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UNIVERSITY OF THE WITWATERSRAND

South Africa – Exploring the 2016 Planned Carbon Emissions Tax

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Declaration

I, Alicia Rae Edelstein, declare that this research report is my own unaided work. It is submitted in partial fulfilment of the requirements for the degree of Masters of Commerce in the field of Accountancy at the University of the Witwatersrand, Johannesburg. All sources that I have used or referred to have been indicated and acknowledged as such by means of complete references. This report has not been submitted before for any other degree or examination at any other institution.

Alicia Rae Edelstein _____

Date _____

Abstract

At the 2009 Copenhagen climate-change talks South Africa proposed a reduction in greenhouse gas emissions by 34% in 2020 and 42% in 2025. This report is intended to research and conclude upon whether South Africa can practically implement a carbon emissions tax in order to reduce the amount of carbon dioxide and other greenhouse gases emitted, as well as on whether the introduction of a carbon emissions tax would be an appropriate way in which to address the climate change problem and South Africa's contribution thereto. The research undertaken is necessary as South Africa is a relatively large emitter of carbon dioxide and other greenhouse gases thereby contributing to the global problem of climate change which is caused by these emissions and if South Africa wants to honour its proposed reduction, a measure is needed in order to ensure South Africa reduces its harmful greenhouse gas emissions, of which the levying of a carbon emissions tax is researched as such a measure. The research, a detailed literature that identified potential areas of concern or negative impact on the economy and the identified 'issues' were when used in a correspondence survey to test the perception of professionals with a knowledge of the proposed carbon tax. The conclusion reached was that a carbon emissions tax cannot be successfully implemented at this time due to the prevailing economic conditions in South Africa as well as the potential resulting negative effects on the country's low-income population and on South Africa's international competitiveness. It is recommended that the possibility of implementing a carbon emissions tax should be re-evaluated at a future stage once the country's economy is more developed.

Key Words

Climate change	Marginal cost to the environment	Tax shifting
Greenhouse gases	Carbon emissions	Tax experts

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1. Introduction

1.1 Context of the Study

Climate change and the greenhouse gas emissions which cause them are an enormous problem facing South Africa as well as the rest of the world. Global economies have recognised climate change as the largest environmental market failure facing the world currently and there is an international consensus that urgent action is needed to curb the greenhouse gas emissions responsible for climate change. (National Treasury, 2010b)

South Africa, being a developing country is highly energy and carbon intensive, emitting a significant portion of greenhouse gases, and is the twelfth largest producer of carbon dioxide globally being one of the largest carbon dioxide producers in Africa (Lunsche, 2008).

In order to reduce its amount of carbon dioxide emissions and lessen its negative impact on climate change, South Africa has adopted the Kyoto Protocol with effect from February 2005 and has introduced a carbon emissions tax on the purchase of new vehicles from September 2010 (National Treasury, 2010a). Even though under the Kyoto Protocol (United Nations, 1998), South Africa has no obligation to reduce greenhouse gas emissions, as it is a developing country, there is a moral incentive as well as a financial one for the country to introduce measures to reduce emissions and so the South African National Treasury is seriously investigating the implementation of a carbon tax in South Africa in order to reduce greenhouse gas emissions and combat climate change (Luiz and Muller, 2008).

The proposed tax should be levied directly on carbon dioxide and other greenhouse gas emissions, increasing the prices of various goods and services and thereby providing a strong

price signal to both producers and consumers to change their behaviour over the long term (National Treasury, 2010b).

The levying of a carbon tax is most important as it creates an incentive for activities with the lowest or no emissions while discouraging activities with high amounts of emissions. Also, the carbon tax would generate additional revenues and should be fairly easy to implement, achieving an objective in South Africa of reducing the country's greenhouse gas emissions and assisting to combat climate change. (National Treasury, 2010b)

A carbon tax is considered to be a recommended measure in an effort to reduce South Africa's carbon emissions as it is an instrument which is economically efficient in that it creates a broad-based carbon price that efficiently distributes the burden of emissions between economic agents leading to the lowest abatement. This is shown by the fact that a carbon price can be adjusted over time to lead to more or less mitigation and therefore should enable quantity targets to be met in the long term. (Department of Environmental Affairs, 2013)

1.2 Purpose of the Study

The purpose of this research is to determine whether a carbon emissions tax can be successfully implemented in South Africa as proposed for the first time by the Minister of Finance during the 2013 Budget Speech and then the Minister of Finance referred to the implementation of carbon emissions tax again in the 2014 Budget Speech. This tax is proposed to come into effect from 1 January 2016, in an effort to reduce South Africa's carbon dioxide emissions. The researcher will explore the proposed tax in light of the potential implementation issues and disadvantages

which have been identified as possibly resulting from its implementation. (National Treasury, 2013a) (National Treasury, 2014)

1.3 Problem Statement

1.3.1 Main Problem

The main research problem will be to consider whether South Africa, as a developing country, can successfully implement a carbon tax on greenhouse gas emissions based on professional accountants' perceptions.

1.3.2 Sub-Problem and Objectives

Against this background the aim of this research is to identify the practical issues of implementing a carbon tax on greenhouse gas emissions in South Africa and explore their perceived impact on the South African economy by addressing the following objectives:

- Review published literature in order to understanding the need for the levying of a carbon emissions tax in South Africa.
- Analyse the proposed model for levying the carbon emissions tax in South Africa in order to obtain an understanding of the proposed tax.
- Review recorded professional opinions and publications in order to gain an understanding of the possible or perceived impact that the levying of carbon tax will have on low-income households.
- Review professional opinions in order to evaluate whether the levying of carbon emissions tax in South Africa will have an impact on the international competitiveness of the country.
- Reflect on what should or could be done with the revenue collected from levying the tax.
- Use the concerns and proposed impacts identified from the literature review in order to formulate statements to use as a correspondence analysis in order to test professional accountants' perceptions successful implementation of the proposed carbon tax on greenhouse gas emissions.

1.4 Significance of the Study

Global warming and climate change caused by greenhouse gas emissions is a major concern of governments internationally due to their power to create a global recession of enormous proportions with large implications for the entire population (Dimmer, 2011).

This is well known internationally and various measures have been taken to reduce greenhouse gas emissions. However, South Africa has yet to implement a stringent measure to reduce its greenhouse gas emissions to contribute to the fight against these emissions. (National Treasury, 2010a)

The notion of a carbon tax is a relatively new one for South Africa, in light of the fact that it is a developing country and in the implementation of a carbon emissions tax would be going beyond the requirements of the Kyoto Protocol which does not put any pressure on developing countries to introduce a carbon tax (United Nations, 1998). Although various carbon taxes have been implemented internationally, it will be of significant value to perform research on the practicality of introducing a carbon tax in South Africa in order to increase understanding of the proposed tax, including why South Africa is going beyond the requirements of the Kyoto Protocol by proposing this tax, as well as its positive and negative aspects. (Devarajan, 2009)

The Discussion Paper 'Reducing Greenhouse Gas Emissions: The Carbon Tax Option' (2010), details the pressing need for a carbon tax of sorts to be implemented in South Africa as well as a proposed model on which it should be levied. However, a number of implementation and administration issues regarding a carbon tax which have been identified need to be researched in order to determine whether a carbon tax can realistically be implemented in South Africa, as well as to fully investigate the possible issues arising and how they can be managed, to ensure the

implementation of a carbon tax in our country achieves its objectives while maintaining the South African economy and the wellbeing of our population. (National Treasury, 2010b)

It is also considered to be advantageous to determine whether the principle of fairness as discussed by Adam Smith (1776) with regards to a tax system, whereby the balance between the interests of the government and those of the taxpayer are considered to be of crucial importance, is maintained or undermined with regards to the possible future implementation of a carbon emissions tax from the perspective of South Africa from the points of view of both the government and the various residents of the country.

1.5 Delimitations and Assumptions

This research will adopt the definition of fairness as provided by Smith (1776), which states that a fair tax system is one which is guided by a set of suitable rules or principles allowing for a balance between the interests of the government and the taxpayer, and will not attempt to consider the debate surrounding the adequacy of this definition.

This research will not cover emissions trading schemes as a method to reduce harmful greenhouse gas emissions in South Africa and will focus only on the carbon tax option. This is because the research aims to investigate the possibility of implementing the proposed carbon emissions tax successfully after the Minister of Finance first mentioned the introduction of the proposed carbon emissions tax in the 2013 Budget Speech and announced the delay in the implementation in the 2014 Budget Speech. (National Treasury, 2013a) (National Treasury, 2014)

Current provisions within the Income Tax Act No. 58 of 1962 and the Customs and Excise Act No. 91 of 1964 that also tax carbon emissions in South Africa will be excluded. These provisions that will be excluded include the tax levied on the purchase of new motor vehicles, as well as those on plastic bags and light bulbs, amongst others. The exclusion of the existing environmental tax provisions in the legislation is due to the research being concerned with the possibility of the implementing of the separate carbon tax on activities creating harmful emissions in the future and of which the revenue will be kept separate from other tax collections.

Any analysis of boarder tax adjustments regarding imports and exports of foreign and local goods that have an impact on international competition is beyond the scope of this research.

Any possible Value-Added Tax (VAT) as regulated by the Value-Added Tax Act No. 89 of 1991 will also not be included in the research, as the proposed carbon tax would not have any VAT implications.

Although every effort will be made to purposefully select participants who are knowledgably aware of the proposed carbon emissions tax within South Africa as well as the prevailing circumstances which may lead to the potential disadvantages of the tax becoming negative consequences of its implementation, the risk of an absence of complete understanding cannot be totally eliminated. There is an underlying assumption that participants will be suitably versed in the tax and will participate with complete candor.

1.6 Limitations of the Study

Due to the limited number of persons with adequate tax knowledge, sample sizes will be limited due to the availability and willingness of knowledgeable individuals (Creswell, 2003) and may thus be restricted (Maroun, 2007). The intention of the paper is to determine the viability of South Africa implementing a carbon emissions tax in light of the potential disadvantages using the opinions of those with sufficient tax knowledge, and not to comment on the perceived correctness of any actions taken by the Minister of Finance with regards to the proposed South African carbon emissions tax.

Future changes to the proposed model for implementation of the carbon emissions tax cannot be anticipated and therefore the research will only focus on the current available literature.

The research is limited to the unique South African circumstances and only persons residing in the country will be sampled to take part in data collection for this research.

The sample will reflect the general feelings of the whole population consisting of persons with adequate taxation knowledge from all industries. This is due to the fact that even though certain industries may seem to be more severely affected than other (including mining and electricity, amongst others), the effects of this tax will be felt by all taxpayers as a result of the widespread increase in the prices of goods and services that could be caused by the implementation of the proposed tax.

1.7 Definition of Terms

Professional accountants, for the purposes of this report, take the meaning of all members having a minimum of three years academic study in the field of South African taxation or the equivalent practical experience in the field of South African taxation. Furthermore this definition translates to determine professional accountants as those who have completed university degrees (generally comprising a minimum period of three years study), which included a major in South African taxation, residing in South Africa. As such, professional accountants in this instance includes but is not limited to all members of South African professional accountancy bodies such as the South African Institute of Chartered Accountants (SAICA), the South African Institute of Professional Accountants (SAIPA) and the Chartered Institute of Management Accountants (CIMA).

Where necessary, a description of terms or concepts under investigation will be provided in the report before the relevant term or concept is discussed.

2. Literature Review

This section will outline the need for a carbon emissions tax to be implemented in South Africa in an effort to reduce the country's carbon emissions; as well as detail the proposed model on which the tax will be levied.

The potential issues expected to come about as a result of the implementation of the tax are discussed, in order to explore the possible impacts of these potential issues upon introduction of the tax including any mitigating measures which can be employed to reduce these potential negative impacts on the South African economy and low income households.

To this end, the above mentioned findings from the literature will be scrutinized and used as the basis for the correspondence analysis further elaborated on in section 3. The literature findings on hand will be utilized in order to identify various issues surrounding the future implementation of the carbon tax, which in turn will be used to develop the correspondence survey, the primary tool which will gather data for the purposes of this research.

Each of the aspects looked into as part of the literature review will be used to develop criteria upon which we will base our correspondence analysis, and the responses thereto, in terms of expressing an opinion on whether the proposed tax can be successfully implemented in South Africa.

