An evolution in the middle: Examining the rise of multinational investment in smallholder grain trading in Zambia

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Abstract:
African agrifood systems are being transformed by multinational capital. To date, research on this transformation has focused most intently on the rise of supermarkets and demand for African land. Multinational investment in African grain trading has received less attention. Using a range of qualitative methods and representative household survey data from Zambia, this article seeks to understand the causes and consequences of multinational investment in smallholder grain markets. We show that multinational investment into smallholder grain and oilseed trading grew substantially between 2012 and 2015. This has been driven by a range of important supply and demand factors, most notably transformations in downstream markets and stable macro-economic conditions. These are highly sensitive to change and highlight the fragility of this investment wave. The expansion of multinational investment has coincided with a drop in margins between farm-gate and wholesale prices. Moreover, these firms appear to be altering the structure and conduct of grain markets in beneficial ways, including expanding the range of services provided to farmers and increasing perceived levels of trust in private market by farmers. However, prices paid to farmers by these firms are lower than traditional small-scale market channels, ceteris paribus.

1. Introduction

In-flows of multinational capital into developing country food systems can radically alter how foods are produced, sold, processed, and purchased. Multinational investments into these food systems are often an important element of a broader process of food system modernization (Reardon and Timmer 2012; Reardon et al 2006). In addition to multinationalization, food system modernization is associated with increased consolidation along food supply chains, organizational and institutional changes including the rise of vertical coordination through interlinked contracts, and the growing prominence of private grades and standards (Reardon et al 2009; Reardon & Timmer, 2007; Swinnen, 2007; Reardon & Barrett,

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2000). While the modernization of Africa food systems has lagged other world regions, rapid growth in multinational investments signals change.

To date, research on the relationships between multinational investment and African food system modernization has focused most intently on the downstream and the upstream: the rise of supermarkets (Weatherspoon and Reardon 2003; Reardon et al 2003; Minten et al 2009; Neven et al 2009) and the influx of multinational capital into African food production through commercial farm acquisitions (Deininger and Byerlee 2011; Cotula 2009; Hall 2011). Missing in the debate is the growth of multinational investments in the midstream, specifically in food commodity trading (Reardon 2015).

Whether or not multinational investments into relatively thinly traded African grain markets produce outcomes that enhance the performance of these markets in ways that are beneficial to producers and consumers is the central question that needs to be answered in assessing this new trend, and possible policy responses to it. This paper begins to inform this question by drawing on a combination of qualitative and survey data to bring new evidence to the table on multinational investments in food commodity trading. We focus on maize and soybeans in Zambia, and seek to: 1) document the scale of investment in Zambia's smallholder grain supply chains; 2) Assess the causes of the influx of multinational capital, and; 3) Explore the implications of these investments for smallholder farmers, traditional supply chain actors, and price margins in the system.

This paper does not set out to empirically test the relationships between multinational investment and producer and consumer welfare. Instead, it explores the contextual and qualitative implications of these investments that should inform future empirical work on the subject. In addition, we expect this analysis to provide policy and programmatic insights into potential ways of harnessing this investment interest to enhance the welfare of African farmers and consumers and to better understand on-going process of food system modernization in Africa.

The paper is organized as follows. Section 2 explains the data and methods used in the analysis. Section 3 outlines a conceptual framework for assessing the causes of multinationalization of grain trading and its consequences. Section 4 documents the pace of growth of multinational investment in grain trading. Section 5 draws on survey and qualitative data to document the causes of the rise of this investment. Section 6 explores a range of potential implications of these investments on elements of Zambia's grain market structure, conduct and performance. Section 7 offers conclusions and recommendations.

2. Data Sources and Methodology

Data were derived from four sources. First, to understand the ways in which smallholder grain markets function and the effects of multinational investment in grain trading on these markets we carried out interviews with smallholder farmers and traditional market traders in five districts in Zambia. These interviews were carried out between 2012 and 2015 and are detailed in Table 1. Districts were purposively selected to be high production areas that have witnessed recent investments from multinational firms in domestic grain trading.

Farmers selected to participate in focus group discussions were identified with the help of local Ministry of Agriculture and Livestock extension officers. Only farmers who sold grain in the previous year were included in the discussions. During focus group discussions farmers were asked to identify local traders in their area. These traders were stratified as small-scale assembly traders, small and medium-scale wholesalers, and large-scale multinational firms.

Table 1: Interview respondents

Districts	Chipata, Katete, Choma, Mpongwe, Mkushi
Farmer Focus Group Discussions with smallholders	25
Total number of farmers	382
Small-scale assembly Traders	44
Local small and medium-scale wholesalers	7
Large-Scale multinational wholesalers	4

Second, to understand how and why multinational firms have begun investing in Zambia's grain trading markets we conducted interviews with representatives of four of the nine major firms[2] in Zambia, which we complemented with online research of company websites. The interviewed firms were: Cargill, NWK Agri-Services, Export Trading Group, and AFGRI.

Third, wholesale price data comes from the Zambian National Farmers Union market information database, while farm gate prices come from our fourth data source: the 2012 and 2015 Rural Agricultural Livelihoods Survey (RALS). These data sets provide statistically representative data on smallholder livelihood, including marketing behaviors and prices in Zambia at a provincial level.

Unfortunately, these surveys do not explicitly separate farmer sales to multinational large-scale traders from sales to local large-scale traders. In the RALS 2012 the survey response for sales channel is simply "large-scale trader." We argue, however, that this "large-scale trader" channel in the surveys is primarily multinational large-scale traders, for several reasons. First, as will be shown in Tables 2 and 3 below, RALS 2015 data show that 91% and 92% of all smallholder sales of maize and soybeans, respectively, to "large-scale traders" took place in the provinces where NWK-Agri-Services, Export Trading Group, AFGRI, and Cargill operate their smallholder grain and oilseed operations: Central, Eastern, and to a lesser extent Southern Provinces[3]. Reported smallholder quantities purchased by Cargill and NWK in Eastern and Central Provinces (91,481 mt of maize and 4,986 mt of soybeans) account for 49% of the maize and 38% of the soybeans purchased by "large-scale traders" captured in the RALS sales data for those provinces. Purchase data from the other major multinational firms would certainly pull these figures up substantially. Second, interviews with grain wholesalers and the grain traders' association indicate that large-scale domestic traders focus almost entirely on Zambia's commercial farming sector; they have made very few investments in smallholder markets. To the extent that these traders buy from the smallholder sector, they rarely do so through direct purchases from farmers at formal depots. Instead, they buy smallholder grain through intermediary traders, which farmers would not recognize as proxies

[2] The multinational firms operating in Zambia's grain trading sector during the time of field work were: Cargill, Export Trading Group, NWK Agri-Services, AFGRI, IntraAfrica Grain, DomZam (subsidiary of Holbud Ltd), Olam Zambia, Metl Group, and Senwes Ltd.

