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ESTIMATION OF RATES OF RETURN (ROR) ON SOCIAL PROTECTION INVESTMENTS IN LESOTHO

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List of abbreviations

BOS	Bureau of Statistics Lesotho
CGP	Child Grant Program
CMS	Continuous Multipurpose Survey
EU	European Union
GDP	Gross Domestic Product
HBS	Household Budget Survey
IMF	International Monetary Fund
IV	Instrumental Variables
MGSOG	Maastricht Graduate School of Governance
MoSD	Ministry of Social Development
NISSA	National Information System for Social Assistance
NSDP	National Strategic Development Plan
NSPS	National Social Protection Strategy
OAP	Old Age Pension
OVC	Orphans and Vulnerable Children
PA	Public Assistance
PWP	Public Works Program
RoR	Rate of Return
SFP	School Feeding Program
SP	Social Protection
SPI	Social Protection Investments
UNICEF	United Nations Children's Fund
WDI	World Development Indicators
WFP	World Food Program
WHO	World Health Organization

Executive Summary

Compared to other low-income countries, Lesotho is one of the leaders in social protection. It is at the forefront of moving towards a social protection systems approach in Sub-Sahara Africa and beyond. The National Social Protection Strategy (NSPS) 2014/15-2018/19 (Government of the Kingdom of Lesotho, 2015) represents the Government's vision and ambitions for the coming years to address the risks and challenges over the life-course to protect its citizens and particularly the poor and vulnerable Basotho. The implementation of the envisaged core social protection programs for children, the elderly and poor adults, supplemented by complementary programs in other sectors has the potential to significantly reduce the extent and depth of poverty and provide citizens with the means to improve their livelihoods in the short and long term.

It is estimated that the implementation of the core programs of the NSPS will cost four percent of GDP at full coverage (Government of the Kingdom of Lesotho, 2015). Although the analysis has shown that the strategy is affordable, four percent of GDP represents a considerable amount of national resources. In order to garner continued political and financial support for the implementation of the NSPS, it is essential to build strong economic arguments, proving that the investment is worthwhile in terms of expected benefits in the future.

The aim of this study is to estimate the Rate of Return (RoR) on Social Protection Investments (SPI) in Lesotho, thereby generating evidence to support the advocacy for social protection in Lesotho and assisting relevant ministries in planning the allocations for SP instruments. The primary focus of the study is the Child Grant Program (CGP). The CGP targets extremely poor households with children aged between 3 and 17 years. The net benefits of the CGP are compared with the Old Age Pension program (OAP), the school feeding program (SFP) and with a combined package of CGP and OAP.

Non-contributory social transfers directly affect household disposable income, and as such household consumption. However, social transfers also affect household behavior through income and non-income effects. Additional and/or secure income encourages households to invest in health, education, livelihoods and productive activities. The study thus builds on a framework assuming both direct and indirect benefits through increased consumption due to social protection investments (i.e. poverty reduction and human capital accumulation).

The methodology applied in this study consists of three main elements. First, a static simulation is implemented, revealing the direct effects of the increase in household consumption on poverty and inequality. Secondly, different empirical models are used to estimate the relationship between household consumption and school attendance, school attainment and household consumption, and

household consumption and labor market participation. Finally, a dynamic simulation model was constructed in order to predict the effects of social transfers over a period of 15 years. The simulation procedure remains the same in each period. Eligible beneficiaries of the respective SP instrument receive the benefits, which increases their consumption levels with 80% of the transfer values. Based on the new consumption level, the likelihood of school age children to attend school is predicted. Subsequently, the educational attainment is updated depending on whether children attended school. The new consumption levels are calculated as the sum of the previous consumption level plus the direct effect (transfers) and the behavioral benefit. Fertility and mortality rates are integrated into the simulation model in order to reflect demographic changes over time. The dynamic simulation compares the outcomes of the programs to a scenario without SPI. Therefore, the focus is not on predictions of outcome variables in future periods, but rather on the relative development in outcomes compared to the control scenario. The Rate of Return compares the net present value of benefits of an intervention to the net present value of the costs of this intervention.

The analysis is based on the nationally representative Household Budget Survey 2002/2003. Further, data on demographic projections was obtained from the Bureau of Statistics of Lesotho and from the World Health Organization to simulate demographic developments over the time period of the analysis.

With respect to the direct effects on poverty and inequality, the largest reduction in poverty headcount can be observed for OAP followed by SFP and CGP. For the CGP no immediate effect on the poverty headcount can be measured. This is due to its focus on extremely poor households that do not graduate out of poverty with the transfer as the gap is too large. However, the potential effects of the CGP become evident when considering extreme poverty outcomes. The simulation suggests that CGP reduces the extreme poverty headcount by 20% compared to a scenario without SPI. The results of the static simulation also suggest that the CGP is the most cost-effective program as it would generate the largest reductions in outcomes for each percent of GDP invested. According to the static simulation, investing 1% of GDP in the CGP would generate a reduction of 15.3% in extreme poverty, which is about five times the size of the OAP program effect at the same cost.

Based on the empirical models, which are based on the situation in 2002, the estimates imply positive returns to education of an additional year of schooling of 9%, which is close to the international standard of approximately 10% (Psacharopoulos and Patrinos 2004). The effect of household consumption on school attendance is also positive. At the national level, a 10 percent increase in household consumption is associated with a 1.1 percentage point higher probability of a child attending school. The findings suggest that household consumption positively affects school

attendance rates in Lesotho. This implies that SP instruments that increase household consumption levels likely improve education outcomes and therefore contribute to human capital development in Lesotho. The results further show that household consumption has a positive effect on labor market participation. At national level, a 10 percent increase in household consumption level is associated with a 1.6 percentage point increased probability of labor participation for individuals aged 18 to 69. Overall, the findings suggest that SPI that increase household consumption levels (income) potentially raise participation in the labor markets in Lesotho.

The dynamic simulation model is applied to examine the effects over time including the behavioral effects through increased school attendance and higher school attainments. Thus, the SP effects are simulated over a 15 years' time range. All three programs affect school attendance and educational attainments positively. School attendance rates of individuals between 6 and 24 years increased strongest for the CGP scenario and the combination of CGP and OAP. The CGP school attendance rate increased by 5% in the first period, which grows up to an annual increase of more than 12% in period 15 compared to the control scenario. As the SP effects sum up over time, an exponential growth in school attendance rates can be observed. As a consequence, after 15 periods the working-age adults dispose of a 2% higher school attainment in the CGP scenario as compared to the control scenario.

The OAP effect on school attendance is markedly smaller. Despite the larger transfer values of OAP the effect is lower as it is not specifically targeted at children. The combination of CGP and OAP further increases school attendance rates, however, adding only little to the CGP effect.

The effect of the SFP on school attendance is smaller than the CGP effect and increases up to around 7% at the end of the simulation period. Yet, the annual growth rates are smaller than for the other programs. This is due to the SFP assignment to children that are already enrolled in school with thus little scope to further increase attendance rates. However, it has to be noted that the potential effects of SFP on aspects such as school performance or health cannot be regarded in the model. These effect pathways could have important impacts on school attainments and may result in underestimation of the educational effects of SFP in the simulation model.

The analysis of the returns to education suggests that an additional year of schooling increased consumption levels on average by 9% in 2003. At the same time results of the dynamic simulation model show that CGP increased the number of years of schooling on average by 2% per year. This highlights the potential of SPI to generate large returns in future periods. However, the results also showed that school attainments tend to be low in Lesotho and that the education effects especially on the extremely poor need more time to unfold their full returns.

This results in initially negative RoR, which slowly start to improve and turn positive after 10 periods for the CGP. The simulation results suggest that from period 10 onwards the net benefits of the CGP exceed the costs. The RoR of OAP and SFP remain negative throughout the simulation, but show a positive trend. This finding is related to the fact that both programs have universal targeting mechanisms and do not particularly benefit the extremely poor. Secondly, beneficiaries either already attend school (SFP) or left school age long ago (OAP). Thus, their scope to generate returns through school attendance is much lower compared to CGP resulting in lower behavioral benefits.

The findings suggest large program effects on poverty and inequality outcomes. Simulating the CGP on the national level reduced extreme poverty by more than 20% per year and reduced inequality by up to 7%. This indicates the potential of CGP for poverty reductions in Lesotho. Taking all future returns into account, the educational benefits exceed all cost including transfers and operational costs after 10 periods. This underpins the power of SPI for educational but also welfare developments in Lesotho. On top of that, additional returns through health and agricultural investments and increasing tax revenues are not considered in this study. Therefore, the results might only reflect a lower bound estimate of the full potential of social cash transfers.

As a model can never cover the entire set of SPI linkages, it needs to be born in mind that simulation models are always a simplification of reality. The study has a number of particular limitations that need to be born in mind when interpreting the results. Due to the limitations of the HBS 2002/2003 data, not all potential indirect benefits of social transfers could be incorporated in the model. Effects through improved health or investments in productive activities are not considered, which may be particularly important for the OAP. Therefore, the resulting rates of return are likely an underestimation of the actual achievements. Furthermore, the economic and social situation in Lesotho has changed considerably since 2002/2003. For example, school attendance and highest education achievements have increased considerably over the last decade. Nonetheless the models show how specific aspects of SPI pathways generate monetary returns over the long term.

It is recommend to repeat the present analysis once more comprehensive and more recent household survey data are available. Particularly the inclusion of other transmission channels next to education would add value and provide additional insights in the potential benefits and the respective RoR in the long term. Furthermore, information such as access to services and infrastructure would allow a more detailed analysis of the returns of SPI which goes beyond the national average and provide insights into policy areas that need to be strengthened in order to maximize the impact of SPI. The BOS is keen to improve their data collection and adjust the survey instruments such that they better serve the overall needs for regular analysis and evaluation of social protection policies.

1. Introduction

Compared to other low-income countries, Lesotho is one of the leaders in social protection. It is at the forefront of moving towards a social protection systems approach in Sub-Sahara Africa and beyond. The National Social Protection Strategy (NSPS) 2014/15-2018/19 (Government of the Kingdom of Lesotho, 2015) represents the Government's vision and ambitions for the coming years to address the risks and challenges over the life-course to protect its citizens and particularly the poor and vulnerable Basotho. The implementation of the envisaged core social protection programs for children, the elderly and poor adults, supplemented by complementary programs in other sectors has the potential to significantly reduce the extent and depth of poverty and provide citizens with the means to improve their livelihoods in the short and long term. Simulations for Lesotho indicate that the implementation of a set of core programs could reduce the poverty rate by 15 percent and the poverty gap by 40 percent (Government of the Kingdom of Lesotho, 2015:34).

It is estimated that the implementation of the core programs of the NSPS will cost four percent of GDP at full coverage (Government of the Kingdom of Lesotho, 2015). Although the analysis has shown that the strategy is affordable, four percent of GDP represents a considerable amount of national resources. In order to garner continued political and financial support for the implementation of the NSPS, it is essential to build strong economic arguments, proving that the investment is worthwhile in terms of expected benefits in the future. Lesotho currently spends nine percent of its GDP on social protection programs (World Bank, 2013), which is well above the average of most developing countries. However, there is considerable scope for coordination and harmonization of existing social protection programs. To achieve a more efficient allocation of funds, evidence is required to guide policymakers in their investment decisions. Using the existing social protection funds more efficiently could benefit the poor and strengthen the efforts to mitigate the consequences of pervasively high poverty rates in Lesotho.

The aim of this study is to estimate the Rate of Return (RoR) on Social Protection Investments (SPI) in Lesotho. The objective of the analysis is to generate evidence to support the advocacy for social protection in Lesotho and to assist relevant ministries in planning the allocations for SP instruments. This project has been commissioned by UNICEF in the framework of the EU-funded Support Programme to Orphans and Vulnerable Children - Phase 2, and implemented by Maastricht University, Maastricht Graduate School of Governance (MGSOG). The analysis compares economic benefits of SP investments based on individual increments with the economic program costs. The estimation will complement existing impact evaluation results by analyzing the returns to SP in the mid- and long term perspective. The primary focus of the study is the Child Grant Program (CGP), which was

implemented on a pilot basis. The CGP targets extremely poor households with children aged between 3 and 17 years. The net benefits of the CGP are compared with the Old Age Pension program (OAP), the school feeding program (SFP) and with a combined package of CGP and OAP. In this study the RoR of the program is simulated ex ante at the national level providing evidence for the case of a national implementation of the program.

The remainder of the report is structured as follows: Section two describes the economic country context and the existing landscape of social protection in Lesotho. The conceptual framework linking social protection with development and economic growth is introduced in section three. Section five elaborates the study framework guiding the present analysis and section five introduces the data used. Section six presents the results of the quantitative analysis and section seven concludes.

2. Background

Lesotho Country Context

Lesotho is a country with a population of 2.1 million (World Bank, 2014)[1] and it is entirely surrounded by South Africa in the South Eastern part of the country. It has been independent since 1966. The geography is mainly characterized by mountainous and rural areas. Lesotho is one of the poorest countries in southern Africa and one of the most unequal economies in the world (World Bank, 2015b). The main sectors driving the economy are the textile industry and mining activities. In general, economic activity is limited and informal employment is prevalent with 72 percent of those employed working in the informal sector (Olivier, 2013). Over the last ten years, the economy has been growing at an average of four percent annually (IMF, 2015). Yet, economic growth has not been pro-poor, which is also due to a strong bifurcation of the economy in formally and informally employed sectors. The incidence and depth of poverty and the level of inequality are far above average for a country characterized by this level of growth.

The incidence of poverty has remained high over the last decade with an estimated poverty rate of 57 percent in 2010 (World Bank, 2013). There are several reasons that have contributed to persistently high poverty rates. The depth of poverty, estimated at 30 percent of the poverty line, makes it difficult for many households to graduate out of poverty. In addition, derailing factors such as the HIV/AIDS epidemic and environmental and price shocks are other important sources for persistently high poverty rates and a major source for households' vulnerability to poverty (World Bank, 2015b).

The population of Lesotho faces numerous challenges, particularly regarding income insecurity and health. In 2013, the value of the Human Development Index was 0.486 (UNDP, 2014), which is low in international comparison. While the value has increased from 0.443 in 1980, the overall increase of the index hides the development of individual factors. While the average number of years of schooling and GNI per capita have increased, life expectancy at birth has decreased by 4.4 years (UNDP, 2014). The decline in life expectancy and the general incidence of poor health outcomes are due to the high prevalence of HIV/AIDS and high rates of tuberculosis infection among those living with HIV/AIDS, which are particularly high in Lesotho (World Bank, 2015b). Considering the HIV/AIDS prevalence rate of 23 percent among adults, it is evident that this affects the ability of the population to benefit from growth on the one hand and the provision of productive labor on the other hand. Jointly, these

[1] Retrieved from data.worldbank.org

difficulties inhibit Lesotho and its population from enhancing inclusive growth and well-being and from fostering human development.

Income inequality is another challenge. The Gini coefficient was estimated to be 0.53 in 2010 (World Bank, 2013), indicating that enhancing equality needs to be a central component of poverty alleviation efforts. However, it is important to note that countries with a Human Development Index similar to Lesotho like Senegal and Uganda face even higher levels of inequality (World Bank, 2013). The population of Lesotho further face high levels of malnutrition as evidenced by the latest Demographic and Health Survey 2014, which states that 33 percent of all children under the age of five are stunted and 11 percent are severely stunted (Ministry of Health, 2015). The National Strategic Development Plan (NSDP) 2012/13 – 2016/17 (Government of Lesotho, 2015) is an important development framework that entails goals relating to employment, infrastructure, democratic governance, improvement of health and technology and innovation. The NSDP was adopted in 2012 as part of the ambition to realize Lesotho's "Vision 2020". It underlines the importance of social protection and suggests considering the reduction of vulnerability and enhancing the coverage and efficiency of social protection as a key component of national development initiatives.

Social Protection Landscape

The underlying goal of SPI in Lesotho is to provide a strong safety net for vulnerable groups. While still belonging to the category of least developed countries, Lesotho shows one of the highest rates of social protection expenditure in Africa (ILO, 2012). In 2010/2011 about 16 percent of Government expenditures were used for SP, which was equivalent to 9 percent of GDP (World Bank, 2013:22). This amount, however, includes a large variety of different transfers and programs of which not all would necessarily be classified as social protection (for example, the tertiary bursary scheme) (Khondker & Freeland, 2014a). Core social assistance programs accounted for 4.5 percent of GDP or 8 percent of public expenditure (World Bank, 2013:22). Lesotho spends considerably more on social assistance than most other countries in the region, where social safety net expenditures range between 0.2 percent of GDP in Zambia and 2.2 percent in Botswana or Swaziland (World Bank, 2013:23). Various social protection programs are in place and several ministries are in charge of their implementation. Details of the core programs, expenditures and ministries in charge are summarized in Table 1 and the programs included in the simulation are outlined in more detail below. About 76 percent of all social assistance expenditures are currently spent on Old Age Pensions (OAP) (2.39 percent of GDP) and School Feeding Programs (SFP) (1.05 percent of GDP). Other key programs include the Child Grant Program (CGP), Orphans and Vulnerable Children (OVC) Bursary Program, Public Assistance (PA), and Public Works Programs (PWP).

