



**The Maize Price Spike of 2012/13: Understanding the Paradox of High Prices
despite Abundant Supplies**

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Nicholas J. Sitko and Auckland N. Kuteya

Working Paper No. 81

October 2013

Indaba Agricultural Policy Research Institute (IAPRI)
Lusaka, Zambia

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EXECUTIVE SUMMARY

The 2012 harvest was, according to the Ministry of Agriculture and Livestock national food balance sheet estimates, a major surplus production season. However, by November the same year, Zambia started experiencing widespread maize meal shortages and skyrocketing maize meal prices. Responding to these shortages and price spikes, the government increased the price subsidies it provided on maize sold by the parastatal Food Reserve Agency (FRA) to large-scale maize mills and imposed *de facto* price controls on maize meal by threatening to revoke the business licenses of commercial maize mills if retail prices of a 25kg bag of maize meal exceeded kwacha rebased (KR) 50. Despite these efforts maize meal prices continued to rise, reaching as high as KR100 in some markets by February 2013.

Although rapid food price spikes are not new to Zambia, the high food prices of 2012/13 were different in that they occurred in the wake of three consecutive years of maize surpluses. From 2010 through 2012, the country recorded a total maize production of 8.6 million metric tons. Out of this total, 4.6 million metric tons was surplus. The FRA alone purchased nearly 3.7 million metric tons, or 80% of this surplus. Indeed, at the time of the food price spikes, the FRA acknowledged that it still held over 700,000 metric tons of maize. Thus, the price spike of 2012/13 coincided with a significant increase in FRA's activities in the maize market and a decline in the role of the private sector.

This paper seeks to identify and analyze the fundamental causes of high maize meal prices in Zambia amidst years of bumper maize harvests. Our findings reveal that the maize procurement and marketing behavior of the FRA from 2010 to 2012 contributed to the following major structural changes:

1. A shift in maize procurement strategies by commercial mills.

By purchasing the majority of the maize on the market, the FRA limited the need for commercial mills to access maize directly from the market. This had two major effects. First, it reduced competition in the wholesaling sector, as many wholesalers could not compete with FRA's relatively high buying price. Second, it concentrated the maize supply chain around the FRA. As a result, few private actors were able to buy and store maize. This led to greater levels of maize spoilage than would have been the case otherwise. Storage losses at FRA are estimated to be as high as 32%, compared to 7% in the private sector. Second, with supplies concentrated at FRA depots, supply bottlenecks at these depots could severely disrupt the flow of maize into the commercial milling sector. Together, the outcome was both a decrease in available supplies and increased risk of bottlenecks occurring in the supply chain.

2. Rationing of FRA maize sold at subsidized prices to commercial mills.

FRA provided significant subsidies on the maize it sold to the commercial milling sector. However, FRA depots were unable to consistently meet the demand requirements of the commercial milling sector. As a result, some mills were prioritized in terms of receiving FRA maize. Mills that could not consistently access subsidized maize from the FRA were put at a comparative disadvantage relative to those that could. As a result, some of these mills were forced to stop operating temporarily, while others were forced to find maize on private markets, where prices had been elevated due to the scale of FRA's purchases. The end result was both less

maize meal available on the market than would have been the case if all mills were operating at full capacity and an undermining of competition in the sector.

3. Exit of the commercial farming sector from maize production.

Between 2010 and 2013, commercial maize production in Zambia halved, from 300,000 metric tons to less than 150,000 metric tons. This movement out of maize production was the result of FRA undercutting the market price of maize through direct subsidies to commercial mills. Commercial farmers were not authorized to sell to FRA; hence, they were dependent on maize prices from millers and other processors, who were receiving subsidized maize from FRA. Without the buffer of commercially produced maize to compensate for any smallholder supply shortfalls, Zambia's maize market is exposed to greater level of weather-induced supply risk than would otherwise be the case. This is because commercial farmers are able to irrigate their maize crop if rainfall conditions are poor. Moreover, aggregate supplies of maize over the medium to long-term are likely to be less than would be the case if commercial farmers in Zambia were not pushed out of maize production.

The implication of FRA's activities on the informal sector:

1. Squeezing the informal processing sector out of the market.

By procuring the majority of the available surplus and selling it at subsidized rates to a selected group of commercial mills, the informal market, including small-scale traders, retailers, and hammer mills, were effectively squeezed out of the market. As a result, this made the milling sector more concentrated and enabled large millers to raise their prices without risk of losing market share to informal milling competition. This, in turn, deprived many poorer urban and rural consumers of an important source of cheap maize meal when commercial maize meal price rose.

As a result of this market reorganization, the levels of competition in the market decreased while total available maize supplies were lower than would have been the case without the large FRA presence. The limitations of the market structure that emerged out of the consolidation of the market by the FRA were exposed in 2012 by a significant shift in regional trading relationships for maize. In particular, beginning in 2010 and continuing through 2012, South Africa, the region's only consistent surplus producer of white maize, redirected the focus of its exports from the Sub-Saharan Africa region toward overseas markets. Prior to this reorientation, South Africa would typically export over 90% of its available surplus to countries in Sub-Saharan Africa. However, by 2011 only about 20% of South Africa's available white maize surplus was exported to Sub-Saharan Africa. The rapid redirection of maize away from Sub-Saharan markets by South African exporters likely placed an unanticipated demand burden on Zambia's maize market, particularly from the major deficit countries of Zimbabwe and the Democratic Republic of Congo (DRC). Because of the ways in which Zambia's maize market had been restructured it was unable to effectively respond to this increased demand burden, leading to maize and maize meal shortages along Zambia's border and elevated prices throughout the country.

The strategic focus of South African exports toward overseas markets is likely to continue. As a result, the region will increasingly depend on emergent breadbaskets, such as Zambia, to meet its maize requirements. This analysis has shown that a large government presence in the maize market is unlikely to enable surplus producing countries like Zambia to effectively

respond to this regional demand. Moreover, a large state presence in the market can have lasting and detrimental effects on the performance of national food markets. To decrease the risk of national food price spikes, and to enable Zambia to become a reliable exporter of maize, the government must develop strategies to ensure that its role in the maize market will be relatively small, as well as predictable and transparent. This will require limiting the exposure of the FRA to politically motivated interference in its activities. One way to achieve this is through the creation of a council drawn from the private and public sector to guide FRA's actions.

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ACRONYMS

AMIC	Agricultural Marketing Information Centre
CFS	Crop Forecast Survey
CPI	Consumer Price Index
CSO	Central Statistical Office
DRC	Democratic Republic of Congo
FANRPAN	Food, Agriculture, and Natural Resource Policy Analysis Network
FRA	Food Reserve Agency
FSRP	Food Security Research Project
GMB	The Grain Marketing Board
GMO	Genetically Modified Organisms
IAPRI	Indaba Agricultural Policy Research Institute
Kg	Kilogram
KR	Kwacha Rebased (New Zambian Currency)
MAL	Ministry of Agriculture and Livestock
MCB	Maize Control Board
MSU	Michigan State University
MT	Metric ton
NAMBOARD	National Agricultural Marketing Board
SAGIS	South African Grain Information Service
SIDA	Swedish International Development Agency
US\$	United States Dollars
USAID	United States Agency for International Development
ZMK	Zambian Kwacha (Old Zambian Currency)

1. INTRODUCTION

In November 2012, the Government of Zambia officially confirmed widespread maize meal shortages in the urban industrial centers of Zambia's Copperbelt Province (Wangwe 2012a). Throughout the Copperbelt, maize meal prices were rising rapidly, while consumers were forced to queue for hours, sometimes in vain, in an effort to acquire a bag of the nation's staple food. In response to the shortages and price spikes, the government increased the price subsidies it provided on maize sold by the parastatal Food Reserve Agency (FRA) to large-scale maize mills. Yet, maize meal prices continued trending upward, with shortages and high prices reported throughout the country, including the capital city Lusaka. In response, President Michael Sata attempted to impose *de facto* price controls on maize meal by threatening to revoke the business licenses of milling corporations if retail prices for a 25 kilogram (kg) bag of refined maize meal exceeded KR50 (roughly 10 U.S. Dollars (US\$10)). Despite these presidential directives, increased subsidies to large-scale milling corporations, and statements by the FRA that it still held over 700,000 metric tons of maize in its storage facilities, maize meal prices continued to rise and stock-outs persisted. By February 2013, prices as high as KR100 were being reported for a 25-kg bag of maize meal in the Provincial capitals of Solwezi and Kasama (Zambian Watchdog, 6 February 2013).

Rapid food price spikes are not new to Zambia (Jayne, Zulu, and Nijhoff 2006). As a landlocked country, with poor infrastructure and dependence on rain-fed agriculture to produce a single staple cereal, Zambia is susceptible to food price spikes and food supply volatility (Byerlee, Jayne, and Myers 2006). In Zambia, food price spikes tend to emerge under a similar set of conditions. In most cases, price spikes are triggered by domestic production shocks, mostly due to adverse weather conditions, leading to food supply deficits. The price response to this deficit tends to be worsened by the large wedge between import and export parity prices, resulting from high transport costs and poor market infrastructure. This price wedge limits the capacity of imports from abroad to bring down local food prices (Hazell, Shields, and Shields 2005). Finally, in many cases, uncertainty over how the government intends to respond to the supply shortfall often leads to delays in private sector imports, which in turn exacerbates the increase in domestic food prices (Nijhoff et al. 2002).