[3] During the reporting period only AFGRI operated buying centers in Southern Province

for larger buyers; farmer response to survey questions about such sales would certainly not be "large-scale traders." For these reason we believe that our survey data provide strong insight into smallholder marketing to the multinational sector.

3. Conceptual framework

What potential factors drive consolidation and multinational investment in grain trading and what are the implications of this on the structure and performance of smallholder markets? To examine these questions, we draw on insights generated by the literature on food system modernization.

The term food system refers to a holistic conceptual lens, which focuses on the flow of food and associated products and services across the various segments for food supply chains: input suppliers, producers, traders and wholesalers, processors, retailers, and consumers (Thornton et al 2011; Reardon and Timmer 2012). Food system modernization, therefore, entails transformations to segments of food supply chains and the linkages between them that are distinct from traditional market and production arrangements. In a stylized sense, this denotes a shift from low input, dispersed small-scale production systems linked to poorly capitalized processing and retailing markets through myriad low-volume spot market transactions (see Fafchamps 2004; Jayne and Jones 1997), to a more consolidated, capital intensive system where contracts and private standards mediate relationships along the supply chain (Henson and Reardon 2005; Reardon et al 2009).

To understand the causes of the modernization, and more specifically the multinationalization, of the grain trading in Zambia, it is useful to think in terms of changes in demand conditions for the services provided by these firms and the factors that may their supply (Readon and Timmer 2012). Factors that give rise to greater demand for food system modernization within the trading segment occur along the supply chain. Based on existing literature, we identify four potential factors that influence demand. First, at a producer level, farm consolidation creates demand for a better capitalized trading sector, capable of purchasing larger output volumes, as well as an expectation of greater services not typically provided by traditional traders, such as forward delivery contracts and input credit (Farina & Machado 1999, Reardon & Berdegue´ 2002). Zambia has long had a commercial farm sector, which has stimulated demand for large-scale trading services. More recently, research shows that a rapid structural transformation in the smallholder sector[4] is underway. Jayne et al (forthcoming) show that farms greater than 10 ha in size have increased from 4% of the smallholder population in 2008/09 to 7% in 2014/15. This has led to considerable concentration of land, with these farm now controlling 33% of all smallholder land in the country. It is these larger smallholder farms that account for the lion's share of surplus maize production in the country (ibid). This consolidation may serve to draw multinational investment into traditional smallholder markets.

Second, at the downstream processing segment of the system, consolidation, growth, and product diversification often increase demand for steady supplies of inputs of a specified quality, which larger traders are better suited to comply with (Key & Runsten 1999, Dries et al. 2009). This, in turn, is found to be driven by processes of urbanization, urban income growth, and retail market modernization (Reardon and Timmer 2012; Ncube et al 2011). Zambia has historically been more urban than most countries in Sub-Saharan Africa. After a decline in urban populations in the 1990s, urban population growth has picked up rapidly since the turn of the century. Urban population growth rates as of 2015

[4] In Zambia the smallholder sector is defined as farm less than 20 hectares.

stood at 4.18%, while the share of the population that is urban grew from 34.8% in 2000 to 40.9% in 2015 (World Bank data). This growth has coincided with a substantial increase in per capita GDP, from US$1,130 in 2009 to US$1,840 in 2013. These transformations are likely reshaping the food system in ways that creates demand for multinational engagement in food supply chains, including oil and animal feed processing which typical experience significant growth in the context of urban income growth (Tschirley et al 2015; Tschirley et al 2014).

A third, and underappreciated element of the demand-side growth of large, multinational firms is the role of donor investments in smallholder markets (Mellor 1998; Kimura and Todo 2010). The predominance of "value chain approaches" in current agricultural development spending creates demand for the sorts of market coordination and supply chain management skills that multinational trading firms typically have. Because Zambia is a Feed the Future country, with significant donor investments in smallholder supply chain development in the Eastern Province (where most multinational firms are also focused), there is reason to suspect a relationship between investment growth from these firms and donor activities.

Public investments can often produce important demand-side effects on multinational investments (Henisze 2000; Blomstrom et al 2003). In Zambia input subsides and infrastructure investments are likely the most important factors for multinational investment in grain trading. Input subsidies that generate lower cost tradable surpluses (ideally if coupled with liberal trade policies and minimal marketing board involvement) should spark demand for larger actors capable of access sufficient financing and storage to absorb these surpluses. In Zambia, the coincidence of good weather and a significant ramping up of investments in input subsidies, which absorb over 50 % of the country's agricultural budget, has triggered significant surplus maize production growth, with smallholder maize surpluses consistently exceeding one million tons since 2010 (Burke et al 2010). This, however, has also coincided with an expansion of state marketing board activities and the continued application of trade restrictions, thus potentially moderating the beneficial effects on investment (Sitko and Kuteya 2013).

The supply side factors include legislation and policies that enable consolidation and multinational entry into markets. The first critical element is the adoption of economic liberalization policies and regulatory environments that enable foreign capital movement (Barrett 1997; Reardon and Timmer 2012). The second element is reasonably stable macroeconomic conditions and exchange rates, which help limit inflationary and exchange rate risks (Henise 2000; Gastanaga et al 1998). Finally, trade regulations that allow relatively predictable access to cross border markets (Dorosh et al 2009). Trade restrictions on food crops has been a consistent barrier to investment by trading firms in Zambia (Nijhoff et al 2003). However, broader investment and macro-economic trends have been supportive. Zambia's ease of doing business scores are consistently high by continental standards (http://www.doingbusiness.org/). In addition, until recently Zambia maintained multiple years of single digit inflation and relative stable currency conditions.

Based on this summary, many of the important demand and supply conditions for multinational investment in grain trading appear to be in place in Zambia, with several important points of weakness and some signs of recent deterioration. Assessing the role of these factors in firms' decision to enter Zambia's smallholder grain markets will provide important insights into the multinationalization of grain trading.

Turning now to the implications of the rise of multinational investments in grain trading, our food systems approach draws attention to the various segments of the supply chains of interest and the

linkages between them. To understand the potential effects of this transformation, we must first appreciate the implications of the dominant traditional market system. Traditional smallholder grain markets in Africa are typically dominated by numerous, poorly capitalized small-scale players, who link dispersed farmers with limited surpluses to sell to consumers through numerous uncoordinated transactions (Fafchamps 2004; Poulton et al 2006; Sitko and Jayne 2014). As a consequence of this market structure, transactions costs are cumulatively high, prices are often extremely variable, and the capacity to develop more structured, formalized and anonymous trading systems are limited (Fafchamp 2004; Sitko and Jayne 2012; Rashid et al 2010; Byerlee et al 2006).

