DETERMINING OPTIMAL SOCIAL ASSISTANCE LEVEL IN AFRICAN AND ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) COUNTRIES

BY

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Declaration

I, Netshikulwe Matamela (17023652), declare that this thesis titled, Determining optimal social assistance level in African and Organisation for Economic Co-Operation and Development (OECD) countries, and the work presented in it is my own. I confirm that:

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Dedication

This thesis is dedicated to my late grandmother, Vho-Makwarela, who passed on during the course of this degree and my daughter, Vhusa, who was born in this period too. I further dedicate this to my beautiful family, to whom I look up to in every sphere of my life. Without their tremendous support, I would not have accomplished this. I also dedicate this as a motivation to all young girls, that it is possible if you believe and work diligently.

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Abstract

The need to realise steady economic growth, measured in this research by Gross Domestic Product (GDP), has ignited a plethora of studies about the contributors of economic growth and their optimal levels. Government expenditure is one contributor to economic growth. From a theoretical standpoint, optimal government size is depicted by an inverted U-curve known as the Armey curve which is hypothesised between the relationship of government size and economic growth. Empirical literature provides evidence that optimal government size is between 20-30 percent a share of GDP. However, little has been done to investigate the optimal level of isolated components of government spending that maximizes economic growth. One component of government spending that has gained limelight over the past decade is that of social assistance. Defined as public expenditure spent as cash and food transfers to the poor, this research uses social assistance expenditure to assess its optimal level that maximizes growth. This is important because some policymakers are concerned about the ballooning budgets directed at social assistance, and argue that the scarce resources need to be transferred to other social services sectors such as health and education. Basing on the panel-data accessed from the World Bank, this research uses the quadratic equation model to determine the optimal level of social assistance for African and Organisation for Economic Co-Operation and Development (OECD) countries covering the period 2009-15. The finding is that the optimal level of social assistance spending for African and OECD countries is 3.2 percent of GDP and 29.4 percent of GDP respectively. The study also finds that both African and OECD countries operate below the optimal levels and it is suggested that they need to increase social assistance spending in order to realize positive contributions to economic growth.

(Keywords: Armey curve, Optimal social assistance, Panel-data, Fixed effects, Random effects, economic growth)

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CHAPTER ONE

INTRODUCTORY CHAPTER

Since the beginning of time, societies have always experienced socio-economic hazards which affect individuals in various ways depending on their vulnerability. Vulnerability is defined by Kelman (2011) as the inability to resist a hazard or to respond when a disaster has occurred. This raises the need by either the individuals themselves or, if not able, by their government to protect them from the effects of these socio-economic hazards and enhance their living standards. In the past two decades, the development discourse has mainly concentrated on the need for government to protect its citizen through the social protection agenda.

Various agencies and authors have developed different definitions of social protection (see Appendix 1). In the academic discourse, social protection has been defined by Devereux & Sabates-Wheeler (2004) as the set of all initiatives, both formal and informal, that provide: social assistance to extremely poor individuals and households; social services to groups who need special care or would otherwise be denied access to basic services; social insurance to protect the people against the risks and consequences of livelihoods shocks; and social equity to protect people against social risks such as discrimination and abuse.

This definition has four major components that together constitute social protection: social assistance, social services, social insurance and social equity. This research focuses only on social assistance. According to Barrientos (2013), social assistance refers to large scale anti-poverty schemes that are non-contributory and are tax-funded to provide direct cash or food transfers to individuals or households experiencing poverty or vulnerability.

Given its role to fight poverty, social assistance is regarded by different governments as a crucial instrument to uplift the living standards in poor societies in the context of job-less economies (see appendix 2 for country's definitions of social assistance). As a result, social

assistance is provided by the state from the public purse, and thus it is a component of public expenditure, which competes with other public expenditure such as military and public infrastructure construction. In an attempt to justify public spending on social protection in general and social assistance in particular relative to other competing uses, economists who believe in the interventionist school of thought have attempted to prove that social assistance contributes to economic growth.

Devereux & Sebates-Wheeler (2004) suggest that social protection, especially social assistance, contributes to economic growth both directly and indirectly respectively. Social protection contributes to economic growth directly when redistributive transfers raise the incomes and smooth the consumption of the poor. This allows the poor to engage in moderate risk-taking and to protect, rather than erode, their asset holdings when confronted with livelihoods shocks. Social protection contributes indirectly to economic growth through asset creation. For instance public works programmes build public infrastructure and school feeding schemes invest in human capital. Social protection spending may also cause ripple growth effects in the economy through income or employment multipliers.

Arjona et al, (2002) posits that the benefits of social protection may not necessarily be evaluated against economic growth. Instead, they argue for three things: one, that social protection may lead to a more cohesive society that is better able to tackle challenging political and economic decisions resulting in positive structural adjustments; two, that social protection assists the excluded group or class of society to be brought back and participate in the market economy; and three, that social protection leads people, especially children, out of poverty with long term benefits on human capital. On the other hand, social assistance benefits may discourage people from working which leads to a decline in the amount of labour supplied to the economy and then level of output which eventually dampens growth (Alper & Demiral, 2016).

This research is based on the direct relationship between social assistance and economic growth, and is an attempt to assess the level of social assistance that optimises growth in African as well as OECD countries.

1.1. Conceptual points of departure and research questions

Social assistance has gained prominence over the past decade (Barrientos, 2013) and for the first time social protection has been made a target to alleviate poverty in adherence to the sustainable development goal (SDG) number one. This has seen social assistance expenditure increasing annually for most developing countries, especially in Africa (World Bank 2017). Some policymakers have argued that the increased public spending of social assistance could be creating a dependency syndrome and they also make an argument that free cash dampens production and therefore economic growth. As such, these policymakers would rather have the expenditure redirected through other sectors such as education and health, which are known to contribute positively to human capital.

Two questions emerge from the foregoing discussion. First, does social assistance contribute to economic growth? Second, if so, at what level is social assistance expenditure optimal in maximizing economic growth? Answering these questions could inform policymakers the point at which resources would need to be switched from social assistance to other sectors in order to realise steady economic growth. This point can be determined by the Armey curve.

A number of empirical studies have used the Armey curve to understand the relationship between government size and economic growth in various countries (see, Facchini & Melki 2011, Vedder & Gallaway 1998). However, not many studies have attempted to study the relationship between social assistance as a component of government expenditure and economic growth. This study attempts to cover this knowledge gap using panel-data from the World Bank for African and the OECD countries.

1.2. Scope of the study

The sample under consideration consists of seven African countries and 32 OECD countries. The study is limited to these countries due to data availability at time of collection from the World Bank. It is to be noted that social assistance has not long been collected and as such the time period is also limited to seven years, which is from 2009-15, as available in the World Bank.

1.3. Objectives of the study

The specific research objectives of the study are to:

i. Establish the relationship between the countries' social assistance and economic growth for policy counsel focussed on boosting economic growth.
ii. Find an optimal social assistance level for each sample that maximizes economic growth.

1.4. Justification of the study

Social assistance expenditure for countries in Africa and OECD has been increasing since the last decade, which is also increasing total government expenditure for social spending. From the endogenous growth theory, government can influence economic growth through macroeconomic policy. This brings the need to study the nature and degree of social assistance expenditure impact on economic growth. Once found, the government may restructure its social assistance expenditure in ways that both fulfil the goals of social assistance and maximizes economic growth. The study uses the Armey curve, which is plotted from the predicted values of the model, to study this relationship.

1.5. Structure of the thesis

The study is organized as follows:

Chapter 1: Introduction. This section introduces the study giving conceptual points of departure and highlights the research question.

Chapter 2: Background of the study. A discussion of the profiles of social assistance in African and OECD sampled countries under study and comparison thereof is provided.

Chapter 3: Literature review. This section looks at both theoretical and empirical literature based on the existing body found in Africa and OECD.