Despite the substantial financial resources allocated to social protection, the system is not very effective in protecting the poor. According to the World Bank (2015b), the system could be strengthened by better targeting transfers to those in need. The challenge of coherent management and implementation efficiency has been addressed with the introduction of the NSPS in February 2015. Also, a new Ministry of Social Development was established in 2012 when the Department of Social Welfare was extracted from the Ministry of Health. The National Information System for Social Assistance (NISSA) is another step towards coherence and improved coordination. It provides information on more than 25 percent of the households in a centralized manner. NISSA was originally designed for implementation of the CGP, but it is now expected to become the central source of information for all social assistance programs.

Table 1. Overview of core Social Protection Programs in Lesotho

Program	**Number of Beneficiaries***	**Target group**	**Implementing Ministry**	**Budget (in Million M)***	**% of GDP****
Old Age Pension (OAP)	85,087	Universal to all above 70	Finance	540.00	2.39
Child Grants Program (CGP)	24,500 (hh)	Poor households with children under 18	Social Development	50.40	0.22
OVC Bursary Program (OVC)	13,172	Orphan/vulnerable children under 18 enrolled in secondary school	Social Development	41.40	0.18
Public Assistance (PA)	11,800	Destitute under 70	Social Development	40.40	0.18
School Feeding	389,000	All primary children attending primary school	Education	236.00	1.05
Integrated Watershed Management Public Works	115,000	Able bodied rural people	Forestry	112.00	0.50
Total				**1,020.20**	**4.52**

Source: The World Bank [2015b]

*Latest available year

**GDP data from WDI – GDP in Current Local Country Currency

The following sections describe the three programs, which are at the core of the present analysis, in more detail.

Child Grants Programme

The Child Grants Programme was introduced in 2009 and it is implemented by the MoSD, while the ministry receives support from the EU as well as from UNICEF Lesotho. It is targeted at poor and

vulnerable households that are selected according to a combined assessment of a proxy means test and community validation, given that households belong to NISSA category 1 or 2 (thus considered extremely poor). The transfer is paid on a household level and the amount depends on the number of children in a household; it ranges from 360 to 750 Maloti per quarter. Previously the transfer amount did not depend on the number of children and each eligible household received a flat amount of 360 Maloti per quarter. According to a recent report, approximately three hours in total are spent walking to pay points and back (Pellerano et al., 2014).

Pellerano et al. (2014) observed that households received the intended amounts throughout the evaluation period. However, these were provided irregularly and in large portions, which does not correspond with the intention to offer a predictable and regular form of financial support. In general, beneficiary households were found not to be aware of specific amounts and timing of future payments (Pellerano et al., 2014).

Evidence from the impact evaluation of the Child Grant Program indicates that the program has had beneficial outcomes particularly with respect to child well-being, but also with respect to outcomes outside the direct realm of the program. Beneficiary households increased education-related spending of pupils by 38 percent on average. The program also had a positive effect on school enrolment and retention. With respect to health-related outcomes, birth registration increased by 37 percentage points and the illness incidence of under-5 children decreased by 15 percentage points. Furthermore, beneficiary households were more food secure. The positive effect on household livelihoods is evidenced by the increased share of households using crop inputs. Moreover, beneficiary households were better protected against shocks and as such did not have to refer to disruptive coping strategies. The analysis of local multiplier effects with the LEWIE model confirmed the potential of cash transfers of generating large multiplier effects. It is estimated that each Loti transferred to a poor household can raise local income by M2.23 (Ministry of Social Development, 2014).

Old Age Pension

The Old Age Pension program was introduced in 2004 and is currently the largest social assistance program in place (Olivier, 2013). It provides a universal non-contributory pension to all individuals above the age of 70, excluding only former civil servants who receive a higher government pension. The current transfer amount is 500 Maloti (USD 33) per month and the number of beneficiaries increased by 30 percent between 2004 and 2011.

Based on a recent review conducted by the World Bank (2015b), there are currently about 85,000 beneficiaries. Interestingly, though, this number exceeds the actual number of citizens aged 70 or

older, pointing at potential implementation problems and/or lack of administrative monitoring. Families of deceased pensioners often continue to receive benefits, which is facilitated by the fact that authorities not always insist on receiving a proof of life. Further factors contributing to pensions allocated to ineligible citizens are the lack of internal controls allowing staff members to generate artificial records and collect benefits, and the lack of registration and birth certificates, which facilitates reporting a higher age at application. Finally, beneficiaries are not always eliminated from the records upon death due to technical constraints (World Bank, 2015b). Although the application process for the Old Age Pension is rather straightforward and flexible, the amount of time and costs involved in collecting payments and the labour intensive distribution process render the system less efficient.

Even though only an estimated six percent of the poor are older than 64, the OAP has important effects on household consumption and poverty. Beneficiaries hardly live in isolation and as such the OAP benefits individuals living in the same household. Evidence indicates that the OAP increased food security as most of the money is spent on food (Chroome, 2007; Ayala Consulting, 2011 – both quoted in World Bank, 2013). Children also benefit indirectly from the OAP as an estimated 20 percent of the pension is spent on dependent orphan children (Ayala Consulting, 2011 in World Bank 2013).

School Feeding Programme

Almost 400,000 children attending primary public schools benefit from a daily lunch at school. The School Feeding Program targets all children attending public primary school intending to enhance both educational and health outcomes. It is implemented by the Government of Lesotho with support from the World Food Program (WFP). Children in school receive a lunch during 180 days per year. In areas supported by the WFP, children also benefit from a mid-morning snack. In most cases the food is prepared at school by local caterers, except in cases where schools lack the necessary facilities. In the latter case, the food is prepared in the home of the caterer.

In kind transfer programs, such as the SFP, are often not the most cost-efficient ways to transfer benefits to eligiblie households. This is also the case for the SFP in Lesotho. It is estimated that more than 50 percent of the total program costs are operational costs such as food delivery and storage, or catering. The value of the actual meal is about 203.4 Maloti per year, while total costs of the Government-run program are 637 Maloti per child per year (World Bank, 2013).

Even though eligiblity for the SFP is universal, the program is slightly progressive given that an estimated 43 percent of the primary school pupils are from the poorest 40 percent of the population. It is an example of broad targeting with the aim to increase access to public services to the poor. The

SFP has positive impacts on school enrolment, attendance and reduces drop out rates (Motseng Logistics Services, 2011; Haag et al. 2009, both in World Bank, 2013).

3. Direct and Indirect Benefits of Social Protection

Social Protection

The main objectives of social protection are to guarantee human rights (social, political and economic), promote human development and encourage economic growth. Investments in social protection contribute to economic growth and territorial development[2], reduce poverty and inequality across and between groups and contribute to the quality of governance by strengthening institutions. Social protection also plays a role for employment policies and basic services. It contributes to the protection and accumulation of human and physical capital and acts as stabilizer for effective demand. It provides means and resources to solve poverty traps by easing credit constraints and covering transaction costs. These features are essential for the successful implementation of effective employment policies and the achievement of universal access to basic services, such as education and health, pointing at the complementarity of social protection and other social policies.

The design of Social Protection policies covers a wide range of features, depending on the specific priorities and context of the community where they are implemented. One key distinction needs to be made between social insurance programs which are (mainly) financed through contributions of the beneficiaries and thus granted to those who contribute, and social assistance programs provided on the grounds of certain income or household criteria irrespective of any contributions made in the past. Both types of designs can affect well-being and economic growth if implemented well, yet the most financially deprived and vulnerable groups are commonly targeted with social assistance programs. The following review as well as the analysis focus on the latter group of policies, thus non-contributory transfers financed by the government or supported by international donors. Further, cash transfers can be designed to be conditional on the fulfillment of a certain behavior of the recipient households, e.g. regular school attendance or health inspection, while others are unconditionally provided to all eligible households or individuals.

International evidence on the effect of social transfers

Non-contributory social transfers directly affect household disposable income and, subject to the marginal propensity to consume, the level of consumption. Simulations for Lesotho indicate that the implementation of a set of core programs could reduce the poverty rate by 15 percent and the poverty gap by 40 percent (Government of the Kingdom of Lesothos, 2015:34). The increase in disposable income as a result of social transfers affects household behavior and economic performance at

[2] See e.g. Alderman & Yemtsov (2012); Cherrier, Gassmann, Mideros & Mohnen (2013); Barrientos (2012).

different levels. A substantial amount of research has been conducted in order to investigate and emphasize these effects and potential enhancements of existing transfer schemes.

An underlying question often raised in this context is to what extent investments in social protection transfers have an effect on economic growth. As Alderman & Yemtsov (2012) point out, early studies assumed that by shifting resources to less productive shares of the population and by providing disincentives to work or education, cash transfers would be an inefficient approach to poverty and inequality with negative economic effects. Furthermore, rising inequality was not considered problematic when weighed against efficiency and economic growth (Alderman & Yemtsov, 2012). At a later stage, when long term data on new schemes became available it was found that such investments could be beneficial for the overall economy and that disincentives were not substantial if certain precautions were made (Barrientos & Scott, 2008). For instance, Castells and Himanen (2002) found that cash transfers can enhance innovation and thereby increase competitiveness within and across communities. Alderman and Yemtsov (2012) base their analysis on the potentially productive effects achieved by well-designed cash transfer programs. When distributing regular and sufficient resources to vulnerable groups, these may be invested in activities enhancing the level of education or the opportunity for employment and investment. Here, four channels for these productive effects are identified. According to their concept, social transfers may affect the economy through human capital investments, by substituting for a lack of access to credit and thereby stimulating investment, through labor market improvement due to pensions and through local spillover effects. These effects can occur at the level of the household, within a community and at the national level.

Further evidence was provided by Barrientos (2012). With a focus on social transfers in developing countries, Barrientos (2012) investigated different mechanisms how these policies affect growth at the micro level. He also referred to the productive capacity of households, claiming that one should focus on economic growth within the vulnerable group rather than the economy as a whole. He emphasized that policies should be designed with a priority to enhance the productive capacity of households, by stimulating human, physical and financial asset accumulation. In his study it is further outlined that certain characteristics of the transfers are decisive. For instance, it has been found that a regular and reliable payment of benefits is crucial for a sustainable use by beneficiaries and the transfer amount needs to be sufficient to ensure the productive capacity while it may not be too high, causing recipients to rely on them rather than making investments.

As Dercon (2011) points out, it is crucial for social protection mechanisms to be integrated with policies promoting improvement of services available to the population, such as health and education facilities and a stable formal labor market. The following sections present recent evidence on effects

of social transfers on education, health and labor and on local multiplier effects as well as evidence on rates of return that have been estimated.

Education

International evidence is highly conclusive about a positive effect of social transfers on school attendance. Social transfers increase the disposable income and, by reducing cost barriers, increase school enrolment and attendance.[3] Meng and Ryan (2009) evaluated the Food for Education (FFE) program in Bangladesh seven years after its implementation and through propensity score matching they were able to show that the school participation rates of recipient children were higher than those of non-recipients by approximately 15 to 27 per cent. The number of years spent in school was also found to be higher by 0.7 to 1.05 years. Here the benefit was paid per month given that the child attended school at the time. In this context, Schady and Arujo (2006) found that even if conditions are just assumed and not specified or monitored, beneficiary households tend to adjust their behavior. They observed the case of the Bono de Desarrollo Humano (BDH) benefit in Ecuador which had significant positive effects on school enrollment (10 pp.) and significant negative effects on child work (17 pp). Approximately twenty-five per cent of all households in the sample believed eligibility was tied to a certain behavior. When comparing beneficiaries and non-beneficiaries in this group and in the group not assuming any conditions, the effect on school enrollment was only found to be significant for those who perceived the benefit to be conditional (Schady & Arujo, 2006). Their study thus demonstrated the effect that particularly conditional cash transfers can have on school enrolment and thus human capital accumulation.

Health

The second behavioral income effect of social protection is on the health status of the population. Several studies provide evidence about the positive effects of different social transfers on food consumption and health. As Adato and Bassett (2009) claim, there are three likely mechanisms for cash transfers to have positive sustainable effects on the health of recipients. Transfers can cover costs incurred for counselling or treatment, they can indirectly affect health through enhancing the amount and value of food available to the household, and they can encourage healthy behavior through conditional transfer designs. Miller, Tsoka & Reichert (2008) analysed the Mchinji Cash Transfer program in Malawi and found that recipients were more likely to be provided with care than non-recipients and children were found to be ill in a significantly smaller number of cases, by 13 percentage points. Further, the Progresa program in Mexico was found to incentivize particularly the health of

[3] See Baird et al. (2013) for a systematic review.

children as the share of infants taken to growth monitoring visits significantly increased by 5.5 to 13.3 percentage points (Gertler, 2000). However, the main determinants of a positive effect on health are the size and periodicity of the transfer, the target group and complementary investments.

Labor Supply

Thirdly, changes in disposable income due to social transfers may affect labor supply as they generate the opportunity to take up work (e.g. covering transportation costs and reducing financial and care constraints) or to change jobs as the person may afford a longer search period. International evidence suggests that social transfers have a positive effect on labor supply, while reducing child work. As mentioned above, early work on the relation between cash transfers and labor supply assumed that the effect would be negative given the alternative source of income. Today the evidence is more diverse and positive as well as negative effects have been demonstrated. While certain programs specifically aim at promoting employment, others have indirect effects on labor supply (Samson, 2006). For instance, public work schemes can generate seasonal, short term employment while the long-term effects are debated (Chirwa et al., 2004). As Devereux and Solomon (2006) found, a public works scheme in Argentina (Jefes y Jefas de Hogar) successfully enabled beneficiaries to eventually secure long-term employment outside of the program. Indirect effects are expected when other types of transfers lead to improved education, for instance. Tembo et al. (2014) investigated a pilot cash transfer scheme in Zambia and found that to a large extent benefits were used to hire labor which facilitated higher productivity of the land and local employment while generating larger amounts of resources for the household. Similarly, the former program 'Progresa' in Mexico appeared to increase employment opportunities on the community level, benefitting recipients and non-recipients (Barber & Gertler, 2008). As Samson (2009) emphasizes, one of the most important mechanisms in the labor effect of cash transfers is the enhancement of social risk management. Households are more likely to be able to maintain the productive capacity in the case of economic shocks and they can afford a more effective job search when they are not forced to accept any type of employment due to the need for immediate relief (Samson, 2009).

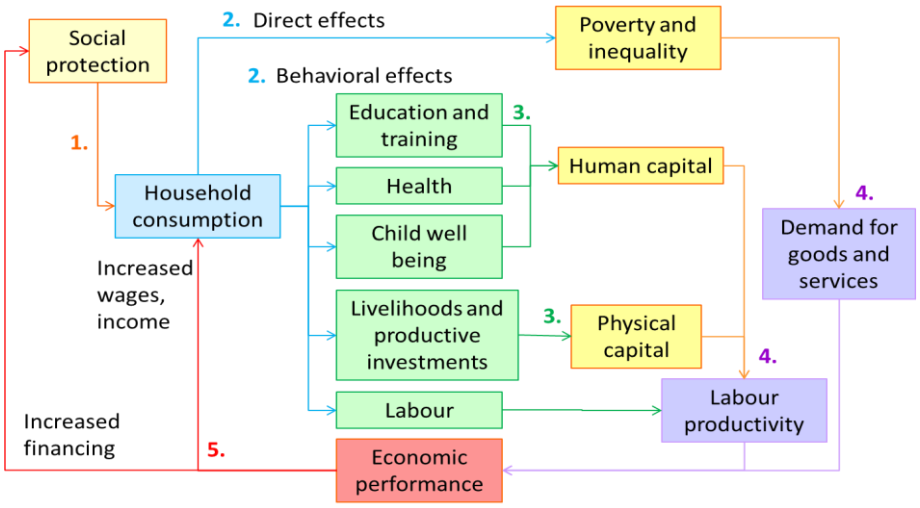
Additional effects relate to households' investments in child wellbeing and productive activities that raise human and physical capital and foster labor productivity. Moreover, social transfers are likely to be spent locally, thereby generating local and regional economic multiplier effects. [4]

[4] See for further evidence on the benefits of social transfers, e.g., Arnold et al. (2011); Schady & Araujo (2006); Bourguignon, Ferreira & Leite (2003); Schady & Rosero (2008); Barrientos & Scott (2008); World Bank (2015c).

Conceptual Framework

Figure 1 summarizes the conceptual framework which guides the analysis in the present study and builds on the evidence linking non-contributory social transfers and socioeconomic development (Mideros et al. 2012, 2015). Non-contributory social transfers directly affect household disposable income, and as such household consumption. However, social transfers also affect household behavior through income and non-income effects. Additional and/or secure income encourages households to invest in health, education, livelihoods and productive activities. Moreover, the transfer design may further encourage certain decisions (e.g. by conditionality and transfers mechanisms). Social transfers have the potential to enhance effective demand and then to generate local multipliers, but also to increase productive capacity and to promote institutional changes, thereby contributing to economic performance. Hence, in order to estimate the economic returns of investments in social transfers, it is necessary to develop a multidimensional perspective including complementary effects (i.e. the effects of different policies being implemented together) and linking micro and macro level effects. Besides, economic effects may not happen overnight and as such the analysis has to take time into account.

