Explaining quality differences at the procurement stage

in the Polish milk sector

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Abstract: The challenge of implementing EU quality and safety standards for food production and trading is one of the driving forces behind the restructuring of the agro-food chains in Central and Eastern European Countries (CEEC). The progress made in the compliance process not only varies amongst sectors and countries, but also among particular chains due to differences in their internal structure and strategies, and features of their political and economic surroundings. We construct a models to identify determinants of the diffusion rate of standards in a food chain under pre-accession conditions. We argue that adoption decisions in the food chain are determined by farmers' and processors' economic considerations. Factors such as pricing behavior, compliance costs and market structure, all of which influence the adoption of standards, are identified and discussed in the paper. The findings are used to test an econometric model utilizing data on Polish milk processing firms in the period between 2000 and 2003. The results indicate that input and output prices have a significant influence on the diffusion rate of standards. The dominance of large-scale holdings in the relevant procurement market significantly increases, whereas high compliance costs decrease the diffusion. Small cooperatives were found to face significant problems in procuring high quality raw materials compared to their competitors. The findings seem to be relevant for pre-accession countries (Bulgaria, Romania) currently facing structural problems in the animal sector that are similar to Poland's prior to its accession to the European Union.

Keywords: product quality, standards, EU enlargement, industrial organization.

1. Introduction

Economic transition in Eastern Europe has caused immense structural changes at all stages of the agri-food chains. Additionally, EU-membership stipulations required the applicant countries to fulfill the Copenhagen criteria, which include the adoption of the *acquis* *communautaire*. For food chains, this means that all mandatory EU standards concerning food production, processing and retailing have to be met by the day of accession or after a fixed transitional period. Especially in structurally weak countries, the compliance process is relatively slow (see Berkum, 2005; Dries 2004; Pieniadz et al. 2003).

Compliance with quality requirements is a problem in production as well as in procurement in the animal sector. However, the procurement stage in the dairy chain is considered to be particularly sensitive with regard to the diffusion of quality standards (Hockmann and Pieniadz, 2005). A strong incentive to comply at this stage results from the fact that after a granted transitional period, only high quality raw material may be accepted by the processors (i.e., at least extra-class of raw milk after 2007 in Poland and after 2009 in Bulgaria and Romania). However, as early as the beginning of the 2000s, there was a high variation of input quality amongst the different dairy chains in the abovementioned countries. In 2001 Poland, for example, the market share of extra-class milk in procured milk varied between 20% and 90% (Boss 2004).

The aim of this paper is to identify determinants of the diffusion rate of standards amongst the milk processing chains under pre-accession conditions. In the theoretical section of this paper, we will identify the factors by using a simple diffusion model. Based on theoretical considerations, an empirical model is constructed to test the hypothesis using data from the Polish dairy sector.

2. Theoretical considerations[1]

2.1. Basic assumption

Farmers deliver raw material with different qualities to a processor. Manufacturing a high quality consumer good requires a minimum quality of a raw material (q_{min})[2]. If the quality is below q_{min}, the stability of the final products cannot be guaranteed, because undesirable attributes of the raw material (sensory, microbiological attributes) and problems in the processing stage result in the inferior quality of the final products. The prices of high and low quality products are w_h and w_l, respectively, with $w_h \geq w_l$.

Prices received by the farmers are correlated with product quality. High quality raw materials are remunerated by v_h, while the price for low quality raw material is v_l, with $v_h \geq v_l$. Corresponding to the choice of *production techniques*, the farmer can be of two different types: low (t_l) or high (t_h) quality producers. The distribution of raw product quality differs with respect to the applied technique. We assume that technique t_h stochastically dominates t_l to the first order, i.e., $\Phi_h(q) < \Phi_l(q)$, $\forall q$. In addition, we assume that the choice of q_{min} does not allow an exact identification of the production technique, i.e., $\Phi_h(q_{min}) > 0$ and $\Phi_l(q_{min}) < 1$.

Technique t_h requires additional resources or compliance costs (k) such as special animal feed, additional sanitary measures, and investment in building and equipment. We do not distinguish between fixed and variable costs and assume for simplicity that these costs are

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1 Our theoretical part is based on Gutkind and Zilberman (1985).

