Rebuilding local foods in Appalachia: Variables affecting distribution methods of West Virginia farms

*James Robert Farmer^a and Megan Elizabeth Betz^b

^aDepartment of Recreation, Park, and Tourism Studies; Vincent and Elinor Ostrom Workshop in Political Theory and Policy Analysis, 1025 E. 7th St., SPH 133, Indiana University, Bloomington, United States, 47405. jafarmer@indiana.edu, 812-856-0969.

^bDepartment of Geography, 701 E. Kirkwood Ave., Indiana University, Bloomington, United States, 47405. mebetz@indiana.edu

Abstract: Across the United States, farms are consolidating and fewer individuals earn their sole income from agriculture. At the same time, the number of very small farms—many of which engage in direct-to-consumer sales strategies—is on the rise. While much research has explored issues of size and scale for farms transitioning to organic certification, this study aims to elucidate the variables that predict whether farmers sell directly to consumers or through indirect methods such as food hubs, wholesalers, schools, and other institutions. Using a mailed survey to West Virginian farmers, this research attempted to better understand the similarities and differences between farms that produce specialty crops and animal products geared for local distribution via direct- and non-direct-to-consumer method of distribution. The goal of this research was to highlight variables that may affect the scaling of operations to include distribution methods beyond direct-to-consumer. To this end, a postal survey was sent to a list of West Virginia farmers focused on local distribution: specialty crop and animal producers were the focus of our list development. A total of 219 participants responded to the survey (29.2% response rate). After cleaning the dataset for the current analysis, 190 surveys were deemed useable. Regression analysis of survey data found that farmers selling through only direct-to-consumer strategies were more concerned about how their farming practices affected the environment, the production of high quality foods, and health risks associated with chemical usage; they were also more willing to try new methods than their non-direct counterparts. Additionally, higher levels of economic dependence on items such as costs of credit, loan availability, etc. was also a significant variable in predicting distribution type. Finally, our results indicate that farmers who are distributing food through non-direct means are demographically distinct from their local-

only counterparts on a number of measures, including, most critically: educational attainment (-), acres farmed (+), and length of family ownership (+). Taken together, these variables point to access to land and capital as determinants of scale and marketing strategy.

Keywords: LOCAL FOOD SYSTEMS; DIRECT-TO-CONSUMER; DISTRIBUTION SCHEMES; WEST VIRGINIA; CENTRAL APPALACHIA; WHOLESALE DISTRIBUTION

1. Introduction

In the U.S., farms have continued to decrease in number and increase in size over the last three decades (USDA, 2013). This shift has generally involved mid-sized farms being assimilated into larger farms, but reports also suggest that there has simultaneously been a sharp increase in the number of very small farms, or “microfarms” (ibid). Many of these farms engage in direct-to-consumer sales strategies, from farmers’ markets and farm stands to community-supported agriculture (CSA).¹ While farms selling directly to consumers are helpful in terms of rebuilding local food systems, increasing food security, and reestablishing a culture around food and agriculture (Alkon, 2008; Allen, 2010; Connell et al., 2008; Hinrichs, 2003), they continue to support a niche market of consumers (Farmer et al., 2014). The shortened supply chains result in increased gains for farmers, who often work across stakeholders to remove institutional barriers (Marsden, et al., 2000). This has led to the rise of the “locavore” and increased interest in local food as a tool for community and economic development.²

While studying food purchasing in rural and urban communities in the United Kingdom, Winter (2003) found “an ideology of localism based on sympathy for farmers, an ideology equally at home amongst outside incomers as more established rural residents” (p. 29). This ideology was embedded in location as well, with rural areas

¹ In the CSA model, consumers become members of the farm by paying one advanced payment for a present number of weeks’ produce; these members then pick up their produce and, due to the up-front payment, share in the risks of poor weather, pests, and low yields (Galt, et al., 2012).

² The term locavore was coined by four women in the San Francisco Bay area to connote a diet in which one purchases food produced within 100 miles of their home for the sake of conserving fossil fuels, preserving the environment, and supporting the local economy (Wu, 2005).

purchasing local produce more frequently than metropolitan areas (ibid). Such purchasing is often said to be driven by a desire to support the local economy (Brown, 2002; Winter, 2003). As such, local food is a way to earn a sufficient living rather than make a great profit, though it can earn farmers price premiums (Paloviita, 2010; Veldstra et al., 2014).

In this way, produce farmers who choose to focus on local markets share many of the same hurdles and advantages as those who choose to operate organic farms where premiums are largely driven by crop perishability; these factors also make flexibility in marketing strategies an essential component of local and organic produce enterprises (LeRoux et al., 2010). Fresh produce continues to dominate organic sales and is at the core of conversations about local food, but Dimitri and Greene (2000) have aptly noted that “net returns to various production systems may vary with biophysical and economic factors (such as soil type, climate, and proximity to markets), and a system that is optimal in one location may not be optimal in another” (p. 4). While wholesalers and retailers view organic as a “seller’s market” and consumer demand is growing, adequate infrastructure, certification, and quantity continue to function as barriers to fulfilling current levels of demand (Dimitri and Oberholtzer, 2009; Johnson and Endres, 2012). Farmers focusing their efforts on local markets face similar hurdles, as the farms largely sell fresh produce that must reach consumers quickly; however, the inability to offer consistent, year-round demand limits the degree to which consumers can depend on their produce. Where possible, direct-to-consumer marketing strategies enable small-scale farmers to avoid limitations of third-party certification and other structural barriers; these farmers “face unique challenges in meeting and verifying wholesale post-harvest handling standards” (Day-Farnsworth et al., 2009, p. 12). Additionally, different sales

73 strategies offer different returns; CSAs offer the highest returns, followed by unstaffed
74 farm stands and farmers' markets, while wholesale (not-direct-to-consumer) offers the
75 lowest returns (LeRoux et al., 2010). As a result, small- to medium-scale farmers must
76 manage a complicated portfolio of risks. If local purchasing programs from farmers'
77 markets to food hubs may begin to shift us toward a food system that supports producers
78 (Campbell and MacRae, 2013), infrastructure is needed to ensure local producers and
79 consumers have access to each other.

