South Africa's Transition to a Consolidated Budget[1,2]

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Abstract

The size of South Africa's fiscal stimuli, whether intended or not, has helped to avert negative consequences of the global financial downturn. With the economic cycle turning again, consolidation of deficits and a reduction of the level of debt are again the focus of policymakers and bureaucrats. These outcomes are generally achieved by either increasing tax rates or cutting spending (discretionary fiscal policy), whereas an alternative option is to allow automatic stabilisers to consolidate budgets. This study attempts to answer whether cyclical factors or discretionary policy minimise output volatility and which one of the two presents a better policy option regarding uncertainty in real economic recovery. A small open-economy gap model is built using South African data, where the budget deficit is endogenised by way of a fiscal policy "rule". Sensitivity analyses and robustness checks are carried out using a structural VAR. Given the estimates of both the automatic stabilisers as well as the components of discretionary fiscal policy, we are able to obtain impact multipliers on output and conduct scenario testing for optimal fiscal policy response towards fiscal consolidation as well as debt sustainability.

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1. Introduction

Fiscal policy, and discretionary fiscal policy in particular[5], has recently become the main focus of economics. With monetary policy unable to sufficiently smooth output volatility, governments have extended deficits in an attempt to stabilise output. South Africa has also seen a significant rise in the deficit. The small surplus in 2008/09 was used to avert the contagion effects of the financial crisis. GDP growth became negative in the final quarter of 2008 and peaked in the second quarter of 2009 at -7.43 percent (SARB, 2010). However, positive growth was registered in the latter half of 2009 and peaked at 4.56 percent in 2010Q1 (SARB, 2010). Even when considering the uncertainty around a true recovery, policymakers' focus now shifts to fiscal sustainability. In South Africa, debt is projected to reach a maximum of 44 percent in 2015/16 according to the Budget Review (National Treasury, 2010). Given the woes of the sovereign crisis in Greece and other Euro area peripheries, it comes as no surprise that fiscal hawks call for austerity measures. This implies immediate change in the budget in the form of (for example) cuts in expenditure and/or widening of the tax base. For this purpose, it is important to distinguish between transitory and permanent influences on the budget as incorrect diagnoses can lead to fiscal over- or under-adjustment. In addition to the composition of fiscal consolidation, considerations around timing are also important - for example, a premature and untimely fiscal exit may harm growth and ultimately lessen fiscal effectiveness. With the above mentioned in mind, this paper decomposes fiscal policy into three components that measure overall fiscal effectiveness on output: automatic stabilisers, discretionary policy related to the economic cycle, as well as the discretionary policy that is independent of the business cycle (cf. Debrun and Kapoor, 2010). The first objective of this paper is to decompose the budget balance into automatic stabilisers as well as the discretionary policy components. The reason for this is twofold: to see which of these components minimises output volatility as well as to see which of these components present good policy options regarding uncertainty in real economic recovery. The second objective is to study the effects of various paths of fiscal consolidation

[5] Discretionary fiscal policy refers to changes in the budget due to active policy decisions. In addition to discretionary policy, the other "instrument" used by policymakers for the purpose of stabilisation is automatic stabilisers which consists of the budget components that react automatically to the business cycle. It should be noted that automatic stabilisers are not an instrument per se, but rather a policy outcome over the cycle. In addition, while it is generally accepted that automatic stabilisers help in moderating the business cycle fluctuations, short-term discretionary (systematic) fiscal policy response (which can be pro- or counter-cyclical) has not been very popular over the last couple of decades for both theoretical and practical reasons.

on debt sustainability and output. A small open-economy gap model is built using South African data, where the budget deficit is endogenised by way of a fiscal policy "rule". Sensitivity analyses and robustness checks are carried out using a structural VAR. Given the estimates of both automatic stabilisers as well as the discretionary fiscal policy components, we are able to obtain impact multipliers on output and conduct scenario testing for optimal fiscal policy response towards fiscal consolidation as well as debt sustainability.

3. Literature Review

The literature regarding output volatility and its causes is extensive. One of the more frequently cited papers on output volatility is the seminal contribution of Ramey and Ramey (1994). They concluded that a negative relationship exists between output volatility and long run economic growth, with the main argument that output volatility crowds out both domestic and foreign investment and savings. By assuming that the above relationship holds, Ramey and Ramey (1994) primarily focuses on the impact of government policy on output volatility[6] and output maximisation and find that government spending-induced volatility is harmful to economic growth. At this point, it should be noted that the study of the relationship between government and output originates from the Keynesian paradigm which states that the economy is inherently unstable and that volatility involves costs. The basis for this argument stems from the idea that government is an infinitely lived agent with limited liquidity constraints. It is thus able to lessen the liquidity constraints faced by consumers through the income based tax system or through the unemployment insurance fund. Government is also able to alleviate exogenous shocks through public debt management and tax base diversification. However, these ideas are based on two assumptions - namely, that there is no available substitute for government induced stabilisation and that the demand for stabilisation remains constant over time. Papers like Debrun and Kapoor (2010) rightly note that substitutes exist in the form of monetary policy and various financial innovations.

The focus of government stabilisation falls on the role that automatic stabilisers play as well as on the discretionary fiscal policy instruments. Automatic stabilisers typically reduce government savings during economic contractions and increase savings during expansions. If

[6] The assumption is that government spending is the main source of volatility.

government policies are conducted in a countercyclical fashion, the strength of automatic stabilisers increases. Fatas and Mihov (2001) as well as Kim and Lee (2007) demonstrate how government size (which approximates automatic stabilisers) is negatively correlated with output volatility. However, this relationship is rather complex - Buti et al. (2003) find that this relationship is positive on the demand side but has a negative impact on the supply side. The supply side relationship can be characterised by taxes on production and the impact on the supply side is smaller only if taxes become more proportional (as an example consider workers demanding higher wages to offset the tax increases). An interesting dimension pointed out by Silgoner et al. (2003) is that the relationship between government size and output volatility is nonlinear. Once government size breaches a certain threshold, its impact on output volatility declines and can even become negative. Furthermore, there is also the issue of the direction in which automatic stabilisers are the strongest. Van den Noord (2002) shows that automatic stabilisers operate more strongly during contractions than expansions. And, in some cases, governments have contributed very little to stabilisation (specifically, in instances where discretionary decisions offset automatic stabilisers).

The role of automatic stabilisers in South Africa has also received significant attention. Swanepoel and Schoeman (2002) use ordinary least squares (OLS) regressions to ascertain the size of automatic stabilisers since 1970. Their results show that automatic stabilisers have been small prior to 2000 and have only increased in the latter parts of their sample (which spans the 1970-2000 period)[7]. As an innovation from the Swanepoel and Schoeman (2002), Jooste and Naraidoo (2010) paper estimates nonlinear tax elasticities, also using more recent data with their sample spanning from 1994 to 2009. They show, that taxes have been more responsive to booms than contractions in South Africa. This is partly due to the estimation period in which commodity prices reached record highs and where only insignificant contractions occurred.

