

Unintended consequences of tax cuts in South Africa*

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Abstract

This paper provides evidence on the macroeconomic effects of personal income tax changes in South Africa. We identify episodes of policy changes using narrative information from legislative documents. Analysis of quarterly macro data in 1996-2019 shows that personal income tax cuts have an initial contractionary impact on output, consumption, investment, and employment. These effects reflect the crowding out of credit and investment by the private sector as it finances tax cuts. As a result, firms reduce their labour demand, targeting unskilled labour, potentially contributing to increased inequality in the country. These effects reverse, however, to expansionary from the seventh quarter onward.

JEL classifications: C32, E23, E62, H2

Keywords: Tax policy, narrative approach, macroeconomics

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1 Introduction

What are the macroeconomic effects of average personal tax changes in South Africa? The question is timely and relevant for many countries across Africa. First, the accumulation of government debt following the 2007 global financial crisis and the CoVID-19 pandemic requires fiscal policy measures aimed at reducing the debt burden. In South Africa the debt-to-GDP ratio almost tripled from 24 percent in 2008 to 71 percent in 2022. In Sub-saharan Africa the average government debt ratio has almost doubled in just a decade — from 30 percent of GDP at the end of 2013 to almost 60 percent of GDP by end-2022. Second, South Africa, notoriously the most unequal country in the world with a Gini coefficient of 63, is a test case to evaluate the effect of tax changes in an extremely unequal society where the income tax burden mainly weigh on the top of the income distribution.¹

In the same way low economic growth in South Africa over the past decade may call upon fiscal policy. For instance, a tax cut could stimulate the economic by creating jobs but what is there a price to pay in terms of government revenue? One unique challenge for evaluating government policy is the ability to distinguish exogenous government policy from its endogenous counterpart as the response to changes in economic conditions.

This paper analyses legislated tax changes using primary sources over the 1996-2019 period in a structural vector-auto regressive model. Our aim is to firstly construct a narrative fiscal policy measure as in [Romer and Romer \(2009, 2010\)](#). Then using this newly constructed dataset, we follow the methodology of [Mertens and Ravn \(2013, 2014\)](#) to empirically answer the question. Our results indicate that personal income tax cuts have an initial contractionary effect on output, consumption, investment, and employment. These effect reverse, however, to expansionary from the seven quarter onward. We identify three channels to help us understand the dynamics of the initial contractionary effect of tax cut. These are the labour market channel, the demand channel, and the finance channel.

The finance channel indicate that the tax cut is fully financed by additional government debt in the bond market. This cause an appreciation of the local currency, which in turn leads to export contraction. We see the contraction of exports as the first demand channel. The demand channel is further exacerbated by the reduction of credit extended to the private sector and the crowding out of private investment. Finally, the labour market channel further amplifies the private sector contraction, as indicated by the reduction in employment. A further analysis of the labour market dynamics indicate that there are sectoral heterogeneity. In particular, we find employment contraction in four key sectors: finance, trade, mining and manufacturing. However, we note that the finance sector displays the largest negative

¹In 2020 South Africa had 14 million registered taxpayers but only around half of them had an income higher than minimum tax threshold of 80 thousand rands. The 2 percent of the registered taxpayer earning more than 1.5 million rands pays around 27 percent of total income tax revenues, a combination of very high income inequality and a progressive tax structure (SARS Tax Statistics 2022)

impact. Given the dominant role of the sector plays in the South African labour market, the contraction in this sector helps also to understand the significant employment contraction we observe. Lastly, we also observe that wages decrease suggesting that labour demand is potentially responsible for the employment contraction.

The investigation of the causal effects between variables follows a broad two-step process: The researcher has to identify or construct the shock and then use this shock within a specified model to estimate the dynamic effect of this shock on other variables. In their review of identification strategies in the macroeconomics literature, [Nakamura and Steinsson \(2018\)](#) provide a survey together with some criticism of current empirical methods used in identifying exogenous shocks. The major criticism deals with the credibility of the identified shock - that is how sure is the researcher that he or she has identified the part of the variable that is exogenous and not its response to other shocks. For the traditional VAR restrictions method, such as the Cholesky decomposition, the authors argue that this method makes “strong implicit assumptions” about the information set of the policy maker and the reverse causality between the variables. These strong assumption can result in identifying endogenous variation of the variable of interest as exogenous. In the fiscal policy literature time series measures such as cyclically-adjusted primary budget balance or its revenue counterpart aimed at removing the endogeneity of fiscal policy still fail to remove non-policy factors correlated with economic activity, [Devries et al. \(2011\)](#).

One of the various identification alternatives to VAR restrictions is the narrative method. Narrative measures are constructed by using historical records of policy makers to identify the reason and the size of the change in the policy instrument, [Ramey \(2016\)](#). Similar to the VAR shocks, these narrative accounts are also subject to measurement errors. [Nakamura and Steinsson \(2018\)](#) indicate that while narrative measures are valuable in identifying shocks, measurement errors arise from (1) the subjectivity or opacity of constructing the shock which can lead to difficulty by other researchers to replicate the constructed measure; (2) few data points which may also be randomly correlated with other shocks; (3) and even endogeneity. [Alesina et al. \(2015\)](#) argue that given how fiscal policies are executed as a multi-year plan, it is not surprising that the narrative measures are endogenous. According to the authors, the endogeneity is a consequence of the structure of the plan and should not invalidate the exogeneity of the plan.

The two broad ways of using the narrative measure are directly as a perfect measure for the true shock, such as in [Romer and Romer \(2010\)](#), or to treat the narrative measure as an instrument for the unobservable structural shocks (also called SVAR-IV by [Stock and Watson \(2018\)](#)). In the [Romer and Romer \(2010\)](#) case, the authors regress their exogenous narrative measure for fiscal shocks on GDP in a single-equation model and in a two-variable model. According to [Stock and Watson \(2018\)](#), treating “*external instruments*” such as narrative measures as a true shock can lead to biased estimates. In this paper, we focus

on the latter methodology of using the narrative measure in a proxySVAR model to answer our empirical question. Despite the challenges of using narrative measures, their use in an SVAR models as instruments is seen as a promising method to incorporate external information in a VAR model to identify shocks (Ramey (2016)) and “holds out the potential for more credible identification than is typically provided by SVARs identified using internal restrictions” (Stock and Watson (2018)). In fact, Nakamura and Steinsson (2018) indicate that the main advantage of this method is that it allows the inclusion of fast-moving variables in a VAR model of lower frequency. In addition, the authors show that another advantage is that it relaxes the contemporaneous restriction in cholesky identification, allowing the contemporaneous response of variables in the model to be non-zero. However, the authors indicate that the VAR misspecification still remains an issue. ²

Several papers have used this methodology in both the fiscal and monetary policy literature. Seminal contributions include Mertens and Ravn (2013, 2014). Mertens and Ravn (2014) find larger tax multipliers for the US. One of the attributions for these large multipliers is the use of the proxySVAR. The authors argue that by being able to account for measurement errors inherent in narrative measures they are able to find higher multipliers. Using this methodology Hussain and Malik (2016) finds that tax cuts have a positive and significant effect on output whereas the effect of tax increases is insignificant (and also exhibit non-Keynesian effects on output). While the authors employ a non-linear model, their results are qualitatively similar to those of Afonso and Sousa (2012) for the US. Mertens and Montiel Olea (2018) also use the proxySVAR, together with local projections instrumental variable (LP-IV), method to investigate macroeconomic effects of changes in marginal tax rates. The authors find that cuts in marginal tax rates increases output and reduces unemployment.

In line with this trend in international literature, this paper contributes to the literature in three ways: firstly, we construct a new narrative measure that can be used as a proxy for structural personal income tax shocks for South Africa. Secondly, we contribute to the empirical literature of fiscal multipliers using a different dataset and identification strategy. Lastly, we look at the macroeconomic effects of personal income taxes. Figure 1 shows the contribution of different tax categories to total revenue during the 1994/95 to 2018/19 fiscal years. Between this period personal, corporate and value-added taxes accounted for around 80% of total revenue. Personal income taxes contribute a substantial amount to total revenue, with their share fluctuating between 30% and 40% during the period under investigation.

For our first contribution, we follow the literature on narrative accounts and identify tax-based policy actions by government over the 1996Q1 - 2019Q4 period. Our focus is only on tax changes that affect personal income taxes.³ The policy has to be both significant and

²See Section B of the Nakamura and Steinsson (2018)’s online appendix.

³Narrative accounts for corporate and VAT changes are also analysed but excluded in this paper.

result in a change in tax liability. For the latter, this can either be a change in average or marginal tax rate. The significance of a tax change is not necessarily determined by its size but rather by its potential socioeconomic and/or economic impact. Following [Romer and Romer \(2009, 2010\)](#), identified tax changes are then classified under four categories based on their motivation: government spending driven, countercyclical (to return economic growth to trend), budget deficit driven, and increasing long-run economic growth. Tax changes classified under the latter two motivations are considered as policy changes unrelated to other developments affecting economic activity – “exogenous” fiscal policy shocks - and form the basis of our paper.

Our second and third contributions are empirical. In this regard, we use the new constructed quarterly tax narrative shocks and follow [Mertens and Ravn \(2013, 2014\)](#) by incorporating the narrative within a VAR model. The underlying assumption of this methodology is that the narrative measure is positively correlated with the structural fiscal shock of the VAR model but uncorrelated with the other remaining structural shocks. Unlike with the narrative literature, this correlation is not assumed to be perfect - that is not a one-on-one mapping. After all, the narrative measure can only measure some parts or the noisiness of the true shock and thereby providing an imperfect measure, [Stock and Watson \(2017\)](#). Using this assumption, a procedure is followed to recover the impact matrix.

Our study is not without limitations. The first obvious limitation is that, by using a linear model, we assume that fiscal multipliers have remained constant during the sample period. [van Rensburg et al. \(2021\)](#) finds that fiscal multipliers in South Africa have been declining after 2010 and were even negative during the 2015 to 2018 period. Notwithstanding this limitation, we hope that the use of the narrative data opens avenues to explore the different methodologies and model specifications such as in [Kliem and Kriwoluzky \(2013\)](#) in future research. Furthermore, we see this research being in line with the above mentioned international literature of using external information to identify shocks.

The rest of the paper is organised as follows. Section 2 presents background information on the South African tax system and labour market. Section 3 presents the South African budgetary process and describe the construction of the narrative index. Section 5 discussed the methodology and the empirical results. The last section concludes and put the results in the context of the analysis of fiscal policy in emerging markets.

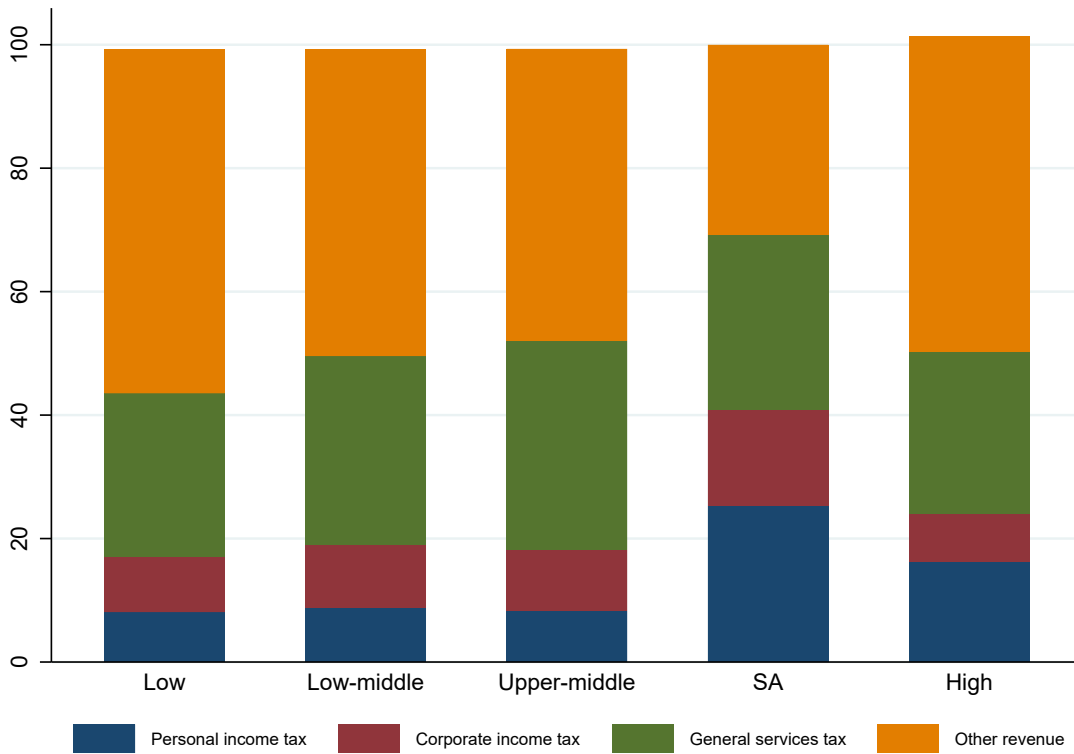
2 Background

2.1 South African taxes and labour market

Figure 1 reports average shares (1996-2019) of four main sources of government revenue (personal income tax, corporate income tax, general services tax, and other revenue) in South Africa in comparison with the four main income country groups (Low Income Countries,

Lower Middle Income Countries, Upper-Middle Income Countries and High Income Countries. The data show that around 35% of South Africa’s Government revenues come from personal income tax, a percentage that is notably higher than that observed in any other country group.

