

# Determinants of Indonesian shallot growers' bargaining power in the agrifood transformation era

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**Abstract.** This article provides an empirical analysis of farmers' perceptions of higher bargaining power in the agrifood transformation era. Smallholders are challenged with exclusion due to the potential existence of asymmetric information, which lowers smallholders' bargaining power. A probit model is used to analyze the variation of higher bargaining power that is perceived by smallholders. This survey uses 700 respondents, all of whom are Indonesian shallot growers in the low-land area of Brebes, Central Java. Estimation results show that the following factors are statistically significant to higher bargaining power: land purchase; the communication method by which farmers and buyers meet elsewhere and buyers collect the produce from the field; farmers' effort to negotiate over non-price terms during the transaction, and farmers' perception of yield improvement.

**Keywords:** *shallot, bargaining power, probit*

**JEL codes:** *Q12, Q13*

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## Introduction

Reardon, Barrett, Berdegue and Swinnen (2009) explore the framework on agrifood transformation as an impending challenge faced by traditional farmers. Rising incomes, wealth and urbanisation, policy changes such as market liberalisation and privatisation, and the upward trend in foreign investment in the food industry and retail sectors have been the major impetuses behind the transformation. According to the historical stages of agrifood transformation, the era of liberalisation in the 1980s, and which continues today, saw the process of transformation speed up considerably. Reardon, Henson and Berdegue (2007) also point to growing supermarket diffusion in developing countries as bringing implications for market institutions and trade, contributing to the transformation. In their article, Reardon et al. (2007) explore the stages of supermarket diffusion, beginning with the initial penetration of supermarkets in sub-Saharan Africa and Asia, followed by the supermarkets' growth in market share, rural-area diffusion and the various products sold in the supermarket channel. The new predominance of supermarkets has affected the market institution and trade, especially for fresh

products like fruit and vegetables. In addition, there is evidence that younger consumers in Asia are forsaking wet markets and becoming supermarket-oriented, which will accelerate the effects of the supermarket revolution on the horticultural sector.

In the Indonesian domestic market, the transformation in agrifood is another challenge for horticultural products already contending with long-standing trade-related issues, which will lead to further poor domestic trade performance. Irawan (2003, 2007) sees Indonesian horticultural products as less competitive than are imported product, mostly due to inefficiency in off-farm activity, such as post-harvest handling and product marketing. The reduced competitiveness is represented by the absence of flexibility to quickly adapt to changes in consumers' preferences and the modern channels that are the result of agrifood transformation.

To undertake an effective response in the sub-sector, the government has classified a number of value-added horticultural products (e.g., chili, shallot, potato and cabbage) to be considered as top-listed commodities for revitalisation programmes. This research will focus on shallots, which comprise the second largest planted area in Indonesia after chili, and the fifth largest production after cabbage, chili, yard-long bean and potato (Munir, Sureshwaran, Selassie and Nyankori, 1997). Around 50 per cent of total shallot production is located in seven districts in Java, with Brebes as the centre of the production, supplying 23 per cent of national demand. Bima, Kuning, Timor and Sumenep are the top four shallot varieties grown in the area, besides the two imported varieties from the Philippines and Vietnam.

Regarding horticultural marketing, Irawan (2007) implies that the role of traders is still dominant in the marketing system, as they represent both producers and consumers. They pass through a process that complies with timely distribution, location and quality to meet consumers' demand and product procurement from producer. In other words, traders act as a bridge for information between producers and consumers by transferring details of demand to producers and delivering the supply to consumers. Johnson, Weinberger and Wu (2008) support the argument that, in the traditional vegetable supply chain, traders (including wholesalers and collectors) play a dominant role in product distribution. They purchase the product directly from farmers and sell to retailers or consumers. In contemporary business, they adapt quickly to new developments in retailing, such as supermarkets and the processing industry, and maintain their role as capital lenders to farmers.

The corollary of the dominant trader's role will affect market performance. For instance, Johnson et al. (2008) raise concerns over the emergence of wholesaler consolidation in the horticultural market, which has the potential to reduce the level of competition and create asymmetric information in that market. Munir et al. (1997) highlight the value-added process and distributional channel in horticulture, which might be some other features, raising questions about whether horticultural markets are efficient in terms of conveying price and information. Irawan (2007) argues that efficient markets should demonstrate a proportional margin for traders and price transmission of producer and consumer. Otherwise, markets will become inefficient, with adverse implications for producers and consumers.

Sayaka and Supriyana (2009) performed a fact finding study on the role of traders in the shallot business and revealed that there is a mutual partnership

between producers and buyers initiated by food companies. However, this relationship might not be optimised without the existence of local traders. The report reveals the incapability of small farmers to directly engage in the partnership due to their ownership of minimal land and capital, and their poor management of on-farm activity. Therefore, the presence of traders as intermediaries is necessary. Sayaka and Supriyana (2009) also found that some traders arrange informal contracts with farmers and sell their products under a written contract to food companies as the sole consumer. Alternatively, traders purchase the shallots from farmers and sell them to retailers *via* traditional channels.