In terms of the discretionary fiscal policy, prior to the 1970s, discretionary policies were used much like demand management, i.e. to correct the business cycle. Following 1970s, policy rules came into the spotlight as a means to overcome dynamic inconsistency and for policies to gain more credibility. Recently, papers like Gali and Perotti (2003) and Gali (2005) seem to find that fiscal policy in much of the industrialised world seems to have become a stabilising force. They estimate fiscal policy rules for 19 countries using the structural budget

[7] The size of automatic stabilisers in the Swanepoel and Schoeman (2002) estimation varies from 0 to 1.5.

as a dependent variable and show that policymakers can use discretionary fiscal policy in a systematic, countercyclical manner. For South Africa, literature on discretionary fiscal policy and fiscal rules is contained in Burger and Chandapiwa (2006) as well as Du Plessis and Boshoff (2007). Burger and Chandapiwa (2006) conclude that an augmented fiscal rule might contribute to both fiscal sustainability and economic stability in South Africa. Similarly, Du Plessis and Boshoff find no evidence that South African fiscal policy has been destabilising (or pro-cyclical) and further suggest "a package of reforms" (in the form of fiscal rules) to prevent South African fiscal policy from becoming destabilising. Other South African studies that have looked at discretionary fiscal policy are Swanepoel and Schoeman (2002), who find that discretionary fiscal policy played an important role in South African fiscal policy over the period 1970-2000, and Jooste and Naraidoo (2010) who extract and examine structural components of the budget using nonlinear tax elasticities that vary over the economic cycle.

A concept that is linked quite closely with discretionary fiscal policy is fiscal consolidation[8]. Fiscal consolidation is generally defined in terms of policies aimed at reducing government deficits and debt accumulation. Siebrits and Calitz (2004), Ajam and Aron (2007) and Du Plessis and Boshoff (2007) note that there are sound reforms behind fiscal consolidation in South Africa, one of the main being the Public Finance and Management Act of 1999 which calls for sound expenditure controls and system of supervision, among others. Other fiscal reforms contributing to fiscal consolidation in South Africa are related to the budget procedure, as well as tax reform and revenue collection. Discretionary fiscal policy in South Africa post-1997 is phrased as "transparency-based discretion" (c.f. Siebrits and Calitz, 2004; Ajam and Aron, 2007; Du Plessis and Boshoff, 2007) which amounts to fiscal authorities reporting cyclical, structural and off-the-line budget items.[9]

4. Methodology

All of the concepts that were introduced in the literature review section above can be represented in Figure 1 which provides a framework for the overall paper. Budget balance which is given by the difference between government spending and revenue, can be

[8] International studies on fiscal consolidation include Coenen et al. (2008), Ali Abbas et al. (2010) and Corsetti et al. (2010), amongst others.
[9] It should be noted that fiscal authorities in South Africa have also published the structural budget balance (SBB) figures for the last couple of years.

decomposed into cyclical as well as the cyclically-adjusted budget (CAB)[10]. The latter typically represents the discretionary actions by policymakers and can further be decomposed into discretionary policy reflecting systematic response of the policymakers to the business cycle[11], as well as the discretionary policy that is independent of the business cycle[12] (cf. Kapoor and Debrun, 2010). Cyclical component is often associated with automatic stabilisers which in turn are also affected by the systematic discretionary policy: generally, pro-cyclical policy weakens automatic stabilisers while a counter-cyclical policy strengthens the automatic stabilisers[13]. Thus, automatic stabilisers smooth output fluctuations, hence contributing towards fiscal stabilisation, and also strong automatic stabilisers (typically when fiscal policy is counter-cyclical) help to facilitate the process of fiscal consolidation. Both automatic stabilisers and the discretionary components of the budget can be used for the purpose of output stabilisation[14]. In addition to all of the above, the impact of the budget balance needs to be measured and compared to its effect on public debt. Public debt is the outcome of any fiscal policy stance. It is often used as a gauge on overall fiscal sustainability. Higher fiscal deficits not only increase the stock of debt, but also increase debt service costs. The impact of debt on the economy is difficult to disentangle. Accruing debt for investment purposes can often yield to longer run growth. However, if the composition of debt is made up of low multiplier expenditures, debt will not contribute to growth. Another important issue of public debt pertains to threshold effects. Rogoff and Reinhart (2010) show that debt levels breaching 60% for developed countries reduce economic growth. There are numerous studies on the impact of fiscal policy on debt sustainability. In this paper, debt sustainability is simply defined as finite increases in debt which stabilises over time.

[10] CAB, also referred to as he structural budget balance (SBB), is obtained in two steps - first, a reference path for GDP is obtained (used to calculate the output gap); second, the public revenue and expenditure items related to this reference path are calculated using the output gap, as well as the expenditure and revenue elasticities. Generally, fiscal rules, which are based on the CAB (SBB), are used in the fiscal consolidation process.

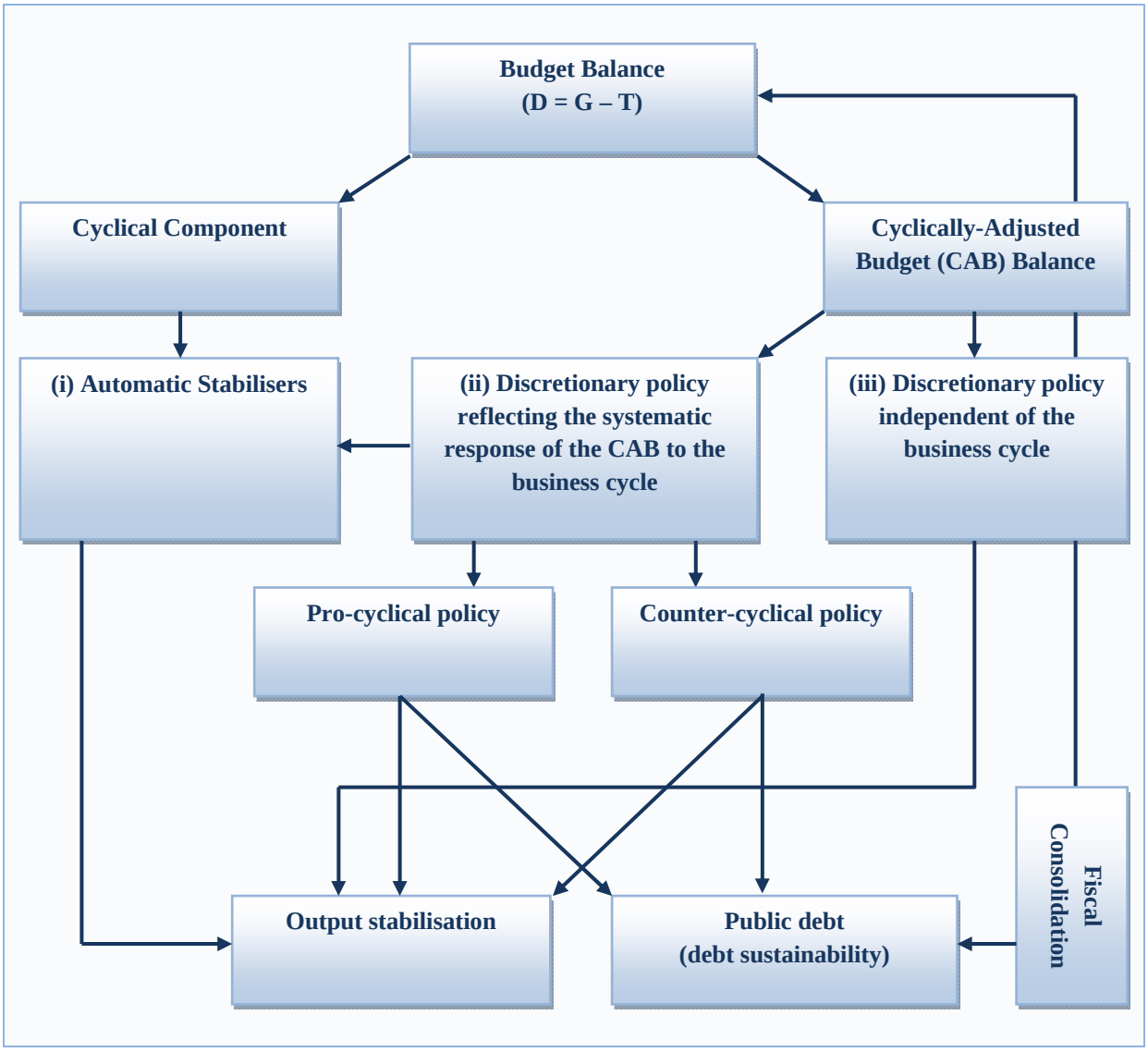
[11] This would represent the active policy stance of the National Treasury over the economic cycle, be it pro- or counter-cyclical.