Chapter 4: Research Methodology. This section presents data and methodology that the study employs; comprising mainly of panel data procedures to be tested and interpreted.

Chapter 5: Empirical analysis and discussions. Here, results of the study are presented and show a significant relationship between variables of interest. Optimal points are determined and overall results further discussed with reference to literature review.

Chapter 6: Conclusions and recommendations. Optimal point is found for both samples and it is concluded that social assistance expenditure is not maximizing economic growth.

CHAPTER TWO

SOCIAL ASSISTANCE IN AFRICA AND OECD

2.1.Definition of social assistance

Social assistance does not have a universal definition (see Appendix 2). In some countries, it is a concept associated not only with income maintenance but also with social work services and individual rehabilitation. In other countries, as also observed by Bradshaw et al. (1996), it is understood as referring mainly to discretionary supplementary schemes which are subsidiary to the main means-tested minimum income benefit. Although social assistance can be publicly and privately provided, this paper considers only publicly provided social assistance, which is a component of government expenditure.

The similarity in definitions in appendix 2 is that social assistance is non-contributory and assist those in need. For the purpose of this paper, the definition to be used is taken from Bradshaw et al. (1996) which states that 'Social assistance is a range of benefits and services available to guarantee a minimum (however defined) level of subsistence to people in need based on a test of resources'.

Social assistance is generally a combination of income transfers and human development targeted interventions, although income transfers dominate (Barrientos, 2010). According to Barrientos, income transfers can be classified as follows:

- Pure income transfers programmes which include transfers targeted to poor households, and categorical transfers such as children and family allowances, and social pensions;
- Income transfer programmes conditional on the supply of labour which require that beneficiaries supply labour for specific periods of time, and are tied to the improvement of infrastructure or community services;

- Income transfer programmes conditional on human capital investment which include human development-targeted transfers schemes, also referred to as conditional cash transfers. These focus largely on education, health and nutrition, and aim to break the persistence of poverty across generation;
- Integrated poverty reduction programmes which constitute an important new innovation in social assistance, combining a range of interventions focused on the poorest.

Different countries use different criteria or different minimum requirements to select beneficiaries of social assistance programmes. In developed countries, social assistance is largely a residual safety net charged with protecting a minority of individuals and households from the effects of poverty, after all the other components of social protection have failed (Bradshaw et al., 1997). In developing countries, social insurance covers a minority of labour force, labour market regulations are thin and poorly enforced, and the incidence of poverty and vulnerability are high; social assistance is the primary social protection instrument addressing poverty and vulnerability (Barrientos, 2013). These may explain the expansion of social protection largely concentrated on social assistance in most developing countries.

2.2.Profiles of Social assistance in Africa

Most states in Africa experienced some kind of social injustices before attaining independence and still face the challenges in redressing them post-independence. Their new constitutions enshrines, amongst others, the citizens' right to social assistance in particular, if not social protection or social security in general. There are various programmes in most countries designed to provide social assistance depending on the structure of the citizen's needs. Provision of assistance is usually in cash transfers although the purposes of the transfers vary. The following profiles are for the selected countries in Africa included in the study.

In Tunisia, the Programme national d'aide aux famille nécéssiteuses (PNAFN) is the largest social assistance programme created in 1986 (United Nations Beruit, 2016). It is the sole and unconditional cash transfer programme, and had a budget equivalent to 0.47 percent of GDP in 2013 covering 13 percent of the lowest income quintile of Tunisia's population (World Bank, 2013). The programme provides social assistance through universal subsidies, targeted cash transfers and free or subsidized health care (United Nations Beruit, 2016). These forms of provision are similar to those of South Africa which provides social assistance through social grants (covering 33 percent of the population in 2017 (StatsSA, 2017)); free basic electricity, water, education, and primary healthcare to indigent members of the society. In contrast, social assistance in South Africa has a budget of 3 percent a share of GDP (World Bank, 2017) and also covers a larger portion of the citizens

Some programmes generally focus more on cash transfers towards family and elderly grants. Countries such as Namibia and Uganda have their respective social assistance programmes mainly consisting of social pensions for the elderly and disabled, vulnerable family support grants based of demographic indicators for eligibility, and child grants based on the need for fostering, disability and one parent being unable to provide for the child. In Uganda, the programme named as Social Assistance Grants for Empowerment' aims to generate evidence on the impact and feasibility of delivering small but regular and reliable direct income support to poor and vulnerable households (Barrett et al., 2014). Social assistance in Namibia is one example that shows the effectiveness of direct income support estimated from reduced headcount poverty on the higher poverty line by more than 30 percent (International Labour Office & Oxford Policy Management, 2014).

As food security declines in many developing countries, most have now redirected social assistance to attend to food shortages in poorest households. Ethiopia, Senegal and Zimbabwe have the programmes named 'Productive Safety Net Progamme', 'National Family Security

Grants Program' and 'Harmonized Social Cash Transfers' respectively. Provisions targeting the poor households are made through conditional and unconditional cash and food transfers based on season and need. In Senegal and Zimbabwe, the labour-constrained families are targeted and in some cases the beneficiaries must attend all sensitization workshops. The PSNP in Ethiopia has had a positive impact on the livelihoods of households where families are now experiencing improved food security, increased asset creation and protection, increased utilization of education and health services and improved agricultural productivity (World Food Programme, 2012).

2.3.Profiles of Social assistance in OECD

Social assistance policy in most OECD countries focuses on promoting independence of beneficiaries through social help and employment support policies. The policy rests on three pillars which are: financial assistance to help households obtain an adequate standard of living; social help to assist families in dealing with an underlying social contingency such as disability, homelessness or addiction; and employment support to help households with their re-integration in the labour market thereby regaining their autonomy (Adema, 2006).

There is no uniform model of social protection or social assistance in the OECD area, such that the systems vary across countries depending on the size, institutional set-up and re-distributive tax/benefit systems (Esping-Andersen, 1990).
The state of social assistance system in a country determines the types and roles of social assistance provided. All social assistance schemes have complex administrative structures, but there are important differences between countries in how benefits are organised and delivered (Adema, 2006).

The most common benefits of social assistance within the OECD are: regular but non-standard living expenses, for example exceptional dietary, health, heating or travel costs; additional benefits for exceptional expenditure, for example replacement or repair of furniture and household equipment, maternity costs, funeral costs; the provision of social services to persons in need; a set minimum income standard included in the social assistance payment; a basic allowance covering normal day-to-day living expenses (other than housing), for example food, clothing, fuel, local taxes; child and family allowances; and housing allowances. Greater part of the OECD countries provide income support to households not having sufficient resources to support themselves. Countries such as Canada, United Kingdom, and Denmark have devoted a lot of their social assistance spending on income support while this category is low in countries like Australia. In Australia, income support rate depend on family circumstances and are lower for those with high income or assets (OECD, 1998). Not many countries offer a lot of housing assistance, but Britain followed by Sweden and France take lead.

Social assistance spending as a share of GDP varies by countries. There are countries spending less than one percent of GDP categorized as small spenders and these include Japan, Southern European countries except Italy and Turkey and other European Union countries. France, Germany, Italy, Canada, Sweden, Denmark, Austria and Netherlands are regarded as medium spenders. There are those countries spending above the average on all means-and-income tested benefits such as Australia, Ireland, New Zealand, United Kingdom and United States of America.

There are several groups of social assistance beneficiaries in the OECD and they too are categorized. The four major groups are that of older people, disabled people, lone parents and the unemployed. Older recipients of means-tested benefits are numerous in Australia, New

Zealand, Ireland and United Kingdom. In Australia and New Zealand, there are no social insurance schemes while in United Kingdom and Ireland, social assistance benefits supplement relatively low basic pensions. The study by Bradshaw et al. (1997) finds that more disabled recipients were in Italy, Belgium, Iceland, Australia, Canada and the United States of America. Furthermore, lone parents forms a relatively large group of beneficiaries in the United States of America, Canada, New Zealand, Australia, Finland and the United Kingdom. The last major group is the unemployed, who are also the principal cause of the increase in OECD social assistance beneficiaries. This rise is influenced by different entitlements, range and generosity of alternative benefits and change in the definitions of unemployment.

