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Evaluating Marketing Channel Options for Small-Scale Fruit and Vegetable Producers

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Abstract
An investigation of the relative costs and benefits of marketing channels used by typical small-scale diversified vegetable crop producers is conducted. Using case study evidence from four small farms in Central New York, this study compares the performance of wholesale and direct marketing channels, including how the factors of risk, owner and paid labor, price, lifestyle preferences, and sales volume interact to impact optimal market channel selection. Given the highly perishable nature of the crops grown, along with the risks and potential sales volume of particular channels, a combination of different marketing channels is needed to maximize overall firm performance. Accordingly, a ranking system is developed to summarize the major firm-specific factors across channels and to prioritize those channels with the greatest opportunity for success based on individual firm preferences.

Keywords: local food, marketing, wholesale, direct, marketing channels, economic evaluation

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Current food shopping trends indicate an increasing demand for local foods that is presenting new marketing opportunities for small-scale agricultural producers. Some indicators of this growing demand is reflected in the increased availability of local foods at traditional retail channels such as supermarkets or through wholesalers, but also in the growth of direct marketing channels such as farmers' markets (FM) and Community Supported Agriculture operations (CSA). USDA estimates that the total U.S. sales at farmers' market grew 13% from 2000 to 2005[1], and the number of farmers' markets increased from 1,775 in 1994 to nearly 4,700 in 2008[2]. Likewise, the total number of CSAs in the U.S. was only about 50 in 1990, but now that number exceeds 2,200[3].

Wholesale channels typically have the ability to move large quantities of produce quickly and usually (but not always) at a lower price than through direct channels. Direct channels often feature higher prices, but require more customer interaction and time requirements of the producer. As such, producers are faced with the decision of whether to move larger volumes of produce through wholesalers at relatively lower prices or seek higher prices in direct markets and run the risk of lower volumes or unsold leftovers. Perhaps more important, given the nature of highly perishable crops, optimizing sales likely requires the flexibility of combining different channels capable of accepting alternative sizes and types of products, and/or absorbing potential unpredictable volumes.

While an abundance of research has investigated consumer responses and preferences for local foods, less attention has focused on the producer side, particularly in identifying how producers identify their appropriate marketing strategies[4]. The existing literature has shown some potential for increases in farm returns through direct marketing; however, the evidence is mixed and depends on a host of spatial, market, and demographic factors, as well as firm preferences that may not be financially based[5]. Common generalizations are problematic given that producers marketing through direct channels are a heterogenous group with wide variation in farm characteristics, including farm size, employment status, and labor resources, and risk preferences.

Accordingly, the objectives of this paper are two-fold. The first is to provide a better understanding of the relative costs and benefits of various marketing channels used by typical small-scale diversified vegetable crop producers in Central New York. Similar to the case study approach adopted by Hardesty[6], we compare the performance of wholesale and direct marketing channels, including how the factors owner and hired labor, prices, and sales volume interact to impact profitability across different channels. We also incorporate how factors such as risk preferences and lifestyle choices affect grower decisions beyond profit measures. Utilizing this information, we will address our second objective – to develop an analytical framework that can rank the performance of alternative channels and aid in informed decision making for producers considering changes in their marketing strategies.

We continue now with a description of the case study methodology employed in this research and a description of marketing channels commonly utilized by small-scale producers. This is followed by an analysis of the relative costs and returns across channels, as well as an examination of other factors that influence marketing choices. Finally, we propose an analytical

tool that can be utilized by growers to evaluate and rank alternative marketing channels based on a set of factors deemed most important by our case study participants. We close with some conclusions and identification of areas for future research.

Methodology
Conceptually, economic theory tells us that to maximize net returns the producer should allocate output to each market channel such that marginal net returns are equal across channels. For example, consider the simple case of one crop with total output Q, and two marketing channels, direct (d) and wholesale (w). The producer's problem can be expressed as:

$$(1) \max_{Q_d, Q_w} NR = P_d Q_d + P_w Q_w - C_d(Q_d) - C_w(Q_w) - C(Q)$$

$$subject \ to: \ Q_d + Q_w = Q$$

where NR is total net returns P_d and P_w are expected output prices for the direct and wholesale channels, respectively, C_d and C_w are the respective marketing cost functions, and $C(Q)$ represents all other costs that do not vary across channels. Solving the first-order conditions for equation (1) yields the familiar equi-marginal result:

$$(2) \left(P_d - \frac{\partial C_d}{\partial Q_d} \right) = \left(P_w - \frac{\partial C_w}{\partial Q_w} \right),$$

where $\frac{\partial C_d}{\partial Q_d}$ and $\frac{\partial C_w}{\partial Q_w}$ are the marginal marketing costs for the direct and wholesale channels, respectively. Equation (2) highlights the importance of considering differences in both output prices and marketing costs when evaluating alternative channels. In addition, marginal marketing costs are likely to decrease as the total output allocated to a channel increases, reflecting economies of scale in marketing. As will be shown below, marketing labor costs can vary considerably across channels, so a producer's interest in getting higher retail prices in direct channels may well be offset by higher marketing labor costs.

