

Carbon tax implementation in South Africa: Is it the right time?

Michael Bamidele Fakoya

African Centre for Sustainability Accounting and Management (ACSAM)

School of Accountancy, University of Limpopo, South Africa

Michael.fakoya@ul.ac.za

Abstract

High carbon intensive production is a major cause for high carbon dioxide emissions. One measure to curb this unsustainable practice and promote low carbon intensity in production is the introduction of a carbon tax regime. The consequences of a carbon tax implementation in a developing economy like South Africa where the unemployment level is rising annually calls for a rethink of carbon policy. This study seeks to understand if it is the right time for South Africa to introduce a carbon tax regime considering its potential impact on poor households, unemployment and general economy. To get such an understanding, the study used a literature review-based research approach. Findings indicate that implementing a carbon tax regime in South Africa will have severe indirect implications for the country's socio-economic agenda. The study concludes that the timing of a carbon tax implementation is not right.

INTRODUCTION

As the world economies develop, more industrialisation and other emission producing activities have increased intensifying global pollution. Countries around the world continue to introduce different strategies to curb this problem. This led to the introduction of the first carbon tax policy in Finland in 1990 (Vehmas, 2005). Taxing negative societal activities to discourage conventional and climate pollution makes economic sense compared to taxing positive societal activities it seeks to encourage, such as jobs, savings, investment, and profits (MacDonald, 2014). Many countries are acting towards redressing their carbon dioxide (CO₂) emissions level through enforcement of sustainable production practices by its industries. To encourage sustainable responsible behaviour among companies, governments are implementing carbon tax policies to regulate and ensure reductions in the use of high carbon intensity during production.

The purpose of a carbon tax is to curb the emissions of greenhouse gases primarily carbon dioxide (Elliott & Fullerton, 2014). High CO₂ can remain in the atmosphere for thousands of years (Fischer, et

al., 1999) and absorbs heat rays (infrared radiation). Substantial amounts of CO₂ emissions result in global warming and initiates anomalies in the ecosystem threatening the natural ecology (Reichstein, et al., 2013). An introduction of carbon tax is likely to encourage CO₂ emissions reduction. This reduction may be achieved through activities such as adopting a cleaner technology in production. In recent years, more countries have introduced carbon tax as an attempt to reduce carbon emission. Many of these carbon tax regimes have not achieved its objective (Andrew, 2008) because the level of CO₂ emissions kept increasing in these countries (such as Australia and Canada (British Columbia) (Friedlingstein, et al., 2014) thereby raising concerns about the effectiveness of this instrument. Some of the documented effects of a carbon tax policy include hurting economic growth; being a regressive tax that benefits big business' and the wealthy at the expense of lower and middle-income earners; and allows businesses to shift the tax burden to consumers while continuing to pollute (Wier, et al., 2005; Fang, et al., 2013). In Africa, Asia and North America it seems that the demand for fossil fuel, particularly coal, will continue to rise with more increase likely in emerging economies because of the vast fossil fuel deposits located in these regions (Fernández, 2014).

Historically, South Africa's CO₂ emissions have steadily increased throughout the time frame where data is available (CDIAC Carbon Dioxide Information Analysis Center, 2013). This is because South Africa's economy relies heavily on mining and heavy industry that are high in fossil fuel consumption. Energy consumption in the industrial and building sectors relies largely on electricity as an energy source, which is produced with high carbon intensity using domestic coal. Overall it is estimated that 94% of South Africa's electricity is generated from coal (IEA International Energy Agency, 2013). Additional emissions emanate from industrial-process emissions, especially in steel and cement production (CDIAC, 2013).

South Africa is the 14th largest CO₂ emitting country based on 2013 fossil-fuel CO₂ based emissions report and the largest emitting country on the continent of Africa (CDIAC, 2013). Meanwhile the South African government committed itself to

reducing greenhouse gas (GHG) emissions during negotiations at the 2009 United Nations Climate Change Conference in Copenhagen. South Africa committed itself to reduce domestic GHG emissions, to coordinate and develop a coherent policy framework to curb GHG emissions by 34% by 2020, and 42% by 2025, below the business-as-usual (BAU) trajectory, subject to the provision of adequate financial, technological and capacity-building support by developed countries.