[12] An example of this would be additional budget decisions that were not originally publicised.

[13] Note that discretionary systematic policy if not undertaken in a counter-cyclical fashion, can limit the size of automatic stabilisers and have a destabilising effect on output.

[14] Fiscal stimulus packages, for example, would form part of the discretionary policy measures aimed at output stabilisation.

Figure 1. Framework



The methodology used in this paper first starts with decomposing the budget into the three components, i.e. (i) – (iii). The paper then examines how each of the three components contribute towards fiscal consolidation (reducing the budget balance as well as debt sustainability) and output stabilisation (increasing the output gap and/or decreasing volatility). A small structural macroeconomic model (gap model) is built for this purpose. In addition to the gap model, an SVAR is used to obtain the impulse response functions of (i) – (iii) and the output gap on each other[15]. Simple multipliers of government induced increase/reduction in the deficit are also obtained. Lastly, the estimates from the gap model

[15] Also note that because of the specification of the fiscal rule in the gap model we are unable to obtain the impacts of all of the components of fiscal policy on output. SVAR specification allows us to circumvent this problem.

are used to construct different consolidation paths for South Africa (through a specified fiscal "rule").

4.1. Data

Table 1 (Appendix I) contains more detail regarding the data that is used in estimation. Monthly data is converted into quarterly data automatically (linear average) using Iris and Matlab. It should be noted that the variables for which the data is not listed in Table 1 as well as the unobserved variables (like potential, output for example) are simulated in Iris[16].

4.2. Decomposing the Budget: The SVAR Model

To study the effects of fiscal policy on output stabilisation requires a framework in which fiscal policy can be decomposed. The methodology employed in this paper is similar to Debrun and Kapoor (2010) which decomposes the budget into its cyclical component, its structural component and its discretionary component. More formally, the conventional budget is defined as follows:

$$d = d^s + ay \qquad (1)$$

Where d^s is the CAB (or SBB) and the parameter a (where $a>0$) represents the size of government or the automatic stabilisers. It can be shown that the size of government closely approximates the size of automatic stabilisers[17]. The cyclically adjusted balance can then be defined as:

$$d^s = -by + \mu \qquad (2)$$

Where $b>0$. Parameter b represents discretionary choices of government expenditure or tax revenue taking the business cycle into account. The parameter μ represents the discretionary policy independent of the business cycle[18]. Substituting equation (2) into (1) and putting the result into an IS equation yields a long run relationship for y (cf. Debrun and Kapoor, 2010) -

[16] Code is available from the authors upon request.
[17] Assuming a unitary tax elasticity and a zero elasticity for expenditure. Also refer to Debrun and Kapoor (2010) for the relevant derivations.
[18] To obtain the discretionary component, one then regresses the structural component on the output gap and a persistence variable. The error term is taken as the discretionary part.

this is represented by equation (3) which is explained in greater detail in the gap model section:

$$y = \frac{1}{[1+c_0(a+b)-f]}[c_0\mu - c_1(i-\pi^e) - c_2 z_t + \varepsilon] \quad (3)$$

In order to study the effects of the three fiscal components on output volatility, Debrun and Kapoor (2010) use GMM estimations. The dependent variable is a simple four quarter moving standard deviation of real GDP growth. We extend this literature by using a small structural macroeconomic model (the gap model) to measure the effects of fiscal policy on output volatility and ultimately output growth. As a robustness check (and an alternative to Debrun and Kapoor's (2010) GMM estimation) on how the three components of the budget affect output, the SVAR is used to obtain the dynamic impulse responses of each variable on output volatility. The SVAR is defined as follows:

$$A(L)X_t = \varepsilon_t \quad (4)$$

Where X_t is the vector of variables. The VAR (vector autoregression) in equation (4) is then written in a moving average form:

$$X_t = A(L)^{-1}\varepsilon_t \quad (5)$$

Where $\varepsilon_t'\varepsilon_t = \Omega$. The restrictions are then imposed to give the model structure - this is done by rewriting equation (5) using a transformation matrix B which is then used to obtain structural shocks η_t from ε_t:

$$\eta_t = B\varepsilon_t \quad (6)$$

Four variables are included in the estimation - a measure of discretionary policy (dis_t), structural budget balance (sbb_t), automatic stabilisers ($auto_t$), and output growth volatility ($\sigma_t g_y$). Hence, vector X_t takes the form:

$$X_t = [dis_t, sbb_t, auto_t, \sigma_t g_y]' \quad (7)$$

The B matrix is specified as:

$$B = \begin{bmatrix} \bullet & 0 & 0 & 0 \\ \bullet & \bullet & 0 & 0 \\ \bullet & \bullet & \bullet & 0 \\ 0.8 & -0.6 & -1.2 & \bullet \end{bmatrix} \quad (8)$$

In terms of the restrictions, the minimum amount is 16 restrictions for just identification given that 4 variables are employed in estimation. Since the orthogonality condition is imposed on the structural shocks (i.e. $\eta_t'\eta_t=I$), that effectively takes care of 10 of the restrictions - hence, 6 more restrictions need to be chosen. The matrix specified in equation (8) above has 9 restrictions meaning that the system is over-identified. Essentially, the SVAR analysis above amounts to the Blanchard-Quah (1989) decomposition which considers the shocks as having permanent effects[19]. The contemporaneous impacts on the variables are identified using the Blanchard-Perotti (2002) approach. The priors are informed by a simple ordinary least squares (OLS) regression that regresses the volatility in GDP growth on automatic stabilisers, cyclical fiscal policy, discretionary fiscal policy and a proxy for openness[20].

4.2. Gap Model

The analysis also employs a simple gap model of fluctuations[21]. This means that unless otherwise stated, all of the variables in the equations below are represented either in gap form (i.e. actual minus the potential).[22]

4.2.1. Transition Equations

We start with the simple output equation which captures the IS relation:

$$\hat{y}_t = \alpha_1 \hat{y}_{t-1} - \alpha_2 \hat{r}_t - \alpha_3 \hat{z}_t + \alpha_4 \hat{g}_t + \varepsilon_t^y \qquad (9)$$

Where y is output, r is the real interest rate, z is the real exchange rate, and g represents government spending. The residual, ε, is assumed to be independently and normally

[19] This implies that variables are non-stationary and so it is necessary to transform the variables accordingly to ensure stationarity in the case where shocks are assumed to have permanent effects. Long-run restrictions imposed are also more consistent with economic theory.

[20] For brevity purposes, the comprehensive results and the diagnostics are not reported in this paper, but will be provided by the authors upon request.

[21] Gap Models have been previously applied to South African data for forecasting purposes as well as to assess monetary policy - cf. IMF (2005) and Harjes and Ricci (2008). However, to authors' knowledge, no attempt has been made to study the effects of South African fiscal policy in a gap framework.

