Analyzing Marketing Margins and Their Implications in Improving Performance of Small-Scale Producers in the Calamansi Chain in Region XI, Southern Philippines

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Abstract

Due to its wide range of uses and profitability, calamansi or calamondin (*Citrofortunella microcarpa*) is considered a high-value crop of the Philippines. But while there are many studies on the various uses of calamansi parts and technologies developed to help farmers, there is a dearth of studies on the structure and operation of the calamansi marketing chain and analysis of marketing margins of producers and other intermediaries. The present study aimed to examine marketing margins to understand the marketing system of the calamansi industry in Region XI, Southern Philippines, and identify opportunities, challenges, and solutions to improve the chain. A price transmission model was estimated using secondary data and supplemented by calculation of net margins for farmers, wholesalers, processors, and retailers using primary data collected from key informants. Results show that farm, wholesale, and fuel prices significantly explained changes in selling or retail prices. Price transmission elasticity is higher from farm to wholesale than from farm to retail, which implies that changes in farm prices are reflected more in wholesale than retail prices. Farmers received better margins even though calamansi is always subjected to seasonality of prices. Processors and wholesalers also earned positive net margins, but some retailers incurred negative net margins because of incidence of shrinkage/wastage. Given that this occurs very rarely, and with better management, retailers can still expect to gain positive net margins. Major actors in the chain may benefit by effectively managing costs, particularly post-production and wastage costs. A package of assistance that includes technology improvement, access to market, and credit is necessary to help farmers, as well as intermediaries, enhance productivity and manage costs to improve their performance in the chain.

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Keywords: calamansi; marketing margin; net margins; price transmission elasticity

Abbreviations:

BAS – Bureau of Agricultural Statistics
CALABARZON – Cavite, Laguna, Batangas, Rizal, and Quezon provinces
DA – Department of Agriculture
DTI – Department of Trade and Industry
MIMAROPA – Mindoro, Marinduque, Romblon and Palawan provinces
PTE – price transmission elasticity

Introduction

Calamansi or calamondin (*Citrofortunella microcarpa*) is the most commonly grown backyard tree among the citrus species in the Philippines due to its ability to grow in a wide variety of conditions (DA, n.d.). Although it is generally believed to be native to the Philippines (BPRE, 2007; DA, n.d.), calamansi, in fact, is a hybrid between species in the genus *Citrus* (Dianxiang and Mabberley, 2008), originating in China and brought to the Philippines and Indonesia during early times (Morton, 1987).

Calamansi has various medicinal, culinary, and other practical uses. A rich source of phosphorous, calcium, iron, and, particularly, vitamin C or ascorbic acid, calamansi is well-known for its health benefits (Morton, 1987; DA, n.d). According to the Nutritional Guidelines for Filipinos 2000, consuming two servings (each at 45–300 g) of the fruit daily is recommended to meet the daily requirement of vitamin C (Josue, 2007). Traditionally made into a fruit drink, calamansi is used as a remedy for cough and to promote even blood circulation and normal digestion (DA, n.d). The juice is also used as cure for irritation, such as insect bites, acne, and scalp itching. Since it is used as flavoring in desserts and additive in seafood and meats, calamansi is a staple in many Filipino kitchens (Josue, 2007; Morton, 1987). The pulp, on the other hand, is used as a major ingredient in beverages, syrups, concentrates, and purees; and the peel is made into jams, candies, and marmalade (Josue, 2007; DA, n.d.). The fruit juice is also used as stain remover and deodorant.

For commercial varieties of calamansi that are supplied fresh to the consumers, the Philippine National Standards (PNS/BAFPS, 2005) provides grading and classification guidelines in order to maintain certain qualities of the fruit. The fruit is classified into three classes according to its general appearance, quality, and condition: (1) the Extra class, where fruits are of

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superior quality and has similar varietal characteristics, mature, firm, well-formed, well-trimmed, and free from superficial defects such as discoloration, disease, and insect damages; (2) Class I, where fruits are of good quality and have characteristics similar to Extra class but have slight defects in shape and appearance; and (3) Class II, where fruits only meet the minimum requirements. Additionally, calamansi is classified according to its size: big ones have a diameter greater than 2.8 cm; medium-sized ones, a diameter of 2.0–2.8 cm; and small ones, a diameter of 1.5–2.0 cm.

