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Food marketing margins during the COVID-19 pandemic

Evidence from vegetables in Ethiopia

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ABSTRACT

It is widely feared that the COVID-19 pandemic will lead to a significant worsening of the food security situation in low and middle-income countries. One reason for this is the disruption of food marketing systems and subsequent changes in farm and consumer prices. Based on primary data in Ethiopia collected just before the start and a few months into the pandemic, we assess changes in farm and consumer prices of four major vegetables and the contribution of different segments of the rural-urban value chain in urban retail price formation. We find large, but heterogeneous, price changes for different vegetables with relatively larger changes seen at the farm level, compared to the consumer level, leading to winners and losers among local vegetable farmers due to pandemic-related trade disruptions. We further note that despite substantial hurdles in domestic trade reported by most value chain agents, increases in marketing – and especially transportation – costs have not been the major contributor to overall changes in retail prices. Marketing margins even declined for half of the vegetables studied. The relatively small changes in marketing margins overall indicate the resilience of these domestic value chains during the pandemic in Ethiopia.

JEL codes: Q13; Q18; O13

Keywords: COVID-19; Food security; Food systems; Value chain analysis; Africa

1. INTRODUCTION

It is feared that the COVID-19 pandemic will lead to widespread increases in global poverty and food insecurity and that these negative impacts will concentrate on the most vulnerable segments of the population in low- and middle-income countries (Torero 2020; Swinnen and McDermott 2020; Barrett 2020). Laborde et al. (2020) estimate that due to the COVID-19 pandemic over 140 million people – a large number of them in sub-Saharan Africa – will fall into extreme poverty and suffer from food insecurity and hunger. A major contributor to the increased food insecurity is the reduction of income among vulnerable populations. In addition, disruptions to food systems and changes in farm and consumer prices could also turn out to be major drivers of food insecurity. Changes in food and agricultural prices are an obvious concern to policy makers in low and middle-income countries during this pandemic, given the importance of agricultural prices for the income of farmers and food prices for the purchasing power of consumers and their link to social unrest (Barrett 2020; Bellemare 2015).

There are various factors that may cause food and agricultural prices to change during this pandemic. Because of reduced demand due to the global recession, some researchers predict that commodity prices will decrease globally (Laborde et al. 2020). Meanwhile, others predict price increases, at least in the short run, due to hoarding and changes in purchase and storage patterns (e.g., Lusk 2020; Reardon et al. 2020). Increased marketing costs – due to complications in logistics linked to the pandemic (such as seen in meat packing plants in the US; Hahn 2020) – may further widen the wedge between farm and consumer prices (Reardon et al. 2020, Narayan and Saha 2020). So far, global staple food prices have been remarkably stable, possibly due to good harvests in the previous season and sufficient storage available globally (Glauber et al. 2020). While significant food price movements have been seen in some cases, they are seemingly context specific (Akter 2020; de Paulo Farias and de Araújo 2020; Yu et al. 2020), with price rises noted in some cases – most often for perishables such as meat, fish, and vegetables (e.g., Akter 2020; Mogues 2020; Lele et al. 2020) – and declines in others (e.g., Harris et al. 2020; Narayan and Saha 2020). However, few authors have looked at what factors in the food systems of poorer economies have contributed to these local food price changes and which farmers have been affected by these

changes during the COVID-19 pandemic. This is an important topic as these food prices matter enormously for the livelihoods of people in low-income countries. Thus, insights on price movements provide valuable inputs into the design of effective policies to mitigate negative effects of the crisis.

In this paper, we provide a careful study of farm and consumer prices and marketing margins during the COVID-19 pandemic in Ethiopia, the second most populous country in Africa. After the first COVID-19 case was confirmed in Ethiopia in mid-March 2020, the government closed schools, banned all public gatherings, and recommended social distancing. Other measures to contain the spread of the virus soon followed. Travelers from abroad were initially put into a 14-day mandatory quarantine and travel through land borders was prohibited. Several regional governments banned all public transportation and imposed restrictions on other vehicle movements between cities and rural areas. In Addis Ababa, public and private transportation, such as minibus taxis, were ordered to work at half capacity (with half the load of people) and charge double the price. Private cars could only be driven every other day (a restriction that was lifted after a few weeks). Moreover, the wholesale market for fruits and vegetables was relocated from crowded quarters (*Atikilit Tera*) to an open space (*Jan Meda*) to facilitate social distancing between customers and traders. While these actions were expected to slow the spread of the virus, they may have had substantial unintended effects on the functioning of food value chains.

