



Farmer satisfaction and short food supply chains

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Abstract

In response to a commentary on our research article (Azima and Mundler in *Agric Hum Values* 39:791–807, 2022), we address the argument that increased reliance on family farm labor with low or no opportunity costs leads to higher net revenue and greater economic satisfaction. Our response provides a nuanced perspective on this issue in the context of short food supply chains. We also examine the share of total farm sales from short food supply chains in terms of its effect size on farmer job satisfaction. Finally, we emphasize the need for further research into the sources of occupational satisfaction among farmers involved in such marketing channels.

Keywords Opportunity cost · Farmwork · Short food supply chains · Job satisfaction

We are pleased that our article – Azima & Mundler (2022) – has sparked a debate on the connection between participation in short food supply chains (SFSCs) and job satisfaction among farmers. A recently submitted comment provides us with a valuable opportunity to expand on our research and clarify certain aspects of our findings.

The author of the comment presents a well-articulated argument, based on a discussion of opportunity costs, that challenges our interpretation of the positive correlation found between higher net revenues and job satisfaction levels, particularly economic satisfaction. The main argument presented is that, regardless of the size of the opportunity cost for family labor, higher net revenues will likely result in greater economic satisfaction.

In this reply, we offer a more nuanced assessment of this claim and clarify our interpretation of the effect of higher net revenues on economic satisfaction. We argue that if the opportunity cost of family work were low or zero, then farmers would overly rely on household labor. Given the assumption of low labor productivity (and thus low marginal

productivity) on farms in SFSCs, this strategy would lead to a situation of self-exploitation detrimental to economic satisfaction. Consequently, low or non-existent opportunity costs for family labor are unlikely to explain the positive effect of higher net revenues on economic satisfaction among SFSC farmers. Moreover, our model confirms this positive relationship while controlling for the number of hours worked by the main farmer. It is also important to stress that off-farm work is common among farm households in SFSCs (as was the case in our sample), suggesting that the organization of labor on such farms might be of greater interest to researchers and practitioners. At the same time, we believe it is essential to find explanations for economic satisfaction that go beyond family labor considerations and standard economic theory.

The author of the comment also questions the effect size of our main variable of interest – the share of total farm sales attributable to SFSCs – arguing that occupational satisfaction derived from SFSCs stems from the experience of direct selling per se, not its relative importance. While we mostly agree with the first point, we note that our research objective was to test whether SFSCs have an *effect* on job satisfaction rather than the magnitude of the effect. We use, however, this opportunity to provide more details about our findings, discuss alternative ways of interpreting the results, and introduce additional primary data to spur further discussions on the benefits of SFSCs for farmers.

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The two methods for evaluating opportunity costs

Opportunity cost is an old concept in economics. In some ways, it reflects the famous saying that “you can’t have your cake and eat it too.” In recent years, critics have highlighted problems with how it is defined and measured (Arce 2016; Ferraro & Taylor 2005; Haghpour et al. 2022; Newman 2017; Parkin 2016a, 2016b; Potter & Sanders 2012). While opportunity cost is a relatively straightforward concept, there is less certainty about what exactly is being given up. Researchers generally measure opportunity cost using either a market-based (estimating the market value of a foregone option) or subjective valuation (measuring the willingness to pay for a foregone option) (Parkin 2016a, 2016b). However, as Parkin (2016b) correctly notes, subjective assessments of opportunity cost can be greater or less than market-based estimates. For example, the subjective value associated with a managerial position at a company may be higher or lower than the economic benefit foregone by starting one’s own business (Parkin 2016b).

The author of the comment navigates between these two approaches to opportunity cost when analyzing the trade-off between running a farm that sells through SFSCs and pursuing off-farm employment. When off-farm opportunities do not exist, which amounts to a situation in which the opportunity cost of farmwork is zero (or negligible), it is argued that the farmer would still estimate the subjective value of such work. This valuation, while subjective, still represents an opportunity cost (Kolmar & Kolmar 2022). In this case, the opportunity cost would be the subjective value attached to rest (or leisure activities).

The two methods for estimating opportunity cost are not equivalent, which the author of the comment seems to acknowledge in the first footnote. Without getting into an academic debate about which of the two approaches is preferable, we simply note that opportunity cost assessments are generally market-based (Arce 2016; Parkin 2016b). In our article, we also chose to adopt this approach for the sake of consistency and because the inclusion of subjective costs would have required us to focus all our analysis on this theme.