In terms of production, the calamansi industry has seen a domestic growth for the past years, from 1997 to 2006; and on the average, production increased by 2.74% annually. However, the production has declined to 180,999 metric tons (0.41%) and 180,907 metric tons (0.05%) in 2002 and 2003, respectively, due to a typhoon that struck the country in 2002, which devastated the major calamansi-producing areas in Luzon (Sanguyo, 2004). But it was able to recover by posting a 200,000 level of production in 2005. As of 2008, the total production of calamansi was 196,595 metric tons (BAS, n.d.). In addition, area planted with calamansi has increased at the rate of 1.46% annually from 1997 to 2006. This increasing trend has continued in the years 2004 to 2006, with an annual average of 20,158.33 ha. Also, the industry's total bearing trees has increased at the rate of 2.70% annually (BAS, n.d.). For regional distribution, Region IV-B or MIMAROPA still holds the first spot in terms of production (62.37%), area planted (40.5%), and number of bearing trees (38.64%) from 1997 to 2006. In terms of production rate, it is then followed by Region IV-A or CALABARZON (8.51%). But Region XI holds the second position in terms of area planted (8.41%) and number of bearing trees (10.29%). In addition, Mindoro Oriental is still the largest-producing province and, in 2006, recorded production of 119,938 metric tons of calamansi, which is followed by Quezon (8,877 metric tons) and Nueva Ecija (5,957 metric tons). Likewise, the leading provinces in terms of area planted and bearing trees are Oriental Mindoro (7,314 ha; 3,284,000) and Davao del Norte (1,242 ha; 612,179). Major export destinations for calamansi juice are Japan (36% of the total volume) and the United States (33%), with Canada (6%), Hong Kong (5%), and the Republic of Korea (5%) trailing behind (Sanguyo, 2004). In 2006, volume and value of calamansi exports grew significantly by 41.83% and 42.97%, respectively, due to notable increases in export of calamansi juice, concentrate, and fresh fruit to these countries. With these figures, the Philippines remained as the sole exporter of fresh and concentrate calamansi in the world (BETP, 2009; NAFC, n.d.).

The profitability and versatility of calamansi are strengths that need to be further developed to improve the industry, increasing year-round production and supply of high-quality calamansi and enhancing global competitiveness of fresh and processed calamansi (NAFC, n.d.). However, various constraining factors beset the industry, which, upon closer examination, are common to

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several other agriculture commodities. Some of these factors are as follows: (1) fluctuating prices from seasonal production, (2) high spoilage, (3) inadequate capital to finance the buying and selling of goods, (4) too many competitors, (5) low price due to low quality of produce and oversupply, and (6) lack of information in farm technology (AsiaDHRRA, 2008). To address these, as well as build on the industry's competencies, the development of a strategic action plan for the calamansi industry, involving the participation of the private sector and spearheaded by the Department of Agriculture (DA) and Department of Trade and Industry (DTI), was launched with the goal of enhancing investments and profitability of the industry (NAFC, n.d.).

But there has been a dearth of studies particularly on the structure and operation of the calamansi marketing system and analysis of marketing margins of producers and other intermediaries. The only extensive study was conducted by the Marketing Studies and Development Section of the Bureau of Agricultural Statistics (BAS) on the marketing cost structure for calamansi in some key areas of Luzon and Visayas. The study quantified the different production and marketing costs and mapped the value chain for calamansi, which illustrated how players and intermediaries act, consolidate, and work together within the chain (BAS, 2003).

The present study, using primary and secondary data, aims to examine and determine the price transmission elasticities and the net margins to assess performance of the marketing system of the calamansi industry in the Philippines. Specifically, the study sought to (1) determine the factors that influence marketing margins for calamansi and the impact of each factor on the marketing margins; (2) determine how efficient the different actors in the supply chain are by calculating their costs and net margins; (3) determine how prices change across the supply chain; and (4) identify opportunities and challenges to improve the industry.

Materials and Methods

According to Butler and McCarthy (2007), marketing margin is the difference between the price consumers pay at the retail level and the price producers receive at the farm gate. It includes processes and services required to transfer a particular commodity from the producer to the consumer. As an effect, prices change from one level to another.

As such, marketing margin analysis provides a way to examine the structure and performance of food chains (Digal et al., 2006). In this study, two methods were used. First, we analyze how costs are reflected in selling prices, particularly the cost of raw materials or buying price through price transmission analysis, which provided an indication of the performance of the system—whether the market is efficient or not. Second, we computed the net margins for each

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node of the chain to show the details on the costs of producing, selling, or processing calamansi, which provides us with an indication of the profitability and distribution of benefits across actors in the chain.

Estimation of price transmission models used monthly data on farm, wholesale, and retail prices in Region XI from 2003 to 2006, the years that had complete datasets for the region (BAS, 2008). Other sets of secondary data that were collected include agricultural wage rate, price of fertilizer, and price of pesticide (BAS, 2008), as well as unleaded gasoline price (DOE, 2008) and lending rate (PIDS, 2008). Microsoft Excel was used to analyze the time-series data and estimate the price transmission model. The regression feature of the software allowed estimation of the price transmission models. T-statistics were generated to determine whether the independent variables are statistically significant or significantly explain variability in selling prices. Statistical significance of the overall model was determined using the F-statistic. Diagnostic tests were also done to determine possible problems of multicollinearity and autocorrelation. Finally, both logarithmic and non-logarithmic functional forms of the model were estimated to improve results.

For the case analysis, primary data gathered using survey questionnaires were utilized in analyzing the net margins received by every actor in a specific chain. The initial step in measuring the net margins is to describe the structure of the marketing chain, which starts at the farm-gate level and through the various intermediaries until it reaches the final consumer; then, the various functions performed at each stage in the marketing process were identified. There were three general marketing chains examined in the case analysis: (1) farm level in Asuncion → wholesalers in Davao; (2) farm level in Tagum → wholesalers in Davao → retailers in Davao; and (3) farm level in Tagum → processors in Tagum. Since calculating net margins is like estimating the profitability of producing or marketing the product expressed in a per-kilo basis, data on the prices of products sold (selling prices) and the amount of product sold, as well as the costs of producing or marketing the product, was collected. However, there are limitations in estimating net margins; for example, the accuracy of volume sold is difficult to ascertain, particularly for marketers such as traders, wholesalers, and retailers, as these data are often treated as confidential. In addition, at the retail level, allocation of costs, especially when the retailers sell different kinds of commodities, may not be accurate. In order to avoid bias, allocation is based on volume sold.

