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A photograph of a brown chicken standing in a field of green grass. The chicken is the central focus, shown in profile facing left. The background is a soft-focus landscape of green foliage and distant hills under a bright sky. A semi-transparent dark grey box is overlaid on the bottom half of the image, containing the title and authors' names.

# **Competition and the challenges of inclusive economic development: An apparent margin squeeze in poultry farming in Malawi**

Timothy Gondwe, Grace Nsomba and Simon Roberts

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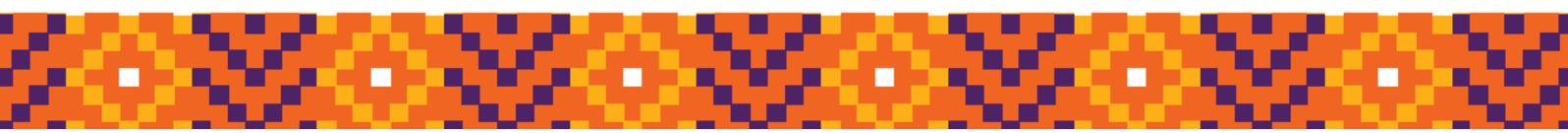
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## Abstract

Poultry demand has grown strongly in Malawi, being the main source of animal protein from the mid-2000s owing to increased levels of economic growth and urbanization. This provides for opportunities to grow the commercial poultry industry to increase participation by small and medium scale producers and supply to consumers. Countries with good conditions for producing the constituents of animal feed, such as Malawi, should have competitive commercial poultry industries as the low costs of these inputs combined with international breeding stock can provide a competitive cost-base for poultry production. However, the industry competitiveness depends on the prices and processing of the inputs through the value chain. This in turn depends on competition in the key input markets. In Malawi there have been major changes in the pricing and supply of the key inputs. We evaluate the impacts of these changes on the competitiveness of small and medium scale poultry producers. When we assess the input prices relative to the prices charged by the large vertically integrated poultry producer, we find that a margin squeeze has been exerted on small and medium scale poultry producers in the second half of 2021 with a likely exclusionary effect, harming competition and participation in the industry. Our analysis indicates that attention should be paid to the pricing of the inputs which render the independent producers uncompetitive, and that there are major competition issues requiring investigation. At the policy level, strategies to support greater rivalry through empowering small and medium scale producers to engage in commercial feed production provide an avenue to discipline market power in future.

**Keywords:** Market structure, poultry, animal feed, competitiveness, margin squeeze

**JEL codes:** D4, F1, L10, O13, O18, Q18



## Table of Contents

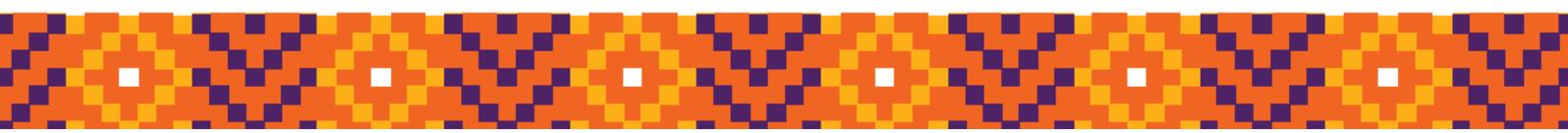
1. Introduction .....	1
2. Overview of the poultry value chain and market outcomes.....	1
2.1. Value chain, linkages, integration and concentration .....	1
2.2. Market outcomes.....	5
3. Assessing market outcomes, possible exclusionary conduct and candidate theories of harm .....	7
4. Testing for a margin squeeze in Malawi poultry.....	9
5. Poultry feed – alternatives to commercial poultry feed .....	12
6. Analysis of the basis for higher upstream prices .....	14
7. Potential interventions and conclusions.....	16
8. References .....	17

## List of figures

Figure 1: Commercial broiler poultry value chain in Malawi .....	2
Figure 2: Prices of maize and soybean .....	6
Figure 3: Prices of maize and soybean against feed and DoC costs, per kg of chicken meat... 6	6
Figure 4: Diagram of possible margin squeeze.....	7

## List of tables

Table 1: Commercial poultry producers and estimated market shares, Malawi .....	4
Table 2: Soy oilcake, soymeal and commercial animal feed producers, Malawi .....	5
Table 3: Calculation of CP margins per 1.9kg bird, Malawi kwacha (Mwk) .....	11
Table 4: Feed rations and costs for independent producers, Malawi kwacha (Mwk) .....	13
Table 5: Bird production costing using own feed production for 300 flock produced over June & July 2022, Malawi kwacha (Mwk).....	13
Table 6: Bird production costing for three-feed regime using commercially bought feed, Malawi Kwacha (Mwk) .....	14



## 1. Introduction

Poultry demand has grown strongly in Malawi, being the main source of animal protein from the mid-2000s owing to increased levels of economic growth and urbanization. Commercial broiler and layer production is estimated to have now surpassed rural poultry (CASA, 2020).

Commercial poultry growth requires investment in breeding operations of the fast-growing global breeds and in the rearing broiler chickens. Chickens can be sold live (as is the case in much of Malawi) or processed and distributed through the cold chain to end consumers (Ncube et al., 2017; Bagopi et al., 2016). By comparison, rural or 'backyard' poultry comprises growing local chickens for both eggs and meat in smallholdings, using low amounts of feed inputs.

Poultry also has strong backward linkages to the production of maize and soybean for animal feed. Countries with good conditions for producing the constituents of animal feed should have competitive commercial poultry industries as the low costs of these inputs combined with international breeding stock can provide a competitive cost-base for poultry production. The industry competitiveness and the ability of smaller poultry producers to compete and grow to supply poultry to consumers depends on the prices and processing of the inputs through the value chain. This in turn depends on competition in the key input markets.

In Malawi there have been major changes in the pricing and supply of the key inputs. We evaluate the impacts of these changes on the competitiveness of small and medium-sized poultry producers. Our assessment of the impacts takes into account alternatives available to the small and medium producers. We then consider what factors underlie the input price changes. Our analysis identifies a margin squeeze to which smaller producers have been subjected as a result of the likely exercise of market power by the large upstream businesses integrated across breeding, soybean processing and animal feed supply. It points to the importance of effective competition enforcement at the national and regional level if smaller producers are not to be excluded and consumers harmed.