Small-scale producers often-times fail to account for their own or others' unpaid labor when making production and marketing decisions[7,8,9]. When these costs are not well understood or considered the result can be a marketing channel portfolio that does not accurately reflect the optimal decision for that producer. This practice is particularly problematic for small-scale fruit and vegetable producers because labor requirements and costs have the biggest impact on profitability when comparing different channels[6,10].

While the producer's problem posed above is straight-forward, it is deficient for our analysis for two primary reasons. First, the model fails to account for the perishable nature of many of the crops marketed. The level of perishability will affect the length of the marketing windows for many of the crops and oftentimes necessitates the use of multiple channels to avoid losses due to spoilage. The second limitation of the model is that it fails to account for such factors as a producer's level of risk aversion, lifestyle preferences, and other quality of life attributes. These types of factors are often a vital part of the decision for producers who grow and market fresh vegetables[7,11,12].

A more complex model factoring in these two limitations is beyond the scope of this study. In addition, cost and returns data collected for this study were limited to four case study farms over a typical peak-season week. Further data would be necessary to accurately reflect timing effects throughout the season and to estimate the marketing cost functions. Furthermore, the model posed above should be re-framed into a household production function framework that values and accounts for household labor decisions dedicated to production, marketing, and leisure. To accommodate these issues, an alternative case study approach is chosen.

Case Study Farm Data
Information on costs and returns were collected from four successful small-scale fruit and vegetable farms in Central New York that utilize a variety of marketing channels. Wholesale channels are defined as those channels for which sales are to a buyer who is not the ultimate end user. Wholesale marketing channels utilized by the case study farms included selling to restaurants, grocery stores, and distributors.

Direct marketing channels are defined as those channels for which sales are made directly to the end user. Direct marketing channels included here are CSA, farm stand (unstaffed), farmers' market, and u-pick (staffed) operations. A summary of the farms and the market channels they utilize are shown in Table 1. All of the farms have been in operation for over five years, and have between 7.3 and 8.1 hectares in diverse vegetable and small fruit production.

Labor data for specific marketing activities were collected from each farm, as well as distances traveled, employee labor rates, and gross sales. Each tracked item was categorized by marketing channel in order to assess the channel-specific costs and returns. To get a better sense of the farm production and marketing operations, multiple interviews were conducted with the farm owners and employees. In addition, a survey was conducted among fourteen local diversified fruit and vegetable growers to gain a more complete understanding of farmers' perceptions regarding marketing channel risks.

Consistent with Hardesty[6] and in interviews with the farm operators, it was clear that, regardless of channel, the major marketing cost for each farm would be labor. This is also consistent with Uva[10] who found that labor constraints were the top barrier to direct marketing by vegetable farms surveyed in New York. While each channel has additional costs such as packaging materials and market fees, labor is, by far, the largest cost component.

During one week of the study (August 4-10, 2008), the owner(s) and employees of each farm were asked to keep daily activity logs to determine how labor was devoted to various marketing activities during a typical peak-season week. Logs were completed by all farm staff, including owners, hired staff, unpaid family members, and volunteers. By comparison to other weeks during 2007 and 2008, the week was typical and representative of the farm averages.

Only labor activities from harvest to market were tracked. Production activities are expected to be the same across channels and were excluded. However, harvest activities are included because it was determined through farm interviews that harvest activities vary depending on the marketing channel destination. The average hourly rate paid to hired staff by the participating farms was US$8.46/hour. For this reason, all volunteer, family member and owners' time was given a conservative value of US$8.50 per hour in the calculations that follow.

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For our purposes here, profitability is defined as gross sales minus the cost of harvest and marketing labor and travel costs (i.e., returns over variable marketing costs). Wholesale prices received by farmers are prices for goods delivered by the farm. For the CSA marketing channel, farms are paid at the beginning of the growing season in exchange for a weekly share of produce, which made the week's gross sales value difficult to assess. As such, we relied on values assigned by the farmer for produce marketed through CSAs and was the same as or similar to the farms' wholesale price.

Sales and cost values for the u-pick channel represent just one farm since only one of the four farms offered u-pick. For the purposes of investigating the costs and labor needs of any other staffed direct marketing channel, the u-pick channel as depicted here is a good representation. Similarly, the farm stand channel is represented by only one farm, and operates un-staffed with an honor system for payment. As a result, the figures for this channel can be used effectively as a base for exploring profitability for an un-staffed direct marketing channel.

Marketing Channel Activities
Small farm marketing can generally be divided into four activities: harvest, process and pack, travel and delivery, and sales time. Labor data were collected for each activity, by market channel. Given that two of the four farms evaluated utilized all three wholesale channels with similar product requirements, it was difficult to separate the harvest and processing activities for these channels. Accordingly we combine all three wholesale channels into one composite channel.