Figure 1: Direct and indirect returns to Social Protection



Source: Source: A. Mideros Mora, F. Gassmann, and P. Mohnen, 2012, *Estimation of rates of return of social protection instruments in Cambodia: A case for non-contributory social transfers.*

4. Study Framework

The Rate of Return (RoR) compares the net present value of benefits of an intervention to the net present value of the costs of this intervention. This study uses micro simulations to analyze how the RoR of different SPI develops over time. More precisely, we simulate the RoR over a period of 15 years to regard for the returns to behavioral effects such as education, which typically requires some time to unfold their full benefits. Microsimulations is a technique for the analysis of economic and social policies at the micro level when the focus is on distributional effects rather than average or aggregate level.

Therefore the simulation results complement existing impact evaluation results in several ways: most importantly the study extends the evidence horizon by adding a long-term, forward looking perspective in addition to rather short-term, back ward looking evaluation studies. Furthermore, it expands the scope of SPI from pilot areas to a hypothesized nationwide implementation, which addresses concerns of external validity of impact evaluations. In addition, simulation models can be used to examine to what extent different targeting procedures, transfer values, or complementary interventions could change the program outcomes.

The study focuses on benefits at the individual and household level including direct and behavioral effects of SPI. Income levels approximated by household consumption are used to monetarize effects and to quantify returns using one common base for the aggregation of benefits. The costs for SPI are derived from impact evaluation results and different cost assessments.

As a model can never cover the entire set of SPI linkages it needs to be born in mind that simulation models are always a simplification of reality. Nonetheless the models show how specific aspects of SPI pathways generate monetary returns in future periods. Therefore, the analysis is a scenario based ex-ante simulation that sheds light on the cost-effectiveness of different SPI on the national level.

Reduced Study Framework

The applied study framework is determined by the data availability. The linkages to be drawn between SPIs and other aspects of socio-economic development need to be covered in the data. For example to analyze the returns to investment in SPI through human capital effects, data on educational outcomes and health variables are required.

Typically data limitations do not allow simulating the complete conceptual model but only those aspects sufficiently covered in the data. The data availability and limitations will be discussed in more

detail in section five. However, it is important to note that the outcomes of this study only refer to a reduced model that cannot regard all SPI effect pathways as explained in previous section.

Figure 2 displays the reduced study framework adapted to the HBS 2002 data. The framework draws linkages between SP, human capital and labor outcomes by modelling the behavioral responses of an income increase on education and labor participation decisions. Impacts through agricultural investments or improved health outcomes cannot be simulated with the HBS 2002 data. This means that the analysis of the RoRs only refers to the reduced model, more specifically, it only considers effects achieved through increased schooling, disregarding potentially important aspects such as health, productive assets and agricultural impacts. Thus the reduced study framework could lead to a lower bound estimation of the RoR, which needs to be kept in mind for the interpretation of the results.

The proposed methodology to estimate the RoR follows the approach presented in Mideros et al. (2012, 2015). Within the framework the national economic performance is kept constant and the RoR is simulated based on consumption returns. In the model macro-economic and structural conditions affect both the situation with and without SP and as such will be assumed constant.[5]

Households that fulfill the eligibility criteria receive a transfer and it is assumed that households use 80 percent of the transfers for consumption purposes.[6] The HBS 2002 offers information on school attendance and educational attainment, which will be used to approximate the returns to education. In addition to that, the data set offers information on household labor participation. This allows shedding light on the potential effect of cash transfers on labor supply decisions.

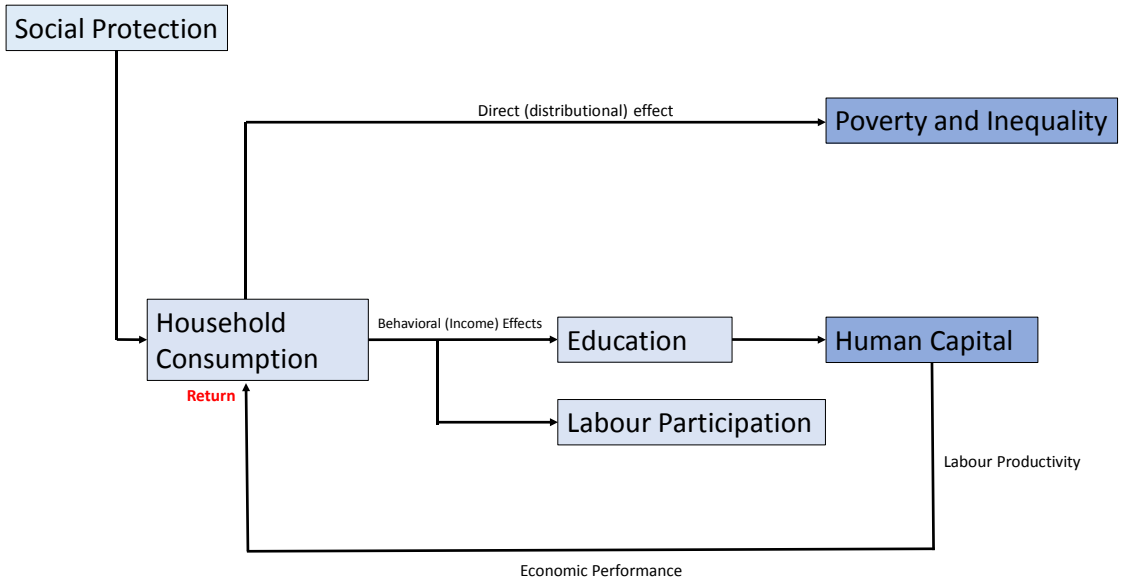
The program costs include program payments, administrative and delivery costs. In that sense the costs are dependent on the number of beneficiaries and the fixed program costs. However, the model does not consider financing aspects such as public versus external resources.

A demographic module furthermore accounts for a changing population over the simulation period. Official mortality and fertility rates are incorporated accounting for ageing, death, and newborns.

[5] The interplay of consumption and GDP growth would require a General Equilibrium Model, which is beyond the scope of this study.

[6] A sensitivity analysis will test how variations of the marginal propensity of consumption affect RoR.

Figure 2: Reduced Study Framework



SPI and Design Parameters

The description of the landscape of social protection showed the variety of implemented programs in Lesotho. However, similar to the design of the reduced study framework, only those SPI can be included in the quantitative analysis for which the respective targeting procedures can be modeled with the data. For example, an analysis of the OVC Bursary requires data on individuals' orphan status or another credible strategy that allows allocating the benefits in the simulation model in similar ways as the allocation procedures in reality.

After a thorough review of the data and modelling procedures, the study framework will be applied to CGP, OAP and SFP. Their respective design parameters are displayed in Table 2. As the CGP program contains a community targeting element, which cannot be quantified directly, the approach applied by Khondker and Freeland (2014b) is adopted in the study. Therefore out of all extreme poor households with children aged between 3 and 17 years, 30% are randomly excluded from the CGP.[7] Modelling of the OAP is straightforward deeming benefits to all individuals above 70. The modelling approach for the SFP requires some assumptions in order to quantify the in-kind transfers in monetary terms. Therefore all households with children attending primary school are granted a cash equivalent of 3.5M per meal in our model. That means that we assume that the SFP raises household's disposable income by 3.5M. In other words we assume that in the absence of the SFP households would spend 3.5M to provide their children with food limiting their financial resources for other purposes.

[7] The applied figure is a conservative approximation formulated in Khondker and Freeland (2014b) based on the targeting error findings of the OPM evaluation of the CPG.

There are several challenges to measuring individual incomes accurately for example related to informal income source or in-kind and reciprocity agreements. Besides that the HBS data provide only a categorized household income measure. Therefore consumption per capita is used to approximate incomes. Hence cash transfers are approximated by a consumption increase related to the size of the cash transfer value. However, impact evaluation evidence suggests that households do not consume the entire transfer, but use part to save or invest. To account for that and to avoid overestimations of the SPI effects a conservative measure of the propensity to consume is applied assuming that only 80% of the benefits are used for consumption purposes.[8]

In order to combine benefits and costs over time, discount rates are applied to compute net present values. A baseline discount rate of 3% is used in the dynamic simulation, and sensitivity tests examine the results using different discount rate values.

Table 2: Included SP Programs and Design Parameters

Programs	Transfer Values	Coverage/Targeting	Program Costs
CGP	• Households with 1-2 child members receive M360 quarterly • Households with 3-4 child members receive M600 quarterly • Households with 5 and more child members receive M750 quarterly	Modelled with random exclusion (30%) of extreme poor households with children aged between 3 and 17 years	Operational costs approximated using information cited in World Bank (2013): *15% of total transfer amount*
OAP	• M.500 monthly	Universal for all over the age of 70 (except recipients of civil service pension)	Operational costs approximated using information cited in World Bank (2013): *5% of total transfer amount*[9]
SFP	• Free meal (M. 3.5 per day) for primary school pupils	Universal for all children enrolled in primary school (180 days a year per child)	Operational costs approximated using information cited in World Bank (2013): *100% of total transfer amount*

[8] In the sensitivity analysis results for different propensities to consume are discussed

[9] A more recent analysis of the actual administrative costs of the OAP indicate that the costs are considerably higher than initially estimated by the World Bank (2013), and might be as high as 20% of the total transfer amount (oral communication with the World Bank, 28 January 2016).

To test for complementarities of combined SP instruments, the simulations will first analyze the individual RoR of CGP, OAP and SFP. In a second step the CGP and OAP programs will be analyzed as a combined package to test the integrated effect of the programs.

Outcome variables

The quantitative analysis focuses on two sets of outcome variables. First and most importantly the RoR, which is defined as follows:

$$(1) \qquad RoR = \frac{net\ present\ value\ of\ benefits}{net\ present\ value\ of\ costs} \times 100$$

The RoR is simulated with dynamic microsimulations after analyzing the program benefits and costs. As outlined in the previous section, all benefits are quantified in consumption terms. Per capita values are computed using adult equivalent scales as reported by the World Bank (2013). Additionally, the consumption outcomes are used to examine the distributional and poverty effects of CGP, OAP and SFP.

Secondly, the analysis examines poverty and inequality effects of SPI. The indicator used for the assessment of poverty and inequality is monthly consumption expenditure per adult equivalent. It is assumed to reflect economic well-being of households, to approximate incomes and it is the common indicator widely used in assessments conducted in low and middle income countries.

The poverty headcount is defined as the share of individuals living below the poverty line or the extreme poverty line, being 149.9 and 84.4 Maloti per adult equivalent, respectively. Further, the poverty gap is calculated by dividing the average distance of household expenditure from the (extreme) poverty line by the value of the poverty line. It thereby shows the depth of poverty and gives an indication of funds required to lift everyone out of poverty. Additionally, poverty severity is the squared poverty gap and thus gives more weight to the poorer households. The GINI coefficient is a common indicator for inequality and it ranges from 0 to 1 while a value of 0 would imply perfect equality.

Lastly, in the process of quantifying the overall benefits, the program effects on education measured with school attendance for school aged children is analyzed as well as labor participation decisions measured with a binomial variable for working age adults.

5. Data and Methodology

Data

In order to estimate rates of return of social protection interventions, micro-level data are required for the analysis. At the core of the data requirements is a comprehensive household income and/or consumption module, which allows determining household welfare and which is suitable for quantifying the effects of social protection. Furthermore, the data should be nationally representative and provide information on all possible links between social protection and household welfare dimensions, such as education, health, labor, or livelihoods, in order to quantify the expected benefits of social protection interventions. This means that the comprehensiveness and robustness of the analysis is essentially determined by data availability.

The availability of household survey data in Lesotho is limited. During the inception mission, the team together with UNICEF and the Bureau of Statistics identified all nationally representative household data sets that could meet the data requirements of the analysis and decided to use the Household Budget Survey (HBS). The Bureau of Statistics is in charge of the HBS. The survey is administered in four waves over one year in order to capture seasonal variations. Over the last 20 years, the HBS has been implemented three times with the latest round conducted in 2010/2011. The survey collects data on households and individuals focusing on indicators relevant for the analysis of poverty and welfare as well as education and labor statistics. The HBS is representative at the national and district level, covering each of the ten districts and distinguishing between urban and rural regions.

Initially, it was decided to use the HBS 2010/11 data given that it is the most recent dataset which contains detailed information on household consumption and hence meets the essential requirements for the statistical estimations. However, as indicated by the World Bank, the consumption data collected in 2010/2011 have to be treated with caution (World Bank, 2015b). The 2010/11 HBS differs from the previous round collected in 2002/03. In 2010/11, the HBS was integrated with the Continuous Multipurpose Survey (CMS) that was launched in 2009 and implemented annually. In this process, the survey instruments changed considerably. For example, the diary, which is used to collect detailed information on household expenditures on food, drinks and other consumables, covered only a one-week period compared to four weeks in the 2002/03 round. According to the World Bank (2015b), the 2010/11 data collection suffered from high attrition after the first quarter. Only 35 percent of the households could be revisited in the subsequent three quarters. Moreover, the change in survey instruments resulted in almost half of the households in the first quarter not reporting consumption of staple foods (Allwine et al. (2013) in: World Bank, 2015b).

Given that a reliable consumption aggregate is the key indicator for the analysis of social protection benefits, the team decided to use the 2002/03 HBS data. The response rate in 2002/2003 was 87.1 percent. With households completing a consumption diary and receiving visits for face to face interviews over a period of one month per survey wave, the survey provides comprehensive information on consumption expenditure for specific goods, both in cash and in kind. It is therefore considered the most appropriate dataset for this report as it facilitates the analysis of consumption patterns in combination with labor and education indicators. As the HBS only covers standard demographic and consumption variables, the data set is not suitable for drawing linkages between SP and health or agricultural effects.

Limitations

There are several challenges in terms of data availability and quantification problems that impede to incorporate all possibly existing linkages of SP in the study. These limitations need to be born in mind in the interpretation of results as they might lead to an underestimation of the RoR. However, the study can only descriptively point out potential missing links based on theory and findings of other studies. Therefore it has to be noted that the following aspects cannot be incorporated in the simulation models:

- Due to the lack of appropriate data in the HBS, the link between SP and agricultural outcomes such as investments in productive capital cannot be taken into account. The 2002/03 HBS does not contain information on cultivation of land or livestock. Enterprise and detailed livelihood information are not sufficiently covered in the HBS data to account for local multiplier effects in the simulations.[10]
- Information on health, disability or orphan status is also not available. The data therefore do not permit a simulation of the OVC bursary benefit or the Public Assistance scheme. Furthermore, the survey does not link households to their respective category in the NISSA system, which implies that in the simulation of the CGP program eligibility is based on extreme poverty status rather than belonging to NISSA category 1 or 2.

For the demographic projections, which are part of the dynamic simulation model, the study uses age-specific mortality rates for Lesotho derived from the Global Health Observatory Data (WHO). Fertility rates are based on projections of the BOS (2010).

[10] This also applies to the 2010/11 HBS.

Methodology

Following the reduced study framework the simulation model aggregates direct and behavioral benefits and compares them to the costs. To start we present a static model in which we simulate the immediate direct effects of CGP, OAP and SFP effect on inequality and poverty outcomes.

Before testing the dynamic effects of the programs over several periods, the behavioral effects need to be quantified. Thus the causal effect of a consumption increase on human capital needs to be separated from the reversed causal effect of human capital on the level of consumption. Therefore the indirect pathways are estimated stepwise: in the first step the effect of cash transfers on education and labor participation is estimated. In the second step the returns to changes in educational decisions are quantified estimating the effect of the highest educational attainment on household consumption levels. The results describe the monetary returns to social transfers through the behavioral changes on educational decisions. The methodological details and estimation formulas are presented in the next section.

Subsequently, dynamic simulations estimate the RoR of CGP, OAP and SFP in each year from 1 to 15. In each period the model tests whether the program eligibility criteria are met according to the program targeting. If so, transfer values of the SP programs are assigned to the beneficiary. Moreover, the model assigns the behavioral benefits in each period to past and current participants as estimated in steps 1 and 2. The RoR are calculated for each period by comparing the monetarized benefits of SP to the costs of SP. All values are discounted to net present values. The costs and benefits are computed as the difference in a scenario with SP compared to a scenario without SP. That means, that in the study the hypothetical case of SP investments is compared to a case without SP to test how investments in SP would generate monetary returns.

A demographic module accounts for population ageing, mortality rates, and new borns according to population projections by the WHO. Therefore, individuals age (stepwise) 15 years from the first to the last period. Furthermore, the demographic model includes probabilities of newborns for women in childbearing age and the probability of death per age group.