80 Direct-to-consumer options may be more critical at smaller scales, as increased
81 farm size is closely linked to increased access to capital. Feenstra, et al. (2011) wrote:

82 The midsize farmer who has been in business longer and is better capitalized can
83 afford to take the risk of trying an unproven values-based marketing channel,
84 especially since she probably has alternative ways to get to market should the
85 new channel not work out. (p. 51)

86 The value-laden direct-to-consumer system, and consumers' willingness to pay price
87 premiums, means that direct sales have a significant positive impact on gross sales (Detre
88 et al., 2011). Opting for a mixed marketing model may help farmers capitalize on the
89 benefits of both: the immediacy of direct-to-consumer and the stability and larger scale of
90 mediated sales. According to Park (2009), farmers new to the business specialize in one
91 marketing strategy; with experience comes diversification of distribution strategies. This
92 reinforces Lyson et al. (1995), who found that while full-time farmers use multiple
93 outlets, part-time and non-growers often only use farmers' markets. These non-growers,
94 craftspeople selling non-food goods or processed goods made from foods they did not
95 grow, are not of interest here, as this research prioritizes farmers, and therefore growers.

96 Scale of business operations, as well as farm acreage, inform selection of farm
97 distribution model. Community-wide, average farm scale may limit access to particular
98 distribution models. For example, Day-Farnsworth et al. (2009) note that a lack of
99 investment capital may limit the ability to start aggregation and distribution businesses at
100 the local or regional level. Unfortunately, it is at this level that aggregation services are
101 most important for small-scale farmers who choose not to sell directly to consumers.
102 Turning to larger-scale aggregation services, in which produce from multiple farms is
103 sold together with no farm name or description, result in a loss of farm identity, which
104 simultaneously results in a loss of value (Day-Farnsworth et al., 2009).

105 Hardesty and Leff (2009) argued, “Direct marketing channels can provide several
106 other benefits to producers. Market diversification is a classic risk spreading tool in all
107 industries, including agriculture. Direct marketing increases the number of marketing
108 options available to farmers” (p. 33). Selecting a marketing strategy and farming practice
109 involves considerable weighing of risks. For example, direct-to-consumer price
110 premiums may be offset by increased marketing costs; working with a wholesaler, on the
111 other hand, offers the greatest returns on marketing costs (Hardesty and Leff, 2009).

112 Balancing these risks is tied to access to markets. Verhaegen and Van Huylenbroeck
113 (2001) claimed, “Since conventional marketing channels are based on industrial co-
114 ordination, quality efforts that are not reflected in tangible features of the product are not
115 financially rewarded...” (p. 444). However, Hanson et al. (2004) have countered that
116 organic farmers reported facing fewer risks than conventional farmers because they are
117 not dependent on chemical inputs. Koesling et al. (2004) and Lpple (2012) found
118 organic farmers to be less risk-averse than conventional farmers, as their limited

application of chemical additives may result in lower yields and increased loss due to pests or extreme weather. Those not certified organic risk losing out on price premiums through traditional distribution strategies, particularly for small-scale farmers with highly perishable produce. This market-based risk is significant and weighs more heavily on those more dependent on farm income (Koesling et al., 2004). Small-scale farmers who are not certified organic but practice the methods risk a loss in the price point accrued through direct markets, particularly if their product enters a traditional wholesale system where chain of custody is not presented to the end consumer (Veldstra et al., 2014). Their product would therefore be considered as conventional as that of a farmer using traditional herbicide/pesticide treatments to promote higher yields.

While much research has pointed to the issues of size and scale for transitions to organic certification (Veldstra et al., 2014; Farmer et al., 2014; Cranfield et al., 2010), little research has been done on farmers drawing on similar environmental and community values, along with price premiums, to prioritize local sales. *This research aims to elucidate the variables that predict whether farmers sell directly to consumers or through non-direct-to-consumer methods—distribution frameworks that include food hubs, wholesalers, schools, and other institutions.* By attempting to better understand the similarities and differences between farms, we hope to highlight variables that may affect the scaling of operations for distribution methods beyond direct-to-consumer. Our primary research question asks:

What variables most predict which West Virginian farmers sell directly to consumers and which use non-direct-to-consumer venues such as wholesalers distributing locally, local grocers, and restaurants?

Based on the type of agriculture that exists in this region, this research addressed production of specialty crops and animal products geared for local distribution. We believe this research will assist local food advocates, farmers, policy makers, and other professionals seeking to further develop local food systems beyond direct-to-consumer sales.

West Virginia farmers are an important group to consider given the states proximity to several metropolitan areas (Washington DC, Baltimore, Maryland, and Pittsburgh, Pennsylvania) and the frequency of small farms in the state (ranking first in the U.S., per capita) in the rural state. In general WV farms are small (69.6 hectares) when compared to the national average 178.5 hectares (NASS, 2004). Farmland prices, over the past several decades, cost more than their agricultural value would suggest, particularly in areas close to sizeable urban populations (Shi et al., 1997). Additionally, West Virginia ranks 49/50 for average household income, indicating the need for consumers to prudently make spending decisions. Coupling the two former variables together, farmers are forced to maximize the per acre return garnered in their farming operations in order to economically sustain their operations and lifestyle (Brown, Miller, Boone, Boone, Gartin et al., 2007), all the while considering a price ceiling for specialized farm products. One approach to achieving this maximization is through local and/or direct to consumer sales.

The agricultural policy landscape of the U.S. and the physical landscape of West Virginia have resulted in a distinct farming culture in the state, making it a unique site for exploring farmers' motivations for selling through various distribution strategies. West Virginia's topography and soil fertility make large-scale agriculture impossible in many

parts of the state, while low population density makes direct-to-consumer sales unprofitable for many farmers. West Virginia has the largest number of small farms (less than \$350,000 gross income per year) per capita, resulting in small-scale agriculture that is distinct in the U.S. for its disproportionate amount of specialty crop agriculture. Peters et al. (2012) reported that there is sufficient space for production to meet the state's demand for fruits and vegetables; however, logistical and marketing hurdles in getting produce to consumers mean there is little motivation for farmers to expand production. While the state is positioned between several large metropolitan areas with some farms serving large metro areas in surrounding states, its rurality makes access to consumers and aggregation complicated.