Yet, the high food prices of 2012/13 diverged in important ways from this common scenario. Rather than emerging from a domestic production shortfall, the food price spike of 2012/13 came in the wake of three consecutive years of record maize *surpluses*. From 2010 through 2012, Zambian farmers produced a total of 8.6 million metric tons of maize (Crop Forecast Survey various years). After accounting for the maize retained by producers for their consumption needs, Zambia's total marketed surplus over this period was in the range of 4.6 million metric tons, which far exceeded the national maize consumption requirement. Of this surplus, the government purchased approximately 80% or 3.68 million metric tons through the FRA.

What explains the widespread maize meal shortages and high maize meal prices in Zambia despite record levels of surplus maize production, subsidies on maize sold to commercial mills, and large grain stocks held by the FRA? Identifying answers to these questions is critical, as unanticipated food price spikes can lead to net welfare losses, both in terms of economic growth rates and household food and nutrition security (Barrett and Bellemare 2011; Myers 2006).

In Zambia, the popular explanation for the 2012/13 food price spikes focused on the structural limitations of the private sector, including insufficient commercial maize

processing capacity in low density regions, and rent seeking behaviors by large-scale milling firms, maize meal retailers, and those involved in the informal trade of maize across Zambia's long and porous borders (Wangwe 2012b). Yet, given three years of record maize production, coupled with large state held maize stocks, the emergence of grain shortages and high maize meal prices likely has more fundamental causes.

This paper seeks to identify and analyze the causes and consequences of the paradoxical food price spike of 2012/13. We argue that the maize procurement and marketing behaviors of the FRA from 2010 to 2012 contributed to a structural reorganization of Zambia's private maize marketing and processing sectors. We explore this market restructuring in terms of the two predominate private market channels that operate in Zambia: 1) the formal market, which is characterized by large volume, commercial maize processing and marketing firms linked to both commercial and small-scale producers; and 2) the informal market, which is characterized by myriad low-volume small-scale traders, small-scale processors, and informal grain retailers. This analysis will show that the effects of FRA's activities have undermined the competitiveness of these two private market channels in ways that left the maize market more vulnerable to supply and demand shocks than would otherwise have been the case. Though present in earlier years, this vulnerability was exposed in 2012 when increased demand pressure from the region was placed on Zambia's surpluses because of South Africa's response to drought induced maize deficits in Mexico and the United States.

This paper is organized as follows. Section 2 presents the data and methods used in this analysis. This is followed by an historical overview of the role of the state and the private sector in Zambia's maize market, with particular attention to how their respective roles shifted during the period 2010 to 2012. In Section 4, we provide an overview of the structure of Zambia's private sector market channels prior to 2010. In Section 5, we analyze how the shifting role of the FRA contributed to a reorganization of Zambia's formal market. Section 6 looks at the effects of the FRA on the organization of the informal sector. Section 7 summarizes the outcome of the reorganization of the private market following the expansion of the FRA in 2010, with particular attention to how this new market structure left Zambia's maize market vulnerable to supply and demand shocks. Prior to concluding remarks and policy recommendations, we provide details of the external shock to Zambia's maize market resulting from a redirection of maize trade by South Africa away from the Sub-Saharan Africa market.

2. DATA AND METHODS

This article draws on multiple data sources in its analysis of the causes and consequences of the reorganization of Zambia's maize markets. In order to understand how maize markets in Zambia have responded to FRA's buying and selling activities we carried out semi-structured interviews with various actors in both the formal and informal maize markets in Zambia. These interviews were conducted from April through June 2013. These included representatives from 10 large-scale milling firms and six large-scale grain trading firms¹. Interviews were also conducted with five small-scale grain traders, 18 small-scale mills, and 28 small-scale grain retailers. These interviews sought to understand how Zambia's maize market structure has been transformed since 2010 in response to the increased activity of the FRA in the market.

These interview data are complemented by wholesale maize grain price data from the AMIC. The retail breakfast and roller meal prices and the CPI were collected from the CSO of the Republic of Zambia. Production data came from the MAL Crop Forecast Survey (CFS), which provides data on smallholder and commercial farm crop production. Formal trade data in Zambia came from the CSO external trade data section. Finally, we used data from South African Grain Information Service (SAGIS) to examine South African maize grain export trends in Africa and overseas.

¹Several of these trading firms are multinational and also provided information on trends in regional maize trading.

3. UNDERSTANDING THE SHIFTING ROLES OF THE STATE AND PRIVATE SECTOR IN ZAMBIA'S MAIZE MARKET

To understand the causes of the seemingly paradoxical 2012/13 food price spike, it is necessary to situate it in a brief historical analysis of the shifting roles of the state and the private sector in evolution of Zambia's maize market. Of particular importance for this analysis is the way in which the state's role in the maize market expanded during the lead up to the food price spike.

High levels of state involvement in maize markets in Zambia date back to the early colonial period, when the Maize Control Board (MCB) was first established to protect European settlers from competition from African farmers (Chipungu 1988). Shortly after independence the MCB, then called the Grain Marketing Board (GMB), was transformed into the National Agricultural Marketing Board (NAMBOARD). The transformation of the GMB to NAMBOARD was part of Zambia's broader humanist project, which sought to undo the colonial legacy of urban development bias (Sitko 2013). To this end, Zambia's independent government removed the price differentials on maize established during the colonial era, which were based on both geographic location and maize quality. In their place, NAMBOARD instituted pan-territorial pricing and uniform grading for maize. Yet, contrary to the rhetoric of Zambian humanism, these prices were often set lower than world prices in order to provide cheap food to the urban industrial population (Pletcher 2000). Despite this, NAMBOARD's pan-territorial pricing, coupled with restrictions on both the movement of maize between districts and the involvement of the private sector in maize procurement, led to a state monopoly over the maize market. This monopoly persisted until 1991, when high levels of state debt ultimately forced the adoption of an economic structural adjustment program.

A major component of Zambia's structural adjustment program was the liberalization of maize markets. This entailed, among other things, the dismantling of NAMBOARD, the freeing up of private sector maize trading and processing, and the selling-off of many parastatals, including former state run maize processing firms. The process of liberalization sparked a massive influx of private investment into the maize sector. These investments occurred at multiple scales, from small-scale informal traders, retailers, and processors to multinational investment in grain trading and processing. The expansion of private sector activity in the maize market had important implications for the structure and performance of Zambia's maize market. In place of a state-centric marketing and processing system emerged a marketing system characterized by two distinct, but often interrelated private marketing channels, the formal and the informal.

However, it is important to note that maize market liberalization in Zambia has always been partial. Despite creating space for private investment in the maize market and dismantling of NAMBOARD, the state continued to play an important role in maize market through the activities of the FRA. The scale of the FRA's involvement in the maize market has important implications for the functioning of the two private sector channels that emerged after liberalization.

Since market liberalization in the 1990s, the FRA has operated under two distinct regimes based on the scale of its procurement activities. The first regime began with the inception of

FRA in 1996 until its role in the market was significantly expanded in the 2010/11 marketing season². Table 1 details FRA's purchases relative to the total available surplus for the marketing years 2003/04 to 2012/13³. Apart from an uptick in FRA purchases in the run-up to the 2006 general elections, which reached 51 percent of the available surplus, the first FRA regime is characterized by the FRA purchasing the minority share of the available surplus, with the majority of the surplus left for the private sector. The second regime, which began in the wake of the record harvest in 2010, is characterized by a high level of activity in the maize market by the FRA. Over the three year marketing year period of 2010/1 to 2012/13 Zambia recorded a total maize surplus of 4.6 million metric tons, of which the FRA bought roughly 3.68 million metric tons, or 80%, leaving little of the total surplus for private sector procurement.

The ability of the FRA to transition from the first to the second regime was enabled by two fundamental factors. First, in 2005 the Food Reserve Act, which governs the FRA, was revised to enable the FRA to participate in maize marketing, in addition to its mandate to manage the national strategic reserve (Mason and Myers 2013). Second, despite a budget allocation that limited FRA purchases to 300,000 tons, the government provided guarantees to the financial sector that enabled the FRA to borrow on the commercial credit market in order to expand its activity in the maize market. Over the period 2010 to 2012 the Ministry of Agriculture and Livestock estimates that the FRA borrowed approximately US\$420 million for its maize marketing activities in addition to the funds provided by the Treasury (Ministry of Agriculture and Livestock 2013). With an enabling legislative environment and a state guaranteed line of credit, the FRA was able to significantly expand its buying activities.

Table 1. Maize Sales and FRA Purchases in Zambia (2003/04 to 2012/13 Marketing Years)

Marketing Year	Anticipated Smallholder Sales (mt*)	Commercial Farm Sales (mt)	FRA Purchases (mt)	% Total Sales Purchased by FRA
03/04	370,332	412,381	54,846	7%
04/05	356,750	253,861	105,279	17%
05/06	206,092	254,804	78,666	17%
06/07	454,676	313,519	389,509	51%
07/08	762,093	287,089	396,450	38%
08/09	522,033	218,728	73,876	10%
09/10	613,356	229,893	198,629	24%
10/11	1,062,010	306,540	883,036	65%
11/12	1,429,911	233,147	1,751,660	105%
12/13	1,440,944	142,256	1,046,000	66%

Source: CSO/MAL Crop Forecast Surveys (various years); CSO/MAL Post-Harvest Surveys (various years); CSO/MACO/FSRP Post-Harvest Supplemental Surveys (2004 and 2008). * Metric tons.

