What drives patient discontent?
The effect of individual and market determinants

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ABSTRACT

Background. User´s satisfaction is an important tool to evaluate the performance of healthcare services. Measures of satisfaction are important tools for research, administration and planning.

Objectives. (i) Study patient satisfaction as a multidimensional concept including organizational issues, professional competence, human characteristics, and status of facilities as dimensions determining the relation between patients and healthcare providers; and **(ii)** Investigate the contribution of each dimension to overall patient satisfaction, their determinants so as to examine individual and market characteristics which affect overall patient satisfaction, and their mechanisms of operation.

Design. Our dataset is based on results from a survey undertaken in health centres to patients visiting their physician. We use information on: (i) Individual variables -demographic, socio-economic and psychological-; (ii) Market variables –scheduling, centre type, habitat-. The four dimensions included are: organizational issues, professional competence, human characteristics and status of facilities.

Main Measures. Patient overall satisfaction is measured as recommendation of the service (dichotomous variable which allows focus on patient's discontent). Satisfaction defined over the four dimensions are measured as ordinal variables (5-point Likert's scale).

Results. Although individual and market characteristics affect satisfaction with each dimension and overall satisfaction, they operate differently. The characteristics of the provided service determine dramatically, but not only, satisfaction with organisational issues. Since the later is the relatively more important component of overall quality assessment, policy-makers should keep track of these control variables.

Conclusions. We have provided a tool for health policy management to be aimed towards ameliorating patient's discontent, since we have identified patients' "value chain".

Keywords. Patient satisfaction, determinants, dimensions, Pratt index, seemingly unrelated regressions, ordered probit.

Demand for the best service is perhaps the major claim among users[1] of a given public service, although as citizens, individuals may recognize that resources may be used elsewhere. For public healthcare, the decision to provide universal and free health coverage leads to the most expensive alternative of any public budget. The challenge is to efficiently balance the two distinct and competing factors of money value for citizens and high quality services for users. Since public healthcare systems are personal public services, there is a trend towards users becoming the centre of the system. Users are not passive agents, but have a say in the evaluation of policy's efficiency. Their feedback becomes an effective mean for improving the performance of public services as it can be used to demand accountability from providers, especially when there are no alternatives due to regulation in the delivery of services.

When measuring user's satisfaction, different dimensions are proposed to disaggregate those aspects affecting the relation between patients and the healthcare sector. Professional competence, quality of care, and organizational issues are some of the dimensions to be assessed. Empirical evidence shows that patients distinguish among these dimensions of care when judging its quality [1], providing greater response variability than when considering overall satisfaction. Thus, it is accepted that substantial dissatisfaction exists with specific dimensions of care, notably waiting times and communications in primary care ([2], [3]). It is necessary to identify users' **"value chain"** in order to examine, how important is the satisfaction level within each dimension in overall satisfaction, and how each market and individuals´ characteristics affect each dimension and ultimately overall satisfaction

The purpose of this paper is: **(i)** to add to the limited knowledge and empirical evidence on the research of patient satisfaction as a multidimensional concept. These dimensions include organizational issues, professional competence, human characteristics, and status of facilities as those attributes playing an important role in the relation between patients and the healthcare sector; and **(ii)** to investigate the determinants of patient satisfaction with primary service including both individual and market variables. The contribution of each dimension to overall patient satisfaction and their determinants will provide us with an opportunity to examine not only individual and market characteristics which affect overall patient satisfaction and discontent but also their mechamisms of operation.

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[1] Dissatisfaction and discontent are used interchangeably in this paper.

This is possible using the *2004 Survey for Improving Patient Satisfaction* in Andalucía (IESA E0409). The survey captures individuals' overall satisfaction with primary care, and with a number of dimensions. It includes individual data on demographic and socio-economic measures, as well as psychological characteristics, individual aspirations, and other market characteristics. Although the research is carried out within the primary health service of a particular geographical area (Andalucía), the interest of this research lies in its methodology, which can be employed in any other region or public service evaluation.

Other important contributions of this paper are the following. First, it implies a significant move towards a more informed understanding of the multidimensional concept of patient´s satisfaction where little empirical, comparative data has been published [4]. This paper extends this line of research developing a joint model based on overall satisfaction and on different dimensions of primary care. Second, it contributes to the objective of achieving a more user-focused healthcare service. In order to improve healthcare provision, managers need to be able to differentiate between factors they have control over and those that are part of a wider social and political context. User satisfaction studies inform planning as part of a range of assessment indicators used to compare different alternatives of organising and providing healthcare [5]. Third, it contributes the policy agenda of developed countries where the user´s perspective is certainly entering as a vital component of health system management as highlighted in the WHO´s World Health Report [6].