Previous research by Farmer et al. (2014) found that while only 4 WV farms that were surveyed were certified organic, 91 farms self-identified as organic or "beyond organic." Fairweather and Campbell (1996) proposed five criteria that keep farmers from organic agriculture: not knowing about organic, being well satisfied with current yields or the farm's appearance, being well satisfied with a low-input system they are already using, thinking organic farming is not technically or financially viable, thinking organic farming is not sustainable. Many of these same factors may be at work among West Virginian farmers choosing a mix of direct-to-consumer and mediated distribution strategies, informing how they weigh risk and make decisions regarding distribution strategies. Johnson and Endres (2012) identified several core structural barriers that limit small-scale farmers' ability to enter the marketplace, which include: capacity limitations, a lack of traceback mechanisms, and a lack of certified commercial kitchens and processing facilities. Additionally, farmers struggle to keep track of federal rules and

regulations (ibid). Many of these barriers can be avoided by selling directly to the consumer, which gives farmers flexibility in terms of scale and branding. Engagement with the consumer enables them to describe their farm practices without being bound to organic standards and labeling to obtain price premiums.

If the supply of local (which is often comprised of organic) goods is to increase and fulfill demand, additional research must be conducted to understand the risks, limitations, and motivations that drive farmers' choices in agricultural practice and distribution. Furthermore, if farmers are to embrace the uncertainty of alternative agricultural models, then farmers' conceptualization and internalization of institutional barriers must be better understood. This research represents a first step to better understanding these factors and the ways in which scale, access to land, access to capital, and farm history inform an operation's marketing strategies.

2. Materials and Methods

2.1 Study Site

This state-wide study was conducted in West Virginia, a state located in the heart of central Appalachia in the eastern United States. 1,855,413 residents lived in West Virginia in 2012, and the state ranked 49th for median household income. West Virginia is an exceptional site for studying farmers growing for local distribution given its proportion of "small" farms and topography that is more conducive to the growing of specialty crops than traditional commodity row crops. While small-farms and specialty crops are not always synonymous, the two overlap much for the current study and site. West Virginia's 23,618 farms average 157 acres compared to the 418-acre average U.S.

farm (USDA, 2007a): it has the largest number of small farms of any state. It was also one of 22 states that saw a 5.1% or greater increase in the number of farms between 2002 and 2007 (ibid). Parts of West Virginia, particularly those most known for farming, are relatively close to major metropolitan areas, including Pittsburgh, PA; Columbus, OH; Richmond, VA; Washington, DC; and Baltimore, MD.

West Virginia is dominated by forested mountains, a challenging landscape for traditional row-crop agriculture; however, agricultural regions are found throughout the state in its river valleys (along the Ohio River), the northern (near Morgantown) and eastern (nearing the Baltimore/Washington, DC, area) panhandle regions, and in the southeastern rolling hills of Greenbrier and Monroe Counties. West Virginia's sloping topography lends itself to orchards and other types of fruit production, as well as specialty crops, which include "fruits and vegetables, tree nuts, dried fruits, horticulture, and nursery crops (including floriculture)," and which "must be intensively cultivated and used by people for food, medicinal purposes, and/or aesthetic gratification to be considered specialty crops" (USDA, 2013).

2.2 Research Design

This research project was based on a two-phase sequentially embedded mixed-methods research design according to Creswell and Clark (2007) and was similar to a study of organic dairy farmers conducted by Cranfield et al.'s (2010). Interviews were initially conducted with 14 West Virginia farmers in order to develop a contextually relevant questionnaire. The instrument, a postal mailed survey, was then administered to as many West Virginia farmers as could be identified. The mixed methods approach allowed for one step to inform the development of the next, as well as for one method to

complement the limitations of another (Greene et al., 1989). While the survey provided breadth, the interviews provided depth. A detailed reporting of the interview methods and results can be found in the Farmer et al. (2013). This paper presents the results of analyses from the Phase 2 survey.

2.3 *Instrument Development and Administration*

The questionnaire was developed based on the analysis of interview data and a review of current literature. The questionnaire had five sections. Section 1 solicited operational information such as farm type (organic, certified organic, in transition, exempt, conventional, and other), acreage, farm products, farm income, soil type and fertility, and participation in government programs. Section 2 contained questions and prompts developed from the phase 1 interviews and a literature review that pertained to production methods, farming philosophy, and risk perception prompts, many of which were based on Koesling et al.'s (2004) research. Section 3 gathered details on market variables and outlets, such as the city/town where farm products are distributed, perceived demand for certified organic products in the area, and distribution venues. Section 4 of the instrument solicited data and perspectives on USDA organic certification. Section 5 included demographic questions. The questionnaire underwent review and revision, with comments solicited from research scientists and an expert panel comprised of conventional, organic, and specialty-crop farmers.

The research team used a variety of mechanisms to compile a list of West Virginia farmers focused on local distribution: specialty crop and animal producers were the focus of our list development. A participant list from a conference organized by the

West Virginia Small Farm Center supplied the greatest number of contacts. This was supplemented with contact information from the online Local Harvest database (<http://www.localharvest.org>), information from all West Virginia farmers' markets, through open recruitment at farm and food meetings and conferences in Huntington and Morgantown, through the *West Virginia Small Farm Advocate* periodical, the West Virginia Department of Agriculture (WVDA), the West Virginia Farmers Market Association, e-mail announcements by the West Virginia Food & Farm Coalition, and the researchers' personal contacts. Our lack of access to a complete list of West Virginia farmers, which does not exist, limits the generalizability of our results and lessens the conclusion that can be made.