² In Zambia the *maize marketing season* or *marketing year* begins in May when crops are harvested and continues through the following year ending in April.

³ Between its inception in 95/96 and 02/03 FRA purchases ranged between 0 and 23,000 metric tons.

The FRA's maize buying activities under the second FRA regime placed significant strain on both the national treasury and public grain storage systems. Over the course of the three bumper harvests, FRA offered smallholder producers a uniform price for their maize of approximately US\$260/metric ton (Kuteya and Jayne 2012).

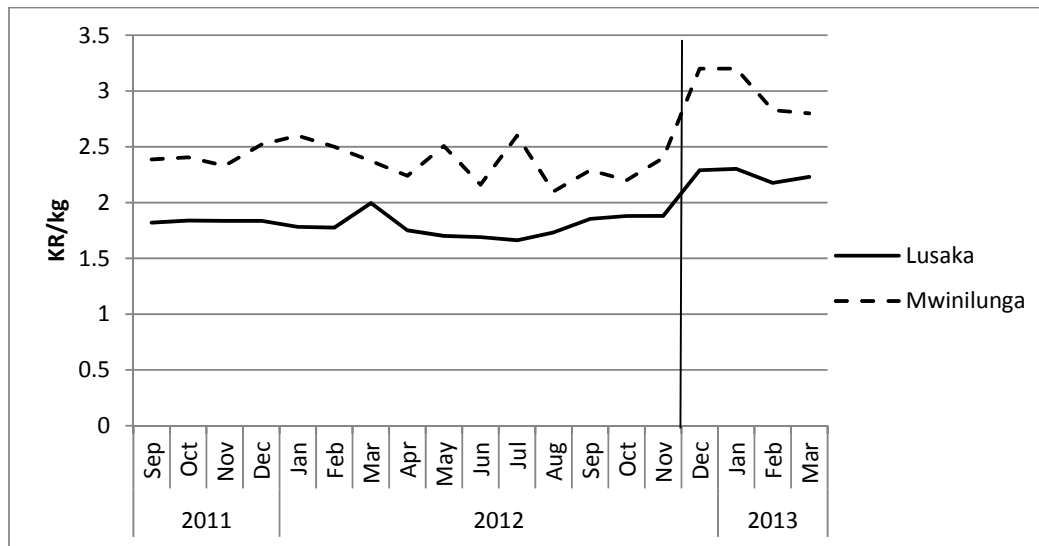
After accounting for storage and financing costs, plus grain losses resulting from inadequate storage, the FRA's costs for every marketable ton of maize likely exceeded US\$400 /metric ton (Kuteya and Jayne 2012). Despite coinciding with consistently high global maize prices and the severe shortages of grain in East Africa in 2011, the high cost of FRA's grain procurement made it impossible to profitably export its surplus to the region. Moreover, due to transport constraints in the region and limited efforts or capacity of FRA storage depots to ensure minimal maize quality standards at the time of purchase and during storage, the volumes of maize that could be exported, even at a financial loss, were limited.

It is estimated that because of FRA's buy high and sell low strategy during the second FRA regime the Treasury lost between US\$250 and US\$350 for every metric ton it handled (Kuteya and Jayne 2012). This amounts to a total Treasury loss in the range of US\$900 million to US\$1.2 billion over the three year period. This loss alone exceeds the total 2013 budget for Zambia's health sector. Thus, the FRA's activities came at an extremely high opportunity cost to other important sectors of Zambia's economy and society.

In addition to the financial cost, the FRA's expanded activities in the market placed severe pressure on available public sector storage. The FRA responded to this storage pressure in two ways. First, beginning in September 2011 the FRA began to off-load maize to a selected group of large-scale mills at a price of between US\$140 and \$230 per metric ton (Kuteya and Jayne 2012). This was done in an effort to both hasten the movement of maize out of the overflowing FRA storage facilities, as well as to confer the benefits of the nation's bumper harvests to Zambian consumers through anticipated lower food prices. Second, FRA maize destined for export to the region was dropped to as low as US\$110 per metric ton, thereby subsidizing consumers in the region and squeezing out competition from other exporting nations, such as South Africa, that do not enjoy the same level of government price support.

Despite large levels of surplus production and significant subsidies on maize supplied to commercial mills, maize meal prices in Zambia increased rapidly toward the end of 2012. Figure 1 presents nominal maize meal prices in the capital city, Lusaka, and Mwinilunga, a town along the border with the DRC. In Lusaka, maize meal prices rose by 21% between November and December of 2012. As a result, maize meal prices in Lusaka were 24.6% higher in December 2012 than the previous year. Mwinilunga exhibited a similar, albeit more pronounced increase. Between November and December 2012, maize meal prices in Mwinilunga rose by 33%. This contributed to a 26.9% increase in the price of maize meal in December over the previous year. It is also important to note that these prices were recorded in retail shops during a time when presidential directives required that maize meal prices not exceed Zambian Kwacha (ZMK)2/kg (approximately US\$0.38). The fact that average maize meal prices exceeded these amounts in both markets is interesting in itself. Equally important, and not effectively captured in these data, were the stock-outs of maize meal experienced from November 2012 through March 2013, which severely constrained consumers' capacity to access sufficient maize meal (Chaponda 2013; Wangwe 2012a).

Figure 1. Nominal Monthly Maize Meal Prices (Breakfast Meal) in Lusaka and Mwinilunga, Zambia



Source: Central Statistical Office (CSO) Monthly Price Bulletin. Found online at <http://www.zamstats.gov.zm/gen/monthly.php>

The price spike of 2012/13, therefore, occurred in the context of a significant expansion in the scale of FRA's activities in the maize market and, subsequently, a decline in the role of the private sector. The resultant reorganization of the maize market is at the heart of the seemingly paradoxical spikes in food prices witnessed in Zambia in 2012/13. Before detailing how the formal and informal maize market channels were restructured by this shift in FRA procurement regimes, we will first provide a description of the structure of these channels prior to 2010.

4. THE ORGANIZATION OF ZAMBIA'S MAIZE MARKET BEFORE 2010

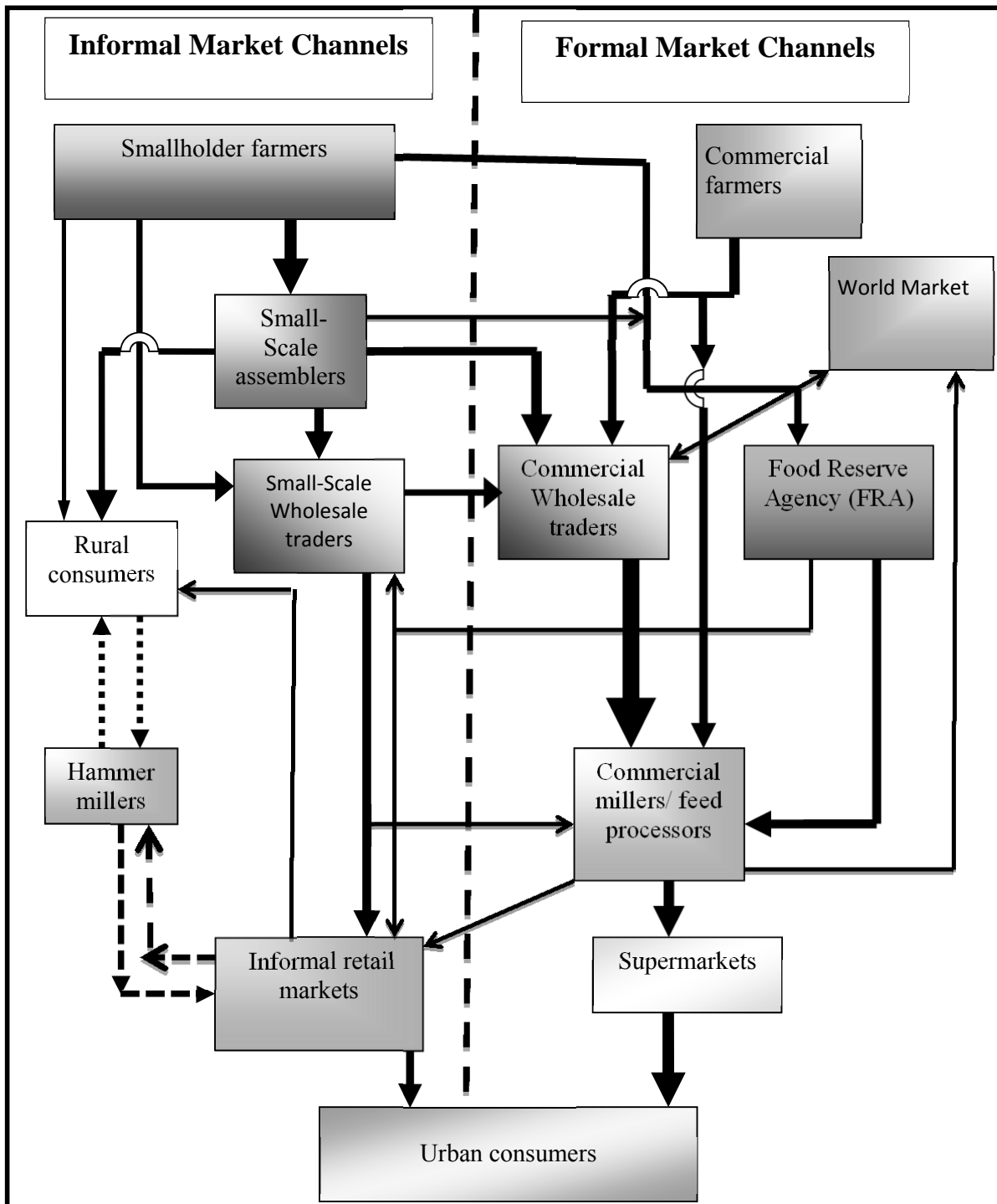
Figure 2 presents a schematic representation of the trading relationships between market actors in Zambia's maize market under the first FRA regime. On the right hand side is the formal maize market. This market linked commercial and small-scale farmers, as well as international suppliers, to formal grain wholesalers, processors, and supermarket retailers. Through links to international and local credit markets, this sector tends to be well capitalized and capable of conducting large volume transactions. According to interviews with commercial grain processors, the Zambian commercial maize processing sector absorbs roughly 60-80% of the available maize surplus during a normal production year. As shown in Figure 2, this involved sourcing grain from diverse market actors, including direct procurement from producers, formal and informal wholesalers, and, when necessary, the FRA.

