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**OUT OF POCKET HEALTH EXPENDITURES IN TURKEY  
IN THE AFTERMATH OF THE REFORMS:  
IMPACT OF CO-PAYMENTS ON EXPENDITURES  
AND USE OF HEALTH SERVICES**

**Burcay Erus**

**Working Paper No. 1070**

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## Abstract

In 2002 Turkey started to implement reforms in health care aiming to ease access and increase efficiency. Reforms increased insurance coverage and resulted in higher number of outpatient and inpatient treatments at both public and private hospitals. To reign in consequent increase in health expenditures, a series of co-payments were instituted. Along with that primary care services were reformed through a family-medicine system that provided free access. The aim was to channel patients to primary care and hence cut on costs of secondary care. This work aims to measure the impact of these two measures, introduction of co-payments at secondary care and ease of access to free primary care, on out-of-pocket expenditures and access/use of healthcare services. We find that while contributory payments resulted in higher OOP health expenditures, especially for lower income households, the impact was small and did not hinder access to healthcare services. Indeed, possibly due to easier access to primary care, inability to see a doctor became less prevalent. Adverse effect of the contributory payments have been limited and have largely been countered by the provision of a easily available primary care system.

**JEL Classifications:** I13, I18

**Keywords:** Turkey; healthcare reform; co-payments; family medicine

## ملخص

في عام 2002 بدأت تركيا في تنفيذ إصلاحات في مجال الرعاية الصحية التي تهدف إلى تسهيل وصولها وزيادة الكفاءة. زادت الإصلاحات من التغطية التأمينية وأسفرت عن عدد أكبر من العلاجات للمرضى الخارجيين والمرضى الداخليين في كل من المستشفيات العامة والخاصة. ولكبح جماح زيادة النفقات الصحية، أقيمت سلسلة من المدفوعات المشتركة. جنباً إلى جنب مع إصلاح خدمات الرعاية الصحية الأولية من خلال نظام طب الأسرة التي سهلت وصول الرعاية المجانية. وكان الهدف هو توجيه المرضى إلى الرعاية الصحية الأولية وبالتالي قطع تكاليف الرعاية الصحية الثانوية. ويهدف هذا العمل إلى قياس أثر هذه التدابير، وإدخال المدفوعات المشتركة في الرعاية الصحية الثانوية وسهولة الوصول إلى الرعاية الصحية الأولية مجاناً، على النفقات خارج جيب واستخدام خدمات الرعاية الصحية. نجد أنه في حين أن المدفوعات ساهمت في النفقات الصحية بشكل أعلى وخاصة للأسر ذات الدخل المنخفض، فقد كان هناك أثر صغير لها ولم تعيق الوصول إلى خدمات الرعاية الصحية. في الواقع، ربما يعود ذلك إلى سهولة الوصول إلى الرعاية الصحية الأولية، فعدم القدرة على رؤية الطبيب أصبحت أقل انتشاراً. وجدنا أن التأثير السلبي للمدفوعات الاشتراكات محدود، من خلال توفير نظام الرعاية الصحية الأولية المتاحة بسهولة.

## 1. Introduction

In 2002, Turkey started to implement reforms in health care aiming to ease access and increase efficiency (see e.g. OECD/World Bank, 2008; Atun et al., 2013). As part of the reforms, a universal health insurance scheme was gradually implemented. Premiums were paid by the government for those deemed poor based on a means-testing procedure. Decreasing informality in the labor markets helped as well and the those actively covered by public health insurance increased by about 20 percentage points to almost 90 percent in 2010s.

Along with the new health insurance scheme, healthcare provision was reformed as well. Number of private hospitals increased dramatically after public insurance started to cover care at private hospitals. In public hospitals, salary based system was replaced by a system heavily relying on a fee for service component, increasing physician productivity at public providers. Also significant were the policies discouraging (and later completely banning) public sector physicians from simultaneously operating their own small-scale practices.

These reforms resulted in higher number of outpatient and inpatient treatments at both public and private hospitals and hence increasing public health care costs. To reign in health expenditures, Turkish government introduced a number of co-payments for physician and hospital visits as well as prescription drugs starting in 2009.<sup>1</sup> While the primary care is free, co-payment for a visit to a specialist is set at 5 TL in public hospitals and at 12 TL in private hospitals (current exchange rate is 3 TL/USD). Additional charges apply for drugs prescribed by the physician. In the meantime, the limits on charges by private hospitals on top of the payments by the public insurance scheme have been increased from its earlier limit of 30% of the payment by the public insurance.

Almost simultaneously, the new primary care system based on family medicine (replacing earlier health centers) have been extended from its pilot stage to cover all the country in 2010. All individuals were assigned to a specific family medicine and there were no co-payments (excluding prescribed drugs). Along with co-payments on secondary and tertiary care, this was aimed to channel demand for care to primary providers to save on healthcare costs.<sup>2</sup>

This work aims to measure the impact of these two measures, introduction of co-payments at secondary care and ease of access to free primary care, on out-of-pocket expenditures and access/use of healthcare services. Evaluations of the initial reforms extending public insurance coverage found a number of positive results but an analysis of the reforms in the long term, after additional payments were instituted, is largely lacking.

How individuals respond to incentives when it comes to health care services has been a topic of interest for a long time. With the increase in the availability of health insurance and increasing health care costs, this became even more important. As would be expected, in the early phase of the reform with increased insurance coverage households made more use of services covered and spent smaller sums out-of-pocket. With co-payments and user fees, usage would be expected to decrease while per visit expenditures would increase. This being said, the size of the impact is far from clear, especially considering that the contributory payments are relatively small and a functional free primary care is instituted.