Figure 1: Share of revenue sources (% total revenue)

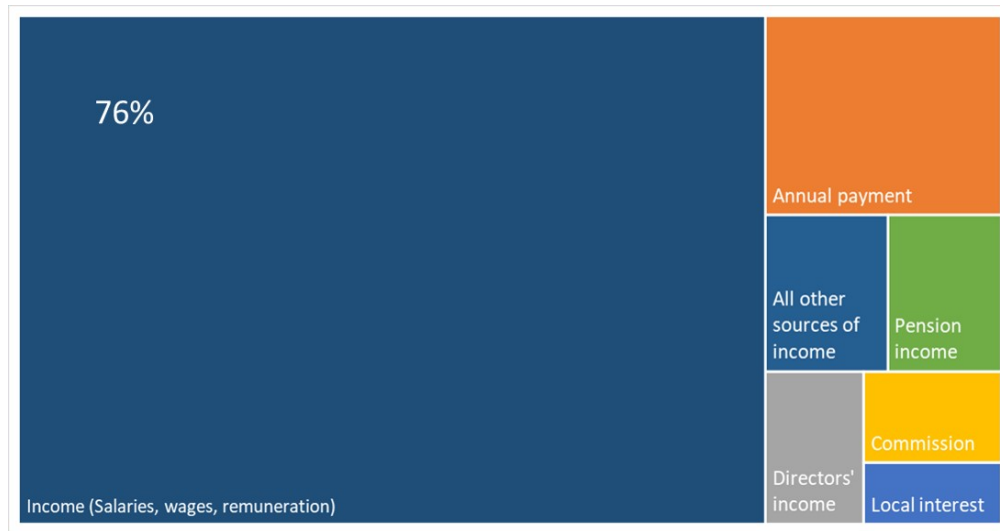


Note: This Figure shows the averages of different revenue types by income groups between the period 1996 and 2019. Total revenue include tax and non-tax revenue, grants and social security contributions. Due to incomplete and inconsistent availability of data for some countries, the total does not add to 100% for some countries. Source: UNI-WIDER Government Revenue Dataset (GRD)-[Oppel et al. \(2021\)](#)- and Authors calculations.

The majority of the South Africa’s income tax is derived from salaries, wages and remunerations, contributing approximately 76% of total income tax revenues (see Figure 2). The system provides, however, generous tax exemptions at the bottom of the income distribution. Table 1 below shows the number of taxpayers for each income brackets and their contribution to the total amount of labour income tax revenues. Of the almost 14 millions registered taxpayers only a little more than half of the taxpayers earn above the non-taxable threshold of 80 thousand Rand a year. The majority of the tax revenues come from a small number of high income individuals, with the top 2% contributing to more than a quarter

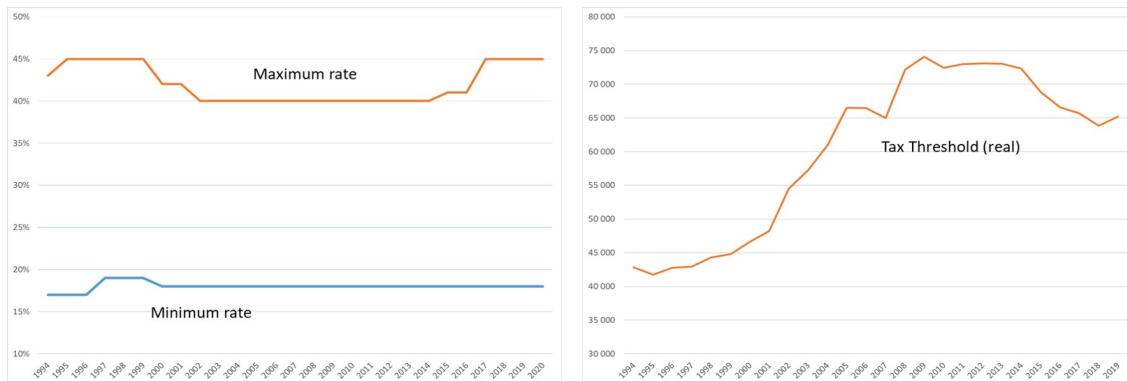
of all tax revenues. For those subjected to income taxes, the tax system is also progressive, with a marginal income tax rate going from 15% for the lower income bracket to 45% for the highest bracket (Figure 3).

Figure 2: Sources of taxable income in South Africa - 2018



Source: Authors' calculation with data from South African Revenue Service (SARS) .

Figure 3: Marginal tax rates and real tax threshold 1994-2020



Source: Authors' calculation on South African Revenue Service (SARS) data.

Income inequality also affects the distribution of income tax revenues by sector in South Africa. Table 2 shows the economic sectors composition of income tax revenues and compares it with the distribution of formal employment. Most of the income tax revenues comes from the service sector, with around half of all personal income taxes coming from the financial and business services sector and the public sector.

Table 1: Estimates of individual taxpayers and taxable income, 2020/21

Taxable bracket (,000)	Registered Individuals	%	Taxable Income (R.bill)	%	Income Tax (R.bill)	%
R0-R80 (1)	6,822,326	–	218.8	–	–	–
R 80 - R 150	2,084,683	29.2	235.3	9.3	23.8	4.2
R 150 - R 250	1,771,582	24.8	354.3	14.1	30.9	5.5
R 250 - R 350	1,071,402	15	318.3	12.6	42.7	8.4
R 350 - R 500	1,029,509	14.4	424.1	16.8	81	14.4
R 500 - R 750	615,177	8.6	368.2	14.6	90.4	16.1
R 750 - R 1,000	266,169	3.7	225.7	9	65.9	11.8
R 1,000 - R 1,500	182,883	2.6	217.2	8.6	71	12.7
R 1,500+	125,029	1.8	376.4	14.9	150.6	26.9
Total	7,146,434	100.0	2519.5	100	560.8	100.0
Grand Total	13,968,760		2738.3		560.8	

Source: National Treasury - Tax Statistics 2022. Notes: (1) Registered individuals with taxable income below the income-tax threshold.

Table 2: Personal income tax, formal employment distribution and skill ratio by sector

Economic Activity	PAYE payments by sector and Industry (% 2018)	Formal Employment by Sector and Industry (% of total in 2018)	Skill Ratio (2014)
Primary sector	7.0	10.3	0.08
Agriculture, forestry and fishing	2.3	6.9	0.05
Mining and quarrying	4.8	3.4	0.12
Secondary sector	11.2	21.7	0.22
Manufacturing	7.0	12.7	0.25
Electricity, gas and water	1.6	1.2	0.46
Construction	2.6	7.8	0.16
Tertiary sector	82.0	67.9	0.47
Retail, catering and accommodation	6.5	17.7	0.18
Transport, storage and communication	3.6	5.8	0.32
Financial intermediation, insurance, real-estate and business services	44.4	18.1	0.67
Community, social and personal services	27.4	26.3	0.77
Other	-0.2	0.1	-
Total	100.0	100.00	

Source: Authors' calculations from South African Revenue Service (SARS) and Statistic South Africa (StasSA) data.

This sectoral distribution of tax revenues matches the sectoral distribution of skills in the economy. In the last column we report the skill ratio at the sectoral level, defined as the ration of high skill workers (managerial, professional and technical workers) over the sum of semi-skilled and low skilled workers employed in each sector. The two sectors that contribute over 70% of income tax, the financial sector and the public sector, have the highest skill ratio and employ around 65% of all the high skill employees.

The extreme unequal distributions of income earners, tax payers and skills are important to understand the impact of a change in income taxes on the South African economy. In addition, a change in tax policies has an effect on the financing needs of the Government and its reliance on the debt market. The South African government's debt is largely held by local entities, including national pension funds, financial institutions and the private sector. The share of South African government debt held by foreign investors fluctuated between 35 and 40% until the COVID-19 crisis, after which there was a sharp decline in foreign holding to 25.6% in 2022 ([National Treasury, 2023a](#)).

2.2 The tax legislation process

Two timings of the South Africa's tax system are of importance for our work: the legislative process for taxes; and the timing of tax collection. Figure 4 below summarizes the main information.⁴

For the legislative framework, the budget process runs from April to March the following year.⁵ This time-frame coincides with the government's financial year ([Parliament SA \(2019\)](#)). **From April (year t) to October (year t+1)** most of the process is, however, internal to the public administration and not observed by the public. The budget process comes into public focus between October (year t) and February (year t+1), during the presentations of the mini-budget and the budget speeches, respectively.

The *mini-budget*, which sets out government's medium-term fiscal framework and revisions to government spending from the main budget, is usually delivered in October together with the publication of the medium-term budget policy statement (MTBPS). However, not much details on tax proposals are given on this occasion.

Tax changes are set out in the *budget speech*, which is usually delivered in February on the budget day. The budget review, which is published on the budget day, contains more information on tax proposals and tax legislation changes. This is a detailed document providing more information on government expenditure and tax proposals, together with a review of previous years revenue performance. We primarily use this document to identify

⁴We would like to thank the staff at National Treasury for providing us with more insight into the budget and legislation process, which has enabled us to put together this figure and its short summary.

⁵This process excludes the excluding the auditing and assessment stage, which occurs after the end of the financial year. Taking this last step into account makes the budget process run for eighteen months.

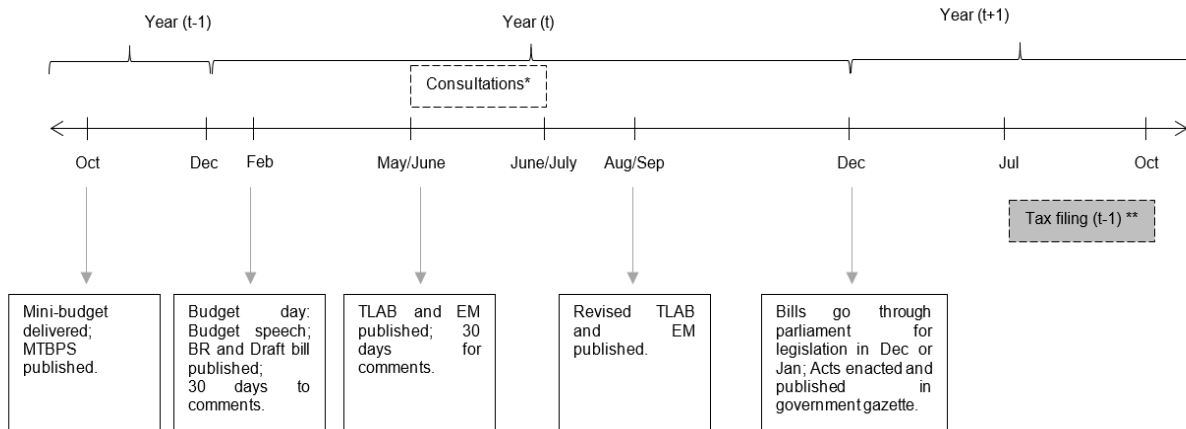
tax policy changes. In addition, we also look at the State of the Nation Address (SONA) by the president, which is customarily delivered a week or so before the Budget speech. These documents were obtained from National Treasury, South African government and South African Revenue Services (SARS) websites.

