Value Creation Strategies in Credence Food Productions: The Case of Organic Farming in Italy

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Abstract

In this paper we analyse different strategies used by Italian organic farmers to create value from credence food production. More specifically, we consider the following strategies: participation in policy support programmes (i.e. rural development measures and agro-environmental schemes), direct marketing (i.e. short-chains, on-farm businesses, agro-tourism), on-farm processing and being a member of a marketing and/or processing cooperative. We use data from the 2006 Italian FADN (Farm Accountancy Data Network) related to 981 organic farmers. To estimate the factors affecting farmers' strategies and to evaluate them simultaneously we implement a multivariate probit model (MVP). The results could be helpful to implement guidelines for public and private intervention in the next CAP programming period. Allowing for differences in farmers' goals and their impact on the choice of farming method and strategies is important in a modern competitive scenario.

1 Introduction

Agricultural "quality-enhanced" products often assume the characteristic of "credence goods". A credence good is a product whose characteristics or quality attributes cannot be verified, even after consumption (Nelson, 1970; Darby and Karni, 1973; Antle, 1999). For example, this is the case of organic produce. When credence attributes are involved in the transaction, consumers may become subject to moral hazard behaviour from producers due to asymmetric information between the two parties and potentially too high monitoring costs (Vetter and Karantininis, 2002). Producers can therefore take advantage by imposing a premium on a good which has no "quality-enhanced" attributes (Vetter and Karantininis, 2002). On the other hand, switching from traditional to credence food production could entail excessively high transaction costs due to investments in specific assets and increased uncertainty. These specific conditions may prevent producers from developing a wider range of strategies to create and extract all the potential value from credence food transactions. For example, when organic farmers consider the costs for implementing (investing in) complex transactions too high, they could limit the opportunity to create value from organic production simply by extracting value from public support schemes and not marketing them as "credence food" (hold-up problem). On the other hand, organic farmers are more likely to maintain very specific forms of contracting (i.e. short chains or on-farm marketing) because of their lock-in condition (i.e. the asset specificity of being organic limits their ability to switch to other contractual settings). In this sense organic farmers can show very specific patterns of decision-making compared to conventional ones. For example, previous studies have underlined how important are marketing dynamics, public policy measures and risk management in different decision-making processes of European organic farmers related to value-creation strategies and technology adoption (Pietola and Oude Lansink, 2001; Gardebroek, 2006; Serra et al., 2008; Corsi et al., 2009; Gardebroek et al., 2009). Other papers have stressed the role of personal attitudes and motivations in modelling organic

farmers` decisions (Darnhofer et al., 2005). That said, all these papers focus on the comparison between organic and non-organic farmers' decisions and/or specifically on the decision to adopt, or switch to, organic technologies and practices. While such decisions have received increasing attention in the agricultural economics literature, we believe that too little attention has been given to a more extended set of organic famers` strategies, especially to explain their search for value-creation in their businesses.
Based on these considerations, in this paper we analyse and discuss the behaviour of a sample of Italian organic farmers by focusing on what strategies they choose to create value from credence food production. In section 2 we present the model to analyse the way in which Italian organic farmers currently seek value creation, taking into account the following strategies: participation in policy support programmes (i.e. rural development measures), direct marketing (short-chains, on-farm businesses, agro-tourism), on-farm processing and being a member of a marketing and/or processing cooperative. In section 3 we present the main characteristics of the survey sample, namely farmers in Italy belonging to the Farm Accountancy Data Network - RICA (FADN). Annual data were used from a representative sample of farms, whose size can be considered as commercially viable. Within the original database, we only selected farms (approximately 15,500) belonging to the 2006 sample. To estimate the factors affecting farmers' strategies and evaluate them simultaneously we implement a multivariate probit model (MVP). In section 4 we present the results while in the final section a brief discussion and some concluding remarks are provided.

