Increasing progressivity in South Africa's personal income tax system

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Abstract

This dissertation uses NIDS Wave 4 to simulate past, present and future personal income tax progressivity in South Africa. It is divided into two main sections. The first section investigates changes in progressivity between tax years 1996 and 2017. Using the Kakwani index I find increased progressivity over this time period. However, pre-and post-Gini coefficients show decreased progressivity. The second section uses a static, arithmetic microsimulation model to simulate two policies aimed at increasing progressivity: a negative income tax and increased tax rates for high income earners. The negative income tax is shown to significantly reduce inequality, while increased tax rates for high income earners have a limited impact. They also have limited potential for increasing tax revenue, making it unfeasible to finance the negative income tax through such tax increases. A South African negative income tax will either have to be smaller than the levels simulated or financed through other means.

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All remaining errors are my own.

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Chapter 1
Setting the scene

While the primary function of a personal income tax system is to collect government revenue, it also has several other functions. Of special importance to the South African context is its mandate to reduce inequality. South Africa has one of the highest levels of income inequality in the world, much of which is a direct result of the country's history of colonialism, apartheid, and racial discrimination. Reducing these inequalities have been at the centre of much of government policy since the end of apartheid, and the progressive personal income tax system together with social grants aimed at low-income households have played a large role. Yet inequality remains stubbornly high, and has even increased, since the end of apartheid in 1994 (Leibbrandt, Finn and Woolard, 2012). The most recent estimate of the Gini coefficient of incomes post-taxes and -transfers is 0.66[1]. Even with the combination of progressive personal income taxation and comprehensive social grants, South Africa's level of income inequality is much higher than other comparable countries (for instance, Brazil's Gini coefficient post-taxes and -transfers is 0.54[2]). This prompts the question of whether - and what - more can be done to make the personal income tax system more redistributive. Can it be further altered to reduce inequality?

The degree of progressivity of a tax system reveals not only who bears the burden of tax, but also how redistributive the tax system is. A small number of papers have aimed to assess progressivity dynamics in post-apartheid South Africa. Nyamongo and Schoeman (2007) and Steenekamp (2012b) both aim to assess how the progressivity of the personal income tax system over time has changed, while Inchauste et al. (2015) perform a comprehensive fiscal incidence analysis of the main tax and transfer programmes in South Africa. The results from the papers assessing progressivity over time are somewhat ambiguous. While the personal income tax system is shown to be progressive

[1] Own estimate from NIDS Wave 4 using the Wave 4 survey weights, years 2014/15.
[2] From Higgins and Pereira's (2014) calculations based on data for 2008/2009 from Pesquisa de Orçamentos Familiares (a family expenditure survey for Brazil).

over the time period assessed, the conclusions about year-on-year change in progressivity depend on the measures used to assess progressivity. Of the two studies, the one by Nyamongo and Schoeman (2007) has more conceptual clarity. They use both a redistributive and a disproportionality (Kakwani) measure to assess progressivity between 1989 and 2003. Their analysis finds that, using the Kakwani index, progressivity increased in 1989-1990 and during the first tax reform phase 1990-1994, but thereafter declined. The redistributive effect shows similar results, except for the first tax reform phase, where it showed a decline in progressivity. Steenekamp's (2012b) analysis of progressivity between 1994 and 2009 shows an overall declining trend in progressivity. However, his choice of progressivity measures is confusing. They include the threshold at which the top marginal rate applies (as a multiple of the average wage) and the difference between the marginal average tax rates. It is therefore not entirely clear what he means when he concludes that progressivity has declined. In any case, neither of the papers assessing progressivity over time go further than 2009, highlighting the need for a more recent analysis of tax progressivity. Inchauste et al. (2015) provide a recent and thorough fiscal incidence analysis of the entire tax and transfer system, but for one year only. None of the papers include medical deductions and medical aid tax credits in their calculations of progressivity measures. Considering the scale of these deductions and tax credits, and how much their tax treatment has changed over time, their exclusion from calculations is likely to distort the results.

While an analysis of the historical and present degree of income tax progressivity provides context, it does little to advise on future policies for increased progressivity. Hence, the aim of this dissertation is two-fold; firstly, to investigate how the progressivity of the personal income tax code changed between 1996 and 2017, and secondly, to explore whether it can be made more progressive to reduce income inequality and poverty. The latter is done by looking at how tax progressivity can be increased at the top end of the income distribution through increased marginal tax rates for top earners, and at the bottom end through a negative income tax. A negative income tax functions as a grant for which the only requirement is income below a certain threshold, and its size is proportional to one’s income. Its potential for reaching individuals who are currently excluded from the social welfare system combined with its administrative simplicity makes it particularly suitable for the South African context.

The rest of this chapter describes the data used in this study, followed by a comprehensive overview of microsimulation methods and why they are used to achieve the aims of this dissertation. Chapter 2 provides context to the rest of the dissertation by first summarising the key characteristics of the South African personal income tax system. It continues by taking a step back to evaluate the dominant theoretical strand in tax literature – optimal income tax theory – and its relevance for tax policy. Chapter 3 achieves the first aim of the dissertation. It starts with a discussion of different progressivity measures and how they impact progressivity evaluations, followed by an investigation of the progressivity of the South African personal income tax code between 1996 and 2017. Chapters 4, 5, and 6 realise the second aim of the dissertation. These chapters move away from the historical perspective of South African tax progressivity, and towards its future by investigating potential policies for increasing progressivity. Chapter 4 looks at the possibility of a South African negative income tax, a policy targeted towards the bottom end of the income distribution. It first reviews some of the empirical literature on negative income taxation and then simulates two negative income tax proposals. Chapter 5 explores the potential for increasing progressivity from the top end of the income distribution. The chapter starts by summarising some of the literature on top income taxation, followed by a simulation of seven proposals of increased taxation of high income earners. Chapter 6 combines the policies from chapters 4 and 5 to explore the impact of a negative income tax financed by increased tax rates for high income earners. Chapter 7 discusses the policy implications of the results and ends with concluding remarks.

1.1 Data

This dissertation uses data from Wave 4 of the National Income Dynamics Survey (Southern Africa Labour Research and Development Unit, 2016). NIDS is a national longitudinal survey which conducts face-to-face interviews with the same set of individuals and the members of their households at the time of each interview. While it is a longitudinal survey consisting of four waves, each wave can be treated as a crosssection of the South African population. This is because the waves have been "separately calibrated to the corresponding population totals as given in the mid-year populations estimates [by StatsSA] released in 2015" (Chinhema et al. 2016, p.59). Wave 4 of NIDS was collected from September 2014 to August 2015. Given the small numbers of high income earners in the dataset and that NIDS is a longitudinal survey (in which one may expect high income households to either be under sampled or have higher rates of attrition), it is important to view the results based on the top end of the income distribution with a degree of scepticism. These earners would perhaps be better captured by tax data.

In order to undertake the analysis in this dissertation, the ideal dataset would include information on yearly gross taxable incomes and tax liability for a nationally representative sample. However, there is no current dataset which provides this. This dissertation therefore uses two different data sources to simulate a similar dataset. Income data from NIDS is used to construct a taxable income variable, and tax codes from yearly budget reports are applied to this variable to create net incomes for each tax year. NIDS is particularly useful for constructing a taxable income variable since it includes very detailed information about individual incomes, allowing one to exclude income sources which are not presently taxed through the personal income tax (e.g. inheritance).

The sample is restricted to households for whom there exists income data for at least one person. An aggregated taxable income variable is constructed for these households.[3] The taxable income variable consists of total yearly income from employment, profit shares, and bonuses. It does not include income from social grants, UIF payments, lobola and inheritance.[4] Since the individual income measures that make up the taxable income variable are all measured from the previous month while the tax variables are

[3]While the NIDS data does provide an aggregated income measure at the household level, the tax code can only be applied to individual level income data. Furthermore, the aggregated income measure includes income sources that are not taxed through the personal income tax, making it unsuitable for this purpose.

[4]While there is no inheritance tax in South Africa, there is an estate tax. Including income from inheritance in taxable income would therefore mean taxing the estate/inheritance twice.

yearly, the taxable income variable is multiplied by 12 to construct a yearly variable. This comes with the caution that one-off income sources or months that deviate from a "representative" month may lead to bias in yearly earnings for some households and individuals. Because the purpose of the taxable income variable is to simulate a pre-tax scenario, the taxable income variable is "grossed up" (since the NIDS income variables are net of tax). This is done by applying the 2016 tax code (The National Treasury of South Africa, 2016), which covers 1 March 2015 to 29 Feb 2016, to the net taxable incomes using the equation 1.1:

$$g = \frac{(n - r + ft - ti * L)}{1 - ti} \tag{1.1}$$

where $g = \ gross\ taxable\ income$, and

$$n = \ net\ taxable\ income$$

$$r = \ tax\ rebate\ (dependent\ on\ age\ group)$$

$$ft = fixed\ tax\ amount\ that\ varies\ per\ tax\ bracket$$

$$ti = marginal\ tax\ rate\ for\ each\ tax\ bracket$$

$$L = the\ lower\ bound\ tax\ base\ for\ each\ tax\ bracket$$

Additionally, since the base tax year is 2016, the medical and medical aid deductions relevant for this year are applied in reverse to ensure that the gross taxable income variable corresponds to the gross income from which tax liability is calculated. Naturally, this set-up is less complex than the actual system for deductions and exceptions, which also include things such as pension fund contributions and contributions to retirement annuity funds. For simplicity, these are not included in this analysis. This final gross taxable income variable is the base variable to which the tax rules are applied.

Chapter 3 investigates the change in progressivity of the personal income tax code over time and therefore uses a constructed dataset of yearly net incomes as mentioned above.

This dataset is constructed by first subtracting medical deductions from the base gross taxable income variable g, creating a dataset of gross taxable incomes for each year. Then, the tax codes for each year are applied to their respective gross taxable income variables, using equation 1.2 (the reverse of equation 1.1):

$$n = g(1 - ti) + r - ft + ti * L \tag{1.2}$$

In the case where gross income is below the tax threshold(s), $n = g$. The tax codes are gathered from the Budget Reviews for tax years 1996-2017[5] (Department of Finance, 1995-1997, The National Treasury of South Africa, 1998-2016). Information on medical aid tax credits and other medical deductions are gathered from the National Budget Reviews, as well as tax guides from SARS (South African Revenue Service, 2004-2016). The South African personal income tax code contains marginal rates as well as fixed amounts and tax rebates, which are given in Rands. Because the tax codes are applied to the 2014/15 NIDS dataset, the Rand amounts in other years have been adjusted for inflation to 2015 prices using CPI data from Statistics South Africa (2017a).

Chapters 4, 5, and 6 use the gross taxable income g for 2016 to calculate eligibility for the negative income tax and liability for paying tax. The resulting changes in their net incomes are then fed back into their household incomes as measured by $w4\_hhincome$ in the NIDS dataset. This is done to analyse the proposed policies' impact on poverty and inequality in the full population rather than just the taxpaying population. All poverty and inequality calculations are done on per capita household incomes.

1.2 Microsimulation for policy analysis

This dissertation uses a static, arithmetic microsimulation model to investigate proposed changes to South Africa's personal income tax code. More specifically, the model used is a tax-benefit model. The following section explains what microsimulations are and the reasons they are used in this dissertation. It further gives

[5] It should be noted that tax years go from March to February, i.e. tax year 1996 starts 1 March 1995 and ends 28 February 1996.

an overview of the use of tax-benefit microsimulation models in South Africa and abroad, concluding with a summary of the specific model used in this dissertation.

Microsimulation models consist of three key components: a micro-dataset with economic and socio-demographic information about the economic agents, the policy rules that one wants to investigate (in this paper, the tax code), and a theoretical model of agents' behavioural response (Bourguignon and Spadaro, 2006). The behavioural response model is what separates the different types of microsimulation models – an arithmetic microsimulation model[6] assumes no behavioural response to policy, while a behavioural microsimulation model incorporates behavioural response functions. One can further distinguish between static and dynamic microsimulation models. Static models exist in one time period only, while dynamic models incorporate a time dimension where agents age as time passes and therefore can incorporate more advanced decision-making (Bourguignon and Spadaro, 2006). As noted in Wilkinson (2009), a dynamic microsimulation model must include some sort of behavioural effect, but it differs from a behavioural model in that the behavioural change is due to ageing, rather than policy change.

Microsimulation models allow for a comprehensive ex-ante evaluation of policy suggestions as they make it simple to simulate a policy change and create counterfactual scenarios (Figari, Paulus and Sutherland, 2015). They are therefore extensively used by public policy researchers as well as by government. Typically, they are used to evaluate how changes in policies affect the distribution of income and other microeconomic measures (Figari, Paulus and Sutherland, 2015). They can also be integrated with macroeconomic models in 'micro-macro' approaches and be applied to a wider range of scenarios (Bourguignon and Spadaro, 2006).

[6] The arithmetic microsimulation model is often referred to as a "static" microsimulation model. However, to avoid any confusion with static (as opposed to dynamic) microsimulation models, this paper uses the arithmetic/behavioural distinction used in Bourguignon and Spadaro (2006) to refer to non-behavioural and behavioural models.

The simulations rely on existing relationships between the variables within the datasets, such as the relationships between income and demographic factors. This makes it simple to investigate the underlying mechanisms behind any policy result (Woolard et al., 2005). For instance, the number of women who will receive a subsidy though a negative income tax policy will be a result of the underlying relationship between income and gender in the dataset. Similarly, given that the sample is nationally representative, microsimulation models can be used to calculate aggregate costs and benefits of policy suggestions (Bourguignon and Spadaro, 2006). Using micro-datasets with comprehensive information about its economic agents has several advantages, including that it allows the model to take into account the full heterogeneity in the population and therefore provide very detailed analysis of a policy suggestion (Woolard et al., 2005). Furthermore, it allows for an analysis of the impact of policies, not only on the population as a whole, but also within different sub-populations and individuals (Wright, Noble and Dinbabo, 2012). It is important to note, however, that the quality and applicability of a microsimulation fundamentally relies on the quality of its dataset. A good microsimulation model must have data of a certain size and detail which is not always available, particularly in a developing country context.

Since this paper looks specifically at tax policies, the model used is a tax-benefit microsimulation model. A tax-benefit model allows one to simulate the potential tax policies by applying tax codes to the incomes of the representative individuals in the sample. From this, one can investigate how various tax policies will affect poverty and income inequality in both the population as a whole, as well as in different subpopulations and income percentiles. A challenge of using microsimulation models instead of tax data to assess the effects of tax policy changes is that the microsimulation models cannot account for what taxpayers actually pay in tax (or receive in grants), but can only model what they ought to have paid or received. Not modelling grant uptake and tax evasion/avoidance may lead to inaccurate conclusions about the impact of tax policies (Woolard et al., 2005). Nevertheless, tax-benefit microsimulation models have been used extensively to model tax policies in OECD countries, with a notable example being EUROMOD, a microsimulation model which covers all EU28 countries (Sutherland and Figari, 2013). The framework for EUROMOD has also been used to create tax-benefit microsimulation models for non-EU countries such as Russia (Popova, 2012) and Serbia (Ranđelović and Rakić, 2013). Tax-benefit microsimulation models are also increasingly developed for developing countries. Brazil (Immervoll et al., 2006) and Namibia (Wright, Noble and Barnes, 2014) already have tax-benefit microsimulation models, and SOUTHMOD, the collective name for a group of microsimulation models in developing countries (mostly in Africa) based on the EUROMOD framework, is currently being developed (UNU-WIDER, 2017).

Tax-benefit microsimulation models have also been used in the South African context to evaluate personal income taxation and the tax system more generally. Notably, SAMOD is a static tax-benefit microsimulation model based on EUROMOD, whose newest iteration is underpinned by both the Living Conditions Survey 2008/09 (Statistics South Africa, 2011) and Wave 4 of NIDS (Southern Africa Labour and Development Research Unit, 2016) (Wright et al., 2016). In academic research, SAMOD has been used to evaluate existing policies, such as the child grant (Dinbabo, 2011) and the impact of the tax-benefit system as a whole on child poverty (Wilkinson, 2011). It has also been used to simulate potential policies: in particular, Ntshongwana, Wright and Noble (2010) use SAMOD to evaluate three hypothetical social grants, including a grant for primary caregivers, and an income replacement grant for low income earners. Others, including Woolard et al. (2005), use microsimulation to evaluate the redistributive impact of taxation, and Inchauste et al. (2015) similarly evaluate the impact of the main tax and social transfer systems on inequality. Others who have constructed tax-benefit microsimulation models include Wilkinson (2009), Thompson and Schoeman (2006), and Van Heerden (2013). While tax-benefit microsimulation models have been used to assess the impact of a negative income tax in other countries (see for instance Colombino et al., 2008; Narazani and Shima, 2008; Abul Naga, Kolodziejczyk and Mueller, 2008), the closest model in the South African context is a micro-macro simulation model by Magnani and Badaoui (2015), which evaluates a type of negative income tax.

As with most South African tax-benefit microsimulation models, the microsimulation model used in this paper is a static, arithmetic model. The decision to use a static microsimulation model is made firstly because it is the simplest and most transparent method, as noted in Wilkinson (2009). However, it is also because results from a dynamic model will be "very sensitive to the robustness of the model of behavioural response" (Wilkinson, 2009, p.5) that is used. While NIDS provides longitudinal data that could potentially be used to construct a behavioural response model to changes over time, doing so is beyond the scope of this study. The microsimulation model used in this paper is also an arithmetic model. This is simply because there is no reliable model in South Africa for behavioural responses to taxation, whether they are labour supply responses, tax avoidance, or evasion. Since microsimulation results are sensitive to the assumptions of their models, adding a behavioural response to the model would make the results unreliable at best. Not including a behavioural response is not as restrictive as it would seem – it simply means that the model being used measures the first round effects of policy change (Bourguignon and Spadaro, 2006, p.80). However, not including behavioural responses to changes in tax policy may impact the realism of the microsimulation estimates. Firstly, if there is a significant behavioural response to a change in tax policy, the effectiveness of the policy (in reducing inequality or poverty, for instance) may be greatly over- or underestimated in a non-behavioural model. Secondly, if there is a significant behavioural response, the cost or revenue predictions from a policy will be unreliable (Wilkinson, 2009). Thirdly, as noted in Woolard et al. (2005), a complete assessment of a tax policy ought to include both equity and efficiency evaluations, which is difficult to do without a behavioural effect model.

Chapter 2
Personal income tax in South Africa and optimal income tax theory

This chapter aims to provide context for the following chapters' discussions of the progressivity of the personal income tax. It does so by first taking a step back to look at an important theoretical strand of tax literature, optimal income tax theory. Chapter 2.1 looks at the Mirrlees model and its extensions, and discusses why optimal income tax theory can help frame the problem of how to set tax rates. Bringing the discussion back to actual tax systems, this is followed by an overview of the South African personal income tax in chapter 2.2.

2.1 Optimal income tax theory

The following sub-chapter takes a step back to look at some of the taxation literature within economics. More specifically, the focus is put on the optimal income tax theory, which has long been the dominant strand of tax theory in economics. James Mirrlees (1971) was a pioneer in this field. In his influential model, the government wishes to maximise social welfare given a set tax revenue that it wants to collect. The optimal tax selection in a society depends on three key factors: its value of equity and fairness, the distribution of skills in the population, and individuals' behavioural response to taxation. Society's value of equity and fairness is captured by the social welfare function, which in Mirrlees' model takes the form of additive individual utilities. The distribution of skills in the population is imperfectly proxied by the income distribution, while the population's labour-consumption preferences determine the behavioural response function. In the classical Mirrlees model, the optimal tax schedule is almost linear, but Mirrlees noted that for bureaucratic simplicity, policymakers may opt for a linear tax schedule. The highest marginal tax rates come in at relatively low incomes, and decline thereafter. These results come with an important caveat: societies with high skills inequality may necessitate a more redistributive tax system than societies with low levels of skills inequality, as the redistributive benefits would dominate the reduced work incentives. In this situation, the tax schedule would look very different. This point is typically overlooked in the optimal tax literature following Mirrlees.

There are many extensions of the Mirrlees model aiming to account for different realities of the labour market. Some include restrictions on the workers, such as imperfect information or limited choice in labour supply. In Diamond (1980), workers are limited to choose their labour supply on the extensive margin only - they can work full time or not at all. Non-workers may receive income support. In maximising welfare, there is a trade-off between incentives to work and the social utility of consumption, and subsidisation of low income earners may be optimal. Diamond's (1980) model has special relevance for low income earners for whom the labour supply choice is often on the extensive margin (Saez, 2002). In Eaton and Rosen (1980), workers face uncertain wages at the moment of deciding their labour supply, and have to make a decision based on the subjective probability distributions of their wages. The optimal tax rate is higher than in a model without uncertainty.

Other models extend the Mirrlees model to account for the complex choices facing the worker in the labour market. In Kapicka (2006), human capital is endogenous. In this model, tax distorts incentives for human capital accumulation for two reasons. The first reason is due to the dynamic nature of human capital. If agents discount future consumption, it is already difficult for government to create incentives for human capital accumulation and it will want to be careful to decrease them by increased tax rates. The second reason comes from the assumption that abler people both invest more in human capital and work more, making their output of non-leisure time strictly convex, and thus more sensitive to tax distortions. Hence, since taxation distorts both labour incentives and incentives for investing in human capital, the optimal tax rate is lower than in a model with exogenous human capital. Kleven, Kreiner, and Saez (2009) model optimal taxation for couples with interdependent labour supplies. The couple's primary earner chooses labour supply on the intensive margin and therefore chooses how many hours to work, while the secondary earner chooses on the extensive margin, i.e. whether to work or not. They find that if the secondary earner's decision to work is a signal of the household being better off, the optimal tax schedule would suggest a positive tax on the secondary earner. If their decision to work is a signal of the household being worse off, however, it suggests that a positive subsidy should be put on the secondary earner.

Lastly, some extensions of the optimal tax theory include threats to the sustainability of the tax system. Simula and Trannoy (2010) allow high income individuals to emigrate to avoid taxation, which introduces a participation element into the model. This results in a decreased, sometimes negative, optimal tax rate compared to a world without migration. Similarly, Rothschild and Scheuer (2011) propose a model where agents can choose between participating in a "traditional sector" and a crowdable "rent-seeking" sector. In marked contrast to Piketty, Saez, and Stantcheva (2011), who advocate higher tax rates to combat rent-seeking, Rothschild and Scheuer (2011) conclude that taxes should remain modest. Their argument is that a lower tax rate will increase rent-seeking efforts, which ensures a crowded rent-seeking sector with low private returns from rents-seeking. This again discourages others from entering. However, their argument is entirely dependent on the, perhaps unrealistic, assumption that the rent-seeking sector is crowdable with decreasing private returns.

There is also a considerable macro strand of optimal taxation literature, which will not be discussed in detail in this sub-chapter (a review of this literature can be found in Golosov, Tsyvinski, and Werning (2007)). Its main contribution has been to introduce a dynamic element to the theory by assuming that individuals live for t periods of time and have stochastically evolving skills (Golosov et al., 2010). An oft-cited limitation of the macro approach is that its resulting optimal tax systems tend to be very complex with little application to policy recommendations (Piketty and Saez, 2013).

Critique of optimal tax theory

While optimal tax theory has dominated the tax literature for decades, it has not remained unchallenged. Some of its main criticisms are that the added-utility social welfare function is unsuitable for calculating optimal tax schemes, that it ignores implementation costs and feasibility concerns, and that its results are not robust.

The difficulty in selecting the appropriate social welfare function was acknowledged by Mirrlees himself, who stated that

> *"… unless there are stronger cases for some welfare functions than for others, the formal derivation of properties of welfare-maximizing policies is a pointless exercise"* (Mirrlees, 1986, p.1198–99).

The added-utility social welfare function is problematic for several reasons, including that individuals' marginal utility of consumption is unobservable. Additionally, as noted by Piketty and Saez (2013), the utilitarian approach tends to conflict both with existing tax systems and perceptions of redistributive justice. It treats income earned by effort and luck identically, gives transfers to low-income individuals whether they work or not, and recommends that all characteristics correlated with earnings should be tagged for differential tax rates (including "odd" characteristics like height, as mentioned by Salanié (2011)). Alternative social welfare functions have been suggested. Rawls' max-min criterion where the welfare of the worst-off in society is maximised is particularly popular (Sadka, 1976). Piketty and Saez (2013) also explore other alternatives, including the Pareto principle, libertarianism, "principles of responsibility and compensation" (Piketty and Saez, 2013, p.71), and equal opportunity principles. An interesting suggestion comes from Saez and Stantcheva (2016), who propose replacing the standard social welfare weights with "generalized social marginal welfare weights" which reflect "society's concerns for fairness without being necessarily tied to individuals" (Saez and Stantcheva, 2016, p.24). While this is admittedly a vague proposal, their point is that the weights could be determined by social justice principles (for instance the Rawls' max-min criterion), leading to a normative theory of taxation.