## 2. Overview of the poultry value chain and market outcomes

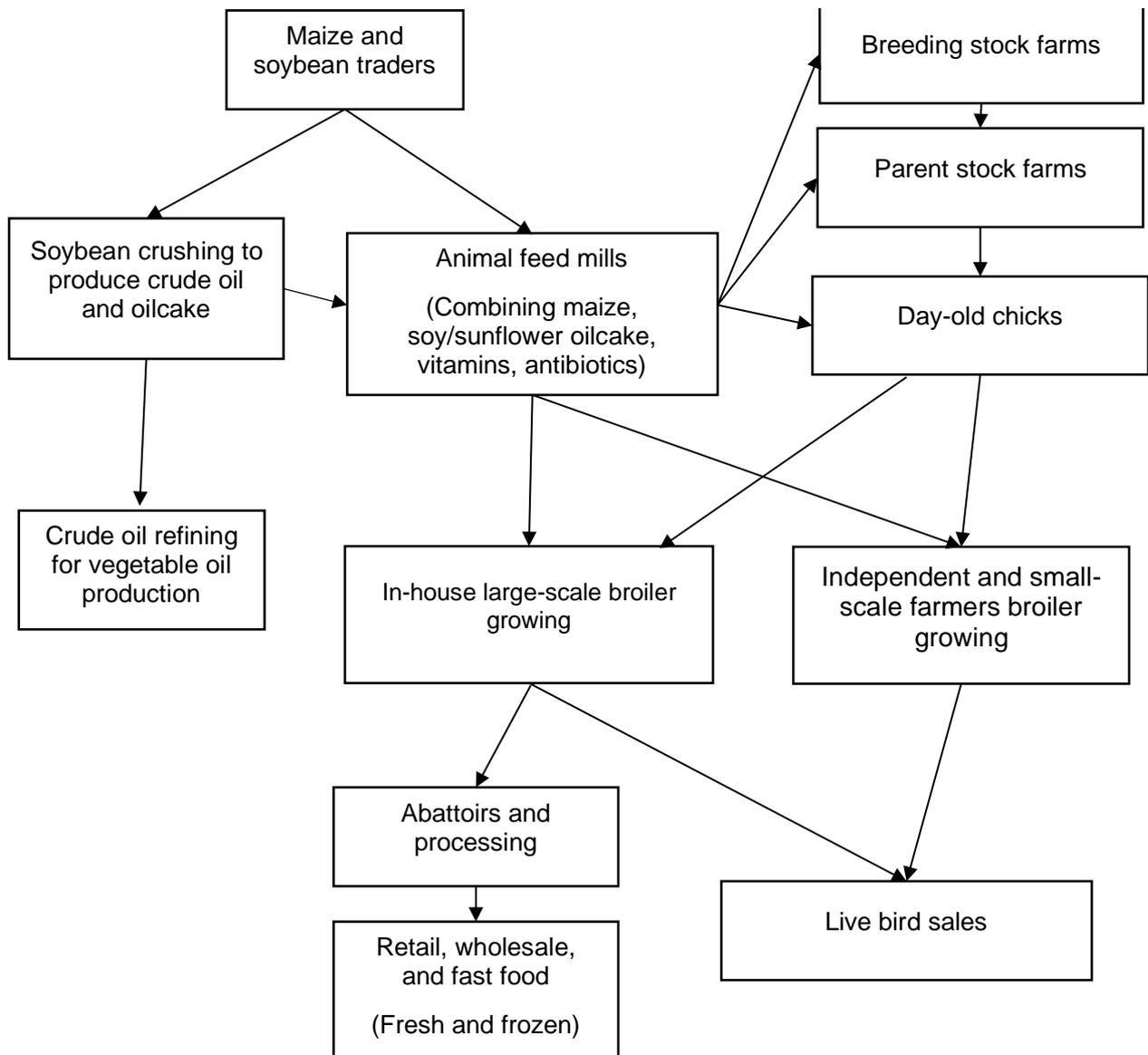
### 2.1. Value chain, linkages, integration and concentration

The commercial poultry value chain has multiple levels - from the production and processing of commodities such as maize and soybean for animal feed to a quasi-industrial process of broiler chicken rearing, through to the processing and distribution of poultry in fresh and frozen form (Figure 1; Bosiu and Goga, 2019). There are large-scale commercial producers which may be vertically integrated from the key inputs of breeding stock and feed through to the sale of poultry products. In Malawi, commercial poultry from small and large-scale producers is mainly sold at trading centers in urban and peri-urban markets, as well as small proportions of the total sold as processed poultry in supermarkets and to fast-food outlets.

The integrated large commercial businesses operate along-side smaller and medium sized producers who may only operate in broiler production. The poultry industry provides an opportunity for smaller producers which include large numbers of women farmers to expand their commercial activities. To do so they need to source their inputs on competitive

terms from third parties. We assess the vertical and horizontal linkages, the market outcomes for key inputs and the effects on smaller broiler chicken producers.

Figure 1: Commercial broiler poultry value chain in Malawi



Source: Adapted from Bagopi et al. (2014) and interviews in Malawi

Poultry feed and breeding stock are by far the most substantial inputs in the value chain, while labour, energy, drugs and chicken litter comprise small proportions. Feed accounts for between 60 and 70 per cent of the total input costs for broiler production (Ncube et al., 2017; Bosiu and Goga, 2019).

The main components of poultry feed are milled maize and soybean (including in meal or oilcake form), with salt, vitamins and mineral premixes, and synthetic amino acids accounting for a relatively smaller proportion of the feed mixture. In the case of Malawi, the main components of feed are sourced from millers and oil-seed crushers who also produce vegetable oil and for which oilcake or meal is a co-product. This level of the value chain has important horizontal links between vegetable oil production and feed production.

In terms of breeding stock there is a global duopoly with two main breeds of chickens that are used worldwide in the broiler production industry. These are the Ross breed, supplied by EW/Aviagen, and the Cobb breed, supplied by Cobb-Vantress. Typically, the holder of the intellectual property - in this case Aviagen or Cobb-Vantress - sells great grandparent stock of the breed under license to a breeding company in a given geography (such as southern and central Africa) who then breed grandparents to supply parent stock to hatcheries. The parent stock produce what are known in the industry as 'day-old chicks' (DoCs) to rear as broiler chickens in around 35 to 42 days. The breeding companies with the licence may also be vertically integrated into broiler production as well as supplying independent broiler producers.

Across east and southern Africa, the broiler production model has evolved in different countries. In some countries, such as South Africa and Zambia, the large integrated companies have incorporated contract growers to rear the birds (Ncube et al., 2017). Typically, the poultry company contracting the farmer would provide day-old chicks, animal feed, and extension services such as veterinary services and training. In the case of Malawi, however, contract farming has not been implemented widely, with the largest poultry company only using contract growers within the last 3 years.<sup>1</sup> As a result, large commercial producers own the majority of the farms for broiler production, as well as all abattoirs and processing facilities. This has meant that a large proportion of fresh and frozen broilers are produced by large commercial producers, while majority of small and medium sized independent producers sell their broilers live.<sup>2</sup> Large-scale producers also sell much of their broiler production as live chickens in Malawi.

