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Title: The unlocked power of the agricultural sector: An economy-wide approach in South Africa

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1. *Abstract*

With the use of an economy-wide perspective, this paper discusses the changing structure and role of the agricultural sector in South Africa. With South Africa facing a triple challenge of high rates of poverty, inequality, and unemployment, this paper argues that policy-makers should look to the agricultural sector to pragmatically achieve sustainable development. While structural change had been growth-enhancing in the early 1970s, many sectors of the economy have since failed to generate inclusive growth and employment opportunities for the vast majority of South Africans. Through multiplier analysis, this paper finds that there are considerable opportunities for development to be gained from investment in the agricultural sector. Indeed, especially in the context of a post-pandemic recovery, policy-makers must recognize the integral role of the sector in South Africa's development strategy.

2. *Introduction*

For many low- and middle-income nations, the agricultural sector acts as the largest contributor to the economy and employment. The significant size of the sector provides evidence of its role in nations' development journeys and, for many economies, this sector takes on the role of a catalyst or engine for growth (Zhang & Diao, 2020). The process of structural transformation followed by most economies involves certain key dimensions. These include a decline in the share of agriculture in output and employment; a rise in urban economic activity; a migration of labour from rural to urban economies; and demographic transitions in population growth (Timmer & Akkus, 2008). These dimensions of economic transformation have formed the traditional route to economic growth and development success across the globe, but while the world economy has followed on its growth trajectory, much of the African continent has failed to follow the same path (Ndulu, 2008). Indeed, it was not even obvious to economists that developing countries in the region could sustain growth beyond exogenously induced and episodic spurts of economic activity (Adelman, 2000; Ndulu, 2008). At the same time, development policy in Africa has seen frequent policy shifts and influence from global trends in development philosophies. In the years after World War II, the mainstream policy was initially aimed at market failure and so states were encouraged to take active roles in regulating and managing economic activity (Adelman, 2000; Ndulu, 2008). Later, the policy debate flipped to address growing concerns around government failure and so the role of the state in economic growth was reigned in by economic policy practitioners across most of the globe.

Under the influence of everchanging prescriptions from the global community, South Africa and much of the economies of the African continent now find themselves in a state that cannot be characterized by rapid industrialization nor by significant growth (Rodrik, 2016).

Gershenkron (2015) claimed that developing nations that were late in their entrance to the global economy had to simply follow the 'book of blueprint' taken from the experience of more advanced economies to reach similar development outcomes. However, the reality of the modern world presents heterogeneity in growth patterns and conditions. In understanding economies that have demonstrated uncharacteristic growth journeys, it is helpful to interrogate the process of structural transformation that underpins economic growth and development. Kuznets (1973) distinguished industrialization, urbanization, and agricultural transformation as central features of structural economic change. The study of structural change has, in the modern era, led to increased scrutiny of the role of the agricultural sector in the development process. With the conventional route to economic development revolving around industrialization, the question much of the literature addresses is when and how an economy should undertake the process of industrialization. This study seeks to instead ask whether South Africa, as a follower economy in the global sphere, has missed its window of opportunity for industrialization and aims to highlight the significance of its agricultural sector in securing developmental goals in the modern era. The paper first analyses the historical role of the agricultural sector in growth and development. A discussion is then held on the unique history of South Africa's relationship with the sector and the current conditions in the sector that suggest an unlocked potential to spur growth and development. Following this, an empirical investigation of the agricultural sector's growth inducing powers is conducted. In exploring the role of the agricultural sector in South Africa's growth journey it is possible to extract policy strategies for further growth and development in South Africa.

3. Literature Review

3.1. The role of agriculture in economic development: Perspectives and narratives

Economic development is a term that captures more than just economic growth. Included under this umbrella term are indicators that describe improvements in living standards, alleviation of poverty and inequality, advancements in education, health, and housing, as well as progress made in the freedoms and social protection of civilians (Junankar, 2016). On the development

path, agriculture is recognised as a vital sector in spurring economic growth and alleviating poverty (Pinstrup-Anderson & Shimokawa, 2007). Early writings on economic development framed the growth process as one of resource allocation away from low-productivity sectors to high-productivity sectors (Adelman, 1999). This reallocation positions the agricultural sector as a low-productivity, low-technology sector with decreasing returns. For this reason, many theorists have recommended policy tools that aim to stimulate and direct resource allocation away from the agricultural sector to modern, industrial sectors (Adelman, 1999; Rosenstein-Rodan, 1943). Of course, it is also argued that the role of agriculture is not fixed. Adelman (1999) and others argue that the role of the sector alters along the path of economic growth (Adelman, 1999; Kuznets, 1955; Lewis, 1954). It is this consideration that must be kept in mind when discussing policy tools for economic growth and development.

The role of agriculture in the development process is a much-debated subject, and the recent era of economic thought has brought forward two contrasting views on the sector (Andersson & Till, 2018). The first view posits that the agricultural sector is a source of pro-poor growth and a driver for long-term growth and industrialisation (Andersson & Till, 2018). The second view is that the sector lacks the power to lift populations out of poverty and has not had the necessary linkages to stimulate economic growth (Andersson & Till, 2018).

In investigating the first of these views, the Lewis Model may be a suitable start to the discussion (Andersson & Till, 2018; O'Williams & Smith, 2008; Figueroa, 2004). The work of Sir Arthur Lewis has contributed significantly to the foundations of development economics and a key principle was the essential role of agriculture as a pre-condition for economic development. It was when the term "industrialization" was being touted as the key to raising income per capita that Lewis argued that, in the context of developing and post-colonial economies, there can be little economic growth without a leveraging of the reinforcing relationship between agricultural and industrial activities (Lewis, 1950; O'Williams & Smith, 2008). Indeed, during his time as a leading thinker in development economics, Lewis emphasized problems of accumulation, distribution, and growth, indicating that the primary task is that of increasing voluntary savings. Following this line of thinking, it would be an error to assume that the central challenge of development is industrialization (Figueroa, 2004).

Of course, the many insights provided by Lewis on the role of agriculture in development have, to an extent, been lost through the many variations of the Lewis Model and much of modern

economic discourse seems to reduce the sector to a simple and primitive reserve of surplus labour (Figueroa, 2004; Dethier & Effenberger, 2011; Lewis, 1954). Work by Kuznets (1966) also frame the agricultural sector as a supplier of food and limits the role to that of a source of subsistence in reaching greater hallmarks of growth and development. These earlier works suggest that as the economy reaches greater stages of growth, the role played by the agricultural sector in driving development will shrink (Dethier & Effenberger, 2011; Kuznets, 1966). Much of development policy has been informed by the view that the path to growth and development is, without exception, accompanied by the shift away from agriculture (Kuznets, 1955). A more recent wave of 'agro-pessimism' has resulted in literature that suggests not only that growth in the agricultural sector is unimportant in driving economy-wide development, but also that the sector may be a weak force for development for even those in closest proximity to the sector, that is, rural and farming communities (Dethier & Effenberger). Many economists have posed the question asking why, if agriculture is capable of generating growth, has the sector delivered so little (Meijerink & Roza, 2007). Responses to this question include the rapidly changing state of markets in the face of globalization, degradation of the natural resource base, exclusion of small-scale farmers in policy design, and the rising costs of public sector interventions (Diao et al., 2007; Meijerink & Roza, 2007).

Despite the skepticism directed at the growth-generating powers of the agricultural sector, there is a large body of evidence that suggests the sector cannot be left out of development policy. Timmer and Akkus (2008) observe that no country has managed to sustain transitions out of poverty without encouraging increases in agricultural productivity. A key case study that assists in dismissing the idea of a 'passive' agricultural sector can be found in the success of the Green Revolution in Asia during the 1960s and early 1970s (Diao et al., 2007). During the Asian Green Revolution, innovation and economy-wide transformation were achieved within a single generation (Larson & Otsuka, 2016). This crucial period in the history of agricultural development saw the region lift its population from widespread hunger, malnutrition, and poverty (Hazell, 2009). Technological advancements in agriculture allowed for the efficient dissemination of new farming knowledge and seed genetic material amongst farmers, most of whom were smallholder farmers of rice and wheat. Asian farmers, empowered by improved seed material, fertilizer, and irrigation technology and supportive public policy, doubled agricultural output in 25 years between 1965 and 1990. At the farm level, rural incomes grew from rises in farm productivity and wider rural economies were spurred into development. This saw farming families able to afford schooling for Asia's next generation of skilled and educated

labour, while also carving out long-term pathways to prosperity (Larson & Otsuka, 2016; Estudillo & Otsuka, 2010). Elsewhere in the world, it has been confirmed that agricultural development has direct and powerful poverty reducing effects that extend beyond just the growth of rural incomes. Valdes and Foster (2010) reflect on the fact that development in agriculture results not just in increased employment and incomes for those engaged in farming and food-processing activities, but that development in non-farming and post-harvest activities is also stimulated. This powerful observation implies greater sustained growth, long-term investment and human capital development and, increased fiscal powers at both local and national levels. At a macroeconomic level, Asian economies were able to utilize their agricultural terms of trade to sustain employment in the agricultural sector while the investments in structural change revealed the sector to be a valuable growth sector (Timmer & Akkus, 2008). The development path carved out from the Green Revolution included transitions to improved food security, greater political stability, and the building blocks for modern economic growth.

3.2. Leveraging agricultural linkages for development

In Hirschman's (1958) writings on development strategies, it is argued that economic development follows a path of unbalanced growth and is driven to equilibrium by multiple pressures and stimulations. Hirschman (1958) outlines that the most efficient route to development entails the building and utilization of strong backward linkages between sectors in the economy. In developing an understanding of the role of agriculture in economic growth and development it is necessary to pay attention to the existence and size of linkages between the sector and the wider economy. There is a consensus that inter-sectoral linkages are important in facilitating economic growth, but confusion arises in identifying and selecting which sectors will drive economy-wide growth (Sonis et al., 1995; Subramaniam & Reed, 2009). As noted by Hirschman (1958), agriculture has been criticised for its lack of strong linkage effects and so policy discussions have judged agriculture to be ill-suited to support growth strategies (Vogel, 1994).