Conversely, what we will refer to as the *informal* market is comprised of myriad small-scale traders, wholesalers, retailers, and processors (hammer mills). The sector is often characterized by spot market transactions with weak mechanisms for market-based risk management, severe liquidity constraints faced by traders, which limits the potential for seasonal storage, and relatively little political influence or voice in the determination of regulations governing the agricultural sector. As indicated by the thickness of the arrow in Figure 2, the informal sector served as the primary market for smallholders prior to the 2010 FRA expansion. Yet the informal sector does not operate independently of the commercial sector. Tracing the flow of maize through the market channels in Figure 2 shows that small-scale traders and wholesalers in the informal sector frequently aggregate grain for onward sale into the formal maize market. Moreover, although the commercial milling sector is an important source of grain for urban consumers, informal grain retailers and small-scale hammer mills acted as alternative sources of maize for both rural and urban consumers. This informal market, therefore, provided a significant source of competition to the formal processing and retailing sectors.

As shown by the thin arrows leading into the FRA, the FRA's role in the maize market relative to the private sector was small under the first regime. As has historically been the case, the FRA would buy from smallholders and traders at pan-territorial, often above-market prices at satellite and holding depots located in various districts of the country. However, under the first regime the FRA did not operate satellite or holding depots in all districts of the country, which limited the geographic scale of its market presence. The stocks procured by the FRA were then distributed to the market, through direct sales to commercial mills as well as to traders and retailers servicing the informal sector.

As shown in Figure 3, the market structure that developed under the first FRA regime proved largely beneficial to Zambian consumers. Because of increased competition from formal and informal traders and processors the cost of processed maize meal has declined substantially in real terms since market liberalization. Moreover, this decline has been driven largely by declining margins between wholesale grain prices and retail maize meal prices, suggesting that the majority of the price decline has come from improvements in the marketing and processing sectors, rather than declines in producer prices (Chapoto and Jayne 2006).

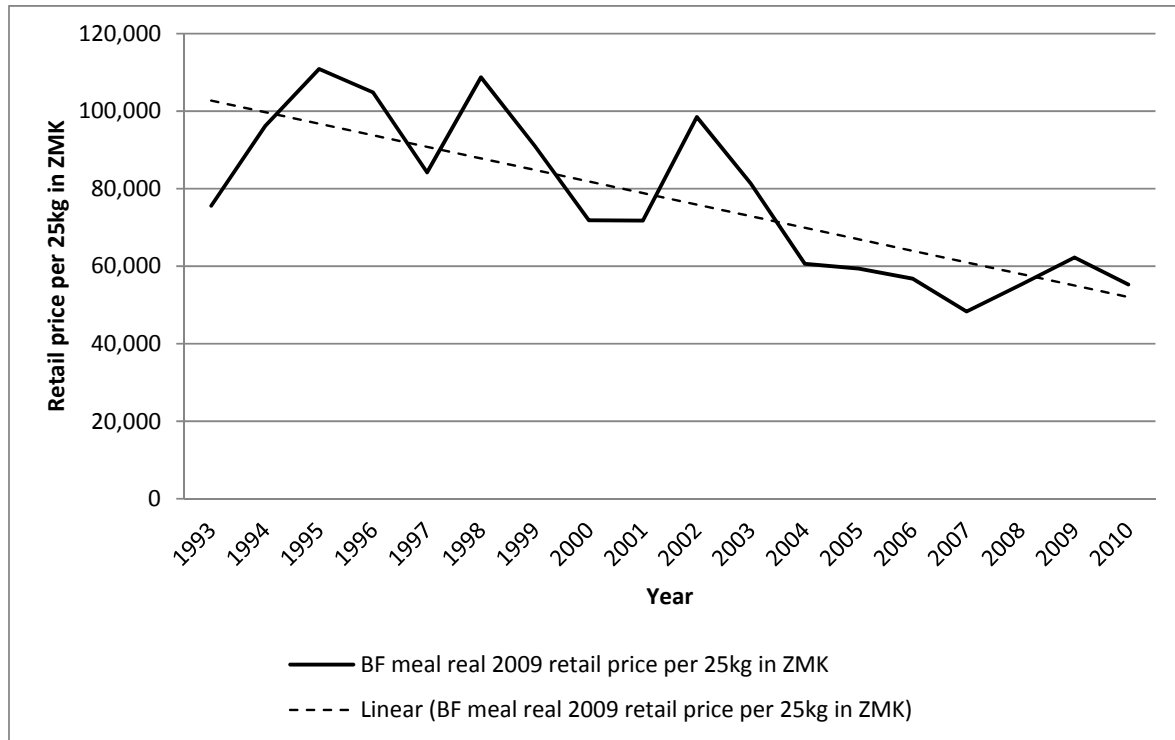
Figure 2. Maize Market Structure Prior to 2010



Source: Author.

Note: The size of the arrow indicates relative volume.

Figure 3. Average Real Annual Maize Meal Price Trends (1993-2010) (2009=100)



Source: Central Statistical Office (CSO) Monthly Price Bulletin. Found online at <http://www.zamstats.gov.zm/gen/monthly.php>

Despite these positive developments in Zambia's maize market, the decision by Zambian policy-makers in the wake of the 2010 bumper maize harvest was to expand the role of the FRA in order to prevent a producer price collapse. By so doing it shifted the role of the state from minority to majority actor in the maize market. This, in turn, caused a rapid reorganization of both the formal and informal private maize markets, which undermined the competitiveness of these markets and increased the susceptibility of the market to price spikes and localized stock-outs.

5. REORGANIZATION OF THE FORMAL MAIZE MARKET POST-2010

According to interviews with large-scale grain traders and processors, prior to FRA's expansion in the maize market in 2010, the formal maize sector had become increasingly competitive and had made significant progress in developing mechanisms for managing maize price volatility, including contractual mechanisms for managing supplies in the absence of a functional structured trading platform (Sitko and Jayne 2012). In particular, maize mills had begun to enter into pre-planting supply contracts with commercial farmers, as well as collateral management relationships with large-scale grain traders and farmers. These contracts allowed processing firms to secure access to maize at predetermined prices during Zambia's lean season, which generally begins in December when stocks from smallholder producers begin to dwindle and ends in March when fresh maize becomes available. At the same time these arrangements provided mechanism for farmers and traders to manage temporal arbitrage opportunities and to inform their decisions about potential imports and exports. Through the development of these inchoate risk management mechanisms, the Zambian formal maize sector had become increasingly capable of managing seasonal price movements, even when adverse weather conditions limited smallholder maize supplies.

Developments within the formal maize sector in Zambia also had important implications for surplus small-scale producers. Interviews with maize milling and trading firms suggest that under the first FRA regime these firms had begun to invest in dispersed procurement systems, including remote buying points, as well as procurement contracts with wholesalers in district capitals (Sitko and Jayne 2014). These investments by commercial firms in smallholder grain procurement coincided with a measurable increase in village-level grain procurement. In 2008/09, for example, an average of nine traders competed for smallholder maize in each village (Chapoto and Jayne 2011). This number declined to 5.45 by 2011 after FRA ramped up its maize purchase activities. Thus, in years when the FRA limits its role in the maize market, private sector demand for smallholder maize tends to be high, yielding measurable benefits for smallholders in terms of market competition and market access, even in remote regions.