We used a modified Tailored Design Method for the distribution of the mailed questionnaire (Dillman et al., 2011). Mailings were spaced according to Dillman et al. (2011), and included four separate posts that occurred between January 25, 2012 and February 14, 2012. Post 1 included a letter of invitation to partake in the study by completing the ensuing questionnaire. Post 2 included a copy of the questionnaire and a pre-stamped/addressed envelope for the return. Post 3 included a reminder post card and post 4 included a reminder post card. No incentive was provided. Returned-completed questionnaires were entered into a database. A total of 884 questionnaires were mailed to potential participants. Sixty-five questionnaires were returned for insufficient addresses, and 68 were returned because the recipient no longer qualified to participate in the study. The remaining 751 addresses were deemed valid.

2.4 Data Analyses

This current analysis expands from the previous work of Farmer et al. (2014), who focused on the decision to certify or grow organically. We used SPSS 23.0 to analyze the data. Descriptive statistics were used to create mean and frequency scores for demographic variables and farm characteristics. Chi-square and ANOVAs were employed to compare the two groups of farmers (those distributing directly and those who also used non-direct distribution means). Principal component analyses (PCA) were used to understand relationships between various items in each scale and to assist with the creation of composite variables for further analysis. Components from the PCA that were returned with Eigenvalues greater than 1, sufficient loading above 0.300, and acceptable reliability levels with a Cronbach's alpha score greater than .70 were retained. Finally, a binary stepwise logistic regression was used to understand what factors related to the farmers' choice to distribute through direct-to-consumer venues only or to use non-direct distribution approaches.

3. Results

3.1 Ag Census & Survey Response Overview

A total of 219 participants responded to the survey (29.2% response rate). After cleaning the dataset for the current analysis, 190 surveys were deemed useable. Considering a few census demographics and farm data points is useful in providing context for West Virginia farmers and for the interpretation of our results. According to the USDA (2007b) Agricultural Census, 52.5% of farms in the state earned less than \$2,500 and 67.7% earned less than \$5,000 annually. The average age of a West Virginian farmer was 58.1, and 99.76% of them identified themselves as white on the USDA

(2007b) Agricultural Census. Women are the primary operators of approximately 13.6% of farms. The mean farm size in the state is 157 acres with 65.7% of farmers holding an off-the-farm job.

3.2 Participant Profile

Based on our categorization of respondents according to the dichotomous variable encompassing distribution venues, 40.5% (n=77) sold directly to consumers only, while 59.3% (n=112) distributed in some manner to other institutions that in turn sold directly to consumers. Table 1 provides a comparison of demographic and farm characteristics between the two groups. The average respondent age was 55.33, and they had been involved in farming operations for a mean of 24 years (minimum of 2 and maximum of 90). Most had at minimum earned a bachelor's degree (60.4%), while 3.2% did not complete high school. 97.3% identified as white. Most household incomes fell between \$20,000 and \$60,000 (52.9%) with 38.2% exceeding \$60,000. Respondents indicated that an average of 22.05% of their household income was derived from farming operations, while over 61% of households held an off-the-farm job. Most (68.4%) respondents were the first generation of their family on the land they farmed, while 26 respondents (13.9%) indicated that their family had been on the land for more than four generations. One individual indicated his family had been on the land prior to the Revolutionary War. Most respondents grew up in a rural setting (63.2%), while 36.7% grew up in either a suburban or urban setting. The majority of individuals had no agricultural training or education (55.9%).

Table 1. Descriptive and comparison results of demographic and farm characteristic data overall and between groups.

Category	Subcategory	Direct Only (n=77)	Non-Direct Sales (n=112)
Average Age		53.44	56.60
Years Farming***		18.86	27.37
Education	No H.S. Diploma	2	4
	Some College/Training	20	46
	B.S. Degree	30	29
	Graduate Degree	23	30
Ethnicity	white	75	109
	Other	2	3
Off-Farm-Job		47/75 yes	66/109 yes
Generation on the land**		1.53	2.19
Setting grew up in*	Rural	39/74	77/110
	Suburban	28	25
	Urban	7	8
Household Income*** (106)	0-20k	14	2
	20-40k	11	32
	40-60k	19	32
	60-80k	10	14
	80-100k	6	12
	100k+	11	14
Formal Ag Training		30/72 yes	49/106 yes
Acres farmed****		30.41	115.54
Percentage of Household Income from farm		14 (18.71%)	27 (24.53)%

*p>.1; **p>.05; ***p>.01; ****p>.001

3.3 Research Question: What variables most predict West Virginian farmers who sell directly to consumers versus those who use non-direct venues such as wholesalers distributing locally, local grocers, and restaurants?

First we compared results between the two groups on the two 1-7 point scales (risks and economic factors). Results are presented in Tables 2 and 3. Secondly, we

performed principal component analyses on each scale, respectively, to develop composite scores for emergent factors.

A principal component analysis (presented in Table 2) on the battery of questions related to risks detected the presence of three components with Eigenvalues greater than one. Only the first component had a Cronbach's alpha score above .6, which is generally the acceptable threshold (Hair et al., 1998). Bartlett's Test of Sphericity was significant at the .000 level with a KMO test for sample adequacy at .846. The component is named based on the components with heavy loading at .300 or greater. Component 1 had a Cronbach's alpha score of .869 and explained 39.03% of the variance. This component included items related to concern for the production of high quality food, soil fertility, pollution, health risks, willingness to try new farming practices, health of the land, and interest in learning about new practices; we titled component 1 *innovative-environmental concern*. Table 2 also highlights the scale items and corresponding p-values between the two groups. Six items returned significant results from the ANOVA, while two additional items are noted as marginally significant.

Table 2. Between group comparison results and Principal Component Analysis for scale items pertaining to perspectives on production methods, farming philosophy, and risk acceptance.