However, this view has been challenged by proponents of the balanced-growth approach or, as termed by Adelman (1984), agricultural-demand-led-industrialization (ADLI). This approach places agriculture as the basis of national development and calls for the leveraging of linkages and interactions between the agricultural and industrial sectors (Adelman, 1984). The key to

the success of agricultural-led development is raising the levels of productivity in the sector. Adelman (1984) outlines that this would involve improvements in the physical and institutional infrastructure in the agricultural sector. More specifically, this could include the modernisation of production technologies, innovation in irrigation and fertilisation methods, upgrading of transport and access routes to markets, and investments in capital goods (Junankar, 2016). Through strong linkages with other sectors, development can diffuse throughout the economy: the surpluses produced in the agricultural sector is deployed to other sectors, most notably the industrial sectors, and aggregate demand for wider production is expanded, labour is shifted to the non-agricultural activities and, by exports of agricultural goods, foreign exchange can flow into the economy (Junankar, 2016). The successes of the Green Revolution may also be used to highlight the importance of strong inter-sectoral linkages. With the increased dynamism of agricultural productivity, the Asian countries were also able to shift labour and other inputs into other sectors of their economies (Axelsson & Palacio, 2017). As theorized, this resulted in increases in the overall level of productivity and the creation of surplus capital that could be deployed to other sectors.

Empirical evidence that provides a contrary narrative to Hirschman's (1958) judgement of agriculture's lack of significant linkage effects can be found in the work of Mellor & Lele (1973) on India. This paper found that, while production linkages for agriculture may be weak, consumption linkage effects are very strong – strong enough to stimulate demand for goods and services in other sectors of the economy, while also supporting expansions in the labour force (Mellor & Lele, 1973; Mellor, 2017; Delgado et al., 1998). The evidence of the growth-inducing potential of the sector found in India, as well as in other case studies, also informed policy decisions made in Ethiopia, another case study of success on the African continent. As phrased by Mellor (2017), Prime Minister Meles, informed by his work on agricultural growth linkages, led the nation on a path of agricultural-led development. Such policies include powerful public spending on irrigation, transport, and power to support increases in agricultural productivity and incomes (Rohne Till, 2020; Rodrik, 2017). Consequently, Ethiopia's rapid increase in average annual GDP growth has been accompanied by a fast-growing and productive agricultural sector (Rohne Till, 2020). Many observing Ethiopia's agricultural performance in the 1970s and 1980s would not have anticipated its current success – indeed, many were of the opinion that the last decades of the previous millennium had seen the fall of the region in both political prominence as well as in productive output performance (Desta, 2019). South Africa's agricultural sector has also received its fair share of criticism and many

fear that the agricultural sector and its emerging farmers will be the greatest losers in this new era of the Fourth Industrial Revolution (Mtshali & Akinola, 2021).

Rodrik (2017) recognizes that manufacturing as a tool for development is fast falling out of favour for low- and middle-income countries. Reasons for this include increasing levels of skill intensity, barriers to entry into the global value chain, and tendencies towards premature deindustrialization. As suggested by Ethiopia's performance and utilisation of the agricultural sector, growth may be realized without a rush to industrialization. In the same vein, where industrialisation fails to deliver, policymakers should look to other sectors. The agricultural sector presents itself as a tool to achieve radical economic transformation and, in the modern era of technological advancement, the question may be asked of whether the sector still fits the mould of a 'primitive and unproductive' activity.

Macroeconomic data from recent decades suggest that growth-promoting structural change has been discreetly occurring across the African continent, most notably in Ethiopia, Malawi, Senegal, and Tanzania (McMillan, 2013; Rodrik, 2017; Cabral & Amanor, 2021). These transformations have caught the attention of policy-makers and academics and so interest in agriculture and the modernization of the sector has once again been reignited. While the previous literature suggested that Africa could not successfully launch a Green Revolution due to high levels of low-wage labour and land fragmentation, the reality of modern-day Africa suggests a new route to an agricultural renaissance is possible. Regions on the continent have increasingly seen rising demand for technological innovation in the agricultural sector, evidenced by increasing demand for tractors, tractor-related services, and the emergence of capitalised farming operations (Cabral & Amanor, 2021). The rise in rural wages as a result of rapid urbanisation has also triggered demand for labour-saving technologies led by the private sector. With the rise of medium-scale farming operations, there has also been increased spending on services from smallholders (Cabral & Amanor, 2021). This trend in the region elevates the significance of the agricultural sector as it suggests rising diversification in the product market and the adoption of new technologies. Thus it may be said that agricultural production in Africa is in a process of evolution into a quasi-modern activity (Rodrik, 2017).

In placing this debate into a conceptual framework, it is useful to ask whether the economies of the African continent exhibit the dualism of the ever-popular Lewis model (1954). As history has recorded, much of the growth across the continent arose from mining success and as such,

much of the volatility in the continent's growth performance can be explained by fluctuations in commodity markets (Diao & McMillan, 2017). While the reliance on commodities may have propped up growth performance in the past, many economies across the continent have not seen the necessary structural changes needed to support strong development agendas. The dependence on the export of agricultural commodities as well as mineral commodities has led to a revision of expectations for Africa's potential for development, with many cautious about trends of declining world prices for exports such as minerals, cotton, sugar, and other products (Alemu, 2016; Diao & McMillan, 2017; Rodrik, 2016). Accompanying these movements in global markets, declining agricultural performance, and falling employment shares in agriculture have been observed in most African countries. Following the conventional interpretation of the Lewis model (1954), one would expect that employment shares would rise in the industrial sectors, but the African context has provided an alternative reality. Instead, there has been a proliferation of activity in the informal sector. This sector, typically viewed as unproductive, has been left to support demand for jobs and other market needs (Diao & McMillan, 2017). This leaves many African economies facing poor agricultural performance, relatively little development of manufacturing capacity, and an unregulated and poorly understood informal sector. Indeed, South Africa's inability to generate labour-intensive growth falls well within this description, with slowing industrial growth, neglect of the agricultural sector and, a growing shadow economy that accounts for the employment of one in every six South Africans (Bhorat & Rooney, 2017; Khumalo, Mthuli & Singh, 2019).

As with the first Green Revolution in Asia, this second Green Revolution taking place in Ethiopia and other African nations brings hope of significant economic transformation on the continent. Policy-makers in the region must take this opportunity seriously, as it is imperative that every segment of society, especially those in the most rural and underserved areas, benefits from economic, social and environmental development. The United Nations' 2030 Agenda calls on governments to devote resources to grow and strengthen sustainable agriculture and fisheries to support rural livelihoods and inclusive development (Odusola, 2021; United Nations, 2015). From the work of economists such as Mellor & Adelman, it has been possible to better identify and measure growth linkages, thus lending credibility to agriculture's role as an engine for growth (Diao et al., 2007). The following section attempts to expand on South Africa's economic development and the role of its agricultural sector.

3.3. Distinguishing the South African economy: Sector analysis, transformation and growth without industrialization

This section seeks to understand the nature of the South African agricultural sector by exploring the sector's evolution over time and its contribution to the economy. To start, it helps to examine the development history of the agricultural sector. In the early stages of development, agricultural activity in South Africa took on the form of subsistence farming (Greyling, Vink & van der Merwe, 2018). The discovery of mineral wealth in the country threw the initial dependence on subsistence farming into flux. By the 1890s a union arose between food production and mining activity, where a reliable supply of produce, specifically maize, was essential in sustaining industrial activity. What emerged in this agricultural landscape was a small and prosperous farming community, known as the 'Boer notables' (Greyling, Vink & van der Merwe, 2018). These elite farmers were able to make substantial investments in modern production technology and labour. The rise of these two sectors as dominant drivers of growth in the economy also relied on a supply of cheap and exploitative labour (Greyling, Vink & van der Merwe, 2018). In the early 1900s, the powerful forces of these two industries managed to influence state policy such that they were able to receive immense support from the national levels of government. Stanwix (2012) goes so far as to describe the history of the agricultural sector as a series of government interventions, with white farmers receiving support in the form of disaster relief, infrastructural development, water subsidies, consumer price subsidies, and investments in research and development. This paternalistic relationship between the state and agricultural elites shifted to a more technocratic affair after the fall of the apartheid government in 1994 (Stanwix, 2012; Greyling, Vink & van der Merwe, 2018).

Post-1994, the nation has gone through several phases of development policy programmes. These include the Reconstruction and Development Plan (RDP), the Growth, Employment and Redistribution Programme (GEAR), and finally, the National Development Plan (NDP) (Karriem & Hoskins, 2016). The RDP had received criticism for its neglect of the agricultural sector and the 16 million people whose livelihoods are located within rural economies (van Rooyen, Ngqangweni & Njobe, 1994). Contained within the RDP was an emphasis on land reform, but this focus did include sufficient attention to support productive land use and income creation through the agricultural linkages with the rest of the economy. The policy programme was also relatively short-lived and soon after GEAR, a largely neoliberal policy framework, dominated the development agenda until 2007 (Karriem & Hoskins, 2016). The conservative

spirit of GEAR was preserved in the 2010 release of the New Growth Path (NGP) where the promotion of rural development was aimed at 300 000 smallholder livelihoods while leaving the enrichment of the industrial and agrarian elites undisrupted (Karriem & Hoskins, 2016). The NDP (2012) aims to facilitate agricultural development that will ensure land reform and job creation in rural communities. However, in framing established players in the sector as leading partners, the NDP has received criticism for leaving market-oriented agricultural policy intact and not supporting its developmental goals with a focused and coordinated planning unit (Karriem & Hoskins, 2016).

Throughout these policy developments, the contribution of the agricultural sector to South Africa's GDP has been mostly stagnant (Reddy et al., 2016). Post-Apartheid South Africa's economy has become stratified into four distinct types. Sectors such as manufacturing and construction are characterised by high total factor productivity (TFP), high labour shedding, and growth that remains constricted by low income elasticity of demand; whereas agriculture and mining are characterised by low TFP, low output growth, and limited labour absorption (Fedderke, 2014). Sectors such as utilities, trade, and communications display high TFP growth, high labour shedding, and accelerated output growth; Financial services have shown low TFP growth, highly labour absorbing with high growth (Fedderke, 2014). The performances of these various sectors have resulted in a highly unbalanced growth profile and an unusual economic structure. While the finance and services sectors have expanded significantly, industry and agriculture, key engines of development, have contracted and struggled to remain competitive since the re-opening of the South African economy in the 1990s (Bhorat & Rooney, 2017; Edwards, 2005; Bhorat et al, 2020).

