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# Health Expenditures and Financing; A Macro Determinant and Micro Financing Perspective for Developing Countries (A Case of Pakistan) (A Case of Pakistan)

Syeda Anam Fatima Rizvi

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**ÉCOLE DOCTORALE SCIENCES ÉCONOMIQUES,  
JURIDIQUES, POLITIQUES ET DE GESTION**  
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## UNIVERSITÉ CLERMONT AUVERGNE

Ecole Doctorale des Sciences Economiques, Juridiques, Politiques et de gestion  
Centre d'Etudes et de Recherche sur le Développement International (CERDI)  
Université Clermont Auvergne, CNRS, IRD, CERDI, F-63000 Clermont-Ferrand, France

Sujet de la thèse:

### **Health Expenditures and Financing; A Macro Determinant and Micro Financing Perspective for Developing Countries (A Case of Pakistan)**

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pour l'obtention du titre de Docteur en Sciences Economiques  
par

**Syeda Anam Fatima RIZVI**

sous la direction de

**Professeur Samuel GUERINEAU**

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#### Membres du Jury

Bruno Boidin	Professeur à Université de Lille	Rapporteur
Mazhar Mughal	Professeur à ESC Pau Business School	Rapporteur
Martine Audibert	Directrice de recherche CNRS	Présidente du Jury
Samuel Guérineau,	Maitres de conférences -HDR, Directeur	Suffragante/ Directeur thèse
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- *To my Parents and Brothers who have always been my pillars of strength and supported me in all my accomplishments.*
- *To my Husband Faheem Raza for his unconditional love and sacrifices.*
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## SUMMARY

Health expenditures across the globe are rising; therapeutic health services have increased as well as becoming expensive. Life expectancy in developed economies have increased more as compared to the developing countries, however developed economies have ensured adequate health financing mechanisms as compared to developing countries case. Developed economies have developed health financing models through risk pooling i.e. insurance mechanism and developing health markets where as developing economies are still grappling with the quest of adequately financing their health spending needs. But still incidence of Out-of-Pocket Health expenditures are the major source and these at times also become catastrophic for the families which have an unexpected health emergency.

In this thesis we have empirically estimated the macro determinants for health expenditures across countries. Every country has its unique health sector circumstances, these differences may be in the existence of health markets, insurance options, economic growth and above all the institutional quality which defines the overall governance structure of health sector. Income, education, technology, and aging population are generic drivers for higher health expense on the other hand. Our results have shown that these variables significantly affect overall need of health expenditures.

These are however macro level determinants and in order to understand the basic empirical underpinnings of the health financing needs one has to delve into micro level studies. One of the major query in this regards for developing countries like Pakistan is to see the determinants for the out of pocket health expenditures. These OOP health expenditures often become catastrophic and may result in making households welfare damaged permanently. Because these OOP are managed by selling productive assets or by reducing the essential expenditures such as education and other amenities. However, one needs to understand the causes for such catastrophic expenditures to be able to propose evidence-based policy proposals. Our findings provide that theory of change where we see that for Pakistan; the households's education, age, type of employment and region are major covariates which drives the families into further poverty by virtue of a health shock to one of the family member, and if it is the household head which is also the single earner of the family then without intervention of the government it becomes impossible to become stable again.

Lastly, one question which puzzles the policy makers that rationality suggests that individuals are risk averse. Hence in a health outcome climate where risk of catastrophic expenditures probability is very high one should cover the risk by opting for health insurance, however the

data does not reflect this picture. This may be because of an underdeveloped health insurance market in countries like Pakistan, but there can also be behavioral attributes besides low-income levels which may result in such insurance purchase decisions. Therefore, a good research query would be to evaluate the determinants of health insurance purchase decisions. Because this can lead us to propose a policy framework which ensures that majority of population's health risk is covered through health insurance system. Our results have identified that age, province, family size, education, internet usage and wealth are significant variables. Since we could not cover the health insurance markets from a primary data perspective hence this can be a limitation of the study.



## RESUME

Les dépenses de santé augmentent partout dans le monde ; les services de santé thérapeutique se sont multipliés et sont devenus coûteux. L'espérance de vie dans les économies développées a augmenté davantage que dans les pays en développement, mais les économies développées ont assuré des mécanismes de financement de la santé adéquats par rapport au cas des pays en développement. Les économies développées ont développé des modèles de financement de la santé grâce à la mutualisation des risques, c'est-à-dire un mécanisme d'assurance et le développement de marchés de la santé, alors que les économies en développement sont toujours aux prises avec la quête d'un financement adéquat de leurs besoins en matière de dépenses de santé. Mais les dépenses de santé directes restent la principale source et celles-ci deviennent parfois catastrophiques pour les familles confrontées à une urgence sanitaire inattendue.

Dans cette thèse, nous avons estimé empiriquement les déterminants macroéconomiques des dépenses de santé dans tous les pays. Chaque pays a ses particularités en matière de secteur de la santé. Ces différences peuvent résider dans l'existence de marchés de la santé, les options d'assurance, la croissance économique et surtout la qualité institutionnelle qui définit la structure globale de gouvernance du secteur de la santé. En revanche, le revenu, l'éducation, la technologie et le vieillissement de la population sont des facteurs génériques d'augmentation des dépenses de santé. Nos résultats ont montré que ces variables affectent de manière significative le besoin global en dépenses de santé.

Il s'agit cependant de déterminants au niveau macro et pour comprendre les fondements empiriques fondamentaux des besoins de financement de la santé, il faut se plonger dans des études au niveau micro. L'une des questions majeures à cet égard pour les pays en développement comme le Pakistan est de déterminer les déterminants des dépenses de santé directes. Ces dépenses de santé directes deviennent souvent catastrophiques et peuvent entraîner une détérioration permanente du bien-être des ménages. Parce que ces restes à charge sont gérés en vendant des actifs productifs ou en réduisant les dépenses essentielles telles que l'éducation et d'autres commodités. Cependant, il faut comprendre les causes de ces dépenses catastrophiques pour pouvoir proposer des propositions politiques fondées sur des données factuelles. Nos résultats fournissent cette théorie du changement là où nous constatons cela pour le Pakistan ; les ménages, l'éducation, l'âge, le type d'emploi et la région sont des covariables majeures qui plongent les familles dans une pauvreté encore plus grande en raison d'un choc de santé subi par l'un des membres de la famille, et si c'est le chef de famille qui est également le seul soutien économique du ménage. alors, sans intervention du gouvernement, il devient impossible de redevenir stable.

Enfin, une question qui laisse perplexe les décideurs politiques est que la rationalité suggère que les individus ont une aversion pour le risque. Par conséquent, dans un climat de santé où le risque de dépenses catastrophiques est très élevé, il convient de couvrir le risque en optant pour une assurance maladie, mais les données ne reflètent pas cette image. Cela peut être dû à un marché de l'assurance maladie sous-développé dans des pays comme le Pakistan, mais il peut également y avoir des caractéristiques comportementales, outre les faibles niveaux de revenus, qui peuvent conduire à de telles décisions d'achat d'assurance. Par conséquent, une bonne question de recherche consisterait à évaluer les déterminants des décisions d'achat d'une assurance maladie. Parce que cela peut nous amener à proposer un cadre politique garantissant que la majorité des risques sanitaires de la population sont couverts par le système d'assurance maladie. Nos résultats ont révélé que l'âge, la province, la taille de la famille, l'éducation, l'utilisation d'Internet et la richesse sont des variables significatives. Étant donné que nous n'avons pas pu couvrir les marchés de l'assurance maladie du point de vue des données primaires, cela peut constituer une limite de l'étude.

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**CHAPTER 1**  
**GENERAL INTRODUCTION AND OVERVIEW OF**  
**CHAPTERS**

## 1.1 Background and motivation

Health issues in developing countries are a major concern for global health. These countries often face a range of health problems that are closely linked to poverty, lack of access to healthcare, and inadequate infrastructure. While the specific health issues can vary from region to region, there are some common themes that are prevalent across developing countries.

One of the most significant health issues in developing countries is infectious diseases. These countries often face high rates of communicable diseases such as malaria, tuberculosis, and HIV/AIDS. These diseases are often more prevalent in areas where there is poor sanitation, limited access to clean water, and inadequate healthcare services. In many cases, infectious diseases are preventable and treatable, but in developing countries due to lack of a comprehensive health system along with lack of funding facility, they continue to pose a significant threat to public health.

Addressing health issues in developing countries requires a multifaceted approach. This includes increasing access to healthcare services, improving sanitation and access to clean water, and addressing poverty and malnutrition. It also requires investment in education and infrastructure to ensure that individuals have the knowledge and resources they need to make healthy choices. Besides financing this health service purchase is one of the core issue as well. By addressing these issues, health outcomes of individuals in developing countries can be improved and promote global health equity.

Out of eight Millennium Development goals (MDGs) Six were related to health and were supposed to be achieved by 2015<sup>1</sup>. The ambitious nature of these goals was linked with concern about the massive health challenges being faced by the world's poorest countries, which has led to a growing momentum within the field of global health. However current trend proves that despite international support and financial assistance, many low-income countries failed to achieve the target and still these countries are very far away from achieving these goals. Even now the SDGs framework has one goal directly linked with the wellbeing of people through health i.e. SDG3: *Ensure healthy lives and promote well-being for all at all ages*. Besides this there are Seventeen (17) other goals which have direct implications for the health outcomes<sup>2</sup>. On the other hand, health care institutions are short of capabilities like health care financing, drug supply, health work force and information system, which affect their

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<sup>1</sup> [https://www.who.int/news-room/fact-sheets/detail/millennium-development-goals-\(mdgs\)](https://www.who.int/news-room/fact-sheets/detail/millennium-development-goals-(mdgs))

<sup>2</sup> <https://www.who.int/europe/about-us/our-work/sustainable-development-goals>



performance and deliverance. Which leads to under performance of the earlier MDGs and now the SDGs.

Health financing refers to the ways in which healthcare services are paid for and how the costs of healthcare are shared among individuals, governments, and other stakeholders. Effective health financing is essential to ensure that individuals have access to affordable and high-quality healthcare services, regardless of their socioeconomic status.

There are several ways in which healthcare services can be financed. In many developed countries, healthcare is financed through a combination of public and private funding. The government may provide funding for healthcare services through taxes or other revenue sources, while individuals may also contribute through insurance premiums or out-of-pocket payments. Private funding can come from employers or private insurance companies.

In developing countries, healthcare financing is more challenging due to limited resources and infrastructure. In many cases, individuals may have to pay out-of-pocket for healthcare services, which can be a significant financial burden. This can result in individuals forgoing necessary healthcare services or experiencing financial hardship which made these health expenditures catastrophic.

To address these challenges, there has been a growing focus on universal health coverage (UHC). UHC aims to ensure that all individuals have access to essential healthcare services without experiencing financial hardship. This can be achieved through a variety of financing mechanisms, such as social health insurance or tax-based financing.

Another important aspect of health financing is ensuring that healthcare services are cost-effective and efficient. This requires an understanding of the costs of healthcare services and how they can be minimized without compromising the quality of care. In some cases, this may involve investing in preventive healthcare services, which can reduce the need for more expensive treatments later on.

Overall, effective health financing is essential to ensure that individuals have access to affordable and high-quality healthcare services. Limited resources and infrastructure can result in long wait times for healthcare services, inadequate staffing levels, and inadequate medical equipment and supplies. This can result in suboptimal health outcomes and higher healthcare costs over time. This requires a multifaceted approach that considers the needs of both individuals and healthcare systems, as well as the broader economic and social context. By

working together to address health financing challenges, we can improve health outcomes and promote global health equity.

Limited access to health insurance is another significant challenge in health financing in developing countries. Many individuals do not have access to formal insurance schemes, which can result in significant financial hardship in the event of illness or injury. Even where insurance is available, it may not cover the full cost of healthcare services, leaving individuals with significant out-of-pocket expenses.

Health insurance acts as a safety net; for the rich it is management of financial stress and for poor it covers the health risk. Ideally preventive health care is considered better than therapeutic care but one can get unexpectedly sick or have other morbidities. For coverage of health costs related to these one can't arrange or at times even afford to pay. Being unable to fund the cost of health services purchase often quality or adequacy of such purchases may also be compromised. Which means even if health expenditures are met by OOP these may be suboptimal.

Investment in the health sector can lead to a long-run beneficial outcome. It is useful in promoting health outcomes, decreasing poverty, and help stimulation of economic growth. Despite the fact, the public health expenditure stayed squat in emerging nations and the overall public has no option but to bear health care expenditures from their pockets, which has been persisted as the main source of health financing. Globally, 32% of health expenditure was out of pocket expenditure in 2015. Out of these, World Health Organization evaluates that out-of-pocket expenditure on health care facilities impel 4100 million individuals into poverty each year. However, nearly 150 million people bear monetary calamities due to out-of-pocket health expenditures (WHO, 2015). Catastrophic Health Expenditure is health care cost or out-of-pocket outlay that surpasses a well-defined threshold level of a household's aggregate consumption or non-food consumption expenses per year, (Aregbeshola and Khan,2018; Choi et al.,2016). Based on a 2010 WHO report, a nation's public health expenditure of around 6% of GDP will moderate Out of pocket expenditures and make the occurrence of calamitous health expenses negligible.

To tackle health financing issues in developing countries, a multifaceted approach is required. This includes increasing public funding for healthcare services, investing in health insurance schemes, and developing cost-effective and efficient healthcare systems. It also requires a focus

on preventive healthcare services, which can reduce the need for more expensive treatments and procedures later on.

## **1.2 Aims and Objectives**

In general, purpose of the study is to explore the health expenditures of developing countries and specifically of Pakistan. Also, to understand Pakistan's health financing and its health status vs other countries in the region. Since we know that lack of sufficient expenditures on health can lead to catastrophic health expenditures, so another objective is also to investigate about catastrophic health expenditures in Pakistan and its determinants. As a matter of fact, to avoid these catastrophic health expenditures, one of the possible solution is to have health insurance. So, in addition, we have also analyzed the determinants for Insurance Purchase Decision in Pakistan. Precisely, objectives of the study are:

1. Determinants of Health Expenditures in Developing Countries.
2. Household Catastrophic Health Expenditures and Its Determinants in Pakistan.
3. Socio-Economic Determinants for Insurance Purchase Decision in Pakistan.

## **1.3 Overview of Chapters**

### **1.3.1 Scheme of thesis**

In this backdrop the present thesis conducts three independent research. Three essays are written to address the following research objectives:

- i. It is a well-known fact that resource availability matters the most in health care system-based outcomes. But health spending is highly unequal across the world and presents varying outcomes such as comparably same health expenditures with varying life expectancies etc.; there are contradictory to common beliefs. Therefore, in chapter 2, the study aims bridge the knowledge gap by investigating the driving factors of Health expenditure. The study investigates the impact of potential factors on health expenditures in Developing countries. Although many factors affect the working of health care institutions and the delivery of health care services. But in this study, we have included some potential factors that are exclusive to health expenditures determinants in developing nations which can be delved upon for future policy reforms.
- ii. Chapter 3 digs deep into the potential reasons both at the Micro-Household level and the ambient socio-economic variables for Catastrophic Health Expenditures by taking a case study of Pakistan. For Pakistan the average value of aggregate health spending as a ratio of GDP for Pakistan during the period 2000- 2016 remained

2.78% with the least 2.36% in 2011 and with the highest of 3.34% in 2007. In 2016, Pakistan being a lower-middle-income country has health expenditure per capita of US-Dollar 40 with an out-of-pocket expenditure of 65.2 % of current health expenditures and 2.8% of total health expenditures (% of GDP)<sup>3</sup>.