Healthcare reform programs in developing as well as developed countries in recent decades have been subjected to rigorous research. Most reforms incorporated universal health insurance as well as inclusion of private providers in health care services, two traits that are also common

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<sup>1</sup> These were fully implemented in 2010 due to legal cases against new fees.

<sup>2</sup> It turned out that there was another fee-free method of receiving care. Emergency care, i.e. hospital visits outside the regular working hours, were initially exempted from co-payments. Observing that a large number of such visits do not require immediate medical attention, MoH started in 2013 to charge co-payments for these visits unless they were deemed to be an emergency by the physician.

to Turkish reforms. How the coverage changed has been summed in Acharya et al. (2013) and Giedion et al. (2013) which find varying results. In other studies, looking at the insurance coverage Richardson et al. (2012), Shin (2006) and Erus et al. (2015) find lack of coverage among poor households despite claims for universal coverage. This study adds to the literature in its emphasis on the longer-term impacts.

Second strain of literature that our study relates to is on the impact of health insurance and copayments on healthcare use. This literature goes back to early years, a famous example being the well-known Rand Health Insurance experiment. Zweifel and Manning (2000) summarize the literature and point to the lack of empirical evidence especially those that address confounding factors. Wagstaff and Lindelow (2008) find that more extensive coverage may result in higher out-of-pocket payments due to adverse incentives of providers and asymmetry of information.

The work also relates to the literature evaluating the reforms in Turkey. Although limited in number, mostly due to lack of necessary data, earlier research considered various aspects of the Turkish healthcare reform. In a recent evaluation of the reforms, Atun et al. (2013) praised the Turkish reforms for expanding access and increasing health status. Aran and Hentschel (2008) analyzed the situation of poor and the change from 2003 to 2006. Yardim et al. (2010 and 2014) looked at the change in out-of-pocket expenditures from 2003 to 2009. Erus and Aktakke (2012) analyze the health expenses for formally employed and their dependents. As discussed above, these studies do not go beyond 2009 and hence miss the impact of later copayments.

In this study, we analyze Turkish case and track use of healthcare services as well as expenditures by the households in a time frame spanning about ten years, from 2003, when the reforms have started, to 2013, most recent year for which micro level data is available. Our focus is on later period, from 2008 on. We first examine out-of-pocket health expenditures using micro level data from Household Budget Surveys. We find that while contributory payments resulted in higher OOP health expenditures, especially for lower income households, the impact was small and did not hinder access to healthcare services. Indeed, possibly due to easier access to primary care, inability to see a doctor became less prevalent. Adverse effect of the contributory payments have been limited and have largely been countered by the provision of a easily available primary care system. Next section presents the methodology followed by results and conclusion.

## **2. Research Methodology**

The analysis makes use of various micro level data from Turkish Statistics Institute (TurkStat) as well as aggregate statistics obtained from the Ministry of Health (MoH). Primary data source is Household Budget Survey of Turkey (Hanehalkı Bütçe Anketi) for the years 2003 to 2013. Data provides information on monthly expenditures including OOP expenditures. Household Budget Survey comprise around 26,000 households in 2003 and 8,000 to 10,000 households in 2008, 2010 and 2013.

The first step in the analysis focus on aggregate figures for different years. Variables of interest is the ratio of households making non-zero out-of-pocket health expenditures and share of such expenditures in total expenditures obtained from HBS. We also consider aggregate statistics on use of primary and secondary care obtained from MoH's Annals of Statistics (2003-2013).

For the multivariate analysis, we focus on two dependent variables. First, we create a dummy variable indicating whether any OOP health expenditure was made. For this analysis, we use probit analysis. Second, we create some continuous variables for the share of expenditures in total household expenditures. As many households do not face a health condition, we observe a large number of 0 values. Also observed are a few very large values. To handle these properly, we run quantile regressions. We perform the analysis at median (50th quantile), 75th, 90th and

95th quantiles. Given large number of households with no OOP expenditures, median reflects the cases which require low levels of payment. We expect the higher quantiles to gradually reflect more expensive medical treatments, mostly inpatient care. Methodology allows us to track the change at different levels of expenditure and protect the estimation from dominating effects of few cases with very large expenditures and large number of cases with no OOP expenditures.

While this estimation method provides the effect of different household characteristics on OOP health expenditures at various quantiles, it does not provide average expenditures and its change through time. To address this problem, we make use of finite mixture estimation models. The method allows us to estimate a mixture of two different distributions for OOP health expenditure to reflect smaller expenditures (for trivial cases) and large expenditures (for more serious cases) separately. For each distribution, we are able to condition the mean on independent variables. Following the literature, in this analysis we focus only on those households with non-zero expenditures.<sup>3</sup>

In the finite mixture model, the density function estimated for the positive OOP health expenditures can be characterized as follows:

$$f(y|x; \theta_1, \theta_2; \pi) = \pi f_1(y|x; \theta_1) + (1 - \pi) f_2(y|x; \theta_2)$$

where  $\pi$  represents the probability that the observation is an observation from the first distribution and  $\theta_j$  is the coefficients for the  $j^{\text{th}}$  distribution.  $y$  stands for the share of OOP health expenditure (in percent). Estimation is performed using Stata's 'fmm' command.