Users' satisfaction: A review of issues and concepts

The need to examine health services from the patient´s point of view has become increasingly important (see [4] for a literature review). As healthcare budgets come under examination, consumers in developed countries have become more critical of the healthcare provided; claiming rights as active participants in the planning and evaluation of health services [7]. Patient satisfaction surveys have proved valuable instruments to monitor and improve quality of care ([8], [9]), and measures of satisfaction are important tools for research, administration and planning.

Despite the number of patient satisfaction surveys, not much research has been devoted to study the meaning of the construct "patient satisfaction". Ware *et al.* (1983) are credited for much early theoretical work. They made a significant distinction between satisfaction *ratings*, which "attempt to capture a personal evaluation of care that cannot be known by observing care directly" [10], and objective satisfaction *reports* about the major

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characteristics (dimensions) of providers and care. They distinguish between "patient" variables (including patient characteristics and expectations) referred to as *determinants* of satisfaction, and "care" variables referred to as the *dimensions* of satisfaction.

When searching for *determinants* of patient's satisfaction, socio-demographic and economic variables such as age, gender, educational attainment and social class arise as straightforward candidates. Perhaps the most consistent characteristics are patient's **age**, with a significant body of evidence suggesting that older people are normally more satisfied with healthcare than their younger counterparts [11] and **educational attainment,** with greater satisfaction associated to lower education [12]. However, there is a lack of evidence for **social class** since this variable is often not assessed [13] and patient **gender** which does not seem to affect satisfaction values. A meta-analysis by Hall and Dornan [13] concluded that these demographic and socio-economic determinants are at best a minor predictor of satisfaction. However, their role might be important to investigate in order to adjust for these factors for benchmarking when comparing services, and to make possible for providers to target patients at risk for worse experiences.

Since personal responses to healthcare satisfaction bear, not only on the issue of comparability and meaningfulness, but more importantly on the causes of that satisfaction, attention should be paid to **psychological** determinants [4]. Little work has examined possible associations between **health status** and satisfaction as an approximation for psychological status/level of distress. Research by Westaway, MS., et al. [14] suggests the association is complex, concluding that particular dimensions of distress influence differently specific dimensions of satisfaction. Further, there is little doubt that **expectations** play a fundamental role in expressions of satisfaction. People rarely make absolute judgments, but based on their knowledge they draw comparisons from their past or from their future expectations. The assumption is that expectations refer to some notion of "standards" or "aspirations" formed on the basis of personal needs, previous experience, word-of-mouth communications, explicit and implicit service communication [15]. Few attempts have been made to see if such attitudes exist as identifiable, stable properties of individuals. The effect of expectations on quality assessment is not univocously determined. While disconfirmation theory [16] assesses that lower expectations lead to higher satisfaction rating, there is evidence that supports that negative preconceptions of a service provider will result on negative ranking. Consequently, expectations deserve further analysis.

Lastly, we further need to explore the influences from the local health system and wider society, identified as **market characteristics**. These variables will include indicators of the functioning of the system (i.e. patient density ratio, scheduling system, etc.), and aspects of wider context such as habitat, the latter being linked to Linder-Pelz [17] "entitlement" idea by which individuals belief they have proper, accepted grounds for claiming a particular outcome.

Definition of dimensions

As already mentioned, overall service satisfaction is an aggregate concept, which can be unfolded into its different dimensions. These dimensions act as *mediators* between individual/market determinants and overall user's satisfaction, as the level of satisfaction derived from a given dimension will eventually be an important component of overall satisfaction with the service.

Several classification of dimensions have been proposed, some appropriate only for specific healthcare context, others aiming at broad applicability. Abdellan and Levine [18] pioneered an early identification of key dimensions and many other studies have followed (see for example [10] and [19]). However, as they are conducted in very specific contexts, it is understandable that any classification never seems entirely appropriate and a great deal of work is continuously done to identify which factors of a service are the most important in determining overall satisfaction.

Measuring user´s overall satisfaction: Focus on discontent

The measurement of user´s overall satisfaction has also evolved through time. Despite the extensive use of satisfaction surveys, they have been criticized for consistently reporting high undifferentiated levels of patient satisfaction, with very few patients expressing dissatisfaction. Thus, Hall and Dornan´s [13] meta-analysis of satisfaction found average satisfaction levels to be 76% across more than 200 studies. However, several qualitative studies have reported that although high levels of satisfaction were expressed on patient satisfaction surveys, in-depth interviews indicated negative experiences not reflected in the questionnaires [20].