2.1 The Need for a Carbon Emissions Tax

Climate change is an increase in the overall global temperature in all countries the full year round. This increased temperature causes sea levels to rise, thereby melting arctic glaciers, increasing cases of extreme weather conditions, and decreasing agricultural produce yields. (IPCC, 2007)

Generally climate change is caused by the burning of fossil fuels like coal, oil, and gas which release carbon dioxide and other greenhouse gases. In South Africa the main causes of these emissions are the energy and transport sectors which, in the course of their functioning are responsible for deforestation, the maintaining of landfills, and the use of fertilisers (National Treasury, 2010b). Numerous direct observations of recent climate change have been made including, the increase in the average water vapour content over land and oceans broadly consistent with the additional water vapour that warmer air is able to hold, the increase in the

average ocean temperatures globally, and the decrease in glaciers and snow covered mountains in both the northern and the southern hemispheres (IPCC, 2007). Climate change results in various external costs in order to adapt. The external cost of carbon is the cost of each ton of carbon dioxide emitted determined by quantifying in monetary terms the costs caused by the damage to the atmosphere adjusted for the amount of time the carbon dioxide remains in the atmosphere (Aldy, 2009).

In terms of worldwide statistics South Africa is the twelfth largest emitter of carbon dioxide. South Africa is an energy based economy, with fossil fuels forming over ninety percent of the country's energy demand. Coal provides over seventy–five percent of that energy demand also catering for over ninety percent of South Africa's electricity generation. The country's significant energy demand is driven to a large extent by the mining industry where South Africa is the largest producer of gold and platinum in the world and among the largest producers of diamonds and coal. In comparison to other countries energy consumption levels in South Africa are notably higher than that of other developing countries, particularly the consumption of electricity, which forms the basis for statement one of the correspondence analysis discussed later on. This information regarding South Africa's levels of carbon emissions looks into whether there is an actual need for a carbon emissions tax to be implemented in South Africa as a criterion for the reasoning behind the implementation of the tax in terms of its subsequent success upon its implementation. (UNEP, 2004)

In light of the emission intensive profile of South Africa, Government believes that the country needs to reduce its carbon dioxide emissions in order to combat the global problem of climate change. If worldwide action is to be taken to correct climate change, the various countries governments would have to mutually agree on a policy with which to do so. However due to the

sheer number of governments that would need to participate, as well as the different governing policies and views prevalent, a fully coordinated and concerted response is not likely to come about in the near future. Therefore the South African Government has discovered a need for a method of taxing carbon dioxide emissions to be implemented in South Africa as a separate entity. (National Treasury, 2010b)

Even though climate change causes market failure in terms of its costs, this is not reflected in the pricing of goods and services producing the emissions which cause climate change. A carbon emissions tax would increase the prices of these goods and services, thereby encouraging lower emissions and improved energy efficiency. The carbon tax would be implemented to correct the market prices of goods and services, the production and usage of which requires carbon emissions, by charging a tax approximating the cost of the negative environmental effects thereby increasing the prices of such goods and services by the marginal external cost to the environment. (Rivers, 2008)

A tax on carbon emissions would ideally be set at a rate which is equal to the marginal cost of emitting each additional unit of carbon dioxide. This would effectively create an incentive for undertaking activities with low or no emissions in order to reduce the amount of carbon tax charged, also generating additional revenues which would be another benefit of implementing the tax. (National Treasury, 2010b)

This is the grounding on which statement two of the correspondence analysis is based, whereby answers to this statement would determine whether a tax levied directly on carbon emissions is

considered to be more effective in reducing the amount of such emissions as opposed to other possible methods, including emissions trading schemes.

2.2 Proposed Model for Levying the Carbon Tax

The carbon tax, once implemented, will need to be as administratively simple as possible, minimizing the administration costs for taxpayers. This is intrinsically linked to the tax base being the number of taxpayers required to pay the tax. Careful consideration will also be necessary with regards to the actual tax charge to be levied per ton of carbon dioxide emitted and an effective system with which to monitor the functioning of the tax once implemented, as seen in statement three of the correspondence analysis. (National Treasury, 2010b)

An important consideration of designing a carbon emissions tax would be to minimize administration costs. Generally a tax encompassing many diverse producers and consumers, like the proposed carbon tax, would lead to high administrative costs, in comparison with lower administrative cost that will arise when other methods of taxing carbon emissions are utilised, including emissions trading schemes (Smith, 2008). However, the ideal tax base on which to levy a carbon emissions tax would be directly on the entity responsible for the carbon dioxide emissions. This would then mean a large tax base is needed to fairly implement the tax. Therefore a trade-off arises with respect to the fairness of the tax and the administrative costs of implementing the tax, which needs to be considered. (National Treasury, 2010b)

In order to keep in line with the objective of a carbon emissions tax being to reduce South Africa's carbon emissions the tax should be levied directly on the entity producing the emissions.

This would normally be manufacturers and producers of goods and services, emitting carbon dioxide in the course of such manufacturing and producing. The next issue to consider is where in the production process the tax should be levied. Existing options are; upstream, when the goods and services requiring carbon emissions enter the economy, being when the goods and services enter the market for sale, or downstream, when the fuels causing carbon emissions are combusted in the process of producing the goods and services. From the point of view of administrative costs, which would be reduced if the tax is levied upstream as there are likely to be fewer entities needing to be regulated at the upstream level, this would be the preferable stage at which to apply the tax. (National Treasury, 2010b) There is an added advantage to applying the tax earlier in the production process as it would accurately reflect the carbon emissions during processing as well as in the final product, and encourage lower processing emissions, including the use of fuel products containing less carbon (Fullerton et al., 2008).

However, there is an argument, also investigated and considered to be effective (Fullerton et al., 2008), for the carbon emissions tax to be levied downstream instead of upstream in order to further impact the price of carbon and be more visible to consumers, due to the direct effect that would follow being price increases of the final goods and services. Further awareness of the implementation of the carbon tax can be created by firms advertising that part of the cost of relevant goods and services contains a carbon tax element, and therefore levying the carbon tax downstream would seem to be the preferable option from fairness and effectiveness point of view. (National Treasury, 2010b)

Therefore a crucial consideration arises in respect of the trade off over when in the production and sale cycle to levy the carbon emissions tax. A choice will have to be made between the lower administration costs of upstream levying and the enhanced effectiveness and fairness on downstream levying, by quantifying additional administration costs arising from levying the tax on the larger tax base of the entities directly responsible for the emissions, and determining whether these costs outweigh the additional benefits derived from levying the tax in the fairest way, being directly on the entities producing the emissions in the form of additional revenue collected (National Treasury, 2010b). This information forms the basis for statement four of the correspondence analysis, whereby the difference between the expected administration costs of levying the tax and the expected revenues to be collected from its implementation will need to be considered when determining the possible success of the tax. As such a criterion used to determine the potential success of the implementation of the tax would involve a review into whether the perceived administration costs of levying the tax are expected to be higher than the revenues to be collected from it and to review the extent that such administration costs would negate the purpose of the tax.

When deciding on the amount of tax to levy on carbon dioxide emitted, it is accepted that the tax should over time be equal to the costs of the emissions to the environment in terms of the damage it causes, as seen in statement five of the correspondence analysis. This means that another criterion used to determine the potential success of the carbon tax is whether it would be possible to achieve a broad coverage of the tax with minimum exemptions and exclusions, as well as the possibility of levying the tax at a rate equivalent to the marginal social costs of damage to the environment. The tax should be levied on all sectors responsible for carbon

emissions at equal rates to ensure fairness, and should therefore first be introduced at a lower rate and increased over time to facilitate taxpayers' adjustment to the tax, as seen in aspect three of the proposed carbon emissions tax in the correspondence analysis which further elaborated on in the next section. (Lachapelle, 2009)

In order to address the abovementioned issues Government proposes to price carbon by way of a carbon tax at the rate of R120 per ton of carbon dioxide equivalent effective from January 2016' (National Treasury, 2013a). In order to lessen the impact this tax on the functioning of affected businesses, a tax-free exemption threshold of sixty percent is proposed to be set, including additional allowances for emissions intensive and trade-exposed industries; including mining, electricity production and transportation with possibility of additional industries being included as necessary, as seen in statement six of the correspondence analysis. (National Treasury, 2013b)

It is further proposed that the carbon tax, as a three phase implementation process, beginning with a charge of R120 per ton of carbon dioxide emitted, phase two follows with the tax rate being increased at a rate of 10 per cent per annum from 1 January 2016 until 1 January 2020. Finally phase will result in a revised carbon tax regime with lower tax-free thresholds and a revised tax rate, which should commence on 1 January 2020, should be announced at the time of the Annual Budget in February 2019 at the latest. This is when the more long-term charge for carbon emissions will be determined. (National Treasury, 2013a)

2.3 Potential Impact on Low-Income Households

It has been thought by various researchers that the implementation of a carbon emissions tax may have a negative impact on low-income households. This would come about by virtue of the fact

that low-income households spend a larger proportion of their income on domestic energy sources compared to higher-income households. Therefore a carbon tax, by increasing the prices of various goods and services requiring high levels of emissions, will place a distortedly high burden on low-income households and will cause them to spend an unfairly high proportion of their income on domestic energy sources increased by the carbon tax component as well. This issue has the potential to greatly affect the South African economy due to the majority of the country's population falling under the low-income sector, and therefore the design and implementation of the carbon tax will need to address this issue and protect the relevant households. (National Treasury, 2010b)

In order to understand how the carbon emissions tax will have an unfair distributional effect on low-income households, the following explanation will be given. As per general economic conditions, before the carbon tax is implemented, the market for various goods and services affected by the tax follow the normal behaviours of demand and supply. Once the carbon tax comes into effect, the prices of such goods and services for the consumer increase by the amount of tax charged, this in turn decreases demand for those products and therefore also decreases the quantity of goods and services supplied. The persons legally obligated to pay the tax do not generally bear the entire burden of the tax, which is usually shared between producers and consumers depending on the workings of the particular markets for each affected good and service. In cases where the markets are competitive for certain products, the burden of the tax is likely to be assumed by producers, whereas for products where demand is fixed the tax burden will be borne by the consumer (Entin, 2004: p8 para 3).

Relating the above explanation to the situation regarding the disproportionately severe effect that the implementation of the carbon tax could have on low-income households, the main affected goods and services are those used for domestic energy sources by such households. As these goods are an essential part of their livelihoods, the demand for such goods is mostly fixed by low-income households due to their importance and value. Due to the fixed demand, producers will be able to pass the price increases brought on by the carbon tax to consumers by increasing the price of domestic energy sources by the full amount of the tax. Low-income households will then be forced to pay significantly higher prices for their energy sources which will leave them with a much lower disposable income, negatively affecting their wellbeing and financial stability. This negative affect will then be amplified as low-income households spend a significantly higher proportion of their disposable income on domestic energy sources than higher-income households, thereby causing these households to retain a much lower disposable income on a long term basis, which is likely to cause a drop in general living standards thereby severely impacting the South African economy for the worse due to the fact that a large proportion of households in South Africa are those with low incomes (Entin, 2004: p8 para 3).

It is accepted that the adverse distributional effects of the carbon emissions tax on low-income households would be unacceptable, and therefore measures will need to be taken on implementation of the tax in order to lessen this impact. This forms the basis of statement seven of the correspondence analysis. Various measures can be considered in this regard which will be discussed below. The perceived effectiveness of such mitigating measures on the potentially adverse distributional effects of the tax will be considered as a criterion for measuring the success of the implementation of the tax. This means that the more effective the mitigating

measures are expected to be, the more successful the tax's implementation should be as well, and *vice versa*.

One such measure, to adverse distributional effects of the carbon emissions tax on low-income households, suggested is that of using additional personal income tax relief in order to mitigate the financial constraints the introduction of a carbon tax is likely to place on individuals. This type of personal income tax relief can take the form of an exemption or rebate available to certain individual taxpayers (this is likely to include mainly those falling into the category of low-income households), however the effectiveness of this type of relief may be undermined by the fact that most members of low-income households do not earn enough money to be considered above the tax threshold and are therefore not taxpayers (Fullerton, 2008).

Another available option to adverse distributional effects of the carbon emissions tax on low-income households, are to increase transfers of funds to low-income households. This will take the form of increased social grants to those households formally classified as low-income and who will be severely affected by the implementation of the tax. This, however, will pose further issues stemming from its high administrative burden and the high possibility of unfairness arising from who will receives such grants and the potential difficulty in establishing which households will be most severely affected by the tax (Fullerton, 2008).

