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Land redistribution and the South African economy

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Abstract: Land redistributive policies can be viewed as effective tools for reducing rural poverty mainly because agriculture continues to be a major source of rural livelihood and a contributor to rural economic growth. For the structural changes and economy-wide impacts, including behavioural changes of rural land distribution, to be assessed and captured through time, a South African Social Accounting Matrix can be used as a database to construct a dynamic computable general equilibrium simulation model to simulate the potential impact on household welfare in South Africa. This study seeks to assess how government redistributive policies may affect household welfare in short- and long-run, focusing on poverty and income distribution in South Africa by applying a dynamic computable general equilibrium microsimulation model. The results showed that rural land distribution increases poor household income through an increase in factor by an average of 0.828. However, for most macroeconomic variables, the impact is negative in the short-run with a gradual increase in the long-run. The results support the claim that rural land distribution coupled with agriculture investment and government support can be effective in improving household welfare.

Keywords: computable general equilibrium; income inequality; micro-simulation; poverty reduction

Recent empirical research has demonstrated that equality in natural resource ownership among the population can have significant impacts on poverty alleviation and income distribution among citizens (Deninger et al. 2000; World Bank 2003; Lahiff and Cousins 2005; Boccanfuso et al. 2006). With agricultural land being viewed as a key natural resource for wealth generation in many developing countries, rural land redistribution can be an important strategy for alleviating poverty and improving household welfare mainly because poor people have strong ties to agriculture. The rationale behind poverty alleviation is that poor households can now share in profits as co-owners of the land rather than only as wage workers. In this light, several developing countries [e.g. Zimbabwe, Malawi, Namibia and South Africa, as highlighted in Lahiff (2007)] have recently started the redistribution of natural resources, especially land, to create opportunities for higher incomes and creation of employment for resource-poor households.

Numerous empirical studies have shown that equality in land ownership can be an effective tool in fighting poverty and promoting growth [International Fund for Agricultural Development (IFAD) 2001; Department for International Development (DFID) 2003; World Bank 2003; Borras 2006; World Bank 2006; Civardi et al. 2010]. With several developing countries now emphasising rural land redistribution, there has been an increased interest in the relationship between land ownership, agriculture productivity, poverty reduction, and income distribution. An analysis of whether and how these redistributive policies impact on the overall economy, poverty and income distribution provides a better understanding of the long-term effects. Rural land redistribution programmes can be potentially attractive policies for poverty reduction and improvement of income distribution; hence, an empirical demonstration of the effectiveness of these programs is of great importance. In addition, the empirical demonstration of the welfare effects will

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provide the government with evidence and tools to assess the relevance and effectiveness of these alternative poverty reduction policies in the country.

However, the question of whether these rural land redistribution policies are justified and can be effective as tools for reducing unemployment and poverty by contributing to the overall improvement of rural household welfare still remains unanswered. Therefore, this study applies a dynamic Computable General Equilibrium (CGE) model in an attempt to answer this question by assessing the impact of rural land redistribution on the economy. A CGE model is an effective method of simulating the impact of policy implementation on an economic system (Decaluwe et al. 2000). A dynamic CGE model can account for the accumulation and distributive effects and can enable poverty and inequality analysis over time. This dynamic model is crucial as land redistribution is a long-term investment while a microsimulation model is for distribution analysis.

The policy objectives of most governments in Africa are largely targeted at reducing rural poverty and income distribution inequalities of their citizens. However, these targets have increasingly become difficult to meet. Several studies have attributed this failure mainly to limited access to productive resources and limited government support provided to small-scale farmers. In many developing countries, long-term rural poverty and larger income inequalities are associated with large land inequalities (Deininger 2003). Although the majority of the rural population depend on agriculture for their livelihood, a large part of this population does not have access to productive land (Keswell and Carter 2014). This being the case, a rural land redistribution policy as a tool for improving access to productive resources has not been receiving sufficient attention. With several economic strategies emphasising rural land redistribution for rural poverty reduction, there has been a growing interest in the relationship between rural land redistribution and poverty. This being the case, there is only a limited volume of the empirical literature on land redistribution and its impact on growth, poverty, and income inequality in South Africa. Apart from policy formulation, this study also intends to contribute to the advancement of knowledge in the area of land redistribution.