Aside from being a source of animal protein, poultry production is also an important source of income for urban and rural subsistence producers in Malawi. It is a key driver of livestock sector growth, particularly through private sector investments, which have created employment and largely substituted poultry imports (CASA, 2020). In terms of livestock ownership in Malawi, chicken is the fastest growing. For instance, between 2015 and 2019, the chicken population has increased by 112% (CFTC, 2020). In terms of meat production, however, chicken ranked second after pork in 2019, accounting for 31% of meat production in 2019. The Population and Housing Census of 2018 recorded that 1.3 million smallholder households keep or own chickens in Malawi,<sup>3</sup> yet the commercial broiler/egg production system constitutes the largest proportion (52%) of the national flock.<sup>4</sup>

Again, given backwards linkages, poultry production is well positioned to enhance poverty reduction through the creation of income generating activities for poultry farmers and traders who are majority the youth. The important backward and forward linkages with other industries such as those in feed production, maize and soybean farming, as well as the production of value-added poultry products such as sausages and fillets means that poultry production should in fact be more inclusive if it is to be leveraged for growth and poverty reduction (Gereffi and Fernandez Stark, 2016; Ncube et al., 2017; Bosiu and Goga, 2019; CFTC, 2020).

<sup>1</sup> Interview with Small and Medium Poultry Farmers Association, 4 March 2022.

<sup>2</sup> Interview with Small and Medium Poultry Farmers Association, 4 March 2022.

<sup>3</sup> Government of Malawi – National Statistical Office, 2018 Population and Housing Census (PHC) – Final Report, Zomba

<sup>4</sup> Interview with Small and Medium Poultry Farmers Association, 4 March 2022.

### *The Malawian poultry market*

Rural poultry farming consists of a mixed flock that is less than 100 birds, dominated by local dual-purpose chickens, and extensively raised on free range, low input system. Rural poultry is difficult to improve through complete intensification because the higher costs of production outweigh the increased gains. Rural flocks have recently included the introduction of imported exotic breeds, such as Kuroiler from India, and Sasso from France. These take much longer to grow, with some sales on local markets.

The commercial poultry market in Malawi is made up of a large number of small-scale farmers (with optimal flocks of up to 500 birds) and a small number of large vertically integrated producers.<sup>5</sup> Commercial poultry production is concentrated around urban areas in Blantyre, Lilongwe and Mzuzu, focusing on broilers and layers.

Broiler breeds Cobb 500 and Ross 308 are the breeds used by small, medium and large-scale poultry producers. Hubs for great-grandparent and grandparent production are found across the globe, with shipments of breeding stock as fertilized eggs and day-old chicks from these hubs by air and overland transport.

In Malawi, Central Poultry (CP) owns the franchise for Cobb and keeps parent stock for hatching eggs and sales of day old chicks. All other hatcheries keep parent stock for Ross. In southern Africa (except South Africa), breeding facilities have been set up for Cobb 500 and Ross 308 breeds through Country Bird and Irvine's in Zambia and Zimbabwe, from which Malawian producers source fertilized eggs.

A few large and integrated producers control breeding stock production, feed supply, and broiler production (Table 1). Concentration at the level of breeding and supply of day-old chicks is striking, with CP holding approximately 87% market share in terms of supply of day-old chicks into its own broiler production operations and to supplying independent producers. CP is a fully integrated broiler producer that breeds and rears Cobb 500 broilers for sale to independent producers as day old chicks and sells broilers into the retail market as fresh or frozen chickens.<sup>6</sup> CP is also dominant in broiler production, with a share of Malawian market of approximately 80%.

**Table 1: Commercial poultry producers and estimated market shares, Malawi**

Company	Breeding & DoC supply	Feed	Broiler production
Central Poultry	~87%	~40%	~80%
Charles Stewart & Lenzie	~1%	-	
Kelfoods/ Proto Feed	~11%	~40%	<4%
Conforzi	~1%		
Amazon	<1%		<1%
Thanzi	<1%		<1%
Other, small & medium scale			~15%

*Source: compiled by authors from interviews in Malawi*

The commercial animal feed industry is also highly concentrated with two main producers being Central Poultry and Kelfoods, jointly accounting for around 80% of feed sales (Table 1). Lenzie Milling is the only independent large-scale poultry feed producer, and was

<sup>5</sup> Interview with Small and Medium Poultry Farmers Association, 4 March 2022.

<sup>6</sup> <http://www.centralpoultrymw.com/>

formerly linked to Charles Stewart Hatchery. Lenzie Milling currently has the capacity to produce 300t of poultry feed per month in the capital city of Lilongwe and is targeting to increase this to 1400t per month through an additional mill in Blantyre.<sup>7</sup> There are two very small feed producers, Conforzi and Amazon.

There are, however, very large oil crushers who produce vegetable oil and oilcake as co-products. In addition to the CP, there are four substantial soybean processors who could supply important feed components, namely Capital Oil Refinery Industries (which we understand has close links with CP Feeds), Export Trading Group, Mount Meru and Sungold (Table 2). However, we understand that ETG, Mount Meru and Sungold are not feed producers in Malawi. These producers of vegetable oil therefore play a critical role in supplying oilcake inputs to the animal feed producers, including small poultry producers that opt to mix their own feed. The terms on which the feed producers can source oilcake is clearly important for their competitiveness.

Table 2: Soy oilcake, soymeal and commercial animal feed producers, Malawi

Company	Animal feed production	Supply of oilcake / soymeal	Vegetable oil	Soybean crushing capacity (MT per annum)
CP (including Sunseed Oil)#	Yes	Yes	Yes	180 000 <sup>8</sup>
Capital Oil Refinery Industries#	No	Yes	Yes	320 000 (combined) <sup>9</sup>
Export Trading Group (ETG)	No	Yes	Yes	
Mount Meru	No	Yes	Yes	
Sungold Food Processing	No	Yes	Yes	
Kelfoods/Proto Feeds	Yes	No	No	-
Conforzi	Yes	No	No	-
Amazon	Yes	No	No	-
Lenzie Milling	Yes	No	No	-

Source: compiled by authors from interviews in Malawi

Notes: # related by family

Given that CP is the only producer with horizontal links to soybean crushing activities through its sister company Sunseed Oil, it is the most integrated poultry producer, both in terms of breeding stock and feed production into broiler production. Outside of this, all other feed mills and soybean crushers operate at one or two levels of the value chain. CP's size and vertical integration raises questions about the terms on which it supplies independent third parties compared to its in-house operations.