A final alternative to adverse distributional effects of the carbon emissions tax on low-income households, especially relevant in a South African context, is to use the effects and resulting revenues from the carbon emissions tax to improve the situation of the country's residents by

improving the delivery of basic services such as electricity and water, as well as give assistance to affected workers by moving them to alternative employment in order to help the transition to a more 'environmentally friendly' economy and minimize any negative effects on the already unstable unemployment situation in South Africa. This option, of increasing Government spending on South African residents, seems the most practical so far, but it remains to be seen whether it will be effective in mitigating the potential adverse effects of the carbon emissions tax on the country's majority low-income households. (National Treasury, 2010b)

2.4 Potential Impact on International Competitiveness

It would seem that the implementation of a carbon emissions tax will bring about certain impacts on different South African businesses. The severity of these impacts would depend on the industry of operation, the emissions intensity of the business processes, as well as the ability of the specific business to transfer cost increases as a result of the carbon tax onto consumers. An issue of concern with regards to the carbon tax is that as a result of potential higher costs arising from the tax, which will result in higher prices of affected goods and services, will lead consumers to seek alternative, less expensive sources of the same goods and services, being those from international producers. It is thought that, as these international producers will not be subject to such taxes, the international producers will likely charge lower prices for products. Increased imports will lead to a loss of revenue and competitiveness for South African businesses. The potential repercussions of this issue are serious and it is therefore imperative to incorporate some sort of mitigating measures into the design of the tax. (National Treasury, 2010b)

The anticipated intensity of the effect that the carbon emissions tax will have on the competitiveness of businesses are dependent on a number of factors including its structure, and most importantly the ability of such businesses to transfer cost increases to consumers' being whether the businesses will be able to increase the prices of their affected goods and services by the full amount of tax paid without losing substantial business. This will in turn, be largely dependent on the strength of demand for the products as well as industry competitiveness. It can then be said that products with inelastic demand, as well as those where the full amount of tax can be passed to consumers are unlikely to be severely affected by the introduction of a carbon tax. Examples of such goods and services would be those that are necessary to sustain basic living needs such as; fuel, basic foodstuffs, and accommodation amongst others. The issue arises with regard to other sorts of products where demand is more elastic and cost increases cannot simply be passed onto consumers will be further elaborated on in the following paragraphs. (National Treasury, 2010b)

In recent years the global economy has become almost completely integrated due to worldwide access to the internet and the business conducted thereon. It is therefore relatively simple for consumers, should the prices of their desired goods and services increase, to seek alternative sources of the same products at lower prices. As the carbon tax, if implemented, would affect the whole of South Africa these alternative sources would be international businesses not subject to carbon tax or something similar and therefore will be able to charge lower prices than their South African competitors. In the long term this will result in a significant loss of revenue for certain South African businesses, possibly causing some to shut down, and will therefore slow the country's economy down which is highly undesirable. It is as such important to ensure that in the

process of designing the carbon emissions tax; mitigating measures are utilized to prevent the above potential problem from occurring, as seen in statement eight of the correspondence analysis. (Fullerton, 2008)

Several mitigating measures are available to lessen the potential loss of international competitiveness of South African businesses which will be discussed below. The effectiveness of these measures will depend on a number of factors including; the extent of international trade in the particular sector, the nature of the affected products (whether they are luxury or necessary and the price sensitivity of their consumers), and the significance by which the carbon tax is expected to affect the price of the products. (National Treasury, 2010b)

An option that has been considered to protect South Africa's international competitiveness is to exempt certain goods and services from the carbon emissions tax. These exemptions will be granted to industries producing the most carbon-intensive products, as these products will be the most affected, experiencing the highest price increases. It is believed to be likely that competitive pressures will be significant enough to warrant complete exemption of affected products. However, using complete exemptions of the most carbon-intensive products undermines the objective of the tax and will result in lost revenue. This option is therefore not recommended and at most only limited exemptions should be allowed of certain products only if absolutely necessary. The exemptions are recommended to not be used as a measure to mitigate the impact in international competitiveness. (Fullerton, 2008)

A similar option available for mitigating the potential negative effects of the carbon tax on South Africa's international competitiveness will be to subject certain highly affected goods and services to reduced tax rates. This, again, will apply to those products which are carbon-intensive and likely to have the most significant price increases from the carbon emissions tax. The amount by which to reduce the tax rates is variable at the option of the Government, providing flexibility. This option, while not without fault, is preferable to total exemptions as it will still provide some revenue from the tax and has additional flexibility to vary the revenue amounts depending on prevailing circumstances. (Fullerton, 2008)

While the above alternatives are ways in which to mitigate the potential decline of South Africa's international competitiveness arising from the implementation of the carbon emissions tax, the suggested alternatives do present several disadvantages. These disadvantages include; inefficiencies in the operation of the tax, loss of tax revenue from the most carbon-intensive sectors, and dissatisfaction of those who will not be subject the relevant exemptions or reduced rates. As these disadvantages are likely to be severe, it seems that the best alternative to utilize in order to mitigate the negative international competitiveness effects is to implement the carbon emissions tax as a gradual phasing-in, being to charge the tax initially at modest levels and over time increase the tax charges to more realistic levels. This approach will affect all taxpayers equally thereby minimizing discontentment, and will maintain an adequate level of fairness, therefore being the best measure to employ in order to mitigate the potential negative effects on international competition. (Fullerton, 2008)

2.5 What should be done with the Resulting Revenues

Another critical issue regarding the carbon emissions tax implementation is what will be done with the revenue collected from the tax. Various options exist including reduction of taxes in other areas known as tax shifting, and recycling the revenue back into the economy in the form of increased government spending. Attention will have to be given to the possibility of earmarking the revenue in other words, allocating the revenue for a specific purpose before it has been collected. However, there are numerous disadvantages with regards to earmarking which will be elaborated on, including misallocating funds, overcomplicating the tax system and bringing about significant rigidities to South Africa's public finance system. (National Treasury, 2010b)

The possibility of tax shifting, allowing the imposition of tax on 'bad' activities, being the emissions of carbon dioxide, to reduce tax charged on 'good' activities such as labour, is a viable one. Should tax shifting be utilized with the revenue collected from the levying of the carbon emissions tax, it is thought that the tax to be reduced will be payroll taxes, being taxes on labour. This method of revenue allocation (tax shifting) is relatively easier to achieve than attempting to benefit taxpayers by distributional methods of revenue allocation due to ease of implementation and administration. A reduction in taxes on labour will lead to short to medium term gains arising in the employment sector. However, the more flexible the employment sector is, the longer term the relevant gains will last. (Winkler and Marquard, 2009)

Taxes on labour are levied in order to raise revenue for Government spending, however these taxes must be kept at reasonable levels to maintain employment. It has been thought that if additional revenues can be raised through the levying of a carbon emissions tax, taxes on labour

can be decreased which will be a positive, because it could result in higher employment levels, especially in the case of South Africa. (Winkler and Marquard, 2009)

In the case of additional revenues being collected from levying the carbon emissions tax, but no tax shifting, the result will be a net significant increase in revenue available for Government spending. The net increase in available revenue will then mean that certain Government service improvements will come about for residents as more money is available for spending on such services. However, a further and more detailed analysis is needed to determine whether tax shifting or recycling revenue back into the economy in the form of increased Government spending will be more beneficial for residents in numerical terms in order to ascertain the best course of action to benefit South African residents. This forms the grounding for statement nine of the correspondence analysis. The analysis of the numerical benefits involved with each course of action has yet to be done and so a conclusion on this sub-issue of whether it would be more beneficial to engage in tax shifting or revenue recycling cannot be reached at this time. (National Treasury, 2010b)

Earmarking, another possible usage for the revenue collected from implementing the carbon tax, is defined as using the revenues of a tax for a specific purpose, activity or program. This implies that the revenue to be received from the levying of the tax is allocated to certain areas of expenditure before it has been actually collected which is before the tax has been implemented and any revenues collected from the implementation. At the current time there is no formal policy in South Africa allocating the revenue to possibly be received from the carbon emissions tax to any specific area, therefore the various cases for and against earmarking will be looked

into in order to see whether following an earmarking course of action would be advantageous in respect of the revenue to be collected from the possible implementation of a carbon emissions tax. (National Treasury, 2006)

Earmarking is on occasion preferred by revenue authorities and governments as it is thought to guarantee and potentially increase the sources of funding for a particular cause. In the case of the carbon emissions tax under consideration, earmarking could be suggested to provide funding for the specific purpose of reducing South Africa's carbon dioxide emissions, as seen in statement ten of the correspondence analysis (National Treasury, 2010b). The ability to successfully determine what should be done with the revenue collected from the carbon tax is considered to be an important criterion in investigating the possibility of its successful implementation.

However, even though in theory earmarking the revenue to be collected from levying the carbon emissions tax to reducing the country's carbon emissions seems to be the most beneficial use for it, there are numerous disadvantages to earmarking that will be discussed below.

The workings of the South African Government's budget cycle are highly transparent, allocating funds to the various governmental departments every three years (National Treasury, 2010b). It has been found that earmarking any revenue sources tends to fragment and complicate the tax system, allowing certain departments to evade the discipline of the budgeting process, and leading to the underfunding of certain departments and the overfunding of others which distorts the overall funding allocation system for the country. Past discoveries made by various international Governments of earmarking systems have found that earmarking is universally

ineffective, as in the long term any initial gain made by increasing expenditure on the earmarked purpose is lost in the resulting distorted funding to other areas. According to Cuervo and Ghandi (1998) revenues should be allocated in terms of the priorities of the respective government. These priorities are subject to change without warning and may be difficult to predict, which presents another disadvantage of earmarking the revenue for purposes promoting the reduction of overall carbon emissions in South Africa.

Economic theories of public finance do not support the notion of earmarking specific revenue sources citing the reason that earmarking increases the risk of misallocating public funds resulting in either too much or too little funding being spent on the chosen purpose due to the fact that generally, revenues actually collected from levying the tax subject to earmarking are lower or higher than the predetermined optimum level of spending. (National Treasury, 2010b)

It is therefore not recommended to fully earmark the potential future revenues to be generated from levying the carbon emissions tax as the resulting rigidities in South Africa's public finance system should be avoided. Also, the unavoidable distortions of revenue allocated to revenue generated that would arise from earmarking would be too significant to condone the practice, based on research done by the National Treasury on the consequences of earmarking when used by other countries, especially those in the European Union (European Parliament, 2010). Therefore it seems that the best route to follow with respect to the revenue to be generated from levying the carbon emissions tax should be used for budgetary needs allocated once the need has arisen, coupled with continuous evaluation of the expenditures and their appropriateness. (National Treasury, 2010b)

2.6 Summation

As seen, South Africa's carbon dioxide emissions are comparatively high and are contributing to the worldwide problem of climate change and its related effects. The possibility of implementing a carbon tax on all carbon dioxide emissions within the country has been proposed, with a related implementation model. However, certain potential negative consequences have been identified as possibly occurring as a result of the implementation of the carbon tax which would negatively affect the South African economy as well as the welfare of its citizens. These effects have been explored and include; the potential negative distributional effect the carbon tax may have on low-income households within the country, and the potential negative impact on South Africa's international competitiveness. Another issue discussed with regards to the implementation of the carbon tax is what should be done with the revenues collected from levying the tax. Various options are looked into including tax shifting and earmarking the revenue for specific purposes connected to improving South Africa's impact on the environment in general. Ultimately, it needs to be determined whether the proposed carbon tax can be implemented successfully, in light of the potential issues which may result from its implementation.

3. Research Methodology

Creswell (2003) defines the quantitative research approach as:

> "one in which the investigator primarily uses post positivist claims for developing knowledge, employs strategies of enquiry such as experiments and surveys and collects data on predetermined instruments that yield statistical data".

A qualitative approach is one in which the enquirer often makes knowledge claims based on constructivist perspectives or advocacy perspectives or both. A mixed method approach is one in which the researcher tends to base knowledge claims on pragmatic grounds (Sale, Lohfeld and Brazil, 2002).

A mixed method approach will be beneficial as it will allow for an in-depth literature review to be undertaken and either supported or refuted by a statistical analysis of the results of the later-mentioned survey, and therefore undertaken in the performance of this research. This is shown in that it will allow for both qualitative and quantitative research to be done in the form of a literature review, correspondence analysis and structured closed ended questions. The literature review will constitute the qualitative approach within this methodology as it will require the researcher to make knowledge claims based on the constructivist perspectives of the various available writings on the topic at hand. (Creswell, 2003)

Following this literature review, the quantitative approach within this methodology will be undertaken in the form of a survey to be completed by the sampled professional accountants consisting of structured closed ended questions. This method is understood to be appropriate in terms of its continuous and widespread use in research. (Leedy and Omrod, 2001)

3.1 Methodological Approach

A literature review will be performed where information regarding the possible future implementation of a carbon emissions tax in South Africa, including relevant journal articles and government publications, will be analysed. This will be done in order to gain a basic

understanding of the prospective carbon tax model as well as any potential negative impacts of the implementation of this tax on the South African economy.

It is understood that quantitative techniques may be useful in supporting or contradicting the available literature (Maroun, 2007). A correspondence analysis can then be undertaken in order to backup or challenge the findings of the literature review (Creswell, 2003). The method used to gather the data in this case will be through the use of a survey which will contain closed ended questions.

