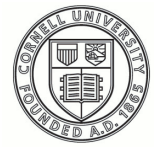

9-2015

Global Agrifood Value Chains and Local Poverty Reduction: What Happens to Those Who Don't Plug In?

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Abstract

Structural changes in the global agrifood value chain have transformed food production in developing countries including Indonesia. One element of this is the spread of supermarket retailing. By increasing the demand for and returns to higher quality produce, this development has the potential to improve living standards in a sector where poverty has been persistent. Many studies have shown the magnitude of price premiums available to farmers who sell to supermarkets. However, little attention has been paid to how the introduction of a supermarket retailer affects those farmers who continue to sell to traditional market channels. Our data suggests that in regions where there are both modern and traditional buyers, competition effects result in the immiserization of farmers who continue to sell to traditional markets. This result underlines the fact that while sectorial transformation has desirable poverty reduction potential, actual impacts are lumpy. The distribution of farmer participation in a region may result in a case where the upgrading of agrifood supply chains can increase poverty in the absence of policy interventions.

Keywords

agrifood value chain, Indonesia, quality price premium, small farmers, supermarket

Comments

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ABSTRACT

Structural changes in the global agrifood value chain have transformed food production in developing countries including Indonesia. One element of this is the spread of supermarket retailing. By increasing the demand for and returns to higher quality produce, this development has the potential to improve living standards in a sector where poverty has been persistent. Many studies have shown the magnitude of price premiums available to farmers who sell to supermarkets. However, little attention has been paid to how the introduction of a supermarket retailer affects those farmers who continue to sell to traditional market channels. Our data suggests that in regions where there are both modern and traditional buyers, competition effects result in the immiserization of farmers who continue to sell to traditional markets. This result underlines the fact that while sectorial transformation has desirable poverty reduction potential, actual impacts are lumpy. The distribution of farmer participation in a region may result in a case where the upgrading of agrifood supply chains can increase poverty in the absence of policy interventions.

Keywords: agrifood value chain, Indonesia, quality price premium, small farmers, supermarket

JEL Classification: O13, Q13

I. INTRODUCTION

Recent decades have seen a transformation in global agrifood value chains. Features of this new environment include increased global demand for higher quality food products, value chain modernization, and a more vertically organized buyer–supplier structure. Among developing countries, an important physical manifestation of these changes has been the spread of supermarkets.

The rise of supermarkets throughout the developing world over the past 2 decades reflects the broader economic trends of income growth, urbanization, and liberalized trade (Reardon et al. 2009; Reardon, Henson, and Berdegué 2007; Reardon, Berdegué, and Timmer 2005; Reardon et al. 2003; Neven et al. 2006). Developing countries have been able to capture a significantly increasing share of world trade in high value agricultural goods (Diop and Jaffee 2005), which positively impacts gross domestic product growth. Yet, gains are not evenly distributed and poverty remains stubbornly concentrated in rural areas.[1]

Supermarket entry is accompanied by the introduction of modern supply chain logistics. Logistical upgrading offers an important channel through which farmers can move up the value chain (Minten, Randrianarison, and Swinnen 2009; Reardon et al. 2009; Reardon and Timmer 2007; Swinnen 2007). There is evidence from Kenya (Rao and Qaim 2010; Neven et al. 2009), the People's Republic of China (Miyata, Minot, and Hu 2009), Viet Nam (Moustier et al. 2010) and other developing economies showing that farmers who successfully plug into the modern supply chains experience income improvements, sometimes dramatically.[2] Our study reinforces this result by showing that for the case of small chili farmers in Indonesia, there is a positive price differential for sales to supermarkets versus traditional wet markets, even when we control for quality.

But there are two features of supermarket presence that suggest their impact may not be unambiguously poverty reducing. First, supermarkets coexist alongside traditional wet markets. On the retailer side, the literature has highlighted the negative impacts the presence of a modern retail channel can have on traditional retail markets. It has shown, for example, that losses occur to both small-scale grocery shops (Natawidjaja et al. 2007; Reardon, Henson, and Gulati 2010) and traditional wet market retailers (Schipmann and Qaim 2011; Suryadarma 2011; Yaningwati, Achmad, and Susilowati 2012). While it follows that producers who continue to supply to traditional retailers may also be negatively impacted in the presence of supermarket buyers—for example, if there are changes to returns to quality or postharvest sorting activities—this, to our knowledge, has not been explored in the literature.

A second feature is that supermarkets tend to source, at least initially, from larger and more established suppliers, which excludes small farmers (Reardon et al. 2007, Natawidjaja et al. 2007, Reardon and Berdegué 2002). The literature has looked into the factors that determine selection into the modern food retailing channel. But this leaves out any understanding of the dynamics of how farmers who continue to supply only to traditional wet markets fare. Are they impoverished by their inability to supply through the newly available modern channel? Or do they gain from knowledge and price spillovers in this environment?

