# Unobserved Heterogeneity and Censoring in the Demand for Health Care

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**Summary**

In this paper we estimate a demand for private medical services equation based on the tradition of the Grossman´s model of demand for health using data for a panel of Spanish households. The econometric specification accounts for the censored nature of the data, which arises from no participation and infrequency of purchases, and the existence of unobserved heterogeneity, which arises from the non observability of health stata. Our evidence suggests that ignoring these features can have a significant impact on the size, sign and significance of the model estimates. The estimates for the participation and consumption processes also suggest that the deduction of expenditures on health care currently applicable in the Spanish tax system are positively associated to income and fertility.

KEY WORDS: Demand for health, latent variables, panel data.

## 1. Introduction

Health care takes one of the largest shares of the public budget in countries such as Spain, where citizens have access to subsidised assistance in both publicly and privately owned centers, enjoy several copayment schedules in the purchase of medicines and are also able to claim a 15% tax deduction for all expenses on health care. Recently, measures such as the exclusion of a substantive range of medicines from the list of products within the copayment schedules have been implemented in order to curb public expenditure. The concern about the distributional effects of this and related potential policy changes on the population has brought the debate on fiscal matters associated with health care to the attention of both academics and decision makers. In particular, the effects of the tax expenditure associated with the deductions mentioned above are worth analysing. Who do these deductions benefit? Could they be replaced by some kind of tax expenditure related to demographic structure?

In this paper we provide an empirical account of the consumption of one of the components in the vector of health care inputs of Spanish households: privately purchased medical services. This category of consumption includes all expenditure on visits to practitioners, specialists or surgery related to all types of treatments except dental care. The study of the patterns of consumption for this component of private health care is partly motivated by the fact that these services are available in the public network at no monetary cost. The data shows clearly that only a portion of the population participates in the purchase of these services, and it is conceivable that the benefits of greater promptness of delivery[1] and/or perceived quality are enjoyed by households in the upper part of the income distribution. This raises the question of whether the associated tax deduction is regressive. In parallel, it is interesting to assess how price sensitive this type of demand is, for a withdrawal of the tax expenditures can

lead to substantial reductions in usage, part of which might have to be absorbed by the public sector.

In order to shed some light on the questions posed above, we estimate a demand for private medical services equation based on the tradition of Grossman's[2] demand for health model. This model motivates not only the choice of the variables that we use in order to explain the variation in demand but also the incorporation of unobserved heterogeneity in the econometric specification. A second econometric issue arises due to the fact that the category of expenditure that we examine is i) not universally consumed and ii) is purchased infrequently. As it is well known, standard estimators for limited dependent variable models such as the tobit are not appropriate in these circumstances.

In section 2 we briefly comment upon the economic model on which our empirical analysis will be based and highlight the fact that Grossman´s formulation leads naturally to an econometric model with unobserved heterogeneity. In section 3 we discuss the data on which we estimate the model and describe the nature of the censoring processes before proposing an estimator related to the family of multivariate models analysed by Blundell and Meghir[3] that deals simultaneously with the possibility of no participation and the noise induced by infrequent purchases. In this section we also describe the way in which the LDV estimates are used in order to deal with the unobserved heterogeneity problem. Section 4 presents the empirical results and section 5 concludes.

## 2. The demand for private medical services as a health care input

The demand for private medical services we are about to specify is related to the demand for health care in Grossman´s model. Recall that in the latter agents

maximise the life cycle discounted sum of utilities defined over sick time and consumption subject to an asset acumulation constraint and a particular technology in the production of health capital. The first order conditions for the desired stock of health in this intertemporal problem equate the marginal benefits (both pecuniary and non pecuniary) of health capital to its marginal cost. In order to fulfill this condition over the life cycle, agents use time and medical care to generate health capital. Under the pure investment version of the model, and assuming a Cobb-Douglas production function for the health stock, an operational[4] representation of the reduced form of the demand for health care equation implied by the model is given by

$$\ln M(t) = \alpha_1 + \alpha_2 \ln w(t) + \alpha_3 \ln P^m + \alpha_4 E + \alpha_5 X + \alpha_6 t + \ln\left[1 + \frac{\tilde{H}(t)}{\delta(t)\mu}\right] \quad \textbf{(1)}$$

where w(t) is the wage rate, $P^m$ is the price of medical services, E is education, t is a time index and X is a vector of conditioning variables picking up environmental conditions. The terms involving the stock of health, H, are i) its relative change over time $\tilde{H}(t) = \dot{H}(t) / H(t)$, ii) its rate of depreciation $\delta$ and iii) $\mu$, a partial adjustment parameter reflecting the potential inability of individuals to adjust to their desired health capital stock instantaneously. Although we follow Wagstaff[5] in the introduction of partial adjustment, we retain the log-linearisation of the investment schedule originally proposed by Grossman in order to arrive at the demand for health care equation.