## 2.2. Market outcomes

The 2021 harvest season saw prices at the harvest in April and May which were around \$500/t for soybeans and \$150 for maize (see Nsomba et al. 2022). The soybean prices at the time were very similar to those in South Africa and compare with around \$400/t in **Zambia**. The Malawian maize prices were substantially below South African prices (around \$230/t) and in line with prices in Zambia. Production of soybeans had increased substantially to over 400<sup>th</sup> tonnes in 2020 compared with 223 thousand the year before. This underpinned the

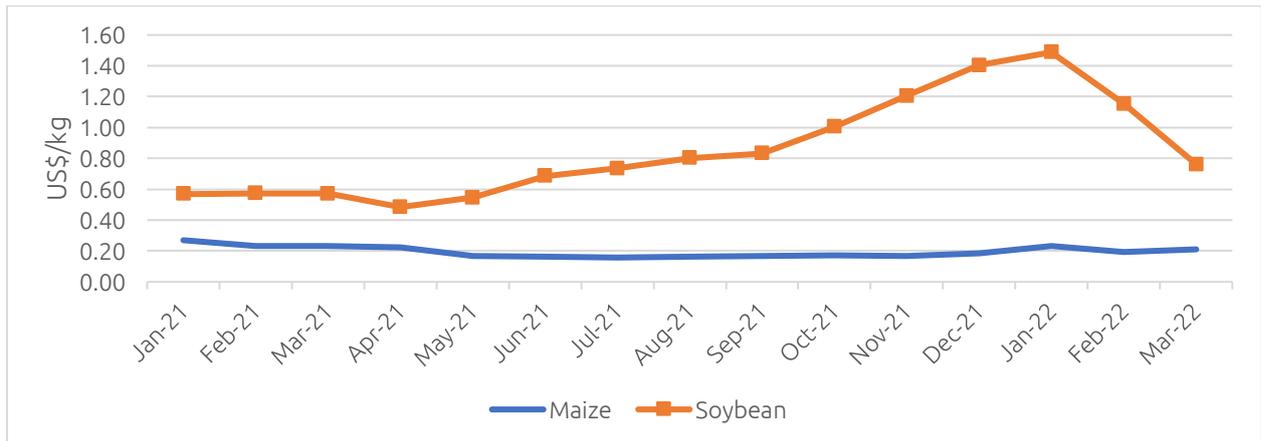
<sup>7</sup> Interview with Lenzie Milling, 24 March 2022.

<sup>8</sup> Crushing capacity of 70 000t, with storage capacity of 40 000t in March of 2022. From soybean crushing the yield is 17-19% soybean oil with the remainder being oilcake. Interview with Sunseed Oil, 18 March 2022.

<sup>9</sup> Of this, Mt Meru is estimated to be around 100<sup>th</sup> tonnes ([https://pdf.usaid.gov/pdf\\_docs/PA00W6VG.pdf](https://pdf.usaid.gov/pdf_docs/PA00W6VG.pdf)) and Sungold is relatively small; we estimate a total of 500,000 tons of crushing capacity in Malawi.

significant net exports of soybeans and oilcake. Malawi is generally self-sufficient in maize apart from El Nino drought years which last occurred in 2015/16. Malawi prices of soybeans then increased dramatically over 2021, almost trebling to around \$1400/t by the end of the year (Figure 2). Maize prices meanwhile remained stable. International soybean prices over 2021 also remained around the same levels (only increasing by 40% in 2022 to around \$660/t). Feed prices also increased very substantially. Against these price increases, poultry prices increased by approximately 39% over the same period (Figure 3).

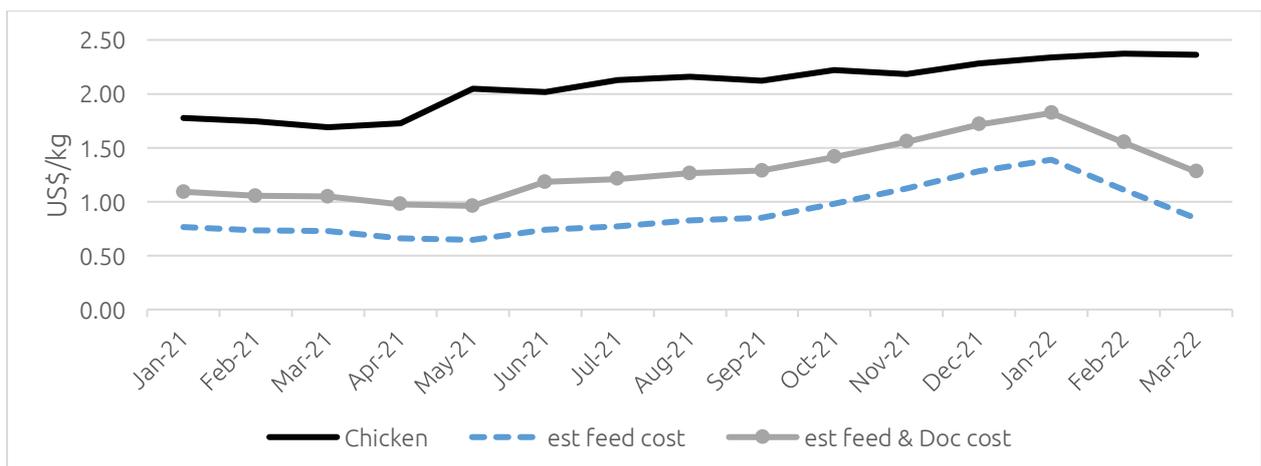
**Figure 2: Prices of maize and soybean**



Source: Compiled from interviews in Malawi

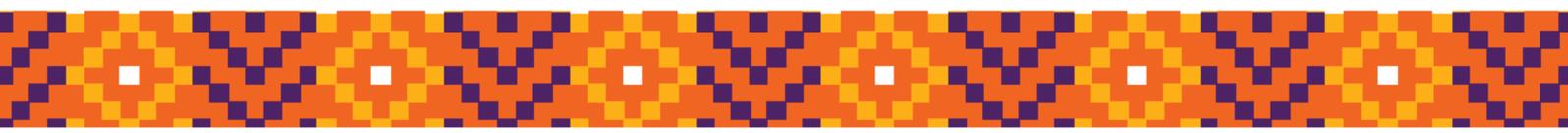
There was also an increase in the prices of day-old chicks during the same period (Figure 3). In June of 2021, CP raised prices of day-old chicks from approximately \$0.65 to \$0.88. Following CPs increase in price, Kelfoods increased prices by the same magnitude.

**Figure 3: Prices of maize and soybean against feed and DoC costs, per kg of chicken meat**



Source: Compiled from interviews in Malawi

The increase in input prices relative to poultry prices raises a question about the impact on the viability of small and medium scale broiler producers and whether the market outcomes reflect competition or the exercise of market power by a dominant firm or a group of large firms to exclude smaller rivals.



