Barro, 1990), and their use is essential for the production. As a positive externality, public services are assumed to be supplied at no costs to the producers. The weight on public services ψ is nonzero, but it will hold that $\psi < \alpha_n$ (i.e., exogenous growth is guaranteed).⁷

The first-order optimality conditions give the firm labor, capital and imports demand functions

$$\begin{aligned} N_t W_t &= \alpha_n Y_t P_{d,t}, \\ K_{t-1} R_{k,t} &= \alpha_k Y_t P_{d,t}, \\ M_t^y P_{m,t} &= (1 - \alpha_n - \alpha_k) Y_t P_{d,t}. \end{aligned}$$

C. Imports

Demand for imports in this economy comes from both households that demand foreign consumption goods and producers that use foreign intermediate goods in the production of domestic consumer goods. The total demand for imports is then

$$M_t = C_{f,t} + M_t^y.$$

The imported final and intermediate goods are both purchased at the same import price, $P_{m,t}$.

D. Exporters

There is a representative exporter that buys domestic consumption goods and sells them abroad at the export price, $P_{x,t}$. The demand for exports, X_t , depends on the level of foreign demand, $Y_{w,t}$, and on the relative price competitiveness of domestic goods on the foreign market

$$X_t = \bar{X} \left(\frac{P_{x,t}}{P_{w,t} F X_t} \right)^{-\epsilon_x} Y_{w,t},$$

where $P_{w,t}$ is the world price of equivalent foreign goods (in foreign currency), $F X_t$ is the nominal exchange rate, and $\epsilon_x > 1$ is the export price elasticity.

The export price $P_{x,t}$ directly derives from the terms of trade, T_t ,

$$T_t = \frac{P_{x,t}}{P_{m,t}},$$

which is exogenously given.

⁷If $\psi > \alpha_n$ then the production function would exhibit increasing returns to scale in capital and government services and the model would exhibit endogenous growth. The issue of endogenous growth is left for future research.

E. Financial intermediaries

In the model, capital is not completely mobile thanks to the introduction of a risk premium on foreign borrowing. This serves two purposes. Firstly, it better reflects the reality of relatively less mobile capital in low income countries. Secondly, with perfect capital mobility, indebtedness could grow in an unbounded fashion.⁸ There are financial institutions that can access loanable funds abroad and intermediate them to domestic private borrowers. The rate at which the funds are loaned out, $R_{l,t}$, depends on the world risk-free interest rate, $R_{w,t}$, augmented for the country credit risk, cr_t ,

$$R_{l,t} = R_{w,t} + cr_t.$$

The country risk premium depends on the economy's relative indebtedness

$$cr_t = prem \left[\log \left(\frac{R_{l,t} B_t F X_t}{P_{k,t} K_t} \right) - \log(LVR) \right].$$

$R_{l,t} B_t F X_t$ represents the interest of foreign debt value in domestic currency. $P_{k,t} K_t$ is the nominal asset value (capital) that can be used as collateral. The LVR is the loan-to-value ratio that foreign creditors accept without a risk penalty. It is useful to note, however, that even though the expression for the risk premium may look ad hoc, it can be viewed as a reduced form of credit premia implied by optimal pricing models, e.g. Bernanke et al. (1999).

F. Monetary policy

The role of monetary policy is to anchor inflation expectations at a desired level and help to mitigate the negative short-run effects of market imperfections. Because of the fiscal focus of the paper, the role of central bank is modeled only minimalistically. To capture the main role of monetary policy, the central bank is assumed to follow an inflation targeting rule in which the domestic risk-free rate is simply set according to

$$R_t = \rho_r R_{t-1} + (1 - \rho_r) [\bar{R} + \phi_\pi (\pi_t - \pi^*)].$$

The central bank desires to smooth its interest rate decisions by a factor $0 < \rho_r < 1$ weighting the existing interest rate level, R_{t-1} , and the need for new action given by the deviation of current inflation, π_t , from the policy target, π^* .

G. Government

The government consists of the treasury and a government agency. The treasury's role is to collect taxes and other domestic revenues, manage external funding, and redistribute these resources domestically. The agency, which can also be thought as a ministry within the government, is responsible for providing public services. The agency receives a regular endowment from the treasury and is obliged to maintain a balanced budget.

⁸See Schmitt-Grohe and Uribe (2003) for the review of other possible approaches addressing this problem.

1. Government agency: Public-services producer

The agency's charter from the government is to maximize the supply of public services, G_t . Public services are supplied to the whole economy and serve as an input (positive externality) to private production. The basket public services is composed of security services, H_t , and infrastructure services, z_t .

Security and infrastructure are substitutes blended in a CRS manner. The assumption is motivated by Berman et al. (2011). In their seminal empirical analysis for Iraq, they find that development spending helps to improve civilians' attitude towards local as well as central government and reduce insurgent activities. In Afghanistan, development programmes seem to have similar implications for security, although the evidence is less clear-cut (Beath et al., 2012, or Chou, 2012).⁹

Agency's decisions to maximize the level of public services are constrained by the funding allowances from the central government. At the beginning of each period the agency is endowed with a lumpsum money transfer, $I_{g,t}$, and optimally decides how much of these funds to allocate to infrastructure, z_t , or security-related human capital, H_t . Formally, the agency's problem is characterized as

$$\max_{\{H_t, z_t, I_{z,t}, I_{H,t}\}} E_0 \sum_{t=0}^{\infty} \Lambda_t (A_{g,t} H_t)^\phi z_t^{1-\phi},$$

subject to the budget constraint

$$I_t^g \geq I_{z,t} + I_{H,t},$$

and subject to the accumulation law for public capital

$$\begin{aligned} H_t &= (1 - \delta_H) H_{t-1} + s(I_{H,t} - \bar{I}_H) + s\bar{I}_H, \\ z_t &= (1 - \delta_z) z_{t-1} + s(I_{z,t} - \bar{I}_z) + s\bar{I}_z. \end{aligned}$$

The production of public services exhibits constant returns to scale with respect to security capital, H_t , and the level of infrastructure, z_t . $A_{g,t}$ is the factor associated with security capital productivity. The levels of security and infrastructure capital accumulate in a similar fashion to private physical capital, but, as is typical in low-income economies and Afghanistan is not an exception, investment in public capital is subject to losses and inefficiencies. The parameter $0 < s < 1$ captures these inefficiencies by "penalizing" investment levels that differ from the long-term equilibrium, \bar{I}_z or \bar{I}_H . If government desires to increase the level of public capital by the value of 1 afghani, it needs to invest more than 1 afghani. In the context of the experiments in section 5, this feature will tend to amplify the pressures on the government expenditure policy due to shrinking financial resources.

When prioritizing investment decisions, the agency takes into account current as well as expected future benefits that such investment will bring to the public. The stochastic discount factor, Λ_t , captures that agency's role in a formal way. To reflect public welfare, the stochastic discount factor is derived from the savers' decision problem. Specifically, the discount factor depends on the functional

⁹Beath et al. (2011) has lately argued that a certain minimum level of security must be provided for public development programmes to have improving effects on public attitudes towards the government and reducing violence.

form of savers' utility

$$\Lambda_t = \beta E_t \left\{ \frac{U_c(C_{t+1}^s, N_{t+1}^s)}{U_c(C_t^s, N_t^s)} \right\}.$$

The stochastic discount factor introduces a time dimension to the agency's problem. Without the stochastic discount factor, the decision problem would be static. First, the factor makes the agency's decision problem dynamic by making intertemporal substitutions optimal. That means that the agency can bring some investment projects forward or delay if it finds it desirable from the public welfare view point. Second and more importantly, the nature of the stochastic discount factor makes the supply of public services countercyclical.