Most of the satisfaction surveys make use of five-point Likert scales rather than a dichotomy of satisfaction versus dissatisfaction. It is questionable for example, whether patients themselves make a distinction between being *satisfied* and *very satisfied* [21], and if so, what leads them to do so? High reported satisfaction ratings cannot be taken to indicate that patients have had good experiences in relation to a particular service. "Dissatisfaction" rates, however, may be of more use as an indication of a minimum level of negative experience and may be of potential use in benchmarking exercises and particularly attractive in the context of popular health systems, where satisfaction responses are prone to socio-psychological biases, such as "gratitude". A survey that pays greater attention to expressions of dissatisfaction seems more appropriate. It is the intention of this paper to contribute further empirical evidence on this matter.

Data and Methods

The data is derived from the 2004 *Survey for Improving Patient Satisfaction* in Andalucía (IESA E0409). This consists of an individual survey conducted by the Institute of Advanced Social Studies (CSIC) in Spain with funding from the Department of Health of the Andalucian Government with a representative sample of approximately 20.000 individuals. The population is all users of the region's public primary healthcare service personally interviewed after receiving attention in the medical centers.[2]

One criticism made to the use of satisfaction surveys is that their design may reflect a "managerial bias" [22] as the issues assessed are defined by health professionals and managers rather than by the potential users. In our survey, the components of the variables for users´ evaluation are drawn from an intense literature revision on the topic, and from the experience of having runned this Survey since 1999 (see [23] for reference). It is hoped then that they are grounded in the populations´ own concerns.

We postulate a two-layer model where users' overall healthcare satisfaction depends on satisfaction with each of dimension identified. Each dimension further depends upon objectively measurable variables including individual (i.e. personal, household type, socio-economic, psychological variables and individual expectations) and market determinants. We distinguish a set *X* of explanatory variables that explain the dimensions of primary care

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[2] The sample is drawn using a stratified, multi-stage design using probability sampling. The principal stratification of the sample takes place by health districts, basic health zone (ZBS), and health centers. Primary sampling units were selected in different ways depending upon the relevant size of the health center.

considered denoted by DS_O, DS_P, DS_H, and DS_F for patients' satisfaction with organizational issues, professional competence, human characteristics and status of facilities respectively[3]. We assume that all variables potentially have an effect on each dimension. In its turn, overall satisfaction (OS) is explained by DS_O, DS_P, DS_H and DS_F. The structure is scketched in Figure 1.

In order to investigate the significance and relative importance that different dimensions of healthcare have on overall patient's satisfaction, relative Pratt indexes are estimated. We further study the importance of individual and market characteristics on reported users's satisfaction over the specific dimensions. Given the ordinal nature of the dependent variables (i.e. healthcare dimensions), and the potential correlation of the disturbances (error terms) **seemingly unrelated ordered probit regressions** are estimated[4]. The analytical relevance and interpretation of the methods used is presented in the *methodological aspects* of the appendix.

The description of the variables used in the analysis is presented in Table A1 in the appendix. Consistent with previous theoretical and empirical literature on patient satisfaction (see for example [4] and [24]), regressions include a range of dummy variables to capture the effects of individual characteristics such as age, gender, marital status, household type, education, job status and income. Psychological and aspiration variables include frequentation, health status, evaluation of the current situation of the healthcare system and expectations for the future. Market characteristics are controlled for including access, centre type, habitat and patient density ratio. Table 1 reports the means, proportions and standard errors of these variables.

One of the advantages of this Survey is that it provides information on different dimensions of healthcare and on overall healthcare satisfaction. For the dimensions, the questions are formulated asking how individuals feel the healthcare system is performing in each of them. The answer takes discrete values from 1 (very badly) to 5 (very well). The dependent variable for overall satisfaction derives from the question asking patients whether or not they would recommend the healthcare service to a relative or friend. The use of this dichotomous

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[3] The dimensions were selected based on a thorough literature review, data availability and exploratory work.

[4] We further assume linear dependence between dimension variables DS_{ij} and the set of independent variables (X_{ij}), β_j and ε_{ij}, and that $\varepsilon \approx N(0,1)$

measure adds to the empirical literature as it focuses on the discontent concept which may be of greater use as an indication of a minimum level of negative experience.

Results

We examine the importance of each healthcare dimension in overall satisfaction using relative importance Pratt indexes (see Table 2). *Organizational issues* contribute most to overall patient's satisfaction. If something "extremely bad" occurs with respect to *organizational issues* (45.1%), this is likely to cause greater discontent on patients than any other dimension. The second most important factor is *status of facilities* (26.8%) followed by *human characteristics* (24.1%). The least important factor appears to be *professional competence* (4.0%). It is essential to highlight the low relative importance given to the human aspect of care regarded in many other studies as the principal component of satisfaction (e.g. [25]). The explanation may be the satisfaction concept that underlies the question formulated on overall patient's satisfaction (i.e. whether or not the patient would recommend the service to a friend). Giving individuals the choice between satisfaction (recommend) and dissatisfaction (not recommend) may make them more critical when evaluating the importance given to the different dimensions of overall satisfaction.