2 The model

We can model organic farmers' decisions to implement different strategies by assuming that they are solving the following maximization problem:

$$\max [\mathrm{V_i}(\pi^{\mathrm{a}}(\Omega_i) + \pi^{\mathrm{d}}(\Omega_i) + \mathrm{M})] \tag{1}$$

where V_i is the indirect utility associated to strategy *i*, π^a is the farmer's expected business profit function from agricultural activities, π^d is the farmer's expected business profit function from other non-agricultural activities (i.e. diversification, off-farm activities, etc.), Ω^i is the vector of factors exogenous to current farmer's decisions when networking decision *i* is chosen, including farm characteristics, farm operator and household characteristics, local conditions, and so on. *M* is other forms of income (i.e. public transfers, interest, rent, private pensions, dividends, etc.). We intentionally included profits related to non-agricultural activities and other forms of income to extend the model to a "multifunctional" type of organic farming in which such pay-offs could also be very important (Darhofer, 2005). Hence in this model farmers will choose a strategy if the expected utility from implementation exceeds that from other strategies, including not implementing any of the strategies considered (Masten and Saussier, 2002), such that:

$$\begin{aligned} Y^* &= Y_i, \text{ if } V_i > V_j \\ &= Y_j, \text{ if } V_i \leq V_j \end{aligned} \tag{2}$$

where Y_i represents the strategy type i, Y_j an alternative strategy type j, V_i and V_j the corresponding expected indirect utility values of strategy type i and its alternative j, while Y* represents the strategy type actually chosen. Therefore we can view the farmer's decisions on strategy implementation within the random utility discrete choice model (Verbeek, 2008). In this framework the utility function is assumed to be known for each farmer but some of its components are unobserved by the researcher. This unobserved part of the utility is treated

as a random variable. For the i^{th} strategy decision the expected indirect utility is then modelled as the sum of the observed variables and non-observable random component ε_i :

$$V_i = \beta_i' X_i + \varepsilon_i \quad (3)$$

As in equation [3] we can write the choice utility of implementing any alternative as follows:

$$V_j = \beta_j' X_j + \varepsilon_j \quad (4)$$

where β_i' and β_j' are vectors of parameters to be estimated. Hence farmers can decide simultaneously whether to implement one or more types of strategy conditional upon the vectors of explanatory variables X_i and X_j. In this approach we can use a multivariate probit model (MVP) to study farmers' joint-decisions to implement types of strategy. More specifically, we consider here three different types of strategy: (a) participation in policy support programmes (i.e. rural development measures), (b) direct marketing (short-chains, on-farm businesses, agro-tourism), (c) on-farm processing and being a member of a marketing and/or processing cooperative. All these strategies are signals of the degree of organic farmers' embeddedness in a more general rural development path (Darhofer, 2005). Rural development support and public subsidies are considered major factors to explain farmers' adoption of organic technologies (Pietola and Oude Lansink, 2001). Moreover, even when the switching decision has already been made (i.e. farmers have already turned to organic technologies), we still believe that policy-support seeking could be an important opportunity for creating value for Italian organic farmers.

The existence of public support demonstrates that government and society recognize positive externalities associated with organic agriculture and are willing to pay to obtain such benefits (Lohr and Salomonsson, 2000). In the European context the aim of these policies is to enhance organic agriculture and to send signals about social preferences to non-organic farmers as well, encouraging conventional agriculture to seek more environmentally and socially sound practices. Providing a subsidy to already-converted farmers is also far from redundant (Lohr and Salomonsson, 2000): it rewards the information-gathering and risk-taking of the early innovators and promotes equity in distribution of rewards for practising sustainable agriculture (Lohr and Salomonsson, 2000). That said, farmers who are exclusively policy-seeking are seen as those less driven by environmental or ethical motivations in practising organic farming (Lohr and Salomonsson, 2000). The strategy to sell organic products directly on-farm is a signal of a farmer's willingness to use quality as a major instrument to extract profit from his/her organic choice. This strategy is strongly related to the rural context because it implies the active participation of organic farmers in complex networks and/or building relational contracts with consumers. Rural sociologists recognize the presence of direct marketing activities (i.e. via agro-tourism, on-farm marketing, etc.) within the process of re-grounding and deepening of rural farmers (Van der Ploeg et al., 2002). Organic farming is thus often seen as a category of alternative or short food supply chains (Renting et al. 2003), as a form of high-quality differentiated production that has the capacity to respond to consumer concerns, such as those related to food safety (Zanoli 2004). Short food supply chains are seen as a "defense" strategy against the prevailing trends of globalization and further industrialization of markets and their impact upon broader aspects of rural development (Marsden et al. 1999; Marsden et al. 2000). The third strategy also reflects of the aims of farmers to improve the quality of their production and produce value-added by directly participating and organizing processing and/or marketing activities on-farm or within rural networks (e.g. cooperatives) (Darhofer, 2005). The difference with the second strategy consists in greater interaction with the socio-economic context, a higher degree of participation in networking activities and capital-use intensity. Therefore the first strategy is

more socially and politically oriented while the other two represent more socio-economic oriented value-creation strategies.