Indeed, the agricultural sector having once been the backbone of the economy has seen the most drastic decline since 1911, having shrunk from a 21% share in Gross Domestic Product (GDP) to a 2.5% share of GDP in 2016 (Boshoff & Fourie, 2020). While a shrinking of the sector can be expected with the development of the economy, the degree to which the share has dropped presents a concern for policymakers trying to optimize the resources of the economy for growth. While agriculture was once the primary employer since 1980 its capacity to generate jobs has been severely diminished. In the period between 2001 and 2012, the sector lost more than half a million jobs (Bhorat et al, 2014). As shown in Table 1, the performance of the sector in the post-crisis era has not exhibited significant signs of a recovery. Employment in the agricultural sector continued to fall between 2004 and 2014, with only a slight uptick

between 2015 and 2020 (Statistics South Africa, 2009; Statistics South Africa, 2012; Statistics South Africa, 2014; Statistics South Africa, 2020). Overall, the average share in employment sits at approximately 5%. Interestingly, the sector escaped large job losses during the COVID-19 pandemic and even saw an increase of 21 000 jobs between 2020 and 2021 (Statistics South Africa, 2021).

Agriculture's modest contribution to employment in South Africa should not distract from the importance of the sector. This has been proven by the resilience shown by the sector during the economic contractions during the COVID-19 pandemic (South African Reserve Bank [SARB], 2021). The agricultural sector has outperformed 2019 levels and has strengthened the primary sector's recovery. What is more insightful has been the agriculture sector's standout performance in TFP during the COVID-19 pandemic – the sector has seen almost 4% growth in TFP while most other industries have experienced declines since the global financial crisis (SARB, 2021). This suggests that there is much to value in the sector and that it has a critical role to play in driving innovation, investment, and efficiency in the South African economy.

In line with the sector's low employment growth shown in Table 1 and Table 2, Boshoff and Fourie (2020) find that the South African economy has undergone significant structural change as it relates to the role of the agricultural sector. Their findings suggest that the correlation between South Africa's business cycle and cycles in the agricultural sector has fallen to zero after the year 2000. The implication of poor correlation between agricultural performance and wider growth cycles is that the sector is at great risk of falling into a state of collapse despite its potential to drive employment, growth, and poverty alleviation. The consequences of a weak agricultural sector in the South African landscape have led to a development path that is unable to create low-wage jobs and thus unable to assist in the alleviation of poverty and inequality. To better formulate agricultural policy for growth, it is necessary to determine the strength of the linkages possessed by agricultural activities and to optimize the resilience of the sector, especially in the context of the COVID-19 crisis.

Table 1. Employment by Industry, 2004-2020 in thousands

Industry	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	% Change
Agriculture	800	740	859	737	819	715	665	644	696	740	702	880	874	843	845	861	820	8%
Mining	384	343	339	367	354	340	327	334	375	411	428	455	444	434	419	412	403	7%
Manufacturing	1833	1860	1922	1960	2091	1954	1839	1871	1817	1810	1760	1762	1692	1782	1769	1762	1528	-4%
Utilities	87	3	97	86	103	105	95	91	102	128	117	132	118	149	148	139	104	60%
Construction	783	937	1016	1051	1215	1189	1109	1109	1091	1145	1249	1405	1431	1414	1472	1348	1164	72%
Trade	2748	3180	3450	3342	3316	3120	3073	3148	3145	3132	3202	3161	3178	3250	3280	3358	3084	22%
Transport	678	705	684	717	823	800	816	811	860	914	932	905	910	977	984	998	925	47%
Finance	1228	1338	361	1459	1782	1862	1748	1818	1902	1995	2030	2198	2275	2402	2479	2518	2374	105%
Services	2295	2321	2379	2490	2776	2814	2875	3027	3202	3351	3493	3551	3571	3609	3694	3667	3484	60%
Private Households	1206	1252	1311	1258	1303	1291	1237	1214	1232	1236	1230	1288	1283	1303	1292	1281	1160	6%
Other	2	90	1001	0	3	4	4	3	3	4	3	4	4	6	12	6	15	200%
Total	12044	12769	13419	13467	14585	14194	13788	14070	14425	14866	15146	15741	15780	16169	16394	16350	15061	36%

Source: 2009, 2012, 2014 and 2020 Labour Market Dynamics in South Africa.

Table 2. Share in Employment by Industry, 2004-2020 in percent

Industry	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Agriculture	6,64	5,80	6,40	5,47	5,62	5,04	4,82	4,58	4,82	4,98	4,63	5,59	5,54	5,21	5,15	5,27	5,44
Mining	3,19	2,69	2,53	2,73	2,43	2,40	2,37	2,37	2,60	2,76	2,83	2,89	2,81	2,68	2,56	2,52	2,68
Manufacturing	15,22	14,57	14,32	14,55	14,34	13,77	13,34	13,30	12,60	12,18	11,62	11,19	10,72	11,02	10,79	10,78	10,15
Utilities	0,72	0,02	0,72	0,64	0,71	0,74	0,69	0,65	0,71	0,86	0,77	0,84	0,75	0,92	0,90	0,85	0,69
Construction	6,50	7,34	7,57	7,80	8,33	8,38	8,04	7,88	7,56	7,70	8,25	8,93	9,07	8,75	8,98	8,24	7,73
Trade	22,82	24,90	25,71	24,82	22,74	21,98	22,29	22,37	21,80	21,07	21,14	20,08	20,14	20,10	20,01	20,54	20,48
Transport	5,63	5,52	5,10	5,32	5,64	5,64	5,92	5,76	5,96	6,15	6,15	5,75	5,77	6,04	6,00	6,10	6,14
Finance	10,20	10,48	2,69	10,83	12,22	13,12	12,68	12,92	13,19	13,42	13,40	13,96	14,42	14,86	15,12	15,40	15,76
Services	19,06	18,18	17,73	18,49	19,03	19,83	20,85	21,51	22,20	22,54	23,06	22,56	22,63	22,32	22,53	22,43	23,13
Private Households	10,01	9,80	9,77	9,34	8,93	9,10	8,97	8,63	8,54	8,31	8,12	8,18	8,13	8,06	7,88	7,83	7,70
Other	0,02	0,70	7,46	0,00	0,02	0,03	0,03	0,02	0,02	0,03	0,02	0,03	0,03	0,04	0,07	0,04	0,10

Source: 2009, 2012, 2014 and 2020 Labour Market Dynamics in South Africa.

3.4. South Africa's agricultural sector and its Sub-Saharan African (SSA) neighbours

As previously discussed, despite the reliable nature of the sector, agriculture's share of the South African economy has steadily been on the decline. While remaining a positive contributor to GDP, its share has averaged 3% over the last decade and a half. Encouragingly, however, the sector has experienced standout growth during the COVID-19 crisis. The sector grew in its share in GDP by 15.1% despite the considerable challenges posed by the pandemic and lockdown measures (National Agricultural Marketing Council, 2020). Agricultural exports also reached record levels in the last two years, with the sector reaping the rewards of favourable weather conditions and exchange rate movements. It may be asked whether such a performance by the agricultural sector makes it particularly primed for targeted development and policy innovation. A comparative analysis may yield more insight on whether South Africa's agricultural sector is uniquely positioned for an agricultural renaissance or whether, like in other nations, the sector is on a road to inconsequence.

At the continental level, the sector accounts for the employment of more than half of Africa's labour force but only contributes 15% to the region's GDP (Osabuohein, 2020). The role of the sector is undeniably vital to Africa's development story. At the 2003 African Union summit in Mozambique, African leaders and policymakers affirmed the vital importance of the sector when they adopted the Comprehensive African Agriculture Development Programme (CAADP) (Sers & Mughal, 2019). This agricultural framework sought to encourage higher agri-food production and greater levels of food security. The Maputo Declaration launched in the same year, envisioned an overcoming of food insecurity and a spurring of development through increased public investment in the agricultural sector. Almost two decades later, several countries in the region have managed to increase their public spending on agriculture. Ethiopia, Kenya, Mozambique and Sierra Leone all increased public spending on the sector beyond the 10% level specified in the Maputo Declaration (Sers & Mughal, 2019). These nations have managed to reap the benefits of agricultural growth that has since materialized. Many have commented on the progress that has since been made on the continent as a result of increased public spending and policy focus on agriculture. However, much more is required to secure sustainable and climate resilient growth and development.

Taking a closer look at SSA, there is a great deal of structural variation in the economies of the region. For instance, while the share of agriculture in GDP and employment takes up small

single-digit shares in South Africa, for many other SSA nations the sector is the life force of the economy. Angola's agricultural sector accounts for 11% of GDP and a whopping 70% of its total employment (Ben-Ari, 2014). Closer to home, Namibia and Botswana have both seen a dramatic decline in the prominence and performance of their agricultural sectors. Just like South Africa, where the sector once accounted for approximately half of all economic activity, the agricultural sector now accounts for less than 5% of their economies (Food and Agriculture Organization, nd; United Nations Development Programme, 2012; Matopote, Manatsha & Joshi, 2021). This is despite the fact that the majority of their populations depend, either directly or indirectly, on the sector for their livelihoods. Indeed, it has been observed that in SSA, growth in agriculture is several times more effective in reducing poverty than growth generated in other sectors of the economy, such as manufacturing or services (Pan-African Farmers' Organization [PAFO], 2021).

In the context of the Maputo Declaration, and the successive Malabo Declaration, government expenditure is an accepted driver of agricultural and economy-wide development. In the South African case, there is a tendency to rely on foreign direct investments for economic growth and indeed public expenditures on the agricultural sector has remained low. To illustrate, the allocation to agriculture and rural development comprises of only 1.6% of the total medium-term economic framework budget (Department of National Treasury, 2021). Work done by Ngobeni and Muchopa (2022) affirm calls to increase public spending allocations to the sector. Doing so will enable the government to honour its commitment to regional agreements and ensure that the sector is endowed with modern technologies and knowledge systems. But South Africa is not exceptional in its lagging commitment to agricultural development. The SSA region has, since 2000, seen a shrinking of public expenditures on agriculture as a share of total spending from 5.1% to approximately 3% in 2010 (Sers & Mughal, 2019).