This market structure tends to elevate the risks of supply chain investments that could improve the performance of the market (Fafchamps 2004). In particular, the prevailing traditional market system limits incentives to coordinate investments in the supply chain, as investments at one end may be appropriated by other players along the supply chain. Input credit is a classic example, where the potential for side selling limits firms' willingness to invest in input credit contracts. The inability to effectively coordinate actions in African supply chains is seen as a major obstacle to achieving a more productive and efficient food system (Poulton et al 2006).

The emergence of large-scale trading firms offers the potential to substantially reduce the risks that typically imped investments in smallholder markets. Larger firms are capable of coordinating a range of investments in supply chains and are substantially less exposed to risks associated with opportunism by other market players (Poulton et al 2006). If this is the case, we would anticipate the rise of multinational trading to result in greater investments in a range of hard and soft market infrastructure and services, including market information, transport, storage facilities, and input credit. A priori we also anticipate that the emergence of multinational traders will contribute to a decline in marketing margins, as grain would have to pass through fewer hands to reach end users and scale economies in transport and market intelligence would reduce transactions and search costs (Reardon and Timmer 2012).

Finally, because capital movements also often entail cultural exchanges, we anticipate that the influx of foreign capital into smallholder grain and oilseed markets will bring with it different ways of conducting business in the trading sector (Dunning 1994). We would anticipate this to be the case for two reasons. First, multinational firms may make large fixed cost investments in infrastructure, such as storage, which would require long repayment horizons and thus creates incentives for cultivating longer-term relationships with producers and suppliers than exist in traditional markets. Second, as global actors, multinational firms have incentives to manage perceptions of their investments and, therefore, to ensure a higher level of transparency and professionalism than may exist in traditional systems.

These broad implications, however, tell us very little about the distributional effects of this investment at the farm and trading segments of the supply chain. A priori, we anticipate that the rise of multinational investments in grain markets will generate benefits that will largely accrue to larger, better off producers. As Reardon and Timmer (2012) discuss, farmers that participate in modern food industry channels have greater net earnings per hectare cultivated or per kg marketed than those who sell through traditional market channels. This may be due to higher gross prices paid, in order to induce consistent supplies from reliable producers, or through high net prices created through tied input credit or other services that lower production costs and/or transactions costs associated with identifying markets or negotiating prices. Given economies of scale in production and marketing of grain and oilseeds, we would anticipate that these benefits will largely accrue to larger farms and thus may have a regressive effect on rural income distribution.

However, the evidence on small-scale participation in food system modernization is ambiguous. Evidence suggests that the extent to which small-scale farms participate in modern food system market channels is a function of several factors: 1) the relative labor intensity of the crop. While small farms are capital constrained, they may be better capable of exploit household labor to adopt the necessary labor intense field practices of some crops (Von Braun, Hotchkiss, and Immink 1989). 2) The existence of farmers' cooperative or other market institutions that lower transactions cost of doing business with small-scale farmers may enable greater participation of small farm in modern food systems (Bakshi, Roy, and Thorat, 2006). 3) public or private investments that address farmers' constraints to credit or inputs, and thus overcome the idiosyncratic market failures that plague smallholder production systems, may make small farms competitive with larger ones (Austin 1981). 4. The relative clustering of small-scale farms in high potential agro-ecological zones will influence the degree to which small-scale farms participate in food system modernization. Thus, there are a range of institutional, geographic, and product-specific factors that may enable greater participation in food system modernization by small-scale farms that we must be attentive to when examining the implications of the rise of multinational investment in grain trading.

The effects of multinational entry on traditional markets actors is important. Literature on food system modernization shows that as supply chains modernize, they frequently undergo a process of "disintermediation," where modern supply chain actors gradually by-pass traditional intermediaries as their businesses evolve (Reardon 2015). Yet, the bulk of evidence on disintermediation has focused on high value, perishable commodities that require more capital intensive investments in storage and handling to enter modern food system channels. There are several reasons to suspect that small-scale, traditional market actors will endure in the context of multinational expansion. First, large swaths of sub-Saharan Africa remain poorly integrated into markets due to chronic underinvestment in infrastructure. In these regions the high transactions costs of assembling grain may be prohibitive for large firms, and thus may be better served by traditional market actors. In much of sub-Saharan Africa, grain markets are highly concentrated (Jayne et al 2010). This means that myriad producers have very limited surpluses to sell. For these very small farms, traditional market actors will likely remain the ideal form of market intermediary. Finally, large swaths of Sub-Saharan Africa face relatively poor agro-ecological conditions, many of which will worsen as a result of climate change. Low levels of surplus production and highly variable output substantially limits the incentives for large-scale investments in trading in those regions.

While it is too early to fully assess the implications of the rise of multinational investment in Zambia's smallholder grain markets, we will draw on household survey data, qualitative evidence from traditional sector traders, and price data to identify emergent trends and to assess their implications for the future development of Zambia food system.

4. Quantifying the level of multinational involvement in Zambian grain supply chains

Before assessing in detail the causes and consequence of multinational investment in smallholder Zambian grain markets, we first establish the pace and scale of this transformation using smallholder survey data from 2011/12 and 2014/15. According to interviews with the Grain Trader's Association and with representatives from major trading firms, 2011 marks the beginning of the recent wave of investments by multinational firms in smallholder markets in Zambia. Data on smallholder maize and soybean sales to "large-scale traders" are summarized in Tables 2 and 3. Based on our previous discussions and additional information provided below, we argue that these data are largely evidence of multinational investment in smallholder markets.

Table 2 shows that between 2011/12 and 2014/15, maize sales by smallholder farmers to large-scale traders increased nearly five-fold, from 40,617 mt to 241,071 mt. This represents an increase from 3% of total smallholder sales by volume to 12% that were sold to large-scale traders. In provinces where multinational firms are most active the figures are even more pronounced. In Central and Eastern Provinces, 23% and 17% respectively of total smallholder maize sales volume was sold directly to large-scale traders in 2014/15. The rapid growth in sales to large-scale traders is consistent with the purchase data reported by Cargill and NWK Agri-Services. In 2010/11 these companies purchased 31,000 mt[5] of maize from small-scale farmers in Zambia. By 2014/15 this had increased three-fold to 91,481 mt.