As the role of traders is still dominant in the shallot business, the existence of asymmetric information might accrue along the stages in the value chain. Jaleta and Gardebroek (2007) indicate an incentive for better informed agents to maximise their personal profits when market participants (that is, farmers and traders) do not share equal information. Trade may bring uneven benefits when buyers' maximum affordable price exceeds the seller's minimum offering price. Sexton Richard, Zhang et al. (2005) explain that how agents share the price margin will depend on various factors, with bargaining power playing an important role. In the Indonesian shallot business, smallholders will either take advantages or be exploited. Shallot growers interact from a position of dominance with local traders as the major shallot buyers, and farmers can either gain an opportunity from their high reliance on traders or be conspicuously undermined by this system.

The objective of this article is to identify the determinant of farmers' bargaining power and analyse factors that explain the variation in bargaining power. A detailed set of variables covering farmers' characteristics, assets, transaction types and information obtaining methods is used in the analysis. The emphasis in this article is on observing the conditions that lead to an improvement in price bargaining from the farmer's perspective. This approach is based on a number of prior findings from the literature. First, bargaining power can be price and non-price related, with the former being considered the more serious problem. This was confirmed in this study, as 61 per cent of respondents reported 'Buyer did not give promised price' as the main problem. Second, farmers' perspectives were chosen to inform the analysis as farmers are large in number. In addition, Gong, Parton, Cox and Zhou (2007) reveal that farmers' bargaining power plays an important role in determining choice of marketing channel in China. They found that bargaining power is measured in ordinal rankings based on farmers' perceptions; the higher the bargaining power of the farmer, the more likely that farmer is to use forward contracting and directly marketing of their product to the processor, rather than to use intermediaries. Such a scenario would indicate a high-value end market. Third, the procedures behind bargaining power vary from case to case and do not match a single theoretical framework, as mentioned in Jaleta and Gardebroek (2007). Fourth, perception, which is based on subjective preference, is measured due to its unique role in behaviour and decision-making processes. Adesina and Baidu-Forson (1995) use farmers' perceptions on variables that affect farmers' access to information to explain the determinants of technology adoption with reference to its importance for policy formulation. The contribution of this study is to present the determinants that can affect farmers' perceptions of better bargaining power over price within a certain period.

The remainder of this study is organised as follows. Section 2 develops a simple framework for analysing the change in price bargaining power. Section 3

presents the data obtained, which is based on the perceptions of shallot growers from the North Coast of Java. Section 4 explores the estimation and data analysis and Section 5 gives a conclusion of the outcomes.

## **Framework**

Sivramkrishna and Jyotishi (2008) and Jaleta and Gardebroek (2007) conducted research on bargaining power. Sivramkrishna and Jyotishi studied the implementation of contract farming, which has considerably changed farmers' bargaining power in India. They saw contract farming in Dharwad district of Karnataka as systematically exploiting farmers under a monopsonistic market. The monopsonistic exploitation was measured by analysing the divergence between the supply curve and the marginal expenditure. Jaleta and Gardebroek worked on farm-gate tomato price negotiation at a central market at Addis Ababa. They measured bargaining power by observing the prevailing price committed by both sellers and buyers which is presented as:

$$P^* = \alpha_s P_{s,1} + (1 - \alpha_s) P_{b,1}$$

where  $P_{s,1}$  and  $P_{b,1}$  refer to the seller's initial ask price and buyer's initial offer price, respectively; and  $\alpha_s \in [0,1]$  indicates how close the final transaction price is to the seller's initial price. In the analysis, they use simple regression with final transaction price as the dependent variable.

Both of these research studies showed that measuring bargaining power can be in terms of market structure or committed price. In the shallot business, referring to Sayaka and Supriyana (2009), the role of traders is necessarily important to improve shallot growers' welfare under the mutual partnership with food companies. Practically, traders act as a bridge between growers and both the modern and traditional markets, with or without written agreements. This implies that interdependence between growers and traders might become an important factor in achieving improved growers' welfare. However, this hypothesis suggests that farmers are less powerful and not as well informed about market opportunities as are farmers, considering their lack of capability of being so. As a result, farmers conduct their business under the condition of asymmetric information, creating the potential for them to be exploited (Sivramkrishna and Jyotishi, 2008).