It is clear that South Africa and its neighbours face a common challenge of a shrinking agricultural sector. In the context of declining policy attention and public expenditure allocation, it is reasonable to query whether there are common environmental, institutional or resource constraints that are acting to restrict support to the agricultural sector in SSA. In many circles the slow rate of agricultural transformation is blamed on the poor rate of adoption of modern farming technology (Wambede, Joyfred & Jimmy, 2019). Lowe (1986) posits that the agricultural challenges in Africa can only be overcome by innovative policy and innovative farmers. But many in the region have interpreted this to mean that agriculture must be made

industrial in nature. Uganda, for example, implemented its Plan for Modernisation of Agriculture in 2000 with its mission statement of transforming subsistence agriculture to commercial agriculture by the year 2017 (Wambede, Joyfred & Jimmy, 2019). South Africa too has heard its fair share of calls for commercialization. Prominent voices, such as that of former head of PAFO and AgriSA executive Theo de Jager, have declared that African agricultural development must depart from a mindset of fighting poverty to one of wealth creation and the exploitation of intra-African trade (Southern African Confederation of Agricultural Unions [SACAU], 2014; Hall & Cousins, 2015).

However, it has been bemoaned by farming communities across the region that modernization policies too often result in the dispossession of smallholder and family-based farmers (PAFO, 2021; Bergius, Benjaminsen & Widgren, 2018). Policymakers in South Africa, and their counterparts in SSA, must be cautious in relying too much on foreign direct investment in agriculture to achieve developmental goals. To illustrate the risks of an unhealthy reliance on foreign capital, one only has to look at the emerging scenario in Tanzania's Southern Agricultural Growth Corridor (SAGCOT). The SAGCOT initiative is the cornerstone of Tanzania's Kilimo Kwanza (Agriculture First) strategy and involves the partnership of the state with various development agencies and large, mostly foreign, corporations (Bergius, Benjaminsen & Widgren, 2018). The initiative very much aligns with the ecomodernist philosophy of "modernize, urbanize and commercialize" and it has attracted criticism for its side-lining of smallholder interests and its encouragement of the monopolization of the agricultural sector. An especially concerning outcome of the SAGCOT initiative is the increased evictions and threat to smallholder lands that have been earmarked for 'productive' use by foreign investment partners (Bergius, Benjaminsen & Widgren, 2018). Zambia's Ministry of Lands has been overwhelmed by complaints of displacement from ancestral and family lands (Minister of Lands, 2013). These incidents of displacement and dispossession are often as a result of investment projects that purport to support sustainable development and growth (Chitonge et al., 2017). Increasingly, it appears that attempts at agricultural revival and innovation are being weakened by policy that serves outward interests instead of prioritising inclusive and sustainable transformation.

South Africa, in its role as a regional power with strong alliances with global capital, has had much influence on the dominant policy philosophy in SSA. Despite the various commitments to land reform and agricultural transformation, South Africa has been slow in its delivery of

these promises. What has instead been delivered by the policy frameworks of the post-apartheid government is a consolidated and corporatized agricultural sector (Hall & Cousins, 2015; Hall & Cousins, 2018). These internal developments have had great influence on the rest of the SSA region. Whether foreseen or not, South African policy has encouraged the spread of agricultural development strategies that are centred on the dominance of large capital (Hall & Cousins, 2015). Strict adherence to this policy trajectory entails not only the problems associated with disregarding the livelihood and knowledge systems of rural communities, but also risks seeing the sector following in the footsteps of the manufacturing sector which has become overly capital-intensive and incapable of sustainable and effective job creation (Reddy et al., 2016).

South African policymakers must be cognizant of such risks. It is thus necessary that policy be creative and inclusive of local interests. A departure from the predominant policy tradition can secure a diversified and resilient agricultural sector. Policymakers must be cautious of pursuing modernisation at any cost. As illustrated by this exploration of agricultural policy in SSA, the costs of such an approach are indeed great and run contrary to sustainable development goals. Perhaps a first step is a realization on the part of the state that they can and should do more than simply facilitate investment in the sector. There is a role for the state to craft an agricultural sector that is truly transformative. This may then influence the development trajectory of the wider SSA region, spurring inclusive development and greater commitment to public investment in the agricultural sector and in the livelihoods of those living in rural communities.

4. Methodology

4.1. Data and Empirical Framework

In evaluating the potential of the agricultural sector to drive growth, this paper will make use of a social accounting matrix (SAM). A SAM represents a quantitative description of the economy in the form of a table of accounts (Keuning & Thorbecke, 1989). This disaggregated framework captures the structure of productions and distributions of the factorial and household incomes and illustrates the initial conditions and behaviours of consumers, producers, government, and foreign agents (Keuning & Thorbecke, 1989). The use of a SAM-based Leontief model allows for an analysis of questions related to policy, income distribution,

and poverty alleviation (Townsend & Macdonald, 1998). This extends the reach of the model beyond just an analysis of production accounts.

In building a theoretical understanding of the framework, it helps to think of a SAM as a snapshot of transactions taking place in the economy at a point in time. These transactions are captured as flows of incomes and payments between various institutions within the economy and, as well as with institutions beyond its borders (Round, 2003). These interactions between institutions are recorded in the cells of the SAM. The arrangement of cells in the matrix is such that each row and column represents an account of flows (Breisinger, Thomas & Thurlow, 2009). The organization of the SAM distinguishes the flows of transactions towards 'activities' and 'commodities.' Activities in this framework refer to those accounts that produce goods and services. An activity requires certain types of inputs. These inputs can be classified as factors of production, such as land, labour, capital, and commodities (production inputs). Commodities are in the form of goods and services that are produced by the various activities in an economy (Breisinger, Thomas & Thurlow, 2009).

Also included in the basic framework of a SAM are various domestic institutions and accounts that represent transactions with foreign entities. The inclusion of these institutions lends power to the SAM framework as it widens the scope of analysis beyond productive and market interactions to include behaviours of households, government, and foreign markets (Breisinger, Thomas & Thurlow, 2009; Round, 2003).

This paper conducts a SAM analysis of data compiled from various sources by van Seventer et al. (2019). This SAM comprises of data from the National Income and Product Accounts (SARB, 2018), as well data from the 2015 Labour Market Dynamics Survey, and the 2015 Living Conditions Survey. The SAM constructed by van Seventer et al. (2019) consists of 62 productive activities and 104 commodity accounts. Included in the activities are agricultural production of crops, animals, mixed farming activities, husbandry services, game hunting, and related services, as well as production of organic fertilizer. Other activities such as agricultural processing, mining, textile manufacturing, and hospitality are also included. A full list of activities is shown in Figure 1 of the Appendix. The SAM also accounts for labour that is disaggregated by education level. Households in the model are disaggregated by per capita expenditure deciles. Included in van Seventer et al.'s (2019) SAM are accounts for government, investment, and foreign accounts. The SAM shows the circular flow of incomes in the

economy, with the income generated from production in the value-added accounts distributed to households and the government. From the flows of payment to the owners of labour and the state, expenditures then arise from consumption, social transfers and savings. Additionally, the SAM assumes an open economy, with the export and import of goods and services, and other transactions with the rest of the world. As such, the SAM provides a useful framework for the analysis of economy-wide interventions as well as multiplier analysis. A simplified representation of the SAM is shown in Figure 2 of the Appendix.

In the SAM, it is assumed that certain flows within the economy are a result of endogenous processes. Such accounts include those that capture flows to and from production activities, the distributions of factor payments, and the consumption expenditures on production. These accounts serve to form the fundamental causal relationships within an economy (Vogel, 1994). This map of transactions between households, firms, and other institutions is central to characterising the circular flow of commodities, incomes, and expenditures in a multi-household framework. It is assumed that demand for inputs is fixed and proportional to output, and that technology, preferences and prices are fixed (Arndt et al., 2020). While this framework is particularly useful in analysing policy, it must be cautioned that it is limited in its ability to capture medium to long-term impacts of policy shocks (Keuning & Thorbecke, 1989). The results of this study cannot, therefore, fully account for the trade-offs that exist between current consumption and future opportunities for consumption, production, and income growth. Additionally, the assumptions and conditions captured in a SAM at a specific point of time may not hold to economic conditions in another period, for example, in the time crisis (Round, 2003). This limitation is particularly relevant for the interpretation of results as it relates to the role of agriculture in COVID-19 economic recovery plans.

4.2. Analysis of Multipliers

Past studies have estimated that the regional agricultural income multipliers from agricultural interventions fall between 1.3 and 4.3 (Haggblade, Hammer & Hazell, 1991). As has been discussed, the potential of the agricultural sector to drive growth and development very much depends on the magnitude of these multiplier effects. The magnitude of the multiplier reflects, in essence, the ability of the agricultural sector to utilize underused resources in productive economic activity.

In the South African context, there is reason to believe that agricultural multipliers are of a significant magnitude due to the sector's labour-intensive needs and strong connectedness with non-farming employment (Black & Gerwel, 2014). To investigate the interlinkages between sectoral production, household incomes and expenditures, and the macroeconomy, it is assumed that there is exogeneity in the accounts for government, the rest of the world, and capital (Bautista & Thomas, 1999). The South African SAM can then be represented by,

$$Z = M_n(Z) + E \quad (1)$$

As shown above, a static multisectoral equation of commodity and income flows can be expressed as a vector of total output and income supplies that equals the sum of endogenous and exogenous demands. In (1), Z is a column vector of the endogenous accounts, E is a column vector containing exogenous accounts and M_n is a matrix of share coefficients. These coefficients express the shares of total expenditure held by the accounts for endogenous production, value-added activities, households, and transactions with the rest of the world (Vogel, 1994). The SAM multiplier matrix can then be found by solving for Z in (1).

$$Z = (I-M_n)^{-1} E \quad (2)$$

In the above expression, it can be seen that a change in exogenous demand, E, will, via transmission through direct and indirect linkages, lead to a change in final total demand, Z (Breisinger, Thomas & Thurlow, 2010; Vogel, 1994). Table 2 describes the multiplier effects of a R1 increase in final demand for agriculture against a R1 increase in final demand for the manufacturing, mining, and services sectors. Agriculture is seen to exhibit sizable multiplier effects. Each South African Rand of additional value-added in the agricultural sector leads to an increase of R 1.05 in total value-added elsewhere in the South African economy. It is interesting to note that the GDP multiplier for manufacturing is the smallest of all the key production sectors. This confirms the flatlining of the sector and puts into real terms what the economy's favouring of capital-intensive activities has done to harm the employment performance of the sector (Reddy et al., 2016). The demand stimulation generated by the agricultural sector exceeds that of manufacturing, as well as mining. The manufacturing sector's fall in the share of employment and stagnant growth indicates that, according to formal definitions, South Africa is experiencing deindustrialization (Reddy et al., 2016; Tregenna,

2016). As is evident, the multipliers for the agricultural sector are larger than all sectors excluding the services sector. It is important to note, however, that while the services sector may have larger multiplier effects, it lacks the labour-absorbing power that the agricultural sector possesses and the benefits of growth in services fail to reach low-skill workers and the poor (Black & Gerwel, 2014). The income multipliers for the agricultural sector are also sizable. This observation is consistent with the literature, as the sector is a vital source of income for those households that are most vulnerable to poverty.