Adding to concerns about the social welfare function is the critique that optimal income tax theory does not address implementation costs or feasibility concerns, limiting its usefulness for policy recommendations. Joel Slemrod is perhaps the most unwavering critic in this regard, but similar sentiments can be found in Salanié (2011). Slemrod's main criticism of the optimal income tax theory is that it neither accounts for the existence of tax evasion and avoidance, nor the large implementation costs of collecting taxes (Slemrod, 1990). Similarly, Salanié (2011) points out that the implicit assumption of a benevolent planner who can determine tax rates as they please is unrealistic - it both ignores any political economy concerns of taxation, and assumes that the tax system can be immediately and drastically altered.

Lastly, the lack of robust results from optimal income tax theory further limits its usefulness for tax policy. In particular, results are not robust to changes in social welfare functions, individual preferences, and distribution of ability, resulting in few overarching conclusions (Creedy, 2009b). Additionally, as Creedy (2009a) notes, optimal tax models tend to simulate tax policies on small homogenous populations, which makes them ill-suited to capture population heterogeneity. He suggests that other methods, such as behavioural microsimulation and other empirical research, may be more useful for tax analysis.

However, Creedy (2009a) also provides a useful perspective on how to think about the lessons from optimal income tax theory. He notes that

> *"The extensive optimal tax literature does not provide … clear guidance, but instead has clarified the precise way in which the optimal tax system depends on a wide range of factors, some of which relate to value judgements while others concern behavioural responses or basic conditions, such as abilities, which display considerable heterogeneity in practice." (p.503-504)*

Perhaps the strength of optimal tax theory lies in its ability to concisely formulate the problem of selecting a system of taxation in which a number of concerns pulls in different directions. Using Mirrlees' framework of considering inequality, behavioural reactions to taxation, and a (suitable) social welfare function may prove very beneficial if the lessons from optimal taxation's critics are also incorporated.

2.2 Personal income tax in South Africa

Having discussed the optimal tax literature and its significance for actual policy, we can move on to discussing the actual personal income tax system in South Africa. Personal income tax is the largest component of South Africa's tax revenue. In 2014/15, it contributed 36.4% of total tax revenue and was 9.2% the size of GDP (National Treasury and South African Revenue Service, 2016). Personal income tax is levied on taxable income[7] of individuals and trusts. For most individuals, taxable income is received as salaries, wages, pensions or annuity payments, and investment income (The National Treasury of South Africa and South African Revenue Service, 2016). Individuals are required to pay tax if they earn more than R75 000 a year if they are below 65 years old[8] (The National Treasury of South Africa, 2016). Effectively, this means that a large share of the South African population earns less than the tax threshold and is not liable to pay personal income tax. The structure of personal income tax is progressive, with marginal tax rates varying between 18% and 41%, as seen in table 2.1. The combination of these two factors means that a small minority of the population pays the majority of the tax. Table 2.2 shows that the top 10(20) percent of the income distribution pays 86.9(97.5) percent of personal income tax. Hence, in constructing the present South African personal income tax system, special attention has been given to inequality reduction. The next chapter will investigate how this has changed over time by measuring progressivity of the personal income tax in the years 1995-2016.

[7] Taxable income consists of gross income minus exemptions and deductions.
[8] The tax threshold rises to R116 150 and R129 850 for individuals above age 65 and 75, respectively.

Table 2.1 Tax rates for individuals – 2017 tax year

Taxable income (R)	Rates of tax (R)
0 – 188 000	18% of taxable income
188 001 – 293 600	33 840 + 26% of taxable income above 188 000
293 601 – 406 400	61 296 + 31% of taxable income above 293 600
406 401 – 550 100	96 264 + 36% of taxable income above 406 400
550 101 – 701 300	147 996 + 39% of taxable income above 550 100
701 301 and above	206 964 + 41% of taxable income above 701 300
Rebates	
Primary	R13 500
Secondary	R7 407
Tertiary	R2 466
Tax thresholds	
Below age 65	R75 000
Age 65 and over	R116 150
Age 75 and over	R129 850

Source: Budget Review 2016 (The National Treasury of South Africa, 2016)

Table 2.2 Market income distribution and concentration shares of personal income tax

Decile	Market income	Personal income taxes
1	0.1 %	0.0%
2	0.2%	0.0%
3	0.5%	0.0%
4	0.8%	0.0%
5	1.5%	0.0%
6	2.7%	0.1%
7	4.5%	0.4%
8	8.3%	2.0%
9	17.7%	10.6%
10	63.7%	86.9%

Source: Inchauste et al. (2015)

Chapter 3
Progressivity in South Africa's personal income tax, 1996-2017

This chapter investigates how the progressivity in South Africa's personal income tax changed between 1996 and 2017. To do this, it is first necessary to define what is meant by progressivity and how it can be measured. Chapter 3.1 discusses different progressivity measures and the decisions that must be made in deciding on which progressivity measures to use. It finishes with a closer look at the Kakwani index and how it has been used in the South African tax literature. Chapter 3.2 briefly describes the methodology used in this chapter to assess progressivity changes, while chapter 3.3 presents the results.

3.1 Measuring progressivity

In the optimal tax literature, progressivity is implicitly rather than explicitly addressed. This is in the sense that the relative tax burden of income groups and the composition of tax is decided, but rarely with a focus on progressivity in itself. But in this analysis it is necessary to make explicit the meaning of tax progressivity. In the general sense, a tax system is progressive if the percentage of income paid in taxes increases with income. However, it is often unclear how one should measure the degree of progressivity, or how progressivity can be compared between countries or over time. In the academic literature, a number of progressivity measures exist. Therefore, to avoid confusion and ensure replicability of results, it is important in any analysis of tax progressivity to specify which measure(s) one is using and why.

There have traditionally been two main types of progressivity measures: local and global measures. Local measures of tax progression use only the properties of the tax schedule to determine progressivity, but disregard the income distribution it is applied to (Seidl, 2009). Examples of local progressivity measures are the tax elasticity and the residual income elasticity (Jakobsson, 1976). As noted by Seidl (2009), the biggest limitation of the local measures of tax progression is that they measure progressivity independently of the income distribution. This ignores the issue that changes to the income distribution can alter how progressive a tax is, even if the tax code remains unchanged. As an example, consider a situation where the tax code remains constant, while the incomes of high income earners increase relative to the rest of the distribution. If they are subject to the same tax rates as before, their proportion of total tax paid in society will have decreased, implying a decrease in progressivity.

Global progressivity measures use both the distribution of tax liability and the distribution of incomes to calculate progressivity. They can therefore easily be graphically illustrated using Lorenz and tax distribution curves, as seen in Figure 1 below.

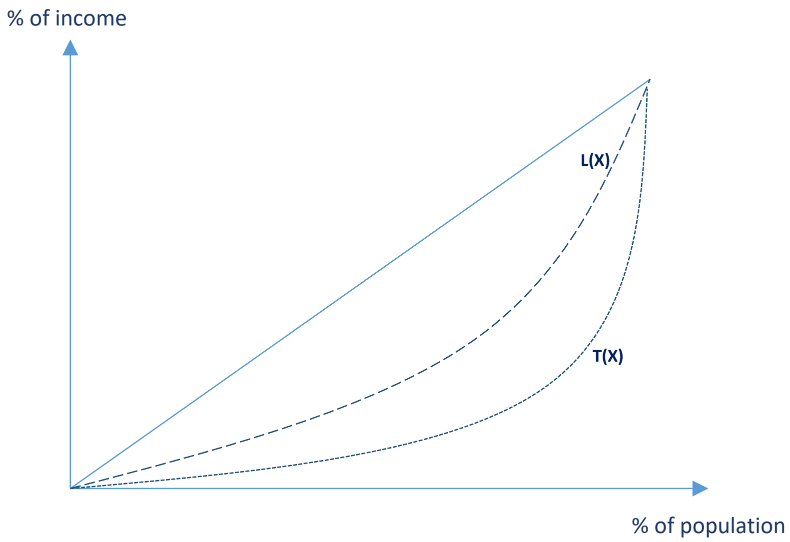


Figure 3.1 Lorenz and tax distribution curves

The most basic global measure is the one by Reynolds and Smolensky (1977), which is simply the difference between the distribution of gross and net incomes (i.e. the area between the Lorenz curve L(X) and the tax distribution curve T(X)). The Reynolds-Smolensky index is also often referred to as the "redistributive effect". The other global measures are mostly extensions of this measure. Two widely used global progressivity measures are the Suits index (Suits, 1977) and the Kakwani index (Kakwani, 1977). Of these, the Kakwani index is the most widely used. Simply put, the Kakwani index – often referred to as the disproportionality index – measures the difference between convexity of the Lorenz curve L(X) and the tax distribution curve T(X). A benefit of the Kakwani index is that, unlike the Reynolds-Smolensky index, it is scale invariant (Thoresen, 2004). Recently, Stroup (2005) suggested an alternative global measure, which instead of measuring the difference, measures the ratio of convexity of the Lorenz and the tax distribution curves (Stroup and Hubbard, 2013). The global tax measures have the advantage of being applicable to different tax systems and income distributions, which makes intertemporal and between-country comparisons possible. However, as pointed out by Pogorelskiy, Seidl and Traub (2010, p.1), aggregating across the whole income distribution can lead to counterintuitive results – for instance, a tax system which is regressive over certain intervals may be considered more progressive than a tax which is progressive across the distribution.

There are also other, less orthodox, methods for assessing progressivity. Piketty and Saez (2006) compare the before-and-after tax incomes of different income deciles to show that higher earning individuals pay a larger percentage of their incomes in taxes than others. However, their interpretation of these results is less rigorous. As critiqued by Stroup and Hubbard (2013), they do not have a clear way to measure changes in progressivity. Instead, they use the change in tax rates for the top 1% of income earners as an indication of changes in progressivity overall. Stroup and Hubbard emphasise that ignoring the changes for rest of the income distribution is problematic for their conclusions about progressivity: Piketty and Saez's claim that progressivity declined between 1960 and 2004 because tax rates for the top 1% declined ignores the fact that the 20th-40th percentiles experienced lower tax rates in the same period. Unless the weighting of high versus low income earners is made clear, it is highly problematic to assess progressivity based on changes for specific income groups. Kakinaka and Pereira (2006) propose an alternative progressivity measure which differs strongly from other measures in the literature. They use macro data to create a progressivity measure based on the relative volatility of tax revenue and aggregate income (Kakinaka and Pereira, 2006). While this is undeniably a clever approach which carries the advantage of using data that is easier to get hold of – in particular in countries with less access to good micro data – it ultimately does not provide any insight into the income distribution and tax structure, reducing its relevance for a dissertation like this. Lastly, Pogorelskiy, Seidl and Traub (2010) suggest a new progressivity measure which they refer to as "uniform tax progression for different income distributions". Their methodology allows one to compare tax progressivity using dominance relations of different income distributions.

There is no obvious answer as to which tax progressivity measure is best. Mostly, it depends on which situation is being assessed – whether the income distribution is fixed, whether one is comparing between countries, and so on. The literature discussing tax progressivity and targeting of transfers in the South African context (Inchauste et al., 2015; van der Berg, 2009; Nyamongo and Schoeman, 2007; Van Heerden and Schoeman, 2010; Steenekamp, 2012b), have, when using specific measures of progressivity, mostly used the Kakwani index. This is likely for several reasons, in particular because it is a simple and intuitive tool for comparing tax progressivity over time and between countries. The Kakwani index has been used in South Africa both to compare changes in progressivity within South Africa over time, but also to compare its progressivity with that of other countries. Nyamongo and Schoeman (2007) assess the change in progressivity of personal income tax in South Africa between 1989 and 2003, and find that, using the Kakwani index, progressivity increased between 1989 and 1990 and during the first phase of reform programmes 1990-1994, but decreased in the second phase of tax reform programmes. The findings are the same if using a redistributive progressivity measure, except for in the first phase of reform, where this measures shows a decrease in progressivity. This is interesting to note because it highlights that conclusions about progressivity depend explicitly on which measure is being used, and that results from different progressivity measures can be contradictory.

To the best of my knowledge, there have been no studies assessing the change in progressivity of personal income tax in South Africa after 2003, but Inchauste et al. (2015) provides an international comparison of progressivity (as measured by the Kakwani index) of the personal income tax and payroll tax combined . Comparing South Africa, Brazil and Mexico, they find that the countries' Kakwani indices are 0.13, 0.27 and 0.30, respectively. They explain that the large differential between South Africa and the two other countries stems from South Africa's higher inequality combined with a lower tax progressivity at the bottom end of the income distribution. If the Kakwani index would have been calculated on the total system of income tax and transfers, the latter effect and the differential might be lower.

3.2 Methodology: progressivity 1996-2017

To assess the progressivity of personal income tax over time, chapter 3.3 starts with a graphic simulation of how the net incomes of representative taxpayers have changed. Specifically, this entails that the personal income tax code[9] of years 1996 to 2017 will be applied to representative taxpayers with gross earnings of R1 000 000, R500 000, R250 000, and R100 000, assuming that their gross income was constant over this time period. Medical aid tax credits and deductions are not included in these illustrations of net incomes as their sizes depend on other factors than income, which may affect their interpretation. While these illustrations do not show changes in overall progressivity, they provide a visual starting point for further discussions. To disaggregate the underlying factors behind progressivity change over this period, chapter 3.3 further analyses the changes in marginal tax rates, tax liability thresholds, and tax treatment of medical expenses and medical aid contributions.

Lastly, chapter 3.4 calculates overall progressivity for the years in question. This is done using the dataset of net incomes for years 1995 to 2016, whose construction was explained in chapter 1.1. Since we do not have the income distributions for each of these years, the underlying income distribution of these datasets comes from Wave 4 of NIDS. The progressivity calculations therefore assume that the income distribution for all years is identical to that of 2015, and the results should therefore be interpreted as *the progressivity of the tax code*, rather than of the tax system. The changes in overall progressivity are calculated using pre- and post-tax Gini coefficients as well Kakwani indices for the different years. The Gini coefficients illustrate to what extent personal income tax is effective in reducing income inequality, while the Kakwani index gives a measure of how progressive the tax system is in a given year. While Gini coefficients are

[9] The tax codes and brackets have all been adjusted to 2015 Rands

well-known, the section below aims to give a more detailed description of the Kakwani index and how it should be interpreted.

The Kakwani index (Kakwani, 1977) is the difference between the concentration index of taxes (C_t) and the Gini index of before-tax incomes (G_x)[10] (shown in equation 3.1).

$$K = C_t - G_x \tag{3.1}$$

C_t is defined as one minus twice the area under the concentration curve (Jenkins, 1988), i.e.

$$C_t = 1 - 2\int_0^x F_i[t(x)]dF(x) \tag{3.2}$$

G_x is defined as one minus twice the area under the Lorenz curve, i.e.

$$G_x = 1 - 2\int_0^x F_i(x)dF(x) \tag{3.3}$$

The Kakwani index can therefore be shown to be twice the area between the tax concentration curve and the Lorenz curve. A Kakwani index of zero implies that the tax system is proportional or neutral, and the index can therefore be thought of as an index of "departure from proportionality" (Verbist and Figari, 2014, p.4). A positive Kakwani index departs from proportionality of taxation towards progressivity, and therefore implies a progressive tax system. A negative Kakwani index implies a regressive tax system. The Kakwani index varies between -2 and 1, where -2 implies serious regressivity and 1 implies very high progressivity (De Maio, 2007). International standard dictates that values between -0.1 and 0.1 indicate a neutral tax system (Inchauste et al., 2015). Since it is based on the Lorenz curve and the tax concentration curve, some of its limitations will be similar to those of the Gini coefficient, namely that it does not

[10] The Gini index is defined as one minus twice the area under the Lorenz curve, while the concentration index of taxes is defined as one minus twice the area under the concentration curve.

differentiate between different types of inequality, and is more sensitive to values in the middle of the income distribution (De Maio, 2007).

3.3 Results

Evaluating the progressivity of the South African personal income tax code between 1996 and 2017 is not entirely straightforward. Over this time period, there have been several counteracting changes in the personal income tax code, leading to somewhat ambiguous results. The top marginal tax rate decreased from 45% to 40% in the early 2000s and stayed the same until it was increased to 41% in 2016, indicating decreased progressivity. However, over the same time period, the lower threshold for tax liability increased, which exempted many lower income earners from paying tax. This indicates increased personal income tax progressivity. Furthermore, the system for medical aid and expenditure deductions has changed significantly over this time period, and a system of medical aid tax credits was introduced in 2013 to increase its progressivity. This subchapter presents the changes in the personal income tax code between 1996 and 2017 and their impact on tax progressivity. It will then present the changes in overall progressivity as measured by the pre- and post-tax Gini coefficient and the Kakwani index.

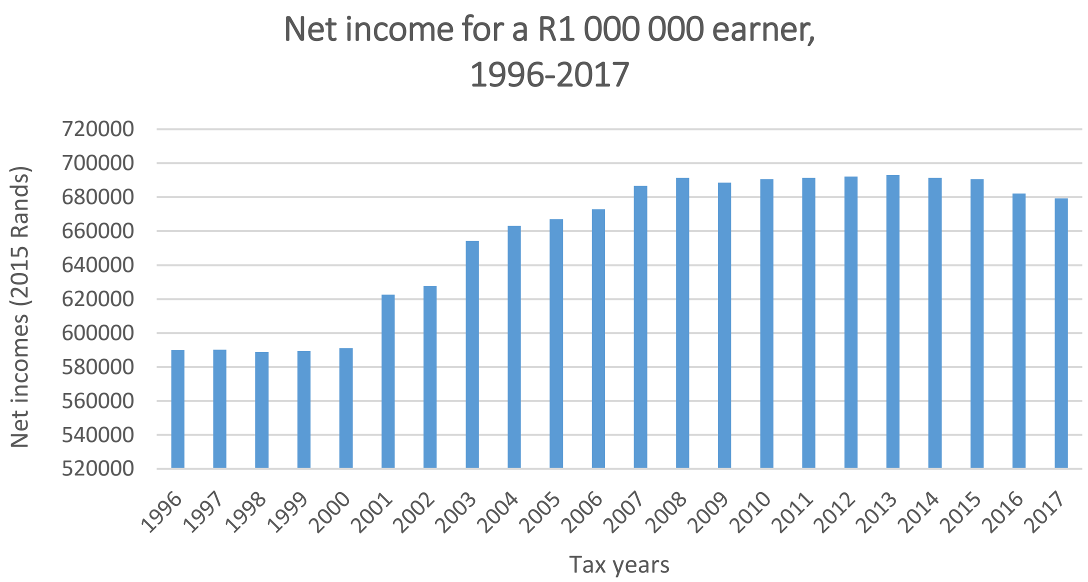
Tax liability of representative tax payers

To get an impression of how the personal income tax code has changed between 1996 and 2017, it can first be useful to look at how the changes affected representative tax payers over this time period. In essence, we ask the question: if a person had a constant gross taxable income over this time period, how would that person's net income vary? To illustrate this, the net incomes of earners of R1 000 000, R500 000, R250 000, and R100 000 between 1996 and 2017 are presented in figures 3.2-3.5 below[11]. For all these earners, net incomes were at their highest in 2013 and at their lowest in 1998 or 1999, meaning that 2013 was the year where they all had their lowest tax liability and 1998/99 the years with the highest liability.

[11] Tax thresholds and fixed taxes are all adjusted to 2015 rand to ensure comparability

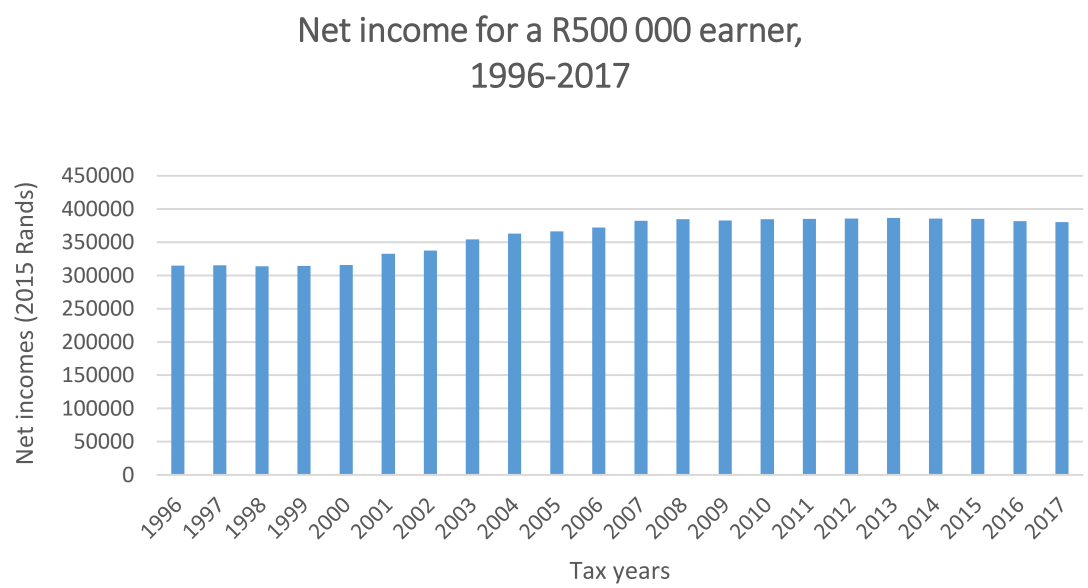
However, some of the earners experienced more drastic decreases in their tax liability between 1998/99 and 2013. Specifically, the R500 000 and R250 000 earners experienced increases in their net incomes by 23.2% and 21.6% between 1998 and 2013. In monetary terms, this means that a person earning R500 000 would have a net income of R313 776 in 1998 and R386 502 in 2013, and that someone earning R250 000 would have a net income of R176 039 in 1998 and R214 052 in 2013. The R1 000 000 earner also experienced a significant change between 1998 and 2013. In 1998 they would have earned a net income of R588 776, while by 2013; the same person's net income would have increased by 17.7% to R693 004. The earner who experienced the smallest difference is the R100 000 earner – in 1998 their net income would be R87 729, while in 2013 it would be R95 417 – a difference of only 8.8%.

In terms of years of large changes, 2001 and 2003 especially stand out for the R1 000 000 and R500 000 earners. This is because these two years saw a large decrease in the top marginal tax rates, first from 45% to 42% and then from 42% to 40%, to which both groups were subjected. For the R1 000 000 earner, their net income increased by 5.3% from 2000 to 2001, and a further 4.2% from 2000 to 2003. The net income of the R500 000 earner increased by 5.2% from 2000 to 2001, and a further 4.9% from 2002 to 2003.



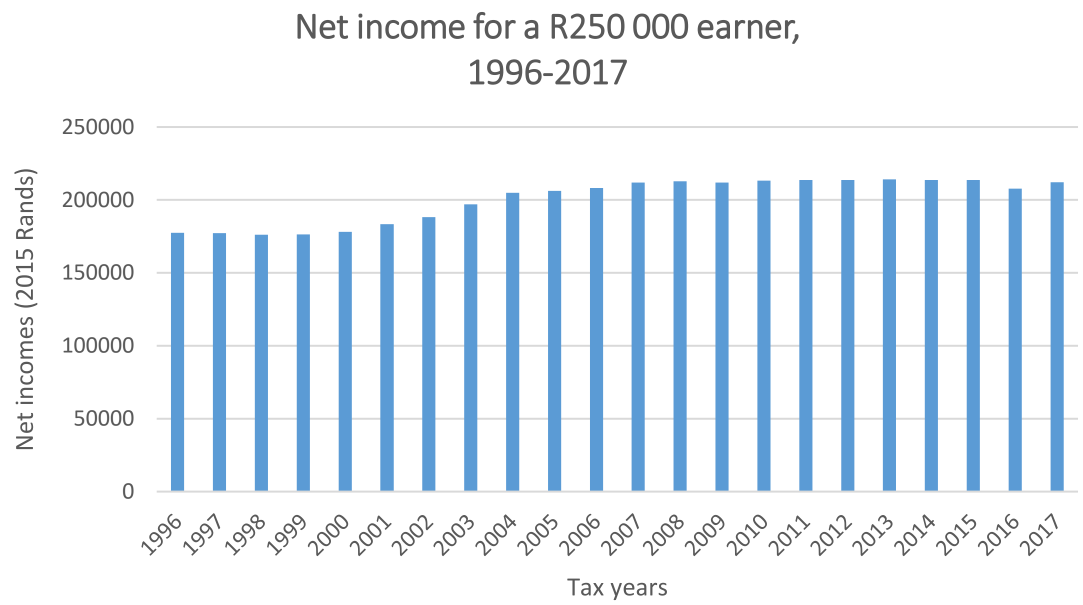
Source: Own calculations using tax codes 1996-2017 from Budget Reviews 1995-2016 (Department of Finance, 1995-1997, The National Treasury of South Africa, 1998-2016). All numbers in 2015 Rands.