Correspondence Analysis

A correspondence tableau will be used where certain aspects of the proposed carbon tax will be in the columns and the defined statements regarding various potential issues surrounding the proposed carbon tax will be in the rows. The sampled individual professional accountants will be requested to express their opinions on which aspects of the proposed carbon tax will address each issue or if certain issues are not addressed at all by the proposed carbon tax model. (Creswell, 2003)

Structured Closed-Ended Questions

The closed ended questions which form the survey to be distributed, will gather information in a manner that allows the sampled professional accountants to express their true feelings regarding the proposed model for the carbon emissions tax as well as over the potential negative effects the implementation of the tax may have on the South African economy, in a structured and categorized way which will enhance the researchers ability to accurately analyze and interpret the responses given to the survey.

In terms of responding to the survey, participants will be requested to respond to a number of statements covering the appropriateness of the proposed model on which the carbon emissions tax will be levied as well as the potential negative effects the implementation of the tax may cause on the South African economy, whereby respondents will need to determine which, if any, aspects of the proposed carbon tax address the statements provided. Possible responses will consist of certain aspects of the proposed carbon tax being; 'the charge of R120 per ton of carbon dioxide emitted', 'a tax free exemption threshold of sixty percent', 'the gradual increase of the charge per ton of carbon dioxide emitted at ten percent per annum from 2016 to 2020' and 'not addressed at all'. The usage of this type of scale is done to ensure that the participants' opinions can be accurately understood and categorized for the purposes of analyzing and interpreting the findings of the survey responses. (Leedy & Omrod, 2001)

Mixed Method Approach

Collecting and gathering the data will be considered a quantitative method of performing the research, whereas the prior literature review will be the qualitative side of this research as this will be largely interpretive. Predetermined defined statements will be used which then be easy to quantify however, careful consideration must be given to the wording as if the wording is inappropriate, the data collected will not be meaningful. The participants' beliefs as extracted from analysis of their responses to the survey will be used to add value to the literature review and ultimately assist in answering the research problem through exploring the relevant tax experts' opinions regarding the proposed model on which the tax will be levied as well as the potential negative effects of the implementation of the tax on the South African economy. (Creswell, 2003)

3.2 Population and Sample

Population

The population consists of all knowledgeable professional accountants who have a minimum of three years academic study in the field of South African taxation or the equivalent experience in the South African taxation field, being those individuals in a position to provide valuable input on the research problem (Creswell, 2003). These members of the population were identified as those who have completed university degrees (generally comprising a minimum period of three years study), which included a major in South African taxation, residing in South Africa. As such, the professional accountants considered within this population included but were not limited to all members of South African professional accountancy bodies such as the South African Institute of Chartered Accountants (SAICA), the South African Institute of Professional Accountants (SAIPA) and the Chartered Institute of Management Accountants (CIMA).

As the completion of the aforementioned university degree is the main criterion used to identify the members of the population, three completed years of study in the South African taxation field is needed, whereby a part of a year will not be included.

All professional accountants meeting the abovementioned criteria will be included in the population. Those who may specialise in other areas subsequent to obtaining the necessary qualification are still considered to have the adequate knowledge surrounding South African taxation to be able to meaningfully participate in the correspondence analysis.

However, those professional accountants who are currently working in the industries likely to be severely affected by the proposed carbon tax will not be considered as part of the population due to their lack of objectivity. As a result of this, our population will consist of professional accountants from universities and accounting-type firms with the requisite qualifications.

No background reading or knowledge regarding green taxes is required, as the required three years of study in South African taxation is considered to be sufficient to enable the sampled respondents to apply their minds in responding to the correspondence analysis, and ensure that the resulting responses are meaningful.

Sample Size

Only individuals, known as professional accountants for the purposes of this proposal, who have a minimum of three years academic study in the field of South African taxation or the equivalent experience in the field of South African taxation, will be given the survey to answer. The sample will likely include professional accountants from auditing firms and universities. Professional accountants from the various industries will not be included in the sample owing to their lack of objectivity due to the fact that the proposed tax will have a direct effect on their industries as a result of its implementation.

To ensure reliability approximately sixty professional accountants will be relied upon, which is considered to be adequate based on the fact that the tax related nature of the survey results in a small population size. A sample of sixty professional accountants is considered to be sufficient as it will allow enough accountants to respond to the correspondence analysis from different

spheres, being universities and auditing firms, to give a holistic level of responses. While also being small enough to take cognisance of the small population size. (Maroun, 2007)

It is imperative that participants have sufficient knowledge of the South African taxation system, as without this knowledge the data gathered will be meaningless. Owing to the relatively small sample size, the data that is gathered will be used as a comparative tool against the literature review in order to reach a conclusion, whereby it is thought that as the research is fairly interpretive in nature the use of large sample sizes to justify the extrapolation of findings is not required (Creswell, 2003).

3.3 Data Collection and Analysis

A correspondence analysis was used to collect and subsequently analyze the data, as it is a good way to support data which has been collected; it is useful when providing reasoning when sample sizes are small, and it is relatively easy to comprehend and interpret (Maroun, 2007). A correspondence analysis was performed in prior research on a somewhat related topic whereby Maroun and Turner (2011) and Maroun (2007) examined the perceived fairness of capital gains tax within the South African taxation system. This serves to depict the appropriateness of this method of data collection as well as its ability to collect the data.

Prior to the survey (Appendix 1) being distributed, the statements and questions were reviewed by a tax academic and an expert on language from the University of Witwatersrand's School of Accountancy. This was done in order to ensure the statements and questions were structured correctly, were clear, understandable and were not ambiguous. A pilot study was then performed

where participants were asked to comment on the survey, noting any specific statements or questions which were not understood or ambiguous as well as any areas of concern. No major issues were identified. The survey was then adapted taking into consideration any of the comments received. At this point the survey was sent to the University of Witwatersrand's Human Research Ethics Committee, where ethical clearance was obtained in order to allow the survey to be sent out to respondents.

The survey was then answered by participants on a voluntary basis. The sixty sampled participants were selected based on the various universities and auditing firms located in the Johannesburg area of South Africa. This area was used due to its practical location, and resulting ease of administration when distributing and collecting the correspondence analyses. An approximately equal number of participants were selected from each university and auditing firm in the area to ensure objectivity was maintained. Any selected participants who subsequently chose to withdraw from the study, were replaced with another participant from the same institution in order to maintain the same level of diversity and objectivity within the sample.

Participants were contacted via telephone or email, explained the purpose of the research and asked if they wished to fill out the survey. If they agreed to fill out the survey, a copy was then sent to them for completion, via email, with an explanation of how to fill it out. Any participants who agreed to fill out the survey but did not return a completed one were contacted by the researcher personally and requested to return the survey. All sampled participants were given the survey to complete around the same time, being during the months of November 2013 to January 2014. This was done in order to ensure the surveys were completed correctly and to prevent result bias. Participants were explained that they were required to place an 'X' in the box if the statement related to an aspect of the proposed carbon emissions tax.

Correspondence Analysis

The respondents were required to mark each row with an 'X' if they felt that the specific statement related to a characteristic of the proposed carbon tax. Once all surveys were completed, being a total of sixty, the data was collected and aggregated into a contingency table. When aggregating the data each 'X' was allocated a value of one and where the block was blank no value was allocated. The data from the correspondence analysis was then analyses using STATA software program. Results were generated and a two dimensional graph plot created for each statement responded to that was present in the correspondence analysis. The various aspects of the proposed carbon tax are plotted on the horizontal axis and the corresponding statements are then plotted on the vertical axis. The correspondence analysis is thus an easy to interpret correlation between individual statements and various aspects of the proposed carbon tax which may address these statements. (Creswell, 2003)

The descriptive results of the data are summarized in Table 1 below, whereby participants' responses to individual statements are interpreted and discussed in more detail in the following section.

Table 1: Contingency Table

Question	Aspect 1	Aspect 2	Aspect 3	Aspect 4
1	46	1	3	10
2	23	7	5	25
3	8	22	18	12
4	18	3	9	30
5	15	2	6	37
6	10	21	17	12
7	9	28	13	10
8	9	19	21	11
9	17	8	6	29

10	11	7	5	37
Total Frequency	166	118	103	213
Relative Frequency	0.276667	0.196667	0.171667	0.355

Table 2 below provides the descriptive statistics of the findings of the correspondence analysis. These are presented per aspect to allow the reader to gain a basic understanding of the findings before the results are analysed in detail in the following section.

Table 2: Descriptive Statistics

Measure	Aspect 1	Aspect 2	Aspect 3	Aspect 4
Mean	14.5	16.1	10.4	19
Standard Error	0.9574271	3.902848	1.309792	3.282952
Median	14.5	17.5	9.5	16.5
Standard Deviation	3.0276504	12.34189	4.141927	10.381608
Sample Variance	9.1666667	152.32222	17.15556	107.77778
Kurtosis	-1.2	1.584053	3.275305	-0.771968
Skewness	0	0.916969	1.215924	-0.099055
Range	9	42	16	33
Minimum	10	1	4	1
Maximum	19	43	20	34

3.4 Validity and Reliability

Validity is seen to be a connection between the research, data gathered and results drawn up. Internal validity ensures that the most suitable conclusion is ascertained from the research that is

obtained, whereas external validity refers to the ability to extrapolate the research to a larger population. Reliability ensures that the research is dependable, free from error and prejudice. It is necessary to ensure that the research is valid and reliable in order to make the work pertinent. (Golafshani, 2003; Kalof, Dan & Dietz, 2008; Roberts, Priest & Traynor, 2006)

In order to ensure that the research is internally valid all information was obtained from literature which is derived from reputable sources. To the maximum extent possible the literature that was used and relied upon was from peer reviewed publications and announcements from government. All participants that completed the survey were professional accountants and so would have had an understanding of the topic addressed. An expert was used to help interpret and manipulate the results in order to improve the internal validity. Ethics clearance was also obtained prior to the research survey being distributed (Appendix 3). Ethics clearance was obtained in order to ensure the survey was not socially or psychologically evasive or damaging towards the participants, allowing for all questions to be appropriately answered. The survey was reviewed, to ensure it was clear and understandable, before being conducted. A pilot study was also performed to help determine the appropriateness of the survey and whether the statements could be matched to the maxims. (Leedy and Ormrod, 2001)

A mixed method was used, which helped to validate the results and ensured reliability (Golafshani, 2003).

When analysing the results, consideration was given as to whether the results were logical and related to the statements used. External validity may be impaired from the perspective of the general population as a result of the small sample size used; however due the nature of the questions being asked the use of professional accountants helped to ensure the statements and

questions were understood and answered appropriately which improved the overall validity. Within the population different participants from different tax backgrounds were asked to answer the survey. This aided in improving the external validity as different tax perspectives resulted in a better overall general opinion.

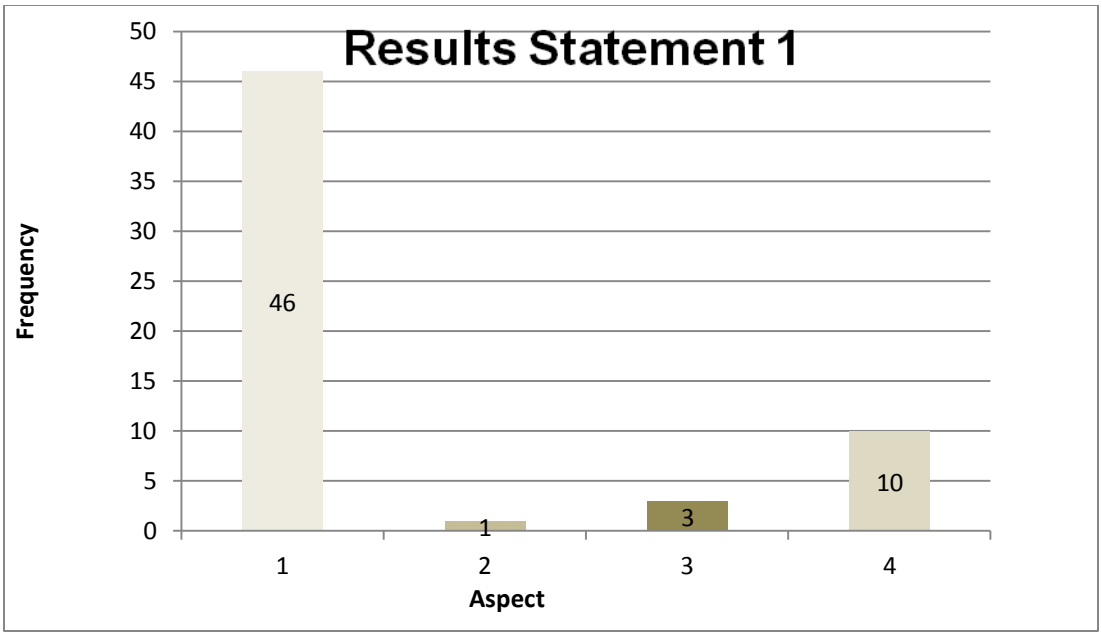
A standard survey with consistent statements was used for all participants in order to improve reliability. Reliability was improved by the review of the survey in order to avoid ambiguity; this was performed by an independent knowledgeable tax expert. The data which was manually captured was double checked by a different person to ensure the capturing was accurate

4. Results

A bar graph was constructed for each statement contained within the correspondence analysis separately in order to analyse and interpret the results more effectively and in a more detailed manner.

