

TAXING ECONOMIC “BADS”: THE CASE FOR A CARBON TAX IN SOUTH AFRICA

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DECLARATION

I, Zandile Ndebele, hereby declare that the work on which this thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.


.....

SIGNATURE

26-01-2017

DATE

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Firstly, I thank God, whose endless mercies have allowed me to reach this point in my life and, were it not for his grace, the opportunities to undertake my studies would be few.

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DEDICATION

For my son, Andile, whose patience and love gives me the courage to dare life.

LIST OF FIGURES

Figure 2 Total Annual Anthropogenic GHG emissions by Groups of Gases 1970-2010	9
Figure 4 LTMS and the Peak, Plateau and Decline Emissions Trajectory	33
Figure 4.1 Mitigation Process, South Africa.	34

LIST OF ACRONYMS

BAU	Business-As-Usual
CCS	Carbon Capture Storage
CDM	Clean Development Mechanism
CO ₂	Carbon Dioxide
CH ₄	Methane
COP	Conference of Parties
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GWC	Growth Without Constraints
IPCC	Intergovernmental Panel on Climate Change
LTMS	Long Term Mitigation Scenarios
N ₂ O	Nitrous Oxide
OECD	Organisation for Economic Cooperation and Development
PCP	Power Conservation Programme
PPD	Peak, Plateau and Decline
RBS	Required by Science
tCO ₂	ton of carbon dioxide
tCO ₂ -eq	ton of carbon dioxide equivalent (also tCO ₂ -e)
UNFCCC	United Nations Framework Convention on Climate Change

ABSTRACT

Climate change is regarded as the greatest market failure of our times. The emission of GHG's has largely contributed to the rapid rise of climate change that has resulted in environmental disasters such as droughts and floods. Adaptation and mitigation measures have been used to find solutions to climate change. Due to the Kyoto Protocol, the mitigation of climate change has also received significant focus which encouraged the use of market-based instruments to mitigate climate change by lowering GHG's. Although they have received criticism, market-based instruments such as environmental taxes found favour under climate change mitigation as it is theorised that they create environmental and economic benefits. This is known as the double-dividend hypothesis and this refers to a situation when an environmental tax benefits the environment and the economy for example through improving the environment or recycling revenue to reduce distortionary taxes.

The mitigation of climate change has been at the centre of the environmental debate for decades leading to the establishment of the UNFCCC and the annual COP meetings. However, no legally binding instrument to lower GHG emissions has been made effective on State parties to the Convention. Due to the lack of progress on the international arena to find a permanent solution for climate change mitigation, States have moved towards using domestic instruments such as cap-and-trade and carbon taxes to lower correct the emissions of GHG's. South Africa seeks to reduce the levels of GHG emissions and move towards a low-carbon economy by introducing carbon tax legislation which shall place a price on the GHG's emitted by several industries. Thus, numerous reports and reviews have been put forward stating the economic and environmental issues that may arise from the use of carbon taxes to mitigate climate change in South Africa.

TABLE OF CONTENTS

DECLARATION	i
ACKNOWLEDGEMENTS	ii
DEDICATION	iii
LIST OF FIGURES	iv
LIST OF ACRONYMS	v
ABSTRACT.....	vi
TABLE OF CONTENTS.....	vii
CHAPTER 1: INTRODUCTION	1
1.1 Chapter Objective	1
1.2 Background	1
1.3 Statement of Problem.....	5
1.4 Research Questions and Objectives	6
1.5 Research Methodology	6
1.6 Structure of Dissertation	7
CHAPTER 2: HISTORY OF GLOBAL CLIMATE CHANGE MITIGATION POLICY	8
2.1 Chapter Objective	8
2.2 The Science of Climate Change.....	8
2.2.1 Diagrammatic Presentation of the Rise of Global GHG emissions	9
2.3 International Climate Change Mitigation Policy Actions	10
2.3.1 United Nations Framework Convention on Climate Change (UNFCCC).....	10
2.3.2 Conference of Parties (COP) to the UNFCCC.....	11
2.3.3 The Kyoto Protocol to the UNFCCC.....	11
2.3.4 Bali Action Plan to Cancún Agreements: Anti-Climax of the Kyoto Protocol?.....	12
2.4 Exploring Instruments for Environmental Policy	13
2.4.1 Direct Regulatory Instruments (Command-and-Control Regulations)	14
2.4.2 Incentive-based Instruments	14
2.4.3 Price Instruments versus Quantity Instruments.....	15
2.5 Carbon Taxes in Other Jurisdictions	16
2.5.1 Canada's British Columbia	17
2.5.2 Australia	19
2.6 Conclusion	19
CHAPTER 3: COMPLEXITIES OF THE ECONOMICS OF CLIMATE CHANGE.....	21
3.1 Chapter Objective	21
3.2 The Climate Change Mitigation Debate	21

3.3 The Economics of Climate Change Mitigation Policy	21
3.3.1 The use of market-based instruments.....	22
3.3.2 The Double-Dividend Hypothesis.....	23
3.3.3 Revenue- Recycling Effect	24
3.3.4 Other Benefits of Environmental Taxes.....	24
3.4 Sceptics of Environmental Taxes.....	25
3.4.1 Criticism of the Double-Dividend Hypothesis.....	25
3.4.2 Criticism of Revenue-Recycling Effect	26
3.4.3 Distributional Impacts of Environmental Taxes	27
3.5 Conclusion	28
CHAPTER 4: INTRODUCTION OF A CARBON TAX IN SOUTH AFRICA	30
4.1 Chapter Objective	30
4.2 Energy Use and Carbon Emissions in South Africa	30
4.3 Development of South African Climate Mitigation Policy.....	31
4.3.1 Long Term Mitigation Scenarios (LTMS) for South Africa.....	32
4.3.2 “Peak, Plateau and Decline” Trajectory (PPD).....	33
4.3.3 Summary of South Africa’s Mitigation Process	34
4.3.4 Draft Carbon Tax Bill	34
4.4 Key Issues of a Carbon Tax in South Africa	35
4.4.1 The State of Energy Policy	36
4.4.2 Competitiveness	37
4.4.3 Increase in Unemployment Levels.....	39
4.4.4 The Welfare Economy	40
4.5 Conclusion	40
CHAPTER 5: RECOMMENDATIONS FOR DESIGNING AN EFFECTIVE CARBON TAX IN SOUTH AFRICA.....	42
5.1 Chapter Objective	42
5.2 Carbon Tax Policy Design Considerations	42
5.2.1 Determining the Tax Base.....	43
5.2.2 Determining the Tax Rate	45
5.3 Searching for the Economic Double-Dividend in South Africa	46
5.3.1 Addressing Revenue-Recycling and Distributional Impacts in South Africa.....	46
5.3.2. Reducing Unemployment	47
CHAPTER 6: CONCLUSION AND RECOMMENDATIONS	48
6.1 Chapter Objective	48
6.2 Recommendations.....	48
6.3 Conclusion	50

BIBLIOGRAPHY	52
APPENDICES	57
Ethical Clearance Form.....	57
Change of Dissertation Title Form.....	58

CHAPTER 1: INTRODUCTION

1.1 Chapter Objective

This chapter will introduce the context of the study and provide a framework of the dissertation material.

1.2 Background

International agreements aimed at mitigating climate change have been reached in the past fifteen years. One such agreement, the Kyoto Protocol, was adopted on the 11th of December 1997 and from the outset it was considered as a positive step.¹ In terms of the agreement, ‘Annex I’ countries were legally bound to reduce ‘greenhouse gas’ (GHG) emissions by an average of 5.2 percent below 1990 levels in the period between 2008 and 2012.² Under the Kyoto Protocol, South Africa is an ‘Annex II’ country and has no limits to the levels of GHG’s emitted and has no targets to achieve. However, South Africa is a “contributor and a victim of global climate change”³ as it is not only affected by climate change but is ranked among the top twenty highest carbon dioxide (CO₂) emitters in the world as measured through its carbon emissions per capita of Gross Domestic Product (GDP).⁴ Thus, proactive action to mitigate GHG emissions is necessary to ensure that sustainable development is realised. However, although climate change mitigation strategies are necessary, it has been argued that they must not be at a great economic cost for the businesses, industry, the poorer population and the country’s steady economic growth.

Under the Kyoto Protocol, the central mechanism in climate change mitigation strategies were the market-based instruments such as carbon tax. Markets are largely regarded as the “best means of allocating finite resources without unnecessary waste, while keeping as many people happy as possible.”⁵ Market-based policy instruments are regulations which if well designed

¹ O Tickell *Kyoto 2: How to Manage the Global Greenhouse* (2008) 33.

² J Kahn Randall & D Franceschi ‘Beyond Kyoto: A Tax-Based System For The Global Reduction Of Greenhouse Gas Emissions’ (2006) 58 *Ecological Economics* 778, 779.

³ T Mbadlanyana ‘Political Economy of Carbon Tax in South Africa: A Critical Analysis’ (2013) 43 *Africa Insight* 77, 78.

⁴ T Makube ‘Economic Instruments to Mitigate Climate Change in South Africa and Other Developing Countries’ available at: http://www.erc.uct.ac.za/Research/publications/10Winkleret-al_ERC_Conference_Proceedings.pdf, accessed on 19 March 2015.

⁵ Tickell (note 1 above) 9.

and implemented have the ability to “encourage behaviour through market signals rather than through explicit directives regarding pollution control levels or methods.”⁶ With market-based instruments, individuals and firms can undertake efforts to control pollutions which would be in their interest and which meet policy goals collectively.⁷ Thus, such an instrument can influence the decision-making processes of producers and consumers ultimately positively affecting environmental effectiveness and economic efficiency which are regarded as cornerstones of environmental policy to mitigate climate change.

The Kyoto Protocol introduced carbon tax as a domestic policy to support its innovative international mechanism to fight carbon emissions.⁸ Although carbon is not the only GHG emitted it has been favoured as the easiest to track mainly because a direct relation exists between fossil fuels burnt and the carbon generated.⁹ In addition, it has been theorised that energy consumption may be curtailed if carbon taxes are introduced and this consequently may lead to the reduction of GHG emissions and air pollution.¹⁰ Therefore, the introduction of a carbon tax may ensure efficient and environmentally beneficial outcomes. However, the argument for the introduction of a carbon tax and the effects thereof must be analysed through the ‘double- dividend hypothesis.’

The ‘double-dividend hypothesis’ suggests that there are two kinds of benefits attached to environmental taxes.¹¹ The first dividend suggests that introducing an environmental tax results in the improvement of the environment. The second dividend is that environmental taxes assist in raising revenue thus leading to an improvement in economic efficiency.¹² Relying on the ‘double dividend hypothesis,’ it has been argued that introducing an environmental tax is not a complete solution as a climate change mitigation strategy because the reform must go further

⁶ RN Stavins ‘Experience with Market-Based Environmental Policy Instrument’ in K Maler & J. R Vincent (ed) *Handbook of Environmental Economics: Environmental Degradation and Institutional Responses* (2003) 355, 357.

⁷ *Ibid* 358.

⁸ A Baranzini *et al* ‘A Future for Carbon Taxes’ (2000) 32 *Ecological Economics* 395, 396.

⁹ R Boyd & ME Ibarraran ‘Costs of Compliance with the Kyoto Protocol: A Developing Country Perspective’ (2002) 24 *Energy Economics* 21, 24.

¹⁰ *Ibid* 24.

¹¹ D Fullerton & GE Metcalfe ‘Environmental Taxes and the Double- Dividend Hypothesis: Did You Really Expect Something for Nothing?’ (1997-1998) 73 *Chi.-Kent L. Rev.* 221, 221. Also see Boyd & Ibarraran (note 9 above) 25.

¹² Fullerton & Metcalfe (note 11 above) 221.

and state the role of the environmental tax in the economy.¹³ Thus, the ‘double dividend hypothesis’ suggests that a carbon tax will indeed have an impact on the economy and the environment and it becomes significant to assess further the extent of these impacts on South Africa as a developing country.

South Africa has demonstrated its commitment to the international processes addressing the regulation of GHG emissions and those combatting climate change. A course of action for South Africa regarding climate change has been forthcoming hence the 2007 Long Term Mitigation Scenario’s (LTMS) which laid the basis for robust climate change policy. Essentially, the LTMS produced evidence-based scenarios which were because of research fed into the facilitated stakeholder process.¹⁴ The ‘use the market strategic option’¹⁵ identified under LTMS proposed the use of the market to promote the approval of accelerated technologies and social behaviour through incentives and taxes.¹⁶ Under the LTMS, a tax on carbon was considered as an effective mitigation option for South Africa.¹⁷

Based on the LTMS, the National Treasury has proposed to introduce a carbon tax in 2016 as a climate change mitigation option. In favour of introducing carbon tax in South Africa, the treasury has posited that a limited negative impact on economic growth will be associated with the carbon tax.¹⁸ The National Treasury has gone further to state that a tax on carbon will propel the economy towards a more sustainable and low carbon-growth path.¹⁹ In support of introducing a carbon tax in South Africa, some scholars have concluded that a low- carbon economy has been viewed as the best option for the creation and development of jobs.²⁰ However, other scholars have asserted that there are strong shortcomings with introducing a carbon tax in South Africa due to the high unemployment rate which is a result of labour market distortions, and also due to the tax burden taxpayers could suffer.²¹ Boekhoudt further asserts

¹³ Fullerton & Metcalfe (note 11 above) 221.

¹⁴ H Winkler *Taking Action on Climate Change: Long Term Mitigation Scenarios for South Africa* (2010) 2.

¹⁵ Scenario Building Team 2007. Long Term Mitigation Scenarios: Scenario Document, Department of Environment Affairs and Tourism, available at http://www.erc.uct.ac.za/Research/publications/07Scenario_team-LTMS_Scenarios.pdf, accessed on 20 March 2015. Also see Winkler (note 14 above) 161.