While the author of the comment is correct that an increase in the amount of family labor devoted to farming in SFSCs will increase net income (assuming positive labor productivity), we do not agree that this will automatically result in greater economic satisfaction. In fact, as we argue in this article, under the assumption of zero or low opportunity costs, higher net income will likely have a neutral rather than a positive effect on economic satisfaction. This point, however, does require a further explanation, which we provide below.

The opportunity cost of farmwork in SFSCs

The chapter by Corsi et al. (2018) cited in our article analyzes SFSCs using economic theory, a somewhat novel approach given that most research on alternative food networks adopts a “sociology of markets” perspective (Renting et al. 2003). As Corsi et al. (2018) argue, SFSCs tend to attract farm households that face little or no opportunity costs:

Since AFNs are typically labour-intensive, it would not be surprising if they are more attractive for small farms where there is excess labour with low or no opportunity cost and where farmers may thus be willing to undertake an additional activity at low returns. This is certainly not the case for all farmers participating in AFNs, but it is a part of the trend. [...] The family labour provided in AFN activities raises a further consideration, connected to farmers’ motivations. Indeed, it cannot be taken for granted that farmers are motivated only by the search for profits. (Corsi et al. 2018, pp. 175–176).

There certainly are nuances in this excerpt (and in the rest of the chapter cited) that we did not have a chance to discuss in our article. Nevertheless, the arguments we presented are supported by (1) economic production theory as it pertains to cases involving inputs with low or no opportunity costs (i.e., with little or no market value) and (2) the literature on self-exploitation and labor productivity in SFSCs.

To estimate the value of an input with no opportunity cost, one must first calculate its marginal productivity (i.e., the growth in output associated with a one-unit increase in the input) and then multiply this figure by the output price to obtain the marginal revenue (Onofri & Volpe 2020; Posnett & Jan 1996). While more complex estimations can be developed, especially when the input is paid labor or unpaid volunteer work (Posnett & Jan 1996), this simple formula summarizes well the underlying concept and can be used to elucidate findings from previous studies on work overload, self-exploitation, and low labor productivity in SFSCs (Dupré et al. 2017; Galt 2013; Mundler & Jean-Gagnon 2020). In such marketing channels, the marginal revenue of family labor with no opportunity costs is likely to be modest due to low marginal productivity, which would explain why studies have shown that SFSC farmers are prone to self-exploitation. This practice is also driven by strong community ties and a desire to satisfy consumer expectations and gain social recognition [see Nichols et al. (2022) for a recent case study on the moral economy underpinning SFSCs during the COVID-19 pandemic]. It can also be explained by the fact that many farmers in SFSCs view their farm as an all-encompassing life project and choose to invest in its

development at the expense of earnings. Whatever the case may be, self-exploitation does not appear to be a source of economic satisfaction or a sustainable business strategy and is likely to worsen if the opportunity cost of family work is low or zero, resulting in an overreliance on household labor.

However, we do not believe that such a scenario is common since farmers in SFSCs are often involved in off-farm work and have alternative sources of income. In our study, for instance, 75% of surveyed farmers relied on income sources other than farming. Many of the respondents were beginning farmers who had chosen to farm as a second career and for whom SFSCs offered a unique entry point into the profession (Bruce 2019). Given their background, most of them undoubtedly had a strong ability to secure off-farm work, suggesting that SFSCs are not generally composed of farm households with limited alternative employment opportunities.

Unpublished data from our survey also indicates that farmers allocate labor from family members, volunteers, and employees to an array of tasks needed to succeed in SFSCs, including production, processing, and marketing activities. We argue that the organization of labor on farms in SFSCs might be as important, if not more so, than the way family labor is allocated between on-farm and off-farm work.

While the author of the comment gives a nuanced description of the use of family labor in SFSCs when opportunity costs are low or non-existent, they fail to adopt a consistent definition of this concept. Based on economic principles regarding the use of inputs with zero market value, as well as scholarship on farm labor in SFSCs, we believe that increases in farmer economic satisfaction due to higher net revenues are unlikely the result of more intensive use of household labor constrained by low opportunity costs. In our sample, most of the respondents had other sources of income, and when higher net revenues can be achieved through SFSCs while controlling for the number of hours worked (which our OLS model does), farmers are likely to experience a stronger feeling of success and economic satisfaction.