The questions raised above all relate to the central question that motivates this paper: how does modernization in the agrifood sector impact small farmers who continue to engage only with

[1] IFAD (2010) estimates that more than two-thirds of the 1.4 billion people who live in extreme poverty are located in rural areas.

[2] See also Hernández, Reardon, and Berdegué 2007 for Guatemala; Reardon et al. 2007a for Mexico; and Natawidjaja et al. 2007 for Indonesia.

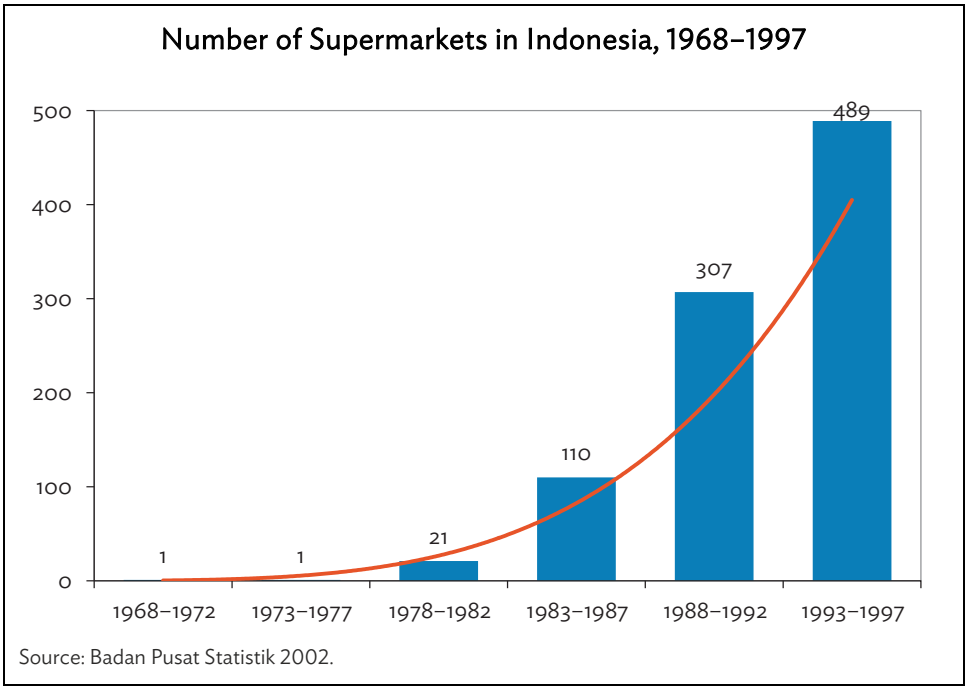
traditional buyers? Using a survey of 597 chili farmers in Indonesia we compare how the price premium attached to chilies of higher observable quality is affected by the presence of a supermarket channel. Chili producers are chosen because chilies are a high value agricultural product in Indonesia and an important vegetable consumed daily by most Indonesian families. Unlike other fresh vegetable products which are harvested all at the same time, chilies can be harvested weekly or fortnightly over a month or more providing a steady cash flow for producers.

We expect to find that the price premium for high quality chilies is higher when the destination is a supermarket as opposed to a traditional market. We also go beyond this direct comparison to ask whether the price premium offered in the traditional market is affected by the presence of a supermarket. The answer to this question has important policy implications for countries seeking to address high rates of rural poverty by attracting foreign investment in agriculture.

We begin in Section II by presenting a conceptual framework for understanding the dynamics of the interaction between supermarkets and traditional markets in the early stages of market penetration. Section III describes the dataset. In Section IV we present the empirical model and test the hypothesis that the presence of a modern supply chain will weaken the price–quality relationship in traditional markets. Section V offers some policy recommendations drawn from the analysis.

II. CONCEPTUAL FRAMEWORK

Following trade liberalization in the 1990s, supermarkets experienced a swift expansion in market penetration globally (Reardon et al. 2009, Neven et al. 2006). Indonesia was part of the second of three established waves of supermarket diffusion into developing countries. The growth in supermarkets' average share of retail sales in Southeast Asia increased from 5%–10% in 1990 to 30%–50% by the mid-2000s (Reardon and Gulati 2008, see figure below). This is expected to continue as increasing numbers of shoppers are willing and able to pay price premiums for convenience, food quality, and food safety (Mergenthaler, Weinberger, and Qaim 2009; Pingali 2007; Minot and Roy 2006; Traill 2006; Regmi and Dyck 2001).