Multivariate analysis focuses on the years after the introduction of co-payments and widespread use of family medicine system. We consider 2008 as our pre-change period and then compare it with 2010 and 2013. As independent variables, for probit, quantile regression and finite mixture model, we consider household and household head characteristics. Those that are available in the data set are household size, insurance status (uninsured, insured where premium is paid by the government, other insured), number of children and elderly, education level, gender, employment status and age of household head. Finally, we calculate total expenditures by household and adjust for the household size using modified OECD index. Then we update the figures in 2008 and 2010 by CPI to obtain them in levels comparable to the one in 2013. Summary statistics for these variables is provided in Table 1.

In multivariate analysis dummy variables for the years 2010 and 2013 are included both on their own and in interaction with income level. The coefficients for year dummies and their interaction with income will indicate the change over time in dependent variables and whether households with different income levels have been affected differentially.

For the analysis of healthcare use we make use of microdata from Survey of Healthcare Research which contains a number of questions regarding use and inability to use healthcare services. This data is available for the years 2008, 2010 and 2012. Data set provides us whether a household member had a physician visit, an outpatient and inpatient hospital visit. There are also questions on whether household members avoided a physician or hospital visit even though they needed it. Finally, we can observe from the data whether avoidance was related to the cost of the care. We divide the sample in each year in five quintiles according to the adjusted income level of the household and analyze response to these questions.

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<sup>3</sup> An alternative model handling non-spenders could be a two stage regression like Tobit models. Yet, these models are not preferred since they reflect a structural assumption regarding those with no OOP expenditure, which is not likely to be the suitable for OOP health expenditures. Hence, we exclude non-spenders and discuss implications in discussion section.

### 3. Results

#### 3.1 Health expenditures

Table 2 illustrates the change in key variables over time. First row presents aggregate number of physician visits obtained from the MoH statistics. Then, in the following rows, using HBS, ratio of those with any OOP health expenditure and various quantiles for the share of the health spending in total expenditure is provided.

Although the study focuses on developments after 2008, we present the averages from 2003 to illustrate the impact of early reforms on healthcare access and costs. Changes from 2003 to 2008 is sharp with per capita visits to the hospital and primary care provider doubling over five years as was reported in earlier research. In the same period, we observe a corresponding increase in the number of households incurring positive OOP health expenditures. As to the level of expenditures increase is most seen in lower levels of expenditure, possibly reflecting higher use of healthcare. In higher expenditure levels, 90th to 99th percentiles of OOP health expenditures, we observe a drop, especially in highest levels of expenditures, possibly reflecting access to private hospitals under public insurance coverage.

In 2010, with the new contributory payments and expansion of family medicine system, per capita visits appear to increase, by about 10%. Those making an expenditure, on the other hand, increases by about 15%. The share of the budget spent on healthcare increases the most among lowest spenders, a result we may expect since contributory payments are usually low. In 2013, the ratio of spenders increase further to 70%. Similar to 2010, the change affects low levels of health expenditures reflecting impact of co-payments.

Next we attempt to understand how the burden is distributed among households with differing characteristics. For that we first run a probit regression where the dependent variable is a dummy indicating positive OOP expenditure. Then we run quantile regressions using the share of OOP health expenditures in all expenditures as dependent variable. We present two specifications for the income. Results in Table 3 use log of income and its interaction with year dummies as independent variables. For the second specification, we create dummy variables for income quintiles and use them and their interaction with year dummies as independent variables. These results are presented in Table 4 (Full regression results are in the Appendix).

The table shows that likelihood of making a payment increased by about 14.12 percentage points in 2010 relative to 2008. There was a further increase of another 10 percentage points in 2013, making the difference 25 percentage points relative to 2008. The relation between likelihood of making a payment and the income level appears not to have changed over time.

In the level of expenditures, we do not observe a change in high quantiles, namely 90th and 95th. In 70th quantile a change happens in 2010 and a further change occurs in 2013. In 50th the change occurs only in 2013. In both 50th and 70th quantiles relation between income and the budget share of OOP health expenditures weakens in 2013.

When we use income quintiles to measure the impact across different levels of income, our results are similar. Presence of an OOP health expenditure is increased in 2010 and then again in 2013. In 50th and 70th quantiles of health expenditures, we find higher figures both in 2010 and 2013 for all income quintiles. Yet the increase is weaker in higher quintiles, in richer households, in 2013. In higher expenditure quantiles, the impact appears to be significant and positive only for the poorest and richest households.

Next, we use a finite mixture model to distinguish between minor and major expenditures. Minor ones likely correspond to copayments and major ones are payments made out of



insurance coverage.<sup>4</sup> Table 5 presents the results without control variables for each year. The first set of coefficients arguably correspond to minor expenditures and the second to major ones.

Results show increase in the budget share spent on minor cases of about one third. Variation around the mean is higher as well. With the expenditure on major cases, however, we observe little change over time and even a decrease in 2013. Table 6 shows the results from the multivariate analysis. Results with panel data is provided.<sup>5</sup>

Here we distinguish between the components based on their variation (sigma). The one with lower variation, which has probability of 72 percent, corresponds to minor cases. We find that coefficient for the years 2010 and 2013 are positive and significant, pointing to impact of copayments on expenditures for minor cases. As would be expected we find the budget share to decrease with level of expenditures and this gets stronger in later years.

For major incidents, we observe no change in 2010 but a sharp increase in 2013. There is a decrease in the impact of income in the same year. The result may be reflecting a few large expenditures in the data and should be taken cautiously.