We study rural-urban vegetable value chains from the country's most important commercial horticultural cluster in the East Shewa zone in the Central Rift Valley, which supplies approximately 200 million USD worth of vegetables annually (Minten et al. 2020) to Addis Ababa, the largest city of the country. To assess the changes in the vegetable marketing system, we rely on unique large-scale price data (more than 10,000 observations) at different levels of the value chain, including rural farmers, wholesale markets, wet markets, and urban retailers, that were collected for major vegetables just before the onset of the pandemic (February 2020) and three months into the pandemic (May 2020). We also collected data from value chain participants – farmers, wholesalers, and retailers – on adjustments and disruptions in their marketing activities linked to the pandemic.

Value chain agents indicated that their businesses were seriously affected by the COVID-19 pandemic. Most agents reported a decrease in demand, turnover, and clients; increased losses; less competition; higher transport costs; and changes in procurement areas. We further find that producer prices changed significantly over this period, with increases over a three-month period up to 64 percent (tomato) and decreases as high as 67 percent (green pepper). Changes at the retail level were however relatively much smaller, between 19 percent increases (tomato) and 29 percent decreases (green pepper). We find that despite significant hurdles in domestic trade, changes in marketing costs have not been the major contributor to increases in retail prices. Rather, changes in retail prices have mostly been linked to changes in farm gate prices. Marketing margins even declined in the case of two of the four vegetables studied.¹ Moreover, increases in transportation costs, which were seen in Ethiopia as well as in other countries during the pandemic (Narayan and Saha 2020), might have been less of a driving factor of overall price changes in these value chains of perishable products. Such products are typically traded over relatively short distances, so transportation costs are relatively less important as a component of their retail prices, in contrast with other crops (Dillon and Barrett 2016).

These findings suggest that a number of other factors outside the studied domestic value chains have contributed to a larger extent to farm and consumer price changes. First, the ban on international trade and disruptions to inter-regional trade led to a more localized marketing system.

¹ Changes in marketing margins between the two periods reduced the change in absolute terms of vegetable retail prices compared to farm prices, i.e., in the case of increases of farm gate prices, smaller marketing costs reduced that increase at the retail level and vice-versa.

It seems that this wider market access before the pandemic seemingly played a price-stabilizing role for some vegetables, leading to large price swings during the pandemic. These effects have then created winners and losers among farmers, as has been seen during previous trade policy shocks (Aksoy and Beghin 2004; Headey 2011). Second, urban demand fell due to income losses and the widespread fear that eating raw vegetables would increase the likelihood of contracting the virus (Hirvonen et al. 2020).

2. DATA

2.1. In-person survey in January and February 2020

This study builds on a large-scale vegetable value chain survey conducted in January and February 2020 in Ethiopia. Focusing on the main value chain supplying vegetables to Addis Ababa, we fielded primary surveys at different levels of the value chain, going from rural producers to urban retailers.²

The sampling strategy varied depending on the respondent type. First, four major vegetable producing woredas (districts) in East Shewa zone in the Oromia region (Adami Tulu, Bora, Dugda, and Lume) were purposely selected for this study. From these woredas, we selected kebeles (sub-districts) that had at least 100 hectares of irrigated land. A total of 37 kebeles were identified (Dugda: 12 kebeles; Adami Tulu: 12; Bora: 7; Lume: 6). Then within each kebele, we categorized all farmers as either investor or smallholders depending on the amount of land they were renting in. Farmers that rented in less than 0.5 hectares of land were considered to be smallholders, while those renting in more than 0.5 hectares were considered to be investors (see Minten et al. 2020). One-quarter of the farmers interviewed were randomly selected from the investor farmers list; three-quarters from the smallholder list. In each kebele, a community questionnaire was fielded as well. A total of 810 vegetable farmers were interviewed in January and February, of which 634 were smallholders and 176 were medium-scale investors.³

Second, 56 urban wholesalers operating in Addis Ababa were interviewed. These wholesalers were randomly selected from the group of wholesalers that dealt with one of the five major vegetable crops focused on in the study: onion, tomato, green pepper, cabbage, and Ethiopian kale.

Third, prices of vegetables were followed daily in the wholesale market and in four large wet markets in Addis Ababa.

The value chain survey covered different types of urban retail outlets in five sub-cities (out of 10) in Addis Ababa. In these sub-cities, we visited all supermarkets and minimarkets, as well as all the Ethiopian Fruit and Vegetable Marketing Share Company (ET-FRUIT) outlets. We then randomly selected four kebeles and visited 10 randomly selected local fruit and vegetable shops in each kebele. Within each kebele, two ketenas (neighborhoods) were randomly selected and all micro-sellers of the five vegetables were listed. From this list, three micro-sellers were randomly selected.

The five vegetables examined are the most important vegetables grown in this area, with 33 and 31 percent of the irrigated land allocated to tomatoes and onions, respectively, while cabbage, green pepper, and Ethiopian kale are estimated to be grown on 8, 8, and 9 percent of the land, respectively. Other crops make up the remaining 12 percent.