The draft of the Rates Bill is also published on budget day. This document contains changes to rates or levies on personal income tax, corporate taxes and excise duty amongst others. These changes **are either effective immediately** on announcement or few days following the budget speech. Taxpayers are given 30 days to comment on the tax change proposals.

Following the budget day, work begins on drafting the Tax Law Amendment Bill (TLAB) and the Tax Administration Law Amendment Bill (TALAB) in **May-June in year $t+1$** . The two bills contain technical tax proposals which deal with “unintended anomalies, revenue leakages, loopholes and technical matters applicable to the current tax legislation that require correction” ([National Treasury \(2023b\)](#)). These documents are then published for comments for 30 days in May or June in year $t+1$. Explanatory Memorandums (EM) are also published alongside the bills or eventually the final act. These documents provide the background and motivation for the tax proposal. We use these documents as our main source for the motivation of tax changes. Commenters are given the opportunity to present their comments to Parliaments in addition to attending the workshop with National Treasury. After consultation with taxpayers and commenters, revised versions of the TLAB, TALAB and EM are published in August-September in year $t+1$. Lastly, the Rates Bill, TLAB and TALAB go through the parliamentary process of being legislated and then promulgated before the end of the fiscal year. Most of the legislation is towards the end of the calendar year in December (year $t+1$)-January (year $t+2$). Overall, little changes between the tax policy change announced during the budget speech and the ones that become a tax law.

Provisional tax payers have other non-salaried sources of income. Following this definition, a person who earns both salaries and other income can be both provisional and non-tax payer. As result, the share of NP is about 76%. Therefore, any government tax change will have immediate impact on PIT revenue and workers’ income. Provisional taxpayers have until January (year $t+1$) to fill in their taxes.

Figure 4: Personal income tax legislative and tax collection process



Source: Authors' calculation based on data from the National Treasury.

Note: * Consultations with taxpayers and commentators. ** Tax season for non-provisional taxpayers starts in July and ends in October whereas for provisional taxpayers, it starts in July and ends in January.

3 Narrative tax-based fiscal shocks

We construct a narrative account of legislated personal income tax (PIT) changes between 1996Q1 and 2019Q4 in the same spirit of [Romer and Romer \(2009, 2010\)](#) and [Mertens and Ravn \(2013\)](#).

The starting point in identifying tax policies is deciding on what constitutes a significant tax change. While it is not our intention to go into detail of every component of the tax change, careful consideration is given into what goes into the aggregate narrative tax measure. For our analysis, the significance of a tax change is not necessarily determined by its size but rather by its potential socioeconomic and/or economic impact, as long as it results in a change in average or marginal tax rate. Therefore policies which on their own would be considered insignificant in term of their revenue impact are also considered for the aggregate measure. This attempt to not simply exclude small tax policy changes partially aims to address one of the measurement errors that arises during the construction of narrative measures which is of excluding minor changes as mentioned in [Mertens and Ravn \(2013\)](#). However, we restrict our analysis to tax policies affecting the majority of the society or households. We exclude policies that are targeted at specific financial transactions or use of certain instruments to avoid paying tax or reduce tax liabilities.

3.1 Tax change categories

As in [Romer and Romer \(2009, 2010\)](#), we classify tax changes into 2 main categories based on their motivations or reasons: endogenous and exogenous. Below is a brief summary of the two categories as discussed in [Romer and Romer \(2009, 2010\)](#):⁶

Endogenous tax changes: Endogenous tax changes are intended to return economic growth to its potential level. In this category, government is concerned about current or future economic growth. Hence these tax policies will be correlated with output or other factors affecting output. Tax changes in this category include amongst others increasing (decreasing) taxes or decreasing (increasing) government spending during an economic boom (downturn); responding to other shocks that might move output from its potential; and increasing taxes to fund an increase in government spending. The latter is classified as a spending-driven tax change whereas the former two are considered countercyclical tax changes. These tax policies do not form part of our analysis on the macroeconomic effect of tax changes.

Exogenous tax changes: Tax changes in this category are taken for long-term reasons irrespective of current conditions or future outlook. The two main sub-categories are deficit-driven and long-run tax changes. Deficit-driven tax changes are aimed at addressing past economic policy choices. Long-run tax changes encompass a wide range of tax changes aimed at raising the potential growth. These include policies aimed at making the tax system fair and equitable, procyclical tax policies to raise potential growth, new tax policies aimed at increasing the tax base and other reasons.

In South Africa, adjusting rebates and tax brackets for inflation is an automatic process, to avoid fiscal drag, at least during the period under investigation. Since it has been implemented every year, we classify it as automatic tax change. Only in few cases are these inflation indexations accompanied by changes in marginal tax rates. Given this automatic change, our rule is to classify them as countercyclical - especially when government is explicit that the aim is to counter inflation - and thereby endogenous.⁷ There are two cases in which we deviate from this rule: higher than inflation adjustments during economic boom and using fiscal drag to raise taxes. Both are procyclical tax policies which go against the countercyclical tax policy stance of government.

The first case of higher than inflation changes in the tax brackets and rebates to achieve an even higher economic growth falls under the classification of tax policies to raise potential growth. For example, in 2002/03 and 2003/04 fiscal years the economy was estimated to grow by 2.3% and 3.3% in those years and further expected to continue to grow over the remaining years of the three year medium-terms. During the same years, government provided personal

⁶It's not our intention to provide a detailed explanation of these motivation, for this consult the two papers.

⁷As indicated in [Romer and Romer \(2010\)](#), automatic tax changes have minimal news value, therefore not a shock.

income tax reliefs of about R15 billion and R13 billion, respectively, with the following reasons cited in the Budget Reviews documents - “The proposed tax relief will increase the disposable income of employees, easing the pressure on wage costs to firms, as well as the pressure on household budgets that may arise from higher than anticipated inflation following the depreciation of the currency” in 2002 and “The adjustments compensate fully for inflation and provides real relief to all taxpayers...and increasing the take-home pay of wage earners to encourage consumption and saving” in 2003. In the 2003/04 case, economic growth for 2002 was estimated to be 3% which was higher than the estimate of 2.3% in the 2002/03 Budget (as indicated in Table 2.4 in the 2002 Budget Review and Table 2.5 in the 2003 Budget Review). In both cases, government indicated that strong revenue growth was the reason for these generous tax reliefs - therefore there were no fears of widening of the budget deficit and the economy was expected to growth at higher rates in the three year medium-terms. In such cases we estimate the inflation adjustment amount and the remaining amount is then allocated as the size of the shock.

The second case is when government choose not to make the inflation indexations. Since these adjustment results in foregone revenue by government, fiscal drag when government has limited fiscal scope is classified as a deficit-driven tax increase and therefore exogenous. The tax relief for personal income tax in 2010 Budget for the 2010/11 fiscal year was estimated at R6.5 billion in the Budget documents. Since the government was clear that the relief was moderate and to help the economy recover - “moderate tax relief for households, to assist in sustaining the economic recovery” - we classify the relief as a deficit-driven tax increase. While the statement indicates that the relief if to assist the recovery, the lower than inflation adjustment to both the tax brackets and rebates is contradictory to supporting economic growth and indicates that this is an implicit tax increase. In anticipation of lower tax revenue (and therefore higher than previously expected budget deficit) due to lower economic growth, government choose to offer a modest tax relief. ⁸ Subsequently, the 2011 Budget allocated R8.1 billion for tax relief in the 2011/12 fiscal year but also to compensate for some of 2010/11 year that could not be accommodated in the last fiscal year’s relief.

Lastly, in an effort to balance fiscal policy objectives with negative effects of taxes on the economy, government can pursue multiple policy objectives. For example, during an economic downturn, government might indicate its support for economic growth while also maintaining its position for fiscal sustainability. To address these competing motivations, we take a bottom-up approach: we look at the motivation for the identified individual change and then calculate the net effect of all identified tax changes in that year. In this way we ensure that even small but relevant tax changes are included in our analysis.

⁸The 2010 Budget Review indicate that the estimated previous, current and next years inflation were 7.1%, 5.8% and 6.1% respectively. However, the tax brackets and rebates were adjusted by 5.3% and 5.1% respectively, which are both below any of the estimated inflation rates.

3.2 Revenue source, sizing and timing of narrative tax shocks

In this paper we only look at the personal income tax changes. However, the categorisation of some of the taxes is obscured by statutory vs legal or economic obligation. To ensure consistency with the data and how taxes are administered, we follow the revenue collector's tax categories. These are obtained in the Statement of the National Revenue, Expenditure and Borrowing taken from the National Treasury's monthly press releases. For example, while employment tax incentives are treated as business incentives, they are administered as refunds against employees' pay-as-you-earn (PAYE) and therefore categorised under personal income tax.

For the size and timing of the shock, we follow the literature where the size of the shock is proxied by the *expected* annual revenue impact of the new policy. In our case, and similar to [Romer and Romer \(2010\)](#), we obtain these estimates from the Budget documents.

The timing of a shock is determined by its effective date. Following [Yang \(2005\)](#), we take note of three important dates in the tax policy process: (1) the date of the announcement of the tax policy to parliament or the public; (2) the date of the enactment of the legislation of the announced tax policy; (3) and finally the effective date of the legislated tax policy. For date (1), we use the date of the State of the Nation address or Budget speech. At a quarterly frequency, these do not matter as they are only two weeks apart. For date (2), we use the date on which the legislation was assented. Lastly, for date (3) we use the effective date of the change which in some cases are also mentioned in the Budget review ex-ante. Same as in [Romer and Romer \(2010\)](#), any tax change effective after the midpoint of a quarter is assigned to the next quarter.

The last two important characteristics of the shock look at whether the shock is temporary or permanent and anticipated or unanticipated. [Mertens and Ravn \(2013\)](#) classify unanticipated tax changes as policies implemented within a quarter after being legislated. [Hussain and Malik \(2016\)](#) also follow the same classification approach. This classification allows researchers to investigate if anticipated and unanticipated shocks have different macroeconomic effects.

Tax changes shocks are classified as temporary if they are effective for a specified period. Therefore permanent tax changes remain effective until future tax changes or repeals. Some tax changes have an element of both temporary and permanent effect. For example, if government adjust tax brackets for fiscal drag but also increase the top marginal tax rate, such as in 2017/18 fiscal year, we treat the adjustment of rebates and tax brackets as temporary - whether full or partial adjustment. However, we treat the increase in marginal tax rates as permanent since such are rarely effective for one year and tend to stay in place until government decides otherwise.

3.3 Summary of the tax narrative

Following [Mertens and Ravn \(2013\)](#), we construct a measure for the personal income normalised by its tax base as follows:

$$\Delta \text{PIT}_t^{\text{narr}} = \Delta \text{Personal Income Tax Liability}_t / \text{Personal Taxable Income}_{t-1}$$

where Δ is the estimated change. Personal taxable income is proxied by non-agricultural sector wages. An alternative measure is scaled by the previous period gross domestic income, which is similar to [Romer and Romer \(2010\)](#) and [Devries et al. \(2011\)](#). We construct two measures for the narrative shocks. With the first measure, we only consider tax changes to the marginal tax rates and the tax brackets. Since these tax changes are effective immediately or within a month after the budget announcement, they should not contain any anticipation effects. We call these shocks our benchmark shocks. For the second measure, we include changes to other forms of personal income taxes, such as fringe benefits, capital gains tax and the employment tax incentive (ETI), to the first measure.⁹ These tax changes can include anticipation effects.