Harvest
Harvesting is the process of gathering saleable produce from the fields and, for a diverse group of fruits and vegetables, can be a very time intensive activity. The amount of labor devoted to harvest varies depending on the marketing channel but, in general, is higher for the wholesale channels, since they often require considerable field sorting and bunching of products.

Processing and Packing
Process and pack activities include: culling, grading, sorting, washing, bagging, packaging, and packing orders and boxes. Processing produce, like harvesting, varies depending on the marketing channel. Produce destined for wholesale buyers requires a higher degree of washing, culling, grading, and packaging then does the same produce destined for direct sales. In particular, wholesale customers demand produce of consistent size, while farmers report that direct marketing customers are satisfied with irregularly shaped and sized produce.

Travel and Delivery
For this study, transport time includes travel to and from farmers' markets, satellite farm stands, and deliveries to restaurants, grocery stores and distributors. Also included is time spent loading and unloading produce and talking with customers. Grocery stores, restaurants and most distributors require delivery. While many CSAs have a member pick-up day at their farm, customers are sometimes offered additional locations, or delivery is available for an extra fee.

Sales
For our purposes, sales time includes "face time" with customers, time spent invoicing, making sales calls, creating daily harvest sheets or price lists, and doing other administrative tasks.

Direct sales channels generally require a higher level of customer service and a positive, friendly attitude; however, they can also provide producers with valuable customer feedback on buying preferences and price sensitivity. Some farmers enjoy interacting with consumers and consider selling in the direct channels a rewarding community event and an opportunity to build their farm's brand. While some view customer interaction as a bonus, not everyone is skilled at interfacing with customers in this way.

Time intensive direct market channels can reap other rewards such as leading to new wholesale, farm stand, and u-pick customers, which are hard to measure. Some farmers view the farmers' market as a form of advertising for their other, higher-profit channels. Additionally, chefs and wholesale buyers may discover a farm at farmers' market and begin wholesale purchasing.

Marketing Channel Results

Data collected from the farms were used to analyze each channel's performance in regard to sales volume, profit, labor requirements, and risk.

Sales Volume

The volume that can be sold through a given channel has a large impact on profitability. The more perishable the crop, the more important it is to have a channel that can absorb the volume harvested as quickly as possible. Optimizing sales of perishable crops requires the flexibility of combining different channels capable of absorbing unpredictable volumes. The general tradeoff between relatively high- and low-volume marketing channels is price. However, despite lower prices, high volume channels offer the benefit of increased efficiency in the harvest and production process.

The total volumes sold by the case study farms during the studied week illustrate the relative volume capacity of each marketing channel (Figure 1). The average volumes sold for each channel were derived from the group's total gross sales for the week and normalized relative to the farmers' market sales volume average. For this group of farms, wholesale channels, with a group average of 14 wholesale customers each week, were able to purchase roughly 3.4 times as much (in value) as farmers' markets even though they offered the lowest price to farmers.

CSA, the next highest volume, offered the same as or slightly higher prices than wholesale outlets. Given an adequate number of shares sold, CSAs can consume large volumes. In addition, it is always possible to give members more in their share if a particular crop is plentiful, but this does not translate into more income, just less wasted produce. U-pick, the third highest volume marketing channel, also offers a relatively low price compared with other direct marketing channels.

Profits

While sales volumes are important, returns relative to cost is also important for long-run firm viability. From our case study farms, we compute the average profit percentages by market channel, calculated as net returns relative to gross sales (i.e., gross sales less marketing labor and mileage costs, then divided by gross sales). The results are shown in Figure 2.

In this case, the CSA channel was shown to have the highest profitability percentage, followed closely by the unstaffed farm stand. As expected, per dollar of gross sales, the profitability of the

wholesale channel was the lowest. This highlights the trade-off in volume versus unit profits, but both should be considered in making marketing channel choices.

Risks and Lifestyle Preferences
In addition to the normal production risks of weather and pests, each marketing channel offers a set of risks to the producer. Marketing risk comes in many forms, including market demand for a crop, price, competitors, failure to offer a diverse selection, and low volume sales. Additional risks include the possibility of low customer turnout resulting in unsold product. Risks for any channel that allows customers on the farm are injuries, crop damage, litter, and other problems.

In a survey conducted with additional Central New York vegetable farms, farmers were asked what they felt were the primary risks associated with each channel. When asked open-ended questions about risks, respondents did not adhere to the strict meaning of risk, but also listed drawbacks and challenges. In any event, the responses were categorized into seven basic challenges: low volume sales, high labor and marketing costs, the ability to provide product of consistent quantity and quality, buyer failure to fulfill commitments, competition, unpredictable customer turnout, and low price risk. Table 2 illustrates the frequency that each challenge was mentioned.