Figure 3.2 Net income for a R1 000 000 earner, 1996-2017.



Source: Own calculations using tax codes 1996-2017 from Budget Reviews 1995-2016 (Department of Finance, 1995-1997, The National Treasury of South Africa, 1998-2016). All numbers in 2015 Rands.

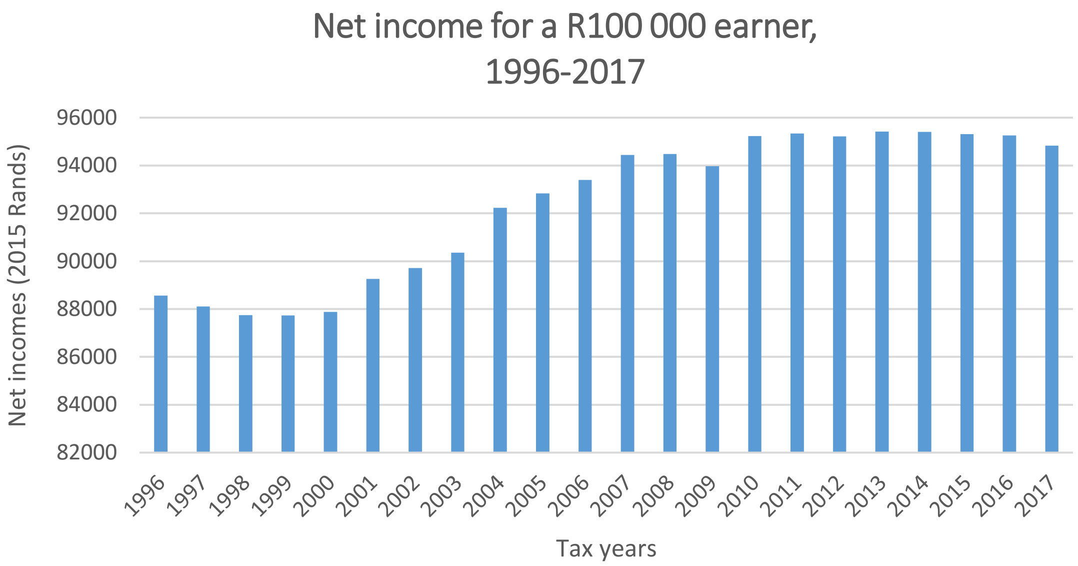
Figure 3.3 Net income for a R500 000 earner, 1996-2017.



Source: Own calculations using tax codes 1996-2017 from Budget Reviews 1995-2016 (Department of Finance, 1995-1997, The National Treasury of South Africa, 1998-2016), all numbers in 2015 Rands.

Figure 3.4: Net income for a R250 000 earner, 1996-2017.

For the R250 000 earner, the biggest change in net incomes was between 2002 and 2003, when their income increased by 4.6% from R188 262 to R196 910. Their net incomes increased further quite drastically between 2003 and 2004, from R196 910 and R204 954, a difference of 4.1%. Both the years 2002-2003 and 2003-2004 saw a 5% decrease in marginal tax rates for this income group, first from 40% to 35%, followed by a decrease from 35% to 30%. This income group also saw another big decrease in their marginal tax rate between 2006 and 2007 from 30% to 25%, but this had a smaller effect on net incomes which only increased by 1.8%.



Source: Own calculations using tax codes 1996-2017 from Budget Reviews 1995-2016 (Department of Finance, 1995-1997, The National Treasury of South Africa, 1998-2016), all numbers in 2015 Rands.

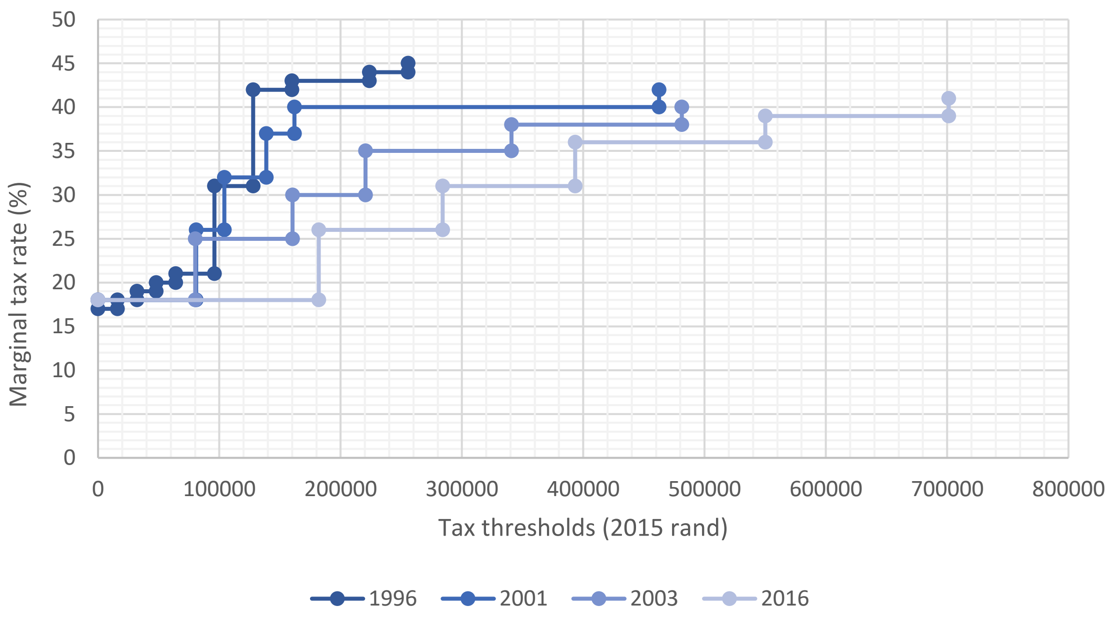
Figure 3.5 Net income for a R100 000 earner, 1996-2017.

The R100 000 earner saw the largest difference in net incomes between 2000 and 2001 when the marginal tax they were subject to decreased from 30% to 26%, and between 2003 and 2004 when their marginal tax decreased from 25% to 18%. From 2000 to 2001, the R100 000 earner's net income increased by 1.6%, while it increased by 2.1% between 2003 and 2004.

All earners except the R100 000 earner saw a tax increase of 1% in their marginal taxes between 2015 and 2016. However, since it is such a small increase it did not have a large effect on the net incomes of these earners – the R1 000 000, R500 000, and R250 000 earners only saw their net incomes decrease by 1.23%, 0.88% and 2.7%, respectively. From 2004, the R100 000 earner would be in the lowest tax threshold, for which the marginal taxes have neither increased nor decreased. Noting this, one might mistakenly think that there was little change in the progressivity at the bottom end of the distribution. However, while there was little change in progressivity for those in the lowest tax thresholds, the tax thresholds themselves increased over the same time period, exempting many lower income groups from paying tax. In particular, this was the case between 2003 and 2013, where the minimum threshold for tax liability increased from R54 142 to R74 539 – an increase of 37.7%.

Drivers of progressivity change

Three main drivers of progressivity change between 1996 and 2017 can be identified: decreases in top marginal tax rates, increased tax thresholds for tax liability, and increased progressivity in the tax treatment of medical aid contributions and medical expenses. Figure 3.6 below illustrates marginal tax rates and tax thresholds in years of reform; 1996, 2001, 2003, and 2016. The first thing to notice is that the slope of the marginal tax schedule decreased between 1996 and 2016, meaning that a larger increase in one's income was required to move into a higher tax bracket. The second change is that the top marginal tax rate decreased from 45% in 1996 to 42% in 2001 and 40% in 2003, and then only increased again to 41% in 2016.



Source: Budget Reviews 1995 (Department of Finance, 1995), 2001, 2003 and 2016 (The National Treasury of South Africa, 2001, 2003, 2016)

Figure 3.6 Marginal tax rates on income in 1996, 2001, 2003, and 2016

One can further see that there were more tax brackets in the 1996 tax code than there have been since – in 1996 there were ten different tax brackets with different marginal tax rates, while from 1999 onwards there were only six. The marginal tax rates for the four top brackets in 1996 were higher than for the top income brackets in 2001, 2003, and 2016. These reductions in the top marginal tax rates and decrease in the tax liability of higher income earners indicates a reduction in tax progressivity.

As previously mentioned, the lower threshold for tax liability changed significantly between tax years 1996 and 2017, even when the thresholds are adjusted for inflation. In 1996, only earners with a taxable income above R46 321 in 2015 Rands were liable to pay tax, while in 2013 this threshold had increased to R74 126 – a difference of almost R30 000. This means that many people at the lower end of the earnings distribution who would have been liable to pay tax in 1996 would not have been so in 2013. Since this change of paying less tax due to threshold increases affected only lower income earners, it indicates an increase in overall tax progressivity. However, it should be kept in mind that these threshold changes have not impacted those at the very bottom of the income distribution, as anyone with yearly taxable incomes below R46 321 would not have been liable to pay tax over this time period at all. Interestingly, the increase in tax thresholds happened over the same period as the reduction in top marginal tax rates, indicating that tax relief took place both at the top and bottom end of the income distribution.

From my own calculations, the average income tax rates have steadily declined since the late 1990s. This makes intuitive sense considering that fewer people are liable to pay tax (and thus face a tax rate of zero) combined with lower marginal tax rates at the top end of the income distribution. While the average tax rate for all individuals with income data in the sample was 26.5% in 1997, it was 12.5% in 2015. Important to keep in mind is that since these average rates are calculated by applying tax codes to the Wave 4 of the NIDS dataset, they do not reflect the average rates of the populations in other years, but rather the average tax rates of the tax code when applied to the 2014/15 income distribution.

Another key factor which impacted the progressivity of the personal income tax code in South Africa was the change in the tax treatment of medical aid contributions and medical expenditures, both of which have qualified for significant deductions and rebates. As shown in table 3.1 below, which summarises the tax treatment of medical aid contributions and medical expenditure between 1996 and 2017, three main policies have been in place. From 1996 to 2006, all medical expenditure above a specified threshold was deductible. Then, from 2007 to 2012, the monthly deductions for medical scheme contributions were capped to enhance the equity of the deduction system. Additional expenditure above a set threshold was still deductible. From 2013 onward, the medical scheme deductions were replaced by a fixed monthly tax credit for medical aid contributions, with partial deductions for additional expenditure above a threshold. In addition to incentivising medical aid scheme uptake, one of the main motivations behind the conversion to tax credits was to further increase progressivity of the tax treatment of medical aid contributions. This change would avoid rewarding those who can afford more expensive medical schemes with larger tax deductions.

Table 3.1 Tax treatment of medical aid contributions and medical expenses, 1996-2017

	1996-2003	2003-2006	2007-2012
Under 65	Medical expenditure exceeding the greater of 5% of taxable income or R1000 is deductible	Medical expenditure exceeding 5% of taxable income is deductible	Medical scheme contributions up to a set amount (R824-893 for self + first dependant and R445-553 for additional dependants) are deductible. Additional expenditure on medical expenses schemes and other medical expenditure as exceed 7.5% of taxable income are deductible.
Over 65	All qualifying medical expenditure is deductible.	All qualifying medical expenditure is deductible.	All qualifying medical expenditure is deductible.
Disabled	Medical expenditure exceeding R500 is deductible.	Medical expenditure exceeding R500 is deductible.	All qualifying medical expenditure is deductible.

	2013-2014	2015-2017
Under 65	Medical aid tax credits (R268-270 for self + first dependant, R180-181 for additional dependants). Balance of contributions exceeding 4 times the tax credit are deductible, as are qualifying out-of-pocket medical expenses exceeding 7.5% of taxable income.	Medical aid tax credits (R269-R272 for self + first dependant, R180-182 for additional dependants). Balance of contributions exceeding 4 times the tax credit are deductible, as are qualifying out-of-pocket medical expenses exceeding 7.5% of taxable income.
Over 65	All qualifying medical expenditure is deductible.	Medical aid tax credits (R269-272 for self + first dependant, R180-182 for additional dependants). 33.3% of medical scheme contributions as exceed 3 times the tax credit, as well as 33.3% of all medical expenditure are tax deductible.
Disabled	Medical aid tax credits (R268-270 for self and first dependant and R180-181 for additional dependants). Balance of contributions exceeding 4 times the tax credit is deductible, as are all qualifying out-of-pocket medical expenses.	Medical aid tax credits (R269-272 for self + first dependant, R180-182 for additional dependants). 33.3% of medical scheme contributions as exceed 3 times the tax credit, as well as 33.3% of all medical expenditure are tax deductible.

Source: South African Revenue Service (2004-2016)

Measures of overall progressivity

As previously noted, changes in the personal income tax code between 1996 and 2017 have pulled in different directions. This is reflected in the progressivity statistics. Firstly, we can see from table 3.2 that the pre-tax Gini coefficient of per capita taxable income in NIDS Wave 4 is 0.8006. The tax years with the lowest post-tax Gini coefficients are 1997 and 1999, where they take the value of 0.7543. In later years, the personal income tax code appears to have become less inequality-reducing, with the post-tax Gini coefficient rising steadily to 0.7727 in 2015. Looking at these pre- and post-tax Gini coefficients one could conclude that the tax code has become less progressive over time. However, if one considers the Kakwani measure of tax progressivity, the progressivity of personal income tax has risen steadily since the late 1990s. For 1997, the Kakwani index takes a value of 0.1311, whereas it is 0.1982 for 2017.

Table 3.2 Progressivity measures of the personal income tax code, 1996-2017

	Tax year							
Measures	2017	2016	2015	2014	2013	2012	2011	2010
Pre-tax Gini	0.8006	0.8006	0.8006	0.8006	0.8006	0.8006	0.8006	0.8006
Post-tax Gini	0.771	0.7717	0.7727	0.7673	0.7678	0.7677	0.7673	0.7676
Average tax rate	0.1305	0.1299	0.1253	0.1638	0.1616	0.1795	0.1731	0.1802
Kakwani index	0.1982	0.1948	0.1956	0.1708	0.1711	0.1521	0.1597	0.152
	2009	2008	2007	2006	2005	2004	2003	2002
Pre-tax Gini	0.8006	0.8006	0.8006	0.8006	0.8006	0.8006	0.8006	0.8006
Post-tax Gini	0.7674	0.7677	0.7673	0.766	0.7653	0.765	0.7636	0.7599
Average tax rate	0.1854	0.1823	0.1842	0.1952	0.2003	0.2043	0.2165	0.2351
Kakwani index	0.1475	0.1494	0.1493	0.1447	0.1429	0.1406	0.1362	0.1347
	2001	2000	1999	1998	1997	1996		
Pre-tax Gini	0.8006	0.8006	0.8006	0.8006	0.8006	0.8006		
Post-tax Gini	0.759	0.7547	0.7543	0.7543	0.7543	0.7556		
Average tax rate	0.2421	0.2611	0.2634	0.2640	0.2652	0.2203		
Kakwani index	0.1326	0.1326	0.1321	0.1316	0.1311	0.1634		

Source: Own calculations using NIDS Wave 4 (2016) with Wave 4 survey weights and tax codes from Budget Reviews 1996-2017

As mentioned in chapter 3.2, the Kakwani index can be interpreted as a departure from proportionality, and proportionality would be indicated by Kakwani values between -0.1 and 0.1. Considering this, some of the Kakwani values given in table 3.2 are not far from proportionality. Remembering that the Kakwani index directly measures progressivity as the relative concentration of taxes compared to the concentration of incomes explains why the values are so low for South Africa - the income distribution is simply so unequal that the tax concentration would have to be much greater to get higher Kakwani values.

It may seem contradictory that the two progressivity statistics in this chapter point in opposite directions. In order to make sense of this result, we should note that while both are indicators of progressivity, they measure different dimensions of it. The pre- and post-tax Gini coefficients measure the inequality-reducing effect of personal income tax, while the Kakwani index measures the concentration of incomes relative to the concentration of pre-tax incomes. Given that we know that tax thresholds have increased and that the "average tax rate" has decreased over this time period, it makes intuitive sense that those who are paying tax have become fewer and that their tax burden has become more concentrated and hence, that the Kakwani index has increased. However, the inequality-reducing effect of taxation also depends on how high the top marginal tax rates are and how many people are paying taxes. Therefore, since we know that the top marginal tax rates decreased in the early 2000s, it makes sense that the post-tax Gini coefficient has increased over this time period. In conclusion, evaluating whether progressivity increased or decreased between 1996 and 2017 is not straightforward - if we consider the Kakwani index it has increased, but if we solely look at the pre- and post-tax Gini coefficient, progressivity has decreased.

Chapter 4
A negative income tax for South Africa

South Africa's social grants are mainly targeted towards the elderly, disabled, and children, leaving a large fraction of those vulnerable to and living in poverty without any social assistance. A negative income tax could change this. A negative income tax provides an income transfer to individuals with incomes below a certain threshold, which decreases with income and equals zero when it reaches the threshold (Zeckhauser, 1971; Ashenfelter and Plant, 1990). The size of the transfer is directly related to the recipient's income, so it specifically targets the poor. Since the only eligibility criterion for the negative income tax is to have an income below a certain threshold, it can benefit the large number of unemployed and working poor who fall between two chairs in the current transfer system.[12] This chapter explores the possibility of implementing a negative income tax in South Africa. Chapter 4.1 explains the basic characteristics of a negative income tax, while chapter 4.2 discusses the empirical literature on negative income taxes. Chapter 4.3 explains the methodology used to simulate a negative income tax policy for South Africa, and chapter 4.4 discusses the results.

4.1 Basic characteristics

Ashenfelter and Plant (1990) describe the basic set-up of a negative income tax as follows: if the recipient has no income, they will receive a guaranteed subsidy G. The subsidy D given to recipients with a positive income Y, is a decreasing function of income, decreasing at rate τ. As such, the income subsidy will be given by equations 4.1 and 4.2.

[12]In 2016, the unemployment rate ranged between 26.5% and 27.1% (Statistics South Africa, 2017b). Woolard and Klasen (2009) highlight that despite the high unemployment rate, unemployment insurance in South Africa is virtually nonexistent. Finn (2015) estimates that 5 448 263 people in South Africa can be considered "working poor".

$$D = G - \tau Y \text{ if } Y < \frac{G}{\tau} \quad (4.1)$$

$$D = 0 \text{ if } Y > \frac{G}{\tau} \quad (4.2)$$

The quantity $B = \frac{G}{\tau}$ is the "breakeven" quantity, and is the quantity at which the subsidy received is zero. If income equals the wage rate times the hours worked, the implicit wage rate for a low-income worker will be $Y = w(1 - \tau)$, since the subsidy will decrease by $w\tau$ for each hour worked. τ can therefore be referred to as the implicit tax rate or the take-back rate[13].

The negative income tax is administered through the tax system rather than by a separate social security unit. It functions almost exactly like the personal income tax except that instead of paying a net tax, individuals receive a net subsidy – hence its name. The only requirement for receiving the income subsidy is having an income below a certain threshold. Its conceptual and administrative simplicity makes it accessible and saves administrative costs. Furthermore, utilising the infrastructure of the already well-functioning South African tax system ensures reliability and accountability, and brings lower-income earners into the tax system. This is beneficial in terms of collecting tax data on lower income earners.

A negative income tax is similar to other income transfer programmes, such as the basic income grant and the earned income tax credit. The main difference between a negative income tax and a basic income grant is that while the basic income grant gives a set transfer to everyone, the negative income tax only gives an income subsidy to those below a set threshold, and it decreases with income (Tondani, 2009). If progressive taxation is used to finance a basic income grant, net transfers could be the same as with a negative income tax. This would make the two policies identical in practice[14], with individuals below the threshold getting a net transfer and individuals above getting a

[13] It can also be referred to as a marginal tax rate, but to avoid confusion with marginal taxes in other parts of the paper, I refrain from using that terminology.

[14] Of course, this does not mean that they would be identical in their ideology and political implications.

net tax. The basic income grant has received much attention in South Africa, both in policy circles and academic literature. Notably, the 2002 report by the Taylor Committee of Inquiry into a Comprehensive Social Security System for South Africa (based on a commissioned report by Economic Policy Research Unit (Samson *et al.*, 2002)) recommended the phasing in of a modest basic income grant (Barchiesi, 2007). While this policy suggestion was supported by many civil society organisations, including a BIG Coalition consisting of – among others – COSATU, various Christian organisations and Black Sash, it was not supported by the Treasury (Makino, 2003). Following this, there have been some contributions to the academic debate by for instance Standing and Samson (2003) and Seekings (2005), but the debate on a South African basic income grant has seemed to mostly die down. The earned income tax credit works similarly to a negative income tax, but includes a work requirement for the recipient (Rothstein, 2010), meaning that non-workers do not receive any transfer. If there is full employment, the earned income tax credit is identical to the negative income tax.

The two main parameters to be determined in a negative income tax are the guaranteed subsidy G and the implicit tax rate τ (Widerquist, 2005). If G is set too low, the negative income tax's ability to alleviate poverty diminishes, but if it is set too high work disincentive effects will be too large and the programme becomes fiscally unaffordable. A high τ lowers the programme costs, but increases work disincentives. One risks creating a poverty trap where individuals do not increase their work hours to avoid losing their income subsidy. A low τ increases work incentives, and policymakers concerned about this will therefore typically set τ at less than 100% (Tobin et al., 1967; Zeckhauser, 1971).[15] However, a low τ also increases the programme costs, and privileges the "less poor" over the poorest. The negative income tax's ability to reduce poverty therefore depends on its design and the size of its key parameters. For instance, it can be designed to eliminate headcount poverty for recipients by setting the guaranteed subsidy equal to the poverty line.

[15]This is to avoid a situation where a recipient will be unwilling to work an hour more because that hour will be "taxed away" anyway, leaving the same result as if they were to not work that extra hour.

The negative income tax can have a significant redistributive impact. This is supported by evidence from Abul Naga, Kolodziejczyk, and Mueller (2008), which shows that a negative income tax designed to eliminate poverty also reduces inequality more dramatically than other income maintenance schemes. Angyridis and Thompson (2015) similarly find that increasing the guaranteed subsidy both reduces relative and absolute poverty, and causes significant redistribution. They note, however, that in their study the results come "at the expense of a significant reduction of output" (Angyridis and Thompson, 2015, p.1). This is because tax rates must be very high to finance the negative income tax, which has distortive labour supply effects. This legitimises a concern raised by Golladay and Haveman (1976), who found that the negative output effects offsets the negative income tax's redistributional impact.

A simple income criterion may make the threshold lower for seeking assistance (Diamond, 1968), as it will not depend on previous work experience or any other criteria which could exclude the most needy[16]. However, it may lead people to decrease or manipulate their earnings to become eligible (Ashenfelter and Plant, 1990; Cox, 1998). It is unclear how large a risk this poses. In Joulfaian and Rider's (1996) survey of U.S. tax returns in 1988, they found underreporting income in the earned income tax credit to be modest.