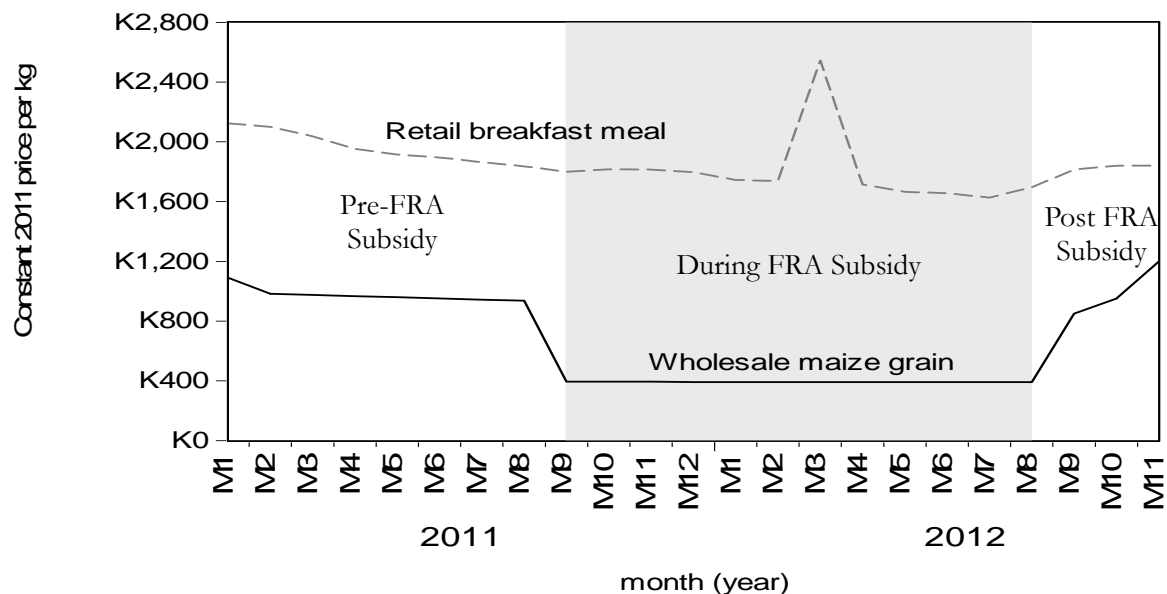
The positive developments within the formal maize sector have been significantly undermined by FRA's buying and selling activities since 2010. Drawing on interviews with representative from commercial maize milling, farming, and trading firms we identify three primary ways in which FRA's market interventions have prompted a detrimental reorganization of the formal maize market.

The first major cause of market reorganization occurred because the FRA purchased the majority of the available surplus at above-market, pan-territorial prices. By consolidating the majority of the available maize surplus, the FRA effectively squeezed the formal trading sector out of the maize market. In addition, by assuming responsibility for purchasing, transporting, and storing maize, the FRA made it uneconomical for commercial maize mills to invest in grain procurement and storage. This had several important effects on the market. First, it placed a huge burden on public storage systems, leading to significantly more maize spoilage than would have been the case if the private sector had an incentive to store grain. According to the Minister of Agriculture and Livestock in his May 9th, 2013 ministerial statement, maize grain deterioration and losses in FRA sheds was estimated at 32%. In contrast, formal wholesalers interviewed for this study estimate their storage losses to be in the range of 3 to 5%. These stark differences are the result of a number of factors. The most obvious of these being a lack of sufficient publically own covered storage to accommodate

the volumes of maize purchased by the FRA. This in turn forced the FRA to store much of the maize it acquired on concrete slabs covered with tarpaulin during the rainy season, leading to high levels of grain loss. Second, the availability of grain circulating in private markets was severely limited by the over-consolidation of the surplus by the FRA. Third, investment in smallholder grain assembly was undermined by the private sector's withdrawal from the market, making it difficult for farmers with only minimal surpluses to effectively engage in the market. Finally, the number of available points where maize could be purchased and loaded on to trucks was limited to FRA sheds and the few silos where limited private sector stocks were kept. This, according to respondents, created major distribution bottlenecks in the formal maize market, as the majority of maize demands from the formal processing sector had to be met from FRA sheds. At the same time this introduced scarcities in the wholesale maize markets, leading to higher prices than would have been the case if maize were flowing more smoothly through the market.

The bottlenecks created by an over centralization of maize in FRA sheds, combined with FRA-induced shortages in the private wholesale markets, contributed to a second important factor in the reorganization of Zambia's maize markets. While FRA's *de jure* policy was to provide access to subsidized maize to all licensed maize mills, bottlenecks at the point of distribution meant that some contracts for maize to commercial mills could not be met. According to some respondents from the formal maize milling sector, certain politically well positioned mills were given preferential treatment in terms of access to FRA maize. Mills that were unable to ensure a steady supply of maize from FRA were forced to either limit their overall throughput to match available FRA supplies, close down temporarily until stocks were again available, or procure grain from private wholesale markets, where prices were significantly higher than the subsidized prices offered by the FRA. In each case the result was a decrease in competition within the milling sector.

Figure 4. Constant Prices of Wholesale Maize Grain and Retail Breakfast Meal per kg in Lusaka



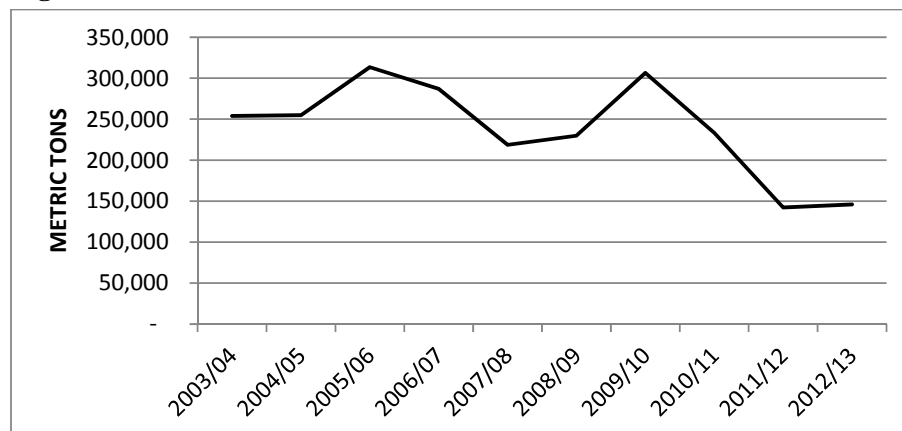
Source: Central Statistical Office (CSO) Monthly Price Bulletin. Found online at <http://www.zamstats.gov.zm/gen/monthly.php>

By undermining competition within the maize milling sector, FRA's maize distribution activities have made it difficult in the short-term for it to use into mill subsidies to bring down maize meal prices. As shown in Figure 4, when the FRA decreased its selling price to commercial mills to 400 ZMK/kg (roughly US\$ 0.08/kg) from September 2011 to August 2012, the retail maize price did not respond (Kuteya and Jayne 2012). This is because many mills, as well as informal markets, were not able to access the maize at this price or in sufficient quantities to satisfy market demand.

The final major structural change resulting from FRA's activities in the market occurred in the commercial farming sector. Interviews with commercial farmers in Zambia suggest that because of FRA's selling price to commercial mills, many mills began to back away from the standard practice of managing maize supplies through forward contracts with commercial farms. Without production contracts in place, and with high levels of price uncertainty due to FRA's activities, commercial farmers began to shift away from maize into soya beans production. As shown in Figure 5, commercial maize production halved, from 300,000 metric tons to less than 150,000 metric tons, between 2010 and 2013. Without the buffer of commercially produced maize to compensate for any smallholder supply shortfalls, Zambia's maize market is exposed to greater level of weather-induced supply risk than would otherwise be the case. This is because commercial farmers are able to irrigate their maize crop if rainfall conditions are poor. Moreover, aggregate supplies of maize over the medium to long-term are likely to be less than would be the case if commercial farmers in Zambia were not pushed out of maize production.

Thus, the broad effects of FRA's activities between 2010 and 2012 on the structure of the formal maize market has been: 1) to decrease available supplies, both through disincentives to commercial maize production and through losses resulting from inadequate public storage; and 2) to trigger consolidation within the trading, processing, and retailing sectors, leading to an overall decline in competition within the sector. These important structural changes have both short and long-term consequences. In the short-term the loss of supplies and competition within the formal sector means that there is less maize circulating in Zambia's markets than would otherwise be the case, and fewer actors in the market with access to it. Among other things, this creates distribution bottlenecks, as the speed with which maize can enter the market is limited by loading capacity of a limited number of FRA storage facilities.

Figure 5. Commercial Farm Maize Production Trends 2003/04-2012/13



Source: MAL Crop Forecast Surveys various years.

It also limits the geographic scope and competitiveness of the retail maize meal market, because not all large-scale mills operate in all markets of Zambia. As a result, geographic areas serviced by mills without preferential access to FRA maize suffer both in terms of the price paid for maize grain and in terms of overall supplies.

This radical restructuring of the maize sector is likely to have long-term consequences for food and agricultural markets more generally. Consolidation caused by FRA's activities, both among processing and trading firms, not only limits the overall competitiveness of the market, it may make Zambia a less favorable location for private investment in agriculture. For example, some grain traders indicated that because of the ways in which temporal arbitrage opportunities have been undermined by FRA's buying and selling prices, they have decided to forego planned investments in commercial grain storage. These long-term effects may divert much needed investment away from Zambia's agricultural sector, and will place a greater burden on Zambia's already overstretched budget. This in turn may limit the long-term capacity of Zambia to serve as a breadbasket for the region.