The above narrative measure is a proxy or instrument for the latent shock of average personal income tax rate (APITR), which is calculated as:

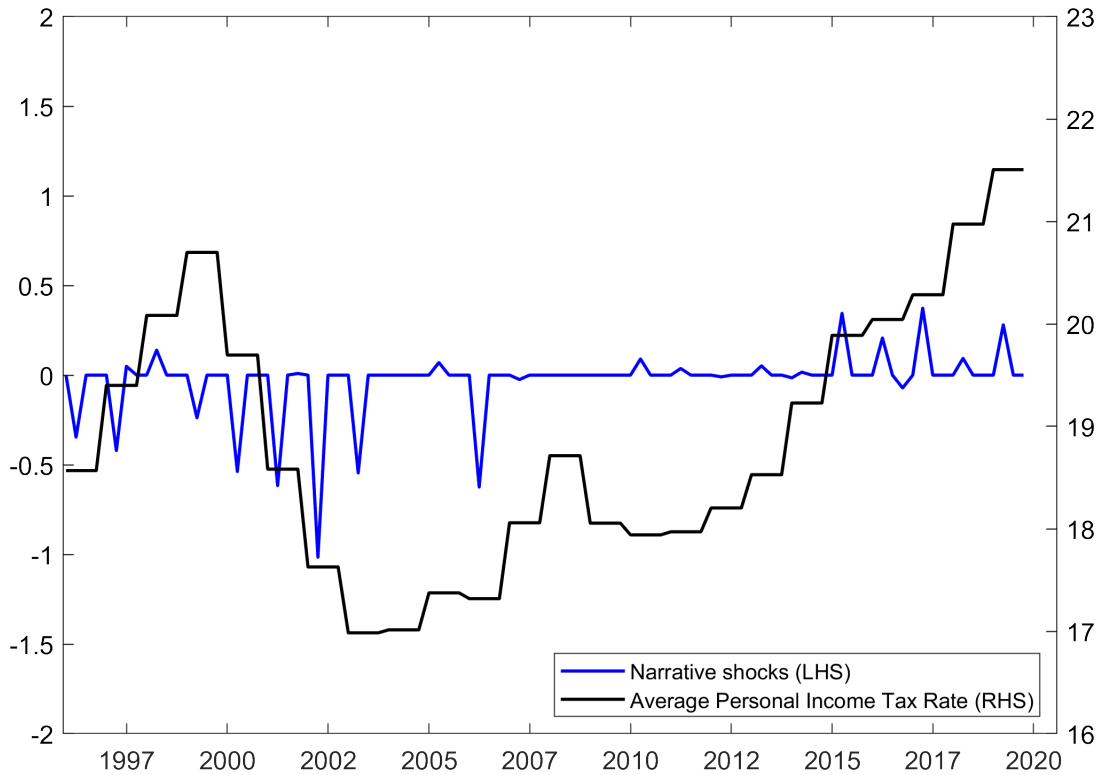
$$\text{APITR}_t = \text{Personal Income Tax}_t / \text{Personal Taxable Income}_{t-i}$$

where i can either represent current tax base ($i = 0$), one-quarter lag ($i = 1$) or four-quarter lag ($i = 4$).

A summary of the tax changes analysed is provided in [Table A1](#) in [Appendix A3](#). We have a total of 55 exogenous tax changes. After aggregation, we end up with 22 personal income tax shocks, which forms part of our analysis. These are shown in [Figures 5](#) alongside the average personal income tax rate. The average personal income tax rate is smoothed using the Hodrick-Prescott (HP) filter to remove the seasonal fluctuation. The tax shocks are shown against the filtered average personal income tax rates.

⁹Fringe benefits are non-cash benefits by employers by employees; capital gains tax is triggered by the disposal of an asset and is tax on the proceeds of the assets that are above its base cost. It forms part of the income tax and not taxed separately; ETI is a tax incentive by government for employers to hire young employment people. Source: South African Revenue Services (SARS).

Figure 5: Narrative shocks vs. APITR - % of Wages



Note: This figure shows the narrative measure of documented and legislated exogenous Personal income tax (PIT) shocks. The solid blue line is for the average personal income tax rate (APITR), the solid black line is for the narrative shocks of all the PIT shocks. These are normalised by gross domestic product (GDP). The sample period is 1996Q1 to 2019Q4

The period we are analyzing is characterized by two main policy strategies which encompasses what we see as three episodes of changes in personal income taxes. Between 1996 and 2007, the South African government adopted a strategy of fiscal discipline to stabilize the country’s fiscal position and build credibility of the country macroeconomic framework in the international financial markets. The democratic government established in 1994 inherited both a high and increasing public debt to GDP ratio and a significant development backlogs. The government took than the decision to prioritize fiscal sustainability, thus avoiding having to rely on external borrowing to finance the increase in service provision (Levy et al., 2021). This period of our analysis include a period of significant fiscal consolidation, achieved via an increase of personal income tax rates and control of expenditure (Calitz and Siebrits, 2003).

Within this period is where we place our first episode of tax changes in the second half of the 1990s. Tax changes included reducing the tax bracket from ten to 6 between the 1996/97 and 1998/99 fiscal years. Parts of the tax reforms emanated from the recommendations of the Katz commission. As stated in the 1996 Budget Review, these changes were part of government’s plan to (1) make the tax system fair and equitable - “One of the commitments

that the Government has made to the people of this country is to ensure that the tax system is fair and equitable. As it is currently structured the burden of taxation falls disproportionately on individuals. Of great concern to us is the fact that those most seriously affected are people on low to middle incomes. Our longer-term strategy is to meet the objectives set out in the Third Interim Report of the Katz Commission...In this Budget we take some steps in meeting these objectives” and (2) “broaden the tax base and break the culture of non-payment” as stated in the 1997 state of the nation address. However, due to fiscal constraints, it was stated that there would be a gradual approach to reforms. In addition to the tax rate table, government increased taxes for fringe benefits by increasing the tax rates on car allowances and taxable amount on housing allowances and limiting the employer’s tax deductible amount for medical aid contributions on behalf of employees to two-thirds. Government was unequivocal that these measures were aimed at stemming the abuse of these benefits which “also results in a substantial loss of revenue to the government and creates inefficiencies in remuneration” and dealing with the abuse of medical aid in restructuring remuneration packages and reducing the tax liability for personal income tax, as stated in the 1997 and 1998 Budget review respectively. Therefore given the motivations for these government tax reforms, we classify them as philosophical under the Romer and Romer classifications.

Fiscal consolidation and the widening of the tax base were the pre-condition for an aggressive expansion of government expenditure in social services and a reduction of tax burden on household and firms in the period between 2000 and 2007. This macroeconomic strategy, named Growth, Employment and Reconstruction Strategy (GEAR) ([National Treasury, 1996](#)) drove fiscal policy decisions until the global financial crisis of 2007 and the contemporaneous change in policy direction after the African National Congress Polokwane Conference in December 2007. The Gear strategy was based on focusing on long term economic growth by anchoring the fiscal plans of increasing expenditure in education, health and public services to three year budget plans aimed at increasing revenues at faster pace than increasing in expenditure and reduce the Debt burden. Tax policy changes during this period forms part of our second episode. Government felt that the beneficiaries of increased tax revenue should be households since this tax source contributed more to total tax revenue. Any fiscal space obtained in during this period was partly used to increase public provision of services and partly to reduce the tax burden on the private sector ([Burger and Calitz, 2015](#)).

Against the backdrop of increasing revenue and economic growth and optimism for the country, government wanted to raise the potential growth of the economy. Therefore the tax cuts and marginal tax rates reductions in the early 2000s, which forms part of our second episode of tax changes, are classified as long-run under the Romer and Romer classifications. The tax cuts were across all income levels and of significant foregone revenue by the government. Tax changes during this period included a reduction in the top bracket from 45% to

42% in 2000/01 fiscal year, the introduction of capital gains tax and further adjustments of fringe benefits. Changes in the tax brackets for fiscal drag are classified as exogenous while the portion of tax change that results in reduction in tax burden to individuals is classified as exogenous or endogenous depending on the motivation of the tax change. This means the first two periods are classified under the long-run Romer and Romer category - tax changes not motivated by counteracting any shock to the economy or reducing the budget deficit. During these two episodes the average tax rate declines before increasing around 2005. Tax changes in the early 2000s takes place under a period of the longest period of economic expansion since WWII according to the South African Reserve Bank (SARB) expansion period which ran from September 1999 to November 2007. As noted in the paper by (Sachs, 2021), the apparent contradiction between the objective of fiscal adjustment and the reduction of the tax burden made most of the significant changes in tax policies at the beginning of their sample an effective shock, as they were possible only as residual of an increase in revenue generation capacity and of the growth of the economy higher than expected.

In the second period of our sample, especially during the Zuma presidency from 2009 to 2018, fiscal policy becomes less anchored to long term objectives and responds re-actively to the weakening of long term economic trends and the rapid worsening of the public debt position. In this period, fiscal deficits become endemic and public wage bill increases rapidly, absorbing a larger percentage of the government expenditure. Tax policy initially does not adjust to the unsustainable fiscal dynamics until, towards the end of the sample considered, direct and indirect taxes has to adjust dramatically when tax revenues started to significantly under-perform budget expectations and international rating agencies indicated increasing worries of South Africa fiscal sustainability(Sachs, 2021). The fiscal reaction though was not systematic and the measure we observe were mostly ad hoc and unexpected.

This period contains our last episode of the tax policy changes. In contrast to the first two expansionary episodes, this episode consists of contractionary fiscal policy changes during the second half of the 2010s. In this episode government was concerned about the increasing budget deficit following the cumulative increase in debt which started in 2008. In his study into the role of macroeconomic fundamentals to increasing yield spread between the South African and United States long-term rates, Fedderke (2021) finds that the increase in public debt from 25% to 60% of GDP contributed 280 basis points to the yield spread. This is a significant portion of the total 368 basis point increase from all macroeconomic factors - which in addition to public debt included increase in inflation, declining potential growth and rand-dollar depreciation. Against this backdrop of increasing public debt, low tax revenue and declining potential growth, government instituted a pro-cyclical fiscal consolidation plan which included tax increases through fiscal drag, an increase in marginal tax rates and an introduction of a new top bracket. For example, in the 2013/14 fiscal year, government was explicit that the tax brackets and rebates were “partially adjusted for fiscal drag”. Following

a few years of raising taxes via fiscal drag, government started using a combination of fiscal drag and increasing marginal tax rates to raise revenue from individuals. Marginal tax rates were increased by 1% across all tax brackets except the lowest one in 2015. These were first increases in marginal tax rates under the democratic regime and the motivation was to “close the structural deficit in the public finances over the medium term”. The 2014 medium-term budget policy statement stated that the favourable conditions (that is lower interest rates, high commodity prices and a stronger rand) that created fiscal space in the run-up to the GFC, and that allowed government to respond with stimulus when the economy went into recession, had dissipated. Accordingly, government planned to narrow the deficit and stabilise the debt by lowering spending and increasing revenues. These sentiments were further iterated in the review “In the period of low global growth forecast over the next several years, South Africa has begun to promote structural reforms needed for the long term”. Furthermore, in the 2017 budget government introduced a new top tax bracket of 45%. In this fiscal year, government aimed to raise extra R28 billion in revenue, of which R16.5 billion was from personal income taxes and dividend withholding tax. As indicated in the 2017 Budget review, “Government is acutely aware of the difficult economic conditions facing the majority of South Africans, but deferring tax increases by accumulating more public debt would ultimately impose a greater burden on citizens”. Under Romer and Romer classifications these changes are deficit-driven tax changes.

4 Methodology

4.1 Structural Vector-autogressive model

Consider the following structural vector autoregressive (SVAR) model:

$$AY_t = A_0 + \sum_{i=1}^p A_i Y_{t-i} + \varepsilon_t, \quad (1)$$

where A is an $n \times n$ impact matrix, Y_t is a vector of endogenous variables including APITR, which order first and followed by other macroeconomic variables which we define below, A_0 is a matrix of intercepts, A_i is the lagged coefficient matrix for lags i until p , and ε_t is an $n \times 1$ vector of structural shocks with $E[\varepsilon_t] = 0$ and $E[\varepsilon_t \varepsilon_s'] = I$ for $t = s$ and zero otherwise. In the empirical analysis we augment equation (1) with exogenous variables including linear and quadratic trend as well as the real commodity price. We include the latter to control for dominant role commodities play in South Africa (e.g. [Houssa et al. \(2023\)](#)).

The reduced form VAR representation of equation (1) is:

$$Y_t = \alpha_0 + \sum_{i=1}^p \delta_i Y_{t-i} + \mu_t, \quad (2)$$

where $\alpha_0 = A^{-1}A_0$, $\delta_i = A^{-1}A_i$, and $B = A^{-1}$ and $\mu_t = A^{-1}\varepsilon_t$ is the reduced form residuals with $E[\mu_t\mu_t'] = BB'$.

Identification of the structural shocks ε_t entails to find the matrix B. In our case we are only interest in the first shock. For this purpose we follow the methodology proposed by [Mertens and Ravn \(2013, 2014\)](#), which amounts to instrument the APITR by the narrative shocks presented in the previous section. The results of diagnostic tests reported below show that the narrative shocks is a valid instrument for APIT (the instrument is positively correlated with the structural shock of interest; and the exogeneity condition implying that the instrument is orthogonal to other macroeconomic shocks in the model). We refer the reader to [Mertens and Ravn \(2013, 2014\)](#) for details about the methodology.