Please rate your level of agreement with each of the following statements. Please respond to each issue by marking the appropriate box on the 1-7 (Fully Disagree to Fully Agree) Scale.	Direct Mean	ND or Combo Mean	Component 1 $\alpha=.846$
I am concerned with the production of high quality foods.	6.78***	6.35***	.803
Higher soil fertility is an important consideration for me.	6.27	5.96	.706
I attempt to minimize pollution as much as possible on the farm.	6.54***	6.27***	.838

Health risks associated with chemicals/farm applications are one of my concerns.	6.37*	5.54*	.680
I am willing to adopt and try new and innovative farming practices.	6.36*	5.98*	.776
The health of the land on my farm is extremely important to me.	6.72***	6.41***	.820
I am interested in learning about new farming techniques and practices.	6.34**	5.97**	.679
The farmers I associate with use conventional farming techniques that involve common herbicide and pesticide applications.	4.31**	4.76**	.101
The existence of my farm is an important asset to my larger community.	5.09**	5.04**	.074
The farmers I associate with use organic / sustainable farming techniques that do not involve common herbicide and pesticide applicants.	3.92	3.93	-.059
I hope my land continues to be farmed after I decide to stop farming.	6.35	5.98	.257
I attempt to minimize off-the-farm inputs in the processes on my farm.	5.27	5.31	.276

*p>.1; **p>.05; ***p>.01; ****p>.001

348

349 A principal component analysis (presented in Table 3) on the battery of questions
350 related to economic factors detected the presence of three components. All components
351 had a Cronbach's alpha score greater than .790, which is acceptable (Hair et al., 1998).
352 Bartlett's Test of Sphericity was significant at the .000 level with a KMO test for sample
353 adequacy at .825. All components are named based on the items with heavy loading at
354 .300 or greater. Component 1 had a Cronbach's alpha score of .785 and explained
355 34.83% of the variance. This component included items related to price premiums for
356 organic products, organic farming laws, governmental laws and regulations, payments to
357 organic farming, and changes in government support; we titled component 1
358 *governmental support, certification, and policy*. Component 2 had a Cronbach's alpha
359 score of .847 and explained 10.75% of the variance. This component included items

360 relating to changes in technology, cost of credit, availability of loan funds, uncertainty
361 about family relationships, fire damages, and technical failure/malfunction of
362 machinery/equipment; we titled component 2 *dependence and uncertainty*. Component 3
363 had a Cronbach's alpha score of .736 and explained 8.36% of the variance (all three
364 components combined explain 53.95% of the variance). Component 3 items included
365 changes in consumer preferences, marketing and sales, cost of inputs, equipment costs,
366 changes in technology, and government laws and regulations; we titled component 3
367 *market forces and change*. Table 3 also highlights the scale items and corresponding p-
368 values between the two groups. Four items returned significant results from the ANOVA,
369 while two additional items are noted as marginally significant.
370

Table 3. Between group comparison results and Principal Component Analysis for scale items pertaining to issues related to farm economic performance. Significant variables are denoted with asterisks and retained components are in bold face.

How dependent do you consider each of the following issues in regard to the economic performance of your farm? (The scale is 1= No Dependency to 7 = Very Large Dependency)	Direct Mean	ND or Combo Mean	Component 1 $\alpha=.854$	Component 2 $\alpha=.837$	Component 3 $\alpha=.797$
Changes in consumer preferences	4.90	5.20	.103	.169	.791
Marketing/sale	4.94	5.38	.118	-.041	.781
Costs of operating inputs	4.96	5.12	.043	.111	.558
Cost of capital equipment	4.93	5.02	.082	.295	.479
Changes in technology	3.74**	4.29**	.199	.496	.566
Cost of credit	3.02*	3.61*	.175	.841	.084
Availability of loan funds	2.89*	3.44*	.254	.837	.079
Price premiums for organic products	4.46***	3.58***	.853	.032	.112
Organic farming laws and regulations	4.02*	3.42*	.875	.141	.161
Other government laws and regulations	4.46	4.59	.536	.360	.381
Additional government payments to organic farming	2.85	2.73	.853	.139	.019

Changes in government support payments	2.86	3.19	.600	.184	.023
Injury, illness or death of operators	5.45	5.46	.133	-.048	.257
Health situation of others in the farm family	4.43***	5.31***	.070	.091	.041
Uncertainty about family relationships	2.91	3.22	.093	.415	-.147
Hired labor	3.16	3.31	.180	.186	.012
Fire damages	3.83	4.19	.051	.581	.278
Technical failure/malfunction of machinery and equipment	4.08	4.47	.081	.441	.217

*p>.1; **p>.05; ***p>.01; ****p>.001

371

372 The binary logistic regression results that evaluated factors affecting whether or
373 not an individual would distribute direct to consumers only or also through non-direct
374 channels provided 6 steps for interpretation (Table 4). Covariates in the model included
375 the composite score for the composite component *innovative-environmental concern*,
376 gender responsible for farming operations, the composite scores for the three economic
377 components in Table 3, education attainment level, acres being farmed, length of
378 ownership of the land, farm classification type, and years of direct involvement in the
379 farming operations. We chose to present Step 5 due to the combination of its significance
380 level, percentage accuracy, AIC and BIC scores, and inclusion of more variables than
381 other steps. The model fits the data well (Hosmer and Lemeshow Goodness of Fit Test
382 $p=0.578$), was significant at the .018 level, and met parameters to justify interpretation.
383 Five variables were significant, including the composite component *dependence and*
384 *uncertainty*, educational attainment level, length of ownership of the land, farm
385 classification type, and acres farmed. As an individual's dependence and uncertainty
386 score on technology, finance options, family relations, and other significant issues
387 increased, so did his or her likelihood of being a farmer who distributes through non-

direct avenues vs. direct. As one's length of ownership and acres farmed increased, so did the likelihood that person would distribute through non-direct means. Additionally, those whose farms were classified as organic (non-certified) were more likely to distribute through alternative means than direct to consumer. Finally, as one's educational level increased, that person's likelihood of selling through non-direct means decreased.

Table 4. Summary statistics for binary stepwise logistic regression model in which farmers' distribution methods were regressed on 8 independent variables. Independent variables retained in step 5 are listed in order of their Exp(B) score, with asterisks denoting significance.