- iii. As mentioned above one of the ways for sustainable health financing is through insurance. With options of private (self and Companies) and government financing. However, the decision to purchase private health insurance depend on many factors. It is important to get information about purchase willingness of the potential clients and to examine the factors affecting this choice. This can help in designing an adequate health insurance framework. Again, focusing on Pakistan as a developing country help shed more light on this critical issue. The purpose chapter 4 is to examine the socio-economic determinants that influence the purchase of health Insurance in Pakistan. The results of the study help policy makers in knowing the determining factors that affect the insurance purchase decision in a Pakistani household. Further it will help them to formulate insurance policies and to improve the existing ones.

### 1.3.2 Methods and Data Used

**Chapter 2** is titled “*Determinants of Health Expenditures in Developing Countries*”. The study used two types of models:

*i. STATIC MODEL*

Following Shamsi and Waqas (2016), Khan et al. (2016), Murthy and Okunade (2016), Faisal and Ulrich (2011) the general Health expenditure model is used, based on the hypothesis that health spending per capita is determined by a host of macroeconomic factors. Therefore, our model can be specified as:

$$\ln HE_{it} = \beta_{it} + \beta_1(\ln GDP)_{it} + \beta_2(\ln GE)_{it} + \beta_3(RD)_{it} + \beta_4(UNEMP)_{it} + \beta_5(LE)_{it} + \beta_6(POP65)_{it} + \beta_7(PHY)_{it} + \beta_8(SE)_{it} + \beta_9(URB)_{it} + \varepsilon_{it}$$

*ii. DYNAMIC MODEL*

$$\ln HE_{it} = \beta_{it} + \beta_1(\ln GDP)_{it} + \beta_2(\ln GE)_{it} + \beta_3(RD)_{it} + \beta_4(UNEMP)_{it} + \beta_5(LE)_{it} + \beta_6(POP65)_{it} + \beta_7(PHY)_{it} + \beta_8(SE)_{it} + \beta_9(URB)_{it} + (\ln HE)_{it-1} + \varepsilon_{it}$$

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<sup>3</sup> World Health Organization Global Health Expenditure database ([apps.who.int/nha/database](https://apps.who.int/nha/database) )

Data for estimation is taken from World Bank-World Development Indicators (WDI) of 108 Developing Countries for the last 20 years (2002-2021). The variables include health expenditures per capita (PPP) taken as dependent variable. while population ages 65 and above, school enrollment, R&D Expenditure, government effectiveness (proxy for quality of institutions), GDP per capita, unemployment, life expectancy and number of physicians per 1000 people (as a proxy for medical service) are taken as independent variables.

*Dependent Variable:* For regression purpose we have taken Health expenditures per capita at purchasing power parity (PPP) (in natural log) as dependent variable. The reason for taking in PPP was to make our results comparable across countries.

*Independent Variables:* Independent variables include population of age 65 and above as a percentage of the total population; since the study is on a macro level, so increase in population above 65 age would increase pressure on existing resources and require more health care at the same time, which may increase the health expenditures made per capita. Natural log of GDP per capita; this is the standard income proxy variable, and we expect this variable to be positively related to the dependent variable. School enrollment; is the primary school gross enrollment ratio. This is the variable taken especially from the context of more education leading to higher incomes as explained in literature review, increasing awareness thus acting both increase in preventive methods or behavioral for health outcomes and accessing health care services is more felt. Expenditures on R&D; increase in R&D expenditure can lead to more and sophisticated equipment's availability which may result in higher cost of health care. Natural log of government effectiveness; less efficient government can lead to higher expenditure requirements thus increasing the cost of Health care utilization.

*Other Variables:* To deal with potential endogeneity, this study uses unemployment, number of physicians, life expectancy and urbanization as instruments in the system GMM.

**Chapter 3** is titled "*Household Catastrophic Health Expenditures and Its Determinants in Pakistan*". Following the methodology proposed in studies such as Wagstaff and Doorslaer (2003), Aregbeshola and Khan (2018), Cleopatra and Eunice (2018), Attia-Konan et al. (2020), and others, the present study estimates determinants of the Out-of-Pocket approach by using Probit and Quantile Regressions. According to this OOP approach, Catastrophic health expenditure is the medical expenditure or out-of-pocket spending for health that surpasses a defined threshold of a family's overall consumption or non-food consumption spending yearly. Since there are no universally agreed thresholds defined in the literature, this study used

thresholds of 10%, 25%, and 40% to capture the best possible sensitivity. Income is often misreported especially in developing countries' household surveys; therefore, in this study Total non-food expenditure is taken as a proxy of the household's relative income. Which is a better measure of a household's health care affordability (WHO World Health Report, 2000; Xu et al.2003).

Once the household is identified to incur CHE based on threshold analysis then Probit Model was used to analyze the relationship between the CHE and independent (determinants) variables to identify significant attributes of these households which push individuals towards financial poverty due to CHE. The standard Probit Model is defined as:

$$\ln\left(\frac{P}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n + \epsilon$$

In the above equation, P is the dependent variable i.e. occurrence of CHE defined as 1 when HH has catastrophic health spending and 0 otherwise.  $X_1, X_2, X_3, X_n$  are explanatory (determinants) variables,  $\beta_1, \beta_2, \beta_3, \beta_n$  are coefficients of independent variables and  $\epsilon$  is the error term.

From the data perspective individuals' access to health care facilities from OOP expenditures is dependent on several socio-economic characteristics of households. The role of environmental, socio-economic, and demographic factors is well documented in health financing and health-care literature. (Malik & Syed, 2012; Marmot et al., 2008). Also, Michael Grossman has some significant work on health care demand and production (Grossman, 1972).

Hence, to see HH level catastrophic health expenditure for Pakistan, we have used survey data of Household Integrated Economic Survey (HIES) for the year 2015-2016 for 24,238 households. It contains household information including education, income, consumption expenditure, and health expenditures.

*Main Variables:* Health Expenditures, non-food expenditure

*Determinant Variables:* Province, region, Household Head gender, HHH age, HHH marital status, HHH employment status, HHH education

*Dependent Variable:* Dummy for Catastrophic Health Expenditures in Probit Regression and log of Health Expenditures in Quantile Regression

**Chapter 4** is titled “*Socio-Economic Determinants for Insurance Purchase Decision in Pakistan*”. The study used Probit regression models to examine the impact of various factors on the insurance purchase decision. Also, to assess the role of gender in insurance purchase

decision, we have included the Model 3. It includes a dummy variable for gender. The general form of the models is:

$$\text{Model 1 } Y_{men} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \beta_k X_k$$

$$\text{Model 2 } Y_{women} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \beta_k X_k$$

$$\text{Model 3 } Y_{pooled} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \beta_k X_k$$

In the above equations, Y (health coverage) is the dependent variable as 1 when individual has health insurance and 0 otherwise.  $X_1, X_2, X_3, X_k$  are explanatory variables,  $\beta_1, \beta_2, \beta_3, \beta_k$  are coefficients of independent variables.

Data is taken from the 2017-18 Pakistan Demographic and Health Survey (PDHS). PDHS was conducted in four provinces; Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan, also in two regions of Azad Jammu Kashmir and Gilgit Baltistan; in Islamabad and FATA. Total 14,540 Households were interviewed. In which 3691 all ever-married men of age 15-49 and 12708 all ever-married women of age 15-49 were interviewed.

*Dependent Variable:* Health insurance Coverage is the dependent variable with Binary values i.e 0=Not insured and 1= insured

*Independent Variables:* Education, number of children, family size, wealth index (as proxy for income), internet usage (as a proxy for technology) work status, region etc.

#### **1.4. Structure of thesis**

Furthermore, the thesis is divided into three more chapters. Chapter 2 investigates the impact of potential factors on health expenditures in Developing countries. Chapter 3 analyzing the determinants of Catastrophic health expenditures of Pakistan. And finally, Chapter 4 examines the socio-economic determinants that influence the purchase of health Insurance in Pakistan.

Each chapter is further divided mainly into few subsections; Introduction, Literature Review, Data and Methodology, Results and lastly Discussion, Conclusions and Policy Implication. References and Appendices are provided after each chapter. Then, there is a general conclusion of the thesis. And finally, the summary of thesis in French language.

**CHAPTER 2**  
**DETERMINANTS OF HEALTH**  
**EXPENDITURES IN DEVELOPING COUNTRIES**



## ABSTRACT

Resource availability matters the most in health care system-based outcomes. But health spending is highly unequal across the world and presents varying outcomes. There are many factors that trigger health expenditures for example income, technology, education and elderly population etc. However, each variable has varying significance interms of affecting the overall financing. This study aims to investigate determinants of health expenditures in Developing countries. For estimation purpose we have used fixed effect model and GMM method on a selected data set of relevant variables pertaining to developing countries. As anticipated and aligned with the theory, determinants were found to behave differently both in short run and long run.

***Key words:*** Health Expenditures, Developing Countries, Determinants

## 2.1 Introduction

Out of eight Millennium Development goals (MDGs) Six were related to health and were supposed to be achieved by 2015<sup>4</sup>. The ambitious nature of these goals was linked with concern about the massive health challenges being faced by the world's poorest countries, which has led to a growing momentum within the field of global health. However current trend proves that despite international support and financial assistance, many low-income countries failed to achieve the target and still these countries are very far away from achieving these goals. Even now the SDGs framework has one goal directly linked with the wellbeing of people through health i.e. SDG3: *Ensure healthy lives and promote well-being for all at all ages*. Besides this there are Seventeen (17) other goals which have direct implications for the health outcomes<sup>5</sup>. On the other hand health care institutions are short of capabilities like health care financing, drug supply, health work force and information system, which affect their performance and deliverance. Which leads to under performance of the earlier MDGs and now the SDGs.

There is a growing consensus that health care institutions in low-income countries are too feeble and fragmented to deliver the desired quantity and quality to those in need. Experience suggests that if health care institutions are short of capabilities like health care financing, drug supply, health workforce, an information system, they may not be able to perform and deliver.

Besides market-based solutions work well for developed economies, whereas effective interference exists for several key health issues in developing countries; and due to these interventions, there is a reduction in health services prices, and availability of resource position has increased. However, despite all these the achievement of outcomes in terms of achieving the health goals is slow. Thus, now there is increasing concern that besides these the health care institutions would be required to think out of the box for helping in achieving the desired health goals. Since the subject is in its initial stage with varying interventions there is no consensus on a singular solution which provides respite to all the developing countries health crises.

So as a first step objective should be to understand the dynamics of health expenditure through investigating the determinants and to investigate that why some countries with low expenditures have reasonable health outcomes as compared to those countries who spend more,

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<sup>4</sup> [https://www.who.int/news-room/fact-sheets/detail/millennium-development-goals-\(mdgs\)](https://www.who.int/news-room/fact-sheets/detail/millennium-development-goals-(mdgs))

<sup>5</sup> <https://www.who.int/europe/about-us/our-work/sustainable-development-goals>

yet outcomes are not that encouraging. Henceforth justifying that there is a need to research on why these differences in health outcomes exist. There could be possible determinants, such as the demographic ratios (old/young), education, per capita incomes, unemployment and medical services etc which are influencing the health care expenditures and outcomes besides only financing.

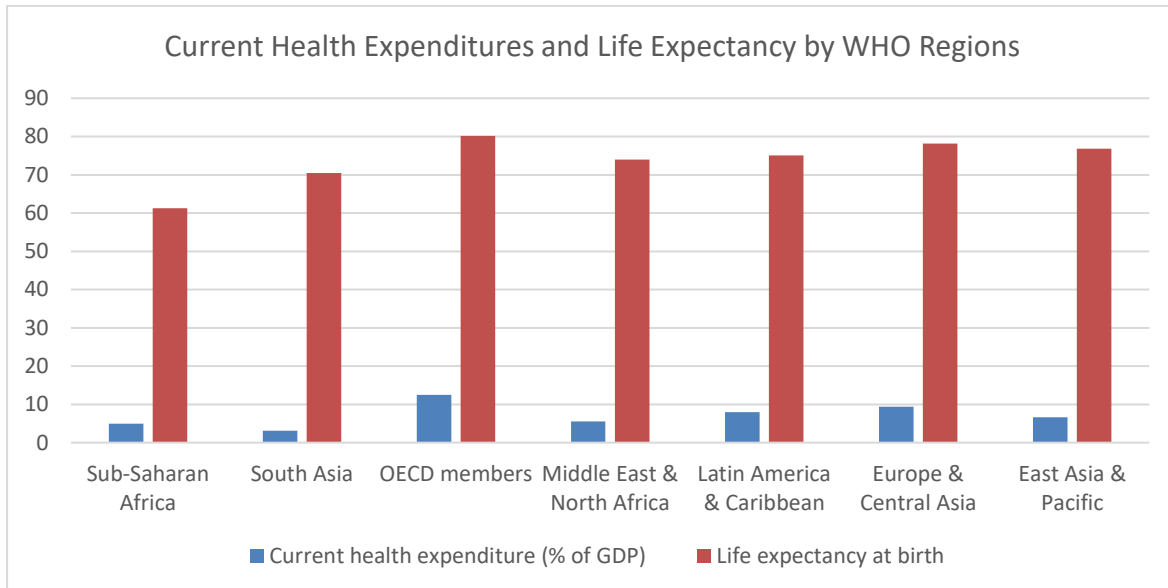
## **2.2 Health Expenditures across the World**

There is evidence of dispersion in Health expenditures across the globe for example Poullier et al. (2002) examined the health care expenditures for 191 countries for the year 1998 and confirmed that health spending is unequally spread across countries. Higher health expenditure is linked with better health outcomes; but this relationship presents enormous disparity. Hence, public policy can play a major role in improving the effectiveness with which resources are transformed into better health, even in low health spending countries. Similarly, Evans et al. (2000) measured the overall health performance of 191-member countries of WHO for the period 1993 to 1997. The study found that efficiency for health spending increases with health expenditure per capita and then decline slightly thus showing a returns to scale of health investment.

National Health Accounts (NHA) estimates for 2018 show that health spending is extremely unequal around the world. Region of America (both North and South) have only 13% population of the world but spend the most on health per person. Similarly, European countries invest a large percentage of their GDP in health sector. On the contrary South Asian countries have highest population i.e. 26% but spend only 2% of their GDP on average for Health Sector. Likewise, African countries spend only around 1% of GDP with a population share of 13% of the world.

Therefore, there is a consensus that there is a dispersion in health sector spending and corresponding outcomes in terms of health outcomes across the globe. Although health spending affect health conditions the most, but other factors and especially the efficiency of spending also matters and because of that health outcomes varies significantly among the countries even if level of spending is the same. Figure 1 shows that OECD countries spend around 12% (as a percentage of GDP) coupled with the highest life expectancy than others (more than 80 years). They have highest private and public expenditure in health sector as well. Whereas European and American countries spend 9.3% and 8% respectively and have life expectancy of around 75-78 years. Whereas Sub-Saharan Africa (SSA) is at lowest place in terms of life expectancy of 61 years and spending of only 5% of GDP. But Middle Eastern

and North African countries spend almost same as SSA countries but have life expectancy of 74 years. While South Asian countries spend the least i.e. 3% but still have better life expectancy of 70 years as compared to SSA countries. Therefore, its not just the level of expenditures but there are possibly other reasons for these health outcomes across the globe.