Table 2: Total smallholder maize sales and direct sales to large-scale traders by province, 2011/12 to 2014/15

	Maize							
	2011/12				2014/15			
Province	Smallholder sales (MT)	Quantity bought by large-scale traders (MT)	% of provincial smallholder sales bought by large-scale traders	% of total large-scale trader purchases	Smallholder sales (MT)	Quantity bought by large-scale traders (MT)	% of provincial smallholder sales bought by large-scale traders	% of total large-scale trader purchases
Central	294,155	12,767	4%	31%	561,334	128,602	23%	53%
Copperbelt	92,623	2,255	2%	6%	119,433	11,357	10%	5%
Eastern	280,526	5,338	2%	13%	349,990	57,878	17%	24%
Luapula	71,685	1,101	2%	3%	117,743	335	0%	0%
Lusaka	40,514	45	0%	0%	60,409	6,212	10%	3%
Muchinga	120,411	1,994	2%	5%	171,370	1,876	1%	1%
Northern	161,796	828	1%	2%	216,673	989	0%	0%
NorthWestern	82,329	332	0%	1%	118,681	55	0%	0%
Southern	285,117	14,825	5%	37%	314,755	33,767	11%	14%
Western	31,196	1,130	4%	3%	35,041	-	0%	0%
Total	1,460,353	40,617	3%	100%	2,065,429	241,071	12%	100%

Source: RALS 2012 and 2015

Table 3 presents similar data on soybean sales by smallholder farmers. It shows that between 2011/12 and 2014/15 soybean sales from smallholder farmers to large-scale traders increased nearly six-fold, from 2,428 mt to 14,119 mt. As a share of total sales volume, sales by smallholder farmers to large-scale traders increased from 17% to 40% over that period of time. In Central and Eastern Province, where most of all the sales took place, 47% and 44%, respectively, of all smallholder soybean sales went to large-scale traders. The pace of this growth is highly consistent with reported soybean purchases by NWK Agri-Services and Cargill. In 2010/11 these firms had a combined smallholder soybean purchases of 800 mt, which by 2014/15 increased six-fold to 4,986 mt.

Table 3: Total smallholder soybean sales and direct sales to large-scale traders by province, 2011/12 to 2014/15

	Soybeans							
	2011/12				2014/15			
Province	Smallholder sales (MT)	Quantity bought	% of provincial	% of total large-	Smallholder sales (MT)	Quantity bought	% of provincial	% of total large-

[5] In 2010/11 purchases of maize by NWK were made by Dunavant Cotton

		by large-scale traders (MT)	smallholder sales bought by large-scale traders	scale trader purchases		by large-scale traders (MT)	smallholder sales bought by large-scale traders	scale trader purchases
Central	6,097	678	11%	28%	16,717	7,940	47%	56%
Copperbelt	281	9	3%	0%	487	46	9%	0%
Eastern	5,126	1,513	30%	62%	11,654	5,101	44%	36%
Luapula	62	0	0%	0%	450	416	93%	3%
Lusaka	607	56	9%	2%	524	290	55%	2%
Muchinga	706	121	17%	5%	608	5	1%	0%
Northern	864	44	5%	2%	2,845	259	9%	2%
NorthWestern	619	2	0%	0%	1,117	0	0%	0%
Southern	124	4	3%	0%	490	62	13%	0%
Western	5	0	0%	0%	-	0	0%	0%
Total	14,490	2,428	17%	100%	34,893	14,119	41%	100%

Source: RALS 2012 and RALS 2015

5. Assessing the factors driving multinational investment in smallholder grain markets

In this section we draw on interview data with multinational firms in Zambia and other data sources to assess the extent to which the demand and supply-side factors for the multinationalization of grain trading contributed to the observed growth in smallholder sales to these firms. Our literature review highlights four potential demand-side factors: 1) production consolidation; 2) market opportunities created by downstream investments in processing and retailing; 3) donor investments in smallholder markets, and 4) public investments to support smallholder market development and production. Interviews with grain trading firms and the Grain Traders Association of Zambia largely support our hypotheses on the demand-side factors that influence multinational investment, with several important points of departure.

Of the four multinational firms interviewed for this paper, none indicated that the rapid consolidation of smallholder land and surplus production in Zambia played a role in their decision to enter smallholder grain markets. This is unsurprising, given that the evidence on this has only recently entered policy discussions in Zambia. Instead, these firms discussed their smallholder investments in Zambia as strategic investments in future opportunities offered by African smallholder agriculture. The choice of Zambia as an important location to develop a smallholder grain trading business was strengthened by the existence of a large commercial farming sector, which provides relatively predictable surpluses, and thus helps to defray of risk of investing in fixed costs of grain trading in Zambia, such as offices, storage facilities, and transportation.

Despite the lack of explicit attention to smallholder land consolidation in their strategic decision to invest in smallholder grain markets, household survey data shows that sales to large-scale traders by smallholders are skewed toward larger land holders. Table 4 and 5 present smallholder sales volumes by land size for the smallholder market channels identified in our household survey. These tables show that in 2014/15 56% of all soybean sales and 73% of all maize sales to large-scale traders came from farms with total landholdings of 5 hectares or more. Despite the recent growth of these larger farms, farms

over 5 hectares of total land only make up 21.2% of the smallholder[6] population. Thus, larger land holders appear to be an essential, albeit unrecognized, element of the current growth of large-scale, multinational investment in grain trading.

[6] In Zambia, the term “smallholder” is used for farms under 20 hectares.

Table 4: Smallholder Soybean Sales by Market Channel and Land Size, 2014/1

	Small-scale traders			Large-scale traders			Miller/processors			Other HHs			Other (eg schools, NGOs)		
	MT purchased	Row %	Column %	MT purchased	Row %	Column %	MT purchased	Row %	Column %	MT purchased	Row %	Column %	MT purchased	Row %	Column %
0-2 ha	2,601	61%	14%	1,242	29%	9%	332	8%	25%	80	2%	13%	8	0%	7%
2-5 ha	5,569	55%	30%	4,168	41%	30%	103	1%	8%	270	3%	44%	16	0%	13%
5-10 ha	5,145	48%	28%	5,051	47%	36%	355	3%	27%	119	1%	19%	93	1%	80%
10-20 ha	3,041	54%	16%	2,149	38%	15%	453	8%	34%	4	0%	1%	-	0%	0%
>20 ha	2,312	57%	12%	1,510	37%	11%	70	2%	5%	143	4%	23%	-	0%	0%
Total	18,669	54%	100%	14,119	41%	100%	1,314	4%	100%	617	2%	100%	117	0%	100%