Because farmers can follow more than one strategy simultaneously, the use of a multivariate probit model is particularly appropriate since it could indicate the potential substitutability or complementarity between the different strategies. Therefore in this model farmers choose one or a combination of strategies if the gains are greater than those of any other combination. Basically, farmers can decide simultaneously whether to implement one or more strategies. The use of multivariate probit as a micro-econometric model to investigate farmers' decisions between potential joint alternatives is a consolidated technique within the agricultural economics literature in the field of information and knowledge transfer (Velandia et al., 2009), in/off investment and planning decisions (Oude Lansink et al., 2003), agri-environmental policy participations (Polman and Slangen, 2008). Moreover, Corsi and colleagues (2009) recently applied this approach to model organic famers' decisions to diversify their marketing chains in a regional case study in Italy. Following equations (3) and (4) the empirical specification of MVP takes the form:

$$\mathrm{Y}_{\mathrm{i}}^{*} = \beta_i^{'} X_i + \varepsilon_i \text{ with i = 1, 2, 3} \quad (5)$$

$$\mathrm{Y}_{\mathrm{i}} = 1 \text{ if } \mathrm{Y}_{\mathrm{i}}^{*} > 0 \text{ and } 0 \text{ otherwise} \quad (6)$$

where $\mathrm{Y}_{\mathrm{i}}^{*}$ is an unobservable latent variable denoting the probability of choosing *i* type of networking. Thus the final specification of the MVP for *i* = 1 (policy-seeking), *i* = 2 (direct marketing) and *i* = 3 (on-farm/cooperative processing) is as follows:

$$\mathrm{Y}_1 = \beta_1 X_1 + \varepsilon_1 \quad (7)$$

$$\mathrm{Y}_2 = \beta_2 X_2 + \varepsilon_2 \quad (8)$$

$$\mathrm{Y}_3 = \beta_3 X_3 + \varepsilon_3 \quad (9)$$

where X_1, X_2 and X_3 represent the set of explanatory variables related to *location, farm and farmer characteristics*; β_1, β_2 and β_3 are the regression coefficients, and ε_1, ε_2 and ε_3 are error terms. To estimate the three equations [7], [8] and [9] we assumed that the error terms (ε_1, ε_2 and ε_3) may be correlated. Then, instead of being independently estimated, they are considered to be a trivariate limited-dependent-variable model in which the three error terms follow a multivariate normal distribution with zero mean and variance and covariance matrix *r*.

3 Data

In this study we surveyed farmers in Italy belonging to the Farm Accountancy Data Network - RICA (FADN). Data were collected for each year from a representative sample of farms, whose size can be considered as commercially viable. Within the original database, we only selected farms belonging to the 2006 sample. In the end, our sample included roughly 15,500 farms. Among these, we chose only those farms with organic certification. In all, this subsample consisted of 981 farms. The variables recorded for each farm concern both farm production and various balance sheet items, useful for assessing their economic results and strategic choices.

In order to analyse the strategic behaviour of the various farms, the variables considered were classified into three macro-groups (table 1). The first class, namely that of dependent variables, comprises three possible strategies: policy-seeking, direct marketing and processing strategies. The three variables were constructed using a dummy that assumes a value of 1 if the entrepreneur adopted the strategy in question, 0 otherwise. By contrast, the second and third groups contain independent variables. In the second group are the farm's life-cycle characteristics, such as entrepreneur's age and the presence/absence of succession and the farm's production specialisation. The third group gathers the variables concerning the sample farm's geographical location and height above sea level.
In brief, the farms tend to be managed by entrepreneurs who are not particularly old (average 50 years old), with a scant presence of successors (5%). Economically speaking, the farms are medium-sized, with particularly small farms (< 16 ESU) making up about 27 % of the total. As regards production type, about 36.7% of firms invest in permanent crops with a high incidence of family labour. More than half the sample (57.3%) possess a business development plan and in about 80% of cases, the farms are members of associations. As regards location, in line with the particular features of the organic sector in Italy, about half the sample is located in southern Italy and 30% may be attributed to the new segment of peri-urban agriculture.