Figure 1: Results of Statement 1

Statement 1: South Africa is the twelfth largest emitter of carbon dioxide globally; and as such has been thought to contribute to the worldwide problem of global warming (UNEP, 2004).



As seen in the Figure 1 above, a vast majority of respondents, which is 77%, agreed that a charge of R120 per ton of carbon dioxide emitted addressed the issue of South Africa being a significant emitter of carbon dioxide globally. This could be interpreted to mean that most respondents feel that the actual presence of a carbon emissions tax is enough to address its emissions status rather than agreeing that the amount of R120 as the charge per ton emitted is addressing the issue.

The responses to aspects 2 and 3 at 2% and 5% respectively are considered to be negligible in relative size and therefore have no interpretive value.

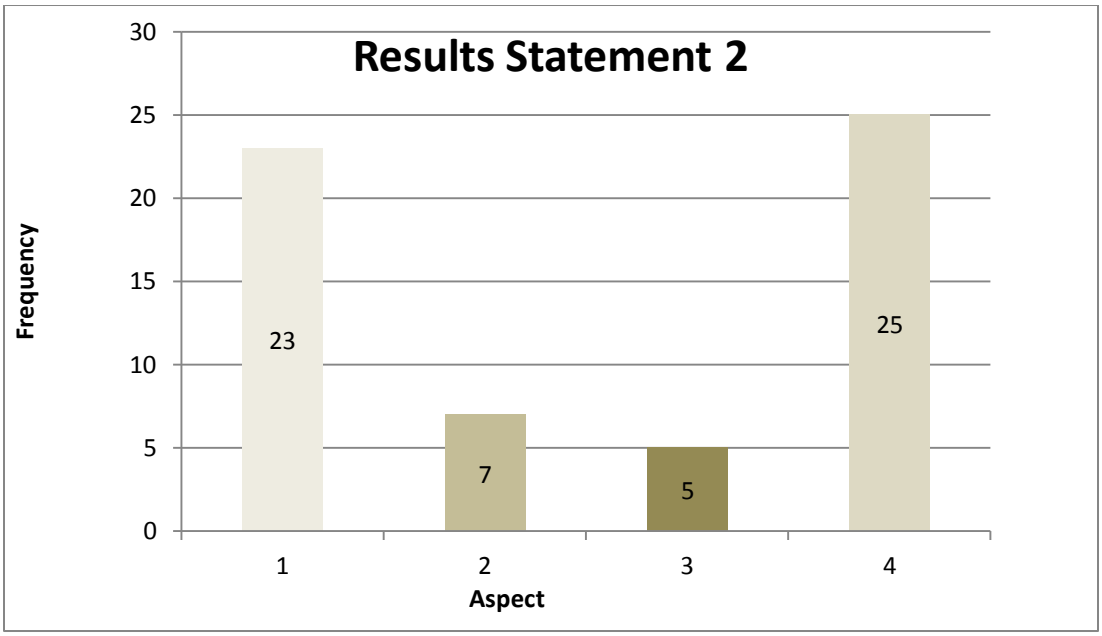
It is calculated that 17% of respondents felt that no aspect of the proposed carbon tax addressed the issue of South Africa's global emitter status, which is interpreted to mean that 17% of the population of professional accountants do not agree that implementing a carbon emissions tax will address the issue of South Africa's high levels of carbon emissions.

The results with regards to statement one which deals with South Africa's current high levels of carbon dioxide emissions and the ability of the implementation of the carbon tax to lower these

levels successfully, imply that the charge of R120 per ton of carbon dioxide emitted should meet this aim. However, it remains unclear as to whether the actual proposed amount of R120 per ton to be levied, or whether the fact that a charge at all would be levied per ton of carbon dioxide emitted is the reason for this success.

Figure 2: Results of Statement 2

Statement 2: Levying a separate tax directly on carbon emissions in an effort to reduce the amount of greenhouse gases emitted by South Africa, as opposed to certain other methods including emissions trading schemes (National Treasury, 2010b).



From the data collected, it can be seen in Figure 2 that most respondents felt that with regards to evaluating the potential effectiveness of levying a carbon emissions tax as opposed to other considered methods (including emissions trading schemes), either that the charge of R120 per ton of carbon dioxide emitted would contribute to the effectiveness of the carbon tax over other

methods, or that its effectiveness over other methods is not addressed by any aspect of the proposed carbon tax.

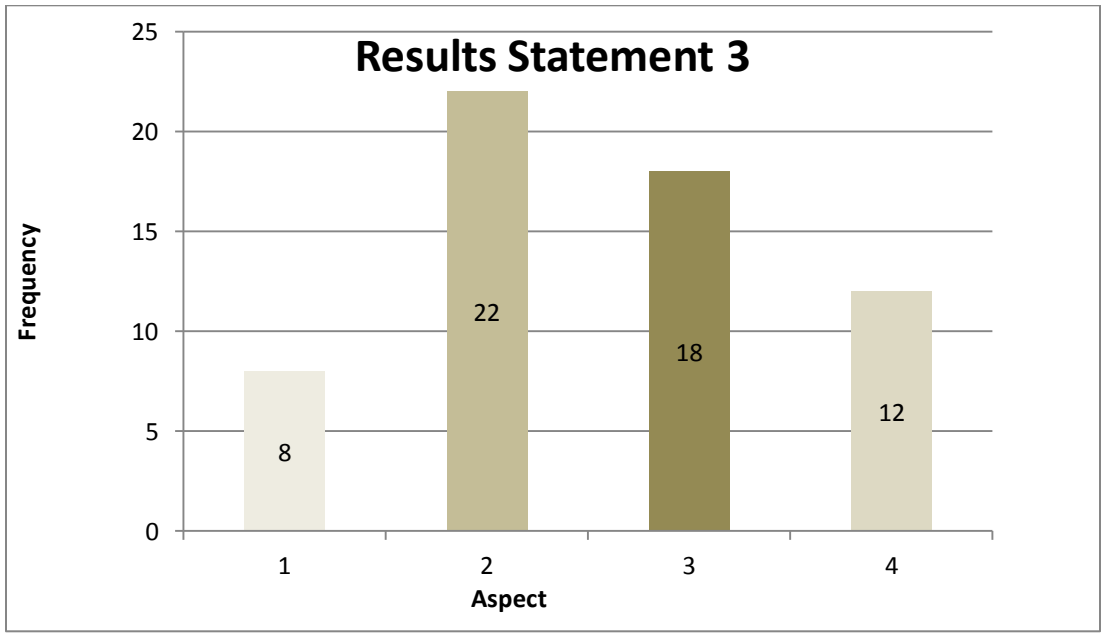
Slightly more respondents, 42% as opposed to the 38% above agreed that no aspect of the carbon tax would make it more effective at its stated purpose of reducing South Africa's carbon emissions than any other considered method for the same purpose.

As only 12% and 8% of respondents felt that the proposed tax free exemption threshold of the carbon tax and the proposed gradual increase in the charge per ton of emissions respectively would make the carbon emissions tax more effective over other considered methods at decreasing South Africa's carbon dioxide emissions, it believed that these results do not have any interpretive value for the purposes of concluding on this research.

Therefore with regards to the issue of whether any aspect (or no aspect at all) of the proposed carbon emissions tax would render it more effective at its stated purpose of reducing South Africa's carbon dioxide emissions than any other method considered for the same purpose, it is felt by professional accountants that no aspect of the proposed carbon tax renders it potentially more effective than other methods i.e. they do not consider the carbon emissions tax to be more effective at reducing South Africa's carbon dioxide emissions than other methods (including emissions trading schemes). While, at the same time, many professional accountants also believe that the consistent charge of R120 per ton of carbon dioxide emitted would be the contributing factor in making the carbon emissions tax more effective at its stated purpose than other considered methods.

Figure 3: Results of Statement 3

Statement 3: The carbon emissions tax should be levied on the largest tax base possible i.e. the largest possible number of taxpayers, (which would be final consumers), and implemented in the form of increased prices of affected goods and services. This should be done in order to ensure fair implementation (National Treasury, 2010b).



As seen from the results depicted in Figure 3, most participants in answering the correspondence analysis agreed that both the tax free exemption threshold of sixty percent proposed to be implemented with the carbon emissions tax (37% of participants), and the proposed gradual increase in the charge per ton of carbon dioxide emitted (30% of participants), would address the issue of the carbon emissions tax being levied on the largest tax base, or greatest number of taxpayers, possible.

An amount of 13% of respondents felt that the actual charge of R120 per ton of carbon dioxide emitted addressed the issue of the desired levying of the carbon emissions tax on the largest tax

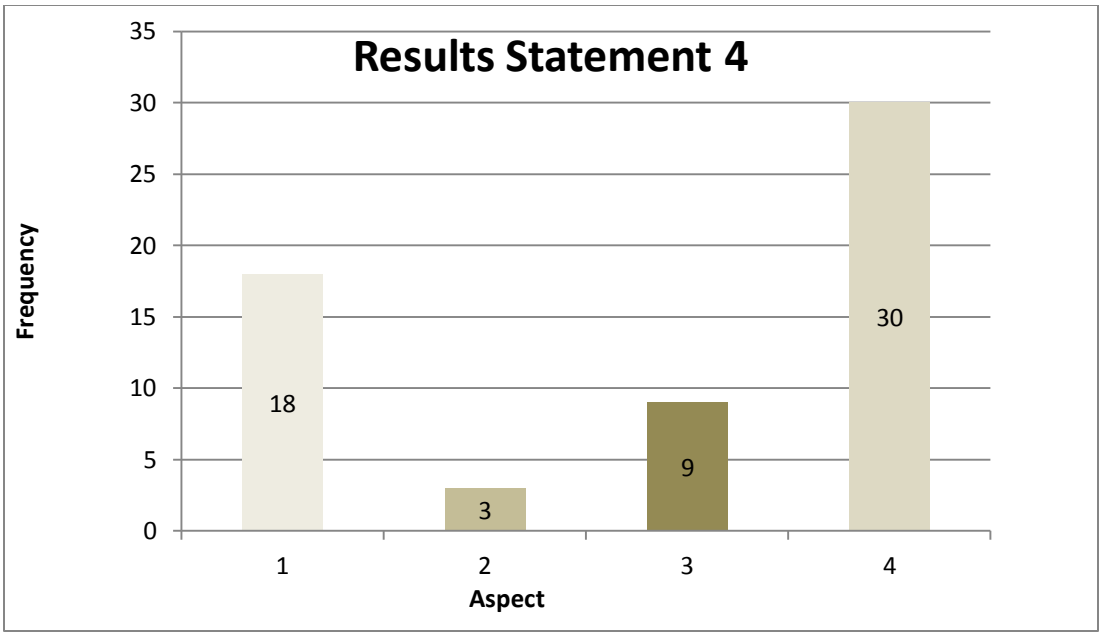
base possible. This appears to be in line with the results uncovered so far in that a fixed charge levied on all taxpayers already in the tax base would not address any aspect of determining which taxpayers would fall into such a tax base.

Of the professional accountants who answered the correspondence analysis, only 20% agreed that no aspect of the proposed carbon emissions tax would address the desired issue of promoting the largest tax base possible to fall within the tax net of this carbon emissions tax. This leads us to believe that the issue of ensuring that the tax base of the carbon tax is maximized is one which should be addressed by certain aspects of the proposed tax, as agreed on by 80% of South African professional accountants.

It therefore appears that the identified issue of ensuring that the maximum tax base, being largest number of taxpayers is charged the applicable amounts under the carbon emissions tax, is likely to be addressed, according to most South African professional accountants, by either the proposed exemption threshold of 60% or the proposed gradual increase in the amount levied per ton of carbon dioxide emitted.

Figure 4: Results of Statement 4

Statement 4: Even with attempts made to minimize the administration costs of levying the carbon emissions tax, (including costs to determine which parties fall within the tax base as well as the application of the exemption threshold and allowances), such costs are estimated to be so high they will negate the purpose of levying the tax, i.e. the amount of administration costs incurred will exceed the resulting revenues collected from levying the tax (National Treasury, 2010b).