However, Mayrowani and Darwis (2009) indicate a notable shift in shallot marketing in North Coast Java. In 2000, almost all shallot growers sold their products to first-collectors, showing their dependence on traders. Their lack of capacity to access the market was the main contributor to this situation. Since this time, the situation has been different. The growing number of traders and better infrastructure are some significant contributing factors to this change in competition in the business. Traders initiatively offer better marketing access for farmers to keep their business sustainable. For instance, one common marketing strategy is 'tebasan', in which traders visit and collect the products from the field. Farmers prefer 'tebasan' to conventional marketing since it can eliminate their distribution costs. In addition, most farmers have more alternative agents (e.g., collectors, wholesalers or retailers) to which to sell their product. Mayrowani and Darwis (2009) found that about 75 per cent of shallot growers sell their product through collectors, most of which deal with only one or two buyers.

The above discussion indicates that some groups of farmers have better bargaining power due to the more competitive business environment. Farmers seem to have more choices about where to sell their products, positioning them more equally in relation to each other. Therefore, the group who obtains the better price will perceive themselves as having better bargaining power. To investigate further farmers' perceptions of their bargaining power, a probit model is used to identify the determinants that affect higher bargaining power. As in Jaleta and Gardebreek (2007), the final transaction price is analysed by simple regression, a Linear Probability Model, to determine the significant variables affecting farmers' bargaining power. However, Hill, Griffiths and Lim (2007) and Wooldridge (2009) argue that although simple regression can be easily used and estimate the linear probability, it has some disadvantages. The two most important disadvantages are that the fitted probabilities can be less or greater than zero and the partial effect of any explanatory variable is constant. Wooldridge (2009) explains that a probit model can overcome the limitation in the Linear Probability Model, as it is established for a binary response model, in which there are two possible answers in the explained variable. The basic form of a probit model is shown in equation 1:

$$P(y_i = 1|x) = G(\beta_0 + \beta_1 X_1 + \dots + \beta_k X_k) = G(\beta_0 + x\beta)$$

where  $x\beta = \beta_1 X_1 + \dots + \beta_k X_k$

In equation 1, G is a function taking values strictly between 0 and 1, that is  $0 < G(z) < 1$ , for all real numbers z. This ensures that the estimated response probabilities are strictly between 0 and 1. In a probit model, G is the standard normal cumulative distribution, which is expressed as an integral:

$$G(z) = \Phi(z) \equiv \int_{-\infty}^z \phi(v)dv$$

where  $\phi(z) = (2\pi)^{-\frac{1}{2}} \exp(-z^2/2)$

Further, probit models can be derived from an underlying (or unobserved) latent variable model, as shown in equation 2 below:

$$y^* = \beta_0 + x\beta + e, y = 1[y^* > 0]$$

where the notation  $1[\cdot]$  is to define a binary outcome. The function  $1[\cdot]$  is called the *indicator function*, which takes on the value 1 if the event in brackets is true, and 0 otherwise. Further, y is 1 if  $y^* > 0$  and y is 0 if  $y^* \leq 0$ . A probit model also uses maximum likelihood estimation (MLE) to overcome the nonlinear nature of  $E(y|x)$ . At the same time, MLE has automatically counted heteroskedasticity in  $Var(y|x)$ . Therefore, under the general theory of MLE for random samples, it is consistent, asymptotic normal and asymptotically efficient. In short, the equation to obtain the MLE estimator is:

$$f(y|x_i; \beta) = [G(x_i\beta)]^y [1 - G(x_i\beta)]^{1-y}, y = 0,1$$

In this article, the application of a binary response model is to explain the effects of the determinants on the response probability  $P(y = 1|x)$ , where  $y = 1$  if farmers perceive a higher bargaining power (otherwise,  $y = 0$ ). To determine the explanatory variables, previous research, relevant literature and theory are used in the analysis. Jaleta and Gardebreek (2007), in their research on farm-gate tomato

price negotiation at the central market in Addis Ababa, used the following explanatory variables: age, education level, differences in buyers' and sellers' quality assessment, distance of the tomato farm from the main road, earlier trade relationships between buyers and sellers, who made the initial bid, sellers' information on the central market price, daily tomato price at the central market, the quantity of tomatoes being transacted, and the number of buyers who had visited a seller. Markelova, Meinzen-Dick, Hellin and Dohrn (2009) and Fischer and Qaim (2011) focused on collective action to improve farmers' bargaining power and their inclusion in the market. Guo and Jolly (2008) and Miyata, Minot and Hu (2009) worked on contractual farming in China, which enables farmers to cooperate with agribusiness firms and the modern market. In regard to contract farming, Key and Runsten (1999) highlight cheap family labour as the major advantage of smallholders' inclusion in contracts. The social distance factor can also be found among vegetable farmer in Jiangsu Province, as presented in Lu, Feng and Trienekens (2008). These authors worked on the relationship between 167 vegetable farmers and 84 vegetable processing and exporting companies through the *guanxi* network<sup>1</sup> in the vegetable supply chain. Their results showed that both farmers and processing and exporting firms obtain advantages from *guanxi* through high interpersonal trust, increased transaction specific investment, and better market efficiency and profitability. Finally, Reardon et al. (2009) highlighted the importance of farmers' assets such as land, in enabling their inclusion in the agrifood transformation, while Khan (1979) identified that large farmers are much more efficient than are smallholders in terms of their use of non-traditional input like fertilizer, hired labour and farm machinery. Khan also argued that large farmers are better positioned in the market in relation to bargaining, credit access and government development policy, given that they have more assets and units of output.

