The value of direct farmers-consumers relationships as determinants of consumers' purchase choices

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Paper prepared for presentation at the EAAE-AAEA Joint Seminar
'Consumer Behavior in a Changing World: Food, Culture, Society"

March 25 to 27, 2015
Naples, Italy

The value of direct farmers-consumers relationships as determinants of consumers' purchase choices[1]

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Abstract :

In this paper we estimate the economic value of the relational good. i.e., the value consumers attach to the personal relationship when buying directly from a particular farmer. This is motivated by the importance of such personal relationships within Alternative Food Networks. The theoretical setting for the choice of a particular vendor is presented. The value of the relational good for consumers buying directly from farmers in open-air markets in Torino (Italy) is estimated with stated preferences techniques. The results suggest that consumers attach a non-negligible value to the relationship, i.e., 16 percent of their expenditure for fruits and vegetables.

Keywords: relational goods, stated preferences, direct sales, alternative food networks

JEL codes: D3, D4, Q13, Z13

1. Introduction

Personal relationships are pervasive in everyday life. They shape most of people's and behavior life in many respects. However, they remained out of the scope of economic research for a long time. But increasingly, economics has dealt with various facets of human behavior implying interpersonal relationships, leading to a growing recognition that they play a role even in economic life. The role of interpersonal relationship has been theorized as the production of relational goods (Uhlaner, 1989; Gui, 2000; Gui and Stanca, 2010). In particular, Gui (2005) views "interpersonal events as 'encounters': peculiar productive processes that employ various

[1] This paper is part of the research project "Alternative Food Networks: An Interdisciplinary Assessment" (AFNIA) funded by the University of Torino and Compagnia San Paolo - Progetti d'Ateneo. We gratefully acknowledge their financial support. We are also grateful to Vincenzo Iacomo for excellent research assistance.

types of resources contributed by interacting parties (human resources, above all), and that deliver not only conventional outputs (…) but also relational outputs." (Gui and Stanca, 2010).

Though a stream of research investigated the relationship between relational goods and happiness, to the best of our knowledge the issue of measuring the value people attach to relational goods has not been explored so far. Measuring the value of relational goods is relevant for understanding how, and how much, basic economic activities can be influenced by personal relationships. In this paper, we intend to estimate the value that consumers attach to personal relationships in a basic economic activity, food purchase.

Estimating the economic value consumers attach to the particular relationship with specific farmers helps understanding how consumers' actual behavior can deviate from purely self-interested rational considerations, meaning by that considerations that only take into account the purchased good in itself, and not the framework in which it is purchased. We would also like to stress that, though the value of relational good is measured in monetary terms, it does not mean that it can be purchased. By their very nature, relational goods cannot be purchased. The money value of the relational good we estimate is simply a measure of consumers' preferences, where money is the unit of measurement. This is analogous to the valuation of environmental goods, for which estimating a money value does not imply that they are for sale.

More specifically, the relational good we analyze is the one created between consumers and farmers in a situation of direct sales. Farmers' direct sales to consumers are considered one among the Alternative Food Networks (AFNs), i.e., those marketing chains that, unlike conventional ones, create a direct relationship between consumers and producers, and/or embed consumers in the territory and in the local productive fabric.

In the economic literature, the concept of Alternative Food Network is linked to the issue of the farmers' choice of the marketing channel and, on the other side, on the symbolic value of food products (local, traditional, etc.) for consumers, and on their choice of where to purchase. We intend to investigate the latter issue.

The economic literature dealing with consumers' preferences generally focus on the factors influencing the choice of purchasing from farmers' markets (FMs). Many studies provide insight into significant motivations and behavioral characteristics of those consumers who purchase local foods at FMs. Different methodological approaches are used in order to identify groups of consumers with different characteristics both in term of socio-economic descriptive variables and in term of attitudes or motivations towards FMs, e.g. quality of products, interest for local food, direct contact with farmers, convenience, environmental sustainability, support for rural development processes etc. (Gumirakiza *et al.* 2014, Jefferson-Moore *et al.* 2013, Neill

et al. 2014, Rocchi *et al.* 2010). Conversely, some research investigates how attending FMs may affect consumers' willingness to change food habits toward high-quality products (Pascucci *et al.* 2011). In some cases, the analysis is performed for different types of direct marketing facility (e.g. pick-your-own farms, roadside stands, FMs, and direct farm markets) in order to characterise farmer-to-consumer market segments having different needs, wants or demand characteristics (Govindasamy and Nayga 1997, Onianwa *et al.* 2005). Other studies analyse the key factors affecting the frequency of consumer visits to FMs (i.e. consumer factors, market factors, and socio-demographic characteristics) or the associations between local food purchasing from FMs and diet-related outcomes (Abelló *et al.* 2014, Minaker *et al.* 2014, Thapaliya *et al.* 2015).