### **3.2 Healthcare access**

Next we inquire how additional costs affected access. While MoH statistics show an increase in physician visits (see Table 2 above), that increase may be specific to some income groups or may be reflecting more intense use by a smaller number of households. For that reason we look into Health Survey for the years 2008, 2010, and 2012.<sup>6</sup> We present the ratio of households who had a specialist visit and hospital visit during the previous 12 months as well as those who could not do so even though they needed it.

Here we find increase in the ratio of households in which at least one member visited a physician but a decrease in hospital visits. Inability to visit a physician or a hospital appears to have radically decreased first in 2010 and then in 2013. Similarly, those failing to see a doctor or go to hospital for monetary reasons is lower in 2010 and further down in 2013.

## **4. Conclusion**

Turkey has been through a significant period regarding healthcare services from 2003 to today. All aspects of the system, from financing to provision, has been reformed. Initial phase incorporated an expanding insurance coverage and, to meet increased demand, it increasingly involved market forces with the aim of increasing supply. In the later stage, facing high healthcare expenses, contributory payments were initiated and access to low cost primary care services were eased. We are trying to assess the impact of these on OOP healthcare expenditures as well as access to healthcare services.

Our findings indicate that with the new payments a larger number of households had to incur OOP health expenditures. The level of OOP expenditures increased for low levels of OOP expenditures as would be expected from the relatively low co-payments for healthcare services. At high expenditure items impact was not observed. When we consider differential effect by income level, we find that those with lower income were slightly more affected.

While both the likelihood of making a payment and the share in the budget increased, the ratio of those failing to see a specialist has decreased in 2010 and further in 2013, relative to 2008. Inability to pay is less often pronounced as the main reason. Hence the impact of additional

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<sup>4</sup> This could be the case if a patient visited a hospital out of the public insurance coverage. There may also be informal payments to physicians. Finally, private hospitals who contracted with public insurance may at times charge significant amounts.

<sup>5</sup> Results for each year is provided in the appendix. Panel data results implicitly assume the sigma value to be the same for all years.

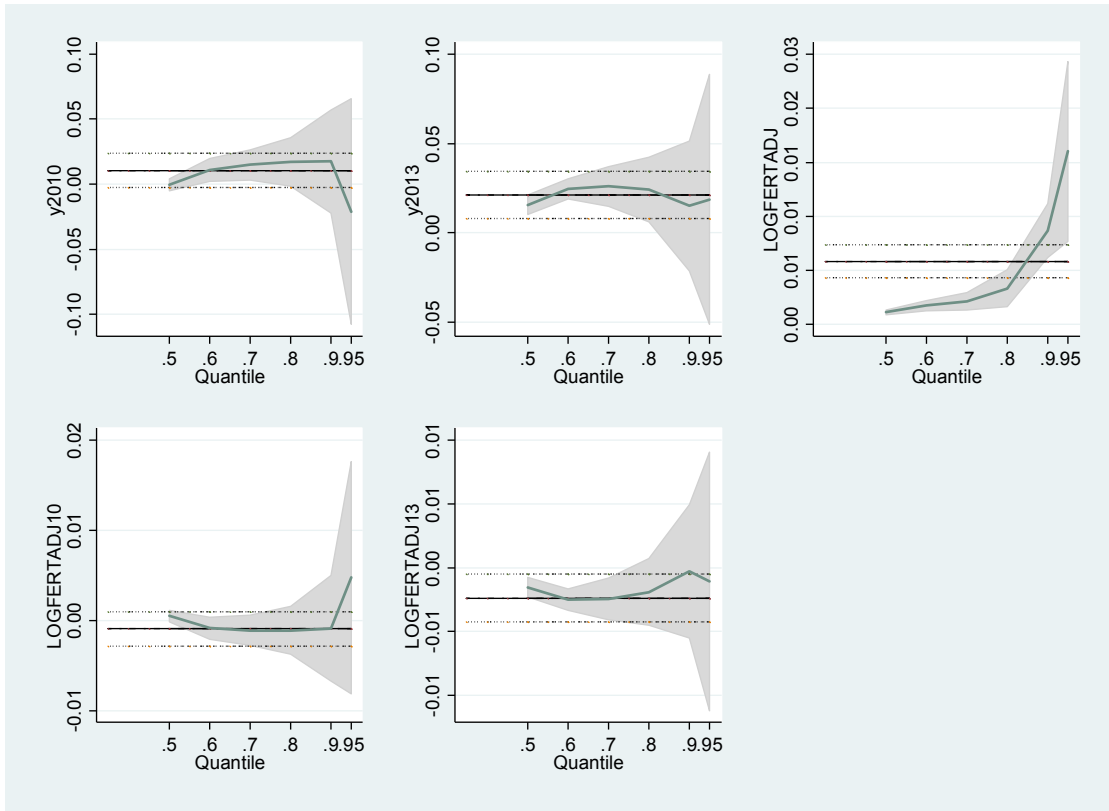
<sup>6</sup> Microdata for the survey of 2014 is not yet available.

fees created a cost to households but did not interfere with their use of health services, most likely because of more available primary care services.