Equation 1 forms the basis of the econometric model that we estimate in this paper, as private medical services are a component of health care in general. To the extent that the rate of change of the health stock relative to the depreciation rate is not available to the researcher, and more so if no information whatsoever on health status

can be used as a proxy, the model above will have to be estimated in the presence of unobserved heterogeneity.

## 3. Data and econometric specification

### 3.1 The censoring problem

The data we use is taken from the Spanish Continuous Family Expenditure Survey (CFES). This is a quarterly expenditure survey where a (stratified) random sample of 3200 households is rotated in 1/8 every quarter. This allows the construction of panels with information on households covering up to 8 quarters. In particular we use a balanced panel of 6100 households observed during 8 time periods. The time periods range from the first quarter of 1986 to the last of 1987 for the first households that entered the survey and the third quarter of 1992 to the second quarter of 1994 for the most recent entrants in our sample.

Apart from detailed demographic information, the survey contains records on 11 categories of health related expenditures, namely medicines with and without prescription, other pharmaceutical products, therapeutical material with and without subsidy, medical services, dental services, nursing services, hospital services, insurance premia and a residual category. The quality of the information contained in these records varys according to the monitoring period (the length of time over which the household is asked to report expenditures, which in this survey can be either one week, one month or one quarter). In some cases, such as prescribed medicines, it is just one week and we find that 70% of households are not observed spending on this category in any of the 8 periods. To some extent this is due to the fact that the copayment for prescriptions is zero for a substantial part of the population. But the problem of infrequent purchases is pervasive: even if all households have to face the full cost of self

prescriptions, only 43% report a positive expenditure over any of the 8 periods. Further, more than half of these (23% of the total) have one positive record only.

The situation improves when the monitoring period is the month, as is the case with our object of study. In table 1 we present the pattern of observed positive expenditures on private medical services and the mean and median of the purchases by number of observed purchases. The table shows that 42.7% of the 6100 households are never observed purchasing this category of health care. The rest of households are observed incurring positive purchases at least once and roughly one third of the total are observed purchasing more than once. The median expenditure is 15000 pta. per quarter and the mean level is around 25000 pta per quarter.

For the rest of categories the percentage of households who never report a positive expenditure are 68% (dental services), 91% (nursing services), 98% (hospital services), 96% (therapeutical material with subsidy), 57% (therapeutical material without subsidy), (79%) insurance premia and 99% (residual category).

**Insert table 1 about here**

The econometrics literature distinguishes three main causes for the existence of zero records in micro expenditure surveys, namely no participation in the consumption of the relevant commodity, corner solutions and infrequent purchases. In many applications it is reasonable to assume from the outset which cause operates. For instance, in studies on the demand for clothing it would be reasonable to assume infrequency of purchase to be the main explanation. Similarly, in the case of the demand for tobacco, abstention (no participation) will explain a substantial proportion of zero records[6-7]. For some goods, however, there is no clear cut cause and, in a cross section of households, more than one or even the three causes might induce the existence of

zero records. The case of expenditures on health care are a paradigmatic example of this type of situations. Even if it can reasonably be argued that all households participate in the consumption of some form of health care (i.e. there are no non-participants in the sense applicable to tobacco consumption or labour force participation), the existence of different types of copayment policies, substitutes at zero money cost and the difference between monitoring periods and the period for which information in the survey is supposed to be representative, leads to the existence of a high percentage of zero records when dissaggregated categories are examined.

