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The Southern African poultry value chain

Regional development versus national imperatives

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Abstract: This paper highlights the key strategies, both regional and domestic, that have led to the current structure of the poultry value chain in Southern Africa. While large firm strategies in poultry have been found to be regional in nature, and important regional developments in soybean production, processing, and trade have emerged, the regional poultry value chain has remained largely underdeveloped. This underdevelopment is linked to a discord between national and regional policies, with non-trade barriers such as import limits and complete bans on some products playing a key role in some of the countries.

Keywords: industrial policy, poultry, regional integration, regional value chain, Southern Africa, trade policy

JEL classification: L66, O57, Q13, Q17, F15

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1 Introduction

Poultry production in the Southern African region has been led by large, vertically integrated firms, predominantly from South Africa (Bagopi et al. 2014; Ncube et al. 2016). These firms have made forays into the region by establishing vertically integrated operations outside South Africa and also by increasing investment into downstream activities in the respective countries.

However, while these developments have occurred in the region, there have been limited moves towards the coordinated development of a regional value chain (RVC). An RVC denotes a situation where both consumers and producers are located within the region (Keane 2015). While there has been trade in animal feed inputs (mostly from South Africa and Zambia), key inputs such as soybeans and soybean oilcake are still sourced from deep-sea sources. The region as a whole is a net importer of soybean meal and chicken, driven by demand in South Africa (Ncube et al. 2016). This demand is reflected in South Africa's trade deficit for poultry of US\$200 million (or 22 per cent of consumption) in 2015 and an oilcake trade deficit of US\$123 million in 2015. Including the soybean trade deficit of US\$68 million in 2015, the total trade deficit related to the poultry industry in South Africa, the largest economy in the region, is US\$391 million.

At the same time, there have been important developments in Zambia in recent years as it has become a net exporter of soybeans and oilcakes. Specifically, Zambia's trade surplus of US\$13 million for oilcake in 2015 represented approximately 10 per cent of South Africa's corresponding trade deficit. Similarly, Zambia's soybean trade surplus of US\$5.5 million in 2015 represented 8 per cent of South Africa's corresponding trade deficit in 2015. Zambia's soybean-related trade surpluses decreased sharply from 2014 (US\$54 million in 2014 for all oilcakes and US\$13 million for soybeans), but this was related to various factors such as decreased exports of soybeans and soybean oilcakes. While Zambia's trade surpluses decreased, that they still exist reflects the potential for a regional poultry value chain in Southern Africa, with South Africa and Zambia as key actors.

This paper is the second in a series of four working papers based on research into the animal feed to poultry value chain in Botswana, South Africa, Zambia, and Zimbabwe.¹ The first paper (Ncube et al. 2016) highlighted the development of the animal feed to poultry value chains in Botswana, South Africa, and Zimbabwe. This paper drew out the key issues emerging in each country, particularly as they related to regional industrialization. Specifically, the first paper highlighted that there had been large investments into the value chain in the region, such as the entry of vertically integrated players, the increase of contract farmers, and the entry of new animal feed producers in Zimbabwe (Ncube et al. 2016). The first working paper also delved very briefly into considerations of RVCs. The movement and investments of large, mostly South African, vertically integrated firms into the rest of the region, especially Zambia and Mozambique, reflected regional integration at the firm level.

The current working paper builds on the findings of the first one by delving deeper into considerations of a regional poultry value chain in Southern Africa. This is based on an understanding that the formation of a coordinated RVC, i.e. with both consumers and producers located within the region, is dependent on competitive, reliable supply of inputs, and demand for the final products. This paper seeks to analyse, at a regional level, the factors that would affect the

¹ The research focusing specifically on the development of the poultry value chain in Zambia alone is being carried out by our research partners at the Indaba Agricultural Policy Research Institute (IAPRI).

formation of a regional poultry value chain, namely competitiveness, production capacity, and regulatory issues. It considers the firm and state strategies that have had the effect of either facilitating or negating the creation of an RVC in the poultry industry. This paper draws out key insights regarding regional versus national tensions, as related to both firm and state strategies.

The final paper in this series (Ncube et al. 2017) is a synthesis of the findings from all the papers that came about through this study, including the current paper. The research for the working papers in this series included both primary and secondary data gathering and analysis. The secondary data analysis included the analysis of costs, prices, and trade data acquired from various secondary sources such as the United Nations Comtrade database, company annual reports, and so on. The primary data gathering was carried out through in-depth interviews in Botswana, South Africa, Zambia, and Zimbabwe. Forty interviews were held in total, mainly with animal feed and poultry producers, industry associations, and government departments.

This working paper is organized as follows. Section 2 contains a brief consideration of the various issues related to RVCs, namely regional integration and the factors that affect RVC development. Section 3 provides a brief account of competitiveness in the domestic value chains in South Africa, Zambia, Zimbabwe, and Botswana, including considerations around how they affect the regional poultry value chain. Section 4 presents the strategies that have been used by firms or states to develop the value chain, both in the region and nationally. Section 5 concludes.

2 Global value chains, regional value chains, and regional integration

Global value chain (GVC) theory helps to explain how patterns of international trade and production have shaped prospects for development and increased competitiveness (Gereffi 2014). Participation within the global economy, particularly through GVCs, has seen a number of countries benefit from economic growth. This is largely because the ‘trade, investment, and knowledge flows that underpin GVCs provide mechanisms for rapid learning, innovation, and industrial upgrading’ (Gereffi 2014). Thus, GVCs are able to provide firms in developing countries with access to greater competencies such as improved industry standards, efficiencies, and process knowledge.

However, achieving success and efficiency within global economies has been shown to be a difficult task. This is particularly because firms in developing countries seeking to participate in the global economy are subject to the usually stringent governance and control of the lead firms in a particular GVC. It has thus been suggested that firms in developing countries should first seek insertion into *regional* value chains in order to gain the capabilities required to participate successfully in GVCs (Farole 2015; Morris and Fessehaie 2014). The consideration of RVCs is particularly important because these chains may be more amenable to upgrading than GVCs as they would be less tightly controlled (Keane 2015). Issues such as harmonization of standards or border controls may be slightly easier to negotiate between countries that share borders than between those that do not. Thus, understanding firm and state strategies in the formation of RVCs is important in order to understand their operation and potential for regional industrialization.

Until recently there has been limited literature on RVCs in Africa. Apart from the case studies on various African agricultural and mining commodities feeding into GVCs,² the GVC literature on African value chains either focused on the effect of Asian firms on African producers or on the demand patterns driven by the BRICS countries (i.e. Brazil, Russia, India, China, and South Africa) (Keane 2015). More recently, RVC studies in Southern Africa have been carried out in various

² See, for example, Cramer (1999), Dolan and Humphrey (2000), and Gibbon (2003).

forms. These studies have either had a regional focus, that is, as an assessment of the potential or existence of RVCs—e.g. Farole (2015) and Keane (2015) in their assessment of the Southern African Customs Union (SACU) region—or as case studies looking at specific value chains – e.g. Fessehaie et al. (2015).