In answer to the issue potentially arising above, 50% (or half) of the population of South African professional accountants does not believe that there is any proposed aspect to the carbon emissions tax which would address this issue as indicated in Figure 4.

Furthermore, 30% of respondents to the correspondence analysis agree that the proposed flat rate of R120 to be levied per ton of carbon dioxide emitted would address the possibility of administration costs incurred in implementing the carbon emissions tax exceeding the benefits to be derived from levying the tax. An explanation for this would arise from the proposed constant rate of R120 charged per ton of carbon dioxide emitted, which is thought to minimize administration costs.

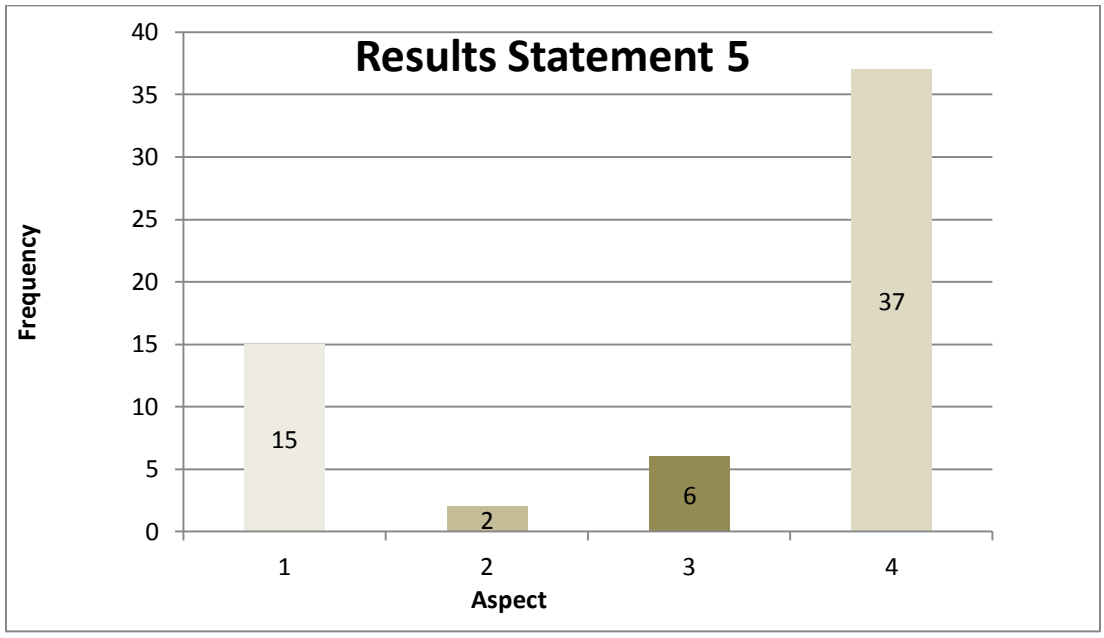
Respondents believing that the proposed exemption threshold (5% of respondents), and the gradual increase in the charge per ton of carbon dioxide emitted (15% of respondents) are few due to the fact that such aspects included in the carbon tax model are likely to increase rather

than decrease the administration costs associated with the tax owing to the increased monitoring and complications involved in implementing such measures correctly.

It would therefore seem that, as far as South African professional accountants are concerned, it is likely that the administration costs associated with levying the carbon emissions tax would be so high as to exceed the revenues resulting from such tax, as they do not believe that any aspect of the proposed carbon tax would effectively address this issue. The possibility of the administration costs of the carbon emissions tax exceeding its resulting revenues is a potentially severe negative consequence of implementing the tax and could affect its success significantly.

Figure 5: Results of Statement 5

Statement 5: In order to be effective, the carbon tax should aim for broad coverage, with minimum exemptions and exclusions for different emissions and sectors, and should be applied at a rate equivalent to the marginal social damage costs to the environment. (National Treasury, 2013b)



As indicated in Figure 5 a significant majority of respondents (62%) to the correspondence analysis agreed that no aspect of the proposed carbon emissions tax would ensure its broad coverage, minimum exemptions and exclusions, and being levied at a rate equal to the marginal social damage costs to the environment. As also seen in the explanation above, this could also be indicative of potential major issues that could arise upon implementation of the carbon tax; due to the fact that a lack of broad coverage of the tax, the presence of exemptions and exclusions, and a mismatch of the tax levy compared to the marginal social damage costs to the environment would lead to significant inefficiencies and possible ineffectiveness of the tax.

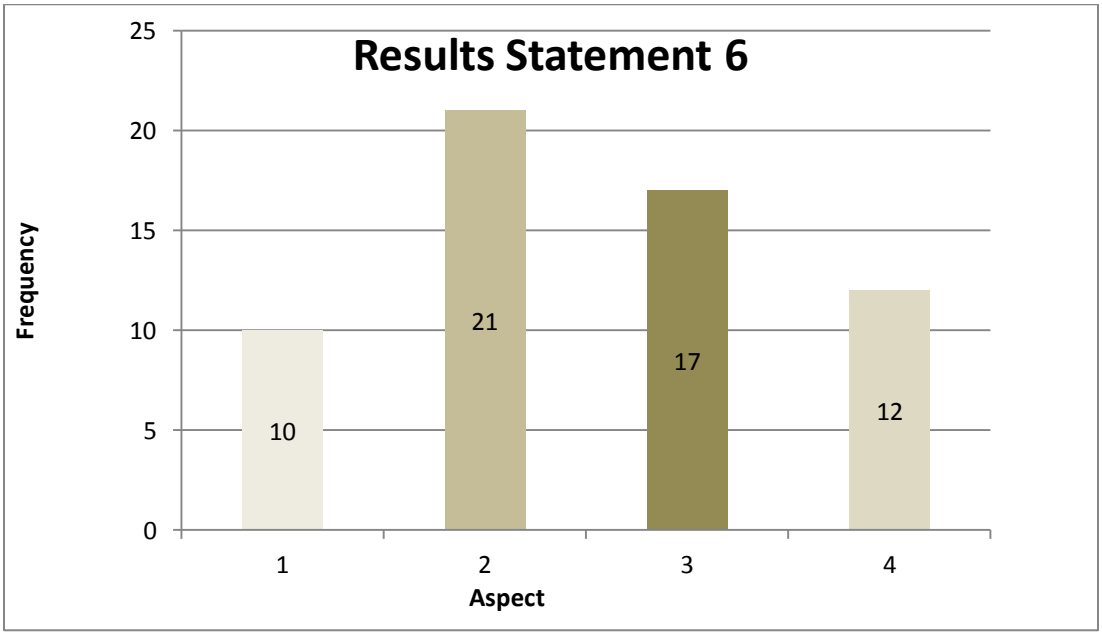
A minimal number of respondents, as 3% and 10% respectively, believe that a proposed tax free exemption threshold and a gradual increase in the tax charge per ton of carbon dioxide emitted would address the issue of the abovementioned potential inefficiencies. This sort of result would be in line with the knowledge gathered on the carbon emissions tax in that additional administrative measures (such as those mentioned) would in fact exacerbate these inefficiencies instead of addressing them.

It seems to be agreed, as stated by 25% of respondents, that a straight tax charge of R120 per ton of carbon dioxide emitted would somewhat address the aforementioned potential inefficiencies. This could come about due to the fact that a flat tax charge would maintain a reasonably broad tax base consisting of every documented emitter of carbon dioxide and would ensure that there were minimum exemptions and exclusions for different sectors.

It seems to be the opinion of the majority of professional accountants in South Africa that the potential inefficiencies explained would not be addressed by any aspect of the proposed carbon tax, which is a major risk for the tax becoming ineffective upon its implementation. However, at the same time, the proposed flat tax charge per ton of emissions is a somewhat mitigating factor in this situation and could lessen the impact of these inefficiencies.

Figure 6: Results of Statement 6

Statement 6: The carbon tax will have a potential negative economic effect on emission-intensive industries (including mining and electricity provision amongst others), in the form of higher costs to the operators in these industries (National Treasury, 2013b).



In Figure 6 it appears as though the issue of addressing the potential negative economic effect that the carbon emissions tax may have on certain carbon intensive industries, including mining and electricity provision amongst others, is likely to be addressed by certain aspects of the

proposed carbon tax according to the professional accountants who responded to the correspondence analysis.

35% of respondents believed that this issue would be addressed by the exemption threshold of sixty percent proposed as part of the possible future carbon tax model. This is a viable prediction as the exemption threshold has in fact been proposed for the purpose of mitigating the possible negative economic effect which the tax could have on emissions intensive industries by allowing certain amounts of their carbon dioxide emissions to be exempt from the tax, proposed at a sixty percent threshold.

While 28% of respondents agreed that a gradual increase in the tax rate levied per ton of carbon dioxide emitted would address the abovementioned issue. This gradual increase has been proposed to be at a rate of ten percent per annum commencing from the year 2016 and continuing until the year 2020 and could lessen the negative economic impact of the tax on carbon intensive industries by only introducing the full impact of the tax gradually at a future while initially levying the tax at a lower rate.

However, this measure is unlikely to be as effective as the exemption threshold already discussed, as seen by the 17% of respondents who agreed that the constant tax charge of R120 per ton of carbon dioxide emitted would address this particular issue. As this flat charge per ton of emissions is the ‘relatively low’ amount that would initially be levied then gradually increased under the previously discussed aspect of the proposed carbon tax, it is likely to be more effective

in mitigating the negative economic impact on carbon intensive industries, as it will not increase at future dates.

As only 20% (a distinct minority) of respondents believed that no aspect of the proposed carbon emissions tax would address the issue of the potential negative impact on emissions intensive industries, it does not seem likely that this issue would cause severe negative consequences should the carbon tax be implemented, and it does appear that adequate mitigation of this potential problem would occur.

Figure 7: Results of Statement 7

Statement 7: The increase in prices of affected goods and services resulting from levying the carbon emissions tax would have a disproportionately severe effect on low-income households, due to the fact that such households spend large proportions of their income on domestic energy sources. This severe negative impact on such households would be so severe owing to the large number of such households in South Africa (Entin, 2004).

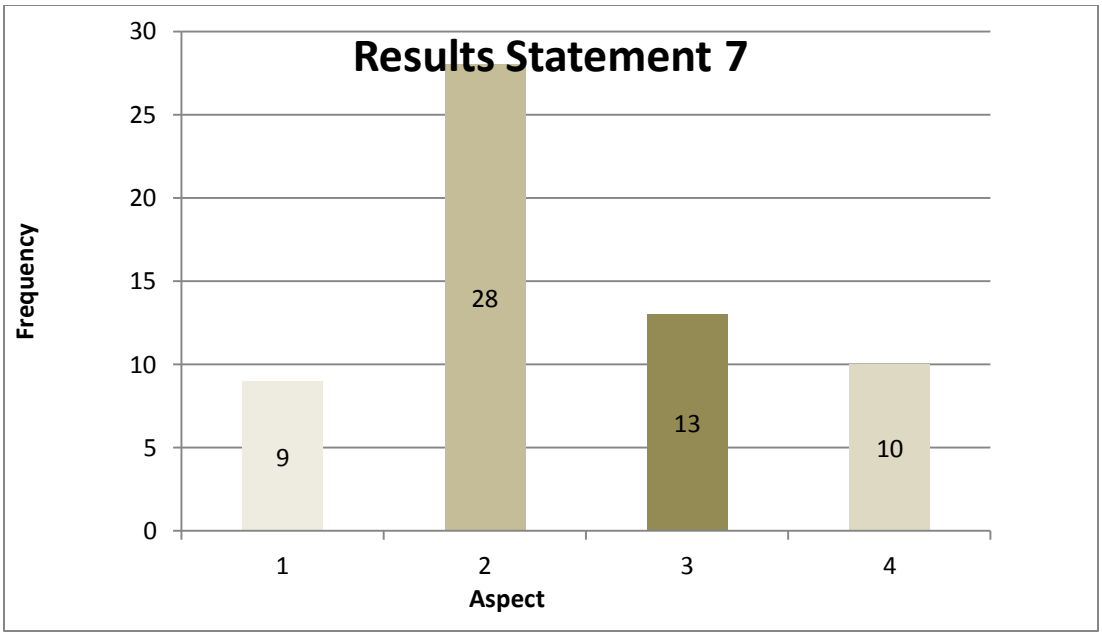


Figure 7 illustrates that with regards to the investigated issue of the disproportionately severe effect increased prices of certain affected goods and services resulting from levying the carbon tax would have on low-income households, due to their spending large proportions of their income on domestic energy sources, respondents to the correspondence analysis seem to agree that this issue would be addressed mainly by the proposed exemption threshold of sixty percent (as agreed by 47% of respondents). This could occur based on the likelihood that the exemption threshold would prevent severe increases in the prices of affected goods and services, which in turn would lessen the potential negative effect on low-income households.

