Determinants of household health spending in Mexico

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Abstract

In Mexico, out-of-pocket and catastrophic spending are persistent across the income distribution spectrum, and a filiation with health institutions does not safeguard individuals against such possibilities. This study estimates tobit models to analyze the determinants of out-of-pocket and catastrophic health expenditures, and finds that regional, individual, and household characteristics cause heterogeneity in health spending behaviors. The data suggest that the effective use of public services reduces, albeit insufficiently, the probability of incurring excessive expenditures. Public policies should focus on health promotion and disease prevention, as well as on reducing the gaps in the quality of public health services.

Keywords: health expenditure; income distribution; public services; disease prevention; tobit models.

1. INTRODUCTION

According to several authors, out of pocket expenses from households for health matters are an indicator of the inequality that exists within the health system, (Xu *et al*., 2007; Van Minh *et al*., 2013; Cinaroglu, 2018). This is particularly representative in low and middle-low-income countries (Mills, 2014), although developed countries are not exempt (WHO, 2017; Baird, 2016). Even the 3rd goal of the Sustainable Development Goals (SDGs), item 8, states that universal coverage includes protection against financial risks, and considers the proportion of households with high health expenditure as an indicator of the percentage of household spending (UN, 2019). Health expenses become catastrophic when a household must reduce its basic consumption for a period of time to meet health expenditures over a certain threshold (Xu *et al*., 2003). Therefore, understanding the factors occur more frequently in the cases of excessive health expenses allows for public policy proposals that are more in tune with reducing existing disparities within the population.

The health system in Mexico functions under a combined health model in which public and private figures intervene. In addition, Martínez and Murayama (2016), point out that in Mexico, the right to healthcare is differentiated by the institution of affiliation, since protection is greater when obtained as a work benefit, and that this occurs in an environment where a large part of the population works in informal occupations[1] . Thus, having social security, (affiliation as a work benefit), reduces the probability of having catastrophic expenses (Knaul, *et al.,* 2018; Granados-Martínez and Nava Bolaños, 2019), although this seems to increase when individuals working in the informal sector are affiliated to programs that are associated with the Ministry of Health services[2] (Díaz-González and Ramírez-García, 2017). In addition, the population that does not have access to any of these forms of affiliation, or that encounters barriers when accessing it, can substantially increase the probability of resorting to the private health sector (Bautista-Arredondo *et al.,* 2014).

This article aims to identify the variables that explain the differences between the levels of out-of-pocket expenses and catastrophic health expenses in Mexico. Therefore, we will use different characteristics of individuals and households, as well as the impact of public expenditure per capita, which will potentially create regional divergences. The comparison between out-of-pocket spending and catastrophic spending, as well as the scope of public expenditure, creates a contribution to the recent literature about the issue of health spending in the country. Thus, this document is composed of six sections, including the introduction, and begins by reviewing Mexico's health system's background, and continues with the literature that focuses on the analysis of excessive health costs in the country. The fourth part deals with the methodology needed in order to continue the analysis of the econometric results, and concludes with some of the implications of, as well as observations on public policy.

2. THE HEALTH SYSTEM IN MEXICO

Following the authors Gómez-Dantés *et al*. (2011) and Martínez and Murayama (2016), the Mexican health system is composed of a private sector and a public one. The private sector offers its services only to those individuals who have the economical ability to pay the suppliers and insurance companies; however, the public sector is much more complex. On the one hand, there is the public subsector of the Social Security System, that serves formal workers and their families, as well as retired people. The Mexican Social Security Institute (Spanish acronym *IMSS*), the Institute for Social Security and Services for State Workers (Spanish acronym *ISSSTE,* at a federal and state level*),* and the services offered to workers from Mexican Petroleum Industry (Spanish acronym *PEMEX),* Ministry of National Defence (*SEDENA),* and the Navy (*SEMAR)* are in this category. The other public subsector is the Social Protection System in Health (*SPSS*), for individuals who are not entitled to social security, where the Secretary of Health (*SSA)* also coordinates the State Services of Health (*SESA),* the *IMSS*- Opportunities program (known later as *IMSS-Prospera, IMSS-P* in Spanish*)* and the Public Insurance, known in Spanish as *Seguro Popular (SP).*

The National Survey of Household Incomes and Expenditures (Spanish acronym ENIGH) from 2018, reports that almost 86% of the population was affiliated to a health service. Table 1, shows data reported from the National Council for the Evaluation of Social Development Policy (Spanish acronym CONEVAL),

which indicates the evolution of the distribution of the population affiliated among the various public health programs, even if a person could be registered in more than one program or institution, a situation which has been, and is being, corrected (Spanish acronym SSA,2019a). The population insured with the institutions associated with formal employment plans remained relatively constant during the period of 2008-2018, while the SP showed the greatest increase during the same time frame. This is due to the goal of universal health services coverage implemented in Mexico, (García-Junco, 2012).