² This type of detailed value chain data, collected in a cascading manner, is vital for developing a complete picture of the value chain. Other approaches come with a number of methodological weaknesses. For example, the common practice in food value chain analysis is that it often only uses anecdotal or qualitative evidence and it does not rely on reliable and representative surveys (e.g., Webber and Labaste 2009; World Bank 2009; Nang'ole, Mithöfer, and Franzel 2011). Moreover, household surveys based on random sampling have the disadvantage that the selected farmers might be of relatively less importance in major food supply areas and thus might not present a representative picture of the farmers who effectively participate in value chains of specific food crops (World Bank 2009).

³ We also interviewed 169 beneficiaries of SNV's Horti-Life project but did not attempt to re-contact these farmers in the phone survey.

2.2. Phone survey in May 2020

To understand how the COVID-19 pandemic is affecting the vegetable value chain, we conducted a phone survey with the farmers as well as the wholesale and retail outlets that took part in the in-person survey in early 2020. In the phone survey, we planned to re-contact half of the vegetable farmers as well as half of the wholesale and retail outlets. If the respondent could not be reached, refused to take part in the survey, or was no longer active in the vegetable sector, he or she was replaced with another respondent from the in-person survey sample. All phone survey respondents were randomly selected from the pool of previous survey respondents. The final phone survey sample included 433 farmers,⁴ 30 wholesale outlets, and 235 retail outlets.

An average phone interview took approximately 30 minutes. The farmer survey instruments focused on access to inputs, marketing and income, behavioral responses to COVID-19, and their plans for the next cropping season. The wholesale instrument asked about the trading activities and changes in operations in the past three months. The retail instrument asked questions about procurement and sales and changes in operations in the past three months. All three instruments asked about vegetable prices at the time of the survey, permitting us to compare prices at different levels of the value chain in the same period. We also used that same price instrument to daily follow prices at the wholesale market and four major wet markets in Addis Ababa, as we did in the first survey round in early 2020.

Table 2.1: Comparing respondent characteristics in the February 2020 survey sample between respondents that were and were not included in the May 2020 phone survey

Observations and variables	Included in phone survey	Not included in phone survey	Difference	p-value
Farmers				
Male headed households (%)	96.1	92.9	3.2	0.04
Level of education of respondent (years)	6.6	5.1	1.5	0.00
Vegetable business experience of respondent (years)	10.1	9.6	0.5	0.25
<i>Observations:</i>	433	546		
Urban wholesalers				
Male respondent (%)	93.3	100.0	-6.7	0.18
Level of education of respondent (years)	9.2	9.5	-0.3	0.68
Vegetable business experience of respondent (years)	11.3	10.4	0.9	0.63
<i>Observations:</i>	30	26		
Urban retailers				
Supermarket (%)	19.2	12.8	6.4	0.49
Fruit & vegetable grocery shops (%)	46.4	57.8	-11.4	0.08
Fruit & vegetable micro-sellers (%)	28.5	23.7	4.8	0.56
ET-FRUIT shops (%)	6.0	5.7	0.3	0.98
Male respondent (%)	45.1	49.5	-4.4	0.53
Level of education of respondent (years)	7.5	7.0	0.5	0.25
Vegetable business experience of respondent (years)	7.8	7.9	-0.1	1.00
<i>Observations:</i>	235	211		

Source: February 2020 and May 2020 survey rounds.

Note: Difference in means between the groups tested with a t-test (null-hypothesis: difference in means = 0).

In Table 2.1 we use the data collected in February to compare the farmer, wholesale and retail outlet characteristics between those who took part in the phone survey and those who did not. We see that the two sub-samples are generally well balanced. The differences in means are largely not

⁴ The survey team attempted to call a total of 570 farmers. Out of these, 433 were successfully interviewed, 51 experienced phone problems (no network or wrong number), 14 farmers refused to take part in the phone survey, and 72 farmers did not sell or grow one of the five studied vegetables in the previous month. Out of the 433 farmers in the final phone survey sample, 299 were smallholder farmers and 134 investor farmers. However, we do not disaggregate our findings along this dimension in this paper.

statistically different from zero. The exception is that farmers that took part in the phone survey were, on average, somewhat more educated and more likely to originate from male-headed households. In addition, among the retail outlets, fruit and vegetable shops were less represented in the phone survey compared to the in-person survey conducted before the pandemic.

3. RESULTS

3.1. Value chain agents' views about changes due to the pandemic

In the phone survey, we asked our respondents how their operations had changed during the pandemic. Nearly 60 percent of the smallholder farmers and more than 60 percent of the investors reported that they received less income than usual in the past 30 days (Table 3.1). Others indicated, however, same or even higher incomes. Despite the larger share reporting lower incomes, the majority of smallholders and investors reported to plan to continue growing vegetables in the next season – most signaled that they would be expanding their operations by renting in more land in the near future (Table 3.1).