The achievement of these goals required the development of a legal and institutional framework, set in motion when the National Treasury issued in 2010 a carbon-tax discussion paper for public comment. This discussion paper made the case for the gradual introduction of a carbon-tax system as the best way to reduce the country's GHG emissions (Alton, et al., 2014). This study questions the potential success of a carbon tax in South Africa given that Australia have scrapped such taxes after it failed to achieve desired result.

Although aiming to assess the potential success of a carbon tax in South Africa, this paper does not aim to provide a conclusive range or constant figure that indicates the level of expected success based on mathematical and statistical calculations but provides a review of literature about the experiences of other countries that have implemented a carbon tax regime. This enabled a deduction to be made on the appropriateness of introducing a carbon tax in South Africa at such a time of low economic growth.

RESEARCH METHODOLOGY

The study used a literature review-based method. This entail surveying scholarly articles, books and other sources (e.g. dissertations, journals) relevant to the research topic, to provide a description, summary, and critical evaluation of a carbon tax implementation and deduce whether the timing of introduction is appropriate for South Africa now. The purpose is to offer an overview of significant literature published on a topic.

The main purpose of this study is to assess the potential success of the proposed carbon tax in South Africa vis-à-vis the experiences of other countries that have implemented it. This entails analysing the challenges and effects that the proposed carbon tax might have on the country, from implementation to operation. It is also considering experiences from other countries around the world that have introduced carbon tax and the general economy challenges in South Africa that deductions are made.

LITERATURE REVIEW

Challenges of implementing a successful carbon tax

The design and implementation of a carbon tax in South Africa is a complicated process because of the dependency by much of the population on government unemployment grants for basic livelihood (Fakoya, 2013). There are good grounds to determine whether South Africa is, or will ever be, ready to implement carbon taxes. This study argues that implementing a carbon tax regime is a cut throat exercise. The process requires rigorous efforts to enhance the possibilities for success, without which failure is a certainty.

Generally, implementing a carbon tax regime maybe difficult with some of its procedures negatively impacting its chances of success. One such factor is the ability to obtain information on how to effectively reduce carbon emissions to obtain carbon tax benefits by companies in a way that is relevant and while the information is reliable. Among the Scandinavian countries, Denmark seems to have a working formula in implementing carbon tax. This is assumed to be driven by the fact that its electricity sector though more carbon-intensive achieves great turnover stemming from combining carbon tax with subsidies for energy efficiency as echoed by Winkler and Marquard (2011). The ability to understand the impact of reducing carbon emission in order to obtain tax savings, would require industries to employ the work of tax experts, and other experts such as electrical engineers line with the Denmark approach. Although this may lead to additional costs being incurred which may offset the perceived tax savings; acquiring such experts advice would lead to reliable and relevant information being acquired despite being overshadowed by the costs of obtaining such expert services.

The intergovernmental panel on climate change identified some issues that may prove to be challenging in the successful implementation of a carbon tax in South Africa. These include the following according to (Jakob, et al., 2014):

- Delay of mitigation may lead to future costs and risks.

The farther the response to carbon emission challenges, the more likely the costs associated with reduction in future. This is estimated to result from constantly increasing levels of CO₂ in the environment, for which the effects are likely to last a life time.

- Carbon pricing is essential to reduce emissions.

What Jakob, et al. (2014) suggested is echoed in this statement “When emissions from domestic production activities are priced unilaterally, the global environmental impact will be undermined to the extent that emissions increase elsewhere- an effect known as carbon leakage” (Böhringer, Carbone & Rutherford, 2011). Böhringer, et al. (2011) contend that a price that emitters could afford is more likely to cause emissions to continue. On the other hand, a price higher than what emitters can afford is likely to promote usage of schemes to pass the costs forward in the supply chain to the end users of products that caused such emission. Thus, it is essential to implement the carbon tax at an optimal price.