Based on the findings of the above literature, this article chose the following explanatory variables for inclusion in the analysis:

- Characteristics: gender, age and education. Age and education are expected to have a positive effect, with the more experienced and educated farmers anticipated to have more bargaining power.
- Assets: the improvement in farmland as represented by an increase in land area from land purchasing and productivity. It is expected that when farmers have more assets, they will have more bargaining power.
- Interaction between farmer and trader: numbers of different shallot buyers to whom farmers sell their products, their communication method (i.e., the buyer and farmer's meeting point), price agreement and whether they negotiate non-price terms such as quality. Number of buyers, price agreement and negotiation of non-price terms are expected to have a positive effect on farmers' bargaining power. The effect of communication method is expected to vary. For instance, if buyers visit farmers' field or farmers meet buyers elsewhere, the effect is projected to be positive. However, if farmers use intermediaries or farmers go to the buyer's place, the effect will likely be negative.
- Other relevant variables: the involvement of family labour in shallot production, farmers' membership in organisations and cooperatives, the

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<sup>1</sup> A Chinese term that refers to social networks of personal relationships, as the basis of information and communication sharing, trusted-relationship building and collaboration.

quantity of shallot sold, the distance between the farmland and the selling place. A positive effect is expected from the farmer's membership in an organisation or cooperative and the quantity of shallot sold. The effect of distance from the field to the selling place will depend on the typical communication used. For instance, if buyers collect the harvest in the field, then the effect is expected to be positive. Finally, the involvement of family labour in shallot production is projected to be positive based on the argument of Key and Runsten (1999) that farmers who use family labour have the opportunity to be involved in contract farming, which offers farmers a better selling price.

## Data

The primary focus of this article is to analyse the determinants of bargaining power of Indonesian shallot growers. To do this, a representative sample of shallot grower households was interviewed from June to July 2011 by trained enumerators. The three survey locations were all located in Brebes District, Central Java, which is known as a major production area for shallot in Indonesia. The survey covered low-land and high-land areas in Brebes. The sampling design started by identifying shallot producing areas at the district level using secondary data of shallot production in Brebes from 2010 to 2011. By using random sampling methods, 10 sub-districts in low-land areas and two sub-districts in high-land areas were selected. The final sample used in this particular article comprises 700 households from 61 villages in low-land areas only. All participants are shallot farmers. Descriptive statistics of the variables are presented in Tables 1 and 2.

In the present study, 39.57 per cent of respondents perceived themselves as having higher price bargaining power than their buyers, while 60.43 per cent of respondents perceived their bargaining power to be unimproved. The descriptive analysis revealed some of the reasons that most farmers do not perceive themselves as having improved bargaining power. For example, in their interactions with buyers, 96.29 per cent of respondents reported that they do not have written agreements for the transaction. This can be interpreted either as that farmers can hold trust in their transactions with buyers, or that they have no capability to implement written agreements. As mentioned in Guo and Jolly (2008) and Miyata et al. (2009), contractual farming (i.e., written agreement) can eliminate market uncertainty so that farmers can attain a better selling price.

Another finding of this study is that 89.71 per cent of respondents do not hold membership in a cooperative, but that more than half of them (56.57 per cent) are members of farmers' organisations. However, none of the respondents reported marketing their products through their organisation. This shows that farmers' organisations are not designed as marketing institutions. Rather, 43.04 per cent of respondents perceive farmers' groups to be a forum for experience sharing, and 66.67 per cent of respondents perceive cooperatives primarily as credit providers. Regarding selling their products, farmers reported preferring to invite buyers to harvest their products from their field (61.90 per cent) or collect their harvested products from home (19.71 per cent), which implies that collective marketing is not attractive for farmers.

Most of the respondents were well educated, with 85.71 per cent being literate and having accomplished at least six years of study. Respondents spoke about a mean of 3.88 buyers, but reported selling their products to a mean of 1.55

buyers, showing that farmers have a choice as to whom they sell their products. Another important finding for bargaining power is that 60 per cent of respondents reported buyers coming to their farms to collect the product. A rough estimation holds that in situations in which the buyer collects the harvest, the longer the distance from farm field to selling place, the more bargaining power a farmer potentially has, assuming buyers put in the effort to collect the harvest (see Table 1).