Table 1. Description of the variables used in the econometric model

Variable name		Description	Unit of measure	Mean	S.D.
		Dependent variables: type of network (Vi) [(a)]			
Y_1	*POL*	Policy-seeking strategy	*Dummy*	yes = 27.4 %	-
Y_2	*DMK*	Direct marketing strategy	*Dummy*	yes = 44.2 %	-
Y_3	*PROC*	Processing strategy	*Dummy*	yes = 67.7 %	-
		Farm and farmer features[(a)]			
X_1	*age*	Farmer's age	*Year*	50.0	13.21
X_2	*suc*	1 if " Successor is present"	*Dummy*	yes = 5.1%	-
X_3	*size*	1 if farm is small business (<16 ESU)	*Dummy*	yes = 27.6%	-
X_4	*arab*	1 if ``Farm is specialized in arable crops``	*Dummy*	yes = 20.9%	-
X_5	*hort*	1 if `` Farm is specialized in horticulture ``	*Dummy*	yes = 0.7%	-
X_6	*perm*	1 if `` Farm is specialized in permanent crops ``	*Dummy*	yes = 36.7%	-
X_7	*lives*	1 if `` Farm is specialized in livestock ``	*Dummy*	yes = 21.5%	-
X_8	*dev_plan*	1 if "Business Development Plan is present"	*Dummy*	yes = 57.3%	-
X_9	*fam_lab*	Percentage of family labour on total labour force (AWU)	*%*	78.7	30.16
X_{10}	*acc_serv*	1 if "Accountancy services re used"	*%*	yes = 4.9%	-
X_{11}	*ir_uaa*	Percentage of irrigated UAA	*%*	19.3	33.14
X_{12}	*assoc*	1 if "Farmer is a member of an association or social network"	*Dummy*	yes = 79.4%	-
		Location			
X_{13}	*alt* [(a)]	The farm's height asl	*Mt.*	355.6	272.19
X_{14}	*south* [(a)]	1 if "farm is located in South Italy "	*Dummy*	yes = 50.5 %	-
X_{15}	*urb_rur* [(a)]	1 if "farm is located in an urban area"	*Dummy*	yes = 28.9 %	-

Source: (a) INEA - Italian FADN, 2006 (b) ISTAT - Census Data, 2004

4 Results

Estimation was carried out in Stata. To estimate the TVP model, we used the *mvprobit* command coded by Cappellari and Jenkins (2003). The multivariate probit model was estimated with the simulated maximum likelihood (SML) method using a smooth recursive simulator, known as the GHK simulator, to evaluate multivariate Normal probabilities.

Although the specific details of this algorithm are omitted here, see Train (2003, p. 126–37), Greene (2003, p. 932–33) and the references cited therein for further elucidation.
The empirical results obtained from the multivariate probit model estimation are summarised in Table 2. The model's goodness of fit is assessed using the *chi square* test. Our results show that in the equations related to the three strategies, different influences of the independent variables are significant. For example, *policy-seeking* is more influenced by the location of farmers in different contexts.
In particular, the variables that appear to affect the adoption of such a strategy are altitude (*alt*), in positive fashion, and location in southern Italy (*south*) and urban zones (*urb_rur*) negatively. The only other variable that appears to increase the probability of adopting this strategy is the farm's use of advanced business management services such as *accountancy services* (*acc_serv*).

Table 2. Estimates of the MVP: Value creation strategies of Italian organic farms

Log likelihood = -1581.3114 Wald chi2(45) = 260.87
Prob > chi2 = 0.0000

	Policy-seeking (Y_1 = POL)			Direct marketing (Y_2 = DMK)			Processing (Y_3 = PROC)		
Coefficients	*Estimates*	*t-ratio*		*Estimates*	*t-ratio*		*Estimates*	*t-ratio*	
intercept	-0.49179	-1.69	*						
age				0.00621	1.82	*	0.00905	2.70	***
suc				0.49986	2.53	**	0.61918	2.87	***
size									
arab				-0.64124	-4.81	***	-0.39347	-2.94	***
hort							-1.0890	-1.79	***
lives				-0.92462	-6.68	***	-0.57866	-4.32	***
dev_plan				0.15635	1.67	*	0.23164	2.53	**
fam_lab				-0.00405	-2.55	**			
acc_serv	0.40391	1.98	**						
ir_uaa				-0.01249	-8.15	***	-0.00555	-3.81	***
assoc							0.24030	2.30	**
alt [(a)]	0.00060	3.23	***						
south [(a)]	-0.27357	-2.77	***						
urb_rur [(a)]	-0.32169	-3.12	***						
No. observations	981								