Table 1. Percentage of the population insured according to the institution

Affiliation by institution	*2008*	*2010*	*2012*	*2014*	*2016*	*2018*
Public Insurance (SP)	19.3	30.5	40.8	43.5	45.3	42.2
IMSS	31.2	31.8	32.1	34.0	35.4	36.4
ISSSTE-ISSSTE ESTATAL	6.6	7.3	6.6	6.8	7.0	6.9
PEMEX-SEDENA-SEMAR	0.9	0.9	0.9	1.0	0.8	0.8
IMSS-PROSPERA	-	-	-	-	1.0	0.3
Others	2.7	2.3	2.6	2.1	1.6	1.5

Source: adapted from CONEVAL (2019).

The operational branch of the SPSS, the SP, was founded as a budget program that started operating in 2004. The main goal of the SP was to achieve health service coverage through public and voluntary affiliation for the individuals without access to social security, as well as financial protection for that same population group. (Martínez and Murayama, 2016).

According to Flamand and Moreno-Jaimes (2015), a considerable innovation of this program was that the resources were distributed according to the number of members, while taking advantage of the existing infrastructure and operational capacity of the federal entities, which, as the authors point out, created differences in their efficiency and quality in health services. Thus, the SP used the resources and infrastructure of the SSA and SESA, and eventually, the IMSS' and those of private suppliers (Gómez-Dantés *et al*., 2011).

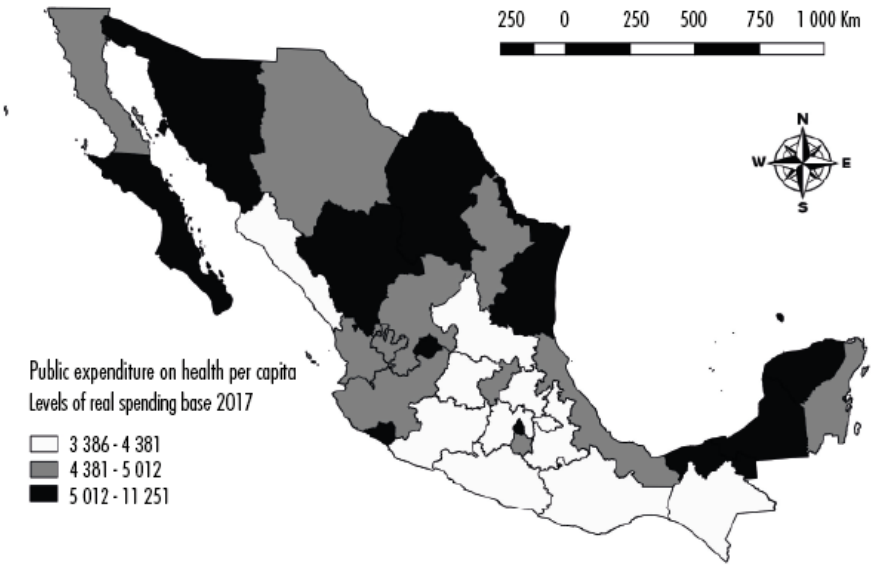
The total public expenditure on health that is allocated to the finance of the health system is composed of different funds. According to the General Directorate of Health Information (SSA, 2019b), the public expenditure is divided into the Health Secretariat (Ramo 12), the *IMSS-Prospera* (Ramo19), the Health Services Contributions Fund (Spanish acronym FASSA-Ramo 33), State Spending, SEDENA (Ramo 7) , SEMAR (Ramo 13), the IMSS, the ISSSTE, PEMEX, the Social Security Institute for the Mexican Armed Forces (Spanish acronym ISSFAM) and the Social Security Institutions of the Federal Entities (Spanish acronym ISSES). Information regarding these levels of expenditure is available in the System of Health Accounts at Federal and State Levels (Spanish acronym SICUENTAS, 2019).

Financing of the health system in Mexico has major inequalities, in terms of the condition of insurance and among federal entities. Murillo and Almonte (2020) indicate that between 2014 and 2018, 53.8% of the public expenditure was allocated to institutions of social security, while 46.2% was designated to programs for the population without a work affiliation, even though the gap between these proportions was reduced to a large extent after the introduction of the SP, as noted by Martínez and Murayama (2016). However, the authors point out that the diversity of demographic, economic and administrative criteria led to segmentation and heterogeneity of services, because the strong divergences among federal entities can be explained by the importance of formal employment in the state labor markets and by the lack of health coverage.