**Table 1** Descriptive statistics of farmers' activity, characteristics and interaction with traders

No	Variable	Criteria				
		Farmer	Trader	Ag Labor	Labor	Others
1	Primary activity	89.43%	0.86%	1.71%	57%	2.29%
2	Secondary activity	9.57%	10.43%	28.43%	10.7%	40.86%
Farmer's characteristic		Value (%)	Mean	Std Dev		
1	Age (years old)		46.65	11.22		
2	Education (years)		6.13	4.18		
3	Gender					
	Male	97				
	Female	3				
Interaction with buyer (trader)		Value (%)	Mean	Std Dev		
4	Speak to shallot buyer (numbers)		3.38	2.68		
5	Sell to shallot buyer (number)		1.55	1.5		
6	The distance from farmland to selling place (Km)		3.512	32.05		
7	The quality of shallots sold (Kg)		1141.824	1923.31		
8	Having written agreement					
9	Yes	3.71				
10	No	96.29				
11	Communication on method with buyers					
	Mobile Phone	2.77				
	Landline phone	0.58				
	Buyer comes to the farm	61.9				
	Buyer comes to the farmer's house	19.71				
	Farmer goes to buyer's place	3.66				
	Meet buyer elsewhere	2.77				
	Through intermediary person	8.91				
	Through Cooperative/ group	0				

Source: Primary data (processed)

**Table 2** Farmers' knowledge on end market, membership in cooperative and negotiation during transactions

No.	Variable	Value (%)
1	Knowing the type of end-market	
	Yes	63.8
	No	36.2
2	How to know the type of end-market	
	Shallot buyer	82.84
	Trader in end-market	5.72
	Other farmers who sold the product to the same buyer	9.84
	Others	1.6
3	Shallots are eventually sold in traditional market	
	Yes	60
	No	40
4	Shallots are eventually sold in supermarket	
	Yes	2.29
	No	97.71
5	Farmer has purchase land over past five years	
	Yes	13.43
	No	86.57
6	Farmer mentions the change in shallot yield	
	Increased	31.57
	No change	68.43
7	A member of farmer's group	
	Yes	56.57
	No	43.43
8	A member of cooperative	
	Yes	10.29
	No	89.71
9	Farmer negotiate with shallot buyer over the price	
	No, always accept the price	4.29
	Yes, Sometimes bargain	95.29
	No, farmer sets the price	0.43
10	Farmer negotiate with shallot buyer over the non-price item	
	No, always accept	25.86
	Yes, Sometimes bargain	71.29
	No, farmer sets the non-price term	2.86
11	The involvement of household member in shallot production	
	Yes	93.57
	No	6.43

Source: Primary data (processed)

Further, farmers are well informed about where their harvests are sold, with 63.80 per cent of respondents knowing their products' end market. Of these, 82.84

per cent received this information from their buyers. It is worth highlighting that these figures demonstrate the openness of end-market information in the farmer-buyer relationship, which is good for farmers as it allows them to adjust their product quality accordingly. Another important finding is that 60 per cent of respondents sell their product to traditional markets, which can be seen as leading to their higher bargaining power, considering that the quality of product required when selling for traditional markets is lower than when selling to modern markets. Therefore, a better selling price relative to quality potentially occurs. Membership in a farmers' group can also be a contributing factor to higher bargaining power. Farmers can harness their organisation to negotiate price and non-price terms during transactions. However, while this study found that 95.29 per cent and 71.29 per cent negotiate over price and non-price terms during transactions respectively, this does not appear to be the sole result of the farmers' membership to a farmers' group. Regarding the factors that can lower farmers' perceived bargaining power, farmers' high dependency on the shallot business might have an adverse effect.

### **Estimation Result**

The results of the probit model to explain farmers' perceptions of their bargaining power are presented in Tables 3 and 4. Improvement is measured when the respondents perceive themselves as having more bargaining power at the time of survey as compared to five years previous. Explanatory variables covered in the analysis are listed in Section 2. Family labour is predictably to affect the condition of price agreement.

Referring to Wooldridge (2009), by assumption, the case above is likely to be endogenous, where one of the explanatory variables has a correlation with an unobservable term. According to the argument of Key and Runsten (1999), the variable of price agreement appears to be affected by family labour, an unobservable variable in the model. A treatment using Two Stages Least Square needs to be performed to overcome this issue. The model is thus described as:

$$y_1 = \beta_0 + \beta_1 y_2 + \beta_2 z_1 + u$$

where  $\beta_1 y_2$  is assumed to be endogenous, while  $\beta_2 z_1$  is exogenous. In this study,  $\beta_1 y_2$  represents the variable of price agreement, and the instrument variable that explains the price agreement is family labour. Endogeneity testing needs to be performed to determine whether family labour is a good instrument variable. The test is presented as follows:

$$y_2 = \beta_0 + \beta_1 z_2 + \beta_2 z_1 + v$$

where  $\beta_1 z_2$  represents family labour, which is considered as the instrument variable.