**Figure 2. 1: World Health Expenditure Patterns vs Health Outcomes**

*Data source: WDI 2019 statistics*

### 2.3 Research gap

Above discussions hereby suggests that its not just the amount of expenditure that can lead to desirable health outcomes. However, as a matter of fact from the above graph it can be seen that there are other social, demographical, monetary and institutional factors also that affect health expenditures significantly. Few studies have explored these variables individually (more details are provided while discussing each variable) however there is a lack of studies which have seen the determinants of health expenditures at the Macro level. Especially considering the differences in the income levels, governance models and efficiency of these systems, demographic characteristics and education levels etc. all have a major influence on the macro health expenditures. Further considering the fact that health expenditures are perpetual in nature and needs a dynamic analysis before drawing out conclusion for policy reflections as well as considering the heterogeneity at the macro levels all needs to be analyzed. Hence there is a dire need to explore and study those factors to better understand the dynamics of health expenditure patterns.

## **2.4 Objective**

It is a well-known fact that resource availability matters the most in health care system-based outcomes. But health spending is highly unequal across the world and presents varying outcomes such as comparably same health expenditures with varying life expectancies etc; there are contradictory to common beliefs. Therefore this study aims bridge the knowledge gap by investigating about the driving factors of Health expenditure. The main theme of the study is to investigate the impact of potential factors on health expenditures in Developing countries. Although many factors affect the working of health care institutions and the delivery of health care services. But in this study, we have included some potential factors that can affect health expenditures in developing nations which can be delved upon for policy reforms. These variables are such as Income, cost effectiveness, ageing population, Education, life expectancy, unemployment and medical services etc.

## **2.5 Importance of chapter**

Undoubtedly, Health outcomes are not just restricted to health sector, in fact they influence the whole economy through life expectancy, labor productivity, country's welfare, skills etc, Murthy & Okunade (2009). Hence its very important to study and understand the relationship of health expenditures with its determinants. In this regard, this study intends to explore the determinants of health care expenditures by collecting recent insights from the existing literature and, also by carrying out an empirical analysis to see possible relationship of health spending with income, technological progress, demographical and institutional factors. This study can be useful to understand the association of health sector and other key variables which are affecting health sector directly or indirectly. This can help suggest policy reforms which are necessary for better health outcomes. Besides, it may help in the future evolution of health care expenditures and polices in the Developing countries.

## **2.6 Health Expenditure Determinants**

From almost second half of the 20th century, public expenditure on health care has been increasing not only in absolute terms, but also relative to the national incomes. This consistent growth was an outcome of profound economic, institutional, social and technological changes which occurred all over the world. Which therefore led to an increase in public awareness, their expectations, and demand for health care on the one hand, and on the other hand the improvements in the medical field allowed them to offer better although expensive health care.

Health care expenditures are affected by a lot of factors, but their interaction is very complex to identify their individual impact on health care expenditure growth. With econometric tools the impact of the respective variables on health care production and spending can be estimated. This is possible by using past observations, but the policymakers are interested in the explanatory power of such an exercise and its usefulness in anticipating future developments in the health care sector. According to a study by Newhouse (1992), Over the period 1940–1990 in the United States, Health spending was increased by 700% out of which only 35-70% of increase in health expenditure was driven by income. This led him to believe the fact that a greater percentage of health expenditure increase was caused by other factors that could be social, demographical, political or technological change. In this regard, following are the main variables which are observed from the literature considering their relationship with Health Expenditures.

### **2.6.1 Income**

In the literature, many factors are referred to as possible drivers for health care expenditures. But Income (per capita GDP) is considered as a very important factor for explaining differences across countries in the growth of health care expenditures.

Some old studies like Newhouse (1977) generally used cross-sectional data to identify the determinants of health care expenses. They found income to be a crucial factor in the growth of health care expenditures in developed countries. Likewise, Milne and Molana (1991) also found that countries with highest real per capita income have expensive health care. These found health care as luxury good. While Feldstein (1979) argues that the income elasticity of Health Care Expenditures is less than 1 which means the percentage increase in Health Expenditures is less than the percentage increase in income. This result may be because at that time per capita health expenditures were low. Hitiris and Posnett (1992) estimated individual country and for pooled cross-section and time series models, respectively, for OECD countries, found a strong positive relationship between Health Expenditures and GDP levels.

On the other hand, due to a lot of criticism on the cross-section data use and the latest estimation techniques in panel Data, several studies in OECD countries used panel data and found income elasticity larger than one (Gerdtham, Sogaard, et al.1992). Recently Baltagi and Moscone (2010) studied the long run relationship between health expenditures and income for 20 OECD countries over the period 1971-2004. They found that health care expenditures and their determinants had long run relationship. They found health care elasticity with respect to income

which was about 0.87. Gerdtham and Jönsson (2000) studied the literature on international comparisons of health care expenditures and found that among other variables like ageing, technology and institutions, income is the most important variable. They conclude that the most crucial factor for difference in health care expenditures is aggregate income. The effect of gross domestic product is positive and significant. Furthermore, Hall and Jones (2007) and Razaei et al. (2016) found out that increase in household's income will definitely increase health care demand and hence health expenditures. Similarly, Okunade (2009) also found GDP to be most significant determinant of real per-capita health care expenditure. Similar results are found by Acemoglu et al. (2013) Barkat, Sbia, and Maouchi (2019), Khan et al. (2016), Byaro et al. (2018), Magazzino and Mele (2012), Zhou et al. (2020), Tang (2010), Ali and Sayed (2020) and Murphy and Topel (2006). Also, Chaabouni and Abednadher (2014) found out long run and stable relationship among income and health expenditures. Whereas Erdil and Yetkiner (2009) found causality between GDP and per capita health expenditures.

Therefore, from the above discussion role of aggregate income (GDP) to increase Health Expenditures is considered most substantial.

### **2.6.2 Technology**

Medical technology is the second most important supply factor which affect the entire development, production, delivery and financing process of health care. Whereas the precise estimates of its contribution to the improvement in longevity and health status are still missing, while recent studies can link it to an ever more crucial role in the explanation of increased health expenditure. Technology is defined as the drugs (pharmaceuticals and vaccines), medical equipment, health-care procedures, supportive systems, and the administrative systems that can tie all these disparate elements together are considered as the main driver of health care costs. Newhouse (1992) was the first to quantify the impact of technology, it found that the bulk of health care expenditure growth in the industrialised countries can be attributed to technological growth. After that many other studies for example Okunade and Murthy (2002) has supported Newhouse inference. More recently, Oliveira Martins and de la Maisonneuve (2005) found that over the last decades, health care spending has grown faster than the aggregate income, the effects of technology and relative prices seem to significantly affect health care expenditure development.

A paper by Congressional Budget Office (CBO) titled "Technological change and the growth of health spending" (2008), reviewed previous literature and concludes that at least 50% of the increase on health care costs is due to technological advancements. The broader literature

estimates a range 40-80% of technological Impact in increase Health Costs. Such results along with the perception that long term projected growth in health care spending is unsustainable, have led some analysts to propose that measures like slowing the diffusion of expensive new technologies to control the health care costs. Given the importance to both health care and innovation to society's welfare, it is important to estimate this contribution at highest precision possible.

You et al. (2016) investigated the relationship of Health Care Expenditures with income per capita and measures of technology in both long and short run in Australia for 39 years (1971-2011). It used both technology proxy and residual component approaches in co-integration framework. Research and development spending, hospital research spending, two technology indexes constructed from medical devices and infant mortality rate showed a firm long run relationship with income and Health care expenditure. Further the income elasticities suggest that health care is a normal good and a technical necessity.

Smith et al. (2009) found that increased medical technology is the primary driver of health spending growth. But technology doesn't expand independently, it is fueled by rising incomes and insurance coverage. Medical technology explains 27-48 percent of health spending growth since 1960 in US.

Flow of technological services from R&D activities have positive and direct effects on innovation as output (Acs and Audretsch,1988). Technologies in medical sector have generally emerged from private and public R&D efforts and other kind of collaborations. Collaborative alliances in innovation process within and outside of industries are very important (Arora and Gambardella,1994). Partnerships of Industries and universities in medical research have also played a huge part in the innovations of drugs, optics and nuclear technologies etc. (Jaffe,1989).

Smith et al. (2000) reviewed the past literature and estimated the approximate range for the contribution of technological change to growth in health spending. It used the existing macroeconomic residual-based estimates and concluded that technological change is the major reason behind the invariable increase in the health share of the GDP. It found a range of 38 to 62 percent of the total growth in real per capita income. It also suggested that in the absence of technological change, growth in the real per capita health spending for 1940-98 would have averaged about 2.5% per year, only slightly higher than growth in real per capita GDP (near 2.0%).



Metz (2012) estimated an upper bound for the contribution of technological progress on health care costs by using US time series data. He follows the model of Congressional Budget Office's (CBO) 2008 report and uses the identical data. He found that the contribution of technological progress is 32.3%, which is smaller than suggested by CBO's report that was 50%.

Dybczak & Przywara (2010) used the data for European economies to estimate the expected impact of the technological progress on health care expenditures. Single OLS and fixed effect regressions have been estimated at individual country level and pooled data. It found that technology in health care have relevant contribution in improving health status and extending life expectancy. Other studies like Ali and Sayed (2020), Khan et al.(2016) found out that among other factors like income and ageing population, progress in medical technology increases the health care expenditures. Technological progress is indeed an important factor but simultaneously its difficult to measure. A number of proxies for example research and development expenditures, life expectancy, infant mortality and number of physicians etc were used to capture the technological progress. But most of them have found technology as a potential driver of health care cost.

So, from the above brief review the role of technology is found to be positive in health cost increase. However, since the improvement in technology leads to better health outcomes as well so it because a question of cost and benefit and requires further inquiry. But overall literature review reveals that technological development in the health care sector has been affecting the cost significantly.

### **2.6.3 Ageing Population**

One of the most important factors that affects the cost of health care is age. Here, Population of age 65 and more is taken as proxy for old age population dependency to test the hypothesis that Age affects health expenditures positively. Although the media has widely stated that an aging population is a major driver of the rising cost of health care, academic research has refuted this claim. The impact of age on the health expenditures is also complex due to the various factors that affect the health of individuals and the health care system. Some of these include the changes in the demands and expectations of the population, the emergence of new technologies, and demographic uncertainty Di Matteo, (2005).

Studies in Canada have shown that the cost of providing health care for a 60 year old is almost double that of a 40 year old. On the other hand, the per capita cost of providing care

for a 70 year old is almost triple that of a 40 year old Denton (1975). Studies conducted in the US and Canada have shown similar trends and patterns in the expenditures related to the aging population. In Canada, the number of people over 65 is expected to increase by about 18% by 2025. This will also contribute to the rising cost of drugs Dalziel (1996). Many other studies like Zweifel et al. (1999), Neuman et al. (2015), Hoffman et al. (1996) suggests that as the population ages 65 or more, incidence of serious chronic and cardiovascular diseases along with disabilities risk will likely increase. Moreover, at this age they require more hospital visits, treatments and drugs which of course increases medical expenses, almost five times more than younger adults. Similarly, Baumol & Blinder (2015), Hosoya (2014), Ali and Sayed (2020) also found the same results. Barkat, Sbia, and Maouchi (2019) also found out that in long run, ageing population plays a significant role to increase health expenditures in Arab world countries. Additionally, Wang (2009) also found that among other factors, population over age of 65 is one of key determining factor in US. Likewise, Tang (2010) also studied key determinants of health expenditures for Malaysia and found that income and population of age 65 are significant and positively related to health expenditures.

Byaro et al. (2018) used aging population and income to explain variation in health expenditure of Tanzania. They found that elderly people need more health care and expected to spend more on health services. Which was also empirically proved a positive and significant results. Further, they also found out that income is main driver of health care cost. Zhou et al. (2020) found similar results for developing countries that ageing population and income stimulate health expenditures. Similarly, Awais et al. (2021) also found out that aging population has a significant and positive impact on health expenditures in developing and developed countries.

De Meijer et al. (2013) studied the effect of population aging on health expenditure growth in Western countries. They discussed that literature indicates that aging effect health expenditures directly because of underlying health conditions and disabilities and also indirectly, through some societal factors. They found out that in long run, health expenditures increase due to aging. In addition, study also shows that medical technology, age and health are very closely connected for health expenditure growth. Hence there is enough literature to support that aging population does play an important role in driving health care cost.

#### **2.6.4 Education**

It is a fact that people with higher levels of education are more likely to be in work and if they have a job, are paid more than those with low-level education. People with more

education and thus higher incomes have lower risk of stress and diseases that are associated with social and economic hardships. While those with less education have fewer knowledge and resources to avoid the effects of stress. Economic hardships, trauma and stress can have a negative effect on health over time and make individuals more sensitive to further stressors.

Education has a direct effect on health and healthy behaviors because people learn about the effects of unhealthy behaviors at school, college or university. Besides, educated people can better understand the basic consequences of unhealthy living. And also, indirectly better education helps in securing higher paying jobs, and consequently educated people can afford the things that help them to live a healthier lifestyle. People having a good job with high income can lower the stress risk and more educated people usually work in safer environments.

Siddiqui et al. (1995) investigated the determinates of health expenditures in Pakistan. He found out that along with GNP per capita, education also has significant impact that drive health care expenditures. Some other studies like Govindraj et al. (1997), Gupta et al. (2003), Ricci and Marios (2006) and Filmer and Pritchett (1999) also tested the hypothesis to see if education has an impact on health care expenditure. Also, Magazzino and Mele (2012) found that people with atleast a secondary level of education tend to spend more on health care.

A study by Hajibabaei et al. (2020) tested the hypothesis for health expenditure determinants. He tested income, demographical factors i.e ageing population, social factors i.e education and technological progress, to see if they have any impact on health expenditures. All of them were found to significant and positively related with health care expenditure except education.

Mary Silles (2009) found evidence of a causal relationship between education and health, with an extra year of education increasing the probability of 'good' health by between 4 and 6 per cent. She also found that the probability of having no long-standing illness increases by between 5 and 7 per cent and that the probability of having no work-preventing illness increases by around 1 per cent. Similarly, Cutler and Lleras-Muney (2007) reviewed the literature and analyzed the relationship between education and health. They found a clear association between education and health. Study found that better educated people have lower morbidity rates. Similarly, it found that life expectancy is increasing for everyone in the United States, thus differences in life expectancy have grown over time between those with and without a college education. Rahman (2008) found out that education and per capita

income are major determinant of health expenditure in India. Similarly, Awais et al. (2021) found positive and significant relationship among literacy rate and health care cost for both developed and developing countries.

A study by Rahman (2011) for the case of Bangladesh found out a strong (unidirectional causality and bidirectional causality) relationship between health expenditures and education and that eventually increases the GDP of Bangladesh. which is a sufficient proof that these two factors are playing important role in the growth of Bangladesh. Hassan and Kalim (2012) got Similar results for Pakistan and found out causality among GDP, education and health expenditures. Therefore, education is considered another important factor that can increase health expenditures.

### **2.6.5 Institutional Quality**

Health spending and its linkages have been studied across the world with different lenses. This linkage is very weak for the countries where institutional issues can be fully sight seen. Imperfect research and data complicate in designing effective policies, but evidence on nature of health institutions has begun to emerge. Poor quality Institutions caused severe restrictions on improving health through conveyance of health care services in developing countries.

In the last two decades there is a remarkable improvement in access to health care, but the quality of health care services has been observed to improve very less hence the outcomes are not as desired. Recent evidence proposes that insufficient care and under-performance are due to lack of accountability and unproductive motives (Lewis 2006). This may feature weaknesses such as government failure, effectively “government interventions that have gone wrong” (Jack and Lewis, 2004).