The SSA (2019a) also provides important observations, highlighting that public spending has been state-differentiated, decreasing lightly in the period of 2012-2017, and that spending on curative care services reached 85% of participation. Thus, these differences among federal states are reflected in the disparities of the improvements in health care services and infrastructure, as there are still places where individuals must travel long distances to receive medical assistance (Aguilera and Barraza-Lloréns, 2011). To this end, Méndez (2019) states that the indicator for per-capita public spending decreased for all health institutions, considering the time frame of 2010-2020. This occurs, he warns, due to the decreasing trend of the amount allocated, (as a percentage of the country's Gros Domestic Product (GDP), and because the budget formulation is not commensurate with the population that is expected to be cared for, which causes a major inequality in the resources assigned by the institution.

Public financing is one of the most important elements of the health system as it reflects the priority that the government assigns to health care for the population (Gutiérrez, 2018). Figure 1 shows the geographical distribution of total per capita public health expenditure for 2017, classifying the states by their level of spending. In order to consider the heterogeneity of public spending in the country, regionalization from Figure 1 is suggested for the upcoming analysis.

Figure 1 Total per capita public health expenditure, 2017



Source: Compiled by the authors based on data from SICUENTAS (2019)

- Region 1 (High expenditure): Sonora, Coahuila, Tamaulipas, Baja California Sur, Durango, Aguascalientes, Colima, Mexico City, Tabasco, Campeche and Yucatán.
- Region 2 (Average expenditure): Baja California, Chihuahua, Nuevo León, Zacatecas, Nayarit, Jalisco, Querétaro, Veracruz, Morelos and Quintana Roo.
- Region 3 (Low expenditure): Sinaloa, San Luis Potosí, Guanajuato, Michoacán, Hidalgo, México, Guerrero, Tlaxcala, Puebla, Guerrero, Oaxaca and Chiapas.

This shows that there are great inequalities in the attention and quality of health care services. The differences exist between the public and private sectors, but there will be differences among institutions of the public sector (Martínez and Murayama, 2016), as well as among federal entities.

3. CATASTROPHIC EXPEDINTURE IN HEALTH AND ITS IMPACT ON HOUSEHOLDS

Catastrophic spending on health has been a matter of study in Mexico due to its impact on the well-being of households. Studies suggest that excessive health expenses have reduced over time and that this reduction has partly been achieved through increased access to health services and the roll of the SP's public program. Nevertheless, the results show that there is heterogeny not only at a regional level, but also because of the socioeconomic differences of individuals. Herein are documents that provided the basis for examining-analysing this problem.

From a survey developed to examine the impact of the SP, King *et al.*, (2009) find that this program reduced catastrophic household spending. They also point out that the program works better in poorer areas and is related more to the quality and quantity of facilities, (health centres, hospitals, etc.), than to the families' characteristics.

For their part, Grogger *et al.* (2014) emphasize that despite the significant reduction in catastrophic expenditures, the SP's protection is heterogenous, because rural areas with less access to health care facilities face less significant reductions, while areas with greater access to larger facilities do present considerable financial protection. This finding is also concluded in studies such as Leyva-Flores *et al.* (2013) and Gutiérrez *et al.* (2016), which stress the need for comprehensive policies in order to address or attack the inequalities in access to health services.

Some studies focus on the search for the protective effect of services on health spending in different areas. Galárraga *et al.* (2010) aim at a national-level protective effect of the SP on the spending of medicines and outpatient costs, but not on hospitalization costs. Garrido-Latorre *et al.* (2008) analyse the percentage of prescriptions delivered to users of the outpatient services of the SSA and SP services for 2006, indicating that while it had been possible to improve the level of complete delivery of prescriptions, the catalogue of medications favoured those with a low unit cost at the expense of those with the higher prices and therapeutic efficacy.

In a similar vein, Wirtz *et al.* (2012) observe that the difference in the probability of incurring expenses is not significant between the beneficiaries of the SP and those who do not have affiliation, the latter being the ones who present the highest level of expenditure. This, they explain, may be due to the limited medication catalogue and their shortage, which causes households to use the SP service but to purchase the medication privately.

The analysis by Pérez *et al*. (2013) focuses on the modality of medical care services in offices adjacent to private pharmacies. They confirm that the highest use is by SP users, followed by those who have no affiliation whatsoever. The underlining problem is the great difference in the probability of obtaining the medication depending on the institution that is providing the care, since compared to 2006, the non-supply rate increased among users of public services, (Wirtz *et al.*, 2013). A more recent study by Pavón-León *et al*. (2017), reports that for those affiliated to the SP in Xalapa, Veracruz, 95% of the samples had to incur out-of-pocket expenses in order to obtain medications that were covered by the institution.