In comparison to this, 22% of respondents believed that the gradual increase in the amount of tax charges per ton of emissions would address this particular issue. This is interpreted to be a result of the fact that the gradual increase in the tax charge would also lead to a gradual, or greater, increase in the prices of affected goods and services which would ultimately still cause

disproportionately negative consequences for low-income households when purchasing domestic energy sources.

Only 15% of respondents agreed that the constant charge of R120 per ton of emissions would address this issue and it would seem that this proposed flat charge is unlikely to provide much mitigation of the potential negative effect that the carbon tax could have on low-income households.

However, as a small amount of only 17% of respondents in total believed that no aspect of the proposed carbon emissions tax would address the investigated issue, it does not appear as though the potential negative effect that the tax could have on low-income households would remain a serious hampering issue upon implementation of the tax as the proposed mitigating measures (especially the exemption threshold) would achieve their purpose successfully in mitigating this issue.

Figure 8: Results of Statement 8

Statement 8: The negative impact on South Africa's international competitiveness, whereby consumers may favour internationally produced goods and services over their locally produced counterparts, resulting from the country's price increases as an effect of additional carbon tax to be paid would be high and could cause damage to the economy. This could occur if consumers choose to source their goods and services internationally at lower prices, which can be charged

due to the fact that these international producers would not be required to levy such a carbon tax (Fullerton, Leicester & Smith, 2008).

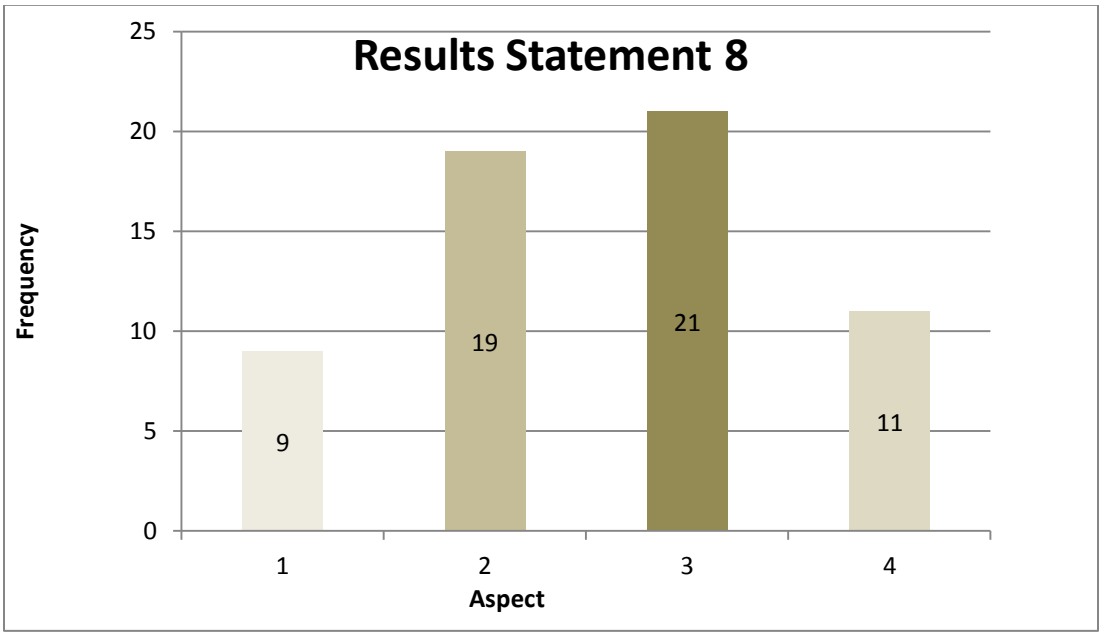


Figure 8 indicates that the professional accountants responses to the issue of whether the carbon tax would negatively impact South Africa's international competitiveness due to the proceeding increase in the prices of local goods and services compared to their international competitors lower prices, in the absence of being subjected to such a carbon tax, it appears as though this issue should be adequately addressed by certain aspects of the proposed carbon emissions tax and is unlikely to remain a serious concern upon implementation of the tax. This is evident from the fact that only 18% of respondents believed that no aspect of the proposed tax would address this issue, whereas the remaining respondents disagreed.

15% of respondents felt that the proposed flat charge of R120 per ton of carbon dioxide emissions would address the potential negative effects of the tax on South Africa's international competitiveness. It is interpreted that this number is low due to the possibility that the flat charge

would cause a constant increase in the prices of affected goods and services which would not be mitigated or improved by any other mechanism of the tax, offering little to no relief for consumers. This aspect of the tax, therefore, is unlikely to be notably successful at addressing the potential negative effects of the carbon tax on South Africa's international competitiveness.

A large amount of respondents, namely 32%, agreed that the exemption threshold would address the potential resulting issue impacting South Africa's international competitiveness. This is a likely possibility due to the marked impact which the exemption threshold would have in reducing the amount of carbon tax which the relevant entities would have to pay, which would in turn reduce the increases in the prices of affected goods and services and therefore lessen the effect on the country's international competitiveness.

A further 35% agreed that the gradual increase in the rate of tax charged per ton of emissions would address this particular issue. Even though this rate would begin at R120 per ton of emissions before gradually increasing, the action of the gradual increase would still provide mitigation to the effect of the tax on the prices of affected goods and services as consumers would be aware that there are efforts put in place in an attempt to minimize the negative consequences felt by them in the form of rising prices of certain goods and services. It is however questionable whether the gradual increase in the tax rate charged would mitigate the potential negative effect on the country's international competitiveness as much as the abovementioned exemption threshold.

Figure 9: Results of Statement 9

Statement 9: The revenue collected from levying the carbon emissions tax could be used to shift taxes, i.e. decreasing the burden on "good" activities by lowering the amount of taxes charged in other areas which do not have a negative impact on the environment (Winkler & Marquard, 2009).

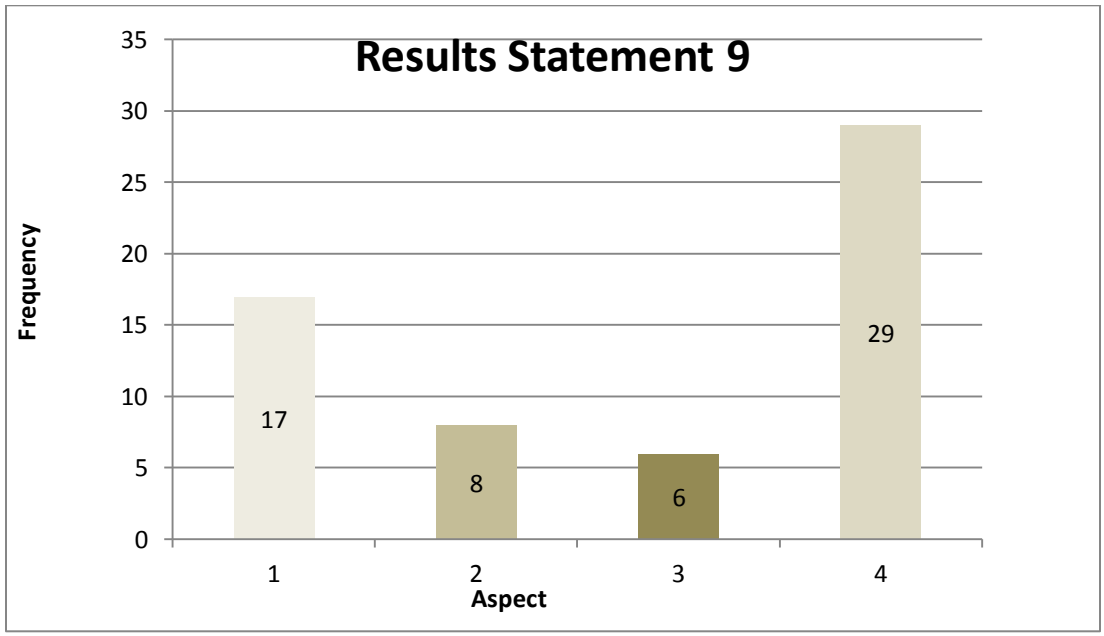


Figure 9 indicates that this issue that was responded to by the relevant professional accountants who answered the correspondence analysis in this case was that of the use of the revenue collected from levying the carbon emissions tax. Whereby it is thought that such revenue could be used to shift taxes, or reduce taxes charged on 'good' activities i.e. those which do not have a negative impact on the environment.

In response to this issue, 28% of respondents agreed that the constant charge of R120 per ton of emissions would address it. This can be explained as the fact that the flat tax charge will be

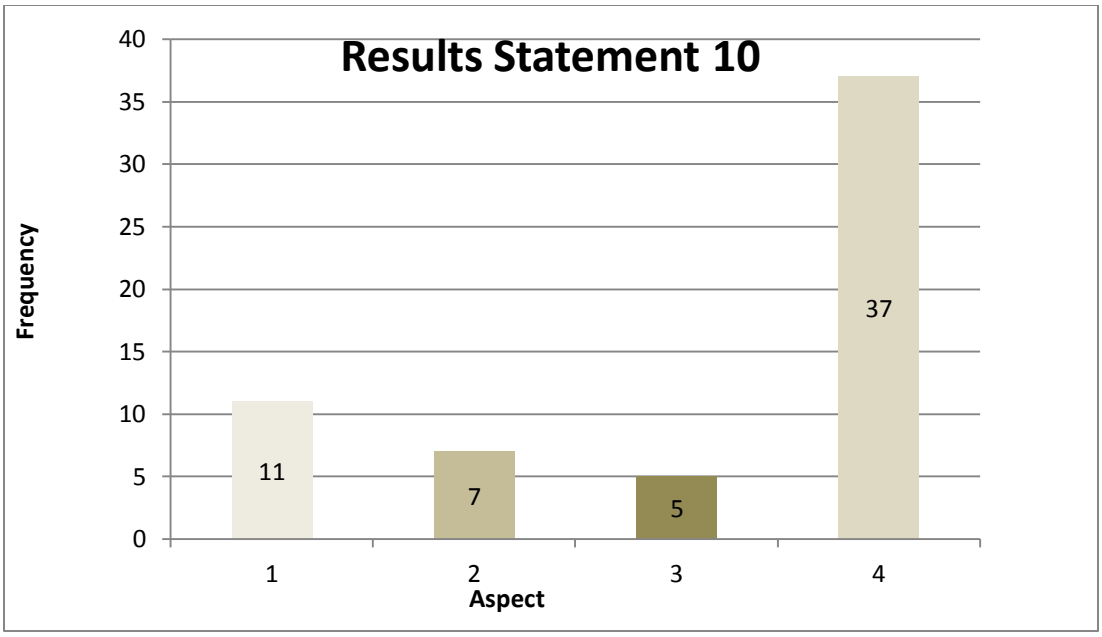
easier to collect in administering the tax, and therefore a straight-forward reduction in other 'good' taxes could occur, just by reducing these tax rates on the public while at the same time being in possession of revenue collected from the carbon tax to fund this reduction.

Only 13% and 10% of respondents believed that the proposed exemption threshold and gradual increase in the rate of tax charged per ton of emissions would address the issue of the use of the resulting revenue of the tax respectively. As these percentages are very low and considering the fact that these two aspects of the tax are unlikely to impact what is done with the revenue collected, they appear to have little to no interpretive value for the purposes of this research.

Many respondents, 48% of them, felt that no aspect of the proposed carbon emissions tax would address the usage of the resulting revenue. This seems the most likely outcome as decisions regarding the usage of the collected revenue are separate from those governing the implementation and running of the tax, and could be set and changed after the revenue has been collected and the tax administered. Therefore it does appear that the proposed carbon emissions tax model does not address the usage of the resulting revenue after it has been collected. This is further seen in the responses to statement ten discussed below.

Figure 10: Results of Statement 10

Statement 10: The revenue collected from levying the carbon emissions tax could be earmarked for specific purposes to further reduce South Africa's carbon emissions before it is actually collected (National Treasury, 2006).



The results indicated in figure 10 also deals with what should be done with the revenue collected from levying the carbon tax; the results follow a similar trend to that seen with statement nine above. In this case the issue questioned whether the resulting revenue should be earmarked for specific purposes to further reduce South Africa's carbon emissions before it is actually collected.

18% of respondents agreed that the flat charge of R120 per ton of emissions would address the possibility of earmarking the revenue for the specific purposes of further reducing the country's emissions. This is likely to be as a result the ease of collection of the tax under this system where a flat rate is charged, whereby earmarking the revenue for such purposes would be possible.