Price Transmission Model

Lechanová and Novák (2006) describe a price transmission model as one way to measure the proportion of an input price change that is passed on to the output prices. A positive elasticity would mean that as the buying price increases, selling prices also increase. Moreover, since the magnitude of the

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elasticity indicates the level of competitiveness, elasticity closer to 1 would imply a higher level of competition (Digal et al., 2006).

In addition, the coefficient of price transmission elasticity (PTE) is used as the basic measure for the intensity of the price transmissions, which is computed as follows:

$$(1) \qquad EPT_{ij} = \frac{\frac{\partial p_j}{P_j}}{\frac{\partial P_i}{P_i}} = \frac{\partial p_j}{\partial P_i} \times \frac{P_i}{P_j} \quad ,$$

where *i* and *j* are the two hypothetical markets, say, retail and farm, that exist (Lechanová and Novák, 2003).

Equation (1) is derived from a model that is based on the assumption that all actors in the chain maximize profit and the technology applied to all suppliers of marketing services, such as traders, wholesalers, and retailers, is a fixed proportions type. That is, there is no substitution among production inputs such as labor or capital to produce a product or a service. Assuming there are only two actors in the chain, i.e., wholesaler and retailer, who are price takers and incur raw material cost only, the following profit-maximizing condition can be derived (see Digal et al., 2006; Elcana, 2003):

$$(2) \qquad \begin{aligned} p &= TR - TC \\ p &= P_r Q - P_w Q \\ \frac{dp}{dQ} &= P_r - P_w = 0 \\ P_r &= P_w = MC \end{aligned} \quad ,$$

where:
p = profit;
TR = total revenue;
TC = total cost;
dp = derivatures of profit;
dQ = derivatures of Q;
P_U = unleaded gasoline price in PhP/L and > 0; and
P_{LR} = lending rate in % and > 0.

Note that $P_r Q$ is the total revenue (TR), $P_w Q$ is the raw material cost that is equal to total cost (TC), and it is assumed that $Q = Q_r = Q_f$, which means there are no losses incurred as the product goes from the farm to retail. Equation (2) shows that retail and wholesale prices are equal to marginal cost when actors

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maximize profit. This can be generalized into the following model:

$$(3) \qquad P_r = f(P_w, C) \quad ,$$

where C = other cost; all other variables as previously defined.

Equation (3) means that the retailer maximizes profit by equating its price to marginal cost, which is composed of the price of raw material and other costs such as labor, water, electricity, etc., incurred in selling the product.

To estimate a model, it is assumed that the functional form of equation (3) is additive and the retailer incurs costs aside from raw material. Considering the costs involved in producing and marketing the retail product based on interview of key informants, data availability, and previous studies (e.g., Baek and Koo [2009], Trostle [2008], and Schnepf [2006]), the cost factors considered were agricultural wage rate, fertilizer price, pesticide price, unleaded gasoline price, and lending rate. The empirical counterpart of equation (3) can now be defined as follows:

$$(4) \quad P_r = a + b_1 P_f + b_2 P_w + b_3 P_L + b_4 P_F + b_5 P_{Pes} + b_6 P_U + b_7 P_{LR} \quad ,$$

where:
P_r = retail price in PhP/kg;
a = constant;
P_f = farm price in PhP/kg and > 0;
P_w = wholesale price in PhP/kg and > 0;
P_L = agricultural wage rate in PhP/day and > 0;
P_F = fertilizer price in PhP/kg and > 0;
P_{Pes} = pesticide in PhP/L and > 0;
P_U = unleaded gasoline price in PhP/L and > 0; and
P_{LR} = lending rate in % and > 0.

Note that coefficients or slopes of these independent variables are expected to have a positive relationship with retail prices as changes in these cost variables should be transmitted or reflected proportionately in selling prices. Aside from retailing, price transmission in other nodes of the chain was also examined. Thus, the following equations or price transmission models were estimated:

For farm–wholesale level (M_1):

$$(5) \quad P_w = a + b_1 P_f + b_2 P_L + b_3 P_F + b_4 P_{Pes} + b_5 P_U + b_6 P_{LR} \quad ,$$

For wholesale–retail level (M_2):

$$(6) \quad P_r = a + b_1 P_w + b_2 P_L + b_3 P_U + b_4 P_{LR} \quad ,$$

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For farm–retail level (M_3):

$$(7)\quad P_r = a + b_1 P_f + b_2 P_L + b_3 P_F + b_4 P_{Pes} + b_5 P_U + b_6 P_{LR} \quad .$$

All variables and parameters are as previously defined.