The results show that fear of low sales volume was an issue with the restaurant channel and most often for farmers' market (Table 2). For CSA, the concern was about leftover produce. Also, interviewed farmers find that approximately 20% of produce harvested and brought to a farmers' market goes unsold. Low prices are a risk created by competition from other farms as well as other channels, and can also be the result of a market flooded with a certain item.

Farmers revealed their fear of commitments with wholesale buyers when they identified the risks of buyer-back-out and crop failure (Table 2). While crop failure is a concern for all channels, the case study farmers clarified that they are more stressed over crop failure with wholesale channels due to the commitments they have with buyers. Farmers were also concerned about wholesale customers backing out of orders if their needs change suddenly, if they refuse produce due to poor quality, or if they turn to another supplier.

The two main reasons given for avoiding a particular marketing channel amongst the case study farms were lifestyle preferences and stress aversion. Wholesale channels tend to create stress because they require higher levels of product preparation, product specifications, and volume commitments. Distributors were also perceived to be very demanding, where producers must accept dictated prices, deadlines, and delivery logistics. Alternatively, direct marketing channels were perceived as relatively low stress. This was particularly mentioned with the CSA channel that may have lower expectations in terms of processing and packaging.

Each of the direct marketing channels, except for the CSA, aroused concerns over customer turn out (Table 2). Factors such as weather, location, and the availability of parking were all mentioned as risks when direct marketing. Attendance can also be affected by competing events in the area.

The most frequently cited concern regarding all marketing channels was high labor and marketing costs (Table 2). Of the direct channels, high marketing costs were most frequently

mentioned for farmers' markets that tend to be labor intensive and carry additional marketing costs, such as market fees, advertising, and travel. The wholesale channel cited as having the highest marketing costs was the distributor. Respondents mentioned a high level of labor needed to solve the "logistical headaches" of delivery, the high level of quality control work, and the added "time and energy for good service" when selling wholesale.

Labor Requirements
While surveyed farmers perceived that wholesale channels were generally more labor intensive than direct channels, data from the case study farms demonstrates that in wholesale, the return in gross sales for each hour worked is about the average of all channels evaluated. This is illustrated in Figure 3, which depicts the hours of marketing labor (including operator labor) needed in each channel to achieve the same dollar level of gross sales.

The farmers' market and u-pick (staffed) channels required higher than average levels of labor to achieve the same level of sales. Farmers' market, farm stand, and u-pick channels generally require a high degree of customer interaction and are channels that reward a tidy appearance and welcoming display. Of course, farm stands and u-pick sales can be conducted using honor system payment, but some minimal level of customer interaction is inevitable. CSAs require relatively little customer interaction except for during weekly pick up times, but they may have newsletters or email updates for their members.

Wholesale customers require less interaction, except when discussing orders or making deliveries. Also, once a relationship is established with a wholesale buyer, sales calls take less time. Wholesale accounts allow more anonymity; however, promotion in the form of cases of free sample product is common.

Other Channel-Specific Costs
While some operational costs are common among all marketing channels (utilities, equipment, insurance, licenses and certifications, vehicles, and buildings etc.), each channel has additional costs and requirements that are specific to that channel. A list of associated costs by marketing channel is summarized in Table 3. It is important to consider these associated costs when determining marketing channel choices; however, due to the potential for large variations in the scale of sales through each channel, the operator's chosen level of marketing management, and staffing, it is not useful to compare the channels in regard to these costs here. For more information on these costs see LeRoux[13].

Identifying a Marketing Channel Strategy
As discussed above, choosing the appropriate marketing mix includes consideration of many factors, including sales volume, risk, lifestyle preference and stress aversion, labor requirements, and channel-specific costs. The weights (or importance) assigned to each of these factors is unique to the individual or firm. Additionally, the nature of highly perishable crops, along with the risks and potential sales volumes of particular channels, requires combining different channels to maximize firm performance.

Multiple channel strategies were utilized by all of the case study farms. Figure 4 illustrates the different marketing channel strategies used by the farms that allowed them to diversify the sources of their income, as well as optimizing sales of unpredictable levels of harvest. Each farm

has a "steady" marketing channel with a relatively consistent demand, and represents the farm's first priority for the weekly harvest. Once that channel is satisfied, the farm's other channels can be supplied with additional harvest. Case studies in California similarly found that direct marketing, when used along with wholesale, can increase producers' overall profitability[6].

Channel Ranking

To overcome the difficulty of comparing channels, we develop a simple, but effective, ranking system to summarize the major factors influencing the business performance of a channel. Table 4 shows each channel's factor scores for the case study farms based on labor requirements, sales volume, and profitability. Each set of factor scores across channels is ranked from one (i.e., the highest rated channel for that factor) to five (i.e., the lowest rated channel for that factor), and scaled to reflect the relative distance between the factor scores. The ranking of channel riskiness comes from the results of the 14-farm survey.