Knaul *et al.* (2018), analyse the effect of the SP based on the information from ENIGH, from 2004 to 2012. The authors find that affiliation to the SP reduces the probability of incurring catastrophic expenses, as well as the presence of the SP in the entity and the expansion in its coverage. They add that if elderly people and children under the age of five live in the household, the probability of presenting excessive expenses increases, the same happens if the household receives remittances.

Despite the above, those affiliated with the SP and those not affiliated to any institution do not present significant differences in levels of catastrophic spending. With the 2010 ENIGH, Díaz-González and Ramírez-García (2017) show that, although one cause of health spending is not being affiliated with the public system, having SP is not a guarantee of not presenting it either. The authors point out that insurance is a determinant of spending, but it is not a determinant of the probability of incurring catastrophic expenses, since more than 90% of health spending comes from families' pockets. Likewise, income does not seem to be a determinant factor in the presence of catastrophic expenses, since it is a phenomenon that occurs through the distribution.

On reviewing the literature, three general conclusions can be drawn regarding health spending in Mexico. First, the fragmentation of the health system causes differences in terms of coverage, as well as the level of out-of-pocket spending across the entire population. Second, the fact that the SP operates from the existing infrastructure reduces its ability to provide adequately for its beneficiaries. Third, the majority of documents conclude that the behaviour of out-of-pocket spending is heterogeneous among the population that attends the various systems; the SP in particular is the system that presents the least protective effects, in addition to being highly differentiated according to the socioeconomic and regional characteristics of the individuals.

4. DATA AND MODELS USED

According to reports by the World Health Organisation, (World Health Organisation [WHO], 2017) there is no single approach to measure catastrophic health expenditure. For the SDGs, health spending can be defined as catastrophic when it exceeds 10 or 25% of the income or total consumption (WHO,2017). This methodology is often called "budget participation." In this study, this perspective is used considering a 10% threshold on income, taking into account that the income involves government transfers and remittances from abroad, considerable amounts that are spent on health matters (Díaz-González and Ramírez- García, 2017; Knaul *et al*., 2018; Mora-Rivera *et al.*, 2018). This is also for comparative purposes with other studies carried out for Mexico, which use the approach of Xu *et al*. (2003), considering payment capacity, (income, or consumption, minus food expenditure), of households.

All the variables used in this article are obtained or constructed from the ENIGH 2018 (see Table 2) and are suggested from the review of national and international literature about out-of-pocket and catastrophic spending, (see Guzmán, 2018).

Table 2. Definition of variables

Variable	*Definition*
Variables regionales	
REGION	Region in which the individual resides in, according to regionalisation of figure 1. Region 1: High expenditure Region 2: Average expenditure; Region 3: Low expenditure (category of reference).
RURAL	Dichotomous, 1 if the household is located in a community with less than 2 500 habitants.
Household characteristics	
ADMAY	Binary, 1 if there are people of 65 years of age, or older in the household.
NINOS	Binary, 1 if there are children younger than the age of five in the household.
OCUPA	Number of occupants in the household
Characteristics of the individual	
SP	Binary, 1 if the individual is enrolled in the SP program.
IMSS-ISSSTE	Binary, 1 if the individual is enrolled in the IMSS or ISSSTE (federal or state level)
OTHER	Binary, 1 if the individual is enrolled in the service provided by PEMEX, SEDENA, SEMAR, IMSS-P, private or others.
DISCAP	Binary, 1 if the individual presents a disability.
AGE	The individual's age
SEX	Binary, 1 if the individual is male.
PRIVATE	Binary, 1 if the individual went to a private health service the last time he or she was treated for any discomfort.
ICTPC	Total monthly current income per capita [a].
QUINTIL	Indicates the quintile the individual is in, according to their total monthly current income per capita, the first quintile will be taken as a reference [b].
Dependent variables	
GB	Monthly out-of-pocket spending per capita.[c]
GBC	If GB/ICTPC ≥ (0.10)*(ICTPC) then GBC= GB/ICTPC, on the contrary GBC=0.

Notes: [a] The total current income per capita used by CONEVAL is considered to calculate poverty. To clean up the database, the observations without report, reports of zero and reports of less than 40 and of more than 50 thousand pesos per month were eliminated in the variable total current income per capita, which meant the loss of less than 1% of the total sample. [b] A Box-Cox transformation is applied to the variable ICTPC to normalize the data distribution. Quintile analysis was carried out from the transformed data. [c] Health care spending in citizens is made up of three groups: outpatient care, hospital and medicines, and it considers the expenditure in the last three months. Monthly health care expenses are divided by the equivalent of adults that make up the household, considering the CONEVAL scale for calculating poverty.