The discount factor depends on the expected economic performance. If the economy is expected to expand in the future ($E_t C_{t+1}/C_t > 1$), the value of the discount factor declines. From the public welfare perspective, that decline makes the supply of public services more valuable today when the economy is weaker relative to the future when the economy is doing better. An inverse logic also holds. When the economy is expected to do worse in the future, supply of public services will be more valuable in the future than today. The agency will tend to postpone its investment decisions into the future.

The agency cannot make any savings decisions other than accumulating capital at different rates. By investing in security and infrastructure at a different pace this allows the agency to smooth public expenditures over time.

The first-order optimality conditions to the agency's decision problem yield the agency's rules for allocating spending between domestic security and infrastructure, respectively,

$$\begin{aligned} \phi \frac{G_t}{H_t} &= \lambda_{G,t} - (1 - \delta_H) E_t \Lambda_{t+1} \lambda_{G,t+1}, \\ (1 - \phi) \frac{G_t}{z_t} &= \lambda_{G,t} - (1 - \delta_z) E_t \Lambda_{t+1} \lambda_{G,t+1} \end{aligned}$$

The equilibrium structure of public services depends on the relative costliness to maintain individual forms of public capital ($\{\delta_H, \delta_z\}$) and their importance for the production of final public services (ϕ).

In a special case when both security and infrastructure depreciate at the same rate, $\delta_H = \delta_z$, and when $\Lambda_t \lambda_{G,t} = 1$, then it is optimal for the agency to invest in both public services in a fixed share that is given by their relative importance, $0 < \phi < 1$:

$$H_t = \frac{\phi}{1 - \phi} z_t.$$

The more important security, H_t , is in the production of G_t , the more investment will be allocated towards it:

$$I_{H,t} = \phi I_{G,t}.$$

2. Treasury

The role of the treasury is to manage government revenues and expenditures so that the government budget is in balance:

$$\tau_t P_t (C_t^s + C_t^h) + FX_t T_t^d + \frac{D_{t+1}}{R_t} = P_{d,t} [\Omega_t (I_t^g - \bar{I}^g) + \bar{I}^g] + D_t + T_t^s + T_t^h.$$

The sources of revenues, the left-hand side of the budget equation, include sales tax, $\tau_t C_t$, and foreign aid, $FX_t T_t^d$, converted to domestic currency at the nominal exchange rate, FX_t . The government can also obtain additional revenue, $\frac{D_{t+1}}{R_t}$, from issuing one-period *sukuks* discounted at the risk-free rate, R_t . Government expenditures, the right-hand side of the budget equation, consist of the annual endowment to the public-goods producer, $P_{d,t} I_t^g$, repayment of maturing *sukuks*, D_t , and transfers to households, T_t^s and T_t^h . The revenues and expenditures must be in balance:

In relation to public investment, the government faces cost overruns, Ω_t . Additional costs typically come from planning and coordination problems, particularly important in low-income countries. Therefore, in order to achieve a certain effective level of investment, more resources have to be provisioned for. Following Buffie et al. (2012), the cost overruns depend on the size of infrastructure investment relative to its existing level and its deviation from its steady-state level

$$\Omega_t = \left(1 + \frac{I_{z,t}}{z_{e,t-1}} - \frac{\bar{I}_z}{\bar{z}_e} \right)^\psi.$$

The parameter $\psi > 0$ captures the severity of the absorptive capacity in public capital.

In the experiments that follow the effective tax rate is pinned down either by the requirement of balanced budget or set to a fixed value calibrated to match a desired nominal ratio (see Section 4.A).

H. The rest of the world

The experiments considered later focus primarily on the financial sustainability of the domestic economy. Except for foreign aid, the behavior of the foreign economy plays a secondary role. Therefore, the foreign block is modeled in a rudimentary manner. The foreign interest rate, $R_{w,t}$, price level, $P_{w,t}$, and foreign output, $Y_{w,t}$, are set at their long-run equilibrium levels, \bar{R}_w , \bar{P}_w , and \bar{Y}_w , respectively.

I. Market clearing

All markets clear in the economy. The domestic goods market clears when supply equals the sum of domestic consumption demand, $C_{d,t}$, private and public investment, I_t and I_t^g , and foreign demand, X_t

$$Y_t = C_{d,t} + I_t + I_t \xi_I \left[\left(\frac{I_t^s}{I_{t-1}^s} - 1 \right) - \beta \left(\frac{E_t I_{t+1}^s}{I_t^s} - 1 \right) \right] + I_t^g + X_t.$$

The adjustment costs to private investment demand enter as social costs here.

Finally, the national aggregate resource constraint is given by the balance of payments that equates national spending with national income:

$$B_t F X_t = R_{l,t-1} B_{t-1} F X_t - (P_{x,t} X_t + T_{d,t} F X_t - P_{m,t} M_t).$$

The external balance of the economy is closed by the balance of payments.

IV. SECURITY AND INFRASTRUCTURE INVESTMENT IN THE LONG AND SHORT RUN

This section summarizes the behavioral characteristics of the model introduced above. A reader interested in using the model for fiscal experiments may skip directly to Section 5. Given the main contribution of this paper, the attention in this section is focused on the behavioral properties of the public sector. The private sector behaves in a stylized fashion.

A. Baseline calibration

The model baseline calibration is summarized in Table 1. Parameters are set to match selected nominal ratios characterizing the Afghan economy. A point worth highlighting is that under the baseline calibration, government will prefer investment in security to infrastructure services. Firstly, it is because it is assumed that security is overwhelmingly important to the economy ($\phi = 0.9$). Secondly, once accumulated, infrastructure capital is less durable than security-related capital ($\delta_z = 0.3$ while $\delta_d = 0.2$), which increases the incentives to investment relatively more in security than to infrastructure even more. The relative importance of security over infrastructure in Afghanistan is motivated by Beath et al. (2012) who suggest that a minimum level of security has to be in place for development spendings to be beneficial to economic growth. For all the experiments presented later, it is implicitly assumed that security will remain central for economic stability and development over the whole baseline time horizon.

[T A B L E 1]

Selected GDP ratios characterizing the baseline model are summarized in Table 2. Under the baseline, the overall fiscal deficit (including grants) is zero. A substantial part of government expenditures is covered from the inflow of foreign aid that makes 34 percent of domestic GDP. A major part of economic output goes towards private consumption (85 percent of GDP), with two-thirds of of consumption goods being imported. That is reflected in the size of the trade deficit (34 percent of GDP).

[T A B L E 2]

B. Structure of public services

Given the geopolitical situation in Afghanistan, current spending preferences favor security over infrastructure. In the model context, this is captured by the government agency subjectively assigning higher preference to security relative to infrastructure in the production of public services ($\phi = 0.9$). In addition, the stock of infrastructure depreciates faster than the stock of capital related to security, $\delta_z > \delta_d$. The former assumption stems from the understanding that productive development cannot occur without a stable security environment, and therefore, in the medium-term, security services are preferred for the time being. Infrastructure is assumed to deteriorate at a faster rate given its overall scarcity and the intensity with which it is used, for example, the heavy use of only a handful of major roads by all forms of traffic (civilian and military).

Because security and infrastructure capital are substitutes in the CRS production process of public services, if the government should set its spending preferences optimally, the choice will be driven by the relative durability of the two types of public capital. If the infrastructure capital is more durable than security capital, the government agency would maximize the public welfare (measured by the level of output or consumption) by supplying only the infrastructure services. Chart 2 shows that if the security capital is more durable than infrastructure capital (baseline calibration here), the agency would maximize the public welfare by supplying only security services.