Source: RALS 2015

Table 5: Smallholder Maize Sales by Market Channel and Land Size, 2014/15

	Small-scale traders			Large-scale traders			Miller/processors			Other HHs			FRA			Other (eg schools, NGOs)		
Landholding size	MT purchased	Row %	Column %	MT purchased	Row %	Column %	MT purchased	Row %	Column %	MT purchased	Row %	Column %	MT purchased	Row %	Column %	MT purchased	Row %	Column %
0-2 ha	68,086	24%	20%	23,160	8%	10%	14,382	5%	8%	14,691	5%	24%	165,672	58%	13%	1,546	1%	14%
2-5 ha	95,626	19%	28%	42,229	8%	18%	20,135	4%	12%	18,225	4%	30%	336,527	65%	27%	3,492	1%	32%
5-10 ha	109,616	18%	32%	55,953	9%	23%	44,862	7%	26%	15,330	3%	25%	376,825	62%	31%	2,544	0%	23%
10-20 ha	42,916	10%	12%	67,058	16%	28%	45,240	11%	26%	8,691	2%	14%	257,099	61%	21%	3,264	1%	30%
>20 ha	27,722	12%	8%	52,672	23%	22%	48,869	21%	28%	3,972	2%	7%	98,792	43%	8%	-	0%	0%
Total	343,966	17%	100%	241,071	12%	100%	173,488	8%	100%	60,909	3%	100%	1,234,916	60%	100%	10,846	1%	100%

Source: RALS 2015

Interviews with large-scale trading firms identify transformations in the structure of downstream markets, including growth in food processing and supermarket retailing, as a fundamental factor in driving their investments in smallholder trading markets. There are several reasons for this. Large-scale processors, including maize millers, oil crushers and animal feed processors, are the main downstream clients of large-scale traders. Supply contracts from these processors are the primary triggers for multinational national firms to buy grain. The traders interviewed for this paper indicated that given prevailing uncertainty created by inadequate domestic and regional market price and supply information, the lack of formal trading platforms, and a lack of predictability in government policy of trade, traders indicated that they rarely take speculative positions in maize or soybean markets. Instead, the quantities they buy are largely dictated by supply contracts with processors. In the absence of these contracts, traders are unlikely to make substantial investments in smallholder markets.

Grain processing in Zambia has expanded substantially in recent years, driven in large measure by changes in the dietary preferences of better-off Zambians (Zhang and Goldsmith 2016). According to the Poultry Association of Zambia, broiler production in Zambia increased from 13 million tons in 2007 to 43 million tons in 2014 (http://www.paoz.org/Data%20&%20Statistics). Zambia's animal feed processing has responded accordingly. Prior to 2000 Zambia produced less than 10,000 mt of animal feed commercial. As of 2015 seven major feed mills operated in Zambia with a combined feed production capacity of 320,000 mt of feed per year (AgriProFocus Zambia, 2015). These firms are major buyers of both maize and soybeans. Edible oil production has seen similar growth. As of 2013, Zambia's edible oil crushing capacity, which uses soybeans as the principle ingredient, reached 375,575 mt per year, up from roughly 46,000 mt in 2008 (Chisanga and Sitko 2013). This growth, and the supply contracts it creates for large trading firms, has been instrumental in influencing multinational investment in smallholder maize and soybean markets.

In addition, two other important factors are relevant here. The first is that in the case of NWK Agri-Services, Cargill, and Olam previous investments in or acquisitions of smallholder cotton businesses have facilitated their entry into smallholder grain markets. The smallholder cotton business in Zambia entails high fixed costs associated with input credit, extension services, storage, and management. Yet cotton supplies are subject to significant year to year variations, due to weather conditions and the lagged price response of farmers (Theriault and Tschirley, 2014). This means that in years following low cotton prices, cotton volumes decline, making is difficult to cover fixed costs. In this context, a logical response is to expand these existing investments into other smallholder crops with more price-inelastic supply. As one respondent put it, prior to investing in smallholder grain markets, "we were literally stepping over maize to get to the cotton."

Second, margins in Zambia's smallholder markets are high, due to the large number of intermediaries involved in the markets, high transactions costs associated with limited economies of scale and poor infrastructure, and limited market information. As shown in Table 6, farm-gate to wholesale margins for maize in Zambia were nearly 30% in 2011/12. These margins were particularly high in the provinces that have subsequently received the bulk of multinational investment in Zambia: Central, Eastern, and Southern. Through more formalized smallholder buying networks, relative to traditional markets, multinational firms indicated that they see opportunities to overcome some of these transactions costs in ways that enable them to capture high returns.

Table 6: Farm-gate to Local Wholesale Market Margins

Province	2011/2012
Central	0.356
Copperbelt	0.240
Eastern	0.329
Luapula	0.215
Lusaka	0.195
Muchinga	0.202
Northern	0.212
North-Western	0.334
Southern	0.345
Western	0.148
Zambia	0.293

Sources: Farm-gate prices from RALS 2012, Provincial wholesale prices, Zambia National Farmers Union rice information system.

The role of donor investments in smallholder markets was not considered a factor the decision to invest into smallholder markets. Indeed, respondents were largely critical of donor activities in smallholder markets, seeing them more as a disruption than as a support. One example that was repeated several times was in the case of soybean seed supplies. Soybean seeds are relatively scarce in Zambia, for a variety of reasons. Increasingly, large firms are seeking to provide soybean seed credit to farmers to improve supply. Yet in 2015, a donor funded project acquired a large quantity of these seeds to be distributed for free to beneficiary farmers. Respondents indicated that as a result, they could not acquire sufficient seeds to implement their seed credit program at the scale they had intended.

Despite these tensions, respondents from trading firms see important opportunities for collaboration with donors. This includes leveraging donor support to defray fixed costs in aggregation and extension services, as well as risk sharing on input credit and forward delivery contracting. This represents an important area for future attention.

Government investments in smallholder markets and supplies are viewed ambiguously by respondents. Recent road infrastructure and input subsidy investments are acknowledged as important factors for stimulating investment in smallholder markets. These are seen to lower transactions costs and increase tradable surpluses. However, large public investments in grain purchases by the government through the Food Reserve Agency, coupled with price uncertainty created by the off-loading of government maize stocks on domestic and regional markets are subsidized prices and the frequent imposition of ad hoc trade restrictions are seen as barriers to continued and future investment in smallholder markets.

Government influence over what we call “supply-side factors”, such as foreign direct investment, fiscal, and monetary policies were widely seen by respondents as critical for their smallholder investments in grain markets. Consistent with the government’s stated commitment to market liberalization, respondents did not perceive any formal barriers to investment in smallholder grain trading. In addition, during the recent period of growth in multinational activity in smallholder grain markets, many important macro-economic factors were supportive of this investment; Domestic currency exchange rates were relatively stable, thus limiting exchange rate risks to the firms, inflation rates were low and stable, and government debt to GDP ratios were good. In addition, several respondents indicated that

Zambia's record of holding peaceful democratic elections was important in their decision making process.