¹⁶ Winkler (note 14 above) 161.

¹⁷ *Ibid* 161. Also see Mbadlanyana (note 3 above) 81.

¹⁸ Department of National Treasury Carbon Tax Policy Paper (2013) 10.

¹⁹ *Ibid* 10.

²⁰ Winkler (note 14 above) 3.

²¹ Mbadlanyana (note 3 above) 83.

that a carbon tax has a potential impact on competitiveness mainly in light of the struggling mining sector and rising energy costs.²² Other research has gone further and suggested that a low-carbon growth economy can necessitate a competitive advantage in that it creates incentives for research and it can foster the creation of a resource efficient economy.²³

Another factor that could negatively impact the industries should a carbon tax be introduced is that the electricity sector is responsible for about 48 percent of South Africa's carbon emissions due to its high use of coal.²⁴ Interestingly, the mining and manufacturing industries are the primary users of electricity and it is logical to state that they will be affected by the introduction of a carbon tax and subsequently the economy will be adversely affected due to the centrality of these industries in the South African economy.

The design of the proposed carbon tax must be considered to address the potential distortions that may arise because of introducing a carbon tax. The policy report proposes that the carbon tax must be implemented through a gradual process,²⁵ to allow for the development of alternate energy sources to replace carbon²⁶ and to lessen the possibility for macro-economic shocks in the labour market or price levels.²⁷ In designing a carbon tax the 'point of imposition of the tax,' 'border tax adjustments,' 'carbon taxes fiscal revenue recycling' and 'exemptions, rebates ceilings' must be considered in order to address issue on competitiveness and reduce impacts.²⁸ As an economic instrument, a carbon tax must be objective, transparent, credible, simple and reliable.²⁹ A good tax design ensures that the underlying purpose and principles surrounding a carbon tax design are clearly recognised.³⁰ Moreover, Lewis states that the tax rate and tax base must be identified and this notion is supported by Herber and Raga who suggest that a carbon tax must be identified in specific rather than ad valorem terms as it is "a physical amount of

²² A Boekhouth 'Preparing for a Carbon Tax in South Africa' (2013) 24 *International Tax Review* 42, 19.

²³ Mbadlanyana (note 3 above) 81.

²⁴ R Jeffrey 'Renewables and Carbon Tax: A Negative Impact on Mining and Economic Growth' (2013) 9 *Inside Mining* 18, 18.

²⁵ Carbon Tax Policy Paper (note 18 above) 1.

²⁶ M Waggoner 'Why and How to Tax Carbon' (2008) 20 *Colorado Journal of Environmental Law and Policy* 1, 7.

²⁷ Kahn Randall & Franceschi (note 2 above) 780.

²⁸ Baranzini *et al* (note 8 above) 402.

²⁹ Makube (note 4 above) 172.

³⁰ *Ibid* 172.

fuel used to produce energy that is linked to carbon emissions, not the pre-tax price of the fuel.”³¹

There is a need for a carbon tax in South Africa due to high carbon emitted in the country and because climate change is our generations’ greatest threat. However, various research has shown that a carbon tax will indeed have a great economic impact to the country and it therefore becomes essential to analyse the impact a carbon tax will have on competitiveness, investment, growth in the mining and manufacturing industries, and labour market distortions. For the carbon tax to be effective in addressing climate change and promoting economic growth, it should be designed with consideration of the social, political and economic climate prevailing in the country. This research will primarily look at the economic consequences of a carbon tax and will propose a carbon tax design that shall seek to address the potential distortions that may arise after a carbon tax is introduced in South Africa.

1.3 Statement of Problem

South Africa is in the top twenty carbon emitters in the world and yet it does not have a tax on carbon as a climate change mitigation strategy. South Africa’s energy use, which relies heavily on coal, contributes significantly to the high carbon emissions released into the atmosphere every year.

Further it has been argued that the introduction of a carbon tax in South Africa will have long term effects such as increasing unemployment, competitiveness and decreased investment in South Africa. Introducing a carbon tax in South Africa creates a dilemma between the environment and the economy and in analysing this dilemma, the ‘double-dividend hypothesis’ will be used. With this view in mind it becomes important to understand the objectives behind the introduction of the carbon tax and to look at how the Treasury plans to implement the carbon tax should it become effective in 2016. The research that follows was undertaken to shed light on the above matters.

³¹ BP Herber & JT Raga ‘An International Carbon Tax to Combat Global Warming: An Economic and Political Analysis of the European Union Proposal’ (1995) 54 *American Journal of Economic and Sociology* 257, 260.

1.4 Research Questions and Objectives

The research questions are as follows:

- i) Why have market-based instruments such as carbon taxes been considered under domestic and international policy frameworks as an effective measure in mitigating climate change?
- ii) Is there a need for South Africa to introduce mitigation measures in the form of a carbon tax?
- iii) What are the economic costs and benefits of introducing a carbon tax in South Africa?
- iv) How can the carbon tax in South Africa be designed such that taxing economic ‘bads’ produces double-dividends for the country?

The research objectives for the study are as follows:

- i) To contextualize the South African climate change mitigation strategy within the international agenda that advocates for the use of economic instruments to mitigate climate change.
- ii) To assess the relationship between carbon tax and other existing economic instruments introduced as part of the global climate change mitigation strategies.
- iii) To examine how the introduction of a carbon tax in South Africa offsets the reasons or objectives for the use of economic instruments to mitigate against climate change.
- iv) To analyse the potential of a carbon tax in South Africa to mitigate climate change within the current socio-economic environment.
- v) To suggest an effective carbon tax design drawing from considerations that must be taken into perspective in designing an effective environmental tax policy.

1.5 Research Methodology

The research for this dissertation is desk-top based. The dissertation will use a range of sources such as journal articles, legislation and textbooks. Journal articles will be looked at primarily because there has not been final legislation on carbon tax. The dissertation will particularly focus on articles that explain the issues around climate mitigation strategies and economic instruments such as carbon tax. In addition, the dissertation shall identify South African reports that expound on the economic consequences of introducing a carbon tax internationally and locally to contribute to the design of a carbon tax in South Africa.

1.6 Structure of Dissertation

Chapter One will provide the background to the dissertation and outline the core theories around the use of economic instruments as measures to mitigate climate change by lowering GHG emissions.

Chapter Two will address the history of global climate change mitigation policies. The chapter will also explore some of the economic instruments that are available for environmental mitigation. An analysis of carbon taxes in other jurisdictions will be undertaken to show how the tax has worked elsewhere.

Chapter Three will consider the complex issues around the use of market-based instruments to mitigate climate change by lowering greenhouse gases. The key theories influencing the debate on environmental tax as a climate change mitigation instrument will be reviewed.

Chapter Four will summarily discuss the journey leading up to the introduction of a carbon tax in South Africa. Further, the chapter will discuss some of the key issues that may affect the success and effectiveness of a carbon tax in South Africa. These issues are limited to the economic sector as the economic dividend is more problematic than the environmental one its interpretation.

Chapter Five will consider the carbon tax design considerations for South Africa and will analyse the potential for an economic double dividend after the introduction of a carbon tax.

CHAPTER 2 : HISTORY OF GLOBAL CLIMATE CHANGE MITIGATION POLICY

2.1 Chapter Objective

This chapter reviews global climate change policy strategies with the aim of providing a framework for the development of South Africa's environmental mitigation policy initiatives and strategies. To give background and context to the review, the chapter will firstly discuss the science of climate change to show the relevance of climate mitigation responses amid the gradual rise of atmospheric GHG emissions globally. Lastly, the chapter will proceed to use a cost-benefit analysis to discuss the operation of climate change mitigation policies in other jurisdictions to illustrate the environmental and economic reasonableness of introducing mitigation instruments.

2.2 The Science of Climate Change

The Intergovernmental Panel on Climate Change (IPCC) states the following on climate change and its effects;

“Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level.”³²

Following on the above, over the last century there has been an increase of GHG concentration in the atmosphere and climate science states that this has led to the rise of global averages of air and sea temperatures ³³ due to the greenhouse effect which occurs because of increased carbon dioxide concentrations in the atmosphere thereby causing this increase in temperatures. Carbon dioxide (CO₂) is not the only GHG emitted into the atmosphere, but it has been favoured as the easiest to track mainly because scientific data cites a direct relation between fossil fuels burnt and the carbon generated, thus the superiority of carbon tax as a superior climate change policy.³⁴

³² IPCC Climate Change 2007: Synthesis Report to the Fourth Assessment Report (2007), 2.

³³ M Sengul *et al* 'Climate Change and Carbon Dioxide (CO₂) Sequestration: an African Perspective' (2007) 64 *International Journal of Environmental Studies* 543, 543.

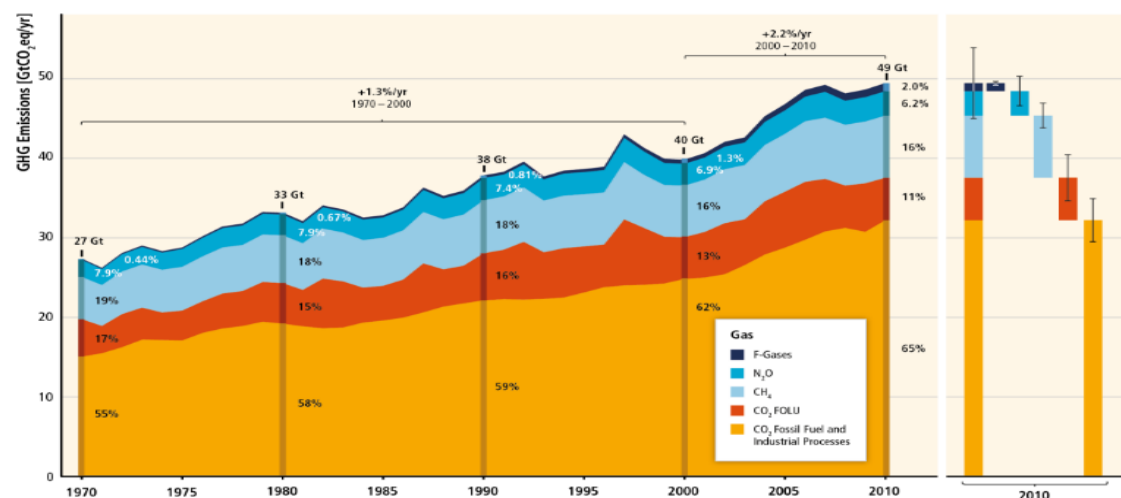
³⁴ Boyd & Ibarraran (note 9 above) 24.

The earth is enveloped by a layer of GHG's and in order to maintain the proper balance for temperature regulation to support life, this layer should consist of the proper mix of GHG's.³⁵ GHG's are primarily composed of carbon dioxide (CO₂), nitrous oxide (N₂O) and methane (CH₄) but GHG's generally refer to the anthropogenic gaseous constituents of the atmosphere which are known to 'absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and the clouds.'³⁶ Therefore, external factors and the 'internal variability' within the climate system both contribute to the global changes in climate patterns³⁷ through GHG emissions even though literature attributes the rise of global temperature averages primarily to anthropogenic GHG's, that is, gases from human activities.³⁸

2.2.1 Diagrammatic Presentation of the Rise of Global GHG emissions

The figure below shows the continued rise of GHG emissions thus the need for climate policy strategies intervention.

Figure 2 Total Annual Anthropogenic GHG emissions by Groups of Gases 1970-2010



Source: Intergovernmental Panel on Climate Change, Fifth Assessment Report (2014).

³⁵ EA Rosa 'Global Climate Change: Background and Sociological Contributions' (2001) 14 *Society & Natural Resources* 491, 493.

³⁶ IPCC Climate Change 2001: The Scientific Basis. Third Assessment Report (2001).

³⁷ *Ibid* 5.

³⁸ Sengul (note 33 above) 544.

2.3 International Climate Change Mitigation Policy Actions

From the mid-80's, the climate change problem has occupied centre stage in the international political agenda and complex issues surrounding the actions and legal instruments that can be used to mitigate against climate change have been proposed by governments, international institutions and organizations.³⁹ For climate change responses to be effective and progressive, there must be an international understanding that global and collective responses to climate change are required because its origins, scale, impact and urgency goes beyond borders and territorial lines.⁴⁰ It is imperative that countries demonstrate an understanding of the implications of adaptation and mitigation of climate change on national security, growth, competitiveness, public finances and the environment. Sensible choices have been made by participating countries in the form of a legally binding and comprehensive international agreement to lower GHG emissions. This has been on the table for the international community since 1992 with the United Nations Framework Convention on Climate Change (UNFCCC). This global and collective action climaxed with the Kyoto Protocol in 1997 which was negotiated under the auspices of the UNFCCC⁴¹ and the protocol progressively contained legally binding reduction targets for major GHG emitters.

2.3.1 United Nations Framework Convention on Climate Change (UNFCC)

The UNFCCC, negotiated at the Earth Summit in Rio de Janeiro in 1992, was the international response to the climate change problem and it was to serve as a guide for climate change mitigation actions. The ultimate objective of the UNFCC and any legal instrument adopted at Conference of Parties (COP)⁴² is set out in Article 2 of that document:

‘... to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that

³⁹ E Hey ‘The Climate Change Regime: An Enviro-Economic Problem and International Administrative Law in the Making’ (2001) *International Environmental Agreements: Politics, Law and Economics* 75, 75.

⁴⁰ N Stern ‘What is the Economics of Climate Change?’ (2006) 7 *World Economics* 1, 9.

⁴¹ T Williams ‘The Climate Change Convention and the Kyoto’ available at <http://www.lop.parl.gc.ca/content/lop/researchpublications/prb0721-e.pdf>, accessed on 4 July 2016.