[C H A R T 2]

The effects of the changing importance of security services are summarized in Chart 3.

[C H A R T 3]

Both stocks of infrastructure and domestic security capital (as shares of GDP) are declining with the depreciation rate of infrastructure, although security is notably less elastic with respect to the depreciation rate of infrastructure because of the relatively low importance of infrastructure relative to security. The bottom right panel shows that the share of the security sector in the economy increases with the increasing public importance of security. Correspondingly, the share of infrastructure sector declines (bottom left panel). Changes in the shares are disproportionate, with the infrastructure sector reacting with much greater sensitivity.

Chart 4 complements the above results by focusing solely on the role of capital depreciation. It shows that the level of infrastructure, security, and public services as a whole is declining with declining durability of infrastructure. Leaving all other things constant, the size of public sector (measured as the share of public services supply on the total GDP) increases as security capital depreciates faster (the top right panel). Because security becomes more costly to maintain, resources are allocated in favor of infrastructure (bottom right panel). The level of public services falls because the newly accumulated level of infrastructure is insufficient to fully offset the negative effect of the declining level of security. But GDP (top left panel) is positively affected by faster depreciating security capital. The negative effect of declining public services, since public services present a positive externality for output, is more than compensated for by higher public investment expenditures. As a result, GDP increases.

[C H A R T 4]

C. Public investment multipliers

What is the long-run effect of an additional dollar of public investment on GDP and its key components? Table 3 summarizes the multipliers of a permanent increase in donor aid, infrastructure, and security investment by one dollar and of a permanent increase in government expenditures financed by a one dollar increase in sales tax revenues. The reported baseline multipliers are based on the assumption that the government runs a balanced budget and any inflow of foreign aid in foreign currency is fully sterilized.

[T A B L E 3]

An additional dollar of donor aid to the domestic government yields about US\$1.4 of additional real GDP. Foreign aid has the largest impact on consumption and public investment. The multipliers are somewhat smaller when additional foreign aid flows only to security or only to infrastructure investment, illustrating certain complementarity of the two.

Fiscal expansion financed by increasing tax revenues has no positive impact on the macroeconomy. An increase in tax revenues by one Afghani generates no real increase economic activity – GDP or private investment remain unchanged. Any positive effect of the fiscal expansion is muted by the distortionary effect of the tax increases on private consumption. Private consumption falls by 0.7 Afghani as a result of the additional tax of 1 Afghani that consumers must pay. The increase in public investment by 0.1 Afghani is insufficient to offset the negative effect of the tax increase.

D. Impact of government spending shock

Although there are no long-run effects on the economy, the model developed in this paper predicts fiscal expansion financed by tax increases may have short-run expansionary effects. A 1 percent increase in government expenditures increases output on impact by 0.3 percent (Chart 5; top panels). Under the balanced budget constraint additional public expenditures are financed by tax hikes. The increasing tax burden initially leads to lower consumption (by 0.1 percent) – partially compensated by more labor supply, but the positive wealth effect of expenditure expansion eventually offsets the higher taxes and consumption increases before returning back to the long-run equilibrium. The positive wealth effect comes as a result of higher private sector productivity due to more public services; real wage increases and labor supply declines (bottom panels). Gali et al. (2007) come to similar results.

[C H A R T 5]

In response to negative aggregate demand shocks, the model predicts government spending to behave countercyclically. Chart 6 shows the reaction of public sector when consumption falls by 1 percent. The bottom panel illustrates the countercyclical behavior of government expenditures by showing that supply of public services increases when the economy contracts. As the economy recovers, supply of public services gradually declines. Because security capital is a more durable and more valuable asset for the production of public services, the government maximizes supply of the services by allocating relatively more resources towards the security sector in the economic downturn.

[C H A R T 6]

V. FISCAL EXPERIMENTS

The anticipated withdrawal of foreign troops scheduled for 2014 and gradually declining inflow of foreign aid pose a serious challenge for the sustainability of public finance in Afghanistan. Many policymakers argue that going forward it is essential for the Afghan government to focus on the mobilization of domestic revenue resources to ensure the financing of security-related services and vital public infrastructure. Both types of public goods are essential for securing the country's future development. The results summarized in this section support this argument that without greater self-reliance of the Afghan public finances, the economic growth seeded via foreign aid will remain fragile at best and diminish rapidly at worst.

Using the analytical framework from section 2, this section explores two fiscal experiments. The first experiment looks at the impact of a permanent decline in foreign donors' aid. The second experiment looks at the impact of a shortfall in tax revenues due to increased tax evasion. Both experiments consider three alternative fiscal responses:

1. **Debt financing policy:** the shortfall in revenue is supplemented by the issuance of domestic debt; the government keeps all budget chapters unchanged; in particular, real public investment expenditures are kept constant at their steady-state level; the effective tax rate remains unchanged;
2. **Tax policy:** the government commits to running a balanced budget; the shortfall in revenues is consolidated by effective tax rate increases up to the point when the government's budget is balanced; government expenditures are assumed mandatory, and they are kept constant at their initial steady-state levels;
3. **Expenditure policy:** the government commits to running a balanced budget; the shortfall in revenues is consolidated by scaling back public investment expenditures while debt and the effective tax rate remain unchanged at their initial steady-state levels.

To rank the considered policy options a qualitative criteria is used. The usefulness of individual policies is arbitrarily judged by their economic sustainability and plausibility and by their effects on output; all with equal weights on their relative importance.

A. Shortfall in foreign donors' aid

In this experiment, the inflow of donors' aid is permanently scaled back by half. The effects on public finance and selected macroeconomic variables are summarized in Chart 7 and 8, respectively. Overall, the sudden shortfall in foreign aid permanently shrinks the size of the economy. None of the three considered policy responses can fully offset the negative fiscal and economic impact. While increased public borrowing would minimize the contraction, the necessary build up in debt would reach unsustainable levels. It is the mobilization of domestic revenues by raising sales tax that has the potential of minimizing the negative impact of the economy by preserving the public capital accumulated due to past foreign aid while maintaining fiscal sustainability (Chart 5, top left panel). In contrast, cutting public expenditures keeps the budget in balance but at the expense of disinvesting and lowering the level of public capital. Public disinvestment worsens the outlook for household real

income, private consumption, and investment as the supply of public services falls sharply. Finally, pure debt financing policy helps to preserve public capital and support the economy but it is not a fiscally prudent option. Debt increases are insufficiently compensated for by increasing tax revenues from the expanding economy, and the debt rapidly accumulates to an unsustainable level.

Mobilization of domestic revenues via tax increases is the most favorable policy response in terms of economic outcomes (Chart 5, top left panel, dashed line). Under this scenario domestic sales tax increases more than two fold (from 10 to the level of about 23 percent). The GDP level remains largely unchanged and over the ten-year period it is projected to decline by 3 percentage points from its initial level. As the government sustains its baseline level of public investment in both security and infrastructure (Chart 5, top right panel), the contractionary effect of a higher tax rate comes through its distortive impact on private consumption. As household disposable income declines, so does consumption (Chart 5, middle left panel, dashed line), which leads to lower aggregate demand and hence lower demand for capital by firms (private investment falls; middle right panel, dashed line). Initially private consumption declines by more in this policy option as compared to expenditure-led fiscal measures since the distortive effect of a higher tax on consumption dominates the negative wealth effect associated with expenditure cuts. Three years into the shock, however, these two policy options converge into a permanent decline in private consumption of 19 percentage points as compared to baseline. Households smooth their disposable income by private borrowing. That impacts the country's balance of payments and the trade balance. Private (mostly foreign) borrowing comes at a cost to the economy in the form of raising the country's credit risk, which leads to a domestic currency depreciation to the order of 20 percent compared to the baseline. Households substitute towards cheaper domestic consumption goods and imports of foreign goods fall. As a result the trade balance improves (Chart 5, bottom left panel, dashed line).