Consumption plays the essential role in the analysis of the RoR and poverty outcomes of SPI. It is used to quantify the returns to education and fills the role of a common basis for the aggregation of monetary benefits. Thus, before presenting the quantitative results, the consumption levels and the baseline scenario without SPI is described. Table 3 displays the consumption level per capita according to the HBS 2002 data. The average consumption level per adult equivalent was around 228 Maloti per month with a large discrepancy between urban and rural consumption. The disaggregated values show that urban consumption levels are about two thirds higher than rural consumption levels. This

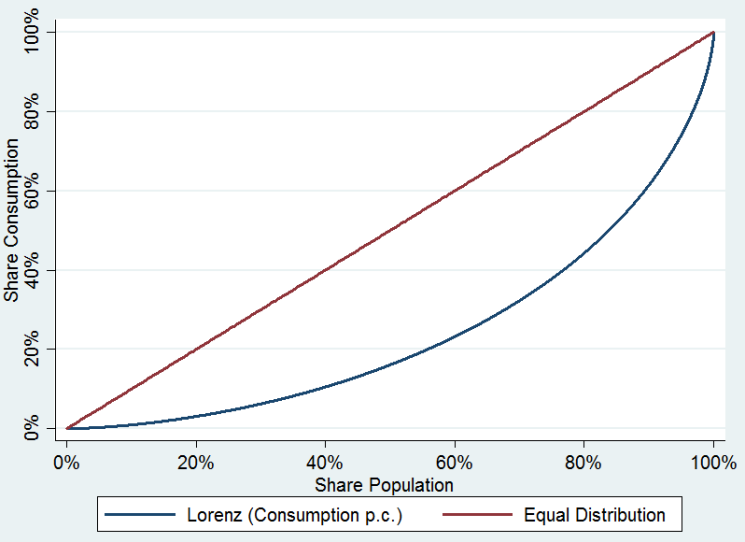
is also reflected in significantly larger prevalence of poverty and especially extreme poverty levels in rural areas. Based on our calculations, the data indicate that in 2002/2003 around 52% of the population fall below the consumption poverty line of 149.91 Maloti.[11] The share of extremely poor is nearly twice as high in rural areas compared to urban regions. The inequality levels, as measured with the GINI coefficient, are persistently high with a GINI of 0.52 with only minor differences between urban and rural areas.

Table 3 Average (monthly) Consumption, Poverty and Inequality in Lesotho

	Total	Rural	Urban
Consumption per capita	227 M.	171 M.	290 M.
Absolute Poverty (headcount)[12]	52.2%	62.5%	40.4%
Extreme Poverty (headcount)	30.3%	38.7%	20.8%
Inequality (GINI)	0.52	0.50	0.50

Note: Own calculations based on HBS 2002.

Figure 3: Consumption-based Lorenz Curve, 2002/2003



To illustrate the inequality in consumption levels per capita, Figure 3 shows the Lorenz curve that plots the share of consumption on the total consumption by the population share. The straight line (45°) denotes an equally distributed society in which all members have the same level of consumption. The curved line displays the observed Lorenz curve based on the HBS data. The large area between both lines indicates the high level of consumption-based inequality in Lesotho. The lower half of the populations disposes of less than 20% of the total consumption in Lesotho. In contrast the highest 20% of the population dispose around 60% of the total consumption in the country.

[11] Note that this figure is slightly below poverty rates reported in other documents for 2002/2003, which vary between 54 percent (World Bank, 2010) and 56.6 percent (World Bank, 2015a).
[12] Poverty rates are calculated as the percentage of the population with consumption per adult equivalent below the national poverty lines.

6. Analysis and Results

Static simulation

To test how SPI affects distributional and poverty outcomes in Lesotho, the results of static microsimulations at the individual level are presented in this section. Which distributional and poverty effects can we expect from CGP, OAP and SFP and a combined set of SPI?

Based on the HBS data and the SPI design assumptions (see Table 2), the direct distributional (G) and poverty (P^0) effects of the programs are simulated. Note that in this section the behavioral responses are not (yet) included. To quantify the benefits (B), the baseline without SPI is compared to a scenario with SPI, assigning the difference in both scenarios to the direct program effects.

$$\text{Equation (1)} \qquad B_P = [(P^1 - P^0)/P^0] \times 100$$

$$\text{Equation (2)} \qquad B_G = [(G^1 - G^0)/G^0] \times 100$$

The static simulation is applied to CGP, OAP and SFP separately and the combined package of CGP and OAP in combination. Table 4 displays the transfer values, costs and number of beneficiaries according to the static simulation. Total annual transfer values are largest for the OAP, followed by the CGP and the SFP. In terms of percentage of GDP, it matters greatly what year is used for the comparison. Expressed as a percentage of GDP in 2003, the OAP accounts for 4.8%, and the CGP and SFP for 1.4% and 1.2% respectively. Taking 2013 as benchmark, the share of GDP that would have to be allocated to the three programs has decreased significantly. This is not surprising given that GDP in 2013 was almost three times the value of 2003 in nominal terms. The results also differ compared to Table 1, which contained actual data with respect to the number of beneficiaries and costs incurred, while Table 4 shows the simulated values based on the HBS data 2002/2003. The considerably lower value for OAP is mainly due to the lower number of persons aged 70 and older in 2002/2003. A similar observation can be made for the SFP. The data below indicate that much fewer children have been attending primary school in 2002/2003 compared to the current situation. The difference in costs and beneficiaries of the CGP is due to the nationwide coverage of the program in the simulation.

Table 5 displays the results of the static simulations on poverty and inequality outcomes. The figures illustrate the percentage decrease in outcome variables compared to the baseline scenario without SPI. The outcomes are simulated for CGP, OAP, SFP, and a scenario combining OAP and CGP. It has to be noted that the static simulation only regards the immediate impact on the outcome variables without considering any demographic or educational dynamics.

Table 4 Transfers and Number of Beneficiaries - Static Simulation

	Total annual transfer value (Maloti)	% of GDP in 2003*	% of GDP in 2013*	Number of individual recipients
Child Grant Program	105,019,800	1.4%	0.5%	53,490[a]
Old Age Pension	360,162,000	4.8%	1.6%	60,027
School Feeding	89,513,235	1.2%	0.4%	284,169

Source: own calculations
* GDP 2003 (IMF): 7.492 billion; GDP 2013 (IMF): 21,975 billion
[a] Recipient households. Total number of recipient children == 141,249

Table 5 Static Simulation: Relative Change in Poverty and Inequality

	Poverty Headcount	Poverty Gap	Poverty Severity	Extreme Poverty Headcount	Extreme Poverty Gap	Extreme Poverty Severity	GINI
CGP	0.0%	-10.6%	-19.9%	-19.4%	-29.8%	-37.6%	-3.9%
OAP	-8.9%	-12.8%	-14.9%	-13.8%	-16.9%	-18.7%	-3.5%
SFP	-2.9%	-5.8%	-8.2%	-6.2%	-10.6%	-13.7%	-1.8%
CGP & OAP	-9.7%	-22.8%	-32.9%	-30.9%	-43.0%	-51.6%	-7.1%

Source: own calculations based on HBS 2002/2003. Variation (%) = $(P^0 - P^1)/P^0$

Among the three SPI, the largest reduction in poverty headcount can be observed for OAP with 9% followed by SFP and CGP. The combined effect of CGP and OAP reflects the sum of both with a small additional effect on the poverty headcount. For the CGP no effect on poverty headcount can be measured. This is due to the targeting of extremely poor households that do not graduate out of poverty with the transfer as the gap is too large. However, looking at the SPI effects on the poverty gap a reduction of 10% can be observed for the CGP. The effect is slightly larger for the OAP and markedly lower for the SFP, which is due to the universal nature of the program and the small transfer value.

The effects of the CGP targeting criteria become particularly evident when considering extreme poverty outcomes. The simulation suggests that CGP reduces the extreme poverty headcount by 20% compared to a scenario without SPI. The effect of the combination of CGP and OAP would even reduce extreme poverty by nearly 40% in the static simulation. As the CGP is particularly aiming at the extremely poor, the effects are considerably larger than for the SFP, which is universal for all children enrolled in primary school. As OAP transfers values are much larger than for the other programs, the effects on poverty are also expected to be larger.

Not surprisingly the different effects of universal and targeted programs are most strongly reflected in inequality outcomes. In the static model CGP reduces inequality in consumption by around 4%, which is more than twice the effect of SFP and larger than the OAP effect. This underpins that it requires redistributive instruments in order to obtain inequality reductions.

To examine the heterogeneity of the results, the sub-groups of urban and rural households are analyzed separately (Table 6). The effects in urban and rural areas are similar in size for CGP and OAP, though slightly larger in rural areas. A remarkable exception is the inequality reduction effect through CGP in rural areas. The effect is much larger than in urban areas, showing the high potential for inequality reductions in rural areas. The SFP effects tend to be higher in urban areas for all outcomes except inequality. This is because children in urban areas are more likely to attend school and hence more likely to benefit from the program. This shows that the SFP particularly benefits those households and children with access to schools.

Table 6 Static Simulation: Relative Change in Poverty and Inequality, Urban versus Rural Areas

	Poverty Headcount		**Poverty Gap**		**Poverty Severity**		**GINI**	
	Urban	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**
CGP	0.0%	0.0%	-10.3%	-10.7%	-20.0%	-19.9%	-2.4%	-6.1%
OAP	-7.4%	-9.8%	-11.1%	-13.6%	-13.8%	-15.4%	-2.6%	-3.4%
SFP	-3.6%	-2.5%	-6.8%	-5.3%	-9.5%	-7.7%	-1.6%	-2.2%
CGP & OAP	-8.0%	-10.6%	-21.4%	-23.5%	-32.6%	-32.9%	-5.0%	-8.7%
	Extreme Poverty Headcount		**Extreme Poverty Gap**		**Extreme Poverty Severity**			
	Urban	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**		
CGP	-21.2%	-18.5%	-31.8%	-29.1%	-39.8%	-36.8%		
OAP	-13.2%	-14.0%	-17.0%	-16.8%	-18.4%	-18.8%		
SFP	-7.8%	-5.4%	-12.7%	-9.7%	-16.4%	-12.7%		
CGP & OAP	-34.6%	-29.1%	-46.3%	-41.7%	-53.5%	-50.9%		

Source: Own calculations based on HBS 2002/2003. Variation (%) = $(P^0 - P^1)/P^0$

To account for the different cost structures of the programs, the cost effectiveness rates for different outcome variables are presented in Table 7. Total program costs include both transfer and

administrative costs according to the design parameters in Table 2. The cost-effectiveness measures the simulated effect for a given budget. For example, what effect can be expected by investing 1% of GDP in the CGP, OAP or SFP in terms of poverty rate reduction? The results of the static simulation (Table 7) suggest that the CGP would generate the largest reductions in outcomes for each percent of GDP invested, except for the poverty headcount. According to the static simulation, investing 1% of GDP in the CGP would generate a reduction of 15.3% in extreme poverty, which is about five times the size of the OAP program effect at the same cost. As described, this result is not surprising giving the specific target group of the CGP. The cost-effectiveness of the SFP and OAP are similar for most outcomes.

Table 7 Static Simulation: Cost Effectiveness

	Cost (% of GDP in 2003)	Cost (% of GDP in 2013)	Poverty Rate	Poverty Gap	Poverty Severity	Extreme Poverty Rate	Extreme Poverty Gap	Extreme Poverty Severity	GINI
Child Grant Program	1.6%	0.5%	0.0%	8.7%	15.8%	15.3%	23.2%	28.3%	3.2%
Old Age Pension	4.9%	1.7%	2.2%	2.9%	3.3%	3.1%	3.6%	3.9%	0.8%
School Feeding Program	2.3%	0.8%	1.2%	2.5%	3.5%	2.7%	4.6%	5.9%	0.8%
CGP & OAP	6.4%	2.2%	1.8%	4.2%	5.9%	5.8%	7.7%	8.9%	1.3%

Source: own calculations based on HBS 2002/2003.
Poverty / Inequality reduction over total program costs as percentage of GDP in 2003
Assumed administration costs in percentage of total transfers: CGP 15%, OAP 5%, SFP 100%

Economic returns and behavioral effects of SPI

Household consumption from the HBS 2002/2003 data is used to estimate three different types of effects. The first model estimates the returns to education by assessing the responsiveness of consumption to changes in the years of schooling, a proxy for human capital investments. In the second and third models, consumption is used to estimate the responsiveness of school attendance and labor participation to changes in income (with consumption used as a proxy). Estimates generated from these models are used in the subsequent dynamic microsimulation models that determine the rates of return of SPI.

Returns to Education

A common approach to quantify the returns to education is a Mincer equation that establishes the link between the level of schooling and wages (Mincer 1974; Schady 2000). The HBS data cover information on wages, but the particular feature of a highly segregated labor market in Lesotho

advocates for an alternative approach. Such an approach would need to account for the high levels of informality in Lesotho. Alternatively, the returns to schooling at the household level are estimated by using household consumption as a proxy for household disposable income. This allows for the direct estimation of the effect of education on consumption which could also be interpreted as the monetary returns to education and hence the returns of SPI through educational effects. The following model is considered for estimation (equation 3):

Equation (3) $$\ln(consumption_i) = \beta + \rho E_i + \theta N_i + \pi_i$$

where the logarithm of household consumption per adult equivalent i is used to approximate income[13], E_i denotes the individual educational attainment measured by years of schooling for individuals aged 18 to 69. N_i refers to observable household characteristics such as age, sex, and geographic control variables.

However, the main methodological problem with equation (3) is the two-way causal relationship of consumption and education. On one side, increased household income (proxy is consumption) has a positive effect on schooling either through reduced child labor or increased spending on education. On the other side, education is an asset that boosts incomes. In order to correct for the potential bias from reverse causality, an instrumental variable (IV) approach using a two-stage least squares model is estimated. Education is instrumented with a variable measuring historical primary school enrollment at district level. School enrollment data from 1979 to 2002 are used. Historical district level school enrolment rates predict access to education which affects an individual's educational attainment, but they do not directly predict household consumption which justifies their use as an instrumental variable. In the first stage the following model is estimated:

Equation (4) $$E_i = \gamma Z_i + \theta N_i + e_i$$

Where E_i refers to the educational attainment of individuals aged 18-69, which is instrumented using Z_i , historical district school enrollment rates.

Table 8 presents the results of the two-stage least squares (2SLS) model examining the returns to education using household consumption per adult equivalent as a proxy for income. The results are presented for the full sample and sub-populations of the poor, non-poor, urban and rural. The first stage estimates an individual's maximum level of education as a function of the instrumental variable i.e. historical district school enrollment rates (equation 4). Using the minimum critical value of 10

[13] Absolute household consumption values are normalized using the logarithm given the skewed distribution of household consumption and in order to account for outliers.

(Stock and Yogo 2005), the F-statistics at the bottom panel of Table 8 show that the instrument is strongly correlated with individual education attainment in all specifications[14].

Table 8. 2SLS estimation of (log) household consumption per adult equivalent, age 18-69

	National	Poor	Non-poor	Urban	Rural
Schooling	0.09**	-0.08*	0.12**	0.05	0.17**
	(2.94)	(-2.55)	(3.05)	(1.46)	(2.61)
Female	-0.02	0.07*	-0.04	0.03	-0.18+
	(-0.83)	(2.12)	(-1.38)	(1.50)	(-1.94)
Age	0.01	0.04+	-0.00	0.04+	-0.03
	(0.71)	(1.89)	(-0.02)	(1.85)	(-0.97)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	14710	7418	7298	7225	7485
Cragg Donald F-Statistic (weak identification test)	51.04	38.27	15.28	32.58	19.72

Notes: All regressions adjusted for the complex sample survey design. Additional controls that are not reported include age squared, cubic age, farming as main income source, household size and regional dummies that account for variation in geographical terrain. F-statistic measures weak identification for the instrument, historical primary school enrolment. + p < 0.10, * p < 0.05, ** p < 0.01. t statistics in parentheses. Source: Own calculations based on the HBS 2002 data.

Estimates in Table 8 show that at national level, an additional year of schooling at individual level increases household consumption by 9% in 2002. The other statistically significant estimates show that the returns to an additional year of schooling on consumption are about 12% for the non-poor, but negative (-8%) for the poor and 17% for rural individuals. The HBS 2002 data shows that only 45% of the poor are engaged in paid work. Hence, the lower returns to additional schooling among the poor households could be due to lower levels of productivity or decreased participation in paid work. Overall, the estimates imply positive returns to education and are close to the international standard of approximately 10% (Psacharopoulos and Patrinos 2004). For instance, Mwabu & Schultz (1996) investigated returns to education in South Africa and found significant effects of schooling on the gross hourly wage of approximately 8% (male) and 6% (female) for primary education and up to approximately 30% for tertiary education (Mwabu & Schultz, 1996).