Another stream of research is devoted to estimating WTP for product characteristics (e.g., organic, local, labeled, etc.). Some papers simply investigate the issue with consumers attending farmers' markets (Chang et al., 2013; Curtis et al., 2014). Other include being sold at farmers' markets as a characteristic of the good (Carroll et al., 2013; Onken et al., 2011). Though, they do not distinguish among different motivations for purchasing at farmers' markets: they may include the price, actual or presumed quality of the produce, symbolic value from purchasing from farmers or of local product, trust in the vendor, along with the motivation of our interest, the personal relationship with the farmer, i.e., the relational good. The role of relational goods in agricultural production has been recently analyzed by Rocchi (2013), but only in qualitative terms. Our contribution is the attempt to quantify the relevance of this determinant for purchasing choices.

The structure of the paper is as follows. First, we present the theoretical framework of the issue, and the econometric strategy we follow. Next, we give a description of the data employed in the empirical exercise, and we present the results. Some conclusions follow.

2. Theoretical approach and econometric strategy

We are interested in the value of a relational good stemming from a commercial transaction between farmers and consumers. For consumers, we can assert that a relational good connected with the transaction has been produced if the utility the consumer obtains from the transaction is greater when performed with a specific farmer. Therefore, for a consumer optimally choosing his/her bundle of goods X for a price vector p_1:

$$U(X,\alpha_0,Y) < U(X,\alpha_1,Y) \quad (1)$$

where X is a vector of desired quantities of n goods composing the bundle, Y is the consumer's income less the expenditure on X goods, α_1 is the level of the relational good connected with the purchase and α_0 indicates the absence of the relational good, i.e., the utility obtained by the purchase of the goods from another seller with whom he/she has no personal relationship.

Assume the consumer has chosen his/her optimal bundle of goods X for a price vector p_1 when enjoying the relational good α_1. Call C the consumer's characteristics that can affect his/her utility. The problem is measuring the value of the loss of the relational good, i.e., a change to α_0. Under the assumption that the consumer does not change the optimal bundle in absence of a relational good, there will exist a price vector p_2 such that:

$$U_1(X, \alpha_0, C, Y|p_2) = U_1(X, \alpha_1, C, Y|p_1) \quad (2)$$

This implies that when no value is attached to the relational good, $p_2 = p_1$. Assume the consumer is given the alternative of buying the same quantities at lower prices p_{bid}, but not enjoying the relational good ($\alpha = \alpha_0$). He/she will accept this alternative if:

$$U_1(X, \alpha_1, C, Y) < U_2(X, \alpha_0, C, Y+(p_1 - p_{bid})X) \quad (3)$$

In terms of the indirect utility function, the alternative will be accepted if:

$$v_1(p_1, \alpha_1, C, Y) < v_2(p_2, \alpha_0, C, Y+(p_1 - p_{bid})X) \quad (4)$$

To implement an empirical analysis, following the random utility theory (McFadden 1974 and 1976), it is assumed that the indirect utility functions are composed by systematic component functions of observable variables, and by random components, known by the consumer but not by the researcher. The above equation can then be written as:

$$v_1(p_1, \alpha_1, C, Y) + \varepsilon_1 < v_2(p_2, \alpha_0, C, Y+(p_1 - p_{bid})X) + \varepsilon_2 \quad (5)$$

Hence, the probability that a consumer is willing to accept a lower price p_2 for giving up the relational good is:

$$\text{prob(acceptance)} = \text{prob}\{v_2(p_2, \alpha_0, C, Y+(p_1 - p_{bid})X) - v_1(p_1, \alpha_1, C, Y) > \varepsilon_1 - \varepsilon_2\} \quad (6)$$

Assuming a functional form for the utility functions and a distribution for $\mu = \varepsilon_1 - \varepsilon_2$, the probability of a positive difference can be estimated by maximum likelihood techniques.