⁴² See section 2.3.2

food production is not threatened and to enable economic development to proceed in a sustainable manner.’⁴³

Further, the UNFCCC which came into force in March 1994 imposed limits on GHG’s emitted by developed countries as the primary emitters of GHG’s but developing countries were given no limits or targets to reduce emissions.⁴⁴ From the establishment of the UNFCCC in 1992, international parties have met at COP where the discussion has evolved around the development of a mechanism in the form of a legally binding instrument for all countries to ensure the reduction of GHG emissions.

2.3.2 Conference of Parties (COP) to the UNFCCC

The COP is the ‘supreme decision-making body of the UNFCCC’ and Parties meet annually to discuss the effects of steps taken by Parties and to review progress made towards realizing the ultimate objective of the Convention.⁴⁵ The first meeting of the COP was hosted by Berlin, Germany in March of 1995.

The key COP’s are discussed below with an aim of illustrating the tumultuous and mammoth task involved in developing a legally binding instrument that cannot only effectively mitigate climate change but which is in line with popular economic and environmental policy that supports economic growth and development.

2.3.3 The Kyoto Protocol to the UNFCC

The Protocol to the UNFCCC was adopted in 1997 in Kyoto, Japan at the 3rd COP and this was the first instrument to contain legally binding reduction targets for all major GHG’s.⁴⁶ The Protocol birthed the development of a global market for carbon through the adoption of carbon trading as the central mechanism for Annex B signatory states to comply with their emissions target which was set at 5 percent below 1990 emission levels under Article 3.⁴⁷

⁴³ United Nations, United Nations Framework Convention on Climate Change, Article 2, 1990. <https://unfccc.int/resource/docs/convkp/conveng.pdf>, accessed 4 June 2016.

⁴⁴ Williams (note 41 above) 2.

⁴⁵ UNFCC available at <http://unfccc.int/bodies/body/6383.php>, accessed on 16 December 2016.

⁴⁶ HE Ott ‘The Kyoto Protocol: Unfinished Business’ (1998) 40 *Environment: Science and Policy for Sustainable Development* 16, 17.

⁴⁷ D Layfield ‘Turning Carbon into Gold: the Financialisation of International Climate Policy’ (2013) 22 *Environmental Politics* 901, 904.

International economic instruments, namely the joint implementation, international emissions trading and the clean development mechanism were introduced by the Protocol to support its climate change policy regime.⁴⁸ Article 12 of the Kyoto Protocol provided that developing countries were not required to accept reduction targets but however, developing countries could participate in the global carbon market through the Clean Development Mechanism (CDM).⁴⁹ In terms of paragraph 2 of Article 2 of the Protocol, the CDM was designed to assist non-Annex B countries to realize their sustainable development goals.⁵⁰ To keep the Protocol and the co-operation on climate change mitigation policy alive, the international community has continued to meet at the Conference of Parties to the UNFCCC.

2.3.4 Bali Action Plan to Cancún Agreements: Anti-Climax of the Kyoto Protocol?

The international community gathered at the climate change conference in Bali, Indonesia in 2007 with the goal of coming up with an agreement that was legally binding and comprehensive which would impose mitigation obligations upon countries and this was a mark towards a post-2012 climate change regime.⁵¹ However, no binding document was agreed to at the Bali meeting and thereafter, the international community re-engaged in 2009 at Copenhagen, Denmark and this culminated with the Copenhagen Accord which was drafted by five countries and which delegates at the COP 15 of the UNFCCC agreed to “take note of” and not “adopt” as per initial expectations.⁵² The goal of COP 15 of the UNFCCC was to conclude a legally binding agreement that had been negotiated at the Bali United Nations Climate Change Conference in 2007 in order to fill the void left by the expiration of the Kyoto Protocol in 2012.⁵³ The major criticism of the Copenhagen Accord was that it did not contain legally binding GHG emissions reduction targets and there was no deadline set for the production of a document that would succeed the Kyoto Protocol.⁵⁴

⁴⁸ Baranzini *et al* (note 8 above) 397.

⁴⁹ Layfield (note 47 above) 905.

⁵⁰ *Ibid* 905.

⁵¹ J De Cendra de Larragán ‘The Future of International Climate Change Law: A Scenario-based Perspective, (2012) 12 *Climate Policy* 6, 9.

⁵² *Ibid* 9.

⁵³ LM Sandler & RI Schiffman Kymer ‘Copenhagen Accord: Outcomes, Next Steps, and Business Implications’ (2010) 22 *Environmental Claims Journal* 144, 145.

⁵⁴ *Ibid* 145.

In 2010 at the climate change conference in Cancún, Mexico, the climate change negotiations also failed to drive the discussion towards a legally binding climate change instrument as anticipated although the Cancún agreements managed to insert the Copenhagen Accord into the climate change negotiations. Despite this shortcoming, the Parties at the Cancún conference agreed that there was need for deep and immediate cuts in the global GHG emissions as per the IPCC's Fourth Assessment Report which stated that global GHG emissions must be reduced to a global average temperature below 2°C above pre-industrial levels.⁵⁵

2.4 Exploring Instruments for Environmental Policy

Climate mitigation and adaptation policies operate in tandem with the ultimate objective expressed in Article 2 to the UNFCCC which is mainly to stabilize “greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”⁵⁶ The continued rise of anthropogenic GHG's has directed the international community towards the introduction of climate change adaptation and mitigation policy actions and responses.

The intervention of environmental policy in the reduction of emissions has been deemed important as the externalities associated with human induced climate change are not automatically amended by specific institutions or markets.⁵⁷ Externalities of climate change are those destructive effects of GHG emitting economic activities and the costs of such activities are borne by those that contribute least to the global effect of the emissions.⁵⁸ Economic instruments have the potential to internalize the external cost (externalities) of emissions therefore such instruments may possibly lead to the alteration of the emissions profile of the economy.⁵⁹

⁵⁵ European Bank for Reconstruction and Development ‘Special Report on Climate Change: The Low Carbon Transition’ available at <http://www.ebrd.com/news/publications/special-reports/special-report-on-climate-change-the-low-carbon-transition.html>, accessed 14 August 2016.

⁵⁶ Article 2 to the UNFCCC (note 43 above).

⁵⁷ Stern (note 40 above) 27.

⁵⁸ AB Jaffe *et al* ‘A Tale of Two Market Failures: Technology and Environmental Policy’ (2005) 54 *Ecological Economics* 164, 165.

⁵⁹ M Goldblatt ‘Comparison of emissions trading and carbon taxation in South Africa’ (2010) 10 *Climate Policy* 511, 512.

A wide range of policy instruments exist that can be used for the reduction of anthropogenic GHG emissions. These instruments include direct regulatory instruments (command-and-control instruments) and incentive-based instruments such as taxes and cap-and-trade.⁶⁰ The choice of instrument to curb emissions depends on the various criteria favoured. In the case of economists, the preferred criteria leans toward cost effectiveness and its close kin, economic efficiency (which is the aggregate net benefits associated with a policy).⁶¹ Further criteria could include the political practicability, capacity to deal with uncertainties and the distribution of costs and benefits.⁶²

A discussion on the various types of instruments and their key strengths and weaknesses as environmental policy instruments follows.

2.4.1 Direct Regulatory Instruments (Command-and-Control Regulations)

Command-and-control regulations involves the enactment of a law to prevent a behaviour and an enforcement machinery is used to make people obey the enacted law.⁶³ Under environmental policy, standards are set to improve and protect environmental quality.⁶⁴ The command-and-control regulations are either performance based or technology based.⁶⁵

2.4.2 Incentive-based Instruments

There are two main incentive-based instruments used to mitigate climate change and these are:

- Carbon tax which is a *price instrument* that has a direct price on GHG emissions. The emitters are responsible for the full cost of their emissions.⁶⁶

⁶⁰ LH Goulder & IWH Parry 'Instrument Choice in Environmental Policy' (2008) 2 *Rev Environ Econ Policy* 152,155. Also see further below for explanation of cap-and-trade.

⁶¹ *Ibid* 152.

⁶² *Ibid* 152.

⁶³ S Pag-aaral 'A Law of Nature: The Command-and-Control Approach available at http://www.sswm.info/sites/default/files/reference_attachments/PIDS%202002%20Standards%20in%20Command%20and%20Control.pdf , accessed 15 August 2016.

⁶⁴ *Ibid* 1.

⁶⁵ JE Aldy & RN Stavins 'The Promise and Problems of Pricing Carbon: Theory and Experience' (2012) 21 *Journal of Environment & Development* 152, 154.

⁶⁶ Goldblatt (note 59 above) 513.

- Cap-and-Trade which is a *quantity instrument* that directly creates an emissions quantity by placing a cap on emissions imposed on emitters. It indirectly creates price on GHG emissions by allowing emitters to trade their emissions allowances.⁶⁷

2.4.3 Price Instruments versus Quantity Instruments

With a carbon tax, a fixed price of carbon is set and the quantity emitted can fluctuate directing the market to work out the quantity.⁶⁸ Conversely, with emissions trading, a quantity of emissions to be made is set and the price of carbon fluctuates leaving the market to work out the price.⁶⁹

Economic theory identifies the uncertainty about the abatement costs and benefits as key differences between the taxes and cap-and-trade economic instruments.⁷⁰ Price instruments, are preferred in circumstances where “the benefits of making further reductions in pollution (that is the marginal benefits of abatement) change less with the level of pollution than the costs of delivering these reductions (that is the marginal costs of abatement).”⁷¹ However, quantity instruments are preferred in circumstances where “the benefits of further reductions increase more steeply with the level of pollution than do the costs of emission reductions.”⁷² However, it is established that these differences are based on assumptions and form an incomplete analysis but still they advance an understanding of when and how these instruments apply.⁷³

It has been put forward that carbon trading should be preferred over carbon tax due to its fixed level of carbon emissions. However, this could be a weakness in that fixed emissions are less efficient than a carbon tax as quotas are rigid and disallow the adjustment of production decisions to changing circumstances.⁷⁴ Such rigidity of an instrument would create uncertainty when it comes to fluctuating carbon prices.⁷⁵

⁶⁷ *Ibid* 513.

⁶⁸ J Humphreys Exploring a Carbon Tax for Australia available at <http://www.institutoliberalidade.com.br/ingles/arquivos/ExploringAustralia.pdf>, accessed on 22 April 2015.

⁶⁹ *Ibid* 2.

⁷⁰ Goldblatt (note 59 above) 513.

⁷¹ *Ibid* 513.

⁷² *Ibid* 513.

⁷³ *Ibid* 514.

⁷⁴ Humphreys (note 68 above) 2.

⁷⁵ *Ibid* 2.

Carbon taxes have the potential to have no negative effects as they have a revenue-recycling effect meaning that the revenue from a carbon tax can be used to reduce other distortionary taxes thus cut back on the costs of implementing a carbon tax. However, this is not possible with emissions trading as the revenue raised from the polluters is used for subsidies. Additionally, emissions trading comes with huge costs that arise from negotiations, insurance, compliance, search and approval costs.⁷⁶

Further, there are assertions that emissions have external social costs as the emitters do not bear the costs of their emissions. It is propounded that Pigouvian taxes⁷⁷ have the ability to correct market failures caused by such externalities.⁷⁸ Economists and policy-makers regard taxes favourably over other instruments due to their ability to reduce emissions at the lowest cost to society as the incentive effect of the tax works to equalize the marginal abatement cost across all emitters.⁷⁹ However, the same principle is inhibited by cap-and-trade instruments and some even go further to support emissions trading instruments over taxes as they are deemed to have more certain outcomes for emission reduction targets.⁸⁰ It would appear that no true dichotomy between these taxes and emissions trading really exists as each one has its own design features that are an advantage or disadvantage. Therefore, the choice of policy instrument chosen by a government will depend on the objectives to be achieved and to some extent budgetary issues as carbon taxes are economically reasonable to implement as the revenue collected may be used to cut other taxes.

2.5 Carbon Taxes in Other Jurisdictions

In 1997, the international community through the Kyoto Protocol established GHG emissions reduction targets for developed countries and economies in transition for the first commitment period between 2008 and 2012. Under the protocol, the Annex B countries, which were 38 developed countries, committed themselves to decrease their emissions by 5 percent between

⁷⁶ *Ibid* 3.

⁷⁷ Pigovian taxes are named after Arthur C. Pigou who developed the idea in his book 'The Economics of Welfare.' The term refers to taxes that are levied to correct negative externalities usually associated with high polluting industries.

⁷⁸ J Hassler *et al* 'Climate Policy' (2016) *Economic Policy* 503, 529.

⁷⁹ P Elkins & T Parker 'Carbon Taxes and Carbon Emissions Trading' (2001) 15 *Journal of Economic Surveys* 325, 329.

⁸⁰ *Ibid* 331.

2008 and 2012 in comparison to their base-year emissions (usually 1990) and were recorded to account for 39 percent of the 2010 global GHG emissions.⁸¹

Although climate change mitigation using carbon taxes came and dominated the international stage through the Kyoto Protocol, the levying of carbon tax began in the early nineties with the Nordic countries of Finland, Sweden, Denmark and the Netherlands.⁸² Finland introduced the first tax on carbon dioxide emissions in 1990 and was followed thereafter by Norway, Sweden and Denmark which introduced carbon taxes in 1991 and 1992. After the Kyoto Convention, several countries and regions including Australia and British Columbia introduced domestic carbon taxes and energy taxes to achieve their emissions reduction targets. Below, I discuss the implementation of carbon taxes in British Columbia, Canada and in Australia. These two countries are used as examples as the carbon tax in British Columbia has been regarded as progressive and has received wide acceptance compared to the tax in Australia where it was politically unpopular. The operation of the carbon tax in these countries highlights the social, economic and political challenges of introducing a carbon tax.