4.2 Estimation and Data

We estimate the reduced form VAR in Eq. (2) by least squares. Thereafter, we identify the average personal income tax shocks using the methodology presented in the previous section. We estimate IRF and 95 percent confidence intervals computed using a recursive wild bootstrap with 10,000 replications.

Analysis employs quarterly data over the period from 1996Q1 to 2019Q4. Overall, we analyse the dynamic response of 23 macroeconomic variables allowing to understand the transmission channels of the shocks. Further details on the data are presented in [Appendix A2](#).

Given the short time span of the data, however, we estimate each case a six-variable SVAR model. The benchmark model includes the following six macroeconomic aggregates: i) Average Personal Income Tax Rate; ii) Government Total Spending; iii) Real GDP; iv) Private Investment, Private Consumption and Government Debt. Thereafter, we estimate several SVAR models with six variable to help understand the transmission channels. The variables include durable and non-durable household consumption in real terms; consumer price inflation; short-term nominal interest rate as a measure of the policy rate; labour market variables - employment, productivity and nominal wages; trade variables - imports and exports; foreign exchange variables - nominal effective exchange rate and the US dollar to rand exchange rate; business confidence; share prices; real total tax revenue; real personal income tax revenue; and wages as a measure of personal income tax base. In each case we include three variables for consistency: i) Average Personal Income Tax Rate; ii) Government Total Spending; and iii) Real GDP. All the model specifications are estimated including real commodity price and both linear and quadratic trends as exogenous variables. We fix the lag length to 2 in the main models but we also provide robust analysis with varying the lag to 4 but using bi-variate SVAR models. For each model, we test the null hypothesis that the variables in the model do not Granger cause our measure of the narrative shock. With

exception to the USD/ZAR exchange rate and share prices, the *p-values* of the variables are higher than 0.10, indicating that neither of the variables can predict the narrative shock - see Table A2.

5 Empirical Results

We start with the discussion on the information content of the narrative indicator for the personal income shock identification in Section 5.1. Subsequently, Section 5.2 presents the main results on the macroeconomic impact of personal income tax cut where we distinguish between non-marginal tax rate (Non-MTR) changes and its marginal tax rate changes (MTR) counterpart. Finally, in Section 5.2 we discuss the transmission mechanisms of the shock.

5.1 Information content of the narrative indicator

Table 3 shows the reliability statistic of the narrative measure. The value for the benchmark specification is 0.70 with 95% confidence intervals of [0.59,0.75] whereas the values for when we control for durable and non-durable consumption is 0.67 and 0.63 with confidence intervals of [0.46 , 0.72] and [0.47 , 0.70] respectively. Values close to zero in the intervals indicate that the information in the narrative measure for all the shocks is not that much useful for identifying the latent structural shocks. With a minimum point estimate of 0.44 for the reliability statistics, the results in Table 3 indicate that the narrative measure explains the latent structural personal income tax shocks strongly in most of the model specifications.

Table 3: Diagnostic statistics

	Point estimate	Confidence interval	
Benchmark	0.70	0.59	0.75
Durable consumption	0.67	0.46	0.72
Durable consumption	0.63	0.47	0.70
Labour	0.70	0.60	0.75
Shares and business confidence	0.51	0.27	0.67
PIT revenue	0.69	0.52	0.76
Monetary policy	0.44	0.21	0.68
Private credit	0.67	0.52	0.73
Trade	0.46	0.26	0.65
Total tax revenue	0.68	0.53	0.74

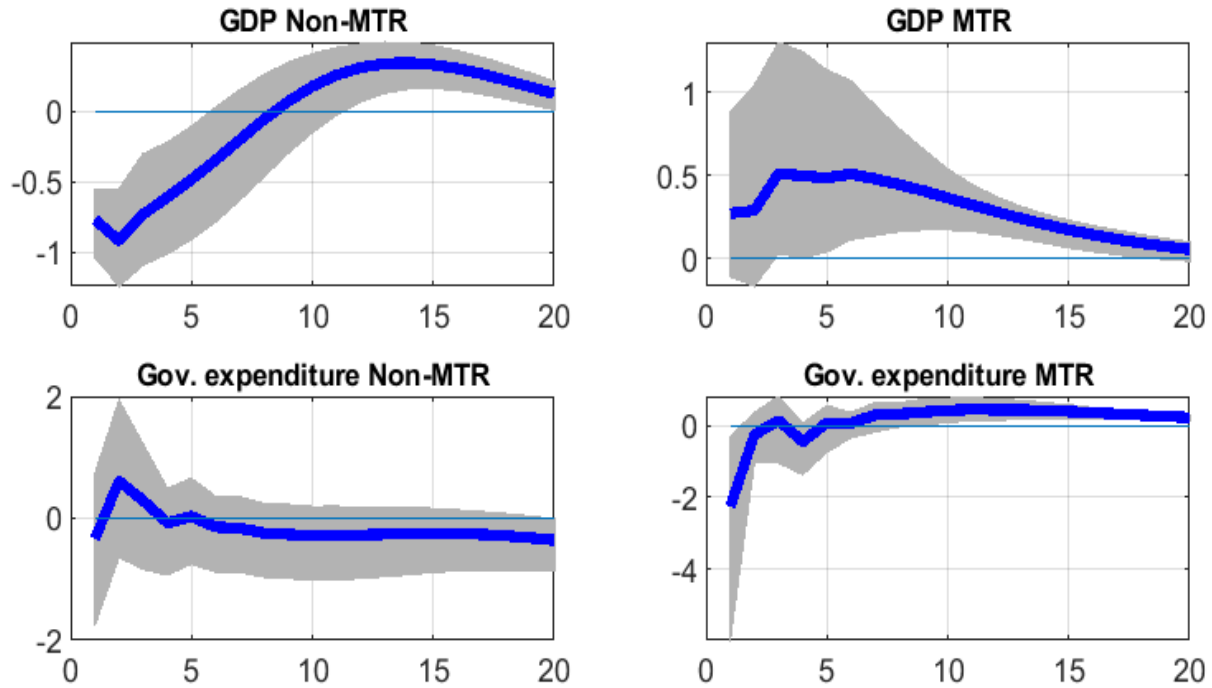
Note: This table shows the reliability statistics of the narrative measure. The 95% confidence bands reported in square brackets.

5.2 Macroeconomic impact of tax cut in South Africa

The main objective of this section is to document the difference in the impact of tax cut between Non-MTR and MTR shocks. Taken together, the Non-MTR shocks and the MTR shocks forms part of our benchmark shocks which include changes to the marginal tax rates and changes to the tax bracket. The rationale for looking at the two type of shocks separately is that changes to marginal tax rates are permanent, whereas changes to tax bracket (mainly to adjust for inflation in order to avoid bracket creep) are transitory. There are, however, only a few number of MTR shocks. As a result, we focus on a small-scale model with three macroeconomic variables: average tax rate, government expenditure, and GDP. As already indicated, these are the three variables included in every model specification.

Figure 6 reports the dynamic impact of tax cut on GDP and government expenditure where we distinguish between the MTR and Non-MTR. The results show a significant difference between the two types of policies. In the case of MTR, a tax cut causes an initial recession over 6 quarters before the effect is reverse around 11 quarters. The figure also shows a fundamental difference between the two types of policies on the response of government expenditure to tax cut. For the MTR the government cuts its expenditure following tax cut whereas in the Non-MTR case we do not see any significant change in government expenditure. These different results of the impact of tax cut between Non-MTR and MTR remain qualitatively unchanged across different lag specifications. Since both types of shocks only capture unanticipated effect, the results suggest that tax cuts are more expansionary when implemented via a reduction in the marginal tax rates, which are permanent, than through inflation adjustment. While it would be interesting to explore the effects of the Non-MTR and MTR shocks on other variables separately, data limitation does not allow us to. Therefore, for the remainder of our analysis, we are going to look at the transmission mechanism of the two shocks combined, which are the benchmark shocks discussed in Section 3.3.

Figure 6: Impact of personal income tax cut: Non-MTR versus MTR

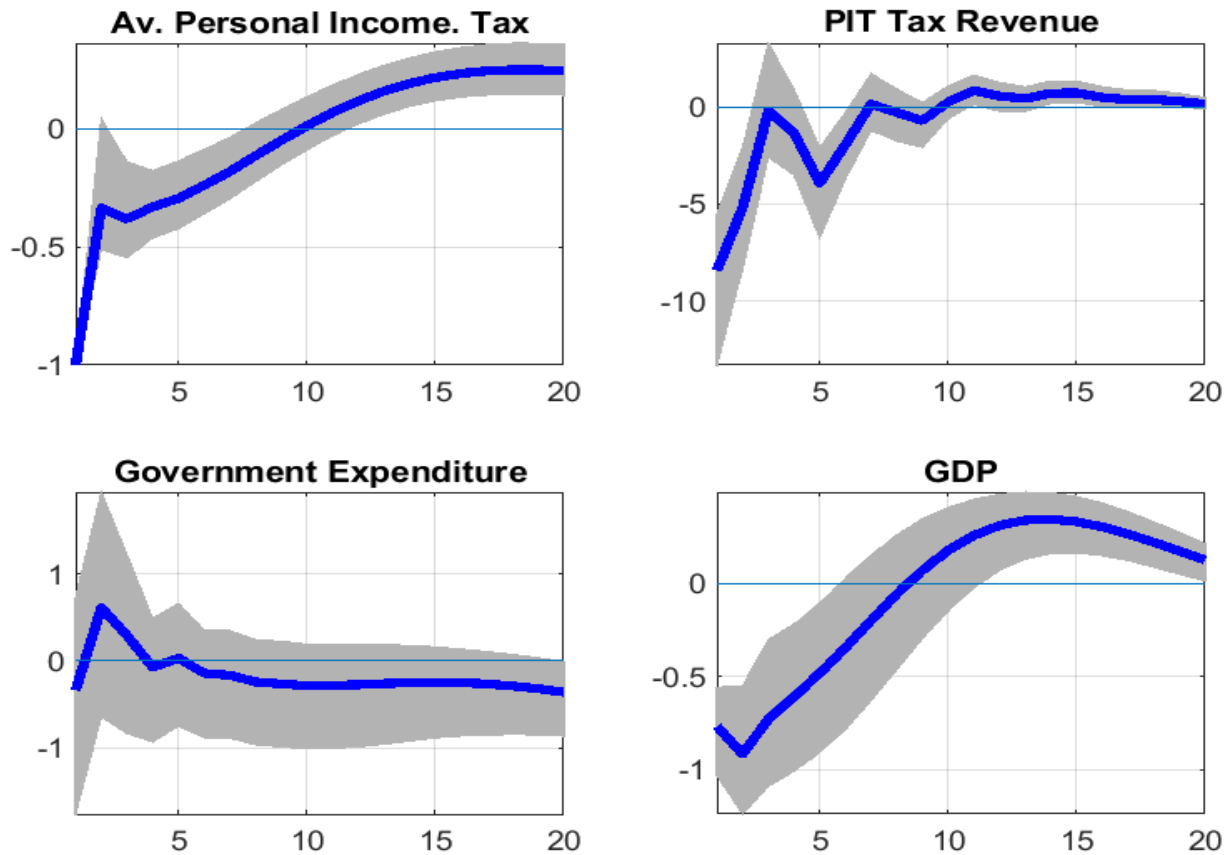


Note: Response to a 1% point reduction in APITR. The impulse responses shows the estimations and the 95% confidence intervals. The shocks are demeaned. The horizontal axis represents the period in quarters. The response for APITR is in percentage points whereas other variables are in percentages. The sample period is 1996Q1 to 2019Q4. Data source: Authors' calculation .

5.3 Transmission channels for the tax cut

Figure 7 reports the dynamic responses to a personal income tax in South Africa. The results indicate a contraction of real activity impact in the short run (about 7 quarters) which is followed by a much longer expansionary period of about 3 years. We also observe a decline in personal income tax revenue. This indicate that the tax cut is not tax revenue neutral and thus results in loss of personal income tax revenue. The response for government spending is similar to the results for the Non-MTR. Three channels help to understand this dynamic effect of tax cut: the labour market channel, the demand channel, and the finance channel.