Net Margins

Net margin analysis is a practice of measuring and describing the structure of the marketing chain, which usually starts at the farm level and tracing the product through the various intermediaries until it reaches the final consumer (BAS, 2003). In this study, we selected four players or actors in each node of the chain—namely, farm, wholesale, retail, and processing—in the City of Tagum and the Municality of Asuncion, both in Davao del Norte, which are localities that consider calamansi as one of their major crops. Due to time, accessibility, and budget constraints, calamansi supply chains that lead to Bankerohan, one of the largest trading centers in Davao City, were chosen (Figure 1).

During the course of data collection, there were six farmers, six wholesalers, three retailers, and two processors who shared their knowledge on the marketing system of calamansi in Region XI. Also, there were four government officials/ employees who supported the proponent in locating these players.

Price, costs, and activities for every marketing level of the chosen supply chain were collected. These data, particularly those of prices and costs, were then used for the net margins analysis. Moreover, net margins were computed for peak season and off-season prices to show variability of net margins due to seasonality.

At the farm level, actors were identified through a list of farmers provided by the agricultural offices in the two locations.

At the wholesale and retail levels, only wholesalers and retailers who sourced out from the two areas were included so that the marketing chains are properly linked. Also, only retailers that dealt with the wholesalers for their produce were included; retailers who sourced directly from the farmers were excluded. Note that the supermarket in Tagum and the retailers sourcing from Asuncion were not included in the interview due to unavailability of these respondents at the time of data collection.

For the processing of calamansi concentrate, those in Tagum City were chosen for the study primarily because three well-known processing plants operate in the region, while in Asuncion, only a single processing plant operates. Furthermore, the processor in Asuncion does not undergo production at a regular basis, only producing calamansi concentrate when the farm price of calamansi is low since production when price of fresh calamansi is high means loss of profit.

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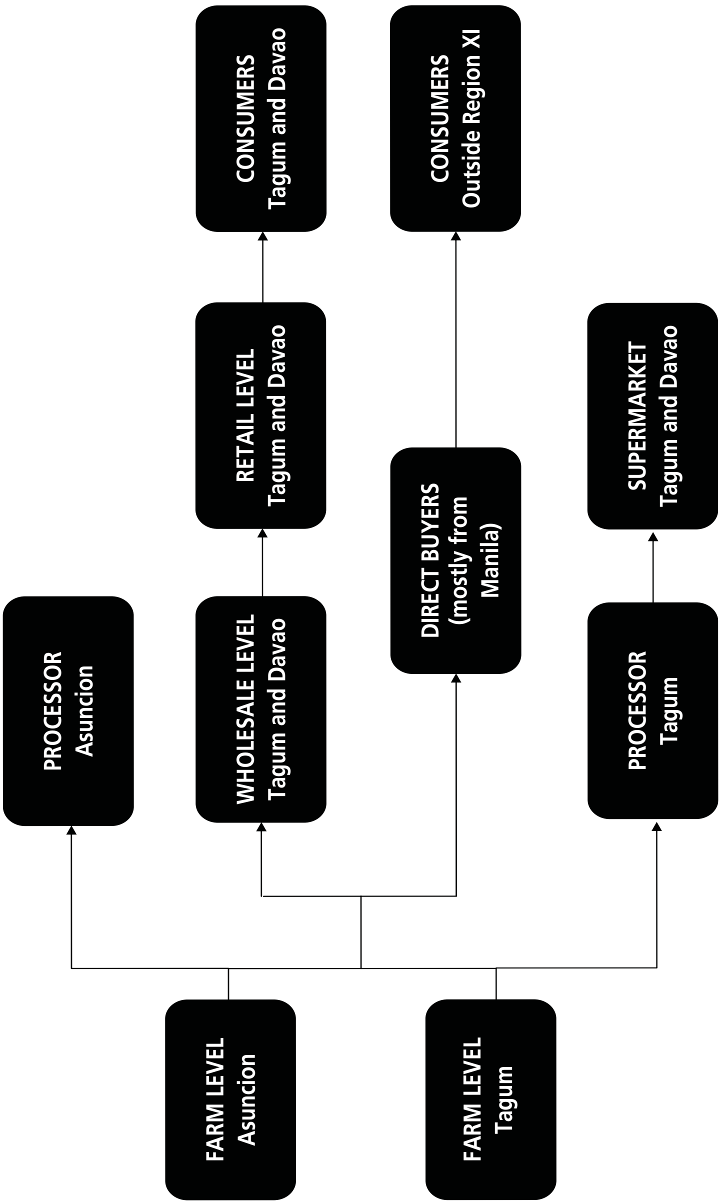

FIGURE 1. Supply chain of calamansi in Davao del Norte

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Results and Discussion

Regression Output

In the regression output generated in estimating the price transmission model for each marketing node, all coefficients and overall models presented are significant at 0.05 level, except for fertilizer price at farm–wholesale level (Table 1). In employing an autocorrelation test to detect the presence of correlated error terms, the results suggest that there is no significant autocorrelation. Multicollinearity, the correlation of independent variables, is not also present in the generated models, which strengthen the reliability of the models. Finally, with higher R squares, it implies that the variability of the dependent variable, i.e., wholesale and retail prices, is explained by the independent variables for each marketing node.