Similarly, a frequently raised concern about the negative income tax is that it reduces labour supply. If both income and leisure are normal goods, classical theory dictates that with a negative income tax, individuals will decrease their work hours as leisure becomes relatively cheaper, absent any preference changes (Green, 1968, p.280). Gallaway (1966) argues that the labour supply response would be large enough to negate the positive effects of the negative income tax, and is therefore sceptical of its potential

[16]Unemployment insurance, for instance, is a short-term measure which requires previous work – clearly problematic in a country where many of the employed have no work experience or have been unemployed for a long period of time (Banerjee et al., 2008).

for reducing poverty, except for groups with already low levels of labour force participation. Diamond (1968) notes that there may also be disincentive effects for those above the poverty level, and that the negative income tax may in the long run affect saving patterns. The disincentive effects do not only have welfare implications, but also affect the size of the transfer which can be financed (Diamond, 1968). If people reduce work hours to qualify for the income subsidy, the number of eligible recipients would be larger.

Killingsworth (1976) challenges the classical theory by considering family labour supply models rather than individual labour supply models. In these models, the effect of the negative income tax on labour supply is indeterminate, and in certain cases positive. Notably, if a couple has an interdependent utility function where one person's utility not only depends on their own leisure and income but also on their partner's leisure, a negative income tax can increase labour supply. Killingsworth's results come with the limitation of only pertaining to couples who can adjust their labour supply on the intensive margin. However, if there are constraints to labour market participation[17], one can imagine a model where this holds for the extensive margin too. Similarly, Saez (2002) finds that the negative income tax is the optimal transfer programme if labour supply effects are concentrated on the intensive margin, but that a programme more similar to the earned income tax credit is optimal if they are concentrated on the extensive margin. Ultimately, the question of labour supply effects is an empirical one, and it is returned to in the following section on empirical research of the negative income tax.

4.2 Empirical research on the negative income tax

The empirical research on the negative income tax can be divided into two strands: the experimental literature, mostly focused on the negative income tax experiments in the United States, and the microsimulation literature, which has gained most traction in

[17] For instance, high job-seeking costs

European countries. There is little empirical literature with a developing country as the subject, save for one micro-macro simulation model for South Africa.

Experimental literature

The experimental literature on the negative income tax comes mainly from four US experiments that took place between 1968 and 1980 and one Canadian experiment from around the same time[18] (Widerquist, 2005). These experiments varied in sample size, recipient criteria and location (Robins, 1985; Widerquist, 2005). They also varied in the size of the guaranteed subsidy and the implicit tax rate. In the US experiments, the income guarantee varied between 50% and 148% of the poverty level, and the guarantees in the Canadian experiment were also near the poverty level at the time (Widerquist, 2005). A key motivation for the experiments was to empirically estimate their effect on the labour supply. While interpretations of the results from the experiments differ, most of the literature agrees that there was a non-negligible labour supply decrease. However, the experiments showed no evidence of large withdrawals from the labour force (Robins, 1985; Widerquist, 2005). Furthermore, there was no evidence that the work-effort response was large enough to threaten the fiscal viability of the negative income tax (Widerquist, 2005). The decrease in labour supply differed across gender and marital status – wives, single female heads, and youth reduced their labour supply significantly more than husbands (Robins, 1985). The magnitude of work effort reduction found in the five experiments ranged from 0.5% to 9% for husbands, 0% to 27% for wives, and 15% to 30% for single female heads. The labour supply for youth followed a similar pattern as wives and single female heads. Burtless and Hausman (1978) found that the negative income tax had a very small effect on the labour supply for a large part of the population, but that for a minority, the labour supply effect was substantial. The relative importance of income and substitution effects was contentious. While Burtless and Hausman (1978) found that the income effect played a far larger role than the

[18]The US experiments were the New Jersey Graduated Work Experiment (1968-1972), the Rural Income Maintenance Experiment (1970-1972), the Seattle/Denver Income Maintenance Experiment (1970-1980), and the Gary Income Maintenance Experiment (1971-1974). The Canadian experiment was the Manitoba Basic Annual Income Experiment (1975-1978).

substitution effect in determining the labour supply response, Robins (1985) found that the relative importance varied across gender and marital status, with substitution effects being the most important for wives, while income effects dominated for single female heads. The interpretation of racial differences in labour supply responses was also controversial. While Robins (1985) reported that black and Latino/Mexican participants had a larger labour supply response than white participants, Moffitt (1981, p. 25) stated that interracial differences "appear[ed] to be only a result of random statistical error".

There are several concerns regarding the validity of the results from the negative income tax experiments. One limitation results from the well-intended attempt to experiment with different values of the guaranteed subsidy and the implicit tax rate, making the numbers of participants in each treatment group relatively small (Ashenfelter and Plant, 1990). The small sample size was an issue for most of the experiments. The Seattle/Denver Income Maintenance Experiment had a much larger sample size than the other experiments, however, so its estimates are more precise (Robins, 1985). A second issue was that assignment to treatment groups was not random. Families with higher market incomes were more likely to receive more generous programmes (Widerquist, 2005; Ashenfelter and Plant, 1990), which may have introduced bias into the estimates. Further, attrition appeared to be closely related to the type of programme a family was assigned to (Ashenfelter and Plant, 1990). Other concerns were that the experiments took place only over the relative short term, that there was underreporting of incomes, and Hawthorne effects (Widerquist, 2005).

Microsimulation literature

There is also a substantial negative income tax literature which uses microsimulation models. While the negative income tax experiments took place in North America between 1968 and 1980, the microsimulation literature is more recent, and mostly focused on European countries. Simulations have been used to study the effect of a negative income tax for Denmark (Colombino et al., 2008), Finland (Honkanen, 2014), Italy (Aaberge, Colombino and Strøm, 2004; Narazani and Shima, 2008; Colombino et al., 2008), Portugal (Colombino et al., 2008), South Africa (Magnani and Badaoui, 2015), Switzerland (Abul Naga, Kolodziejczyk and Mueller, 2008), and the UK (Colombino et al. 2008). Most of the studies use microsimulation models, but Magnani and Badaoui (2015) use a micro-macro simulation model.

Aaberge, Colombino and Strøm (2004) use a behavioural microsimulation model to compare a negative income tax complemented with a flat tax to a workfare scheme and a flat tax scenario in Italy. Characteristics of the model include partners' simultaneous choices and constraints on choice of work hours, which the authors deem essential for the results. They find no evidence that a negative income tax creates participation disincentives or a poverty trap for the lowest two deciles. Further, they find that the negative income tax and workfare models are more equalising than a flat tax – the only decile that loses is the top decile. Lastly, the simulations show that labour supply wage elasticities are inversely related to income, suggesting that lower marginal tax rates will be more efficient for low income earners than high income earners. Narazani and Shima (2008) also simulate a negative income tax for Italy, and compares it to two similar programmes, a basic income grant and a workfare tax. The paper combines a static microsimulation model of EUROMOD and a labour supply model. As in Aaberge, Colombino and Strøm (2004) the negative income tax is complemented by a flat tax. They find that on the intensive margin, the labour supply changes from a negative income tax are small, and larger in the Southern than Northern Italy. The work disincentives are increasing in benefit level. They are larger (for males) at the lowest deciles, and decreases with income. On the extensive margin, the authors distinguish between full and part-time participation. For full-time participation, the extensive margin results follow the intensive margin results. However, for part-time participation, male labour supply is neutral to transfer size, while female labour supply decreases with size. Unsurprisingly, the more generous the scheme, the larger effect it has on reducing inequality. A negative income tax where the guaranteed subsidy is 75% of the poverty line decreases the Gini coefficient from 0.25 to 0.16 in Central and Southern Italy, and from 0.22 to 0.18 in Northern Italy, whereas a guaranteed subsidy of 57% of the poverty line reduces the Northern Gini to 0.24, while the Southern Gini remains the same.

Colombino et al. (2008) use EUROMOD to simulate the effects of a negative income tax for Denmark, Italy, Portugal, and the United Kingdom. It includes a negative income tax financed by a flat tax and a negative income tax financed by a progressive tax. Similarly to Aaberge, Colombino and Strøm (2004), they find that members of households with higher incomes have a less elastic labour supply, and therefore suggest that financing a negative income tax through a progressive tax better exploits these elasticities. Colombino et al. (2008) also find that in countries with low female participation rates, a negative income tax is more affordable than alternative guaranteed income schemes. Abul Naga, Kolodziejczyk and Mueller (2008) compare a variety of potential income maintenance schemes in Switzerland using microsimulation, including a full and a partial negative income tax[19]. The microsimulation model includes a tax-benefit model and a model of labour supply. The full negative income tax is designed to eliminate poverty with a guaranteed subsidy equal to subsistence expenditure, while the guaranteed subsidy of the partial negative income tax is 50% of subsistence expenditure. They find that the full negative income tax reduces income inequality most drastically of the maintenance schemes, reducing the Gini coefficient from 0.21 to 0.14. As it eliminates headcount poverty by design, the poverty headcount decreases from 3.3% to 0%. The partial negative income tax is less effective in reducing poverty and inequality, but is also less expensive to implement than the full negative income tax, which would require a linear tax rate of 62% to be viable. By contrast, the partial negative income tax would require a linear tax rate of 51%. It reduces the Gini coefficient to 0.162, and the poverty headcount to 1.1%. Honkanen (2014) compares a negative income tax to a basic income grant using SISU, a static microsimulation model for Finland. The paper finds that redistribution is more efficient if using a negative income tax than a basic income grant, but that the two policies are otherwise quite similar, as both can significantly reduce poverty and inequality. Compared to the current (2010) system, the negative income tax reduces the Gini coefficient from 0.27 to

[19]The other maintenance schemes assessed are a participation income covering 50% of subsistence cost of living, income support which tops up household resources to the level of subsistence expenditure, and a simplified form of the earned income tax credit.

0.23. The poverty rate – defined as under 50% of median income – decreases from 6.9% to 2.9% with the negative income tax.

Magnani and Badaoui (2015) appears to be the only study assessing a negative income tax for South Africa, and they use a micro-macro simulation model. Their proposed policy is a combination of a flat tax rate of 20% and a lump-sum transfer of R408 to everyone. While non-workers and informal sector workers receive the full transfer, workers in the formal sector only receive a net transfer if "their income is lower than the transfer divided by the flat rate" (Magnani and Badaoui 2015, p.20). An interesting addition is that informal sector workers are explicitly included and that their net transfer equals that of non-workers, regardless of income[20]. Since all recipients receive the same amount, calling the proposed policy a negative income tax is a bit of a misnomer, as it more closely resembles a basic income grant. However, the study is included because of the lack of similar studies for a South African (and developing country) context. It finds that the policy reduces poverty and inequality through reducing the level of unemployment. The poverty rate in the sample decreases from 34.4% to 32.6%, and the Gini coefficient decreases from 0.60 to 0.59. However, it also discourages labour market and formal sector participation while increasing the size of the informal sector.

4.3 Methodology

Chapter 4.4 simulates two negative income tax proposals, whose set-up is as follows: each individual between 18 and 59 years of age whose taxable income is less than R1309 (R670) per month, will receive a subsidy which equals R1309 (R670) minus their taxable income. This means that the implicit tax rate $\tau = 1$, and the income subsidy D received will be given by equations 4.3 and 4.4.

[20]The basic income and negative income tax literature typically does not explicitly include the informal sector. This may not be of large significance in a developed country with a small informal sector, but in a country with a large informal sector it may introduce fairness concerns with low-wage workers in the formal sector financing grants for their informal sector counterparts.

$$D = G - \mathrm{Y} \text{ if } \mathrm{Y} < \mathrm{G} \qquad (4.3)$$

$$D = 0 \; if \; Y > G \qquad (4.4)$$

If they have a taxable income of zero, they will receive the guaranteed subsidy of R1309 (R670) per month. Individuals with taxable incomes above R1309 (R670) will not receive any subsidy. The taxable income which determines eligibility is the same gross taxable income variable g discussed in chapter 1.2. The extra income from the negative income tax is added back to household income, from which poverty and inequality measures are calculated. The total costs of the potential negative income tax policies are calculated by scaling the total negative income tax subsidies up to the country level using survey weights.

Deciding on the size of the basic grant of the negative income tax

In this paper, the main proposed negative income tax has a guaranteed subsidy of R1309 per month, which is the upper-bound poverty line proposed in Budlender, Leibbrandt, and Woolard (2015) inflated to 2015 Rands. This is referred to as the upper-bound negative income tax from here on out. Additionally, a negative income tax policy which sets the guaranteed subsidy at the lower-bound poverty line of R670 per month is simulated (referred to as the lower-bound negative income tax). Pegging the negative income tax to a poverty line is standard practice in both the experimental and simulation literature. The American negative income tax experiments all set their guaranteed subsidies equal to between 50% and 150% of the poverty line, and the guaranteed subsidy in the Canadian experiment was a monetary amount close to the poverty line at the time (Widerquist, 2005). Similarly, several negative income tax microsimulations peg the guaranteed subsidy to a poverty line or similar measures - Abul Naga, Kolodziejczyk and Mueller (2008) simulate two grants which cover 50% and 100% of "subsistence expenditures", respectively, while Narazani and Shima (2008) simulate subsidies that vary between 25% and 100% of the poverty line. Others choose sizes which relate to other notions of what a basic income is or are of comparable size to other social transfers. De Jager, Graafland, and Gelauff (1996) set the guaranteed subsidy at 50% of the minimum wage, and Honkanen (2014) sets the subsidy at a level close to the Finnish basic unemployment allowance and guaranteed pension. The only

South African microsimulation of a policy similar to a negative income tax sets the transfer at R408 per month, which is similar in size to the food poverty line in Budlender, Leibbrandt and Woolard (2015) inflated to 2015 Rands, R421.

The main proposal uses the upper-bound poverty line constructed by Budlender, Leibbrandt and Woolard (2015) because it exists as a meaningful measure of poverty, and is easily interpreted, while also having transparent theoretical underpinnings. As Budlender, Leibbrandt and Woolard (2015) note, this upper-bound poverty line can be interpreted as the minimum level of expenditure required to cover basic food and non-food needs. They do not encourage use of the lower-bound poverty line as it lacks any intuitive interpretation as a measure of economic well-being. However, the second proposal is pegged to the lower-bound poverty line to illustrate the effects of a less costly negative income tax. While a monthly income of R1309 or R670 does not make one well off by any standard, it ensures a degree of income stability that can have a significant impact on a poor household.

Eligibility for receiving the negative income tax

Part of the appeal of the negative income tax is that its only criteria for eligibility is income. However, the negative income tax in this paper has a couple of additional criteria. Since the negative income tax is administered through the personal income tax system, the unit of taxation for the negative income tax is the individual. Hence, eligibility for and the size of the income subsidy received depend on one's individual rather than household income. This has some obvious drawbacks, including that some low- or no-income earners will share households with high income earners, and as such, may not actually be part of the intended recipient group. This issue could potentially be mitigated by having an upper limit on total household income, as is the case with the old-age pension. However, given that much of the appeal of the negative income tax is its simplicity as well as its symmetry with the personal income tax system, this negative income tax bases eligibility on individual income only.

Furthermore, the decision has been made to administer the negative income tax only to individuals over 18 and below age 60. This is because both the younger and older groups are already covered by social grants in South Africa - the child support grant and the old age pension, respectively. While the child support grant only gives R350 per month to recipients, the maximum amount of the old age pension is currently set at R1500 per month and is thus of a similar magnitude as the proposed negative income tax.

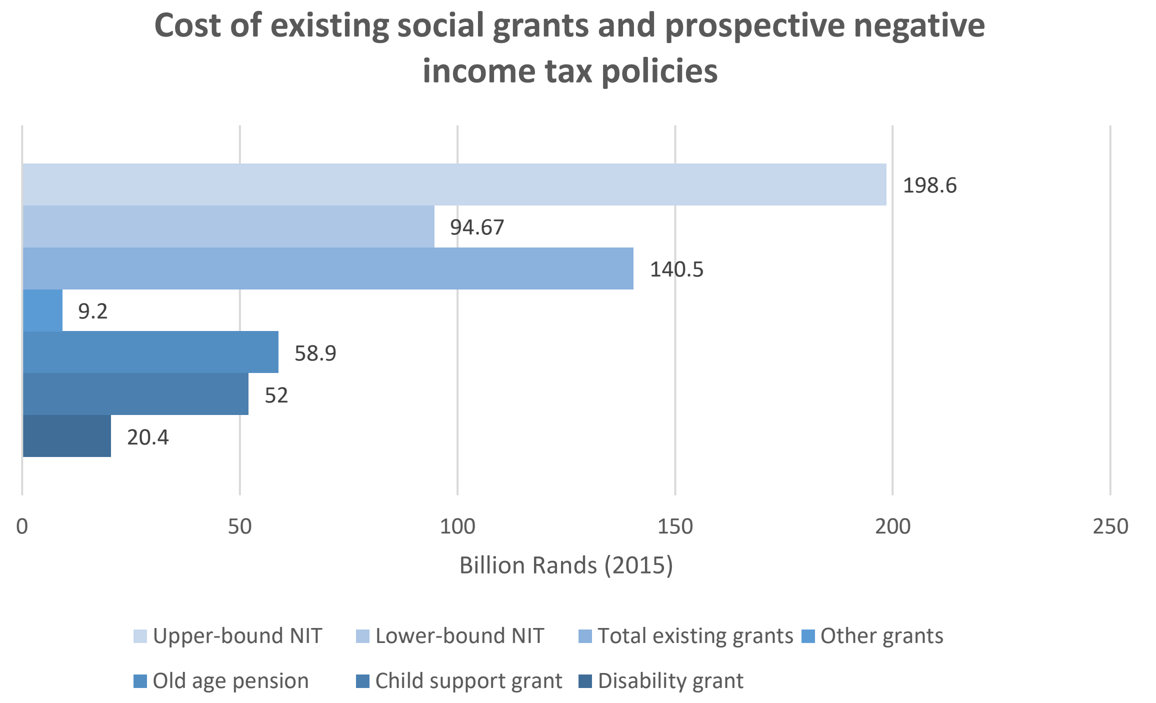
4.4 Results

This subchapter discusses the results of the negative income tax microsimulations. These results include the size and coverage of the two negative income tax policies, the demographics of the eligible negative income tax recipients, and the impact the two policies have on income inequality and poverty.

Size and coverage

By necessity, implementing a negative income tax in the South African context will be a large-scale project. Considering the proportion of the population living in poverty, any social grant or subsidy which targets the poor is costly. This is especially the case for the upper-bound negative income tax. Using the eligibility criteria outlined in chapter 4.3, 14.5 million individuals are eligible to receive an income subsidy through the upper-bound negative income tax. The average subsidy for a negative income tax recipient is R1 142, and 11.1 million people - or 76.8% of the eligible recipients - will receive the guaranteed subsidy of R1 309 per month. Assuming full uptake of the programme, the total cost for the upper-bound negative income tax programme is R16.5 billion per month, or R198.6 billion per year. In comparison, the combined cost of the child support grant, old age pension, and disability grant was R140.5 billion in 2016 (The National Treasury of South Africa, 2016). This means that in order to implement such a policy, the government would have to more than double their expenditure on social grants.

The lower-bound negative income tax differs in size, but is in all other respects identical to the upper-bound negative income tax. It is also significantly less expensive. This is mainly because the amount that eligible recipients receive is smaller. The number of eligible recipients also decreases, but not by a very large amount. This is because many of the eligible recipients are zero-income earners who in either policy scenario will receive the guaranteed subsidy. In the lower-bound negative income tax policy, 12.7 million individuals are eligible to receive and income subsidy. Of these, 11.1 million individuals (or 87.4% of eligible recipients) receive the full amount of R670 per month. The total cost for this programme totals at R7.9 billion per month, or R94.7 billion per year. Hence, the cost of the lower-bound negative income tax is less than half of the amount of the upper-bound negative income tax. To illustrate how these programmes compare to each other as well as the existing social grants, figure 4.1 below shows their costs. As is seen, due to their size, the negative income tax programmes are relatively expensive. While the financing of these programmes is not discussed in detail in this chapter, chapter 5 looks at the potential for increasing tax revenue through increased taxes at the top end of the income distribution. Chapter 6 discusses the negative income tax in light of this, and simulates a combined proposal of a negative income tax paid for by increased marginal tax rates for top income earners.



Source: 2016 Budget Review and own calculations using NIDS Wave 4 with Wave 4 survey weights.

Figure 4.1 Cost of existing social grants and prospective negative income tax policies

Who are the recipients?

The main reason a negative income tax is particularly suitable for South Africa is its ability to target parts of the population that do not have access to the existing social security system of grants, pensions and unemployment insurance. The design of the negative income tax proposals ensures that only individuals between 18 and 59 years with gross incomes less than R1309 and R670 are eligible to receive an income subsidy. Yet it is interesting to note the demographics of eligible recipients to see who is targeted by a negative income tax like this. What follows is a discussion of the characteristics of eligible recipients of the upper-bound negative income tax, and then see how they change with the lower-bound negative income tax.

Firstly, the upper-bound negative income tax reaches a fairly young subset of the population: 45.6% of eligible recipients are between 18 and 29 years old, and an additional 22.7% are between 30 and 39 years old. Considering that unemployment rates are particularly high for younger groups compared to the population as a whole, it should be seen as advantageous that the negative income tax is successful in targeting this subset of the population. In 2016, unemployment rates for individuals age 15-24 and 25-34 ranged between 50.9-54.5% and 31.2-32.1%, respectively, while unemployment rates for the population as a whole ranged between 26.5% and 27.1% (Statistics South Africa 2017b). Further, it can be noted that the vast majority of individuals eligible to receive the negative income tax are African. The proportion of eligible negative income tax recipients who are African is 85.6%, meaning that this population group makes up more than their population share of 80.4%. 8.2% and 2% of eligible negative income tax recipients are Coloured and Indian/Asian, meaning that these groups make up close to their population shares of 8.8% and 2.5%, respectively. Only 4.2% of eligible negative income tax recipients are White, meaning that White individuals only make up roughly half of their population share (8.3%). Another important feature of the individuals eligible for the negative income tax is that they are much less likely to be employed than the rest of the population. Only 22.2% of eligible negative income tax recipients are employed, while the proportion is 46.5% for the population as a whole. Of individuals eligible for the upper-bound negative income tax, 49.1% are not economically active and

28.6% are unemployed (of which 2.5% are discouraged workers and 26.1% are unemployed in the "strict" definition).

The majority of eligible negative income tax recipients are women. While women make up only 51.3% of the population, 61.6% of eligible negative income tax recipients are female. This raises the potential concern that many recipients with low incomes do not actually live in low-income households. While this concern is not entirely unfounded, it is also not as gendered as one might expect. While 31.2% of female negative income tax recipients belong to households with per capita incomes above R1309 per month, so do 34.2% of male negative income tax recipients. Combined with the feature that the mean household income for negative income tax recipients belonging to households with per capita incomes above R1309 per month is R3780, this suggests that it is not a large concern.