2.5.1 Canada's British Columbia

On December 17, 2002, Canada ratified the Kyoto Protocol thereby committing itself to reducing its GHG emissions by 6 percent from the 1990 level of 599 million tonnes of carbon dioxide emitted.⁸³ In 2008, British Columbia adopted the most progressive policy on climate change in Canada by proposing to introduce a consumption-based carbon tax of 10 dollars per tonne of carbon dioxide emitted.⁸⁴ It further proposed that the consumption-based carbon tax would rise to 30 dollars per tonne by 2012.⁸⁵ The carbon tax in British Columbia is not a tax on all GHG emissions but it is a tax on “emissions from the combustion of fossil fuels and other specified combustibles.”⁸⁶ British Columbia's carbon tax has been hailed as an

⁸¹ I Shishlov *et al* 'Compliance of the Parties to the Kyoto Protocol in the First Commitment Period' (2016) 16 *Climate Policy* 768, 769.

⁸² Z Mingxi 'CGE Simulation for Levying Carbon Tax in China and International Experience of Levying Carbon Tax' (2011) 9 *Chinese Journal of Population Resources and Environment* 84, 88.

⁸³ DG Duff 'Carbon Taxation in British Columbia' (2009) 10 *Vermont Journal of Environmental Law* 87, 88. It should be noted here that Canada later withdrew from the Kyoto Protocol in 2011.

⁸⁴ AG Bumpus 'Firm Responses to a Carbon Price: Corporate Decision Making Under British Columbia's Carbon Tax' (2015) 15 *Climate Policy* 475, 481.

⁸⁵ Duff (note 83 above) 91.

⁸⁶ *Ibid* 92.

environmental and economic success and thus far no significant negative impacts have been thoroughly recorded since the inception of the tax.⁸⁷

The data on the British Columbian carbon tax indicates that revenue collected has largely contributed to the lowering of other taxes in the province such as business and individual taxes.⁸⁸ In terms of its environmental impact, the data collected by Elgie and McClay shows that British Columbia's GHG emissions linked to the carbon taxed fuels declined by a considerable 10.0 percent.⁸⁹ However, others such as Komanoff and Gordon state that per capita GHG emissions were lower in both Canada and British Columbia in the pre-tax year than in the with-tax year.⁹⁰ They report further that in 2012 and 2013, the GHG's emitted were 3, 3 percent greater than in the lowest-emissions year, 2010.⁹¹ Komanoff and Gordon attribute the increase in GHG's to the economic recovery which is shown by the minuscule rise in the British Columbia emissions per unit of Gross Domestic Product (GDP).

When the carbon tax was introduced, the prediction was that it would negatively affect British Columbia's economic growth. However, since the carbon tax was introduced, British Columbia's per capita GDP has grown by 1.75 percent as opposed to 1.28 percent thus British Columbia's per capita GDP has improved compared to the rest of Canada.⁹² This economic growth has been credited to the use of carbon taxes to lower personal and corporate income taxes.⁹³ In Elgie and McClays view, the per capita GDP growth cannot be entirely attributed to carbon taxes which contribute a small fraction to economic growth. Rather than stating that carbon tax has had a positive impact on economic growth, it would be more appropriate to state that the carbon tax has had no negative impact to British Columbia's economic growth.

⁸⁷ Pembina Institute 'Backgrounder: The B.C. Carbon Tax,' available at <https://www.pembina.org/pub/the-bc-carbon-tax>, accessed 28 April 2016.

⁸⁸ Bumpus (note 84 above) 481.

⁸⁹ S Elgie & J McClay 'BC's Carbon Tax Shift After five years: Results An Environmental (and Economic) Success Story' available at http://www.energyindependentvt.org/wp-content/uploads/2014/11/BC_Carbon-Tax-success-story.pdf, accessed on 28 April 2016.

⁹⁰ C Komanoff & M Gordon 'British Columbia's Carbon Tax: By the Numbers. Carbon Tax Center Report <http://www.carbon-tax.org/blogarchives/2015/12/17/british-columbias-carbon-tax-by-the-numbers/>, accessed on 27 April 2016.

⁹¹ *Ibid* 10.

⁹² Pembina Institute (note 87 above) 2.

⁹³ *Ibid* 2.

Despite the inconsistencies in the data collected to measure the carbon tax impacts in British Columbia, its carbon tax remains highly esteemed as an environmental and economic policy success.⁹⁴

2.5.2 Australia

Australia introduced a carbon tax in 2012 at an initial rate of twenty-three Australian dollars (AU\$23) per t/CO² emitted on specified fossil fuels as its central climate policy instrument and from its introduction, the tax on carbon was politically unpopular. The carbon tax applied to a threshold of 25,000 tonnes of carbon dioxide emitted and to carbon dioxide, methane, perfluorocarbons from aluminum smelting and N₂O emissions.⁹⁵ In the two-year period when the carbon tax was in effect, Australia had an 8.2 percent total GHG decline and AU\$6.6 billion was raised by the tax in its first year and it was projected to raise more than AU\$7 billion in its second year.⁹⁶

Despite these indicators, the carbon tax was repealed in June 2014 due to its political unpopularity as the ruling party claimed that the cost of the tax was passed on to consumers in the form of higher prices on goods.⁹⁷ This argument was however illogical considering that part of the costs of climate change had been borne by communities rather than the polluters who have continued to make huge profits.⁹⁸

2.6 Conclusion

There was consensus on the need for mitigation policy that encourages the reduction of GHG's globally hence the international community gathered in Kyoto to forge a legally binding document or instrument that achieves this. Although progressive, the Kyoto Protocol did not fulfil its objective of introducing an international legally binding instrument to reduce atmospheric GHG's and thus it was no surprise that emissions continued to rise during and after the Protocol was effective. Countries jumped onto the emissions reduction bandwagon and this saw many countries introducing taxes or cap-and-trade instruments for the reduction

⁹⁴ *Ibid* 2.

⁹⁵ A Robson 'Australia's Carbon Tax: An Economic Evaluation' (2014) 34 *Economic Affairs* 35, 37.

⁹⁶ K Chan 'Don't Forget the Weather in the Axing of the Carbon Tax in Australia' (2015) 6 *Carbon Management* 63, 65.

⁹⁷ *Ibid* 64.

⁹⁸ See distributional impacts of carbon taxes discussed in chapter 2.

of GHG emissions. Some of the countries gained positive results from the introduction of such instruments. However, these instruments were politically unpopular in some countries where the argument was that the costs of mitigating fell on the consumers rather than the polluters as the costs of production were transferred from the manufacturer to the consumer. Despite the outcome of the various mitigation instruments, the mitigation of climate change remains popular on the global environmental agenda. Nonetheless, it must be considered that the use of economic instruments to reduce GHG's raises complex economic issues such as distributional impacts, competitiveness, increased unemployment, the revenue-recycling effect, and the tax-interaction effect. Further to this, the double-dividend hypothesis has attempted to categorise the benefits of carbon tax into two, which is environmental effectiveness and economic efficiency. The next chapter shall address the above issues that are brought up by the use of economic instruments to mitigate climate change.

CHAPTER 3: COMPLEXITIES OF THE ECONOMICS OF CLIMATE CHANGE

3.1 Chapter Objective

The chapter will analyse the arguments around the use of economic instruments to address climate change mitigation. Further an analysis of the double-dividend hypothesis put forward by economists who view environmental taxes as having environmental and economic benefits will be analysed with the aim of contributing to the debate between environmental tax sceptics and economists.

3.2 The Climate Change Mitigation Debate

The international climate change debate has been around for centuries and central to this debate was the classification of the climate change problem as either an environmental concern to be solved through technological advancements or as an enviro-economic issue⁹⁹ to be addressed through economic models and market-based instruments. Significant to this research is the use of the market-based or economic instruments to find a solution to an environmental problem hence the introduction of carbon taxes as domestic policies to support the Kyoto Protocol's innovative international mechanism to reduce GHG emissions.¹⁰⁰

3.3 The Economics of Climate Change Mitigation Policy

*"Economics has much to say about climate change."*¹⁰¹

Economics has been considered as key for the assessment and management of climate change risks and for the design of domestic and international responses for carbon emissions reduction.¹⁰² The view is that economic policy must intervene because externalities associated with human induced climate change are not automatically amended by specific institutions or markets.¹⁰³ The climate change problem is seen to have a distinct character and has been phrased as the greatest market failure of the century¹⁰⁴ thus addressing it would require a field

⁹⁹ Hey (note 39 above) 76.

¹⁰⁰ Baranzini *et al* (note 9 above) 396.

¹⁰¹ N Stern *The Economics of Climate Change: The Stern Review* 1 ed (2007), 2.

¹⁰² *Ibid* xiii.

¹⁰³ *Ibid* 27.

¹⁰⁴ B Andrew 'Market Failure, Government Failure and Externalities in Climate Change Mitigation: The Case for a Carbon Tax' (2008) 28 *Public Administration and Development* 393, 394.

with a ‘unique focus’ such as economics.¹⁰⁵ The adoption of economic instruments by the Kyoto Protocol was a demonstration that the solution to climate change may lie with economic instruments hence the climate change problem was modelled as an enviro-economic issue from that point on.

Although it appears that economic climate change mitigation policy instruments are favoured as the potential drivers of low-carbon economies, it is maintained that policy continuously evolves and is frequently contested.¹⁰⁶ For this reason, economics does matter in responding to climate change but the necessity of environmental, socio-economic and political instruments in climate change responses cannot be side-lined.¹⁰⁷ The broader debate would be that responses to climate change in the form of economic policy instruments need to have a holistic approach that is not purely economy or market-based. The role of economic instruments in mitigating against climate change is appreciated but ethical perspectives such as equity, justice, freedoms and rights need to be considered.¹⁰⁸ Economic instruments that mitigate against climate change may prove effective in the long term but it is recommended that they operate within the political economy of governments to guard against regressive and ‘out of touch’ environmental policy.

3.3.1 The use of market-based instruments

The climate change mitigation policy debate has been centred around market-based instruments which have been viewed as potentially effective in addressing climate change. The use of markets has been perceived as the ‘best means of allocating finite resources without unnecessary waste, while keeping as many people happy.’¹⁰⁹ Market-based policy instruments are viewed as regulations which if well designed and implemented have the ability to ‘encourage behaviour through market signals rather than through explicit directives regarding pollution control levels or methods.’¹¹⁰ With market-based instruments, individuals and firms

¹⁰⁵ LH Goulder & WA Pizer ‘The Economics of Climate Change’ *Resources for the Future Discussion Paper* available at <http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-DP-06-06.pdf>, accessed on 4 May 2015.

¹⁰⁶ E Tyler ‘Aligning South African Energy and Climate Change Mitigation Policy’ (2010) 10 *Climate Policy* 575, 576.

¹⁰⁷ Mbadlanyana (note 3 above) 83.

¹⁰⁸ Stern (note 101 above) 3.

¹⁰⁹ Tickell (note 1 above) 9.

¹¹⁰ Stavins (note 6 above) 357.

can undertake efforts to control pollutions which would be in their interest and which meet policy goals collectively.¹¹¹ Such an instrument can influence the behaviour of producers and consumers when they are decision-making. Therefore, even though economists regard taxes as distortionary, environmental taxes have found favour in that they seek to correct market failures such as climate change rather than share in the distortions resonating with other taxes.¹¹²

From the discussion above, the idea is that climate change mitigation policies ought to be centred on economic instruments as they can lead to less carbon intensive goods and services by introducing structural changes within economies.¹¹³ Apart from the several advantages such as revenue neutrality and recycling purported to resonate with environmental taxes, there is a strong proposition among enviro-economists that environmental taxes can yield what is referred to as a double-dividend hypothesis. It is within this hypothesis that advocates of environmental taxes find their justification for economics having much to say about climate change.

3.3.2 The Double-Dividend Hypothesis

The question of benefits attached to environmental taxes is a recurring discussion in climate change mitigation policy. Generally, the double-dividend hypothesis suggests that there are environmental and economic benefits attached to the use of environmental taxes in mitigating against climate change.¹¹⁴ The stronger double-dividend hypothesis argument suggests that introducing an environmental tax results in the improvement of the environment through the reduction of pollution and distortionary taxes leading to reduced overall economic cost of taxes.¹¹⁵ The weaker double-dividend hypothesis argument suggests that an environmental tax can reduce pollution as well as produce net economic gains for society leading to an improvement in economic efficiency.¹¹⁶ The possibility of this occurring will depend upon the

¹¹¹ *Ibid* 358.

¹¹² H Winkler & A Marquard 'Analysis of the Economic Implications of a Carbon Tax' (2011) 22 *Journal of Energy in Southern Africa* 55, 56.

¹¹³ B Cloete & G Robb 'Carbon Pricing and Industrial Policy in South Africa' (2010) 10 *Climate Policy* 494, 494.

¹¹⁴ Fullerton & Metcalfe (note 11 above) 221.

¹¹⁵ Baranzini et al (note 8 above) 401.

¹¹⁶ I Parry 'Revenue Recycling and the Costs of Reducing Carbon Emissions' Climate Issues Brief June 1997 available at <http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-CCIB-02.pdf>, accessed on 5 July 2016.

benefits from the revenue-recycling effect outweighing the costs incurred by energy-intensive industries likely to be affected by the environmental tax.¹¹⁷

3.3.3 Revenue- Recycling Effect

Environmental taxes are understood to lead to revenue recycling because they are seen to decrease economic costs related with the tax system¹¹⁸ as tax revenues collected could assist in cutting distortionary taxes (referred to as ‘revenue neutrality’)¹¹⁹ thereby preventing the tax-interaction effect. The tax-interaction effect occurs when a policy or regulation raises the costs of production output for firms and lowers the levels of employment and investment in the economy thus multiplying the distortions created by the tax system.¹²⁰ Taxing the carbon content of fossil fuels ‘drives up the cost to firms of producing electricity and gasoline, which tends to reduce the overall level of employment in the economy.’¹²¹ The weaker notion of the double-dividend hypothesis is validated by economists who state that revenue recycling lowers the net cost of a carbon tax.