Different functional forms have been used in the related literature of environmental goods evaluation. We used a logarithmic form implying non-negativity and decreasing marginal utility of income:

$$U_1 = \alpha_1 + \beta \ln Y + \gamma C + \varepsilon_1 \quad (7)$$

$$U_2 = \beta \ln[Y + (p_1 - p_{bid})X] + \gamma C + \varepsilon_2 \quad (8)$$

Hence, the change in utility from the present situation to the prospected one is:

$$\Delta U = -\alpha_1 + \beta \ln[1 + (p_1 - p_{bid})X/Y] + \mu \quad (9)$$

where $\mu = \varepsilon_2 - \varepsilon_1$. Assuming a normal distribution for μ, the probability that a consumer accepts the prospected discount is:

$$\text{Prob(acceptance)} = \text{Prob}[-\alpha_1 + \beta \ln[1 + (p_1 - p_{bid})X/Y] + \mu > 0] =$$
$$= \Phi_\mu[-\alpha_1 + \beta[1 + (p_1 - p_{bid})X/Y] \quad (10)$$

where Φ is the standard cumulative density function.

This approach is similar to the utility difference model used in contingent valuation of environmental goods and emphasized by Hanemann (1984). Alternatively, using the valuation function approach (this is similar to the approach in environmental valuation proposed first by Cameron, 1988)[2], the value of the relational good can be estimated considering the expenditure function. Call again p_2 the price vector such that:

$$U_1(X, \alpha_0, Y|p_2) = U_1(X, \alpha_1, C, Y|p_1) \quad (11)$$

so that the relevant indirect utilities are equal:

$$v_1(p_1, \alpha_1, C, Y) = v_1(p_2, \alpha_0, C, Y) \quad (12)$$

Call v_0 the indirect utility that can be reached with prices p_1 and no relational good, $v_0 = v_0(p_1, \alpha_0, C, Y)$. Since $v_1(p_1, \alpha_1, C, Y) = v_1(p_2, \alpha_0, C, Y)$, the value of the utility due to the existence of the relational good can then be assessed by comparing the indirect utility with the reduced price and no relational good v_1 to the indirect utility with the original price and no

[2]The two approaches are theoretically consistent, as to each utility difference function corresponds a valuation function, and vice versa (Hanemann and Kanninen, 2001)

relational good $v_0(p_1, \alpha_0, C, Y)$. It is the willingness-to-accept the prospected change and can be measured by the difference D between the values of the relevant expenditure functions:

$$\begin{aligned} D &= e(p_1, \alpha_1, C, v_1) - e(p_1, \alpha_0, C, v_0) \\ &= e(p_2, \alpha_0, C, v_1) - e(p_1, \alpha_0, C, v_0) \\ &= D(p_1, p_2, \alpha_0, C, v_1, v_0) \end{aligned} \quad (13)$$

This implies that when no value is attached to the relational good, the difference is nil. Following again the random utility theory (McFadden 1974 and 1976), and attaching a random component to the expenditure functions, the above equation can be written as:

$$D = [e(p_2, \alpha_0, C, v_1) + \varepsilon_2] - [e(p_1, \alpha_0, C, v_0) + \varepsilon_1] \quad (14)$$

Hence, the probability that a consumer is willing to accept a lower price p_{bid} for giving up the relational good is:

$$\begin{aligned} \text{Prob(acceptance)} &= \text{Prob}(D>0) = \text{Prob}\,[e(p_{bid}, \alpha_0, C, v_1) - e(p_1, \alpha_0, C, v_0)] > \varepsilon_2 - \varepsilon_1] = \\ &= \text{Prob}[D(p_1, p_2, \alpha, C, v_1, v_0) > \mu] \end{aligned} \quad (15)$$

Assuming a functional form for the deterministic part and a distribution for $\mu = \varepsilon_2 - \varepsilon_1$, the probability of a positive difference can be estimated by maximum likelihood techniques. More precisely, the functional form that has been assumed for the willingness-to-accept function is:

$$WTA = Xb + \varepsilon \quad (16)$$

where X is a vector of personal characteristics of consumers, including income, and ε a random term. The probability that a consumer accepts a prospected discount *d* is:

$$\begin{aligned} \text{Prob(acceptance)} &= \text{Prob}[d - Xb + \varepsilon > 0] = \text{Prob}[d - Xb > -\varepsilon\,] = \\ &= \Phi_\varepsilon[-(d - Xb)] \end{aligned} \quad (17)$$

where Φ is the standard cumulative density function.

