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The Impact of the Dividend Tax in South Africa: A Dynamic CGE Model Analysis*

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Abstract

This paper analyses the economy-wide impact of the dividend tax (DT) on the South African economy, which was increased from 10% to 15% by the government in 2012. The analysis was conducted using a dynamic computable general equilibrium (CGE) model of South Africa, which captured the observed structure of South Africa's economy. The parameters of the CGE equations were calibrated to observed data from a social accounting matrix (SAM) for 2010. One policy option was considered. Our simulation results show that the impact of increasing the DT will have a minute but positive impact on the reported macro-economic variables in the immediate year of implementing the DT rate increases. GDP increases by 0.0585% and 0.5085% in 2013 and 2018 will be seen respectively. This change was small in 2013 but will be significant in 2018. The key finding is that at the macro level, the implementation of the policy shock on its own had a positive macroeconomic impact.

JEL Classification: D33, D58, H25

Keywords: dividend tax, secondary tax on companies, CGE model, South Africa

1 Introduction

In 2012 a dividend tax (DT) on households was introduced in South Africa as a replacement to the Secondary Tax on Companies (STC) (see notice in the Government Gazette on 20 December 2011). According to the South African Revenue Service (SARS, 2012), DT is a tax imposed on shareholders for the receipt of dividends from companies, which, under normal circumstances, would be withheld from the dividend payment. Previously companies paid STC on net

*The views expressed in this paper are personal views of the authors and do not represent those of the South African Revenue Services or Government of the Republic of South Africa.

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dividends paid out, while DT is a withholding tax born by the liable recipients, who are largely individuals. The DT rate was increased from 10% to 15% on the declaration of dividends by shareholders.

While there are many important details and challenges in understanding the fundamentals of this tax change and its micro impacts, there may also a wider economic impact worth considering. In this paper we analysed the impact of DT on the South African economy through the use of a dynamic computable general equilibrium (CGE) model. GAMS software was used to develop the model and one policy simulation was performed, with a view to assessing the impact of the DT rate increase from 10% to 15% over the period 2012 to 2018. During our analysis we considered the removal of the STC and the subsequent introduction of the DT at specific rates. The paper is structured as follow: Section 2 provides a literature review on the taxes, Section 3 introduces an overview of the DT in South Africa, Section 4 describes the methodology, Section 5 presents the simulation results, and finally Section 6 concludes the paper.

2 Literature review

According to Awasthi and Bayrakta (2014), no country can survive without taxes. The tax system of a country plays a crucial role in procuring the required revenues to fund government expenditures. These days taxes go beyond simply generating revenues; they are the "fiscal contract" between a population and its government; the so-called "price for civilization" (credited to Oliver Wendell Holmes, Jr., 1904, as cited in Holmes, 1995). In fact, the willingness for taxpayers of a country to honour their duties relates very strongly to their identification with the nation as citizens of the country they live in. This fundamental motivation to pay tax – also referred to as tax morale – is greater where taxpayers have more confidence in the integrity of government, and more specifically, the integrity of the tax system.

The economic theories suggest that the law enforcement of taxes depends on political economy considerations (Gordon and Nielsen, 1997). Major opposition and political instability would result in inefficiencies in tax collection, as well as a minimisation of the resources devoted to the tax system. Furthermore, collection depends on the structural factors that affect the simplicity of tax evasion, such as urbanisation level, share of agriculture, trade openness and the tax compliance gap.

Alm and El-Ganainy (2013) mentioned a valid factor associated with the tax compliance gap, indicating that the compliance and policy gaps in tax collection are not independent of each other. This is due to the fact that a policy gap results from legal provisions such as exemptions, reduced rates and thresholds, which make compliance more challenging. Nonetheless, reducing the policy gap may often be the simplest and most effective way to reduce the compliance gap. In contrast, efforts to reduce the compliance gap may lead taxpayers to delve further into the game of discovering and exploiting weaknesses in tax structures, hence increasing the (measured) policy gap.

In South Africa, SARS is mandated to collect all revenue due to the fiscus in terms of Act No. 34 of 1997. SARS ensures maximum compliance with tax and customs legislation and provide a customs service that maximises revenue collections, protects the borders and facilitates trade. The main sources of tax revenue are Personal Income Tax (PIT), Company Income Tax (CIT) and Value Added Tax (VAT). PIT, CIT and VAT account for approximately 80% of total tax revenue. The fuel levy, together with specific excise and customs duties, account for approximately 13%, while other taxes account for the remainder.

Cukierman, Edwards, and Tabellini (1992) pointed out that the globalisation of trade and finance has intense repercussions on the patterns of taxes. In general, developing countries depend greatly on trade taxes, seigniorage and financial repression as the main sources of fiscal revenue. All these taxes have in common a fairly low cost of collection and enforcement. In addition, trade taxes are collected at a centralised port of entry and seigniorage and financial repression act as implicit taxes (SARS, 2014).

Most countries deal with new challenges by adopting taxes such as VAT and DT. Nowadays VAT is a major part of the tax system in over 136 countries, generating about one-fourth of the world's tax revenue (Ebrill, Keen, Bodin, and Summers, 2001; 2002), yet the argument concerning the welfare gains associated with switching from trade taxes to VAT is not over. In view of this, Emran and Stiglitz (2005) argued that the welfare gains from a switch to VAT are questionable in the existence of a considerable informal sector.

Concerning DT, in many countries governments require companies to withhold as a minimum the standard tax, paying this to the national revenue authorities and disbursing the remaining balance to the shareholders. The issue of taxing the dividends has been argued in the past few years, especially in relation to the recognition of the 'beneficial owner' of dividends as opposed to the owner of the share. The acceptable characteristic of the beneficial owner of dividends is the person entitled to the benefit of the dividends attaching to a share (Bird and Gendron, 2010).

In terms of assets, Evrensel (2010) argued that a dividend does not consist of a distribution of an asset in specie; instead, the beneficial owner of the dividend is liable for the dividend tax in respect of such a dividend. Nonetheless, where the dividend is a distribution of an asset in specie, the company that declared the dividend is liable for the dividend's tax in respect of such dividend. A foreign dividend declared by a non-resident company is only a dividend, as defined, to the extent that such dividend does not consist of a distribution of an asset in specie.