Debt financing is a less favorable policy option. To the degree that the government is tapping domestic markets for borrowing, this negatively affects private consumption and investment in the short run as households find it optimal to save more (the risk free interest rate increases by more than the foreign lending rate making it more attractive for households to lend domestically). Hence, the contractionary effect on the real economy comes through the private sector. Such debt financing, however, would put public finances in an unsustainable path as public debt would reach 80 percent of GDP in ten years and the debt servicing cost would result in an ever increasing overall and operating budget balance (Chart 4, bottom right panel).

Cutting public investment expenditures is economically the least favorable policy option out of the three. In this policy option, the government has to shrink in order to keep the budget balanced. As a result of the shrinking public sector, real GDP per capita permanently drops by about 5 percent relative to baseline over a decade. Investment in security declines by 5 percent and investment in infrastructure declines by 10 percent compared to the baseline (Chart 4, top two panels). The reason for such a strong impact is that the decline in the supply of the public good has dual effects: the first is the direct effect on the aggregate demand and the second is the negative externality. In the latter case, the contraction in the provision of the public good acts as a TFP shock: any additional unit of public services increases the productivity of each factor of production. Hence, as the government cuts public investment in both infrastructure and security in its effort to compensate for the shortfall in aid, it is causing an economy wide contraction of 10 percent via a direct effect of lower demand in the economy as well as a decline in the rate of return of all factors of production. Production is negatively affected via the reduction in total factor productivity as the supply of public services (both of security and infrastructure) falls. Lower returns on factors of production such as labor and capital also leads to lower private consumption and investment. This has knock-on effects for the trade balance which

shows improvement as total imports decline due to the weakening in domestic demand while exports remain unchanged. Finally, the contractionary effect on the economy leads to slightly lower domestic revenues. However, this is offset by the larger expenditure cuts which lead to an improvement in the operating deficit as a share of GDP.

[C H A R T 7]

[C H A R T 8]

B. Shortfall in tax revenues

This section looks at the implications of shortfalls in tax revenues. A foreign troop withdrawal is likely to result in heightened uncertainty, and the public financial management architecture remains fragile in Afghanistan as do both the customs and tax administrations. Evasion and corruption are daily challenges for tax and customs officers, and therefore, any number of events could lead to the impairment of revenue administration generating greater risks for revenue shortfalls.

Despite tax evasion being bad news for revenue collection, it can be good news for an economy on the whole. As taxes typically have a negative distortionary effect, a declining tax burden would generate real income increases and consequently positive shifts in aggregate demand; assuming that public spending remains constant. In this experiment, sales tax revenue, as a share of GDP, permanently declines due to tax evasion. Specifically, tax revenue relative to GDP permanently declines by 1 percentage point, from the baseline 11 percent down to 10 percent. Technically, the shortfall is modeled by reducing the effectiveness of tax collection that translates into a lower effective tax rate. The lower effective tax rate is expansionary for economic activity as it boosts private consumer demand because households enjoy higher disposable income. This is the case for the debt financing policy option. Under the public investment policy setup, the positive growth effect is more than offset by the negative externality of lower public spending and the subsequent supply loss of public services. Domestic revenue mobilization in this setup aims at reversing the increase in evasion by increasing the tax rate, thus, completely offsetting the initial expansionary effect of a lower effective tax rate.¹⁰

The effects on public finance and the aggregate economy are summarized in Chart 9 and 10, respectively.

In the effort to reverse the lower revenue, the government could borrow in the domestic market, which would partially offset the expansionary effect of the lower effective tax rate as households would find it optimal to permanently increase their saving rate. Private investment also declines as a result. The net effect is mildly expansionary on the real economy, while resulting in a permanently higher overall deficit and rising debt-to-GDP ratio of 6 percentage points by the end of the 10th year, putting the cumulative debt-to-GDP ratio to 62 percent and rising. Hence, in this policy scenario, a permanent decline in the effective tax rate while having a negative effect on fiscal sustainability due to lower revenue stimulates growth via higher private consumption. The accumulated debt over 10 years is fiscally unsustainable, and stabilization measures will be required. This results in a 0.3 percentage

¹⁰We do not model the impact of an increasing tax rate as leading to further tax evasion. Existing taxpayers remain compliant. Should this not be the case, the offset would only be partial.

points lower real GDP compared to the baseline. Once again, as described in section 4.A, the strong impact of cuts in public investment comes from the dual effect of lower aggregate demand and the negative externality effect that acts as a negative TFP shock.

The third policy option for the government to restore the loss of revenue is via additional tax measures, assuming that such tax measures won't intensify tax evasion. An additional effective tax rate increase will tend to offset the effect of evasion. Given the expansionary effect of the latter, the increase in the rate does not need to be of the same magnitude in order to fully reverse the increase in the rate of evasion.

In summary, in this experiment, the debt financing and revenue measures are superior to cuts in public investment. The optimality of increased public borrowing depends on the magnitude of the shock as that would determine the fiscal sustainability of such an option.

[C H A R T 9]

[C H A R T 10]

C. Results discussion

In the simulations, the optimal policy response turned to depend on the magnitude and duration of the shocks generated. The key implications arising from the two experiments carried out in this paper are that expenditure cuts in the form of lower public investment are the least preferred option as they have an amplified negative effect on the economy given the strong positive externalities associated with government-provided public goods. Domestic revenue mobilization, either in the form of raising revenues through broadening the tax base (e.g. efforts to introduce a VAT, excise duties, etc.) and mining or reducing tax evasion by improving tax administration, is the most preferred option. One must note, however, that depending on the magnitude of the shock, the required increase in the tax rate (or collection efforts) must be realistically feasible. In the experiment of donor aid falling by 50 percent, the effective tax rate would need to increase by 13 percentage points to 23 percent within a decade. While this is more than doubling the current rate, Afghanistan ranks as one of the countries with the lowest revenue-to-GDP ratio and poorest revenue administrations. Whether such a rate increase could truly mobilize revenue will be dependent on a number of factors, most notably structural improvements in revenue administration.

It is also important to note that both the experiments above, refrained from considering cutting recurrent spending as a consolidation measure. In Afghanistan this would be predominantly wages and while it would have a potentially lower negative effect on the economy as compared to cuts in public investment (via lower consumption), it would require unrealistic levels of wage cuts and or retrenchment in the security sector. Furthermore, the framework naturally abstracts from a number of other important characteristics of the Afghan economy. For example, the optimal responses could be altered once we allow for the fact that evasion is likely to be a function of the tax rate in such a poor-administered country. Furthermore, for a country that is starting from a level of zero debt, it is unclear how much debt local or global markets would be willing to bear before funding costs become prohibitively expensive. Using a novel general equilibrium framework to study the key tradeoff facing the government, the analysis should be interpreted as providing only a partial equilibrium analysis. Clearly, political stability of the country is a key prerequisite for any economic polity to be efficient.

Overall, the analysis also shows that public borrowing on world capital markets is not a sustainable option to finance permanent shortfalls in revenues. Afghanistan's capacity to carry public debt is indeed very limited. There is some scope for domestic issuance, mainly to promote market development. But unless there is a growth dividend much higher than predicted in this paper, the model predicts that Afghanistan is unlikely to be able to finance its spending needs through borrowing. Quite soon, debt servicing costs would crowd out other spending and debt would be propelled onto an explosive path.