Figure 7: Dynamic impacts of tax shocks: Key variables



Note: Response to a 1% point reduction in APITR. The impulse responses shows the estimations and the 95% confidence intervals. The shocks are demeaned. The horizontal axis represents the period in quarters. The response for APITR is in percentage points whereas other variables are in percentages. The sample period is 1996Q1 to 2019Q4. Data source: Authors' calculation.

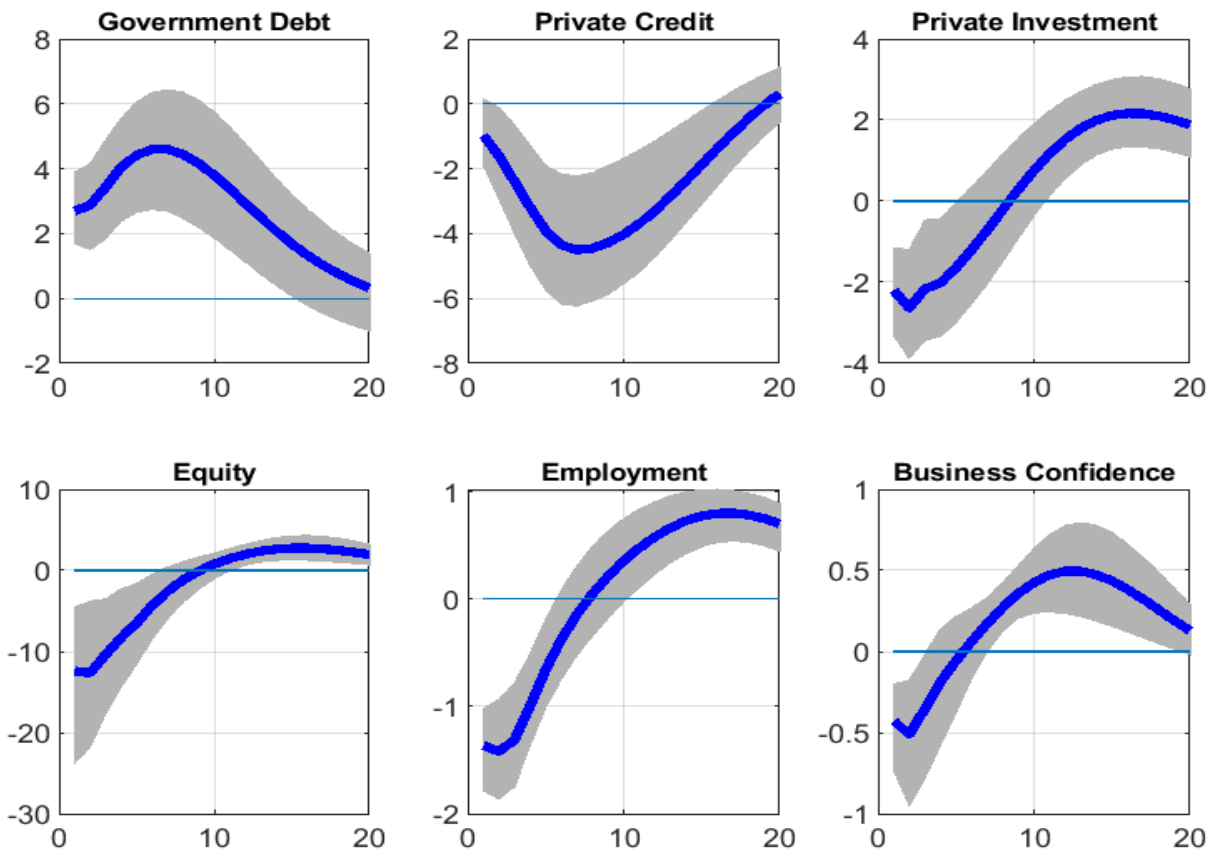
Debt financing of tax cut crowds out the private sector

Figure 8 reports the dynamic responses of government debt and a number of key indicators on the private sectors: credit, investment, employment, equity and business confidence.

Starting with the *finance channel*, our results indicate that the tax cut is fully financed by additional government debt in the bond market. These results are consistent with the decline in personal income tax revenue we observed in Figure 7. Since the tax cut results in loss of personal income tax revenue, government will have to borrow to fund the shortfall unless this effect is countered by increases in other tax revenue categories. The results indicate government borrows and that this additional debt is bought by domestic and foreign investors. The increase of inflows of foreign capital, in order to hold additional South African debt, cause an appreciation of the local currency. This in turn leads to export contraction, as

we show later. We see the contraction of exports as the first *demand channel*. The financing by the private sector of the additional government debt also contracts the demand as it crowds out private investment. We find that credit to the private sector depresses during several quarters and investment contracts in the first five quarters following government tax cut. Thus, it seems that lenders, who are mainly banks, change their asset portfolio from private sector lending toward holding more government bonds to finance the tax cut. Finally, the *labour market channel* further amplifies the private sector contraction as can be observed from Figure 8. Overall our results capture the private sector crowding of tax cut by the decrease in equity and business confidence. In the next sections we further document on specificities of each of the three channels.

Figure 8: Crowding of the private sector

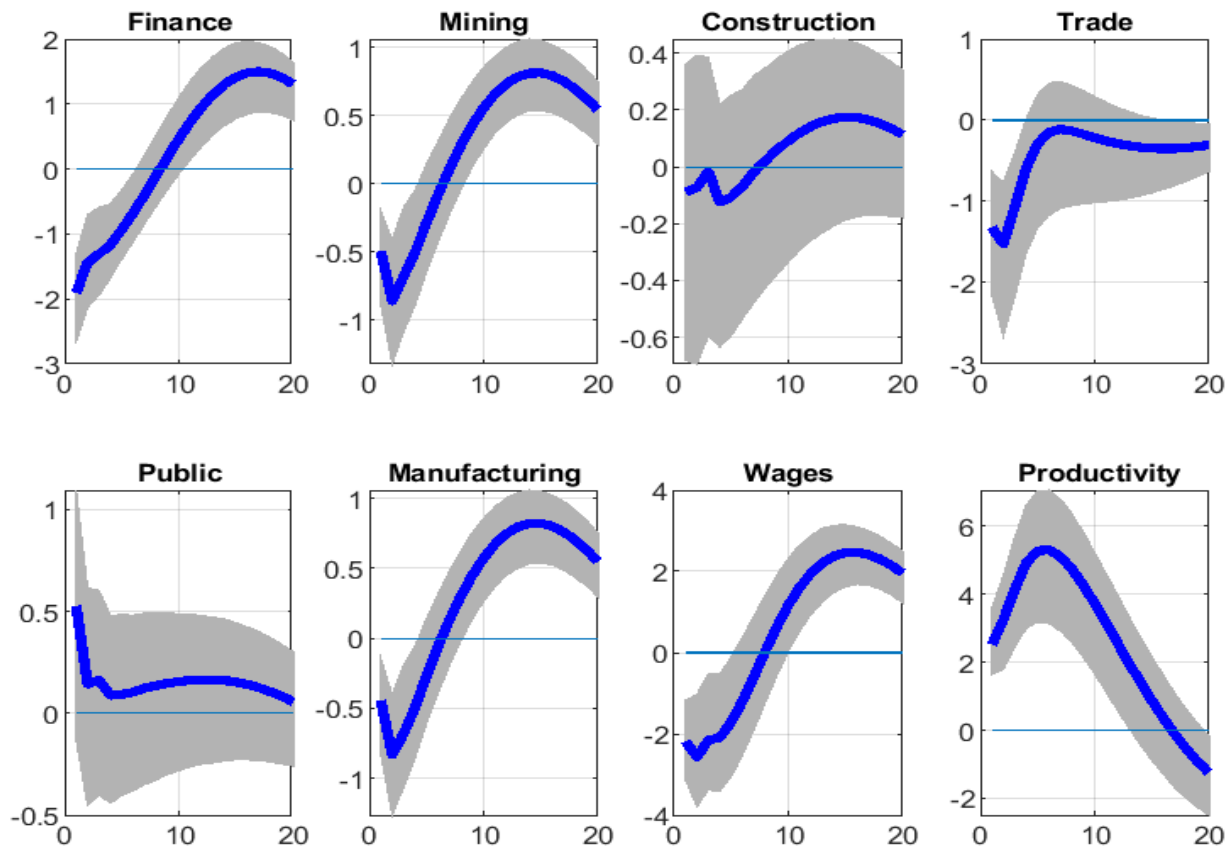


Note: Response to a 1% point reduction in APITR. The impulse responses shows the estimations and the 95% confidence intervals. The shocks are demeaned. The horizontal axis represents the period in quarters. The response for APITR is in percentage points whereas other variables are in percentages. The sample period is 1996Q1 to 2019Q4. Data source: Authors' calculation.

Labour market heterogeneity

Figure 9 reports the dynamic responses of wages, productivity and employment across six economic sectors: finance, mining, construction, trade, public administration and manufacturing. The data show significant sectoral heterogeneities. In particular, we find employment contraction in four key sectors: finance, trade, mining and manufacturing. Note that the finance sector displays the largest negative impact. The dominant role this sector plays in the South African labour market thus helps also to understand the significant employment contraction we observe. Note also that wages decrease suggesting that labour demand is potentially responsible for the employment contraction. This effect sounds to reason as firm must cut investment due to financing constraints.

Figure 9: Labour markets composition

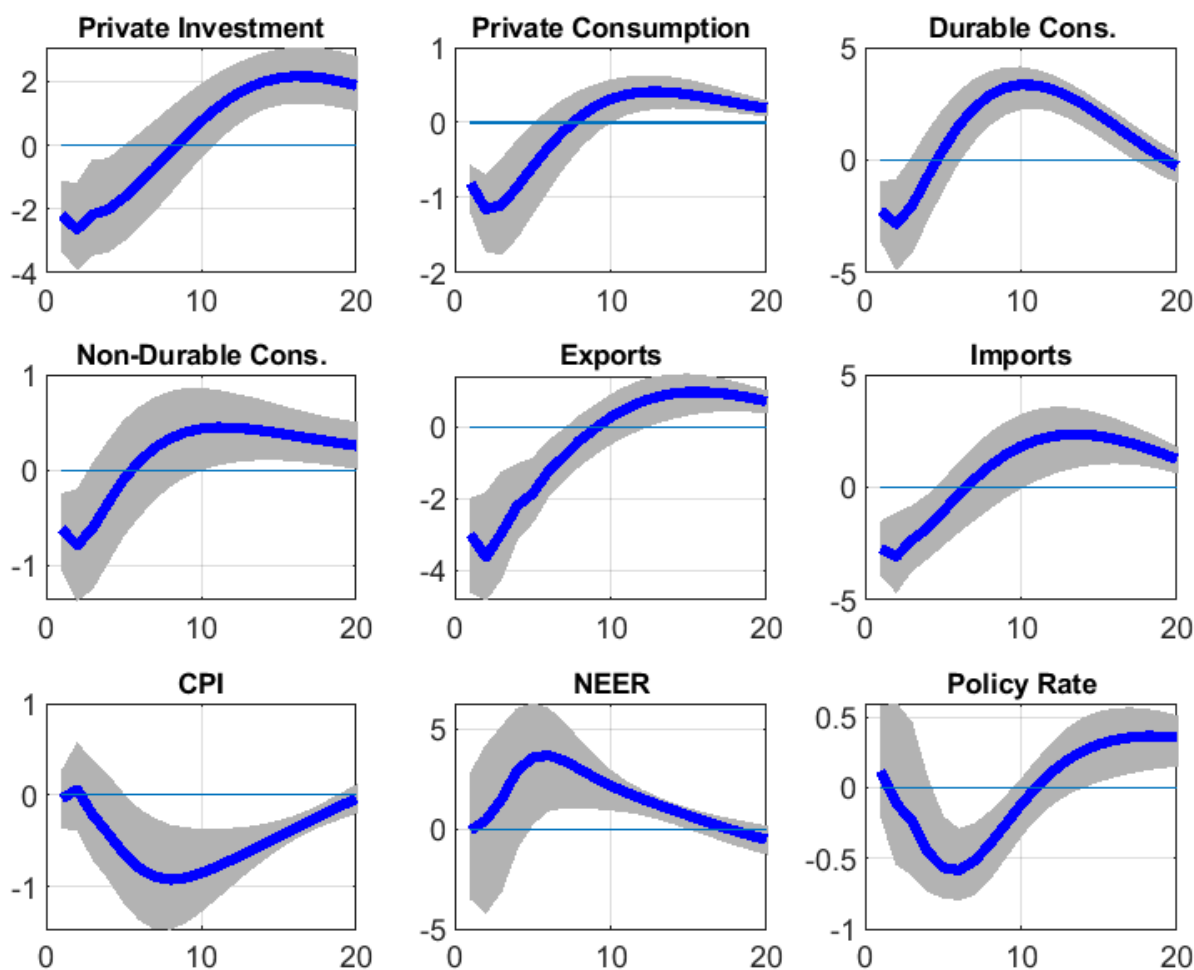


Note: Response to a 1% point reduction in APITR. The impulse responses shows the estimations and the 95% confidence intervals. The shocks are demeaned. The horizontal axis represents the period in quarters. The response for APITR is in percentage points whereas other variables are in percentages. The sample period is 1996Q1 to 2019Q4. Data source: Authors' calculation.