In his assessment of SACU and the possibility of developing RVCs, Farole (2015) advocates for the development of RVCs in SACU. Using the gateway model, he suggests developing RVCs specifically for these to be plugged into GVCs. The gateway model would involve the development of SACU RVCs, led by South African-run firms, in order to plug into GVCs. However, this gateway approach is hampered by geographic remoteness, high transport costs, trade barriers, and low levels of skilled labour (Farole 2015).

Also in an assessment of SACU, Keane (2015) looks at the firm-level characteristics of SACU firms participating in GVCs. Keane (2015) finds evidence of a production network, particularly in the metals industry. However, while metals from other countries in the region end up in South Africa, they do not form part of South Africa's extraregional metal-based exports.

Two key insights emerge from the RVC studies. First, most RVC studies are conducted with a view to developing RVCs as preparation for entry into GVCs (Keane 2015). For instance, Kaplinsky and Morris (2015) state that RVCs can play an important role as a learning ground for African suppliers ultimately destined for global markets. African markets have far less stringent standards and requirements than global, particularly developed, markets. That is, RVCs are seen as a means to an end, not an end in themselves. However, it has been suggested that for some countries plugging into RVCs as an end in itself might be the most viable strategy for development as they may have very low domestic capabilities (Keane 2015).

The second key insight, and perhaps the most important, is that, as highlighted by Farole (2015), RVCs in Southern Africa remain largely underdeveloped. This underdevelopment extends to the agro-processing sector, where they say RVC development should be the greatest given the level of agricultural production in Southern African countries (Farole 2015). For example, in their analysis of the soya RVC in South Africa, Zambia, and Zimbabwe, Fessehaie et al. (2015: 22) found that there is very little interaction among the three countries, especially between Zambia and South Africa (the latter of which has the largest deficit), although Zimbabwe has been the biggest importer of Zambia's soya products (Ncube et al. 2016). The underdevelopment of RVCs is not confined to Southern Africa. In a study of selected East African RVCs, Daly et al. (2016) indicate that while significant strides have been made, particularly in policy and regulatory areas, this progress is hampered by issues of capability and trade being dominated by smallholders.

Key challenges affecting the development of RVCs in the agribusiness sector include large asymmetries in scale between South Africa and the rest of the region, trade barriers including infant industry protection, and a lack of harmonization in standards and labelling (Farole 2015). Also, for much of the Southern African region there is inadequate national and regional competition to stimulate technology upgrading and regional development (AfDB et al. 2014). However, there are some success stories; Fessehaie et al. (2015) found that South Africa serves as a regional hub for both South African and international original equipment manufacturers (OEMs) of mining equipment. However, although South African OEMs are in the region, they were latecomers in their moves into the region compared to their international counterparts, who have a much larger regional footprint (Fessehaie et al. 2015).

The development of RVCs depends on both structural and policy factors. Structural factors include the Southern African region having difficulties in achieving scale and also having large intraregional imbalances. The SACU region is characterized by relatively small regional markets

that make it difficult to take advantage of scale economies because production volumes are relatively low (Farole 2015). Intra-regional imbalances, with South Africa dominating the SACU (and indeed the Southern African) region and with industries favouring location in South Africa, make it difficult to develop RVCs (Farole 2015). These scale considerations affect the competitiveness of the firms/countries in terms of both GVC and RVC integration.

Policy factors are also important for the formulation of RVCs. This is especially the case in the context of regional communities and regional integration. Regional communities are seen as an avenue by which countries could improve their trade competitiveness through upscaling in value chains. The upscaling can be facilitated by enacting regional policies that reduce or eliminate excessive protectionist trade measures, as well as increased tax incentives for attracting new technology (AfDB et al. 2014). These policy measures are meant to boost trade within the regional community as the RVC is dependent on the free flow of goods and services within the region. As such, there must be both strong policies and strong alignments between national and regional institutions if countries in the regional community are to benefit from efficient RVCs (AfDB et al. 2014).

Regional integration has long been a goal for Southern African Development Community (SADC) countries. However, in spite of the regional integration agenda, national policies are often in opposition to the regional integration initiatives in the SADC (Hartzenberg and Kalenga 2015). Although countries have generally implemented a number of trade liberalization measures, they have found ways to circumvent the effects of application of tariff liberalization by implementing non-tariff barriers (NTBs), including in agriculture (Hartzenberg and Kalenga 2015). Particularly for agro-processing, trade policies undermine the potential for the development of downstream activities (Farole 2015).

The main NTBs found in agriculture among SADC countries are sanitary and phytosanitary standards (SPS), labelling requirements, periodic banning of imports and exports, and import and export licensing procedures (Hartzenberg and Kalenga 2015: 26). There is now a move away from trying to implement 'Eurozone-type regional integration', towards trying to think of new ways to effectively address constraints faced by firms aiming to deepen economic linkages (Hartzenberg and Kalenga 2015). As such, the formulation and development of RVCs is directly affected by issues of trade cooperation between neighbours in the region. While complete regional integration may no longer be a viable means by which to encourage intra-regional trade, countries may still be able to foster trade cooperation among close neighbours to encourage the development of an RVC.

The positioning of RVCs as a 'gateway' to entry into GVCs is certainly interesting in the context of economic development in Africa. However, the African continent is commonly cited as having the highest growth rates and growing markets, particularly for consumer goods, including food, owing to growing incomes. Moreover, while intra-African trade has grown at an average annual growth rate of 13.5 per cent between 2000 and 2010 (AfDB et al. 2014), Africa is still missing out on growth that was observed in more integrated and connected regions in other parts of the world. As such, the development of RVCs could actually be viewed as an end in itself, not only as a gateway to GVCs.

The next section looks at competitiveness along the value chain, focusing on input prices and the cost structure along the value chain.

3 Competitiveness along the value chain

Competitiveness is an important determinant of a firm or country's participation in a GVC. For instance, the formation of the GVCs in the clothing and footwear sectors, with production occurring in East Asia, was driven in part by firms seeking competitive production of these goods in order to capture rents at higher value added parts of the value chains, such as design and marketing (Gereffi 1994). By the same token, the development of RVCs in Southern Africa is dependent on competitive production located in the region.

Competitiveness in the animal feed to poultry value chain is largely dependent on access to critical inputs—namely animal feed and day-old chicks. Animal feed is by far the largest single cost in producing broilers, contributing 60–70 per cent to the producer price of a bird (Zengeni 2014a).³ Competitiveness is also dependent on accessing the correct breed of day-old chicks at a competitive price.