In this study,  $y_1$  is binary and represents farmers' bargaining power, while  $y_2$  represents the price agreement. The analysis covers the endogeneity issue, which uses family labour as the instrument variable of price agreement. Table 3 shows that family labour (*dfamily\_labor*) is a good instrument to explain price agreement.

**Table 3** The first stage of the probit model

Explanatory variable	Description	Co-efficient	Robust std error
dbuy_land	Land purchase [1 if yes]	-0.0424	0.0196
dcommet_mb	Farmers meet buyer elsewhere [1 if yes]	0.1265	0.0301
dcommet_bv	Buyers collect the harvest in the field [1 if yes]	0.1044	0.0206
dnego_nprice	Farmers negotiate over non-price terms [1 if yes]	0.0469	0.0122
dyield_improve	Farmers perceive improved yield [1 if yes]	0.0274	0.0081
dfog_t	Farmer's membership in organisation [1 if yes]	-0.0148	0.0108
dcoop_t	Farmer's membership in cooperative [1 if yes]	0.0058	0.0152
age_resp	Farmer's age, years old	0.0004	0.0005
educ_resp	Farmer's years of education	0.0005	0.0012
dgender_resp	Farmer's gender [1 if male]	-0.0142	0.0111
sell_buyer	Numbers of buyers	0.0071	0.0023
dist_shallot	Distance from the field to the selling place (Km)	0.0003	0.0002
sold_shallot	Quantity of shallot sold (Kg)	3.25E-06	2.87E-06
dfamlab*	Dummy, the involvement of family labour [1 if yes]	0.2854	0.0585
Cons		0.5671	0.0748
Wald test of exogeneity ( $\lambda = 0$ ): $\chi^2(1) = 2.08$ Prob > $\chi^2 = 0.1496$			

From the results shown in Table 3, family labour is statistically significant at any level, which means that family labour appears to affect price agreement positively, as expected. This accords with the argument of Key and Runsten (1999) that family labour increases the opportunity of smallholders to be included in a contract. Therefore *dfamlab* is a good instrument variable.

Table 4 shows the probit model with instrument variables that covered the endogeneity test. Land purchase, the communication method where farmers meet buyers elsewhere and buyers collect the harvest in the field, farmers' efforts to negotiate over non-price terms, and farmers' perception of improved yield were all found to be statistically significant with farmers' higher bargaining power.

Farmers' assets, which in this study was represented by land purchase (*dbuy\_land*), contradicted expectations. Rather than positively correlating with bargaining power, results showed that an increase in land purchase by one unit lowered the farmers' perception of their bargaining power by 0.4817, *ceteris paribus*. In contrast, in reality, a positive benefit is often ascribed to tenant farmers' land purchase since more land is thought to improve their wealth and prosperity. To justify the findings, an exploration of the land-management-related literature was necessary to give a firm standpoint. Mookherjee (1995) highlight that where

land is owned by a landlord, its sale to a tenant is never voluntary. Instead, to purchase the land, the amount paid to compensate the landlord is likely to exceed the limited wealth of the tenant farmer. This raises the question of how tenant farmers fund their land purchases. Moreover, when farmers own their land, they become more vulnerable to weather uncertainty, due to the reduced risk sharing.

**Table 4** Estimates of determinant shallot growers' bargaining power

Explanatory variable	Description	Farmers' perception of higher bargaining power	
		Co-efficient	Robust std error
dpr_agree	Price agreement [1 if yes]	-0.7905	8074
dbuy_land	Land purchase [1 if yes]	-0.4817*	0.1589
dcommet_mb	Farmers meet buyer elsewhere [1 if yes]	1.2102*	0.3356
dcommet_bv	Buyers collect the harvest in the field [1 if yes]	0.5036*	0.1618
dnego_nprice	Farmers negotiate over non-price terms [1 if yes]	0.4122*	0.1189
dyield_improve	Farmers perceive improved yield [1 if yes]	0.4384*	0.1073
dfog_t	Farmer's membership in organisation [1 if yes]	0.1074	0.1054
dcoop_t	Farmer's membership in cooperative [1 if yes]	-0.2758	0.1703
age_resp	Farmer's age, years old	-0.0007	0.0049
educ_resp	Farmer's years of education	0.0106	0.0138
dgender_resp	Farmer's gender [1 if male]	0.2005	0.2831
sell_buyer	Numbers of buyers	0.0516	0.0328
dist_shallot	Distance from the field to the selling place (Km)	0.0024	0.0025
sold_shallot	Quantity of shallot sold (Kg)	6.82E-06	0.00002
cons		-0.6639	0.8009
Number of Obs		700	
Wald Chi2 (14)		57.64	
Prob>Chi2		0.0000	
Logpseudolikelihood		-10.6092	