A worse-than-expected security situation in Afghanistan is the main downside risk. A worsening security situation can be expected to drain scarce budget resources from development spending to security spending, reducing the much-needed improvements in living standards. Similarly, shortfalls in donor support, or volatility in donor support will trigger expenditure cuts that will sacrifice future development. And lastly, failure to achieve the targeted revenue gains will equally entail expenditure cuts and lower growth. For now, the pecking order for spending is clear, with security expenditure necessarily taking primacy.

VI. CONCLUSION

Using a general equilibrium framework with rational expectations, we attempted to capture the unique policy tradeoff that exists in Afghanistan given the competing priorities of security and development against a backdrop of declining foreign aid. By exploring the evolution of the Afghan economy over the coming decade using two risk scenarios, it is possible to trace how public investment in both security and development, together with sustained domestic revenue efforts, reinforce one another in support of growth. In particular, with public spending on security and development acting as complements in raising the living standards of Afghans, the government needs to carefully balance the two spending categories.

Even though the paper focused on isolated policy responses in its experiments, a combination of various alternatives might also be warranted. To the degree that public investment might be reduced in response to permanent shortfall in revenues, the allocation of these cuts will depend on the return on each investment to the production of public services. In the current calibration, it is investment in security that takes the predominance over infrastructure. This might change as the economy develops and the risks associated with the lack of security decrease reversing the return on that type of public investment.

There are at least two avenues for future research. An important issue is the interaction between the formal and informal economy, the role of informal sector in helping to finance the current account, as well as linking domestic tax revenue effort more clearly to the size of the informal sector. The impact of financial intermediaries, namely in the provision of credit is also an important extension that could be considered. Finally, another important area of interest is to extend the framework for endogenous growth to analyze the effect of public investment in security and infrastructure on long-term growth potentials.

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Table 1. Baseline calibration.

Parameter	Value	Definition
α_n	0.8	Labor's share in domestic production
α_k	0.1	Physical capital's share in domestic production
β	$1/1.1^{1/4}$	Time preference factor
η	0.2	Labor supply elasticity
δ	0.03	Physical capital depreciation rate
δ_z	0.3	Infrastructure depreciation rate
δ_d	0.2	Security capital depreciation rate
χ	0.8	Consumption habit persistence
ϕ	0.9	Security's share in public services production
$\bar{\tau}$	0.14	Average tax rate
ψ	0.27	Weight of public services in private production
ρ_d	0.9	Autocorrelation in foreign aid
f	0.6	Share of hand-to-mouth consumers
ω	0.2	Weight of domestic goods in consumption basket
ϵ_x	2	Price elasticity of export demand
\bar{R}_w	$1.06^{1/4}$	Foreign gross interest rate
LVR	0.02	Risk free loan-to-value ratio
$prem$	0.1	Private debt risk premium
ϕ_π	1.5	Monetary policy weigh on inflation stabilization at the target
π^*	0	Long-run inflation target
ξ_I	20	Adjustment costs for private investment
s	0.6	Public investment efficiency

Table 2. Baseline GDP ratios (in percent).

Public finance:	
Overall fiscal deficit	0
Tax revenues	11
Donors' aid	34
Aggregate economy:	
Private consumption expenditures	75
<i>Domestic goods</i>	30
<i>Foreign goods</i>	45
Private fixed investment	14
Government expenditures	45
<i>Infrastructure</i>	5
<i>Security</i>	40
Trade deficit	34

Table 3. Selected fiscally relevant long-run multipliers

	donors' aid ^(*)	security investment	One dollar of infrastructure investment	sales tax revenues
Gross domestic product	1.4	0.1	0.8	0
Private consumption expenditures	0.4	0.1	0.9	-0.7
Private fixed investment	0.1	0	-0.2	0
Public investment	1.1	0	0.4	0.1

Note: All simulations assume that the government runs a balanced budget and that the budget is balanced by adjusting the effective tax rate. (*) it is assumed that the inflow of foreign aid in foreign currency is fully sterilized and therefore has no effect on domestic real prices and allocation of resources in the steady state.