The introduction of a modern retailer transforms the existing food retail sector through two major activities. The first is the modernization of the procurement system. Throughout the procurement value chain, modern retailers promote upgrading of the prevailing logistics system (Neven and Reardon 2004).

A second and related transformational activity is the promotion of food quality standards—in particular, health and safety standards. These standards are often "private" in that they are devised and enforced by the retailer rather than the host government. There are several reasons modern retail adopt private standards: to substitute for missing or inadequately enforced public standards (Berdegué et al. 2005); to differentiate their product from the traditional retail format (Balsevich et al. 2003, Henson and Reardon 2005); and/or to incentivize and provide guidelines for producers to increase quality (Reardon and Swinnen 2004, Weatherspoon and Reardon 2003, Reardon and Barrett 2000).

The introduction of standards by supermarket retailers impacts suppliers in an established trajectory (Berdegué et al. 2005). At the beginning, when the modern channel starts to source locally, the implementation of private standards results in a procurement system that skims the high quality products from traditional wholesale value chains. At this stage, the implemented standards are basic and are often confined to cosmetic and flavor characteristics, which can be identified directly by looking at the product.

Later, when specialized wholesalers become established, supermarkets enforce standards related to unobservable food traits such as pesticide residues or the presence of pathogens. This is the stage in which Indonesia exists. The enforcement of unobservable standards such as these is necessary for the supermarket to manage its procurement from both abroad and from local producers. In 2006, supermarkets accounted for about 30% of the overall grocery retail sales in Indonesia, of which fresh fruits and vegetables account for 10% to 15% (Natawidjaja et al. 2007).

For the Indonesian chili farmers with whom this paper is concerned, the presence of supermarkets impacts their income through two effects. First, there is a differentiation effect whereby supermarkets, in comparison to traditional buyers, pay their suppliers higher overall premiums for any given quality product. This is reflected in higher consumer prices that are used to signal that supermarket products have more desirable, but unobservable quality characteristics. Second, there is a competition effect. Supermarket entrance increases aggregate demand for high quality chilies. This new source of demand affects the prevailing price premium offered by buyers from the traditional market. Below, we consider these two effects in greater detail.

A. Differentiation Effect: Supermarkets Pay Higher Quality Premiums

Prior to supermarket entry in developing countries, national food quality standards generally do not exist or are not stringently enforced (Berdegué et al. 2005). In part, this is due to the degree of informality in the food industry, which makes quality control difficult (Jeo 2010, Reardon et al. 2009). At this stage, traditional wet markets are the main providers of fresh produce to the population. As a result of the lack of quality assurance, traditional wet market retailers cannot differentiate their products from their competitors in terms of health and safety standards. Similarly, it is difficult for the consumers to differentiate between safe and unsafe goods. Consequently, traditional retailers compete among each other based on prices of observable quality attributes such as size.

Upon entry, supermarkets initially target only higher income consumers. To attract these consumers, supermarkets differentiate their goods from traditional wet markets by advertising their provision of quality assurance through certification and branding (Fulponi 2006). Products of higher observable quality are marked with higher retail prices. This price premium makes supermarket products unaffordable to lower income consumers, which results in dual markets. These markets differ in terms of unobservable product quality provided to the population as well as the price charged. At this stage, traditional markets and supermarkets target distinct market segments and are not directly in competition with one another.

As the supermarket retail format spreads geographically within a developing country—as it has in Indonesia—and as the country develops, an increasing number of consumers gain awareness about food quality. The resulting rise in consumers' willingness and ability to pay a premium for food quality and safety increases the demand for high quality food (Mergenthaler, Weinberger, and Qaim 2009). Supermarkets continue to pay a premium to farmers who can meet their private quality control standards to ensure continuous supply of goods of given quality (Hernández, Reardon, and Berdegué 2007).

At the same time, as the domestic fresh produce market continues to evolve, the premium price paid by supermarkets to farmers who can meet private quality standards weakens. This occurs as public standards evolve in response to consumer demands for greater information disclosure about food attributes (Josling, Roberts, and Orden 2004). Improvement in public food safety monitoring further ensures that a higher percentage of products sold in traditional wet markets will meet public health requirements. In short, decreasing food safety concerns and a shrinking quality differential between products sold in different retail formats increases competition between supermarkets and traditional wet markets and prices begin to converge (Suryadarma et al. 2007, Suryadarma 2011, Schipmann and Qaim 2011)

Thus, we expect the differentiation effect to confirm our first hypothesis that supermarkets pay higher returns to their suppliers for goods of a given observable quality than do traditional markets. The trajectory of supermarket development suggests that supermarkets pay a higher farm gate price to reward the unobservable health and safety standards that differentiate their products from visibly identical wet market produce. Over time, the price premium will fall, but it will not go to zero since it is also meant to compensate farmers for the uncertainty and the risk involved in the investment required to meet these standards.