Quality of institution in health sector is understudied despite being very important.

Destabilized health investments which lead to unclear relationship between health status and health care services are a result of lack of effective institutions. In middle-income and poorer countries indicators like utilization statistics, hospital infection rates or surgery survival rates are rarely collected due to lack of enforcement and regulation (Lewis 2006). Some indirect measures like corruption, lack of medical supplies, poor management, and funds leakage and provider absenteeism also undermine effective service supply. Hence to improve health status besides having more investment in health care, the quality of institutions matters more than anything. The linkage between expenditure and outcome will remain feeble until the problem of quality of expenditure is solved.

Rizvi (2019) determines the effect of health expenditures on economic growth considering the quality of health institutions with the hypothesis that where institutions are better investment in health brings more economic growth as compared to those with low quality institutions. The results reveal that if health expenditures adjusted for the quality of government expenditures increase by 100%, then the economic growth will increase by 5%.

A lot of work has been done on literature of health expenditure but very few studies focus on the quality of expenditure or institutions alongside the health investments. Institutional economics literature proposes that it's not the level rather quality of expenditure or institutions that matters for achieving economic growth.

Although role of institutions in economic growth has been established. However little attention has been given on its application such as Health Care expenditures and health outcomes. There is some evidence but not many studies could be found. Seeing this in this chapter we will discuss some evidence on this topic and significance of institutional quality in pushing health care expenditures.

#### **2.6.6 Other Factors**

There are some other factors that are mentioned in literature and play reasonable role in increasing health care cost. One of them is number of physicians, Physicians per thousand population is taken as a proxy for Supply of medical personnel. According to Wang (2009) number of physicians have positive and significant on health expenditures.

Another factor is unemployment, there are mixed views regarding role of unemployment in health expenditure growth. For example, In a Study by Abbas and Hiemenz (2011), a negative relationship was found between of unemployment and public health expenditure. Whereas Awais et al. (2021) found it significant and positive. Also, Magazzino and Mele (2012) found that along with other factors like urbanization, no of beds in community hospital and education, unemployment also effects heath expenditure significantly. Here, life expectancy, number of physicians, unemployment and urbanization are used as controlled variables in this study.

#### **2.6.7 Summary**

Indeed, Income and technology both are significant drivers of health care expenditure. It is hard to spend more on new medical technology, without an increase in income but without modern technology in the end there will be no reason to want more health care per capita. But the effect of education is significant in many recent studies. Also, Aging population also seems

to increase health care expenditures over time. Nevertheless, institutional quality matters the most in the working of health care institutions and delivery of the health care services. Hence, this study aims to contribute to the existing literature by investigating the determinants of health care expenditures in an empirical analysis. Purpose of this study is to give an up-to-date overview of the literature on the factors responsible for the growth of health care expenditures in Developing countries. For example, income, institutional quality, education, ageing population, unemployment etc. Also, study includes an institutional factor i.e institutional quality, which wasn't used in previous literature. There is already a dearth of research in developing nations especially for the health care sector. Very few studies are found to investigate the determinates of health expenditures and those are not recent. Hence, it's important to study the factors that explain health care expenditure growth in developing countries. This study tries to contribute to the existing literature by examining the effect of the above-mentioned factors on health care expenditures through empirical analysis using static and dynamic models for developing countries.

## **2.7 Model and Econometric Methods**

At the macro expenditure-outcome frontier there are countries which are spending relatively more i.e. these are relatively expensive as compared to other countries in terms of achieving health outcomes. In that context one of the theories is the nature of these services, cause-effects are not one-to-one as well as over time health technology usage and preventive medicine use is on the higher side. These would change the health outcomes as compared to conventional channels of achieving health outcomes. Secondly there are instances such as if there is a legislation where in case of an improper treatment the patient can sue back for incompetent treatment, this can force the doctor to prescribe more drugs and test and the overall treatment becomes more expensive. Third, in countries in which old age people are proportionally more, than the health care expenditures are more as compared to the countries in which younger generation is more. So, to better understand and verify these potential determinants we need to estimate the regression model with the variables discussed in earlier chapters.

In terms of the models to be estimated we start with a standard static fixed and random effects panel model estimations by using natural log of health expenditures per capita as dependent variable and independent variables explained below for a sample of Developing countries.

### **STATIC MODEL**

Following Shamsi and Waqas (2016), Khan et al. (2016), Murthy and Okunade (2016), Faisal and Ulrich (2011) the general Health expenditure model is used, based on the hypothesis that health spending per capita is determined by a host of macroeconomic factors. Therefore, our model can be specified as:

$$\ln HE_{it} = \beta_{it} + \beta_1(\ln GDP)_{it} + \beta_2(\ln GE)_{it} + \beta_3(RD)_{it} + \beta_4(UNEMP)_{it} + \beta_5(LE)_{it} + \beta_6(POP65)_{it} + \beta_7(PHY)_{it} + \beta_8(SE)_{it} + \beta_9(URB)_{it} + \varepsilon_{it}$$

In the model we have used health expenditures per capita in PPP<sup>6</sup> terms as dependent variable. The reason for taking this variable is that naturally the level of health expenditures could not be compared directly, second owing to difference in prices again may not reflect the actual differences. So, the overall model will help us in determining significance and relative importance of variables which impacts the per capita health expenditures across countries.

Where,  $t$  = time period (2002-2021),  $i$  = cross-sectional unit,  $\ln HE$  is the health expenditures per capita in PPP (natural log),  $\ln GDP$  is GDP per capita in natural log,  $\ln GE$  is government effectiveness in natural log,  $RD$  is Research and Development expenditure,  $UNEMP$  is unemployment,  $LE$  is life expectancy,  $POP65$  is population of age 65 and above,  $PHY$  is Number of Physicians,  $SE$  is school enrollment,  $URB$  is Urban Population.

For estimating this model, we have used the econometric methods for Panel data sets i.e. Fixed/Random Effects for a Sample of 108 Developing countries. Then selection of fixed or random effect model is done which is based on the Hausman specification test.

### **DYNAMIC MODEL**

$$\ln HE_{it} = \beta_{it} + \beta_1(\ln GDP)_{it} + \beta_2(\ln GE)_{it} + \beta_3(RD)_{it} + \beta_4(UNEMP)_{it} + \beta_5(LE)_{it} + \beta_6(POP65)_{it} + \beta_7(PHY)_{it} + \beta_8(SE)_{it} + \beta_9(URB)_{it} + (\ln HE)_{it-1} + \varepsilon_{it}$$

We also specified a dynamic relationship which is characterized by the presence of a lagged dependent variable among the regressors. But it causes an endogeneity problem due to its correlation with differenced error terms and hence OLS estimation becomes an unsuitable

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<sup>6</sup> Purchasing Power Parity adjusted perspective.

option. In this scenario, to deal with endogeneity problem the Generalized Method of Moments (GMM) was proposed by Arellano and Bover (1995) and Blundell and Bond (1998). According to Blundell and Bond (1998) the GMM method is suitable for large sample sizes but with short period of time. Which is exactly our case. We have a large sample of 108 Developing countries but with a time period of 20 years (2002-2021). We have been careful about number of instruments, that it should not exceed number of countries. Then we have used Hansen J-test and Arellano and Bond (1991) as diagnostics test.

## 2.8 Data and Variables

**Data:** Data for estimation is taken from World Bank-World Development Indicators (WDI) of 108 Developing Countries for the past 20 years (2002-2021). The variables include health expenditures per capita (PPP) taken as dependent variable. while population ages 65 and above, school enrollment, R&D Expenditure, government effectiveness (proxied for quality of institutions), GDP per capita, unemployment, life expectancy and number of physicians per 1000 people (as a proxy for medical service) are taken as independent variables. Descriptive statistics are provided in appendix.

**Dependent Variable:** For regression purpose we have taken Health expenditures per capita at purchasing power parity (PPP) (in natural log) as dependent variable. The reason for taking in PPP was to make our results comparable across countries.

**Independent Variables:** Independent variables include population of age 65 and above as a percentage of the total population; Since the study is on a macro level, so increase in population above 65 age would increase pressure on existing resources and require more health care at the same time, which may increase the health expenditures made per capita.

natural log of GDP per capita; this is the standard income proxy variable, and we expect this variable to be positively related to the dependent variable, school enrollment; is the primary school gross enrollment ratio. This is the variable taken especially from the context of more education leading to higher incomes as explained in literature review, increasing awareness thus acting both increase in preventive methods or behavioral for health outcomes and accessing health care services is more felt, R&D; increase in R&D expenditure can lead to more and sophisticated equipment's availability which may result in higher cost of health care,



natural log of government effectiveness; less efficient government can lead to higher expenditure requirements thus increasing the cost of Health care utilization.

**Other Variables:** To deal with potential endogeneity, this study uses unemployment, number of physicians, life expectancy and urbanization as instruments in the system GMM.

## **2.9 Results**

### **2.9.1 GMM Result**

Presented below (table 1) are the regression results for both static and dynamic models. We have used Fixed and Random effect in static model estimation. Then, we have selected fixed effect model based on the Hausman specification test (with 0.000 probability). While for Dynamic model we have used the GMM method because of the endogeneity issue. Number of instruments used were less than number of countries. Also, Hansen J-test statistic confirmed that instruments used in our model were valid. Moreover, values of AR(1) and AR(2) accepts null hypothesis and proved that this model is a good fit.

Gross Domestic Product (GDP) was found to be significant and positively associated with the health expenditures in both static and dynamic models (1.239 and 0.502), This means that Income is the major driver for rise in the health expenditures over time for the developing countries. People tend to spend more on health as they get wealthier. However, for the static and Dynamic model coefficients are different. For the Dynamic model co-efficient is smaller although positive. This shows that in the long run other variables had taken away the impact which in static model was more attributed to income. Education was found positively but insignificantly affecting in short run. Whereas in long run, it was significant and negatively related to health expenditures. One of the reasons can be that educated people can better understand their health conditions and make expenditures accordingly as well as move to more preventive discourses. People learn about the effects of unhealthy behaviors at school, college or university. Besides, educated people can better understand the basic consequences of unhealthy living and hence less unhealthy diet/behaviour and diseases incidence will lead to less total health expenditures. While population of age 65 and above was found significant and positive in short run only because elderly people need extra medical care and facilities, which of course would increase health expenditure in short run. Secondly, most of time they had serious chronic diseases that require immediate treatments and hospitalisations, which is indeed very expensive and hence lead to rise in health expenditures. Also, in developing countries elderly people are not insured and have a lower life expectancy as compared to developed

countries which makes it believable to think that this variable is found positive in short run only.

Government effectiveness and R&D expenditure were found insignificant in both long run and short run. But government effectiveness had positive relationship with health expenditures for developing countries because improvement in government effectiveness would first increase in health expenditures per capita and then will improve health outcomes. This is because of the fact that these developing countries are far behind in health outcomes as compared to the developed countries and they need to do a catching up. So better governance system will help countries invest more in their Human capital development. Similarly, R&D expenditures were found positive too both in short and long run because it is quiet evident from the literature that technology triggers health expenditures through increase in availability of more sophisticated bio medical equipment as well as improved generation of medicines and tests etc. but unfortunately here its found to be insignificant may be due to data limitation. Then for control variables, Unemployment was found to be positive in both but significant in static model because if a person is unemployed that means he has low income, so he would be undernourished and he would have greater risk to get ill. And eventually his health expenditure would increase. We got similar results for life expectancy and number of physicians. While urbanisation was found insignificant in both models. We have also checked for the potential non-stationarity of health expenditures and income. We have used Fisher's unit root test and found out that both health expenditure and income are stationary at levels. we have also checked for reverse causation between income and health expenditures by using Granger's test and no evidence was found for reverse causation. As the relationship among heath expenditures and income was found to be unidirectional.

## Regression Results<sup>7</sup>

VARIABLES	(1) static model (Fixed effect)	(2) Dynamic model(GMM)
L.Inhe		0.844*** (0.090)
Lngdp	1.239*** (0.085)	0.502** (0.231)
Lnge	0.065 (0.136)	0.125 (0.387)
Rd	0.002 (0.034)	0.028 (0.066)
Unemp	0.007* (0.004)	0.002 (0.011)
Le	0.023*** (0.007)	-0.015 (0.014)
pop65	0.060*** (0.014)	-0.034 (0.028)
Phy	0.079*** (0.015)	0.034 (0.036)
Se	0.001 (0.002)	-0.014* (0.008)
Urb	-0.000 (0.004)	-0.012 (0.008)
Constant	-6.906*** (0.751)	0.020 (0.953)
Observations	307	289
R-squared	0.902	
Number of id	50	50
AR(1)		0.0912
AR(2)		0.256
Hansen		0.978
Sargan		0.379
Number of instruments		20

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10, Standard errors in parentheses

**Table 1 Regression Table**

### 2.9.2 Heterogeneity by medical facilities

For post estimations, we have checked heterogeneity by countries having sufficient (below median) Hospital beds (per 1,000 people) as proxy for medical facilities (appendix 1.2). These results were found consistent with our dynamic model result as most of our explanatory variables were found significant.

<sup>7</sup> In static model, selection of fixed model was based on the Hausman specification test (0.000)

### **2.9.3 Heterogeneity by Political Stability**

We have also checked heterogeneity by countries having political stability and absence of violence/Terrorism (Appendix). Which is very relevant because if countries are politically unstable and country is facing terrorism then evidently there will be more casualties and patients. That means people will spend more on health. Either developing or developed, both will have more health expenditures if a country is politically unstable. Only lag of dependent variable i.e lag of health expenditure was found significant.

### **2.9.4 Robustness Check**

#### ***Alternative Proxy variable***

As robustness test, we have re-estimated our model with an alternative proxy variable. We have used educational attainment as a proxy for education. In this analysis we got mixed results as only Education attainment was found significant.

## **2.10 Revised Estimation**

### **2.10.1 Regression Results**

In this section Revised Estimation Results are being presented. For revised Estimation we have extended our sample by adding more developing countries, 117 in total for the time period of 2000-2021. GDP, Health Expenditures and Government Effectiveness are taken in log. To solve the downsize of sample issue, we used general to specific approach for model selection. The General-to-Specific (GETS) approach, also known as the Hendry methodology, is a systematic econometric procedure for model selection and specification. First the general model is tested by several econometrics restrictions to make a simplified model to get a congruent representation. Then it conducts diagnostic tests on the general model to identify potential misspecification errors. Based on the results of specification tests, systematically simplify the model by removing statistically insignificant variables or variables that fail diagnostic tests. It continues this process until all remaining variables are statistically significant. Then the final model is the one that includes only statistically significant variables and meets all diagnostic criteria. Hence Research and Development was removed in the final model.

## General To specific Approach<sup>8</sup>

VARIABLES	(1) General Model	(2) Final Model
GDP	0.886*** (0.035)	1.002*** (0.028)
Government effectiveness	-0.517*** (0.047)	-0.381*** (0.028)
Population 65 and above	0.097*** (0.007)	0.067*** (0.006)
School Enrollment	-0.000 (0.000)	0.000** (0.000)
Life Expectancy	0.018*** (0.004)	0.024*** (0.002)
Urban population	0.001 (0.002)	-0.003** (0.001)
Research and Development	-0.025*** (0.008)	
Constant	-2.729*** (0.277)	-3.836*** (0.189)
Observations	732	1702
R-squared	0.900	0.883
Number of groups	84	112

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10, **Standard errors** in parentheses

**Table 2 General to specific Approach**

From the above table 2 we can see that results are consistent with theory. After adjusting for the downsizing problem of including R&D as an explanatory variable we have estimated the equation and performed all the diagnostics. Model fitness test show R square of 0.900 in case of general model and 0.883 in case of reduced equation. However, number of observations also vary from 732 in first case to 1702 in second. Relatively speaking the GDP variable has come to be the most dominating one among the comparable determinants. Its co-efficient is 1.002 and is highly positively significant. Which means as the incomes of the population increase, they tend to spend more on the health care service. Our results are consistent with the findings of Hitiris and Posnett (1992). Which incase of population being overaged would also result in the same direction although the co-efficient is much smaller i.e. just .067. Our results are similar to those of Di Matteo, (2005). Incase of higher school enrolment health expenditures

<sup>8</sup>Specific model estimates are presented in appendix.

do increase and the variable is highly significant however the coefficient is very small. Our results resemble those of Siddiqui et al. (1995).