It would not be desirable that the revenues from the environmental taxes is absorbed into government’s general spending programme and budgetary process rather than being redistributed or recycled.¹²² It would be progressive if the taxes create revenue streams for governments which can be used to invest in further pollution controls, energy efficiency and new forms of energy and decrease of other taxes over time.

3.3.4 Other Benefits of Environmental Taxes

Industries which are the main culprits behind high carbon emissions do not bear the costs of their production as this cost burden is shifted onto the community.¹²³ Collective action led by government is necessary as there is no market incentive for firms and households to lower emissions and protect the environment.¹²⁴ Thus the introduction of an environmental tax by

¹¹⁷ *Ibid* 3.

¹¹⁸ *Ibid* 3.

¹¹⁹ Baranzini *et al* (note 8 above) 400.

¹²⁰ Parry (note 116 above) 4.

¹²¹ *Ibid* 3.

¹²² Baranzini *et al* (note 8 above) 400.

¹²³ *Ibid* 395.

¹²⁴ OECD ‘Environmental Taxation A Guide for Policy Makers’ available at <https://www.oecd.org/env/tools-evaluation/48164926.pdf>, accessed 5 June 2016.

government would direct the costs to the polluter and address the climate change problem which is the biggest market failure of our time.

To guide environmental policy, the Organisation for Economic Co-Operation and Development (OECD) highlights the following as benefits of environmental taxes:

- Taxes directly address the market failure by “pricing in” environmental costs;
- Taxes leave consumers and businesses with flexibility to determine the least-cost way to reduce the environmental damage;
- Ongoing incentive to abate;
- Improves competitiveness of low-emission alternatives;
- Strong incentive to innovate;
- Cost certainty vs. environmental certainty;
- Transparency.¹²⁵

3.4 Sceptics of Environmental Taxes

*“As usual in economics, closer inspection reveals that there are no free lunches.”*¹²⁶

In making a case against the use of the market to lower emissions through environmental taxes some environmental sceptics have stated that the possibility of developing a perfect market that shall contribute to the reduction of carbon emissions is wishful because carbon tax as a market-based instrument is uncertain and so will be the long term consequences.¹²⁷ Arguments have been made against the hypothesis that environmental taxes can yield environmental and economic benefits and also that the introduction of an environmental tax is likely to decrease the costs of a tax system through the revenue recycling effect. Also, there has been strong opposition to the use of environmental tax instruments due to the conjectured distributional impacts they come with.

3.4.1 Criticism of the Double-Dividend Hypothesis

It is put forward that there can never be a double-dividend with environmental taxes if the tax system is fully efficient, that is if the structure of the tax system could not be altered to lower

¹²⁵ *Ibid* 2.

¹²⁶ *Ibid* 4.

¹²⁷ Andrew (note 104 above) 394.

the economic costs of the tax system for a given amount of revenue raised.¹²⁸ Thus for the double-dividend to be realised, there must be existing distortions in the market or tax system such that upon the introduction of an environmental tax, a strong double-dividend and efficiency gradient is activated resulting in the increase of environmental quality and income.¹²⁹

There is no real evidence or data that supports the argument that there are environmental benefits attached to environmental taxes thus its impact on climate change mitigation is uncertain. The difficulty in the valuation of the environmental benefits as well as that of benefits realised from carbon abatement have led the mitigation debate towards the economic double-dividend instead.¹³⁰ The introduction of environmental taxes found favour through the strategic shift from the valuation of environmental benefits to the strong economic double-dividend which leads to higher employment, revenue-recycling and higher GDP.¹³¹ The failure of market-based instruments and the double-dividend hypothesis is apparent in that there has been no reduction in GHG post-Kyoto Protocol even in those countries that introduced variants of the tax system.¹³² From this, it is clear that market-based instruments appear to not have practically impacted climate change as envisioned.

Per some sceptics, the ‘double-dividend hypothesis’ disregards the tax interaction effect.¹³³ Environmental taxes raise the costs of production and negatively impacts employment and investment opportunities. Unfortunately, these negative impacts are not fully off-set using environmental taxes to reduce other taxes meaning that the tax-interaction effect dominates the revenue-recycling effect. Therefore, the environmental tax shares in and multiplies in the distortions of the tax system as it is posited that an environmental tax is not sufficient in lowering other distortionary taxes.

3.4.2 Criticism of Revenue-Recycling Effect

The biggest criticism against environmental taxes revenue recycling is that the revenue collected from such taxes will be absorbed into government spending¹³⁴ and will not be directed

¹²⁸ Parry (note 116 above) 5.

¹²⁹ J van Heerden *et al* ‘Searching for Triple Dividends in South Africa: Fighting CO2 pollution and Poverty while Promoting Growth’ (2006) 27 *The Energy Journal* 113, 116.

¹³⁰ Baranzini *et al* (note 8 above) 401.

¹³¹ *Ibid* 401.

¹³² See chapter 2 for a discussion on introduction of environmental taxes in other jurisdictions.

¹³³ Parry (note 116 above) 4.

¹³⁴ Baranzini *et al* (note 8 above) 399.

towards clean-energy investments, environmental community programmes or assist in cushioning against the effects of climate change.

In addition, per some critics, the tax will increase the costs of production and that of the tax system rather than decrease them because of pre-existing distortions created by the tax system which increase the overall costs.¹³⁵ Due to its narrow tax base, environmental taxes are seen to be distortionary because the narrower the base, the more distortionary the tax.¹³⁶ Thus, it would appear superficial to argue that environmental taxes can produce a revenue-recycling effect through the reduction of distortionary taxes when it is distortionary due to its narrow tax base.

3.4.3 Distributional Impacts of Environmental Taxes

Environmental taxes are argued to be cost-effective instruments but the distribution of their costs has been a source of debate. Environmental taxes are said to have a trickle-down effect (distributional impact) because costs of introducing the taxes are transferred from the energy producers to the manufacturers to the consumers. Baranzini states that the distributional impacts can be measured between different households as follows:

- ‘households over different income groups;
- different household types;
- rural and urban households;
- different generations and;
- different income groups.’¹³⁷

It is further stated that the analysis of the distributional impacts of a carbon tax is complex. The following four factors are suggested for the analysis of the distributional impact of carbon taxes:

- ‘Households’ expenditure structure’, which includes the purchase of energy directly but also the purchase of goods, the production of which has entailed the use of energy;
- ‘Who will effectively bear the burden of the tax’;
- ‘The distribution of benefits from improved environment quality’;

¹³⁵ Parry (note 33 above) 4.

¹³⁶ *Ibid* 4.

¹³⁷ Baranzini *et al* (note 8 above) 401.

- ‘The use of the fiscal revenues generated from a carbon tax’ could ‘ex-post’ reduce the eventual regressive impacts.”¹³⁸

Climate change involves externalities meaning that the agent responsible for the emissions does not bear the cost of the damages caused by GHG emissions as these are shifted to the community.¹³⁹ What is agreeable among economists is that somebody has to be held responsible for the large externalities associated with climate change and it is unrealistic to expect the poor who contribute least to the problem to assume the burden of this catastrophic market failure. Therefore, the cost of introducing an environmental tax must be borne largely by the polluter and the costs must not be transferred to the consumers through higher prices for energy and products.

3.5 Conclusion

To conclude, it has been reasoned that the impacts of carbon tax can never be accurately determined as introducing an environmental tax is not a complete solution to mitigate against climate change because any reform must go further and state the role of the environmental tax in the economy.¹⁴⁰ It has to be questioned whether the tax will be added to existing regulatory restrictions, how the revenue will be collected and used or whether the revenue will go towards a specific tax reduction or whether the revenue will go towards a specific spending programme.¹⁴¹ The use of the market to mitigate against climate change has found support and it is proposed that when it comes to allocating scarce resources, markets operate efficiently when compared to instruments such as cap-and-trade.¹⁴² It can however not be negated that the use of markets to address climate change will require a more ‘today’ kind of approach where Governments set realistic targets that will not burden developing economies¹⁴³ and the positive environmental impacts are recorded.

Therefore, regard must be given to the design and scope of the carbon tax as proposed by the South African National Treasury. To suggest a way forward for use of a carbon tax as an

¹³⁸ *Ibid* 401.

¹³⁹ Stern (note 40 above) 4.

¹⁴⁰ Fullerton & Metcalfe (note 11 above) 221.

¹⁴¹ *Ibid* 221.

¹⁴² Baranzini *et al* (note 8 above) 395.

¹⁴³ P Bond ‘Market failure at Durban's Climate Summit’ (2012) 94 *SA Geographical Journal* 89, 97.

instrument to mitigate climate change in South Africa will require an analysis of the economic and environmental impacts (double-dividend hypothesis) of a carbon tax draft legislation in South Africa, which plans to introduce the tax in 2017. In this light, the next chapter will discuss the implementation of carbon taxes in South Africa with the aim of engaging the discussions put forward in this chapter for and against the introduction of carbon taxes as a climate change mitigation instrument.

CHAPTER 4: INTRODUCTION OF A CARBON TAX IN SOUTH AFRICA

4.1 Chapter Objective

This chapter considers the national climate change mitigation policy in South Africa to highlight not only the reason for introducing a carbon tax but some of the challenges that may be faced by its introduction. Further, the chapter will look at some of the mitigation strategies introduced prior to the proposed carbon tax. Finally, the chapter will analyse the arguments around the introduction of a carbon tax in South Africa and ultimately an analysis of the carbon tax bill shall be made.

4.2 Energy Use and Carbon Emissions in South Africa

In 2010, the UNFCCC Secretariat was informed at the conference in Copenhagen by the South African government that it would take appropriate domestic mitigation action to allow a 34 percent deviation below the ‘business-as-usual’ (BAU) emissions growth trajectory by the year 2020 and a 42 percent deviation below the BAU emissions growth trajectory by the year 2025.¹⁴⁴ However, South Africa’s commitment was made on the basis that developed countries would make adequate provision for financial, technological and capacity-building support.¹⁴⁵ The 2011 National Climate Change Response White Paper drafted by the Department of Environmental Affairs (DEA) was a direct response to the commitment taken by South Africa. With this commitment to achieving a deviation below the ‘business-as-usual’, South Africa moved the debate from *whether* to reduce GHG emissions to *how* to achieve the pledged 2020 and 2025 deviation targets.¹⁴⁶ Regardless of the shift in the climate policy debate in South Africa, the government has to consider the reality that the country is among the world’s most carbon-intensive economies¹⁴⁷ largely due to the historical development around the mineral-energy complex that fuels the economy through energy-intensive industrial development.¹⁴⁸

¹⁴⁴ H Winkler *et al* ‘Carbon Taxes and Emissions Trading Schemes: Structuring Approaches to Pricing Carbon in Energy- and Trade-Intensive Sectors: Options for South Africa’ available at http://dspace.africaportal.org/jspui/bitstream/123456789/33712/1/10Winkler-et-al_ERC_Conference_Proceedings.pdf?1, accessed on 15 April 2015.

¹⁴⁵ *Ibid* 128

¹⁴⁶ *Ibid* 128.

¹⁴⁷ T Alton *et al* ‘Introducing Carbon Taxes in South Africa’ (2014) 116 *Applied Energy* 344, 344.

¹⁴⁸ Winkler *et al* (note 144 above) 128.

Carbon intensity is relatively high in South Africa because of its heavy energy use and reliance on coal as the major energy resource.¹⁴⁹ Over 90 percent of the electricity in the country has been generated from coal-based power plants and this demonstrates the over-reliance on coal for the generation of electricity.¹⁵⁰ One of the results of the combustion of fossil fuels such as coal is the increase in atmospheric GHG which are the major contributors of climate change. It is indefensible that the energy sector in the country generates 87 percent of the CO₂, 94 percent of the N₂O and 96 percent of the sulphur oxides in the atmosphere.¹⁵¹ It thus comes as no wonder that South Africa is in the top twenty carbon emitters in the world due to its energy intensive industries that rely largely on coal usage¹⁵² and that carbon dioxide emissions have multiplied five-fold since 1950.¹⁵³ The South African government is therefore faced with a task to not only design and implement a carbon tax which is effective but also to strike a balance between energy, environmental goals and sustainable development.¹⁵⁴ In this light, the government has attempted to redress the issue of its carbon footprint through various policy actions and strategies discussed below.

4.3 Development of South African Climate Mitigation Policy

South Africa faces a challenge with climate mitigation as the economy is heavily reliant on the minerals-energy complex which has consequently led to the high carbon emissions dilemma the country finds itself in. The Government needs to develop energy planning, industrial policy and other policy strategies that will change the generation and consumption of energy by putting a price on externalities to facilitate the efficient allocation of resources and adjustment of behaviour.¹⁵⁵ A range of policy frameworks to lower GHG emissions have been introduced by government and these are a reaffirmation of the country's commitment to the global management of climate change as it is a signatory of the UNFCCC and the Kyoto Protocol.

¹⁴⁹S Devarajan S 'Tax Policy to Reduce Carbon Emissions in South Africa' available at <http://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-4933>, accessed on 22 April 2016.

¹⁵⁰ Winkler *et al* (note 144 above) 130.

¹⁵¹ P Bond 'Dirty Politics: South African Energy' in P Bond *et al* (eds) *Climate Change, Carbon Trading and Civil Society: Negative Returns on South African Investments* (2007) 12, 13.

¹⁵² Alton *et al* (note 147 above) 346.

¹⁵³ Bond (note 151 above) 14.

¹⁵⁴ Alton *et al* (note 147 above) 344.

¹⁵⁵ S Vorster *et al* 'Mitigating Climate Change Through Carbon Pricing: An Emerging Policy Debate in South Africa' (2011) 3 *Climate and Development* 242, 243.