B. Competition Effect: Supermarkets Dampen Price Premiums in Traditional Markets

In both modern and traditional retail settings, products with more desirable observable characteristics command premium retail prices. In geographic areas where produce is only available in traditional wet markets, observable qualities are the only way for consumers to differentiate among fresh produce. This remains true where public health and safety standards exist, but are poorly enforced.[3] This situation allows us to establish a baseline for price premiums available to farmers in the period prior to supermarket competition.

In areas where supermarket retailers compete with traditional market buyers, we expect that supermarkets will pay a higher premium than traditional buyers for all levels of observable quality. This results from the differentiation effects discussed in the previous section where the ability to certify

[3] Mergenthaler, Weinberger, and Qaim (2009) show for the case of Viet Nam that while government standards exist, the inability of the responsible regulatory body to provide quality and hygiene controls has resulted in asymmetric information and distrust between producers and consumers.

unobservable characteristics enables supermarkets to charge price premiums to signal the presence of unobservable quality characteristics.

In addition to the differentiation effect which raises the returns to farmers who sell produce to supermarkets, we also expect that the presence of supermarket competition will dampen observable quality premiums paid by buyers for the traditional markets. The literature suggests one reason for this effect in fresh produce markets is intermittent episodes of excess supply of high quality produce in traditional markets (Barrett et al. 2010). This occurs when the products intended for supermarket buyers either do not meet the agreed quality standards or when the buyer simply did not show up to collect and pay for the requested produce. As observed in Ghana, India, and Nicaragua, when a shipment fails to meet the quality and safety standards of the supermarket, the producer is left with the sole option of selling to the local market at a much lower price.

This dynamic only exists in competitive markets. The differential will not change for farmers who sell to traditional buyers in geographic areas where the option to sell to supermarkets does not exist. The reason for this is that in regions where the modern retail channel is not available, cases of excess supply of produce with high unobservable quality characteristics do not exist.

III. DATA AND DESCRIPTIVE EVIDENCE

Data for this study comes from a 2010 household survey of chili producers in West Java, Indonesia (see Sahara 2012). The survey was undertaken to study rural welfare outcomes in the presence of supermarket buyers. To accomplish this, survey questions documented the average farm gate price farmers receive for their chilies in the most recent season for which the harvest is complete. By taking the average of the most recent transaction in the same season, the within seasonal price differential is smoothened. Since the reported price can be of harvest from different season, we added seasonal control later in each regression. The majority of survey respondents are small farmers who own on average 4,525 square meters of land. About 10% have more than 1 hectare, while around 70% have less than 0.5 hectare, which makes it difficult to benefit from scale economies.

The survey sample is stratified by market channel to ensure sufficient representation of producers who supply both the traditional and modern markets. Three districts in West Java are purposely selected—Garut, Ciamis, and Tasikmalaya. With Garut being a major production zone and Ciamis and Tasikmalaya, being the district with a substantial number of farmers selling to the supermarket. Next, subdistricts were selected by applying systematic random sampling, followed by another round of random selection of three villages from each subdistricts. In the end, 42 villages were selected. Finally, 12 households in each village were drawn from a list of chili-producing household data compiled from the land tax office. The dataset consists of responses from 506 chili farmers selected from the above procedure (see Sahara 2012 for more detail).

Garut is a district with no evidence of supermarket buyers. That is, all farmers sell their produce to buyers for traditional wet markets. In Ciamis, both supermarket and traditional buyers are present and farmers selling to both are sampled. Similarly, Tasikmalaya is a district where both supermarket and traditional buyers are present, but the random sampling captured only farmers who supply to the traditional market.

This differentiation among the sampling districts enables us to identify three cohorts of farmers. First are traditional wet market suppliers (traditional, T) where no alternative modern channel is available. This includes all farmers in Garut. Second are modern channel suppliers where both

modern and traditional buyers operate (modern/competitive, M/C). These are the 112 farmers in the Ciamis group that supply chilies to supermarkets. Third are suppliers to traditional wet markets in regions where both modern and traditional buyers operate (traditional/competitive, T/C). These are the 94 farmers in Ciamis and 104 farmers in Tasikmalaya who supply traditional markets (Table 1).

Table 1: Number of Observations for Farmers by Downstream Buyers and District

	Downstream Buyer		
Sample District	Traditional	Supermarket	Total
Ciamis	94 (T/C)	112 (M/C)	206
Tasikmalaya	104 (T/C)	0	104
Garut	287 (T)	0	287
Total	485	112	597

Source: Author's calculations based on survey dataset (Sahara 2012, ACIAR 2010).