While on the other hand government effectiveness and Urban development both have a negative sign for their determining co-efficient. For the former its -0.381 and for later its .003. Which means as the government become efficient in their resource allocations there is a drag on health expenditures by common people. In other words government health services become more efficient hence the overall cost of health service purchase for individuals reduce significantly. Our results are consistent with results of Rizvi (2019). In case of urban development, the inference is almost the same that as the degree of urbanization increase it leads to lesser health care spending owing to better preventive health environment such as health and hygiene facilities etc.

### Static and Dynamic Model

VARIABLES	(1) Static <sup>9</sup> (fixed Effect)	(2) Dynamic Model (GMM)
GDP	1.264*** (0.035)	-0.066 (0.087)
Government effectiveness	-0.321*** (0.030)	-0.161* (0.088)
Population 65 and above	0.067*** (0.007)	0.018 (0.018)
School Enrollment	0.000 (0.000)	0.002 (0.002)
Life Expectancy	0.020*** (0.002)	0.011 (0.007)
Urban population	-0.002 (0.002)	0.004 (0.003)
Constant	-5.739*** (0.234)	0.010 (0.389)
Lag Health Expenditure		0.883*** (0.084)
Observations	1702	1613
R-squared	0.888	
Number of id	112	112
AR(1)		0.000
AR(2)		0.409
Hansen		0.000

<sup>9</sup> In static model, selection of fixed model was based on the Hausman specification test (0.000)

Sargan	0.000
Number of instruments	18

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10, **Standard errors** in parentheses

**Table 3 : Static and dynamic model**

In the table 3, fixed effect model was chosen based on the Hausman test for the static case. R&D variable was again dropped to avoid the downsizing of observations. Results are similar to the standard specific model explained above. However, the co-efficient of GDP have changed in magnitude. The coefficient of the GDP has increased from 1.002 to 1.264. While rest of all explanatory variables are the same in terms of the coefficients. Which means the income levels matter the most in determining the health expenditures in the society. The more income the society have the more will be the health expenditure. While government effectiveness would help reduce the expenditures because of more efficiency.

But when we move to the Dynamic model also provided in table above then results change dramatically. Dynamic model is estimated using the GMM technique. As compared to static model, Out of all determining variables only government effectiveness was found significant and negatively related to health expenditure. Which is consistent with the theory that the more efficient the system, the less health expenditure would be. Lag of health expenditure has the highest coefficient value of 0.883. Which means there is an inertia at the macro level for the health expenditures of first order. All the coefficient values have declined because of this Health expenditure inertia however the direction remains the same. Therefore, in accordance with the literature (Hitiris and Posnett ,1992; Di Matteo, 2005 and Rizvi,2019) and results we can say that GDP, Government effectiveness and ageing population were found to be significant determinants as well as they seem to be most important because GDP measures country's economic output and generally higher GDP drives higher health expenditures (Byaro et al.,2018 ; Ali and Sayed,2020 ; Zhou et al. ,2020). Then, effective government can lead to better resource allocation and can improve quality of health care services (Lewis,2006 ; Rizvi,2019) and lastly aging population is also associated with higher health care cost due to chronic diseases etc (Neuman at al., 2015; Sbia, and Maouchi,2019; Ali and Sayed,2020). While some studies like You et al. (2016), Khan et al. (2016), Hajibabaei et al. (2020) and Hassan and Kalim (2012) have also found education and technology affecting health expenditures significantly and positively and on the contrary we have found both of them insignificant in our sample.

## 2.10.2 Heterogeneity analysis

For post estimations, we have checked heterogeneity by Income, Regional and Demographic variations.

### Income Wise Heterogeneity<sup>10</sup>

VARIABLES	(1) Low-income	(2) Lower-middle income	(3) upper-middle	(4) High-income
GDP	0.349 (0.231)	0.350 (0.692)	0.206*** (0.082)	0.192 (0.397)
Government effectiveness	0.129 (0.210)	-0.141 (0.145)	-0.070 (0.066)	-0.218*** (0.084)
Population 65 and above	-0.045 (0.061)	0.035 (0.474)	0.002 (0.014)	0.020 (0.018)
School Enrollment	0.007** (0.003)	-0.001 (0.002)	-0.000 (0.000)	-0.007 (0.001)
Life Expectancy	-0.007 (0.005)	-0.002 (0.007)	-0.001 (0.004)	0.002 (0.008)
Urban population	-0.000 (0.003)	-0.000 (0.003)	-0.001 (0.001)	0.001 (0.001)
Constant	-1.185 (0.954)	-1.351 (2.978)	-1.151 (0.567)**	-0.636 (2.327)
Lag Health Expenditure	0.697*** (0.148)	0.820* (0.438)	0.961*** (0.081)	0.810*** (0.196)
Observations	384	574	436	219
Number of id	31	52	40	22
AR(1)	0.019	0.053	0.004	0.022
AR(2)	0.226	0.191	0.491	0.451
Sargan	0.034	0.000	0.000	0.533
Hansen	0.267	0.004	0.008	0.162
Number of instruments	18	18	18	18

**Table 4: Income heterogeneity**

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10, Standard errors in parentheses

To capture the heterogeneity income wise data was divided into four categories. Low, Lower-Middle, Upper-Middle- and High-Income countries. Results vary across these four sets. The GDP as an explanatory variable is only significant in the upper middle-income country. In rest of the cases, it has become insignificant. Which in earlier regression this variable was the most

<sup>10</sup> World bank thresholds for each income category.

- Low-income: GDP per capita below \$1,045 (as of 2021)
- Lower-middle-income: GDP per capita between \$1,046 and \$4,095
- Upper-middle-income: GDP per capita between \$4,096 and \$12,695
- High-income: GDP per capita above \$12,695



effective variable in determining the health expenditures. Similarly, for the government expenditures effectiveness is only established in upper and High-income countries. School enrolment seems to be consistent in all the four regressions, where the results suggest that as the health expenditures of the people decrease, they tend to acquire more education. Population above 65 and Life expectancy impact is consistent across all regression models based on income differences. Both tend to increase the level of expenditures. Urban population effects health expenditures positively in case of high-income countries. Which means the people are forced to spend more because of urbanization. Finally, the lag of dependent variable which is health expenditures have significant impact on current health expenditures because of the inertia factor.

### Heterogeneity analysis Demographically: Urbanization<sup>11</sup>

VARIABLES	(1) Low	(2) Medium	(3) High
GDP	0.156 (0.202)	0.171* (0.097)	-0.123 (0.077)
Government effectiveness	-0.052 (0.140)	-0.089 (0.100)	-0.169* (0.089)
Population 65 and above	0.006 (0.039)	0.003 (0.021)	-0.009 (0.009)
School Enrollment	0.008* (0.004)	-0.000 (0.000)	0.001 (0.003)
Life Expectancy	0.001 (0.013)	0.000 (0.005)	0.031* (0.018)
Urban population	0.000 (0.004)	-0.001 (0.004)	0.007 (0.004)
Constant	-0.881 (0.792)	-0.543 (0.351)	-1.357 (0.934)
Lag Health Expenditure	0.757*** (0.121)	0.889*** (0.129)	0.951*** (0.101)
Observations	815	459	320
Number of id	60	39	24
AR(1)	0.001	0.004	0.018
AR(2)	0.591	0.191	0.573
Sargan	0.000	0.000	0.296
Hansen	0.095	0.012	0.318
Number of instruments	18	18	18

**Table 5: Urbanization heterogeneity**

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10, **Standard errors** in parentheses

<sup>11</sup> Urban Population Percentage < 50 are placed in Low Urbanization; Urban Population Percentage between 50 and 75 are in Medium Urbanization, if Urban Population Percentage > 75 are placed in High Urbanization

Next, we have incorporated the heterogeneity in terms of urbanization. Degree of urbanization was characterised by the percentage of population living in urban areas. Surprisingly the otherwise very significant determinants for health expenditures i.e. the GDP has become insignificant in the low urbanization category vs. the medium and Higher urbanization cases. Surprisingly in case of the higher urbanization case the GDP variable is negatively related with the dependent variable meaning that as economic growth happens the people have to spend less in the highly urbanized countries. This may be due to reasons that these economies have growth with a health consciousness or focusing more on preventive health practices. While government effectiveness is only seen significant in case of the higher urbanization case with a negative relationship with the dependent variable. Other variables are all significant with standard signs however in case of highly urbanized counties the sign of relationship reverses. Pointing to differences in health behaviour of highly urbanized countries as compared to others. While the lag of dependent variable has taken up most of the variation in the dependent variable and its positively related to the dependent variable but not highly significant. In all the three cases coefficient value is more than 0.80 which is the highest among other explanatory variables. Followed by government effectiveness and GDP respectively.

### Heterogeneity analysis: Regional

VARIABLES	(1) Asia	(2) Middle-East	(3) Africa	(4) Caribbean
GDP	-0.140 (0.134)	-0.017 (0.351)	0.214 (0.151)	3.926 (3.936)
Government effectiveness	-0.258*** (0.103)	-0.346** (0.178)	-0.085 (0.133)	0.316 (0.746)
Population 65 and above	0.020 (0.024)	0.025 (0.043)	0.018 (0.037)	0.125 (0.097)
School Enrollment	0.000 (0.002)	0.000 (0.008)	0.009*** (0.003)	-0.004 (0.004)
Life Expectancy	0.028* (0.016)	0.025 (0.046)	-0.004 (0.006)	-0.195 (0.256)
Urban population	0.007*** (0.002)	0.018 (0.012)	-0.002 (0.004)	0.061 (0.059)
Constant	-0.455 (0.586)	0.074 (1.982)	-1.102 (0.694)	-11.336 (22.31)
Lag Health Expenditure	0.878*** (0.134)	0.576* (0.352)	0.800*** (0.123)	-1.076 (2.398)
Observations	279	189	746	83
Number of id	19	13	51	8
AR(1)	0.007	0.144	0.002	
AR(2)	0.736	0.902	0.736	0.095
Sargan	0.324	0.000	0.000	0.614

Hansen	0.471	0.918	0.065	1.000
Number of instruments	18	18	18	18

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10, **Standard errors** in parentheses

### Heterogeneity analysis: Regional

VARIABLES	(5) Latin America	(6) Europe	(7) Oceania
GDP	0.062 (0.098)		
Government effectiveness	-0.136 (0.085)		
Population 65 and above	0.035* (0.021)	0.312*** (0.097)	
School Enrollment	-0.009** (0.004)	0.005 (0.038)	0.005 (0.004)
Life Expectancy	0.000 (0.019)	0.049 (0.475)	
Urban population	-0.000 (0.002)	-0.029 (0.402)	0.123*** (0.037)
Constant	1.388 (1.301)		
Lag Health Expenditure	0.851*** (0.102)		
Observations	268	32	16
Number of id	16	4	2
AR(1)	0.040	0.872	0.294
AR(2)	0.197	0.802	0.399
Sargan	0.000	0.066	0.185
Hansen	0.597	1.000	1.000
Number of instruments	18	16	15

**Table 6: Region wise Heterogeneity**

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10, **Standard errors** in parentheses

Lastly the results for regionally comparable estimated models are given in the above table<sup>12</sup>. Surprisingly the variable GDP which in our base case was highly positively significant has become insignificant in case of regionally bifurcated analysis. Similarly in case of the government effectiveness its only significant in case of Asia and Middle east while for rest of the regions it is insignificantly related to the dependent variable. Population above 65 is only significant in case of Latin America and Europe. Which means either the government is bearing significant cost or the private health markets through Insurance are adequately funding the additional health expenditures which in other regions is not the likely case. School enrolment

<sup>12</sup> Incase of Oceania and Europe certain data series were missing so these variables had to be dropped.

is only significant in case of Africa and the Latin America. Which means that the gap in funding reduces as the population gets educated in these regions. Lag of dependent variable is significant in all the regionally comparable models however its negative in sign for the Caribbean case. Which is surprising as it points out that there is no inertia rather the health expenditures decline in the current times if there are higher health expenditures in the previous period.

## **2.11 Conclusion and Discussion**

### **2.11.1 Conclusion**

There are massive Health Care Challenges across the globe with varying nature and complexities. However, it has been well recognized e.g. out of the Eight MDGs three focused on health. Even in the new frameworks of development like the SDGs these are given extreme importance. SDG 3 directly talks about health and all other goals are indirectly linked to better health. Countries across the globe are increasing expenditures to improve outcomes but still outcomes are not the same. Some are more efficient in approaching the health outcomes and some are less. Considering the importance of these productivity differences it becomes essential to see the drivers of health expenditures across countries for better understanding and possible policy framework.

The study took a sample of 108(117)<sup>13</sup> developing countries of time period 2002-2021(2000-2021)<sup>14</sup>. As anticipated, determinants were found to affect health expenditures differently both in short run and long run. Income levels mattered the most in case of inducing higher levels of health care expenditures. In long run school enrollment taken as a proxy of basic level of education effects health expenditures significantly and negatively. while Population of age 65 and above has positive and significant impact on health care cost in short run. While, In revised estimations almost all determining variables are found significant except education proxy. And in log run only government effectiveness was significant and negative.

However. when the same estimations were done considering the possible heterogeneity issues in the data then few results changed. Heterogeneity analysis was conducted in terms of income differences, Urbanization and regional comparison. Surprisingly the income variable was not that much significant in these cases. The lagged variable reflecting the dynamic context of

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<sup>13</sup> Taken in revised model

<sup>14</sup> Taken in revised model

regression was mostly significant across the estimations meaning that there is a strong inertia in health expenditures.

### **2.11.2 Limitations of the study**

Since some variables were proxied to the best possible extent hence results may improve more if purpose-built data is collected. Also, there could be factors other than those mentioned in the study, that play significant role in driving health cost. For example, health insurance, which was used in many studies, but it couldn't be included in this study due to data constraint. Secondly, in most of the developing countries data on health care expenditures are collected through survey so usual limitations to these holds.

### **2.11.3 Policy implications**

In order to achieve SDG targets related to health outcomes governments need to increase resource allocation as well as identify means for better, equitable and affordable Health Care Systems. Having said that policy prescription for developing countries could be to focus on it's the level of resource allocation and improvement in system such as better curriculum for preventive health care, investing more in research sector, accountability and supervision in institutions etc.