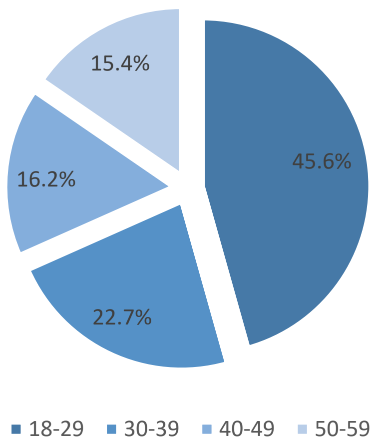


Figure 4.2 Age group

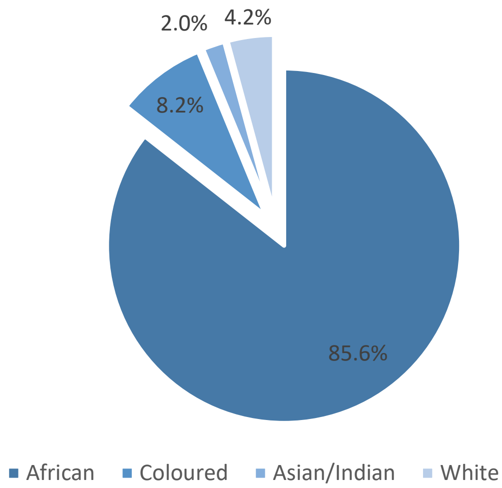


Figure 4.3 Population group

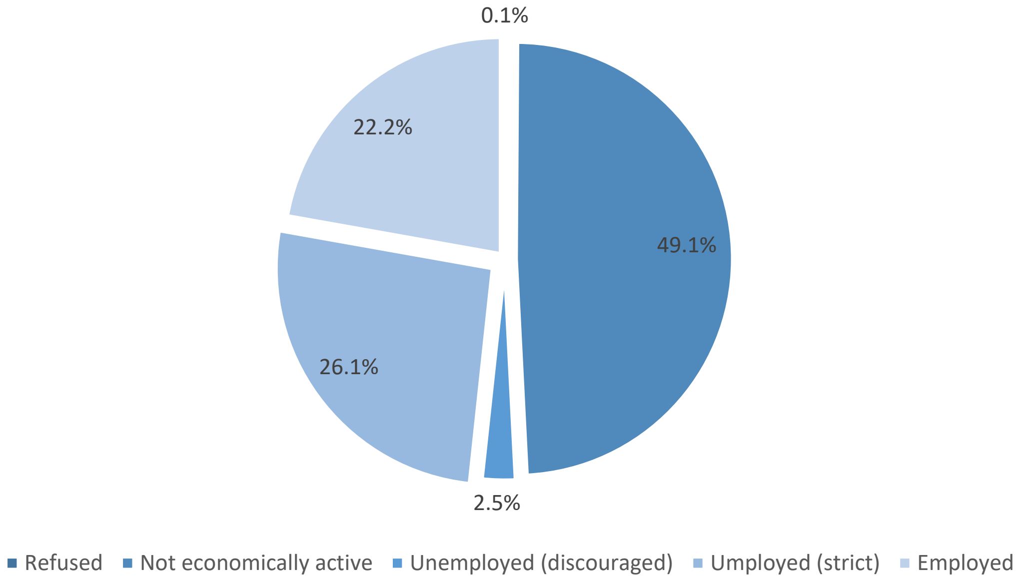
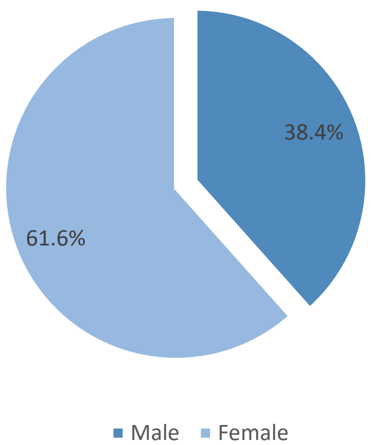


Figure 4.4 Employment status



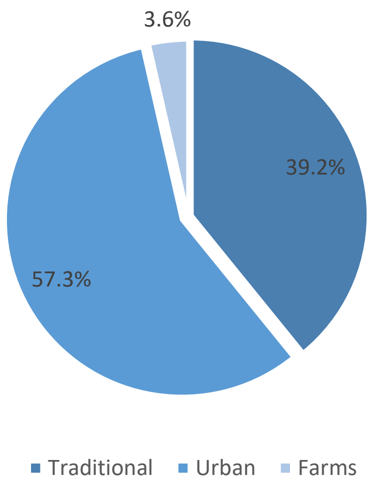


Figure 4.5 Gender

Figure 4.6 Geo-type

Figures 4.2-4.6: Demographic characteristics of individuals eligible to receive the upper-bound negative income tax. Source: Own calculations using NIDS Wave 4 with Wave 4 survey weights

Lastly, figure 4.6 shows that the majority (57.3%) of eligible recipients stays in urban areas. However, urban recipients make up slightly less than their population share of 62.1%. Eligible recipients in traditional areas make up more than their population share of 34%, with 39.2% of eligible negative income tax recipients staying traditional areas. Individuals living on farms make up 3.6% of eligible recipients, roughly the same as their population share of 4%.

The demographic factors of prospective negative income tax recipients do not appear to change significantly with the lower-bound negative income tax, except in the case of employment status. Only 11.8% of eligible recipients for the lower-bound negative income tax are employed, a 10.8 percentage point difference from the upper-bound negative income tax. 55.8% of eligible recipients are not economically active and 32.3% are unemployed (of which 2.8% are discouraged workers and 11.8% are unemployed in the "strict definition"). Much of the lack of change in the other characteristics can likely be attributed to the large number of zero-earners who are the same both in the upper- and lower-bound scenarios. In terms of age, there is a slight increase in the youngest cohort age 18-29 from making up 45.6% of recipients to 47.7%, corresponding to small decreases in the proportion of recipients ages 29-59. The gender composition is almost identical in the lower-bound scenario as in the upper-bound one, with the proportion of eligible female recipients being 62.2%, as is the racial breakdown of the eligible recipients with only small changes for all groups. There is a very slight increase in the proportion of eligible negative income tax recipients living in traditional areas from 39.15% to 40.33%.

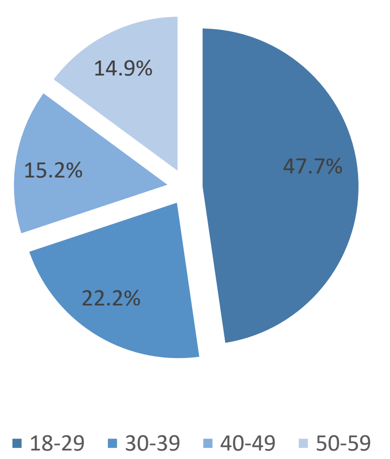


Figure 4.7 Age brackets

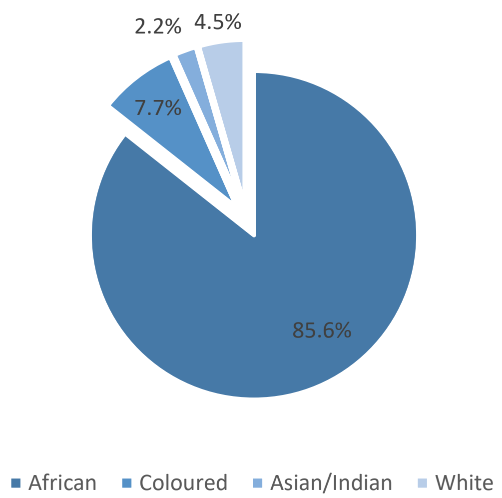


Figure 2.8 Population group

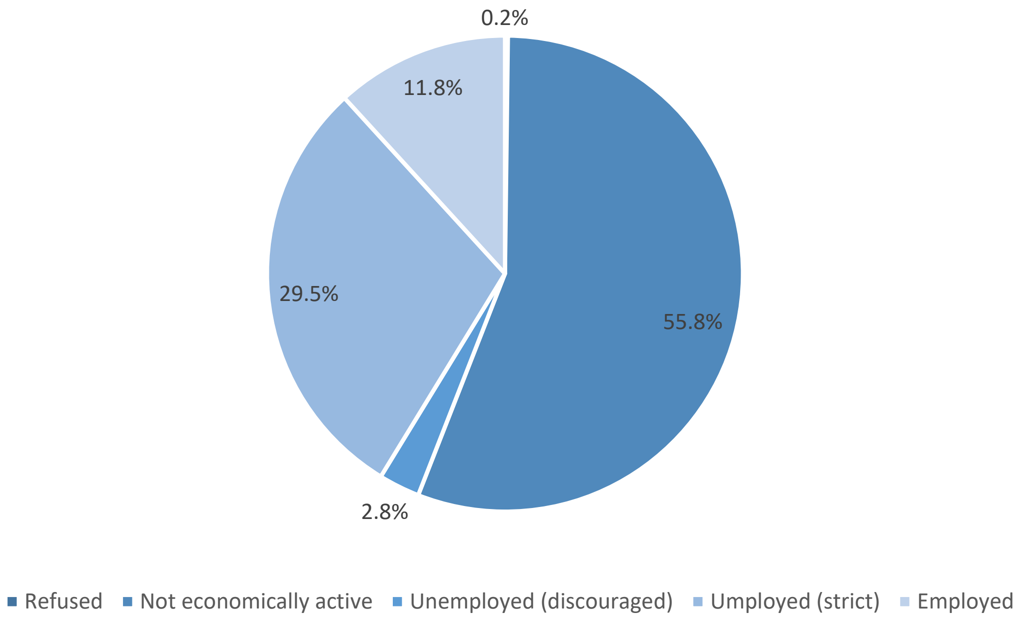
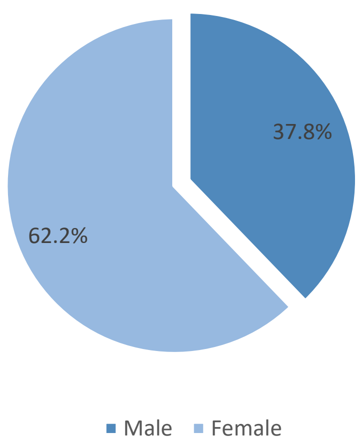


Figure 4.9 Employment status



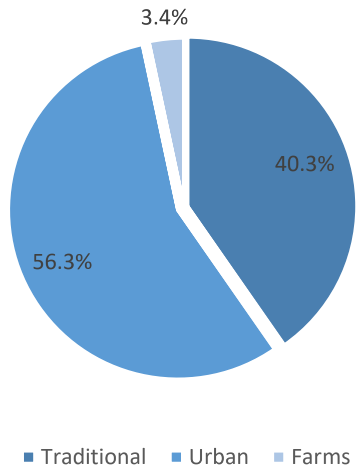


Figure 4.10 Gender

Figure 4.11 Geo-type

Figures 4.7-4.11: Demographic characteristics of individuals eligible to receive the lower-bound negative income tax. Source: Own calculations using NIDS Wave 4 with Wave 4 survey weights

Impact on inequality

The Gini coefficient of household income calculated after tax and transfers, but before the negative income tax is implemented, is 0.66[21]. This is similar to the Gini coefficient calculated in Hundenborn, Leibbrandt, and Woolard (2016). After introducing the upper-bound negative income tax, the Gini coefficient drops to 0.59, a 10.6% reduction. This is a very large decrease, especially considering that this decrease in the Gini coefficient results only from introducing the income subsidies, and does not yet include its financing. If the negative income tax was to be fully or partly financed progressively through the personal income tax system, the decrease in the Gini coefficient would be considerably higher.

The lower-bound negative income tax also leads to a significant decrease in income inequality, albeit less so than the upper-bound negative income tax. It decreases the Gini coefficient from 0.66 to 0.62, a decrease of 6.1%. While this is a smaller effect, it is still large. Again, it should be noted that this reduction in inequality is the result of merely introducing the income subsidy, and that a progressively financed negative income tax would likely reduce inequality further. Figure 4.12 below illustrates the Lorenz curves for household incomes with and without the negative income tax. Both the upper- and lower-bound negative income tax proposals are included for comparison.

[21] Own calculation using NIDS Wave 4 and the Wave 4 survey weights

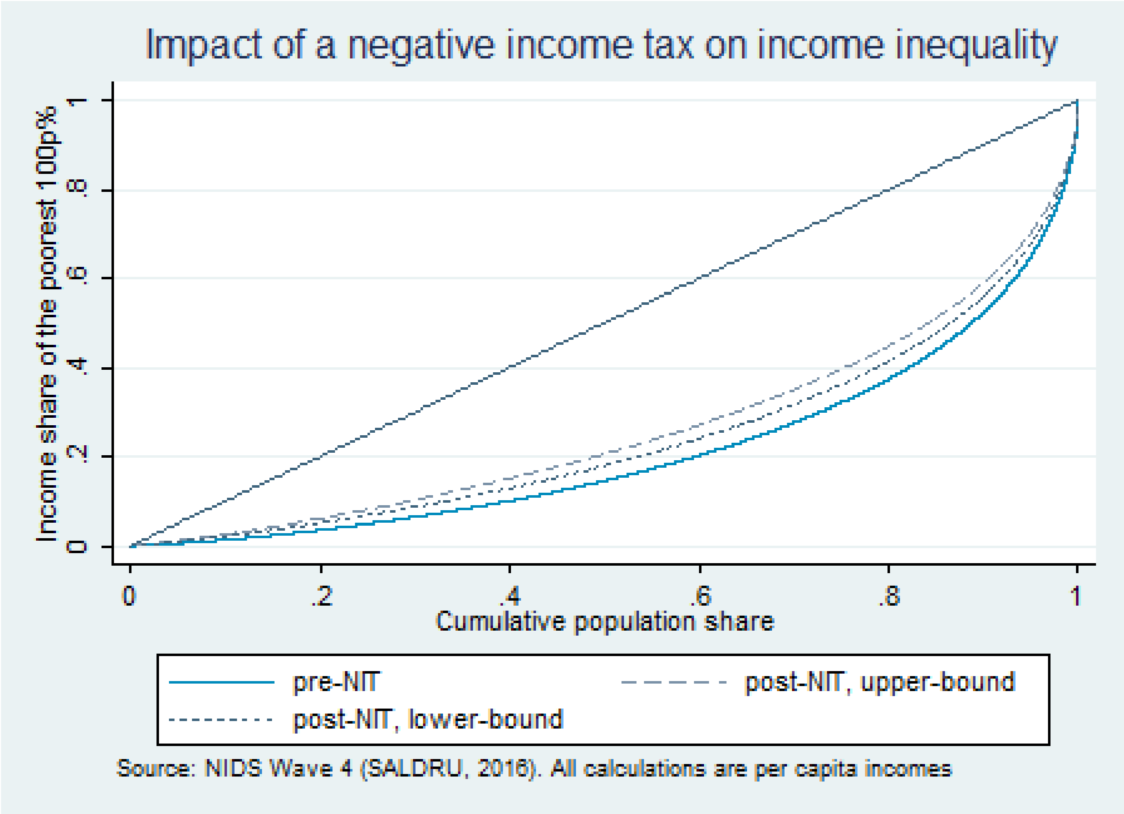


Figure 4.12 Lorenz curves of per capita household incomes before and after two types of negative income tax. Own calculations using Wave 4 survey weights.

The reduction in income inequality resulting from a negative income tax can also be shown by looking at income share tables. In table 4.1, we see that the introduction of both the lower- and upper-bound negative income tax increases the total income share of the bottom 50% of the population, while reducing the income share of the top 10% of the population. The shares of the "middle 40%" from deciles 5-9 increases marginally with the upper-bound income tax. A more detailed overview is seen in table 4.2, which further divides the income shares by deciles. Notably, all but the top 3 deciles increase their income shares – both in the case of the lower-bound and the upper-bound negative income tax. Importantly, the bottom 10% of income earners more than doubles their share of total income, from 0.8% before a negative income tax to 1.7% after the upper-bound negative income tax. The income shares of the top 30% of earners all decrease, but the most significant change can be seen for the top 10% of earners, whose share decreases from 55.3% before any negative income tax to 50.8% with the upper-bound negative income tax.

Table 4.1 Impact of a negative income tax on income shares 1

	Income shares		
Percentiles	**Before negative income tax**	**With upper-bound negative income tax**	**With lower-bound negative income tax**
P0-50	10.0%	14.3%	12.3%
P50-90	34.7%	34.9%	34.7%
P90-100	55.3%	50.8%	53.0%

Source: Own calculations using NIDS Wave 4 with Wave 4 survey weights

Table 4.2 Impact of a negative income tax on income shares 2

	Income shares		
Percentiles	**Before negative income tax**	**With upper-bound negative income tax**	**With lower-bound negative income tax**
P0-10	0.8%	1.7%	1.3%
P10-20	1.4%	2.3%	1.9%
P20-30	1.9%	2.8%	2.4%
P30-40	2.6%	3.4%	3.0%
P40-50	3.3%	4.2%	3.7%
P50-60	4.4%	5.0%	4.7%
P60-70	6.0%	6.5%	6.2%
P70-80	9.1%	9.0%	9.0%
P80-90	15.2%	14.5%	14.8%
P90-100	55.3%	50.8%	53.0%

Source: Own calculations using NIDS Wave 4 with Wave 4 survey weights

Impact on poverty

The upper-bound negative income tax has a large impact on poverty, as seen in table 4.3. Using the upper-bound poverty line of R1309 shows that introducing the negative income tax reduces headcount poverty by 12.8 percentage points (or by 24 percent) from 52.9% to 40.1%. While the reduction in the poverty headcount is fairly high, it might seem lower than expected given that the negative income tax is set at an amount which brings up all recipients to the R1309 poverty line. However, it is important to remember that since the criteria for receiving an income subsidy is individual income rather than household income, many eligible individuals in households with members younger than 18 or older than 60 years old will share their subsidy with non-recipients, leading to a smaller reduction in the poverty headcount. The negative income tax does not just reduce the number of people living in poverty, but also reduces the depth of poverty, as measured by the poverty gap ratio. It almost halves the poverty gap ratio which decreases by 12.9 percentage points from 26.1% to 13.2%. The severity of poverty also decreases significantly with the upper-bound negative income tax. The poverty severity ratio (also known as the squared poverty gap) decreases by 10.2 percentage points from 15.8% to 5.6% with the introduction of the negative income tax. If using one of the other poverty lines, either the lower-bound poverty line or the food poverty line, the results are even more distinct. In particular, extreme poverty – as measured by the amount of people living below the food-poverty line – is virtually eliminated. Before the introduction of the upper-bound negative income tax, the headcount ratio using the food poverty line is 14.0%, while it decreases to 0.9% with the introduction of the upper-bound negative income tax.

Table 4.3 Impact of the upper-bound negative income tax on poverty

Poverty measure	**Before negative income tax**	**After negative income tax**
Headcount ratio (P_0)		
Upper-bound poverty line, R1309	52.9%	40.1%
Lower-bound poverty line, R670	29.7%	8.4%
Food-poverty line, R423	14.0%	0.9%
Poverty gap ratio (P_1)		
Upper-bound poverty line, R1309	26.1%	13.2%
Lower-bound poverty line, R670	10.7%	1.5%
Food-poverty line, R423	4.1%	0.2%
Poverty severity ratio (P_2)		
Upper-bound poverty line, R1309	15.8%	5.6%
Lower-bound poverty line, R670	5.3%	0.5%
Food-poverty line, R423	1.8%	0.1%

Source: Own calculations using NIDS Wave 4 with Wave 4 survey weights. Poverty lines from Budlender, Leibbrandt and Woolard (2015) have been inflated to 2015 prices. All poverty lines are per capita.

As seen in table 4.4, the lower-bound negative income tax also has a significant impact on poverty. Naturally, it is smaller than that of the upper-bound negative income tax. A large difference is that the lower-bound negative income tax does not profoundly alter the headcount ratio for the upper-bound poverty line, as it only decreases from 52.9% to 47% with its introduction. This result is unsurprising, since the lower-bound negative income tax is set at a level lower than the upper-bound poverty line. Looking at the impact of the negative income tax on the lower-bound poverty line, however, we can see that it makes a large difference – the headcount ratio decreases by 11.3 percentage points (or 38%) from 29.7% to 18.4%. As with the upper-bound negative income tax, the lower-bound negative income tax virtually eliminates extreme poverty as measured by the headcount of people living below the food-poverty line. After the introduction of the negative income tax, it decreases from 14.0% to 3.4%. The lower-bound negative income tax also decreases the depth and severity of poverty. This is especially the case when considering the poverty gap and poverty severity ratios using the lower-bound poverty line, but it also makes a significant difference on the poverty measures which use the upper-bound poverty line. With the introduction of the negative income tax the poverty gap ratio decreases from 26.1% to 19.3%, and the poverty severity ratio decreases from 15.8% to 9.7%. As with the upper-bound negative income tax, introducing this negative income tax virtually eliminates extreme poverty as measured by the headcount of people living below the food-poverty line. After the introduction of the negative income tax, it decreases from 14.0% to 3.4%.

Table 4.4 Impact of the lower-income negative income tax on poverty

Poverty measure	**Before negative income tax**	**After negative income tax**
Headcount ratio (P_0)		
Upper-bound poverty line, R1309	52.9%	47.7%
Lower-bound poverty line, R670	29.7%	18.4%
Food-poverty line, R423	14.0%	3.4%
Poverty gap ratio (P_1)		
Upper-bound poverty line, R1309	26.1%	19.3%
Lower-bound poverty line, R670	10.7%	4.3%
Food-poverty line, R423	4.1%	0.6%
Poverty severity ratio (P_2)		
Upper-bound poverty line, R1309	15.8%	9.7%
Lower-bound poverty line, R670	5.3%	1.5%
Food-poverty line, R423	1.8%	0.2%

Source: Own calculations using NIDS Wave 4 with Wave 4 survey weights. Poverty lines from Budlender, Leibbrandt and Woolard (2015) have been inflated to 2015 prices. All poverty lines are per capita.

Discussion

As noted in the methodology chapter, the microsimulations used in this paper are static non-behavioural microsimulations. This means that the results found should be interpreted as first-round effects without behavioural changes or changes in the underlying population. The main reason for not including a behavioural response is the lack of reliable estimates, and therefore, that including them would lead to speculation. However, individuals' labour supply response to income subsidies have been given significant space and interest both in the South African and international literature, and it should be addressed. Since a negative income tax in South Africa does not currently exist, an option for gaining information about behavioural effects at the lower end of the income distribution is to look at the research conducted on the old age pension.

The old age pension is of a similar size to the guaranteed subsidy suggested for the negative income tax. The findings in Bertrand, Mullainathan and Miller (2003) show that household members of old age pension recipients decrease their labour supply when a household member becomes eligible, and results from Klasen and Woolard (2009) show that social grants may lead the unemployed to base their location on the location of the grant recipient, rather than the most optimal location for job search. On the other hand, the results in Posel, Fairburn and Lund (2006) and Ardington, Case and Hosegood (2009) suggest that an extra income source in the household such as the old age pension may increase labour supply, primarily through enabling migration. This suggests that it is not obvious that an income subsidy like a negative income tax will reduce labour supply in South Africa. However, the concern that a negative income tax will decrease labour supply may be even higher than for other grants as it directly targets the working-age population. This is a valid concern and it may very well be the case that some individuals will forego work to receive the grant. Nevertheless, most of the unemployment in South Africa is structural (Banerjee et al., 2006), suggesting that the benefits of providing social support for this large group traditionally left behind by the social security system may outweigh the potential disadvantages of a negative labour supply effect.

On another note, the estimated cost of the negative income tax assumes full uptake by eligible recipients. It is fairly realistic to assume that benefits uptake will be high when conditions for eligibility are few, an assumption supported by the high uptake of other social grants in South Africa[22]. Still, some eligible recipients may decide to forego it. This may hold especially true for those with relatively high household incomes compared to the negative income tax, or those on the threshold margins who are only eligible for a very small grant. If this is the case, one would expect the total cost to be lower. It may also be the case that some individuals will underreport their incomes to become eligible for the negative income tax. If this is the case, one would expect the total cost to be higher.

In conclusion, a negative income tax has the potential to significantly decrease both inequality and poverty in South Africa, but these gains come at a high cost. Using only income and age as eligibility requirements proves to be fairly effective, as the negative income tax reaches a young, majority African demographic which is mostly unemployed or not economically active. Lacking information about behavioural effects makes it difficult to make predictions about its impact on recipients' labour supply, but if studies on the impact of the South African old age pension is any indication, it can go either way.

[22]According to South African Social Security Agency, 17.1 million social grants were given January 2017, of which 3.3 million were old age grants, 12 million were child support grants, and 1.1 million were disability grants. (South African Social Security Agency, 2017)

Chapter 5
Increased tax rates for top earners

How to tax individuals with high incomes is an ever-contentious topic. It touches on people's inherent sense of fairness, especially in a highly unequal country as South Africa. However, there is often a lack of clarity in who the said high income individuals are. In public discourse, the lack of clarity is often compounded by the fact that people often do not know what the income distribution looks like, or have difficulty with placing themselves in it (Slemrod, 2000).

Where exactly we draw the line of who is or is not a high income earner is somewhat arbitrary, but it has a significant effect on which results we get. Those with incomes in the top 10 and 1 percent of the income distribution are a quite different group than those in the top 0.1 and 0.01 percent – in terms of incomes, behaviour, and other characteristics (Piketty, 2014; Slemrod, 2000). It is therefore necessary to be clear on which definition of "high income earner" is being used. Steenekamp's (2012a) paper, which assesses the effects of higher marginal tax rates on top income earners in South Africa uses three different definitions: those in the top 1% of the income distribution are considered "rich", while those in the top 0.1% and 0.01% are "very rich" and "super rich", respectively. This dissertation refers to high income earners as those in the top tax bracket, as the threshold for getting into this tax bracket is roughly the income which places a person in the top 1% of earners.

While chapter 4 looked at a way to increase progressivity at the bottom end of the income distribution, this chapter explores the issue of increasing progressivity from the top end of the income distribution by increasing the marginal tax rates for high income earners. Chapter 5.1 discusses factors which impact decisions on taxing high income earners, focusing especially on the elasticity of taxable income. Chapter 5.2 explains the tax proposals and how they are simulated, and chapter 5.3 discusses the results.