Determinants of different dimensions of healthcare services

We now ask "how do individual and market characteristics affect each healthcare dimension?" Some characteristics have obvious connections with particular dimensions. For example, the effect of "access to the system" should be mainly on the satisfaction with *organizational issues* and to a least extent on *professional competence* (this dimension includes aspects of information received); "patient density ratio" should mainly affect the satisfaction with *human characteristics* while "type of centre" and "habitat" should affect the satisfaction with the *status of facilities*. Other variables such as age, gender, education and health status have no direct relationship with any dimension of overall healthcare satisfaction and may affect differently the satisfaction levels. The results are highly consistent with above conjecture, providing some interesting findings.

Older people declare higher satisfaction with all healthcare dimensions except for satisfaction with *status of facilities*. Further, **male** users declare higher satisfaction with the *human aspects* of the healthcare service. Neither **household type** nor **marital status** seems to follow a clear pattern of satisfaction in any of the dimensions. **Education** affects

negatively on satisfaction with the *system organization*, suggesting that the more educated may have higher expectations on this domain. Lower satisfaction with *organizational issues*, *professional competence* and *human characteristics* are reported by unemployed people which may be correlated with the idea that unemployment reduces satisfaction with life overall [26]. No significant results can be reported in relation to **reported household income**.

Health status improves substantially the satisfaction levels in the *organizational issues* and *professional competence* dimensions. Only those in good health report higher satisfaction level in relation to *status of facilities.* Lower satisfaction with *organizational issues* and *status of facilities* and, to a less extent, with *professional competence* is associated with the negative **evaluation of the current situation** of the system and the **pessimistic foresights** for the future (the latter being true with satisfaction with *organizational issues* only). Since the value of coefficients for the assessment on the past evolution of the service is greater than the coefficient for foresights, it seems that the past rules with greater intensity on the formation of reference points for aspirations.

Market characteristics also have a say on individual's satisfaction with different dimensions of healthcare. Patients seem more satisfied with the *status of facilities* if they previously request an **appointment** than if they "wait in line" until being attended, they also value positively their satisfaction with the *professional competence* of individuals within the system. Furthermore, an increase in the number of patients per doctor leads to greater dissatisfaction with all healthcare dimensions, indicating that the **ratio patient/physician** seem an important tool to ensure overall patient satisfaction. **Type of center** has a significant influence on the level of satisfaction with the *human characteristics* of the system as patients attending consulting rooms are significantly more satisfied than those attending health centers, and those in part-time consulting rooms more satisfied than those in consulting rooms. We understand this may be due to the more personalized treatment likely to be received in smaller centers where the patient/doctor density ratio is lower. Lastly, the estimated parameters on the **habitat** dummies indicate that individuals living in small size towns are more dissatisfied with all dimensions of healthcare than those living in larger cities whereas no significant results can be reported with respect to rural patients. We believe this is due to the fact that sometimes services delivered in these places are far from those claimed to be fair by their residents.

Conclusions

This study shows that information about patient satisfaction with primary care measured as a dichotomous variable in terms of whether or not the user would recommend the healthcare service is an important tool to collect information on dissatisfaction. Using (i) Pratt indexes to measure the relative importance that different dimensions of healthcare have on overall patient's satisfaction, and (ii) seemingly unrelated ordered probit regressions to study the importance of individual and market characteristics over specific dimensions of healthcare, have proved useful and appropriate instruments to study the determinants of users' healthcare satisfaction and their mechanisms of operation.

Several interesting results have emerged:

(1) Individuals distinguish among different dimensions of overall satisfaction and the impact of individuals and market characteristics is different in each of them. They give greater importance to their satisfaction with *organizational issues* (even above satisfaction with the system's *human aspects*) when deciding whether or not they would recommend the healthcare service.

(2) Given the importance of users' satisfaction with *organizational issues*, we find that this dimension is negatively affected by **Education** suggesting the higher expectations of more educated users. **Health Status** is also an important determinant (possibly through a greater knowledge on the service), as well as backward and forward evaluations of the situation of the system (**expectations**).

(3) Considering now users' satisfaction with *status of facilities*, this is weakly affected by users' **Education** and **Health Status**.

(4) Users' satisfaction with *human characteristics* of the healthcare system is significantly affected by users' gender with **male** users being significantly more satisfied and by users' **occupation** with unemployed people being significantly more dissatisfied.