Differentiation among these three types of farmers enables us to measure the impact of supermarket presence via two comparisons. First, the comparison of the prices received by M/C market suppliers in comparison to traditional suppliers illustrates the basic differentiation effect that supermarkets pay more. Second, a comparison between T/C market participants and traditional market participants shows how premiums in the traditional markets adjust to the presence of modern retail alternatives.

Summary Statistics

The average price per kilo received by the three types of producers is reported in Table 2. Producers who sell their chilies to supermarket buyer in competitive markets receive significantly higher average prices than both producers who sell to traditional buyers in competitive markets and also those who have no choice but to sell to traditional buyers. The average price is also significantly different between the traditional wet market suppliers in different districts (with and without competition from modern buyers).

The three categories of producers sell chilies of comparable size. Around 25% of the output consists of medium-sized chilies, 34% consists of small-sized chilies, and 40% of the basket is made up of large-sized chilies.[4] In terms of chili types, the traditional market famers produce mainly the curly type (68%), the T/C market farmers mainly produce long, straight chilies, while the modern market farmers produce diverse types of chilies (Table 2).

The survey finds that farmers selling to supermarket buyers are most likely to invest in postharvest activities. Around 50% of all M/C market participants sort their outputs by size (small, medium, and large); color (bright color, red or green depending on the type of chilies); and quality (no rotten or damaged chilies), while only around 15% of the traditional and T/C market participants engage in these activities.

There are differences in the household characteristics between producers in the three market segments (Table 3). Households in Garut, where only the traditional market channel is available, differ significantly from households in districts where there are modern sector activities. Farmers in Ciamis and

[4] The chili size categories used in this paper are a simplified version of the original 9-graded sizes documented in the survey. Since there are limited observations in some grading groups, we compiled the 9-graded sizes into three categories: small, medium, and large. An alternative 5-size conversion is also employed in the robustness check. The two added categories are grand and no grading. They add to the existing 3-size categories by the following order: no grading, small, medium, large, and grand.

Tasikmalaya where both modern and traditional buyers operate are on average 3 years younger, have 2 more years of formal education, live closer to an asphalt road and have a smaller household size as compared to the traditional market producers where there is no competition from supermarkets. Within these two regions, producers who sell to the M/C market are still much younger and have even more education than those who sell to the T/C buyers.

Table 2: Summary Statistics

(Mean)	Traditional	Traditional/ Competitive[a]	Modern/ Competitive[b]	Diff. between the Two Competitive Markets[c]
Price	5,950.27	6,551.64***	8,187.57***	***
Size category				
Small	0.36	0.33	0.33	
Medium	0.28	0.24*	0.25	
Large	0.36	0.43***	0.42**	
Postharvesting activities				
Size sorting	0.06	0.12***	0.40***	***
Color sorting	0.15	0.13	0.55***	***
Quality sorting	0.15	0.19**	0.54***	***
Types of chili produced				
Hot beauty and hot chili	0.08	0.22***	0.33***	***
Long straight	0.03	0.42***	0.29***	***
Curly	0.68	0.17***	0.29***	***
Others	0.21	0.19	0.09***	***

Notes:
[a] Significance level reported in this column refers to the mean value difference between traditional/competitive market and traditional market.
[b] Significance level reported in this column refers to the mean value difference between modern/competitive market and traditional market.
[c] Significance level reported in this column refers to the mean value difference between traditional/competitive and modern/competitive market.
Source: Authors' calculations.

Table 3: Household Characteristics

(Mean)	Traditional	Traditional/ Competitive[a]	Modern/ Competitive[b]	Diff. between the Two Competitive Markets[c]
Household size (count)	4.78	4.28***	4.32***	
Age of household head (years)	46.53	45.94	43.52***	*
Age of the spouse (years)	40.61	39.42	37.75***	
Education of household head (years)	5.87	7.24***	7.99***	**
Education of the spouse (years)	6.05	7.47***	7.82***	
Reading ability of household head (dummy, 1=yes)	0.93	0.98**	1.00***	
Reading ability of spouse (dummy, 1=yes)	1.00	1.00	1.00	
Household members, age 15–65 years (%)	0.64	0.68**	0.65	
Household members, age above 65 years (%)	0.02	0.03	0.04*	
House area (square meter)	245.08	249.37	267.71	
ln(house value)	17.58	17.53	17.62	
Distance to road (kilometer)	0.44	0.09***	0.12***	

Notes:
[a] Significance level reported in this column refers to the mean value difference between traditional/competitive market and traditional market.
[b] Significance level reported in this column refers to the mean value difference between modern/competitive market and traditional market.
[c] Significance level reported in this column refers to the mean value difference between traditional/competitive and modern/competitive market.
Source: Authors' calculations.