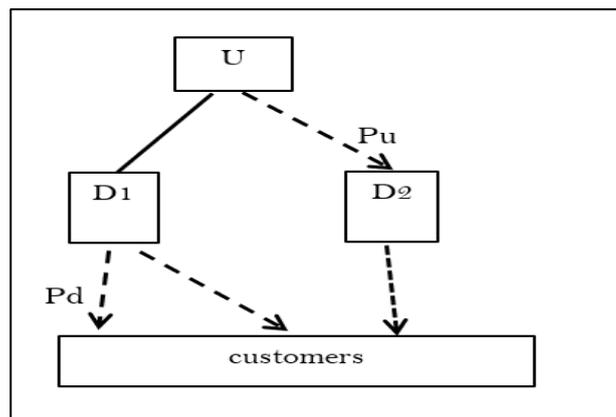
### 3. Assessing market outcomes, possible exclusionary conduct and candidate theories of harm

Due to the increases in input costs, the margins of small and medium scale poultry producers were reduced, while the prices of their final product increased relatively little as seen in Figure 3 above. Given the high levels of concentration at different levels of the value chain, it is appropriate to assess whether the outcomes observed are the result of the exertion of market power to undermine the independent producers.

Many industries are characterized by vertical production relationships where production of a final product requires inputs from suppliers at various stages of the value chain. Vertical integration within one firm may realise efficiencies from better coordination (Ncube et al., 2017). At the same time, it means large firms can govern the value chain, exploiting their position of dominance in upstream levels to restrict competition in downstream markets. In competition economics we consider the ability, incentive and effect the possible conduct.

One way in which a vertically integrated firm with substantial market power at upstream and downstream levels can exploit its position is to exert a margin squeeze on non-integrated rivals. This theory of harm involves the dominant upstream firm  $U$  raising the price  $P_u$  relative to the downstream price  $P_d$  which its downstream business  $D_1$  charges. The non-integrated downstream rival  $D_2$  finds that their margin is squeezed.

Figure 4: Diagram of possible margin squeeze



Source: Authors construction

The ability for the dominant firm to unfairly undermine the downstream competitors depends on the alternatives available to  $D_2$  to source inputs and whether  $D_2$  can charge higher prices than  $P_d$  downstream. If this is not the case, then the effects could be so extreme that downstream rivals exit the market. Even if the downstream firms do not exit, this may represent unfair competition and an exclusionary abuse of dominance.

In addition to the ability to exclude non-integrated rivals we also need to think about the incentive to do so and the effects on competition. Answering these questions requires the necessary information for the appropriate analysis. This includes answering the question as to whether the allegedly dominant firm would reasonably be able to efficiently operate its business with the same costs it imposes on downstream rivals (Fumagalli and Motta, 2018; Roberts, 2022).

***Ability***

There are three elements that must be present for the margin squeeze theory of harm to hold:

1. Incumbent must be vertically integrated
2. Incumbent must be dominant in the upstream (input) market(s)
3. The input must be essential or indispensable and downstream rivals have a degree of reliance on the vertically integrated firm for supply of the input

These factors mean that if the dominant firm increases the input prices the non-integrated downstream rivals do not have good alternatives to which they can turn. It is important to consider the alternatives of the rivals in practice to assess the influence of the dominance firm on their input costs.

In the downstream market it is necessary to assess the prices which are set by the dominant firm and the effect on the prices charged by the rivals. If they are competing and supplying good substitutes, the rivals will not be able to charge higher prices and still maintain their sales levels. Customers will instead switch to the dominant firm's products.

***Incentive***

The test on incentives needs to assess the legitimate rationales for coordinating supply in the vertically integrated firm against the anti-competitive reasons for engaging in the conduct in light of the evidence. If the vertically integrated firm is realizing efficiencies which may be passed onto consumers in the form of lower downstream prices, then this will render non-integrated rivals less able to compete but it is not evidence of an abuse of dominance. The test can be framed in terms of whether the conduct of the dominant firm makes economic sense absent an anti-competitive rationale.

One way of answering this question is by examining whether the vertically integrated firm's downstream business would be commercially viable at the prices it is charging to independent businesses. If this is not the case, then it is not any lesser efficiency of independent businesses but a strategy to undermine these businesses which is lessening competition.

If there is an anti-competitive intent, then unfairly undermining the viability of rivals will strengthen the downstream position of dominant firm. There are various reasons why this may be important for dominant firm. First, the firm's position and market power upstream may be bolstered by undermining downstream competition. Entrants and smaller rivals upstream need downstream markets for their products. This can include increasing the stability of collusion upstream if this is the basis for the firm's market power. Second, there may be limits on the exertion of market power upstream, for example, through regulation or because of imperfect alternatives such as imports. By undermining rivalry downstream where alternatives may be less attractive profits can be increased through raising downstream as well as upstream prices above competitive levels.

***Effects and the appropriate tests***

The anti-competitive effects depend on the assessment of whether exclusion is likely of an as-efficient competitor. If competitors who are operating as efficiently as the dominant firm

are excluded, then we can conclude that the conduct will have the effect of unfairly undermining competition. Note that, in practice, the competitors may have different business models and strategies as they have been positioning themselves to survive and grow given the dominant firm which they are up against. The test is of the dominant firm's prices and margins to consider whether they make commercial sense in terms of normal competition on the merits or whether they are set to exclude rivals.

In margin squeeze cases, where the dominant firm is vertically integrated and supplies a product or service to its own subsidiary which is an indispensable input to actual or potential competitors, the price set on this input may be found to be capable of excluding efficient competitors if the margin that can be made does not cover the downstream reasonable costs of production and supply. The cost benchmark here is normally the long-run average incremental cost of the dominant firm's subsidiary. In other words, the price for the input charged to third parties is applied to the subsidiary and, if it does not cover the relevant costs of the subsidiary for the appropriate increment of output, then it would not be commercially viable on a standalone basis (see Fumagalli et al. 2018; O'Donoghue and Padilla, 2006; OECD, 2009).

#### **4. Testing for a margin squeeze in Malawi poultry**

In terms of the conditions for a possible margin squeeze, CP is dominant in the supply of broiler day-old-chicks in Malawi in downstream broiler supply (Table 2). CP is also a very large and likely dominant producer of poultry broiler feed although there are other suppliers of substantial size. CP also processes and crushes soybeans and maize (Table 3). We analyse the implications of this further below. Day-old-chicks and feed are indispensable inputs.

Given these industry characteristics and the position of CP, we can consider CP's conduct as both an upstream supplier of inputs and a downstream supplier of broiler chickens, in Malawi sold largely in the form of live chickens. In terms of whether the pricing constitutes a margin squeeze, the main tests seek to assess whether the prices upstream and downstream being charged by the dominant firm make sense absent an anti-competitive rationale and whether they undermine competition.