2 In the following, we use the terms "standards" and "minimal quality" as synonyms. In general, quality has to be characterized in a multidimensional fashion. See for instance Rosen (1974). In order to keep the theoretical consideration as simple as possible, we assume that quality is a one-dimensional variable.

constant for a farmer. Thus, the additional average cost of technique t_h decreases with an increase in the amount of raw material production (x). We make the simplifying assumption that compliance costs are the same for all agents. Thus, farmers differ only with respect to the scale of production.

Because of higher value added, the processor has an incentive to specialize in high quality production. This requires farmers to deliver the corresponding quality of the raw material, which in turn requires a sufficient remuneration of the resources allocated to agricultural production. In the following we assume that, except v_h, all prices are given by market structure. Thus, v_h is the only decision variable to affect farmers' behavior. After the processor has announced v_h farmers decide to adopt or not to adopt production technique t_h. We assume that there is a marginal farmer (x*), who is indifferent between adoption or non-adoption. Since adoption costs decrease with farm size, those with higher production than x* will, by definition, be located in the group of high quality raw material producers, while smaller farms will stick to t_l.

The problem of making the optimal choice of v_h can be sought at two stages. First, the processor announces a v_h. Second, diffusion of the high quality techniques will occur according to the farm characteristics and the price of the high quality raw material. The optimal v_h is found by backward induction. The processor takes the decision of farmers into account and fixes v_h so that profits will be maximized. The price differential $w_h - w_l$ also determines the rate of diffusion of high quality production techniques.

2.2. The marginal farmer

Given all prices, a risk neutral farmer compares expected profits with and without the adoption of the high quality production technique. Under the assumptions discussed above, these are given by:

$$\mathrm{E}\pi_h = \mathrm{x}\,[(1 - \Phi_\mathrm{h})\,\mathrm{v_h} + \Phi_\mathrm{h}\,\mathrm{v_l}\,] - \mathrm{k} \;\text{ and}$$

$$\mathrm{E}\pi_l = \mathrm{x}\,[(1 - \Phi_\mathrm{l})\;\mathrm{v_h} + \Phi_\mathrm{l}\,\mathrm{v_l}\,].$$

Adoption occurs as long as $\mathrm{E}\pi_h \geq \mathrm{E}\pi_l$. The threshold is given by

$$\mathrm{x}^* = \frac{\mathrm{k}}{(\Phi_l - \Phi_h)(\mathrm{v_h} - \mathrm{v_l})}.$$

2.3. The processors decision

The processor's expected profits are given by:

$$\mathrm{E}\pi^p = (1 - \Phi_\mathrm{h})\int_{x^*}^{x_{\max}} g(x)dx(w_h - v_h) + \Phi_\mathrm{h}\int_{x^*}^{x_{\max}} g(x)dx(w_l - v_l) +$$

$$+ (1 - \Phi_\mathrm{l})\int_{x_{\min}}^{x^*} g(x)dx(w_h - v_h) + \Phi_\mathrm{l}\int_{x_{\min}}^{x^*} g(x)dx(w_l - v_l). \qquad (1)$$

Denoting sector output by $X = \int_{x_{\min}}^{x_{\max}} g(x)dx$ (1) can be transformed to

$$\mathrm{E}\pi^p = X\{(1 - F(x^*))(w_h - v_h)[(1 - \Phi_\mathrm{h}) + (1 - \Phi_\mathrm{l})] + F(x^*)(w_h - v_h)[\Phi_\mathrm{h} + \Phi_\mathrm{l}]\}, \qquad (2)$$

where F(·) is the probability distribution function of farm size, i.e., F(x*) is the share of output produced by farms smaller than x*. The first order condition is:

$$\frac{\partial \mathrm{E}\pi^p}{\partial v_h} + \frac{\partial \mathrm{E}\pi^p}{\partial x^*}\frac{\partial x^*}{\partial v_h} = 0.$$

The first term is negative and represents the loss of profits due to an increase in the price of high quality raw materials. The second term is the increase in profits because of a reduction in the threshold of adoption. Conducting the differentiation and collecting terms provides:

$$X\left[-\left(1-\Phi_{\mathrm{h}}\right)+\left(\Phi_{\mathrm{l}}-\Phi_{\mathrm{h}}\right)F(x^{*})+k\frac{\left(w_{h}-v_{h}\right)-\left(w_{l}-v_{l}\right)}{\left(w_{h}-v_{h}\right)^{2}}f(x^{*})\right]=0. \quad (3)$$

Given that the second order condition holds, the comparative statics are given by the differentiation of (3) with respect to the corresponding factor[3]. The individual effects are:

$\frac{dv_h}{d\alpha} > 0$, for α = k, v_l, w_l, Φ_l, X and $\frac{dv_h}{d\alpha} < 0$, for α = w_h, Φ_h.