Advocates of consumption-based emission policies (including embodied carbon tariffs) argue that regulating emissions in domestic production also fails to account for other emissions a country is “responsible for”. This is mostly of a concern if its citizens consume imported goods with embodied emissions (Böhringer et al., 2011). South Africa has its fair share of imported goods. Thus, by charging carbon tax to domestic enterprises, the government may easily fail to recognise the loophole created by such a tax to promote international products stemming from countries that do not impose such a tax. Climate change policies will only be successful if they eventually establish a comprehensive climate regime that covers virtually all countries and emitting sectors (Luderer, et al., 2013). The impact of such lack of foresight by any government policy would make domestic goods to be more expensive, thereby forcing consumers to opt for international brands with local manufacturers closing or moving to countries without a carbon tax thereby creating local unemployment and economic instability.

On the export side, energy-intensive exports to non-abating countries would get a full refund of carbon payments at the point of shipment (Lockwood & Whalley, 2010). Full border adjustments will need to combine import tariffs with export subsidies, effectively implementing destination-based carbon pricing (Lockwood & Whalley, 2010). Even though there is a likely effect of losing trading powers on the bases of imports, Whalley et al. 2010 suggest that exporters may recover the costs if they supply their products to other countries which do not have a carbon tax policy in place. Clearly, the question whether the import pitfalls would be offset by exports advantage becomes eminent. This is the reason why Böhringer, et al. (2011) note that the major focus is on import challenges than on exports, signifying that the cost of imports to a country that has carbon emission reduction policies will possibly amount to more of its existing dilemmas being magnified. Such dilemmas may further exasperate the high dependence of its citizens on government

unemployment grants as pointed out by Fakoya (2013).

Keeping the levies of existing carbon tax on liquid fuels used for motor vehicles along with the new carbon tax would result in double taxation in South Africa. This is because South Africa already levies a vehicle emission tax, based on the theoretical carbon emissions of fuel burnt by a vehicle over its lifespan. It would therefore be inappropriate to levy an additional carbon tax on actual emissions (PWC, 2010). Even though double taxation may arise, it would not be a major problem as it can be responded to by making the existing fuel levy to be an advance tax, as the fuel levy is based on deemed emissions. This advance tax may be recovered or settled when actual data of emission is available to pay the proposed carbon tax, which is based on actual emissions. There are also practical problems in the calculation and application of appropriate tariff rates (Böhringer et al., 2011). The complexity of calculating defensible measures of embodied carbon for goods with long and complicated supply chains would likely limit tariff coverage to a fraction of the total emission embodied in trade, reducing their effectiveness (Böhringer et al., 2011). There should be attempts to reduce the possibility of launching carbon tax at an inappropriate rate.

Climate policy is assumed to remain fragmented, with no emissions trading between regions until 2020. Limited trading of emissions between industrialized and developing countries is allowed after 2020 (Luderer, et al., 2013). It is assumed that resource-exporting countries (Group III) will not adopt any binding targets (Luderer, et al., 2013). Emission reduction targets for industries are elevated by the saleability of carbon emissions, or GHG certificates. Illiquidity of these certificates, or the inexistence of a perfect market where such certificates may be sold and bought, will hinder the short-term incentive for businesses to commence with carbon emission reduction (Luderer, et al., 2013). Thus, industry participants will not be motivated to introduce carbon emission reduction strategies, since they will not be benefiting in the short term.

The fact that implementing a carbon tax is a challenge is not debatable. No researcher should undermine the complexity linked with implementing a carbon tax regime. In fact, Rozenberg, et al. (2013) emphasise that the difficulty of introducing a carbon tax regime stems from the process that current generation should sacrifice, and the objective of the regime that future generations may benefit. Of course, taking from the attestation of Rozenberg et al. (2013), it would take a huge social responsibility to motivate citizens of a country to wilfully participate in carbon emission reduction schemes.

Such willingness is least expected in a country globally known for its political and corporate corruption, where most business deals are whispered to be driven by bribes. With corruption perceptions index indicating that South Africa is ranked 44 (Hope Sr, 2017) while the scales were nil for a very corrupt country and 100 for a very clean one. These assessments were performed through measuring a country's public sector dealings on their own, with no attempt to suggest that a country whose public sector is clean locally is regarded as not involved in corruption elsewhere, on the global grounds.