4.3.1 Long Term Mitigation Scenarios (LTMS) for South Africa

The LTMS were undertaken as a course of action to address the challenge of lowering GHG emissions as agreed to in 2005 at the consultative conference on climate change.¹⁵⁶ In the field of mitigation, the LTMS were unique in that the research flowed into the stakeholder process that consequently produced evidence-based scenarios.¹⁵⁷ The process was based on scenarios which are “active options for future paths seen against growth and emissions.”¹⁵⁸ The LTMS research consisted of four research teams focusing on energy, industrial process emissions, economy-wide impacts and non-energy emissions in waste, agriculture and forestry.¹⁵⁹ The LTMS research findings influenced the formal policy development process at the Climate Change Summit in 2009 and it was agreed that the process should be complemented by the introduction of legislative, regulatory and fiscal packages that would make effective the strategic direction and policy by 2012.¹⁶⁰

The key scenarios under the LTMS were the Growth without Constraints (GWC) and the Required by Science (RBS) scenarios. There was a huge gap between the research results of the two scenarios regarding the impacts of climate change if steps are taken and if no steps are taken at all. The process showed that if South Africa followed the GWC scenario, GHG emissions would quadruple by 2050 and this was a high-risk path that would lead to carbon constraints in trade, advanced impacts and increase in oil prices.¹⁶¹ Clearly, the GWC scenario had unfavourable outcomes leaving the RBS scenario as the best alternative to curbing GHG emissions and leading the country towards a sustainable development path.

In the LTMS process the use of economic instruments was part of the “use the market” strategic option which stressed the use of incentives and taxes to make the market work in order to direct the use of mitigation technologies and social behaviour to lower the level of emissions.¹⁶² Central to the “use the market” strategic option was the escalating carbon dioxide tax whose main focus was to foresee the slowing and lowering of GHG emissions and ultimately direct

¹⁵⁶ Winkler (note 14 above) 1.

¹⁵⁷ *Ibid* 2

¹⁵⁸ Department of Environment Affairs and Tourism’s Long Term Mitigation Scenarios: Scenario Document (2007).

¹⁵⁹ Winkler (note 14 above) 3.

¹⁶⁰ *Ibid* 5.

¹⁶¹ *Ibid* 200.

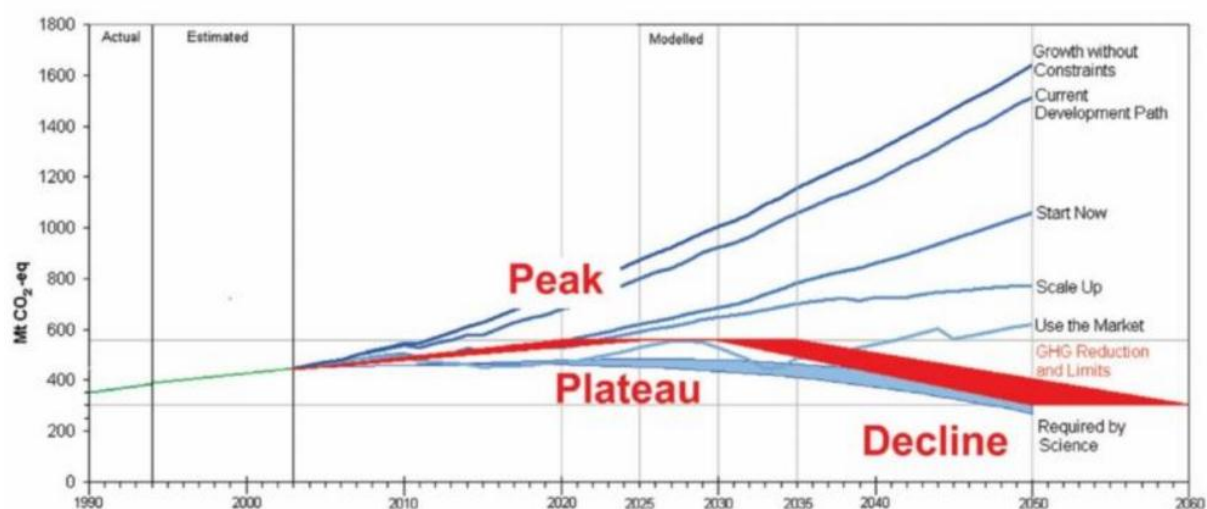
¹⁶² *Ibid* 161.

electricity supply from coal to other energy sources such as nuclear that make less of an atmospheric mess through high GHG emissions. According to the scenario, the tax rate would start at R100 per tonne of CO₂ emissions and rise to R250 by 2020. The tax rate would be kept constant for a decade and then it will rise “sharply in a phase of absolute emission reductions.”¹⁶³ This scenario was thus focused on climate change mitigation through economic instruments like an escalating tax on carbon dioxide emissions from energy.¹⁶⁴

4.3.2 “Peak, Plateau and Decline” Trajectory (PPD)

The Government’s response to the LTMS was the “peak, plateau and decline” (PPD) trajectory which was the form and shape of the climate change mitigation strategies and actions to be followed by South Africa.¹⁶⁵

Figure 4 LTMS and the Peak, Plateau and Decline Emissions Trajectory



Source: Tyler, 2010.¹⁶⁶

Per the peak, plateau and decline trajectory which is the red shaded band in the graph, absolute emissions peak in the 2020 to 2025 period. The emissions will then plateau in the period up to

¹⁶³ *Ibid* 129.

¹⁶⁴ *Ibid* 126-127.

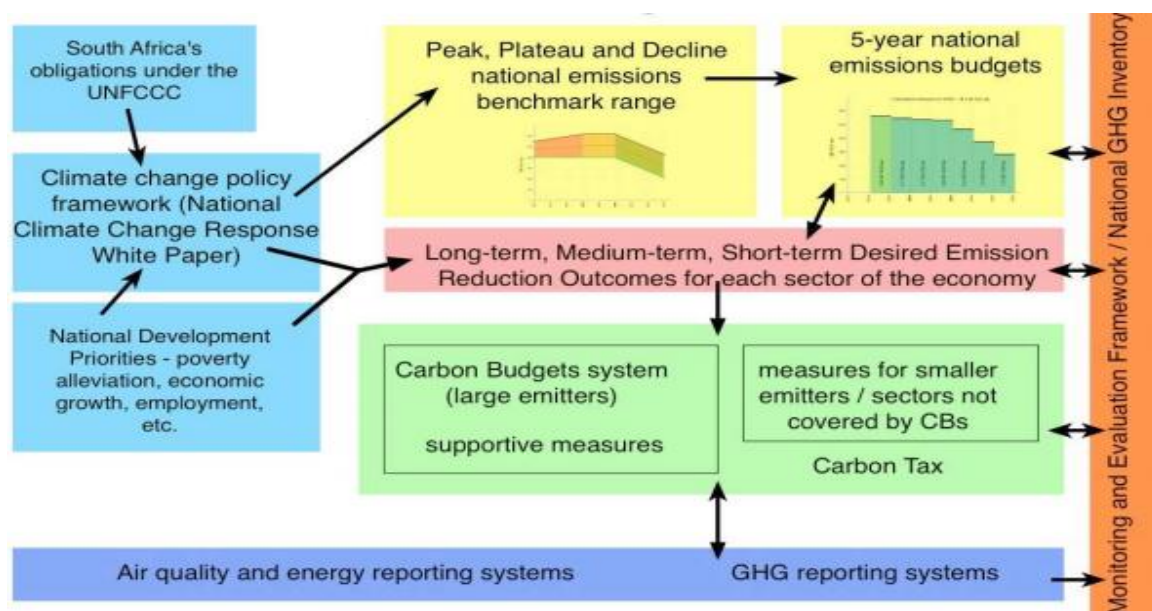
¹⁶⁵ Technical background document, mitigation component of INDC available at http://www.erc.uct.ac.za/sites/default/files/image_tool/images/119/Papers-2015/15-ERC_Technical_background_INDC_0.pdf, accessed on 2 October 2016.

¹⁶⁶ Tyler (note 106 above) 578.

2035 before declining in absolute terms from 2035 in order to reach the 2050 emissions target identified under the RBS LTMS scenario.

4.3.3 Summary of South Africa's Mitigation Process

Figure 4.1 Mitigation Process, South Africa



Source: Energy Research Centre, 2015.¹⁶⁷

4.3.4 Draft Carbon Tax Bill

The National Treasury released the Carbon Tax Bill on 2 November 2015 for public comment. South Africa is committed to reducing GHG emissions below BAU trajectory by 34 per cent by 2020 and 42 per cent by 2025 and the Bill reflects that commitment. The preamble to the draft Carbon Tax Bill states that there is a need to:

‘stabilise greenhouse gas concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner’¹⁶⁸

The preamble to the Bill further states that the costs of remedying the pollution must be borne by the polluter (polluter pays principle) and that the use of several economic instruments shall assist in the emissions reduction target and nudge the towards efficient energy use and sustainable growth. The proposed carbon tax primarily covers fossil-fuel combustion emissions

¹⁶⁷ *Ibid* 3.

¹⁶⁸ Preamble to the Draft Carbon Tax Bill, 2015.

and this means that the electricity, manufacturing and mining industries are going to be affected by the proposed legislation.

The tax in the draft Bill is set at an initial marginal rate of R120 per tonne of CO₂. The tax is set to come into operation on 1 January 2017. However, in its First Interim Report on Carbon Tax, the Davis Tax Committee proposed that in the first year of its implementation, taxpayers in terms of the proposed Carbon Tax Act should not incur any tax liability (zero liability) but rather affected taxpayers must submit tax returns to the National Treasury so that the information can be used to test the impact of the proposed tax using modelling.

Main Design Features of the Carbon Tax

- Basic 60 percent tax-free threshold in the first phase of the carbon tax;
- 10 percent tax-free allowance for process emissions;
- Up to 10 percent tax-free allowance for trade exposed industries;
- 5 to 10 percent carbon offsets tax-free allowance;
- 5 per cent tax-free allowance for companies participating in phase 1 (up to 2020) of the carbon budgeting system;
- The total allowances and reduction above may not exceed 95 percent of the total GHG emissions of the taxpayer.¹⁶⁹

Pollution taxes and emissions trading schemes are two mechanisms common to market-based instruments but the pollution or carbon tax offers a variety of options for the reduction of carbon emissions.¹⁷⁰ The tax could be imposed on oil company profits or on fossil fuels as they are dug up from the ground. Pollution taxes are viewed as progressive in that optimum levels of pollution can be set by the government and then a tax is set accordingly.¹⁷¹

4.4 Key Issues of a Carbon Tax in South Africa

The balancing of green initiatives with continued economic growth for the redress of poverty and unemployment is high on the South African agenda.¹⁷² Government does accept that the

¹⁶⁹ Draft Carbon Tax Bill Released: South Africa Moves to Reduce Greenhouse Gas Emissions available at <http://www2.deloitte.com/za/en/footerlinks/pressreleasespage/carbon-tax-bill.html>, accessed on 7 October 2016.

¹⁷⁰ Layfield (note 47 above) 904.

¹⁷¹ *Ibid* 904.

¹⁷² C Lewis 'How South Africa's Proposed Carbon Tax Will Affect Business' (2012) 23 *International Tax Review* 53, 53.

continued growth of GHG emissions is costly to society and that the reduction of these emissions will prove beneficial to not only businesses but the wider population¹⁷³ who are affected by climate change the most due to for example, changes in weather patterns. Structural changes in the South African economy are likely to be triggered by economic instruments as they encourage lower-carbon industries over high emitting, energy-intensive sectors. It is therefore important to consider several key issues that may be triggered by the introduction of a carbon tax in South Africa such as rising costs in the energy sector, rise in unemployment levels, decrease in industrial competitiveness and the impact of the tax on poorer households. An environmental policy or instrument is primarily introduced to enhance environmental performance but it is key that an environmental policy imposes minimal costs to the rest of the economy.¹⁷⁴ The following sections discuss some of the key issues put forward regarding the immediate introduction of the carbon tax in the country.

4.4.1 The State of Energy Policy

South Africa's resolution to use carbon tax as an instrument for reducing GHG emissions has been met with fear and scepticism from the energy-intensive industries who argue that energy generation in South Africa is largely dependent on the use of fossil-fuels thus making it cumbersome to significantly reduce carbon emissions.¹⁷⁵ For the introduction of a carbon tax, certain peculiar traits in the South African economic structure must be observed and considered under any environmental policy and strategy that seeks to realise the reduction of GHG emissions. The country's economy has an energy sector that relies on coal as the primary energy supplier and for the generation of over 90 percent of its electricity which puts the country's carbon emissions between that of upper-middle income and high income countries with 7.4 metric tonnes carbon dioxide per capita.¹⁷⁶ These energy-intensive industries form the core of the South African economy and it is posited that control over the carbon intensity of electricity generation by stakeholders of these industries is relatively small¹⁷⁷ thus the use of

¹⁷³ *Ibid* 53.

¹⁷⁴ JP Clinch 'Environmental Policy Reform in the EU' in G Galli & J Pelkmans (eds) *Regulatory Reform and Competitiveness in Europe: Horizontal Issues* (2000) 203, 225.

¹⁷⁵ Lewis (note 172 above) 53.

¹⁷⁶ van Heerden (note 129 above) 115.

¹⁷⁷ Lewis (note 172 above) 53.

coal as the major fossil fuel makes compliance and adjustment to new less-carbon intensive energy sources difficult and cumbersome for South African industries.

It may appear that stakeholders in the energy-intensive industries are resistant to the introduction of a carbon tax or the lowering of GHG emissions but this is far from the truth as the history of energy policy shows otherwise. The 1998 Energy Policy White Paper is a central instrument that shows the energy sector's commitment to climate mitigation and the reduction of GHG emissions. The five objectives of the paper were:

- “increasing access to affordable energy services;
- improving energy governance,
- stimulating economic development,
- managing energy-related environmental and health impacts;
- securing supply through diversity.”¹⁷⁸

The White Paper was essential to the climate change mitigation policy debate but more necessary to the development of such policies is their practical adoption by the energy sector. Several energy policies such as the 1994 Electrification Programme, Power Conservation Programme (PCP), Carbon Capture and Storage (CCS) and sector planning have been developed over the years to practically apply the White Paper objectives in the energy sector.¹⁷⁹ However, generally, there has been a lack of progress with the energy policy paradigm shift envisioned in the White Paper due to the lack of support from the various institutional levels, planning and policy instruments¹⁸⁰ to fully internalise the negative economic costs of externalities.