In the following we will concentrate on the diffusion of the high quality production technique:

$$\frac{d\left(1-F(x^{*})\right)}{d\alpha}=-f(x^{*})\left(\frac{\partial x^{*}}{\partial\alpha}+\frac{\partial x^{*}}{\partial v_{h}}\frac{\partial v_{h}}{\partial\alpha}\right), \text{ with } \alpha = w_h, w_l, v_l, \Phi_h, \Phi_l, k, X \quad (4)$$

Conducting the indicated differentiation provides:

$\frac{d\left(1-F(x^{*})\right)}{d\alpha} < 0$, for α = k, v_l, w_l, Φ_l, X and $\frac{d\left(1-F(x^{*})\right)}{d\alpha} > 0$, for α = w_h, Φ_h.

3. Empirical implementation

Our empirical application deals with the Polish dairy sector, where compliance with quality requirements is a production as well as a procurement problem. However, our primary interest is the relationship at the procurement stage, since this stage is considered to be particularly sensitive with regard to the diffusion of quality standards.

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3 Whether the second order condition is satisfied or not depends on the shape of the distribution function. In order to eliminate this effect, we assume that the distribution of farm sizes can be approximated by a uniform distribution in the interval (x_{min}, x_{max}). In this case, the SOC is fulfilled.

3.1. Data base

Data on individual dairy processors in Poland were culled from several sources. Our main data base was provided by BOSS, Economic Information, Ltd., in Poland. The information is based on dairy processing company surveys in 2002 and 2003, and contains annual data from 2000 to 2002. Since the identity of the individual firms was known, additional information from regional statistics could be included: these are the location of each firm and its ownership status. Utilizing information about the location of a firm, a set of regional variables corresponding with the relevant market of the ith firm/chain have been compiled.

Since participation in the survey differs between years, only data from dairies with the same number of observations for all variables were used for the analysis, as required by the estimation procedure of the simultaneous equation models. These concern 38 dairies in 2000, 60 in 2001 and 50 in 2002. The three abovementioned sub-samples have been pooled, providing 148 observations. The original goal of the survey was to create a ranking of the Polish dairies. Hence, due to the voluntary participation in the ranking, it is likely that primarily firms with good business performance and prospectives are represented in the data set. The higher profit margin of the investigated sample compared to the average of the industry confirms our presumption (see Table 1, appendix).

Most of the firms are large and medium-sized companies, although firm size ranges from 40 employees up to 1,300 in the pooled survey data. The data set is dominated by cooperatives, which accounted for 93% (138) of the investigated dairies. A typical firm in the sample processes a wide spectrum of different products (drinking milk, yogurt, cheese, etc.). Thus, the sample is a good representation of the Polish dairy sector. An overview of the analyzed firms is provided in Table 1.

3.2. Parameterization

The theoretical model suggests strong interactions along the food chains, i.e., expected profits of the dairy company (π_i), diffusion of standards (Q_i) and the prices for raw materials (v_i). Because of these mutual relationships, the appropriate approach is to estimate a simultaneous equation model treating the abovementioned variables as jointly endogenous. One central variable in the diffusion model is the differential in retail prices for high and low quality products ($w_h - w_l$). Unfortunately, the data set provides only information about average regional prices (w_i). We assume superior values of w_i to be connected with a higher share of quality goods in the consumption bundles in a given regional market, and to be an outcome of a high demand for quality goods (I_i) and product differentiation in that market (DP_i). In order to account for these determinants, we incorporate a retail price equation in the model. Given the specific nature of the diffusion model, the following simultaneous equation system will be used for estimation purposes:

Processors profit: $\pi_i = \alpha_1 + \alpha_2 v_i + \alpha_3 w_i + \alpha_4 z_i + \alpha_5 DF_i + \varepsilon_{\pi, i}$

Diffusion rate of standards: $Q_i = \beta_1 + \beta_2 v_i + \beta_3 w_i + \beta_4 x_i + \beta_5 k_i + \beta_6 DF_i + \varepsilon_{q, i}$