Specifically, primary factors affecting wholesale price in farm–wholesale level include farm and fertilizer prices. This means that for every 1% increase in farm price, wholesale price will increase by 0.46%. Likewise, the negative result of fertilizer price could be explained by the fact that the calamansi farmers do not consider this cost variable to be of great value since fertilizer application is only done once a year. Thus, in a daily basis, it is not considerable enough to affect the selling price at the wholesale level.

At the wholesale–retail level, all variables in the model significantly affect retail price. This means that for every 1% increase in wholesale price, retail price increases by 0.48%. Similarly, as unleaded gasoline price and lending rate

Table 1. Regression output

Variables	Farm–wholesale[a]	Wholesale–retail[a]	Farm–retail[b]
Constant	0.455	0.480	6.825
Farm price	0.928	-	1.529
Wholesale price	-	0.480	-
Fertilizer price	-0.271	-	-
Unleaded gasoline price	-	0.276	0.132
Lending rate	-	0.003	-
N	48	48	48
Durbin-Watson	2.195	1.418	1.801
R square	0.797	0.938	0.808
F value	88.076	223.815	94.851
Significance	0.000	0.000	0.000

Notes:
[a] Log variables are used.
[b] Nonlog variables are used.

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increase by 1%, retail prices increase by 0.28% and 0.003%, respectively. Finally, farm and gasoline prices positively affect retail price at farm–retail level, which means that for every 1% increase in the prices of these two variables, retail price will increase by 1.53% and 0.13%, respectively.

Price Transmission Elasticities (PTE)

At the regional level, price transmission elasticities are positive: farm–wholesale, 0.93; wholesale–retail, 0.48; and farm–retail, 0.46. Among the three marketing nodes, farm–wholesale level has the highest elasticity, which is close to 1. This indicates a higher level of competition, implying that the buying price is a key factor considered in determining the selling price at the wholesale level.

On the other hand, the two marketing nodes, wholesale–retail and farm–retail levels, have posted elasticities that are below 0.50, which signify that the system is relatively less competitive in these two nodes of the chain as changes in buying prices are only reflected in selling by less than 50%. But there are other factors that explain changes in selling prices aside from buying prices, including other costs and barriers to entry such as market power that can lead to inefficiency in the market.

Net Margins

Chain 1 (Asuncion Source)

Farm level. Production costs, which include fertilizer and pesticide application, incurred by farmers accounted for the lowest share to the total production and marketing costs. This could be explained by the fact that this activity is usually done once or twice a year only, so when computed on a daily basis, the value is minimal; thus, its share to total costs, which includes the cost of procuring inputs, ranges only from 0.38% to 1.56%. Accounting for the bulk of the total cost are the marketing costs, such as packing and distribution costs (35.42%–50.42%), and post-production costs (35.00%–52.60%)(Table 2).

In computing for net margins, peak season and off-season prices were used to show price variability due to seasonality. However, it can be observed that farmers incurred positive net margins regardless of the season. When the buying price of calamansi drops to PhP 8.00 per kg, they can still earn at least PhP 5.39 per kg. But when it reaches PhP 16.00 per kg, they can earn as high as PhP 14.08 per kg. This positive net margins show that calamansi production in Asuncion is highly profitable (Table 3).

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Table 2. Costs (PhP/kg) and percent share of 3 farmers in Asuncion

Variable/Cost	Farmer 1	Farmer 2	Farmer 3
Production	0.03 (1.56)	0.02 (0.83)	0.01 (0.38)
Post-production	1.01 (52.60)	0.84 (35.00)	0.98 (35.55)
Marketing	0.68 (35.42)	1.21 (50.42)	1.12 (42.91)
Own labor	0.20 (10.42)	0.33 (13.75)	0.50 (19.16)
Total	1.92	2.40	2.61
No. of sacks	50	30	20
Volume (kg)	1250	750	500

Table 3. Net margins (PhP/kg) of 3 farmers in Asuncion

Farmer	Total cost	Selling price		Net margin	
		Off-season	Peak season	Off-season	Peak season
1	1.92	8.00	16.00	6.08	14.08
2	2.40	8.00	16.00	5.60	13.60
3	2.61	8.00	16.00	5.39	13.39

Wholesale level. At the wholesale level, the bulk of the cost is the value of raw materials, which accounted for 93.57% to 96.82% of the total cost. The share of labor, own and hired, and storage cost are less than 5% (Table 4).

In computing for the net margins, results show that wholesalers 1 and 2 earned more than wholesaler 3 during the regular season, but the latter's net margin is significantly higher than the two during peak season. While selling prices are the same, cost of raw materials or buying cost incurred by wholesaler 3 is lower, thus earning higher net margins (Table 5).

Chain 2 and 3 (Tagum Source)

Farm level. Production cost incurred by farmers is relatively low compared to post-production and marketing costs, with share to total cost ranging only from 2.15% to 15.45%. However, the share of post-production cost ranged from 34.41% to 45.94%, which is expected due to high harvesting cost. Marketing cost is also quite high with a share to total cost ranging from 16.96% to 29.03% because of high packing cost, which includes labor and materials. Thus, the high post-production and marketing costs puts pressure on farmers in terms of financial requirements (Table 6).