Table 3.1: Stated income losses in the past month and future plans among farmers

	Smallholders (%)	Investors (%)
Income changes:		
"In the past 30 days would you say that your household received more or less income compared to the income you usually receive at this time of the year?"		
Much less	8.7	10.5
Less	50.8	53.0
Same	28.1	26.1
More	11.0	9.7
Much more	1.3	0.8
Future plans:		
Plan to grow vegetables in next rainy season	77.5	88.8
Plan to grow vegetables in next irrigation season	94.6	88.1
Intention of farmers on land rental in next irrigation season:		
No change	42.6	20.9
Rent in more	43.0	59.0
Rent in less	2.4	3.0
Rent out more	1.0	1.5
Rent out less	0.3	0.0
Do not know yet	10.7	15.7

Source: May 2020 survey round. Observations: 433 farmers.

We asked wholesale and retail traders to compare the situation at the time of the survey to the situation three months earlier, i.e., before the pandemic began. Most wholesalers and retailers reported that there was less choice when it comes to transportation and that related costs had substantially increased (Table 3.2). Moreover, both the demand and the quantity of vegetables sold had decreased and the share of vegetables that could not be sold had increased (Table 3.2).

Table 3.2: Stated changes in traders' businesses compared to three months prior

	Decreased	Remained same	Increased
Wholesalers (%) who believe that...			
... the choice in transporters going to rural areas ...	63.3	36.7	0.0
... the cost of transport from rural areas to Addis Ababa ...	0.0	6.7	93.3
... the number of clients that they sell to ...	83.3	0.0	16.7
... turnover (quantity of vegetables sold) ...	86.7	0.0	13.3
... losses ...	3.3	20.0	76.7
Retailers (%) who believe that...			
... the choice in transporters from wholesale markets ...	55.7	37.5	6.8
... the cost of transport from Addis wholesale markets to retail shops ...	1.3	24.7	74.0
... the number of clients that they sell to ...	82.1	9.4	8.5
... turnover (quantity of vegetables sold) ...	80.4	10.2	9.4
... losses ...	11.5	26.4	62.1

Source: May 2020 survey round. Observations: 30 wholesalers; 235 retailers.

At the time of the phone interview in May, the wholesale traders further reported that, compared to the period before the pandemic, more of the vegetables they sold originated from the East Shewa zone – where the interviewed farmers were located (Table 3.3). We also observe important shifts in the clientele of the wholesale traders. The role of micro-sellers and public institutions (schools, hospitals, etc.) declined, while a larger share of the produce was sold to supermarkets, grocery stores, and restaurants.

Table 3.3: Procurement locations and sales patterns of urban wholesalers before and after onset of COVID-19 pandemic

	3 months before (%)	Now (%)	Difference (%-point)
Origin of vegetables:			
East Shewa	44.7	60.0	15.3
Other areas	55.3	40.0	-15.3
Clients sold to:			
Other wholesalers	19.4	16.7	-2.7
Consumers	2.3	0.0	-2.3
Institutions (schools, universities, jails, army, hospitals, etc.)	6.4	1.2	-5.2
Restaurants	6.5	11.3	4.8
Supermarkets	8.7	12.8	4.1
Micro fruit and vegetable sellers	40.5	24.8	-15.7
Fruit & vegetable grocery shops	17.4	33.2	15.8
Other clients	0.8	0.0	-0.8

Source: May 2020 survey round. Observations: 30 wholesalers.

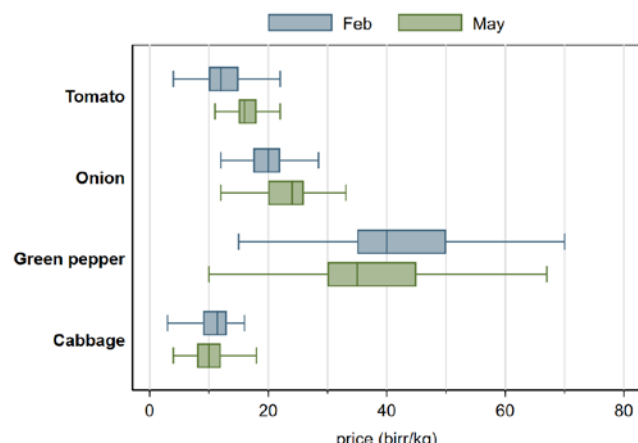
3.2. Price formation in the vegetable value chain before and during the pandemic

The survey instruments fielded in both survey rounds were carefully designed to collect price data at different levels of the value chain. We asked farmers to estimate the price of the vegetables with different quality characteristics in their kebele at the time of the survey. We asked wholesalers and retailers to quote the prices for all qualities of vegetables that they were selling the day of the interview. We have a total of 11,665 price observations for tomatoes, onions, green pepper, and

cabbage.⁵ Table A1 in the Appendix provides summary statistics for these price data. As all surveys were conducted at the same time, we can analyze vegetable price formation along the value chain.