Therefore, the aim of the study is to investigate the impact of rural land redistribution on growth, poverty and income distribution in South Africa. In order to achieve this, the study will analyse the distributive effects of rural land redistribution policies on poverty reduction in order to simulate the full distributional impact of a rural land redistribution policy and to generate counterfactual scenarios in South Africa.

LITERATURE REVIEW

This section presents the theoretical framework of the study, provides a brief analysis of the study area and its poverty profile, and outlines an empirical analysis of the rural land redistribution.

Theoretical framework

There is only a limited volume of theoretical works in economics on land reform, mostly concerning the economic impacts on growth, poverty, and income inequality. Economists have long been concerned with estimating the impacts of land redistribution on household welfare. The common and widely applied theory is the neoclassical theory of land reform, which forms the basis of this study.

Neo-classical theory of land reform. The theory is part of the new school of thought in the field of agricultural development and views rural land redistribution as an integral part of the strategy and policy of economic development (Zahir 1975). Land reform is designed to redistribute property rights in land for the benefit of landless peasants, small farmers, and tenure (Zarin and Bujang 1994). Imperfections in land ownership and distribution are said to impede the incentives needed for accelerating agricultural growth. Hence, in the traditional sense, land reform can be defined as a demand for greater stress on development and improved agricultural productivity. In the neoclassical theory, the land is treated as a marketable commodity which should be priced and allocated according to its marginal productivity. This implies that the theory is appropriate in dealing with complex practical questions of agricultural productivity and land reform. Improving agricultural productivity and security of tenure is essential for economic growth.

According to the neo-classical theory, land reform is essential for economic growth. In developing countries, agricultural development plays a vital role in economic development because agriculture is not only a major form of employment, but the rural populations also depend on the sector for livelihood. Therefore, an economic growth strategy should focus on the distributional factor of the income generated by the growth. Thus poverty, unemployment, and inequality in the economy should be taken into account in policymaking. The rural land redistribution and associated growth opportunities have strong implications for long-term

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development (Lofgren and Diaz-Bonilla 2005). Access to land reduces vulnerability to hunger and poverty, influences the capacity to invest in their production activities and enhances prospects for better livelihoods.

State-led reform and market-assisted land reform. Empirical and theoretical findings indicate that there exist various and complementary paths that can secure access to land for the rural poor (de Janvry 2002). However, the most common approaches to rural land redistribution are state-led and market-assisted land reforms. Under the state-led reform approach, the government/state plays a central role in promoting land reform programs (Boyce et al. 2005). This form of land reform consists of a central authority that dispossesses and redistributes land to selected beneficiaries. State-led reforms are most common in countries with high land property concentration, great social and economic inequality, abject rural poverty, and widespread landlessness (Ciamarra 2003).

The market-assisted land reform approach affirms that under certain conditions, markets can endogenously lead to equal and efficient land asset distribution, hence they can be substitutes for state-led reforms (Deininger 1999). In a market-assisted land reform, the beneficiaries receive a combination of grants and loans which they use to negotiate the purchase of land from willing sellers. This form of land reform depends on the fact that there exists an inverse relationship between farm size and output per unit of land, and on the fact that the land market is regressive for the resource-poor.