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## APPENDIX

Variables	Symbol	(1) N	(2) mean	(3) sd	(4) Min	(5) max	(6) Measuring unit
Urban Population	Urb	2,150	53.47	23.54	8.682	100	% of total population
School enrollment, primary	Se	1,557	102.9	16.70	23.36	150.0	% gross
Research and development	Rd	729	0.640	0.903	0.00544	5.436	% of GDP
Unemployment	Unemp	1,074	7.159	5.292	0.100	35.46	% of total labor force
Population ages 65 and above	pop65	2,150	4.983	2.974	0.686	18.90	% of total population
Physicians	Phy	937	1.237	1.511	0.0110	8.420	per 1,000 people
Current health expenditure per capita	Lnhe	1,880	5.687	1.197	2.462	8.319	PPP (current international \$)
GDP per capita	Lngdp	2,098	7.969	1.285	5.555	11.10	constant 2015 US\$
Government effectiveness	Lnge	2,160	0.892	0.330	-0.589	1.691	Index
Life Expectancy	Le	2,052	66.94	9.237	41.37	85.38	total years

**Table 7: Descriptive Statistics**

VARIABLES	lack of medical facilities	Sufficient medical facilities
L.lnhe	0.531*** (7.27)	0.749*** (5.57)
Lngdp	0.491* (1.82)	0.467 (1.34)
Lnge	0.039 (0.30)	0.391 (1.14)
Rd	-0.128 (-0.96)	0.120 (0.97)
Unemp	0.014 (1.35)	0.007 (1.00)
Le	-0.014 (-0.74)	-0.014 (-0.87)
pop65	0.041*** (4.51)	-0.033 (-0.69)
Phy	0.015 (0.96)	0.031 (0.68)
Se	0.003 (1.52)	-0.025* (-1.69)
Urb	-0.002 (-0.31)	-0.009 (-0.85)
Constant	-0.690 (-1.17)	1.464 (0.90)
Observations	59	230
AR(1)	0.249	0.080
AR(2)	0.331	0.254
Hansen	0.997	0.961
Sargan	0.024	0.659
Number of instruments	20	20

**Table 8: Heterogeneity analysis by medical facilities**

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10, Standard errors in parentheses



VARIABLES	Politically unstable	Politically stable
L.lnhe	0.898*** (9.42)	1.001*** (6.78)
Lngdp	0.441 (1.30)	0.023 (0.06)
Lnge	-0.283 (-0.52)	0.125 (0.16)
Rd	-0.078 (-0.85)	-0.077 (-0.82)
Unemp	-0.004 (-0.67)	-0.019 (-0.87)
Le	-0.010 (-1.00)	-0.016 (-0.78)
pop65	-0.025 (-0.73)	0.051 (1.51)
Phy	0.006 (0.23)	-0.058 (-0.62)
Se	-0.007 (-1.13)	0.005 (0.63)
Urb	-0.005 (-0.95)	0.001 (0.10)
Constant	-0.670 (-1.00)	0.160 (0.10)
Observations	181	108
AR(1)	0.020	0.219
AR(2)	0.268	0.219
Hansen	0.433	0.717
Sargan	0.030	0.726
Number of instruments	20	20

**Table 9: heterogeneity analysis by political stability**

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10 Standard errors in parentheses

Data source: Worldwide governance indicators

VARIABLES	Using Education attainment
L.lnhe	0.970*** (7.75)
Lngdp	0.131 (0.56)
Lnge	0.478* (1.67)
Rd	-0.058 (-0.91)
Unemp	0.005 (1.32)
Le	-0.004 (-0.29)
pop65	0.020 (0.67)
Phy	0.008 (0.42)
Edu	-0.005* (-1.82)
Urb	-0.005 (-1.42)
Constant	-0.487 (-0.98)
Observations	140
AR(1)	0.069
AR(2)	0.642
Hansen	0.677
Sargan	0.665
Number of instruments	20

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10, Standard errors in parentheses

**Table 10: Robustness by alternative proxy variables**

### Specific Model with only Independent Variables

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VARIABLES	Specific Model
GDP	1.395*** (0.030)
Government effectiveness	-0.346*** (0.047)
Population 65 and above	0.030*** (0.071)
School Enrollment	0.002*** (0.000)
Constant	-5.627*** (0.243)
Observations	1702
R-squared	0.980
Number of groups	112

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**Table 11: specific model**

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ , Standard errors in parentheses

**CHAPTER 3:  
HOUSEHOLD CATASTROPHIC HEALTH  
EXPENDITURES AND ITS DETERMINANTS IN  
PAKISTAN**

## **ABSTRACT**

Pakistan being a lower-middle-income country, is always being able to allocate less than or around 2% of GDP to health due to which Out-of-Pocket payments have a very large share in Pakistan's total health financing. Hence, when this OOP health expenditure exceeds a defined threshold of the Household's Non-food consumption expenditure then the Household faces financial catastrophe. This research sheds light on the features that can make households in Pakistan more vulnerable to catastrophic health expenses and fills the gap by analyzing the determinants of Catastrophic health expenditures of Pakistan. we have used survey data of Household Integrated Economic Survey (HIES) of Pakistan for the year 2015-2016 for 24238 households. It contains household information including education, income, consumption expenditure, and health expenditures. As anticipated, some determining factors significantly increase the risk of facing catastrophic health expenditures.

### **Keywords**

Catastrophic Health Expenditure; Out-of-Pocket Payments; Non-food consumption expenditure

### **JEL Classification**

I10, I19, H51

### 3.1 Introduction

Investment in the health sector can lead to a long-run beneficial outcome. It is useful in promoting health outcomes, decreasing poverty, and help stimulation of economic growth. Despite the fact, the public health expenditure stayed squat in emerging nations and the overall public has no option but to bear health care expenditures from their pockets, which has been persisted as the main source of health financing. Globally, 32% of health expenditure was out of pocket expenditure in 2015. Out of these, World Health Organization evaluates that out-of-pocket expenditure on health care facilities impel 4100 million individuals into poverty each year. However, nearly 150 million people bear monetary calamities due to out-of-pocket health expenditures (WHO, 2015). Catastrophic Health Expenditure is health care cost or out-of-pocket outlay that surpasses a well-defined threshold level of a household's aggregate consumption or non-food consumption expenses per year, (Aregbeshola and Khan,2018; Choi et al.,2016). Based on a 2010 WHO report, a nation's public health expenditure of around 6% of GDP will moderate Out of pocket expenditures and make the occurrence of calamitous health expenses negligible. On the contrary, the average value of aggregate health spending as a ratio of GDP for Pakistan during the period 2000- 2016 remained 2.78% with the least 2.36% in 2011 and with the highest of 3.34% in 2007. In 2016, Pakistan being a lower-middle-income country has health expenditure per capita of US-Dollar 40 with an out-of-pocket expenditure of 65.2 % of current health expenditures and 2.8% of total health expenditures (% of GDP)<sup>15</sup>. The health Indicators of Pakistan as compared to the region, indicate poor health outcomes such as high infant mortality, high population growth rate, and lowest life expectancy among other regional countries. One possible reason is that the health expenditure of Pakistan is far lower than other regional countries. As also stated above that Pakistan has been allocating less than or around 2% of GDP to health on average. For instance, It has been projected from the comparatively low levels of public expenses, out-of-pocket expenditures played a great role in Pakistan at 65%<sup>2</sup> (% of current health expenditures), which is extremely high in global context (where the average is 18.5% in 2015-2016).

Berki (1986) is the first to explore catastrophic health expenditures and defined them as the expenditures which covered a huge share of the household budget and interrupts the family's consumption. Also, according to Russell (1996), this method is linked to the opportunity cost of health expenditures. Contemporary studies have used this approach by using different measures, for example Wagstaff and Doorslaer (2003) used the out-of-pocket health spending

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<sup>15</sup> World Health Organization Global Health Expenditure database ([apps.who.int/nha/database](https://apps.who.int/nha/database) )

portion in the overall domestic budget to examine the occurrence, intensity, and factors of CHE. Plus, different thresholds were used to measure the sensitivity of incidence of CHE faced by households. Moreover, [Wagstaff and Doorslaer \(2003\)](#) assessed the prevalence of CHE by using health expenditure as a fraction of family income minus the food expenses. Although [Xu et al. \(2003\)](#) recommended an alternative method (ability-to-pay), in which he used the income left providing for food spending by an average household in the public. Some other studies like [Flores et al. \(2008\)](#) and [Pal \(2012\)](#) have proposed reviewed measures of calamitous OOP health expenditures.

Considering a large share of Pakistan's population being poor, we need to understand the determinants of the CHE for designing better policies. The present study uses Pakistan health and non-food expenditures from HIES 2015-2016 dataset, [Wagstaff and Doorslaer \(2003\)](#) methodology is employed to analyze the determining factors of Catastrophic Health Expenditures of Pakistan.

In Pakistan, limited research exists on healthcare Expenditures, and among those, the emphasis is kept on the government's health expenditures ([Siddiqui et al., 1995](#); [Akram & Khan, 2007](#)). One research ([Malik and Syed, 2012](#)) is found on OOP health spending of Pakistan. Besides, we haven't found any research that has examined the catastrophic health expenses of Pakistan. This study discuss briefly the incidence of CHE in Pakistan and explores the factors that can make households in Pakistan more vulnerable to catastrophic health expenses.

## **3.2 Discussion on health profile and health expenditures in Pakistan**

### **3.2.1 Health Status**

Along with numerous political, financial, social, and cross-boundary challenges, Pakistan must deal with some serious health issues. For example, the life expectancy of Pakistan is 66<sup>16</sup> which is the lowest among the regional countries and lower than other developing countries. Likewise, the infant mortality rate is 63 per 1000<sup>17</sup> births which are the highest in the region. Also, in youngsters, diarrhea and breathing problems are still major killers<sup>18</sup>. Maternal demises because of avoidable causes like sepsis, hemorrhage, hypertensive crises, and sepsis, are common. Pakistan is one of the three remaining nations where Polio is still widespread<sup>19</sup>. Furthermore, Pakistan has an endemicity of hepatitis B and C in the overall inhabitants with 7.6% affected

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<sup>16</sup> World development indicators (WDI), World Bank

<sup>17</sup> World development indicators (WDI), World Bank

<sup>18</sup> UNICEF. Child Survival: Under-Five Mortality. 2016. <http://data.unicef.org/child-mortality/under-five.html>

<sup>19</sup> Polio Global Eradication Initiative. <http://www.polioeradication.org/Keycountries.aspx>

individuals<sup>20</sup>; stands 5<sup>th</sup> highest for tuberculosis burden in the world<sup>21</sup>, has a focal geographical area of malaria endemicity<sup>22</sup>, and an established HIV concentration among high-risk groups<sup>23</sup>. Pakistan is ranked 7<sup>th</sup> highest in the world for diabetes prevalence<sup>24</sup>. One in four adults over 18 years of age is hypertensive, and smoking levels are high. Pakistan has one of the notable incidences of under-weight children in South Asia. Gender discrimination, Poverty, low literacy, joblessness, and enormous treatment gap have directed to an indistinguishable burden of psychological health complications.

The health system faces challenges of vertical service delivery structures and low-performance accountability within the institutions, creating efficiency and quality issues. Largely unregulated for quality care and pricing, there is also duplication of services by the private sector<sup>25</sup>. Despite having the potential, the private segment pays the least. The public sector is inadequately staffed, job satisfaction and work environment need improvement<sup>26</sup>. The overall health sector also faces an imbalance in the skill mix and deployment of the health workforce, and inadequate resource allocation across different levels of health care i.e. primary, secondary, and tertiary.

A range of actions is needed, acting upon the social factors within the health and social sectors, if a wider impact is to be achieved<sup>27</sup>. But this strategy needs a careful understanding of underlying parameters at household levels which makes households face CHE.

### **3.2.2 Health Spending of Pakistan vs Other Regional Countries**

According to UNDP, Pakistan is confronting huge socio-economic challenges including illiteracy, poverty, poor health facilities, and a continuously rising population. Pakistan is the 6<sup>th</sup> most populous country with a growth rate of 2.05% per annum and a total population of 200.2 million<sup>28</sup>, is a major intersection in terms of the relation between health and development. Despite having a per capita income of current US\$1472<sup>29</sup> (India: \$2015, Bangladesh: \$1698) in 2018, Pakistan has weak health outcomes across the region. In Human Development Index (HDI) Pakistan is positioned at 150<sup>30</sup> (India:130, Bangladesh:136) out of 189 countries. The

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<sup>20</sup> See [Qureshi et al. \(2010\)](#)

<sup>21</sup> World Health Organization. Global TB Report. Geneva: 2014.

<sup>22</sup> Global Fund. Pakistan 2014 Malaria Grant Concept Note. Islamabad: 2014.

<sup>23</sup> UNAIDS. Global AIDS Response Progress Report. Geneva: 2014

<sup>24</sup> World Health Organization. Global report on diabetes. Geneva: 2016

<sup>25</sup> World Health Organization. Analysis of the private health sector in countries of the Eastern Mediterranean: exploring unfamiliar territory. Regional Office for the Eastern Mediterranean, Cairo: 2014.

<sup>26</sup> See [Hafeez et al. \(2010\)](#)

<sup>27</sup> See [Bhutta and Hafeez \(2015\)](#)

<sup>28</sup> Pakistan population statistics from World development Indicators (WDI)

<sup>29</sup> World Development Indicators (WDI)

<sup>30</sup> Human Development Indices and Indicators:2018 statistical update



health Indicators of Pakistan show a high population growth rate, high infant mortality, and lowest life expectancy among other regional countries. One reason could be that Pakistan's health spending is far less than other regional countries. Pakistan allocated less than or around 2% of GDP to health historically, which is very low. This also does not have the required prepaid component of health financing system and also is not a match with other lower-middle-income countries as well as very far away from a global average of 5.3%. The comparative position of Pakistan in health expenditure and health outcomes among other regional countries is given in Table 12.