Effect size

There has been much debate about the use of significance tests and effect sizes to test theories (Chow 1988; Sun et al. 2010). While taking a position in this complex and ongoing controversy would be beyond the scope of this reply, we believe that significance tests remain a valid starting point for evaluating hypotheses. Although it is true that with a large enough sample a statistical relationship can become artificially significant, we consider this to be more of a research design problem than a sample-size or statistical issue (Chow 1988). In our article, we highlighted the

originality of our research methodology but also acknowledged its limitations and stressed the need for further studies.

Significance tests are more meaningful when underpinned by solid literature reviews and clear theoretical reasoning. Indeed, this is what motivated us to cover the extensive literature on the social and economic benefits of SFSCs for farmers. Our goal in conducting statistical tests was to determine whether a relationship could be found between participation in SFSCs and occupational satisfaction among farmers. In other words, we sought to ascertain the existence (and not the magnitude) of social and occupational benefits derived from such channels. There is also no universally accepted definition of what constitutes a “large” effect, as this can vary depending on the issue studied or the discipline.

We recognize though that there exist at least two ways to study SFSC involvement. In addition to our measurement choice – share of total farm sales generated by SFSCs – another option would have been to use a binary variable to compare farmers who rely exclusively on SFSCs with those who rely entirely on conventional food chains. However, such an approach would be problematic since the line between alternative food networks and the conventional food system is not always clear (Le Velly 2019). Furthermore, it would exclude farmers who use both types of marketing channels. Future studies that adopt a binary measurement tool could certainly yield interesting insights, but special attention would need to be given to methodology design.

Turning to our results, a common effect size estimate for OLS regressions is the standardized beta coefficient. Ranging in value from -1 to 1 , this coefficient measures the effect of a one-standard-deviation increase of the independent variable in terms of the standard deviation of the dependent variable. In Table 1, we report the standardized beta coefficients along with the unstandardized coefficients that were presented in our article.

Comparing the results in Table 1 with Cohen’s (1988) guidelines and with Fey et al.’s (2022) cut-off points for regression models leads us to agree with the author of the comment regarding the small effect size of the share of total sales from SFSCs (SFSCshare). In the case of economic satisfaction, a one-standard-deviation increase in SFSCshare causes the economic satisfaction score to rise by “only” 0.18 standard deviations. The three largest effects are caused by the dummy variables for net revenue in the \$0 – \$40,000 brackets (with negative net revenue as the comparison). According to the cut-off points proposed by Fey et al. (2022), the positive effect on economic satisfaction can be classified as “medium” for farmers in the \$20,000 – \$40,000 net revenue category.

Regardless of the size of the effect, it should be noted that the satisfaction scales were created using the average score for multiple Likert items. Consequently, a seemingly small increase in reported satisfaction could be caused by a

Table 1 Unstandardized coefficients and standardized beta coefficients from the OLS regressions for occupational satisfaction among SFSC farmers