In South Africa, even though DT is a tax on the shareholder, the company paying the dividend is liable for the payment of DT. Interest and penalties apply if DT is not paid on time (by the end of the month following the month of accrual to the shareholder). As indicated earlier, in 2012 the dividend tax rate was increased from 10% to 15%.

Some World Bank (2009) working papers have pointed out that in various developed countries such as the USA and Canada, income from dividends is taxed, albeit at a lower rate than ordinary income. Nonetheless, in most cases the lower tax rate is due to profits being taxed initially as corporate tax. In this respect, effective tax rates on dividends vary from negative to over 30%, depending on income level and different regional tax rates and credits.

In India dividends were previously taxed in the hands of the shareholders as with any other income, however in 1997 all domestic companies became liable to pay a dividend distribution tax on the incomes dispensed as dividends, resulting in a smaller net dividend to the shareholders. The rate of taxation varied between 10% and 20% until the tax was abolished with effect from 2002.

In Australia and New Zealand dividends are taxed at the shareholders' minimum tax rate up to 45%. Both countries have a dividend imputation system which allows the tax paid by the company upon its pre-tax profits attached to dividends.

In Austria the KeSt (Kapitalertragssteuer) is used as the dividend tax rate which is 25%, while in Belgium there is a tax of 25% (or 15% for saving accounts or 21% under certain conditions) on dividends. In contrast, dividends are tax-exempt in Brazil, Iran and Hong Kong. Meanwhile in China, the dividend tax rate was increased from 20% to 50% in 2005.

In Finland, there is a tax rate of 25,5% or 27,2% on dividends (85% of dividends are seen as taxable capital income and the capital gains tax rate is 30% for capital gains lower than 40 000 Euros and 32% for the part that exceeds 40 000 Euros). Nonetheless, effective tax rates are 45.5% or 47.2% for private persons. The main reason for revising tax rate is that corporate incomes have already been taxed, which means that dividends are taxed twice. Corporate income tax is 20%.

We noticed that there are similarities between dividend tax rates in some European countries, for instance in France there is a tax rate of 30% on dividends and 60% on the business owners, in Germany there is a tax of 25% on dividends, in Italy there is a tax of 26% on dividends (known as 'capital gains tax') and in Turkey there is an income tax withholding of 15% on dividends. In Ireland, companies paying dividends must normally withhold tax at the standard rate of 20% from the dividend and issue a tax voucher to incorporate the particulars of the tax paid. A person not liable for tax can reclaim it at the end of year, while a person liable to a higher rate of tax must declare it and pay the difference (World Bank, 2007).

In Israel there is a tax of 25% on dividends for individuals and 30% for major shareholders; there is no tax for any company when it receives a dividend. In Taiwan, the dividends are taken into account in the taxation of one's gross income. Although this varies from one stock to another, there is a specific deduction rate in the gross income tax if one holds stock on the in-dividend date (once per year). Since 2013 there has been an additional 2% tax on all dividends, which serves as the supplemental premium for the second-generation National Health Insurance (NHI) of Taiwan.

In the United Kingdom, companies pay corporation tax on their profits and the remainder can be paid to shareholders as dividends. Basic rate taxpayers have no further tax to pay as the dividend is deemed to have been received net of 10% tax. Higher-rate taxpayers must pay a tax of 25% of the net dividend received (32.5% less the 10% deemed tax deduction, calculated on the deemed gross payment of the dividend). Additional-rate taxpayers (total income above £150,000 per year) must pay a 36.1% tax on the net dividend received (World Bank, 2007).

Even though the DT seems to be a credible way to raise revenue for the government, it was criticised by the Cato Institute in 2015 when they cautioned that a dividend tax amounts to unfair "double taxation". Double taxation occurs when tax is levied twice on the same income or profit. This criticism is based on three elements: first, high dividend taxes supplement the income tax code's general bias against savings and investment; second, high dividend taxes cause corporations to rely heavily on debt rather than equity financing - highly indebted firms are more vulnerable to bankruptcy in economic downturns; and third, high dividend taxes reduce the incentive to pay out dividends in favour of retained earnings. This may cause corporate executives to invest in wasteful or unprofitable projects.

Some studies, however, have demonstrated that companies that pay dividends have higher earnings growth, suggesting that dividend payments may be evidence of confidence in earnings growth and sufficient profitability to fund future expansion (Arnott and Asness, 2003).

3 Overview of the Dividend Tax

In South Africa, as of 1^{st} April 2012 the dividend tax no longer excludes foreign dividends, but only amounts transferred or applied by a resident company. DT is payable by the last day of the month after the payment of the dividend, or the month after the dividend is payable (STC was based on the declared date and not the payment date).

The amount withheld is paid over to SARS by the company paying the dividend, rather than by the beneficial owner. Some companies paying dividends may use regulated intermediaries to carry out the same function (this is normally the case with listed companies), however if the dividend consists of a distribution of an asset in specie, the company itself has to pay the tax and may not withhold it from the dividend payment. Any dividend declared by a resident company or a listed non–resident company is exempt from DT if the beneficial owner is:

- a resident company;
- the government, a provincial administration or a municipality;
- a public benefit organisation;
- an environmental rehabilitation trust;
- an exempt South African public entity;
- a pension fund, provident fund, retirement annuity fund or medical scheme;

- the Council for Scientific and Industrial Research, the South African Inventions Development Corporation or the South African National Roads Agency Limited;
- a shareholder in a registered micro-business to the extent that the total amount of dividends paid during a year of assessment does not exceed R200 000;
- a non-resident if the dividend is paid by the non-resident company in respect of locally listed shares and the dividend does not consist of the distribution of an asset in specie; or
- a portfolio of a collective investment scheme in securities.

At the time of the announcement of the DT implementation, the cost of the impact of the changeover from STC to DT was based on the South African Reserve Bank's quarterly bulletin analysis of dividend recipients. The 2012 Budget announced that DT would come into effect at a flat rate of 15% and that the revenue that may be lost as a result of the transition from STC to DT could amount to R1.9 billion (SARS, 2012).

The recipients of dividends that featured in the cost calculation (in R million) are set out below:

The above data was published in the Integrated Economic Accounts tables of the South African Reserve Bank's (SARB) Quarterly Bulletin and were obtained from various sources by the SARB.