Chart 1. Model schematics

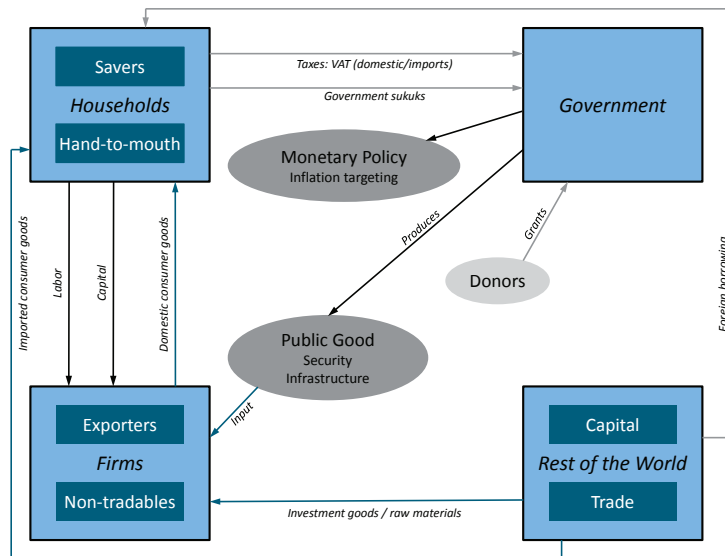


Chart 2. Importance of security, output and consumption

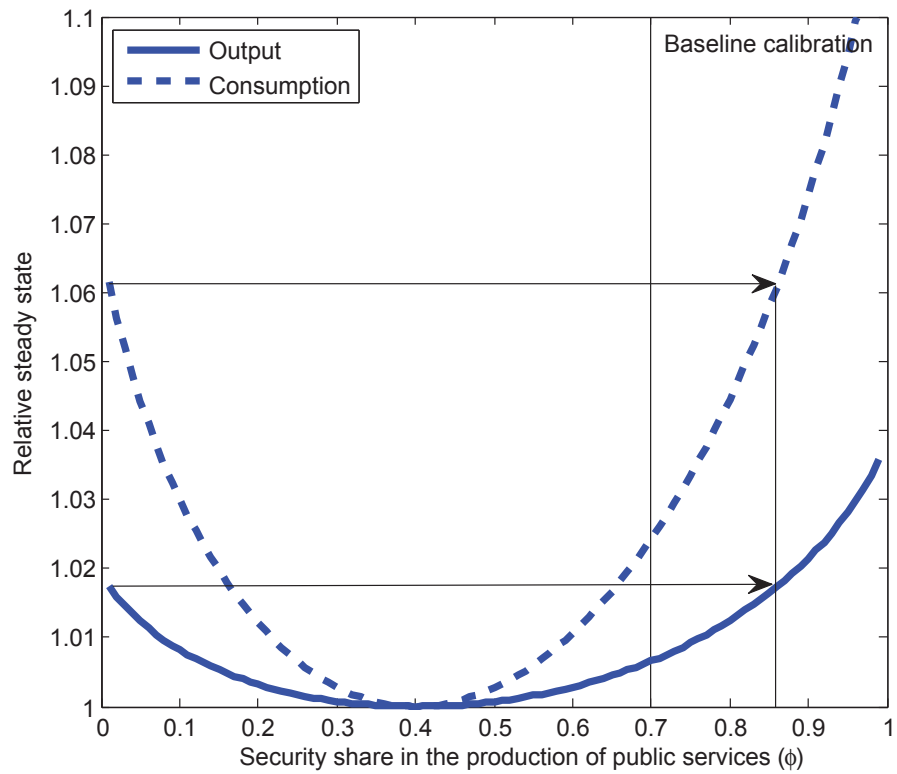


Chart 3. The effects of changing structure of public services

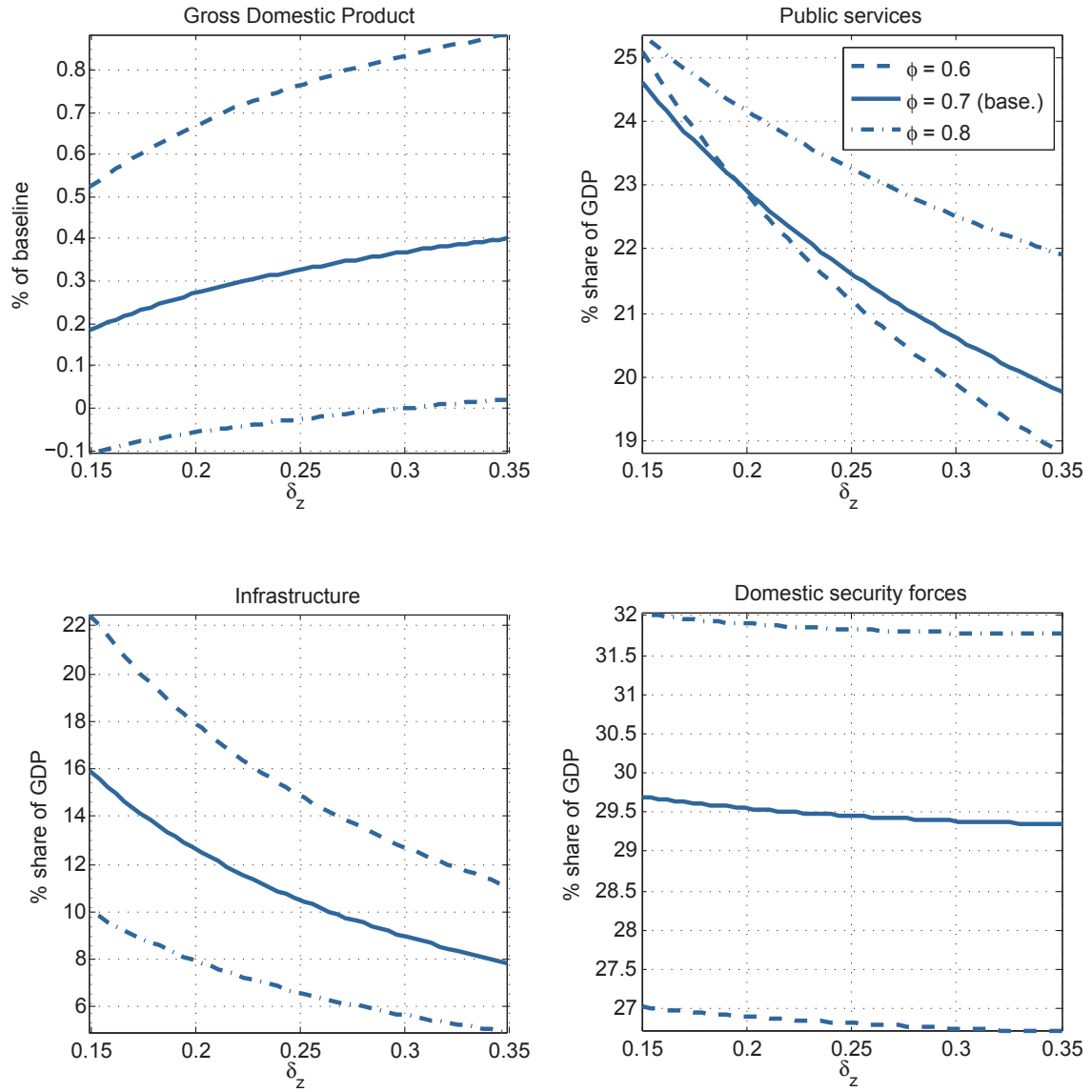


Chart 4. The effects of depreciation on the supply of public services