The management of the birds during their lifespan also affects the competitiveness of the production of broilers, especially as this relates to FCR and the mortality rate. The FCR is a measure of how well an animal converts feed intake into live weight and is measured as a ratio of kilograms of feed required to produce a kilogram of meat.⁴ The higher the FCR, the more feed has to be used to produce each kilogram of bird, thus the less competitive the poultry operations. The mortality rate is the percentage of birds that die in each batch that has been 'placed'.

The FCR is determined by issues such as the birds being fed at specific times and intervals, receiving the correct phase of feed for their stage of growth, and so on. For instance, in order for a bird to grow efficiently, it needs more protein at earlier stages of growth and more energy at later stages of growth.⁵ Consequently, animal feed producers make feeds for different phases of a bird's growth, ranging from starter to finisher.

Furthermore, the temperature, cleanliness, and lack of disease in the birds' environment, and administration of vaccines, directly affect the mortality rate.⁶ Due to the sensitivity of broilers to their environment, biosecurity measures are particularly important in ensuring that the mortality rate is minimized.⁷ Other costs are related to transport, abattoir costs, and brining. Considered together, these factors determine the competitiveness of a firm's—and also a country's—poultry value chain, which is crucial in understanding the regional poultry value chain.

In order to analyse competitiveness in the animal feed to poultry value chain in Southern Africa, it is important to consider the prices of the various raw materials as these make up the bulk of the production costs of a broiler. This section analyses the cost structure related to producing chicken in the countries considered in this study, focusing on feed and day-old-chick prices. This section also attempts to estimate a cost structure in each country and draws conclusions about the competitiveness in the value chain. Where some countries are omitted, this is due to a lack of data.

³ Interview with CBH, 3 July 2015; interview with Daybreak, 30 June 2015; interview with Tswana Pride, 18 November 2015.

⁴ Interview with Daybreak, 30 June 2015.

⁵ Interview with Epol, 16 July 2015.

⁶ Interview with Eagle's Rock, 4 August 2015.

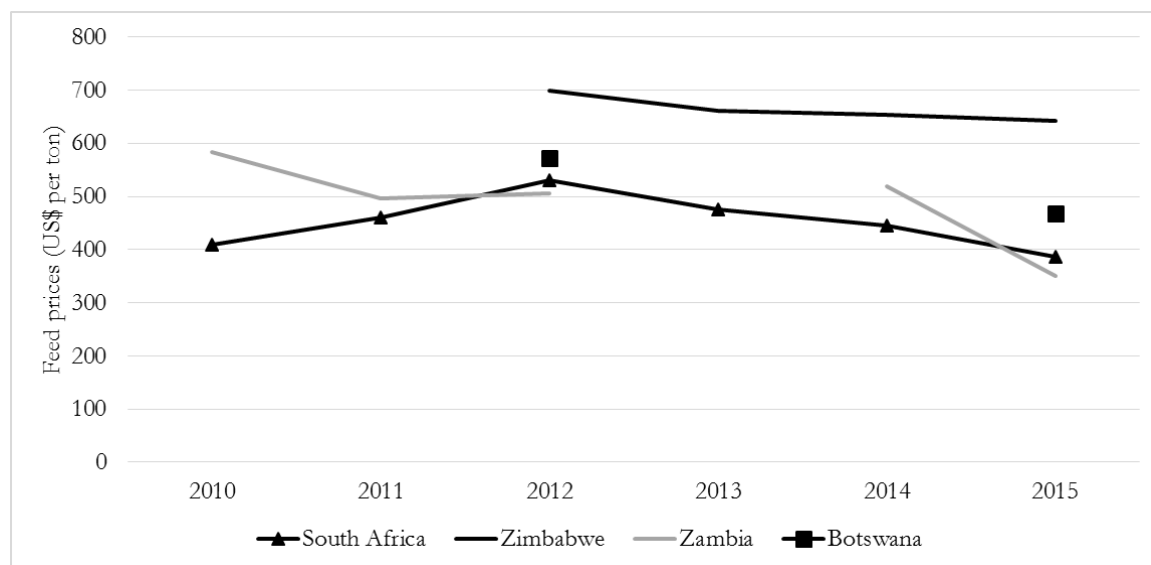
⁷ Interview with Rainbow, 15 July 2015.

3.1 Prices of raw materials

Feed prices

As mentioned above, feed remains the largest single cost in the production of broilers. Access to cheap feed is largely dependent on having competitively priced maize and soya, as these two constitute approximately 80–85 per cent of the cost of poultry feed production, with maize alone making up approximately 60 per cent of the cost of producing animal feed.⁸ In Figure 1 we summarize the prices of animal feed in the four countries under review.

Figure 1: Feed prices, US\$ per tonne



Zambia 2015 price is based on an estimate of Zambian prices quoted by IAPRI (2015), adjusted for the exchange rate. The kwacha prices actually went up, not down.

Source: based on Bagopi et al. (2014); Zimbabwe Poultry Association (ZPA) data obtained from interviews in Zimbabwe (2015) and SAPA (2015a, 2015b).

Zimbabwe has the highest feed price among the countries in our analysis, followed by Botswana, then Zambia and South Africa (Figure 1). South Africa's animal feed prices increased between 2010 and 2012. During this time, yellow maize prices—which largely determine feed prices in South Africa as this is the maize used for animal feeds—also increased sharply (Figure 2). In fact, animal feed prices in South Africa largely track those of yellow maize, as reflected in a similar decrease in both prices between 2012 and 2015.

⁸ Interview with Eagle's Rock, 4 August 2015; interview with Sovereign Foods, 1 October 2015; interview with Epol, 16 July 2015.

Figure 2: Maize prices



The 2016 prices are up to April 2016; data for 2015 were updated from SAFEX.

Source: based on FAO (2015); SAFEX; Grain Traders' Association of Zambia; Stockfeed Manufacturers' Association.

In contrast, the animal feed price in Zimbabwe increased between 2012 and 2013 following a switch in imports of maize from South Africa to Zambia, prompted by a ban on genetically modified organism (GMO) maize in Zimbabwe, which is what South Africa produces and uses for stock feed production. In addition to the ban on GMO maize, Zimbabwe also has industry protection against finished goods (e.g. animal feed) in order to protect its feed producers.⁹ After 2013, the price of animal feed in Zimbabwe remained stagnant, decreasing very slightly over time. The maize prices in Zimbabwe increased sharply at the time (Figure 2), while the soybean prices had a similar trajectory to the feed prices (Figure 3). The stagnant prices in Zimbabwe are also despite the increase in the number of entrants in the animal feed production industry; prior to 2009 there were two dominant players—National Foods and Agrifoods—but now there has been an increase in the number of smaller players. This could be due to a number of reasons. First, Zimbabwe imports the bulk of its raw materials—grains from Zambia and additives from South Africa. Second, the capacity utilization of stock feed manufacturers in Zimbabwe averaged 40–50 per cent,¹⁰ indicating that the cost per unit of feed produced is higher, especially relative to other countries. Finally, most of Zimbabwe's animal feed is sold in bags¹¹ due to the fact that most of its market is made up of small-scale producers, compared to that of the other countries where there is a relatively large proportion of feed sold in bulk.