Analysis of the study area and its poverty profile

Although it is widely agreed that South Africa is an upper-middle-income country by international standards, the country has exceptionally high levels of income inequalities and poverty rates in worldwide perspective (May 2002), with 57% of the population living in poverty [Human Sciences Research Council (HSRC) 2004]. This suggests that the country is still faced with the challenge of a significant proportion of the population living in poverty, as this is associated with large income disparities among different groups of the population. This makes reducing income inequalities and eradicating high poverty rates, especially among rural households, primary objectives of the South African government. Hence, long-term strategies that focus mainly on increasing employment and boosting food security in rural areas are required (du Toit 2005; Bhorat and Kanbur 2006). Such strategies should promote sustainable employment creation, reduce poverty, foster economic growth and remove structural impediments in the economy. In addition, rural communities should participate fully in economic activities. To this end, the government must increase its spending towards pro-poverty policies, especially those that promote rural agriculture such as rural land redistribution (Deininger 2003).

The South African agriculture sector is highly dualistic. About 86% of total agricultural land comprises highly developed large-scale commercial farmland and is owned by about 10.9% of the population, with around 89.1% of the population occupying subsistence-oriented rural land (Weiner and Levin 1993). This means that there are large disparities in land ownership among different population groups in the country. These disparities mean that only a limited number of rural people may secure a fair living from agriculture, resulting in a large majority of the population being poverty-stricken in rural areas (World Bank 2006). Although it is evident that the production technology employed by land beneficiaries will differ from that of commercial farmers, rural agricultural land redistribution in South Africa would still be an important strategy for reducing poverty and improving income distribution for the poor (May 2000; IFAD 2001; Deininger 2003). Owing to this, since 1994 the South African government has been progressively engaged in agricultural land policies to address past imbalances as a way of trying to improve the living standards of the rural population (Seekings and Nattrass 2005). Given that more resources and efforts are deployed for agriculture by the government, it can be expected that agricultural land reform policy will have non-negligible effects on productivity growth and rural poverty reduction. However, as indicated by van den Brink et al. (2006), detailed accumulative and welfare analysis of land reform has been hampered by the lack of empirical evidence concerning the impact of the programme on livelihoods of intended beneficiaries.

Increasing population growth, the need to increase economic productivity and reduce rural poverty, and an increasing demand for land resources are raising a growing concern about the efficiency of natural resource use in the country. As the population growth continues to outpace economic growth, the competition for resources between economic agents has increased while their supply has remained inelastic. This has increased the need for rural land redistribution, taking into account the benefits of efficient agricultural resource policies even in developing countries like South Africa (Deininger and Binswanger 1999). Lahiff and Cousins

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(2005) argued that these rural agricultural land redistribution policies are meant to address past land imbalances and improve resource use, thereby promoting sustainable economic growth and reducing poverty. Despite its importance, rural land redistribution in South Africa has not been fully implemented and articulated.

Empirical literature

In South Africa, a lot of attention was given to the evaluation of the impact of land redistribution in the past two decades (Lahiff and Cousins 2005; Seekings and Nattrass 2005).

Numerous empirical studies have shown that rural land redistribution can be an effective tool for fighting poverty and promoting agricultural growth (Marais 1998; IFAD 2001; Deininger 2003; DFID 2003; World Bank 2006). Rural land redistribution in developing countries results in distributional and accumulative effects on households. These effects can lead to a reduction in extreme poverty and income inequalities (Ahmed and O'Donoghue 2010). Thus, even in South Africa, rural land redistribution has been identified as a catalyst for growth, welfare enhancement, and transformation of the rural economy.

However, there is neither strong evidence about improvement in income distribution through rural land redistribution nor a guarantee that the latter would benefit the poor. Specifically, empirical evidence linking rural land redistribution and poverty in South Africa is still limited (Chimhowu 2006; Lahiff 2007).