[22] In terms of the notation, we represent the gap variables with an accent "^" whereas the steady state (long run growth variables) are indicated with a bar.

distributed around a mean of zero (this is also true for the residuals in equations (10) – (13) and equation (15) below). Next, the Phillips Curve relation is given by equation (10):

$$\pi_t = \beta_1 \pi_{t-1} + \beta_2(\pi_{t-1}^M + \Delta\bar{z}) + (1 - \beta_1 - \beta_2)\pi_{t+1}^e + \beta_3 \hat{y}_t + \varepsilon_t^\pi \quad (10)$$

Where π denotes the inflation rate, π^M denotes the imported inflation rate, and π^e denotes the expected inflation rate. The equation for imported inflation is given by equation (11):

$$\pi_t^M = \gamma_1 \pi_{t-1}^M + (1 - \gamma_1)(\pi_t^* - \Delta s_t) + \varepsilon_t^M \quad (11)$$

Where *s* is the exchange rate and defined by equation (12) which captures the standard uncovered interest parity condition:

$$s_t = s_{t+1} + \frac{(i_t - i_t^*)}{4} - prem_t + \varepsilon_t^s \quad (12)$$

Where *i* is the nominal interest rate (policy rate) and *prem* represents the exchange rate risk premium. Monetary policy is captured with a standard monetary policy rule (equation (13)):

$$i_t = \delta_1 i_{t-1} + (1 - \delta_1)[\bar{r} + \pi_{t+1}^e + \delta_2(\pi_{t+1}^e - \pi^T) + \delta_3 \hat{y}_t] + \varepsilon_t^i \quad (13)$$

In addition, the term structure of interest rates is given by:

$$I_t = \frac{(i_t + i_{t+1} + i_{t+2} + i_{t+3})}{4} \quad (14)$$

Lastly, the fiscal block is represented by equations (1)-(3), where equation (3) is rewritten as:

$$y = \frac{1}{(1 + \alpha_4(a+b) - \alpha_1)}[\alpha_4 \mu - \alpha_2(i - \pi^e) - \alpha_3 z_t + \varepsilon] \quad (15)$$

And the resulting fiscal multiplier is given by:

$$\frac{\alpha_4}{(1 + \alpha_4(a+b) - \alpha_1)} \quad (16)$$

A list of other equations and identities necessary to close the model is provided in Appendix II. In addition, certain parameters are calibrated and estimated using constrained maximum likelihood – the details of this exercise are presented in Appendix III.

5. Results[23]

Figure 2 presents the estimate of the automatic stabilisers for South Africa which is calculated as the share of government multiplied by the output gap[24]. This variable verifies Swanepoel and Schoeman (2002) result, in that prior to 2000, the size of automatic stabilisers has been small. However, after 2000 the size of automatic stabilisers has increased significantly reaching a peak of about 1.5 as a percentage of GDP.

[INSERT FIGURE 2 AROUND HERE]

Using historical decompositions, we are able to ascertain how the different macroeconomic variables impacted the budget balance as well as the output gap (see Figures 5 and 6). The impact of budget on the output gap has been mostly positive in the 2000s. This suggests that in the early 2000s fiscal policy was somewhat pro-cyclical - however, during the financial crisis, fiscal policy still contributed to pushing up the output gap, which suggests that it was somewhat counter-cyclical. Figures 3 and 4 also show that fiscal policy has been timely (perhaps late with one lag) in isolating the financial crisis. It is also worthwhile to note that the Kalman filter output gap estimated in the gap model is reported in Figure 3 is still negative in the last part of the sample and highlights the impact of the financial crisis on the economy. On a priori grounds, the significant negative output gap will render the size of automatic stabilisers insufficient to close the budget deficit, which in turn would suggest that additional discretionary policy might be necessary.

[INSERT FIGURE 3 AROUND HERE]

[INSERT FIGURE 4 AROUND HERE]

Before calibrating the gap model, the SVAR impulses are used to guide the understanding of South Africa's fiscus in a historical context. Figure 5 presents the normalised impulses from such an exercise. Then main conclusion drawn from Figure 5 is that automatic stabilisers have had a significant stabilising role on output volatility in South Africa. However, discretionary decisions crowd out the size of automatic stabilisers and ultimately reduce its role as a stabiliser of volatile growth.

[INSERT FIGURE 5 AROUND HERE]

[23] All of the figures discussed in this section can be found in Appendix IV.
[24] The output gap is generated using the Kalman filter in the gap model.

Figure 6 contains the impact multipliers obtained with the estimates from the gap. As one of the objectives of the study, impact multipliers were calculated using the estimates from the gap model. Though these only correspond to aggregate fiscal policy, it should be noted that various components of taxes and expenditure might have differing impact. Figure 6 contains the impact multipliers for output, public debt and the monetary policy interest rate. A 1 percent increase in the fiscal deficit that is induced by increasing expenditure and keeping the tax rate constant, increases the output gap by a maximum of 0.63 percent over 8 quarters. The impact on debt is significantly larger. The immediate response of public debt to a 1 percent increase in deficit is 0.57 but increases over unity in the long run. Lastly, the impact on interest rates are also notable – 1 percent increase in the deficit raises interest rates by 0.65 percent in the long run which could crowd out private investment and hence adversely affect economic growth.

[INSERT FIGURE 6 AROUND HERE]

The gap model is calibrated using the base results of the OLS equation discussed at the end of section 3.2 as well as the SVAR results. Table 2 (Appendix III) contains the summary of all the parameter calibrations. Additional parameters were estimated within the gap model.

[INSERT TABLE 2 AROUND HERE]

A Bayesian VAR was used to calibrate out of sample forecasts for the first two quarters (this is standard practice for gap models). Since forecasts will be used to identify the optimal path of fiscal consolidation, a Bayesian VAR provides the near term forecasts which then feed into the gap model[25].

After completing the model setup, the second objective of the study can be addressed, i.e. what is the optimal path towards a consolidated budget? This is done to facilitate the discussion of a timely and efficient fiscal exit and for this purpose, the baseline scenario of no discretionary fiscal consolidation (i.e. just allowing automatic stabilisers to respond) is compared to different scenarios of discretionary fiscal consolidation. Three issues need to be considered when deciding on the optimal consolidation path. This includes the efficiency-volatility trade-off, fiscal sustainability and the strength of automatic stabilisers to consolidate the budget. Concerning the last factor, given a negative forecasted output gap, automatic stabilisers are not strong enough to close the output gap. Efficiency is viewed as allowing the

[25] These forecasts are available from the authors upon request.

maximum fiscal multipliers to work through the economy fully, i.e. not reducing the deficit too quickly given the negative output gap. However, the decision of keeping the deficit at the current level induces more output volatility which has negative consequences for long-run economic growth. Taking the other extreme, a "too speedy" fiscal consolidation does not sufficiently contribute to closing the output gap (indecision reduces the impact of the fiscal multiplier), but has less output volatility. The optimal path of fiscal consolidation is thus a gradual discretionary reduction along with the output gap that allows for a more sustainable fiscus while at the same time reducing output volatility and allowing the fiscal multipliers to be most effective.

Figure 6 shows the impact of the different fiscal consolidation paths on the output gap, as well as the projected public debt. The different budget paths are defined as follows:

- Baseline: no change in the budget deficit;
- Paths 1-5: in each quarter, the budget deficit decreases by 0.2%, 0.4%, 0.6%, 0.8% and 1%, respectively.