The costing of the transition to DT at the time assumed that:

- Roughly $\frac{1}{3}$ of distributions to non-residents would attract DT at a rate of 10%.
- Roughly $\frac{2}{3}$ of distributions to non-residents would attract DT at a rate of 5%.
- Roughly 7% of distributions to households would be received by non-profit institutions.
- The remaining 93% of distributions to households would attract DT at a rate of 15%.

As will be discussed in the methodology section, we assumed a flat rate for all households in the scenarios including the application of DT.

4 Methodology

We used the Dynamic Computable General Equilibrium Model (t-SAGE) of the South African National Treasury to examine the impact of DT on the South African economy. The t-SAGE model was initially developed by UN-WIDER for the South African National Treasury, but was later modified by Arndt *et al.* (2011) and Alton *et al.* (2012).

The t-SAGE model is a simplified representation of the South African economy as at 2010. The model describes the interactions and relationships between different agents in the economy in both the factor and product markets. Foreign markets are included through trade and foreign savings. The t-SAGE model is a recursive dynamic model, thus it allows for the observation of inter-temporal changes to the economy and its characteristics, as well as the analysis of policy intervention impacts as they unfold over time. The model is updated each period using the solution values of the previous period. Capital stock is grown according to investment growth in the previous period, where the share of capital accumulated by each sector is dependent on the weighted average of sector profitability as well as the sector's initial share in capital stock. Economic growth is further influenced by changes in factor supplies and productivity.

The t-SAGE model is based on the 2010 Social Accounting Matrix (SAM) for South Africa which is founded on the national accounts data. It consists of 48 activities, 85 commodities, four types of labour (by educational attainment) and 14 representative households (by income). Both corporate and personal income taxes are represented and three indirect taxes are captured: an activity tax, customs duties and a general sales tax. A more detailed specification of the model relationships are provided below.

4.1 Consumer and producer behaviour

According to Alton e*t al.* (2012), consumers are assumed to maximise their utility, represented through a Stone-Geary utility function, subject to their budget constraint. Each of the 14 representative households was assumed to adopt this behaviour. The derived Linear Expenditure System (LES) of demand for each household is given in equation 1 below.

$$P_j \bullet H_{jh} = P_j \bullet \gamma_{jh} + \beta_{jh} \bullet \left((1 - S_h - td_h) \bullet Y_h - \sum\nolimits_{jt} P_{j'} \bullet \gamma_{j'h} \right) \quad (1)$$

H is consumption of good j by household h, γ is a minimum committed consumption level, β is the marginal budget share, P is the market price of each good, Y is total household income and S and td are the marginal savings and direct tax rates respectively. LES functions are widely used in CGE models because they are easier to calibrate than many other functional forms; they allow income elasticities to vary across household groups and price elasticities to vary across goods. Income elasticities in the model are based on a study by Case (2000).

All factors were assumed to be owned by households. As a result, total household income is captured by equation 2:

$$Y_h = \sum\nolimits_j (\omega \bullet W \bullet L_j + \theta \bullet r \bullet Z_j \bullet \bar{K}_j) + st_h \quad (2)$$

where st are social transfers from the government, and coefficients ω and Θ determine the distribution of factor earnings to individual households of labour and capital respectively. The t-SAGE model also includes enterprises that earn the returns to capital and use these profits to pay corporate taxes, save and pay dividends to households.

Producers are assumed to maximise profits subject to input and output prices. Following neoclassical theory, a constant elasticity of substitution (CES) function determines output quantity A from sector j. The producer production function is represented by equation 3:

$$A_j = \alpha_j \bullet \left(\delta_j \bullet L_j^{-\rho j} + (1-\delta_j) \bullet \bar{K}_j^{-\rho j}\right)^{-1/\rho j} \tag{3}$$

where α reflects total factor productivity (TFP), L and K are labour and capital demands, and δ and ρ are share and substitution parameters. Such production functions permit technologies to vary across industries. Maximising profits subject to Equation 3 yields the following factor demand equations:

$$L_j / K_j = [(r \bullet Z_j / W) \bullet (1 - \delta_j / \delta_j)]^{1/(1+\rho_j)} \tag{4}$$

where W is the labour wage and r is a fixed economy-wide capital rental rate adjusted by a sector-specific (distortion) term Z. The factor substitution elasticity is a transformation of ρ. Higher elasticities mean that producers can more readily switch between labour and capital when relative prices change. As indicated previously, the t-SAGE model differentiates between four education-based labour categories.

Intermediate demand in the model is determined using Leontief technology functions. Fixed input-output coefficients io reflect the quantity of good j' used to produce one unit of good j. These technical coefficients are drawn from Stats SA (2010) and Arndt *et al.* (2011). The producer price, PA, is the sum of factor and intermediate payments per unit of output

$$PA_j \bullet A_j = W \bullet L_j + r \bullet Z_j \bullet \bar{K}_j + \sum\nolimits_j P_j io_{jj'} \tag{5}$$

4.2 Government and investment demand

Government revenue consists of all the different taxes, namely import tariffs, income tax, company tax, and indirect tax (VAT). The government is treated as a separate institution where revenue is the sum of direct (td_h) and indirect taxes (ts_j) as well as transfers to government (st_g), as shown on the left-hand side of Equation 6:

$$\sum\nolimits_h td_h \bullet Y_h + \sum\nolimits_j ts_j \bullet P_j \bullet Q_j + \sum st_g = \sum\nolimits_j P_j \bullet \bar{G} \bullet g_j + \sum\nolimits_h st_h + B \tag{6}$$

Revenues are used to purchase goods g_j and make social transfers st_h. Any remaining funds are (dis)saved, as shown by B on the right-hand side of the equation. Our macroeconomic closure for the government assumes that consumption spending is equal to base-year quantities g multiplied by an exogenous adjustment factor G. The recurrent fiscal balance B adjusts to equalise total revenues and expenditures.

A savings-driven investment closure implies that total investment adjusts to the level of total savings. This is shown below where i is fixed base-year investment quantities multiplied by an endogenous adjustment factor I.

$$\sum_h s_h \bullet Y_h + B + \bar{F} \bullet X = \sum_j P_j \bullet I \bullet i_j \tag{7}$$

4.3 Factor and product market equilibrium

As described by Alton *et al.* (2012), the total labour supply LS is determined by upward-sloping supply curves that depend on the prevailing wage W, the base-year wage w, the base-year labour supply ls, and a wage supply elasticity ε. In equilibrium, total labour supply LS must equal the sum of all sector labour demands L:

$$LS = ls \bullet (W/w)_\varepsilon = \sum_j L_j \tag{8}$$

Unlike labour, which is mobile across industries, capital is sector-specific. Both factor demand K and the rental rate r are fixed (see Equation 3) and the distortion term Z (which shows sector specific variation in the rental rate r) adjusts to equate capital demand and supply in each sector.