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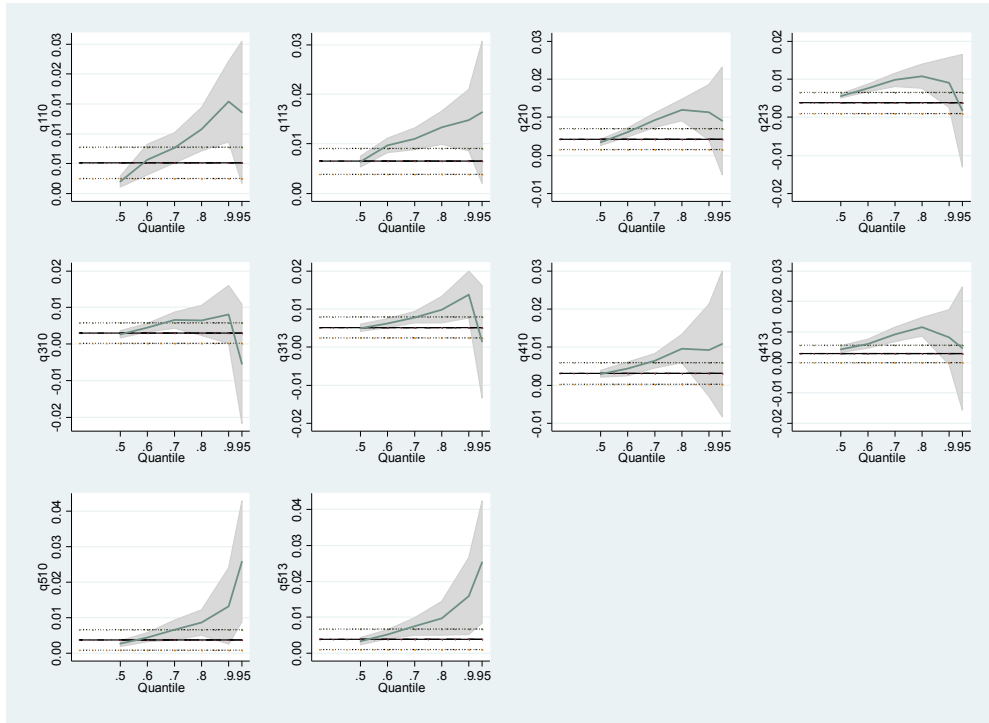
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**Figure 1: Quantile Regression Coefficients for Key Variables**



Notes: Straight line provides the estimate from an OLS regression. Shadowed area is the confidence interval for the quantile regression estimate.

**Figure 2: Quantile Regression Coefficients for Key Variables**



Notes: Straight line provides the estimate from an OLS regression. Shaded area is the confidence interval for the quantile regression estimate.

**Table 1: Summary Statistics of Independent Variables (Standard Deviations in Parenthesis)**

	2008	2010	2013
Log expenditures	6.98 (0.65)	6.97 (0.65)	6.93 (0.67)
Number of elderly	0.27 (0.58)	0.27 (0.56)	0.26 (0.57)
Number of children	1.06 (1.23)	1 (1.22)	0.92 (1.16)
Urban	0.71 (0.45)	0.7 (0.46)	0.7 (0.46)
Household head male	0.89 (0.31)	0.86 (0.34)	0.87 (0.34)
Household head married	0.88 (0.33)	0.86 (0.35)	0.85 (0.36)
Household head high school grad.	0.19 (0.39)	0.17 (0.38)	0.17 (0.38)
Household head university grad.	0.12 (0.33)	0.12 (0.33)	0.15 (0.36)
Household head uninsured	0.09 (0.29)	0.1 (0.3)	0.06 (0.23)
Household head has green card	0.1 (0.3)	0.11 (0.31)	0.08 (0.28)
Number of observations	8549	10082	10060

**Table 2: Ratio of Those with OOP Expenditure, Level of OOP Expenditure and Aggregate Data on Health Provider Visits (%)**

	2003	2008	2010	2013
Per capita visits to primary care*	1.3	2.5	2.7	2.9
Per capita visits to secondary and tertiary care*	2.1	4.2	4.6	5.3
Ratio of those with any health expenditure	41.85	55.59	63.77	70.90
Share of OOP Health 50 <sup>th</sup> percentile	0 (0)	.17 (2.49)	.47 (7.3)	.68 (13.84)
Expenditures in all 75 <sup>th</sup> percentile	.99 (6.27)	1.37 (17.86)	2.11 (32.09)	2.26 (47.93)
Expenditures - % (level of OOP Health 90 <sup>th</sup> percentile)	5.12 (40)	4.35 (72)	5.61 (93.41)	5.51 (130)
Expenditures at relevant 95 <sup>th</sup> percentile	9.88 (75)	8.24 (134.31)	9.06 (170.92)	8.91 (225)
percentile) 99 <sup>th</sup> percentile	26.64 (250.7)	22.58 (450.6)	21.71 (470.83)	19.84 (616.67)

Notes: \*These are obtained from the MoH's Annals of Statistics (2003-2013). All other figures are calculated by the authors from the Household Budget Surveys of the relevant year.

**Table 3: Analysis of Out-of-Pocket Health Expenditures (With Log Expenditures)**

	Presence of expenditure	Health expenditure share (%)			
	Probit (marginal effects)	50 <sup>th</sup>	70 <sup>th</sup>	90 <sup>th</sup>	95 <sup>th</sup>
Year 2010	14.12** (7.14)	-0.05 (0.23)	1.50** (0.59)	1.75 (2.03)	-2.10 (4.44)
Year 2013	25.71*** (6.51)	1.57*** (0.28)	2.60*** (0.57)	1.50 (1.86)	1.87 (3.57)
Log Exp	13.43*** (0.88)	0.11*** (0.01)	0.21*** (0.06)	0.86*** (0.20)	1.6*** (0.45)
Log Exp*Year 2010	-0.87 (1.11)	0.04 (0.03)	-0.11 (0.08)	-0.08 (0.30)	0.47 (0.66)
Log Exp*Year 2013	-1.46 (1.07)	-0.15*** (0.04)	-0.24*** (0.08)	-0.03 (0.27)	-0.11 (0.52)
N	28961		28691		
Pseudo R-square	0.036	0.013	0.015	0.021	0.028