To do this we can assess whether the downstream operation of the dominant firm could trade profitably based on the upstream price charged to its competitors. If it has a negative margin, then the conduct would appear designed to undermine its rivals. We can also consider whether the margin between the input price that the dominant firm charges a competitor and the price that the downstream operations of the dominant firm charges, allows a reasonably efficient firm operating in the downstream market to obtain a normal profit. Again, if this is not the case then the conduct is likely to harm competition.

We therefore assess whether poultry producers procuring day-old chicks and poultry feed at the prices set by CP to independent producers make a reasonable margin when selling at the prices being charged by the downstream broiler production division of CP for live chickens. We also consider if there are any objective justifications for CP's pricing arrangements.

##### *Input costs and prices*

There are two essential inputs into broiler production: feed and day-old chicks. In terms of feed, maize and soybean are the two main components. There are other components

including vitamins and minerals supplements, and vaccines which can be administered separately. There are also labour, energy and chicken litter costs. We have established the prices charged by CP for day-old-chicks and for poultry feed through the cycle from starter, grower to finisher feed to grow a broiler of about 1.9kg which we understand is the approximate weight of the broilers produced by CP. We also have the price at which CP vendors sell its chickens to consumers and an estimate of the price charged by CP net of the vendor margin. We have separately estimated the costs of vaccines and other inputs for the birds.

The costs of labour and energy depend on the efficiency of the production plants. We understand that CP has large scale facilities which will mean lower average labour and energy costs, albeit requiring major upfront investments. We estimate these costs separately on what we understand from interviews is a conservative basis. We also separately include an estimated mortality rate.

Given the estimates required for the assessment we consider the sensitivity to including different cost components.

Technical efficiency is critical for the overall competitiveness of broiler production. The feed conversion ratio (kg of feed used to produce a kg of meat) is a good indicator of production efficiency of any producer. Lower values of the feed conversion ratio indicate high production efficiency in that smaller amounts of feed are required to produce a kilogram of meat. Based on efficiency levels in international markets and interviews, we estimate a feed conversion ratio of CP to be 1.6 to 1.8.<sup>10</sup> Some independent producers have higher conversion ratios (around 1.9 to 2.0); however, we apply the more efficient estimates.

We have also cross-checked our assessment with interviews which established that basic costs per unit of production (for a 1.8-2kg bird) are structured as follows: feed, 70%; day-old chick, 20%; energy, 5%; labour, 3%. Our assessment is in line with these broad proportions, noting that the prices being set by CP over time will in themselves impact on the actual proportions.

There are other costs such as investments in production facilities including phytosanitary investments that do not vary with broiler production. As feed constitutes the majority of production costs, the availability and price competitiveness of soybean and maize is critical, which we also unpack further in sections 5 and 6 in terms of alternatives available to independent producers.

In terms of day-old chicks, interviews with market participants indicated that prices increased from Mwk495 per bird in April/May 2021 to Mwk700 in June/July and by November/December 2021 prices had increased again to Mwk800. We also assess feed costs for November/December 2021. This is a very important period as it is when broiler chickens are being reared for the festive season in December and January, considering the six-week rearing time.

We understand that other suppliers set similar prices for key inputs as CP. Some much smaller entrants have had lower prices, such as Thanzi Chicks which entered as a day-old

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<sup>10</sup> Based on Professor Timothy Gondwe's expertise in the industry and international benchmarks.

chick supplier in late 2020, and in mid-2022 was pricing chicks at Mwk100 below other suppliers as a marketing strategy.<sup>11</sup>

We assess the prices of inputs and estimates of production costs against the selling prices for the November-December 2021 period. We compare this with the first half of 2021, before the substantial price increases in animal feed and its constituents, using April-May 2021 for our assessment. We note that CP had price increases between these time periods, for both essential inputs of feed and day-old chicks, increasing by approximately 100% and 62% respectively.

Market data and interviews indicate that in December 2021, vendors sold CP broilers in the market in central Malawi at approximately Mwk2600, up from Mwk2400 in April. We consider the CP price per bird at the production facility, that is, after netting off the transport costs and margins to vendors, calculated as the CP retail price less 10%. This gives a wholesale price in December 2021 to Mwk2340. From the input costs and wholesale price we calculate the margins over different estimates of input costs and for 1.6 and 1.8 feed conversion ratios (Table 3).

**Table 3: Calculation of CP margins per 1.9kg bird, Malawi kwacha (Mwk)**

	Nov-Dec 2021	April-May 2021
DoC per chick	800	495
CP Feed price/kg	514 <sup>a</sup>	260 <sup>b</sup>
Feed cost @1.6 conversion for 1.9kg bird	1562	790
Feed cost @1.8 conversion for 1.9kg bird	1757	889
AVC, for only DoC & Feed @1.6 conversion	2362	1285
AVC, for only DoC & Feed @1.8 conversion	2557	1384
Vaccines, drugs, litter <sup>c</sup>	46	46
Energy & labour @5% of cost price <sup>d</sup>	117	108
AVC, vaccines, energy & labour @1.6 conversion	2525	1439
AVC, vaccines, energy & labour @1.6, mortality 4%	2623	1493
AVC, vaccines, energy & labour @1.8, mortality 4%	2833	1602
CP wholesale price ex-producer <sup>e</sup>	<b>2340</b>	<b>2160</b>
CP chicken price per bird to customer	2600	2400
Margins of price over:		
AVC: DoC & Feed, @1.6 conversion	<b>-22</b>	875
AVC: DoC, Feed, vaccine, energy, labour @1.6	<b>-185</b>	721
..with 4% mortality, @ 1.6 conversion	<b>-283</b>	667
..with 4% mortality, @ 1.8 conversion	<b>-483</b>	558

Source: Authors own calculations

Notes:

<sup>a</sup> This is based on a combination of 14% starter feed (at 28368/50kg), 28% grower feed (at 24881/50kg) and 58% finisher feed (at 25430/50kg).

<sup>b</sup> Estimated from maize and soybean prices and from interviews.

<sup>c</sup> From interviews for November/December 2021 prices, assumed to be the same throughout 2021.

<sup>11</sup> Interview with small producer July 2022.

<sup>d</sup> estimated at 5% of price ex-producer

<sup>e</sup> assuming 10% difference between vendor price and ex-producer price, from interviews

The findings are striking. The combination of input costs and wholesale prices yield negative margins in November/December 2021 even when we only consider day-old chick and feed costs and with the most efficient conversion ratio at 1.6. Adding in additional costs which have to be incurred, as part of long run average incremental costs, and an estimate of mortality rates means much larger negative margins. Including the additional costs (but not all costs of running the facility) at the 1.6 conversion ratio means CP was losing Mwk283 on each bird sold, or a negative margin of -12%. We note that negative margins mean no return to the investments made, and no account for management time and other overheads.