For the purpose of this study, the International Food Policy Research Institute (IFPRI) 2009 Social Accounting Matrix (SAM) (Statistics SA 2009) was aggregated into 41 production activities (in this case production activities are a combination of 49 activities and 85 commodities), four factors of production, and private institutions which combine five household categories and enterprise accounts. The agriculture accounts, comprising commodities and activities, were aggregated into two accounts, commercial and small-scale agriculture, as rural land redistribution is from commercial to small-scale agriculture. For further analysis, agriculture capital was sub-divided into equipment and land, which will be further sub-divided between large-scale commercial and small-holder agriculture. Private institutions, activities, and factor accounts will then constitute endogenous accounts, while the exogenous accounts comprise the government account, savings and investment accounts, and accounts of rest of the world (Pyatt and Round 2006; Pansini and Vega 2008).

The literature review indicates that the main focus of previous studies has been either to estimate the economy-wide impacts of rural land redistribution using a static CGE model, or to provide theoretical insights on the impact of rural land redistribution (Cockburn et al. 2010). This being the case, Bernstein (2013) is of the opinion that, although there has been a significant focus on the analysis of the impact of rural land redistribution on economic growth over the last decade, the topic remains a topical issue, especially in South Africa. This is premised on the notion that even though most empirical studies have found that rural land redistribution can be beneficial to the economy and can enhance welfare in several countries, it is useful to have a detailed study that evaluates its effects over time and its influence on poverty and inequality. This can only be done by using a dynamic CGE microsimulation model (Cockburn et al. 2004). The incorporation of a simulation model enables researchers to capture the distributional effects of a policy; hence the poverty impacts of policies over time can be adequately measured using a dynamic CGE simulation model (Annabi et al. 2005).

METHODOLOGY AND DATA

In terms of empirical analysis, the study adopted a recursive dynamic CGE microsimulation and the underpinning database is the IFPRI 2009 SAM for South Africa (Statistics SA 2009) similar to that applied by Mabugu (2001) and Decaluwe et al. (2000). This SAM distinguishes between 49 activities and 85 commodities. There are also 14 different household types and the rest of the world account. For the purposes of this study, a few adjustments were made to the original IFPRI 2009 SAM in order to make the data compatible with the Partnership for Economic Policy (PEP) 1-t CGE model. The adjustment included splitting the agricultural accounts into large-scale commercial and small-holder agriculture accounts. The capital accounts for the agricultural sector were divided using extrapolation into agricultural land and equipment. Lastly, the external demand account was created from the domestic demand account.

This study uses the standard CGE framework, coupled with a microsimulation model for detailed poverty analysis. The basic theoretical framework of the South Africa CGE models is a comprehensive market equilibrium that satisfies Walras law (Decaluwe and Martens 1988). The basic framework of the CGE is shown in Figure 1. The model consists of a production module, an interna-

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tional module, and an income and expenditure module of the final demand. Producers are assumed to maximise profit using a concave production technology, and consumers are assumed to maximise utility. Factors are enumerated at the margin with factor payments equal to their marginal value. This CGE specification follows the neoclassical-structuralist modelling as presented in Dervis et al. (1982) and incorporates imperfect Armington Constant Elasticity of Substitution (CES) on the demand side, and Constant Elasticity of Transformation (CET) on the supply side, allowing for substitution possibilities between domestically produced and externally traded goods (Lofgren and Diaz-Bonilla 2005). The CGE model consists of a production module, an income module, and final demand accounts.

Model closure rules

All the prices in the CGE model were expressed as relative to the consumer price index, which is the numeraire price. Factor market closure in this study assumed that production factors are mobile across various activities in the economy, and all savings and investment-related transactions are conducted by assuming that the share of investment expenditure in total final domestic demand remains constant. The foreign exchange market is assumed to clear via the flexible exchange rate, and the external balance remains fixed.

Model calibration

The CGE model was calibrated using computer codes written in General Algebraic Modeling System (GAMS) language. Inputs to the model included the SAM and other behavioural parameters on the production technology, commodity rate, and consumer preferences. The GAMS model for the Nonlinear Complimentary Problem (NCP) is solved as a Mixed Complementary Programming (MCP) problem with the Path Solver Algorithm. The SAM database, variable description, elasticities and population were captured in a Microsoft Excel file, which is used as an include file into GAMS code of the CGE model via a GAMS Data Exchange (GDX) file. The solution file of the calibrated CGE model is read into the simulation GAMS file.