In the particular case of household expenditure on private medical services in Spain, the existence of a free substitute will clearly induce some households to never consume this type of service. This free substitute is the coverage given by the social security contributions, which is provided either through publicly owned outlets, the case for most households, or the private sector, the case for some of the households who are entitled to choose which provider their contributions are directed to (civil servants). Similarly, households who buy private insurance on top of the compulsory scheme will rarely be observed paying for this service unless there exist a copayment contract. Concerning the latter group, only 20% of the households who ever purchase private medical services are observed ever paying for an insurance premium. However, the survey pools together policies that cover medical assistance with those that provide compensation from death so it is not possible to know whether the latter group of households are really covered for medical assistance. In any case the presumption that a portion of the population does not participate in the consumption of this category is consistent with the evidence shown in table 1, which suggests that there are some households who never purchase private medical services and can be classifyed as non participants, and, moreover, we are able to identify them. The data also suggest that those who participate in the consumption of this commodity do not do so every month. For these households, a pattern of alternating positive and zero records is observed. This structure for the data generating process implies that, first, a household decides

whether to participate in the consumption of this service and then, if the decision is to do so, how often to make the purchases. Finally, the amount of service purchased is decided. In this sense the corresponding econometric model is trivariate: it contains a process for participation, a process for the frequency of purchase and a process for the amount of purchases.

Let us start with the first of the processess, which we assume is ruled by a latent index such as in the standard probit model (individual subscripts are omitted for notational simplicity).

$$\begin{aligned} H^* &= \alpha r + \eta \\ H &= l(H^* > 0) \\ \eta &\approx N(0,1) \end{aligned} \qquad \textbf{(2)}$$

where l is the indicator function.

Focusing now on participating households let $y^*=\exp(\beta x+ e)$, where e is a random error, denote latent consumption of private medical services and y its observational expenditure counterpart. Following Blundell and Meghir[3] in assuming that $E(y^*)=E(y)$ and expanding the last expectation, we obtain

$$E(y|D=1)P(D=1)=E(y^*) \qquad \textbf{(3)}$$

where we assume that

$$
\begin{aligned}
D^{*} &= \gamma z + w \\
D &= I(D^{*} > 0) \\
w &\approx N(0,1)
\end{aligned}
$$

**(4)**

is a probit type process determining whether a purchase is made during the monitoring period. The relationship between latent consumption and observed expenditure is then given by

$$
\begin{aligned}
y &= (y^{*} / P(D=1)) \exp(v) \\
v &\approx N(0, \sigma_{v}^{2})
\end{aligned}
$$

**(5)**

and taking logarithms

$$
\begin{aligned}
\log y &= \log y^{*} - \log P(D=1) + v = \beta x - \log \Phi(\gamma z) + u \\
u &= e + v \\
u &\approx N(0, \sigma_{u}^{2})
\end{aligned}
$$

**(6)**

Even though the model is trivariate, only two "hurdles" have to be passed in order to observe a positive expenditure: the participation one and the purchase one. The model does not accomodate standard corner solutions. That is, conditional on being a participant, $y^{*}$ cannot be zero. This is a model of "first hurdle dominance" in the terminology of Jones[6]. Given that we allow for a separate participation process, it makes sense to treat zeros in the observed counterpart of consumption as a result of the semi-durable nature of this category of consumption only. The use of a logarithmic specification for the consumption equation (which is justified by the skewness of observed expenditures) also rules out values of zero for $y^{*}$.

Under independence of the three stochastic errors η, w and u, the sample log likelihood for this data generating process is given by

$$\log L = \sum_{y=0} \log(1-\Phi(\gamma z)\Phi(\alpha r)) + \sum_{y>0} -\log\sigma_u + \log f\left((\log y + \log\Phi(\gamma z) - \beta x)/\sigma_u\right) + \log\Phi(\gamma z) + \log\Phi(\alpha r) \quad \textbf{(7)}$$

As discussed above, an important feature of the panel format of the data is that it provides sample separation information: we have identifyed which households do participate in the consumption of private medical services. Under the assumption of independence this implies that the model can be estimated as a separate probit for participation on the whole sample and an infrequency of purchase model for the sub-sample of participants[6]. The likelihood function for the latter is easily obtained from equation 7

$$\log L = \sum_{\substack{y=0 \\ H=1}} \log(1-\Phi(\gamma z)) + \sum_{\substack{y>0 \\ H=1}} -\log\sigma_u + \log f\left((\log y + \log\Phi(\gamma z) - \beta x)/\sigma_u\right) + \log\Phi(\gamma z) \quad \textbf{(8)}$$