A concern with the price data collected from the traders is that they may be subject to reporting bias. To explore this issue, in the February survey round we also asked price quotes from customers visiting the same wholesale and retail outlets.⁶ A comparison of the prices quoted by the traders and the buyers shows negligible and not statistically significant differences, indicating that the traders were reporting prices truthfully and accurately (Table A2 in Appendix).

Figure 3.1: Retail prices by vegetable type and survey round



Source: February 2020 and May 2020 survey rounds.

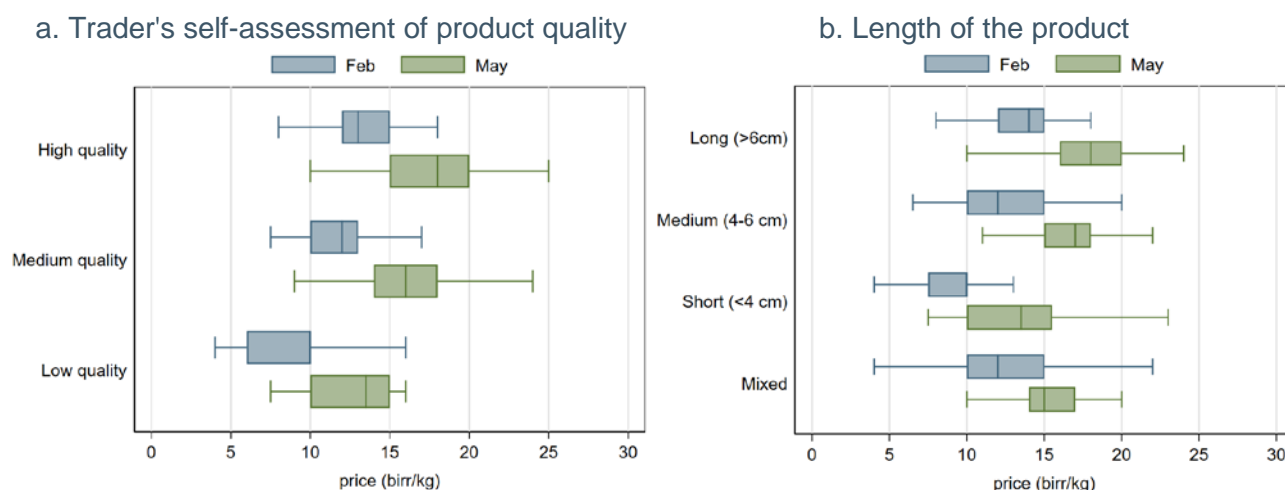
Figure 3.1 shows a box and whiskers diagram of the retail (consumer) price changes and variations across the four vegetable types. The size of the box marks the difference between the 25th percentile (the left-hand side of the box) and the 75th percentile (the right-hand side of the box) of the retail price distribution for a given vegetable and survey round. The bottom and top rule indicate the bottom 5th and top 5th percentiles of the full distribution. Focusing on the vertical bar rule inside the box that marks the median, we see that retail price trends were quite heterogeneous during the pandemic. Median tomato and onion prices increased by 33 and 20 percent, respectively, while the median prices of green pepper and cabbage went down by 13 and 12 percent, respectively. Moreover, the sizes of the boxes in the diagram reveal considerable variation in retail prices, particularly for green pepper.

These within-product price variations are to a large extent driven by quality differences. This is illustrated in Figure 3.2, which shows how the tomato prices vary across different quality indicators, such as the trader's self-assessment of the overall quality and the length of the product.

⁵ We dropped the analysis of price formation for Ethiopian kale given the use of units in markets that were difficult to convert to kilograms, such as small bunches, large bunches, and bags.

⁶ Enumerators were told to stay around for a few minutes after completing their interview, to wait for a buyer at that particular wholesale or retail outlet. If a buyer appeared, they asked the price directly from the buyer, if not, they moved to the next interview. This explains the lower number of observations in Table A1.

Figure 3.2: Retail tomato prices by quality and survey round



Source: February 2020 and May 2020 survey rounds.

We then analyze price formation before and during the pandemic using a regression approach. Specifically, we regress the price of the vegetable on binary variables for each level of the value chain and then interact these with a binary variable capturing the survey round (= 1 if May survey, zero otherwise). We also control for differences in vegetable quality and origin (place of production).⁷ Table 3.4 reports the regression results separately for each vegetable type. The bottom row shows the farm gate price measured in birr/kg for each vegetable in February 2020. The coefficient on the 'May survey' variable shows the change in the farm gate price in May 2020. We see that the farm gate prices for tomatoes and onions increased considerably over the three-month period, while the opposite was true for green pepper and cabbage.