3. Data

The empirical analysis is based on a survey among consumers in Torino (Italy) conducted in 2014. The sample was drawn with a two-stage random sampling methodology. The primary sampling units were the urban open-air markets in town where farmers sell their products.

Farmers selling in city markets are a long tradition, and the law grants to farmers the right to sell directly their products. In Torino, according to city statistics, there are farmers selling directly in 28 open-air markets, in a number ranging from 1 to 13, except for a particular market (the largest in town) where they are 88.

Therefore, as a first step, individual markets were divided in 3 strata according to the number of farmers selling at the markets, plus the market with 88 farmers. The strata were 1-4, 5-8, 9-13 farmers. In each stratum, 5, 4 and 3 specific markets were randomly drawn.

In each market, consumers to be interviewed were chosen at random. Interviewers were instructed to place themselves at different places of the market and to choose a passer-by every *n* ones, where *n* was a number (usually 5, but lower in small markets). Interviews were distributed in different days of the week and in different hours.

Since the objective was to estimate the value of the direct relationship between consumers and producers, consumers were interviewed only if they were likely to be regular customers in the particular market. Thus, the questionnaire started with a filter question asking if the respondents shopped regularly in that particular market. If so, after some general questions on purchasing habits, they were asked if they bought fruits and vegetables from farmers. Only those who usually bought most or part of these products from farmers were asked the elicitation question. Using a closed-ended format, they were asked whether, given the possibility of finding exactly the same products as those they bought most frequently from a farmer at a lower price from another farmer, they would still buy from their favorite farmer or from the other one. The specification "exactly the same products from another farmer" was intended for getting rid of reasons other than the relational good and the price. In particular, we wanted to avoid a preference based on information provision, on trust, and on the symbolic value or the convenience of buying from farmers rather than in other points of sale. The proposed price discounts were randomly assigned. A double bounded elicitation format was employed. The first prospected price discount was randomly assigned between 10, 20 and 30 percent. The possible answers were "I would stay with my favorite farmer", "I would move to the other farmer" and "I am indifferent". Those who chose their favorite farmer were then prospected a discount of 20, 30 and 40 percent, respectively; the others a discount of 5, 10 and 20, respectively. In all cases, also an example of the absolute discount was prospected (e.g.. "A 20 percent discount means that on an expenditure of 10 Euro you would save 2 Euro").

To avoid a question order bias, six different versions of the questionnaire were randomly submitted to the respondents, each different in the ordering of the provided answers.

Finally, the questionnaire asked some socio-demographic information on the respondent.

The interviewers made personal contacts with 393 urban market customers; 54 respondents (13,7%) didn't enter the survey because they were occasional customers, 94 (23,4%) skipped the elicitation question, since they bought the larger part of fruits and vegetables from conventional market vendors. After dropping questionnaires with missing information, a final sub-sample of 207 questionnaires was employed to estimate the value of the relational good with the difference-in-utility model, while for the valuation function model, due to some missing data on personal characteristics, 200 observations were used.

Table 1 shows the descriptive statistics of the explanatory variables. The explanatory variables include respondents' socio-demographic characteristics (gender, age, education, household size, number of children under fourteen, job skill level, household income) and a dummy variable indicating whether the respondent is the family member who usually is in charge of buying fruits and vegetables. The education variable has been created transforming the education level attained in years of education, under the assumption of regular schooling. The income variable is reported both as the shares of the different income brackets and as the mean of stated income bracket, with the highest class arbitrarily truncated at 4,500 euro[3].

As expected, the socio-demographic characteristics of the sub-sample are rather different from those of the town residents as recorded by the Census data. For instance, the share of males is much lower (38% in the sample, 48% according to the Census), because females more frequently take care of buying food. The average age of the market customers (51) is higher than that of the population (45), possibly because elder people have more time for midweek shopping and market shopping during the day. Market customers are also more educated than the general population (14.5 years of education on the average as compared to 9.2 years of the city residents). It is evident that personal characteristics affect the choice of buying from farmers in an open-air market; therefore, the estimated values attached to the relational good refer to the sub-sample and inference to the general population requires to be properly modelled.

4. Results

Table 2 presents the results of the utility difference model[4]. Both coefficients are highly significant and of the expected signs. From the estimated equation, the average WTA can be recovered integrating over the relevant interval. It is important to note that WTA here is

[3] This calculation is needed for the estimation of the difference-in-utility model, where income is a continuous variable.