### 3.2 Individual effects

From the discussion in sections 2 and 3, we can conclude that the econometric representation of equation 1 belongs to the general class of models given by

$$\log y_{it}^{*} = \beta' X_{it} + \gamma_{it} + \varepsilon_{it} \qquad \textbf{(9)}$$

where $\gamma_{it}$ is an unobserved individual effect, $y^{*}$ is not directly observable and $\varepsilon_{it}$ is a purely random error term. Given that the time span during which all households stay in the survey is two years, we may treat the individual effect as a fixed unobserved heterogeneity term and drop the time subscript. In previous studies of demand for health care based on Grossman's model, this term has been assumed to be either zero, invariant across individuals or randomly distributed. The latter is the least restrictive of these assumptions and if we interpret this term as an individual effect uncorrelated with the rest of regressors, only problems of efficiency will arise when using a cross section to retrieve the parameters of interest. However, in the context of a demand for health care model, there are intuitive grounds to expect that these individual effects are correlated with some of the regressors, especially age, education and the environmental variables (in fact, the recognition of the potential correlation of the rate of depreciation and the speed of adjustment with demographic characteristics led Wagstaff[4] to carry out separate analyses for different age groups). In these circumstances, standard cross sectional estimation techniques will yield biased parameters.

Our aim is to obtain consistent estimates in the presence of both the type of censoring described above and the potential correlation of the individual effects with the regressors. In order to do so we resort to a variation of Chamberlain's[8] Minimum Distance method proposed by Arellano and Bover[9] and applied, in the context of dynamic demand equations, by Labeaga[10]. In particular, Chamberlain explicitly models the relation between individual effects and regressors in the following way

$$E(\mu_i | X_i, R_i) = \lambda^0 + \lambda_1' X_{i1} + \lambda_2' X_{i2} + ... + \lambda_T' X_{iT} + \lambda_R' R_i \qquad \textbf{(10)}$$

that is, individuals effects are a function of lead and lags of all explanatory variables (the vector X) and interactions of the latter with demographics, and non linear terms, the vector R.

Our model can then be written as

$$E(\log y_i^* | W_i) = \gamma' W_i \qquad \textbf{(11)}$$

where W contains X and R. This is used to obtain a prediction for log $y_i^*$ in each one of the T periods making up the panel by means of the limited dependent variable estimator discussed in section 3.1. Once such predictions have been obtained, we can recover the parameters of interest by applying the within groups estimator to the following equation

$$\widehat{\log y_{it}^{*}} = \beta x_{it} + \gamma_i + \tau_{it} \qquad \textbf{(12)}$$

where $\widehat{\log y_{it}^{*}}$ is the predicted value of $\log y_{it}^{*}$ and $\tau$ is a purely random term. This estimator is consistent, but less efficient than the minimum distance method originally proposed by Chamberlain.

## 4. Empirical results

### 4.1 Econometric estimates

In table 2 we present the estimates for the model. The first three columns show the maximum likelihood estimates of (I) the probability of participation, (II) the frequency of purchase process and (III) the consumption equation. These estimates are corrected for the censoring problem but not the unobserved heterogeneity problem. Column (IV) presents the estimates for the consumption equation using the within groups estimator with censoring for the full panel. Finally column V) shows the OLS estimates of the consumption equation for comparison purposes. The results for participation in column (I) are obtained from a probit on the cross section of 6100 households at their first interview, whereas the results in columns (II) and (III) are obtained from the maximum likelihood estimator (whose likelihood function is given in equation 8) on the subsample of 3494 participating households at first interview. The results in column (IV) are obtained from the full panel of 27952 participating households and those in (V) from the pool of all households over the eight periods. For the within group censored panel estimator, we have maximised the likelihood function in equation 8 on each of the 8 waves of the panel including all leads and lags, interactions and power terms (up to the cube) of the regressors in both the frequency of

purchase process and the consumption process in a first step. This produces a prediction for $log\ y^*$ according to equation 11 for each household, which is then used as the dependent variable in equation 12. The table includes statistics for the null hypothesis of no fit and the relevant measures of goodness of fit.