2.4.Comparison of social assistance in Africa and in OECD

Sections 2.3 and 2.4 bring to light the characteristics of social assistance in both the OECD and African country samples. They have differences but also do have similar characteristics. The most common benefit in all is the income-support which aims at either supplementing income to households not earning up to a certain threshold or for specific-purposes such as elderly grant and child grant. The composition of social assistance in OECD is broader than that of Africa in that the assistance serve vast purposes from grants to housing allowances whereas in Africa, it's mostly grants and food programmes. In Africa, there is high levels of poverty than in OECD such that most focus is alleviating poverty than in OECD where social assistance is able to help citizens acquire assets.

CHAPTER THREE

LITERATURE REVIEW

3.1. Theoretical background

This section considers the relationships between social assistance, a component of government spending used as proxy for size and is part of social protection, and economic growth at a theoretical level. Theories in the existing literature that have been developed are reviewed in order to base the hypothesis of the study.

3.1.1. Approaches to social protection

To date, social assistance is yet to have conceptual approaches. As such, this section considers conceptual approaches at social protection level, which is broader than social assistance. Three approaches are reviewed and these are transformative social protection, social protection floors and social risk management.

Social risk management (SRM) is defined as a collection of public measures intended to assist individuals, households and communities in managing risks in order to reduce vulnerability, improve consumption smoothing, and enhance equity while contributing to economic development in a participatory manner (Devereux & Sabates-Wheeler, 2004). The SRM framework comprises of four elements namely: 1) the type of risk incurred - this element traces the impacts of shocks and risks on various livelihoods assets; 2) the type of strategies to address income shocks - risk reduction (*ex ante* actions to increase the level of income), risk mitigation (*ex ante* actions to reduce the income variance if a shock were to occur) and risk coping (*ex post* actions to alleviate the impact of a shock); 3) the type of instruments by formality of arrangements – these range from informal or personal arrangements to market based arrangements to formal or publicly mandated or privately provided arrangements; 4) the type

of institutions and actors involved – this framework recognises that a diverse range of actors can be involved in social protection provision such as state institutions, market-based institutions, NGO's, households and individuals.

Social Protection Floors (SPF) is defined as guarantees that secure the availability, provision of and access to an essential level of quality social protection and services to all (UNDP-ILO, 2010). Guaranteeing access to essential services and transfers that are part of the SPF empowers people to cope with the economic fallout of the crisis while maintaining their dignity (International Labour Organization & World Health Organization, 2009). SPF should comprise of at least the following four social security guarantees: 1) access to essential health care, inclusive of maternity care; 2) basic income security for children, providing access to nutrition, education, care and any other necessary goods and services; 3) basic income security for persons in active age who are unable to earn sufficient income, in particular in case of sickness, unemployment, maternity and disability; 4) basic income security for older persons (ILO, 2012).

In a case where the need for social protection is defined as mechanisms for smoothing consumption in response to fluctuating or declining incomes, initiatives are taken focussed on targeted income or consumption transfers. These transfers provide economic protection in response to economic risks and livelihoods vulnerability, yet they lack to protect people from social vulnerability. This opens a platform to introduce the transformative approach to social protection. The transformative element refers to the need to pursue policies that relate to power imbalances in society that encourage, create and sustain social vulnerabilities. There are a number of spheres with which this transformative approach may be needed. The intra-household division of resource ownership, access and use and strategies that deal with problems of social vulnerability are two examples of these spheres. In particular, Devereux & Sabates-Wheeler (2004) argue that the first sphere could be in the form of support to trade

unions which may enable socially marginalized groups to claim rights to livelihood enhancing assets or changes to the regulatory framework that could protect vulnerable groups against discrimination and abuse. Furthermore, they posit that strategies to deal with social vulnerability problems may include those that address power relations between men and women and protect women from vulnerability caused by the socio-cultural values.

One could argue that social protection systems are most likely to achieve their transformative potential if their foundations are strongly laid in human rights. This introduces the Human Rights Based Approach (HRBA) to social protection which is normatively based on international human rights standards. This approach is primarily based on the principles of universality and equality, that every human being is entitled to social protection. With this approach, universal schemes are preferred to those that benefit special categories of beneficiaries. HRBA consists of a number of essential attributes, which include formulating policies and programmes that aim to fulfil human rights, identifying rights holders and their entitlements and corresponding duty bearers and their obligations, and working towards strengthening the capacities of rights holders to make their claims and those of duty bearers to meet their obligations (United Nations Research Institute for Social Development, 2016).

3.1.2. Growth theory

A plethora of studies have long been based on the neoclassical growth model, pioneered by Solow (1956). This model is also known as exogenous growth mode and predicts that economies grow with exogenous technological change. This theory postulates that government policy cannot affect economic growth because economic growth effects are determined exogenously except when the economy is transitioning to a steady state.

The new growth theory, also known as the endogenous growth model, pioneered by Romer (1986), Lucas (1988), Barro (1990), and Rebelo (1991), documents a nonlinear relationship

between economic growth and government expenditure. It differs with the neoclassical growth theory in that government, as an endogenous variable, can affect economic growth implying government can influence economic growth through macroeconomic policy.

3.1.3. The Armey Curve

The Armey curve, proposed by Armey (1995), represents a non-linear relationship estimated between government size and economic growth which is illustrated by an inverted U-shaped curve. This curve plots government spending and predicted real GDP. Theoretically, this relationship originates from a contribution of Barro (1990) suggesting that the effect of an increase in government spending and taxation on the economic growth is dependent on government size. This means that in an endogenous growth theory, there's a positive (negative) net effect if the government size is small (big).

Vedder & Gallaway (1998) support the arguments of the Armey curve, and stress that government spending in moderation is good for the economy while it is bad when done in excess. Most importantly, the Armey curve determines an optimal point of government size (found at the peak) that maximizes economic growth. When government is small, political actions at income redistribution via tax policy or through payments to the poor are modest in magnitude (Vedder & Gallaway, 1998). As government continues to grow beyond the growth maximizing point, the law of diminishing marginal returns kicks in, implying that further expansion of government spending no longer enhance economic growth, but contributes to its stagnation and decline.

This paper uses the Armey curve theory on economic growth and social assistance, a component of government spending, instead of government size.

3.2. Empirical literature

3.2.1. Studies on government size and economic growth

A plethora of empirical studies exist in the body of literature that looks at government size and economic growth relationship. There is a prominent view within the existing literature postulating that governments are generally larger than optimal, and Kahn (2011) deduces that such is due to spending programs and regulations adopted by many countries in response to the 2008 economic crisis. The estimated optimal government size is between 15 and 30 percent of GDP.

A study by Chobanov & Mladenova (2009) on 28 OECD countries over the period 1970-2007, measuring government size by overall government spending as a share of GDP, suggests that the optimal level of government spending is 25 percent and best explained by the Scully (1994) model. This study is limited by data and type of model which results in escalated evidence. It suggests that the true optimum government level is smaller than the 25 percent and that it not only depends on government size but also on its quality which is not incorporated as its measures are inherently subjective.

Facchini & Melki (2011)'s study of France over the period 1871-2008 uses total public expenditure as a share of GDP to measure government size to find strong evidence of an Armey curve relationship explaining economic growth and government size using the quadratic model. However, they find no robust relation when using the linear equation. The same study reveals that the optimal French government size is 30 percent of total GDP and this rate was reached in the late 1940s. This rate is in accordance with that found for other countries in Europe but differs with the 20 percent share of GDP found in the United States government. This study is more robust as it spans a long time-series which is one of the longest stable democratic periods analysed.