5.1 How to tax high income earners?

As Slemrod (2000) points out, the decision of how to tax high income earners depends on economic concerns such as the income generation process, behavioural effects of taxation, and potential externalities of high income earners. However, it also depends on value judgements and notions of social justice, to which economics does not have much to contribute. Although any analysis which ignores these aspects is admittedly incomplete, it is beyond the scope of this study to deliberate on them. An aspect that will be deliberated on, however, is the behavioural effects of taxation.

The elasticity of taxable income – a key statistic

The idea of a behavioural effect which reduces the efficiency of taxation comes from the optimal taxation literature, which is discussed in chapter 2.2. In the optimal taxation literature, the behavioural effects discussed are mostly limited to the labour supply effect: when taxes rise, leisure becomes relatively less expensive than work, and the individual will reduce their labour supply. In more recent literature, however, there has been a shift towards a broader conceptualisation of the behavioural response. This broader notion is referred to as the elasticity of taxable income (ETI). It includes all behavioural responses to taxation, including changes in labour supply, substitution towards activities with preferential tax treatment, changing compensation plans to include more untaxed fringe benefits, tax avoidance more generally, tax evasion, and so on (Slemrod and Bakija, 2000; Feldstein, 2008; Saez et al., 2012).

For several reasons, the elasticity of taxable income has particular relevance for assessing tax changes for high income earners. Firstly, the empirical literature which estimates the size of the elasticity of taxable income has mostly found that it is significantly larger for high income earners than it is for the rest of the income distribution. High income earners tend to have easier access to legal ways of avoiding tax such as changing their compensation plans towards lesser-taxed income sources, hiring tax lawyers to find loopholes, timing their responses, and so on. For instance, as explored in Esteller, Piolatto, and Rablen (2016), high income earners tend to be much more mobile than people in other parts of the income distribution. They can and often do work in different countries or legislatures, and have a degree of discretion of where and how to submit their tax returns. This is especially pertinent when an individual works part-time in several different locations, as it can make it difficult for tax authorities to identify to which location most taxes should be paid (and since the tax authorities in different locations may not always cooperate seamlessly). In these settings, "… mobility becomes a means through which avoidance can be carried out" (Esteller, Piolatto, and Rablen, 2016, p.1). Tax evasion, while traditionally seen as the realm of lower income groups ("the poor evade, the rich avoid" (Slemrod, 2000, p.12)) may still be more available to higher income groups. Offshore bank accounts, for instance, can be very difficult for authorities to detect and control.

Secondly, the fact that high income earners tend to play a disproportionately large role in any economy (Slemrod, 2000), particularly in the paying of taxes, can make any behavioural effects of this group problematic for society as a whole. In South Africa, the top decile pays 83.6% of total income taxes (Inchauste et al., 2015). If the behavioural response to taxation of this group is large, it can be difficult to increase their taxes without it having negative effects on government revenue. Another concern is that the scope for raising revenue by increasing taxes on high incomes is limited. Brewer and Browne (2009) look at this in the example of a UK top tax on incomes above £150 000. They argue that there is great uncertainty about how much revenue can feasibly be collected from this type of tax. They further suggest that the elasticity used by Treasury to calculate revenue impact is unrealistically low, leading calculations to overestimate the revenue that can be generated from such a tax.

The majority of empirical ETI estimates are calculated for a US context, and Saez et al. (2012) and Giertz (2009) provide good reviews of the recent literature. The paper by Giertz (2009) includes an extensive overview of the different authors' ETI estimates. He finds that while most of the estimates are around 0.4, they range between 0 and 1. Several of the authors mentioned in his study provide estimates for high income earners: Auten, Carroll, and Gee (2008) find a population-weighted ETI of 0.35, but the ETI for individuals with incomes above $200 000 is much larger at 1.09. Gruber and Saez (2000) find an ETI of 0.57 for earners with incomes above $100 000, compared to 0.4 for all earners. Saez (2004) estimates that the ETI for earners in the top 1% of the income distribution is 1.58, but this decreases to 0.62 when a time trend is included. He further finds that the estimate changes when the top 1% is disaggregated into different groups. Overall, Giertz concludes that the recent research suggests smaller estimates than those by Feldstein (1995) and Lindsey (1987), and that the ETI increases with income. He notes, however, that since the ETI is very sensitive to a range of factors, "the range of plausible estimates ... is broad" (Giertz, 2009, p.131). Saez, Slemrod, and Giertz (2012) critically evaluate the same literature as Giertz, and conclude that the best available estimates of the ETI lie between 0.12 and 0.40. In addition to reviewing US studies, they also look at a recent Danish study on the ETI by Kleven and Schultz (2011), which finds a population estimate that is smaller than those in most US studies. It does however, find a similar trend with the elasticities for high income earners, which are "monotonically increasing in income level and are two to three times larger in the top quintile of the distribution than in the bottom quintile of the distribution" (Saez, Slemrod, and Giertz, 2012, p.41).

As mentioned by Giertz (2009), the ETI estimates are sensitive to the parameters used, including how taxable income is defined, which may vary from country to country. This is a crucial point, especially when we consider applying knowledge from the US experimental literature to the South African context. Steenekamp (2012a), in lieu of a reasonable ETI estimate for South Africa, looks to the results from the U.S. and the U.K., and argues that an elasticity of 0.4 is realistic. He further argues that the elasticity for high income earners is likely to be relatively high in South Africa, considering the smallness of the tax base, mobility of high income earners, and the various possible ways to shift income.

While it is clearly difficult to come up with a good ETI estimate without sufficient empirical evidence, extrapolating ETIs from one country to another must be done with caution. As Saez et al. (2012, p.40) note, there is no reason to assume that ETI estimates will be transferable between countries, since they are "function[s] not only of arguably relatively uniform aspects of preferences, but also of the details of countries' tax systems". Steenekamp's solution to this issue is to present his results for three different elasticities of 0.2, 0.4, and 0.8. Based on these ETI estimates, he finds that the extra revenue gained from increasing top marginal tax rates would be negligible or negative. If one wants to include a behavioural response, Steenekamp's solution of presenting different potential elasticities to show their impacts on the results may be the best possible option when no ETI estimate is available. In this dissertation, however, no behavioural effect is included.

While grouping different behavioural effects into one elasticity is convenient and makes for a conceptually simple statistic, not everyone agrees that it is the best way to assess the cost of income taxation. Saez, Slemrod and Giertz (2012) and Piketty, Saez and Stantcheva (2014) are sceptical as to its usefulness in making policy recommendations. They argue that different types of behavioural responses call for different policy recommendations, and that therefore, grouping them all together is a mistake. Saez, Slemrod and Giertz (2012, p.42) note that "the anatomy of behavioural response" is irrelevant in the narrow perspective where the tax system is fixed, since all responses will be indications of the tax system's inefficiency. However, when assessing potential changes to the tax system, the type of behavioural response is indeed very relevant. Specifically, they find that timing and avoidance are the most common behavioural responses to large tax reforms in the U.S. When this is the dominating behavioural response, they argue that the best policy response is to broaden the tax base and reduce avoidance possibilities rather than reduce taxes.

This sentiment is echoed in Piketty, Saez, and Stantcheva (2014) who present another behavioural response to taxation in the form of compensation bargaining. The essence of this behavioural response is that decreased top marginal income tax rates will lead to increased compensation bargaining by high income earners, since additional compensation is taxed at lower rates than before. Because increased compensation bargaining and therefore higher top incomes is not a reflection of higher productivity, it follows that the top marginal tax rates should be kept high to discourage this type of bargaining by decreasing its rewards. Malloy (2016) takes the argument further by arguing that lower top marginal tax rates reduces the bargaining power of labour relative to the firm, and that any resulting increases in top incomes will come at the expense of workers and their incomes. Therefore, top marginal tax rates should be kept high. Saez, Slemrod, and Giertz (2012) additionally emphasise that externalities of the behavioural responses are relevant, but that these are not considered in ETI calculations. For instance, if increased taxation results in a shift towards increased charitable giving (or other "good" tax-deductible activities) it is not obvious that welfare is decreased. For all the reasons mentioned above, the elasticity of taxable income should be used with care.

Other considerations

While the behavioural response to taxation is naturally a very important part of the discussion on how to tax high income earners, other economic considerations also play a role. One of the most important factors in this regard is the income generation process, and where the high incomes in question come from – particularly whether top incomes were acquired through productive or innovative means (e.g. the "superstar" theory) or by luck or any unproductive or destructive manner. In classic economic theory, wages reflect individuals' marginal productivity, and high incomes, which come as a result of higher marginal productivity, should not be punished by higher levels of taxation. This corresponds to the "superstar theory", which explains top incomes by arguing that they are reflective of people who are "superstars" or entrepreneurs in their fields, and therefore receive high levels of remuneration (Mankiw, 2013; Kaplan and Rauh, 2013). However, as argued by for instance Alvaredo, Atkinson, and Piketty (2013) and Piketty, Saez, and Stantcheva (2014), high top incomes which result from bargaining power on the part of high income earners without it necessarily being reflected in their productivity weakens the argument for avoiding high top income tax rates. In a similar vein, if high incomes result from unproductive and destructive activities such as rent-seeking and corruption, or from unfair advantages of some group over another rather than higher productivity, higher taxation of top incomes may be recommended. On the other hand, as Mankiw (2013) points out, in this case the solution may not necessarily be to increase higher taxation of top incomes, but rather address the inefficiency directly. While this is certainly a valid point, in many instances it is not as simple as deciding to remove the inefficiency and taxation may be a simpler way to address the issue.

Lastly, potential externalities from high income earners are relevant in the discussion of top income taxation. An oft-raised argument is that high income earners have positive externalities on the rest of society, particularly when it comes to innovation and job creation. If this is the case, high levels of taxation for high income earners can have negative effects not only on the high income earners themselves and revenue collection, but also on jobs or other societal goods, and lower taxation of high income individual is recommended (Slemrod, 2000). However, there are also potential negative externalities of (very) high incomes which advocate higher levels of taxation for these earners, for instance a disproportionately large influence on the political system. In the case of large negative externalities of high incomes, higher top marginal tax rates should be considered.

5.2 Methodology

Having outlined some of the considerations facing policymakers wishing to tax high income earners in chapter 5.1, chapter 5.3 simulates seven different policy suggestions for how the personal income tax code can be amended to increase progressivity by targeting the top end of the income distribution. The policies are simulated both to investigate how much more inequality can be reduced by increasing progressivity, and how much additional revenue can be collected from them. Because of this, the proposed changes are all fairly ambitious in how high the top marginal tax rates are set. The seven proposals can be separated into three groups, where the two first groups only alter the marginal tax rates for the existing tax thresholds. The third group adds an extra tax bracket aimed at the very top end of the income distribution – the top 0.1%. As noted in the beginning of this chapter, where the line for who is a high income earner is drawn is somewhat arbitrary, but the top 10%, 1%, and 0.1% are all very different groups in terms of earnings, behaviour, and other characteristics. Since the current top income tax threshold is set around the level of the top 1% of income earners[23], it is interesting to explore the possibility of setting an extra threshold at the level of the top 0.1% of earners. This is furthermore compelling because while the top 1% of earners in South

[23] Income to be in the top tax threshold is R701 301, and to be in top 1% R748 383 (own calculations using NIDS Wave 4 and the wave 4 survey weights)

Africa are fortunate in relative terms, the income threshold needed to get to this part of the distribution is unlikely to correspond to popular perceptions of "the rich". Society's willingness to accept high tax rates may be higher for those they perceive as very wealthy compared to those merely perceived as more fortunate. The estimates for the revenue increases are calculated by applying the prospective tax codes to the base dataset as constructed in chapter 1, summing the differences of the change in tax liability for the affected group using Wave 4 Survey Weights.

The first two tax policy proposals involve increasing the top marginal tax rate from 41% to 45%. Proposal 1 only increases the marginal tax rate for the top tax bracket, while the marginal tax rates for all other brackets stay constant. Proposal 2 increases the marginal tax rates for the top three tax brackets – the marginal tax rate increases by 1, 2, and 4 percentage points for the fourth, fifth, and sixth tax bracket, respectively. The marginal tax rates facing the different taxpayers with proposals 1 and 2, as well as in the existing tax code, are illustrated in table 3 below.

Table 5.1 Tax proposals, group 1

	Existing system (2016)	**Proposal 1**	**Proposal 2**
Tax brackets			
1: <181 900	0.18	0.18	0.18
2: 181 901-284 100	0.26	0.26	0.26
3: 284 101-393 200	0.31	0.31	0.31
4: 393 201-550 100	0.36	0.36	0.37
5: 550 101 - 701 300	0.39	0.39	0.41
6: >701 301	0.41	0.45	0.45

Source: Budget Review 2016 and own proposals

Group 2 of the tax proposals simulate a substantial increase in the top marginal tax rates of 9 percentage points compared to the 2016 tax code. This is a radical proposal, but it is included to illustrate how it would affect inequality and tax revenue. It is further assumed that if this were a tax code the government would be interested in implementing, the change would not happen overnight, but rather incrementally. Proposal 3 only increases the marginal tax for the top tax bracket, while proposal 4 also increases the marginal tax rate for bracket 5 from 39% to 45%. Proposal 5 additionally increases brackets 3 and 4 by 4 percent. These tax changes are illustrated in table 5.2 below.

Table 5.2 Tax proposals, group 2

	Existing system (2016)	Proposal 3	Proposal 4	Proposal 5
Tax brackets				
1: <181 900	0.18	0.18	0.18	0.18
2: 181 901-284 100	0.26	0.26	0.26	0.26
3: 284 101-393 200	0.31	0.31	0.31	0.35
4: 393 201-550 100	0.36	0.36	0.36	0.4
5: 550 101 - 701 300	0.39	0.39	0.45	0.45
6: > 701 301	0.41	0.50	0.50	0.50

Source: Budget Review 2016 and own proposals

The last two tax proposals differ from the other five in that they include adding an additional bracket for earners who are in the top 0.1% of the income distribution. Since the top 0.1% of incomes start at R2 123 692[24], this is also where the new tax bracket starts. Individuals with incomes above this threshold face a tax rate significantly higher than the original top tax bracket at 55%. Additionally, proposal 6 also increases the marginal tax rate of the sixth tax bracket to 0.45. Proposal 7 increases the marginal tax rates for the first tax bracket by 1%, the second bracket by 2%, and so on until the sixth tax bracket. These proposals can be seen in table 5.3 below.

Table 5.3 Tax proposals, group 3

	Existing system (2016)	Proposal 6	Proposal 7
Tax brackets			
1: <181 900	0.18	0.18	0.19
2: 181 901-284 100	0.26	0.26	0.28
3: 284 101-393 200	0.31	0.31	0.34
4: 393 201-550 100	0.36	0.36	0.40
5: 550 101 - 701 300	0.39	0.39	0.44
6: 701 301 – 1 977 872	0.41	0.45	0.47
7: >1 977 873	N/A	0.55	0.55

Source: Budget Review 2016 and own proposals

As with the negative income tax in chapter 4, liability is determined by the gross taxable income g. The decrease in individuals' net incomes from tax changes are then added back to their household incomes, from which pre-and post-tax Gini coefficients and

[24] Own calculations using NIDS Wave 4 and the wave 4 survey weights

income shares are calculated. The total revenue generated by the tax proposals is calculated by summing additional tax payments, and scaling them up to the country level using survey weights.

5.3 Results

One of the big insights resulting from these simulations is that the potential for both increasing government revenue and for increasing progressivity and reducing inequality by further increasing tax rates for high income earners is limited – even in the case of relatively drastic tax increases at the top end of the income distribution. This suggests that there is a limit to how much we can rely on the personal income system to combat inequality and ensure a more equal income distribution. It should also be noted that these revenue estimates assume no behavioural responses to taxation.

Group 1: Top marginal tax rates of 45%

While both proposal 1 and 2 include a fairly large increase in the top marginal tax rates, they do not decrease income inequality by much. As mentioned in the previous chapter, the Gini coefficient with the existing tax code is 0.66. Proposals 1 and 2 do not alter it, as the Gini coefficient after both proposals remains 0.66. Looking at the change in income shares after the two proposals reveal a similar picture. Table 5.4 shows that the biggest difference is seen for p50-90 that experience an increase in their income share of 0.8 percent from 34.73% to 35.01%. As is seen, there is virtually no difference between proposal 1 and 2 when it comes to inequality. This is further emphasized in table 5.5, which divides the shares into deciles. There is barely a difference in income shares after the two proposals, with the biggest difference being p20-30, whose income share increases by 1.1% (0.02 percentage points) from 1.89% to 1.91%.

Table 5.4 Impact of group 1 tax proposals on income shares, 1

Percentiles	**Before tax changes**	**After proposal 1**	**After proposal 2**
P0-50	10.01%	10.09%	10.09%
P50-90	34.73%	35.01%	35.01%
P90-100	55.26%	54.90%	54.89%

Source: Own calculations using NIDS Wave 4 and Wave 4 survey weights

Table 5.5 Impact of group 1 tax proposals on income shares, 2

Percentiles	**Before tax changes**	**After proposal 1**	**After proposal 2**
P0-10	0.83%	0.83%	0.83%
P10-20	1.40%	1.41%	1.41%
P20-30	1.89%	1.91%	1.91%
P30-40	2.55%	2.57%	2.57%
P40-50	3.34%	3.37%	3.37%
P50-60	4.42%	4.46%	4.46%
P60-70	6.03%	6.08%	6.08%
P70-80	9.05%	9.13%	9.13%
P80-90	15.23%	15.35%	15.35%
P90-100	55.26%	54.90%	54.89%

Source: Own calculations using NIDS Wave 4 and Wave 4 survey weights

Estimated revenue from personal income tax from own calculations is R334.0 billion.[25][26] Estimated tax revenue with proposal 1 is R350.9 billion, meaning that the changes to the tax code would collect an additional R16.9 billion. Proposal 2 would collect slightly more, with estimated tax revenue being R351.1 billion, an increase of R17.1 billion from the 2016 tax code.

Group 2: Top marginal tax rates of 50%

All three proposals in group 2 reduce inequality by more than proposals 1 and 2, but perhaps by less than one would expect from such a large change in tax policy. All proposals reduce the Gini coefficient from 0.66 to 0.65. As seen in table 5.6, proposals 3 to 5 increase the shares of percentiles P0-50 and P50-90 by approximately the same

[25]In 2015 Rands

[26]This estimate differs a bit from personal income tax revenue estimates from the 2015 Budget Review, where the estimated revenue from the personal income tax is R350.0 billion.

amount. Proposal 3 increases income shares of p0-50 by 1.8% from 10.01% to 10.19%, while proposals 4 and 5 increase their share by 1.9%. The income shares of p50-90 increase by 1.84%, 1.87%, and 1.9% with proposals 3, 4 and 5, respectively. This can be seen in table 5.6 below. Looking at the changes in income shares by deciles in table 5.7, we can see that the difference between proposals 4, 5, and 6 are miniscule. The deciles that see the biggest changes are p20-30 and p40-50, which both see their income shares increase by 2.1%.

Table 5.6 Impact of group 2 tax proposals on income shares, 1

Percentiles	**Before tax changes**	**After proposal 3**	**After proposal 4**	**After proposal 5**
P0-50	10.01%	10.19%	10.20%	10.20%
P50-90	34.73%	35.37%	35.38%	35.39%
P90-100	55.26%	54.43%	54.42%	54.41%

Source: Own calculations using NIDS Wave 4 and Wave 4 survey weights

Table 5.7 Impact of group 2 tax proposals on income shares, 2

Percentiles	**Before tax changes**	**After proposal 3**	**After proposal 4**	**After proposal 5**
P0-10	0.83%	0.84%	0.84%	0.84%
P10-20	1.40%	1.42%	1.42%	1.42%
P20-30	1.89%	1.93%	1.93%	1.93%
P30-40	2.55%	2.60%	2.60%	2.60%
P40-50	3.34%	3.41%	3.41%	3.41%
P50-60	4.42%	4.50%	4.51%	4.51%
P60-70	6.03%	6.14%	6.14%	6.14%
P70-80	9.05%	9.22%	9.22%	9.23%
P80-90	15.23%	15.51%	15.51%	15.51%
P90-100	55.26%	54.43%	54.42%	54.41%

Source: Own calculations using NIDS Wave 4 and Wave 4 survey weights

Proposals 3, 4, and 5 lead to significant increases in revenue collection, however. The estimated revenues from tax proposals 3 and 4 are R372 billion and R372.4 billion, increases of R38 and R38.4 billion from the 2016 tax code. Proposal 5 increases tax revenue by R39.4 billion, with a total revenue collection of R373.4 billion.

Group 3: An additional tax bracket for the top 0.1%

The proposals in group 3 have similar impacts on overall inequality as group 2, as they both decrease the Gini coefficient to 0.65. This is notable, as it shows that even these radical changes to personal income tax can only reduce inequality by so much. Tables 5.8 and 5.9 show how income shares by percentiles change with the introduction of proposals 6 and 7. We can see that proposal 7 impacts the income shares slightly more than proposal 6. The income share of p0-50 increases by 2.1 percent from 10.01% to 10.22%, and the share of p50-90 increases by 1.8 percent from 34.73% to 35.37%. Proposal 7 also reduces the income share of p90-100 by 1.6% from 55.26% to 54.40%. Looking at table 5.9, we see that the deciles that experience the biggest change because of proposal 7 is the p0-10 and p40-50 who both increase their income shares by 2.15% (from 0.83% to 0.85% and from 2.55% to 2.61%).

Table 5.8 Impact of group 3 tax proposals on income shares, 1

Percentiles	**Existing system (2016)**	**Proposal 6**	**Proposal 7**
P0-50	10.01%	10.20%	10.22%
P50-90	34.73%	35.38%	35.37%
P90-100	55.26%	54.42%	54.40%

Source: Own calculations using NIDS wave 4 and Wave 4 survey weights

Table 5.9 Impact of group 4 tax proposals on income shares, 2

Percentiles	**Existing system (2016)**	**Proposal 6**	**Proposal 7**
P0-10	0.83%	0.84%	0.85%
P10-20	1.40%	1.42%	1.43%
P20-30	1.89%	1.93%	1.93%
P30-40	2.55%	2.60%	2.61%
P40-50	3.34%	3.40%	3.41%
P50-60	4.42%	4.50%	4.51%
P60-70	6.03%	6.14%	6.15%
P70-80	9.05%	9.22%	9.22%
P80-90	15.23%	15.51%	15.49%
P90-100	55.26%	54.42%	54.40%

Source: Own calculations using NIDS Wave 4 and Wave 4 survey weights

Both proposals 6 and 7 increase revenue significantly. Proposal 6 increases revenue to R362.3 Billion, which is a R28.3 Billion increase from the 2016 tax code. Proposal 7 increases revenue by R35 Billion, collecting a total of R369 Billion.

Discussion: Behavioural effects and the elasticity of taxable income

The calculations of the revenue generated from changing personal income tax assumes that there is no behavioural response to taxation. This may be a realistic assumption to apply to a short-term scenario, but in the longer term one would assume that there might be some type of behavioural response which can impact the tax changes' redistributive impact. This is consistent with cross-country evidence that disincentive effects "off-set but do not outweigh First-order redistributive effects" (Förster. and Tóth, 2015, p.1804). When discussing the elasticity of taxable income earlier in this chapter, it was noted that one might expect a larger behavioural response from high income groups, which was also seen in empirical ETI estimates. As such, the estimates for revenue collection in this sub-chapter may overstate the revenue that can be generated from the proposed tax policies.

On a related note, it is also necessary to be cautious of the numbers for revenue generation since high income earners may be under-sampled in the NIDS dataset and that any calculation based on those groups (in particular when considering very high incomes, such as the top 0.1% of income earners) will rely heavily on the few observations in that range.

Chapter 6
A combined proposal: a negative income tax financed by top tax increases

Chapter 4 showed that the negative income tax proposals are very costly. From the simulations of the different tax change proposals at the top end of the income distribution in chapter 5, it becomes clear that the extra revenue generated cannot feasibly finance a negative income tax of the proposed sizes. Hence, the negative income tax must either be financed through some other means than the personal income tax system, or it must be adjusted to fit a more realistic budget based on the additional revenue that can be collected from it. Since simulating a negative income tax financed through outside means is beyond the scope of the study, this chapter looks at the latter and simulates a negative income tax financed by increases in top taxes. Chapter 6.1 briefly explains what such a negative income tax would look like, and chapter 6.2 discusses the results.