4.4.2 Competitiveness

Competitiveness refers to an entity's ability to sell its goods and services domestically or internationally.¹⁸¹ For a firm, competitiveness entails its innate capacity to sustain or strengthen its market shares and profitability on the domestic or international level.¹⁸² Carbon taxes are considered to have a negative effect on the competitiveness of firms as they lead to an increase

¹⁷⁸ Tyler (note 106 above) 579.

¹⁷⁹ *Ibid* 579 ff.

¹⁸⁰ *Ibid* 583.

¹⁸¹ Baranzini *et al* (note 8 above) 401.

¹⁸² *Ibid* 401.

in the costs of production. The increase in the cost structure of a firm due to a carbon tax may potentially lead a firm to react in various ways such as minimising its carbon emissions (dependent upon tax incentives through the tax rate and revenue-recycling), shifting costs of production to consumers through price increases (distributional impacts) or relocation of production to other countries¹⁸³ with lower-carbon production processes or less strict carbon policies. The country's industrial and commercial progress may be held back because of additional expenses arising from compliance and adjustment to the carbon regulations imposed through the tax hence the over stated emphasis that South Africa should focus its resources on socio-economic objectives instead ¹⁸⁴ of environmental concerns.

Further on, a carbon tax in South Africa may lead to increased competitiveness between the firms as they seek untapped wastefulness to offset carbon costs of compliance and adjustment.¹⁸⁵ Moreover, firms are forced by carbon pricing to engage in a process of "self-discovery" which involves looking into the economy to find new investment opportunities in different industries and then undertaking the new opportunities.¹⁸⁶ Therefore, carbon pricing may also increase competitiveness by assisting the "self-discovery" process as firms or industries are coerced into considering the consequences of their economic activities in relation to the costs of their GHG emissions.¹⁸⁷ The ultimate result of "self-discovery" may be reformation of technologies, products and processes that are in line with climate change policy on the reduction of GHG emissions. Thus, the introduction of a tax may yield positive results in that firms become more competitive domestically and internationally as they trade in goods with a smaller carbon-footprint.

Nonetheless, a few factors such as transport costs, investment or trade barriers have a negative effect on competitiveness and thus the effects on competitiveness by environmental regulations is negligible. This argument rests on what is termed the Porter Hypothesis that states that competitive advantage is enhanced rather than hindered by environmental regulation.¹⁸⁸ The hypothesis is supported by empirical evidence from the OECD which confirms that the adverse

¹⁸³ *Ibid* 401.

¹⁸⁴ Lewis (note 172 above) 53.

¹⁸⁵ Cloete & Robb (note 113 above) 501.

¹⁸⁶ *Ibid* 498.

¹⁸⁷ *Ibid* 498.

¹⁸⁸ Clinch (note 174 above) 226.

effects of environmental policy on competitiveness, trade and investments are negligible.¹⁸⁹ However, the data is regarded as severely limited and that the actual impacts of an environmental policy or regulation on competitiveness and economic performance cannot be accurately measured.¹⁹⁰ What remains is that there can be no single contributor that affects a firm's ability to compete domestically and internationally as a number of factors come into play when assessing a firm's competitiveness.

4.4.3 Increase in Unemployment Levels

Carbon taxes allegedly leads to competitiveness and higher levels of production which in turn generates a range of other issues such as a reduction in economic growth, tax revenues and employment.¹⁹¹ Regarding the reduction in employment, the perception is that if firms become more competitive and the costs of production become higher, this will accelerate job losses as firms attempt to adapt to the market.¹⁹² The notion is therefore that carbon taxes fail to support a developing country's objectives which are mainly to improve economic competitiveness, economic growth, poverty reduction, infrastructure development, increasing exports and job creation.¹⁹³ It is advanced further that carbon taxes create labour market distortions in the form of unemployment and in South Africa, unemployment is highly concentrated in low to medium skilled workers who have fixed wages.¹⁹⁴ A tax on carbon comes with structural changes in the economy and in production; these changes are argued to have the potential to produce a 1 percent decrease in employment levels in low-skilled and medium-skilled workers.¹⁹⁵ If certain conditions relating to the tax burden and tax shifting effects exist, an environmental tax may benefit employment by decreasing the tax burden on labour.¹⁹⁶ The tax burden on labour and the externalities of GHG emissions must be shifted away from workers to those responsible for the carbon emissions.

¹⁸⁹ *Ibid* 226.

¹⁹⁰ Jaffe (note 58 above) 158.

¹⁹¹ Cloete & Robb (note 113 above) 501.

¹⁹² *Ibid* 501.

¹⁹³ Mbadlanyana (note 3 above) 88.

¹⁹⁴ Devarajan (note 149 above) 15.

¹⁹⁵ *Ibid* 15.

¹⁹⁶ C Carraro *et al* 'Environmental Taxation and Unemployment: Some Evidence on the 'Double Dividend Hypothesis' (1996) 62 *Journal of Public Economics* 141,146.

4.4.4 The Welfare Economy

A wide range of economic models have been used to assess the impacts of a carbon tax on various households in South Africa. The regressive nature of a carbon tax especially its potentially negative impacts on poorer households can be circumvented through tax subsidies, revenue recycling or the reduction on prices of goods. To address the potential distributional impacts that follow a tax on carbon, revenue collected from the tax must not be used as income and absorbed in government spending but rather it should be recycled to ease the burden of increased energy costs on poorer households through targeted tax relief such as social grants and food subsidies.¹⁹⁷ Introducing a carbon tax in South Africa has a potentially disproportionately negative impact on poorer households in that as the consumers, the cost burden of mitigating against climate change will be shifted to the poor households through increased prices on goods. Therefore, the carbon tax must ensure that the poor households have safety nets such as revenue recycling.

4.5 Conclusion

The introduction of a tax on carbon in South Africa has not found great support especially from the energy intensive industries which rely heavily on coal as a fossil fuel and which is primarily responsible for the high carbon emissions in South Africa. Apart from the carbon tax, there have been attempts to introduce measures to realise the reduction of GHG in the country. However, GHG emissions have continued to rise and if left unmitigated the costs and the effects of climate change could be catastrophic for South Africa especially the poorer communities who are believed to carry the burden of climate change. Further to this, the country needs to follow the trajectories compiled during the LTMS process and try to ensure that the polluter pays for the costs of high carbon emissions so that appropriate strategies and actions to mitigate against climate change are taken. If the revenues from the tax are recycled towards climate mitigation programmes, new technologies and cushioning poorer communities against climate change the carbon tax would be a step in the right direction in mitigating against climate change.

The chapter highlighted some of the key design features of the tax on carbon as provisioned in the Draft Carbon Tax Bill released for public comment and it contains many allowances and reductions to ease the effects of the new tax whilst still being effective in ensuring the reduction

¹⁹⁷ Vorster (note 155 above) 249.

of GHG emissions. In the next chapter, I shall proceed to discuss further the design features of a tax that must be considered in the Draft Carbon Tax Bill with the view to show the practical aspect of compliance with the Carbon Tax should it be introduced in 2017.

CHAPTER 5: RECOMMENDATIONS FOR DESIGNING AN EFFECTIVE CARBON TAX IN SOUTH AFRICA

5.1 Chapter Objective

In this chapter, the design of a carbon tax for South Africa will be discussed. The chapter will look at the policy considerations that should be directing or should have directed the process of designing a carbon tax for South Africa. Further, the chapter shall discuss the South African carbon tax design in light of the ‘double-dividend hypothesis’ which is a standard of weighing benefits attached to environmental taxes. The aim will be to weigh whether policy makers can design an environmental policy that can see the reduction of GHG emissions whilst concurrently promoting an increase in economic growth or efficiency through employment creation or revenue recycling. However, it should be noted that there are arguments that have been advanced against using the double-dividend hypothesis to determine the effectiveness of a carbon tax policy. It is argued that the effectiveness of the tax should not be limited to environmental effectiveness and economic efficiency as the effects of a carbon tax on a country goes beyond the environmental and economic factors. However, I argue that the double-dividend hypothesis is the initial standard by which the carbon tax design should be assessed because environmental effectiveness which translates to the reduction of GHG must be the core motive for an environmental policy and that policy must also ensure continued efficiency in the economy.

5.2 Carbon Tax Policy Design Considerations

The use of taxes to minimize the social costs or burden of pollutions on the greater population has been written and discussed by Pigou in his *Economics of Welfare* but he did not suggest how the tax ought to be designed.¹⁹⁸ The tax on carbon sets a price on CO₂ emissions and is structured to internalize the externalities that relate to anthropogenic climate change.¹⁹⁹ The costs of GHG emissions are thus borne by those who are responsible for the negative consequences of climate change. Inherently, all carbon taxes have this general purpose to internalize externalities but the policy goals of a jurisdiction determine the type of a carbon tax policy to be designed. The environmental policy goals of a jurisdiction may be for example to raise revenues for carbon mitigation programme funding or to cater for the environmentally

¹⁹⁸ GE Metcalfe & D Weisbach ‘The Design of a Carbon Tax’ (2009) 33 *Harvard Environmental Law Review*. 499, 500

¹⁹⁹ *Ibid* 500

vulnerable areas. In implementing carbon tax, the following policy design considerations should be taken into consideration: the tax base, the tax rate, which sectors are to be taxed, the use of tax revenues, how to guarantee that the tax achieves emissions reduction targets.²⁰⁰

5.2.1 Determining the Tax Base

The tax base refers to the amount on which tax is levied and this involves an enquiry into what is taxable.²⁰¹ To generate sufficient revenue, it is important for Government to define the tax base and widening the tax base will not assist in raising sufficient revenue if adequate opportunity for extension is not provided for by the tax base itself.²⁰² Drawing universal definitions or designs that can be used to determine the tax base is a difficult task due to the intricacies that arise in an international tax environment. In taxing carbon emissions, the Government must make a national decision on what fuels or sources of energy will be subject to the carbon tax legislation. Also, the Government must determine which industries shall be exempted from the tax or shall pay lower tax rates.

In designing a carbon tax and determining the tax base, it must be decided whether the tax will be placed on upstream or downstream sources of emissions and the probable outcomes of taxing upstream sources vis-à-vis downstream sources. When taxing upstream sources, there is a guarantee of administrative efficiency in tax collection due to the limited sources or points of collection²⁰³ therefore making the collection of the tax revenue cheap and accurate. Further, the benefit of taxing upstream sources is that any potential sources of GHG emissions for fuel combustion that occurs at a later stage are included thereby taking advantage of all opportunities for carbon emissions abatement such that in the case of South Africa where there are coal-intensive industries, the tax would be levied on coal production at the mine mouth.²⁰⁴ However, when taxes are imposed on downstream sources, such as levying a tax on electricity consumption²⁰⁵ the existence of distributional effects are inarguable as consumers from lower income households who consume the most electricity feel the direct signal of the tax. It is

²⁰⁰ J Sumner *et al* (2011) 'Carbon Taxes: A Review of Experience and Policy Design Considerations' (2011) 11 *Climate Policy* 922, 923 ff.

²⁰¹ AS Silke & M Stiglingh *Silke : South African Income Tax* (2016) 1193.

²⁰² *Ibid* 1193.

²⁰³ Sumner *et al* (note 200 above) 924

²⁰⁴ JE Aldy *et al* 'A Tax-based Approach to Slowing Global Climate Change' *National Tax Journal* 2008 61 493, 505

²⁰⁵ Sumner *et al* (note 200 above) 924

therefore clear that taxing upstream is more favourable than taxing downstream sources because tax collection becomes complex and expensive when the tax base is broad covering many sources of emissions.

It is preferred that a carbon tax should be put directly close to the pollutant or actions that are leading to environmental harm and an example is a tax levied on the refinery or wholesaler and this promotes efficient collection and administration in the tax system.²⁰⁶ The tax base covering large and evident stationary energy suppliers is a good tax base and the easiest administratively and there is an added advantage that the costs of the tax will be passed onto private and business users of energy who will be forced to apply energy conservation strategies thereby reducing the quantity of the energy demanded and used.²⁰⁷ This scenario will be a good environmental tax design as there is a possibility of the reduction of GHG emissions.

Scandinavian countries were among the first to adopt carbon taxes in the 1990's and their carbon taxes have narrow bases and no uniform tax is levied on the emissions from the sectors covered by the tax.²⁰⁸ In Canada's province, British Columbia, the tax base is broad imposing a carbon tax on an estimated 70 percent aggregate GHG emissions because the tax does not apply to all GHG emissions, portion of CO₂ emissions in total GHG emissions and the CO₂ emissions from fossil fuel combustion.²⁰⁹ Although British Columbia's carbon tax has found support as a progressive environmental policy, it should be stated that the broader the base, the more expensive it is to collect the tax. The optimal tax base can be determined by the concession made between the benefits of a broader tax base and the surge in tax collection costs.²¹⁰ In South Africa, the tax base is determined by the relevant piece of legislation and certain items or sectors can be exempted so as to make the size of tax base narrower.²¹¹ According to section 4 of the draft Carbon Tax Bill, the tax base consists of fossil fuel combustions,²¹² fugitive emissions²¹³ and industrial process and product use emissions.²¹⁴

²⁰⁶ OECD Environmental Taxation A Guide for Policy Makers (note 124 above) 5.

²⁰⁷ *Ibid* 5

²⁰⁸ Metcalfe & Weisbach (note 198 above) 508.

²⁰⁹ Duff (note 83 above) 94.

²¹⁰ Metcalfe & Weisbach (note 198 above) 501.

²¹¹ Silke & Stiglingh (note 201 above) 1194.