Zambia's stock feed prices in Figure 1 were converted from Zambian kwacha prices. The Zambian kwacha-denominated prices actually registered an increase, particularly between 2014 and 2015. However, due to the depreciation of the Zambian kwacha, the US dollar-denominated prices show

⁹ Interview with Zimbabwe Competition and Tariff Commission, 21 March 2016.

¹⁰ Interview with LMAC, 19 August 2015; interview with Profeeds, 21 August 2015.

¹¹ Interview with Windmill, 21 March 2015; interview with Feedmix, 22 March 2016.

a downward trend. As such, there has been a massive exchange rate effect on Zambian stock feed prices.

Maize prices

Maize is the main cost in the production of animal feed. However, not only is the price of maize important for the domestic production of animal feed, it is also very important in the region because of the level of trade in maize. Two players—South Africa and Zambia—are the largest producers of maize in the region and, consequently, are net exporters of the commodity. As such, maize prices are lowest in South Africa and Zambia.

Zambia has seen increasing competitiveness in its maize prices, with the price decreasing from an average of US\$288 per tonne in 2009 to US\$215 in 2015 (Figure 2). This brought the prices almost on par with the South African prices of US\$210 per tonne in 2015. As a result, some South African firms have imported from Zambia, with the import price reportedly as low as US\$200 per tonne.¹² In fact, between May and August 2015, Zambian maize prices were below US\$210 per tonne. The increasing competitiveness of Zambian maize prices is also reflected by the recovery of its exports to South Africa from US\$1.6 million in 2014 to US\$6 million in 2015.¹³ However, the latest estimates of 2016 prices in both South Africa and Zambia indicate a sharp increase in prices due to the drought experienced in much of Southern Africa. Interestingly, the firms that imported maize from Zambia are those that also have operations in Zambia (CBH and RCL), indicating the beginnings of an RVC.

The lack of sufficient production of maize in both Zimbabwe and Botswana, for different reasons, has led to them depending on imports for their supply of critical inputs. Zimbabwe's maize and soybean production has decreased since the implementation of the land reform programme (Takala-Greenish 2015). Botswana has generally been a maize and soya importer, given that the country is located in a semi-arid region that has low levels of rainfall, making it not conducive for crop production.¹⁴ Therefore prices of these critical inputs are determined by the import prices in these markets, with Zimbabwe's prices being a reflection of the Zambian prices.

Soybean prices

While competitive pricing of maize is important, what is even more important is the competitive pricing of soybeans, as the region is a net importer of the raw material. As such, competitive pricing of soybeans and oilcake in the region is essential for developing an RVC. Prior to 2014, South Africa's soybean imports were relatively low, reaching an annual average of US\$1.9 million between 2008 and 2013. During this period, South Africa's main import sources were Argentina and the United States, although these import volumes were very low. This was before the implementation of the soybean strategy in South Africa. The increase in crushing capacity led to a sharp increase in imports of soybeans in South Africa; from US\$911,000 in 2012, to US\$3.4 million in 2013, and a spike to over US\$52 million in both 2014 and 2015. The imports in 2014 and 2015 were mainly from Brazil and Zambia (2014), and Brazil and Paraguay (2015).

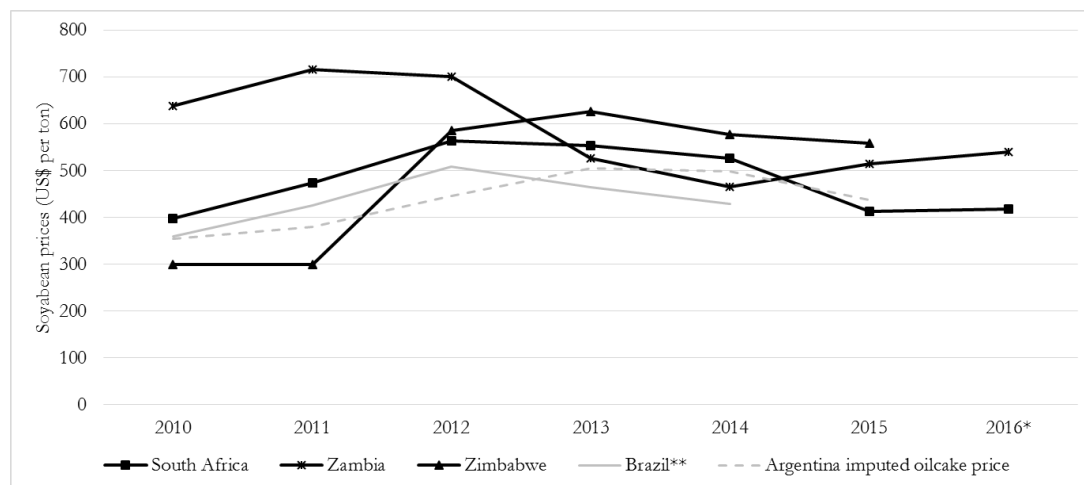
¹² Interview with Country Bird South Africa, 3 July 2015; interview with Epol, 16 July 2015; interview with Afagri, 27 July 2015.

¹³ Quantec data, <http://quanis1.easydata.co.za/TableViewer/tableView.aspx>.

¹⁴ Interview with Botswana Poultry Association, 17 November 2015.

Soybean prices in the region are still above the free on board (FOB) prices in Brazil (Figure 3). The Brazilian price is an estimated producer price.¹⁵ The decrease in Zambian prices in 2014 led to an increase in exports to South Africa, which reached US\$15 million. In fact, the price in Zambia has decreased by approximately 30 per cent between 2011 and 2015. Despite the decrease in price it is still above the Brazilian price. The decrease in the Zambian price is in line with the general increase in soya production. Soybean production in Zambia increased from just over 42,000 tonnes in 2003, to approximately 117,000 tonnes in 2011, and to just over 226,000 tonnes in 2015 (IAPRI 2015). However, the increase in Zambian prices between 2014 and 2015 led to a switch to Paraguay as an additional source to Brazilian soybean imports, which was the main import source for soybeans in 2014 and 2015.

Figure 3: Soybean prices



* Denotes FOB prices; other prices are landed prices.

Source: based on FAOSTAT for Brazil, Zambia, and Zimbabwe; SAGIS for South Africa; Trademap for Argentina.