Behavioral effects: School attendance

Social transfers usually lead to an income effect that produces changes in household income and consumption. In this section, the effect of an increase in household income on education is estimated using school attendance. The HBS 2002 data contains a binomial variable that denotes whether household members aged 10 and older are attending school or not. Since, the data for individuals

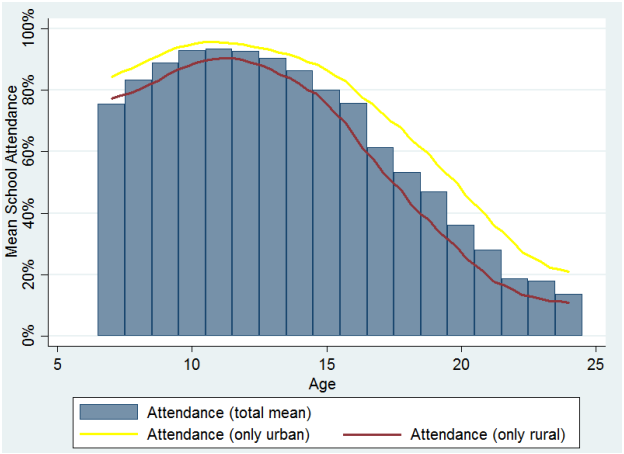
[14] The F-statistics measure the strength of the instrument of historical district primary school enrollment. All the F-statistics are higher than the lowest thresholds (5 or 10%) of the acceptable bias when compared to the bias of ordinary regressions.

aged 6 to 9 was missing, we imputed the values obtained from estimating the probability of attending school for individuals aged 10 to 12 using an IV probit[15]. Yet, this approximation does not capture all aspects of education. For instance, SPI could affect children's capacity to learn through better nutrition and reduced absenteeism. However, attendance is a good indicator for measuring the elementary prerequisite for qualitative educational effects.

A graphical analysis of the HBS 2002 data shows that school attendance in Lesotho is diverse and depends on demographic and geographic characteristics. The data show that in 2002, about 66% of all individuals who were six to 24 years old attended school. Yet, there is significant variation depending on the age (see Figure 4 and Figure 5). Another difference becomes evident when comparing urban and rural areas. Up to age 12, school attendance is equally high but diverges strongly afterwards showing a difference of more than 20% after age 17.

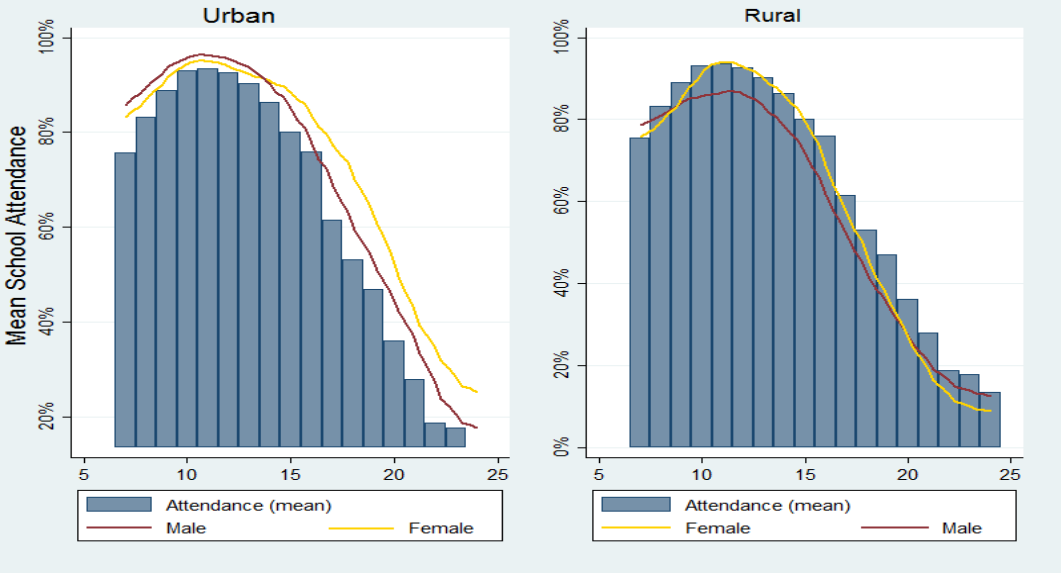
A comparison of the average school attendance between males and females between age 6 and 24 shows an opposite effect particularly in rural areas. In these areas the data indicate markedly higher attendance rates for females at lower ages and a converging process at higher education levels. However, this pattern does not hold for urban areas. An explanation for this trend in the rural areas could be the "herd boy effect" in which young males particularly take care of the cattle and do not attend school. The effect is significant reaching a difference of about 10% at the beginning of secondary school at age levels around 14 years.

Figure 4: School Attendance (Age 6-24) - Mean, rural, and urban



[15] The IV probit models estimated the effect of household consumption on the probabilities of attending school for poor and non-poor individuals aged 10 to 12. Household consumption per adult equivalent was instrumented by the presence of the following in a household; a toilet, brick or tiled roof and mobile or telephone. Other covariates included in the regression are sex, age, age squared, cubic age, age of household head, female household head, household size and farming as a main income source.

Figure 5: School Attendance (Age 6-24) - mean, male, female



The differences in school attendance could also be related to differences in the economic resources of a household which are an important determinant of educational decisions. Regression analysis is used to further examine this relationship. The estimates are derived from determining the responsiveness of school attendance to changes in disposable income (approximated by household consumption). The regression results shed light on the potential effects of SPI on educational outcomes and will play a central role in the dynamic simulation model.

As school attendance is measured by a binary variable (yes/no), a binomial model is estimated, where $\Pr(School_i = 1)$ describes the likelihood that an individual aged 6 to 24 attends school and N_i^{Sch}, N_j^{Sch} refer to various individual and household control variables respectively.

Equation (5) $$\Pr(School_i = 1) = \phi\left(ln(consumption)_i,\ N_i^{Sch},\ N_j^{Sch}\right)$$

However, household consumption is endogenous because the level of household consumption not only affects the likelihood of attending school, but the level of schooling also has an effect on household consumption. This reversed causality between education and consumption may bias the outcomes of the model. In order to avoid biased estimates of the coefficients, the probability of attending school is estimated using an instrumental-variable (IV) approach, more specifically, an IV probit model that instruments household consumption. Household consumption no longer enters the equation directly. The IV approach requires finding variables ('instruments' in this context), which are strongly correlated with household consumption, but not with school attendance. Variables, such as

the household's distance to water source[16], whether the roof is made of bricks or tiles and the presence of a mobile phone or telephone in the households are used as instruments Z_j to predict household consumption in addition to other individual and household control variables. These instrumental variables are strongly correlated with household consumption but they have no bearing on the likelihood whether a child attends school of not. The first stage of the IV probit model is thus:

Equation (6) $$ln(consumption)_j = \gamma Z_j + \theta N_i^{Sch} + \xi N_j^{Sch} + e_j$$

The second stage of the IV probit model is in the form of equation (5) but instead uses predicted consumption values obtained from equation (6).

Table 9. Consumption Effect on School Attendance of Individuals aged 6-24 (IV Probit)

Marginal effects	National	Poor	Non-poor	Urban	Rural	Female	Male
Consumption (log)	0.11***	0.14***	0.12***	0.06***	0.07**	0.07***	0.06***
	(6.60)	(7.82)	(4.11)	(6.19)	(2.43)	(5.81)	(4.08)
Female	-0.02***	-0.01***	-0.02**	-0.03***	-0.01		
	(-4.34)	(-2.70)	(-2.29)	(-4.40)	(-1.15)		
Age	0.17***	0.16***	0.13***	0.18***	0.18***	0.20***	0.14***
	(16.11)	(10.28)	(7.04)	(12.54)	(12.54)	(15.71)	(7.09)
Age squared	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***
	(-13.07)	(-9.30)	(-6.05)	(-10.07)	(-9.46)	(-12.72)	(-5.34)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12479	6915	5564	5658	6821	6253	6226
Cragg Donald F-Statistic (Weak identification test)	22.25	16.31	27.99	103.92	16.6	62.54	54.81
Sargan score p-value (Overidentification test)	0.52	0.36	0.64	0.97	0.02	0.38	0.21

Notes: All regressions adjusted for the complex sample survey design. Additional controls that are not reported include cubic age, past behaviour (age minus completed school years), age of household head, female household head, household size and district dummies. F-statistic measures weak identification for the instruments, distance to water source, roofing material (brick or tiles) and presence of mobile or telephone. In the first column, only distance to water source and roofing material are used as instruments * p < 0.10, ** p < 0.05, *** p < 0.01. t statistics in parentheses. Source: Own calculations based on the HBS 2002 data.

Using the critical value of 10 (Stock and Yogo 2005), the F-statistics[17] at the bottom panel of table 10 shows that the excluded instruments (distance to water source, brick or tiled roofing material, mobile or telephone) are strongly correlated with household consumption (adult equivalent) in all

[16] Distance to water source is measured using the minutes it takes for household members to travel to a water source. There are five categories, 0-14, 15-29, 30-44, 45-59,60+ minutes

[17] The estimated F-statistics for the urban, female and male individuals are higher than the 5% critical value for IV relative bias, and the rest are higher than the 10% critical value for IV relative bias.

specifications. Additional tests indicate that the instruments are valid in all specifications except for the rural sample[18].

Table 9 presents average marginal effects for the full sample and selected sub-populations. The marginal effect measures the change in the dependent variable (here: likelihood of attending school) as a result of a change in an explanatory variable, for example, an increase in household consumption, and holding all other explanatory variables constant. The effect of household consumption on school attendance is positive and significant in all specifications. At national level, a 10 percent increase in the household consumption level (adult equivalent) is associated with a 1.1 percentage point higher probability of attending school by individuals aged 6 to 24. This marginal effect is comparable to that for poor and non-poor individuals. A 10 percent increase in household consumption (adult equivalent) leads to higher probabilities of school attendance of 0.6 and 0.7 percentage points for urban and rural individuals. At the individual level, the marginal effects for females and males are similar. A 10 percent increase in household consumption (adult equivalent) leads to higher probabilities of school attendance of 0.7 and 0.6 percentage points for females and males aged 6 to 24. The minimal variation between the marginal effects for the urban/rural, poor/non-poor and female/male comparisons demonstrates that SPI are likely to raise school attendance by comparable rates across school-aged children. This implies that SPI are more likely to result in a universal effect rather than elicit heterogeneous responses, such that targeting may not be required for the selected sub-populations.

The findings suggest that household consumption positively affects school attendance rates in Lesotho. This implies that SPI that increase household consumption levels (income) likely improve education outcomes and therefore contribute to human capital development in Lesotho. The average positive effects will likely apply to all sub-groups even those with low expected returns (e.g. urban areas).

Behavioral effects: Labor participation

In this section, the effect of household consumption on labor participation is estimated. Social protection investments such as social transfers affect labor participation through different mechanisms. First, the provision of a social transfer can be disincentive for work. When individuals receive regular amounts of income that are above the minimal levels of disposable income or wages, they can choose to work less. However, this effect may vary by age, gender and other socio-economic characteristics. Second, social transfers alleviate credit constraints and may encourage productive

[18] The overidentification test (Sargan score) tests whether the instruments are uncorrelated with the error term and whether the structural equation is incorrectly specified. For validity, the null hypothesis cannot be rejected. In all estimations, the null hypothesis is not rejected at 10% level, with the exception of the estimation based on the rural sample.

investments with differing labor requirements that elicit adjustments in household labor supply and allocation. Finally, for a household, the utilization of a social transfer is also subject to the internal resource allocation and decisions. Hence, the labor responses to the transfer by adults, children, males and females may differ.

Figure 6: Paid Work (18-70 years) - mean, rural, urban

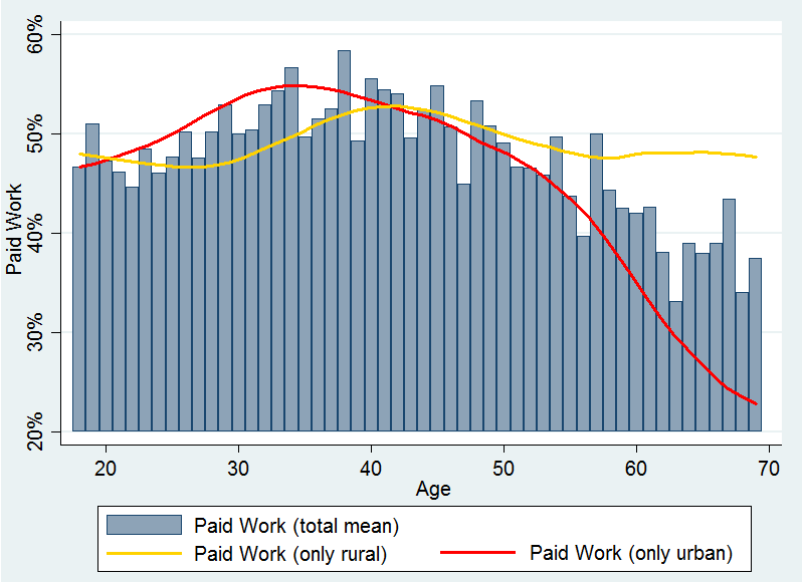
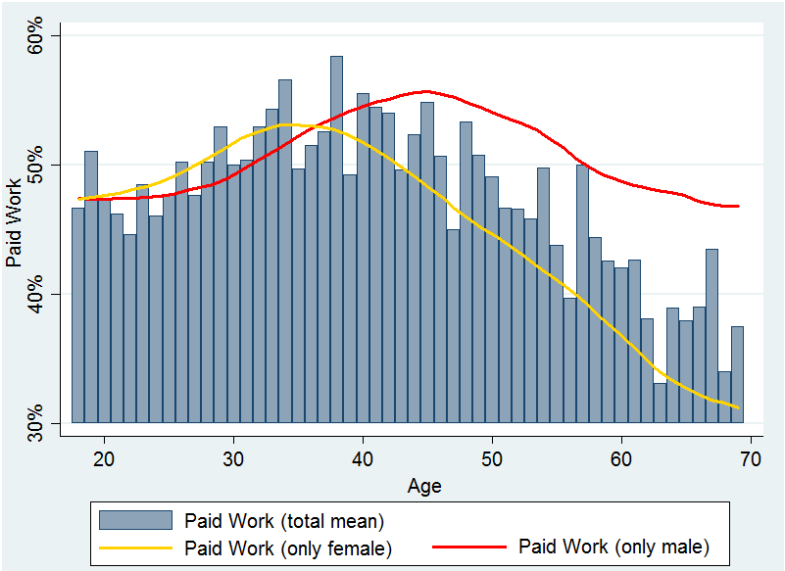


Figure 7: Paid Work (18-70 years) - mean, female, male



For the analysis, labor participation is defined as a binary variable (i.e. whether a person engages in paid work or not). A probit model is estimated where $\Pr(Work_i = 1)$ describes the likelihood that an

individual between ages 18 and 69 participates in paid work and X_i , X_J refer to various individual and household control variables.

Equation (7) $$\Pr(Work_i = 1) = \phi\big(ln(consumption)_i,\ X_i\ ,\ X_J\ \big)$$

However, household consumption (adult equivalent) in equation (7) is endogenous due to the reverse causality between labor participation and consumption. One the one hand, changes in household consumption (income) lead to changes in labor decisions and labor allocation. On the other hand, a reduction or increase in labor participation affects earned income, which in turn affects household consumption levels. Consequently, the probability of participating in paid work (labor participation) is estimated using an IV probit model that instruments household consumption.

Similar to equation (6), in the first step, the variables distance to water source, whether the roof is made of bricks or tiles and the presence of a mobile phone or telephone in the households are used as instruments Z_j to predict household consumption levels in addition to other individual and household controls. The first stage of the IV probit model is thus:

Equation (8) $$ln(consumption)_j = \gamma Z_j\ + \theta X_i\ + \xi X_j\ + e_j$$

The second stage of the IV probit model estimates the probability of paid work as in the form of equation (7), but actual consumption values are replaced by predicted values from equation (8) (first step). The regressions are restricted to individuals aged 18 to 69.

Table 10. Consumption Effect on Labor Participation of Individuals aged 18-69 (IV Probit)

Marginal effects	National	Poor	Non-poor	Urban	Rural	Female	Male
Consumption (log)	0.16**	0.25**	0.21**	0.16**	0.15**	0.14**	0.13**
	(10.01)	(10.53)	(9.17)	(7.76)	(5.60)	(7.92)	(2.85)
Female	-0.03**	-0.02*	-0.02*	-0.02+	-0.05**		
	(-4.21)	(-2.36)	(-2.21)	(-1.93)	(-4.16)		
Age	0.01	-0.00	0.01	0.02+	-0.01	0.01	-0.01
	(0.87)	(-0.25)	(0.66)	(1.75)	(-0.52)	(0.63)	(-0.65)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27214	27214	27214	27214	27214	27214	27214
Cragg Donald F-Statistic (weak identification test)	100.75	11.64	29.63	89.68	21.39	55.44	45.52
Sargan score p-value (Overidentification test	0.39	0.01	0.92	0.09	0.61	0.45	0.14

Notes: All regressions adjusted for the complex sample survey design. Additional controls that are not reported include age squared, cubic age, years of completed schooling, highest educational level within household, household size and regional dummies that control variation in geographical terrain. F-statistic measures weak identification for the instruments, distance to water source, roofing material (brick or tiles) and presence of mobile or telephone. + p < 0.10, * p < 0.05, ** p < 0.01 t statistics in parentheses. Source: Own calculations based on the HBS 2002 data.

Using the critical value of 10 (Stock and Yogo 2005), the F-statistics[19] show that the excluded instruments (distance to water source, brick or tiled roofing material, mobile or telephone) are strongly correlated with household consumption (adult equivalent) in all specifications. Additional tests indicate that the instruments are valid in all specifications except for poor individuals[20].