Note: significant at 1%

That the land market is thin and imperfect also contributes to the effects of land purchasing on farmers' bargaining power. Mookherjee (1995) revealed that land sales in observed countries were not showing any significant growth, although the phenomenon is likely less systematic. For instance, farmland transfer from landlord to tenant farmers on average each year is less than 2 per cent in Indian

village during the year 1970–1971, only 3 per cent in the USA, 1–1.5 per cent in the UK, 1.5 per cent within the white sector in South Africa, and 0.5 per cent in Ireland and Kenya (Moll, Jodha and Kumar, in Mookherjee, 1995). The possible reasons for this include the asymmetric information concerning the value of a piece of land, the value of land as a liquid asset and the desire for portfolio diversification. The asymmetric information concerning land within close-knit village communities might be questionable; landlords might prefer to transfer their land to only the wealthiest farmers.

These findings from the literature justify the results returned by the survey, which found that the percentages of observed respondents who had sold and bought land in the last five years were only 7.14 and 13.43, respectively. Initially, it is likely that farmers purchasing land would be challenged by financial loans and reduced risk sharing, although these factors were not explored in the survey. Generally speaking, such challenges would lower their bargaining power. The positive benefits of land purchase such as increased productivity, assets, wealth and prosperity remain valid, but only in the long term.

Turning to communication methods, these are represented by two variables in this study: buyer visits farmer's land or house (*dcommet\_bv*) and farmer meets buyer elsewhere (*dcommet\_mb*). These variables show a positive effect on farmers' bargaining power, as expected (see Section 2). The estimation shows that if farmers choose to meet buyers elsewhere to negotiate the transaction (*dcommet\_mb*), the probability of farmers' perceiving themselves to have improved bargaining power is 1.2102 higher, *ceteris paribus*. Similarly, if farmers choose to meet buyers at their fields to negotiate the transaction (*dcommet\_bv*), the probability of farmers' perceiving themselves to have higher bargaining power will be 0.5036 higher, *ceteris paribus*.

These results support the work of Mayrowani and Darwis (2009), who highlight a potential increase in competition among buyers, though the number of buyers is not statistically significant in this model. 'Tebasan' has become the more preferable system to accommodate buyers' needs and 88.81 per cent of respondents reported applying this system. Under more stringent competition conditions, buyers need to secure their supply by collecting the products directly from the farmer's field. Farmers appear to perceive themselves as having improved bargaining power if they meet buyers somewhere other than at their own farm. This might be due to the short distance between their field and the selling place, given the result that 8.53 per cent of respondents meet their buyer at the roadside or some other collection place, which is on average less than two kilometres away.

The negotiation process also contributes to perceived bargaining power. As mentioned in Jaleta and Gardebroek (2007), the sellers' commitment to their initial bid falls when the buyers perceive that the quality of the product being transacted is one grade lower than the sellers perceive. However, that applies in the opposite direction in this analysis since the data used is solely based on farmers' (seller) perceptions. The result shows that if farmers negotiate over non-price terms (*dngo\_nprice*), farmers will perceive a higher price bargaining power (0.4122), *ceteris paribus*. In this survey, the non-price terms cover quality aspects such as size, dryness and grade, though this is not elaborated on in the questionnaire. It is clear that farmers and buyers have different perceptions over non-price terms, with farmers usually considering that their harvest is of good quality, while buyers perceive differently, based on information which buyer may access. It is worth noting that the success of non-price negotiation on the part of both parties (and

particularly for the purposes of this paper, sellers) is supported by better knowledge on the market, product quality and price. In this study, 68.30 per cent of respondents knew the end market of their product. Thus, farmers can be expected to negotiate a selling price effectively, assuming their product matches the quality and price requirement of the end produce.

Yield improvement (*dyield\_improve*) also appears to correlate strongly with bargaining power, and this is supported by common sense and the literature. The estimation result of the dummy in yield improvement shows that respondents who report increased yield productivity have an increased perception of higher bargaining power by 0.4384, *ceteris paribus*. Khan (1979) proposes (and proves) the hypothesis that productivity is positively correlated with farm size, where the larger the farm size, the more output harvested, considering the efficient use of input and technology. However, in the shallot business, the average plot area is only 0.752 hectares and the mean harvest is 1.283 ton, slightly above average, considering that Indonesian farmers normally cultivate 0.5 hectares land and harvest 1 ton of output on average.