The model is a SAM based CGE model, wherein the SAM serves to identify the agents in the economy and a database for model calibration. The modelling technique was applied to present a scenario in which the government progressively redistributes 30% of the productive land from large-scale commercial farmers to small-scale farmers covering a 10-year simulation period (2015–2025) in line with the National Development Plan 2030. This modelling technique combines a microsimulation model and a standard multi-sectoral recursive CGE model to simulate the full distributional impact of a rural land redistribution policy and to generate counterfactual scenarios. The microsimulation adopted in this study helps to understand the key determinants and mechanisms of inequality and poverty, and the recursive dynamic microsimulation model can provide disaggregated results at the microeconomic level that are consistent with the macroeconomic framework.

Estimation technique

The simulation assumed that the total quantity of productive agricultural land remains constant, and the land is either utilised by large commercial farmers or by small-holder beneficiaries. In the experimental scenario, the total agricultural arable land is main-

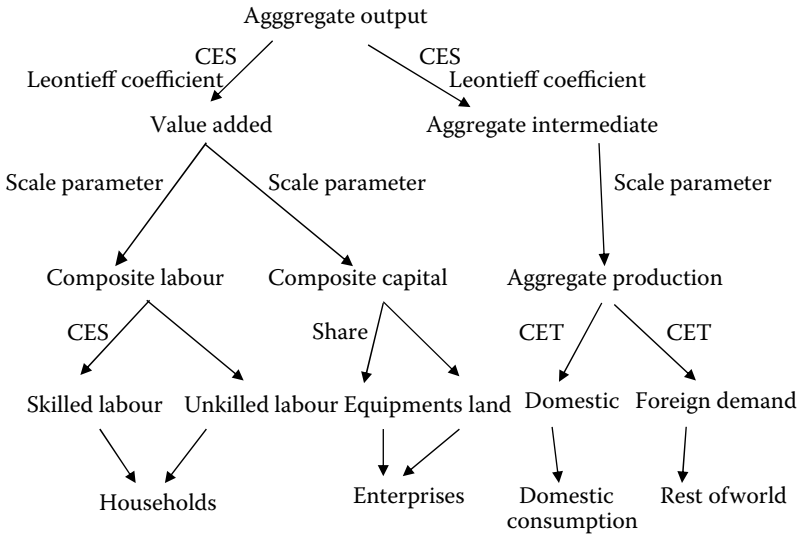

Figure 1: Production structure in CGE

CGE – computable general equilibrium; CES – constant elasticity of substitution; CET – constant elasticity of transformation

Source: Author's processing

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tained at the same level as the base year and simulates a land transfer of 30% from commercial to small-scale farmers over a 10-year period. For proper analysis of the underlying land allocation and macroeconomic issues, wastage is assumed away (Chitiga 2007).

The rural land redistribution simulated in this particular study is based on the current-market based "willing-buyer willing-seller" approach where the government provides grants for financing the programme. The land is redistributed to farmers who are assumed to be constrained in technology and production options. This is based on the assumption that production tends to be low in the agriculture sector, and cropping patterns tend to become less tradable-oriented. The small-holder production patterns will shift domestic prices and increase agriculture's terms of trade. In the simulation, the study assumes that the total agricultural land (82 million hectares) is a fixed percentage of land that is redistributed, and its success is directly correlated with a decline in production.

For detailed poverty analysis, a top-down CGE microsimulation model is employed by using the results of the CGE simulations as inputs into a microsimulation module. This is important in order to assess the distributive impacts of rural land redistribution by using the 2010 Family Income and Expenditure Survey of South Africa (Statistics SA 2009). Per capita consumption in real terms for the base year and the simulation periods is the variable of interest of estimating poverty and inequality changes across the different scenarios (Zhang and Wan 2004). Changes in the CGE factor prices were transferred to the microsimulation model, leading to household-specific income changes (Cockburn et al. 2011). These income changes are combined with a change in consumer prices from the CGE model to compute welfare changes.