**Insert table 2 about here**

The specification for participation (column I) includes variables that proxy situations which pose a threat to health such as the risks involved in child bearing and neonatal related diseases and the existence of smokers in the household. Both of these increase significantly the probability of participation with respect to the reference household. A higher level of current household income affects positively the probability of participation for two reasons: higher ability to pay and a higher opportunity cost for the waiting time due to foregone earnings. Employment, in whichever form but more so for white collar workers, increases the probability of participation with respect to the reference households where the head is not active or unemployed. Owners occupiers were expected to be more likely to participate due to the correlation of this characteristic with life time wealth and thus ability to pay and the results show a significant (at the 10% level) positive impact. The observation of a payment for insurance premia is not associated with any significant effect on the probability of participation. As mentioned before, the premia payments that we observe in the survey include life insurance policies and consequently are an imperfect indicator for the existence of coverage for private medical services.

Concerning the process for frequency of purchases (in column II), we have included the size of the household as a proxy for the frequency with which the need to purchase the service arises. The corresponding estimate suggests a positive and significant impact. The presence of babies of less than one year of age or a pregnant woman also seem to affect positively the frequency of purchases. Household income

(excluding income from capital), the availability of private transport, and the participation of the spouse in the labour market have been included in the specification for the frequency of purchase in order to proxy the opportunity cost (foregone earnings and/or leisure) of visits, but neither seems to exert a significant effect.

Turning to the consumption equation, note that while OLS estimates suggest that every decade there is a decrease in consumption of 3% and the ML estimator suggest an insignificant effect, the censored panel estimator (column IV) suggests a significant increase of 5% every decade. Once the effect of participation is netted out, both the ML and the censored panel estimator (the latter in a significant way) show a negative effect associated with the presence of babies or pregnancy on the consumption schedule. It is interesting to note that while two latter factors affect participation positively, they reduce consumption conditional to participation. This might be caused by the income effect associated with a larger family size. Both categories of education are associated with a greater (and by a sizeable percentage) consumption with respect to households headed by an individual with basic schooling. Note also that both the ML and OLS estimators show an U profile for the effect of household income on consumption. However the profile shown in column IV has always a positive slope, and moreover, this slope is increasing with the level of (log) income. Thus the associated elasticity of expenditure with respect to income increases with the latter. The estimated value at the mean of income is 0.34, which reveals the necessity (conditional upon participation) nature of the service under consideration.

Concerning the estimated price elasticity, note that since our dependent variable is expenditure, it is obtained by substracting one to the coefficient on the logarithm of prices. The censored panel estimate is -1.41. The price sensitivity that this estimator suggests is very much greater than the one associated with the OLS estimator, -0.6.

It seems clear, therefore, that ignoring the censoring processes and unobserved heterogeneity can lead to substantially different results, apart from ignoring relevant information such as the separate effects on participation and rate of consumption that some factors may have.

### 4.2 Implications for health and fiscal policies

The results suggest that the probability of participation in the consumption of private medical care is positively associated with two relevant characteristics from the point of view of fiscal policy, namely wealth (proxied by income, occupational category and home ownership status) and fertility (pregnancy and presence of small children). Conditional on participation, income exerts a positive effect on the rate of consumption too. It would seem, therefore, that the tax deduction associated with the consumption of private medical care is regressive, at least in the sense that the absolute amounts deducted are greater for richer households. Withdrawing or reducing these deductions would penalise households within fertility periods. But the existing deductions for children could be increased to compensate this effect.

As far as second round effects (behavioural responses) are concerned, the estimated elasticity of -1.41 suggests that increases in prices would lead to more than proportional changes in demand for private medical services. A withdrawal or reduction of the deduction is very much equivalent to an increase in prices (even if its effect is not perceived until tax forms are filled), so it would be reasonable to expect a substantial reduction in demand for private medical services should the government eliminate it completely. Whether a parallel increase in demand at public outlets would ensue is something that our estimated model cannot produce inferences about. The crucial issue here is the extent to which Spanish households perceive private medical services as a close substitute for their public counterparts, and this is an issue which merits further research.

The ability of these results to provide insights into the likely consequences of revisions in the copayment policies of other categories of health care currently provided by the Spanish public health network is also limited. However, in connection with the recent government plans for the withdrawal of the subsidy for a substantial number of medicines, a policy relevant message might be extracted: participation in the consumption of private health care is associated with ability to pay. Thus the maintenance of close substitutes within the subsidised list would cushion the effects of the policy change on households at the bottom of the income distribution.