State of carbon tax policy globally

Increasing emissions levels world-wide calls for broad multilateral cooperation in mitigating climate change. Only less than twenty countries are responsible for 75% of the world's carbon emissions (Council on Foreign Relations, 2013), which makes it a necessity for efforts to curb carbon emissions to be global too. Without international cooperation and coordination, some states may free ride on others' efforts, or even exploit uneven emissions controls to gain competitive advantage (Council on Foreign Relations, 2013). The impacts of carbon emissions affect the whole world, efforts to adapt to climate change will need to be global too.

Parties to the United Nations Framework Convention on Climate Change (UNFCCC) adopted the Kyoto Protocol in 1997, which only entered force in February 2005 when 184 member parties ratified it. The Kyoto Protocol is an international act binding nations around the world to reducing carbon emissions. Those countries took on binding targets for the first commitment period Key Performance Indicators (KPI's) that ran from 2008 to 2012. A study by the United Nations (UN) found that current efforts to reduce emissions are only achieving half the reductions needed to achieve the set emissions targets. This indicates that at a global level there is much to be done to curb carbon emissions. In agreement, the report suggests that governments will have to go much further in their pledges to limit future carbon dioxide emissions (CO₂) (Newell, et al., 2013).

Developed countries, which are the most polluting countries are not leading by example when it comes to global efforts of reducing carbon emissions (Nejat, et al., 2015). The failure of rich industrialised countries' governments (for example, United States of America) to propose 2020 climate targets based on science and equity is the culmination of a long history of avoiding responsibility and international obligations on climate change (Schipper & Pelling, 2006). This lack of commitment by member countries to comply with treaties such as the Kyoto Protocol slows efforts to reduce carbon emissions (Füssel, 2010). The history of avoiding

responsibility and commitment by the industrialised countries is shown by the refusal of countries such as the United States of America (USA) to participate in a legally binding system of emission cuts by the Kyoto Protocol. They also failed to fulfil the objectives of returning to the 1990 emissions levels by the year 2000 as agreed and to agree to legally-binding second commitment period of curbing emissions of the Kyoto Protocol in 2009, as committed under the 2007 Bali Mandate (Winkler, et al., 2009). These countries also failed to meet their binding targets under the Kyoto Protocol, while Canada renounced their obligation and countries such as Russia, Japan and New Zealand withdrew from the Kyoto Protocol's legally binding targets post-2012 (Vogler, 2016)

Despite the introduction of the Kyoto Protocol in 2005, carbon emissions have increased worldwide (Friedlingstein, et al., 2014). But why is this? This treaty does not include the world's top three emitters in China (23% share of global emissions) and India (5%) never signed the treaty, while the United States (14.7%) signed but never ratified the deal. There are also no binding targets for developing countries in the Kyoto Protocol treaty (Friedlingstein, et al., 2014). The treaty also does not have any real enforcement mechanism. Although the Compliance Committee includes an Enforcement Branch, this branch has no power of sanction or coercion over noncompliant parties (Gillenwater & Seres, 2011). This shows that there is no real enforcement of the treaty and little action is taken on non-compliant countries, which affects the effectiveness of the treaty.

Countries can choose whether to be part of such treaties, even though they might introduce carbon tax, with no real enforceable emissions targets and regulation by world bodies they are likely drag their feet. Compliance with such treaties should rather be compulsory. The lack of obligation and responsibility globally filters through to individual countries, even though they might have carbon tax, they don't take it seriously as it is not a necessity. This fight seems to be lost at a global stage and with no global seriousness, countries will not take their reduction targets seriously and not be motivated to achieve them. Reflection on some countries that have a carbon tax regime but have not met their carbon tax emission reduction targets

CANADA

Canada is currently struggling to keep on track with its carbon emissions targets. Environment Canada forecasted in 2012 *"that in 2020, Canada's emissions will be 7 percent above the 2005 level, not 17 percent below it"* (OAG Office of the Auditor

General Canada, 2016). In agreement, the 2014 Emissions Trend Report indicated that British Columbia is on pace to increase emissions 11 per cent by 2020 (from 2005 levels). The factors causing the anticipated failure to meet the targets are that the Federal Government has not coordinated with provinces and territories, and Environment Canada still does not have a planning process for how the federal government will contribute to achieving the national reductions required to meet the 2020 target (Uddin, et al., 2015).