Finally, product market equilibrium requires that the composite supply of each good Q equals private and public consumption and investment demand. Market prices P adjust to maintain equilibrium. Producers' abilities to pass-through other taxes to consumer prices are moderated by demand's response to higher prices.

$$Q_j = \sum_h H_{jh} + \bar{G} \bullet g_j + I \bullet i_j \tag{9}$$

All prices in the model are relative to a numeraire. The consumer price index (CPI) is the chosen as the numeraire in the model.

4.4 Investment and capital accumulation

As mentioned above the t-SAGE model is a recursive dynamic model that includes distinct within- and between-period components. The above equations specify the within-period component. Between-periods, exogenous variables and parameters are updated based on externally determined trends (i.e. labour supply LS, government consumption G, foreign capital inflows F, and technical change α) and on previous period results in the case of capital accumulation.

Sector-level capital stocks K are determined endogenously based on previous period investments. As shown below, the quantity of new capital N is based on the value of investment and the capital price PK (i.e. market prices P weighted by investment shares i). New capital is allocated to sectors after applying a depreciation rate υ and a capital allocation factor SK ($0<SK<1$; $\Sigma\, SK = 1$ for each j) $--$(see Dervis, de Melo and Robinson, 1982).

$$N_t = \sum_j (P_{jt} \bullet I_t \bullet i_j) \bullet PK_t^{-1} \tag{10}$$

$$\bar{K}_{jt+1} = \bar{K}_{jt} \bullet (1 - \upsilon) + SK_{jt} \bullet N_t \quad (11)$$

$$SK_{jt} = SP_{jt} + SP_{jt} \bullet [(SR_{jt} - AR_t)/(AR_t)] \quad (12)$$

SP is a sector's current period share in total capital stocks; SR is a sector's profit rate (i.e. $r \bullet Z_j$); and AR is the average profit rate. Thus new capital is allocated in proportion to a sector's share of current capital stocks adjusted by its own profit rate relative to the economy-wide profit rate. Sectors with above-average profit rates receive a greater share of investible funds than their share in the existing capital stocks. This specification also implies that new capital is mobile but installed capital is sector-specific.

The behaviour of the model is dependent on the macroeconomic and factor closures chosen. These closures allow for the placement of constraints into the model, which is crucial in the analysis of large-scale policy changes (Alton *et al.*, 2012). In addition to the closures mentioned in the above model specification, the t-SAGE model further allows the modeller to choose from a possible set of factor and macro closures. Within the factor closure, the modeller has the choice between making factors fully employed and mobile, fully employed and activity-specific, unemployed and mobile, or partially unemployed whereby supply is increased according to an upward-sloping supply curve.

Three important macroeconomic closures are considered in the model. First, **savings and investments**, where one can choose between investment driven savings, savings-driven investments, and investment and government expenditure being fixed shares of absorption. Second, **government**, where government savings can either be fixed or flexible with the implication that tax rates are either flexible or fixed. The model allows for the option of changing the direct or indirect tax rate at a uniform or scaled rate. Third, **current account**, where the exchange rate may either be flexible or fixed, with the consequence that foreign savings are either fixed or flexible.

A number of enhancements were made to the t-SAGE model described above. The first included updating the social accounting matrix (SAM) from 2009 to 2010 data for the purpose of this study. The primary data sources used in building the 2010 SAM were the 2010 Stats SA supply and use tables, 2010 SARB macroeconomic data and the 2010 third quarter Quarterly Labour Force Survey (QLFS). The supply and use tables are used to establish the sector links and relationships, while the QLFS data provide information regarding employment levels and average wages across different labour groups and sectors. The Income and Expenditure Survey data are used to model household factor income distribution and consumption behaviours.

As indicated earlier, the 2010 SAM consists of 48 activities and 85 commodities. Labour is divided according to education level. Specifically, four labour groups are identified: primary educated (Grades 1-7), middle educated (Grades 8-10), secondary educated (Grades 11-12) and tertiary educated. The household sector is disaggregated according to income into deciles, with the top decile being further split into five groups. The 2010 SAM is used as the main database of the t-SAGE model.

The second enhancement to the model was the disaggregation of the direct and indirect tax components, such that the model provides a more realistic view of the South African tax system. In the case of direct taxes, the t-SAGE model makes the distinction between regular and dividend income earned by enterprises and households. Allowances are made for these incomes to be taxed differently as is currently the case. Regular income is subject to Corporate Income Tax (CIT) in the case of firms and Personal Income Tax (PIT) in the case of households, while dividend income to households is subject to the dividend tax starting April 2012. DT can be modelled as a withholding tax paid by the recipients of dividend income. Prior to April 2012, firms paid the tax on net dividend income issued in the form of the STC. Data from the SARB were used to disaggregate enterprise income that flows to households in the form of regular and dividend income revenue streams and the associated tax revenue components. Due to a lack of data, incomes received by households at this early stage of model development are still distributed in the same proportions that are used in the underlying 2010 SAM, i.e. according to the income distribution information acquired from the IES survey. For the poorest 40% of households a small random amount of dividend income is assumed.

An effective tax rate is derived from considering the actual revenue collected through the taxes relative to the tax base. For example, the effective direct tax rate on enterprises and households is the tax collected (CIT plus STC) divided by the total income received.

The detail needed to understand how STC may be modelled and treated independently of CIT is that the t-SAGE model identifies an account that represents "enterprises". These enterprises receive income from the production factor capital after some of the latter has been transferred to the rest of the world (and is taxed by an optional factor tax). The enterprise account distributes its receipts to households as well as to the public sector and the rest of the world (RoW), while saving the rest after it has paid direct tax. As outlined above, the latter includes not only corporate tax but also the STC.