Table 10 presents average marginal effects for labor participation for the full sample and selected sub-populations. The results show that household consumption has a positive effect on labor participation in all estimations. At national level, a 10 percent increase in the household consumption level (per adult equivalent) is associated with a 1.6 percentage point increased probability of labor participation by individuals aged 18 to 69. This marginal effect is comparable to that for urban and rural individuals. A 10 percent increase in household consumption (adult equivalent) leads to higher probabilities of labor participation of 2.5 and 2.1 percentage points for poor and no-poor individuals. At the individual level, the marginal effects for females and males are similar. Similar to the findings on the probability of school attendance, there is minimal variation in the average positive effects when the different sub-populations are compared. Overall, the findings suggest that SPI that increase household consumption levels (income) potentially raise participation in the labor markets in Lesotho.

Dynamic Simulation

The static simulation model showed the direct effects of SPI from the baseline year to the next. In this section dynamic simulation model are applied to examine the effects over time including the behavioral effects through increased school attendance and higher school attainments. Thus, the SPI effects are simulated over a 15 years' time range. The effects are simulated as if the programs were implemented on the national level using nationally representative survey weights. The aim of the dynamic simulation is to analyze the changes over time regarding human capital developments and consumption. Therefore the dynamic model incorporates the behavioral responses as estimated in equation 4 and 6. In order to refine the simulation the effect of consumption on school attendance (equation 4) is simulated for poor and non-poor individuals separately. Thereby the much larger effect of an additional Maloti for a poor household as compared to richer households regarding school attendance is included in the simulations.

[19] The estimated F-statistics are higher than the 5% critical value for IV relative bias in all cases except for poor individuals, in which the F-statistic is higher than the 10% critical value for IV relative bias.

[20] The overidentification test (Sargan score) tests whether the instruments are uncorrelated with the error term. For validity, the null hypothesis cannot be rejected. In all estimations, except for those based on poor and urban individuals, the null hypothesis is not rejected at 10% level. The null hypothesis cannot be rejected at the 5% for estimations on urban individuals.

The model accounts for demographic changes during the 15-year simulation period regarding for ageing, death, and newborns. The demographic module uses mortality rate projections by age and sex to probabilistically determine deaths in each period. In the same way, yearly fertility rate projections account for newborns of women in childbearing age (15-49) in each period. This demographic module ensures that individuals change eligibility along the 15 years study framework. For example, individuals that turn 70 during the simulation period become eligible for the OAP. On the other side, households with children above 17 will no longer be eligible for the CGP.

Within the simulation model, population size increases at an average annual rate of 0.59% resulting in an overall increase of 8.59% from 1.8 million in 2002 to 2.0 million in 2016. The resulting population size in 2016 (1,949,196.82) is very close to a figure forecast by the IMF, based on the population census in 2006 (1,920 million). The slow population growth reflects recent developments in Lesotho of decreasing fertility rates and raising mortality rates. Figure 13 in the Annex summarizes the population development according to the simulation model.

School attendance and educational attainment are used to predict the behavioral returns to SPI. Therefore, the educational outcomes that can be expected with higher consumption levels due to the SPI transfers is compared to the expected education outcomes without the transfers. In that regard the behavioral benefits can be formulated as follows:

Equation (9) $$B_{t=T} = \left(E_{t=T}^{SPI,1} - E_{t=0}^{SPI,0}\right) - \left(E_{t=T}^{SPI,0} - E_{t=0}^{SPI,0}\right) = E_{t=T}^{SPI,1} - E_{t=T}^{SPI,0}$$

Where $E_{t=T}^{SPI,1}$ refers to the expected consumption including the behavioral responses and $E_{t=T}^{SPI,0}$ to the expected consumption in the absence of SPI transfers.

The consumption level is calibrated using the HBS 2002/2003 data. Based on the eligibility criteria of the SPI, the transfers are assigned to individuals. Within households the benefits of SPI are equally distributed among its members according to the adult equivalent weights. That means that individual grants are shared with household members according to their respective weight within the household. [21]

The simulation procedure remains the same in each period as outlined in Table 11: in the baseline period consumption is determined by the HBS data. Assigned beneficiaries of the SPI receive the benefits, which increases their consumption levels by the amount of the transfer values times the propensity to consume (80%). Based on their new consumption level the likelihood of school age

[21] Existing evidence advocates against the alternative assumption that pensions are not shared within households (e.g. Woolard & Klasen, 2005)

children to attend school is predicted (based on equation 4). Following this, the educational attainment is updated probabilistically depending on whether children (age 6-24) attended school. The behavioral benefits of SPI are computed as the difference of predicted consumption with and without SPI as a function of the educational attainment as shown in equation 6. The new consumption levels are calculated as the sum of the previous consumption level plus the direct effect (transfers) and the behavioral benefit. The difference in consumption in a scenario with SPI and the baseline without SPI reflects the overall benefits of the programs.

At the end of each period, the demographic changes are realized. In the next period households need to qualify again for the SPI transfer and only the behavioral benefits are carried over to the next period's consumption. This procedure is automatically performed for 15 periods. Table 11 outlines the simulation steps per period.

Table 11 Simulation Procedure per Period

	1. Direct Effect		2. Behavioral Effects			3. Outcome		4. Demographics
Period	**Non-Eligible**	**Eligible**	**Attendance**	**Attainment**	**Behavioral Benefit**	**Consumption**	**RoR**	
1	HBS 2002 Consumption	Consumption + Transfer (targeting according to Table 2)	Predict prob. of school attendance with adapted consumption	Adapt highest education attainment in the household	Predict consumption with and without change in education due to SPI and assign difference as behavioral benefit. $Benefit = \widehat{C_1^{SPI,1}}\left(\widehat{Edu}\left(C_1^{SPI,1}\right)\right) - \widehat{C_1^{SPI,0}}\left(\widehat{Edu}\left(C_1^{SPI,0}\right)\right)$	Direct + Behavioral effects (consumption level next period is the same level – transfer)	Compare discounted benefits and costs	New-borns and deaths according to official fertility and mortality rates. Everyone ages one year and household size and adult equivalent weights are adapted accordingly.
⋮								
15	Consumption level of end of period 14	Consumption + Transfer (targeting according to Table 2)	Predict prob. of school attendance with adapted consumption	Adapt highest education attainment in the household	Predict consumption with and without change in education due to SPI and assign difference as behavioural benefit. $Benefit = \widehat{C_{15}^{SPI,1}}\left(\widehat{Edu}\left(C_{15}^{SPI,1}\right)\right) - \widehat{C_{15}^{SPI,0}}\left(\widehat{Edu}\left(C_{15}^{SPI,0}\right)\right)$	Direct + Behavioral effects (consumption level next period is the same level – transfer)	Compare discounted benefits and costs	New-borns and deaths according to official fertility and mortality rates. Everyone ages one year and household size and adult equivalent weights are adapted accordingly.

Dynamic Simulation Results

The dynamic simulation compares the outcomes of the programs to a scenario without SPI. Therefore, the focus is not on predictions of outcome variables in future periods, but rather on the relative development in outcomes compared to the control scenario.

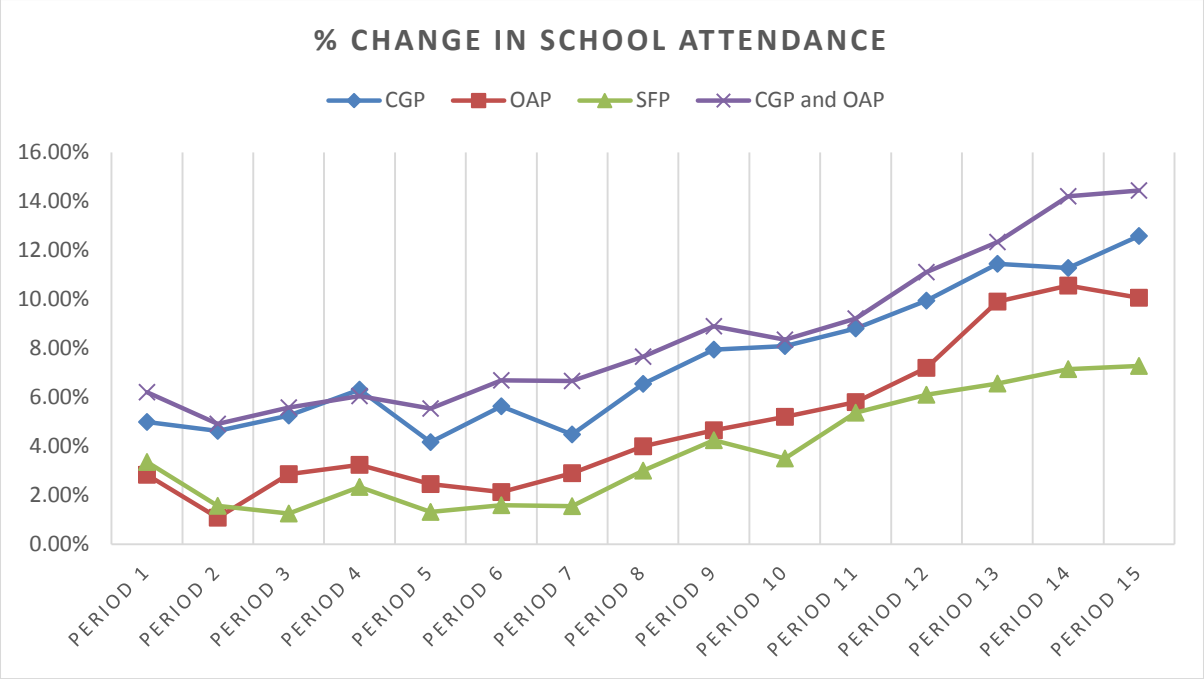
Figure 8 presents the program effects on current school attendance relative to the baseline scenario without SPI. The figure shows that all SPIs affect school attendance and educational attainments positively. School attendance rates of individuals between 6 and 24 years increased strongest for the CGP scenario and the combination of CGP and OAP. The CGP school attendance rate increased by 5% in the first period, which grows up to an annual increase of more than 12% in period 15 compared to the control scenario. As the SPI effects sum up over time later periods also include the returns to the returns, which lead to an exponential growth in school attendance rates. As a consequence, after 15 periods the working-age adults dispose of a 2% higher school attainment in the CGP scenario as compared to the control scenario.

The OAP effect on school attendance is markedly smaller ranging from 1.5% to around 10%. Despite the larger transfer values of OAP the effect is lower as it is not targeted at children. The combination of CGP and OAP further increases school attendance rates, however, adding only little to the CGP effect.

The SFP effect on school attendance is smaller than the CGP effect and increases up to around 7% at the end of the simulation period. Yet, the annual growth rates are smaller than for the other programs. This is due to the SFP assignment to children that are already enrolled in school with thus little scope to further increase attendance rates. However, it has to be noted that the potential effects of SFP on aspects such as school performance or health cannot be regarded in the model.[22] These effect pathways could have important impacts on school attainments and lead to an underestimation of the educational effects of SFP in the simulation model.

[22] Data on school performance are not covered in the HBS 2002/2003.

Figure 8: Relative changes in school attendance (% change compared to control group)



Note: Figure for individuals between age 6 - 24

The increase in school attendance and attainment as a consequence affect the labor productivity leading to higher incomes and consumption levels in future periods. As shown in the static simulation, the positive effects on consumption reduce poverty headcount rates and gaps. In addition to the direct effects of SPI on poverty outcomes the dynamic simulation additionally accounts for the returns to education. Figure 9 displays the consumption growth rate of SPI scenarios compared to the control scenario. The graph clearly shows that consumption differences between the scenarios are small in the beginning but increase exponentially thereafter. This effect is driven by the returns to education that boost consumption levels in future periods. In period 15 the consumption level with OAP exceeds the control scenario by more than 20%. The CGP mean consumption level is 14% higher than without SPI. The difference between OAP and CGP is related to the higher transfer values in the OAP scenario. To account for that the analysis of the RoR will consider also the program costs.

Figure 9: SPI Effect on Consumption Growth (% compared to control scenario)

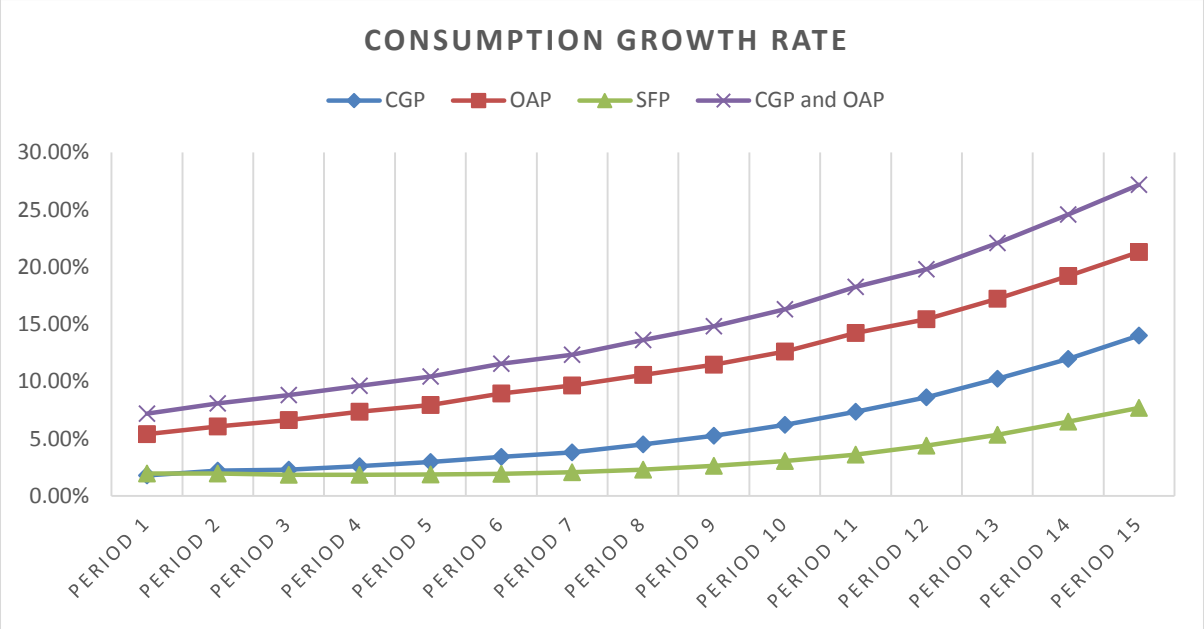
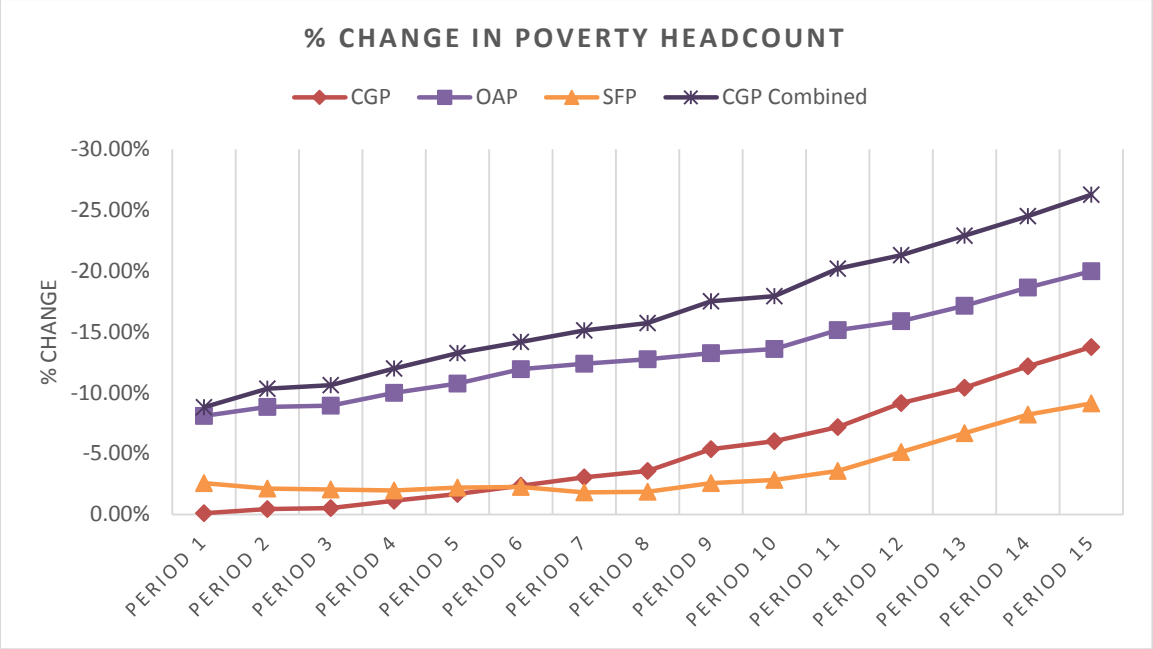


Figure 10 displays the program effects on the poverty headcount compared to the baseline scenario without SPI. Similar to the static model, the effects on poverty is largest for the OAP. The figure shows that the OAP poverty reduction effect steadily increases in each period reducing poverty by 20% compared to the baseline scenario without SPI in period 15. The CGP effect is markedly lower in the beginning but increases much faster than for the other programs. After period 6 the CGP effect on poverty exceeds the SFP effect reducing poverty by approximately 14% in period 15. The strong increase is related to education returns that increase consumption levels and further reduce poverty rates. Looking at the dynamic of the absolute poverty headcount prevalence shows that in the scenario without SPI the poverty prevalence increases slightly over time. Actual poverty trends between 2002 and 2010 have shown a similar pattern, which supports the predictive power of the simulation model (World Bank, 2015a) (see Figure 14 in the Annex). The SFP reduces the poverty headcount by 2% in the first and by about 10% in the last simulation period. The effect is less dynamic because the simulated returns to school attendance of the program are smaller as discussed above.