However, recently many of these positive trends have been reversed. The global drop in commodity prices has hit Zambia particularly hard. Due to its overreliance on copper for foreign exchange, steep drops in copper price have put downward pressure on the kwacha. In response, the government instituted exchange rate restrictions in 2012 and, subsequently, other monetary controls to prop up the kwacha. Some of these were later rescinded, creating higher levels of exchange rate movement than would have otherwise been the case. In 2015, the Zambian kwacha was one of the worst performing currencies in the world and inflation rates jumped to well over 20%. While it is too early to assess the implications of these trends on multinational investments in grain trading, they are likely to be detrimental, highlighting the deeply fragile nature of this transformation.

6. Understanding the implications of multinational investment on grain market structure, conduct, and performance

The food system modernization approach we take in this paper draws significantly on insights form structure-conduct-performance analyses articulated in industrial organization economics (Reardon and Timmer 2012). Following this approach, we will assess grain market performance in terms of producer prices and margins, in the context of identified changes in the structure and conduct of the markets. Due to the relatively recent nature of this on-going transformation, many of the findings presented here conjectural and draw from respondent's perceptions of changes.

Effects on traditional market actors

The modernization of trading and wholesaling segments of food supplies chains often entail "disintermediation," as better capitalized actors capable of meeting evolving supply chain requirements replace traditional market intermediaries (Reardon 2015). While this may be the case in the future, interviews and survey data suggest that rather than replace traditional market actors, multinational investments in grain trading often leverages existing expertise from traditional actors to gain entry into smallholder markets.

Traditional grain markets in Zambia, and sub-Saharan Africa more broadly, are often characterized as embedded within social networks, where repeated transactions and local reputations enable the markets to function in the absence of effective statutory contract enforcement mechanisms or structured trading platforms (Fafchamps 2004). Due to the large number of farmers with limited surpluses to sell, small-scale assembly traders play a vital role in these socially embedded markets (Chikweche and Fletcher 2014; Sitko and Jayne 2014). Interviews with large-scale traders suggest that the diffuse and informal nature of these traditional smallholder markets act as significant entry barriers for their firms, which lack the local social capital and knowledge needed to navigate them. To overcome this, multinational firms frequently develop supply contracts with traditional market actors with local market knowledge.

All four of the multinational firms interviewed indicated that to gain entry into and knowledge of new smallholder markets they routinely provide financing to small-scale local traders to purchase grain on

their behalf. This, of course, is a high risk endeavor. Default rates from local traders can be as high as 15% and markets may be very thinly traded. However, because these firms can access trade financing in global credit markets at low rates, and because potential margins in these smallholder markets are high, these firms are often willing to take the risk.

While local market knowledge helps to ensure the survival of traditional market actors in Zambia in the context of growing multinational investment, other market attributes, such as poorly developed rural infrastructure and the continued predominance of very small farms with limited surpluses to sell further highlights their continued relevance. This coexistence of traditional, modern, and intermediate value chains appears to be a common feature of food system modernization in other developing country contexts (Reardon et al 2012).

Services and supply chain coordination

The structure of traditional grain markets tends to limit coordinated supply chain investments due to elevated risks that investments will be appropriated by other supply chain actors (Fafchamps 2004; Poulton et al 2006). Through vertical coordination mechanisms and market power, large firms may be in a position to overcome these traditional barriers to supply chain investments.

Interviews with traders, combined with survey data, suggest that multinational investments in trading are improving supply chain coordination and triggering supply chain investments not typical seen in African grain markets, such as input credit (Chamberlin et al 2014). All of the firms interviewed currently provide input credit for grains and/or oilseeds to smallholder farmers, albeit at different scales. These range from small investments providing seed credit to a couple thousand sunflower farmers to large investments providing seed and fertilizer credit to tens of thousands of smallholders. According to interviews with firm representatives, the most significant of these is the input credit system implemented by Cargill in Eastern Province. In 2013 Cargill claims to have provided nearly $10 million in input financing for maize and soybean to approximately 30,000 smallholder farmers. However, household survey data collected for in 2015 paints a more modest story. Based on the acquisition source of maize and soybean seeds we estimate a total of 8,033 households acquired seeds for maize or soybeans through an input loan by a large-scale firm in Cargill's focal area of Eastern Province. While this number is lower than the reported figures, the difference does not invalidate the fact that these firms are making important investments in grain and production through input financing, which do not typically exist under traditional market systems.

Based on our interviews we identify two factors that give rise to input credit investments for smallholder grain and oilseed producers. First, in the case of NWK agri-services and Cargill, previous investments in cotton input financing lowered screening costs input credit beneficiaries, as these had already been borne by their cotton business. Input credit beneficiaries for maize and soybeans were selected based on previous repayment history for cotton. Second, seven of the ten multinational firms in Zambia's grain trading markets have ancillary investments in processing and/or input trading, which enables them to take on different levels of risk than firms solely focused on trading. This is because losses from credit default can be made up elsewhere within their vertical organizational structure.

Professionalism in grain markets

Focus group discussions with smallholders operating in regions that have seen an expansion of multinational investment in grain trading share a broadly positive view of this market transformation. Farmers were asked to compare the experience of selling to these firms relative to selling to traditional traders and to the parastatal Food Reserve Agency (FRA). Smallholders' responses to these questions were quite consistent. Respondents stated that, relative to local market actors, multinational firms provide a higher level of professionalism and trustworthiness in their interactions with farmers. Several key points that were repeated are: 1) multinational firms utilize weighing scales that are more reliable than local traders'; 2) they provide additional services, including SMS-based market price updates, input credit in some cases, and extension advice, and; 3) they offer more competitive prices.

Relative to the FRA, these firms are generally thought to offer low prices, but are seen to provide a valuable market alternative because farmers are paid cash on delivery, while the FRA is notorious for delayed payments due to lack of funding. Moreover, some focus group respondents indicated that selling to FRA frequently required making "under the table" payments to FRA depot managers, a problem not encountered with multinational firms.

The enhanced professionalism and efforts to build trust among smallholders can be viewed as a broadly positive development in the conduct of local grain markets. As these attributes become sources of comparative advantage, they should create pressure for traditional market actors and government parastatals to improve the ways they engage with smallholders in order to retain market share. Focus group discussions support this contention: as one respondent put it "for us to sell to them (local traders) they now have to use proper scales. Otherwise we will go to the big buyers (multinational firms)". This comment was repeated multiple times across various focus groups, and suggests that multinational firms are having a positive spillover effect on the conduct of traditional market actors.

Market participation: Can the poor access new markets?