The prices of soybeans are important in the region, particularly due to the increase in crushing capacity in South Africa. However, as already mentioned, the soybean import levels were relatively low. This was because South Africa has generally been a large importer of soybean oilcake, a by-product of the processing of soybeans for oil, to use in the animal feed industry. In the last five years, South Africa has imported on average 660,000 tonnes per annum of soybean oilcake from Argentina, (with 433,000 tonnes imported in 2015 alone), compared to an average of 143,000 tonnes of soybeans between 2014 and 2015. As such, soybean oilcake imports have, until very recently, been far more important than soybean imports. As such, also presented in Figure 3 is the imputed price of soybean oilcake from Argentina. This imputed price was calculated by dividing the value of imports from Argentina by the volumes imported. Although labelled as an imputed Argentinian price, this price is effectively the landed price in South Africa.

An assessment shows that the price has been much lower than local South African soybean prices, and, more importantly for the RVC, lower than the Zambian soybean prices. As such, the Zambian soybean prices have been clearly less competitive than the imputed price of the processed oilcake from Argentina (except in 2014). This is because the imputed Argentinian oilcake prices would include the costs and margins earned by processors. One would expect that the Zambian processed oilcake price would be even less competitive once landed and processed in South Africa. A big

¹⁵ For purposes of comparison, it is assumed that a Brazilian producer would face similar prices to an importer's FOB price.

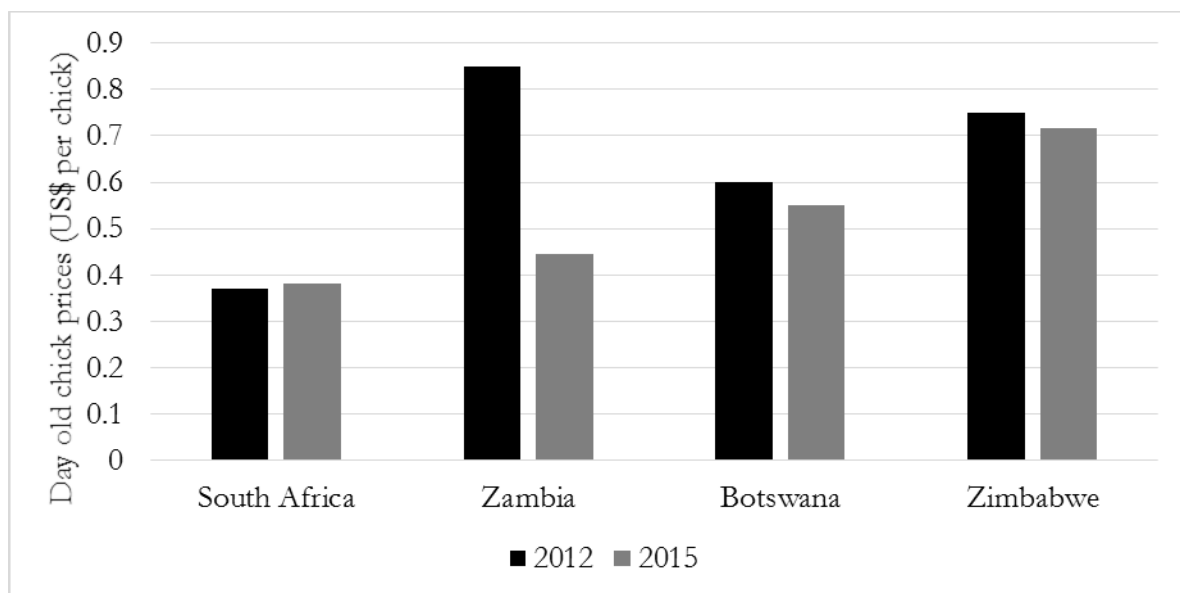
question that remains is why the Argentinian processed product is so much cheaper (albeit at an imputed price) than the raw material price in Zambia.

In conclusion, the decrease in price of soya in Zambia, as shown above, is a welcome development when thinking about developing an RVC, especially given the relatively high exports to South Africa in 2014. However, despite the decrease in prices, these are still higher than the imputed price of the processed product imported from Argentina, which raises important questions about the conditions that would be necessary for Zambia to reach the scale and cost structure to enable a switch from deep-sea sources for both soybeans and oilcake. Reducing the Zambian soya price would require investment to support agriculture production and storage facilities. The need to invest in storage facilities is important, given that one of the largest feed producers in Botswana indicated the poor quality of soybeans from Zambia was due to a lack of storage.¹⁶

Day-old-chick prices

As already highlighted, another crucial input in broiler production is the breeding stock, i.e. day-old chicks. Accessing the breeding stock at a competitive price is also very important in determining the level of competitiveness of producers.

Figure 4: Day-old-chick prices



Source: based on SAPA (2015a), SAPA (2015c), PAOZ (2015), Zengeni (2014b). The Zimbabwean data were obtained from the Livestock & Meat Advisory Council Zimbabwe (LMAC).

Botswana is the only country that does not have a grandparent operation and therefore relies on imported parent stock from Zambia and Zimbabwe. South Africa has the lowest day-old-chick prices in the region at approximately US\$0.38 in 2015; this is 87 per cent lower than the Zimbabwean price, which is the highest in the region. The prices in South Africa reflect the economies of scale enjoyed by the firms there.

The price of day-old chicks in Zambia has fallen by 47 per cent since 2012. The fall in the Zambian price reflects the continued increases in competition and growth in scale in the poultry industry, which has been characterized by new investments in breeding by companies such as Rainbow

¹⁶ Interview with Nutri Feeds Botswana, 18 November 2015.

Chicken's Zamhatch (PAOZ 2015) and also CBH's Ross Breeders.¹⁷ These new investments have led to increased competition at the breeder level, as production has increased leading to lower prices.

Zimbabwe remains the highest-cost producer of day-old chicks in spite of the price falling marginally from US\$0.75 in 2012 to US\$0.72 in 2015. Zimbabwe's price is higher than that of Botswana despite the latter not having a grandparent operation. The price structure in Botswana is indicative of two main issues. First, it reflects the increasing competitiveness of Zambia's day-old-chick breeders as seen in the decrease in prices (Figure 4). This is important because Zambia is a key source of Ross parent stock for the largest breeder in Botswana, Ross Breeders.¹⁸ Second, the fact that Botswana day-old-chick prices are lower than those in Zimbabwe indicates that of the two countries, Botswana is the lower-cost producer of day-old chicks. This conclusion is reached because Irvine's, the other breeder in Botswana, imports parent stock from its Zimbabwean operations.¹⁹ This is a result of the lower feed prices found in Botswana in comparison to Zimbabwe.

3.2 Cost structure

Given the above analysis of the cost of key raw materials, in this section we construct the cost build-up for Botswana, South Africa, and Zimbabwe to reflect the different cost structures in the region. This will provide an indication at a basic level of the changes in cost differential across the three countries. It is clear from the analysis of raw material prices that all three countries have different cost structures, as shown by the price differences.