6. THE REORGANIZATION OF THE INFORMAL MAIZE MARKETING AND PROCESSING SECTOR POST-2010

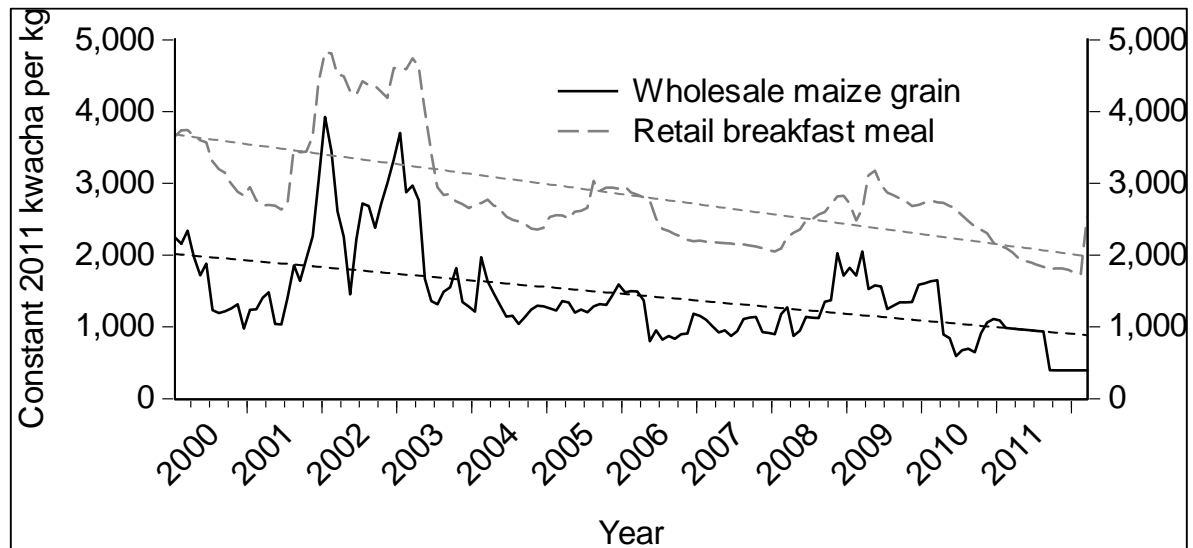
The structural effects of FRA procurement and marketing activities between 2010 and 2012 were not, however, confined to the formal maize market. Zambia's large and vibrant informal trading and milling sectors were equally hampered during this period. In this section we draw on semi-structured interview data from a sample of actors in the informal maize trading and milling sectors in order to illuminate how this sector was transformed as a result of extensive involvement of the FRA in the market.

The informal maize trading and processing sector in Zambia expanded rapidly in the wake of market liberalization policies initiated in the 1990s. The growth of informal food markets was in fact a common response to market liberalization in Sub-Saharan Africa, as these markets tend to face lower barriers to entry than other more knowledge and capital intensive occupations (Barrett 1997). In Zambia the informal maize sector is characterized by myriad small-scale maize buyers and sellers, linked to both commercial trading and milling firms, as well as small-scale grain processors (hammer mills). Broadly speaking, actors in the informal sector are poorly capitalized and tend to transact in small volumes of maize. However, due to their ubiquity their influence on the total maize transacted during a normal marketing year can be substantial. For example, in 2008 small-scale private buyers in Zambia were the market channel used by approximately 70.1% of smallholders in that year (Chapoto and Jayne 2011).

Informal small-scale traders play a critical role in Zambia, where the majority of surplus maize producers do not enjoy the economies of scale needed to profitably transport maize to external markets (Chapoto and Jayne 2009). By buying small quantities of maize from dispersed smallholders and aggregating them for onward sale, informal small-scale traders provide a valuable market intermediation service to Zambia's maize market. Indeed, according to interviews with commercial milling companies, these small-scale grain traders are, in normal years, considered the most reliable source of maize supply from the smallholder sector.

Yet equally important is the supply linkage these small-scale traders provide to low income retail food markets in urban areas. According to interviews with retailers and traders in urban markets in Lusaka, in the years leading up to the 2010 FRA expansion, small-scale traders provided informal retailers with access to relatively low cost maize that was assembled directly from small-scale farmers. By limiting the amount of intermediation in the market, these small-scale traders could generally provide maize to local retailers at competitive prices relative to formal wholesale markets. In this way, the informal maize market during the first FRA regime provided low income consumers with the option of acquiring low cost grain from market retailers, which they could then pay to have milled in nearby hammer mills. This served as an important source of competition for the formal maize milling sector, and contributed to the lower observed margins between wholesale maize grain and retail maize meal prices in Zambia (Figure 6) (Chapoto and Jayne 2006; Mason et al. 2009; Mason et al. 2011; Kuteya and Jayne 2012).

Figure 6. Shrinking Market Margins over Time in Lusaka



Source: Central Statistical Office (CSO) Monthly Price Bulletin. Found online at <http://www.zamstats.gov.zm/gen/monthly.php>

However, according to interviews with participants in these critical informal markets, the normal functioning of this sector was negatively affected by the large and unpredictable intervention of the FRA in the maize market between 2010 and 2012. Tracing the ways in which these interventions hampered the normal functioning of the informal market helps to explain the underlying structural changes that contributed to the elevated food prices in 2012/13.

The first way in which the informal sector was disrupted by FRA's interventions was in terms of limiting the available surplus to be purchased by the small-scale grain assembly sector. Based on farm-gate sales data collected from the Crop Forecast Survey, the percent of farmers selling grain directly to the private sector, predominantly the small-scale trading sector, declined from 70.1% in 2008 to 50.3% in 2011 (Chapoto and Jayne 2011). As the FRA absorbed greater amounts of the available surplus, through above-market pan-territorial prices and a major expansion of FRA buying depots, the amount of grain available to the informal market declined. This may have had important implications for rural consumers, who in most years make up 40-60% of smallholder households (Jayne et al. 2010). As a result of high FRA prices and more FRA buying depots, it is likely that maize that would otherwise have remained in rural areas to be sold to rural consumers was procured by the FRA, thereby making rural maize markets more thinly traded and increasing rural consumers' reliance on access to commercial maize meal to meet their food needs. Moreover, according to interviews with market retailers, the price at which the remaining grain was being sold within the informal markets was considerably higher than in normal production years. This anecdotal information is supported by previous econometric analysis, which found that FRA activities place significant upward pressure on wholesale maize prices in both rural and urban areas (Mason and Myers 2013).

Thus, through its procurement activities, the FRA effectively limited the availability of maize grain in the informal market, while raising the price of the remaining grain. This, according to interviews with informal market actors in Lusaka, forced many grain traders, retailers, and hammer millers out of business. For those that remained in business, the prices at which they

offered grain to consumers were significantly higher than would have been the case in a year when grain was flowing more freely in these markets.

The FRA could have attempted to moderate this effect on the informal sector by off-loading a portion of its stocks to the informal sector. However, interviews with informal retailers and hammer millers suggest that this did not occur. According to respondents in Lusaka's grain markets, FRA either explicitly or implicitly barred the informal sector from accessing subsidized grain from the FRA. According to several respondents this was not always the case. Prior to 2010 several respondents in Lusaka's informal grain markets indicated that they had successfully applied for grain from the FRA. However, following the 2010 bumper maize harvest and the ramping up of subsidies to some large-scale mills, applications for maize from the informal sector went unanswered. The reasons for this are not clear. One hypothesis is that given major infrastructural bottlenecks at FRA depots, the FRA chose to prioritize larger market actors over smaller ones in an effort to have a larger overall effect on maize supplies in the market. Alternatively, it may have been the case that the informal sector lacked the political and economic power to effectively advocate for access to FRA maize.

In either case, the outcome was the same. A segment of the commercial milling sector acquired a disproportionate share of the FRA grain subsidy, while the informal sector was either starved for grain or became reliant on expensive, thinly traded wholesale markets. As a result, the overall competitiveness of the maize market suffered. Consumers could no longer acquire maize from the informal retailers and mill it at local hammer mills when commercial maize meal prices rose. This lack of competition may help to explain why the grain subsidies to commercial maize mills appeared to have no effect on retail maize meal prices (Kuteya and Jayne 2012). Indeed, previous analyses have shown that in the absence of competition from the informal sector, commercial maize meal prices tend to rise (Rubey 1992). In addition, without grain freely circulating in informal markets, the demand pressure on the limited number of FRA selling points increased. This excessive centralization of maize supplies, in turn, undermined the capacity of the private maize market to quickly respond to any emergent or unanticipated demand pressures.