Notes: \*, \*\*, and \*\*\* stand for statistical significance at 10%, 5%, and 1% levels respectively

**Table 4: Analysis of Out-of-Pocket Health Expenditures (With Income Quintiles)**

	Presence of expenditure		Health expenditure		Health expenditure		Health expenditure		Health expenditure	
	Probit-Marginal effects		share (%) Quantile		share (%) Quantile		share (%) Quantile		share (%) Quantile	
	In percentage points		Regression – Median		Regression – 70 <sup>th</sup>		Regression – 90 <sup>th</sup>		Regression – 95 <sup>th</sup>	
	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013
Q1	8.41*** (1.43)	15.78*** (1.20)	0.20*** (0.05)	0.63*** (0.06)	0.77*** (0.16)	1.11*** (0.19)	1.54*** (0.81)	1.45 (0.94)	1.36** (0.53)	1.64** (0.78)
Q2	9.50*** (1.38)	14.35*** (1.29)	0.34*** (0.05)	0.56*** (0.05)	0.92*** (0.16)	0.98*** (0.18)	1.13 (0.81)	0.91 (0.91)	0.90 (0.74)	0.17 (0.89)
Q3	7.44*** (1.43)	16.36*** (1.25)	0.27*** (0.05)	0.50*** (0.05)	0.66*** (0.16)	0.79*** (0.18)	0.80 (0.81)	1.37* (0.91)	-0.54 (1.07)	0.14 (1.23)
Q4	7.16*** (1.47)	14.06*** (1.29)	0.30*** (0.05)	0.44*** (0.05)	0.65*** (0.16)	0.92*** (0.18)	0.93 (0.81)	0.83 (0.90)	1.08 (0.94)	0.46 (0.85)
Q5	7.75*** (1.47)	14.29*** (1.34)	0.27*** (0.05)	0.34*** (0.05)	0.66*** (0.16)	0.75*** (0.17)	1.33** (0.81)	1.59 (0.88)	2.58** (1.13)	2.54** (1.2)
N			28691				28691			
R-Sq.	0.034		0.013		0.016		0.022		0.031	

Notes: Results from probit and quantile regressions. Difference from the level in 2008 is reported. For probit estimation, marginal effects are reported. \*, \*\*, and \*\*\* stand for statistical significance at 10%, 5%, and 1% levels respectively

**Table 5: Finite Mixture Model Estimates**

		Health expenditure share (%)		
		2008	2010	2013
Component 1 (minor cases)	$\mu$	0.88 (0.02)	1.20 (0.02)	1.17 (0.02)
	$\sigma$	0.77 (0.03)	0.97 (0.02)	0.9 (0.02)
	Probability	71.66	72.14	72.42
Component 2 (major cases)	$\mu$	8.34 (0.29)	8.39 (0.21)	7.56 (0.18)
	$\Sigma$	8.6 (0.18)	7.67 (0.13)	6.56 (0.11)
	Probability	28.34	27.86	27.58
N		4625	6423	7112

**Table 6: Finite Mixture Model Estimates –Multivariate Analysis**

	Health expenditure share (%)	
	Component 1	Component 2
Constant	2.36*** (0.21)	-2.60 (2.61)
Year 2010	0.75*** (0.26)	2.13 (3.00)
Year 2013	1.30*** (0.25)	5.15* (2.98)
Log Exp	-0.20*** (0.03)	1.97*** (0.37)
Log Exp*Year 2010	-0.08** (0.04)	-0.40 (0.43)
Log Exp*Year 2013	-0.16*** (0.04)	-0.89** (0.43)
$\Sigma$	0.88 (0.01)	7.38 (0.08)
Probability	72.33	27.67
N	18160	

Notes: \*, \*\*, and \*\*\* stand for statistical significance at 10%, 5%, and 1% levels respectively

**Table 7: Ratio with Inability to Visit Physician and Hospital and its Cause**

		Q1	Q2	Q3	Q4	Q5
At least one visit to physician	2008	73.61	79.55	81.91	81.14	79.41
	2010	80.51	79.01	80.63	82.45	79.36
	2012	77.40	81.31	82.12	82.17	80.88
Could not visit the physician	2008	53.56	45.98	33.22	29.71	23.61
	2010	50.00	36.50	29.41	25.28	20.52
	2012	29.09	23.57	19.16	18.64	17.14
For monetary reasons	2008	36.68	22.68	12.67	8.69	3.87
	2010	34.24	18.98	11.31	5.48	1.30
	2012	15.31	7.63	6.24	3.74	1.74
At least one outp. visit to hospital	2008	63.94	67.77	64.86	65.16	61.86
	2010	54.64	48.18	48.60	46.29	45.40
	2012	51.08	51.52	49.47	51.04	47.82
At least one inp. visit to hospital	2008	25.24	22.59	20.80	18.25	15.20
	2010	22.31	19.98	18.46	19.35	15.57
	2012	22.29	22.49	19.90	16.93	15.03
Could not visit the hospital	2008	17.77	12.95	9.35	6.95	5.57
	2010	16.21	9.12	7.06	4.35	3.66
	2012	8.03	5.09	5.02	4.64	3.05
For monetary reasons	2008	10.82	5.98	2.19	2.00	0.94
	2010	9.74	4.11	2.08	1.28	0.35
	2012	3.91	1.25	1.71	0.80	0.28