IV. RESULTS

We employ a hedonic model for chilies produced across different market segments to analyze the relationship between product quality and farm gate prices. The model is based on consumer choice and assumes that product price can be decomposed into value for individual product attributes (Lancaster 1966, Lucas 1975). The product attributes we test for include the observable qualities of size and sorting.

A. Regression Outputs

The regression specifications used here measure the effect of product attributes on price. We unpack product prices into the values for individual product attributes. Size and postharvest sorting activities are the two observable product quality attributes documented in the survey, which we use to study its effect on the farm gate price producers receive. We then run separate regressions for each of the three types of farmers since we expect to see significant differences in rewards for quality by different buyers depending on whether or not they are facing competition. A Chow test confirms that data from different types of farmers cannot be pooled. This is an indication that downstream retail buyers have significantly different quality preferences and that unobservable quality characteristics segment the markets. Hence, we run ordinary least squares regressions for price on the two product attributes for each market k, where k∈(M/C,T/C,T) for modern/competitive, traditional/competitive, and traditional.

$$\ln(price_k) = a_k + \beta_{1,k}(size) + \beta_{2,k}(sorting) + controls + \varepsilon$$

The dependent variable in all model specification is the log price. The two quality attributes included in the model are size and postharvest processing. These are included as dummy variables. The baseline for comparison is defined by small-sized chilies and products sold without any postharvest processing. The three columns in Table 4 show the price differentials between different quality attributes.[5]

In the traditional market where no supermarket competition is present, we find that medium- and large-sized chilies are 10% and 25% higher in price as compared to the small chilies (Table 4, column 1). Supermarket buyers offer an even higher price reward at 25% and 34% (see, column 3). The model finds that the difference in premium paid for the medium- and large-sized chili is significant only among producers selling to traditional market buyers, but not the producers selling to modern market buyers (last row, Table 4). The significant difference in quality premium between the modern and traditional market suggests that the unobservable quality difference between the products marketed to the two channels may play a role.

The quality return mechanism in the traditional market where there is supermarket competition is weak. The price for the medium-sized chilies in the traditional/competition market is indifferent from the small-sized chili, while the large-sized chilies has a price premium of only 17% higher than the small-sized chilies (Table 4, column 2). This is much less than the 25% markup enjoyed by farmers who sell to traditional markets where there is no supermarket competition. The coefficients

[5] All model specifications include chili type, season fixed effects, as well as within season harvesting period fixed effect (early, middle, late). Chili of types other than hot beauty, hot chili, other TW chili or curly chilies are used as the comparison base group. The first production season (around April) is the comparison base for the three cultivating seasons, while the early harvesting period is the comparison base for the within season fixed effect controls (middle and late). A district dummy for Tasikmalaya is added in the T/C model since the sample consists of producers from both the Ciamis and Tasikmalaya district. The negative sign of the Tasikmalaya district dummy indicates the chili price Tasikmalaya producers receive is on average lower than the price received by producers in the Ciamis district.

reflect our prediction of a competition effect, for which producers who continue to supply traditional markets are negatively affected when their neighbors seize the modern marketing opportunity.

Among the postharvesting activities, sorting products by size is most well rewarded. The magnitude of the price reward for sorting by size is highest in the traditional market (35%) where there is no competition from supermarkets. Even when there is supermarket competition, farmers receive more when selling size-sorted chilies to the traditional market (14%) than the premium they receive in the modern market (16%).

Table 4: Price Reward to Different Quality Attributes

	(1) Traditional		(2) Traditional/Competitive		(3) Modern/Competitive	
Medium	0.098*	(1.862)	0.094	(1.198)	0.254**	(2.331)
Large	0.248***	(4.492)	0.165*	(1.937)	0.343***	(2.985)
Sort by size	0.348***	(3.884)	0.161**	(2.027)	0.139**	(1.978)
Sort by color	−0.092	(−1.518)	0.074	(0.929)	−0.151**	(−2.199)
Sort by quality	−0.006	(−0.096)	−0.033	(−0.524)	0.032	(0.452)
Hot beauty	0.431***	(5.225)	−0.440***	(−5.666)	0.100	(0.850)
Straight	0.108	(0.870)	−0.288***	(−4.059)	0.179	(1.514)
Curly	0.311***	(5.921)	0.008	(0.094)	0.126	(1.077)
Season controls (April as base line)						
Dry, July	0.009	(0.138)	−0.035	(−0.552)	−0.006	(−0.073)
Rain, September	0.034	(0.724)	−0.073	(−1.309)	−0.148**	(−2.024)
Within season controls (early as base line)						
Middle	0.166***	(3.412)	−0.051	(−0.744)	−0.050	(−0.546)
Late	−0.036	(−0.675)	−0.334***	(−3.765)	−0.076	(−0.630)
Tasikmalaya			−0.522***	(−10.256)		
constant	8.077***	(122.073)	9.090***	(90.532)	8.644***	(52.462)
adjR2	0.124		0.322		0.116	
Medium versus Large, t-test (significant if <0.05)						
	0.0058		0.3461		0.3503	