As the respondents believing that the exemption threshold and the gradual increase in the tax rate charged were very low at 12% and 8% respectively, it is not felt that these aspects of the

proposed tax would address the issue discussed and therefore seem to have little interpretive value for this particular issue in the research.

Again the majority of respondents, 62%, felt that no aspect of the proposed carbon emissions tax would address the issue of what should be done with the resulting revenue in the case of earmarking it for specific purposes regarding further improving the environment and South Africa's actions in this matter.

This leads us to understand that, when it comes to what should be done with the revenue collected from levying the carbon tax, the proposed aspects of the tax only cover its implementation and administration and have little to do with the actions to be taken with the collected revenue.

Therefore no aspect of the proposed carbon tax addresses what should be done with the collected revenue, either for the purposes of reducing other taxes on 'good' activities, or earmarking for purposes of further reducing South Africa's emissions.

5. Recommendations and Conclusion

In the analysis of the results in the above section, it was noted that there is some correlation between the issues specified as potentially arising from the implementation of the carbon emissions tax and the various aspects of the proposed tax with regards to their ability to address these potential issues (or not address them at all).

However, there was no perfect correlation and some statements had no correlation at all, namely statements four, five, nine and ten; which deal with the issues of broad coverage of the carbon tax in terms of its tax base, the potentially high administration costs associated with the implementation of the tax, and what should be done with the revenue collected from levying the tax. This implies that the carbon tax is likely to present with certain issues upon implementation, whereby certain of these are likely to be addressed by the various aspects of the tax and others are unlikely to be addressed at all.

As proposed, the flat rate to be charged at R120 per ton of carbon emitted, the first aspect looked into in the correspondence analysis, is likely to address the broad issue of South Africa's relatively high levels of emissions (Statement 1), as well as whether levying the carbon emissions tax as a separate tax over other possible methods identified for the purposes of reducing the country's carbon emissions (Statement 2). While with regards to the discussed issues of desiring maximum broad coverage of the tax (Statement 5) and its possibly high administration costs (Statement 4), the proposed constant charge of R120 per ton of carbon dioxide emitted is thought to have a role in addressing these issues as well, according to respondents of the correspondence analysis. This is seen by the number of respondents who indicated that this aspect of the proposed tax would, in their opinions' address the abovementioned issues with regards to the carbon tax. These are depicted through the number of responses for statements 1, 2, 4 and 5 respectively being 77%, 38%, 30% and 25%.

It is also noted that although a significant number of respondents indicated that the proposed flat rate of levying the carbon tax would address the above statements, with regards to statements 2,

4 and 5, more respondents felt that no aspect of the proposed carbon tax would address these issues. This further leads us to believe that the carbon tax cannot be successfully implemented by South Africa at this time, and is elaborated on below.

The proposed sixty percent exemption threshold of the carbon tax, the second aspect seen in the correspondence analysis, would be likely to address the desired outcome of the tax being levied on the largest tax base (Statement 3) i.e. the greatest number of taxpayers possible, as well as the possible negative effect which the implementation of the carbon tax may have on emissions intensive industries within South Africa (Statement 6). This is evidenced by the number of participants who agreed being 37% and 35% for statements 3 and 6 respectively, which was the majority selection for these statements.

Also, this proposed aspect of the carbon tax is thought to address the issues of its potential negative impacts on South Africa's international competitiveness (Statement 8) and its potential disproportionately severe effect on the many low-income households in the country (Statement 7), shown by the 47% for statement 7 and 32% of respondents for statement 8 who agreed with this.

The third aspect looked into of the proposed carbon emissions tax, that of the gradual increase in the rate charged per ton of emissions at a rate of ten percent per year for a period of roughly four years, is said by professional accountants to assist in addressing the same issues also thought to be addressed by the exemption threshold of the tax, namely levying the tax on the desired largest possible tax base (Statement 3), as well as the potential negative effects on South Africa's international competitiveness (Statement 8) and on its large number of low-income households

(Statement 7). The numbers of respondents who indicated this are 30%, 22% and 35% for statements 3, 7 and 8 respectively. When these responses are looked at in conjunction with those above in favour of the second aspect of the proposed tax, whereby respondents felt that both aspects would address the same statements, it seems to indicate that both proposed aspects of the exemption threshold and the gradual increase in the tax rate levied, would work well together to address several of the issues identified with regards to implementing the carbon emissions tax.

A very important consideration is those issues which are unlikely to be addressed by any aspect of the proposed carbon emissions tax, as these are what could cause the implementation and running of the tax to be unsuccessful. The issues which were considered by professional accountants to not be addressed by any aspect of the proposed tax include; what should be done with the revenue collected from levying the tax including whether it should be used to shift taxes on other activities not causing any damage to the environment (Statement 9), as agreed by 48% of respondents, or earmarked for certain purposes used to further decrease South Africa's negative impact on the environment (Statement 10), as agreed by 62% of respondents.

The issues of whether levying a carbon tax on emissions would be more effective in reducing South Africa's overall level of emissions than other investigated methods (Statement 2), the desired broad coverage of the tax with minimum exemptions and exclusions (Statement 5) and the high amount of administration costs predicted with regards to levying the tax (Statement 4) are mostly thought to not be addressed by any aspect of the proposed carbon tax. This is evidenced by the number of respondents who agreed with this being 42%, 50% and 62% for statements 2, 4 and 5 respectively. However, according to South African professional

accountants, certain other aspects of the proposed tax could partly mitigate these issues, the specifics of which are discussed above.

On analyzing the responses of participants of the correspondence analysis on a broader level, most are in favour of the carbon emissions tax being introduced at a flat rate of R120 per ton of carbon dioxide emitted, as seen by the responses to Statements 1, 2, 4 and 5. This is followed by favour towards the aspect of a gradual increase in this charge over a number of years (determined to be approximately four) as seen in the responses to Statements 3, 6 and 8; as well as including in the model of the tax the exemption threshold of sixty percent, seen in the responses to Statements 3, 6, 7, and 8; should it be determined that the carbon emissions tax is to be implemented. However, respondents have also indicated that there are certain issues which are likely arise upon implementation of the tax which would undermine the effectiveness of the tax and have negative consequences for the South African economy and the well-being of its residents. This is seen in the responses to Statements 2, 4, 5, 9, and 10 whereby respondents indicated that no aspect of the proposed carbon tax would address these statements. This analysis brings us to the conclusion below.

In terms of concluding, it appears as though at this current time South Africa is unlikely to be able to successfully implement a carbon emissions tax under the current proposed terms due to the various issues which are likely to arise upon its implementation which are mentioned throughout this report in detail and are the main focus of the correspondence analysis.

It does seem as though the implementation of a carbon emissions tax would be a very important step towards reducing South Africa's carbon dioxide emissions and form a significant part in the country's contribution to combating the global problem of climate change.

However, the implementation of this tax has potential negative consequences for the country as well, including the likely decrease in living standards for low-income households forming the majority of the South African population and the detriment to the country's international competitiveness, which need to be carefully analyzed and considered when designing the operations of the tax. Care must be taken to ensure that the purpose of the tax is fulfilled without resulting in secondary negative consequences that would undermine the carbon emissions tax's objectives.

Due to the current economic conditions prevailing in South Africa of a recessionary environment and relatively high inflation, including its status as a developing country and the large unemployment levels, it seems that a carbon emissions tax cannot be successfully implemented at this time as a result of these findings. Research suggests that the potential negative effects on the country's economy resulting from an implementation of the tax including; the disproportionately large burden to be placed on the low-income households forming the majority of the South African population and the adverse effect on the country's international competition, would be too great to justify implementing the tax.

The present findings of this research do not, however, preclude South Africa from implementing a carbon emissions tax in the future. As the South African economy continues to grow and

develop, it is likely that the country will be able to implement a carbon tax at some future stage when the implementation of the tax should be re-evaluated.

The results of the research indicate, at the present time South Africa, as a country, cannot successfully implement a carbon emissions tax due to the still-developing economy and significant, likely adverse consequences to the economy and the country's residents. However, as the South African economy continues to grow and develop in the future, as carbon emissions are likely to remain unacceptably high (possibly increasing in line with the increase in population and goods and services output), an additional evaluation should be done on whether at a future a carbon emissions tax can be implemented successfully without incurring the significant adverse consequences preventing the tax from being implemented currently, in order to reduce total carbon dioxide emissions of the country.

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7. Appendices

7.1 Appendix One

Correspondence Analysis

Please read the statements below. For each statement identify which aspect of the proposed carbon emissions tax addresses the relevant statement or issue by placing a tick (✓) in the appropriate block in the row.

Statement or Issue regarding the proposed Carbon Tax	Aspects of the Proposed Carbon Tax			
	Aspect 1 A charge of R120 per ton of carbon dioxide Emitted	Aspect 2 A tax-free exemption threshold of 60 %	Aspect 3 A gradual increase in the charge per ton of carbon dioxide at 10% per year from 2016 to 2020	Aspect 4 Not addressed by any other aspect of the proposed carbon emissions tax
1. South Africa is the twelfth largest emitter of carbon dioxide globally; and as such has been thought to contribute to the worldwide problem of global warming (UNEP, 2004).	1	2	3	4

2. Levying a separate tax directly on carbon emissions in an effort to reduce the amount of greenhouse gases emitted by South Africa, as opposed to certain other methods including emissions trading schemes (National Treasury, 2010b).	1	2	3	4
3. The carbon emissions tax should be levied on the largest tax base possible i.e. the largest possible number of taxpayers, (which would be final consumers), and implemented in the form of increased prices of affected goods and services. This should be done in order to ensure fair implementation (National Treasury, 2010b).	1	2	3	4
4. Even with attempts made to minimize the administration costs of levying the carbon emissions tax, (including costs to determine which parties fall within the tax base as well as the application of the exemption threshold and allowances), such costs are estimated to be so high they will negate the purpose of levying the tax, i.e. the amount of administration costs incurred will exceed the resulting revenues collected from levying the tax (National Treasury, 2010b).	1	2	3	4

5. In order to be effective, the carbon tax should aim for broad coverage, with minimum exemptions and exclusions for different emissions and sectors, and should be applied at a rate equivalent to the marginal social damage costs to the environment. 6. The carbon tax will have a potential negative economic effect on emission-intensive industries (including mining and electricity provision amongst others), in the form of higher costs to the operators in these industries (National Treasury, 2013b).	1	2	3	4
	1	2	3	4
7. The increase in prices of affected goods and services resulting from levying the carbon emissions tax would have a disproportionately severe effect on low-income households, due to the fact that such households spend large proportions of their income on domestic energy sources. This severe negative impact on such households would be so severe owing to the large number of such households in South Africa (Entin, 2004).	1	2	3	4
8. The negative impact on South Africa's international competitiveness, whereby consumers may favour internationally produced goods and services over their locally produced counterparts, resulting from the country's price increases as an effect of additional carbon tax to be paid would be high and could cause	1	2	3	4

damage to the economy. This could occur if consumers choose to source their goods and services internationally at lower prices, which can be charged due to the fact that these international producers would not be required to levy such a carbon tax (Fullerton, Leicester & Smith, 2008).				
9. The revenue collected from levying the carbon emissions tax could be used to shift taxes, i.e. decreasing the burden on "good" activities by lowering the amount of taxes charged in other areas which do not have a negative impact on the environment (Winkler & Marquard, 2009).	1	2	3	4
10. The revenue collected from levying the carbon emissions tax could be earmarked for specific purposes to further reduce South Africa's carbon emissions before it is actually collected (National Treasury, 2006).	1	2	3	4

7.2 Appendix Two

Ethics Clearance Certificate



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18 December 2013

Ms A Edelstein

Student Number: 360582

Dear Edelstein

I have pleasure in informing you that the **SOA Post Graduate Degrees Committee** has approved the following title for your Research Report:

Green tax – can a carbon emissions tax be implemented in implemented in South Africa

Furthermore the committee has approved the following supervisor: **Mrs M Turner**, with whom you should maintain regular contact. Please ensure that the title on the bound copies of your research report is the same as that approved by the Post Graduate Committee.

You will be required to submit to the Faculty Office on submission of the report:

- Two spiral bound copies of the Research Report with a signed declaration
- one copy of the abstract
- one copy of the title page
- the Supervisor's Clearance Form

The ethics number for your research report is **CACCN/1047**. It is very IMPORTANT that you ensure that this number appears on the cover page of your research report when you submit.

Please note that you need to be registered every year until your graduation.

Please note: After confirmation of the final Research Report mark, you will be required to submit two unbound final corrected copies signed and dated, an electronic copy (in PDF format), a signed library clearance form and have completed the full ETD form.

We wish you success with your research.

Kind Regards

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Faculty Admin Officer

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