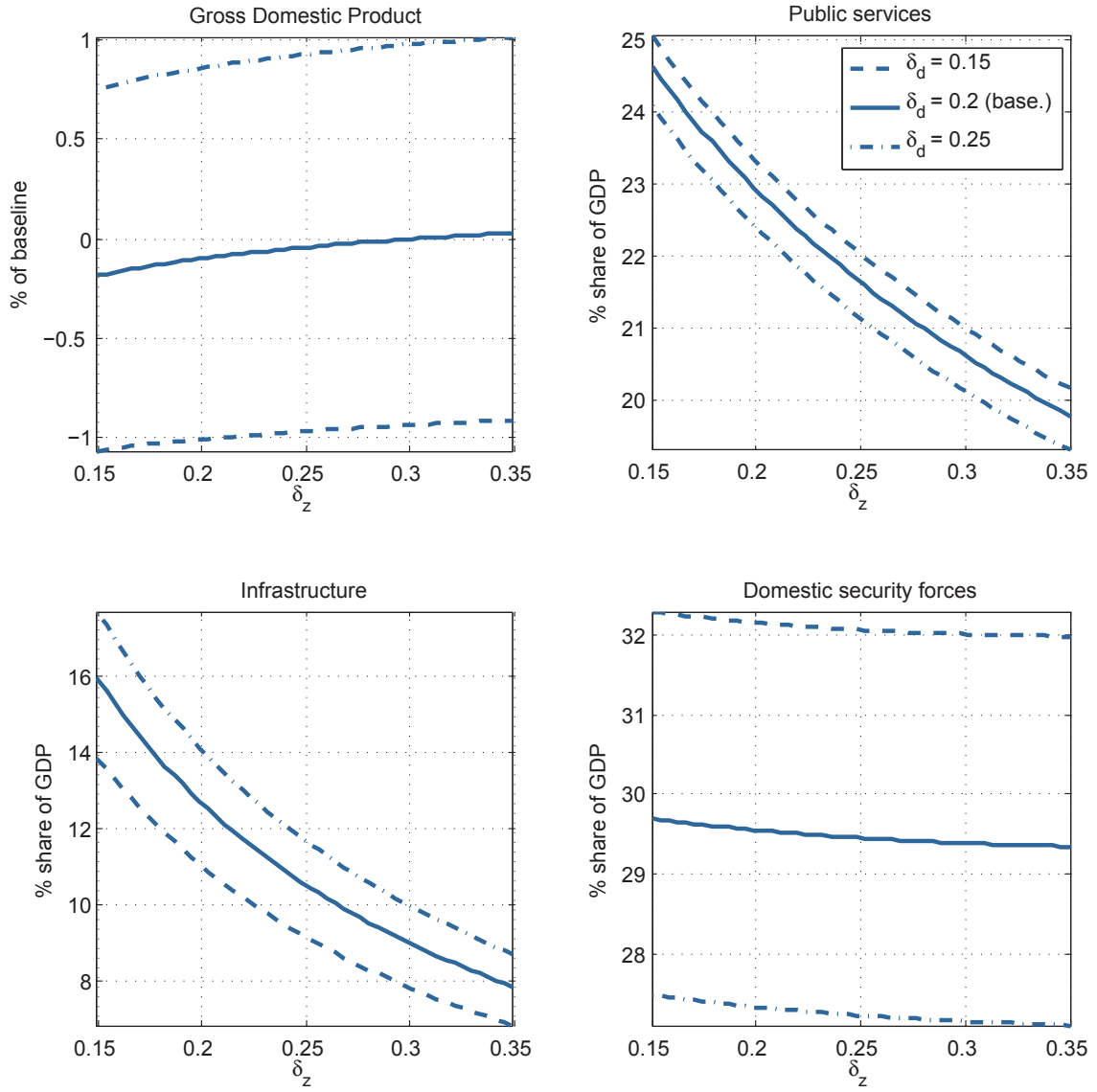


Chart 5. Impact of government spending shock

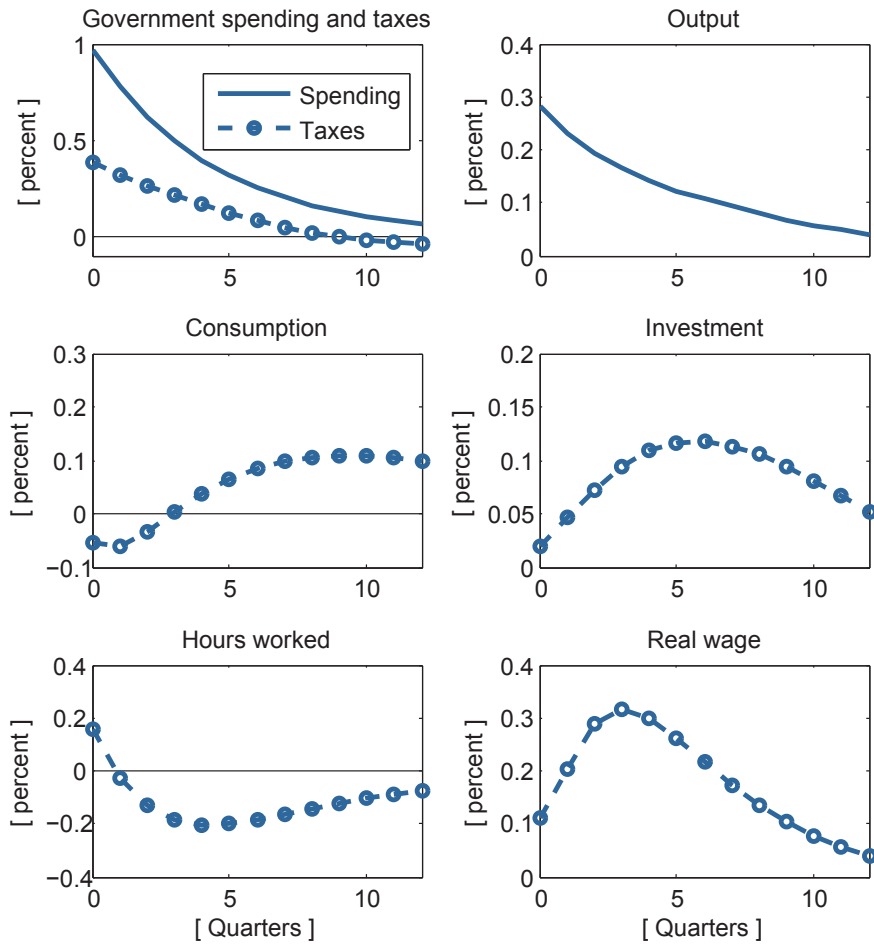


Chart 6. Fiscal response to consumption shock

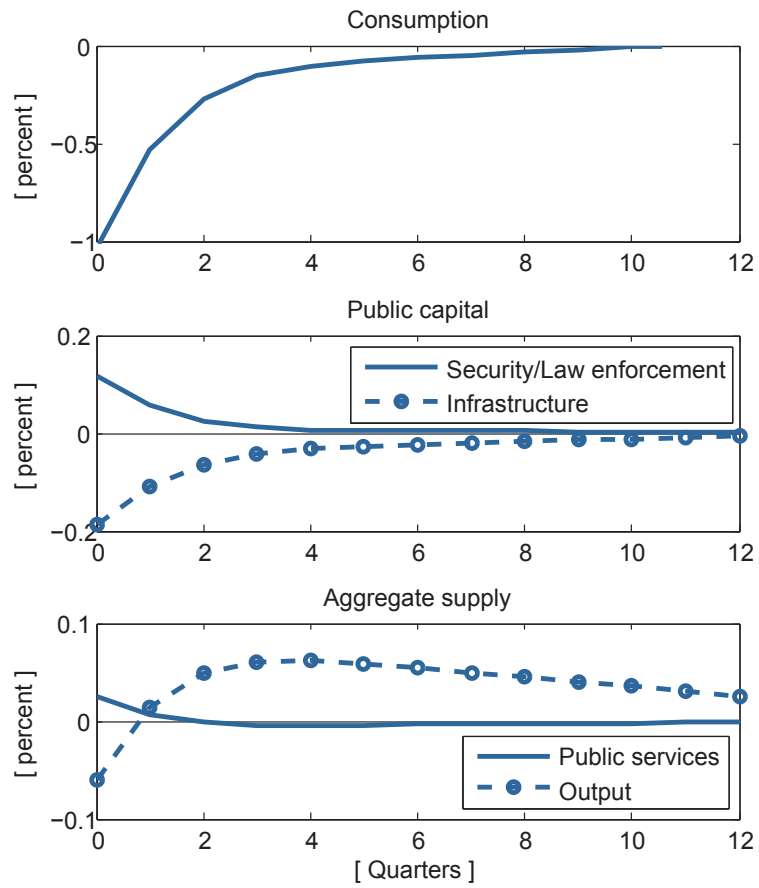


Chart 7. Public finance response to a permanent 50 percent cut in foreign aid