## 5. Conclusion

In this paper we have estimated a demand for private medical services equation based in the tradition of Grossman´s model of demand for health using data for a panel of Spanish households. We have paid particular attention to the censored nature of the data and the existence of unobserved heterogeneity and our results suggest that ignoring these issues has a significant impact on the size, sign and significance of the parameters of the model. The estimated demand equation offers useful policy evidence on the likely effects of altering expenditure deduction schemes currently applicable in the Spanish tax system.

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**Table 1. Pattern of observed positive expenditures on medical services in estimating sample**

| Proportion of households reporting positive records in # quarters (N=6100) | # quarters | Median expenditure (pta. per quarter) | Mean expenditure (pta. per quarter) |
|---|---|---|---|
| 42.7% | 0 | - | - |
| 23.78% | 1 | 15000 | 27163 |
| 15.41% | 2 | 15000 | 23809 |
| 8.30% | 3 | 15000 | 24052 |
| 5.51% | 4 | 15000 | 23299 |
| 3% | 5 | 15000 | 24659 |
| 0.7% | 6 | 15000 | 20647 |
| 0.44% | 7 | 15000 | 27322 |
| 0.16% | 8 | 15000 | 34408 |
| 57.3% | Any quarter | 15000 | 24792 |

| | I | II | III | IV | V |
|---|---|---|---|---|---|
| | ML | ML | ML | WGC | OLS |
| Household size | | 0.043 | 0.102 | 0.081 | 0.090 |
| | | (2.73) | (3.51) | (22.57) | (13.92) |
| Baby or pregnancy* | 0.167 | 0.167 | -0.234 | -0.064 | 0.133 |
| | (2.07) | (2.45) | -(1.17) | -(7.82) | (3.34) |
| Smoking members* | 0.121 | | | | |
| | (3.33) | | | | |
| H. of household has secondary education* | -0.015 | | 0.103 | 0.195 | -0.020 |
| | -(0.37) | | (1.82) | (25.36) | -(0.86) |
| H. of household has university education* | 0.117 | | 0.168 | 0.224 | 0.139 |
| | (1.89) | | (1.36) | (15.59) | (3.91) |
| Log total household real income | 0.118 | -0.031 | -0.472 | 0.018 | -0.115 |
| | (4.85) | -(0.94) | -(3.68) | (3.04) | -(3.25) |
| Log total household real income squared | | | 0.048 | 0.019 | 0.021 |
| | | | (4.34) | (30.19) | (6.90) |
| Log real price of private medical services | | | 1.152 | -0.414 | 0.408 |
| | | | (2.26) | -(9.21) | (3.17) |
| Age of head of household | -0.004 | -0.003 | 0.002 | 0.005 | -0.003 |
| | -(2.26) | -(1.61) | (0.65) | (9.32) | -(4.00) |
| Quarter 1* | | 0.085 | 0.083 | 0.019 | 0.026 |
| | | (1.34) | (0.68) | (6.47) | (0.99) |
| Quarter 2* | | 0.087 | 0.088 | 0.146 | 0.096 |
| | | (1.37) | (0.72) | (49.15) | (3.67) |
| Quarter 4* | | 0.080 | 0.162 | 0.062 | 0.051 |
| | | (1.24) | (1.29) | (21.28) | (1.94) |
| Spouse in employment* | | 0.056 | | | |
| | | (1.24) | | | |
| Car available* | | 0.027 | | | |
| | | (0.52) | | | |
| Head of household is self employed* | 0.191 | | | | |
| | (3.40) | | | | |
| Head of household is blue collar worker* | 0.180 | | | | |
| | (2.79) | | | | |
| Head of household is white collar worker* | 0.247 | | | | |
| | (4.66) | | | | |
| Owner occupier household* | 0.076 | | | | |
| | (1.81) | | | | |
| Under coverage of private insurance* | 0.054 | | | | |
| | (1.32) | | | | |
| _cons | -0.850 | -0.405 | 4.290 | 1.979 | 0.307 |
| | -(4.01) | -(1.31) | (6.41) | (50.84) | (2.26) |
| N | 6100 | 3494 | 3494 | 27952 | 48800 |
| Chi squared (df in parenthesis) | 233 (11) | 7165(21) | 7165(21) | | |
| F (11, ∞) | | | | 17.90 | 8.20 |
| Pseudo R-squared/R-squared | 0.02 | 0.49 | 0.49 | 0.23 | 0.07 |