Most studies look at the impact of government size as it is and do not consider the elasticity of this impact. Guseh (1997) uses a model which differentiates effects of government size on economic growth across political and economic systems for 59 middle-income developing countries over the period 1960-1985. The results suggest that types of political and economic systems in a country affect the magnitude government size on economic growth, where effects are three times as great in countries with non-democratic socialist systems as in countries with democratic market systems. Furthermore, it is suggested that an appropriate policy prescription for economic growth should include reduction in government size and promotion of political and economic liberties.

A study by Iyidogan et al. (2017) on Turkey uses threshold regression model and quarterly data over the period 1998:1-2015:1. An Armey curve is confirmed the study and the estimated threshold level of the Turkish government size is 16.5 percent of total public expenditures as a share of GDP. This study suggests that a large government size does not necessarily lead to a higher economic growth rate and that after some threshold level, further increase in government size has a detrimental effect.

For Taiwan, a study by Chen & Lee (2005) modifies Ram's (1986) two-sector production model into a threshold regression model to test the existence of the Armey curve and applies the Hansen (1996, 2000) to test the threshold effects. The threshold for variable 'total government expenditure divided by GDP' is 22.84 percent, 7.3 percent for threshold variable 'government investment expenditure divided by GDP' and 14.97 percent for threshold variable 'government consumption expenditure divided by GDP'. Each of these variables are used as proxies for government size and give an indication of the existence of a non-linear relationship of an Armey curve.

A study by Mavrov (2007) looks at the existence of the Armey curve and the optimal government size for Bulgaria over the period 1990-2004. The study concludes that Bulgaria's government size of 40 percent is above both optimal rate of 22 percent of GDP (in regression without intercept) and that of 28 percent (in regression with intercept).

Asimakopoulos et al. (2015)'s study of 129 countries available in the World Bank for the period 1980-2009 verifies the Armey curve which is significant around optimal level and on both upward and downward sloping parts. Furthermore, it finds that the optimal government level maximizing economic growth is 18.04 percent for full sample, 19.12 percent and 17.96 percent for developing and developed countries, respectively. These results are robust and valid under a split sample and the optimal levels do not fall far from the general range of 20-30 percent.

Other studies find that it is not necessary for the government size to shrink after optimal level in order to promote economic growth. Bergh & Henrekson (2011) show that negative effects of government size on economic growth can be minimized while promoting economic growth by restructuring taxes and expenditure. They provide plausible explanations of why some countries with high taxes seemingly enjoy above average growth being: i) countries with large governments compensate for high taxes and spending by implementing market-friendly policies in other areas, ii) countries with high social trust levels are able to develop larger government sectors without harming the economy.

3.2.2. Studies on social protection expenditure and economic growth

Not many studies have looked closely at the topic of optimal level of disaggregated government spending, especially social assistance, while some have considered social protection expenditure effects as a whole. Some studies have looked at the impact of components of government spending on economic growth as well as the degree of the impact. However studies of optimal levels of such components still lack.

A study by Arjona et al. (2002) covering 21 OECD countries over the period 1970 to 1998, finds evidence that more social protection expenditure insignificantly reduces output. The estimates from the study suggest that social spending that attempts to change the distribution of market income by promoting the labour market participation of the population earning below the normal market incomes is associated with higher growth as opposed to the other components of social spending. This strengthens the suggestion that each component of social protection expenditure has unique effects on economic growth.

Using a panel data on 12 European Union countries over the period 1970-94, a study by Herce et al. (1998) investigates effects of social protection benefits on economic growth. Results of the study suggest a positive growth rate effect associated with social protection benefits. This study also looks at the different categories of social protection benefits in these countries and finds significant positive effect for health, old age and family programmes but not for employment and housing programmes. The insignificant effect experienced in housing expenditure seem to emanate from the fact that the programme tend to discourage unemployed people to relocate elsewhere to look for jobs. The study interprets the employment insignificance effect as a confirmation of the passive role played by policies towards the unemployed.

Looking at different categories of social protection, a panel study over the years 2002-13 for the selected 18 OECD countries, Alper et al. (2016) employs Feasible Generalized Least Squares estimation procedure and finds that education, health and social protection have a significant positive relationship with economic growth. Social protection is found to be the least contributor to economic growth with .024 coefficient. This paper's overall results suggest that governments can eliminate results of market failures through different channels.

A study by Jaman (2016) employs panel cointegration tests to analyse the long run relationship between economic growth and components of social expenditure (education, health and social welfare) in 8 North-Eastern states of India covering the period 2000-14. This study finds varying results for each state with education expenditure being insignificant in 6 states, implying no causal relationship between it and economic growth, and significantly positive only in one state. A positive significant impact of health and social welfare on economic growth was found in four states and were insignificant in the other four states.

To account for differences in composition of social expenditures between rich and poor countries, Folster & Henrekson (2001) considers only rich countries for the period 1970-95 and find a robust negative relationship between social expenditures and economic growth. The study coefficients indicate that a 10 percent increase in social expenditure as a share of GDP decreases economic growth rate by 0.7-0.8 percentage points. The differences in studies with respect to the impact and degree of impact of social expenditure on economic growth demonstrates the need of further research in this area.

A cross-country study by Blais & McCallum (1987) for selected 17 OECD countries shows that social protection expenditure effects on economic growth are significantly positive. It uses an adjusted social security variable because a large portion of social security payments is made of pensions and there are important cross-country differences in the age structure of the population. Thus it is possible that these differences are influenced by demographic factors. The findings of this paper indicates the existence of an optimal social security growth maximizing level of about 16 per cent. Beyond this point, increases in social security dampens economic growth. This relationship is not fully explained by an Armey curve but by a linear relationship for the years up to 1979, where an additional point on adjusted social security increases growth rate by 0.1 per cent; and then a strongly nonlinear relationship for 1979-83,

where higher values of adjusted social security are associated with higher growth rates up to the optimal point.

3.3. Gap in the literature

This dissertation narrows down to the relationship between social assistance, a component of government spending vested in social protection expenditure, and economic growth. Existing body of literature lacks insight in studies looking at the optimal level of social assistance that maximizes economic growth. Social assistance has been growing in most countries in the last years to a substantial share of GDP and could possibly be seen to be uplifting standards of living for most poor people. One can also say that by uplifting standards of living, social assistance is contributing to human capital which in turn affects economic growth.

CHAPTER FOUR

DATA AND METHODOLOGY

This section discusses the sample of data and sources, functional form of the model, justification of variables to be used and empirical tests to be employed.

4.1. Data Description and Sample Size

To investigate the optimal social assistance level, the study uses panel data for African and OECD countries covering the period 2009-2015. The period under study is selected mostly based on data availability, noting that World Bank started collecting data of social assistance in Africa in 2009. These samples include all countries in Africa and OECD with social assistance data. Using panel data for Africa with N (no. of countries) = 7 and T (time period) = 7, the total number of observations is 49. For OECD, N (no. of countries) = 32 and T (time period) = 7, the total number of observations is 224.

4.2. Selection and justification of variables

Various models are used to study the effects of government size on economic growth such as those of Scully (1998), Ram (1986) and the quadratic equation. Each has their own criticisms. This research employs the quadratic equation model following Vedder & Gallaway (1998) and Pevcin (2004). The choice of employing the quadratic equation model is inspired by other previous studies that show the relationship between general government spending and economic growth represented by an Armey curve. Social assistance, as a component of government spending, relationship with economic growth is also likely to follow this route.

The choice of the variables considered in the quadratic equation for this study is primarily based on the general formula for GDP:

$$GDP = C + G + I + (X - M)$$

where C is consumption, G is government spending, I is investment, X is exports and M is imports. Although the G in this model refers to all government expenditure, not all government spending is under consideration in this dissertation as it is substituted for by social assistance spending as a share of GDP. GDP in this study is taken in constant terms and in Rands. However, GDP growth rate is used as proxy for economic growth and not actual GDP. The growth rate is not calculated by author from the GDP, but sourced from the World Bank and OECD data for respective countries. These variable letters used in this model will not be referred to further from here.