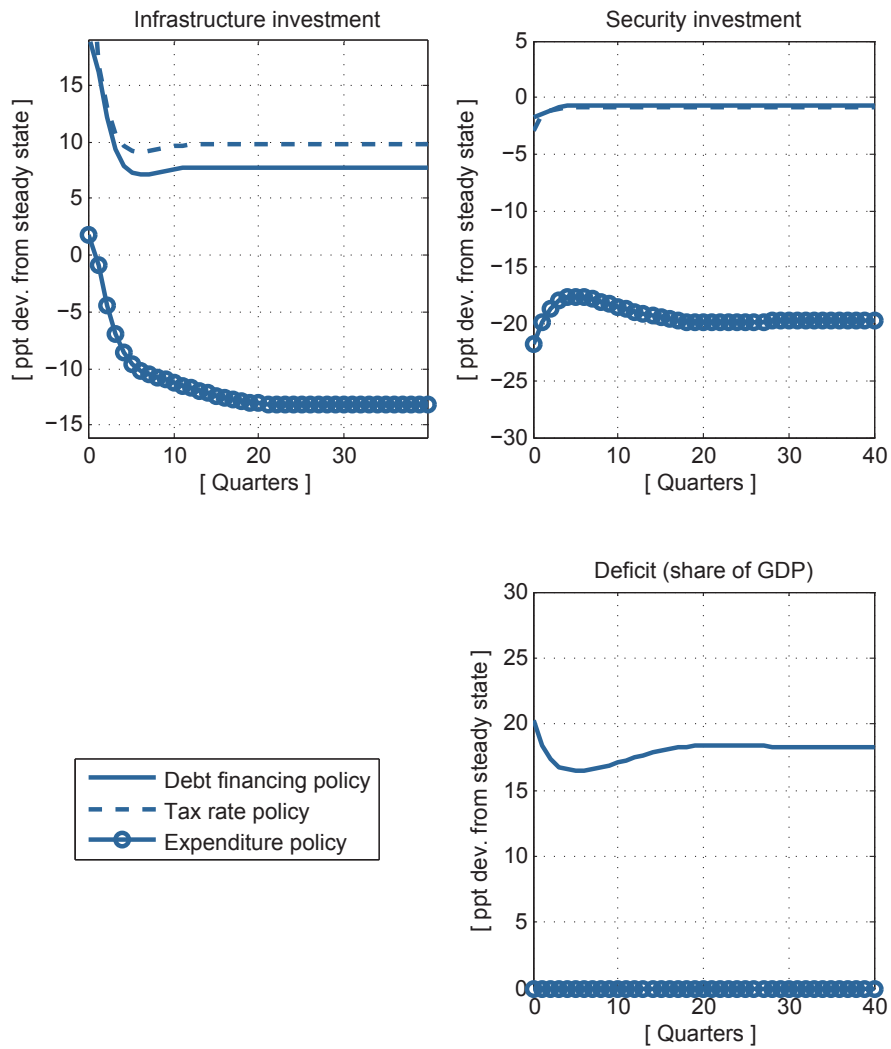


Chart 8. Real economy response to a permanent 50 percent cut in foreign aid

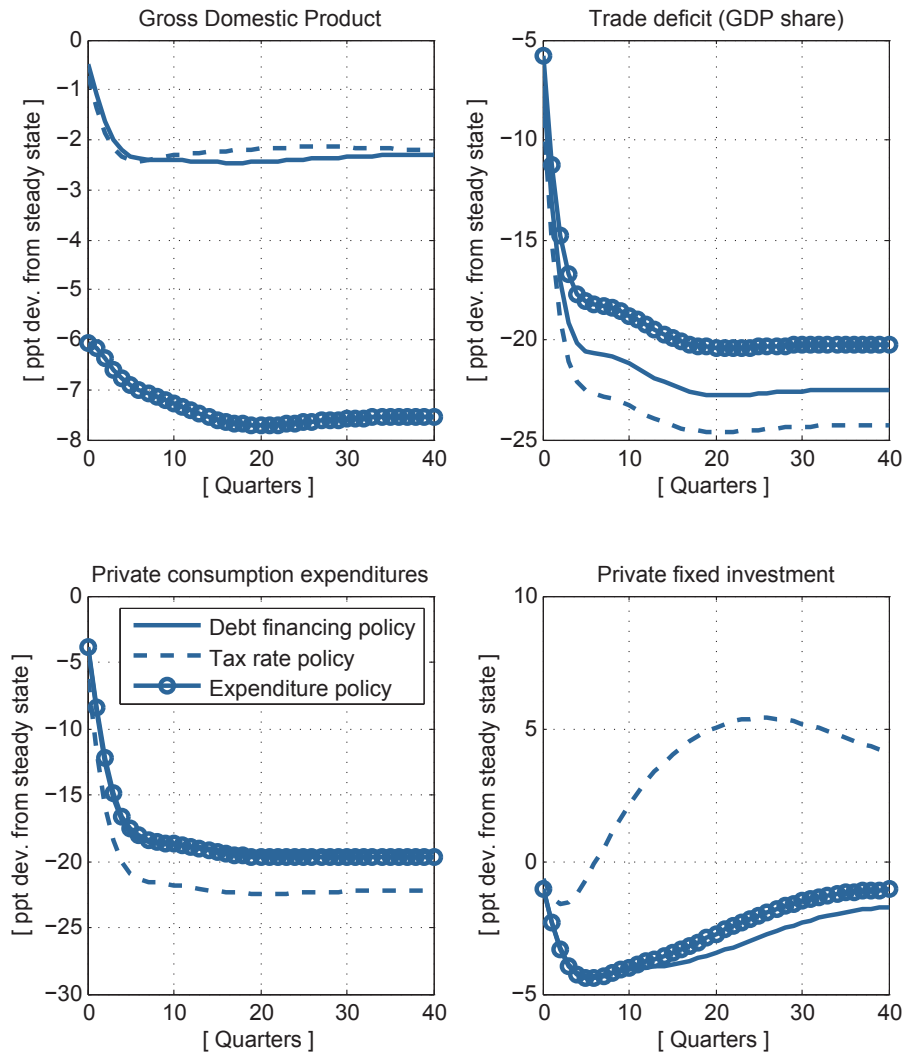


Chart 9. Public finance response to a permanent decline in tax revenues

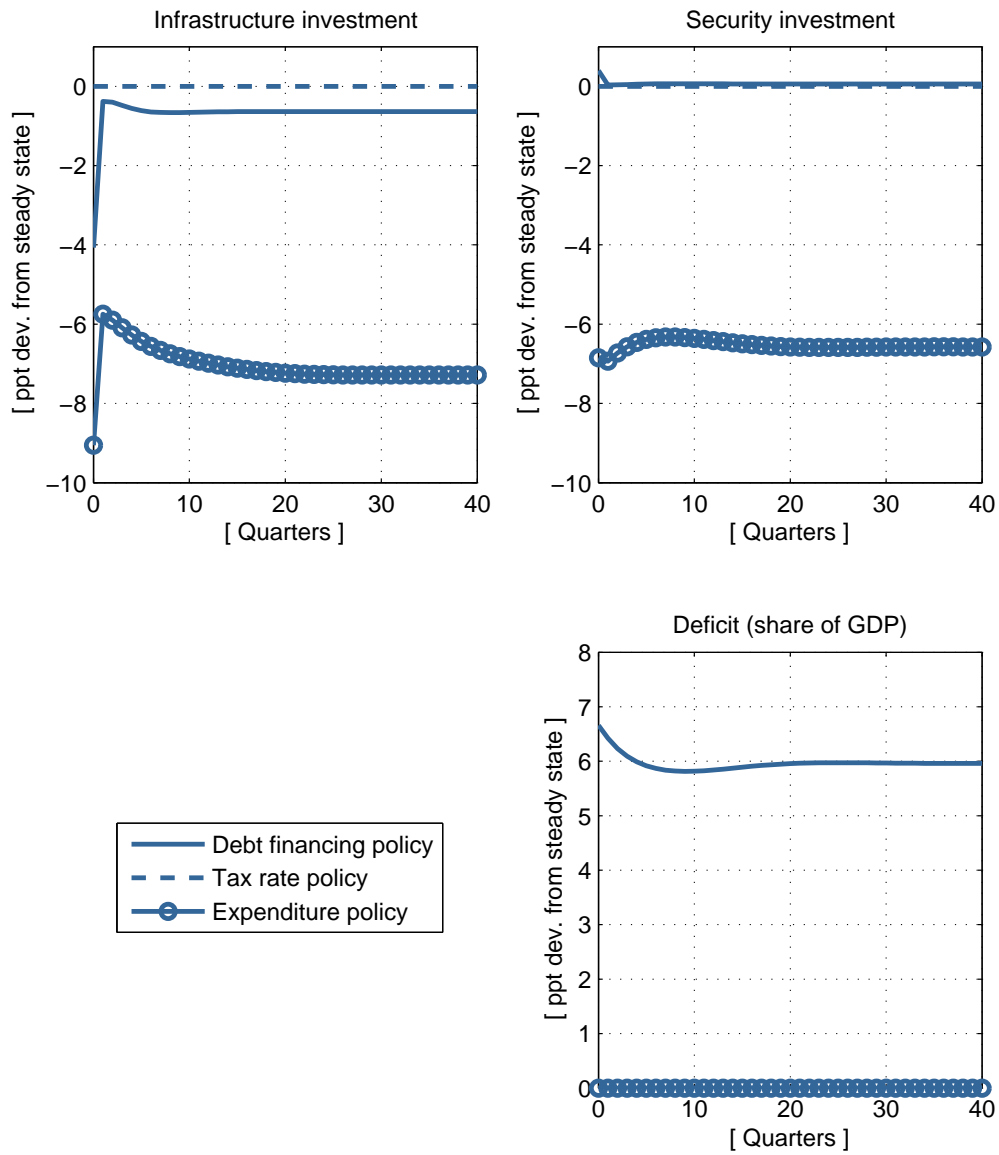


Chart 10. Real economy response to a permanent decline in tax revenues