<b>country</b>	<b>Current health expenditure (% of GDP)</b>	<b>Out-of-pocket expenditure (% of current health expenditure)</b>	<b>Life expectancy at birth, total (years)</b>	<b>Mortality rate, infant (per 1,000 live births)</b>	<b>Population growth (annual %)</b>
<b>Pakistan</b>	2.7528	65.2279	66	62.9	2.0843
<b>Bangladesh</b>	2.3650	71.8888	72	28.3	1.0913
<b>Bhutan</b>	3.4541	20.1297	70	26.5	1.2062
<b>India</b>	3.6583	64.5778	69	33.6	1.0898
<b>Maldives</b>	10.6108	19.1006	77	7.1	4.4283
<b>Nepal</b>	6.2944	55.4400	70	28.8	0.9068
<b>Sri Lanka</b>	3.8932	50.1216	75	7.8	1.1049

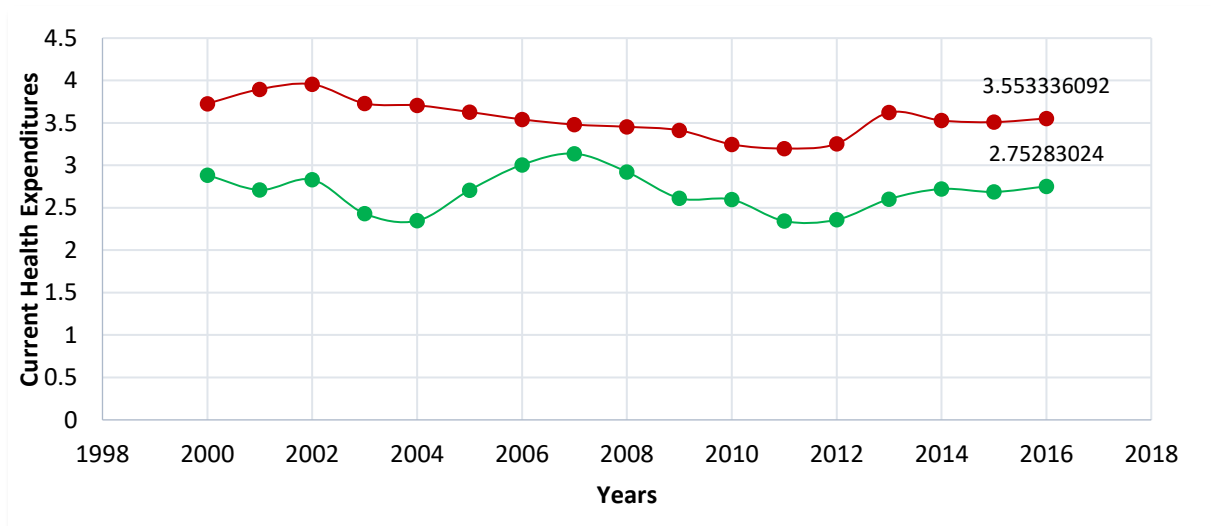
**Table 12 Comparison of health expenditures and health outcomes in Pakistan with different countries in the region in 2016**

*Source: World development indicators, World Bank*

The same picture emerges if we compare the average of South Asian countries with Pakistan. Historically it has been less and more volatile. Figure 2 presents the comparative picture. The share of OOP health expenditure out of the total expenditure is an important indicator in health financing research (Lavado et al., 2013; Xu et al., 2009). In many countries, this figure is used to derive the national level estimates of health accounts (Lavado et al., 2013)<sup>31</sup>. Within low-income countries, the average variation in this share is from 20% to 80%, and this share drops sharply for high-income countries. Below in figure 3, we have produced some comparative

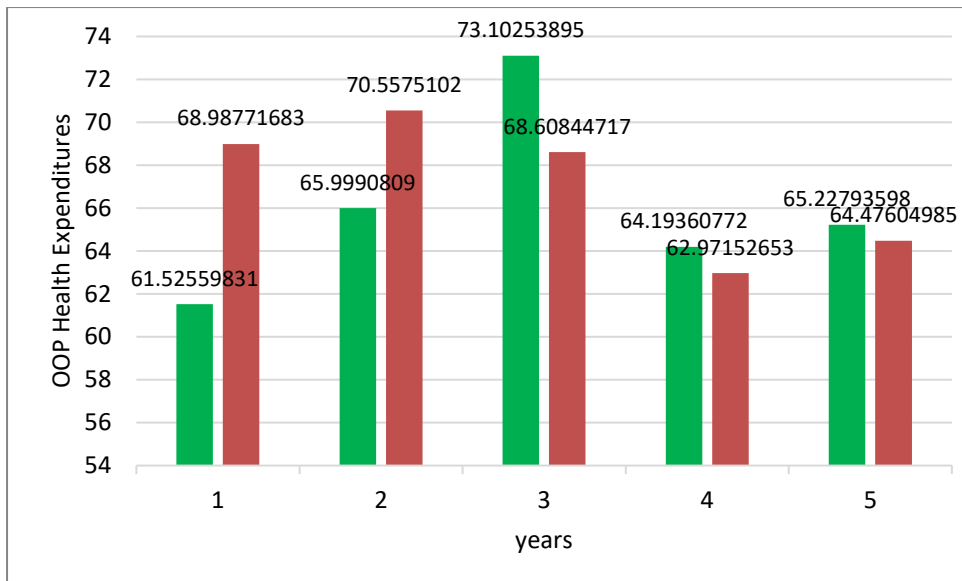
<sup>31</sup> General statistical procedures used to construct WHO health expenditure database," World Health Organization, Geneva, 2012 and Guide to producing national health accounts with special application to low income and middle-income Countries," World Health Organization, Geneva, 2003

positions in the region for Pakistan. Although the average OOP of South Asian countries seems to be close to that of Pakistan but again given the base of total health expenditures, where the other countries have done more allocation, the non-OOP would still be quite big in absolute value. Further in Pakistan. Thus, expenditure efficiency is also questionable see Rizvi (2019), for more discussion on institutional quality for health expenditures. Which reflected more on why the health outcomes such as the life expectancy (presented in Figure 4) is much low as compared to the region. Also, in this regard, Xu et al. (2003) stated that OOP payments are not only the important determinant of health expenditure catastrophe. Access to health care services, poverty in the country and failure of social mechanism all of these are responsible for high rates of catastrophic payments.



**Figure 3. 1: Current health expenditure (percentage of GDP) of Pakistan and mean of south Asian countries.**

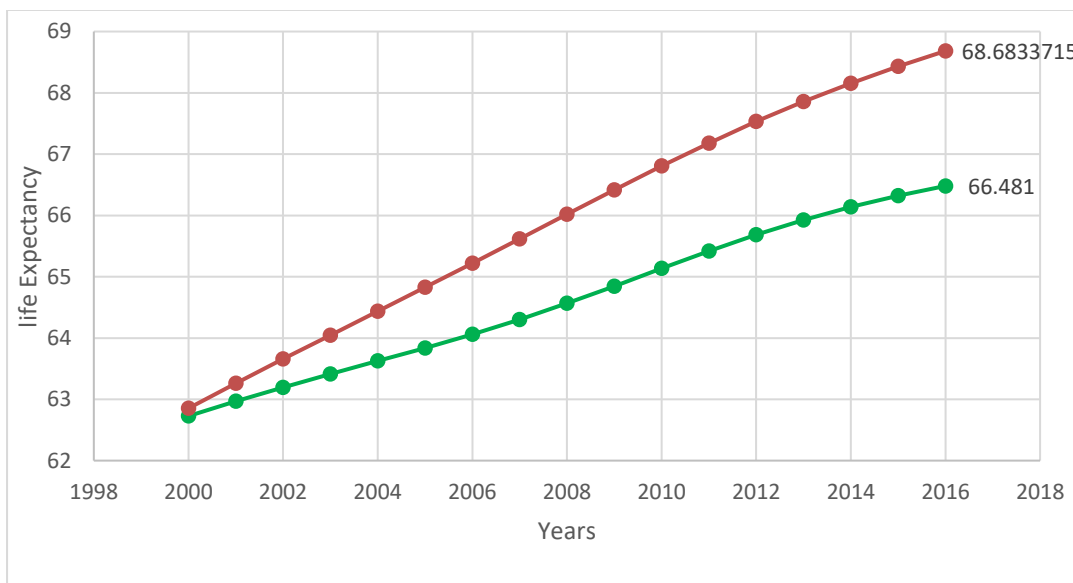
*x-axis: years, y-axis: current health expenditures as % of GDP; Data Source: World Development Indicators, World Bank*



**Figure 3. 2: Out-of-pocket expenditure (percentage of current health expenditure) of Pakistan and mean of south Asian countries.**

*x-axis: years, y-axis: OOP expenditures; Data Source: World development indicators, World Bank*

The relationship between resources and outcomes is important for assessing if a country has a performing health system (Jaba et al., 2014). Many studies investigated the association between health spending and life expectancy and found significant relationship (for example Aisa et al., 2014). In figure 3 if we look at Pakistan vs. South Asian average, then it's evident that both the level of health expenditures being low and the efficiency of spending being questionable the health outcomes are poorer in Pakistan.

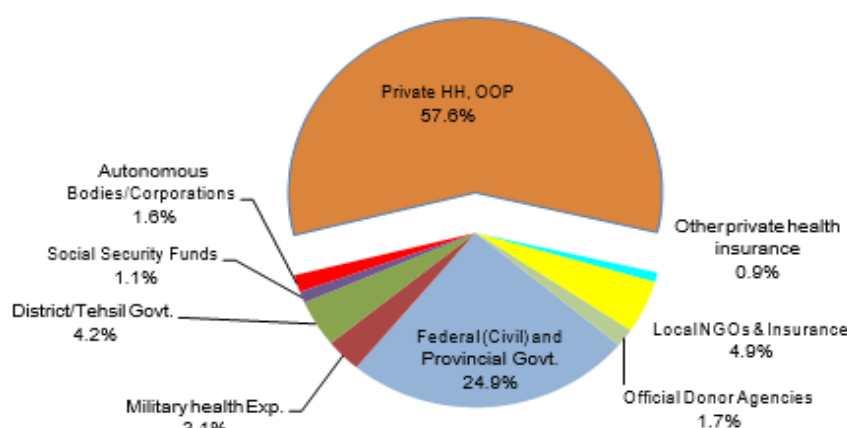


**Figure 3. 3: Life expectancy at birth, total (years) of Pakistan, and mean of south Asian countries.**

*x-axis: years, y-axis: life expectancy at birth; Data Source: World development indicators, World Bank*

### 3.2.3 Health Financing Sources in Pakistan

According to Pakistan National Health Accounts, Pakistan’s Total health expenditure in 2015-16 was Rs.908 billion (3.1% of GDP). As Figure 5 shows, Out of total health expenditures in Pakistan, 35% are made by the government. Private expenditures constitute 63.4% of total health expenditures in Pakistan, out of which 91% are household’s out-of-pocket (OOP) health expenditures. Development partner/ donor organizations have a 1.7% share in total health expenditures.



**Figure 3. 4: Share of financing agents in total health expenditures of Pakistan for 2015-16**

*Source: National Health Accounts Pakistan 2015-2016.*

As clearly mentioned in table 13 Funding sources have three main types, that is government financing, private financing, and rest of the world financing. Out of the entire health spending in Pakistan, 34% of entire health expenditure is financed by the government sector. While 64.4% of the health expenses were financed through the private sector, out of these 64.4%, almost 89% are OOP health expenditures by households. As would have been projected from the comparatively low levels of public spending, out-of-pocket payments played a great role in Pakistan at 65% (% of current health expenditures) of the total financing in 2015-2016, which is tremendously high in worldwide comparative terms (where the average is 18.5). It is also greater than the 20% limit proposed by the 2010 World health report to ensure that financial catastrophe and impoverishment because of accessing health care become insignificant (World Health Organization, 2010). This warrants further study as to why these OOP expenditures are very high, given the health outcomes are not very promising. It leads to hypothesis such as are

these OOP mainly the catastrophic ones hence people end up in short financing and often end up in not the best health outcomes. We will explore these further in sections below.

Source	Total (Million Rs.)	Percentage
Federal Government	67,062	7.4
Provincial Government	187,096	20.6
District Government	39,405	4.3
Autonomous Bodies / Corporations	14,287	1.6
Employer Funds	15,369	1.7
OOP Health Expenditures	524,804	57.8
Local/National NGO's	44,271	4.9
Official Donor Agencies	15,210	1.7
Total	907,504	100.0

**Table 13 Health Expenditure Financing Sources**

*Data Source: National Health Account, 2015-2016*

### 3.3 Review of literature

There are many studies available globally on the determinants of CHE and OOP. Here we present some of them to understand theoretical and empirical background. [Lara and Gómez \(2011\)](#) discovered a set of possible determinants that can raise the risk of experiencing catastrophic health expenses between families. Among them are characteristics and economic condition of household head, socio-demographic conditions, health insurance, a household with more elderly people, type of health care facility, in-patient events, etc. Similarly, [Li et al. \(2012\)](#) inquired about the features impacting catastrophic health expenditures in China. The significant factors include rural/poorer regions, households having hospitalized, chronically ill, and elderly members. Likewise, [Mondal et al. \(2010\)](#) studied the influential features of calamitous health expenditure in West Bengal, India. The analysis showed that many illness spells, hospitalizations, household members with chronic illness, and type of medical care were important factors that are responsible for catastrophic health expenditures. Moreover, [Xu et al. \(2003\)](#) did cross-country inquiry for 59 states and used surveys with socio-economic determinants like education, age, region, age and sex of household members etc. He found

Catastrophic health expenditure levels varied widely among countries, but households can be protected from catastrophic health expenditures by improving financial risk protection. However, [Gotsadze et al. \(2009\)](#) found poverty status, hospitalizations and HH members with chronic illness as major factors. [Su et al. \(2006\)](#) found almost results that member with chronic illness, no of illness, utilization for health care and economic status of the household are all significant factors that can lead to health expenditure catastrophe. [Azzani et al. \(2019\)](#), conducted systematic research to find out the determinants of CHE in low to high-income countries. The study showed households' financial situation, the prevalence of hospitalization, the family with old age individuals, chorionic ill person, and disabled individuals were the mutual factors linked with Household CHE. However, socioeconomic disparity imparts a vital role in the occurrence of CHE all over the globe, where low-income individuals are at higher risk of financial suffering from health care payment. This study proposes that to decrease socioeconomic inequality and healthcare financing policies should be revised to support the people who must need more health care.

One of the important factor which is used in almost all of the studies is Education of the Household head. Education is found significant in many studies for example [Pal \(2012\)](#) suggest that In India, being educated lessens the risk of having catastrophic health expense. Similarly, [Saksena et al. \(2010\)](#) indicated that households with higher educated heads are less prone to face financial catastrophe due to health expense.

Likewise, a lot of studies used age as the determining factor of catastrophic health expenditures. Households with elderly members and children are more vulnerable to catastrophic health expense. [Saksena et al. \(2010\)](#), [Pal \(2012\)](#). [Xu et al. \(2007\)](#) considered whether out-of-pocket expenses on health care can lead to financial hardship. For this reason, survey data of 116 countries have been used which covered 89 countries by analyzing the Gini coefficient, population characteristics under age five years and above 60 years, prepayment in form of tax and health insurance in high, low, and middle-income group countries. Results of this study indicate that all countries suffered from financial catastrophe. Nevertheless, high-income countries, are less affected than middle-income countries, and problems get adverse in low-income countries. The ratio of population below the age of five years remained insignificant to cause financial catastrophe in all income groups which may result in the provision of free-of-cost immunization to the children. On the other side, in middle-income countries ratio of the population above age sixty years enhances the occurrence of financial catastrophe but not in low- and high-income countries. Similarly, [Attia-Konan et al. \(2020\)](#) worked on the Household Living standard survey of Côte d'Ivoire to investigate the factors associated with catastrophic

Health Expenditures. Most households facing CHE were the ones with chronic disease and people over 65 years. Whilst households without health insurance were least affected.

Moreover, many studies like [Mohanty et al. \(2017\)](#), [Saksena et al. \(2010\)](#) found that Households living in urban areas are also less at risk to face health expenditure catastrophe. Moreover, [O'Donnell et al. \(2005\)](#) used sample for Asian countries and found that among all the variables, gender composition, age, heavy reliance on medicines and residence at rural areas are significant contributor to high incidence of CHE. Moreover, [Yazdi-Feyzabadi et al. \(2018\)](#) analyzed that urban families were less at risk to CHE than rural inhabitants and their ability to pay was high. Although, the occurrence of CHE is more in rural areas, individuals having inpatient and outpatient services, and families who have old age members in Iran. This research suggested that policies should be revised to enhance the health services coverage to target the underprivileged population. Also, [Mohanty et al. \(2017\)](#) found that people living rural and poor regions in sample countries are at more risk to face health expenditure shock. [Mulaga et al. \(2021\)](#) also analyzed the incidence and determinants of CHE in Malawi. He found that 1.37% of households have faced CHE. In addition, some factors like hospitalizations, large household size, higher economic status, visiting health facility, individuals lived in rural and central region had more chance to face CHE.

Another households characteristic among all determining factors is geo-geographical location. people living in poor provinces or regions are usually considered to face health expenditure catastrophe.. [Mohanty et al. \(2017\)](#), [Saksena et al. \(2010\)](#), . Similarly, [Aregbeshola and Khan \(2018\)](#) assessed the determinants of catastrophic health expenditures for households in Nigeria. They found that factors like age, education, health insurance status, geo-political zone, type of health facility, and type of illness suffered can raise the risk of facing catastrophic health expenditures among households. Likewise, [Ahmed et al. \(2021\)](#) studied the determining factors of Catastrophic Health Expenditures for Bangladesh and the findings were almost the same. Older people, chronic illness, and geographical location were found to be significant.