Table 3.4: Price regressions by vegetable type

	(1) Tomato	(2) Onion	(3) Green pepper	(4) Cabbage
Urban wholesale	1.74*** (0.25)	4.02*** (0.58)	-0.26 (0.89)	0.41* (0.22)
Urban retail	7.80*** (0.20)	9.01*** (0.46)	23.06*** (0.69)	5.64*** (0.18)
Urban wholesale x May survey	0.72*** (0.28)	-0.80 (0.52)	0.97 (0.96)	1.11*** (0.18)
Urban retail x May survey	-1.13*** (0.23)	-2.02*** (0.55)	2.17** (0.85)	1.18*** (0.21)
May survey	4.77*** (0.12)	5.34*** (0.22)	-11.08*** (0.53)	-2.11*** (0.11)
Quality and origin controls?	Yes	Yes	Yes	Yes
Observations	3,230	3,491	2,646	2,266
R ²	0.697	0.398	0.623	0.647
Farm gate price in February (birr/kg)	5.73	13.67	22.05	5.44

Source: February 2020 and May 2020 survey rounds.

Note: Heteroskedasticity robust standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. Quality controls for tomato are: overall quality, ripeness, length, form, and origin; for onion: overall quality, length, and origin; for green pepper: overall quality, length, thickness, color, and origin; and for cabbage: overall quality, size, and origin.

The coefficients on the non-interacted value chain level variables quantify the gross marketing margins before the pandemic in February 2020. The gross margins at wholesale level are generally small relative to farm gate prices and to the gross margins in the urban retail sector. In the case of

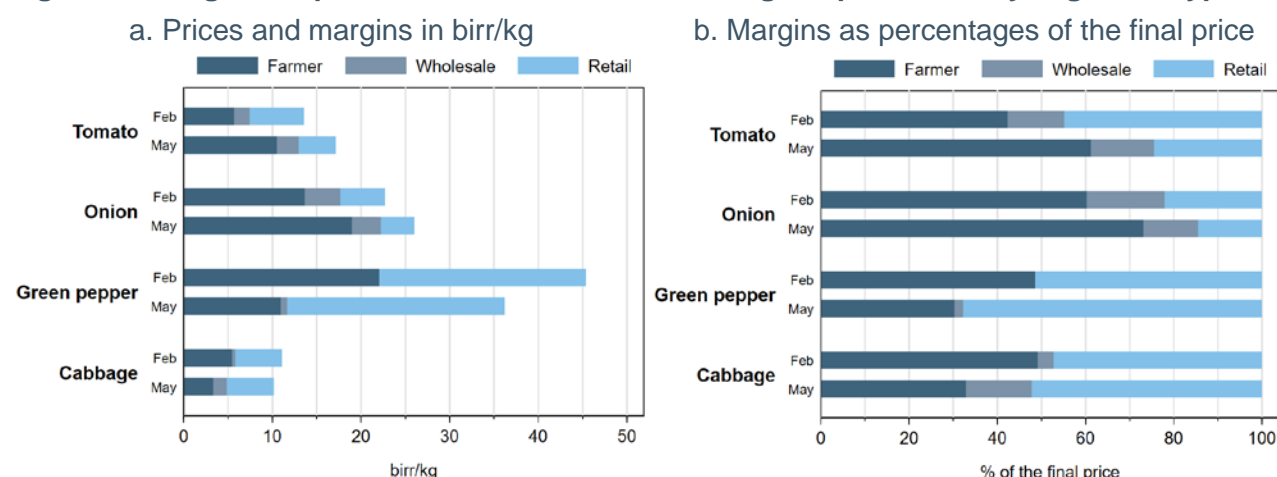
⁷ The quality indicators vary across vegetable types. A subjective quality indicator (best; medium; low) is used for all vegetables, ripeness for tomato (green; ripe; overripe; semi-rotten; rotten), length (in cm) for tomato, onion, green pepper, form (circle; oval; mixed) for tomato, thickness and color for green pepper and size for cabbage (large >1.5 kg; medium 1-1.5 kg; small <1 kg).

green pepper, the gross margin estimate is not statistically different from zero in both rounds. The margins were highest for onions in February (18 percent). While brokers and traders in wholesale markets are often seen as exploitative and overly powerful (Gebreamlak 2020), these results suggest that even if there is market power and one could address it, it seemingly will not reduce urban retail prices nor increase producer prices very much given the relatively small contribution of these margins to final prices.⁸

The coefficients on the interacted terms inform us how the marketing margins changed during the pandemic. In the case of onion, the difference in wholesale margin between the two rounds is negligible and not statistically different from zero. For tomatoes and cabbage, the wholesale margin on average increased 0.7 and 1.1 birr per kg, respectively. Meanwhile, urban retail margins declined significantly in the case of tomatoes and onions and increased for green pepper and cabbage, the two products that saw price decreases between February and May (see Figure 3.1).