Producer prices: $v_i = \varphi_1 + \varphi_2 w_i + \varphi_3 x_i + \varphi_4 k_i + \varepsilon_{v, i}$

Retail prices: $w_i = \gamma_1 + \gamma_1 I_i + \gamma_2 DR_i + \varepsilon_{w, i}$,

with z_i denoting the total quantity of raw material of extra class milk procured by the *ith* firm and DF_i firms' specific strategy. The variable x_i represents average farm size, and k_i the compliance costs in the i*th* region. The definition and descriptive statistics of all variables used are reported in Table 2, appendix. However, some additional explanation might be useful:

Processors profit: Profits π are approximated by earnings before interest and taxes (EBIT). This variable is an adequate indicator of a company's financial performance, since it allows a comparison amongst heterogeneous firms omitting the effects of firm-specific financing and accounting decisions. With regard to the equation for principal profits, we expect a negative sign by α_2 and positive sign by α_3 and α_4. Depending on the firm-specific strategy, different effects of *DF* can be expected. Thus, the variable *DF* was approximated by a firm-specific dummy variable indicating different ownership structures. There is evidence suggesting private firms perform better than cooperatives. Additionally, large cooperatives are more likely to face financial disadvantages due to their complex governance structures compared to their smaller competitors (Fulton, 2001). To analyze the effects of the ownership structure, we differentiate among the private dairies and cooperatives of different sizes in further analysis. Information on the ownership structure was coded in three binary dummy variables, one of them indicates private firms (PRIV). We use two dummy variables for small (*COSM*) and large (*COLG*) cooperatives and do not take into account intermediate co-ops (procuring between 35 and 75 m liter raw milk p.a.). We do not differentiate between private firms of different size since there were only 10 observations on private dairies in the sample. The expected sequence of the estimates is $\alpha_{PRIV} > \alpha_{COSM} > \alpha_{COLG}$.

Diffusion rate of standards: There is a strong correlation between the diffusion rate of the EU standards and the (microbiological) quality of raw milk (Hockmann and Pieniadz 2005). Hence, diffusion (*Q*) is captured by the degree of compliance with EU-standards within the dairy companies. The dependent variable is defined as a share of the “extra” class raw milk in the total milk procurement of the ith milk-processing firm. According to our theoretical model, we assume that β_2, β_3, and β_4 are greater and β_5 lower than zero.

Thus, the higher w, r, and x are, the higher the diffusion rate of quality standards is. Due to the lack of a more appropriate measure, we proxy the compliance costs, *k*, by an index based on draft force resources in agriculture. We assume a high share of living horsepower in the total draft force resources (living, mechanical horse power) to be an indicator of a general outdated production technique in a considered region. An obstacle technique requires additional investments and increases compliance costs. Since higher compliance costs are associated with a lower diffusion rate, we still expect a negative influence of this variable on the quality of procured milk. There are no *a priori* assumptions about the influence of the ownership structure on the diffusion rate of standards. However, it is likely that due to their member commitment, agents delivering to a cooperative have some additional motivation to adopt standards. On the other hand, private dairies have more freedom to select high quality producers, which would suggest a higher diffusion rate as far as private firm as integrators are considered.

Producer prices: In the theoretical part we assume the optimal producer price to be found by backward induction, i.e., after the processor has calculated his profit. Thus, inherently, *v* can be seen as a function of *x*, *w* and *k*. We expect φ_2 and φ_3 to be positive and φ_4 to be negative.

Retail prices: With regard to the retail price equation, demand for high quality products (*I*) has been approximated by the disposal income of the consumer in the vicinity of the ith dairy. According to Engel's curve, there is a positive correlation between quantity demanded for quality products and the consumer's income. Thus, we can expect an increase in final prices as the consumer's income level (*I*) grows. Since there is a positive correlation between the average price and the average quality level in a market, we presume regions with a higher level of foreign investments to feature higher quality and hence average price for the final product. Thus, the average prices for the final product should differ as far as c.p. regions with and without FDI in the dairy sector are considered. This information has been coded in the corresponding dummy variable *DP*. We expect a positive effect of *DP* on the average retail price.