6.1 Methodology

Due to the appeal of the tax that specifically targets the very top end of the income distribution – the top 0.1% - the simulation in this chapter uses tax proposal 7 from chapter 5. Given that the additional revenue generated by this tax proposal is R35 billion, any negative tax that can be financed by it is significantly smaller than those proposed in chapter 4. Based on the revenue generated by proposal 7, the proposed negative income tax in this simulation has a guaranteed subsidy of R250 per month. Save for the difference in subsidy size, the negative income tax simulated is identical to the two previously simulated in chapter 4. If an individual is between age 18 and 59 and has an income of less than R250 per month, they will receive the difference required to bring them up to a monthly income of R250. If they earn zero income, they will receive the full subsidy of R250. Similarly to chapters 4 and 5, net income changes for individuals due to the policies are added to their household income variables. From there, the inequality indicators (Gini coefficients and income shares) and poverty indicators (headcount poverty ratio, poverty gap ratio, and poverty severity ratio) are calculated.

6.2 Results

The total cost of the new negative income tax is R2.83 billion per month, or R33.93 Billion per year. With this policy, 11.5 million people are eligible to receive some sort of income subsidy, and the mean subsidy received is R245.8. The clear majority of recipients, 11.1 million people, are eligible to receive the full amount of R250 per month.

Impact on income inequality

In the previous subchapter, it was noted that tax proposal 7 on its own decreases the Gini coefficient from 0.66 to 0.65. Similarly, the R250 negative income tax on its own decreases the Gini coefficient from 0.66 to 0.65. As such, we can see that even a relatively small negative income tax can reduce inequality equally as much as a drastic change to personal income tax at the top end of the income distribution. Simulating now the scenario where the tax proposal finances the negative income tax, we see that their combined impact decreases the Gini coefficient to 0.64, a change of 3.0%. This is illustrated in figure 6.1, which illustrates the Lorenz curves for per capita household incomes before and after the proposed negative income tax and tax change is implemented. The post-proposal Lorenz curve visibly shift inwards, indicating reduced inequality and increased progressivity, but by significantly less than the negative income tax proposals in chapter 4.

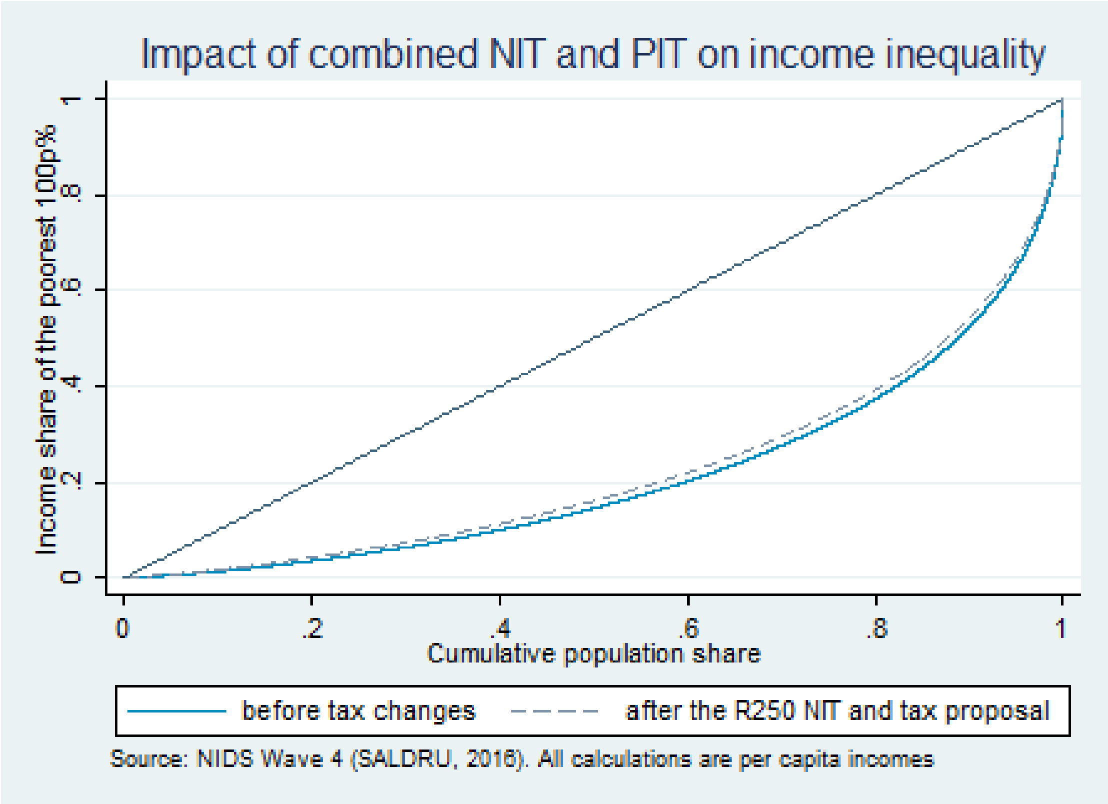


Figure 6.1 Lorenz curves before and after combined negative income tax and personal income tax. Own calculations using NIDS Wave 4 and Wave 4 survey weights.

The percentage shares in table 6.1 and 6.2 show that the policy suggestion is working as intended. The income share of p0-50 increases by 10.8 percent from 10.01% to 11.09%, while the income share of the p90-100 decreases by 3.1 percent from 55.26% to 53.54%. Taking a closer look at table 6.2, we can see that p0-10 of the income distribution is the decile whose income share increases the most. Their income share increases by 28% from 0.83% to 1.06%. Similarly, p10-20 and p20-30 increase their shares by 16% and 11%, respectively. Going upwards through the deciles, we can see that each decile increases their shares by less than the previous one, and that the top decile is the only one whose share decreases.

Table 6.1 Impact of combined negative income tax and personal income tax on income shares, 1

Percentiles	**Existing system (2016)**	**Combined negative income tax + personal income tax proposal**
P0-50	10.01%	11.09%
P50-90	34.73%	35.37%
P90-100	55.26%	53.54%

Source: Own calculations using NIDS Wave 4 and Wave 4 survey weights

Table 6.2 Impact of combined negative income tax and personal income tax on income shares, 2

Percentiles	**Existing system (2016)**	**Combined negative income tax + personal income tax proposal**
P0-10	0.83%	1.06%
P10-20	1.40%	1.62%
P20-30	1.89%	2.10%
P30-40	2.55%	2.76%
P40-50	3.34%	3.56%
P50-60	4.42%	4.61%
P60-70	6.03%	6.21%
P70-80	9.05%	9.19%
P80-90	15.23%	15.35%
P90-100	55.26%	53.54%

Source: Own calculations using NIDS Wave 4 and Wave 4 survey weights

Impact on poverty

Naturally, setting the negative maximum negative income tax at a lower level than the poverty lines means that its poverty-reducing potential, as measured by the headcount ratio, will be limited. This can be seen in table 6.3. Using the upper-bound poverty line, the headcount ratio decreases from 52.90% to 51.25%. The headcount ratio using the lower-bound and food poverty lines decreases from 29.70% to 26.15% and from 14.00% to 9.89%, respectively. However, looking at the depth and severity of poverty as measured by the poverty gap ratio and poverty severity ratio, we see that the poverty gap ratio using the upper-bound poverty line decreases from 26.10% to 23.51%, while the poverty severity ratio using the same poverty line decreases from 15.80% to 13.32%. The effects on the poverty gap and poverty severity ratio are larger when using the lower-bound and food poverty lines.

Table 6.3 Impact of combined negative income tax and personal income tax on poverty

Poverty measure	**Before**	**After combined proposal**
Headcount ratio (P_0)		
Upper-bound poverty line, R1309	52.90%	51.25%
Lower-bound poverty line, R670	29.70%	26.15%
Food-poverty line, R423	14.00%	9.89%
Poverty gap ratio (P_1)		
Upper-bound poverty line, R1309	26.10%	23.51%
Lower-bound poverty line, R670	10.70%	7.91%
Food-poverty line, R423	4.10%	2.15%
Poverty severity ratio (P_2)		
Upper-bound poverty line, R1309	15.80%	13.32%
Lower-bound poverty line, R670	5.30%	3.33%
Food-poverty line, R423	1.80%	0.73%

Source: Own calculations using NIDS Wave 4 and Wave 4 survey weights. Poverty lines from Budlender, Leibbrandt and Woolard (2015) have been inflated to 2015 prices. All poverty lines are per capita.

In conclusion, a negative income tax with a smaller income subsidy size, as simulated in this chapter, will naturally have a smaller impact on income inequality and poverty than those simulated in chapter 4. However, combined with increased marginal tax rates on top incomes it still makes significant gains – in particular for income inequality. Furthermore, while R250 per month is hardly a large amount, its impact on the income security for individuals with no other reliable income source should not be underestimated.

Chapter 7
Policy discussion and conclusions

This dissertation aimed to explore the progressivity of the South African personal income tax system. It did so by first investigating the changes in progressivity of the personal income tax code post-apartheid to present day. Then, a static, arithmetic microsimulation model was used to model two policy proposals for increasing progressivity of the tax code. One targeted the bottom end of the income distribution through a negative income tax, while the other targeted the top end of the income distribution through increased tax rates for high income earners. This chapter starts by discussing some of the policy implications of the results found in the dissertation, followed by pathways for future research. It ends with concluding remarks.

7.1 Progressivity and its contradictions

Numerical measures of progressivity are not interesting in and of themselves. They gain relevance when they are used in comparisons with each other. In this dissertation, they have been used to investigate the direction in the progressivity of personal income tax over the last two decades. This is interesting because it says something about both how effective tax policy has been over time, the trade-offs that have been made, and the underlying structure of the personal income tax system. The two progressivity measures used in this dissertation – pre- and post-tax Gini coefficients and the Kakwani index – moved in opposite directions between 1996 and 2017. While the Kakwani index showed a steady increase in progressivity over this period, the post-tax Gini coefficient also increased, implying a decrease in progressivity. Had it been moving clearly in one direction or the other, it would have been much easier to discuss the implications of this change. What can we make of these results?

They suggest that, at least in the South African context, there is a progressivity trade-off between the increased concentration of taxes and their redistributive impact. Furthermore, they show us that we cannot simply say that progressivity has increased or decreased. Rather, any assessment of progressivity necessitates a clear judgement of what dimension exactly one wants to assess. Do we want to know how the concentration of taxes relative to the concentration of incomes has changed? In that case, the Kakwani index is the most useful tool and progressivity in this sense has increased. However, if what one really wants to know is whether the tax code has become less or more effective at reducing inequalities, the pre- and post-tax Gini coefficients are more useful. The system has become less progressive in this sense. When talking about policy suggestions which aim to change progressivity, it is necessary to be clear about the value judgements inherent in ones choice of progressivity measure. Is the priority to increase redistribution or to increase the tax burden of high income earners? These two will not always be the same.

7.2 Merits and challenges of the negative income tax

From the negative income simulations in chapter 4, we saw that a negative income tax can effectively target poor individuals and households, decreasing poverty significantly. Further, it was shown to have a very large impact on inequality. This impact is largely dependent on its size. However, we have also seen that these effects do not come cheaply, and that the total cost of the simulated policies are much larger than what one could expect to be able to raise through personal income tax – even in the case of drastic increases in marginal tax rates. So making the negative income tax big enough to have substantial impact is very expensive. The large cost of the negative income tax is hardly surprising when the income threshold to receive it is set at an amount that will have a significant impact on poverty and people's wellbeing. This was the case with the upper-bound poverty line of R1309 per month.

The cost is mostly a direct function of the large number of low- and no-income earners in the sample and in the South African population – using the per capita poverty line of R1309 per month, the headcount ratio is 52.9%, which corresponds to 29 million people. Naturally, any policy targeting and transferring income subsidies to this large group will come with a hefty price tag, especially if uptake is large. There is no reason to believe that it would not be, given the bureaucratic ease and few criteria of eligibility. As such, the cost of the negative income tax is not so much an indictment of the policy itself, as a highlight of just how serious is the problem of poverty in South Africa, and that there is simply no cheap and easy way to combat it. In trying to reconcile this large cost with the wish for substantive change, a quote by former Social Development Minister Zola Skweyiya aptly sums up the crux of the dilemma:

> *"While a comprehensive social security system is too expensive, it is also too expensive not to have it, given its ability to reduce poverty and create safety nets and stable families and communities" (Department of Social Development, 2007)*

However, even if a negative income tax of the scale proposed in chapter 4 is beyond the scope of ambition of policymakers, its set-up and this way of thinking about providing income support to low-income earners may still be useful. In particular, basing eligibility on the sole basis of income not only has the advantage of being able to reach the most vulnerable in society, it is also likely to be less administratively costly in terms of monitoring. However, the lack of qualifying criteria may also be its biggest challenge in terms of getting policymakers and the general public on board as it is likely to tie into people's notions of the "deserving" and "undeserving" poor. While it is fairly easy to justify giving income subsidies to children, the disabled, and the elderly, providing grants with no strings attached to able-bodied adults undeniably goes against much of the rhetoric surrounding work and poverty in South Africa. Other programmes designed to assist the unemployed and low-income adults such as workfare programmes, or even the more closely related earned income tax credit (EITC) may be an easier sell in this regard. But given the costs of monitoring such programmes, a negative income tax is far more likely to give policymakers "bang for their buck", rhetorical issues aside.

Furthermore, it is quite likely that those qualifying for workfare programmes or income subsidies with a work component are not all the same individuals that would qualify for a negative income tax. Higher requirements for qualification and lengthy processes to prove eligibility may exclude those the policies most seek to reach, an issue less likely to be present in the case of the negative income tax. Additionally, the chronic nature of under- and unemployment in South Africa is considered to be structural. Subsidies with work requirements may indeed be suitable for a context where one worries about lack of willingness to work. However, in the South African context it may simply provide a solution to a problem that ought not to be the highest priority.

Lastly, a negative income tax does not only give a degree of income stability on an individual level, or help combat poverty and inequality on a national level. There are potential benefits to having it as an integrated part of the personal income tax system, as it would involve bringing many more people into the tax system than is currently the case. This may have benefits both in terms of increasing information about earnings and income, as well as potentially paving the way for future tax compliance.

7.3 Taxation of top incomes and its limited impact on revenue collection

Compared to the negative income tax, increased tax rates for high income earners impacted income inequality much less, a finding that is consistent with the cross-country evidence showing that transfers are generally more equalising than income taxes (Förster. and Tóth, 2015). It was also shown in chapter 5 that the potential for increasing tax revenue through increased tax rates at the top end of the income distribution is very limited. This is the case even for substantial rate increases and when assuming no behavioural effects, as they were only able to raise between R30 and R39 billion Rands. This finding is mostly a result of the small number of individuals who occupy these tax brackets. Furthermore, the impact of the proposed changes on progressivity and inequality is dwarfed by the vast numbers of low-income individuals relative to high-income earners. In this regard, we see that there is a trade-off between increasing revenue collection and increasing progressivity – any serious revenue-increasing tax policy will be reliant on using a larger subset of the taxpaying population than just the top end of the distribution.

Of course, increasing tax revenue is not the only reason why one may want to increase the tax burden of high income individuals. Higher tax burdens for high income individuals can also have a confiscatory effect in the case where society has decided that it does not wish to provide incentives for incomes to go beyond a certain level. This may be due to a sense of unfairness and justice, or the disproportionate influence very high income earners can have on politics and society. It is beyond the scope and outside the field of this study to discuss or speculate about whether this is desirable in the South African context. But it is worth acknowledging that the desire to increase tax rates on high income individuals is not always born out of economic theory, but is nevertheless important in decision making.

On the other hand, there are also "economic reasons" which justify high, confiscatory tax rates for high income individuals, as emphasised in Piketty, Saez, and Stantcheva (2014). In the case where those top incomes result from disproportionate and unproductive bargaining power, high tax rates for top income individuals can serve as a corrective, reducing incentives for this kind of bargaining. Evaluating whether this is the situation in South Africa is again not considered in this study, but it may be a relevant factor in deciding tax rates.

Lastly, we must consider that while the personal income tax system serves a very important role in ensuring that the fiscal policy is fair and equitable, its capacity to combat the scale of economic inequality present in South Africa simply may be limited. Since decompositions of income inequality (Leibbrandt, Finn, and Woolard, 2012) show that the main driver of income inequality in South Africa is the labour market, labour market interventions which increase the earnings of low income individuals – such as a national minimum wage – may prove to have increased importance in the time to come.

7.4 Combined negative income tax and personal income tax proposals

Ideally, a negative income tax and personal income tax could be thought of in combination, with the latter paying for the former. Unfortunately, as we saw in chapter 4 and 5, a negative income tax of the suggested size cannot realistically be fully financed through personal income tax. There are too few taxpayers at the top end of the income distribution relative to the number of poor. Hence, if one wanted to implement a negative income tax, one is faced with a dilemma. Either the scope of the negative income tax must be reduced to fit what can be realistically financed through the personal income tax system (as explored in chapter 6), or the funds for it must be found elsewhere. Since the impact of the negative income tax is heavily dependent on its size, one financed by personal income tax has a much smaller impact on poverty and inequality, and is therefore not entirely satisfactory.

This suggests that it might be necessary to look towards other ways of financing a negative income tax. One option worth considering is raising the value-added tax rate. The value-added tax, which is set at 14%, is mildly progressive (The National Treasury of South Africa, 2016). However, Inchauste et al. (2015) note that if zero-rated basic foods were subjected to the 14% rating, the VAT would be regressive. As such, increasing the VAT is a less than ideal option in terms of progressivity, but it has revenue-increasing potential. The 2016 Budget Review notes that there may be "room to increase indirect taxes, such as VAT", but that "any such changes would need to be accompanied by measures to improve the pro-poor character of expenditure" (The National Treasury of South Africa, 2016). The negative income tax may fit that bill.

7.4 Concluding remarks

Pathways for future research can be easily imagined. In particular, simulations of the negative income tax and personal income tax which incorporate behavioural effects could give a better picture of how these policies would work in reality. Similarly, given that it tends to better capture high income earners, simulating changes in top tax rates using tax data might improve the results of the top tax simulations. Furthermore, it could be interesting to explore a South African negative income tax which especially attempts to increase work incentives by having a low implicit tax rate. A fiscal incidence analysis which looks at the trade-offs of a VAT-financed negative income tax would also be relevant. Lastly, any detailed analysis of the origins of top incomes in South Africa could be interesting, as could studies that explore the intersection between economics and other social sciences to look at the connection between tax, fairness, and social justice in the South African context.

While these are all worthy extensions, this dissertation has shown the potential of, and limitations to, increasing the progressivity of the South African personal income tax system. In particular, it has shown the potential of the negative income tax to deal with the dual challenges of poverty and income inequality. It remains clear, however, that any such policy necessitates serious financial and political commitment from the South African government, and that the discourse moves from whether the country can afford to make such a commitment to – as Mr Skweyiya pointed out – whether it can afford not to.

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Appendix A: Tax code 1996-2017

1996 tax year (1 March 1995 - 28 February 1996)		1997 tax year (1 March 1996 - 28 February 1997)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 5 000	17% of each R1	0 - 15 000	17 % of each R1
5 001 - 10 000	R850 + 18% of the amount over R5 000	15 001 - 20 000	R2 550 + 19% of the amount over R15 000
10 001 - 15 000	R1 750 + 19% of the amount over R10 000	20 001 - 30 000	R3 500 + 21% of the amount over R20 000
15 001 - 20 000	R2 700 + 20% of the amount over R15 000	30 001 - 40 000	R5 600 + 30% of the amount over R30 000
20 001 - 30 000	R3 700 + 21% of the amount over R20 000	40 001 - 60 000	R8 800 + 41% of the amount over R40 000
30 001 - 40 000	R5 800 + 31% of the amount over R30 000	60 001 - 80 000	R18 500 + 43% of the amount over R60 000
40 001 - 50 000	R8 900 + 42% of the amount over R40 000	80 001 - 100 000	R25 400 + 44% of the amount over R80 000
50 001 - 70 000	R13 000 + 43% of the amount over R50 000	100 001 and over	R34 200 + 45% of the amount over R100 000
70 001 - 80 000	R21 700 + 44% of the amount over R70 000		
80 001 and over	26 100 + 45% of the amount over R80 000		
Tax rebates		**Tax rebates**	
Primary	R 2 625	Primary	R 2 680
Secondary	R 2 500	Secondary	R 2 500
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 14 600	Below age 65	R 15 580
Age 65 and over	R 28 785	Age 65 and over	R 27 905
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
1st dependant		1st dependant	
Additional dependants		Additional dependants	

1998 tax year (1 March 1997 - 28 February 1998)	
Taxable income (R)	**Rates of tax (R)**
0 – 30 000	19% of each R1
30 001 – 35 000	R5 700 + 30% of the amount above R30 000
35 001 – 45 000	R7 200 + 32% of the amount above R35 000
45 001 – 60 000	R10 400 + 41% of the amount above R45 000
60 001 – 70 000	R16 550 + 43% of the amount above R60 000
70 001 – 100 000	R20 850 + 44% of the amount above R70 000
100 001 and above	R34 050 + 45% of the amount above R100 000
Tax rebates	
Primary	R 3 215
Secondary	R 2 500
Tertiary	-
Tax treshold	
Below age 65	R 16 921
Age 65 and over	R 30 050
Age 75 and over	-
Medical aid rebates	
Self	
2nd dependant	
Additional dependants	

1999 tax year (1 March 1998 - 28 February 1999)	
Taxable income (R)	**Rates of tax (R)**
0 – 31 000	19% of each R1
31 001 – 46 000	R5 890 + 30% of the amount above 31 000
46 001 – 60 000	R10 390 + 39% of the amount above 46 000
60 001- 70 000	R15 850 + 43 % of the amount above 60 000
70 001 - 120 000	R 20 150 + 44% of the amount above 70 000
120 001 and above	R42 150 + 45% of the amount above 120 000
Tax rebates	
Primary	R 3 515
Secondary	R 3 660
Tertiary	-
Tax treshold	
Below age 65	R 18 500
Age 65 and over	R 31 950
Age 75 and over	-
Medical aid rebates	
Self	
3rd dependant	
Additional dependants	

2000 tax year (1 March 1999 - 28 February 2000)		2001 tax year (1 March 2000 - 28 February 2001)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 – 33 000	19% of each R1	0 - 35 000	18% of each R1
33 001 – 50 000	R6 270 + 30% of the amount above R33 000	35 001 - 45 000	R6 300 + 26% of the amount above R35 000
50 001 - 60 000	R11 370 + 35% of the amount above R50 000	45 001 - 60 000	R8 900 + 32% of the amount above R45 000
60 001 - 70 000	R14 870 + 40 % of the amount above R60 000	60 001 - 70 000	R13 700 + 37% of the amount above R60 000
70 001 - 120 000	R18 870 + 44% of the amount above R70 000	70 001 - 200 000	R17 400 + 40% of the amount above R70 000
120 001 and above	R40 870 + 45% of the amount above R120 000	200 001 and above	R69 400 + 42% of the amount above R200 000
Tax rebates		**Tax rebates**	
Primary	R 3 710	Primary	R 3 800
Secondary	R 2 775	Secondary	R 2 900
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 19 526	Below age 65	R 21 111
Age 65 and over	R 33 717	Age 65 and over	R 36 538
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
1st dependant		1st dependant	
Additional dependants		Additional dependants	

2002 tax year (1 March 2001 - 28 February 2002)		**2003 tax year (1 March 2002 - 28 February 2003)**	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 38 000	18 % of each R1	0 - 40 000	18% of each R1
38 001 - 55 000	R 6 840 + 26% of the amount above R38 000	40 001 - 80 000	R 7 200 + 25% of the amount above R40 000
55 001 - 80 000	R 11 260 + 32% of the amount above R55 000	80 001 - 110 000	R 17 200 + 30% of the amount above R80 000
80 001 - 100 000	R 19 260 + 37% of the amount above R80 000	110 001 - 170 000	R 26 200 + 35% of the amount above R110 000
100 001 - 215 000	R26 660 + 40% of the amount above R100 000	170 001 - 240 000	R47 200 + 38% of the amount above R170 000
215 001 and above	R72 660 + 42% of the amount above R215 000	240 001 and above	R73 800 + 40% of the amount above R240 000
Tax rebates		**Tax rebates**	
Primary	R 4 140	Primary	R 4 860
Secondary	R 3 000	Secondary	R 3 000
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 23 000	Below age 65	R 27 000
Age 65 and over	R 39 154	Age 65 and over	R 42 640
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
2nd dependant		3rd dependant	
Additional dependants		Additional dependants	