	Model 1 Step 5
Model Sign.	.018
Hosmer Lemeshow	.867
Chi-Square	3.887
-2 Log Likelihood	181.958
Nagelkerke	.237
Percentage Accuracy	67.1%
Akaike's Information Criterion (AIC)	232.004
Bayesian Information Criterion (BIC)	238.141
Variables	B (S.E.; Exp(B))
Farm Classification Type	.556 (.369; 1.744)
Q15 F2- dependence and uncertainty	.210 (.127; 1.234)**
Length of Ownership	.016 (.369; 1.016)**
Acres Farmed	.005 (.002; 1.005)*
Education Level	-.198 (.088; .820)*
Constant	-.233 (.791; .792)

S.E. Standard Error; n.s. Not Significant.

****p<.001; ***p<.01; **p<.05; *P<.1

4. Discussion

4.1 Salient Ideas

This study, based on data from West Virginia farmers who are producing for local distribution, explores vital questions concerning the similarities and differences between farmers who "sell local," with some choosing only direct sale venues, while others also

utilize intermediaries for distribution. Our results provide both support to prior studies and new insights on an increasingly important issue as demand for local food continues to outpace supply. As captured within our dichotomous comparisons and further underscored by our regression analysis, three salient ideas stem from our results: (1) demographic and farm differences exists between farmers selling only directly to consumers and those using direct and those using non-direct distribution approaches; (2) variations in farming philosophies exist between the two groups; and (3) variables associated with farm economic stability vary between those distributing directly versus those using non-direct methods.

Our results indicate that farmers who are distributing to restaurants, food hubs, wholesalers, or other institutional buyers are demographically distinct from their direct-only counterparts with regard to a number of measures: most critically, educational attainment, acres farmed, and length of family ownership. Educational attainment was inversely correlated to selling through non-direct means. While previous studies have looked at the implications that education has for information-seeking and risk-taking (Genius et al., 2006; Koesling et al., 2004), little work has been done on farmers' demographics and their decisions to sell through various marketing channels. One exception, Koesling et al. (2004), reported that post-secondary education reduces concern about access to credit and the risks associated with credit. This coincides with our results, which indicate that those selling only direct-to-consumer had higher educational attainment, were less concerned with changes in technology, and were less dependent on external financing options. This may be because these individuals are farming fewer acres, which would likely result in less land debt (Lyson et al., 1995), and therefore they

might view the farming experience as a lifestyle or hobby as opposed to a vocation (Brown, 2002). If farming is a long-standing part of one's familial culture, the development of the business and distribution strategies selected may be further developed for those selling through non-direct means, as these farmers were more likely than their counterparts to have a longer family tie to their land. This finding parallels that of Park (2009), who found that years of experience were highly correlated with income, having a positive affect amongst organic farmers. Taken together, these variables—land tenure and education—point to the main issue of access to land and capital as determinants of scale and, this research anticipates, marketing strategy. These two variables are critical, as acres farmed are often linked to family ownership by the passing of farmland through family lines. Furthermore, if one's family is in the business, then a business model may be inherited along with the land, saving the farmer the financial and temporal strain of beginning a new business.

Additionally, both our regression result and comparison analyses suggest that several variables associated with one's farming philosophy were also found to be distinctly different for the two groups. Prominent among these differences was the *innovative-environmental concern* component from the PCA. This component highlights that farmers only selling direct-to-consumer had greater concerns about how their farming practices affected the environment, the production of high quality foods, and the health risks associated with chemical usage; they were also more willing to try new methods than their non-direct counterparts. Other scholars have found similar results when comparing organic farmers to conventional farmers (Koesling et al., 2004; Läßle, 2012; Sullivan et al., 1996); however, there is a lack of research that compares farmers

based on scaling levels or distribution strategies. That said, farm type (organic or conventional) was retained in our regression model even though it was not significant. Thus, one should interpret the overall result of this particular component with caution, not drawing strict conclusions between farmers based on distribution model alone. Further investigation of this issue is needed in other areas to better understand these important variables that factor into farmers' decisions.

Component 2 from the economic dependence scale, which was significant in the regression analysis, highlights the variation in the two groups when it comes to *dependence* on costs of credit; availability of loans funds; family relations involved with the farming operation; and *uncertainty* with changes in technology, fire damage issues, and technical failure/malfunctioning of machinery and equipment. These findings coincide with research previously done on farmers' decisions to participate in organic agriculture and direct marketing, particularly in the area of technology and financing. Feenstra et al. (2011) found that "[a]ccess to capital is closely related to scale" (p. 510). With growing scale came an increased opportunity to capitalize and take risks on new forms of marketing and distribution channels (ibid). Day-Farnsworth et al. (2009) similarly argued that a lack of investment capital was a significant barrier keeping farmers from participating in mediated sales, meaning wholesalers wanting to capture price premiums for organic and local produce must work with farmers to aggregate, process, and store produce.

Perhaps most surprisingly, our analysis found that non-certified organic farms were more likely than conventional farms to use distribution models other than direct to consumer. While Farmer et al. (2014) argued that economic motivations are largely

responsible for farmers' adoption of organic practices, more seems to be at work here. McCann et al. (1997) argued that organic farmers are more likely to define success in terms of the profitability of their farm, while conventional farmers were more likely to define success as simply "making a living." Further, Park (2009) found many organic farmers use farmers' markets and roadside stands initially, then expand to CSAs or sales to restaurants and grocers as their operation expands—a method that supports an economic motivation of decision making, with expansion happening as access to capital and marketing opportunities increase over time. However, only certified organic farmers stand to gain from price premiums for their produce, as uncertified organic cannot be branded, labeled, or sold as organic in the U.S. Uncertified organic farmers selling directly to the consumer are able to benefit from values-based marketing, as the consumer can see the product, participate, and speak with the farmer about his methods. This extra labor and value-based advantage is lost in aggregation, and with it the ability to demand price premiums from the wholesaler or grocer. Therefore, practicing organic agriculture without seeking certification and without selling direct to consumers implies that more than economic motivations are at work.