The scaled factor rankings for each channel are averaged to determine the final channel scores, either un-weighted or factor-weighted. The use of factor weights allows individuals to give greater weight to those factors that may be more important (e.g., sales volume) to them than others (e.g., riskiness). The lowest overall score is defined as the top performing channel; however, channels scoring low and close to each other provides some indication of preferred multi-channel strategies.

For our general case (assuming equal factor weights), the top performing channel was the CSA, including top rankings for profit percentage, risk, and marketing labor requirements. The results are consistent with similar studies conducted in Wisconsin and California[6,11]. Wholesale channels ranked in the middle, primarily due to differences in labor requirements across the direct channel options.

The farmers' market had the lowest overall ranking, although not the least profitable, suffering from a combination of higher labor demands and low sales volumes. Farmers participating in the case study ranged from $21.05 to $30.74 gross sales per hour of marketing labor when selling at farmers' markets. While total hours of labor for farmers' markets represented 30-37% of participating farms' labor during the case study week, the channel only produced 28-30% of the same farms sales that week. That said, the farmers' market can still be a useful resource for small-scale farmers, particularly new farmers, in terms of enhancing farm exposure and advertising for other channels utilized.

Changes in channel rankings are evident when we assume differing weights across factors. In the example presented, more weight is placed on sales volume and less on perceived risks. In this case, the wholesale channel improves its ranking relative to the equal weight scenario, more readily suggesting a strategy that incorporates both CSA and wholesale channels.

Conclusions

Conducting accurate assessments of marketing channel choices by small-scale farmers requires increased attention towards proper record-keeping to properly account for sales, labor requirements, and other associated costs. In addition, failure to account for owner/family unpaid labor contributions can result in channel selections that reduce overall firm performance. In fact,

the "hidden operator labor costs" can go a long way in explaining farmer misconceptions regarding the profitability of various channels.

A case study analysis of four small-scale fruit and vegetable farmers revealed that the CSA was the top performing channel, based on ranked factors of volume, unit profits, labor requirements, and risk preferences. However, given the perishibility of many of the crops marketed and potentially unpredictable harvest volumes, optimizing sales requires the flexibility of combining different channels. For our group of case study farms, augmenting the direct channel CSA with wholesale outlets was preferred.

As a result of this study, a simple spreadsheet template for producers was developed to evaluate and compare marketing channels for small-scale fruit and vegetable producers. Combined with careful data collection of channel-specific marketing labor activities and sales, the tool will aid in informed decision making for producers wishing to change their marketing mix, increase profitability, or decrease the amount of labor involved in their current marketing activities,.

While the approach offered here presents a useful method for evaluating market channel choices, the analysis would benefit from increased data collection from a larger variety of fruit and vegetable producers, differentiated by firm size, location, and channels utilized. This additional information will allow us to refine and extend the number of market factors most important in optimal channel decisions, as well as provide additional information on a larger set of wholesale and direct marketing channels. Careful attention of these issues is a top priority for our continuing research.

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Table 1. Case study farm comparison and marketing channels utilized.

Characteristics	Farm 1	Farm 2	Farm 3	Farm 4
Hectares in Production	7.3	7.3	7.3	8.1
Number of crops grown:				
Vegetables	18	13	19	8
Fruits	5	0	2	9
Total	23	13	21	17
Organic / Conventional	Conventional	Organic	Organic	Conventional
Direct Channels:				
CSA [a]		X	X	
Farmers' Market	X		X	X
Farm Stand	X			X
U-Pick				X
Wholesale Channels:				
Restaurant		X	X	
Retail / Grocery	X	X	X	X
Distributor		X	X	

[a] CSA = Community Supported Agriculture

Table 2. Number of risks and challenges associated with marketing channels, survey of fourteen Central New York vegetable producers.

Risk or Challenge	CSA	U-Pick	Farm Stand	Farmers' Market	Rest-aurant	Distrib-utor	Grocery
				Number of producers selecting			
Low sales volume, unsold produce	1			3	1		
High labor and other marketing costs			3	7	2	5	2
Ability to provide consistent quality and quantity	2	1		2	2	1	2
Market competition				1			1
Unpredictable customer turnout		2	2	2			
Low prices and profits						4	1
Buyer back out, failure to fulfill commitments					1	1	1
Other	1	1	1			1	1

Table 3. Summary of marketing channel associated costs.[a]

Item	Farmers' market	CSA	U-Pick	Farm-stand	Wholesale: R/G/D
Reusable plastic crates	R	X	O	R	R
Single-use cardboard produce boxes	O	O	O	O	X
Twist ties, packaging, containers, bags	X	O	NA	R	X
Customer shopping bags	X	O	X	X	NA
Farm sign(s)	X	X	X	X	NA
Building/tent, tables, chairs	X	X	X	X	X
Cash register, scale, calculator	X	NA	X	X	NA
Pricing signs	X	NA	X	X	NA
Market fees	X	NA	NA	NA	NA
Brochures and flyers	O	R	R	O	O
Advertising	NA	R	R	O	NA
Transportation, delivery	X	NA	NA	NA	X
Washing/sorting equipment	O	O	NA	O	R

[a] X = necessary, R = recommended, O = optional, NA = not applicable, R/G/D = restaurant, grocery store, or distributor.