The curvature in the output gap figure suggests that while keeping the fiscal deficit at current level closes the output gap a lot quicker, its contribution declines over time. This is typically the case when fiscal policy is pro-cyclical and the costs of debt become unsustainable. The "European style" of reducing the deficit in a very short time is also not warranted for South Africa. The current fiscal stance does not threaten the sustainability of the fiscus given the low level of debt. South Africa has also not fully recovered from the crisis, thus justifying a decision to reduce deficits at a pace that follows the cycle. This gradual adjustment (a linear reduction of 0.3% – 0.6% per quarter) to close the deficit seems to be the most sufficient.

[INSERT FIGURE 7 AROUND HERE]

However, the role of monetary policy assisting fiscal policy should not be ignored. The lower interest rates and the higher deficit have worked well to avert a deeper trough in GDP growth during the crisis. As the economy is recovering, the two policies should continue to align objectives-low inflation, higher output, crowding in of investment and fiscal sustainability.

6. Conclusion

This study extended the current literature on the role of automatic stabilisers and fiscal policy in South Africa. Two main questions were answered: First, what is the impact of the different components of the budget (i.e. automatic stabilisers as well as the discretionary components of the fiscal policy) on output stability and debt sustainability. Second, what is South Africa's "optimal" path to fiscal consolidation.

With regard to the evolution of the budget, the size of automatic stabilisers has increased during the 2000s as fiscal policy became more geared towards counter-cyclical objectives. However, it seems as though South Africa could have been more counter-cyclical prior to the financial crisis as this would have allowed for a more efficient response when the crisis eventually took place. Another important consideration is the effect of additional budgetary on decreasing the size of automatic stabilisers. Often, this additional budgetary spending is pro-cyclical and does not allow for further increases of the unemployment insurance fund or even forces additional tax hikes.

South Africa along with most of the world faces tough decisions regarding the size of the deficit and how to close it. This study shows that extreme views should be ignored because a negative output gap would persist even when closing the deficit at a quicker rate (than the rate at which the output gap closes) as this limits the impact of fiscal multipliers (which will result in a slower closing of the output gap). The other extreme of keeping the deficit at the current level, or decreasing it at a very slow rate, will result in higher debt levels and hence higher debt service costs. Over the long run, its contribution to the output gap becomes negative, too. Hence, this paper suggests that a gradual response is the optimal response.

As a final point, the implementation of a fiscal rule could only contribute and complement the existing fiscal policies. Not only does this ensure that fiscal policy remains sustainable, but allows for proper counter-cyclical fiscal policy that has maximum spending impact during recessions and contributes to savings during expansions which crowds in investment. However, the difficulty of such a rule lies not in the rule itself, but with the numerical target set out by the rule. It lies with the policy maker to convince the ruling party that such a rule ties in well with developing the economy as well as the social context related to it.

References

Afonso, A. and Claeys, P. (2007). “The Dynamic Behaviour of Budget Components and Output”, European Central Bank (ECB) Working Paper Series, Working Paper No. 775.

Ali Abbas, S.M., Basdevant, O., Eble, S., Everaert, G., Gottschalk, J., Hasanov, F., Park, J., Sancak, C., Velloso, R. And Villafuerte, M. (2010). “Strategies for Fiscal Consolidation in the Post-Crisis World”, International Monetary Fund (IMF), Washington, D.C.

Ajam, T. and Aron, J. (2007). “Fiscal Renaissance in a Democratic South Africa”, Journal of African Economies, 16(5): 745-781.

Blanchard, O. and Perotti, R. (2002). “An empirical Characterisation of the Dynamic Effects of Changes in Government Spending and Taxes on Output”, Quarterly Journal of Economics, 117(4): 1329-1368.

Blanchard, O. and Quah, D. (1989). “The Dynamic Effects of Aggregate Demand and Supply Disturbances”, American Economic Review, 79(4): 655:673.

Burger, P. and Chandapiwa, J. (2006). “Should South Africa Have a Fiscal Rule”, South African Journal of Economics, 74(4): 642-669.

Buti, M., Martinez-Mongay, C., Sekkat, K. and van den Noord, P. (2003). “Automatic Fiscal Stabilizers in EMU: A Conflict Between Efficiency and Stabilization?”, CESifo Economic Studies, 49, 123-140.

Coenen, G., Mohr, M. and Straub, R. (2008). “Fiscal Consolidation in the Euro Area: Long-run Benefits and Short-run Costs”, European Central Bank (ECB) Working Paper Series, Working Paper No. 902.

Corsetti, G., Kuester, K., Meier, A. and Mueller, G. (2010). “Debt Consolidation and Fiscal Stabilization of Deep Recessions”, *American Economic Review*, 100(2): 41-5.

Debrun, X. and Kapoor, R. (2010). “Fiscal Policy and Macroeconomic Stability: Automatic Stabilizers Work, Always and Everywhere”, International Monetary Fund (IMF) Working Paper Series, WP/10/111.

Debrun, X., Pisani-Ferry, J. and Sapir, A. (2008). “Government Size and Output Volatility: Should We Foresake Automatic Stabilization?”, International Monetary Fund (IMF) Working Paper Series, WP/08/122.

Du Plessis, S. and Boshoff, W.H. (2007). “A Fiscal Rule to Produce Counter-cyclical Fiscal Policy in South Africa”, Stellenbosch Economic Working Papers, Working Paper No. 13/07.

Gali, J. (2005). “Modern Perspectives on Fiscal Stabilization Policies”, CESifo Economic Studies, Vol. 51(4): 587-599.

Gali, J. and Perotti, R. (2003). “Fiscal Policy and Monetary Policy Integration in Europe”, Economic Policy, 37: 533-572.

Harjes, T. and Ricci, L. (2008). “A Bayesian-Estimated Model of Inflation Targeting in South Africa”, International Monetary Fund (IMF) Working Paper Series, WP/08/48.

International Monetary Fund (IMF). (2005). “South Africa: Selected Issues”, IMF Country Report No. 05/345.

International Monetary Fund (IMF). (2010). Selected Time Series. (Online: www.imf.org.)

Jooste, C. and Naraidoo, R. (2010). “Nonlinear Tax Elasticities and Their Implications for the Structural Budget Balance”, forthcoming.

Kibambe, J.N. and Schoeman, N.J. (2009). “Modelling the Impact of Automatic Fiscal Stabilisers on Output Stabilisation in South Africa”, University of Pretoria Working Paper Series, Working Paper Number 129.

Kim, D. and Lee, C. (2007). “Government Size and Intersectoral Income Fluctuation: An International Panel Analysis”, International Monetary Fund (IMF) Working Paper Series, WP/07/93.

National Treasury. (2010a). Medium Term Budget Policy Statements - 2010. (Online: www.treasury.gov.za.)

National Treasury. (2010b). National Budget - 2010. (Online: www.treasury.gov.za.)

Ramey, G. and Ramey, V.A. (1994). “Cross-Country Evidence on the Link Between Volatility and Growth”, NBER Working Paper Series, Working Paper No. 4959.

Reinhardt, C.M and Rogoff, K.S. (2010). “Growth in a time of debt”, Prepared for American Economic Review Papers and Proceedings.

Siebrits, F.K. and Calitz, E. (2004). “Should South Africa Adopt Numerical Fiscal Rules?”, South African Journal of Economics, 72(4): 759-783.

Silgoner, M., Reitschuler, G. and Crespo-Cuaresma, J. (2003). “Assessing the Smoothing Impact of Automatic Stabilzers: Evidence from Europe”, in Structural Challenges For Europe, Edward Elgar.

South African Reserve Bank (SARB). (2010). Selected Time Series. (Online: www.reservebank.co.za.)