The influx of multinational capital into small-scale grain and oilseed markets raises concerns about its distributional effects on smallholders. Given the significant asset and production heterogeneity and market concentration within most African smallholder systems, including in Zambia, there is reason to be concerned that the potential market benefits described above will only accrue to a minority of already better-off smallholders with the economies of scale to engage directly with large firms. To assess the potential distributional effects of the influx of multinational capital into smallholder markets we disaggregate the smallholder sector into net household income quartiles and use these income groups to quantify the share of total soybean and maize sales by market channel. This is presented in Tables 7 and 8.

Several important findings emerge. First, for both crops purchases by large-scale traders (row %) are substantially more concentrated in the top half of the income distribution than are purchases by small-scale traders. Second, however, large-scale traders obtain 25% of their soybeans and 15% of their maize from the bottom half of the distribution. Large-scale traders are the second largest buyers of soybeans in the lower half of the income distribution but only the third- to fifth largest for maize (third among private buyers).

Indeed, consistent with literature presented in the conceptual framework, the extent to which the poor engage directly in these markets appears to depend on the crop. We posit several reasons for the difference between maize and soybean market participation. First, because maize is consumed by

farmers and soybean generally is not (Lubungu et al 2013), poor households that grow soybeans are much more likely to sell it than the same households who produce maize. The fact that such a large volume of surplus soybeans purchased by large-scale traders comes from poorer households, with smaller surpluses to sell, also suggests that the sorts of origination networks described above are reasonably good at linking to these farmers. This is less so for maize, perhaps because poor maize producers are more geographically dispersed than soybean producers. The role of the state marketing board is also important. As shown in Table 7, the Food Reserve Agency purchases no soybeans but quite substantial volumes of maize, which limits the amount available for private sector actors.

Table 7: Soybean sales quantity by market channel and income quartile, 2014/15

Market channel	Net Income Quartiles											
	1st			2nd			3rd			4th		
	MT sold	Row %	Column %	MT sold	Row %	Column %	MT sold	Row %	Column %	MT sold	Row %	Column %
Small-scale traders	3826	20.5%	68.0%	4352	23.3%	59.9%	4211	22.6%	40.0%	6277	33.6%	54.7%
Large-scale traders	1400	9.9%	24.9%	2259	16.0%	31.1%	5813	41.2%	55.2%	4646	32.9%	40.5%
Miller/processor	314	24.0%	5.6%	434	33.0%	6.0%	230	17.6%	2.2%	334	25.4%	2.9%
Other HH	86	14.0%	1.5%	202	32.8%	2.8%	202	32.9%	1.9%	125	20.4%	1.1%
Govt (FRA)	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Other (schools, NGOs, etc..)	2	1.9%	0.0%	15	13.3%	0.2%	6	5.2%	0.1%	93	79.6%	0.8%

Source: RALS 2015

Table 8: Maize sales quantity by market channel and income quartile, 2014/15

Market Channel	Net income Quartiles											
	1st			2nd			3rd			4th		
	MT sold	Row %	Column %	MT sold	Row %	Column %	MT sold	Row %	Column %	MT sold	Row %	Column %
Small-scale traders	49960	14.5%	26.9%	77807	22.6%	24.0%	85541	24.9%	17.2%	130655	38.0%	13.5%
Large-scale traders	9270	3.8%	5.0%	26640	11.1%	8.2%	58891	24.4%	11.9%	146268	60.7%	15.1%
Miller	1722	2.1%	0.9%	4016	4.9%	1.2%	7357	8.9%	1.5%	69261	84.1%	7.2%
Other HH	14394	23.6%	7.8%	16438	27.0%	5.1%	12849	21.1%	2.6%	17226	28.3%	1.8%
Govt (FRA)	108563	8.8%	58.5%	194870	15.8%	60.1%	328200	26.6%	66.1%	603280	48.9%	62.3%
Other (schools, NGOs, etc...)	1803	16.7%	1.0%	4455	41.3%	1.4%	3534	32.7%	0.7%	1006	9.3%	0.1%

Source: RALS 201

Market Performance: Farm gate prices and margins

What are the relationships between the influx of multinational capital into Zambian smallholder grain markets and farm-gate and supply chain margins? We hypothesized that due to lower financing costs, economies, of scale, increased supply chain coordination, and other market services this investment wave would trigger both increased farm prices and declining margins.

Using average monthly farmer maize sales prices to private buyers from 2011/12 and 2014/15 and monthly provincial level wholesale price data collected by the Zambian National Farmers Union (ZNFU), we calculate the average margin between farm-gate and wholesale prices. These are summarized in Table 9. It shows that nationally, the prices paid to farmers as a share of prevailing wholesale prices have improved substantially between 2012 and 2015. On average, in 2011/12 farmers received 71% of prevailing wholesale prices, this improved to 84% by 2014/15. In Eastern, Central, and Southern Provinces, where the multinational investment wave is concentrated, margins have declined even more rapidly. In Central Province margins have declined by 25%, while in Southern and Eastern they have decline 18% and 14% respectively.

Table 9: Average farm-gate wholesale price margins for maize

Province	2011/12	2014/5	Diff.
Central	0.356	0.105	-0.251
Copperbelt	0.24	0.1	-0.14
Eastern	0.329	0.189	-0.14
Luapula	0.215	0.253	0.038
Lusaka	0.195	0.144	-0.051
Muchinga	0.202	0.128	-0.074
Northern	0.212	0.236	0.024
North-Western	0.334	0.197	-0.137
Southern	0.345	0.163	-0.182
Western	0.148	0.114	-0.034
Zambia	0.293	0.162	-0.131

Source: RALS 2012 and 2015, ZNFU price data.

With available data we cannot attribute changes in margins to the observed wave of multinational investment. While increased investments in rural infrastructure and changes in fuel prices would certainly influence these margins, the coincidence of rapidly declining margins and significant increase in multinational investment is compelling. Further research and additional years of data are needed to identify the causal factors underlying this nascent trend and to determine if it is sustained over time.

Turning now to the farm-gate price implications of this investment wave, we regress reported farmer sales prices for maize in 2011/12 and 2014/15 on market channels, dropping the “small-scale trader” dummy, and controlling for timing of sale, sales volume, distance to point of sale, and provincial level dummies. Contrary to our expectations and farm focus group responses, we find that relative to small-scale traders, prices paid to farmers by larger traders are statistically significantly lower.