Table 4. Market channel evaluation and ranking (4 case study farms).

Market Channel	Labor Required[a]		Sales Volume[b]		Average Profit[c]		Risk[d]	Final Scores[e]	
	Labor Index	Scaled Rank	Volume Index	Scaled Rank	Profit %	Scaled Rank	Scaled Rank	Un-Weighted	Factor-Weighted
CSA	1.0	1.0	1.7	3.8	87	1.0	1.0	1.7	2.1
Farm Stand (unstaffed)	1.5	1.8	1.3	4.5	82	1.7	3.0	2.8	3.0
Wholesale	1.9	2.5	3.4	1.0	58	5.0	5.0	3.4	2.8
U-pick w/Farm Stand (staffed)	3.4	5.0	1.5	4.2	62	4.4	2.0	3.9	4.2
Farmers' Market	3.0	4.3	1.0	5.0	67	3.8	4.0	4.3	4.4
Factor Weights[f]	0.25		0.40		0.25		0.10		

[a] Normalized labor index scores based on computed labor hours per sales dollar (Figure 3). The scaled rankings range from 1 to 5 (the number of channels evaluated), where 1 is the 'best' and 5 is the 'worst'. The scaling considers how far apart the factor results are from each other, rather than just simply ranking them.

[b] Normalized volume index scores based on computed dollar volume sales (Figure 1).

[c] Average profit percentages per dollar of gross sales are calculated as $100*[(sales-(labor + mileage)/sales]$ (Figure 2).

[d] Risk ranking based on farmer survey overall rankings.

[e] Final scores represent average scaled rankings across factors, either un-weighted or factor-weighted. The lowest score represents the highest performing channel. Channels scoring low and near to each other indicate give an indication of preferred multiple-channel options.