Demand channel and monetary policy

We now turn to the impact of personal income tax cut on demand more broadly. We look at the different components of aggregate demand - investment, durable and non-durable consumption, exports and imports. In addition, we also analyse the response of the exchange rate, consumer prices, and monetary policy. Figure 10 shows the results. The results show significant contraction in the main components of private aggregate demand: investment, consumption, exports and imports. Following contraction in demand, consumer prices decrease. As a consequence, the SARB cut the policy rate.

Figure 10: Demand, prices and monetary policy



Note: Response to a 1% point reduction in APITR. The impulse responses shows the estimations and the 95% confidence intervals. The shocks are demeaned. The horizontal axis represents the period in quarters. The response for APITR is in percentage points whereas other variables are in percentages. The sample period is 1996Q1 to 2019Q4. Data source: Authors' calculation.

6 Concluding remarks

This paper provides evidence on the macroeconomic effects of personal income tax changes in South Africa. We identify episodes of policy changes during the period 1996-2019 using narrative information from legislative documents. Analysis of quarterly macro data shows that personal income tax cuts have an initial contractionary effect on output, consumption, investment, and employment. These effect reverse, however, to expansionary from the seven quarter onward. We identify three channels to help us understand the dynamics of the initial contractionary effect of tax cut. These are the labour market channel, the demand channel, and the finance channel.

The finance channel indicate that the tax cut is fully financed by additional government debt in the bond market. This cause an appreciation of the local currency, which in turn leads to export contraction. We see the contraction of exports as the first demand channel. The demand channel is further exacerbated by the reduction of credit extended to the private sector and the crowding out of private investment. Finally, the labour market channel further amplifies the private sector contraction, as indicated by the reduction in employment. A further analysis of the labour market dynamics indicate that there are sectoral heterogeneity.

References

- Afonso, A. and Sousa, R. M. (2012), ‘The Macroeconomic effects of fiscal policy’, *Applied Economics* **44**(34), 4439–54.
- Alesina, A., Favero, C. and Giavazzi, F. (2015), ‘The output effect of fiscal consolidation plans’, *Journal of International Economics* **96**(-), S19–S42.
- Burger, P. and Calitz, E. (2015), ‘Twenty-year review of South African fiscal policy: A tale of two sustainabilities’, *Development Southern Africa* **32**(6), 639–657.
- Calitz, E. and Siebrits, K. (2003), ‘Fiscal policy in the 1990s’, *South African Journal of Economic History* **18**(1-2), 50–75.
- Devries, P., Guajardo, J., Leigh, D. and Pescatori, A. (2011), A new action-based dataset of fiscal consolidation, Working Paper WP/11/128, International Monetary Fund, Washington, DC.
- Fedderke, J. W. (2021), ‘The South African – United States sovereign bond spread and its association with Macroeconomic fundamentals’, **89**(4), 499–525.
- Houssa, R., Mohimont, J. and Otrok, C. (2023), ‘Commodity exports, financial frictions, and international spillovers’, *European Economic Review* **158**, 104465.

- Hussain, S. M. and Malik, S. (2016), ‘Asymmetric effects of exogenous tax changes’, *Journal of Economic Dynamics and Control* **69**(-), 268–300.
- Kliem, M. and Kriwoluzky, A. (2013), ‘Reconciling narrative monetary policy disturbances with structural VAR model shocks?’, *Economics Letters* **121**(2), 247–51.
- Levy, B., Hirsch, A., Naidoo, V. and Nxele, M. (2021), ‘South Africa: When strong institutions and massive inequalities collide’.
- Mertens, K. and Montiel Olea, J. L. (2018), ‘Marginal tax rates and income: New time series evidence’, *The Quarterly Journal of Economics* **133**(4), 1803–84.
- Mertens, K. and Ravn, M. O. (2013), ‘The dynamic effects of personal and corporate income tax changes in the United States’, *American Economic Review* **103**(4), 1212–47.
- Mertens, K. and Ravn, M. O. (2014), ‘A reconciliation of SVAR and narrative estimates of tax multipliers’, *Journal of Monetary Economics* **68**(-), S1–S19.
- Nakamura, E. and Steinsson, J. (2018), ‘Identification in Macroeconomics’, *Journal of Economic Perspectives* **32**(3), 59–86.
- National Treasury (1996), Growth, employment and redistribution: A macroeconomic strategy, Version 2023_1, South African National Treasury, Pretoria.
- National Treasury (2023a), 2023 Budget Review, Version 2023_1, South African National Treasury, Pretoria.
- National Treasury (2023b), ‘Media statement: Invitation to submit technical Annexure C tax proposals for the 2024 budget’.
- Oppel, A., McNabb, K. and Chachu, D. (2021), ‘Government revenue dataset (2021): Variable description’, *WIDER Technical Note* **11**(2021), 2021–11.
- Parliament SA (2019), ‘The guide to the budget’.
- Ramey, V. A. (2016), ‘Macroeconomic shocks and their propagation’, *Handbook of Macroeconomics* **2**(-), 71–162.
- Romer, C. D. and Romer, D. H. (2009), A narrative analysis of postwar tax changes, Unpublished paper (June), University of California, Berkeley, Berkeley.
- Romer, C. D. and Romer, D. H. (2010), ‘The Macroeconomic effects of tax Changes: Estimates based on a new measure of fiscal shocks’, *American Economic Review* **100**(3), 763–801.

- Sachs, M. (2021), *Fiscal dimensions of South Africa's crisis*, Southern Centre for Inequality Studies, University of Witwatersrand.
- Stock, J. H. and Watson, M. W. (2017), 'Twenty years of time series econometrics in ten pictures', *Journal of Economic Perspectives* **31**(2), 59–86.
- Stock, J. H. and Watson, M. W. (2018), 'Identification and estimation of dynamic causal effects in Macroeconomics using external instruments', *The Economic Journal* **128**(610), 917–48.
- van Rensburg, T. J., de Jager, S., Makrelov, K. et al. (2021), Fiscal multipliers in South Africa after the global financial crisis, Working paper, South African Reserve Bank, Pretoria.
- Yang, S.-C. S. (2005), 'Quantifying tax effects under policy foresight', *Journal of Monetary Economics* **52**(8), 1557–68.

Appendix

A1 Main documents used for the analysis

- National Treasury (2013). *Employment Tax Incentive Act 26 of 2013 for South Africa*. Pretoria: National Treasury, Republic of South Africa.
- National Treasury (various years). *Budget Reviews and Speeches of South Africa for Various Years*. Pretoria: National Treasury, Republic of South Africa.
- National Treasury (various years). *Explanatory Memorandums on the Employment Tax Incentive Act 26 of 2013 for South Africa for Various Years*. Pretoria: National Treasury and South African Revenue Services.
- National Treasury (various years). *Explanatory Memorandums on the Taxation Laws Amendment Acts or Bills and Revenue Laws Amendment Acts or Bills for South Africa for Various Years*. National Treasury and South African Revenue Services.
- National Treasury (various years). *Medium Term Budget Policy Statement (MTBPS) for South Africa for Various Years*. Pretoria: National Treasury, Republic of South Africa.
- National Treasury (various years). *Rates and Monetary Amounts and Amendment of Revenue Laws Acts or Bills for South Africa for Various Years*. Pretoria: National Treasury, South African government, and South African Revenue Services.
- National Treasury (various years). *Taxation Laws Amendment Acts or Bills and Revenue Laws Amendment Acts or Bills for South Africa for Various Years*. Pretoria: National Treasury, South African government, and South African Revenue Services.

A2 Data description

Data source: South African Reserve Bank (SARB)

Average personal income tax rate: personal income tax revenue as a percentage of the personal income tax base, percentage, seasonally adjusted. The personal income tax base is the wage bill - total (formal non-agricultural sector) from the national accounts which is defined as current income and saving of households and non-profit institutions serving households which has already been seasonally adjusted at annualised rates.

Real government total spending: national government (total expenditure), R millions, deflated using GDP deflator.

Real gross domestic product: gross domestic product at constant 2010 prices and seasonally adjusted, R millions.

Personal income tax revenue: calculated by multiplying tax payable by persons and individuals as percentage of total revenue (Code KBP4429K) by total revenue (Code KBP4597M), R millions, annualised and deflated.

Private investment: gross fixed capital formation in constant 2010 prices and seasonally adjusted: private business enterprises (investment), R millions.

Total real household consumption: Final consumption expenditure by households: total, constant 2015 prices, seasonally adjusted at annual rate, R millions.

Real household consumption of non-durable goods: final consumption expenditure by households at constant 2010 prices: non-durable goods (PCE), R millions.

Interest rate: bank rate (lowest rediscount rate at SARB), percentage.

Government debt: total loan debt of national government: total gross loan debt, R millions, deflated.

Consumer price index: total consumer prices (all urban areas), index.

Unemployment rate: official unemployment rate, percentage.

Employment in the private sector: total employment in the private sector, index.

Household consumption of durable goods: final consumption expenditure by households at constant 2010 prices: durable goods (PCE), R millions. **Employment - non-agricultural:** total employment in the non-agricultural sectors, index.

Real ULC - non-agricultural: nominal unit labour costs in the non-agricultural sectors which is a ratio of the gross earnings in the formal sector non-agricultural sector to real non-agricultural gross value added, index, deflated using consumer price index.

Productivity - non-agricultural: labour productivity in the non-agricultural sectors which is a ratio of real output to total number of employees, index.

Private credit: total credit extended to the private sector by all monetary institutions, R millions, average of monthly series.

Imports imports of goods and services, including gold - volume indices; index 2015=100.

Exports exports of goods and services, including gold - volume indices; index 2015=100.

Data source: Federal Reserve Bank of St. Louis Federal Reserve Economic Data (FRED)

U.S consumer price index we use consumer price index for all urban consumers - all items in U.S. city average, index 1982-1984=100, monthly, not seasonally adjusted.

Nominal effective exchange rate broad effective exchange rate for South Africa, index 2010=100, quarterly, not seasonally adjusted.

Business confidence business tendency surveys for manufacturing: confidence and indicators - OECD Indicator for South Africa, normalised (normal=100), quarterly, seasonally adjusted.

Data source: International Monetary Fund (IMF)

Commodity price index we use the monthly commodity price index for South Africa, not seasonally adjusted. This data is averaged, deflated using the US CPI data and seasonally adjusted.

A3 Summary of the personal income tax shocks

The classification of shocks follows that of the South African Revenue Services (SARS). Personal income taxes include provisional tax, assessment payments, and penalties; employees' tax; ETI (employment tax incentives); and credit and refunds.