3.3. Estimation and inference

The 3SLS model was estimated using pooled survey data from the three sub-samples in the years 2000 –2002.[4] The estimation results are reported in Table 3, appendix. The high significance of the F-test indicates joint significance and confirms the relevance of the variable used in the model. In principle, our hypothesis regarding the impact of the individual variables on the endogenous variables cannot be rejected. All estimated coefficients yielded the expected sign and are highly significant in most cases. Nevertheless, the ownership structure, which was supposed to have an ambiguous effect, especially on the diffusion rate, requires additional comments.

Cooperatives seem to face different problems as far as different firm size is considered. The estimated coefficients and significance levels suggest that small co-ops have a negative effect on the diffusion rate of standards at the procurement stage. Among the large cooperatives, as well as private dairies, no significant influence of the ownership on the diffusion rate could be found. This suggests that milk chains with a small cooperative as an integrator face more problems when procuring high quality raw milk. One explanation could be that small co-ops included in the investigated sample are mainly located in highly competitive regions where a high number of dairies must share the

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4 The computer package LIMDEP was used to estimate the model parameters. The form of the model was established based on theory and empirical testing for best fit. For the estimation procedure see Greene (2005).

relevant procurement market. Small co-ops are likely to have lower purchasing power, and hence to lose the high quality producers. However, purchasing relatively poor-quality inputs seems not to affect the performance of the small cooperatives, as suggest by the estimated coefficient in the profit-equation. Thus, while large cooperatives appear to suffer from considerable inefficiencies, small co-ops are more likely to focus on a core set of activities and did relatively well in the investigated period.

Despite the high significance of the individual estimates, our analysis may appear limited due to the low explanatory power, as indicated by the respective R^2 values. Especially the variables used in the diffusion-equation gives a value of 0.29, which appears to be an unimpressive value of the model fit. One of the reasons could be the omission of important variables in our theoretical and empirical model, i.e., the competition amongst the firms. We can also follow the low explanatory power in such a way that our approximations are rather rough and in some cases may not be well-suited for capturing the effect as provided by the theoretical model. On the other hand, we argue that the low explanatory power of our empirical model is something we have expected, since we applied average regional prices and a regional proxy for compliance costs. Furthermore, we consider the group of farmers delivering to the ith dairy to be one decision-maker (agent). However, the decision regarding the adoption of standards set by the purchaser is not a joint decision of the group of farmers delivering to the ith firm. Due to the lack of appropriate data we could not account for all individual negotiations among the milk producers and the milk processing firm (i.e., producer-specific payments, vertical relationships, agreements).

4. Conclusions

Our main interest was to analyze the diffusion of the EU-quality standards in the Polish dairy chains. To take account for the interdependencies along the dairy chain, we estimated a multiple equations model (3SLS) treating diffusion rate, processors profit, producer and retail price as endogenous variables. The results confirm the theoretical findings and suggest, first of all, that the adoption of standards is an economic activity guided by producers' and processors' cost and benefits calculations. Hence, the farmer will improve a production technique in order to comply with standards only if the purchasers distinguish among the high and low quality producers and are able to remunerate their additional efforts towards higher quality. For the processing firm, a separating solution also seems to be a superior one, especially if an increasing demand for high quality consumer products exists.

With regard to mandatory quality standards, farmers have to accomplish the necessary upgrading by the expire date of the transitional period or they have to renounce deliveries to the market - or even production - altogether. Since there is a natural tendency to postpone the decision to adopt, the full compliance will occur only if the agents have no other alternatives. The farmer's decision towards compliance before the deadline depends on the evolution of costs and benefits over time. Our result suggests that an increase in the price for high quality material fosters adoption, and the same holds for a decrease in compliance costs. The empirical analysis also provides evidence that a dominance of large-scale holdings in the relevant procurement market significantly increases diffusion. Since Poland faces considerable structural problems in animal production, one opportunity to push forward the diffusion rate of standards, and hence the efficiency of the dairy chain, is to increase horizontal integration on the agricultural level. These factors can also be of relevance for other pre-accession countries with a dominance of small-scale holdings, such as Bulgaria and Romania.

The empirical results confirm that the processor should have an incentive to specialize in high quality production since procuring high quality raw materials is c.p. positively correlated with the achieved profits. More subtly, however, the achievement of positive profits in the large cooperatives is very likely to be hampered by their considerable inefficiencies due to the complexity and low transparency of governance structures. Thus, depending on ownership status, the performance of the milk processing firms would likely also differ in the future. In addition, it is evident that large cooperatives may even have more competitive disadvantages in the dairy market in the future, while their performance enhancements will be hampered by more efficient private firms in the enlarged European Union.