[f] The factor weights used here are for illustrative purposes only, where sales volume is the most important factor (0.40), risk is the least important factor (0.10), and labor requirements and per unit profits are somewhere in between (0.25). Individual factor weights should be from 0 to 1, and the sum over all weights must equal 1.
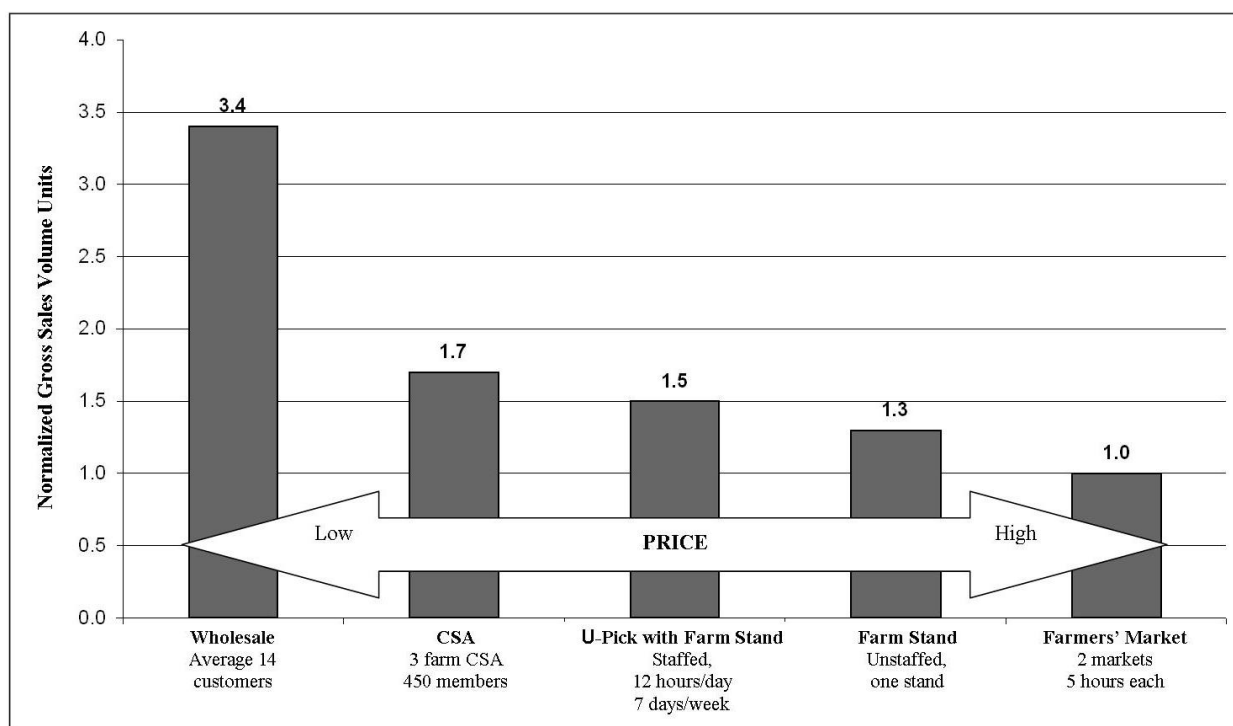
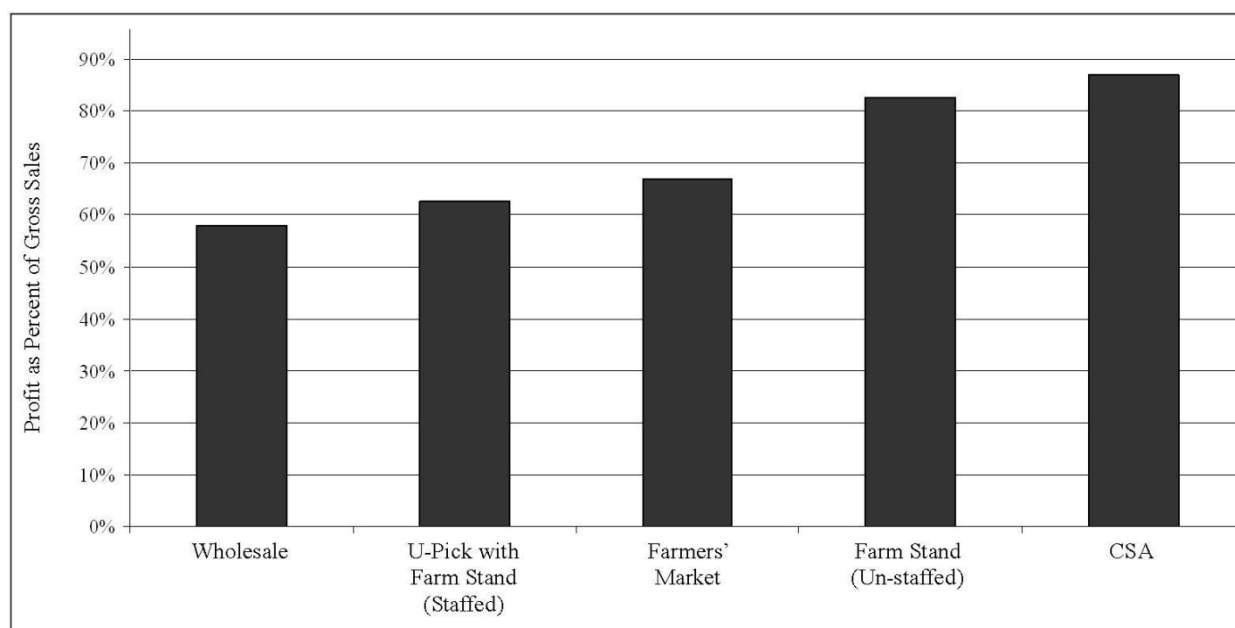**Figure 1. Comparison of dollar volume sold by marketing channel (4 case study farms).**

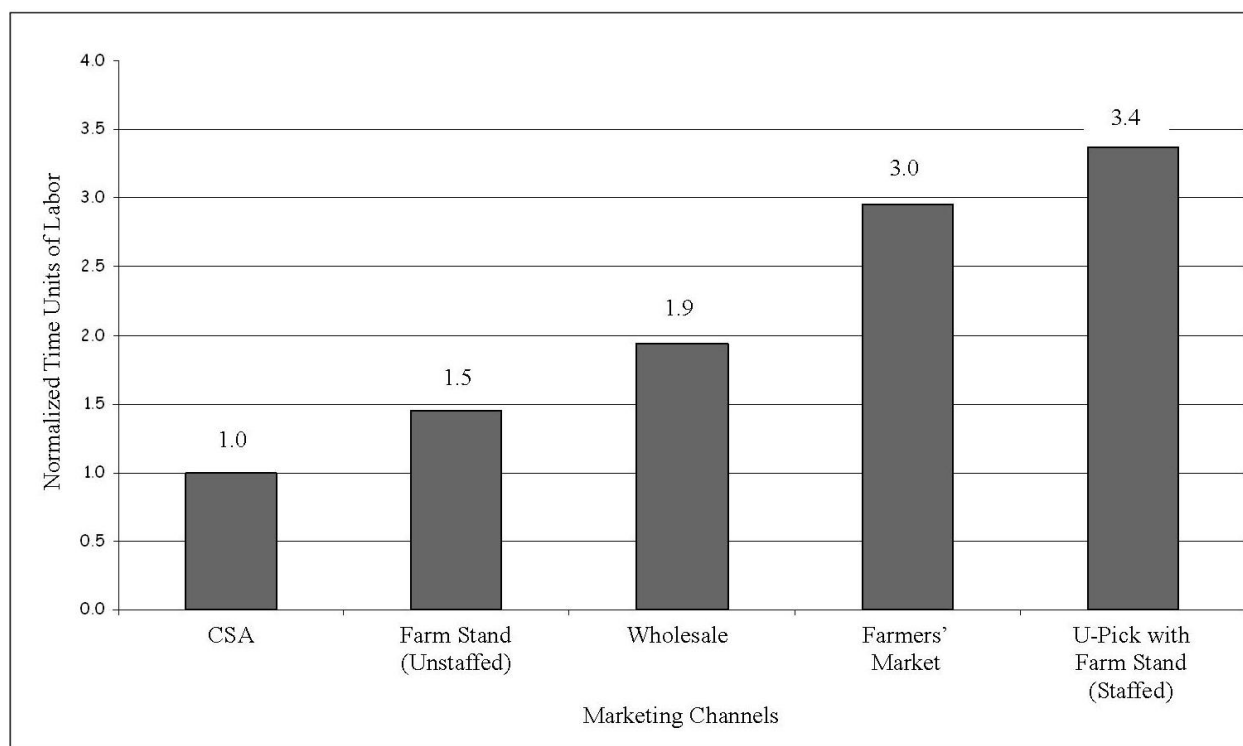**Figure 2. Group average percent profit per dollar of gross sales (4 case study farms).**