Notes: t-statistics in parentheses; * $p < .1$, ** $p < .05$, *** $p < .01$; ^ are p-value for Prob. > chi2.
Source: Authors' calculations.

Sorting the products by color or other quality characteristics is not important. Data indicate that the modern and traditional buyers offer lower prices to color-sorted products (15% and 9%). Since production that produces mixed-color chilies is a sign of lack of standardization or poorer quality input of seeds, it may be that output which requires sorting by color may imply that it is of a poorer quality batch. The dummy variable indicating sorting by quality is insignificant. This is probably because we have already controlled for other quality sorting activities in other variables.

B. Robustness Check

The robustness check results presented in Table 5 have similar model specifications to the previous section. The only difference is that we use alternative size categories and separate the T/C group samples by districts (column 2 for Tasikmalaya and column 3 for Ciamis). Instead of the 3-size categories tested above, we use a finer grained, 5-size category, including: small, medium, large, grand, and no size grading

(see footnote 5 for detail). Again the small size category is use as the baseline, and all other size categories are included in the ordinary least squares regression as dummy variables.

Table 5: Robustness Check

	(1) Wet Market		(2) Wet Market		(3) Wet Market		(4) Supermarket	
Retail Format/ Market	Traditional		Traditional/Competitive (Tasikmalaya)		Traditional/Competitive (Ciamis)		Modern	
No grading	0.158*	(1.830)	0.576***	(4.641)	−0.111	(−0.633)	0.117	(0.889)
Medium	0.216***	(2.584)	0.134	(1.395)	0.178	(1.161)	0.292**	(2.431)
Large	0.388***	(4.292)	0.187	(1.620)	0.262	(1.542)	0.362***	(2.842)
Grand	0.280**	(2.189)	0.094	(0.690)	0.396*	(1.924)	0.583***	(3.529)
Sort_size	0.401***	(4.019)	0.035	(0.418)	0.259*	(1.889)	0.117*	(1.674)
Sort_color	−0.097	(−1.593)	0.302***	(3.140)	−0.095	(−0.736)	−0.154**	(−2.178)
Sort_quality	0.009	(0.138)	−0.183**	(−2.573)	0.183*	(1.784)	0.068	(0.969)
Hot beauty	0.433***	(5.246)	−0.461***	(−4.686)	−0.419***	(−3.319)	0.140	(1.160)
Straight	0.128	(1.020)	−0.306***	(−3.332)	−0.304***	(−2.679)	0.184	(1.505)
Curly	0.326***	(6.157)	0.011	(0.105)	−0.074	(−0.585)	0.135	(1.108)
Seasonal controls								
Dry, July	0.004	(0.056)	0.043	(0.636)	−0.214*	(−1.881)	0.018	(0.238)
Rain, September	0.033	(0.700)	−0.017	(−0.296)	−0.218**	(−2.179)	−0.153**	(−2.127)
Within season controls								
Middle	0.167***	(3.440)	−0.207***	(−2.641)	0.106	(0.917)	−0.010	(−0.112)
Late	0.002	(0.034)	−0.484***	(−4.237)	−0.116	(−0.761)	−0.007	(−0.056)
constant	7.929***	(77.609)	8.626***	(62.767)	9.003***	(41.828)	8.539***	(47.475)
adjR2	0.126		0.366		−0.111	(−0.633)	0.117	(0.889)

Notes: t-statistics in parentheses; * p < .1, ** p < .05, *** p < .01; ^ are p-value for Prob. > chi2.
Source: Authors' calculations.

We find that even with more precise size characteristics, the premiums for bigger chilies remain insignificantly different from the small-sized chilies for the farmers selling to the T/C buyer. Also, there were few postharvest activities where markets are competitive. In contrast, the premium paid for bigger chilies is significant and positive for the producers who sell either to traditional markets where no competition from supermarkets exists, or who sell to modern markets. The size coefficients are all insignificantly different from zero in the two T/C markets, with the exception of the no grading dummy for the Tasikmalaya producers and the grand size dummy for the Ciamis producers.