Without effective government planning and clear timelines, responsible organizations at all levels are left without essential information for identifying, directing, and coordinating their reduction efforts, which ultimately weakens such efforts. This also means that there are no benchmarks against which to measure and report on progress. This means that there is inadequate feedback, which affects the effectiveness of future efforts and strategies. The lack of a clear plan and an effective planning process is a particularly significant gap given that Canada is currently projected to miss its 2020 emission reduction target (Uddin, et al., 2015).

AUSTRALIA

In 2014, Australia became the first country to repeal carbon tax, which left the country with no legislation to achieve the 5% emissions reduction target (Taylor, 2014). This decision came after eight years of bitter political debate, during which climate policy dominated three election campaigns and contributed to the demise of two Prime Ministers (Taylor, 2014). The deputy leader of the Greens Party, Adam Bandt, said it was “the Australian Parliament’s asbestos moment, our tobacco moment- when we knew what we were doing was harmful, but went ahead and did it anyway” (Baird, 2014).

In Australia, carbon tax had too much criticism and opposition before and after it came into operation. When it came into operation in 2011, deputy leader of the Greens Party, Adam Bandt vowed to lead a “people’s revolt” and “fight this tax every second of every minute of every day” (Baird, 2014). A study found that 82 percent of articles on the carbon tax in News Corporation’s Australian papers were negative. The political battle around the carbon tax scheme hampered the implementation and success of it. Without the support of everyone, especially parliament, the scheme was not going to run smoothly and achieve its emissions reduction targets.

DENMARK

The Danish government has set targets to reduce total Danish greenhouse gas emissions by 40% by 2020 compared with the 1990 level and by 100% in 2050 (EA Energy Analyses, Risø DTU, 2008) The question now is, will Denmark be able to achieve such ambitious targets? Estimates show that without new initiatives Denmark will emit about 4 million tonnes more than the 40% reduction target in 2020 (The Danish Government, 2013). Recent reports suggest that the new conservative governing coalition elected in Denmark plans to abandon the country’s ambitious targets for a carbon-free economy (Sovacool, 2017). Denmark’s new Climate Minister was also quoted saying that a 40 percent carbon reduction by 2020 would be “too expensive for Danish businesses” (The Danish Government, 2013). There are reduction potentials in all sectors, but current estimates indicate that realising the 40% target in 2020 will not be without cost (EA Energy Analyses, Risø DTU, 2008). It is now an issue of the environment versus the economy. The Danish government should choose whether to incur more costs (including loss of income) in favour of emissions targets or avoid such expenditure. Incurring costs seem unlikely as reports are suggesting that they are planning to abandon their emissions targets, meaning they will not be achieved.

LIKELY EFFECTS OF A CARBON TAX ON SOUTH AFRICA’S SOCIO-ECONOMIC LIFE

Impact on the energy sector, business and consumers

South Africa is a developing country with many socio-economic problems ranging from poor economic growth, poverty, unemployment and corruption amongst others. The introduction of carbon tax is most likely to worsen some of these problems. To increase economic growth and subsequently the standard of living, South Africa needs security of the supply of electricity, which should also be supplied at a competitive price (Jeffrey, 2016). South Africa’s energy sector is critical to the economy because of its large-scale reliance on energy-intensive mining industry that contributes substantially to its Gross Domestic Product (GDP) (Davidson & Winkler, 2003). South Africa can therefore not afford to be tampering with such a key sector by introducing a carbon tax because it will affect poor households.

The energy sector is responsible for approximately 48% of South Africa’s carbon emissions (PWC, 2011), making it the largest emitter in South Africa, because of its dependence on coal. Putting a price in this sector might have devastating economic consequences due to the economy’s dependence on

this sector. A carbon tax of R120 per ton will increase the cost of a kWh of electricity supplied by Eskom (the National Electricity Company) by approximately 10 cents (The Carbon Report, 2010). The carbon tax cost is going to be passed to businesses and eventually the final consumer through increased prices. This will have serious inflationary implications, as prices amongst various sectors will increase, which will harm an already struggling South African economy. The ultimate effect of the energy price increase will be a decrease in demand for certain products as consumer's disposable income lose value.