To separate this out, our first step was to introduce a new account, which was in a sense fictitious but could be interpreted as one that is collecting and distributing dividend income. The total value of the collections and distributions is available from the national accounts data. Thus the enterprise account receives income from the production factor capital and part of this income is transferred to the dividend account as net dividend payments (i.e. outgoings less incomings) as recorded in the national accounts, while the remainder is distributed by the enterprise account as usual (and discussed above). We also included the value of the STC tax in these dividend payments from enterprises to the dividend account, which is also available from SARB. The latter then distributes the dividend income receipts to households, government and the RoW, and it pays the STC tax to government as if it were a direct tax. While this may appear to be counterintuitive to the nature of the tax and it would make more sense to model it as a "dividend tax", we did not do this for reasons of modelling convenience. In doing so we effectively model a double taxation regime, as enterprise income gets taxed on the full amount before transfers are made to the dividend account, which then gets taxed again by the STC. Table 2 reports the dividend income and STC for the period between 2009 and 2014.

In the second step we split the dividend income that households receive from their normal income from enterprises, and taxed this amount with a flat dividend tax rate. The latter is zero in the base since our SAM data at this stage was only available for 2010, i.e. prior to the introduction of DT. We maintained the regular direct tax on income received by households from all the other sources (labour, capital and enterprises).

Table 3 below reports the sources of incomes received by various types of households (reported according to income distribution deciles, with the highest one broken down into a further five representing 2% income intervals). It shows that households receive incomes from labour, capital and enterprises. The latter is broken down into regular enterprise income (insurance, pension payments etc.) and dividend income. In this paper we are interested in the latter source of household income in order to calculate dividend tax payments by households.

The changes that we intended to make to the t-SAGE model related specifically to the breakdown of enterprise income distributed to households. The original 2010 SAM, which was used as the underlying data for the CGE here, was based on national income accounting that specifically identified household income from enterprises. This income can be broken down into two streams: 'regular' income from enterprises and dividend income, with both totals available from the national accounts. We subtracted the dividend income received by households from the total household income received from enterprises (see columns 5 and 6 in Table 3). Next we distributed both streams of income, i.e. dividend income as well as the residual regular income received by households from enterprises (which may include pension and insurance payments), to the various household income categories. We assumed a small amount of dividend income to be received by the lowest 50% of the income earning households (hhd-0 to hhd-5), while the rest was distributed according to overall income from enterprises, a distribution that was available from the SAM[1]. This standard distribution was thus also used for the non-dividend part of this stream of income (see column 6). Now that we had households receiving two types of income from enterprises, we could proceed by introducing different taxes that applied to these separate income streams. This process is described in the section below.

It may be of interest to point out that since the dividend income tax rate is zero in the base (SAM), the household income tax rate on non-dividend income from all other sources (transfers, enterprises as well as labour) had to be higher than in the base (SAM) so as to allow for the zero tax rate on the dividend income part.

We have discussed the adaptations to the SAM above. In terms of the CGE, one way would be to consider a two-step process, where in the first step the dividend account and the STC are added to the model and a simulation is run in which the STC is simply dropped. In a second step, a dividend income tax

[1] We have looked at recent household surveys but did not find sufficient coverage of this stream of income to justify its use. Since SARS will be collecting tax on dividend income, it will be possible to improve the source of this data in the future.

on households is introduced and a number of additional simulations can then be conducted in which the dividend tax on households is raised from the base level of 0%, to say 10% and 15%.

The above is accommodated by the existing structure of the model if we add an element to the set of domestic non-government institutions (INSDNG, i.e. enterprises and households) accounts that specifically represent the income stream of dividends, as we have done in the SAM. INSDNG is a variable in the model signifying dividend tax for the institutions non-governmental. This new account receives and makes transfers and pays tax in the usual way, as if it were a direct tax. The interpretation of this tax is that it represents the STC. In order to activate/deactivate the STC, i.e. this direct tax on the new dividend account, we introduced a switch which is assigned the value 1 or 0 for all INSDNG, comprising the enterprise account, the new dividend income account and the household accounts. We then multiply the switch with the direct tax rate that applies to all INSDNG. If the switch is equal to 1 it is business as usual and all INSDNG are taxed with the relevant tax rate as defined prior to April 2012. If we want to know what the impact of abolishing the STC is, we must run a simulation in which we turn the tax rate for the dividend account off by setting the switch to 0 for this account.

With the ability to remove the STC from the model, we can turn our attention to introducing a tax on dividend income received by households. We added a household dividend tax rate which is defined here as the ratio of dividend tax receipts by government from households to households' dividend income (received from the dividend account as per the SAM). Note, however, that as DT was not applicable prior to April 2012, the DT receipts by government from households are zero for the base year.

No new equations, declarations or assignments are required in the model but we do need to make changes to the existing equations. Household dividend income is represented by a transfer from the dividend account to households. This income is taxed by the (flat) dividend tax rate which is set to 0 in the base run, as there is no such tax yet in the SAM data. We also know that households will not get taxed twice on the same income; unlike in the case of the STC there is no double taxation.

4.5 Closures and shocks

In this paper we assume a balanced closure for investment and government expenditure in which their absorption shares remain constant, there are flexible government savings, and there is a flexible exchange rate with fixed foreign savings. In line with the stylised facts of the South African economy, primary educated labour is assumed to be unemployed and mobile (i.e. the supply of unskilled labour is perfectly elastic at a fixed wage in each period), while tertiary educated labour is assumed to be fully employed and mobile (i.e. the total supply of skilled labour is fixed but can move between sectors and wages are flexible). Middle and secondary educated labour are assumed to be semi-employed with upward sloping supply curves allowing for an increase in supply and wages.

In this analysis we only considered the impact of the change in the tax system and not the associated spending of the additional funds collected. Changes in revenue were assumed to add to or subtract from the government budget balance, while all other tax rates, including the effective direct tax rates, remained constant when we changed the DT rate. The model is solved over the period 2012 to 2018, with a shock imposed in 2012. The shock is applied to the variable "DIVT" in the model, where the dividend tax rate is increased from 10 to 15%.

5 Simulations and results

We ran the policy simulation in order to measure the impact of increasing the DT rate from 10% to 15% on the South African economy over the period 2012 to 2018. Results quantifying the impact of the shock are reported as percentage changes between the values in the baseline run and the policy run for each variable. This facilitated the interpretation of the differences between the results in the policy and baseline runs as the effects of the policy shock. All results were compared relative to the base (baseline) scenario, which represented a 'business as usual' scenario.