(***) (**) (*) denotes statistical significance at the (1) (5) (10) per cent significance levels
Source: estimation based on INEA – Italian FADN 2006

By contrast, we obtained different results for *direct marketing* and *processing* strategies. In such cases, the probability of adopting such development and diversification paths is increased in the case of entrepreneurs who are no longer young, but who have a successor in the business and an already established business growth plan. However, as regards the production system, given the negative influence shown by arable crops, livestock and horticulture (non-significant variable in the case of *direct marketing* strategy), permanent crops would appear to increase the probability of having firms that process products or that have chosen the short-chain as a come commercial policy.
Direct marketing strategy differs from *processing* strategy only in the negative influence of the proportion of family work to the total. By contrast, a *processing* strategy appears to be favoured by a firm belonging to associations. For both strategies in question, the elements linked to farm location do not appear to affect strategic choices. Differentiation found

between firms with regard to development and diversification paths monitored emerges even more clearly from the matrix of correlations estimated between the various alternatives (Table 3).

Table 3. Correlation coefficient between the equations

Pair	correlation	t-value	P|[z]|>Z	
Policy-seeking/Direct mkt ($\rho_{Pol/Dmkt}$)	0.11	2.10	**	Likelihood ratio test of
Direct mkt/Processing ($\rho_{Dmkt/Pro}$)	0.74	22.07	***	$\rho_{Pol/Dmkt}= \rho_{Dmkt/Pro} =\rho_{Pol/Pro} = 0$
Policy-seeking/Processing ($\rho_{Pol/Pro}$)	n. s.	n. s.	n. s.	chi2(3) = 225.694 Prob > chi2 = 0.0000

(***) (**) denotes statistical significance at the (1) (5) per cent significance levels
Source: estimation based on INEA – Italian FADN 2006

The correlation coefficients between *policy seeking* and *direct marketing* and *direct marketing* and *processing* are positive and significant, indicating that the strategies are positively correlated. By contrast, *policy seeking* and *processing* show no correlation. In brief, our results would appear to indicate little or no relation between taking part in agricultural policy measures implemented by the European Union to support the organic sector and the choice to differentiate the farm's business through new forms of marketing or through processing of the product.

5 Discussion and conclusions

Our results would indicate, first of all, that Italian organic farms are choosing different development paths. Firstly, the choice to process the product (67.7% of the sample) and use of short-chain sales strategies (44.2% of the sample) appear those most widely adopted, in contrast to the scant participation in agrarian policy interventions such as those Rural Development Plans (22.7% of the sample). The hypothesis that there are two different groups of entrepreneurs is further strengthened both by the variables that affect the propensity to adopt various strategies to different extents and by the apparent correlation between the various development paths. As regards the first point, application of MVP showed an influence on the choice of *policy-seeking* strategy only from variables linked to geographical location and altitude of the farms concerned. Judging from the signs of the various coefficients, these farms would appear to be situated in upland areas, are not part of what is nowadays termed periurban farming and belong to regions outside the south.
However, as regards direct marketing and processing, the variables that affect such choices are connected both with the farm's *life-cycle* and its production type. Entrepreneurs falling in this group are those who are no longer young but have succession guaranteed, with farms growing permanent crops and which belong to associations. Furthermore, while such strategies seem highly positively correlated, *policy seeking* shows a low positive correlation with *direct marketing*.
The results of the econometric model together with exploratory statistics of the sample would appear to show the existence of a group of organic producers who follow, regardless of EU interventions, what the "market" is dictating to farms producing quality goods. A short chain to ensure traceability, food safety and health, and low prices combined with product processing so as to diversify, increase out-of-season supply as well as reduce perishability,

would appear to be choices often made jointly by strongly market-oriented entrepreneurs. The same cannot be said for the segment which views the search for public intervention as the only strategy to follow.

Among the various motivations underlying these results could be the fact that EU policy in favour of the organic segment has, up till now, almost exclusively addressed supply. Little or nothing has been done to develop and inform demand for organic products. In such circumstances, farms that concentrate their development lines on new forms of marketing and new segments meet little response insofar as the same is supplied by Rural Development Plans.

The results could be helpful to implement guidelines for public and private interventions in the next CAP programming period. Allowing for diverse farmers' goals and their impact on the choice of farming method and strategies is important in a modern competitive scenario (Darnhofer, 2005).

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