2004 tax year (1 March 2003 - 28 February 2004)		2005 tax year (1 March 2004 - 28 February 2005)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 70 000	18% of each R1	0 - 74 000	18% of each R1
70 001 - 110 000	R12 600 + 25% of the amount above R70 000	74 001 - 115 000	R13 320 + 25% of the amount above R74 000
110 001 - 140 000	R22 600 + 30% of the amount above R110 000	115 001 - 155 000	R23 570 + 30% of the amount above R115 000
140 001 - 180 000	R31 600 + 35% of the amount above R140 000	155 001 - 195 000	R35 570 + 35% of the amount above R155 000
180 001 - 255 000	R45 600 + 38% of the amount above R180 000	195 001 - 270 000	R49 570 + 38% of the amount above R195 000
255 001 and above	R74 100 + 40% of the amount above R255 000	270 001 and above	R78 070 + 40% of the amount above R270 000
Tax rebates		**Tax rebates**	
Primary	R 5 400	Primary	R 5 800
Secondary	R 3 100	Secondary	R 3 200
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 30 000	Below age 65	R 32 222
Age 65 and over	R 47 222	Age 65 and over	R 50 000
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
1st dependant		1st dependant	
Additional dependants		Additional dependants	

2006 tax year (1 march 2005 - 28 February 2006)		2007 tax year (1 march 2006 - 28 February 2007)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 80 000	18% of each R1	0 - 100 000	18% of each R1
80 001 - 130 000	R14 400 + 25% of the amount above R80 000	100 001 - 160 000	R18 000 + 25% of the amount above R100 000
130 001 - 180 000	R26 900 + 30% of the amount above R130 000	160 001 - 220 000	R33 000 + 30% of the amount above R160 000
180 001 - 230 000	R41 900 + 35% of the amount above R180 000	220 001 - 300 000	R51 000 + 35% of the amount above R220 000
230 001 - 300 000	R59 400 + 38% of the amount above R230 000	300 001 - 400 000	R79 000 + 38% of the amount above R300 000
300 001 and above	R86 000 + 40% of the amount above R300 000	400 001 and above	R117 000 + 40% of the amount above R400 000
Tax rebates		**Tax rebates**	
Primary	R 6 300	Primary	R 7 200
Secondary	R 4 500	Secondary	R 4 500
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 35 000	Below age 65	R 40 000
Age 65 and over	R 60 000	Age 65 and over	R 65 000
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
1st dependant		1st dependant	
Additional dependants		Additional dependants	

2008 tax year (1 march 2007 - 28 February 2008)		2009 tax year (1 march 2008 - 28 February 2009)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 112 500	18% of each R1	0 - 122 000	18% of each R1
112 501 - 180 000	R20 250 + 25% of the amount above R112 500	122 001 - 195 000	R21 960 + 25% of the amount above R122 000
180 001 - 250 000	R37 125 + 30% of the amount above R180 000	195 001 - 270 000	R40 210 + 30% of the amount above R195 000
250 001 - 350 000	R58 125 + 35% of the amount above R250 000	270 001 - 380 000	R62 710 + 35% of the amount above R270 000
350 001 - 450 000	R93 125 + 38% of the amount above R350 000	380 001 - 490 000	R101 210 + 38% of the amount above R380 000
450 001 and above	R131 125 + 40% of the amount above R450 000	490 001 and above	R143 010 + 40% of the amount above R490 000
Tax rebates		**Tax rebates**	
Primary	R 7 740	Primary	R 8 280
Secondary	R 4 680	Secondary	R 5 040
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 43 000	Below age 65	R 46 000
Age 65 and over	R 69 000	Age 65 and over	R 74 000
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
2nd dependant		3rd dependant	
Additional dependants		Additional dependants	

2010 tax year (1 march 2009 - 28 February 2010)		2011 tax year (1 March 2010 - 28 February 2011)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 132 000	18% of each R1	0 - 140 000	18% of each R1
132 001 - 210 000	R23 760 + 25% of the amount above R132 000	140 001 - 221 000	R25 200 + 25% of the amount above R140 000
210 001 - 290 000	R43 260 + 30% of the amount above R210 000	221 001 - 305 000	R45 450 + 30% of the amount above R221 000
290 001 - 410 000	R67 260 + 35% of the amount above R290 000	305 001 - 431 000	R70 650 + 35% of the amount above R305 000
410 001 - 525 000	R109 260 + 38% of the amount above R410 000	431 001 - 552 000	R114 750 + 38% of the amount above R431 000
525 001 and above	R152 960 + 40% of the amount above R525 000	552 001 and above	R160 730 + 40% of the amount above R552 000
Tax rebates		**Tax rebates**	
Primary	R 9 756	Primary	R 10 260
Secondary	R 5 400	Secondary	R 5 675
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 54 200	Below age 65	R 57 000
Age 65 and over	R 84 200	Age 65 and over	R 88 528
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
1st dependant		1st dependant	
Additional dependants		Additional dependants	

2012 tax year (1 March 2011 - 28 February 2012)		**2013 tax year (1 March 2012 - 28 February 2013)**	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 150 000	18% of each R1	0 - 160 000	18% of each R1
150 001 - 235 000	27 000 + 25% of the amount above 150 000	160 001 - 250 000	28 800 + 25% of the amount above 160 000
235 001 - 325 000	48 250 + 30% of the amount above 235 000	250 001 - 346 000	51 300 + 30% of the amount above 250 000
325 001 - 455 000	75 250 + 35% of the amount above 325 000	346 001 - 484 000	80 100 + 35% of the amount above 346 000
455 001 - 580 000	120 750 + 38% of the amount above 455 000	484 001 - 617 000	128 400 + 38% of the amount above 484 000
580 001 and above	168 250 + 40% of the amount above 580 000	617 001 and above	178 940 + 40% of the amount above 617 000
Tax rebates		**Tax rebates**	
Primary	R10 755	Primary	R11 440
Secondary	R6 012	Secondary	R6 390
Tertiary	R2 000	Tertiary	R2 130
Tax treshold		**Tax treshold**	
Below age 65	R 59 750	Below age 65	R63 556
Age 65 and over	R 93 150	Age 65 and over	R99 056
Age 75 and over	R 104 261	Age 75 and over	R110 889
Medical aid rebates		**Medical aid rebates**	
Self		Self	R230
1st dependant		1st dependant	R230
Additional dependants		Additional dependants	R154

2014 tax year (1 March 2013 - 28 February 2014)		2015 tax year (1 March 2014 - 28 February 2015)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 165 600	18% of each R1	0 - 174 550	18% of each R1
165 601 - 258 750	29 808 + 25% of the amount above 165 600	174 551 - 272 700	31 419 + 25% of the amount above 174 550
258 751 - 358 110	53 096 + 30% of the amount above 258 750	272 701 - 377 450	55 957 +30% of the amount above 272 700
358 111 - 500 940	82 904 + 35% of the amount above 358 110	377 451 - 528 000	87 382 + 35% of the amount above 377 450
500 941 - 638 600	132 894 +38% of the amount above 500 940	528 001 - 673 100	140 074 +38% of the amount above 528 000
638 601 and above	185 205 + 40% of the amount above 638 600	673 101 and above	195 212 + 40% of the amount above 673 100
Tax rebates		**Tax rebates**	
Primary	R12 080	Primary	R12 726
Secondary	R6 750	Secondary	R7 110
Tertiary	R2 250	Tertiary	R2 367
Tax treshold		**Tax treshold**	
Below age 65	R67 111	Below age 65	R70 700
Age 65 and over	R104 611	Age 65 and over	R110 200
Age 75 and over	R117 111	Age 75 and over	R123 350
Medical aid rebates		**Medical aid rebates**	
Self	R242	Self	R257
2nd dependant	R242	3rd dependant	R257
Additional dependants	R162	Additional dependants	R172

2016 tax year (1 March 2015 - 29 February 2016)		2017 tax year (1 March 2016 - 28 February 2017)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 181 900	18% of each R1	0 – 188 000	18% of taxable income
181 901 - 284 100	32 742 + 26% of the amount above 181 900	188 001 – 293 600	33 840 + 26% of taxable income above 188 000
284 101 - 393 200	59 314 + 31% of the amount above 284 100	293 601 – 406 400	61 296 + 31% of taxable income above 293 600
393 201 - 550 100	93 135 + 36% of the amount above 393 200	406 401 – 550 100	96 264 + 36% of taxable income above 406 400
550 101 - 701 300	149 619 + 39% of the amount above 550 100	550 101 – 701 300	147 996 + 39% of taxable income above 550 100
701 301 and above	208 587 + 41% of the amount above 701 300	701 301 and above	206 964 + 41% of taxable income above 701 300
Tax rebates		**Tax rebates**	
Primary	R13 257	Primary	R13 500
Secondary	R7 407	Secondary	R7 407
Tertiary	R2 466	Tertiary	R2 466
Tax treshold		**Tax treshold**	
Below age 65	R73 650	Below age 65	R75 000
Age 65 and over	R114 800	Age 65 and over	R116 150
Age 75 and over	R128 500	Age 75 and over	R129 850
Medical aid rebates		**Medical aid rebates**	
Self	R270	Self	R286
1st dependant	R270	1st dependant	R286
Additional dependants	R181	Additional dependants	R192

Appendix B: Tax code 1996-2017, adjusted for inflation

1996 tax year (1 March 1995 - 28 February 1996)		1997 tax year (1 March 1996 - 28 February 1997)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 15 975	17% of each R1	0 - 44 688	17 % of each R1
15 976 - 31 950	R2 716 + 18% of the amount over R15 975	44 689 - 59 584	R7 597 + 19% of the amount over R44 688
31 951 - 47 925	R5 591 + 19% of the amount over R31 950	59 585 - 89 377	R10 427 + 21% of the amount over R59 584
47 926 - 63 900	R8 627 + 20% of the amount over R47 925	89 378 - 119 169	R16 684 + 30% of the amount over R89 377
63 901 - 95 850	R11 821 + 21% of the amount over R63 900	119 170 - 178 753	R26 217 + 41% of the amount over R119 169
95 851 - 127 799	R18 531 + 31% of the amount over R95 850	178 754 - 238 338	R55 116 + 43% of the amount over R178 753
127 800 - 159 749	R28 435 + 42% of the amount over R127 799	238 339 - 297 922	R75 672 + 44% of the amount over R238 338
159 750 - 223 649	R41 535 + 43% of the amount over R159 749	297 922 and over	R101 889 + 45% of the amount over R297 922
223 650 - 255 599	R69 331 + 44% of the amount over R223 649		
255 600 and over	83 389 + 45% of the amount over R255 599		
Tax rebates		**Tax rebates**	
Primary	R 8 387	Primary	R 7 984
Secondary	R 7 987	Secondary	R 7 448
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 46 647	Below age 65	R 46 416
Age 65 and over	R 91 968	Age 65 and over	R 83 135
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
1st dependant		1st dependant	
Additional dependants		Additional dependants	

1998 tax year (1 March 1997 - 28 February 1998)		1999 tax year (1 March 1998 - 28 February 1999)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 – 82 124	19% of each R1	0 – 79 368	19% of each R1
82 125 - 95 812	R15 604 + 30% of the amount above R82 124	79 369 – 117 772	R15 080 + 30% of the amount above 79 368
95 813 - 123 186	R19 710 + 32% of the amount above R95 812	117 773 – 153 616	R26 601 + 39% of the amount above117 772
123 187 - 164 248	R28 470 + 41% of the amount above R123 186	153 617 - 179 219	R40 580 + 43 % of the amount above 153 616
164 248 - 191 623	R43 305 + 43% of the amount above R164 248	179 220 - 307 232	R51 589 + 44% of the amount above 179 219
191 624 - 273 747	R57 076 + 44% of the amount above R191 623	307 233 and above	R107 915+ 45% of the amount above 307 232
273 748 and above	R93 211 + 45% of the amount above R273 747		
Tax rebates		**Tax rebates**	
Primary	R 8 801	Primary	R 8 999
Secondary	R 6 844	Secondary	R 9 371
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 46 321	Below age 65	R 47 365
Age 65 and over	R 82 261	Age 65 and over	R 81 801
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
2nd dependant		3rd dependant	
Additional dependants		Additional dependants	

2000 tax year (1 March 1999 - 28 February 2000)		2001 tax year (1 March 2000 - 28 February 2001)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 – 80 363	19% of each R1	0 - 80 938	18% of each R1
80 364 - 121 762	R15 269 + 30% of the amount above R80 363	80 939 - 104 063	R14 569 + 26% of the amount above R80 938
121 763 - 146 115	R27 689 + 35% of the amount above R121 762	104 064 - 138 750	R20 581 + 32% of the amount above R104 063
146 116 - 170 467	R36 212 + 40 % of the amount above R146 115	138 751 - 161 875	R31 681 + 37% of the amount above R138 750
170 468 - 292 229	R45 953 + 44% of the amount above R170 467	161 876 - 462 500	R40 238 + 40% of the amount above R161 875
292 230 and above	R99 528 + 45% of the amount above R292 229	462 501 and above	R160 488 + 42% of the amount above R462 500
Tax rebates		**Tax rebates**	
Primary	R 9 035	Primary	R 8 788
Secondary	R 6 758	Secondary	R 6 706
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 47 551	Below age 65	R 48 819
Age 65 and over	R 82 109	Age 65 and over	R 84 494
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
1st dependant		1st dependant	
Additional dependants		Additional dependants	

2002 tax year (1 March 2001 - 28 February 2002)		2003 tax year (1 March 2002 - 28 February 2003)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 83 179	18 % of each R1	0 - 80 210	18% of each R1
83 180 - 120 391	R14 972 + 26% of the amount above R83 179	80 211 - 160 420	R14 438 + 25% of the amount above R80 210
120 392 - 175 115	R24 647 + 32% of the amount above R120 391	160 421 - 220 577	R34 490 + 30% of the amount above R160 420
175 116 - 218 893	R42 159 + 37% of the amount above R175 115	220 578 - 340 892	R52 537 + 35% of the amount above R220 577
218 894 - 470 620	R58 357 + 40% of the amount above R218 893	340 893 - 481 259	R94 648 + 38% of the amount above R340 892
470 621 and above	R159 048 + 42% of the amount above R470 620	481 260 and above	R147 987+ 40% of the amount above R481 259
Tax rebates		**Tax rebates**	
Primary	R 9 062	Primary	R 9 745
Secondary	R 6 567	Secondary	R 6 016
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 50 345	Below age 65	R 54 142
Age 65 and over	R 85 705	Age 65 and over	R 85 504
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
2nd dependant		3rd dependant	
Additional dependants		Additional dependants	

2004 tax year (1 March 2003 - 28 February 2004)		**2005 tax year (1 March 2004 - 28 February 2005)**	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 132 711	18% of each R1	0 - 138 238	18% of each R1
132 712 - 208 545	R23 888 + 25% of the amount above R132 711	138 239 - 214 829	R24 883 + 25% of the amount above R138 238
208 546 - 265 421	R42 847 + 30% of the amount above R208 545	214 830 - 289 552	R44 031 + 30% of the amount above R214 829
265 422 - 341 256	R59 909 + 35% of the amount above R265 421	289 553 - 364 275	R66 448 + 35% of the amount above R289 552
341 257 - 483 446	R86 452 + 38% of the amount above R341 256	364 276 - 504 381	R92 601 + 38% of the amount above R364 275
483 447 and above	R140 484 + 40% of the amount above R483 446	504 382 and above	R145 841 + 40% of the amount above R504 381
Tax rebates		**Tax rebates**	
Primary	R 10 238	Primary	R 10 835
Secondary	R 5 877	Secondary	R 5 978
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 56 876	Below age 65	R 60 193
Age 65 and over	R 89 527	Age 65 and over	R 93 404
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
1st dependant		1st dependant	
Additional dependants		Additional dependants	

2006 tax year (1 march 2005 - 28 February 2006)		2007 tax year (1 march 2006 - 28 February 2007)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 -144 732	18% of each R1	0 - 172 741	18% of each R1
144 733 - 235 189	R26 052 + 25% of the amount above R144 732	172 742- 276 386	R31 093 + 25% of the amount above R172 741
235 190 - 325 647	R48 666 + 30% of the amount above R235 189	276 387 - 380 030	R57 005 + 30% of the amount above R276 386
325 648 - 416 104	R75 803 + 35% of the amount above R325 647	380 031 - 518 223	R88 098 + 35% of the amount above R380 030
416 105 - 542 744	R107 463 + 38% of the amount above R416 104	518 224 - 690 964	R136 465+ 38% of the amount above R518 223
542 745 and above	R155 587 + 40% of the amount above R542 744	690 965 and above	R202 107 + 40% of the amount above R690 964
Tax rebates		**Tax rebates**	
Primary	R 11 398	Primary	R 12 437
Secondary	R 8 141	Secondary	R 7 773
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 63 320	Below age 65	R 69 096
Age 65 and over	R 108 549	Age 65 and over	R 112 282
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
1st dependant		1st dependant	
Additional dependants		Additional dependants	

2008 tax year (1 march 2007 - 28 February 2008)		2009 tax year (1 march 2008 - 28 February 2009)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 181 487	18% of each R1	0 - 176 462	18% of each R1
181 488 - 290 380	R32 668 + 25% of the amount above R181 487	176 463 - 282 049	R31 763 + 25% of the amount above R176 462
290 381 - 403 305	R59 891 + 30% of the amount above R290 380	282 050 - 390 530	R58 160 + 30% of the amount above R282 049
403 306 - 564 627	R93 768 + 35% of the amount above R403 305	390 531 - 549 634	R90 704 + 35% of the amount above R390 530
564 628 - 725 949	R150 231 + 38% of the amount above R564 627	549 635 - 708 739	R146 391 + 38% of the amount above R549 634
725 950 and above	R211 534+ 40% of the amount above R725 949	708 740 and above	R206 851 + 40% of the amount above R708 739
Tax rebates		**Tax rebates**	
Primary	R 12 486	Primary	R 11 976
Secondary	R 7 550	Secondary	R 7 290
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 69 368	Below age 65	R 66 535
Age 65 and over	R 111 312	Age 65 and over	R 107 034
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
2nd dependant		3rd dependant	
Additional dependants		Additional dependants	

2010 tax year (1 march 2009 - 28 February 2010)		2011 tax year (1 March 2010 - 28 February 2011)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 178 965	18% of each R1	0 - 182 063	18% of each R1
178 966 - 284 716	R32 214 + 25% of the amount above R178 965	182 064 - 287 400	R32 771 + 25% of the amount above R182 063
284 717 - 393 180	R57 431 + 30% of the amount above R284 716	287 401 - 396 638	R59 106 + 30% of the amount above R287 400
393 181 - 555 875	R91 191 + 35% of the amount above R393 180	396 639 - 560 495	R91 877 + 35% of the amount above R396 638
555 876 - 711 791	R148 134 + 38% of the amount above R555 875	560 496 - 717 850	R149 227 + 38% of the amount above R560 495
711 792 and above	R207 382 + 40% of the amount above R711 791	717 851 and above	R209 022 + 40% of the amount above R717 850
Tax rebates		**Tax rebates**	
Primary	R 13 227	Primary	R 13 343
Secondary	R 7 321	Secondary	R 7 380
Tertiary	-	Tertiary	-
Tax treshold		**Tax treshold**	
Below age 65	R 73 484	Below age 65	R 74 126
Age 65 and over	R 114 158	Age 65 and over	R 115 127
Age 75 and over	-	Age 75 and over	-
Medical aid rebates		**Medical aid rebates**	
Self		Self	
1st dependant		1st dependant	
Additional dependants		Additional dependants	

2012 tax year (1 March 2011 - 28 February 2012)		2013 tax year (1 March 2012 - 28 February 2013)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 185 799	18% of each R1	0 - 187 648	18% of each R1
185 800 - 291 085	33 444 + 25% of the amount above 185 799	187 649 - 293 200	33 777 + 25% of the amount above 187 648
291 086 - 402 565	59 765 + 30% of the amount above 291 085	293 201 - 405 789	60 165 + 30% of the amount above 293 200
402 566 - 563 591	93 209 + 35% of the amount above 402 565	405 790 - 567 636	93 941 + 35% of the amount above 405 789
563 592 - 718 423	149 568 + 38% of the amount above 563 591	567 637 - 723 619	150 588 + 38% of the amount above 567 636
718 424 and above	208 405 + 40% of the amount above 718 423	723 620 and above	209 861 + 40% of the amount above 723 619
Tax rebates		**Tax rebates**	
Primary	R 13 322	Primary	R13 417
Secondary	R7 447	Secondary	R7 494
Tertiary	R2 477	Tertiary	R2 498
Tax treshold		**Tax treshold**	
Below age 65	R 74 010	Below age 65	R74 539
Age 65 and over	R 115 381	Age 65 and over	R116 173
Age 75 and over	R129 144	Age 75 and over	R130 051
Medical aid rebates		**Medical aid rebates**	
Self		Self	270
1st dependant		1st dependant	270
Additional dependants		Additional dependants	181

2014 tax year (1 March 2013 - 28 February 2014)		2015 tax year (1 March 2014 - 28 February 2015)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 183 697	18% of each R1	0 - 182 506	18% of each R1
183 698 - 287 027	33 066 + 25% of the amount above 183 697	182 507 - 285 129	32 851 + 25% of the amount above 182 506
287 028 - 397 246	58 899 + 30% of the amount above 287 027	285 130 - 394 654	58 507 +30% of the amount above 285 129
397 247 - 555 685	91 964 + 35% of the amount above 397 246	394 655 - 552 066	91 365 + 35% of the amount above 394 654
555 686 - 708 389	147 417 +38% of the amount above 555 685	552 067 - 703 779	146 458 +38% of the amount above 552 066
708 390 and above	205 445 + 40% of the amount above 708 389	703 780 and above	204 110 + 40% of the amount above 703 779
Tax rebates		**Tax rebates**	
Primary	R13 400	Primary	R13 306
Secondary	R7 488	Secondary	R7 434
Tertiary	R2 496	Tertiary	R2 475
Tax treshold		**Tax treshold**	
Below age 65	R74 445	Below age 65	R73 922
Age 65 and over	R116 043	Age 65 and over	R115 223
Age 75 and over	R129 909	Age 75 and over	R128 972
Medical aid rebates		**Medical aid rebates**	
Self	268	Self	269
2nd dependant	268	3rd dependant	269
Additional dependants	180	Additional dependants	180

2016 tax year (1 March 2015 - 29 February 2016)		2017 tax year (1 March 2016 - 28 February 2017)	
Taxable income (R)	**Rates of tax (R)**	**Taxable income (R)**	**Rates of tax (R)**
0 - 181 900	18% of each R1	0 – 178 633	18% of taxable income
181 901 - 284 100	32 742 + 26% of the amount above 181 900	178 634 - 278 972	32 154 + 26% of taxable income above 178 633
284 101 - 393 200	59 314 + 31% of the amount above 284 100	278 973 - 386 152	58 242 + 31% of taxable income above 278 972
393 201 - 550 100	93 135 + 36% of the amount above 393 200	386 153 - 522 693	91 468 + 36% of taxable income above 386 152
550 101 - 701 300	149 619 + 39% of the amount above 550 100	522 694 - 666 359	140 622 + 39% of taxable income above 522 693
701 301 and above	208 587 + 41% of the amount above 701 300	666 360 and above	196 653+ 41% of taxable income above 666 359
Tax rebates		**Tax rebates**	
Primary	R13 257	Primary	R12 827
Secondary	R7 407	Secondary	R7 038
Tertiary	R2 466	Tertiary	R2 343
Tax treshold		**Tax treshold**	
Below age 65	R73 650	Below age 65	R71 263
Age 65 and over	R114 800	Age 65 and over	R110 363
Age 75 and over	R128 500	Age 75 and over	R123 381
Medical aid rebates		**Medical aid rebates**	
Self	270	Self	272
1st dependant	270	1st dependant	272
Additional dependants	181	Additional dependants	182