The figures in the cost build-up for 2012 were obtained from Bagopi et al. (2014) and Zengeni (2014). The 2015 figures are estimates converted to US dollar²⁰ values constructed from interviews with poultry associations and poultry companies and publicly available data. It is worth noting that these estimates are likely to vary based on numerous factors, such as seasonality, where, for example, the price of feed could be affected. In addition, other costs in broiler production, such as abattoir processing costs, are assumed to be constant in all countries. Margins in South Africa and Botswana were also assumed to be constant while in Zimbabwe the margin is an imputed figure calculated from price data obtained from one of the producers. Average FCR figures were used, obtained from different producers in countries and poultry associations.

¹⁷ Interview with Nutri Feeds (Bots), 18 November 2015; interview with Ross Breeders, 20 November 2015.

¹⁸ Interview with Ross Breeders; 20 November 2015.

¹⁹ Interview with Ross Breeders; 20 November 2015.

²⁰ Exchange rate: South Africa exchange rate US\$1:R12.75 (Quantec data). Botswana figures are converted to US dollars from www.sapoultry.co.za/pdf-statistics/botswana-country-report.pdf.

Table 1: Cost build-up, 2012 and 2015

	South Africa		Botswana		Zimbabwe	
	2012	2015	2012	2015	2012	2015
Feed cost (kg)	0.54	0.39	0.57	0.47	0.70	0.64
Feed conversion ratio	1.67	1.54	1.8	1.8	1.7	1.75
Size of bird (kg)	1.8	1.8	1.8	1.8	1.8	1.8
Feed cost per broiler (US\$)	1.61	1.08	1.85	1.52	2.13	2.02
Day-old chicks	0.37	0.38	0.6	0.55	0.75	0.72
Other costs in broiler production	0.24	0.24	0.53	0.53	0.46	0.46
Live chicken (1.8 kg) cost	2.22	1.70	2.98	2.60	3.34	3.20
Live chicken (1.8 kg) price	2.64	2.02	3.39	2.96		3.6
Live chicken cost per kilogram	1.23	0.95	1.66	1.45		1.78
Abattoir cost/processing per kilogram	0.29	0.29	0.34	0.34	0.10	0.10
Processed chicken, per kilogram, cost	1.52	1.24	2.00	1.79		1.88
Processed chicken, per kilogram, producer price	1.64	1.33	3.15	2.81	2.40	2.50
Brining levels ²¹	30%	30%	Less than 5%	Less than 5%		20%
Producer price, per kilogram adjusted for brining	2.13	1.73	3.15	2.81	2.40	3.00
Fresh poultry producer price (portions)	2.88					
Processed chicken, per kilogram, retail price (frozen portions)	2.93					

Source: based on Bagopi et al. (2014); ZPA data obtained from interviews in Zimbabwe (2015) and SAPA (2015a, 2015b, 2015c).

It is clear that feed is the biggest cost in poultry meat production. In South Africa, feed constitutes about 64 per cent of producing a chicken, which is a decrease from 72 per cent in 2012. This is partly explained by the 27 per cent decrease in feed price between 2012 and 2015 and an improvement in productivity, as shown by the decrease in the feed conversion ratio in 2015. In Botswana, feed constitutes 58 per cent of the cost of producing a live chicken, which is a decrease from 62 per cent in 2012. In Zimbabwe, feed prices constitute 63 per cent of the total cost of producing a live chicken in 2015, which has not decreased since 2012, despite the decrease in feed cost.

Day-old chicks contribute 22 per cent of the total cost of producing a live chicken in South Africa, which is an increase from 17 per cent in 2012. The increase might be as a result of a combination of the marginal increase in price of day-old chicks and a decrease in price of feed, which is the biggest cost contributor. In Botswana and Zimbabwe, which have higher prices for day-old chicks than South Africa, day-old chicks contributed 21 per cent and 23 per cent, respectively, of the total cost of producing a live chicken in 2015. There has been a marginal change in day-old-chick contribution to total cost from 2012 in the two countries.

Due to its economies of scale, South Africa is the lowest-cost producer of chicken in the region. This is mainly due to the low cost of key raw materials such as maize, feed, and day-old chicks. This also supports the Farole (2015) view that South Africa could play a key role in RVCs, outlined

²¹ Information on brining levels is from various industry players. Recent regulations passed by the Department of Agriculture, Forestry and Fisheries have decreased the brining limit to 15 per cent for individually quick frozen and 10 per cent for whole chickens. See www.fin24.com/Economy/chicken-brining-rules-will-devastate-sa-poultry-body-warns-20160504.

in Section 2. Zimbabwe is the highest-cost producer, as reflected by the US\$3.00/kg of processed chicken (after brining), which is higher than Botswana's US\$2.81/kg. Zimbabwe's price is higher than Botswana's despite the fact that both countries are relying on imported maize and soya to produce animal feed, which as shown above is the highest-cost component of producing a chicken. This reflects the previously mentioned view of Hartzenberg and Kalenga (2015) that Zimbabwe has particularly high tariffs and NTBs in agriculture. These will be analysed in more detail in Section 4.

3.3 Conclusion

Stock feed prices in the region have been generally on a downward trend, for varying reasons. While these are largely related to the costs of the raw materials such as maize, which is the single highest cost, other factors have contributed to the trajectory witnessed in the animal feed prices. For example, Zambia's exchange rate would have rendered Zambia's stock feed competitively priced for the region, although domestic producers would have been adversely affected. Conversely, Zimbabwe's stock feed has not changed dramatically despite increases in entrants due to low capacity utilization and the tariff regime. Important developments have emerged in the soybean industry. First, the increase in South Africa's crushing capacity induced an increase in the demand for soybean imports from 2014, mainly from Brazil. Second, Zambian soybean prices decreased to competitive levels in 2014 such that exports to South Africa spiked to US\$15 million. Third, soybean oilcake in South Africa is still coming from Argentina, although the volumes have been decreasing. This decrease, coupled with the sharp increase in imports of soybeans, highlights the promotion of processors through the soybean strategy in South Africa.

The next section looks at the firm and state strategies that have led to the current state of the poultry value chain in the Southern African region.

4 Regional value chain or maintaining national interests? Firm and state strategies in the Southern African poultry value chain

While the poultry industry has large regional players, the existence of an RVC in the strict sense—sourcing all raw materials from within the region through fragmented trade networks—has not yet been proven. While the RVC does exist to a certain extent, this is largely for raw materials—soybeans and maize from Zambia to Zimbabwe, and also breeding stock from South Africa and Zambia to the rest of the region. This is largely a reflection of the countries having firms that have grandparent breeding rights.