Statistics South Africa (STATSSA). (2010). Selected Time Series. (Online: www.statssa.gov.za.)

Swanepoel, J.A. and Schoeman, N.J. (2003). “Countercyclical Fiscal Policy in South Africa: Role and Impact of Automatic Fiscal Stabilisers”, South African Journal of Economic and Management Sciences, No. 4, 802-822.

van den Noord, P. (2002). “Automatic Stabilizers in the 1990s and Beyond”, in The Behaviour of Fiscal Authorities - Stabilization, Growth and Institutions, Palgrave: Basingstoke.

Appendix I: Description of the Data

Table 1. Description of the Data

Variable	Measurement Unit	Frequency	Source
South African Consumer Price Index (CPI), total consumer prices of goods (metropolitan and urban areas)	Index, 2000=100	Monthly, 2000M1-2010M3	STATSSA
South African budget balance	Percent of Gross Domestic Product (GDP)	Quarterly, 2000Q1-2010Q1	SARB (series code: 4420K)
South African exchange rate	Rand per USA Dollar	Monthly, 2000M1-2010M3	SARB (series code: 5339M)
South African Gross Domestic Product (GDP)	Millions of Rand, constant prices, seasonally adjusted, annualised	Quarterly, 2000Q1-2010Q1	SARB (series code: 6006D)
Oil Price	USA dollar per barrel	Monthly, 2000M1-2010M3	IMF

Appendix II: List of Other Equations and Identities

$$r_t = i_t - \pi^e_{t+1} \quad \text{(i)}$$

$$\hat{r}_t = r_t - \bar{r} \quad \text{(ii)}$$

$$\hat{y}_t = y_t - \bar{y} \quad \text{(iii)}$$

$$\hat{g}_t = g_t - \bar{g} \quad \text{(iv)}$$

$$\bar{r} = \bar{r}^* + \Delta\bar{z} + prem \quad \text{(v)}$$

$$\Delta z_t = \Delta s_t + \pi_t - \pi^*_t \quad \text{(vi)}$$

$$\hat{z}_t = z_t - \bar{z}_t \quad \text{(vii)}$$

$$i^*_t = \bar{r}^* + \pi^e_{t+1} \quad \text{(viii)}$$

$$\bar{z}_t = \bar{z}_{t-1} + \frac{\Delta\bar{z}_t}{4} \quad \text{(ix)}$$

$$z_t = z_{t-1} + \frac{\Delta z_t}{4} \quad \text{(x)}$$

$$b_t = \left[\frac{(1+\frac{r}{100})}{(1+\frac{\Delta y_t}{100})}\right] b_{t-1} - d_t \quad \text{(xi)}$$

Appendix III: Calibrated Parameters

Table 2. Calibrated Parameters

	Parameters	Prior mean (calibration)	Posterior mode
IS relation	α_1	0.95	0.99
	α_2	0.20	0.18
	α_3	0.07	0.01
	α_4	0.20	0.45
Phillips curve relation	β_1	0.10	0.30
	β_2	0.20	0.22
	β_3	0.30	0.27
Imported inflation relation	γ_1	0.80	-
Monetary policy reaction function	δ_1	0.50	-
	δ_2	2.60	-
	δ_3	0.80	-
Fiscal "rule"	a	0.50	0.48
	b	0.70	0.68