Table 2. Total Multiplier Effects

	Output Multiplier	GDP multiplier	Income multiplier
Agriculture	2,522	1,048	0,768
Manufacturing	1,962	0,756	0,582
Mining	2,105	0,983	0,742
Services	2,605	1,217	0,941

Source: Author's own calculation based on van Seventer et al. (2019)

Interestingly, the analysis of multipliers already, in these early years of structural change, exhibits an economy that is increasingly reliant on the services sector for growth. In addition to this apparent entry into a phase of deindustrialization, the South African economy is experiencing a second phenomenon of structural change: de-agriculturalization. With the knowledge that almost a quarter of the services sector comprises of government services, it is a challenge to imagine that South Africa's economy is an appropriate fit to the stylised development path described by conventional models of growth (Helmut, 2015). South Africa, once Africa's industrial power, has steadily declined down to the continent's single-digit average of manufacturing value-added. Coupled with the dual challenge of premature deindustrialization and lack of agricultural transformation, policy-makers must chart a new path to sustainable development.

4.3. Simulated Policy Interventions

The multiplier analysis has revealed that there is significant capacity for interventions in agriculture to increase income and growth. Policy interventions that work to raise the productivity of the sector can push the economy on its growth path to greater employment, in both agricultural and non-agricultural sectors, greater efficiency, and sustainable development (Adelman, 1984; Vogel, 1994; Subramaniam & Reed, 2009).

The first simulation attempts to capture the effect of a 10% cash transfer to the most vulnerable households in the economy. In estimating a tax transfer from higher income households, this exercise will define vulnerable households as those who fall below decile eight. The rationale behind this decision is that the initial conditions of the SAM show that deciles eight and higher pay more dues to the state than they receive in state receipts (van Seventer et al., 2019). It is assumed that this indicates that deciles eight and above are in a better socio-economic standing and thus able to bear the obligation of a greater tax burden. The total tax revenue generated from these higher income households amount to R 448 000 million. If the government wanted to generate a tax amount to support vulnerable households' consumption then perhaps a starting point may be to aim to increase the transfers to vulnerable households by 10%. In the context of double-digit growth in the tax-to-GDP ratio since 1990, a 10% increase is a reasonable and proportionate starting point to begin the analysis (Piancastelli & Thirlwall, 2020; Statistics South Africa, 2022). In real terms, this represents an increase of approximately R 36 million in transfers to households in deciles one to seven.

While the SAM does not allow for disaggregation of households into the categories of rural and urban, it is reasonable to assume that the lower deciles of the household income distribution capture those households that live in rural areas. Indeed it is true that almost a third of the population resides in the rural regions of South Africa (Statistics South Africa, 2016). In these areas, there are high levels of poverty, unemployment, and poor service delivery. This reality finds its roots in the discriminatory laws of apartheid and many of the nation's poorest households are still concentrated in rural areas (Leibbrandt, Woolard & Woolard, 2000). A cash transfer to these vulnerable households may form part of the government's policy strategy to support development in rural South Africa as transfers have been shown to have significant power in supporting the incomes of poor households (Leibbrandt, Woolard & Woolard, 2000; Molyneux, Jones & Samuels, 2016; Davis et al., 2012). Encouragingly, there is evidence from Malawi and Ghana that suggests that cash transfer programmes have important implications for agricultural and rural development, and as such, these programmes need to play a role in policy interventions (Davis et al., 2012; Filipski & Taylor, 2012). Filipski and Taylor (2012) find that cash transfers to rural farmers generate substantial multipliers as there is a relaxation of the constraints on the purchasing and use of production inputs. In addition to this, it was observed that rural communities saw increased employment and local investment. In the South African context, agricultural policy reform is essential in securing an inclusive and sustainable future for the economy. The South African government has made clear its intentions to alleviate

poverty, past inequalities, and underdevelopment (Townsend & McDonald, 1997). A key constraint on the generation of economic activity and rural development has been the low levels of income in rural areas. For this reason, it is of interest to simulate a policy intervention that comprises of a transfer to those vulnerable households in the South African economy.

Secondly, it may be useful to interrogate the impact of a reallocation of the fiscal surplus to stimulating demand and production of agricultural commodities. A South African Green Revolution, as a planned intervention, would require not only investment in rural infrastructure and research, but would also need to manage the increasingly pressing challenge of climate change and water scarcity (Tshuma, 2015). It is also vital that South Africa avoids the long-term costs associated with over-reliance on chemical fertilizers, pesticides, and herbicides. An alternative production system is that of organic agriculture. This has fast arisen as a niche market that carries higher export value due to the global awareness of environmental issues such as soil degradation and loss of biodiversity (Ferdous et al., 2021). There is an opportunity for South Africa to establish itself as a player in the organic agriculture sector, along with countries like Samoa, Lichtenstein, and Austria (Ferdous et al., 2021). While the literature on the state of organic agriculture in South Africa is limited, local retailers and other agents in the sector are seeing growing demand while supply is constrained by poor government support and poor levels of knowledge sharing (Kelly & Metelerkamp, 2015). This is just one illustration of the opportunity to be gained from increased state investment in agricultural research and development. Along with investment in irrigation systems and physical infrastructures such as roads and telecommunications, investment in the development of sustainable chemical inputs and climate-resistant crops are also necessary areas in need of policy intervention.

Finally, a simulation will also attempt to replicate the basic strategy of an ADLI policy package. This policy intervention will comprise of directing investment to agriculture to improve agricultural productivity, while at the same time promoting agro-industrial growth (Tarp Jenson & Tarp, 2004). This would also include an export-oriented policy agenda to drive demand for agricultural produce. This policy package comprising of a redirection of the fiscal surplus, as well as an expansion of agricultural exports, is expected to drive positive and significant gains to productive activities in sectors such as agriculture, chemicals, and plastics, as well as business and other services. The first component of this experiment involves an exogenous shock of a 10% increase in the exports of agricultural commodities. The second

component is a reallocation of 10% of the government surplus as described in the second simulation.

5. *Results of the Simulated Policy Interventions*

The results for a simulated increase in cash transfers to vulnerable households, as shown in Table 3 of the Appendix, do indeed carry positive income effects, as discussed in the existing literature. For a 10% increase in the total cash transfers received by the lowest seven decile households, there are positive and significantly large multiplier effects for activities such as agricultural and food production. The multipliers for commodity demand in those sectors are also positive and large. Factor payments to those workers with a primary and middle school education stand to benefit from a cash transfer of this size and as evidenced by this experiment the multipliers are both positive and large. At the household level, the gains are significant and the overall income multiplier effect is large and positive, coming to a value of R 34 584.98 million. Additionally, it is reassuring to see that the multiplier effects for activities such as agriculture, mining, food production, textile production, and other manufacturing are positive and large. These results are encouraging and speak to the transformational power of cash transfers in the context of rural development. Historically, labour productivity in the rural economy has been overlooked in the standard literature, but as indicated by this simulation result, increased demand and productivity in rural economies have a substantial capacity to stimulate growth and alleviate income inequality. Stimulation of economic activity in the agricultural sector and the proximate rural economies has been seen to support sustainable growth through the inflation of informal wages as well as the development of human capital in the form of increased spending on health and education (Obayelu, Adepoju & Omirin, 2019; Morrone, 2014).

Of course, in the context of low growth and post-pandemic recovery, a tax-financed intervention of this scale may be politically unpopular. In addition, the total output and GDP multipliers were both large and negative. This negative impact on total output and GDP may speak to the possible outcomes of overburdening the tax base. Such outcomes include reduced consumption and investment on the part of high income households, who also disproportionately represent holders of capital assets. The data reflects that approximately R 500 000 million in taxes was collected from the upper decile households – if even only an additional R1 million was extracted from the upper deciles, it would be possible to generate an

income multiplier of approximately R1 million, with negligible negative output and GDP multiplier effects. By targeting the most vulnerable households, which also happen to be concentrated in rural areas, such an intervention would contribute to improved food security and alleviation of poverty and income inequality. The results suggest that policy-makers must walk a fine line between exploiting fiscal resources for development and social transformation and sustaining the tax base.

The second policy simulation attempts to conceptualize the effects of a revised allocation of the fiscal surplus. The total value of the state's expenditure on investment comes to R 25 807 million. The simulated policy in the third column of Table 3 comprises a redirection of 10% of this fiscal surplus towards spending on agricultural commodities. Interpreted differently, this intervention effectively acts as a government subsidisation of agricultural commodities. The results show that a redirection of R 2580 million towards agricultural subsidies has significant and positive effects. There is a positive effect on all production activities, with sizable multiplier effects for the agricultural and services sector. This intervention directly stimulates demand for agricultural commodities and it is observed that all commodity accounts exhibit an increase in demand. While the level of 10% is a modest and arbitrarily selected shock, the linearity of the SAM model makes the percentage level unimportant. As can be seen in Table 3, there are positive income multiplier effects with a total income multiplier of R 183.12 million. Income effects are skewed towards higher decile households and this appears to be inconsistent with the expectations that the rural poor would benefit disproportionately from such an intervention. This may be because the benefits of investment is likely to accrue to those high-income households that own capital inputs. Despite the skewed distribution of income effects, the positive change in incomes for the lower decile households may still deliver much relief to South Africa's poorest households as the increase in incomes may see significant increases in economic welfare. To illustrate, using cross-country household-level surveys Ligon and Sadoulet (2008) found that just a one percent increase in agricultural incomes can lead to significant poverty-reducing benefits and increased expenditures for the poorest of households. Additionally, the total GDP multiplier totals R 253.77 million and the total output multiplier comes to R 65.44 million. This highlights the strong intersectoral benefits to be gained from stimulation of the agricultural market and supports a pro-agricultural policy strategy for growth.