## Appendix

**Table A1: Probit Results (Marginal Effects)**

	<b>Coeff.</b>	<b>St.err.</b>	<b>Coeff.</b>	<b>St.err.</b>
hh_male	-0.060	0.012	-0.061	0.012
hh_married	0.121	0.012	0.120	0.012
hh_university grad	-0.030	0.010	-0.049	0.010
hh_highschool grad	-0.019	0.008	-0.022	0.008
hh_uninsured	-0.029	0.011	-0.028	0.011
hh_greencard	0.013	0.011	0.020	0.011
ELDERLY	0.076	0.005	0.077	0.005
CHILDREN	0.033	0.003	0.035	0.003
URBAN	0.003	0.007	0.000	0.007
Year 2010			0.141	0.071
Year 2013			0.257	0.065
Log Exp			0.134	0.008
Log Exp*Year 2010			-0.009	0.011
Log Exp*Year 2013			-0.015	0.011
q2*	0.095	0.015		
q3*	0.136	0.015		
q4*	0.166	0.014		
q5*	0.207	0.014		
q110*	0.084	0.014		
q113*	0.158	0.012		
q210*	0.095	0.014		
q213*	0.144	0.013		
q310*	0.074	0.014		
q313*	0.164	0.012		
q410*	0.072	0.015		
q413*	0.141	0.013		
q510*	0.078	0.015		
q513*	0.143	0.013		

Notes: \*: Binary variable.

**Table A2: Quantile Regression (with Log of Expenditure)**

	<b>50th Quantile</b>		<b>70th Quantile</b>		<b>90th Quantile</b>		<b>95th Quantile</b>	
	<b>Coef.</b>	<b>St.err.</b>	<b>Coef.</b>	<b>St.err.</b>	<b>Coef.</b>	<b>St.err.</b>	<b>Coef.</b>	<b>St.err.</b>
hh_male	-0.00121	0.00024	-0.00345	0.00067	-0.01038	0.00255	-0.02132	0.00640
hh_married	0.00181	0.00023	0.00598	0.00051	0.01314	0.00229	0.02112	0.00716
hh_university grad	0.00009	0.00029	0.00219	0.00088	0.00156	0.00232	-0.00721	0.00434
hh_highschool grad	0.00000	0.00021	-0.00003	0.00044	-0.00140	0.00217	-0.00475	0.00410
hh_uninsured	-0.00059	0.00017	0.00053	0.00093	0.00757	0.00293	0.01378	0.00519
hh_greencard	0.00052	0.00040	0.00241	0.00066	0.00841	0.00235	0.01696	0.00565
ELDERLY	0.00224	0.00020	0.00521	0.00058	0.01684	0.00166	0.02885	0.00326
CHILDREN	0.00048	0.00008	0.00043	0.00017	-0.00155	0.00055	-0.00453	0.00106
URBAN	-0.00012	0.00014	-0.00188	0.00054	-0.01036	0.00192	-0.01858	0.00323
Year 2010	-0.00056	0.00235	0.01496	0.00594	0.01750	0.02027	-0.02097	0.04439
Year 2013	0.01569	0.00277	0.02600	0.00567	0.01504	0.01856	0.01869	0.03575
Log Exp	0.00113	0.00011	0.00214	0.00041	0.00867	0.00126	0.01600	0.00424
Log Exp*Year 2010	0.00048	0.00033	-0.00111	0.00086	-0.00089	0.00300	0.00473	0.00656
Log Exp*Year 2013	-0.00153	0.00039	-0.00244	0.00084	-0.00028	0.00267	-0.00106	0.00517
Constant	-0.00741	0.00065	-0.00747	0.00301	-0.00605	0.00928	-0.00344	0.03164

**Table A3: Quantile Regression Results (with Expenditure Quintiles)**

	50th Quantile		70th Quantile		90th Quantile		95th Quantile	
	Coef.	St.err.	Coef.	St.err.	Coef.	St.err.	Coef.	St.err.
hh_male	-0.00136	0.00036	-0.00350	0.00089	-0.00942	0.00351	-0.01681	0.00830
hh_married	0.00186	0.00028	0.00610	0.00066	0.01340	0.00379	0.01940	0.00914
hh_university grad	0.00036	0.00032	0.00210	0.00097	-0.00176	0.00283	-0.00861	0.00460
hh_highschool grad	0.00001	0.00019	0.00002	0.00070	-0.00354	0.00225	-0.00381	0.00368
hh_uninsured	-0.00045	0.00014	0.00041	0.00104	0.00821	0.00411	0.01374	0.00762
hh_greencard	0.00029	0.00032	0.00204	0.00074	0.00584	0.00314	0.00978	0.00621
ELDERLY	0.00218	0.00020	0.00521	0.00055	0.01659	0.00215	0.02862	0.00439
CHILDREN	0.00044	0.00008	0.00037	0.00016	-0.00163	0.00043	-0.00431	0.00112
URBAN	-0.00015	0.00018	-0.00189	0.00046	-0.00954	0.00141	-0.01639	0.00463
q2*	0.00045	0.00021	-0.00041	0.00093	0.00348	0.00482	0.01021	0.00987
q3*	0.00140	0.00035	0.00176	0.00103	0.00683	0.00376	0.02155	0.01245
q4*	0.00135	0.00031	0.00183	0.00099	0.01272	0.00494	0.02289	0.00879
q5*	0.00183	0.00037	0.00334	0.00134	0.01973	0.00458	0.02683	0.01089
q110*	0.00201	0.00049	0.00769	0.00100	0.01541	0.00364	0.01360	0.00529
q113*	0.00640	0.00067	0.01106	0.00098	0.01478	0.00293	0.01641	0.00782
q210*	0.00342	0.00020	0.00922	0.00079	0.01130	0.00359	0.00902	0.00747
q213*	0.00561	0.00052	0.00981	0.00088	0.00910	0.00426	0.00172	0.00894
q310*	0.00267	0.00057	0.00656	0.00094	0.00804	0.00344	-0.00540	0.01072
q313*	0.00503	0.00040	0.00786	0.00100	0.01375	0.00389	0.00144	0.01232
q410*	0.00300	0.00029	0.00647	0.00061	0.00925	0.00436	0.01084	0.00935
q413*	0.00437	0.00050	0.00923	0.00098	0.00829	0.00479	0.00458	0.00855
q510*	0.00272	0.00055	0.00659	0.00133	0.01327	0.00430	0.02580	0.01133
q513*	0.00336	0.00045	0.00750	0.00141	0.01593	0.00490	0.02540	0.01202
Constant	-0.00036	0.00028	0.00621	0.00090	0.04472	0.00399	0.08594	0.01227