Appendix IV: Figures

Figure 2. Automatic Stabilisers

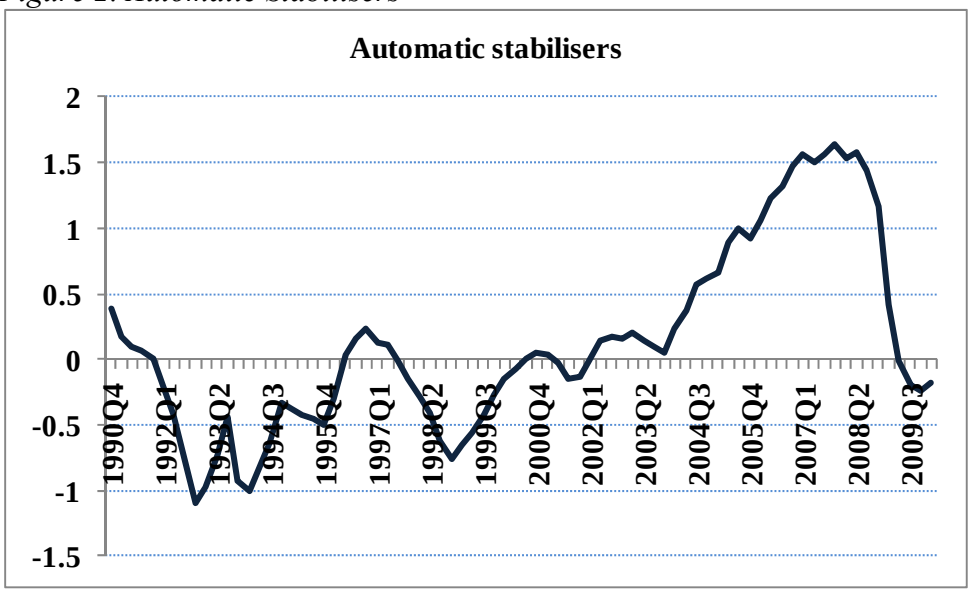


Figure 3. Historical Decomposition – Budget Balance

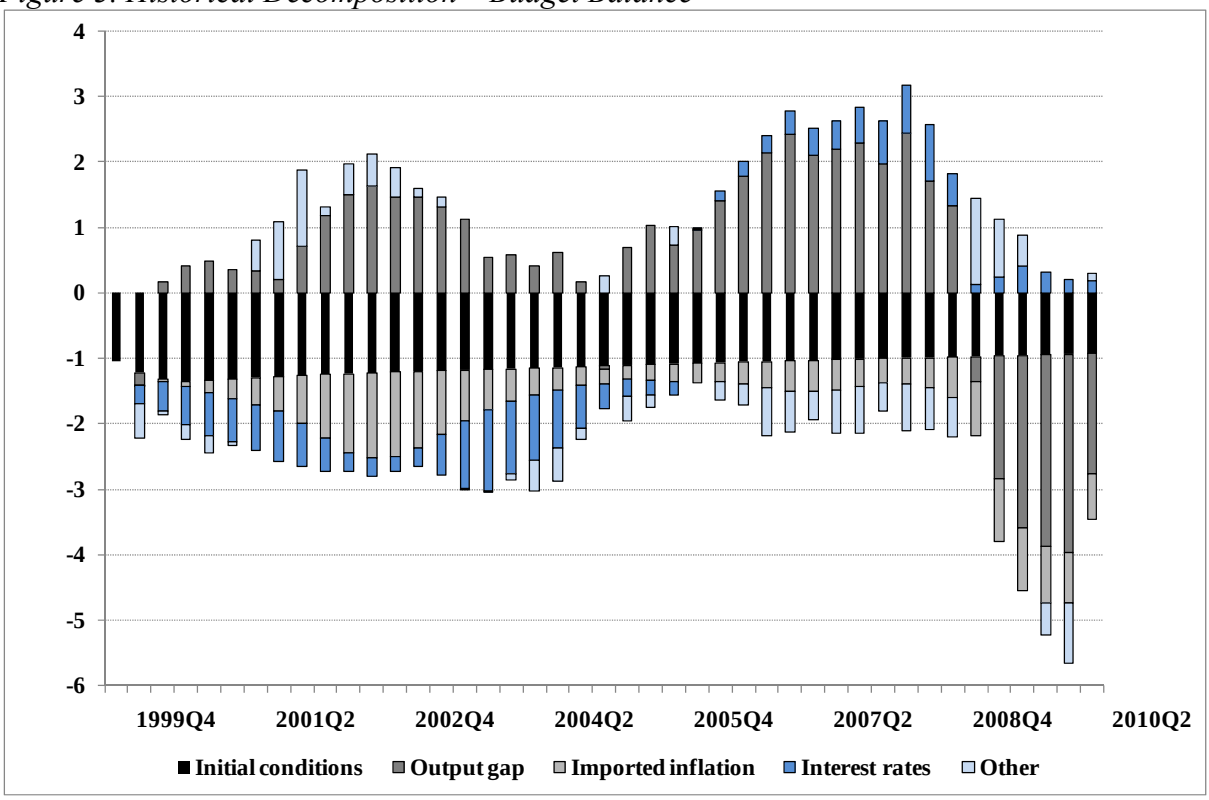


Figure 4. Historical Decomposition – Output Gap

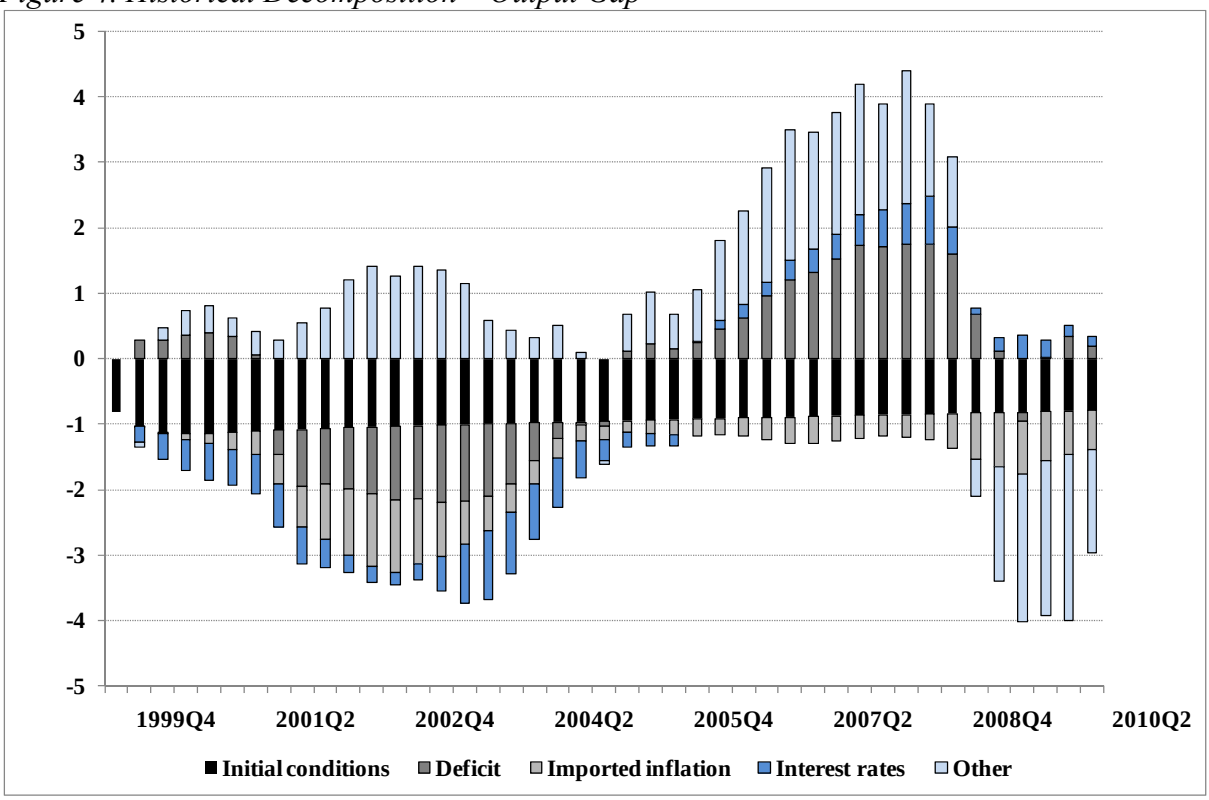
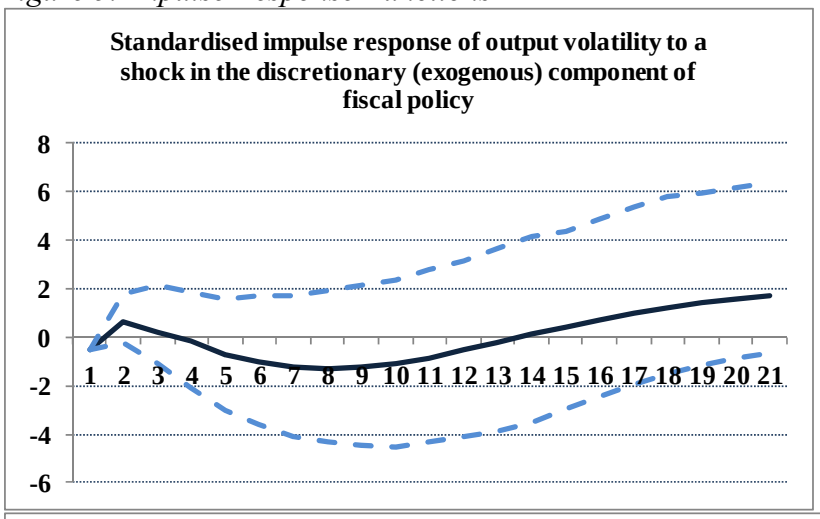
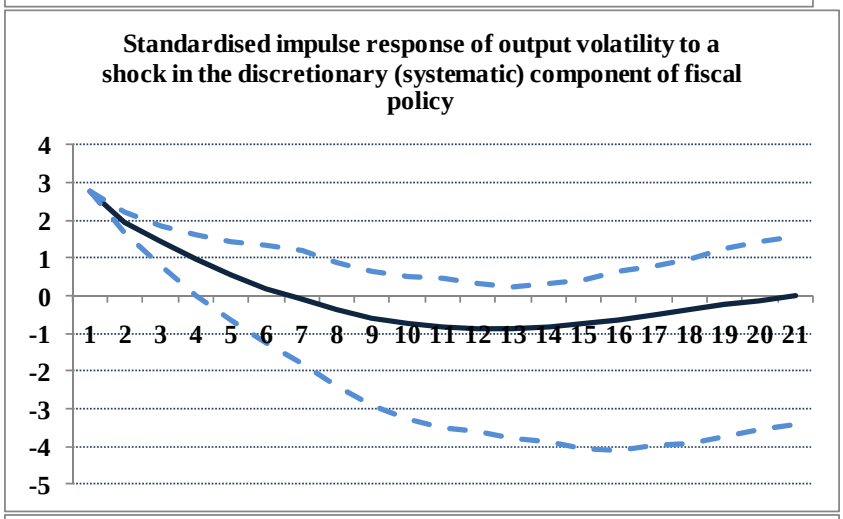