²¹² Section 4(1)(a) of the Draft Carbon Tax Bill.

²¹³ Section 4 (1)(b) of the Draft Carbon Tax Bill

²¹⁴ Section 4(1)(c) of the Draft Carbon Tax Bill

5.2.2 Determining the Tax Rate

Pigou determined that the tax rate at any given level of emissions ‘should equal the social marginal damages from producing an additional unit of emissions or, more or less equivalently, the social marginal benefit from abating a unit of emissions.’²¹⁵ As an environmental policy, the carbon tax aims to encourage the reduction of GHG emissions and to prevent the continued impacts of climate change hence it is only befitting that the carbon tax rate be set at a level that reflects the catastrophic environmental damage that has been caused primarily by anthropogenic GHG emissions thus ensuring that the environmental costs of polluting activities is reflected in producers and consumer prices.²¹⁶ According to the standard economic welfare-maximization theory, the carbon tax rate should reflect the future climate change damages per tonne of current GHG or CO₂ emissions.²¹⁷ The damages of climate change range from ecological disruptions to a change in weather patterns to life-threatening human health effects.

However, establishing the principles for setting the correct tax rate is an easier task than predicting and measuring the destabilising impacts that the GHG emissions will have in the future. Also, setting a price or value of the damages of climate change is easier for damage that has been done on something that has a clear and predictable market value such as clean air but the price for damages is harder to value when it concerns such aspects as human life which is lost as a result of hazardous environments caused by pollution.²¹⁸ South Africa’s long term climate policy goal is that the tax rate will eventually reflect and be equivalent to the marginal external damage costs of GHG emissions.²¹⁹ In the end, the type of tax rate structure chosen by policymakers is determined by Government’s policy goals but by all means an attempt to reduce the environmental externalities must be made otherwise there is a risk of furthering existing market distortions.²²⁰

²¹⁵ Metcalfe & Weisbach (note 198 above) 511.

²¹⁶ OECD Environmental Taxation: A Guide for Policy Makers (note 124 above) 5.

²¹⁷ Aldy *et al* (note 204 above) 503.

²¹⁸ OECD Environmental Taxation: A Guide for Policy Makers (note 124 above) 6.

²¹⁹ Department of National Treasury Carbon Tax Policy Paper (2013).

²²⁰ Climate Change is regarded as the biggest market failure of our generation because of the failure to internalize negative externalities of pollution.

5.3 Searching for the Economic Double-Dividend in South Africa

A central tenet of environmental tax policy is that carbon taxes are an effective mechanism for setting the correct prices of the marginal social costs of climate change by internalizing externalities.²²¹ With that, discussions have been postulated on the effects of environmental taxes on non-environmental welfare, in specific, the overall economy, welfare and employment. The double-dividend hypothesis states that there are environmental and economic benefits that arise from the introduction of an environmental tax. Environmental reforms are shadowed by uncertain effects and the double dividend reflects a desire to control these uncertainties to make progressive environmental reforms that contribute to environmental effectiveness and economic efficiency. The first dividend concerning environmental effectiveness means that the environmental tax is used to lower GHG emissions through putting a price on fossil fuel usage. The second dividend is problematic in its definition as it includes reducing pre-existing tax distortions, improving welfare and employment creation.²²² The case for a South African carbon tax shall be discussed and assessed within these definitions of the first dividend and second dividend that follow the introduction of environmental taxes.

5.3.1 Addressing Revenue-Recycling and Distributional Impacts in South Africa

The goal in introducing a carbon tax should be to reduce GHG emissions rather than to collect revenues for government public spending. However, it is inevitable that the carbon tax can generate revenue thus there must be consensus on the use of the revenues generated by the carbon tax and in so doing the government needs to have in place a structure of the programmes to be implemented using carbon tax revenues. In addition, the revenues collected from carbon taxes may be used to reduce the tax burden through reducing personal income taxes or corporate income taxes.²²³ There is a likelihood that the substitution of environmental taxes for distortionary taxes may not only result in a double-dividend in that activities that lead to environmental damage will be discouraged and the distortionary cost of the tax system is lessened.²²⁴ If the appropriate tax rates are cut, taxing the environmental “bad” would be

²²¹ Goulder & Parry (note 60 above) 157.

²²² B. Bosquet ‘Environmental Tax Reform: Does it Work? A Survey of the Empirical Evidence’ (2000) 34 *Ecological Economics* 19, 23.

²²³ The Davis Committee: Carbon Tax First Interim Report (2015).

²²⁴ LH Goulder ‘Environmental Taxation and the Double Dividend: A Reader's Guide’ 1995 (2) *International Tax and Public Finance* 157, 159.

progressive for South Africa and might eliminate the tax base erosion effect that arises because of taxing the externality creating activity, thus there are chances that the environmental tax will not have regressive effects on the economy. Further, the pre-existing tax distortions targeted should be those especially connected to the production of those firms that are covered by the proposed carbon tax. Reducing other distortionary taxes or levies may incentivise the process of reducing carbon emissions for firms and a shift towards a low-carbon economy.

Measuring the distributional impacts, such as on low income households, of the carbon tax in South Africa is currently complex as the revenue-recycling measures to be taken have not been detailed by the National Treasury. In the absence of revenue recycling measures, the carbon tax will be regressive as the costs associated with the tax is not swapped for distortionary pre-existing taxes thus the potential environmental outcomes are offset. To measure the distributional impact of a carbon tax in South Africa, the Government could look at the distribution of benefits coming from improved environmental quality or look at who will bear the burden of the costs of the carbon tax.

5.3.2. Reducing Unemployment

Among the Government's most crucial economic strategies is the reduction of unemployment and poverty. The spill over effects of environmental taxes in the labour market come from the fact that carbon taxes raise the costs of production for firms and increases competitiveness and this leads to lowering of employment levels in the economy. To address this issue, South Africa may attempt to lower taxes on labour. Alternatively, it has been argued that the introduction of a carbon may create employment as alternative energy productions will require a new skilled labour force. The result will be the unveiling of a new skill intensive work force that will replace less skilled workers. This interchange of skilled workers may come at an expense for the firm and for the unskilled workers but will nonetheless lead to new job opportunities for skilled workers. However, the loss of jobs will be short term with the introduction of a carbon tax as the potential growth of green jobs would eventually happen in the long term as firms shift to a low carbon economy.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Chapter Objective

This chapter concludes on the main ideas discussed in the dissertation. The previous chapters considered some of the likely challenges that the introduction of carbon tax would bring in South Africa. The dissertation relied heavily on the use of market-based instruments to mitigate against climate change and to propel the reduction of atmospheric GHG emissions. Also, the dissertation rested on the double-dividend hypothesis as the ability of a carbon tax to produce environmental and economic benefits was explored. The dissertation also made use of the government reports such as the LTMS and the Carbon Tax Policy papers that emphasised the need to mitigate climate change to move the country towards a low-carbon economy. The carbon tax for South Africa is in the pipeline and time will tell how effective the tax will be in improving the environment and effecting economic stability. In the next section, the key findings of the research are discussed.

6.2 Recommendations

The following are the key recommendations of the research:

a) Ability of Market-Based Instruments to Mitigate Against Climate Change

Market-based instruments are regarded as the best means of mitigating the disastrous consequences of climate change as they encourage behaviour change through market signals. As a market-based instrument, environmental taxes have a potential to lead to environmental and economic benefits. Thus, the use of carbon taxes for the mitigation of climate change would be environmentally and economically progressive. The concern regarding the introduction of a carbon tax in South Africa has been the likely impacts it would have on the economy. However, it is concluded that their use would promote economic growth through the recycling of revenues to reduce distortionary taxes, create new employment opportunities in a low-carbon economy and make local industries competitive internationally as their goods would have a lower carbon footprint. The end motive of the carbon tax must be to influence the behaviour of both suppliers of energy, producers and consumers to ultimately reduce atmospheric GHG's caused by primarily the use of harmful substances such as coal which is relied on heavily by the South African industries. In the long term, the use of carbon tax to mitigate climate change

would be a strategic move for South Africa and the carbon tax can change the economic structure and achieve a reduction of emissions and greener growth.²²⁵

In its first five years in operation taxpayers covered by the carbon tax legislation must not incur any tax liability such that they get sufficient time to adjust to the requirements for a low-carbon economy and the National Treasury could use this time to collect further data on the impacts of the carbon tax.

b) Carbon Tax Design Considerations

The tax base and tax rate structure are central to the designing of an efficient tax policy for South Africa. In determining the tax base, it is emphasised that taxing upstream would be ideal as the polluters would pay for the costs of pollution. This would be in line with Pigou's principle that a carbon tax should correct market failures by ensuring that those responsible for environmental damage are held liable for it. Taxing upstream may however lead to distributional impacts as polluters who are largely producers of energy would seek to cover up the costs of mitigation through increased prices directly affecting the consumer. The government could avoid such a situation by reducing other distortionary taxes. Alternatively, government could allow industries to gradually shift to less environmentally damaging energy sources such that the increased costs of production are spread over several years and the industries that comply with the new environmental regulations or taxes could receive incentives.

The tax rate structure must be set at a level that the existing market distortions caused by climate change are corrected. The tax rate structure must reflect or at least consider the present and future damages anthropogenic GHG emissions. Although quantifying the damages of climate change is complex, an attempt to do so must be made if the biggest market failure of our generation is to be addressed.

Apart from the tax base and tax rate, in designing the carbon tax the National Treasury ought to also consider the following:

- Use of coal as the primary energy source in the country needs to be reviewed. South African industries rely heavily on coal use for energy generation and this has resulted

²²⁵ Carbon Tax Policy Paper Reducing Greenhouse Gas Emissions and Facilitating the Transition to a Green Economy (2013) 10.

in the country's high carbon emissions profile. South Africa's historical development around the mineral-energy complex must also be put into consideration. It is guaranteed that finding alternative energy sources will not be an easy task.

- Economic impacts of the carbon tax that range from increased unemployment to competitiveness among firms should be prioritised as these could hinder the shift towards a low-carbon economy.
- Environmental improvement because of the tax, that is, revenues collected from the tax should be directed towards reducing distortionary taxes and environmental programmes to ensure that the biggest market failure of our time is addressed effectively.

6.3 Conclusion

Climate change mitigation has been the top agenda of the UNFCCC and the Convention's main objective has been brought to life through the various COP meetings held over the years. However, to this day there has not been progress in the introduction of an internationally legally binding instrument that will encourage States to lower the levels of their GHG emissions. Thus, party States to the Convention have had to introduce various instruments for the reduction of GHG's emitted by industries especially. South Africa as one of the top GHG emitter in the world, ought to have introduced mitigation measures to lower its GHG's. This task will be a huge one for the country as its industries rely heavily on minerals such as coal that contribute significantly to the high levels of GHG's emitted. Without legal measures for the reduction of GHG's in South Africa, industries have been unwilling to co-operate through finding alternative means of energy production. What is clear is that domestic measures to mitigate the devastating results of climate change need to be introduced in South Africa to address the high carbon emitted by industries. The introduction of carbon tax as a mitigation instrument in South Africa will be a progressive move towards reducing GHG emissions as industries will be forced to use new less-carbon intensive energy sources or at least be responsible for the costs of their pollution.

However, the proposal for carbon taxes in the country has been met with opposition as the view is that the revenue collected will likely go into government spending and little will be done to mitigate the devastating results of climate change. Thus, it is argued that the environmental benefits emphasised in the double-dividend hypothesis associated with environmental taxes may not be achieved as attention has been given to the economic benefits of the taxes such as revenue-recycling and new employment opportunities. Nonetheless, it has been argued that the

environmental benefits related to the carbon tax will not be realized in the short-term because as a market-based instrument, the tax seeks to influence the decision-making processes of producers and consumers thereby indirectly leading to a change of behaviour which goal is a long-term process. It may appear that the environmental and economic double- dividends are not jointly achievable in South Africa even after the introduction of the carbon tax but if the tax is designed effectively taking into consideration the economic, social and political factors, some success with the tax could be recorded.

Until the carbon tax comes into operation it will be difficult to determine the effect thereof. However, its effect can be predicted by analysing the various arguments for and against its introduction in South Africa and through critically analysing its proposed design. Furthermore, a look at the operation of market-based instruments in other jurisdictions can provide a framework for South Africa should it decide to introduce carbon tax in 2017.

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APPENDICES

Ethical Clearance Form



28 May 2015

Ms Zandile Ndebele (211540990)
School of Law
Howard College Campus

Dear Ms Ndebele,

Protocol reference number: HSS/0569/015M

Project title: Examining the potential economic consequences of introducing a carbon tax in South Africa

Full Approval – No Risk / Exempt Application

In response to your application received on 25 May 2015 the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.


Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully


.....
Dr Shenika Singh (Chair)

/ms

Cc Supervisor: Mr Chris Schembri
Cc Academic Leader Research: Dr Sharon Bosch
Cc School Administrator: Mr Pradeep Ramsewak

Humanities & Social Sciences Research Ethics Committee
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Change of Dissertation Title Form

Appendix 2

Change of Dissertation Title Form



06 May 2016

Mrs Zandile Ndebele (211540990)
School of Law
Howard College Campus

Dear Ms Ndebele,

Protocol reference number: MSS/0569/015M

New project title: Taking Economic "Bads": The case for a Carbon Tax in South Africa

Approval Notification – Amendment Application

This letter serves to notify you that your application and request for an amendment received on 29 April 2016 has now been approved as follows:

• Change In Title

Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study must be reviewed and approved through an amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for period of 3 years from the date of original issue. Thereafter Recertification must be applied for on an annual basis.

Best wishes for the successful completion of your research protocol.

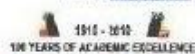
Yours faithfully

Dr Shenuka Singh (Chair)

/ms

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Cc Academic Leader Research: Dr Sharon Bosch
Cc School Administrator: Mr Pradeep Ramsewak

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