The sources of variables from the model used in the study, together with the control variables, are given in table 1.

Table 1: Variables and Source

Variable	Description	Source
GDP	Gross Domestic Product at constant prices	World Bank, World Development Indicators and OECD data
Y	Gross Domestic Product growth rate (Proxy for economic growth)	World Bank, World Development Indicators and OECD data
S	Social assistance (share of GDP)	World Bank, The Atlas of Social Protection and OECD data
U	Unemployment rate	World Bank, The Atlas of Social Protection and OECD data
I	Inflation rate	World Bank, World Development Indicators and OECD data
T	Time variable	Determined in model
O	Trade	World Bank, World Development Indicators and OECD data
C	Gross capital formation	World Bank, World Development Indicators and OECD data
P	Population growth	World Bank, World Development Indicators and OECD data

The quadratic equation model tests the relationship between social assistance expenditure and economic growth where this relationship is expected to produce an inverted-U curve known as the Armey curve and follows (Vedder & Gallaway, 1998) as given below:

$$GDPgrowth_{i,t} = a_i + b_1 S_{it} + b_2 S_{it}^2 + b_3 T_t + b_4 U_{it} + b_5 C_{it} + b_6 O_{it} + b_7 I_{it} + b_8 P_{it} + \varepsilon_{it} \qquad Eq.4.1$$

Coefficient of S, b_1, is expected to be positive showing positive effects of social assistance expenditure on output, while that of S^2 is expected to be negative indicating adverse effects associated with increased social assistance. *T* is the time variable that is included because output grows over time as well as the growth of human and capital resources. Variable U, which is the unemployment rate, is included to explain the changes in output as business cycle fluctuates. Output is expected to be below the average GDP at a time T where unemployment rate is high. Variable I is inflation rate as a percentage of change of Consumer Price Index, added to account for general rise in prices. Variable O is trade. Gross capital formation is represented by variable C, this is added to capture the share of investment in GDP. Variable P represents population growth and ε_{it} is the prediction error term which represents how observed data differs from actual data. The prediction error term reflects nonlinearities, unpredictable effects, measurement errors and omitted variables.

The shape of the Armey curve, which is the inverted U-shape, is expected to emerge due to the negative S^2 term. This term grows faster than S such that negative effects from social assistance expenditure will eventually be greater than positive effects, hence the downward sloping part (Pevcin, 2004).

4.3. Preliminary Tests

4.3.1. Multicollinearity

To determine the problem of multicollinearity, let D be the set of all independent variables X and L_u be the set of all independent variables excluding the X_u. The standard errors are calculated as follows:

$$s_{b_u} = \sqrt{\frac{1 - R_{TD}^2}{(1 - R_{X_u L_u}^2)(N - U - 1)}} \times \frac{s_y}{s_{X_u}}$$

$$= \sqrt{\frac{1 - R_{TD}^2}{Tol_u \times (N - U - 1)}} \times \frac{s_y}{s_{X_u}}$$

$$= \sqrt{Vif_u} \times \sqrt{\frac{1 - R_{TD}^2}{(N - U - 1)}} \times \frac{s_y}{s_{X_u}}$$

The term $R_{X_u L_u}^2$ indicates the degree of collinearity between variable X_u and other independent variables. The bigger it is, the more highly correlated the above mentioned variables are and this increases the standard error because a large number is being subtracted from the denominator. Multicollinearity arises when the other independent variables and X_u become perfectly correlated which increases the $R_{X_u L_u}^2$ term such that the standard error tends to be infinite. It then becomes difficult to determine which independent variable is producing efficient effect on the dependant variable.

The $Tol_u = 1 - R_{X_u L_u}^2$ is the tolerance of X_u which ranges between 0 and 1 with zero indicating more possibility of multicollinearity and one indicating little multicollinearity. $VIF = 1/Tol_u$ is known as variance inflation indicator and shows how much the variance of the coefficient estimate is being inflated by multicollinearity. Usually if the VIF is greater than 10 it indicates multicollinearity.

4.3.2. Unit root tests/Stationarity under Panel data

Most macroeconomic data exhibit non-stationary processes (Perron, 1989), which means unit root exists, raising the possibility of spurious regression results because their means, variances and covariances are time dependent. To investigate the existence of unit root in panel data, this study employs the Levin-Lin-Chu (2002) test, starting from the following panel-data model:

$$\Delta y_{it} = \emptyset y_{i,t-1} + z'_{it}\gamma_i + \epsilon_{it} \qquad Eq.4.2$$

The null hypothesis is $H_0: \emptyset_i = 0$ for all i, that is, all panels contain unit roots and the alternative hypothesis is $H_1: \emptyset_i < 0$, that is, panels are stationary. $i = 1,\ldots,N$ indexes panels; $t = 1,\ldots,T_i$ indexes time; y_{it} is the variable being tested; ϵ_{it} is a stationary error term; z_{it} term can represent panel-specific means, panel-specific means and a time trend, or nothing, depending on the options specified on Stata. Further, $z_{it} = 1$ by default so that $z'_{it}\gamma_i$ represents panel-specific means (fixed effects).

Levin-Lin-Chu (2002) augments equation (1) with more lags, p, of the dependent variable y_{it} as follows:

$$\Delta y_{it} = \emptyset y_{i,t-1} + z'_{it}\gamma_i + \sum_{j=1}^{p} \theta_{ij}\Delta y_{i,t-j} + u_{it} \qquad Eq.4.3$$

Where inclusion of sufficient lags results in u_{it} being white noise. y_{it} is nonstationary under H_0 such that the standard Ordinary Least Squares (OLS) regression t-statistic for $\emptyset$ will have non-standard distribution. The method produces a bias-adjusted t-statistic that has an asymptotically normal distribution (Stata 2008). If a panel-specific means term is included in this model, the OLS estimate of $\emptyset$ is biased towards zero.

This study specifies the 'noconstant' option which suppress the panel-specific means term, $z'_{it}\gamma_i$. This option is chosen to fit data for this study where time dimension T is allowed to grow

more slowly than the cross-sectional dimension such that $\frac{\sqrt{N}}{T} \rightarrow 0$ and all panels balanced (countries with social assistance data may increase faster than the time-period).

4.3.3. Cointegration test

The panel cointegration test developed by Westerlund (2007) tests for the absence of cointegration by determining whether there exists error correction for individual panel members or for the panel as a whole. The error-correction tests (Stata Journal, 2008) assume the following data-generating process:

$$\Delta y_{it} = \delta_i' d_t + \alpha_i(y_{i,t-1} - \beta_i' x_{i,t-1}) + \sum_{j=1}^{p_i} \alpha_{ij} \Delta y_{i,t-j} + \sum_{j=-q_i}^{p_i} \gamma_{ij} \Delta x_{i,t-j} + e_{it} \; Eq.4.4$$

where *t = 1, ..., T* and *i = 1, ..., N* index the time-series and cross-sectional units, respectively, while d_t contains the deterministic components, for which there are three cases. For first case, d_t has no deterministic terms; in the second case, $d_t = 1$ such that Δy_{it} is generated with a constant; in the third case, $d_t = (1,t)'$ so Δy_{it} generated with both a constant and a trend. The K-dimensional vector is modelled x_{it} as a pure random walk such that Δx_{it} is independent of e_{it}, and it is assumed that these errors are independent across *i* and *t*. The estimated method is then written as:

$$\Delta y_{it} = \delta_i' d_t + \alpha_i(y_{i,t-1} - \lambda_i' x_{i,t-1}) + \sum_{j=1}^{p_i} \alpha_{ij} \Delta y_{i,t-j} + \sum_{j=-q_i}^{p_i} \gamma_{ij} \Delta x_{i,t-j} + e_{it} \; Eq.4.5$$

where $\lambda_i' = -\alpha_i \beta_i'$. α_i determines the speed at which the system corrects back to the equilibrium relationship $y_{i,t-1} - \beta_i' x_{i,t-1}$ after a sudden shock. If $\alpha_i < 0$, then there is error correction, which means there is cointegration between x_{it} and y_{it}. If $\alpha_i = 0$, it means there is no error correction hence no cointegration. The latter is given as the null hypothesis.