Source: Compiled by the authors based on data from ENIGH, 2018.

For the calculation of health spending, all 72 items considered in the ENIGH 2018 were used in order to obtain the total monthly current health spending per capita (which will be called out-of-pocket spending, *GB*). Two tobit models were taken into account, one for out-of-pocket expense and one for the catastrophic out-of-pocket expense (*GBC*). That is, in the second model the population that presents *GB* but is not excessive will have the value of zero in the dependent variable; so the distribution of the *GBC* will be approximately continuous for the values in which the health expenditure is positive and catastrophic. The decision to make a comparison is due to the approach that establishes that allocating a greater amount of income to health spending can be seen as a form of investment by households, and not as a problem, unless said spending represents a financial difficulty, (Dmytraczenko *et al.*, 2017).

The tobid model is represented by a latent variable determined by the observed independent variables and the error term that is supposed to present a normal distribution, (Johnston and Dinardo, 1997; Greene, 2003; Bravo and Vásquez, 2008). The observed variable will be equal to the latent variable when this variable is positive, in this case when the individual incurs in *GB* and *GBC*, respectively. The estimated β parameters directly measure the marginal effects of the independent variables on the health expenditure variable.

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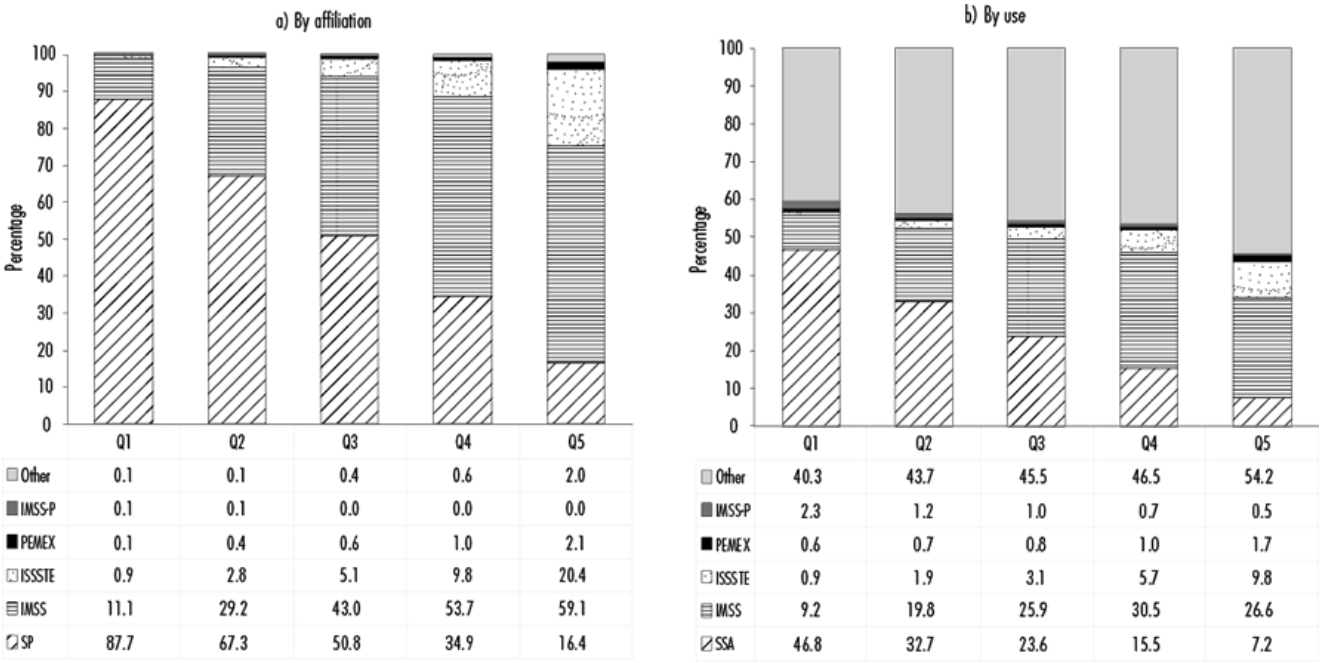
5. CONTEXTUAL ANALYSIS AND EMPIRIC RESULTS

In addition to the information on health spending in the last three months, information on the use of health services as well as their affiliation is reported in the ENIGH 2018. Individuals were asked when they had last suffered any pain, discomfort, illness or an accident that prevented from carrying out their daily activities, and in which medical institution they received medical attention.