This simulation tries to give some preliminary answers to the current debate on the impact of the proposed rural land redistribution in South Africa. The study is envisaged to yield knowledge about the impact of rural land redistribution on growth, poverty reduction, and income inequalities in South Africa. The results are expected to contribute to policy formulation aimed at reducing poverty and income inequalities among the rural households who face long-term poverty and widening income gap.

SIMULATION FINDINGS

The results in Table 1 show that for most macroeconomic variables, the impacts tend to be negative in the short-run but gradually increase in the long-run. Agricultural imports, prices, agricultural consumption, and commercial agricultural supply record positive growth in both short- and long-run. However, the magnitude of growth is very marginal with most of these variables recording a 0.05% growth. The impacts on both real GDP and domestic agriculture demand declined in the short-run (–0.0247 and –0.1425 respectively) and the marginally increases in the long-run compared to the business-as-usual (BaU) simulation. Land redistribution is likely to lead to a negative real gross domestic product in the short-run and to a positive improvement in the long-run. An increase in consumer price index reflects an increase in prices of agricultural products, and an increase in the aggregate price level leads to a reduction in aggregate household consumption, which is an indicator of welfare deterioration. A decrease in agricultural sectoral output and decrease in real household consumption could lead to reduced demand for imports in the long-run.

The short-run negative impact of most of the macroeconomic variables can be explained by the contraction of the agriculture sector due to rural land redistribution as most beneficiaries do not have the means

Table 1. Macroeconomic effects (% change from base year value; base year = 2015)

Variables	Short-run	Long-run
Domestic agricultural demand	–0.1425	0.15
World agricultural export demand	–0.3217	–0.3179
Agriculture supply		
Commercial	0.41	0.58
Small scale	–21.01	–15.76
Agricultural exports		
Commercial	0.23	0.41
Small-scale	–12.17	–15.91
Intermediate agricultural consumption	0.377	0.55
Capital agricultural investment		
Commercial	1.72	1.83
Small scale	–21.01	–26.32
Price (CPI)	0.01	1.01089
User cost of capital	–0.01	0.03
Real gross domestic product	–0.0247	0.0278
Agricultural imports	0.349	0.3319

Short-run (SR) refers to the year 2015 (start of simulation) and long-run (LR) refers to 2025 (end of simulation); CPI – consumer price index

Source: Author's calculations, based on simulation results

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and capacity to fully and productively utilise the land. The contraction of the agriculture sector is transmitted into other sectors of the economy through backward and forward linkages. Significant positive growth is observed in the price levels both in the short-run and long-run. The significant decline in agriculture supply, especially among small-scale producers, may bid up the domestic prices, especially of agricultural products. The user cost of capital also declines in both short- and long-run.

An increase in land for smallholder agriculture tends to reduce the demand for labour, especially in small-scale agriculture, in both short- and long-run (–13.808 and –17.056 respectively). The demand for natural capital in the form of land increased significantly in the short-run as everyone needs his/her own piece of land, but decreased sharply in the long-run (5.00–1.93) as most of the small-scale farmers tend to abandon the land. The supply of capital equipment dropped by 41.6% as there is limited investment in the agriculture sector by large commercial farmers. The reduction in output in many agricultural subsectors leads to reduced demand for both capital and labour.