4.4. Regressions for the quadratic equation model

4.4.1. Random effects model

The random effects (RE) model differs with the fixed effects (FE) in that the variation across countries is assumed to be random and uncorrelated with the predictor variables. The random model to be estimated is:

$$GDPgrowth_{i,t} = a + b_1 S_{it} + b_2 S_{it}^2 + b_3 T_t + b_4 U_{it} + b_5 C_{it} + b_6 O_{it} + b_7 I_{it} + b_8 P_{it} + \varepsilon_{it} \quad Eq.\ 4.6$$

where α is between country error and ε_{it} is within country error. In RE, the individual characteristics that could influence the predictor variables need to be specified.

4.4.2. Fixed effects model

The FE panel regression model accounts for individual heterogeneity. Accounting for heterogeneity of countries is crucial as it can influence measurements of the estimated parameters. Non-consideration of heterogeneity bias the results, irrespective of the sample size (Mutascu & Tiwari, 2010). The FE model to be estimated in this paper is as follows:

$$GDPgrowth_{i,t} = a_i + b_1 S_{it} + b_2 S_{it}^2 + b_3 T_t + b_4 U_{it} + b_5 C_{it} + b_6 O_{it} + b_7 I_{it} + b_8 P_{it} + \varepsilon_{it} \quad Eq.\ 4.7$$

where α_i is the unknown intercept for each country, i=1,…,N. ε_{it} is the error term. The FE model controls for all time-invariant differences between the countries, so the estimated coefficients of the FE models cannot be biased because of omitted time-invariant characteristics (Kohler & Frauke, 2009).

4.4.3. Model Specification Test (Hausman test)

Correlation may exist between countries' unobserved individual effects and growth determinants (Mutascu & Tiwari, 2010). To determine whether to use panel model of FE or RE, Hausman specification test is run where the null hypothesis is that the preferred model is RE against the alternative hypothesis that FE is preferred. The test is based on two estimates, one coefficient from the FE model and one from the RE model (Stata, n.d.). RE estimator is consistently efficient under the null and inconsistent under the alternative hypothesis. FE estimator is consistently inefficient under the null and consistent under the alternative hypothesis. If no correlation exists between countries' unobservable individual effects and growth determinants, RE is a preferred method for analysis. If correlation exists between countries' unobservable individual effects and growth determinants, FE is preferred.

4.5. Optimal level of social assistance

The data will be plotted to see if the Armey curve holds between social assistance and economic growth. Then to determine the optimal level for social assistance, the paper employs partial differentiation to the quadratic equation (discussed in section 4.2.) and the maxima is the optimal level required as follows:

$$GDPgrowth_{i,t} = a_i + b_1 S_{it} + b_2 S_{it}^2 + b_3 T_t + b_4 U_{it} + b_5 C_{it} + b_6 O_{it} + b_7 I_{it}$$

$$+ b_8 P_{it} + \varepsilon_{it} \qquad Eq.4.8$$

$$\partial GDPgrowth_{i,t} / \partial S_{it} = b_1 + 2b_2 S_{it} = 0$$

$$S_{it}^{*} = \frac{-b_1}{2b_2}$$

Since b_2 is expected to be less than zero (see, section 3.2), the inequality restriction of $b_2 < 0$ makes sense to give a positive value of social assistance ${S_{it}}^*$. In any event, social assistance expenditure ${S_{it}}^*$ can never be less than zero.

CHAPTER FIVE

EMPIRICAL RESULTS AND ANALYSIS

This chapter presents and analyses the empirical results of the study, and further discuss them with reference to the literature review and the research question.

5.1. Descriptive statistics

Following is the table of descriptive statistics. For each variable, the data on top line are for Africa and on the bottom line are for OECD.

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP growth	49	5.41	4.02	-1.92	15.45
	224	4.28	3.88	-8.65	35.76
Social assistance	49	1.67	1.42	.26	4.61
	224	21.47	5.35	8.24	31.94
Social assistance squared	49	4.76	6.19	.07	21.27
	224	489.3	223.9	67.9	1020.04
Unemployment rate	49	14.93	7.3	1.9	26.8
	224	8.08	3.87	3.1	26.09
Population growth	49	2.23	.78	1.09	3.44
	224	.06	.69	-1.98	2.56
Inflation	49	5.63	6.35	-7.8	33.22
	224	1.78	1.94	-4.48	12.0
Trade	49	164.76	303.44	10.03	1156.05
	224	96.12	56.99	25.58	328.19
Gross capital formation	49	24.22	6.62	11.13	40.67
	224	21.56	3.36	13.94	31.32

Author's calculations

Number of observations for Africa is 49 made of seven countries and seven data points; while for OECD is 224 made of seven data points and 32 countries. The mean for GDP growth rate is 5.41 for Africa and is greater than that of OECD which is 4.28. Some reasons to this

difference could be that the number of observations for OECD is greater than those for Africa; the countries chosen in Africa could be the main ones experiencing high growth rates; the growth in consumer-focussed industries which are taking advantage of the fast-growing Africa's population (that is, Africa's population growth average of 2.23 and OECD's of .06).

For social assistance, the mean is 1.67 for Africa and 21.47 for OECD. The mean is a measure of the centre of the distribution of the data. Looking at GDP growth, the spread of the data from the mean, represented by standard deviation, is 4.02 and 3.88 for Africa and OECD respectively. GDP growth data for Africa is largely spread as compared to that of OECD. This differs in social assistance as OECD data is largely spread with standard deviation of 5.35 while for Africa it's 1.42. Negative values exist for GDP growth and inflation in both samples, while negative population growth exists in OECD sample.

It is worth noting that the average rates of unemployment, inflation and population growth for Africa are above those for OECD. High rates of these variables may on one hand impede social development or on the other hand increase the living standards. In such cases, social assistance may be expected to be larger in countries socio-economic challenges. However, in this data the average of social assistance for Africa is less compared to that of OECD.

5.2. Preliminary tests results

5.2.1. Multicollinearity test

Test for multicollinearity using the Variance Inflation Factors test yielded the following results.

Table 3: Multicollinearity

Variable	VIF	Tol =1/VIF
Social assistance	87.11	.011479
Social assistance squared	59.48	.016813
Time	5.86	.170558
Unemployment rate	1.05	.950926

Population growth	4.90	.204121
Inflation	1.42	.702042
Trade	2.32	.431637
Gross capital formation	1.12	.891301
Mean VIF	20.41	

Authors calculations

Social assistance and social assistance squared have high VIF (greater than 10) implying that that they are collinear. This is expected as social assistance squared is calculated from social assistance. Social assistance squared cannot be eliminated because it is needed in determining optimal level of social assistance. The rest of the variables have VIF of less than 10 which means no multicollinearity exists hence they are left in the model.

5.2.2. Unit root/Stationarity test

Following are the unit root test results found using Levin-Lin-Chu test for unit root with panel-specific means and cross-section means suppressed. Results are for both adjusted and unadjusted t-statistics in order.