Figure 2 shows the analysis of the population distribution by quintiles according to the place of affiliation. It follows that in the face of increases in income, the amount of population affiliated to the SP decreases; the opposite occurs with the affiliation to the IMSS and ISSSTE. The previous results are consistent with Méndez's (2017) data, who finds that the beneficiaries of the SP are concentrated in the lower-income population, (deciles from I-V), and those affiliated to formal institutions (IMSS and ISSSTE) belong to the highest deciles (VI -X). Figure 2b presents the distribution of the service used last time it was attended, according to the quintile in which they are located. This result is consistent with other completed studies (Danese-dlSantos *et al.*, 2011; Ávila-Burgos *et al.*, 2013; Bautista-Arredondo *et al.*, 2014) which show that as the socioeconomic level of individuals rises, they are less likely to access the health service to which they are affiliated, because attendance at services provided by the SSA is concentrated on the poorest population whereas those with higher income are inclined to access private services. Others, refers to the services of private clinics and hospitals, as well as alternative ones. However, this last point highlights that even in the lowest income quintile a high assistance to private services is reported.

Figure 2. Distribution by quintiles, according to affiliation and use



a) By affiliation	Q1	Q2	Q3	Q4	Q5
Other	0.1	0.1	0.4	0.6	2.0
IMSS-P	0.1	0.1	0.0	0.0	0.0
PEMEX	0.1	0.4	0.6	1.0	2.1
ISSSTE	0.9	2.8	5.1	9.8	20.4
IMSS	11.1	29.2	43.0	53.7	59.1
SP	87.7	67.3	50.8	34.9	16.4

b) By use	Q1	Q2	Q3	Q4	Q5
Other	40.3	43.7	45.5	46.5	54.2
IMSS-P	2.3	1.2	1.0	0.7	0.5
PEMEX	0.6	0.7	0.8	1.0	1.7
ISSSTE	0.9	1.9	3.1	5.7	9.8
IMSS	9.2	19.8	25.9	30.5	26.6
SSA	46.8	32.7	23.6	15.5	7.2

Source: Compiled by the authors, based on data from ENIGH, 2018.

Table 3 presents information of the *GB* in the monthly health per capita, considering only the individuals who reported positive spending according to the service they are affiliated to. The highest average spending on health was presented by those affiliated to the ISSSTE, followed by the members affiliated to PEMEX. It is also observed that the individuals from the lowest quintile affiliated to the SP and the IMSS-P also present *GB*, in both cases slightly lower than that reported by those of the IMSS or the ISSSTE. However, SP affiliates from the first quintile reported maximum expenses higher than those incurred by those enrolled in the other health services.

Table 3. Maximum and average of the GB per quintile and per institution

		Quintile				
Institution		*1*	*2*	*3*	*4*	*5*
SP	Maximum	6 075.69	22 150.63	8 197.26	30 499.90	25 173.78
	Average	63.65	74.21	102.65	150.51	314.06
IMSS	Maximum	3 114.95	22 150.63	6 913.04	24 667.87	46 956.51
	Average	75.00	77.58	82.73	119.45	294.95
ISSSTE	Maximum	1 159.09	1 388.07	8 197.26	5 959.19	17 253.25
	Average	81.95	81.21	113.15	146.67	365.39
PEMEX	Maximum	177.06	729.55	688.57	616.91	7 628.91
	Average	51.64	50.41	94.62	75.10	232.76
IMSS-P	Maximum	179.02	784.07	131.87	101.64	582.82
	Average	59.33	109.91	33.24	17.69	181.58

Source: Compiled by the authors based on data from ENIGH, 2018.

The behaviour of catastrophic expenditures can also be analysed. According to Table 4, catastrophic expenditures mainly affect people located in the first quintile and who live in regions with medium and low per capita public spending (Region 2 and 3, respectively). Although it is pointed out that the excessive expenses seem to occur throughout the territory, even in the face of higher public spending on health. Even though the differences between regions are not considerably large, it is perceived that they are maintained throughout the distribution within the same region, (except for the lowest quintile).

Table 4. Percentage of incidence of catastrophic spending by regions

Quintile	*Region 1*	*Region 2*	*Region 3*
1	7.2	11.7	10.3
2	3.6	5.5	4.4
3	3.2	4.4	4.4
4	3.3	3.1	4.4
5	4.1	4.1	4.8
Total	4.0	5.3	5.8

Source: Compiled by the authors, based on data from ENIGH, 2018.

The results of the different econometric models proposed with the best adjustments will be presented. The explanatory variables, (presented in Table 2), were included according to the review of national and international literature on the subject (Séne and Cissé, 2015; Lam *et al*., 2016; Anderson *et al*., 2017; López del Amo *et al*., 2018), in addition to those mentioned in previous sections. All the coefficients were individually significant, and a good total significance of the model (Prob > chi2) was found in the tobit model. Given that the results were not interpreted directly, Table 5 shows the marginal effects of the censured variable of health spending.