4.2 Limitations and Future Directions

There are several limitations to this study that should be considered in the interpretation of the results and for future parallel research. First, though we attempted to create an exhaustive list of potential farmers through our solicitation of contact information, potential participants were indeed absent from our sample. Access or availability of a conclusive list would enhance the research process and therefore the generalizability of the results. While such a list does not currently exist in WV, or any

other state to our knowledge, the development of comprehensive farm lists to include small farms in addition to large farms would be fruitful. Additionally, we were unable to account for non-response bias. Our survey resulted in a 29.2% response rate. Though well within the acceptable level for mailed surveys (Dillman et al., 2011), following up with non-respondents via a brief phone interview or abridged mail survey would allow us to test for differences in those who did and did not take part in the survey. The length of our instrument, eight pages, may have also affected the response rate by causing participant fatigue that led to attrition. Future research should also consider the issue of farmers who distribute locally and the variables affecting capacity to distribute through non-direct means. Broadening the population pool to those in other states and regions would allow for important comparisons that take into account geographic differences, state rules and policies, and valuable infrastructure in different regions that support industry differences.

5. Conclusion

Though small in scope, research such as this helps us to better understand the variables that may affect farmers' capacity for scaling their operations to move beyond a direct-to-consumer model, as well as the factors associated with why they may lack interest, willingness, or motivation to do such. While our direct-to-consumer farmers were found to indicate a greater willingness to try new approaches to farming, stronger concern for the environment, and noted more of a concern with the health risks associated with conventional chemical approaches to growing, they were also less concerned with issues that are more pressing for larger farms, such as the availability of loans and the cost of technological advances. In West Virginia and among our respondents specifically,

515 critical distinctions exist between farmers selling directly to consumers versus those
516 using non-direct approaches—distinctions that are strongly linked to an individual's
517 history and heritage.

518

519

ACKNOWLEDGMENTS

We thank Matthias Koesling, Martha Ebbesvik, Gudbrán Lien, Ola Flaten, Paul Steinar Valle, and Halvard Arntzen for letting us adapt their instrument for use in our research. We thank expert panelists for their feedback on our instrument or assistance on the research: farmer Tim Alexander, Dr. Tim Woods, farmer Dominique Wong, farmer Dr. Jennifer Robinson, Dr. Jim Kotcon, Laura Hartz, Megan Granfield, Anne Stroud, and Justin Wolfe. We also thank Downstream Strategies of Morgantown, WV USA for collaborating on this project and Justin Wolfe for his editing assistance. We also appreciate the feedback and direction from Professor Caloran (Associate Editor for Journal of Rural Studies) and the three anonymous reviewers. Finally, we thank the United States Department of Agriculture, National Institute of Food and Agriculture for financial support of this project.

REFERENCES

- Alkon, A. H. (2008). From value to values: Sustainable consumption at farmers markets. *Agriculture and Human Values*, 25(4), 487–498. <http://doi.org/10.1007/s10460-008-9136-y>
- Allen, P. (2010). Realizing justice in local food systems. *Cambridge Journal of Regions, Economy and Society*, 3, 295-308. <http://doi.org/10.1093/cjres/rsq015>
- Brown, A. (2002). Farmers' market research 1940–2000: An inventory and review. *American Journal of Alternative Agriculture*, 17(4), 167–176. <http://doi.org/10.1079/AJAA2002167>
- Campbell, A. M., & MacRae, R. (2013). Local food plus: The connective tissue in local/sustainable supply chain development. *Local Environment*, 18(5), 557–566. <http://doi.org/10.1080/13549839.2013.788488>
- Connell, D. J., Smithers, J., & Joseph, A. (2008). Farmers' markets and the “good food” value chain: a preliminary study. *Local Environment*, 13(3), 169–185. <http://doi.org/10.1080/13549830701669096>
- Cranfield, J., Henson, S., & Holliday, J. (2010). The motives, benefits, and problems of conversion to organic production. *Agriculture and Human Values*, 27, 291–306. <http://doi.org/10.1007/s10460-009-9222-9>
- Creswell, J. W., & Clark, V. L. (2007). *Designing and Conducting Mixed Methods Research*. Thousand Oaks, California: SAGE Publications, Inc.

- Day-Farnsworth, L., McCown, B., Miller, M., & Pfeiffer, A. (2009). *Scaling up: Meeting the demand for local food*. Madison, Wisconsin: UW-Extension Ag Innovation Center & UW-Madison Center for Integrated Agricultural Systems.
- Detre, J. D., Mark, T. B., Mishra, A. K., & Adhikari, A. (2011). Linkage between direct marketing and farm income: A double-hurdle approach. *Agribusiness*, 27(1), 19–33. <http://doi.org/10.1002/agr.20248>
- Dillman, D. A., Smyth, J. D., & Melani, L. (2011). *Internet, mail, and mixed-mode surveys: the tailored design method*. Toronto: Wiley & Sons.
- Dimitri, C., & Oberholtzer, L. (2009). *Marketing U.S. organic foods: Recent trends from farms to consumers*. (Economic Information Bulletin No. 58) Washington, D.C.: United States Department of Agriculture.
- Dimitri, C., & Greene, C. (2000). *Recent growth patterns in the U.S. organic foods market*. (Agriculture Information Bulletin 777). Washington, D.C.: United States Department of Agriculture.
- Fairweather, J. R., & Campbell, H. (1996). *The decision making of organic and conventional agricultural producers*. (Research report no. 233). Canterbury, New Zealand: Lincoln University Agribusiness and Economics Research Unit.
- Farmer, J.R., Peters, C., Hansen, E. Boettner, F., Betcher, M. (2013). Overcoming the market barriers to organic production in West Virginia. Retrieved from

http://www.downstreamstrategies.com/documents/reports_publication/overcoming_market_barriers_to_organic_production_in_wv.pdf.

Farmer, J.R., Chancellor, C., Robinson, J.M., West, S., & Weddle, S. (2014).

Agrileisure: Farmers' markets, CSAs, and the privilege in eating local. *Journal of Leisure Research*, 46(3), 313-328.