The simulated ADLI scenario does indeed show the expected positive multiplier effects and also yields strong income effects for all households, although benefits are skewed to the upper-income deciles. The total GDP multiplier and output multiplier of a simple ADLI intervention comes to R846.03 million and R 2 274.81 million, respectively. Overall, the results indicate that an ADLI strategy allows for an increase in consumption, production, and exports, with all households benefitting. This policy scenario supports Adelman's (1991) argument that agricultural-led development is appropriate for developing countries in SSA. Indeed, as seen in this simulation, the benefits of intervention in the agricultural sector have large spillovers to non-agricultural activities as well, thus stimulating economy-wide growth that is inclusive and sustainable. For example, investing in rural infrastructure to support agricultural productivity would see not only an increase in agricultural output and incomes, but also stimulation of non-farm activities in sectors such as construction, energy and, manufacturing and processing in adjacent goods markets (Valdes & Foster, 2010).This result may hold value for policymakers looking to decide on which industries, specifically, manufacturing or agricultural, are most appropriate for government investment.

6. Structural change and South African institutions: Direction for Policy

As the results of the simulations suggest, South Africa, like many other African economies, exhibits patterns of development that are incongruent with the traditional theory. Contrary to the belief that development is achieved via a process of falling shares of agriculture in production and employment, a rising share of industrial production and employment, and a migration of people out of rural areas and into urban hubs (Timmer & Akkus, 2008), South Africa has the opportunity to craft a new development story. In pursuing this new development path, policymakers must ask if and how the existing policies and systems of coordination are conducive to structural transformation. While past agricultural policy has loosely aimed to i.) improve the competitiveness of commercial agriculture, ii.) increase the participation of previously disadvantaged communities, and iii.) preserve natural resources, there has been insufficient focus on the coordination of sectoral development and implementation to achieve these goals (Drimie, 2016).

In examining the various policy commitments across governmental departments, it is clear that there is a consistent intention to utilize the agricultural sector to achieve sustainable and inclusive growth. For instance, the five-year strategic plan released in 2015 (Department of

Agriculture, Forestry and Fisheries [DAFF],2015) envisioned a transformation of the agricultural sector. It was envisioned that there would be an intervention into the bloating of commercial farming markets, an increase in rural employment, and increased participation of South African people in the business of agriculture, forestry, and fisheries. However, this vision has yet to be realized and there has been recognition by the state itself that the transformation process has been slow (DAFF,2015). The Department of Rural Development and Land Reform went so far as to describe the government's failure to transform the sector as a shrinking of the agricultural economy that "has not delivered according to expectations of economic growth, rural development, job creation, equity, and transformation." More recently, there has been a more enthusiastic policy stance on the prioritisation of agriculture and its role in boosting labour-intensive employment (National Treasury, 2019). Despite the well-known advantages of the agricultural sector and its large multiplier effects, its potential has been left unlocked due to several institutional constraints.

One such constraint lies with the availability and access to financial credit in the agricultural sector. Access to financial support is an especial barrier to black and emerging farmers (Sebola, 2018). As it stands the two main channels to financial support are loan funding and grant funding. A key institution in agricultural finance is the South African Land Bank, which has been mandated to service the financial needs of both commercial and small-scale emerging farmers (Land and Agricultural Development Bank Act, 2002). A more defined description of the role of the Land Bank includes its tasks of promoting, facilitating, and supporting equitable ownership of agricultural land, agricultural entrepreneurship, food security, productivity, innovation, investment, and profitability in rural and agricultural economies (Land and Agricultural Development Bank Act, 2002). Despite the fundamental role of this institution and its state-mandated mission, the perception of the bank and its contribution to agricultural transformation are not particularly favourable (Mmbengwa et al., 2010).

For example, despite its mandate to facilitate and promote transformation through the support of emerging and SMME farming, the trend in financing activities suggests a gradual decline in the Land Bank's support to smallholder farmers (Chisasa & Makina, 2012). Commercial banks in South Africa display the same trend and so it is necessary to ask whether lending institutions and the overall investment environment are adequately placed to support true agricultural transformation and, thus, wider economic structural change. It may even be argued that, due to the increasing proximity of private equity partners with agricultural cooperatives, investment

and development finance institutions are an obstacle to structural change and sectoral transformation (Ducastel & Anseeuw, 2017). A case study on South African grain cooperatives found that since the democratisation of South Africa, agricultural cooperatives, a key feature of the South African agricultural sector, have remained largely unreformed and still protect the interests of large white-owned commercial farming enterprises. With increased investor interest in cooperatives, there has been a gradual 'financialization' of cooperatives, with these elite groups amassing capital over the last 20 years (Ducastel & Anseeuw, 2017). While investment flow into agriculture is a necessary feature of sectoral transformation, in this current form, investment patterns are biased in favour of already established commercial farms. As a result, black and emerging farmers find themselves in an ever-increasingly marginalized position. The political nature of these investment patterns warrants policy intervention and regulation to protect the national objectives of sectoral transformation and growth.

State entities must play a greater role in agricultural finance to become the financial partner of choice for emerging farmers. A possible approach would be to revise the high collateral requirements for rural and emerging farmers. Many smallholder farmers are left unsupported and unable to purchase the necessary farming inputs for successful production and marketing (Pfunzo, 2017). This not only hinders structural transformation and diversification of the sector but also severely impacts food security. This has been the case in the province of Limpopo, where inaccessibility to credit had resulted in low productivity and poor quality yields (DAFF, 2015; D'Haese et al, 2013). Additionally, it is necessary to introduce more active monitoring and regulation of investment entities that are quietly shaping the commercial agricultural sector to the needs of foreign shareholders.

Emerging farmers in South Africa who have managed to access finance from the Land Bank demonstrate low success rates and of those failed farming small, micro and medium enterprises (SMMEs) 44% of them cite inadequate finance as the reason for failure (Mmbengwa et al., 2010). Other significant reasons cited for unprofitable and unproductive farming enterprises are poor infrastructure and inadequate skill levels. As is evident, the fact that agricultural finance from the Land Bank signals not only that African and emerging farmers are not being sufficiently supported, but also that state funds are being channelled into inefficient models of development finance. The findings by Mmbengwa et al. (2010) highlight the necessity of innovating the role of the development finance institution into one that extends itself beyond the granting of loans. For example, the Land Bank must intervene to ensure that farmers are

sufficiently endowed with the necessary financial management skills to better utilize the capital investment. As observed by Mmbengwa et al. (2010), many farmers viewed farm income as a more important metric of success than farm profitability – this perception may well go a long way in explaining poor investment performance. Intervening to improve the base of knowledge in agricultural finance and business management is recommended to improve the success rates of the Land Bank's involvement with emerging farmers and other SMMEs in the agribusiness industry. Doing so will not only promote pro-poor development and transformation but will also contribute to increased production, market competitiveness, and a diversified agricultural sector.

Intervention in knowledge systems is another key tool for structural change and agricultural development. As outlined in National Treasury's 2019 strategy plan, it is through research and technological innovation that South Africa can produce competitive, higher value, and higher quality agricultural outputs (National Treasury, 2019; Cramer & Sender, 2015). The cross-border and interprovince spillovers of agricultural knowledge are cited as a key source of agricultural productivity and, ultimately, economy-wide growth (Islam & Madsen, 2018). As observed during the Asian Green Revolution, the generation and diffusion of knowledge, technology, and new seed materials were able to transform entire economies within a single generation (Larson et al., 2010; Larson & Otsuka, 2016). The same is possible in South Africa as the nation has a strong history of publicly financed agricultural research and growing private research funding channels (Liebenberg, Pardey & Kahn, 2010; Pray, Fuglie & Johnson, 2007). However, there is concern about the present level of publicly-financed agricultural research.

Since the 1990s there has been increased fragmentation of research and development services and programmes. In 1992 the public research and development sector faced severe restructuring, with the subdivision of research entities into the nine provincial departments of agriculture. A consequence of this fragmentation of research and development institutions, such as the Agricultural Research Council, and their powers is that the new provincial zones no longer supported targeted agricultural research and development, and existing research partnerships were disrupted (Liebenberg, Pardey & Kahn, 2010). Running parallel to this trend of increased fragmentation is the gradual decline in public funding due to budget cuts in the then Department of Agriculture. As a result, public agricultural research and development capacity fell from 1 091 researchers to 784 researchers between 1996 and 2008 (Flaherty, Liebenberg & Kirsten, 2010).

To remedy these barriers to structural change and agricultural innovation key changes must be implemented to ensure a prosperous, diversified, and resilient agricultural sector in the future. To address the shrinking research capacity, agricultural studies and its students must receive the necessary support and training in institutions of learning. Intervention at the early stages of schooling would require that the South African government addresses the systematic and institutional barriers that students face in core competencies in mathematics and science (Department of Agriculture, 2008). This would comprise of both continued investment in education and professional training, as well as innovation in teaching methodologies. The coordination of training and research partnerships also requires some organizational consolidation to facilitate more targeted research with greater attention to ecological zones as opposed to provincial borders. The building of a knowledge economy, with strong expertise in agricultural innovation, should be a central feature of development strategy.

Education and training are just one of the key channels through which sectoral transformation operates. It is also necessary that public policy pays attention to complementary infrastructural development. For example, the development and diffusion of information and communication (ICT) technology and infrastructure is an important feature of structural change, and world authorities such as the United Nations' Food and Agriculture Organization (2003) have recognized that access to information and knowledge is a requirement for food security and sustainable development. In practical language, investment in and support of ICTs in agricultural and rural production allows entire communities to share information and data, best practices, and gain insight on market conditions (Munyua, Adera & Jenson, 2008). Despite policy commitments to the prioritisation of ICT infrastructure and capacity building, there has been a bias in investment towards urban areas. As a result, there has been a growing disparity between rural-urban access to ICTs and their benefits across health, education, and poverty reduction (Sithole et al., 2013). To accelerate the diffusion of ICTs and fulfil policy commitments to equitable access, the state must take inventory of the existing distribution of access and setting-specific modes of use. For example, South Africa has a high use of mobile phones, even in the most remote of rural areas. Making use of this fact could put South Africa's agricultural sector in a unique position to utilize basic mobile technologies to better coordinate and organize agricultural activities. Looking to the fisheries sector, the use of mobile phone technology has yielded great success with the ICT-driven and community-run Abalobi fishing platform (Nthane et al., 2020). The digital platform has enabled small-scale fishing

communities across South Africa's coastline to overcome various value chain obstacles, while also empowering fishers to manage resources, participate in collective accounting, access buyers and upload real-time data. Tools such as this could yield great opportunities for the agricultural sector, and particularly emerging farmers, to increase production capabilities, management skills, and adoption of new methods and technologies. This would contribute significantly to reducing barriers for Black and emerging farming enterprises and would better coordinate knowledge and resources for rural development and food security. It is therefore necessary for policymakers to be cognizant of local conditions and needs in strategizing infrastructural investment.