Farmers' membership in cooperatives correlated insignificantly to farmers' perceptions of their higher bargaining power. The estimated coefficient was also found to contradict the expectation that cooperatives could improve farmers' bargaining power. This finding might be related to cooperatives' objectives and performance. It was found that 66.67 per cent of cooperative members obtain the benefit of favourable credit provision. Half of the cooperative members reported that their cooperative's performance had not improved over the last five years, and 69.86 per cent were not satisfied with their cooperative's performance.

The involvement of family members in shallot production (*dfamlab*) was covered in price agreement (*dpr\_agree*), which was not statistically significant for bargaining power. However, this variable does not necessarily need to be dropped. Key and Runsten (1999) prove that family labour has a unique role in involving smallholders in contract farming. Thus, *dfamlab* remains a good instrument variable to *dpr\_agree*, though *dpr\_agree* variable is statistically insignificant.

## Conclusion and Policy Implication

The dominant role of traders in the shallot business might render dichotomy to farmer and trader relationship. On the one hand, traders can offer farmers more market opportunities, such as in the example where food companies make contracts with traders to buy farmers' produce. In such cases, traders play an important role in involving farmers in the market transformation. However, when products being transacted are subject to traders' sole valuation and this is not disclosed to the buyer, there is an incentive to withhold information. This study analyses the determinants of bargaining power of shallot growers by regressing the farmers' perceptions of their higher bargaining position.

Factors such as land purchase, communication method, farmer's effort to negotiate and perceptions on yield improvement were found to be statistically significant with higher perceived bargaining power. Only land purchase appears to have a contradictory effect, whereby the more land a farmer has, the less likely they are to perceive themselves as having higher bargaining power (see Section 4 for an explanation of this phenomena, grounded in the literature). Based on a review of the literature it was determined that this is likely owing to farmers being initially burdened with debt from loans and the reduced security offered by risk sharing

with landowners. However, the overall benefits of land purchase increase farmers' assets over time, and represent their improved wealth. As discussed in Irawan (2003, 2007), farmers who own more land have a greater opportunity to increase their production, manage their risk by practicing multi-cropping and producing in scale economies.

The estimation results also show that farmers need to be encouraged to negotiate over non-price terms during the transaction, such as quality of the produce. As discussed in Section 4, buyers perceive quality based on the information they receive. Farmers should inform themselves about the quality of their produce, and thus the price they can expect to receive, so that they are not exploited. However, this can be difficult, as some farmers do not have access to the price information.

A further finding of this study is that the estimation results do not clearly show an effect for the variables of membership in a cooperative or farmers' organisation, number of buyers, distance from the field to the selling place, and quantity sold. Regarding cooperative membership, the lack of farmers' satisfaction with their cooperative (69.86 per cent of farmers were not satisfied with their cooperative's performance) may be explained by this lack of correlation with improved farmer bargaining power, although the findings also suggest that cooperatives and farmers' organisation are not designed as marketing intermediaries. For other insignificant variables, the argument might be in line with shallot marketing structure, where buyers will collect the produce from the field or meet farmers elsewhere with an average distance of less than two kilometres from the field. Therefore, the distance will give no effect to bargaining power. In addition, the bulk argument of quantity sold may not hold due to the perishable nature of shallot. Farmers like to get a high price, but also consider the risk of loss if trade does not occur. Further, since 88.81 per cent of respondents prefer 'Tebasan', where buyers collect the produce from the field, any quantity sold seems not to affect bargaining power since farmers do not bear the distribution cost.

To follow up on these findings, some relevant policies need to be undertaken to address farmers' problems in this agrifood transformation era. First, farmers are supposed to not only be assisted to improve their assets but also instructed in how to manage them. As captured by this analysis, asset improvement such as land purchase alone does not improve farmers' bargaining power. A governmental agency concerned with asset management is important, especially initially, to suppose new or expanding land-owning farmers. Second, as the 'Tebasan' system has been shown to increase farmers' bargaining power, this system needs to be accompanied by supporting policies. For instance, traders' initiative to collect the product from the field could be supported by good road infrastructure. These same policies are important to accommodate farmers that do not apply the 'Tebasan' system. Third, information related to price and end market should be easily accessible for both parties. Based on the finding that farmers who negotiate over non-price terms such as quality will have greater probability of higher bargaining power, a better knowledge of quality becomes important. Moreover, if farmers know where their produce is marketed, they will have a clearer idea of the suitable quality, since end market typically depicts the quality of the product sold. For instance, products that are sold to supermarkets require a higher quality than those sold in traditional market. Lastly, the role of cooperatives and farmers' association needs to be endorsed, given the finding that such organisations do not currently significantly assist farmers to market their product. Markelova et al. (2009) and

Fischer and Qaim (2011) proved that collective action, which can be initiated by farmers' organisations, can improve farmers' bargaining power as well as their inclusion in the market.

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