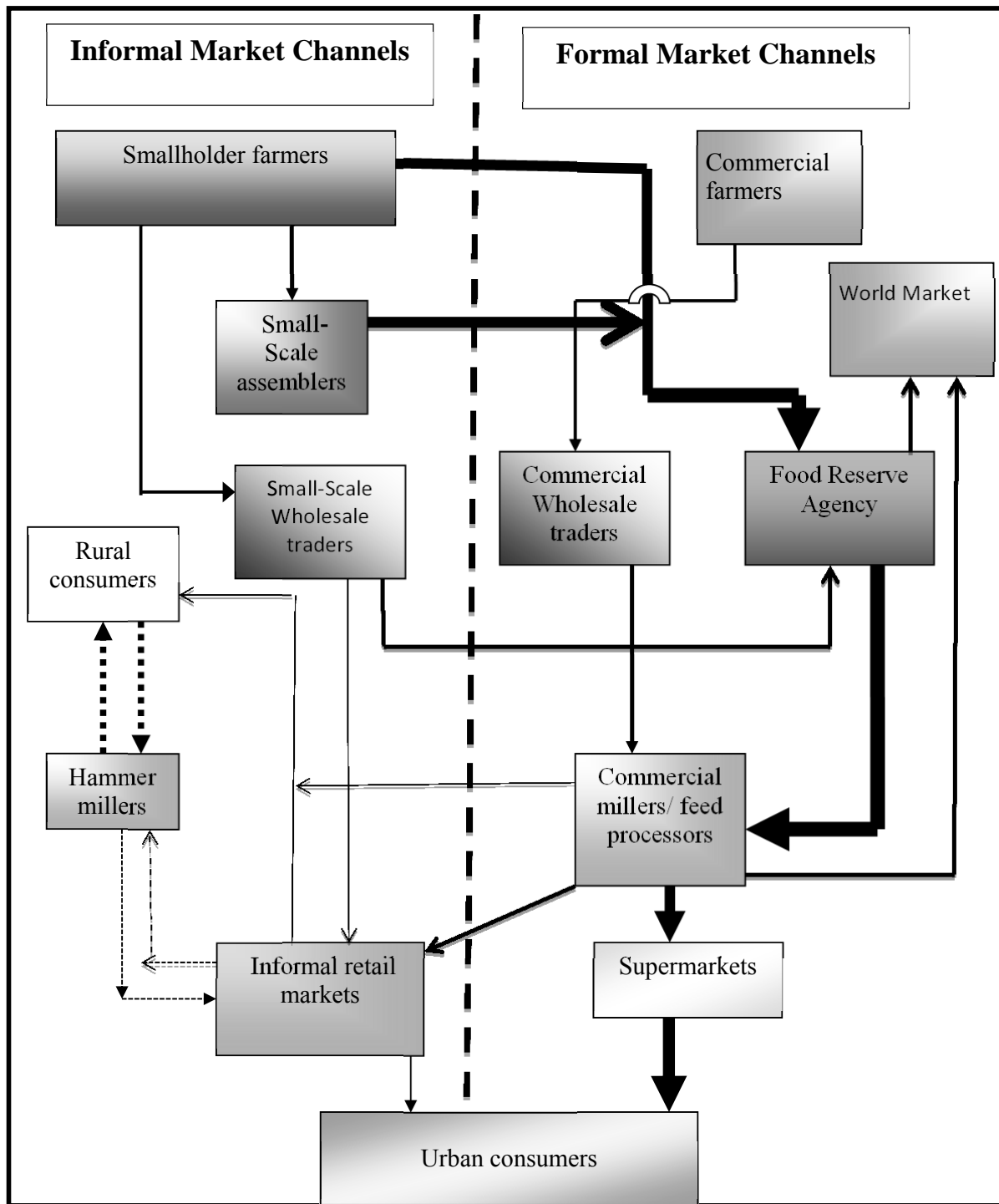
Taken together, our analysis suggests that by limiting the availability of grain in the informal market, pushing many informal market actors out of the maize market, and placing upward pressure on remaining wholesale prices, the FRA's activities severely hampered the performance of the informal sector. The negative consequences of this on the functioning of the maize market generally, and on poor consumers specifically, cannot be overemphasized. When maize grain is available on the market through informal channels, urban consumers can lower their household maize consumption bill by roughly 25% (Jayne et al. 2005). Thus, by undermining the functioning of the informal sector, the capacity of Zambia's poor to access cheaper sources of maize meal was limited. More broadly, the competitiveness and responsiveness of the maize market was also undermined, thereby leaving Zambia's maize market potentially more exposed to demand and supply shocks than would have been the case otherwise.

7. THE POST-2010 MARKET STRUCTURE

Figure 7 summarizes the effects of FRA's transition to the second buying regime on the structure of Zambia's maize market. As indicated by the thickness of the arrows, this new market structure is highly skewed toward market relationships involving the FRA. Under this new market structure, private sector grain assembly and wholesaling are thinly traded, despite record maize harvests. Commercial production has declined, at the same time that trading relationships between commercial farms and milling firms have deteriorated. Under these conditions, commercial maize mills now access the vast majority of their maize demand through the FRA, rather than primarily through the private sector.

As a result of the thinly traded private market channels, urban and rural consumers become increasingly dependent on access to maize meal produced by commercial mills. With the number of private market actors and the volume of maize held by the private sector highly constrained, Zambia's maize market is exposed to significant supply risks resulting from bottlenecks between consumers and commercial processors or the FRA and processors. Moreover, because of the highly centralized nature of this market structure, it lacks the necessary flexibility to respond to unanticipated changes in demand. Under this market structure the aggregate supplies held by the FRA may be less important in terms of meeting the demand requirements of consumers than supply bottlenecks linking the two. It is this skewed market structure that helps to explain how high food prices could emerge in the context of seemingly abundant supplies.

Figure 7. Post-2010 Maize Market Structure in Zambia



Source: Author.

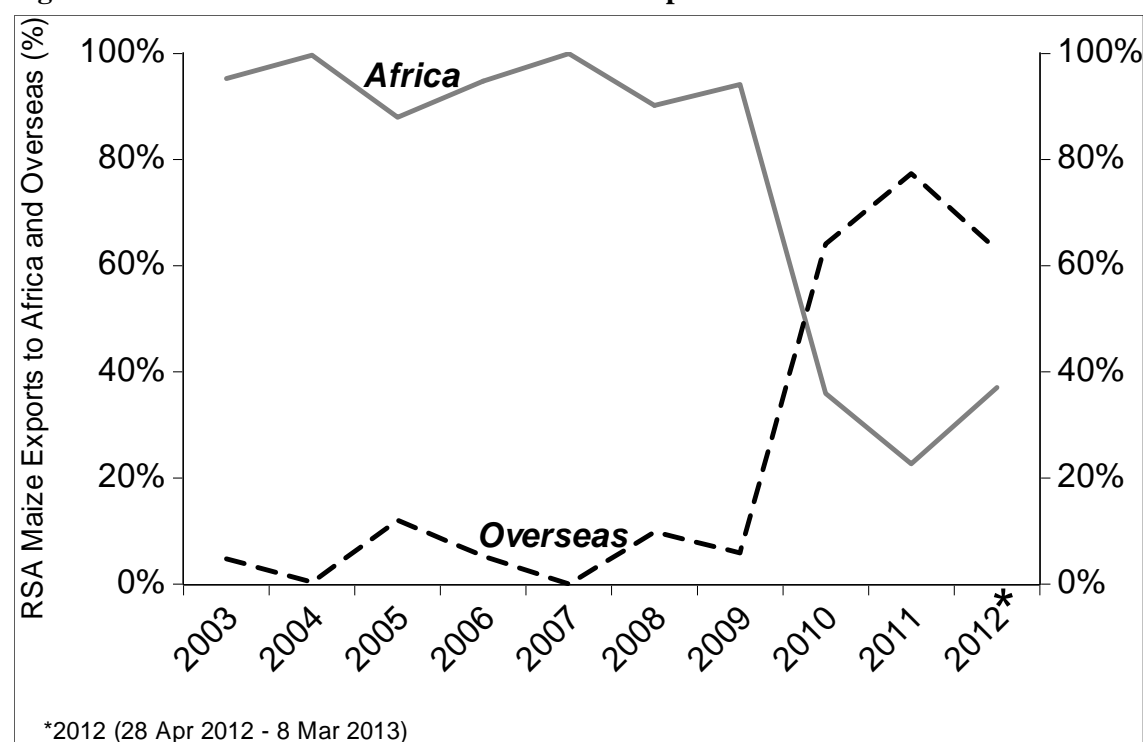
Note: Thickness of the arrows indicates relative volume.

8. THE MARKET SHOCK

The inherent limitations of the market structure that emerged out of the consolidation of the market by the FRA were exposed in 2012 by a significant shift in regional trading relationships for maize. In particular, beginning in 2010 and continuing through 2012, South Africa, the region's only consistent surplus producer of white maize, redirected the focus of its exports from the Sub-Saharan Africa region toward overseas markets. As shown in Figure 8, prior to this reorientation, South Africa would typically export over 90% of its available surplus to countries in Sub-Saharan Africa. However, by 2011 only about 20% of South Africa's available white maize surplus was exported to Sub-Saharan Africa.

There are a number of reasons underpinning the strategic redirection of maize surpluses. The first is that world maize prices have been consistently high since 2010, in part due to major crop losses in the Western Hemisphere. Indeed, during the 2011 and 2012 cropping seasons, Mexico imported nearly 2 million metric tons of maize from South Africa, or roughly 65% of South Africa's exports. Second, the emergence of Zambia, and to a lesser extent Malawi and Tanzania, as surplus producers has led South Africa exporter to reconsider the long-term viability of a Sub-Saharan Africa-focused export strategy (Republic of South Africa 2013).

Figure 8. Trends of South Africa's Maize Grain Exports to Africa⁴ and Overseas⁵



Source: South African Grain Information Service-SAGIS . This is a website, found at <http://www.sagis.org.za/>

⁴ Angola, Benin, Botswana, Cameroon, Chad, Congo, DRC, Ethiopia, Ghana, Guinea, Kenya, Lesotho, Malawi, Mali, Mozambique, Namibia, Nigeria, Senegal, Somalia, Sudan, Swaziland, Tanzania, Togo, Zambia, Zimbabwe.

⁵ Iran, Italy, Korea, Mexico, Venezuela.