That is, if CP charges its downstream broiler production division the same input costs that is charged independent producers at the end of 2021 it would not have traded profitably.

A reasonably efficient competitor would have to incur these costs and would likely have higher costs in other areas such as labour and energy where we have used extremely low estimates. For example, estimates from other producers are for labour and energy costs to collectively be around 8% of the wholesale price. This would therefore mean even more negative margins.

## 5. Poultry feed – alternatives to commercial poultry feed

The feed price is the largest cost component and there have been very substantial increases in feed prices which appear to be linked to increases in soybean prices in Malawi (Figure 2). There are other companies other than CP which supply poultry feed, such as Kelfoods at a commercial level (see Table 3). Interviews and data indicated that their pricing is uniform with those of CP. There exist small and medium scale feed producers, but these are currently localized in their distribution and they rely on sourcing the main feed components. This has significantly restricted their ability to be an alternative source of feed for small and medium scale producers.

Small and medium scale broiler producers have also increasingly started to formulate and make their own feed mixes as a way of by-passing the high commercial feed prices. These mixes consist of ingredients such as maize, soybeans, fishmeal and vitamins and mineral premixes. We consider the cost of broiler production to small and medium scale producers developing their own feed mixes, against prices for live chickens which the producers are targeting in mid-2022. We also have to take into account the impact of different feed mixes on the rate of growth of the birds which impacts the feed conversion ratio. We make the assessment based on small and medium scale producers growing a flock size of 300 birds, with a mortality rate of 5%, together with a feed conversion ratio of 2.

Feed for broilers is generally categorized into three groups: starter feed, grower feed and finisher feed; with starter feed typically having the highest protein (22-24%) content. Chicks are fed on starter, grower and finisher feed for two weeks at a time.

### *Feed rations and costs, and broiler production costs*

We estimate the costs and rations of own feed production for independent producers in Table 4 below. This is done for starter, grower and finisher feed from June – July 2022. The soybeans that are used are full fat and roasted, and not oilcake. Soybeans, maize and fishmeal are milled separately in a hammer mill to obtain small grits (not milled into flour).

Vitamin and mineral premixes are as prescribed (Table 4). Rations are costed at prevailing prices of ingredients, plus costs of processing the feed including milling, roasting soybeans, and packaging. These combined establish the total cost of locally produced feed.

**Table 4: Feed rations and costs for independent producers, Malawi kwacha (Mwk)**

	Broiler Starter			Broiler Grower			Broiler Finisher		
	Amount	Unit cost	Cost	Amount	Unit cost	Cost	Amount	Unit cost	Cost
Maize	481.0	260	125057.9	568.7	260	147871	568.7	260	147871
Soybeans	429.3	650	279042.4	345.7	650	224718	345.7	650	224718
Fishmeal	48.9	1200	58628.3	56.2	1200	67482	56.2	1200	67482
Premix	3	5833.3	17500.0	3	5833.3	17500.0	3	5833	17500
Salt	3	400	1200	2.5	400	1000	2.5	400	1000
MCP	13.8	3000	41376.8	10	3000	30000	10	3000	30000
Lime	20	200	4000	12.8	200	2562	12.8	200	2562
DL-Met	1.1	6000	6377.2	1	6000	6000	1	6000	6000
L-lysine	0	4800	0	0	4800	0	0	4800	0
<b>Total</b>	<b>1000</b>		<b>533182.7</b>	<b>1000</b>		<b>497133</b>	<b>1000</b>		<b>497133</b>
Per Bag			26659.1			24856.7			24856.7
Milling Charge, per bag			700			700			700
Processing Charge, per bag			200			200			200
Labelling per bag			500			500			500
Others, per bag			300			300			300
<b>Overall total cost</b>			<b>28359.1</b>			<b>26556.7</b>			<b>25846.1</b>

Source: Authors' own calculations

Based on these rations, we estimate an overall total cost of Mwk28359 for independents to produce their own starter feed. For grower and finisher feed, we estimate a cost of Mwk26557 and Mwk25846, respectively. We compare these feed production costs to commercially sourced feed in the production of live chickens (see Table 5 and Table 6). To grow a 1.8 kg bird, we estimate that independent producers would need 0.5kgs, 1kg and 2.1kgs of starter, grower, and finisher feed respectively on a three-feed regime.

Using a mortality rate of 5% in broiler production, we find that independent producers earn gross margins of approximately 28% on a three-feed regime when producing broilers using their own feed mixes. This is compared with a margin of 7.5% using commercially bought feed. The margins are based on live broilers sold by the producers direct to customers in mid-2022 at a price which has increased to MK4500 (whether using own feed and commercially bought feed).

Item per month	Unit cost	Amount	June	July	Total
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Breedstock	750	300	225000		225000
Feed starter	28359.13	3	85077.4		85077.4
Feed grower	26556.65	6	159339.9		159339.9
Feed finisher	25846.08	12.6		325660.6	325660.6
Labour	50000	1	50000	50000	100000
Drugs	12000	1	12000	12000	24000
Vaccine	10000	1	10000		10000
Charcoal	16000	4	64000		64000
Litter	600	20	12000		12000
Total			617417.3	387660.6	1005078
Broiler sales	4500	285			1282500
Gross margin					277422.1
					27.6%

**Table 5:** Bird production costing using own feed production for 300 flock produced over June & July 2022, Malawi kwacha (Mwk)

Source: Authors' own calculations

**Table 6:** Bird production costing for three-feed regime using commercially bought feed, Malawi Kwacha (Mwk)

Item per month	Unit cost	Amount	June	July	Total
Breedstock	750	300	225000		225000
Feed starter	37500	3	112500		112500
Feed grower	34500	6	207000		207000
Feed finisher	33500	12.6		422100	422100
Labour	50000	1	50000	50000	100000
Drugs	12000	1	12000	12000	24000
Vaccine	10000	1	10000		10000
Charcoal	16000	5	80000		80000
Litter	600	20	12000		12000
Total			708500	484100	1192600
Broiler sales	4500	285			1282500
Gross margin					89900
					7.5%

Source: Authors' own calculations

The price gap between cost of own made feed and commercially bought is big, reflecting substantial margins being made by the large feed manufacturers. For smaller feed manufacturers to grow and compete effectively, they need to be able to source inputs which requires going back one stage further in the supply chain to analyse the basis for prices.