Table 5: Unit root test

	Africa		**OECD**	
Variable	**At Levels Significance level**	**1st difference significance level**	**At Levels Significance level**	**1st difference significance level**
GDP growth	0.0413** 0.0479**		0.0000*** 0.0000***	
Social assistance	0.0001*** 0.0002***		0.8451 0.8333	0.0000*** 0.0000***
Social assistance squared	0.0000*** 0.0000***		0.7908 0.7792	0.0000*** 0.0000***
Unemployment rate	0.6885 0.6789	0.0000*** 0.0000***	0.0000*** 0.0000***	
Population growth	0.0002*** 0.0003***		0.3688 0.3741	0.0000*** 0.0000***

Inflation	0.1732 0.1829	0.0000*** 0.0000***	0.0053*** 0.0073***	
Trade	0.0040*** 0.0057***		0.0501* 0.0584*	
Gross capital formation	0.9561 0.9474	0.0001*** 0.0002***	1.0000 1.0000	0.0000*** 0.0000***

Author's calculations; Significance levels: *** is 1percent, ** is 5percent, * is 10percent

From the results it can be concluded that for Africa, the variables GDP growth, social assistance, social assistance squared, population growth and trade are integrated of order 0, I(0), meaning that they are stationary at levels; while unemployment rate, inflation and gross capital formation are integrated of order 1, I(1), meaning that they are stationary at first difference. For OECD, the variables GDP growth, unemployment rate, inflation and trade are integrated of order 0, I(0); while social assistance, social assistance squared, population growth and gross capital formation are integrated of order 1, I(1). It is better to have less differenced data as through each differencing of the data shifts away from originality. The data is now ready for non-spurious regressions as it is stationary.

5.2.3. Cointegration test

The cointegration test yields the results in table 6. The null hypothesis of the Kao test (or modified Dickey Fuller test) for cointegration is that there is no cointegration while the alternative hypothesis is that all panels are cointegrated.

Table 6: Cointegration test

	Statistic	P-Value
Modified Dickey-Fuller	1.4568	0.0726*
Dickey-Fuller	1.3317	0.0915*

Author's calculations; Significance levels: * is 10percent

The p-value for the modified Dickey-Fuller test statistic is 0.0726 and that of Dickey-Fuller is 0.0915. Both are significant at 10 percent which means that the null hypothesis is rejected at

10 percent and it can be concluded that all panels are cointegrated, that is, there is a long-run relationship between social assistance and economic growth. It is safe to proceed to estimate the nature and magnitude of the relationship between these variables.

5.3. Empirical analysis

5.3.1. The quadratic equation model

The following are panel data results for both African and OECD sampled countries. Data for Africa was estimated using the RE model and OECD using the FE model as determined by the Hausman specification test. For Africa, Hausman specification test results yield that chi2(8) = 3.89 and prob>chi2 = 0.8673. This fails to reject the null hypothesis of the data being estimated by RE i.e. RE is employed to estimate the data for Africa. Hausman specification test result for OECD data is performed after running FE and RE regressions on the data. Results yield that chi2(8) = 28.35 and prob>chi2 = 0.0004. This means that the null hypothesis of data being best estimated by RE is strongly rejected and the alternative hypothesis of FE is favoured.

Table 7: The quadratic equation model

GDP growth (Africa)	Coefficients	GDP growth (OECD)	Coefficients
Social assistance	-10.56092***	**D.Social assistance**	-12.82908***
	(3.58)		(2.047)
Social assistance squared	1.64395**	**D.Social assistance squared**	0.2185309***
	(.667)		(0.0456)
Time	-0.3230298***	**Time**	-0.3280302**
	(.089)		(.149)
D.Unemployment rate	-0.1274211	**Unemployment rate**	-0.5685895***
	(.122)		(.179)
Population growth	-4.833923***	**D.Population growth**	0.3414534
	(1.587)		(.662)
D.Inflation	0.1630021*	**Inflation**	-0.4764456**
	(.092)		(.209)

Trade	-0.0037009 (.003)	**Trade**	-0.0945512 (.209)
D.Gross capital formation	0.2373785 (.228)	**D.Gross capital formation**	0.054818 (.207)
Constant	34.94601 (8.42)	**Constant**	58.55093 (19.5)
chi2(8)	3.89	**chi2(8)**	28.35***
prob>chi2	0.8673	**prob>chi2**	0.0004
RE model significance	0.0145	**FE model significance**	0.0000

Author's calculations; Significance levels: *** is 1percent, ** is 5percent, * is 10percent

On table 7, the coefficients column represents the coefficients of the respective variables and the numbers on parentheses are their standard errors.

Empirical panel tests carried out for selected African countries, using the RE model with 0.0145 significance level, indicate variables that significantly affect *GDP* are *social assistance, social assistance squared, time, population growth* and *inflation* while *trade, unemployment rate* and *gross capital formation* are non-significant. For OECD countries, FE model was used with 0.0000 significance level and variables that significantly affect GDP being *social assistance, social assistance squared, time, unemployment rate, inflation rate* and *trade* while *population growth, trade* and *gross capital formation* are non-significant.

5.4. The optimal level

Now, this research has arrived at a point of determining the optimal social assistance level that optimises economic growth, which is the main point of this research.

For Africa, the optimal social assistance level is (the following calculation is referred to as Eq. 4.9):

$$GDPgrowth_{i,t} = a_i + b_1 S_{it} + b_2 S_{it}^2 + b_3 T_t + b_4 U_{it} + b_5 C_{it} + b_6 O_{it} + b_7 I_{it} + b_8 P_{it} + \varepsilon_{it}$$

$$\partial GDPgrowth_{i,t} / \partial S_{it} = b_1 + 2b_2 S_{it} = 0$$

$$S_{it}{}^{*} = \frac{-b_1}{2b_2}$$

$$S_{it}{}^{*} = \frac{-(-10.5602)}{2(1.64395)}$$

$$S_{it}{}^{*} = 3.211837343 \text{ percent of GDP}$$

The optimal social assistance level for OECD is (the following calculation is referred to as Eq. 4.10):

$$GDPgrowth_{i,t} = a_i + b_1 S_{it} + b_2 S_{it}^2 + b_3 T_t + b_4 U_{it} + b_5 C_{it} + b_6 O_{it} + b_7 I_{it} + b_8 P_{it} + \varepsilon_{it}$$

$$\partial GDPgrowth_{i,t}/\partial S_{it} = b_1 + 2b_2 S_{it} = 0$$

$$S_{it}{}^{*} = \frac{-b_1}{2b_2}$$

$$S_{it}{}^{*} = \frac{-(-12.82908)}{2(0.2185309)}$$

$$S_{it}{}^{*} = 29.3530114048 \text{ percent of GDP}$$

From the second derivate test for absolute extrema, the derivatives of (4.3.1) and (4.3.2) are negative for units below the optimal points ($S_{it}{}^{*} = 3.211837343$ percent & $S_{it}{}^{*} = 29.3530114048$ percent of GDP) while positive above the optimal points respectively. This indicates that these optimal points are absolute minimum values of the functions. Furthermore, this validates that the shapes of the curves plotted from the results is U-shaped as opposed to an Armey curve which is an inverted-U. The implications of the U-shaped curve is discussed in next sub-section.

5.5. Discussion

In table 5, the negative contribution of *Social assistance* to economic growth is significant at 1 percent with coefficients -10.56092 and -12.82908 for African countries and OECD countries respectively. A unit increase in social assistance expenditure decreases economic growth by about 10.6 percent for the African sample and by about 12.8 percent for OECD sample. The variable *Social assistance squared* is also significant at 1 percent with coefficients *1.64395* and *0.2185309* for African countries and OECD countries respectively. This may mean that at higher levels of social assistance, there are positive contributions to economic growth by social assistance in both samples. This difference in contributions between social assistance and social assistance squared also suggests that current levels of social assistance are under optimal. Perhaps this explains why OECD countries commit more than 20 percent of GDP towards social expenditure. Some studies in literature (see Alper et al. (2016), Arjona et al. (2002), Blais & McCallum (1987)) have found social protection to be a significant positive contributor to economic growth in the OECD countries.

The fact that the results from this research show a negative contribution of social assistance spending to economic growth deserves more discussion. There is no doubt that the foregoing discussion argues for more social assistance spending in order to realise a positive contribution of social assistance towards economic growth. However, it is also argued that the main point may not necessarily be the impact of social assistance on economic growth but rather on lifting people out of poverty. A study by Bastagli (2010) indicates that social assistance has improved human capital through cash transfers used for health and education. Social assistance also protects low income households against livelihoods risks as it incentivize them to engage in high productivity and high profitability economic activities (Piachaud, 2013).