Table 10: Farm-gate Prices and Marketing Channels Regression Results

VARIABLES	LABELS	(1) model 2012	(1) model 2015
Dependent variable			
Price	Price=farm-gate price		
Independent Variables			
o.dchannel1	channel== small scale traders = o,	-	-
dchannel2	channel== large scale traders	-0.0500**	-0.0563***
dchannel3	channel==FRA	0.175***	0.0197
dchannel4	channel==other households	0.00840	0.0882***
dchannel5	channel==processors	0.215***	-0.0217
qty	quantity of maize sold	1.65e-06**	2.57e-06***
distance	distance travelled	0.00157***	0.00122***
month	month of sale	0.00335	-0.00412**
dprov1	prov==Central	-0.0566**	0.0163
dprov2	prov==Copperbelt	-0.0380	0.0317*
dprov3	prov==Eastern	-0.0417*	0.00949
dprov4	prov==Luapula	0.0198	0.0440**
o.dprov5	prov==Lusaka = o,	-	-
dprov6	prov==Muchinga	-0.0165	0.0610***
dprov7	prov==Northern	-0.0164	0.0500***
dprov8	prov==Northwestern	0.00436	0.0541***
dprov9	prov==Southern	-0.0632***	-0.00854
dprov10	prov==Western	0.0265	0.244***
Constant	Constant	0.937***	1.155***
		(0.0323)	(0.0258)
Observations		5,287	4,525
R-squared		0.118	0.084

Sources: RALS 2012 and 2015

Several tentative conclusion and explanations can be drawn from this finding. First, despite being viewed in generally negative terms by policy makers and other stakeholders, small-scale traders are likely highly efficient at what they do (Sitko and Jayne 2014). These traders frequently enter the market early when wholesale prices are low, and therefore have a reputation for exploitative pricing. However, they also tend to buy directly from the farm gate, and therefore assume the costs of moving grain from villages to urban markets. Once timing of sale and distance to market are controlled for, the prices small-scale traders pay to farmers may be competitive with other market channels.

Second, differences in measuring tools used when buying grain may influence the observed differences in prices. Small-scale traders normally use buckets and other containers when buying grain. These are assumed to equate to a certain number of kgs. However, while surveys assume a standard conversion between container type and kgs, there is evidence showing significant differences between the assumed and actual number of kgs of grain held by these containers, with the difference benefiting the trader (Sitko and Jayne 2014). Thus prices differences between small-scale traders and large-scale traders may partially reflect difference between accurate and inaccurate measurements of quantity.

These price difference may also indicate the exercise of market power by these firms, where monopolistic market structures enable large firms to increase margins by driving down farm-gate prices (Little 1994). We consider this unlikely, given the continued importance of small-scale traditional supply chain actors in Zambia's smallholder markets highlight in Tables 5 and 6 (Sitko and Jayne 2014).

Finally, it is important to note that differences in prices do not tell us about the overall income effects of market channel choice. Due to the range of services, including input credit, provided by multinational firms, there is reason to suspect that despite lower ceteris paribus prices, the farm income may be higher. Future empirical analysis on the overall income and welfare effects of differences in market channels is needed to more accurate determine the farm level implication of this investment wave.

7. Conclusion and Recommendations

The observed influx of multinational capital into Zambia's smallholder grain markets is not an isolated event. Website information and interviews suggest that similar investments are underway or under consideration in other major grain producing countries in East and Southern Africa, including Malawi, Tanzania, Kenya, Zimbabwe, and Mozambique (see http://www.cargill.com/worldwide/index.jsp#africa; http://olamgroup.com/locations/southern-africa/south-africa/). This creates new opportunities for smallholder market coordination and investment.

However, while policy discussions on food system transformation and modernization often conceptualize these processes in both a deterministic and linear fashion, with modern food system actors inexorably replacing an inefficient traditional market system (Thompson and Scoones 2009; Knickel et al 2009), the evidence we have presented paints a more nuanced picture. Broadly, our analysis suggests that while multinational firms appear to be altering the structure and conduct of grain markets in beneficial ways, including expanding the range of services provided to farmers and increasing perceived levels of trust in private market by farmers, market performance indicators show ambiguous results. Moreover, rather than displacing traditional market systems, multinational firms appear to largely incorporate traditional market actors into their supply chains, leading to hybrid market systems that exhibit some elements of a modern supply chain, including supply chain contracting and market services, but likely retaining many aspects of the traditional market system.

Moreover, our study highlights the highly fragile nature of the multinational investment wave in grain trading. Unlike other types of food systems investments, which often entail significant sunk costs in land and equipment and are thus likely to be more durable, entry into trading requires few initial asset investments, particularly given improvements in low cost storage technologies (Barrett 1997). Our analysis of the factors driving multinational entry into smallholder grain markets show that many of these are highly sensitive to policy choice and broader macro-economic or political conditions. Given recent exchange rate volatility, disputes over the 2016 presidential elections, and continued high levels of trade policy uncertainty, the investment wave documented here is likely in significant peril.

The benefits of a more coordinated, better capitalized market system for consumers and producers have been established in the literature (Poulton et al 2006; Fafchamps 2004; Swinnen and Maertens 2007). Multinational investments in food systems can help to achieve this end. What, therefore, can policy makers and other actors do to harness this investment interest, while managing potential pitfalls associated with market power? We identify a two-pronged strategy. One the one hand, policy makers and development partners need to focus attention on the supply and demand conditions that influence multinational investment. In addition to supportive trade and other macro-economic policies, which are

broadly beneficial to a wide range of industries, coordinated efforts can be made to help defray some of the fixed costs and risks associated with large firms buying from dispersed small-scale farmers. This includes support to enhance horizontal relationships between farmers, so that greater levels of aggregation are performed by farmers. Off-setting costs associated with extension delivery, which many firms are currently assuming, through donor or public support is also potentially important. Finally, developing innovative ways of sharing default risk on input credit and other services would help to enhance the scope of these nascent investments. This may include subsidizing some form of first loss insurance coverage on input credit loans.

On the other hand, in order to help avoid risks associated with excessive consolidation and market power, investments to support traditional market actors is important. One way to do this this by addressing differences in the cost of credit for domestic and multinational firms. Timmer (1973) showed this to be an effective strategy for improving local investment in Indonesian rice markets. In the context of Zambia, addressing these credit cost and access differences requires developing strategies to lower both the cost of domestic borrowing and collateral requirements for domestic wholesalers to borrow. One way to do this is by prioritize policies that support the development of a warehouse receipt system linked to a functional commodity exchange. While the Zambian commodity exchange has languished since its inception, the government has recently designated it as the national warehousing authority charged with implementing the country's first warehouse receipt system (Sitko and Jayne 2012). Warehouse receipts can enable local wholesalers to utilize grain stocks held in certified warehouses as collateral to access commercial credit (Coulter and Onumah 2002). This has the dual advantage of improving credit conditions for these traders and enabling them to store grain in anticipation of higher prices later in the season.

This dual strategy offers opportunities to encourage multinational investment in grain trading, and thus leverage potential market coordination benefits, while simultaneously supporting continued competition from domestic actors.

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