But farmers still managed to earn positive net margins even with seasonality

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Table 4. Costs (PhP/kg)and percent share of 3 wholesalers in Asuncion

Activity/Cost	Wholesaler 1	Wholesaler 2	Wholesaler 3
Labor cost	0.20 (1.78)	0.20 (1.78)	0.20 (1.97)
Cost of storing	0.08 (0.67)	0.08 (0.67)	-
Cost of "dropping"	-	-	0.10 (0.99)
Own labor cost	0.25 (2.22)	0.25 (2.22)	0.25 (2.46)
Cost of buying			
Peak season	16.00 (96.82)	16.00 (96.82)	12.00 (95.62)
Off-season	8.00 (93.84)	8.00 (93.84)	8.00 (93.57)
Total Cost			
Peak season	16.53	16.53	12.55
Off-season	8.53	8.53	8.55
No. of sacks	40	40	40
Volume (kg)	1000	1000	1000

Table 5. Net margins (PhP/kg) for 3 wholesalers in Davao City

Wholesalers	Total cost		Selling price		Net margin	
	Off-season	Peak season	Off-season	Peak season	Off-season	Peak season
1	8.53	16.53	11.20	18.00	2.68	1.48
2	8.53	16.53	11.20	18.00	2.68	1.48
3	8.55	12.55	11.20	18.00	2.65	3.45

Table 6. Costs (PhP/kg) and percent share for 3 wholesalers in Tagum City

Activity/Cost	Farmer 1	Farmer 2	Farmer 3
Production	0.51 (15.45)	0.13 (4.59)	0.06 (2.15)
Post-production	1.25 (37.88)	1.30 (45.94)	0.96 (34.41)
Marketing	0.80 (24.24)	0.48 (16.96)	0.81 (29.03)
Own labor	0.74 (22.42)	0.93 (32.86)	0.96 (34.41)
Total Cost	3.30	2.83	2.79
No. of sacks	12	10	10
Volume (kg)	336	270	260

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of prices. During off-season when buying price decreases to as low as PhP 3.85 per kg, they were able to earn at least PhP 1.06 per kg. When price peaks at PhP 12.00 per kg, they earned as high PhP 9.21 per kg. These show that calamansi production in Tagum, similar to the case in Asuncion, is highly profitable (Table 7).

Wholesale level. At the wholesale level, the cost of raw materials or the cost of calamansi sold to wholesalers from the farmers in Tagum accounted for the bulk of the expenses, ranging from 74.77% to 93.26% (Table 8). This implies that aside from buying the produce, there are minimal activities undertaken by wholesalers, i.e, transporting and selling the produce. Similar functions are undertaken when wholesalers source their produce from Asuncion.

In computing for net margins, wholesaler 3 earned more than the two

Table 7. Net margins (PhP/kg) of 3 farmers in Tagum City

Farmers	Total cost	Selling price		Net margin	
		Off-season	Peak season	Off-season	Peak season
1	3.30	5.71	12.00	2.41	8.70
2	2.83	5.19	12.00	2.36	9.17
3	2.79	3.85	12.00	1.064	9.21

Table 8. Costs (PhP/kg) and percent share of 3 wholesalers in Davao City

Activity/Cost	Wholesaler 1	Wholesaler 2	Wholesaler 3
Labor cost	0.20 (1.96)	0.34 (2.66)	0.41 (3.19)
Cost of storing	0.08 (0.73)	-	0.05 (0.41)
Cost of "dropping"	-	0.10 (0.78)	-
Own labor cost	0.25 (2.45)	0.21 (1.63)	0.19 (1.45)
Transportation cost	1.50 (14.70)	1.25 (9.75)	0.22 (1.74)
Cost of buying			
Peak season	12.00 (85.56)	12.00 (86.34)	12.00 (93.26)
Off-season	6.00 (74.77)	10.00 (84.05)	11.85 (93.19)
Total cost			
Peak season	14.03	13.90	12.87
Off-season	8.03	11.90	12.72
No. of sacks	40	48	40
Volume (kg)	1000	1200	1000

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wholesalers during the peak season. However, wholesaler 1 got the highest net margin of PhP 7.98 per kg during off-season mainly because the cost of buying during the off-season is somehow inexpensive. Nevertheless, all net margins were positive (Table 9).

Retail level. Similar to the wholesalers, the major cost incurred by retailers is cost of raw materials, i.e., cost of calamansi bought from farmers. For retailers, the share of this cost ranged from 78.13% to 87.01% (Table 10). This is followed by shrinkage or wastage cost and own labor cost. It should be noted, however, that shrinkage or wastage cost is unique to the retailers as it requires some time to sell the produce relative to wholesalers, which leads to spoilage or deterioration.