We use these regression results to show the average price composition along the value chain, i.e., from farmer to consumer, in both periods.⁹ Figure 3.3 shows the predicted gross margins in birr terms as well as percentages of the final retail price. Strikingly, the observed changes in retail (consumer) prices during the pandemic are largely driven by increases or decreases in farm gate prices and not by wholesale or retail cost margins. It seems then that the various disruptions associated with the pandemic have not led to substantial increases in marketing margins.

Figure 3.3: Vegetable price structure before and during the pandemic, by vegetable type



Note: These graphs are based on the estimated coefficients reported in Table 3.4.

As indicated earlier, the reductions in both international trade and domestic trade between sub-national regions (e.g., between the Oromia region, which Addis Ababa is surrounded by, and the Amhara region) seem to have increased the reliance of Addis Ababa on vegetables produced in the Central Rift Valley. This reduced trade may have contributed to the unusually large changes in agricultural prices – confirming earlier findings that regional and international trade can play an important role in stabilizing food price volatility (e.g., Minot 2004). This reduction in trade over longer distances has also led to winners and losers, as is typically seen after trade policy reforms or trade-related shocks (Aksoy and Beghin 2004; Headey 2011).

In Ethiopia, the pandemic disrupted trade between neighboring countries and sub-national regions. Therefore, those farmers in the Central Rift Valley that faced international and regional competition in marketing their produce before the pandemic seemingly benefited as the trade

⁸ The price difference between farm and urban wholesale also accounts for the transportation costs to bring vegetables from rural production areas to the city.

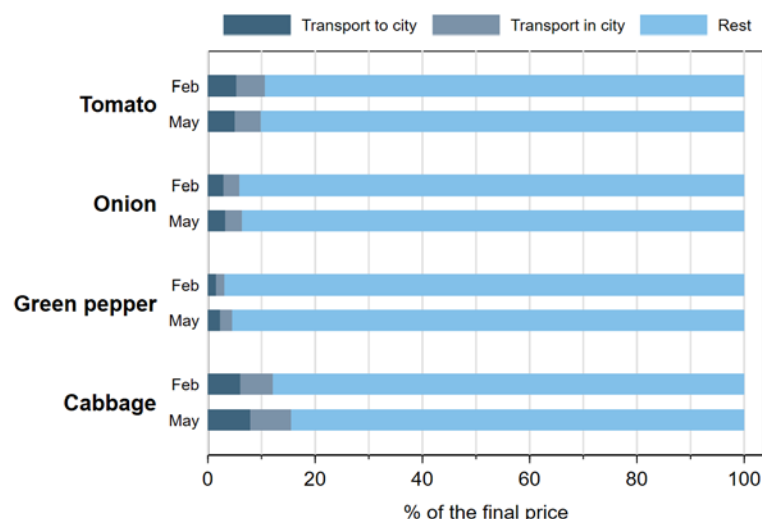
⁹ In the case of green pepper, the estimate on the wholesale margin in February is negative, though not statistically different from zero. We set this margin to zero in Figure 3.3.

disruptions reduced supply, leading to price increases.¹⁰ Onions provide a good example of a crop that was widely imported before the pandemic.¹¹ In contrast, those farmers in the Central Rift Valley that were producing crops that were exported to other sub-national regions (e.g., to Amhara) lost out due to decrease in demand, which subsequently led to an oversupply and declining prices. In our case, such dynamics are observed for green peppers. Moreover, it seems that especially farmers – more than consumers – were exposed to large price volatility because of these domestic and international trade disruptions.

Finally, transportation costs are often a major determinant of food prices (Dillon and Barrett 2016; World Bank 2009; Minten et al. 2016). However, their importance depends on trade distances and the final value of produce. It seems that changes in transportation costs might be less of an issue in the case of value chains with perishable products that are typically traded over relatively short distances. Most traders that we interviewed reported that transportation costs increased considerably between the two periods. The median increase in transportation costs reported by wholesalers who transported vegetables was about 25 percent, while transportation costs in the city changed similarly. Interestingly, transport costs in the city over relatively small distances are as high as transport costs from rural areas to the capital. The relatively high costs in the city are due to the small quantities that are bought daily by retailers and that often need to be transported on small mini-bus taxis, while transport from rural areas is done on large and more cost-efficient trucks that specialize in the transport of vegetables.

It is important to note that transportation costs form a negligible part of the total retail prices of the vegetables studied here and stayed so even with the inflated transport costs during the pandemic. Using the data collected in the February survey, we estimate that transportation costs from rural areas to Addis Ababa as well as transport within the city were each about 0.66 birr/kg, amounting to a total transport cost of 1.3 birr/kg, a relatively small share of the final retail price (Figure 3.4). Figure 3.4 further indicates that the increase in these transportation costs in May – by 0.3 birr per kg – has not been a major contributor to changes in the final retail price of these vegetables.