Table 4 reports the simulation results for selected macro-economic variables. In column 1 (Base) of the table we report values at base-year prices, while the other columns show percentage deviations from the base.

The table above shows simulation results of the policy shock. It can be seen that the impact of increasing the DT from 10% to 15% will have a minute but positive impact on the reported macro-economic variables in the immediate year of implementing the DT rate increases. GDP increases by 0.0585% and 0.5085% in 2013 and 2018 respectively are seen. This change off the base is small in 2013 (less than R200 million in a R2.7 trillion economy), but is significant in 2018. The main conclusion here is that at the macro level, the implementation of the policy shock on its own had a positive macroeconomic impact. Government revenue shows a more substantial change: it increases slightly by 0.0628% from the base level with a close proportional increase in the net indirect tax (0.0611%) in 2013. The reason is that we simulated an increase in a tax rate, i.e. the DT rate increases from 10% to 15%, and this is the primary reason for government revenue to go up. In fact the increase in absorption should lead to an increase in indirect taxes, which is clearly enough to generate the government revenue. The immediate effects of the shock indicate that private consumption and real GDP increase by 0.0485% and 0.0585% respectively. The positive impact on the private consumption and real GDP, however, increases in the outer years of the modelled scenario. Private consumption increases in the outer years as the rise in government savings crowds out private savings through lowering returns on investment.

Table 5 reports the simulation results for the disaggregated real household consumption (percentage change from the base). It can be seen that this will have a positive impact, especially on the low income households. Given our choice of macroeconomic adjustment rules, low income households benefit because the increase in government revenue (see Table 4) has a positive impact on total savings, which requires them to save more and spend less. The lower household savings requirements and consumption is now turned towards a surplus in the period 2013 to 2018. This likewise applies to high income households, but in their case the tax burden has increased relatively more due to the income distribution pattern shown in Table 3. The increase in the DT rate will thus not offset their initial consumption losses due to lower savings, but a higher tax burden should turn it into a loss. The high income households appropriate a higher share of dividend income and they have to shoulder a greater share of the DT burden.

Table 6 reports on the results for employment, wages and inequality. We assumed that lower skilled labour is unemployed and mobile, and that skilled labour is fully employed. In the immediate year of implementing the DT rate increases, employment increased more in unskilled labour (primary: 0.0418%) than in semi-skilled (middle: 0.0206%) and skilled labour (tertiary: 0.02%) relative to the baseline scenario. The impact on total employment was a composite effect of activities losing and gaining output and employment. Those that gained are associated more with the consumption of outputs by lower income households and appear to be more labour intensive than those that are associated with consumption by higher income households. Furthermore, the adjustment took place in the wages due to policy shock. Lower wage employment (0.0293%) increased relatively more than higher wage employment (0.0265%). This implies that sectors that indirectly benefit from the higher DT use relatively more less-skilled labour, which allows them to boost output. The net impact on GDP was positive along with higher wages.

Considering the welfare implications, the simulation results indicate a marginal increase in inequality. The GINI coefficient is found to rise by 0.0063% and 0.0386% in 2013 and 2018, respectively. From the percentile income ratio comparison this rise in inequality is indicated to derive from increased inequality in poorer households as the income percentile ratio of the poorest households (50 to 20%) increases by more than the income percentile ratio of the richest households (90 to 50%). Despite the marginal increase in inequality, the tax instrument generates a significant increase in revenue. Total government revenues rise by approximately 0.5% over the modelled period.

The simulation results show that the factor market assumption for skilled labour being fully employed and unskilled labour being unemployed and mobile benefits all households relative to the application of a DT rate increase. This is expected as it is an economy-wide assumption that will impact all households more or less in a realistic way, as the unemployment rate in South Africa is high (24.3% according to Statistics South Africa, 2014), which includes generally more unskilled labour. Overall it appears that the implementation of DT caused a slight redistribution from high income to low income households, because our analysis is based on statutory book rates rather than actual collection rates, and also depends on the assumed dividend income distribution. Only further data collection by SARS may be able to confirm this redistribution outcome.

Table 7 reports the changes in activity output. There are clear winners and losers in the policy simulations. It is evident from the simulation results that the construction, medical equipment, general purpose machinery, electrical machinery, basic iron and steel, other non-metallic minerals and other transport equipment will benefit the most when the DT policy is implemented. The reason may be that these are the industries that are relatively more in demand by high income households (as reflected in the SAM data). Furthermore, these industries are more exposed to high income households and it is these high income households that suffer most from the higher tax burden associated with the DT. As discussed before, the change in the labour market adjustment rules that we have imposed has a more broad based impact. With unemployment assumed for lower skilled labour more industries are expected to enjoy a net gain. So, if high income households benefit from the DT policy then these activities benefit relatively more.

Other activities will lose in this scenario as they are relatively more exposed to low income household consumption, including food, agriculture, wearing apparel and textiles. The output of the construction, medical equipment, general purpose machinery and other transport equipment thus increases by 0.1416%, 0.1211%, 0.1188% and 0.1063% respectively, while the output of the textile, wearing apparel, agriculture and food processing sectors decreases by 0.0671%, 0.0591%, 0.0414% and 0.0369% respectively.

6 Conclusion

In this study we analysed the economy-wide impact of the DT on the South African economy. The DT was increased from 10% to 15% in 2012 by the South African government. We conducted our analysis using a dynamic general equilibrium (CGE) model of South Africa that captured the observed structure of South Africa's economy. The parameters of the CGE equations were calibrated to observed data from a social accounting matrix (SAM) for 2010. One policy option was considered. Our simulation results show that the impact of increasing the DT will have a minute but positive impact on the reported macro-economic variables in the immediate year of implementing the DT rate increases, while GDP increases by 0.0585% and 0.5085% in 2013 and 2018 respectively. This change off the base is small in 2013 but significant in 2018. The key finding is that at the macro level, the implementation of the policy shock on its own had a positive macroeconomic impact.

The model's results have a positive impact, especially on the low income households. Given our choice of macroeconomic adjustment rules, low income households benefit because the increase in government revenue has a positive impact on total savings, which requires them to save more and spend less. The lower household savings requirements and lower consumption turns towards a surplus during the period 2013 to 2018. This likewise applies to high income households, but in their case the tax burden has increased relatively more due to the income distribution pattern.