These exports are either destined for their own operations in those countries or for commercial sales, depending on which firm it is. According to trade data, the main export destinations for breeding stock, in particular hatching eggs, are Mozambique and Zimbabwe, while Zambia's day-old chicks are mainly destined for Zimbabwe and Botswana. For South Africa, this is an indication of the countries in which firms may have operations but not extensive breeding operations, but do have downstream activities (e.g. growing and processing). CBH's Ross Poultry Breeders in Zambia exports day-old chicks to its Botswana operations.²² Similarly for animal feed products,

²² Interview with Ross Poultry Breeders, 20 November 2015.

Zambeef exports to Novatek Zimbabwe macropacks/premixes for animal feed production which are mixed with maize and soya.²³

However, the exports to the region notwithstanding, these are mainly in raw materials, with most countries opting to protect the production of final products such as broilers and animal feeds. The dearth of an RVC in the agro-processing value chains in Africa is of concern, given that in spite of low levels of intraregional trade, agricultural trade is still the area of most trade (Jensen and Sandrey 2015). In addition, Africa has been identified as having particularly high growth of its consumer population (AfDB et al. 2014), indicating a ready market for products of agro-processing value chains. Moreover, the potential to have regional hubs for the poultry value chain exists in Southern Africa, particularly in South Africa and Zambia. Both countries have extensive, large-scale operations at all levels of the animal feed to poultry value chain, with the same large, vertically integrated firms operating in both countries. South Africa is not only a source of raw materials and a key source of industrial production, it is also a key source of demand for both animal feed and chicken, given its prevailing trade deficit. Zambia is also particularly important as it has positioned itself as a key source of animal feed raw materials for the region, given its net export position. It also has great potential for production growth to meet regional demand (Fessehaie et al. 2015).

The findings of this research indicate that the current state of the animal feed to poultry value chain in the region is a result of various strategies that can be split into two sections: those that are regional in nature; and those that are related to maintaining national interests. This section seeks to outline these strategies and to analyse their effects on the animal feed to poultry value chain in the region.

4.1 Strategies of a regional nature

Firms have branched out into the rest of the region

As mentioned by Ncube et al. (2016), the poultry value chain in the region is characterized by large, regional multinationals, mainly from South Africa. Each one of the large South African firms has extensive operations outside South Africa. Rainbow and Astral both have operations in South Africa and Zambia, with Astral having introduced a new breed into the Zambian market—Lohmann Meat (Ncube et al. 2016). Astral also has operations in Mozambique and Swaziland, while Rainbow also has operations in Botswana. Even the smaller players in South Africa—Quantum and CBH—each have operations in Zambia, with Quantum also having operations in Uganda and CBH having operations in Botswana, Namibia, and Mozambique.

While the expansion into these countries has been largely to meet domestic demand in the destination countries, some of the moves are clearly to take advantage of demand within the region. For example, Zamhatch and Novatek, Rainbow Chicken's subsidiaries in their partnership with Zambia's Zambeef, have invested in hatchery operations and an animal feed mill in the Copperbelt region of Zambia, which is near the border with the Democratic Republic of Congo (DRC). This strategic location will enable them to export day-old chicks and animal feed into DRC and Angola (IAPRI 2015).

As a result of the expansion of firms into the region, there are a number of large, vertically integrated firms. The trade in the raw materials has been fairly active as most poultry industries are protected against imports of chickens, although this is at a very small scale given the size of the poultry industries other than South Africa and Zambia. Also as a result of the trade barriers against

²³ Interview with Novatek Zimbabwe, 24 March 2016.

broiler imports, the large firms that have expanded into the region are mainly producing for the domestic markets in which they have located.

Control of key inputs in the region

There seems to always be some kind of movement towards securing supply of inputs. Most of the firms that have expanded into the region have maintained their vertically integrated structures. A number of these firms either have fully integrated ventures in the region or they have some parts of these operations that are vertically integrated. For example, CBH's operations in Zambia consist of grandparent operations, a feed mill, and an abattoir.²⁴ Similarly, Rainbow Chicken's operations in Zambia include breeding, animal feed, and abattoirs.

Where there has not been explicit vertical integration, there are still instances of firms finding ways to secure the supply of inputs in their regional markets. Various strategic partnerships exist between firms, which ensure security of supply within the value chain. For example, 40 per cent of Master Farmer—the parent company of CBH's animal feed and breeding operations in Botswana—is owned by the Dada family business.²⁵ The Dada family business also owns broiler producer Tswana Pride. As a result, these firms operate in a vertically integrated manner as the animal feed business—Nutrifeeds—supplies most of its animal feed to Tswana Pride and Ross Poultry Breeders,²⁶ while Ross Poultry Breeders supplies day-old chicks to Tswana Pride (see also Grynberg and Motswapong 2011).²⁷ Similar strategic partnerships exist in the Zimbabwean market, such as partnerships between independent firms, including animal feed producers, contract growers, and abattoirs, but these have been undertaken by local firms and on a much smaller scale than those witnessed in the aforementioned example in Botswana.²⁸

However, these two strategies—expansion across the region and retention of control of key inputs—have been focused on developing production capacity in the domestic markets to which the firms have branched out. As such, while activity between firms in the region does exist, this has been muted. By far the most prevalent strategies have been those that promote domestic interests within the poultry value chain. The next section provides an overview of these strategies.

4.2 Maintaining national interests

Industry protection at various levels of the value chain

Industry protection is found at various levels of the poultry value chain, despite regional integration drives such as the SADC free trade agreement (FTA). Industry protection has been effected through both tariff barriers and NTBs. While tariff barriers are definitely an impediment to the free flow of goods within the poultry industry in the region, similarly to what was identified in Mevel and Karingi (2012), NTBs are a much more prevalent method of blocking trade.

The tariff barriers exist at various levels of the value chain. The multilateral bodies under which the countries being studied fall—Botswana, South Africa, Zambia, and Zimbabwe—are the SACU

²⁴ Interview with CBH, 3 July 2015.

²⁵ Interview with Tswana Pride, 18 November 2015.

²⁶ Interview with Nutrifeeds Botswana, 18 November 2015.

²⁷ Interview with Tswana Pride, 18 November 2015.

²⁸ Interview with Windmill, 21 March 2016.

and SADC. South Africa and Botswana are members of SACU, while all four countries are members of SADC. As such, various trade agreements and arrangements are at play.

For SACU countries trading with other regions, there are no import duties on the majority of raw materials. In particular, imports of raw materials such as day-old chicks, maize, and soya products from the SADC region do not face import duties (SACU 2016). However, there are still low duties of 8 and 6.6 per cent on soybeans and soya meal, respectively, under the Most Favoured Nation (MFN) treatments. For South Africa, these duties are as a result of the government's soybean strategy (DTI 2012).