## 6. Analysis of the basis for higher upstream prices

Establishing commercial hatcheries requires substantial investments and the sourcing of breeding stock from the two main multinational companies, Cobb-Vantress (Tyson Foods) and Aviagen. Breeding is standardized globally through the operation of the multinationals and the regional producers to which they licence their breeds. The prices of the day-old chicks in Malawi, however, appear very expensive by international comparison. The price of Mwk800 at the end of 2021 is almost exactly US\$1 per chick. International prices have been around US\$0.40, notwithstanding the fact that the main poultry breeders and producers in

the USA have been operating cartels (Roberts, forthcoming).<sup>12</sup> It also compares with an average price in South Africa in the second half of 2021 of R8.27 or around US\$0.55 (SAPA, 2021). Prices in Zambia were also high at around US\$1 (16 Zambian kwacha) at the time.<sup>13</sup> The higher day-old chick prices in Malawi have a very material impact on the costs of poultry producers, as reflected in Table 4 above.

To understand feed costs, we need to assess the developments in the markets for the main components of maize and soybeans and their processing (including where crushing of soybeans to produce oilcake as a co-product of vegetable oil). The major change in the period is the increase in the soybean price over 2021. Other inputs for feed such as vitamins and minerals, along with vaccines, are important, however, we do not assess them further here.

### *Assessment of soybean price movements*

The soybean prices in Malawi trebled from the prices paid to farmers at the harvest in April/May 2021 to the prices at the end of the year. Soon after the 2021 harvest, prices of soybean were around Mwk350/kg (\$450/t) and rose to Mwk800/kg (\$1000/t) in January of 2022.<sup>14</sup> Prices reported in the market by some market participants spiked to above \$1400. In the same vein, oilcake prices rose dramatically, from around Mwk450/kg (\$570/t) at the beginning of the season to Mwk1050/kg (\$1330/t) in January of 2022.<sup>15</sup>

The increased soybean prices did have significant effects on the price of animal feed. Lenzie Milling, for instance, revised prices four times over the 12 months to March 2021, even with reformulating to use less soy cake.<sup>16</sup> As reflected in Table 4, CP Feeds doubled the feed prices from March/April 2021 to December 2021. This is one of the main factors in the margin squeeze finding from our analysis.

The high soybean and cake prices may suggest that there was a scarcity and prices therefore increased to those of imports. However, given Malawi's soybean production estimates for 2021 and increasing exports into the east and southern African region, indications of a shortage appear to be artificial. In addition, the price levels to which soybeans increased were in fact far above competitive import prices.

The trade data indicate that Malawi was a substantial net exporter of soybeans and oilcake in 2021, as production outstripped local demand by a large proportion. Trade data indicate that large volumes of exports were made to countries in the region at prices substantially below the local prices being recorded in the second half of 2021. This is reinforced by interviews which indicated oilcake being exported to countries such as Kenya, Tanzania, South Africa and Zimbabwe.<sup>17</sup> Concerns have been raised over prices of oilcake surging in

<sup>12</sup> See End-User Consumer Plaintiff's Fifth Consolidated Amended Class Action Complaint [Redacted Version], filed, 7 August 2020, United States District Court, Northern District of Illinois Eastern Division. Tyson Annual Report 2021 on Form 10-K SEC filing, page 79. Consolidated Amended Class Action Complaint, Broiler Chicken Grower Litigation filed in United States District Court for the Eastern District of Oklahoma, 10 July 2017. Second Amended Consolidated Complaint in Civil Action No. 1:19-CV-2521-SAG, om US District Courts for the District of Maryland, filed 2 November 2020. Settlements of these cases have been reached by the main producers

<sup>13</sup> <https://www.agribusinesszambia.com/kwacha-appreciation-set-to-positively-affect-the-prices-of-day-old-chicks/>

<sup>14</sup> Interview with feed producer, March 2022.

<sup>15</sup> Interview with feed producer, March 2022.

<sup>16</sup> Interview with feed producer, March 2022.

<sup>17</sup> Interview with large transporter, March 2022.

the 2021 harvest year, significantly raising the costs of inputs into animal feed and, as a result, animal feed itself.

The high local prices while exports were being made is supported by price discrimination being reported by buyers according to whether they were local or export buyers. For example, one large buyer looked to source for export and were offered an export price of \$600/t for oilcake in January 2022, yet when they were revealed to be a local customer, they were instead charged a price of around \$1000/t.<sup>18</sup> They were, in fact, able to import at prices around \$800-900 from South Africa indicating that local prices were pushed above the import prices that can be realised by large-scale traders and importers. As a result, some buyers have looked into buying greater volumes in advance during the 2022 harvest season, but this is only possible if the buyer has access to large-scale storage facilities and finance.

The ability to set different prices to export customers and to local customers is a very strong signal of substantial market power on the part of the sellers. To support the elevated local prices there has to be firms holding soybeans and willing to sell at prices into the export markets. Either a single firm must be able to control the additional volumes over the local demand to unilaterally be able to create artificial conditions of scarcity or there must be coordination between the main traders and processors of soybeans.

## 7. Potential interventions and conclusions

The poultry industry is a significant sector within agriculture in Malawi. It is an important and relatively low-cost source of protein for household consumption and has wide participation by small-scale producers in rearing and selling chickens. It has key backward linkages to maize and soybean farming, and hence to large numbers of small-scale farmers.

The recent developments raise major concerns about how well markets have worked. Farmers of maize and soybeans have received low prices for their crops, while poultry producers have been charged very high prices over the second half of 2021 and into 2022 for the key inputs of day-old chicks and animal feed. There are relatively high levels of concentration at these levels of the value chain and the market outcomes are indicative of the exertion of market power to distort markets. This is evident in the pricing of day old chicks and feed to small and medium scale producers.

When we assess the input prices relative to the prices charged by the large vertically integrated poultry producer, we find that a margin squeeze has been exerted on small and medium independent poultry producers in the second half of 2021 with a likely exclusionary effect, harming competition and participation in the industry. The same large-scale producers also control pricing of live chickens since they sell to markets where small and medium scale producers also sell their birds.

Efforts to establish fair trading in the poultry sector have sought to prevent large-scale producers from selling to the retail markets where the smaller producers focus. Our analysis indicates that attention should be paid instead to the pricing of the inputs which render the independent producers uncompetitive and that there are major competition issues requiring investigation. At the same time, at the policy level strategies to support greater rivalry through empowering small and medium scale producers to engage in commercial feed

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<sup>18</sup> Interview with feed producer, March 2022.

production provide an avenue to discipline market power in future. There are formulations of feed which can be made at lower cost than that which has been supplied by the large-scale commercial producers, and this translates to reduced cost of production for the smaller poultry producers. Such a strategy may be combined with aggregation and storage of the main feed components to achieve better prices at the harvest time and to support SMSP feed and poultry producers.

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