(5) Lastly, users' satisfaction with the *professional competence* is likely to be affected by users' **occupation** and **health status**. The trend though significant is not that clear for **expectations**.

(6) **Market variables** also seem to significantly affect the dimensions considered. Thus, patients are significantly more satisfied with the *status of facilities* and individuals' *professional competence* if they previously request an **appointment**. The **ratio patients/physicians** seem an important tool to ensure overall patient satisfaction and the **type of center** has a significant influence on the level of satisfaction with *human*

characteristics. Lastly, **size of habitat** affects all domains of overall patient satisfaction. If the characteristics of the service provided and the environment in which it is supplied influence satisfaction with *organizational issues*, and organization is noticeably the most important determinant of discontent, then this result calls for the special attention of policy makers.

These results provide support for policy action since despite its limitations user satisfaction can prove a useful management tool. The Andalucian government can influence the level of users' overall satisfaction by acting on some of the market characteristics considered. Specifically, since providing as personal and close care as possible is stated as the main target of the Health System Strategic Plan in Andalucía, efforts should be made towards ensuring that the different type of centers successfully satisfy patients' demands. Equally, establishing a universal system of appointments is also likely to increase individual satisfaction with her perception of the system organization. Finally regional measures should also be put in place, particularly in small size towns to guarantee that services delivered in these places suit residents' needs. These government measures are likely to improve the system organization and consequently to ensure an increase overall patient satisfaction.

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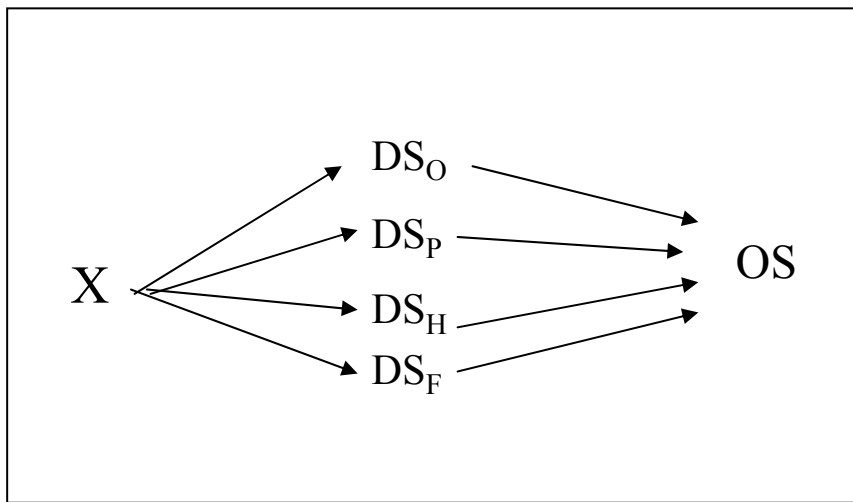
Figure 1. The two-layer model of overall patient satisfaction

Table 1: Sample Statistics

Variables	% (means if counts)	Std. errors
Overall Patient Satisfaction		
Would recommend the service	0.8590	0.003
Would not recommend the service	0.0893	0.002
No response	0.0516	0.001
Patient Satisfaction with organizational issues		
Much unsatisfied	0.0110	0.001
Unsatisfied	0.0419	0.001
Not satisfied not unsatisfied	0.1405	0.002
Satisfied	0.6858	0.004
Much satisfied	0.0866	0.002
No response	0.0339	0.001
Patient Satisfaction with professional competence		
Much unsatisfied	0.0077	0.0009
Unsatisfied	0.030	0.001
Not satisfied not unsatisfied	0.072	0.002
Satisfied	0.669	0.004
Much satisfied	0.219	0.003
No response	0.0006	0.0001
Patient Satisfaction with human characteristics		
Much unsatisfied	0.2004	0.003
Unsatisfied	0.1894	0.003
Not satisfied not unsatisfied	0.1915	0.003
Satisfied	0.2043	0.003
Much satisfied	0.2141	0.003
No response*	n.a.	n.a.
Patient Satisfaction with status of facilities		
Much unsatisfied	0.0132	0.001
Unsatisfied	0.0506	0.002
Not satisfied not unsatisfied	0.1250	0.003
Satisfied	0.7070	0.004
Much satisfied	0.100	0.002
No response	0.0030	0.0002
Objective Personal Variables		
Age1	0.1877	0.003
Age2	0.5049	0.004
Age3	0.3053	0.003
Female	0.6829	0.003
Household Composition Variables		
Household type		
Living alone	0.0883	0.0024
Living with couple	0.1892	0.0033
Nuclear family	0.5541	0.0042
Lone parents	0.0766	0.0023
Other household types	0.0916	0.0025
Marital Status		
Single	0.1581	0.0031
Married / Common law	0.7060	0.0039
Divorced	0.0314	0.0015
Widow	0.1034	0.0026
Socio-Economic Variables		
Education		
No schooling	0.2689	0.0036
Primary schooling	0.4838	0.0044
Secondary schooling	0.1677	0.0032
University degree	0.0769	0.0024
Occupation		
Working	0.3179	0.0040
Unemployed	0.0558	0.0019
Retired	0.1114	0.0025
Student	0.0237	0.0013
Housewife	0.4471	0.0042
Household Income (Euros per month)		
Income 1 - <= 500 €	0.1311	0.002
Income 2 - >500 € & <=750 €	0.1170	0.002
Income 3 - >750 € & <=1000 €	0.1408	0.003
Income 4 - >1000 €	0.2440	0.003
Subjective Personal Variables		
Reported Health Status		
Good health	0.6916	0.0038
Regular health	0.2504	0.0035
Bad health	0.9443	0.0019
Number of visits to primary care physician last year		
Freq 1 - <= 4	0.2557	0.0037
Freq 2 - 5 - 11 visits	0.2502	0.0038