Considering the welfare implications, the simulation results indicate a marginal increase in inequality. The GINI coefficient is found to rise by 0.0063% and 0.0386% in 2013 and 2018 respectively. Despite these marginal positive impacts to raising the DT rate, the tax instrument generates a significant increase in revenue. Total government revenues rise by about 0.5% over the modelled period.

This study shows that there is scope for redesigning the tax system without imposing serious strain on household incomes. Nevertheless, minor changes in the tax structure can have some impact on the tax burden for specific households. Further work on our CGE model is still in progress. This includes improving the model's accuracy by capturing actual DT revenues in the underlying SAM database.

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Table 1: Dividends received by various institutions

	2009	2010	2011	2012	2013	2014
Dividends received						
Households	100501	93611	107368	131500	148875	159940
Government	812	1476	1778	1968	3051	2803
Non-financial corporations	15128	12103	9539	7003	6780	7352
Financial corporations	60578	52206	67394	67847	65365	57373
Total Domestic Economy	**177019**	**159396**	**186079**	**208318**	**224071**	**227468**
Rest of the world	52208	54781	71991	81273	89124	105975
Total Dividends	**229227**	**214177**	**258070**	**289591**	**313195**	**333443**

Source: SARB (2015)

Table 2: Dividend income and STC

Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Property income to enterprises	**506408**	**460874**	**464178**	**547097**	**571292**	**617402**
Non-financial corporations	113266	108882	115006	136855	128034	141301
Financial corporations	393142	351992	349172	410242	443258	476101
Net dividend income to enterprises	**-133690**	**-134702**	**17047**	**-171906**	**-142908**	**-165395**
Non-financial corporations	-166871	-153841	-16914	-246561	-219560	-255280
Financial corporations	33181	19139	33961	74655	76652	89885
STC	**17243**	**15871**	**19297**			

Source: SARB (2015)

Table 3: Household income

	Total labour (1)	Capital (2)	Enterprise (incl dividend) (3)	Total income (4)	Enterprise (5)	Dividend (6)	Direct tax (7)	Effective tax rate (without dividend tax) (8)	Dividen d tax (15%) (9)	Direct tax + Dividend tax (10)	Effective tax rate (with dividend tax) (11)
hhd-0	12996	201	1687	14884	1677	10	343	0.023	1.5	344	0.023
hhd-1	25310	840	2458	28609	2448	10	976	0.034	1.5	977	0.034
hhd-2	34125	1768	4106	39999	4096	10	1944	0.049	1.5	1945	0.049
hhd-3	44891	2117	5180	52188	5170	10	2724	0.052	1.5	2726	0.052
hhd-4	54465	5983	7931	68379	7921	10	4221	0.062	1.5	4222	0.062
hhd-5	61611	14365	10639	86615	10629	10	5678	0.066	1.5	5679	0.066
hhd-6	74810	23891	16358	115058	12018	4340	11227	0.098	651	11878	0.103
hhd-7	108855	44933	21855	175643	16057	5798	19581	0.111	870	20451	0.116
hhd-8	228820	84986	40873	354679	30029	10844	50219	0.142	1627	51845	0.146
hhd-91	70515	24237	11399	106151	8375	3024	15505	0.146	454	15959	0.150
hhd-92	79135	20186	23315	122635	17129	6185	17933	0.146	928	18861	0.154
hhd-93	94925	24123	32901	151948	24172	8729	20621	0.136	1309	21931	0.144
hhd-94	89602	28140	69581	187323	51121	18460	28216	0.151	2769	30985	0.165
hhd-95	101343	26595	169270	297208	124362	44908	31191	0.105	6736	37927	0.128
Total	**1081402**	**302364**	**417553**	**1801319**	**315205**	**102348**	**210378**		**15352**	**225730**	

Source: Stats SA & SARB (2013)

Table 4: Macroeconomic variables (base values and percentage change)

Variables	Description	Base (2010 R billion)	2013	2014	2015	2016	2017	2018
ABSORP	Absorption	2687	0.0580	0.1251	0.2022	0.2904	0.3906	0.5039
PRVCON	Private consumption	1586	0.0485	0.1079	0.1791	0.2628	0.3601	0.4721
FIXINV	Investment	501	0.1576	0.3295	0.5182	0.7262	0.9560	1.2096
DSTOCK	Stock	-3	0	0	0	0	0	0
GOVCON	Government consumption	604	0	0	0	0	0	0
EXPORTS	Exports	642	0.0834	0.1782	0.2856	0.4072	0.5444	0.6989
IMPORTS	Imports	-666	0.0804	0.1717	0.2752	0.3924	0.5246	0.6734
GDPMP	GDP (Market prices)	2663	0.0585	0.1262	0.2040	0.2930	0.3942	0.5085
NETITAX	Net indirect tax	287	0.0611	0.1320	0.2139	0.3078	0.4147	0.5358
EXRXY	Exchange rates	1	0.0013	0.0015	0.0005	-0.0015	-0.0046	-0.0085
YGX	Government income	679	0.0628	0.1349	0.2168	0.3096	0.4138	0.5302

Source: Simulation results from the CGE model

Table 5: Disaggregated real household consumption (% change from the base)

Variables	Base (2010 R billion)	2013	2014	2015	2016	2017	2018
POOR	**273**	**0.0329**	**0.0743**	**0.1247**	**0.1846**	**0.2549**	**0.3360**
hhd-0	27	0.0255	0.0574	0.0959	0.1414	0.1947	0.2561
hhd-1	47	0.0274	0.0618	0.1037	0.1534	0.2114	0.2785
hhd-2	57	0.0313	0.0707	0.1183	0.1751	0.2415	0.3182
hhd-3	65	0.0351	0.0792	0.1333	0.1981	0.2742	0.3621
hhd-4	77	0.0383	0.0864	0.1450	0.2147	0.2963	0.3904
NPOOR	**1313**	**0.0518**	**0.1149**	**0.1904**	**0.2791**	**0.3820**	**0.5004**
hhd-5	89	0.0429	0.0961	0.1604	0.2364	0.3248	0.4267
hhd-6	108	0.0467	0.1041	0.1728	0.2537	0.3476	0.4553
hhd-7	151	0.0490	0.1092	0.1812	0.2658	0.3640	0.4767
hhd-8	287	0.0491	0.1099	0.1833	0.2703	0.3719	0.4893
HHD-9	677	0.0555	0.1225	0.2022	0.2954	0.4034	0.5273
hhd-9-1	84	0.0501	0.1123	0.1878	0.2777	0.3830	0.5050
hhd-9-21	98	0.0510	0.1143	0.1911	0.2824	0.3895	0.5138
hhd-9-22	118	0.0512	0.1147	0.1916	0.2829	0.3899	0.5140
hhd-9-23	144	0.0560	0.1234	0.2031	0.2960	0.4033	0.5261
hhd-9-24	234	0.0611	0.1330	0.2166	0.3130	0.4232	0.5482
ALLHHD	**1586**	**0.0485**	**0.1079**	**0.1791**	**0.2628**	**0.3601**	**0.4721**