7. Conclusion

As demonstrated by the simulated policy interventions, there are significant gains to be had from a policy package of cash transfers, export expansion, and direct government stimulation of the demand for agricultural commodities. A comprehensive leveraging of these findings may bring a positive impact on the creation of output and income for the South African economy, and especially for the rural poor of the nation. Furthermore, the pro-agricultural policies are in alignment with existing development and redistribution goals.

Following these findings, it is then necessary to confront the realities of the South African economy. Why is it that the post-apartheid economy has continued to grow increasingly capital-intensive, with shifts away from primary production towards tertiary production (Bhorat, Goga & Stanwix, 2014)? It seems the economy has very much followed a skills-biased structural change in the hopes that affluence would follow from a prioritisation of industrialisation (Ndulu, 2008; Bhorat, Goga & Stanwix, 2014). The main effect of this has been the decline in government spending on agriculture, agricultural research, and technology transfer systems (Vink, 2004). If South Africa is to fully utilize the agricultural sector to drive growth it is necessary to support investments in agricultural infrastructure and innovation (Adelman & Vogel, 1994).

In the years since democratisation, what little growth there has been in the sector is owed largely to the adoption of more efficient production technologies, diffusion of farmer knowledge, and an uptick in local and international demand for agricultural goods (Sihlobo, 2019). Despite this, the sector can be better utilized to address food insecurity, rural poverty,

and unemployment. For example, while 38% of South Africa's population is located in rural areas, only 5% of the population is employed in the agricultural sector (Sihlobo & Nel, 2016). In addition, approximately 20% of South African households face food insecurity despite there being sufficient production to feed the entire domestic population (Statistics South Africa, 2019). Because of high levels of income equality, there is also an accompanying inequity in household access to both agricultural assets and food sources. Increasingly, the proportions of households engaged in agricultural production have declined and the sector's dualistic structure, with 40 000 established agricultural enterprises is skewed in favour of white landowners, in terms of both land and wealth (Sihlobo & Nel, 2016; Statistics South Africa, 2019).

In realizing the true power of the agricultural sector to transform growth and development, especially in rural areas, it is necessary to direct resources to rural development and innovation in agricultural production. As demonstrated by the policy simulations, there are benefits to be had from prioritising agricultural development. Of course, the results from this paper should not be taken as strictly prescriptive. The model is limited in its ability to comment concretely on the disaggregation of effects on the rural-urban divide and the true implication for rural inequality and poverty. In addition, there is much more to be said on the linkages that exist between the sector and the wider agri-food system. While data on this is limited at this time, it is necessary that policymakers gain an understanding of the specific activities that can spur evolution of the sector even when traditional and primary agricultural activities become smaller components of the economy. The analysis is also static in nature and there is much room to explore the dynamics of the sector over time, especially as it relates to the sector's contribution to economic recovery and transformation in the post-COVID era. In this case, it may be that more complex SAM-based approaches are utilised to give fuller analyses. Despite these limitations, the hope is that this work will contribute to the renewed discussion on agricultural renaissance in South Africa. No longer can this sector, and the people closest to it, be left on the peripheries of development policy.

Appendix

Figure 1. List of SAM accounts

Microeconomic account	Description	Description aggregated
aagri	Agriculture	aAgriculture
afore	Forestry	aAgriculture
afish	Fishing	aAgriculture
acoal	Mining of coal and lignite	aMining
agold	Mining of gold and uranium ore	aMining
amore	Mining of metal ores	aMining
aomin	Other mining and quarrying	aMining
afood	Food	aFood
abevt	Beverages and tobacco	aFood
aweav	Spinning, weaving and finishing of textiles	aClothingtextiles
aknit	Knitted, crouched fabrics, wearing apparel, fur articles	aClothingtextiles
aleat	Tanning and dressing of leather	aClothingtextiles
afoot	Footwear	aClothingtextiles
awood	Sawmilling, planing of wood, cork, straw	aWood&Furniture
apapr	Paper	aOther manufacturing
aprnt	Publishing, printing, recorded media	aOther manufacturing
apetr	Coke oven, petroleum refineries	aChemicals, plastics
abchm	Nuclear fuel, basic chemicals	aChemicals, plastics
aochm	Other chemical products, man-made fibres	aChemicals, plastics
arubb	Rubber	aChemicals, plastics
aplas	Plastic	aChemicals, plastics
aglss	Glass	aNon-metals
anmmi	Non-metallic minerals	aNon-metals
abisc	Basic iron and steel, casting of metals	aMetalproducts
anfme	Basic precious and non-ferrous metals	aMetalproducts
afabm	Fabricated metal products	aMetalproducts
amach	Machinery and equipment	aMachinery & equipment
aemch	Electrical machinery and apparatus	aMachinery & equipment

Figure 1 continued. List of SAM accounts		
Microeconomic account	**Description**	**Aggregated description**
ardtv	Radio, television, communication equipment and apparatus	aMachinery & equipment
amopt	Medical, precision, optical instruments, watches and clocks	aMachinery & equipment
amtvp	Motor vehicles, trailers, parts	aTransport equipment
aotrp	Other transport equipment	aTransport equipment
afurn	Furniture	aWood&Furniture
aomnf	Manufacturing n.e.c, recycling	aOther manufacturing
aelcg	Electricity, gas, steam and hot water supply	aElectricity & water
awatd	Collection, purification and distribution of water	aElectricity & water
acnst	Construction	aOther services
awtrd	Wholesale trade, commission trade	aOther services
artrd	Retail trade	aOther services
amtvs	Sale, maintenance, repair of motor vehicles	aOther services
aacct	Hotels and restaurants	aOther services
altrp	Land transport, transport via pipe lines	aOther services
awtrp	Water transport	aOther services
aatrp	Air transport	aOther services
atrps	Auxiliary transport	aOther services
apost	Post and telecommunication	aOther services
afins	Financial intermediation	aBusiness services
ainsp	Insurance and pension funding	aBusiness services
aofin	Activities to financial intermediation	aBusiness services
areal	Real estate activities	aBusiness services
arent	Renting of machinery and equipment	aBusiness services
acomp	Computer and related activities	aBusiness services
arsea	Research and experimental development	aBusiness services
aobus	Other business activities	aBusiness services
apuba	Government	aGovernment
aeduc	Education	aGovernment
aheal	Health and social work	aGovernment
awast	Sewerage and refuse disposal	aOther services

Figure 1 continued. List of SAM accounts		
Microeconomic account	**Description**	**Aggregated description**
amorg	Activities of membership organisations	aOther services
arecr	Recreational, cultural and sporting activities	aOther services
aoact	Other activities	aOther services
anobs	Non-observed, informal, non-profit, households,	aOther services
cagri	Agriculture	cAgriculture
clani	Live animal	cAgriculture
cfore	Forestry	cAgriculture
cfish	Fishing	cAgriculture
ccoal	Coal and lignite	cMining
cmore	Metal ores	cMining
comin	Other minerals	cMining
celcg	Electricity and gas	cMining
cwatr	Natural water	cMining
cmeat	Meat	cFood
cpfis	Fish	cFood
cvege	Vegetables	cFood
cfrui	Fruit and nuts	cFood
cfats	Oils and fats	cFood
cdair	Dairy products	cFood
cgrai	Grain mill products	cFood
cstar	Starches products	cFood
cafee	Animal feeding	cFood
cbake	Bakery products	cFood
csuga	Sugar	cFood
cconf	Confectionary products	cFood
cpast	Pasta products	cFood
cofoo	Food n.e.c.	cFood
calcb	Alcohol, beverages	cFood
csftd	Soft drinks	cFood
ctoba	Tobacco products	cFood
ctexf	Textile fabrics	cClothingtextiles
ctexm	Made-up textile, articles	cClothingtextiles
ccarp	Carpets	cClothingtextiles
cotex	Textile n.e.c.	cClothingtextiles
cknit	Knitting fabrics	cClothingtextiles
cwear	Wearing apparel	cClothingtextiles
cleat	Leather products	cClothingtextiles
cfoot	Footwear	cClothingtextiles
cwood	Wood products	cWood&Furniture
cpapp	Paper products	cOther manufacturing
cprnt	Printing	cOther manufacturing
cpetr	Petroleum products	cChemicalsPlastics
cbchm	Basic chemicals	cChemicalsPlastics

Figure 1 continued. List of SAM accounts		
Microeconomic account	**Description**	**Description of aggregate**
cfert	Fertilizers, pesticides	cChemicalsPlastics
cpain	Paint, related products	cChemicalsPlastics
cphar	Pharmaceutical products	cChemicalsPlastics
csoap	Soap, cleaning, perfume	cChemicalsPlastics
coche	Chemical products, n.e.c.	cChemicalsPlastics
ctyre	Rubber tyres	cChemicalsPlastics
corub	Other rubber products	cChemicalsPlastics
cplas	Plastic products	cNon-metals
cglas	Glass products	cNon-metals
ccera	Non-structural ceramic	cNon-metals
cclay	Structure non-refractory clay	cNon-metals
ccmnt	Plaster, cement	cNon-metals
cconc	Articles of concrete	cNon-metals
conmp	Non-metallic products n.e.c.	cNon-metals
cfurn	Furniture	cWood&Furniture
cjewl	Jewellery	cOther manufacturing
comnf	Manufactured products n.e.c.	cOther manufacturing
cwast	Wastes, scraps	cMetals
cirst	Iron, steel products	cMetals
cnfme	Non-ferrous metals	cMetals
cstrm	Structural metal products	cMetals
ctank	Tanks, reservoirs	cMetals
cofbm	Other fabricated metal	cMetals
cengt	Engines, turbines	cMachinery & equipment
cpump	Pumps, compressors	cMachinery & equipment
cgear	Bearings, gears	cMachinery & equipment
clift	Lifting equipment	cMachinery & equipment
cgenm	General machinery	cMachinery & equipment
cspcm	Special machinery	cMachinery & equipment
cdoma	Domestic appliances	cMachinery & equipment
coffm	Office machinery	cMachinery & equipment
celcm	Electrical machinery	cMachinery & equipment
crdtv	Radio, television	cMachinery & equipment
cmeda	Medical appliances	cMachinery & equipment
cmtvp	Motor vehicles, parts	cTransport equipment
cship	Ships and boats	cTransport equipment
crail	Railway and trams	cTransport equipment
cairc	Aircrafts	cTransport equipment
coteq	Other transport equipment	cTransport equipment
ccnst	Construction	cOther services
ccsrv	Construction services	cOther services