[4] In all models, the answer "I am indifferent" was treated as a choice of the new vendor. This leads to a conservative estimate of the WTA. Observations with inconsistent answers (indifferent both to the first and to the second discount) were dropped.

measured as $[1+(p_1 - p_{bid})X/Y]$, i.e., as the relative increase in total income resulting from the prospected change. Since the maximum discount that can be offered is 100 percent of the expenditure for fruits and vegetables, the distribution of WTA is bounded from above by, at maximum, the share of this expenditure on total income, that is not observed. Hence, different bounds have been tested. The resulting values of the WTA are presented in Table 3. They are to be interpreted in the following way: if the share of the expenditure on fruits and vegetables is 1 percent of total income, the WTA for giving up the relational good is 0.8 percent of total income, and so on. The individual shares of the expenditure for fruits and vegetables are not observed. Nevertheless, official statistical data (I.Stat) report that the average monthly expenditure for fruits and vegetables of Italian households in the region (North-West) is 3.2 percent of total expenditure. Hence, using this value as the upper bound of integration, the corresponding WTA would be 2.7 percent of total income.

The alternative econometric strategy is using the valuation function approach. Table 4 shows the relevant results. Two models were tested, one using the income variable assumed as the midpoint of the income classes, the second using dummies of the income brackets. The first columns report the estimates of function (17). It should be noted that the only significant parameter is the proposed discount, except for one income class. This implies that consumers buying from particular farmers are not affected in their WTA by individual characteristics. The second part of the table reports the WTA function that can be recovered by the former. The parameters of the WTA function are calculated dividing the relevant parameters of the estimated model by the coefficient of the prospected discount, and the standard errors are corrected as suggested by Cameron and James (1987) and Cameron (1988).

With the estimated WTA function, one can estimate the WTA of all consumers in the sample, by multiplying the matrix of the individual variables by the relevant estimated parameter vector and calculate the resulting mean and standard deviation. It should be noted that in this estimate, WTA is expressed as the percentage discount over the expenditure for fruits and vegetables, not as the percentage over income.

Since the parameters of the WTA equation are the results of the division of the parameters of the other variables by the parameter of the bid, the resulting average WTA and variability measures can be found by simulation methods (Krinsky and Robb, 1986). We randomly drew (10,000 draws) from a multivariate normal distribution with mean β (the vector of the estimates of the estimated equation) and variance-covariance matrix V (the estimated variance-covariance matrix), thus obtaining random β vectors; from each of them, a new vector of the WTA equation coefficients was calculated, and the WTA for the sample was computed. The final result was

empirical distributions of the average WTA on which the mean and the standard deviation has been calculated.

The resulting mean WTA in the sample is 16.3 and 16.4 percent for model 1 and 2, respectively, and the median is 16.3 and 16.4 percent. This implies that a typical consumer in the sample is willing to stay with his/her favorite farmer if the prospected discount is less than 16 percent of his/her expenditure in fruits and vegetables. Therefore, the value of the relational good is not negligible.

The results of the difference-in-utility and of the valuation function models are not directly comparable, since the measures of the WTA are different. Nevertheless, one can consider that, since fruits and vegetables represent 3.2 percent of the monthly expenditure for food of households of the region (I.Stat), the share of WTA over total income would be 0.53 percent according to the estimate of the valuation function (model 1), as compared to 2.7 percent of the utility difference model. The corresponding estimates in terms of shares of the expenditure for fruits and vegetables are 16 and 84 percent, respectively. The estimates of the utility difference model seem suspiciously high. It is possible that using the midpoints of the income brackets introduced some bias in the estimation. In any case, the estimates of the valuation function are more conservative.

5. Conclusions

In this paper, we estimate with different econometric methods the value consumers in a city attach to the relational good represented by the personal relationship with a farmer selling directly his/her products. Contingent on the chosen model, the average value is 16 percent of the consumers' expenditure for fruits and vegetables, and up to 2.7 percent of their overall income. These results suggest that personal relationships do have an impact on consumers' economic behavior. This might not sound as a novelty to marketing practitioners, but to the best of our knowledge its measurement is new.