Freq 3 - 12 - 21 visits	0.2616	0.0040
Freq 4 - 22 or more visits	0.1452	0.0031
Expectation variables		
Evaluation of current situation of health care service		
Paspi_1 – Very bad	0.0032	0.004
Paspi_2 – Bad	0.0499	0.001
Paspi_3 – No bad, no good	0.2887	0.004
Paspi_4 – Good	0.5501	0.004
Paspi_5 – Very good	0.0353	0.001
No response	0.072	0.002
Evaluation of the situation of health care service in 3 years time		
Faspi_1 – Very bad	0.0038	0.0005
Faspi_2 – bad	0.0262	0.001
Faspi_3 – No bad, no good	0.1597	0.003
Faspi_4 – good	0.5703	0.004
Faspi_5 – Very good	0.0551	0.001
No response	0.1842	0.003
Market Characteristics		
Scheduling		
Appointment	0.7127	0.0039
Number	0.2370	0.0039
Other	0.0501	0.0026
Patient density ratio		
ratio_1 - ≤5.000 patients/doctor	0.1933	0.004
ratio_2 – 5.001-6.000 patient/dr.	0.2431	0.004
ratio_3 – 6.001-7000 patients/dr.	0.2611	0.002
ratio_4 - >7.000 patients/dr.	0.3023	0.002
Type of centre		
tcentre_1 - health centre	0.7250	0.00001
tcentre_2 - consulting room	0.251	0.003
tcentre_3 - part-time consulting room	0.0233	0.003
Habitat		
rural - ≤5.000 inhabitants	0.2286	0.0051
nonrur – 5.001-100.000	0.2464	0.0044
urban - >100.000	0.5249	0.0026

Table 2

Relative Importance Pratt Index for different dimension of satisfaction with primary care

Dimension	Importance (%)
Organizational Issues	0.451
Professional competence	0.040
Human characteristics	0.241
Status of Facilities	0.268

Dependent variable: OS = patient satisfaction with overall primary care in terms of whether she would recommend or not the service to a friend (0= 'I would not recommend the service at all'; 1= 'I would recommend the service'

Table 3
Ordered probit regression: Seemingly unrelated estimations for different dimensions of overall user's satisfaction.