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Table 1: Relevance of the investigated sample

	Employees		Revenue		NPM	
	Sample in 1000	Share in the dairy industry	Sample million USD	Share in the dairy industry	Sample	Dairy industry
2000	12.4	25%	792.7	32%	0.79	0.10
2001	17.5	36%	1496.9	50%	1.98	0.04
2002	14.7	32%	1318.4	47%	2.17	0.45

Sources: BOSS (2004), IERiGZ (var. issues), GUS (var. issues b).

Note: NPM: Net Profit Margins: A ratio of profitability calculated as net earnings divided by revenues.

Table 2: Definition and descriptive statistics of variable used

Symbol	Definition	Mean (SD)	Minimum Maximum
Q	Share of “extra” class raw milk in the total milk procurement of the ith dairy	0.637 (0.170)	0.195 0.910
π	Firm-specific earnings before interest and taxes in m PLN p.a., deflated by inflation rate	2.728 (13.841)	-1.739 121.161
v	Average procurement price for raw milk in a region, deflated by the country average in the respected year	0.997 (0.065)	0.833 1.139
w	Average retail prices for drinking milk in a region, deflated by the country average in the respected year	0.997 (0.032)	0.943 1.065
x	Farm size, defined as share of farms that own more then 10 cows on the total number of dairy holdings in a region	0.080 (0.060)	0.002 0.233
k	Proxy for compliance costs in a region, defined as share of “live power" of draft horses in the total draft force resources in a region	0.036 (0.020)	0.008 0.079
z	Firm specific quantity of the procured extra-class raw milk in million liters. p.a.	47.466 (79.788)	2.803 548.073
I	Annual gross disposable income per capita in a region, deflated by the country average in the respected year	0.989 (0.181)	0.771 1.412
COSM	Dummy variable for a small cooperative: the variable is set equal to one if the firm procures less than 35 m liter raw milk p.a. and is 0 otherwise	0.466 (0.501)	0 1
COLG	Dummy variable for a large cooperative: the variable takes the value one if the firm procures more than 75 m liters. Raw milk p.a. and is 0 otherwise	0.203 (0.403)	0 1
PRIV	Dummy variable for a private dairy	0.067 (0.252)	0 1
DP	Dummy variable for product differentiation; the variable is set equal to one if there is at least one foreign dairy in the region, and is 0 otherwise	0.419 (0.495)	0 1

Source: BOSS (2004), GUS 2001, GUS 2005, GUS (var. issues a), internet research, telephone survey.

Note: Number of observations: 148.

Table 3: 3SLS estimates of diffusion model for the Polish dairy sector

Explanatory Variable	Symbol	Dependent Variable			
		Profit	Diffusion	Proc. price	Retail price
		π	Q	v	w
		Coefficient (SD)	Coefficient (SD)	Coefficient (SD)	Coefficient (SD)
Constant		6.671 (29.471)	- 1.488*** (29.471)	1.100*** (0.142)	0.919*** (0.011)
Procured quantity of extra-class milk	z	0.160*** (0.009)	–	–	–
Procurement price	v	- 61.771*** (10.717)	0.540** (0.237)	–	–
Retail price	w	50.475** 22.496)	1.513*** (0.475)	0.159 (0.144)	–
Small cooperative	COSM	2.566* (1.393)	- 0.092*** (0.027)	–	–
Large cooperative	COLG	10.024*** (1.832)	0.005 (0.033)	–	–
Private dairy	PRIV	8.336*** (2.629)	- 0.018 (0.049)	–	–
Farm size	x	–	0.941*** (0.239)	0.508*** (0.066)	–
Compliance costs	k	–	1.215** (0.611)	- 0.399** (0.198)	–
Consumer income	I	–	–	–	0.069*** (0.012)
Product differentiation	DP	–	–	–	0.021*** (0.004)
R^2		0.70	0.29	0.38	0.40
DW		1.95	2.35	2.02	1.78
F-statistic		53.56 [6,141]***	8.02 [7,140]***	29.14 [3,144]***	48.39 [2,145]***

Note: ***, **, * indicate that the effect of a variable is significant at the 1, 5 or 10 percent level, respectively.