Figure 3.4: Share of transportation costs in final retail price, by vegetable and survey round



Source: February 2020 and May 2020 survey rounds.

¹⁰ Minten et al. (2020) show, however, that input costs, such as wages, went up as well for a number of these farmers, but that these changes were less than output price changes.

¹¹ The increase of onion prices is seemingly linked to the closure of the land borders with Sudan due to the COVID-19 pandemic. In a typical year, Ethiopia imports a significant tonnage of onions from Sudan – e.g. 16.1 million USD in 2018 (data downloaded from <https://comtrade.un.org/data/>). But, as borders have been closed, onion imports from Sudan dried up.

4. CONCLUSIONS

Based on unique large-scale price data from different segments in rural-urban vegetable value chains in Ethiopia, we study the evolution of farm and retail prices and marketing margins during the first three months of the COVID-19 pandemic. To slow the spread of the virus, the Government of Ethiopia banned travel through land borders while some regional states imposed restrictions on border crossings. The evidence provided here suggests that this led to substantial changes in vegetable prices. In particular, we see large price changes for farmers, but the effects are heterogenous: farmers who faced less competition from other areas (locally or internationally) benefited through higher output prices from the imposed pandemic trade restrictions, while those that could no longer export to other areas in the country lost out. Overall changes in wholesale and retail marketing margins have been relatively less important, despite the reduced turnover, higher losses, and higher transportation costs reported by agricultural traders and retailers. We take this as evidence of notable resilience in the local marketing systems.

Our findings have important implications for policy. First, close monitoring of price movements and the factors contributing to those movements is paramount, especially during this crisis period. Changes in consumer prices are often claimed to be linked to predatory behavior among traders, motivating government intervention to curb trading activity, as has already been witnessed during the COVID-19 pandemic (Resnick 2020; Wegerif 2020; Gebreamlak 2020). However, the earlier evidence on such predatory behavior is limited (Sitko and Jayne 2014, Minten et al. 2017) and the findings reported here indicate that the price changes during this pandemic have not been driven by large increases in marketing margins. Second, quantitative assessments on the relative importance of different segments in the value chains are useful for setting priorities to reduce farm-retail spreads in order to achieve higher prices for producers and lower prices for consumers. Our data in particular illustrate the lower importance of transportation costs and the large contribution of urban distribution costs in the final retail prices of vegetables. More focus on addressing potential inefficiencies in these urban distribution systems is therefore called for.

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APPENDIX

Appendix Table A1: Means and standard deviations of vegetable prices (birr/kg) by survey round

	February 2020			May 2020		
	Observations	Mean	SD	Observations	Mean	SD
Farm gate						
Tomato	1,123	5.7	2.3	610	10.5	2.8
Onion	1,266	13.7	3.0	602	18.9	4.7
Green pepper	807	22.0	10.0	337	12.0	7.0
Cabbage	823	5.4	2.2	348	3.3	1.4
Urban wholesale						
Tomato	176	5.9	2.0	97	12.1	2.8
Onion	191	16.0	2.8	74	22.1	2.9
Green pepper	189	21.2	6.4	81	11.0	4.5
Cabbage	80	6.9	0.8	65	5.6	1.0
Urban retail						
Tomato	783	12.4	3.8	460	16.5	3.4
Onion	838	22.6	11.6	524	25.5	9.5
Green pepper	801	42.9	12.8	436	36.1	12.2
Cabbage	594	10.9	3.3	360	10.5	2.7

Source: February 2020 and May 2020 survey rounds.

Note: SD = Standard deviation.

Appendix Table A2: Accuracy of prices reported by traders

Vegetable type	Observations	Price quoted by traders (birr/kg)			Price quoted by buyers (birr/kg)			t-test	
		Mean	Median	SD	Mean	Median	SD	t-value	p-val
Wholesale price									
Tomato	24	5.98	6	1.49	5.94	6	1.55	0.09	0.925
Onion	37	16.00	16	1.45	15.97	16	1.48	0.08	0.937
Green pepper	27	21.15	18	6.61	21.26	18	6.46	-0.06	0.950
Head cabbage	22	6.77	7	0.86	6.75	6.75	0.86	0.09	0.930
Retail price									
Tomato	363	11.63	12	3.03	11.41	12	3.22	0.96	0.337
Onion	400	23.62	18	14.46	23.62	18	14.39	0.00	0.997
Green pepper	453	40.13	40	12.68	38.98	40	13.41	1.32	0.186
Head cabbage	263	12.25	13	2.66	11.95	12	2.52	1.34	0.182

Source: February 2020 survey round.

Note: SD = Standard deviation. Difference in means between the groups tested with a t-test (null-hypothesis: difference in means = 0).

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