Variables	$\hat{\beta}_O$	$\hat{\beta}_P$	$\hat{\beta}_H$	$\hat{\beta}_F$
Objective personal variables				
Age _1	-.11571111***	-.14460317***	-.24389424***	.00294192
Age_3	.25557133***	.20724944***	.37687378***	.16769879***
Male	.01786228	-.0273901	.18041391***	.00255197
Household Composition vars.				
Living with couple	.05262104	.04819164	.27454164***	-.04189855
Nuclear family	-.00337782	.05318415	-.01174204	-.04032927
Lone parents	.10954411*	.10051042	.04318605	.05213376
Other household types	.00780924	.12455124*	.0645763	-.00013633
Married/common law	-.06922655	.00064844	-.41562887***	-.00222262
Divorce	-.12049158	-.08978969	-.3276476***	-.03414345
Widow	.01047684	.05944259	-.11318399*	-.07109333
Socio-Economic vars.				
Primary schooling	-.11014311***	-.02509835	-.00163485	-.12542681***
Secondary schooling	-.25429747***	-.00355898	-.08598399*	-.08820433*
University level	-.09377162	.09966456*	.07119726	-.04738001
Unemployed	-.12205644*	-.11763673*	-.13447015**	-.00891982
Student	.13270788	.16222948*	.26433866***	.19870928**
Retired	-.06240778	-.00830542	-.08134663	.09718374*
Housewife	.01553955	.04981253	.0436636	.09856483**
Income_1	.01610687	.02242939	-.0122734	.02739064
Income_2	.00755045	.04842255	.05233041	.01722828
Income_4	.04343482	-.00023026	.00176776	-.00781228
Subjective personal variables				
Bad health	-.15837154**	-.21149763***	.02333476	-.05032183
Good health	.12305861***	.08272226**	.00214574	.08544628***
Freq_1	-.03552094	-.01876486	.11433102***	.03694292
Freq_3	.01980258	-.00257281	.0727735*	-.01784745
Freq_4	.05459599	.08734888*	.03567229	-.03753511
Expectation variables				
Paspi_1	-.91124358***	-.35178962	.20282829	-.40655336*
Paspi_2	-.36129784***	-.27642642***	.01798941	-.18664509***
Paspi_4	.34982716***	.21114797***	.14972911***	.29768345***
Paspi_5	.97992464***	.82007654***	.47659732***	.83990945***
Faspi_1	-.51539227**	-.63820831***	-.42809014**	-.26504601
Faspi_2	-.2637344***	-.14742288	-.16969762*	-.0535015
Faspi_4	.07601098*	.1466188***	.07253578*	.01297778
Faspi_5	.38108842***	.36089371***	.1297499*	.24968242***
Market variables				
Number	-.03346193	-.09024099**	.05010984	-.10068657***
Other scheduling	-.17114708**	-.11622403	-.03691847	-.02174802
Ratio_2	-.01544099	-.06148384	-.17367332***	-.08725981
Ratio_3	-.1531635**	-.16646958***	-.20601571***	-.23965387***
Ratio_4	-.15998736**	-.20240493***	-.16454365***	-.21623065***
Tcentre_1	-.01451073	-.09344659*	-.53223027***	.18561555***
Tcentre_3	-.08082546	.01968446	.58355214***	.01415028
Rural	-.01032908	-.03439251	-.06089902	-.05562985
Ronrur	-.05669635*	-.0692725**	-.19493014***	-.15208758***
$\hat{\gamma}_1$	-2.3060215***	-2.4365553***	1.3869233***	-2.1438232***
$\hat{\gamma}_2$	-1.5634713***	-1.7445927***	-.75335157***	-1.409719***
$\hat{\gamma}_3$	-.73320476***	-1.1550464***	-.18587602*	-.73762447***
$\hat{\gamma}_4$	1.624195***	.95363324***	.48368209***	1.5155998***

Omitted Categories: Female, living alone, single, no schooling, working, Income_3, Regular health, Freq_2, Paspi_3, Faspi_3, Number, ratio_1, Tcentre_2, urban.