According to Table 2, the general prices were positive in both short- and long-run, depicting an increase in prices as a result of the redistribution of land. Significant increases in prices were noted on the prices of exported and purchase prices of agricultural commodities. The marginal increase in Free On Board (FOB) prices is essentiall due to the increase in the cost of trade and transportation margins. These marginal changes in domestic and export price imply that the country is not gaining much ground with respect to its agricultural trade competitors. Real household consumption decreases across all household groups in both short- and long-run. This is mainly due to the increase in food prices as a result of increased food production and reduced returns of factor income. The contraction of the agricultural sector leads to an increase in demand for unskilled labour as a result of reduced primary factor productivity. This showed that agricultural rural land redistribution will affect the agricultural trade rating of South Africa with respect to its major trading competitors.

Results in Table 3 reflect the poverty and distributional effects of rural land redistribution in South Africa. The poverty headcount increases in both short- and long-run (0.067 and 0.125 respectively). The increase in poverty headcount was mainly due to the negative demand-side effects of rural land redistribution which accrued over time. These negative demand-side effects lead to lower wages and returns on capital, and these lower factor returns in both short- and long-run retard the poverty-reducing effect of income. In addition, the poverty-increasing effects of increased consumer prices lead to an increase in poverty in both short- and long-run. There is a slight decrease in inequality in the short-run (–0.004), but eventually inequality increases in the long-run (0.0039). The reason for the short-run decrease may be mainly because the simulation

Table 2. Effects on factors of production (% change from base year value; base year = 2015)

Variables	Short-run	Long-run
Demand for capital		
Equipments	0.00	0.156
Land	5.00	1.93
Supply of capital		
Equipments	0.685	0.400
Land	0.00	0.0004
Demand for labour		
Commercial agriculture	0.969	1.115
Small scale agriculture	–13.808	–17.056

Short-run (SR) refers to the year 2015 (start of simulation) and long-run (LR) refers to 2025 (end of simulation)

Source: Author's calculations, based on simulation results

Table 3. Poverty and inequality effects (% changes in volumes from business-as-usual simulation)

	Short-run	Long-run
Poverty headcount		
Simulation	0.067	0.125
Components of changes in poverty headcount		
Growth	–0.146	0.17
Redistribution	–0.01	0.015
Change in poverty headcount due to changes in		
Wages	0.013	0.12
Own-consumption	0.00477	0.152
Consumer prices	–0.092	0.1
Poverty headcount (by household type)		
Rural	0.585	0.93
Urban	0.005	0.0038
Gini coefficient		
Simulation	–0.004	0.039

Short-run (SR) refers to the year 2015 (start of simulation) and long-run (LR) refers to 2025 (end of simulation)

Source: Author's calculations, based on simulation results

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reduced the wealth of the rich commercial farmers and transferred this to the poorer rural households, but in the long-run, as the income of the rural farmers continues to decrease, the inequality increases.

CONCLUSION

Inequalities in resource ownership are more common in developing and emerging economies and evidence seems to suggest that this is the major cause of rural poverty and income inequalities. The reason is that poor households do not own the means of production, hence they are more prone to poverty. In line with these arguments, empirical literature points to the fact that land redistribution can be effective in equity groups.

However, there is no strong evidence in many countries that land redistribution will decrease poverty and improve income inequalities, or guarantee that poor people will always benefit. This inconclusiveness seems to suggest that such evidence from a particular country must be obtained empirically.

The analytical results show that the transfer of land from commercial to small-scale farmers leads to a decrease in output which has negative consequences for other economic sectors through intersectoral linkages. The decrease in output leads to a decrease in factor remuneration, which will translate into job losses and poor household income. The CGE simulation results also show that land redistribution leads to an improvement in poor household income in the long-run. The simulation results indicate that land redistribution has economy-wide impacts on demand, intermediate consumption, and consumer prices through intersectoral linkages. It also has consequences on factor remuneration, especially wages, and leads to job losses and decline in poor household income. The study recommends minimal transfer of land coupled with government investment in agriculture. To minimise this negative impact, there is a need to design and implement agriculture policies to maintain agricultural productivity. One such policy is to increase government investment and improve irrigation facilities for the small-scale farmers.

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