Notes: \*: Binary variable.

**Table A4: Full Results from FMM Model**

	Component 1		Component 2	
Income	-0.20	***	1.97	***
	(0.03)		(0.37)	
Income 2010	-0.08	**	-0.40	
	(0.04)		(0.43)	
Income 2013	-0.16	***	-0.89	**
	(0.04)		(0.43)	
HH Male	-0.11	***	-1.04	**
	(0.04)		(0.49)	
HH Married	0.10	***	0.39	
	(0.04)		(0.49)	
HH University	0.22	***	-1.22	***
	(0.03)		(0.37)	
HH High school	0.07	***	-0.35	
	(0.02)		(0.32)	
HH Uninsured	0.06	*	1.03	**
	(0.04)		(0.43)	
HH Green card	0.06	*	1.41	***
	(0.03)		(0.42)	
Elderly	0.06	***	1.35	***
	(0.02)		(0.19)	
Children	-0.01	*	-0.43	***
	(0.01)		(0.10)	
Urban	-0.04	*	-1.14	***
	(0.02)		(0.26)	
Year 2010	0.75	***	2.13	
	(0.26)		(3.00)	
Year 2013	1.30	***	5.15	*
	(0.25)		(2.98)	
Constant	2.36	***	-2.60	
	(0.21)		(2.61)	
Sigma	0.88		7.38	
	(0.01)		0.08	
Probability	0.72335		0.27665	

Notes: \*, \*\*, and \*\*\* stand for statistical significance at 10%, 5%, and 1% levels respectively.

**Table A5: Results from FMM Model for Each Year**

	Component 1			Component 2								
	2008	2010	2013	2008	2010	2013						
Income	-0.18 (0.03)	*** (0.03)	-0.30 (0.03)	*** (0.03)	-0.35 (0.03)	*** (0.50)	2.37 (0.38)	*** (0.38)	1.80 (0.38)	*** (0.30)	0.52 (0.30)	*
HH Male	-0.05 (0.08)		-0.12 (0.07)	*	-0.14 (0.06)	**	-1.20 (1.14)		-1.58 (0.77)	**	-0.29 (0.71)	
HH Married	-0.01 (0.08)		0.19 (0.07)	***	0.09 (0.06)		1.26 (1.16)		0.54 (0.81)		-0.37 (0.71)	
HH University	0.17 (0.05)	***	0.25 (0.05)	***	0.21 (0.04)	***	-2.37 (0.84)	***	-1.37 (0.64)	**	-0.46 (0.49)	
HH Highschool	0.03 (0.04)		0.09 (0.04)	**	0.09 (0.04)	**	-0.24 (0.70)		-1.18 (0.54)	**	0.36 (0.45)	
HH Uninsured	0.14 (0.06)	**	0.03 (0.06)		0.01 (0.07)		1.97 (0.83)	**	0.31 (0.68)		0.81 (0.73)	
HH Green card	0.08 (0.06)		0.00 (0.06)		0.11 (0.05)	**	2.48 (0.96)	**	1.59 (0.67)	**	0.27 (0.62)	
Elderly	0.07 (0.03)	**	0.07 (0.03)	**	0.05 (0.02)	**	1.74 (0.43)	***	1.44 (0.32)	***	1.01 (0.26)	***
Children	-0.01 (0.01)		-0.01 (0.01)		-0.01 (0.01)		-0.42 (0.22)	*	-0.49 (0.17)	***	-0.39 (0.15)	***
Urban	-0.02 (0.04)		-0.07 (0.04)	**	-0.02 (0.03)		-1.18 (0.59)	**	-1.61 (0.44)	***	-0.60 (0.37)	
Constant	2.24 (0.24)	***	3.28 (0.24)	***	3.61 (0.20)	***	-6.44 (3.47)	*	-0.54 (2.65)		5.42 (2.09)	***
Sigma	0.78 (0.02)		0.95 (0.02)		0.86 (0.02)		8.43 (0.18)		7.43 (0.13)		6.45 (0.11)	
Probability	0.72		0.72		0.72		0.28		0.28		0.28	

Notes: \*, \*\*, and \*\*\* stand for statistical significance at 10%, 5%, and 1% levels respectively.