South Africa needs accelerated export growth to improve economic growth and job creation levels (South African Government Online, 2017). To achieve this, South Africa needs to boost the competitiveness of its exports and promote deeper regional trade integration, which would also create jobs and help alleviate poverty. This makes the export market a key sector towards the achievement of economic growth for the South African government. Introducing carbon tax will negatively affect the competitiveness of the country's exports in the international markets (National Treasury, 2010). This will reduce their demand resulting in lower returns for exporting industries, which might make companies less interested in the export market. This will reduce the foreign currency earnings that the country relies on to balance its current account and pay for imports (The Carbon Report, 2010). Producing products that are not price competitive will make imports to be more competitive and import sensitive industries would suffer. An example of the damage a carbon tax could cause is the motor vehicle industry, which currently exports more than R100 billion worth of vehicles per annum, employing 100 000 people in the process (Jeffrey, 2015). Carbon tax would cause significant damage to such important industries due to their contribution to the Gross Domestic Product and employment creation. The price increases caused by carbon tax may result in a further deterioration in the country's current account of the balance of payments, which is already at an excessively high level (Jeffrey, 2015). This will also create a decrease in the return on investment of the affected businesses and real investment would decline, which might lead to disinvestment.

Impact on economic growth (GDP)

Different studies have been done around the world about the impact of carbon tax on economic growth with different results. (Fang, et al., 2013) states that carbon tax has no substantive impact on economic growth. While a study by scholars at Resource for the Future (RFF) shows that a substantial, broad-based, revenue-neutral tax on carbon dioxide

emissions would have imperceptible effects on macroeconomic growth as measured by GDP.

The South African economy has been struggling for some time, this is shown by the decreasing economic growth for years now (National Treasury, 2017). There are fears in the market that the introduction of carbon tax might further deteriorate this situation. The country is in serious need to increase economic activity to create employment opportunities which leads to poverty alleviation. An introduction of carbon tax will slow GDP growth by 0.4% per annum, resulting in a 6.5% reduction in the size of the country's GDP by 2030, or approximately R350-billion in rand value (Jeffrey, 2015). A study using the computable general equilibrium (CGE) model done by Siriwardana, Meng and McNeill (2013) on the Australian economy agrees with this. The study concluded that in the short run, Australia's real GDP will decline by 0.68 percent, consumer prices will rise by 0.75 percent, and the price of electricity will increase by about 26 percent because of the tax. The slower economic growth is likely to reduce the taxes collected by at least R70 billion by 2030, which is likely to be more than the carbon tax proceeds. A carbon tax will represent a tax on development (The Carbon Report, 2010). Carbon tax makes carbon intensive industries less competitive while improving the competitiveness of less carbon intensive industries. This have the potential of discouraging carbon intensive foreign investment and displacing carbon intensive production to other countries that do not impose carbon tax (National Treasury, 2010). Some German companies are already doing this by expanding their operations elsewhere because of the non-competitive electricity costs in that country (Jeffrey, 2015). Australia, one of South Africa's key global competitors has scrapped carbon tax, while the US senate blocked the federal government from taxing CO₂ emissions (Jeffrey, 2015). The aforementioned circumstances may disadvantage South Africa if it implements the carbon tax policy when competing with such countries.

THE SOCIAL IMPACT OF CARBON TAX

Impact on unemployment

Various economic studies have been done on the effects of employment on socio-economic life, but there is no clear answer yet on whether unemployment levels are affected by environmental regulation. South Africa has been experiencing rising unemployment levels. The unemployment rate rose to 26.7% in the first quarter of 2016, which is above market expectations of 25.3%, up from 24.5% in the last quarter of 2015 (Statistics South Africa, 2016) (Stats SA, 2016). From September 2005, the unemployment rate rose by 10 percent whereas employment fell 2.2 percent, while from

2000 to 2016 unemployment averaged 25.29% on an annual basis (Statistics South Africa, 2016). With such increasing unemployment levels, the important question to ask and to which most South Africans are interested is how is the introduction of carbon tax going to impact the unemployment rate?