In terms of net margins, it can be observed that only retailer 1 was able to get a positive net margin even if the cost incurred was higher than retailers 2 and 3. This is mainly due to higher selling price received by retailer 1 compared to the other two. In fact, the selling price, which is the highest among the retailers, was high enough to absorb the cost of shrinkage or wastage incurred

Table 9. Net margins (PhP/kg) of 3 wholesalers in Davao City

Wholesaler	Total cost		Selling price		Net margin	
	Off-season	Peak season	Off-season	Peak season	Off-season	Peak season
1	8.03	14.03	16.00	18.00	7.98	3.98
2	11.90	13.90	12.40	18.00	0.50	4.10
3	12.72	12.87	15.56	18.00	2.84	5.13

Table 10. Costs (PhP/kg) and percent share of 3 retailers in Davao City

Costs	Retailer 1	Retailer 2	Retailer 3
Labor cost	0.20 (0.74)	0.20 (0.79)	0.19 (0.72)
Cost of renting	0.11 (0.41)	0.09 (0.37)	0.29 (1.08)
Cost of plastic	0.03 (0.11)	0.02 (0.07)	0.13 (0.50)
Own labor cost	0.50 (1.86)	0.33 (1.32)	0.96 (3.59)
Shrinkage/wastage cost	5.04 (18.75)	2.64 (10.44)	4.07 (15.18)
Cost of buying (peak season)	21.00 (78.13)	22.00 (87.01)	21.15 (78.94)
Total cost	26.88	25.28	26.80
No. of sacks	20	30	10
Volume (kg)	500	750	260

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by retailer 1. The share of this cost to total cost is quite high relative to the other costs, ranking second to cost of raw materials. Despite this, it was able to generate positive net margins due to high selling price and low cost of buying (Table 11).

Processing level. Given the price variability due to seasonality that leads to losses for farmers, with calamansi having the shortest storage life among citrus varieties (BPRE, 2007), there is an opportunity to process calamansi into concentrate during off-season when prices received cannot recover costs incurred. Based on the data gathered from two processors, the cost of material inputs contributes about 34.92% to 40.94% of total cost in processing calamansi. Another major cost is labor, accounting for 31.75% to 36.51% of the total costs (Table 12).

Net margins received by two processors were all positive, which means that calamansi processing is a profitable enterprise. By selling 500-mL bottles of calamansi concentrate, processors 1 and 2 earned net margins of PhP 0.11 and

Table 11. Net margins (PhP/kg) of Davao City retailers

Retailer	Total cost	Selling price	Net margin
1	26.88	29.00	2.32
2	25.28	25.00	-0.28
3	26.80	26.00	-0.80

Table 12. Costs (PhP/mL) and percent share of 2 processors in Tagum City

Activity/Cost	Processor 1	Processor 2
Labor	0.04 (31.75)	0.06 (36.51)
Material inputs	0.07 (40.94)	0.05 (34.92)
Own labor	0.01 (7.85)	0.01 (6.63)
Water	0.001 (0.34)	0.0004 (0.003)
Transportation	-	0.003 (2.25)
Buying cost	0.01 (6.86)	0.01 (7.42)
Cost of bottle		
500 mL	0.03 (16.24%)	0.01 (3.84%)
1 L	-	0.01 (8.15%)
Total cost		
500 mL	0.16	0.07
1 L	-	0.08

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PhP 0.07 per mL, respectively. However, they received different net margins by selling the same product because the former has better packaging than the latter; thus, processor 1 can command higher selling price. Processor 2, however, also earned positive net margin for the 1000-mL bottle of concentrate (PhP 0.06 per mL)(Table 13).

Summary of Net Margins

Based on the results derived from the cases, farmers received greater net margins as compared to other actors in the chain. Specifically, farmers in Asuncion are better off compared to farmers in Tagum because the former has larger hectares of land, about 2.5 ha, devoted to calamansi production compared to the latter, which devotes only 1 ha of land. In addition, it is clear that of all actors in the chains examined, retailers received the least net margins because of incidence of wastage. In most cases, net margins reached negative levels. However, while this does not consider the volume sold per season, calamansi commands higher demand in the market. Thus, retailers can still expect positive net margins. Other actors in the chain such as wholesalers and processors received positive net margins (Table 14).

Furthermore, chain maps were developed to show how cost variables and net margins incurred by the four groups of actors differ from one marketing level to another. The data reflected in these maps were generated based on the average values of the cases covered in the previous discussion (Figures 2 and 3).

Conclusions and Recommendations

Table 13. Net margins (PhP/mL) of 2 processors in Tagum City

Processor	Total cost		Selling price		Net margin	
	500 mL	1000 mL	500 mL	1000 mL	500 mL	1000 mL
1	0.16	-	0.27	-	0.11	-
2	0.07	0.08	0.14	0.14	0.07	0.06

Table 14. Net margins (PhP/kg) at various levels during off- and peak seasons

Chain	Season	Farm	Wholesale	Retail	Processing
1	Off	5.69	2.67	-	-
	Peak	13.69	2.13	-	-
2 and 3	Off	1.94	3.77	-	0.07
	Peak	9.03	2.13	0.41	0.07

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Figure 2. Value chain of calamansi from farm level in Asuncion to wholesalers and retailers in Davao City