Results obtained from a panel study for OECD countries indicate that countries are operating below optimal point of about 30 percent share of GDP. Blais & McCallum (1987) found growth maximizing level of social expenditure to be 16 percent share of GDP in OECD countries which is about half of the current social assistance optimal level. Previous studies did not disaggregate social expenditure to determine social assistance spending, but it is clear that had social assistance spending been determined separately it would have been below 16 percent. The increase in optimal level demonstrates the growing interest and expenditure in social assistance in the world today.

The data results obtained for both samples plot the relationship of economic growth and social assistance as U-shaped (as the coefficient of social assistance squared is less than zero), with the optimal level as an absolute minimum value (determined by the first derivative test). This means that below the optimal level, any unit increase in social assistance is contributing negatively to economic growth. At optimal level, economic growth is at the lowest it can be; while at any point after the optimal level, contributions to economic growth will be positive. This answers the second research question of social assistance optimal level.

Therefore there is need for these countries to increase social assistance spending to exceed 3.2 percent a share of GDP for African countries and 29.4 percent a share of GDP for OECD countries in order to realize positive contributions to economic growth. Some countries may face increased dampening of growth for longer than the others before reaching turning point depending on how far they are from optimal level. The negative relationship found between social assistance and economic growth may be due to that social assistance is below optimal level (where increase in social assistance dampens economic growth), and thus expected to change to positive after the optimal level (given the U-shaped curve).

It is worth noting that African countries have a lower optimal point of social assistance as compared to OECD countries. One would generally expect Africa, which is faced by more social risks and adversities in the day to day life, to have larger coverage of social assistance as opposed to the countries with less vulnerabilities such as those in OECD. However, African capacity is limited to meet the social protection needs. Some studies (see, *social protection in Africa,* 2017) suggest that low productivity limits the necessary fiscal space, and weak governance mechanisms pose serious challenges to efficient delivery and administration in the African countries. In cases where social expenditure entirely falls on government, faster and efficient growth is crucial in order to reduce the burden on *fiscus*.

A challenge that may be expected is to find the limit of social assistance level after optimal point, as each unit increase will be having positive contributions to economic growth.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

This chapter concludes the study and provides an overview of the scope, limitations of the study and then recommendations for future research in line with this research. Conclusions are drawn from the preceding chapter on empirical tests performed to fulfil the objectives of the study. The objectives of the study are: firstly, to establish the relationship between the countries' social assistance and economic growth for policy counsel focussed on economic growth; and secondly, to find the optimal social assistance level for each sample that maximizes economic growth. The study is conducted for a sample of countries in Africa and a sample of countries in OECD for the period 2009-15.

For both Africa and OECD, a significant negative relationship was determined between economic growth and social assistance. As discussed, social assistance is meant to address vulnerability levels of the poor and not necessarily to make direct contributions to economic growth. This has explained the negative relationship between social assistance and economic growth. Both samples have been able to produce an optimal level of social assistance maximizing economic growth. Most countries in Africa and in OECD are providing social assistance to their citizens below their optimal point.

It is recommended that policy makers should consider increasing social assistance to levels above optimal in both African and OECD countries. Increasing social assistance expenditure will decrease economic growth due to the negative relationship, however after the optimal point economic growth will realise positive contributions from social assistance. This is expected because the relationship between these two variables posit a U-curve shape which means the optimal point is a minimum turning point.

Social assistance in Africa is mostly aimed at alleviating poverty and often targets the unable population. Increase in social assistance spending can therefore be achieved through extension of coverage to able adults and youth who are unemployed. This may also create a conducive environment for entrepreneurship and wealth creation for the low-income groups. The youth and unemployed could be assisted with programs that train and guide them with respect to their entrepreneurial skills; which in return may see positive contributions to economic growth through growth in businesses. In OECD, the programmes are more stretched to cover different groups. In such, it could be recommended that to go beyond the minimum threshold, the magnitude of the transfers need to be increased.

The study is limited by data availability. Social assistance data has not long been collected in Africa. The study includes all countries in Africa (seven) that had social assistance data at time of data collection. For OECD, 32 countries with sufficient data for social assistance were studied. The study could have included all countries in Africa and OECD that has social assistance; and could also have had longer time-series than seven.

Future studies could look into more countries with social assistance and also have more time-series data points. They can also try to find optimal social assistance level for each country instead of the general one determined in this research.

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Appendix 1: Definitions of Social Protection

Agencies	**Definitions**
Overseas Development Institute	Social protection refers to the public actions taken in response to levels of vulnerability, risk and deprivation which are deemed socially unacceptable within a given policy or society.
World Bank	Social protection is a collection of measures to improve or protect human capital, ranging from labour market interventions, publicly mandated unemployment or old-age insurance to targeted income support. Social protection interventions assist individuals, households, and communities to better manage the income risks that leave people vulnerable.
International Labour Organization	Social protection is the provision of benefits to households and individuals through public or collective arrangements to protect against low or declining living standards.
Asian Development Bank	Social protection is defined as the set of policies and programs designed to reduce poverty and vulnerability by promoting efficient labour markets, diminishing people's exposure to risks, and enhancing their capacity to protect themselves against hazards and interruption/loss of income.
Countries	**Definitions**
Ethiopia	"A set of formal and informal interventions that aim to reduce social and economic risks, vulnerabilities and deprivations for all people and facilitates equitable growth" (NSPP. 2012).

Kenya	"Policies and actions, including legislative measures, that enhance the capacity of and opportunities for the poor and vulnerable to improve and sustain their lives, livelihoods, and welfare, that enable income-earners and their dependants to maintain a reasonable level of income through decent work, and that ensure access to affordable healthcare, social security, and social assistance" (NSPP, 2011).
Zambia	"Policies and practices that protect and promote the livelihoods and welfare of people suffering from critical levels of poverty and deprivation and/or are vulnerable to risks and shocks" (NSPP, 2014).
Zimbabwe	"A set of interventions whose objective is to reduce social and economic risk and vulnerability and alleviate poverty and deprivation" (NSPPF, 2016).

Appendix 2: Definitions of Social Assistance

Authors/Agencies	**Definitions**
Lamarche & Van Rensburg 1997	Social assistance schemes, as forms of social protection, are schemes in terms of which individuals or groups receive 'need-based assistance from public funds' without themselves ever having contributed directly to the scheme
World Bank Group	Social assistance are non-contributory measures designed to provide regular and predictable support to poor and vulnerable people
Country	**Definitions**
Ethiopia	"Social Assistance: non-contributory transfers to poor people by the government and others. This would include cash or food transfers, remittances and gifts, fee waivers and provision" (NSPP, 2012).
Kenya	"In Kenya, the term 'social assistance' is used to refer to non-contributory transfer programmes aimed at preventing the poor or those who are vulnerable to shocks from falling below a certain poverty level … covering a broad range of actions including cash transfers, food aid, affordable health charges, child protection services, and responses to life-threatening emergencies to enhance coping mechanisms of vulnerable groups. … Informal community support and extended families provide a significant form of social assistance in Kenya" (NSPP, 2011).
Zambia	"…social assistance interventions targeting specific categories of beneficiaries. These have taken the form of non-contributory transfers

	either in cash or in-kind, fee waivers, and subsidies with a view of reducing poverty. These interventions specifically target those who lack the inherent capacity to work" (NSPP, 2014).
Zimbabwe	"Social assistance is a con-contributory form of social security which is financed from government revenue and in some cases with support from non-state actors such as development partners, civil society organisations and the private sector. Because of limited resources, it is means-tested in order to ensure that the most deserving beneficiaries receive cash or in-kind benefits. … Access to social assistance is a basic human right enshrined in international human rights instruments" (NSPPF, 2016).