Carbon tax will make the South African industrial sector less competitive, which will be detrimental to employment creation (Jeffrey, 2015). An introduction of carbon tax will reduce cumulative employment opportunities by approximately 650 000 by 2021, which could increase by 50% if the price of electricity doubles (Jeffrey, 2015). A carbon tax has the potential of pushing down the demand for labour in carbon-intensive industries (Carbone, Morgenstern, Williams III & Burtraw, 2013), this will be as carbon intensive businesses try to cut costs. Opponents to a carbon tax regime argue that the additional tax burden on the economy would result in employment losses in many sectors (Siriwardana, et al., 2013). Carbon intensive businesses will also try to move their operations to countries where there is no or low carbon tax rates (National Treasury, 2010), this will shift employment to other countries increasing the unemployment rate in the process.

Impact on poverty (Standard of living)

South Africa is a country where more than half (54%, 27million) of its citizens live below the upper bound poverty line of R779 per person per month and only 46% are above the same poverty line, meaning they can be considered poverty free. 37% (18.6million) of the population lives below the lower bound poverty line of R501 per person per month, while 22% (10.7 million) live below the food poverty line of R335 per person per month, meaning they are going hungry (Statistics South Africa, 2016). Currently, the proportion of people living in extreme poverty, as per international standard of \$1.25 (in purchasing power parity terms) per day, is 16.5% (Phaahla, 2015). The poverty situation is made better by the distribution of social grants, which more and more South Africans increasingly depend on for survival (Phaahla, 2015). In 1994, social grants recipients were estimated at only 4-million and this has increased to 16.9-million by 30 September 2015 (Ferreira, 2015).

Social grants are the transfers made by the government to poor residents. In a developing country like South Africa that is experiencing high levels of poverty, such grants are of paramount importance as they fill a big welfare hole and help reduce the level of poverty among the lower income groups (Phaahla, 2015). Low-income families spend a larger proportion of their income on energy hence, a tax that increases energy prices would disproportionately affect the budgets of the poorest families (Kreutzer & Loris, 2013). This then makes it important to study the likely impacts of the proposed carbon tax on the grant amounts (buying power) and the standard of living of the poor. The introduction of carbon tax will cause changes in the relative prices of commodities as industries incorporate carbon tax into their production costs (Siriwardana, et al., 2013) effectively passing the carbon tax to the consumers. In addition to the carbon tax price increases, the South African consumer price inflation is already forecasted to increase from 4.6% in 2016 to 6.8% in 2017, this will be followed by a slight decline to 6.3% in 2018 (National Treasury, 2016). The price increases will decrease the real grant amount, unless transfers are indexed to inflation, in which case carbon tax has relatively little impact on the magnitude of transfers in real terms, and may increase the magnitude in National nominal terms (Blonz, et al., 2012).

South Africa spends 3.4% of its GDP on social grants (Phaahla, 2015). Of the country's total expenditure, 11.45% relates to social protection (National Treasury, 2016). There is a concern among South Africans about the ever increasing grant budget, among them is president Jacob Zuma who said that government "cannot sustain a situation where social grants are growing all the time and think it can be a permanent feature" (Ferreira, 2015). If carbon tax is introduced, government grants will have to be increased as they play a big role in poverty alleviation in the country, not increasing them will put more South Africans under the food poverty line, making the already bad poverty situation worse. The question now is, will the South African government afford to increase the already high grant amounts? South Africa has been experiencing a decreasing budget deficit, from 4.1% in 2012 to 3.2% in 2016 (National Treasury, 2016). The country is experiencing low economic growth, a current account deficit and increasing public expenditure, it is therefore questionable whether government grant increases are affordable.

ENSURING A SUCCESSFUL CARBON TAX IMPLEMENTATION

Some scholars advocate the success of carbon tax as an answer to a better 'future'. Answering to the question of having an appropriate carbon tax rate,

the National Treasury of South Africa advocates that there should be a proxy carbon tax base, which provides two options (National Treasury, 2010):

- Upstream: Where fuels enter the economy according to a fuel's carbon content, and
- Downstream: tax is on emitters at the point where fuels are combusted.