	Work enjoyment (<i>N</i> =611)		Social satisfaction (<i>N</i> =611)		Economic satisfaction (<i>N</i> =611)	
	Unstandardized coefficient	Beta coefficient	Unstandardized coefficient	Beta coefficient	Unstandardized coefficient	Beta coefficient
SFSCshare	0.004***	0.161	0.003**	0.128	0.004***	0.182
INTERMEDshare	-0.005***	-0.162	-0.003**	-0.135	-0.005***	-0.176
CROPshare	0.002*	0.102	0.00008	0.006	0.001	0.042
Numberchannels	-0.043	-0.082	0.001	0.002	-0.027	-0.057
Area	-0.00009	-0.021	-0.00017	-0.053	-0.00008	-0.022
Operators	0.058	0.082	0.054*	0.096	0.021	0.032
Age	0.006*	0.104	0.001	0.02	0.007**	0.13
Workhours	-0.00004	-0.057	-0.00002	-0.031	-0.00003	-0.052
Grevenue = \$10,000–\$50,000	-0.162	-0.095	0.050	0.037	-0.064	-0.041
Grevenue = \$50,000–\$100,000	-0.364**	-0.184	0.037	0.024	0.019	0.01
Grevenue = \$100,000–\$250,000	-0.443**	-0.24	-0.054	-0.037	-0.169	-0.101
Grevenue = \$250,000–\$500,000	-0.466**	-0.2	-0.157	-0.085	-0.137	-0.064
Grevenue = \$500,000–\$1,000,000	-0.647***	-0.208	-0.104	-0.042	-0.231	-0.081
Grevenue = More than \$1,000,000	-0.244	-0.077	0.212	0.084	0.213	0.073
Nrevenue = \$0–\$20,000	0.193*	0.122	0.243***	0.195	0.394***	0.274
Nrevenue \$20,000–\$40,000	0.234*	0.131	0.274***	0.194	0.489***	0.3
Nrevenue = \$40,000–\$75,000	0.183	0.075	0.158	0.082	0.576***	0.259
Nrevenue = \$75,000 to \$150,000	0.146	0.047	0.129	0.052	0.531***	0.187
Nrevenue = More than \$150,000	-0.253	-0.053	-0.295	-0.078	0.069	0.016
Gender = Female	0.099	0.065	0.168***	0.139	0.108*	0.078
Highereduc = Yes	-0.126	-0.059	0.012	0.007	-0.142	-0.073
Training = Yes	-0.142*	-0.089	-0.132*	-0.105	-0.088	-0.06
Farmorigin = Start-up	-0.014	-0.008	0.018	0.013	-0.020	-0.013
Farmorigin = Third-party transfer	0.107	0.035	0.025	0.011	0.113	0.041
Previousoccupation = Yes	0.064	0.035	0.022	0.015	-0.019	-0.011
Region = Quebec	-0.085	-0.054	-0.115	-0.093	-0.040	-0.028
Region = Ontario	0.043	0.022	-0.083	-0.054	-0.101	-0.057
Region = Prairie provinces	-0.030	-0.013	-0.030	-0.017	-0.089	-0.043
Region = British Columbia	-0.129	-0.068	-0.025	-0.017	-0.158	-0.091
Farmsetting = Rural	0.037	0.019	0.026	0.017	0.051	0.028
Farmsetting = Urban	0.144	0.035	-0.072	-0.022	0.113	0.03
Employees = Yes	-0.003	-0.002	0.132*	0.106	-0.021	-0.015
Volunteers = Yes	0.112	0.072	0.125*	0.102	0.129*	0.091
Otherincome = Yes	-0.027	-0.015	0.022	0.016	-0.089	-0.056
Processing = Yes	0.049	0.032	0.061	0.05	0.027	0.02
Agritourism = Yes	0.059	0.039	0.089	0.074	0.085	0.061
Organic = Yes	-0.016	-0.01	0.053	0.042	0.075	0.052
_cons	3.009***	-	3.078***	-	2.937***	-

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

noteworthy “jump” in the score of one or more individual items. We did not explore the way changes in the average score were influenced by variations in individual scores. However, if we were to create a tau-equivalent model for the average satisfaction score to allow for different variance errors between the individual Likert items (DeVellis

& Thorpe 2021), we could imagine a scenario where even a small change (say +0.04) could be triggered by a significant increase in the score for a particular item. We must also emphasize that we assumed a constant marginal effect and did not explore the potential effect of different thresholds of SFSCshare on farmers' job satisfaction.

For the logistic regressions presented in our paper, we only showed the coefficients measured on a log-odds scale. We conclude this reply by listing in Table 2 the average marginal effect and p-value for each of the independent variables. For the continuous independent variables shown, the average marginal effect indicates the average change in the probability of occupational satisfaction resulting from a one-unit increase in the variable. In the case of our main variable

of interest (SFSCshare), a one percentage point increase in the share of sales from SFSCs raises the probability of work-related satisfaction (work enjoyment) and economic satisfaction by 0.001 and 0.002, respectively. For the dummy variables, net income has the most noticeable effect as belonging to a higher net income bracket increases the probability of being economically satisfied (up to 0.58 more in one case, compared to the negative net revenue reference bracket).