TABLE A1 Variable codes with description

Variable	Description
Dependent variables	
OS	= patient satisfaction with overall primary care in terms of whether she would recommend or not the service to a friend (0= 'I would not recommend the service at all'; 1= 'I would recommend the service'
DS1	= respondent satisfaction rating of following dimension of primary care: organizational issues where 1 denotes 'very unsatisfied' and 5 denotes 'very much satisfied'.
DS2	= respondent satisfaction rating of following dimension of primary care: professional competence where 1 denotes 'very unsatisfied' and 5 denotes 'very much satisfied'.
DS3	= respondent satisfaction rating of following dimension of primary care: human characteristics where 1 denotes 'very unsatisfied' and 5 denotes 'very much satisfied'.
DS4	= respondent satisfaction rating of following dimension of primary care: status of facilities where 1 denotes 'very unsatisfied' and 5 denotes 'very much satisfied'.
Objective Personal Variables	
AGE	= age of respondent at date of interview. It is coded into 3 categories: 1. *18-30 years old*. 2. *31-60 years old*; and 3. *more than 60 years old*
SEX	=1, if gender is female, 0 otherwise
Household Composition Variables	
MARITAL STATUS	This variable is coded into 5 categories: 1. *Single*; 2. *Married or living as couple*; 3. *Separated or divorce*; 4. *Widow*; and 5. *Other marital status*
HOUSEHOLD TYPE	This variable is coded into 5 categories: 1. *Living alone*; 2. *living as a couple*; 3. *Nuclear family*; 4. *Lone parents*; and 5. *Other household type.*
Socio-Economic Variables	
EDUCATION	This variable is coded into 4 categories: 1. *No schooling*; 2. *Primary studies*; 3. *Secondary studies*; and 4. *University level*.
OCCUPATION	This variable is coded into 5 categories: 1. *Working;* 2. *Unemployed*; 3. *Student*; 4. *Retired*; 5. *Housewife*.
INCOME	Monthly net income coded into 4 categories: 1. <=500 €/month; 2. >500 € & <=750 €/month; 3. >750 € & <=1000 €/month; 4. >1000 €/month
Subjective personal variables (Psychological)	
HEALTH	Reported health status is coded into 3 categories: 1. Good health; 2. Regular health; 3. Bad health
FREQUENTATION	Number of visits to primary care physician during the year coded into 4 categories: 1. 4 or less visits; 2. between 5 and 11 visits; 3. Between 12 and 21 visits; 4. More than 21 visits.
Individual expectations	
P_ASPIRATIONS	Evaluation about the current situation of the health system, coded into 5 categories where 1) denotes very bad and 5) denotes very good
F_ASPIRATION	Evaluation about how the respondent perceives the situation of the health system in 3 years time, coded into 5 categories where 1) denotes very bad and 5) denotes very good
Market Variables	
SCHEDULING	Access to the system, coded into 3 categories: 1. Appointment; 2. Number; 3. Queuing.
CENTRE TYPE	Type of centre coded into 3 categories: 1. *Health centre*; 2. *Consulting room*; 3. *Part-time consulting room*.
PATIENT DENSITY RATIO	Number of patients per doctor coded into 4 categories: 1. <=5000 patients/doctor; 2. 5001-6000 patients/doctor; 3. 6001-7000 patients/doctor; 4. >7000 patients/doctor.
HABITAT	Type of habitat, coded into 3 categories: 1. Rural (<=5000 inhabitants; 2. Non-rural (5001-100.000 inhabitants); 3. Urban (more than 100.000 inhabitants).

APPENDIX: Methodological Considerations

The relative Pratt index is a geometric extension based on the axiomatic derivation in the 2-variable case (27) of the product of the simple correlation and beta coefficient of a variable DS_j (j=O, P, H or F) from the standardized regression equation of the form:

$$OS = \beta_1 DS_O + \beta_2 DS_P + \beta_3 DS_H + \beta_4 DS_F \tag{1}$$

The relative Pratt index d_j (28) is then computed as follows:

$$d_j = \beta_j r_j / R^2 \tag{2}$$

The resulting quotient d_j is the proportion of variance R^2 in the criterion variable accounted for by the predictor variable DS_j ("Standardized Pratt measure") with r_j being the sample estimate of the simple correlation between OS and DS_j. Thus, the relative importance of variable DS_j in a regression equation is determined by the proportion of the variance in the criterion variable OS accounted for by DS_j (27, 28) where DS_j is a predictor variable in the regression model. Because of its additive property and simplicity in interpretation, the relative Pratt index has an advantage over the semi-partial correlation and lends itself as the most appropriate index to use in determining relative importance and ordering of variables. Furthermore, according to Ochieng and Zumbo (2001) (29) relative Pratt index remains relatively robust in terms of variable ordering of relative importance under the stated conditions of types correlation matrix, type of response pattern distribution, use of Likert scale data and number of Likert scale points.

Now, in order to study the importance of individual and market characteristics on reported user's satisfaction over specific dimensions of healthcare, we establish a system of equation with the different dimensions considered. Given the ordinal nature of the dependent variables (i.e. healthcare dimensions), and the potential correlation of the disturbances (error terms) **seemingly unrelated ordered probit regressions** are estimated[5].

The seemingly unrelated regression model expressed as follows (30):

$$DS_{ij} = x_{ij}'\beta_j + \varepsilon_{ij}, \qquad\qquad i = 1,...,N; j = O, P, H, F \tag{3}$$

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[5] We further assume linear dependence between dimension variables DS_{ij} and the set of independent variables (X_{ij}), β_j and ε_{ij}, and that $\varepsilon \approx N(0,1)$

assumes that the standard conditions for the classical regression model hold for each j: namely,

$$E(DS_j) = X_j \beta_j$$

$$V(DS_j) = \sigma_{jj} I_N \tag{4}$$

However, it further allows nonzero covariance between the error terms ε_{ij} and ε_{ij} for a given individual i across equations j and k, i.e.

$$Cov(\varepsilon_{ij}, \varepsilon_{ik}) = \sigma_{ij} \tag{5}$$

while assuming

$$Cov(\varepsilon_{ij}, \varepsilon_{i'k}) = \sigma_{ij} \tag{6}$$

if $i \neq i'$. It is the potential nonzero covariance across equations j and k that allows for an improvement in efficiency of this estimation relative to the classical least squared estimator of each β_j.