Figure 10: SPI Effect on Poverty Headcount



The CGP effects on extreme poverty are larger than for absolute poverty. The effect peaks at a 26% reduction in period 13 compared to the control scenario. Despite the higher transfer values, the OAP effects are only larger in the first two periods and very similar to the CGP effects thereafter. As the CGP is targeted at the extreme poor the effect is much larger considering the difference in the transfer values. The SFP effects are considerably lower decreasing extreme poverty by around 8% annually compared to the control scenario without SPI.

Figure 11: SPI Effects on Extreme Poverty Headcounts

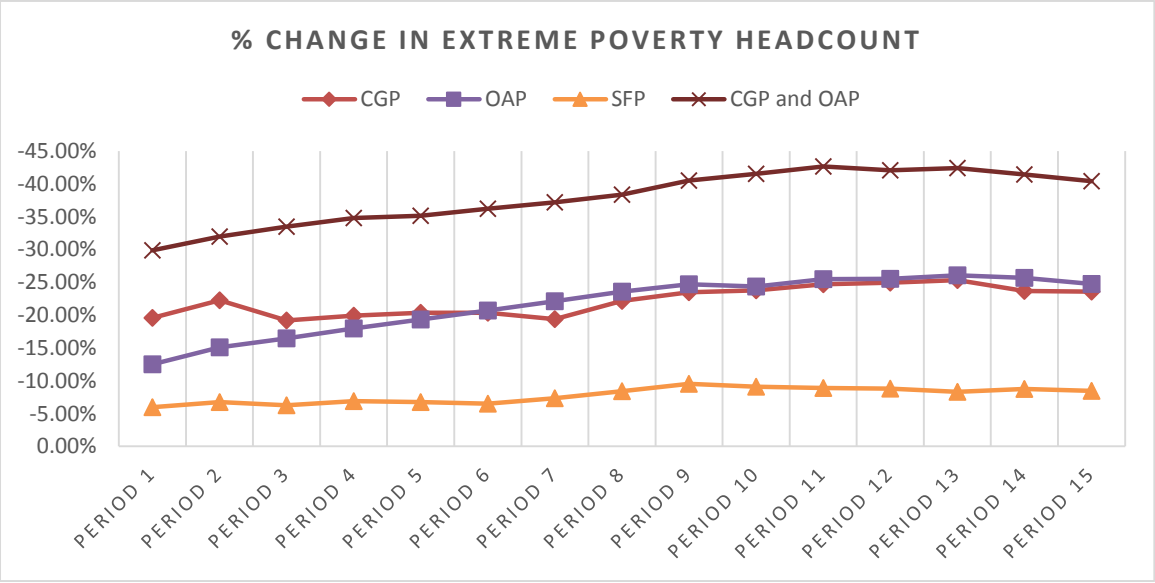


Table 12 summarizes all simulated outcomes for periods 5, 10, and 15. The effects of CGP and OAP on consumption inequality measured with the GINI are similar in size. Both programs decrease inequality by about 8% in period 15. The combination of both programs results in a decrease of 12% in inequality. The SFP effects are smaller leading to a 3% decrease at the end of the simulation period.

Table 12 Dynamic benefits in periods 5, 10 and 15

		Period 5	Period 10	Period 15
CGP	**Years in school**	0.1%	0.9%	2.0%
	Average household consumption growth rate per year	3.0%	6.2%	14.0%
	Poverty Headcount	-1.7%	-6.0%	-13.8%
	Extreme Poverty Headcount	-20.4%	-23.8%	-23.6%
	Inequality	-5.0%	-6.7%	-7.4%
OAP	**Years in school**	0.2%	0.7%	1.0%
	Average household consumption growth rate per year	7.9%	12.6%	21.3%
	Poverty Headcount	-10.8%	-13.6%	-20.0%
	Extreme Poverty Headcount	-19.3%	-24.4%	-24.8%
	Inequality	-4.8%	-6.5%	-8.1%
SFP	**Years in school**	0.1%	0.5%	0.9%
	Average household consumption growth rate per year	1.9%	3.0%	7.7%
	Poverty Headcount	-2.2%	-2.8%	-9.1%
	Extreme Poverty Headcount	-6.7%	-9.1%	-8.4%
	Inequality	-1.8%	-2.6%	-3.4%
CGP and OAP	**Years in school**	0.1%	0.8%	1.8%
	Average household consumption growth rate per year	10.4%	16.3%	27.2%
	Poverty Headcount	-13.2%	-17.9%	-26.3%
	Extreme Poverty Headcount	-35.2%	-41.5%	-40.4%
	Inequality	-9.0%	-11.3%	-12.2%

Rates of Return Results

In this section the RoR results are discussed. The RoR is defined as the net present benefits in terms of consumption compared to the net present costs as outlined in equation 1. The benefits comprise the direct effects and the consumption returns to the behavioral effects on school attendance and attainment. The costs include the transfers and the administrative costs as outlined in Table 2.

Figure 12 displays the RoR of the SPI scenarios along the 15 periods of the simulation. The most striking result is that only the RoR of the CGP turns positive during the 15 periods of the simulation. That suggests that the investments in OAP, SFP and the combination of CGP and SFP did not generate positive returns during the 15 periods for the considering the returns to education. The break-even point of CGP is in period 10. In each period after that the net present value of returns exceeds the net present value of costs. That means that all operational costs and the assumption that only 80% of the

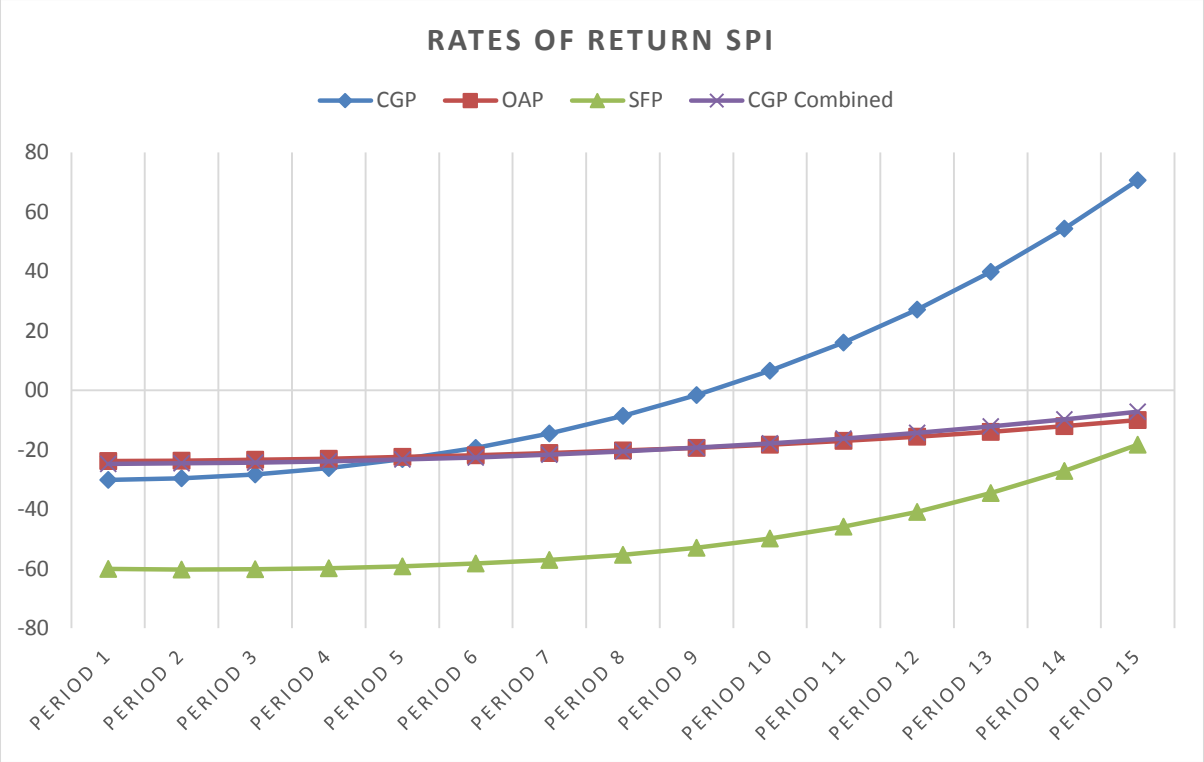
transfer are consumed are overcompensated by the returns to education. The RoR increases exponentially, which is due to the returns to the returns that are aggregated for each additional period.

The behavioral responses of SPI are generated through school attendance effects of children and the returns to schooling need time to unfold their full potential. It is only after beneficiaries have completed school that their increased educational attainments generate returns through higher wages. In period 12 the first cohorts that were supported from grade one enter the working age (18-65 in the simulation model). This is reflected in increasing RoR for later periods of the simulation that grow much faster than in earlier periods.

The RoR of OAP and SFP remain negative but increase in each period and could turn positive after a few additional periods. Yet, the growth rate is much lower compared to the CGP. The OAP and SFP effects on school attendance already implied that their impact on school attainments is lower. This also manifests in lower returns to education and consequently in lower RoR. Yet, it has to be borne in mind that the returns in the simulation model are only generated by school attendance and other potential effects such as for example through improved school performance, investments in productive assets or health benefits are not included. Considering those effects could further increase the programs RoR and shift the conclusions across the different programs.

The differences in the RoR of the programs in period 1 are due to the different cost structures. The administrative costs of the SFP are much larger than for the OAP and the CGP leading to more negative RoR in period 1. The RoR of the combined package of CGP and OAP is mainly driven by the OAP, which as a program is much larger than the CGP. However, the positive dynamics as observed for the CGP can also be observed for the combined programs in a dampened form.

Figure 12: Rates of Return of Social Protection Instruments



Sensitivity Analysis

The results presented in the previous section are based on several model assumptions. This includes the assumption that households consume 80% of the transfer and use the remaining 20% for other purposes such as investments and savings. To test how sensitive the findings are to changes in this assumption, the model is additionally simulated using a propensity to consume of 70% and 100% (see Annex Table 13). Using a larger propensity to consume increases consumption levels stronger than lower propensities to consume. Thus, the SPI scenarios with a 100% propensity to consume have larger effects compared to 70%. However, the overall picture remains similar suggesting that even under the assumption of lower propensities to consume the results point at marked improvements in poverty and inequality outcomes.

Another assumption concerns the size of the discount rates that is used to compute the net present values of benefits and costs. Figure 16 in the Annex displays the CGP RoR for discount rates of 6%, 3%, and 0%. The larger the discount rate the smaller the net present values of future periods. Regardless of that, the breakeven point remains in period 10 for the CGP.

In addition to that, different CGP targeting scenarios were simulated. In the baseline we followed the approach proposed by Khondker and Freeland (2014b). To test how alternative targeting procedures

could affect outcomes, scenarios for a CGP including also poor households and a universal CGP are simulated. A summary of outcomes can be found in Annex Table 14. As the effect on school attendance and thus the returns to education are largest for extremely poor households, the RoR are largest for the current targeting mechanism. The universal program also generates positive returns at the end of the simulation period. As a universal program increases the investments markedly, the outcomes also increase compared to the CGP for extremely poor households. Yet, it has to be noted that we kept the cost structures identical for all targeting scenarios. Given that a universal targeting would reduce the (relative) operational costs, the RoR would be larger in each period than presented in Figure 17.

Lastly, the RoR were simulated for a single investment. That means it is tested how an investment in the first period would affect future consumption levels only through increases in educational attainments. In this scenario the direct transfer payment of the first period is solely regarded as a cost. The results show that the educational returns exceed the net present value of transfer payments and all operational costs after 10 periods. That implies that taking the return to returns into account a one-time investment in CGP charges off after 10 periods.

7. Conclusion

Lesotho is one of the poorest countries in southern Africa and one of the most unequal economies in the world (World Bank, 2015a). The depth of poverty makes it difficult for many households to graduate out of poverty. Besides that, derailing factors such as the HIV/AIDS epidemic are important sources for persistently high poverty rates and a major source for household's vulnerability to poverty. Addressing these challenges, the government of Lesotho expresses the importance of social protection for achieving these aims by spending about 9% of its GDP on social protection (SP) programs.

However, despite the large expenditures there is considerable scope for coordination and harmonization of existing safety net programs. To achieve a more efficient allocation of funds, evidence is required to guide policymakers in their investment decisions. Using the existing SP funds more efficiently could benefit the poor and strengthen the efforts to mitigate the consequences of pervasively high poverty rates in Lesotho.

This simulation study analyzed the short- and mid-term benefits of SPIs in terms of poverty, inequality and human capital outcomes. In order to contrast the benefits with program costs, the RoR were computed for a simulated time horizon of 15 years. The simulated benefits include direct transfer payments and the behavioral responses that are induced by the transfers. This approach allows to

examine the direct and indirect returns to SPI and to compare the RoR of different program interventions.

However, to estimate the RoR several econometric steps are necessary in order to quantify the costs and benefits. Most essentially the data availability determines the different effect pathways of SPI that can be considered in the analysis. At the core of the data requirements is a comprehensive consumption data in order to quantify all benefits and cost. The most current nationally representative consumption data for Lesotho are from 2002. Moreover, due to data restrictions the indirect benefits of SPI are limited to returns to education. Other effects, such as for example benefits through improved health outcomes or agricultural investments cannot be considered in this study.

The analysis of the returns to education suggests that an additional year of schooling increased consumption levels on average by 9% in 2003. At the same time results of the static simulation model show that CGP increased the number of years of schooling on average by 2% per year. This highlights the potential of SPI to generate large returns in future periods. However, the results also showed that school attainments tend to be low in Lesotho and that the education effects especially on the extremely poor need more time to unfold their full returns. This results in negative RoR that increased exponentially and turn positive after 10 periods for the CGP. The simulation results suggest that from period 10 onwards the CGP generates larger benefits (in net present values) than costs. The RoR of OAP and SFP remain negative throughout the simulation, but show a positive trend. This finding is related to the fact that both programs have universal targeting mechanisms and do not particularly benefit the extremely poor. Secondly, beneficiaries either already attend school (SFP) or left school age long ago (OAP). Thus, their scope to generate returns through school attendance is much lower compared to CGP resulting in lower behavioral benefits.

The findings suggest large program effects on poverty and inequality outcomes. Simulating the CGP on the national level reduced extreme poverty by more than 20% per year and reduced inequality by up to 7%. This indicates the potential of CGP for poverty reductions in Lesotho. Taking all future returns into account, the educational benefits exceed all cost including transfers and operational costs after 10 periods. This underpins the power of SPI for educational but also welfare developments in Lesotho. On top of that, additional returns through health and agricultural investments and increasing tax revenues are not considered in this study. Therefore, the results might only reflect a lower bound estimate of the full potential of social cash transfers.

As a model can never cover the entire set of SPI linkages, it needs to be born in mind that simulation models are always a simplification of reality. The study has a number of particular limitations that

need to be born in mind when interpreting the results. Due to the limitations of the HBS 2002/2003 data, not all potential indirect benefits of social transfers could be incorporated in the model. Effects through improved health or investments in productive activities are not considered, which may be particularly important for the OAP. Furthermore, the economic and social situation in Lesotho has changed considerably since 2002/2003. For example, school attendance and highest education achievements have increased considerably over the last decade. Nonetheless the models show how specific aspects of SPI pathways generate monetary returns over the long term.

It is recommend to repeat the present analysis once more comprehensive and more recent household survey data are available. Particularly the inclusion of other transmission channels next to education would add value and provide additional insights in the potential benefits and the respective RoR in the long term. Furthermore, information such as access to services and infrastructure would allow a more detailed analysis of the returns of SPI which goes beyond the national average and provide insights into policy areas that need to be strengthened in order to maximize the impact of SPI. The BOS is keen to improve their data collection and adjust the survey instruments such that they better serve the overall needs for regular analysis and evaluation of social protection policies.