Figure 3. Comparison of marketing labor needed for $2,000 in gross sales (4 case study farms).
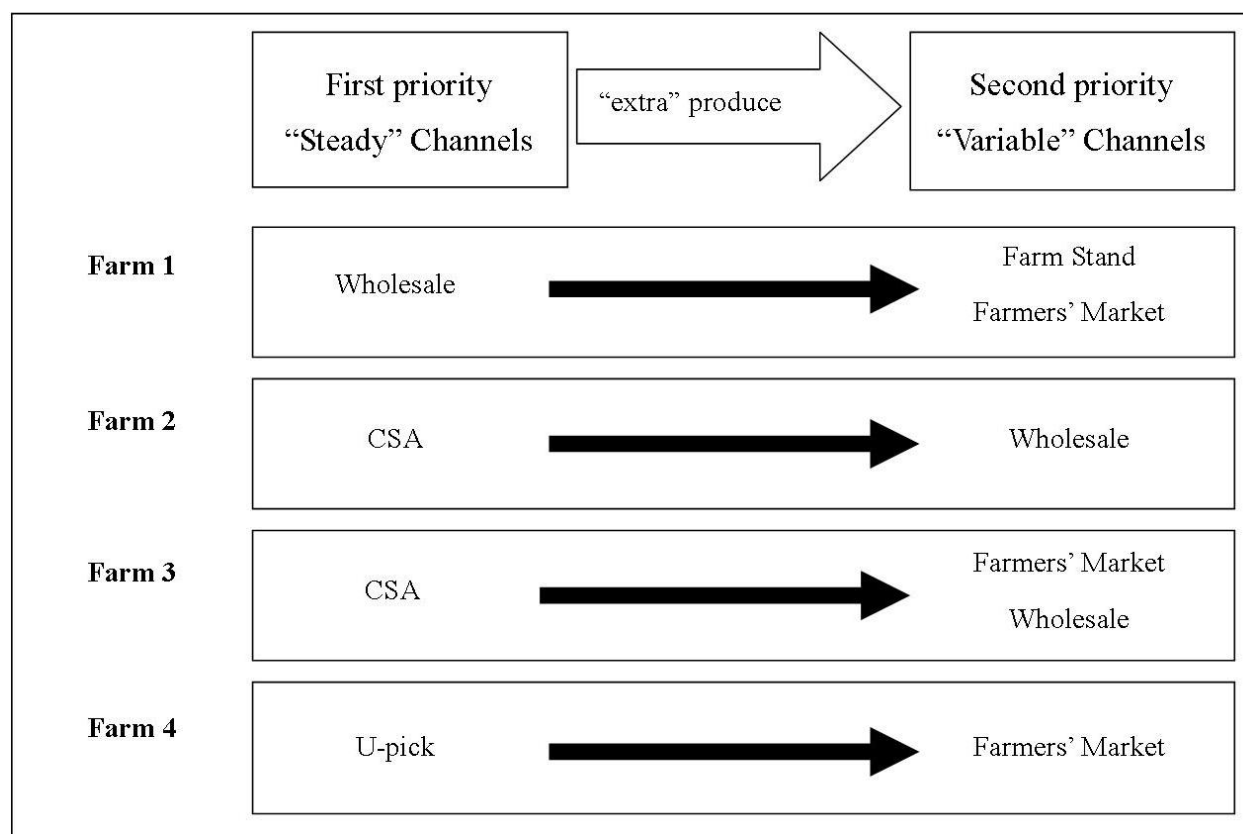

Figure 4. Marketing channel combinations used by case study farms.

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