Source: Simulation results from the CGE model

Table 6: Employment and wages (% change from the base)

Variables	Description	Base (2010 R billion)	2013	2014	2015	2016	2017	2018
Total Employment (millions)								
flab-p	Primary education	77	0.0418	0.0908	0.1476	0.2124	0.2856	0.3676
flab-m	Middle education	208	0.0206	0.0424	0.0659	0.0911	0.1184	0.1479
flab-s	Secondary education	387	0.0201	0.0409	0.0626	0.0853	0.1093	0.1347
flab-t	Tertiary education	541	0.0200	0.0404	0.0612	0.0824	0.1041	0.1262
Average Wage								
flab-p	Primary education	1	0	0	0	0	0	0
flab-m	Middle education	0.9964	0.0293	0.0682	0.1166	0.1741	0.2404	0.3148
flab-s	Secondary education	0.9989	0.0085	0.0275	0.0564	0.0948	0.1422	0.1979
flab-t	Tertiary education	1.0015	0.0265	0.0658	0.1186	0.1855	0.2673	0.3649
Gini Coefficient								
Gini	Gini coefficient	0.6237	0.0063	0.0128	0.0193	0.0259	0.0323	0.0386

Source: Simulation results from the CGE model

Table 7: Changes in activity value added (% change)

	base (2010 R billion)	2013	2014	2015	2016	2017	2018
aagri	49	0.0414	0.0920	0.1527	0.2243	0.3079	0.4044
afore	10	0.0535	0.1162	0.1889	0.2726	0.3681	0.4763
afish	3	0.0386	0.0865	0.1444	0.2130	0.2934	0.3864
acoal	49	0.0523	0.1174	0.1964	0.2909	0.4026	0.5337
aomin	172	0.0799	0.1736	0.2832	0.4108	0.5586	0.7289
afood	53	0.0369	0.0814	0.1342	0.1959	0.2673	0.3491
abtob	25	0.0377	0.0833	0.1375	0.2010	0.2748	0.3596
atext	4	0.0671	0.1423	0.2264	0.3204	0.4252	0.5416
awear	5	0.0591	0.1224	0.1905	0.2640	0.3431	0.4281
afoot	2	0.0649	0.1366	0.2162	0.3041	0.4010	0.5073
awood	8	0.0804	0.1699	0.2697	0.3809	0.5046	0.6417
apapr	10	0.0660	0.1422	0.2294	0.3287	0.4412	0.5678
aprnt	12	0.0701	0.1474	0.2326	0.3261	0.4287	0.5407
apetr	24	0.0456	0.1018	0.1696	0.2504	0.3453	0.4560
abchm	19	0.0627	0.1349	0.2175	0.3117	0.4185	0.5390
aochm	23	0.0614	0.1302	0.2070	0.2925	0.3873	0.4920
arubb	4	0.0672	0.1430	0.2282	0.3234	0.4293	0.5466
aplas	10	0.0807	0.1686	0.2643	0.3686	0.4819	0.6047
aglas	3	0.0642	0.1372	0.2199	0.3133	0.4184	0.5362
anmet	12	0.1128	0.2392	0.3813	0.5412	0.7210	0.9230
airon	12	0.1150	0.2394	0.3743	0.5205	0.6790	0.8505
anfer	11	0.0979	0.2151	0.3557	0.5243	0.7260	0.9670
ametp	19	0.1016	0.2118	0.3317	0.4619	0.6034	0.7569
agmch	21	0.1188	0.2461	0.3828	0.5294	0.6865	0.8549
aemch	8	0.1171	0.2442	0.3828	0.5338	0.6985	0.8778
artel	2	0.0724	0.1499	0.2330	0.3218	0.4169	0.5185
amequ	2	0.1211	0.2520	0.3938	0.5475	0.7139	0.8939
avehe	23	0.0976	0.2021	0.3143	0.4345	0.5630	0.7001
aotrn	4	0.1063	0.2148	0.3251	0.4365	0.5483	0.6600
aoman	17	0.0718	0.1556	0.2527	0.3648	0.4935	0.6402
aelec	50	0.0581	0.1261	0.2050	0.2958	0.3997	0.5178
awatr	14	0.0400	0.0895	0.1493	0.2203	0.3035	0.3998
acons	73	0.1416	0.2966	0.4673	0.6558	0.8643	1.0947
atrad	259	0.0718	0.1532	0.2453	0.3492	0.4660	0.5969
ahotl	24	0.0487	0.1091	0.1823	0.2691	0.3707	0.4879
atran	145	0.0605	0.1317	0.2145	0.3102	0.4198	0.5448
acomm	65	0.0507	0.1102	0.1792	0.2585	0.3490	0.4514
afsrv	164	0.0657	0.1396	0.2223	0.3142	0.4159	0.5278
ainsu	60	0.0647	0.1399	0.2261	0.3241	0.4346	0.5581
areal	136	0.0633	0.1428	0.2399	0.3562	0.4937	0.6544
ardev	2	0.0710	0.1516	0.2425	0.3445	0.4583	0.5845
arent	6	0.0630	0.1379	0.2257	0.3273	0.4438	0.5762
abusi	102	0.0606	0.1286	0.2045	0.2891	0.3830	0.4869
agovn	387	0.0012	0.0026	0.0042	0.0060	0.0082	0.0105
aeduc	18	0.0752	0.1642	0.2680	0.3871	0.5222	0.6738
aheal	49	0.0686	0.1497	0.2444	0.3534	0.4777	0.6181
aosrv	207	0.0699	0.1528	0.2501	0.3631	0.4934	0.6426

Source: Simulation results from CGE model