Both suggestions would respond to the possibility of a carbon tax only being levied to local producers, as the tax will either be on supply by the local producer or on importing by the local user. Indirectly, responding to tax pitfalls and ensuring that the tax is applied to both local and international brands, treasuries suggestion will also respond to regulating competition to ensure that it is fair.

It is highly important that low-carbon technologies, with low costs are utilised to achieve carbon reduction targets in South Africa (Luderer, et al., 2013). This may be achieved as technology becomes cheaper and more advanced as the years' progress, giving better chances to reduce earlier carbon emissions, due to human skills and knowledge improvements. South Africa must invest in low-carbon technologies, and the government can incentives this by providing immediate or accelerated tax deduction for trades that are acquiring low-carbon technologies (National Treasury, 2010).

The tax is a clear winner from the perspective of those countries implementing it and quite damaging to some of the countries subjected to it (Luderer, et al., 2013). The South African Treasury would be at an advantage if it implements carbon emission taxes now than later. But that could not be said for the general economy. There is a cost associated with leaving the introduction of this proposed tax. This is associated with external countries recovering their carbon emission taxes in countries that have no related tax.

The government should avoid the impact of a carbon tax on the poor (Winkler & Marquard, 2011). Winkler and Marquard (2011) raised concerns that the effect of carbon tax to the poor will emerge both directly (through an increase in the cost of electricity, coal, paraffin, LPG and fuelwood) and indirectly (through higher input costs of services, example, transport). Just like the government was able to do with Value added Tax (VAT), they can either make essential goods zero rated or exempt supplies.

The decision to use embodied carbon tariffs by pushing developing countries to be subjected to such a tax could be quite destructive to the existing policy process. In the extreme, it could even result in a tariff

war (Böhringer, et al., 2011) because developed countries may advocate for a blanket carbon policy while developing countries advocate varying carbon policies to ensure that each country and industry only pays for what they emit and use.

DISCUSSION

Our findings from the review of extant literature suggests that South Africa is not ready for a carbon tax regime. Why is South Africa not ready for a carbon tax regime now? Implementing a carbon tax regime comes with its challenges due to its complexity and if not properly implemented it can have a negative impact on the country's economic growth which is presently under strain. This may be difficult due to political upheavals and corruption. South Africa is currently facing rising electricity costs, rising inflation levels, slow economic growth, operating on a budget deficit, rising unemployment levels and most of its citizens live below the poverty line amongst other issues. A carbon tax regime will have indirect implications on these issues, most likely exacerbating them, leading the country to a dire situation economically and socially. The severe casualty of carbon tax will be the poorest of the poor, most of who are dependent on government grants as they are already finding it difficult to put food in the table. This may come as companies shift carbon tax costs to consumers to remain profitable. The difficulty of implementing the carbon tax regime and its effects on the poor specifically in South Africa was advocated by Fakoya (2013), where he linked the complexity to the dependence of the residents on government grants.

IMPORTANCE OF THIS STUDY

This paper is sounding a note of caution to the South African authorities on the potential effects of introducing a carbon tax, while addressing the timing issue of the carbon tax regime. The findings can thus be potentially used in making decisions about the implementation of the carbon tax regime. The relevance of the study cannot be overemphasized considering the present political, social and economic state of South Africa.

LIMITATIONS

Findings in this study is inconclusive because the scope is limited by the availability of empirical data. The study adopts a literature review thereby excluding the collection of empirical data on the effects of implementing a carbon tax regime in South Africa. Most the references relate countries which have implemented or contemplating a carbon tax policy. Since only a literature review was performed, more detailed empirical studies can be

conducted after South Africa may have implemented the carbon tax regime successfully.

CONCLUSION

High carbon intensive production is a major cause for high carbon dioxide emissions. This is so with a developing economy like South Africa. Considering the challenges that a carbon tax regime will bring to the South African economy in addition to existing socio-economic problems the country is facing, the timing is questionable. Policy makers should evaluate and consider the indirect implications of a carbon tax implementation in their decision-making. This should be followed by an exploration of possible alternative actions to mitigate the indirect implications to make decisions that are in the best interests of the environment and the country's economy.

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