The second and third columns show the incidence and probability of incurring positive *GB,* indicated as Pr (*GB* > 0) and Pr (*GB* = 0) respectively. In a similar manner the incidence and probability of incurring catastrophic expenses are reported in the fourth and fifth column.

Table 5. Marginal effects on the level of out-of- pocket and catastrophic spending

	Out-of-pocket spending		*Catastrophic spending*	
	Pr (GB > 0)	*Pr (GB = 0)*	*Pr (GBC > 0)*	*Pr (GBC = 0)*
Regional variables				
Region 1 (High expenditure)	-0.1125***	-0.0323***	-0.1391***	-0.0106***
Region 2 (Average expenditure)	-0.1523***	-0.0437***	-0.1377***	-0.0105***
Rural			0.1750***	0.0133***
Household characteristics				
ADMAY	0.0995***	0.0285***	0.2387***	0.0182***
NINOS	0.0991***	0.0284***	0.0436***	0.0033***
OCUPA	0.0640***	0.0184***	-0.0571***	-0.0044***
Individual's Characteristics				
SP	0.0734***	0.0211***	0.0385*	0.0029*
IMSS-ISSSTE	-0.0398***	-0.0114***	-0.1095***	-0.0084***
OTHER	-0.0973***	-0.0279***	-0.2314***	-0.0177***
DISCAP	0.1798***	0.0516***	0.2943***	0.0225***
AGE	-0.0004**	-0.0001**	0.0050***	0.0004***
SEX	-0.0519***	-0.0149***	-0.0555***	-0.0042***
PRIVATE	0.5856***	0.1681***	0.4741***	0.0362***
QUINTILE 2	0.1181***	0.0339***	-0.4165***	-0.0318***
QUINTILE 3	0.2481***	0.0712***	-0.4044***	-0.0309***
QUINTILE 4	0.3660***	0.1050***	-0.3823***	-0.0292***
QUINTILE 5	0.6380***	0.1831***	-0.3430***	-0.0262***

Notes: Statistically significative at 99%(***); 95% (**) and 90% (*) confidence.
Source: Compiled by the author based on data from ENIGH, 2018.

There are some interesting differences between the behaviours of the GB and the GBC. Regarding the region with the lowest per capita public spending, individuals living in states of the region with medium and high levels of public spending have lower levels of *GB* and *GBC* incidences, as well as a reduction in the probability of their occurrence. However, the incidence of *GBC* increases by 17.5% for those individuals who live in rural areas. This way, it is verified that the public spending can favour financial protection, so it is important to resume the State's investment in this area.

Likewise, the presence of children under five years of age increases out-of-pocket spending, as well as catastrophic expenses. While the presence of elderly people in a household can elevate the incidence of catastrophic expenses up to 23.87%, the number of people in the household has a positive effect over the *GB*, which could potentially be associated with the idea of the health spending as an investment and help reduce the incidence of catastrophic spending by 5.70%

When considering an individual's characteristics, it is undeniable that resorting to private services multiplied household expenses. Increases in the incidences of *GB* and *GBC of around 50%* are observed, while at the same time, the probability of incurring *GB was* 16.81%, and *GBC* 3.62%. If the individual has a disability, the *GB* increase by 17.98% and the *GBC* up to 29.44%. Men present a lower amount for both types of expenses, while age has a positive though marginal effect over the excesses.

It is important to emphasize the effect of the type of health service to which one is affiliated, considering not having any kind of service as a point of referral. Those individuals enrolled in the SP program present higher *GB* incidences than those who do not have any affiliation, even though they are hardly significant in the case of *GBC*. The inscription to the IMSS and the ISSSTE reduces the same incidences, reaching a decrease of almost 10% in the case of *GBC*. Even greater reductions are observed in the case of affiliation to services such as PEMEX, or private, reaching 23.14% for the *GBCs*. The picture is not much different when considering the probabilities of incurring in *GBC*. Being affiliated to the SP increases the likelihood of presenting *GBC*, although marginally and barely significant compared to not having any affiliation. Public service affiliation helps to slightly reduce this probability.

The income level of the individuals also presents an important effect. The results suggest that with higher incomes, there is a tendency to increase health spending. For example, the individuals with the highest quintile raise their *GB* by 63.52%, compared to quintile 1. In the case of the *GBCs,* income is perceived to reduce the likelihood of suffering them; however, as the income level increases, this probability slightly reduces. The latter refers to what is seen in the descriptive statistic, (see previous Tables and Figures), as well as the notes of Díaz- González and Ramírez-García (2017), who point out that the excessive expenditure is a problem that occurs throughout the distribution.