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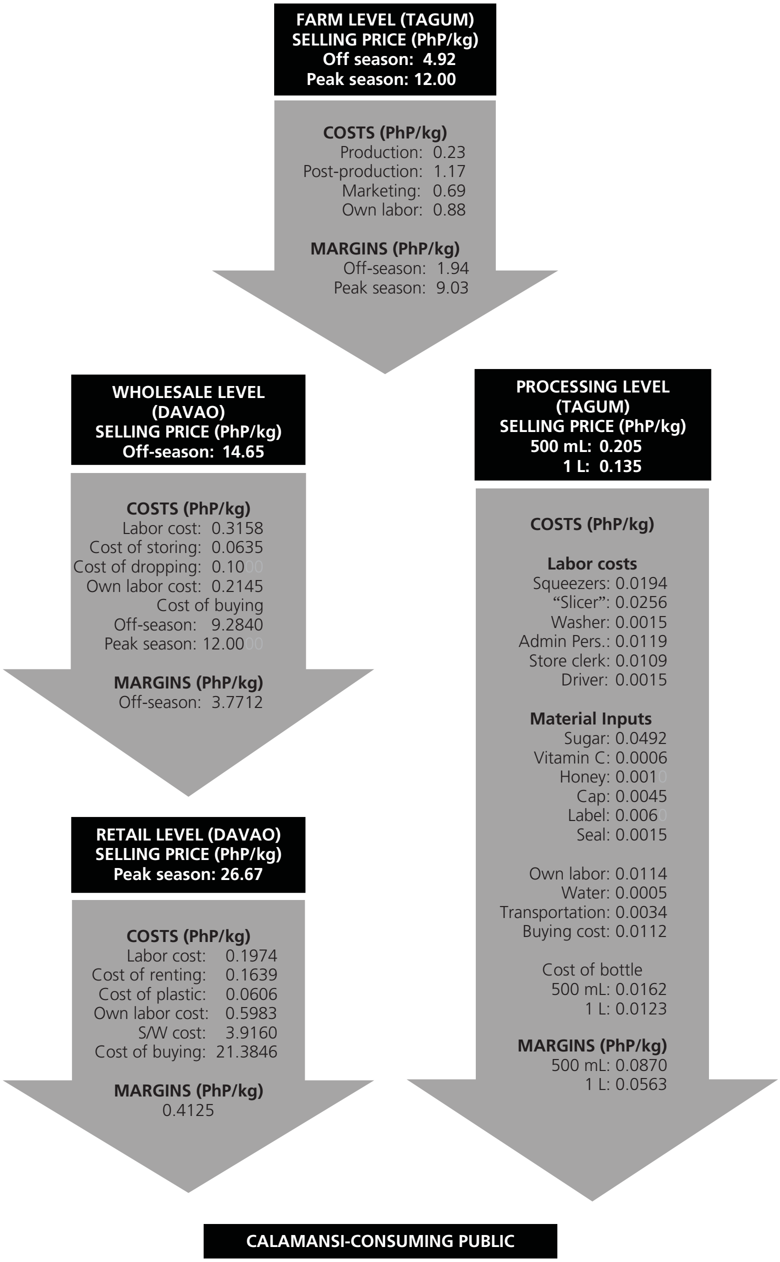

Figure 3. Two value chains of calamansi: (1) from farm level in Tagum City to wholesalers and retailers in Davao City and (2) from farm level to processors in Tagum City

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The analysis of marketing margins, particularly the net margins and price transmission elasticities, point to a number of conclusions and recommendations. First, net margins incurred by various actors in the chains selected vary due to several factors, such as the prices received for their produce or products and the costs incurred. These prices vary depending on the season of the year. However, variation of prices does not heavily affect the farmers because they were able to earn positive net margins regardless of the season. Though there are more activities performed at farm level, farmers did not acquire losses because of improved postharvest practices, such as sorting and cleaning. Because of this, buyers develop confidence towards their suppliers because they are assured that products are of good quality. This is very important in sustaining the farmer-buyer relationship, where trust and confidence between the two actors are well-established because quality requirements are stringently followed.

Second, managing costs is also important to achieve a positive net margin. However, due to high wastage cost (PhP 2.64 to PhP 5.04 per kg), retailers are not able to recover these costs, even if prices received are high. It is clear that prices and costs need to be managed well to achieve positive net margins. Given the competitive nature of the industry as indicated by the results of the relatively high price transmission elasticities, farmers, wholesalers, and retailers are not able to influence price. Since not much can be done to influence price without incurring additional costs, actors in the chain should focus on effectively managing costs and productivity. In fact, there were farmers who were able to minimize costs that cushioned the impact of low prices. While enhancing quality of produce may require additional costs such as better postharvest handling or production practices, these should be explored as better quality calamansi can fetch higher prices.

Third, despite the above challenges, it appears that there are opportunities in processing calamansi particularly when prices for fresh calamansi are low. However, this node of the chain is extremely competitive given the number of brands of processed calamansi (juice concentrate and ready to drink) available in the market today. Thus, it is not clear whether farmers may benefit by venturing into this enterprise to diversify and minimize risks due to variability in prices for fresh calamansi. Moreover, this requires regular supply of fresh calamansi for processing. Hence, it is more profitable to sell in fresh form when prices are high and then process when prices are low during off-season. Thus, supply of fresh calamansi may become a problem for processors during peak season or when prices of fresh calamansi are high, which may lead to undercapacity for some months of the year. To ascertain the feasibility of venturing into this type of enterprise, further study is necessary.

Finally, given the challenges and opportunities, a package of interventions is necessary to address challenges to improve productivity and manage costs, which can range from technology improvement, establishment of producer

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organization to achieve economies of scale and to lower costs, and marketing assistance to access better markets for better prices.

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