Table A1: List of personal income tax shocks

Budget	Tax proposal name	Effective	Legislated	DD	LR
2019	PIT - tax increase through fiscal drag	01 Mar. 2019	13 Jan. 2020	1	0
2019	Medical tax credits decrease through fiscal drag	01 Mar. 2019	13 Jan. 2020	0	1
2019	Venture capital company tax incentive	21 Jul. 2019	13 Jan. 2020	0	1
2018	PIT tax increase through fiscal drag for other tax brackets	01 Mar. 2018	16 Jan. 2019	1	0
2018	Medical tax credits reduction through fiscal drag and other measures	01 Mar. 2018	16 Jan. 2019	1	0
2018	Employment tax incentive (extension)	16 Jan. 2019	16 Jan. 2019	0	1
2017	PIT increase (introduction of a new top tax bracket)	01 Mar. 2017	12 Dec. 2017	1	0
2017	PIT tax increase through fiscal drag for all tax brackets	01 Mar. 2017	12 Dec. 2017	1	0
2017	Employee bursaries (increase in income threshold and bursary/scholarship limits)	01 Mar. 2017	12 Dec. 2017	0	1

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Table A1 – continued from previous page

Budget	Tax proposal name	Effective	Legislated	DD	LR
2017	Employee bursaries ((increase in income threshold and bursary/scholarship limits for people with disabilities)	01 Mar. 2018	14 Dec. 2017	0	1
2016	PIT tax increase through fiscal drag	01 Mar. 2016	18 Jan. 2017	1	0
2016	Capital gains tax (increase in the inclusion rate and the annual taxable amount)	01 Mar. 2016	18 Jan. 2017	0	1
2016	Employee bursaries (increase in income threshold and bursary/scholarship limits)	01 Mar. 2016	18 Jan. 2017	0	1
2016	Employment Tax Incentive (extension and increase in claim value for basic education)	01 Oct. 2016	18 Jan. 2017	0	1
2015	PIT increase (increase in marginal tax rates for all tax brackets except the bottom one)	01 Mar. 2015	08 Nov. 2015	1	0
2014	Tax-free savings	01 Mar. 2015	16 Jan. 2015	0	1
2013	Employment tax incentive (introduction)	01 Jan. 2014	17 Dec. 2013	0	1
2013	Bursaries and scholarship allowance (increase in income threshold and bursary/scholarship limits)	01 Mar. 2013	11 Dec. 2013	0	1
2012	Medical aid tax credit reform and other monetary thresholds (inflation adjustment)	01 Mar. 2012	09 Oct. 2012	0	1
2012	Capital gains tax - individuals (increase in marginal effective capital gains tax rate)	01 Apr. 2012	09 Oct. 2012	0	1
2011	Adjustment in capital gains monetary thresholds	01 Mar. 2011	28 Dec. 2011	0	1
2010	Reform of taxation of travel allowance (increasing the deemed monthly taxable values)	01 Mar. 2011	20 Oct. 2010	0	1
2007	Various monetary adjustments - increase in interest and dividend income exemption and medical contributions	01 Mar. 2007	05 Aug. 2007	0	1
2006	PIT relief - (with tax cuts)	01 Mar. 2006	20 Jul. 2006	0	1
2006	PIT - tax cuts from widening the tax brackets and increasing upper tax bracket over and above inflation adjustments	01 Mar. 2006	20 Jul. 2006	0	1
2005	Interest and dividend income exemption increase	01 Mar. 2005	14 Jul. 2005	0	1

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Table A1 – continued from previous page

Budget	Tax proposal name	Effective	Legislated	DD	LR
2005	Tax treatment of health care funding (capping tax deductions of expensive medical aid schemes)	01 Mar. 2006	27 Jan. 2006	0	1
2005	Motor vehicle allowances (capping vehicle value, reducing residual kilometers and increasing monthly taxable value of the car)	01 Mar. 2005	14 Jul. 2005	0	1
2003	PIT relief - (with tax cuts)	01 Mar. 2003	30 May 2003	0	1
2003	PIT- tax cuts from above inflation adjustments in tax brackets	01 Mar. 2003	30 May 2003	0	1
2003	Interest and dividend income exemption increase	01 Mar. 2003	30 May 2003	0	1
2002	PIT relief - (with tax cuts)	01 Mar. 2002	31 Jul. 2002	0	1
2002	PIT - tax cuts from reduction of various marginal tax rates	01 Mar. 2002	31 Jul. 2002	0	1
2002	Interest and dividend income exemption increase	01 Mar. 2002	31 Jul. 2002	0	1
2002	Employee deductions limit to reduce tax burden (includes eliminating subsistence allowance for accommodation)	01 Mar. 2002	31 Jul. 2002	0	1
2002	Provisional tax administrative reform - increasing the provisional tax registration threshold and aligning the tax year to PAYE tax year	01 Mar. 2002	31 Jul. 2002	0	1
2002	Fringe benefit tax elimination of non-tax deductibility of occasional services	01 Mar. 2002	31 Jul. 2002	0	1
2001	PIT relief -(with tax cuts)	01 Mar. 2001	26 Jul. 2001	0	1
2001	PIT- tax cuts from above inflation adjustment of tax brackets and rebates	01 Mar. 2001	26 Jul. 2001	0	1
2001	Interest and dividend income exemption increase (above inflation adjustments)	01 Mar. 2001	26 Jul. 2001	0	1
2001	Raising provisional tax thresholds to remove administrative burden	01 Mar. 2001	26 Jul. 2001	0	1
2001	Capital gains tax (introduction) PIT	01 Oct. 2001	26 Jul. 2001	0	1
2000	PIT relief - (with tax cuts)	01 Mar. 2000	16 Jul. 2000	0	1
2000	PIT- tax cuts from above inflation adjustment and reduction in top marginal tax rate	01 Mar. 2000	16 Jul. 2000	0	1

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Table A1 – continued from previous page

Budget	Tax proposal name	Effective	Legislated	DD	LR
2000	Interest income exemption	01 Mar. 2000	16 Jul. 2000	0	1
1999	PIT tax cuts through reduction in marginal tax rates	01 Mar. 1999	29 Mar. 1999	0	1
1998	Medical aid schemes fringe benefits - limit the employer's contribution	01 Apr. 1998	29 Jun. 1998	0	1
1998	Trusts tax reform	01 Mar. 1998	29 Jun. 1998	0	1
1998	PIT relief (inflation adjustment and tax brackets reform/reduction)	01 Mar. 1998	29 Jun. 1998	0	1
1998	Tax increase for fringe benefits (travelling allowance)	01 Apr. 1998	29 Jun. 1998	0	1
1997	Increase in certain exemption levels - scholarships and bursaries	01 Mar. 1997	26 Jun. 1997	0	1
1997	PIT relief (inflation adjustment and tax brackets reform/reduction)	01 Mar. 1997	26 Jun. 1997	0	1
1997	Tax increase for fringe benefits (car allowances)	01 Jul. 1997	26 Jun. 1997	0	1
1997	Tax increase for fringe benefits (housing allowance)	01 Mar. 1997	26 Jun. 1997	0	1
1996	PIT (tax brackets reform/reduction)	01 Mar. 1996	27 Jun. 1996	0	1
Total	55			7	48

A4 Examples of Tax Narrative Shock construction

For an illustration of how we applied the criteria for classifying tax changes we provide two examples below.

Example 1: Personal Income Tax Increase

[Rates and Monetary Amounts and Amendment of Revenue Laws Act, 2015 - Act No. 13 of 2015]

Announced: 25 February 2015

Effective: 1 March 2015

Assented: 8 November 2015

Shock period: 2015Q2

Shock type: PIT (exogenous – debt-deficit)

Size: R9.420 billion (+) - (Relief (endogenous): -R8.5 billion; Marginal tax rate increase (exogenous): +R9.42 billion)

This tax policy provided relief to taxpayers by adjusting all rebates and tax brackets for inflation by 4.2% while also raising revenue through a 1% increase in marginal personal income tax rates for all income tax brackets (and trusts) except the lowest, which remained at 18 per cent. According to the 2015 Budget review, this policy stance raised revenue by "enhancing the progressive character of the tax system".

The tax policy at the time was implemented to "close the structural deficit in the public finances over the medium term". The 2014 MTBPS stated that the favourable conditions (that is lower interest rates, high commodity prices and a stronger rand) that created fiscal space in the run-up to the GFC, and that allowed government to respond with stimulus when the economy went into recession, had dissipated. Accordingly, government planned to narrow the deficit and stabilise the debt by lowering spending and increasing revenues. These sentiments were further iterated in the review "In the period of low global growth forecast over the next several years, South Africa has begun to promote structural reforms needed for the long term. Reducing macroeconomic imbalances, including narrowing the budget deficit as a proportion of GDP and consolidating the debt ratio, will provide a sound and predictable basis for achieving these structural reforms. This is the principle underlying fiscal policy". In addition, government aimed to "limit the erosion of the corporate tax base, increase incentives for small businesses and promote a greener economy". Increasing marginal personal income tax rates was one of the recommendations by the Davis Tax Committee, 2015 Budget review. According to the review, the 2015 Budget was implementing the measures announced in the MTBS in October 2014 to "narrow the budget deficit, stabilise debt and begin to rebuild fiscal space".

Therefore the inflation adjustment is endogenous while the net effect of R9.420 billion is exogenous (deficit-driven). Government hoped to raise R16.8 billion (before fiscal drag) in revenue, making the R9.420 billion revenue from increases in marginal tax rates a significant contributor. The tax change is deemed to have come into operation on 1 March 2015 and applied in respect of years of assessment commencing on or after that date. The tax relief is transitory whereas the increase in top marginal tax bracket is permanent.

Example 2: Employment Tax Incentive

[Employment Tax Incentive Act, 2013 - Act No. 26 of 2013]

Announced: 17 February 2010

Effective: 1 January 2014

Assented: 17 December 2013

Shock period: 2014Q1

Shock type: PIT (exogenous - long-run)

Size: R500 million (-)

This new policy aimed to increase youth employment through a cost-sharing mechanism between the employer and government. The Explanatory Memorandum on the ETI bill which was later enacted stated that: "[it] gives effect to the announcement by the President in his 2010 State of the Nation Address, as well as in the 2010 Budget, that government will table proposals to subsidise

the cost of hiring younger workers. The draft bill also gives effect to the 2013 Budget”.

The issue of high youth unemployment was a key focus for government in the run-up to the ETI. The 2012 MTBPS highlighted accelerating youth employment as a key area to broaden participation in economic recovery. In the February 2013 SONA, the President announced that NEDLAC constituencies would be signing a Youth Employment Accord. One of the commitments of this Accord was to engage with the private sector to expand youth employment with targeted support and incentives. The incentive was structured in a way that it would benefit those who earned less than the PIT threshold: “...Targeting those earning below the personal income tax threshold means that the incentive effectively targets the most vulnerable”. The economic significance of this incentive was that it was implemented to address partly the labour market dynamics and encourage the private sector to employ inexperienced youth: “In South Africa’s labour market, the current lack of skills and experience as well as perceptions regarding the restrictiveness of labour regulations, make some prospective employers reluctant to hire youth who may lack experience or qualifications. Given that the private sector contributes about 82 per cent of GDP, and employs over 70 per cent of those in formal employment outside of agriculture, it is critical that in order to have the biggest impact, this involves the private sector. The incentive seeks to do exactly this”.

Government was clear that the incentive would be temporary and its effectiveness would be evaluated after 2 years: “The incentive is meant as a temporary programme to stimulate demand for young workers, and this incentive cannot possibly address all structural issues in the youth labour market. The first phase of the incentive is intended to be simple and easy to implement using existing tax administration platforms. National Treasury and the South African Revenue Service (SARS) will monitor the incentive closely to evaluate the impact. After a review of the effectiveness and impact of the incentive after two years, the second phase can include additional policy features and possible refinement”. Therefore this policy is transitory.

Despite the shortness of the incentive, its aim was to address lack of skills impeding long-term economic growth: “High youth unemployment means young people are not gaining the skills or experience needed to drive the economy forward. This lack of skills can easily become a lifelong experience, thereby having long-term adverse effects on the economy”. Therefore this tax policy is a long-run driven exogenous policy. The tax expenditure for the 2013/14 fiscal year was R500 million.

A5 Granger causality

Table A2: Granger causality test results

Excluded variable (Equation: Narrative shock)	χ^2	p-value
Real GDP	2.93	0.23
Government debt	0.50	0.78
Government spending	1.09	0.58
Private investment	2.29	0.32
Total household consumption	0.92	0.63
Durable consumption	1.85	0.40
Non-durable consumption	3.56	0.17
Interest rate	3.70	0.16
Consumer price index	2.13	0.34
NEER	1.94	0.38
PIT revenue	1.45	0.48
Exports	0.18	0.91
Imports	1.00	0.61
USD/ZAR exchange rate	4.74	0.09
Business confidence	4.27	0.12
Share prices	4.86	0.09
Private credit	0.47	0.79
Employment	3.65	0.16
Noninflation wages	0.65	0.72
Productivity	2.22	0.33
PIT tax base	3.44	0.18

Source: Authors' calculations.