Farmer, J. R., Epstein, G., Watkins, S. L., & Mincey, S. K. (2014). Organic farming in West Virginia: A behavioral approach. *Journal of Agriculture, Food Systems, and Community Development*. <http://doi.org/10.5304/jafscd.2014.044.007>

Feenstra, G., Visher, D., & Hardesty, S. (2011). *Developing values based distribution networks to enhance the prosperity of small and medium sized producers*. Davis, California: University of California Agricultural Sustainability Institute.

Galt, R., O'Sullivan, L., Beckett, J., & Hiner, C.C. (2012). Community Supported Agriculture Is Thriving in the Central Valley. *California Agriculture* 66(1), 8–14.

Genius, M., Pantzios, C. J., & Tzouvelekas, V. (2006). Western Agricultural Economics Association Information Acquisition and Adoption of Organic Farming Practices. *Journal of Agricultural and Resource Economics Western Agricultural Economics Association Journal of Agricultural and Resource Economics*, 31(1), 93–113.

Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational evaluation and policy analysis*, 11(3), 255-274.

- Hanson, J., Dismukes, R., Chambers, W., Greene, C., & Kremen, A. (2004). Risk and risk management in organic agriculture: Views of organic farmers. *Renewable Agriculture and Food Systems*, 19(4), 218–227. <http://doi.org/10.1079/RAFS200482>
- Hair, J. F., Jr., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). Multivariate data analysis (5th ed.). Upper Saddle River, NJ - Prentice Hall.
- Hardesty, S. D., & Leff, P. (2009). Determining marketing costs and returns in alternative marketing channels. *Renewable Agriculture and Food Systems*, 25(1), 24–34. <http://doi.org/10.1017/S1742170509990196>
- Hinrichs, C. C. (2003). The practice and politics of food system localization. *Journal of Rural Studies*, 19, 33–45.
- Johnson, N. R., & Endres, A. B. (2012). Small producers, big hurdles: Barriers facing producers of “local foods.” *Hamline Journal of Public Law and Policy*, 33, 49–122. Retrieved from <http://ssrn.com/abstract=2225440>
- Koesling, M., Ebbesvik, M., Lien, G., Flaten, O., Valle, P. S., & Arntzen, H. (2004). Risk and risk management in organic and conventional cash crop farming in Norway. *Food Economics - Acta Agriculturae Scandinavica, Section C*, 1(4), 195–206. <http://doi.org/10.1080/16507540410019692>
- Läpple, D. (2012). Comparing attitudes and characteristics of organic, former organic and conventional farmers: Evidence from Ireland. *Renewable Agriculture and Food Systems*, 28(4), 329–337. <http://doi.org/10.1017/S1742170512000294>

- LeRoux, M. N., Schmit, T. M., Roth, M., & Streeter, D. H. (2010). Evaluating marketing channel options for small-scale fruit and vegetable producers. *Renewable Agriculture and Food Systems*, 25(1), 16–23.
<http://doi.org/10.1017/S1742170509990275>
- Lyson, T. A., Gillespie, G.W., & Hilchey, D. (1995). Farmers' markets and the local community: Bridging the formal and informal economy. *American Journal of Alternative Agriculture*, 10(3), 108–113.
- Marsden, T., Banks, J., & Bristow, G. (2000). Food Supply Chain Approaches: Exploring their Role in Rural Development. *Sociologia Ruralis*, 40(4), 424–438.
- McCann, E., Sullivan, S., Erickson, D., & De Young, R. (1997). Environmental awareness, economic orientation, and farming practices: A comparison of organic and conventional farmers. *Environmental Management*, 21(5), 747–758.
<http://doi.org/10.1007/s002679900064>
- Paloviita, A. (2010). Consumers' sustainability perceptions of the supply chain of locally produced food. *Sustainability*, 2, 1492–1509. <http://doi.org/10.3390/su2061492>
- Park, T. A. (2009). Assessing the returns from organic marketing channels. *Journal of Agricultural and Resource Economics*, 34(3), 483–497.
- Peters, C., Hansen, E., Clingerman, J., Hereford, A., and Askins, N. (2012). *Opportunities and constraints in local food supply chains*. Beckley, West Virginia: West Virginia Food & Farm Coalition.

Shi, Y.J., Phipps, T.T., and Colyer, D. (1997). Agricultural land values under urbanizing influences. *Land Economics*, 73(1), 90-100.

Sullivan, S., McCann, E., De Young, R., and Erickson, D. (1996). Farmers' attitudes about farming and the environment: a survey of conventional and organic farmers. *Journal of Agricultural and Environmental Ethics*, 9(2), 123-143.

USDA. (2013). Commodity Areas: Definition of Specialty Crops. Retrieved from <http://www.ams.usda.gov/AMSV1.0/scbgpdefinitions>

USDA. (2007a). 2007 Census of Agriculture: Small Farms. Retrieved from http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Fact_Sheets/Farm_Numbers/small_farm.pdf.

USDA. (2007b). Historical highlights: 2007 and earlier Census Years: West Virginia. Retrieved from http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_1_State_Level/West_Virginia/st54_1_001_001.pdf

Verhaegen, I., & Van Huylenbroeck, G. (2001). Costs and benefits for farmers participating in innovative marketing channels for quality food products. *Journal of Rural Studies*, 17, 443–456. [http://doi.org/10.1016/S0743-0167\(01\)00017-1](http://doi.org/10.1016/S0743-0167(01)00017-1)

Veldstra, M. D., Alexander, C. E., & Marshall, M. I. (2014). To certify or not to certify? Separating the organic production and certification decisions. *Food Policy*, 49, 429–436. <http://doi.org/10.1016/j.foodpol.2014.05.010>

Winter, M. (2003). Embeddedness, the new food economy and defensive localism.

Journal of Rural Studies, 19, 23–32. Wu, Olivia. 2005. “ENVIRONMENT IN FOCUS / Diet for a Sustainable Planet / The Challenge: Eat Locally for a Month (You Can Start Practicing Now).” *SFGate*, June 1.

<http://www.sfgate.com/green/article/ENVIRONMENT-IN-FOCUS-Diet-for-a-sustainable-2630631.php>.