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Annex

Figure 13: Simulated Population Development

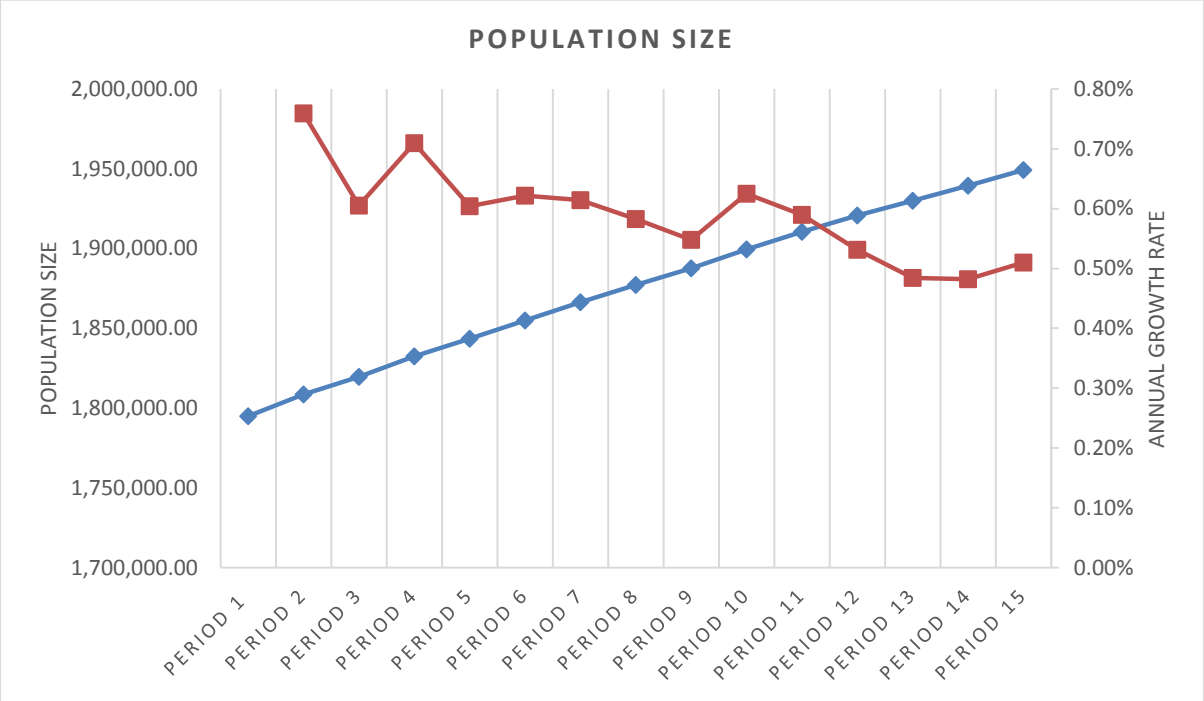

Figure 14: Simulated Development of Poverty Headcount

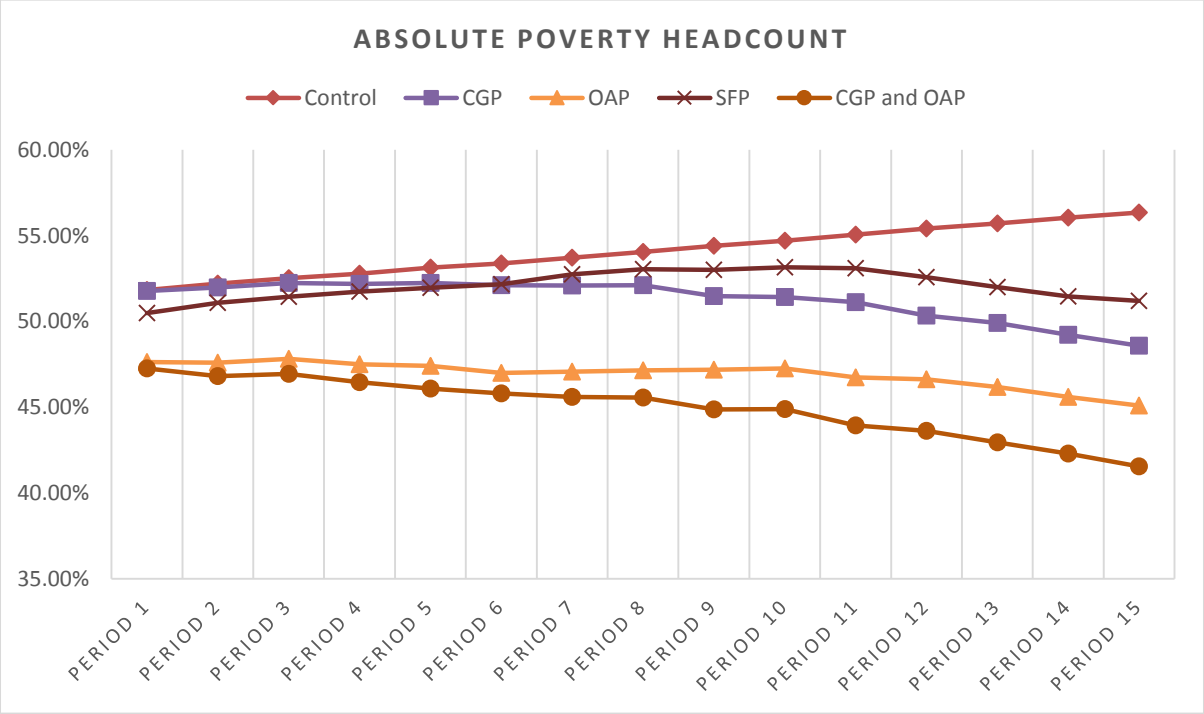

Figure 15: SPI monetary returns to education (average consumption per capita effect in Maloti)

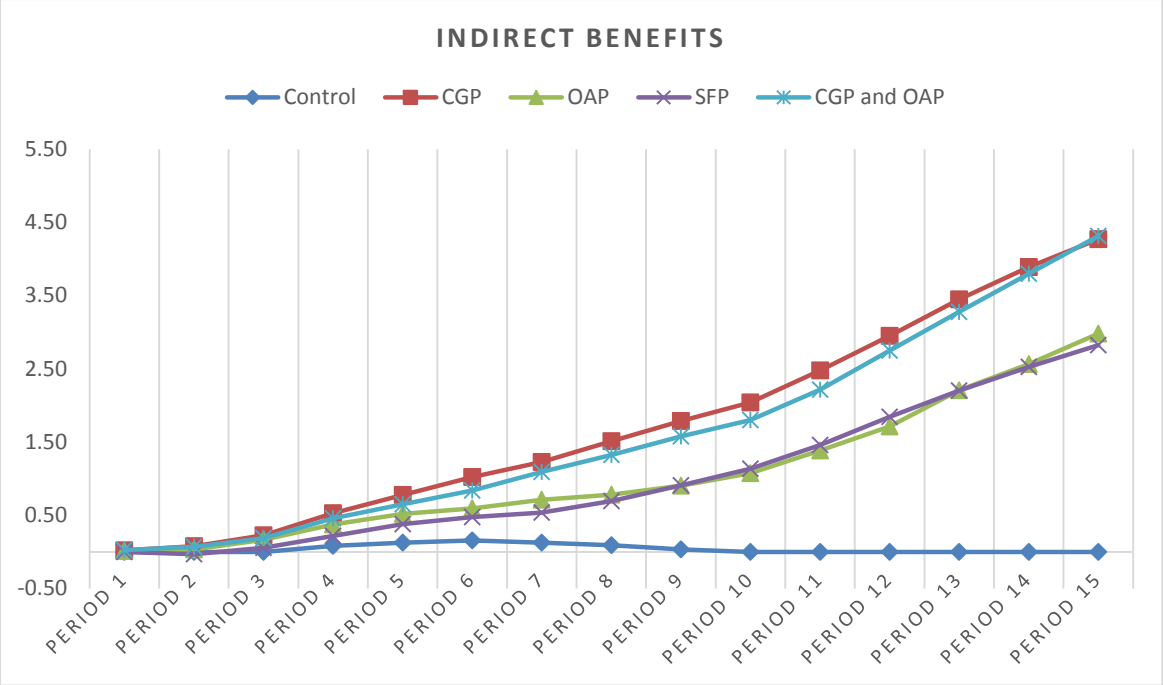

Figure 16: CGP Rate of Return using different Discount Rates

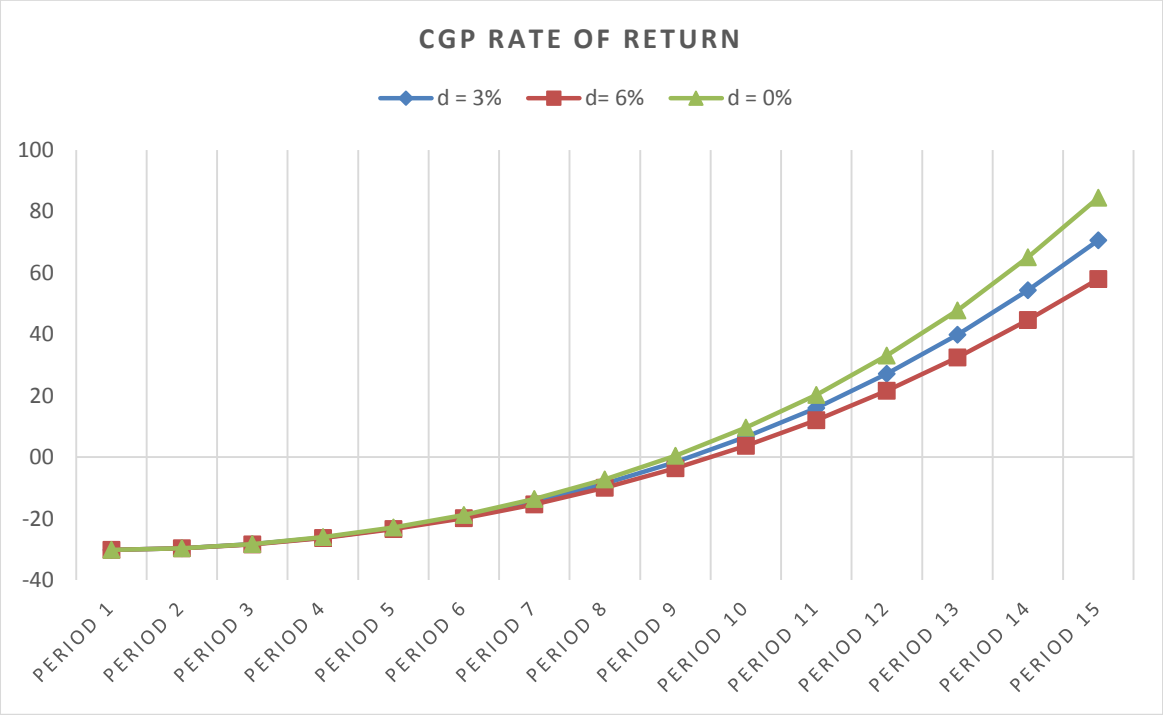

Table 13 Dynamic Benefits with different propensities to consume

	Propensity = 70%	Propensity = 80%	Propensity = 100%

		Period 5	Period 10	Period 15	Period 5	Period 10	Period 15	Period 5	Period 10	Period 15
CGP	Years in school	0.1%	0.9%	2.0%	0.1%	0.9%	2.0%	0.2%	0.8%	2.0%
	consumption growth	2.4%	4.7%	11.7%	3.0%	6.2%	14.0%	3.3%	6.1%	13.6%
	Poverty Headcount	-0.9%	-5.2%	-13.7%	-1.7%	-6.0%	-13.8%	-1.9%	-6.7%	-13.8%
	Extreme Poverty Headcount	-17.0%	-20.5%	-21.4%	-20.4%	-23.8%	-23.6%	-23.3%	-27.3%	-25.1%
	Inequality	-4.4%	-6.1%	-7.5%	-5.0%	-6.7%	-7.4%	-5.9%	-7.5%	-8.1%
OAP	Years in school	0.2%	0.7%	1.0%	0.2%	0.7%	1.0%	0.2%	0.3%	1.0%
	consumption growth	6.7%	10.6%	18.9%	7.9%	12.6%	21.3%	9.6%	14.7%	23.9%
	Poverty Headcount	-9.2%	-12.9%	-19.1%	-10.8%	-13.6%	-20.0%	-13.0%	-16.5%	-21.4%
	Extreme Poverty Headcount	-17.7%	-24.2%	-22.6%	-19.3%	-24.4%	-24.8%	-20.7%	-27.1%	-26.4%
	Inequality	-4.4%	-6.9%	-8.2%	-4.8%	-6.5%	-8.1%	-5.0%	-7.3%	-8.8%
SFP	Years in school	0.1%	0.5%	0.9%	0.1%	0.5%	0.9%	0.1%	0.2%	0.9%
	consumption growth	1.8%	2.7%	7.4%	1.9%	3.0%	7.7%	1.7%	2.5%	6.6%
	Poverty Headcount	-1.5%	-3.1%	-9.2%	-2.2%	-2.8%	-9.1%	-1.4%	-2.7%	-8.1%
	Extreme Poverty Headcount	-8.5%	-10.1%	-8.3%	-6.7%	-9.1%	-8.4%	-6.8%	-7.0%	-6.4%
	Inequality	-1.8%	-2.6%	-4.2%	-1.8%	-2.6%	-3.4%	-1.5%	-2.0%	-2.8%
	Years in school	0.1%	0.8%	1.8%	0.1%	0.8%	1.8%	0.1%	0.8%	1.9%

CGP and OAP	**consumption growth**	9.0%	13.9%	23.9%	10.4%	16.3%	27.2%	12.8%	19.7%	32.3%
	Poverty Headcount	-11.5%	-16.8%	-23.8%	-13.2%	-17.9%	-26.3%	-16.1%	-22.3%	-30.7%
	Extreme Poverty Headcount	-33.1%	-38.4%	-37.5%	-35.2%	-41.5%	-40.4%	-38.8%	-47.3%	-46.1%
	Inequality	-8.3%	-10.7%	-11.7%	-9.0%	-11.3%	-12.2%	-10.1%	-12.9%	-14.4%

Figure 17: CGP Rate of Return using different Targeting Mechanisms

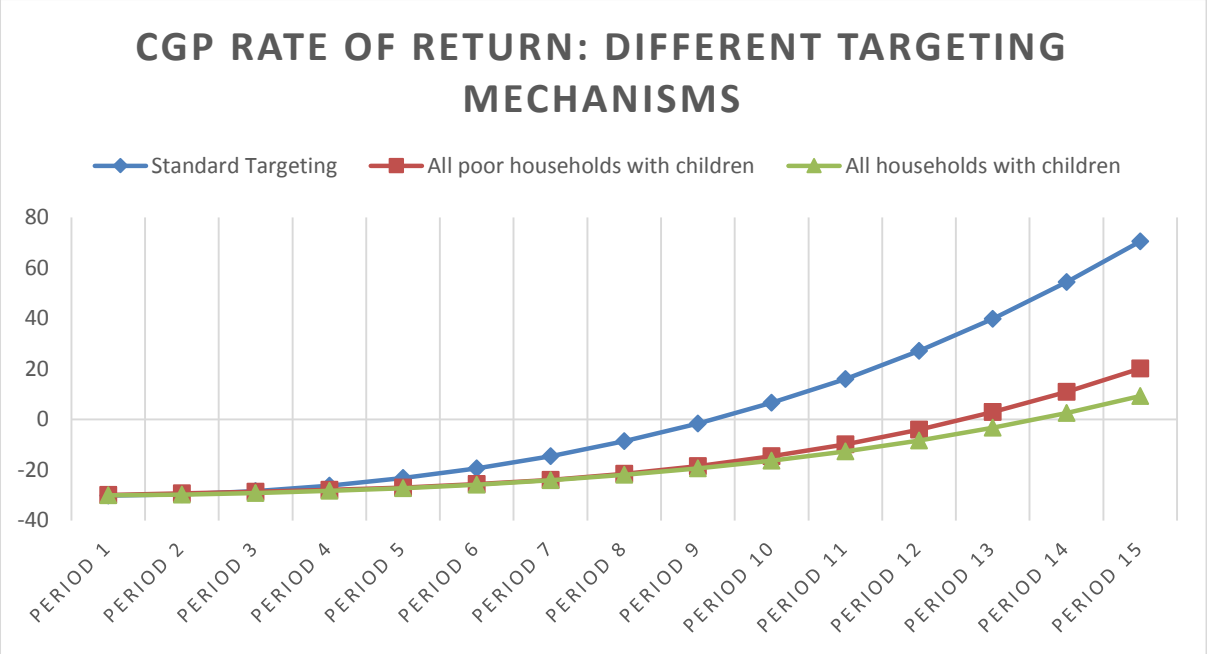

Table 14 Dynamic Benefits of CGP with different targeting mechanisms

	Extreme poor hh with children			**Poor hh with children**			**All hh with children**		
	Period 5	**Period 10**	**Period 15**	**Period 5**	**Period 10**	**Period 15**	**Period 5**	**Period 10**	**Period 15**
Years in school	0.1%	0.9%	2.0%	0.1%	0.5%	1.4%	0.2%	0.8%	1.8%
consumption growth per year	3.0%	6.2%	14.0%	3.9%	5.8%	12.4%	6.3%	8.0%	14.7%
Poverty Headcount	-1.7%	-6.0%	-13.8%	-5.5%	-6.2%	-13.8%	-6.6%	-7.9%	-15.2%

Extreme Poverty Headcount	-20.4%	-23.8%	-23.6%	-20.6%	-22.9%	-20.3%	-21.7%	-23.7%	-22.8%
Inequality	-5.0%	-6.7%	-7.4%	-6.0%	-6.6%	-7.6%	-5.8%	-6.6%	-7.7%
Rate of Return	-23.2%	6.6%	70.6%	-26.9%	-14.6%	20.2%	-27.2%	-16.3%	9.2%