6. FINAL REFLECTIONS

Health problems are not exclusive to some segments of the population and excessive spending occurs at any income level; however, in Mexico the intention is to approach the health sector from a social justice and rights perspective to combat poverty (CONEVAL, 2009). Using this same approach, access should be given to any level of income and should adjust to the various needs of service, finance and location of resources. The aim is to allow access to prevent illnesses that are commonly associated with situations of catastrophic expenditure, especially in disadvantaged sectors of the population.

The empirical exercise carried out offers evidence of the behaviour around health spending based on certain characteristics of people. It was observed that the regional variables from households and individuals continue to be sources of differentiation for *GB* and *GBC*, increasing health spending in rural areas, in the presence of children, elderly adults and people with disabilities in the household, as well as increases in the level of individual income. In addition to the above, it was verified that the public spending on health generates differences in the levels of private spending, particularly impacting individuals from the first income quintile.

A considerable part of the literature focuses on verifying whether a protective effect from the SP exists, due to the fact that much of the most disadvantaged population was covered by this program. The results presented in this article allow us to conclude that the SP managed to protect its affiliates, with differing results, which was precisely one of the reasons why the affiliation to the SP became an element that increased the probability of incurring catastrophic expenses. One of the criticisms of the SP program was that it increased the demand for its services, while simultaneously not being able to offer enough services or quality. The decisions made on the financing of the SP responded, predominantly, to the number of affiliates and not to the installed capacity, which widened the gaps between federative entities, (Flamand and Moreno-Jaimes, 2015), and meant a detailed review of the operation of this budget program was needed.

The increase in demand for health services developed into a scenario in which the poorest households and rural areas are the ones who present the highest rates of health expenditure. Soto-Estrada *et al.* (2016) point out that in recent years there have been important changes in the epidemiological behaviour of diseases, combined with modifications in actual households, due to environmental, economic, social changes and demographic transition. During the period 2008-2018, the group under 15 years of age increased from 34.1% of the total population to 25.3% and the group aged 60 and above increased from 7.3 to 12.3% (INEGI, 2019).

A higher concentration older inhabitants is strongly related to health expenditure. Salinas-Escudero *et al*. (2019) and Granados-Martínez and Nava-Bolaños (2019) analyse the factors that influence the *GB* and *GBC* of elderly adults in the country, respectively. The first study finds that medication was the largest component of out-of-pocket expenses, ranging between 75 and 90% of the total reported health expenditure. The second study highlights that the factors with most impact on catastrophic expenses are the presence of a family member with a disability in the household, which increases the expenses and affiliation to the institutions, causing the opposite effect.

For 2017, Pérez-Cuevas and Doubova (2019) point out that four out of 10 individuals suffered a chronic disease, which adds to the already existing financial and transportation barriers, increasing out-of-pocket expenses. These authors also highlight the deficiencies in the quality of care, as well as the limited supply of preventive services for chronic diseases. In this sense, Soto-Estrada *et al.* (2016) stress the importance of disease prevention and health promotion, since in Mexico around 30% of deaths are concentrated in three main diseases: type 2 diabetes mellitus, ischemic heart diseases and cerebrovascular diseases. Diabetes is the main cause of death in the country, and causes a significant demand for medical services and hospitalization. In addition, they indicate, these conditions share risk factors that could be preventable, such as being overweight, obesity, high cholesterol, tobacco use and high blood pressure.

Dávila-Torres *et al.* (2015) point out that according to estimates from the Organisation for Economic Cooperation and Development (OECD), an effective prevention strategy would prevent around 55 thousand deaths caused by chronic diseases in Mexico. However, despite the existence of a large number of chronically ill people in the country, greater preventive care actions are not being implemented (Pérez-Cuevas and Doubova, 2019). It is therefore important that the health system evolves to deal with new challenges that societies face, in terms of the demographic and epidemiological transition, so that a health emergency such as the current Covid-19 pandemic can be effectively dealt with in future.

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[1] According to the National Institute of Statistics and Geography (*INEGI* 2018), the Rate of Informal Employment 1 (TIL1), stated by *INEGI* for the 3rd trimester of 2018, reached 56.7%, approximately 30.6 million people. Of which, 14.8 million were active in the informal sector, (Occupation Rate in Informal Sector 1), which represented 27.5% of the employed population; and 15.8 million were in informal working conditions, (the employment link is not recognized by the source of work).

[2] As Gómez-Dantes *et al.,* point out (2011), the none wage-earning sector often relies on the Health's Ministry services, on the State Health Secretariats and the *IMSS*-

Opportunities program, (known hereafter as *IMSS-Prospera, in Spanish*), adding the Popular Insurance program as of January 2004.