Figure 1 continued. List of SAM accounts		
Microeconomic account	**Description**	**Description of Aggregate**
ctrad	Trade services	cOther services
cacco	Accommodation	cOther services
ccats	Catering services	cOther services
cptrp	Passenger transport	cOther services
cftrp	Freight transport	cOther services
ctrps	Supporting transport services	cOther services
cpost	Postal, courier services	cOther services
celcd	Electricity distribution	cElectricity & water
cwatd	Water distribution	cElectricity & water
cfins	Financial services	cBusiness services
cinsp	Insurance, pension	cBusiness services
cofin	Other financial services	cBusiness services
creal	Real estate services	cBusiness services
crent	Leasing, Rental services	cBusiness services
crsea	Research, development	cBusiness services
clacc	Legal, accounting	cBusiness services
cobus	Other business services	cBusiness services
ctelc	Telecommunications	cBusiness services
csupp	Support services	cBusiness services
cmnfs	Manufactured services n.e.c.	cOther services
cpuba	Public administration	cGovernment
ceduc	Education services	cGovernment
cheal	Health, social services	cGovernment
cosrv	Other services n.e.c.	cOther services
trc	Margins	Margins
flab-p	Labour with primary school education (grades 1-7)	Labour with primary school education (grades 1-7)
flab-m	Labour with middle school education (grades 8-11)	Labour with middle school education (grades 8-11)
flab-s	Labour completed sedondary school education (grade 12)	Labour completed sedondary school education (grade 12)
flab-t	Labour with tertiary education (certificates, diplomas or degrees)	Labour with tertiary education (certificates, diplomas or degrees)
fcap	Capital	Capital
ent	Enterprises	Enterprises
hhd-0	Households - Decile 1	Households - Decile 1
hhd-1	Households - Decile 2	Households - Decile 2
hhd-2	Households - Decile 3	Households - Decile 3
hhd-3	Households - Decile 4	Households - Decile 4
hhd-4	Households - Decile 5	Households - Decile 5
hhd-5	Households - Decile 6	Households - Decile 6
hhd-6	Households - Decile 7	Households - Decile 7
hhd-7	Households - Decile 8	Households - Decile 8
hhd-8	Households - Decile 9	Households - Decile 9

Figure 1 continued. List of SAM accounts		
Microeconomic account	**Description**	**Description of aggregate**
hhd-91	Households - Percentile 90-92	Households - Percentile 90-94
hhd-92	Households - Percentile 92-94	Households - Percentile 90-94
hhd-93	Households - Percentile 94-96	Households - Percentile 94-98
hhd-94	Households - Percentile 96-98	Households - Percentile 94-98
hhd-95	Households - Percentile 98-100	Households - Percentile 98-100
gov	Government	Government
atax	Activity taxes	Government
dtax	Direct taxes	Government
mtax	Import tariffs	Government
stax	Sales taxes	Government
s-i	Savings & investment	Savings & investment
dstk	Change in stocks	Savings & investment
row	Rest of world	Rest of world
Source:van Seventer et al. (2019)		

Figure 2. A 2012 Social Accounting Matrix for South Africa

	Activities	Commodities	Labour	Capital	Enterprise	Households	Government	Net activity taxes	Net domestic product taxes	Import duties	Income taxes	Change in inventories	Accumulation	Rest of the world	Total
Activities		Output of total domestic economy													Gross output
Commodities	Intermediate consumption	Transactions margins				Final consumption expenditure by households	Final consumption expenditure by government					Change in inventories plus residual term	Gross fixed capital formation	Exports of goods and services	Total demand
Labour	Compensation of employees													Compensation of SA residents in RoW	Labour income
Capital	Net operating surplus plus depreciation													Property income paid: RoW	Capital income
Enterprises				Gross operating surplus of corporations adjusted for property income	Net property income and other surrent transfers received	Property income paid	Social contributions received								Enterprise earnings

Source: van Seventer et al. (2019)

Figure 2 continued. A 2012 Social Accounting Matrix for South Africa

	Activities	Commodities	Labour	Capital	Enterprise	Households	Government	Net activity taxes	Net domestic product taxes	Import duties	Income taxes	Change in inventories	Accumulation	Rest of the world	Total
Households			Compensation of residents	Gross operating surplus	Miscellaneous transfers pais		Miscallaneous current transfers paid							Miscallaneous current transfers paid	Household earnings
Government				Gross operating surplus of general government	Social benefits paid	Miscallenous transfers received	Net social contributions received	Net other taxes om production	Net taxes on products minus imports duties	Import duties	Current taxes on income and wealth			Current international cooperation paid	Government receipts
Net activity taxes	Net other taxes on production in all industries														Net other taxes on production in all industires
Net domestic product taxes		Net taxes on products minus import duties													Net taxes on products minus import duties
Import duties		Import duties													Import duties
Income taxes					Current taxes on income and wealth paid by corporations	Current taxes on income and wealth of households									Current taxes on income and wealth

Source: van Seventer et al. (2019)

Figure 2 continued. A 2012 Social Accounting Matrix for South Africa

	Activities	Commodities	Labour	Capital	Enterprise	Households	Government	Net activity taxes	Net domestic product taxes	Import duties	Income taxes	Change in inventories	Accumulation	Rest of the world	Total
Change in inventories													Change in inventories plus residual item		Change in inventories plus residual item
Accumulation					Residual of corporations plus gross saving of corporations	Residual of households and gross savings	Gross saving of general government							Current external balance	Savings
Rest of the world		Imports of goods and services	Compensation of South African employees	Property income received from RoW		Miscallenous current transfers received from RoW	Current international cooperation received from RoW								Foreign exchange outflows
Total	Gross Output	Total supply	Distribution of labour income	Dostribution of capital income	Enterprise outlays	Household outlays	Government outlays	Net other taxes on production in all industries	Net taxes on products minus import duties	Taxes on international trade and transactions: Import duties	Current taxes on income and wealth paid by corporations plus current taxes on income and wealth of households.	Change in inventories plus residual items	Gross fixed capital formation plus change in inventories plus residual items	Foreign exchange inflow	

Source: van Seventer et al. (2019)

Table 3. Simulated effects of policy responses to the COVID-19 crisis			
	Tax financed transfer to vulnerable households	Reallocation of I&S	Simple ADLI policy package
Output effects			
aAgriculture	2759,57	-6,69	4589,36
aMining	8,02	1925,81	-684,66
aFood	4060,67	-18,12	24,46
aClothingtextiles	379,26	2,15	-3,38
aChemicals, plastics	-304,38	6,84	230,83
aNon-metals	-39,79	-16,00	-18,53
aMetalproducts	-204,15	-79,20	-371,49
aMachinery & equipment	-164,91	-188,03	-255,63
aTransport equipment	-1176,37	-197,16	-269,82
aWood&Furniture	83,02	-26,65	-44,08
aOther manufacturing	15,34	-39,18	-93,98
aElectricity & water	-51,22	53,25	-40,00
aOther services	-692,01	-1067,89	-687,23
aBusiness services	-7107,49	-271,76	-213,10
aGovernment	-1823,50	-11,92	112,07

Table 3 Continued. Simulated effects of policy responses to the COVID-19 crisis			
	Tax financed transfer to vulnerable households	Reallocation of I&S	Simple ADLI policy package
Commodity effects			
cAgriculture	3482,99	-6,71	5796,07
cMining	57,74	2591,66	-919,36
cFood	7913,48	-34,26	49,26
cClothingtextiles	1091,73	7,16	-8,89
cChemicalsPlastics	-470,27	31,34	549,85
cNon-metals	-80,31	-33,80	-39,24
cMetals	-323,21	-115,21	-624,09
cMachinery & equipment	-448,73	-668,05	-906,80
cTransport equipment	-3119,42	-513,00	-704,01
cWood&Furniture	136,76	-43,00	-71,67
cOther manufacturing	-238,00	-60,10	-131,77
cElectricity & water	-51,76	57,56	-43,03
cOther services	1430,92	-1038,42	-647,44
cBusiness services	-10281,34	-387,70	-304,84
cGovernment	-1848,97	-3,97	122,45
Factor income effects			
Labour with primary school education	64,63	9,27	101,52
Labour with middle school education	15,04	6,09	45,61
Labour with secondary school education	-424,02	37,57	-0,23
Labour with tertiary education	-1527,88	52,73	-30,98
Capital	-1005,39	148,11	730,11

Table 3 Continued. Simulated effects of policy responses to the COVID-19 crisis			
	Tax financed transfer to vulnerable households	Reallocation of I&S	Simple ADLI policy package
Household income effects			
Households - Decile 1	4560,36	1,43	12,68
Households - Decile 2	5717,87	2,38	17,62
Households - Decile 3	6089,32	3,04	17,58
Households - Decile 4	6082,86	4,23	21,61
Households - Decile 5	5558,60	5,53	24,97
Households - Decile 6	5151,61	8,70	33,64
Households - Decile 7	3453,89	12,59	37,87
Households - Decile 8	-213,41	19,76	52,69
Households - Decile 9	-513,48	37,48	77,31
Households - Percentile 90-94	-305,39	22,71	51,30
Households - Percentile 94-98	-516,50	33,57	67,91
Households - Percentile 98-100	-480,74	31,70	67,56
Exogenous account effects			
Government	885,07	-5,61	282,28
Savings - Investment	-85,85	38,79	166,58
Rest of the World	-799,22	-32,85	-448,86
Multiplier effects			
Total output multiplier effect	-4257,93	65,44	2274,81
Total GDP multiplier effect	-2877,62	253,77	846,03
Total income multiplier effect	34584,98	183,12	482,73

Source: Author's own calculation based on van Seventer et al. (2019)

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