When it comes to the trade of chicken, SACU's tariff structure still supports duty-free imports from SADC countries due to the FTA. However, under the MFN treatments, duties on chicken imports range from 12 to 37 per cent, with the higher duties applying to bone-in portions (SACU 2016). An even higher rate of 82 per cent is charged on mechanically deboned meat imported under MFN, which was done as a measure to deal with duty circumvention as some importers were abusing this code to import chicken, since it formerly had a lower duty.²⁹

For Zimbabwe, which participated in SADC and the Common Market for Eastern and Southern Africa (COMESA) in Africa, imports of raw materials from COMESA countries, South Africa, and SADC countries are duty-free except for animal feed, which carries a 15 per cent duty for SADC countries. However, under MFN Zimbabwe charges duties ranging between 5 and 40 per cent, with the highest relating to animal feed. On finished products, Zimbabwe has high rates of duty of 40 per cent (or US\$1.50 per kilogram) on all chicken products under the MFN applicable rates (ZIMRA 2013). Moreover, a 15 per cent duty rate still applies under the SADC trade regime, which indicates that the poultry industry is being treated as a sensitive industry that requires a longer tariff phasing down period.³⁰ The region's tariff structure increases with the degree of processing.

As seen, most of the trade, particularly between SADC countries, is duty-free or at least faces low duty rates. In spite of, or perhaps as a result of, the SADC FTA and the various bilateral agreements between countries, countries in the region have instituted NTBs in order to protect both the upstream and downstream levels of the animal feed to poultry value chain. Most countries in the region have some form of NTBs for the poultry industry, particularly in the countries in the study. In Botswana, for importing maize (or soya for that matter) the Botswana government does not issue the import permit until the importer can show they have sourced 30 per cent of their requirements locally.³¹ Botswana also has a ban on imports of chicken except for those with special permits.³² Finally, delays at the border also cause constraints because the people who issue the requisite permits at the border only work between 7 a.m. and 4.30 p.m. Thus, if a truck arrives outside this time frame it has to wait until the following day to be cleared.³³

In Zimbabwe, the government has completely banned the import of final goods in order to protect the industry. As such, chickens and animal feed imports are banned. However, the importation of fertilized eggs and soybeans, soybean meal, and maize is permitted, subject to an import licence.

²⁹ Interview with South African Poultry Association (SAPA), 6 July 2015.

³⁰ Interview with Zimbabwe Competition and Tariff Commission, 21 March 2016.

³¹ Interview with Nutri Feeds (Botswana), 18 November 2015.

³² Interview with Botswana Competition Authority, 17 November 2015.

³³ Interview with Nutri Feeds (Bots), 18 November 2015.

Zimbabwe has applied for extensions for its tariff phase-down periods (moving towards duty-free imports).³⁴ Through the protection of both the poultry and animal feed production industries, the Zimbabwean government ensures the promotion of these industries and linkages to other sectors, such as soya crushing.³⁵ Liberalization of the poultry industry/value chain would adversely affect those sectors. However, the Zimbabwean producers import the bulk of their raw materials for both animal feed and chicken production. As such, the protection effectively aims for value addition of imported raw materials.

In spite of various free trade arrangements and bilateral arrangements in the region, NTBs still exist and affect the structure of the poultry value chain in the region.

Investments in increased capacity

There have been investments in increased capacity across the region—by both private firms and governments—which has largely been for the specific domestic markets. In South Africa, the soybean strategy, which involved the government supporting investment into increasing soybean crushing capacity, has led to the crushing capacity in the country increasing to 2.1 million tonnes.³⁶ However, there have not been commensurate increases in production as it was about 1.04 million tonnes in 2015 (SAGIS 2016). Instead, there have been massive increases in imports, as seen in Section 3. Whether South Africa could actually produce enough soybeans to match the crushing capacity is difficult to tell because of its water scarcity (Fessehaie et al. 2015). However, while the South African production for 2016 is expected to decrease to just over 660,000 tonnes (NAMC 2016), likely due to the drought, it is projected that South Africa's soybean production will meet its current crushing capacity of 2.1 million tonnes in 2024 (BFAP 2015).

As previously mentioned, the firms in Zambia and Botswana are investing in increasing local capacity. Zimbabwe has also seen a sharp increase in the number of new feed mills since dollarization in 2009. These companies have arisen as a result of the demand from the poultry industry, which went through a period of rapid growth between 2009 and 2014.³⁷ While most of the firms are domestic, a number of them import key ingredients from within the region, particularly from Zambia.

In conclusion, both tariff and non-tariff barriers and the level of investments highlight the focus on the domestic value chain, as opposed to the RVC.

5 Conclusion

Southern Africa, and indeed Africa as a whole, has seen high growth in its consumer population. This has led to growth in the demand for agro-processing products. However, in spite of this demand, agro-processing RVCs in Southern Africa have largely remained underdeveloped. The formation of an RVC is dependent on competitive, reliable supply of raw materials such as animal feed and its components.

³⁴ Interview with Zimbabwe Competition and Tariff Commission, 21 March 2016.

³⁵ Interview with Zimbabwe Competition and Tariff Commission, 21 March 2016.

³⁶ Interview with AFMA, 15 July 2015.

³⁷ Interview with LMAC, 19 August 2015.

This paper provides an overview of the poultry value chain in the region, highlighting the key strategies, both regional and domestic, that have led to the current structure of the poultry value chain in Southern Africa. Important developments have emerged in the soybean industry, with Zambia having proved to be an increasingly competitive producer of soybeans, having penetrated the South African market in 2014 and being a key supplier of oilcake to other countries in the region. These developments notwithstanding, there is no coordinated regional poultry value chain in Southern Africa, but rather firm strategies which are regional in nature. As a result, while large firms have spread out throughout the region, they have invested in their destination countries mainly for domestic operations. Where they do export out of their destination countries, this is either for their own operations as in the case of CBH's Ross Breeders exports from Zambia into its Botswana operations, or it is arm's length transactions such as the large exports of maize and soya from Zambia into Zimbabwe.

Other strategies that have negated the formation of an RVC are trade barriers, particularly NTBs. The NTBs, ranging from import limits to complete bans on finished goods, have contributed a great deal to the current structure of the value chain. Protection of the industries in most countries means that firms have to set up in those countries in order to take advantage of the opportunities found there. This indicates that only the large firms, with significant scale economies, could competitively make these investments, and also participate in a possible RVC.

In conclusion, as identified in previous studies of RVCs, the RVC for poultry in Southern Africa is underdeveloped. Key barriers to the formation of the RVC are the fact that most investments occur in domestic markets; also, there are trade barriers. While the formation of the value chain would require the repeal of various NTBs, thereby going against domestic national policies, building on the significant coordinated investments into production of key animal feed raw materials in countries such as Zambia would also be beneficial to the development of the value chain. Further, more detailed research can be carried out in order to analyse the exact mechanisms by which the RVC for poultry in Southern Africa can be further developed.

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