Figure 5. Impulse Response Functions





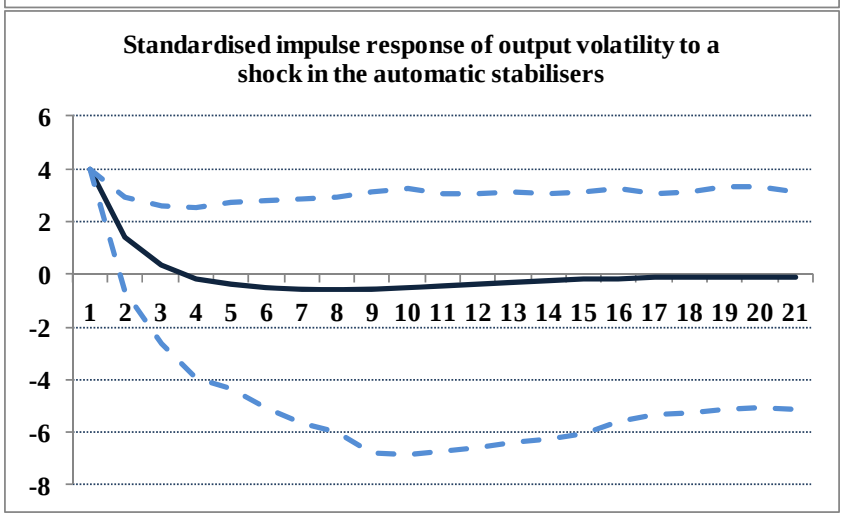


Figure 6. Impact Multipliers

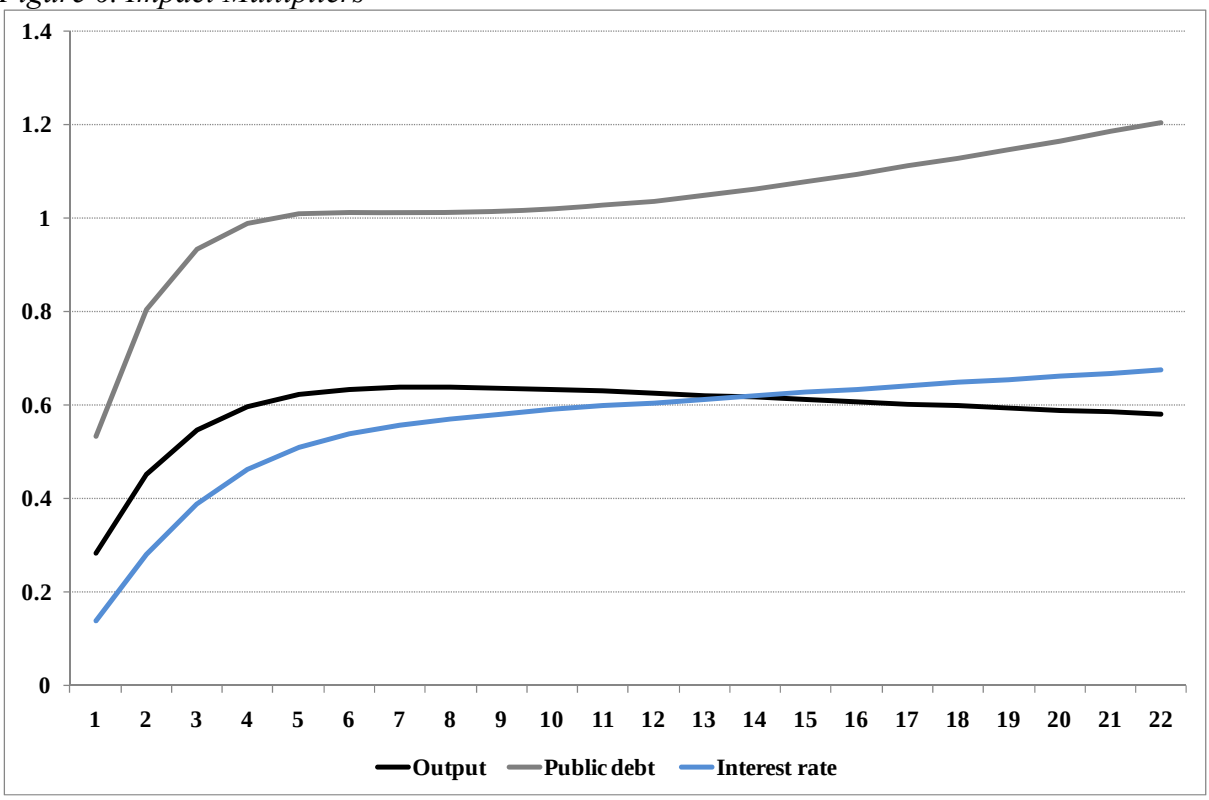


Figure 7. Fiscal Consolidation Paths – Output Gap and Public Debt

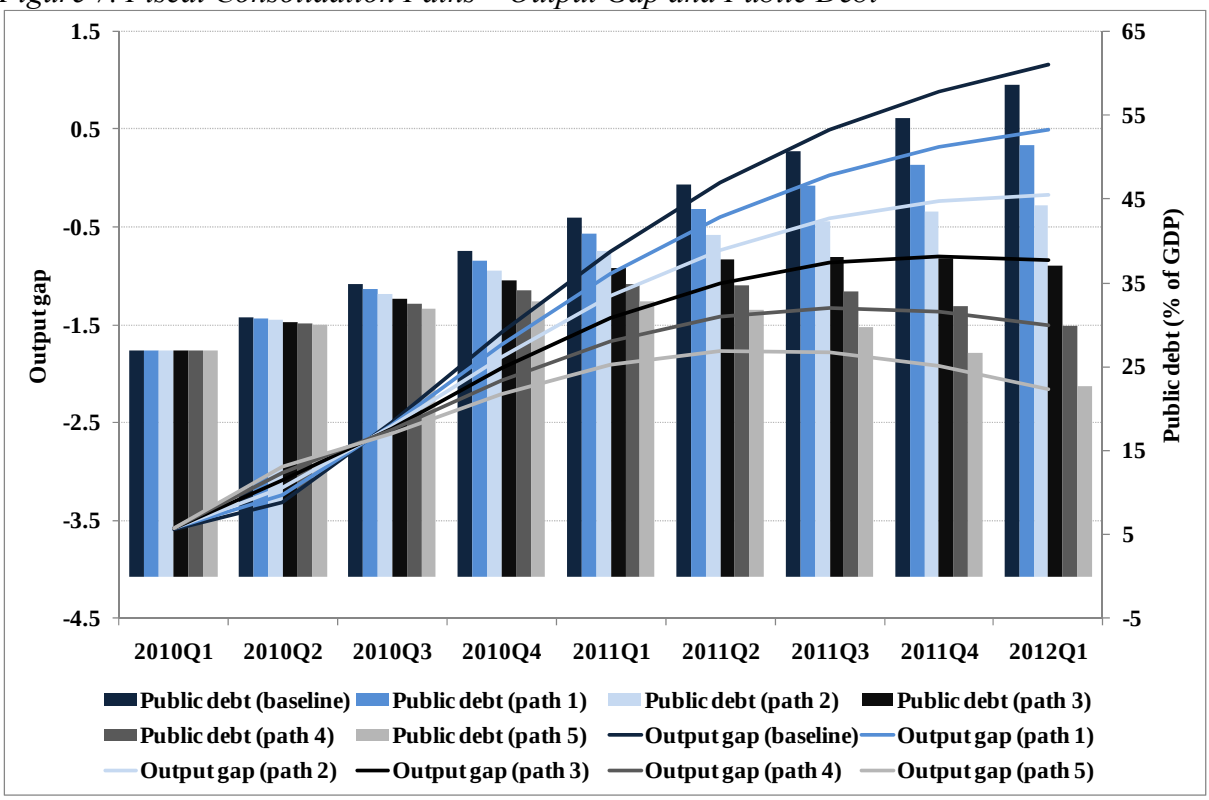


Figure 8. Fiscal Consolidation Paths – Output Gap and Output Volatility