Table 2 Average marginal effects and p-values from the logistic regressions for occupational satisfaction among SFSC farmers

	Work enjoyment (<i>N</i> =555)		Social satisfaction (<i>N</i> =555)		Economic satisfaction (<i>N</i> =610)	
	Average marginal effect	P > z	Average marginal effect	P > z	Average marginal effect	P > z
SFSCshare	0.001	0.036	0.000	0.305	0.002	0.016
INTERMEDshare	- 0.001	0.074	- 0.001	0.144	- 0.002	0.005
CROPshare	0.000	0.052	0.000	0.147	0.001	0.017
Numberchannels	- 0.004	0.490	0.015	0.125	- 0.006	0.653
Area	0.000	0.099	0.000	0.872	0.000	0.890
Operators	- 0.004	0.749	0.014	0.384	0.039	0.073
Age	0.000	0.551	0.000	0.790	0.004	0.003
Workhours	0.000	0.583	0.000	0.195	0.000	0.210
Grevenue = \$10,000–\$50,000	0.034	0.315	- 0.075	0.096	0.043	0.557
Grevenue = \$50,000–\$100,000	0.036	0.337	0.011	0.823	0.153	0.067
Grevenue = \$100,000–\$250,000	0.025	0.547	- 0.044	0.426	0.051	0.587
Grevenue = \$250,000–\$500,000	0.048	0.289	- 0.007	0.913	0.024	0.827
Grevenue = \$500,000–\$1,000,000	- 0.043	0.593	- 0.051	0.552	0.068	0.597
Grevenue = More than \$1,000,000	- 0.013	0.879	- 0.003	0.972	0.103	0.476
Nrevenue = \$0–\$20,000	0.166	0.000	0.127	0.004	0.262	0.000
Nrevenue = \$20,000–\$40,000	0.160	0.000	0.127	0.015	0.342	0.000
Nrevenue = \$40,000–\$75,000	0.158	0.000	0.140	0.016	0.485	0.000
Nrevenue = \$75,000–\$150,000	0.173	0.000	0.173	0.003	0.577	0.000
Nrevenue = More than \$150,000	-	-	-	-	0.588	0.000
Gender = Female	0.000	0.994	0.059	0.036	0.018	0.627
Highereduc = Yes	- 0.007	0.769	0.036	0.353	- 0.041	0.424
Training = Yes	0.003	0.887	- 0.030	0.353	- 0.015	0.704
Farmorigin = Start-up	- 0.056	0.001	- 0.008	0.844	0.024	0.678
Farmorigin = Third-party transfer	-	-	-	-	0.037	0.678
Previousoccupation = Yes	0.080	0.023	0.066	0.118	- 0.011	0.817
Region = Quebec	0.064	0.092	0.007	0.874	0.078	0.225
Region = Ontario	0.012	0.781	- 0.049	0.319	- 0.019	0.790
Region = Prairie provinces	0.076	0.051	- 0.101	0.087	0.016	0.832
Region = British Columbia	0.002	0.965	- 0.070	0.181	0.036	0.605
Farmsetting = Rural	- 0.015	0.530	0.004	0.915	0.068	0.200
Farmsetting = Urban	- 0.108	0.174	0.020	0.795	0.098	0.359
Employees = Yes	0.005	0.819	0.007	0.825	0.025	0.576
Volunteers = Yes	0.010	0.619	- 0.007	0.801	0.034	0.368
Otherincome = Yes	- 0.027	0.190	- 0.015	0.673	- 0.005	0.919
Processing = Yes	0.000	0.985	- 0.030	0.319	- 0.037	0.359
Agritourism = Yes	- 0.006	0.738	0.020	0.466	0.042	0.267
Organic = Yes	- 0.031	0.212	0.030	0.311	- 0.077	0.066

Conclusion

To conclude, we thank the author of the comment for allowing us to clarify several points. Despite the criticisms, we believe the relationship found between job satisfaction and SFSC participation is robust. Nevertheless, it is important to not solely analyze the relationship from an economic perspective and to understand the diverse pathways and motivations of farmers in SFSCs. Such complex factors need to be accounted for when discussing the opportunity costs of family labor on farms involved in such marketing channels. Due to their training, prior work experiences, and current professional activities, most farmers who participated in our survey did not face obstacles to finding off-farm work. As a result, it is reasonable to assume that SFSC farmers are not exclusively driven by income considerations and, instead, make trade-offs that account for the overall vision they have for their farm as both a professional and life project.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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