The results support our prediction that for producers who remain traditional market suppliers in areas where modern market buyers are present, the quality premium rewarded is negatively affected as compared to traditional market suppliers in the district without the presence of modern market buyers. The two regressions for the T/C groups—Tasikmalaya and Ciamis, which were previously pooled—are also quite different. The stark difference in the explanatory power (R-square) suggests the existence of a unique pricing mechanism for the Tasikmalaya market, of which the model specification may have captured some unknown spurious effect.

The overall trend is that quality-based price premiums are mostly monotonically increasing with quality in both the traditional and modern markets, regardless of competition, with the exception of the premium for grand chilies in the traditional market, which is smaller than the premium for large

chilies. The quality premium for medium, large, and grand chili sizes in the traditional and modern markets are all significantly different from the small chilies.

Comparing farmers who sell to modern versus traditional buyers, chilies of greater size are positively rewarded with higher prices. The producers who sell to supermarkets receive a 58% higher price premium for their grand chilies as compared to their small chilies, while the grand chilies are only rewarded with 28% higher price than small chilies for farmers who sell to traditional wet markets. The large size premium is similar among supermarket (36%) and traditional market buyers (39%), while the premium received for medium chilies is still greater for the supermarket buyers (29%) as compared to the traditional market buyers (22%).

V. DISCUSSION AND POLICY IMPLICATIONS

The rapid transformation of the global value chain for agriculture has sparked a supermarket revolution. This has been welcomed as an instrument that can help address rural poverty where it is most stubbornly embedded. Various studies have highlighted the positive welfare effect on producers who successfully integrate into the modern retail value chain, but these have neglected the negative effect on the producers who are left behind in the transformation.

For chili farmers in Indonesia's West Java region, the impacts of supermarket competition with traditional markets have been mixed. Farmers who sell to the modern sector receive higher prices for any given quality than their neighbors in regions where the modern sector is not yet a buyer. This supports the literature that has concluded that the modernization of agrifood value chains can contribute to poverty reduction.

However, this result is tempered with the observation that in regions where both modern and traditional buyers are present, farmers who supply traditional channels see their quality premiums fall in relation to areas where no modern channels are present. These farmers also have characteristics that make them less well-off than their neighbors, which suggest that those farmers with the weakest coping mechanisms are further impoverished by the presence of competition. They are not just relatively worse off, but absolutely worse off as well.

This has two implications for governments that seek to use integration into the agrifood value chain as an instrument to reduce poverty. The first is that along with policies designed to facilitate entry into modern retail, governments might smooth the unintended negative price effects by building in social protection measures. This would ensure that farmers who are not able to take advantage of this channel do not fall below (or further below) the poverty line.

A second implication is that more effective implementation of public food safety standards may ease the compression of price premiums by traditional market buyers. Globally, it is the adherence to quality standards that set the modern sector apart. The price premium offered by the modern sector is a reward for products that meet unobservable health and safety standards. If public standards move closer to private standards we should see higher returns to quality in traditional markets.

This research offers some important reminders with respect to the issue of linking between the transformations of agrifood value chains with domestic poverty outcomes. But it also flags some important issues on which further research is needed. First, the majority of the literature on issues of the impact of modernization on smallholder outcomes is cross-sectional. Studies using time series data

would provide critical insight into the dynamics of returns to quality over time. This would enable further exploration of the impact of supermarkets on prices as the value chain evolves.

Second, both the policy and the academic literature tend to look for solutions that would enable excluded smallholders to link into modern retail channels. But we do not yet have a good idea of how smallholders learn. Do they upgrade as a result of demonstration effects from their neighbors? Or do they need additional training or infrastructure? This kind of data is likely to be country and product specific and will have to be answered through additional case studies.

By contributing to an increasing body of literature on how the transformation of agrifood value chains impact small farmers on the ground, we sought to direct attention beyond the question of how to plug more farms into the system. And instead ask the question of how to ensure that those who are not plugged in do not fall below the poverty baseline.

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Global Agrifood Value Chains and Local Poverty Reduction: What Happens to Those Who Don't Plug In?

The spread of supermarket retailing has transformed food production in developing countries including Indonesia. However, little attention has been paid to how the introduction of a supermarket retailer affects those farmers who continue to sell to traditional market channels. Our research suggests that in regions where there are both modern and traditional buyers, competition effects can negatively affect farmers who continue to sell to traditional markets. This result underlines the fact that while sectorial transformation has desirable poverty reduction potential, actual impacts are lumpy. The distribution of farmer participation in a region may result in a case where the upgrading of agrifood supply chains can increase poverty in the absence of policy interventions.

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