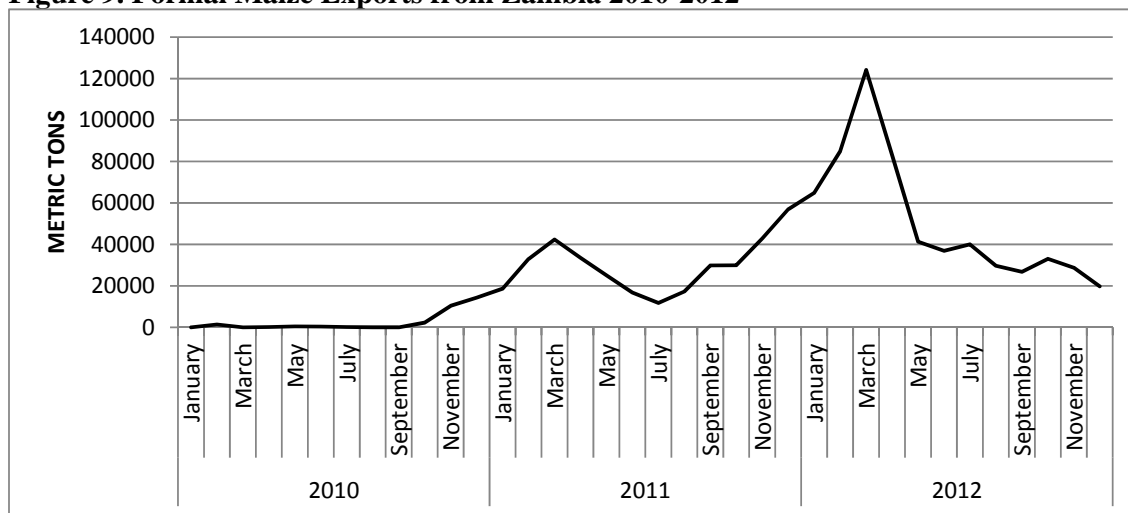
In particular, exporters question their capacity to effectively compete in the long-term with emergent exporting nations that enjoy a significant level of producer and marketing support for maize from national governments. Finally, South Africa is a major producer of Genetically Modified Organisms (GMO) white maize, which faces a number of import restrictions in the region. While these import restrictions are often applied in a seemingly *ad hoc* manner (Kirimi et al. 2011), the added cost and uncertainty associated with differing rules and regulations related to GMO maize has led South African exporters to pursue more stable and predictable markets in other regions.

The rapid redirection of maize away from Sub-Saharan markets by South African exporters likely placed an unanticipated demand burden on Zambia's maize market. Much of this demand comes from the major deficit countries of Zimbabwe and the DRC, which lie on the southern and northern borders of Zambia respectively. While Zambia did issue permits for formal exports to these countries, the small quantities allowed for export coupled with bottlenecks associated with accessing FRA maize for export, made it impossible for formal exports to satisfy demand. This in turn contributed to rising maize prices in those countries.

Based on official export figures, Zimbabwe was the primary destination for Zambian maize, importing a total of 600,000 metric tons between 2010 and 2012, or roughly 61% of the total formal maize exports. Due to a lack of maize processing in DRC, very little maize grain was formally exported to that country. Instead, DRC imported maize meal, totaling 4,754 metric tons, or 83% of Zambia's formal maize meal exports over the same time period. Given an estimated population of over 5.5 million people, limited agricultural production, and isolation from markets within the Katanga province of DRC, total exports of less than 5,000 metric tons of maize meal over three years is likely to have done little to satisfy demand. Moreover, as shown in Figures 9 and 10, the formal exports of both maize and maize meal from Zambia contracted sharply in 2012. Indeed, Zambia formally exported virtually no maize meal in 2012. This was due to the centralization of export licensing by the Government of Zambia in 2012, which in some cases severely slowed the process of obtaining formal permission to export and in others served as a *de facto* ban on exports.

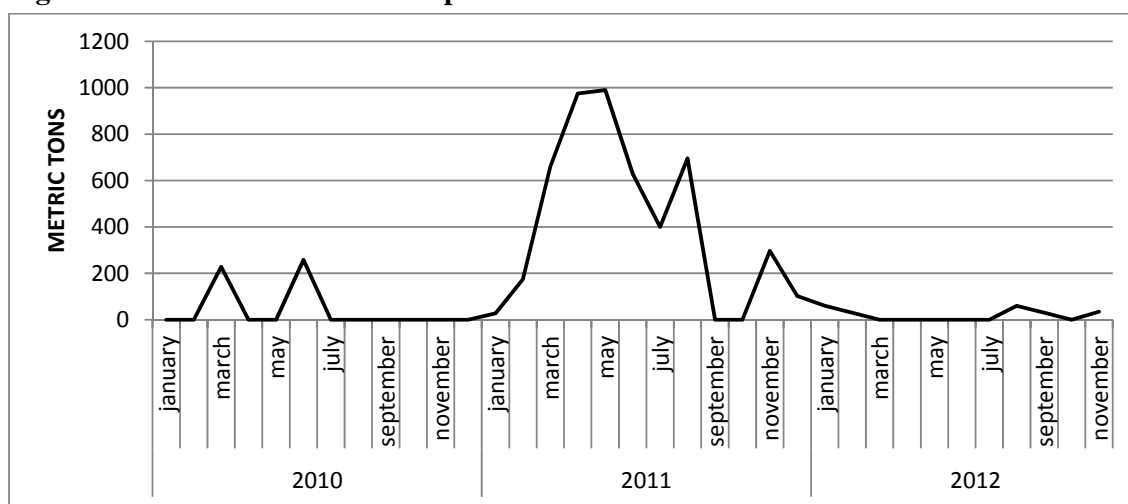
Under these conditions informal markets to service these deficit markets flourished. This placed massive pressure on maize meal supplies in Zambia, particularly along its northern border with DRC. Because Zambia's major market channels had been structurally compromised by years of excessive and unpredictable FRA interventions, Zambia's maize market was unable to effectively respond to this demand pressure. There simply were not sufficient supplies circulating in formal and informal market channels to both respond to the extremely attractive maize meal prices in DRC (and to a lesser extent Zimbabwe) and to adequately service the markets on the Zambian side. The result was that, despite over 700,000 metric tons of maize stocks still held in FRA sheds and large subsidies provided to some commercial maize mills, by November 2012 severe supply shortages began to occur throughout Zambia's Copperbelt province and some districts in the southern part of the country. These deficits, in turn, placed upward pressure on maize meal throughout the country, leading to a national food price rise despite years of bountiful harvests, large food subsidies, and more than adequate maize stocks in the country.

Figure 9. Formal Maize Exports from Zambia 2010-2012



Source: CSO External Trade Data 2010 – 2013.

Figure 10. Formal Maize Meal Exports from Zambia 2010-2012



Source: CSO External Trade Data 2010 – 2013.

9. CONCLUSIONS AND RECOMMENDATIONS

Given the market factors affecting South African exports of white maize, the preference for overseas markets is likely to continue into the future. Sub-Saharan Africa will, therefore, need to become more reliant on emergent African breadbaskets, such as Zambia, to feed its rapidly growing and urbanizing populations. This will certainly require that sufficient producer incentives are in place to enable improvements in overall productivity and production. However, production and productivity growth alone will not be sufficient. As we have shown, enabling the development of competitive and efficient output markets for food is essential. If output markets for staple foods are stymied by high levels of government intervention, improvements in production may not translate into improvements in food prices and availability.

Political pressure to support food producers in the event of major supply gluts is certainly understandable. Yet, this can quickly spiral out of control, leading to lasting and severe damage to the functioning of the entire maize market. This suggests that in order for countries like Zambia, which have the agro-ecological resources to become major surplus food producers, systems and institutions must be put in place to limit reactive, unpredictable government responses to changes in supply conditions. Of particular concern are the ways in which reactive responses to supply changes can divert much needed funding away from public goods, such as investment in infrastructure, which in turn stymies market development leading to a vicious cycle of continued justification for state interventions in food markets (Byerlee, Jayne, and Myers 2006).

Our analysis suggests the need for a critical rethinking in Zambia and the region concerning the management of food prices. In particular, refocusing efforts on managing price instability through investments in long-run market developments rather than short-term efforts to stabilize prices may be in the best interest of domestic and regional consumers and producers (Gadre-Madhin 2005; Byerlee, Jayne, and Myers 2006). This comes down to making sustained public investments in known drivers of economic growth and poverty reduction, including investments in agricultural research, extension, roads, and education (Fan 2000; Fan, Zhang, and Rao 2004). These public investments must be coupled with a policy environment that creates incentives for private sector investment. Our analysis has shown that of particular importance is the promotion of competition within both the formal and informal maize markets.

Promoting competition in the maize market requires the development of a predictable set of rules and regulations regarding government's behavior. Enhancing this predictability will require weakening the capacity of political actors to direct the behaviors of entities such as the FRA. By insulating the FRA from political interference—possibly by locating it within the Central Bank or through the creation of a council drawn from the private and public sector to guide its actions—the state's rationale and scope for monopolizing maize markets may be weakened. Through this enhanced predictability, incentives will be created for private sector actors to invest in grain procurement and in grain storage. As our study has shown, this can provide tangible benefits to local and regional producers and consumers. Moreover, given medium-term projections of high global maize prices, coupled with demand growth in the region, these investments should provide increased incentives for producers to enhance maize output (Moyo and Binswanger 2012). The budgetary space created by operating a smaller strategic reserve can then be redirected, in part, to supporting poor net food purchasers, through social safety nets such as cash transfers or food for work arrangements (Byerlee, Jayne, and Myers 2006). Well-targeted social safety-nets could help to mitigate some of the

detrimental effects of higher food prices that may arise from expanded regional trade and higher global food prices.

One important lesson from our case study is that maize markets in Zambia are highly responsive to policy incentives. The speed at which actors can move in and out of the market is astounding. This flexibility can be harnessed to achieve the sorts of beneficial outcomes desired by policy-makers. Through institutional reforms to the FRA, increased incentives for private investment in maize markets, and investments in public goods, including infrastructure and social safety nets, Zambian policy-makers can help to reorganize the structure of national and regional maize markets to benefit producers and consumers. This in turn can better position Zambia to serve as the region's breadbasket.

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