Some considerations and qualifications are nevertheless needed. First, we estimate the willingness-to-accept. It is well known that in the Contingent Valuation literature measures based on WTA are looked at with suspicion, since they are prone to overvaluation. In the case of relational good, though, using WTA measures is an unescapable choice since, by definition, a relational good cannot be purchased and it cannot even be evaluated by an individual until it is created. Hence, the willingness to pay for a relational good cannot be estimated. Nevertheless, one should be aware that the valuation might be influenced by people's reluctance to leave

something already acquired (Kahneman and Tversky, 1979). And, like in all stated preferences exercises, hypothetical bias is a possibility.

Second, the estimates of the WTA concern the sub-sample of those consumers who typically shopped at that market and mainly purchased from a particular farmer. Therefore, the relevance of the relational good for the general population is obviously less. A quick estimate of the value of the relational good for the general population can be obtained by weighting the estimated values by the share of respondents who were included in the subsample. This share was 72.8 percent. Assuming that the rest of the population has no preference for the relational good, this would imply that the estimate of 16.3 percent of the expenditure for fruits and vegetables would reduce to 11.9 percent if referred to the general population. Nevertheless, this would imply that consumers at conventional stalls have no preference for relational goods with those vendors, which is not granted. Rather, it is quite possible that the sub-sample of consumers regularly buying from particular farmers have characteristics quite apart from the general population (for instance, they are more educated). Hence, the subsample is likely self-selected, and this may affect their WTA. Therefore, we intend to estimate a full model implying the choice of buying from farmers and, conditional on this, the estimate of the WTA.

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Table 1. Descriptive statistics of the variables

	Mean	Std. Dev.
Age (years)	51.09	18.78
Gender (male = 1)	0.38	0.487
Education (years of study)	14.49	4.27
Household member in charge of buying fruits/vegetables (yes = 1)	0.96	0.19
Household size (number of other family members)	1.35	1.08
Children under fourteen (number)	0.13	0.40
High-skill job	0.11	0.31
Middle-skill job	0.45	0.50
Low-skill job	0.14	0.34
Net household income < 1,200 euro/month	0.32	0.47
Net household income 1,200-2,000 euro/month	0.38	0.49
Net household income 2,000-3,000 euro/month	0.21	0.41
Net household income > 3,000 euro/month	0.09	0.29
Net household income (000 euro/month)*	1.734	1.117
N. observations = 207		

* Calculated using the midpoints of the income classes (last class= 4,500 Euro)

Table 2. Utility difference model

	Coeff.	Std.Err.
α***	0.863	0.187
β***	9.053	0.744
	-	
Log-likelihood	192.28	
Chisq. (2 d.f.)	384.56	
N.	207	

Table 3. Mean WTA from the utility difference model

Truncation at:	Mean WTA
0.01	0.008
0.02	0.017
0.03	0.025
0.04	0.034
0.05	0.043
0.10	0.090
0.20	0.188

Note: WTA and truncation are expressed as shares of total income

Tab. 3 - Valuation function models and estimated WTA

	Estimated model		*WTA function*		*Estimated model*		*WTA function*	
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Prospected discount	13.814***	1.729			14.69***	1.833		
Constant	0.945	1.765	0.068	0.119	1.45	2.274	0.099	0.139
Gender (1 = male)	0.040	0.271	0.003	0.020	-0.02	0.279	-0.001	0.019
Age (years)	0.003	0.009	0.000	0.001	0.00	0.009	0.000	0.001
Education (years)	0.036	0.044	0.003	0.003	0.03	0.047	0.002	0.003
Main purchaser (1 = yes)	0.649	1.481	0.047	0.112	0.71	2.060	0.048	0.147
# household members	-0.021	0.131	-0.001	0.009	0.05	0.137	0.003	0.009
# children	0.152	0.382	0.011	0.028	0.13	0.447	0.009	0.031
High-level occupation	0.150	0.497	0.011	0.036	0.52	0.552	0.036	0.037
Mid-level occupation	-0.044	0.315	-0.003	0.023	0.08	0.336	0.005	0.023
Low-level occupation	0.215	0.447	0.016	0.032	0.45	0.476	0.031	0.033
Income (000 Euro)	-0.021	0.123	-0.002	0.009				
Income level 2					-0.47	0.304	-0.032	0.020
Income level 3					-0.91**	0.398	-0.062	0.028
Income level 4					0.316	0.594	0.022	0.040
Log- likelihood	-105.351				-100.583			
Chisq. (12 d.f.)	210.702				201.166			
N. observations	200				200			