[Liu et al. \(2021\)](#) studied the determinants along with incidence and intensity of Catastrophic health Expenditures among elderly Chinese individuals. He found out increase in both incidence and intensity of CHE. Whilst individuals with spouse in the household, disabled, lived in middle and western zones lived in urban area and fall in lowest quantile were more prone to face CHE.

Studies have also found that households headed by females are more likely to face health expenditure catastrophe. For instance, [Cleopatra and Eunice \(2018\)](#) studied the incidence, intensity, and determinants of CHE among Nigerian households. The study showed the

existence of high intensity and occurrence of catastrophic health expenses in Nigeria which although varied under thresholds used. Among other socio-economic factors, female headed households were found significant.

Also, [Cleopatra and Eunice \(2018\)](#) found that unemployed heads are one which are at higher risk to face catastrophic health expenditure. Some recent studies like [Shikuro et al. \(2020\)](#) explored the catastrophic out-of-pocket health expenditure in Western Ethiopia and noticed a high ratio of people facing CHE. Further, the study also found that having members with chronic illnesses, Sex of household head and employment are significant determinants among households.

[Buigut et al. \(2015\)](#) examined the same for Kenya slum communities and results indicated that a considerable percentage of households in Kenya face catastrophic health expenditures. Moreover, a core set of variables were found to be the determinants of catastrophic health expenditures. Among other determinants mentioned before, the occupation of household head can affect the Household's probability to have catastrophic health spending.

### **3.3.1 Research Gap**

As a matter of fact, low health care investments by governments and high OOP payments are responsible for high catastrophic health expenditures in households, which can create financial constraints for them and push them into poverty. In a country like Pakistan, where almost 30% of the population is living below poverty line, the households with high health care cost are venerable and at a higher risk to face financial catastrophic. In this regard, understanding about catastrophic health expenditures can help households to protect themselves from this catastrophe, while managing their finances. In addition, using the information about CHE determining factors researchers and policy makers can identify those households, take necessary measure and formulate policies to protect households.

In literature, we have studies on different countries with different factors but since every country have different dynamics regarding health care facilities and services, so there is dire need to research about CHE in Pakistan. Since, there isnt any study of this kind on Pakistan, This study aims to provides evidence and contributes to the literature on factors associated with catastrophic health expenditures in Pakistan.

### **3.4 Methodology**

Following the methodology proposed in above mentioned studies for example [Wagstaff and Doorslaer \(2003\)](#), [Aregbeshola and Khan \(2018\)](#), [Cleopatra and Eunice \(2018\)](#), [Attia-Konan et al. \(2020\)](#), and others, the present study estimates determinants of the Out-of-Pocket approach by using Probit and Quantile Regressions. According to this OOP approach, Catastrophic



health expenditure is the medical expenditure or out-of-pocket spending for health that surpasses a defined threshold of a family's overall consumption or non-food consumption spending yearly. Since there are no universally agreed thresholds defined in the literature, this study used thresholds of 10%, 25%, and 40% to capture the best possible sensitivity. Income is often misreported especially in developing countries' household surveys; therefore, in this study Total non-food expenditure is taken as a proxy of the household's relative income. Which is a better measure of a household's health care affordability (WHO World Health Report, 2000; Xu et al. 2003).

In the present study, the total health expenditures (out-of-pocket Expenses) as a ratio of non-food expenses are to be seen on different thresholds (10%, 25%, 40%). If health expenditure is more than the threshold value, then it means Household (HH) has faced catastrophic health expenditures.

$$\text{CHE} = (\text{Health expenditures} / \text{Non-Food expenditures}) * 100 \text{ if } > 10\% / 25\% / 40\%$$

Once the household is identified to incur CHE based on threshold analysis then Probit Model was used to analyze the relationship between the CHE and independent (determinants) variables to identify significant attributes of these households which push individuals towards financial poverty due to CHE. The standard Probit Model is defined as:

$$\ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n + \epsilon \quad (1)$$

In the above equation (1), P is the dependent variable i.e. occurrence of CHE defined as 1 when HH has catastrophic health spending and 0 otherwise.  $X_1, X_2, X_3, X_n$  are explanatory (determinants) variables,  $\beta_1, \beta_2, \beta_3, \beta_n$  are coefficients of independent variables and  $\epsilon$  is the error term. The independent variables used in this Probit regression equation are age, province, region, Household Head (HHH) gender, HHH marital status, HHH employment, and HHH education.

Most of the regression models are concerned with examining the conditional mean of a dependent variable. However, there is a growing interest in different modeling methods of conditional distribution an increasingly common approach, quantile regression, is modeling the quantiles of the dependent variable given a set of conditioning variables. Koenker and Bassett (1978) was the first one to recommend quantile regression. It is responsible for assessments of the linear relationship between regressors X to a given quantile of dependent variable Y. A quantile regression models the relationship between X and the conditional quantiles of Y rather than just the conditional mean of Y. Therefore, Quantile regression permits for a further inclusive explanation of the conditional

distribution than conditional mean analysis alone, allowing us, for instance, to elucidate how regressors influence the median, or even the 10<sup>th</sup> or 95<sup>th</sup> percentile of the response variable. The quantile model for  $\tau^{th}$  quantile is expressed by the following equation.

$$Q_{\tau}(y_i) = \beta_0(\tau) + \beta_1(\tau)x_{i1} + \dots + \beta_p(\tau)x_{ip} \quad i = 1, \dots, n \quad (2)$$

In this equation (2), the dependent variable is the log of health expenditures, while the same independent variables were used. Here  $y_i$  is the health expenditures of households who based on health expenditures being higher than 10% of non-food expenditures are identified as CHE-prone households. While, the beta coefficients, instead of being constants are now functioning with a dependency on the quantile. This study used 25th, 50th, and 75th quantile to capture the effect of the independent variables on the dependent variable in these specific quantiles.

### 3.5 Data and Variables

Individuals' access to health care facilities from OOP expenditures is dependent on several socio-economic characteristics of households. The role of environmental, socio-economic, and demographic factors is well documented in health financing and health-care literature. (Malik & Syed, 2012; Marmot et al., 2008). Also, Michael Grossman has some significant work on health care demand and production (Grossman, 1972).

Hence, to see HH level catastrophic health expenditure for Pakistan, we have used survey data of Household Integrated Economic Survey (HIES) for the year 2015-2016<sup>32</sup> for 24,238 households. It contains household information including education, income, consumption expenditure, and health expenditures.

- Main Variables: Health Expenditures, non-food expenditure
- Determinant Variables: Province, region, Household Head gender, HHH age, HHH marital status, HHH employment status, HHH education
- Dependent Variable: Dummy for Catastrophic health Expenditures in Probit Regression and log of Health Expenditures in Quantile Regression

#### 3.5.1 Descriptive statistics

Table 14 shows the population statistics of households surveyed in the research. According to the age classification of households the sample population of age 11–33 years is 17.73%, between 34–65 (74.80%), and older than 66 (7.47%). According to the provincial population sample, 43.35% of people are from Punjab, 21.49% from the Khyber-Pakhtunkhwa (KP), 25.48 % from Sindh, and 9.67 % from Baluchistan. Many individuals 66.65% reside in the urban

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<sup>32</sup> Latest consumption data available for Pakistan.

region whereas 33.35% of individuals reside in rural areas. 90.56% heads of household are male on the other hand 9.44% female are the heads of household. The marital status of 90.14% Heads of households is married, 2.56% are unmarried, 6.97% are widows and 0.33% are divorced. Around 83.25% household heads are employed on the other side 16.75% are unemployed. The employment status of 62.18% heads of household is paid employee, 1.77% are employer, employing less than 10 persons, 1.03% are employer, employing 10 or more persons, 21.23% are Self-employed non-agriculture, 0.24% are contributing family member, 7.66% are own cultivator, 3.20% are sharecropper, 1.23% are contract cultivator and 1.47% have livestock. Around 67.33% of head of households are educated and 32.67% are not.

The Descriptive statistics show that on average yearly health expenditures are 12225.07 (Pak-Rs), with a minimum of 20 Rs and a maximum of 1160875 Rs. The non-food expenditures are on average 145458.1 Rs with minimum zero Rs and a maximum of 5582876 Rs. On average non-food expenditures are higher than health expenditures. The measure of dispersion such as standard deviation represents variation in health expenditures is 26306.21 Rs and the dispersion in non-food expenditures is 170544.7 Rs. The volatility of non-food expenditure is more than health expenditures.

<b>Variables</b>	<b>Population percentage</b>
<b>Age</b>	
Between 11 and 33	17.73
Between 34 and 65	74.80
Greater than 66	7.47
<b>Province</b>	
Punjab	43.35
Khyber-Pakhtunkhwa	21.49
Sindh	25.48
Baluchistan	9.67
<b>Region</b>	
Urban	66.65
Rural	33.35
<b>HHH Gender</b>	
Male	90.56
Female	9.44
<b>HHH Marital Status</b>	
Married	90.14
Unmarried	2.56
Widow/Widower	6.97
Divorced	0.33
<b>HHH Employed</b>	
Yes	83.25
No	16.75
<b>HHH Employment status</b>	

Paid employee	62.18
Employer, employing less than 10 persons	1.77
Employer, employing 10 or more persons	1.03
Self-employed non-agriculture	21.23
Contributing family members	0.24
Own cultivator	7.66
Sharecropper	3.20
Contract cultivator	1.23
Livestock	1.47
<b>HHH Educated</b>	
Yes	67.33
No	32.67

Variable	Obs.	Mean	StdDev	Min	Max
Health expenditures	24168	12225.07	26306.21	20	1160875
Non-food expenditures	24237	145458.1	170544.7	0	5582876

**Table 14 Population statistics / Descriptive statistics**

### 3.5.2 Incidence of Catastrophic Health Expenditures

Following the methodology proposed by [O'Donnell et al. \(2005\)](#), [Wagstaff and Doorslaer \(2003\)](#), Present section explores incidence of CHE. Table 15 shows an analysis of the incidence of CHE. As mentioned, before we have used a ratio of health expenditure to non-food expenditures to estimate the occurrence of catastrophic health expenditures at 10%, 25%, and 40% thresholds. The results indicate that people belong to age group 34-65 years have highest incidence of CHE. which is 69%, 65% and 68% at threshold of 10%, 25% and 40% respectively. As at this age mostly are married and looking after the whole family hence their CHE can be detrimental. Whereas those who have made it up to 66 years of age being the household head would be fair in terms of responding to such challenge. However still a significant portion if that population has suffered it and warrants policy action as elderly people are most vulnerable to such calamities.

Variable Description	10%	25%	40%
<b>Age</b>			
11-33	21.21	22.14	17.48
34-65	69.06	65.23	68.53
>66	9.73	12.63	13.99
<b>Province</b>			
Punjab	30.17	8.44	2.51
Khyber-Pakhtunkhwa	41.23	9.42	4.11
Sindh	38.47	6.57	1.92
Baluchistan	29.38	4.73	1.40
<b>Region</b>			
Urban	53.46	54.19	57.76
Rural	46.54	45.81	42.24

<b>HHH Gender</b>			
Male	90.51	88.55	85.73
Female	9.49	11.45	14.27
<b>HHH Marital Status</b>			
Married	89.0	85.35	85.71
Unmarried	2.71	3.13	2.94
Widow/Widower	7.80	10.79	13.17
Divorced	0.49	0.72	1.12
<b>HHH Employed</b>			
Yes	81.78	77.27	74.27
No	18.22	22.73	25.73
<b>HHH Employment status</b>			
Paid employee	1.05	0.92	1.03
Employer, employing less than 10 persons	0.49	0.35	0.00
Employer, employing 10 or more persons	18.42	20.78	21.03
Self-employed non-agriculture	61.56	59.08	60.82
Contributing family member	0.39	0.50	0.41
Own cultivator	9.92	9.86	8.45
Sharecropper	4.53	3.40	1.65
Contract cultivator	1.67	2.06	2.47
Livestock	1.97	3.05	4.12
<b>HHH Educated</b>			
Yes	58.18	58.76	58.24
No	41.82	41.24	41.76
<b>Total</b>	<b>34.59</b>	<b>8.03</b>	<b>2.95</b>

**Table 15: Incidence of Catastrophic Health Expenditures**

Percentage of Households with catastrophic health spending to household characteristics

According to the region-wise analysis; the incidence of CHE is highest in KP and lowest in Baluchistan irrespective of these three thresholds. This means KPK on average has higher probability of households moving into a poverty status whereas in case of Baluchistan it simply reflects the non-affordability of even such expenditures. Whereas Sindh and Punjab are relatively well off. At threshold levels of 10%, 25%, and 40% of non-food spending, the incidence of CHE is higher in urban areas as compared to rural areas. Urban poverty is disguised and most of the households are subsistence living households. Assets and affordability for such risks are much lower as compared to Rural. Although options to avail risk financing through loans and insurance is there but tendency to opt for those is low both from demand and supply side. The incidence of CHE in male-headed households is high as compared to the female-headed household at these thresholds. This points out that female enter labor force and become major earner of the households only when better jobs and earnings are

available. Then, the incidence of CHE is highest for married household heads and lowest in divorced-headed households as they have more health expense due to accompanying family. Employed-headed households have a high percentage of CHE than the unemployed headed household at these three thresholds because one can spend the money on health iff he has. A person without any income wouldn't be able to bear health care expense. The incidence of CHE in self-employed HHH are greater as 61.56%, 59.08%, and 60.82% at the threshold level 10%, 25%, and 40%. This shows that the business-based entrepreneurs are at high risk for such catastrophic expenditures, which is convincing. Lastly, being educated increases the incidence of incurring CHE at all threshold levels.

### **3.6 Results**

#### **3.6.1 Results of Probit Regression**

Table 16 reports the determinants that can cause CHE of households. Regardless, of the threshold used, all the factors except HHH gender and HHH employed were found to be significant. The association between CHE and age is found to be significant and positive at both 10% and 25% thresholds. Considering the age group, people belonging to age group 11 to 33 years and people above age 66 are almost 10% more likely to have CHE as compared to people having age 34-65 years at 10% threshold level. People who belong to the age group 11 to 33 years and above age 66 are around 3%-4% more likely to have CHE as compared to people having age 34-65 years at a 25% threshold level.

Provinces have significant and positive association with CHE at 10%, while Significant but negative at 25% and 40%. According to the region-wise analysis, at 10% threshold, KP and Sindh are more likely to have CHE as compared to Punjab. While at 25% and 40% thresholds, all other provinces are less likely to have CHE as compared to Punjab. Again, Punjab and Sindh provinces are relatively more stable, whereas KP presents the most vulnerable province. Government in KPK has identified universal Health coverage and hopefully this will be managed to an extent. Whereas for Baluchistan it appears to be the affordability issue.

Compared to people living in urban areas, people living in rural areas have significant chances to face CHE. People living in rural areas are 18%, 3%, and 0% more likely to have CHE as compared to the urban area at threshold levels 10%, 25%, and 40% respectively.

Divorced individuals are 22% more likely to have to CHE as compared to married individuals at the threshold level of 10%, which is obvious because of lack of resources and assets.

The relationship found between household head Employment category and CHE is found significant but negative in most of cases except contributing family members at 10% and people work for livestock at 25% and 40%. Employing less than 10 persons, are 7% less likely

to have CHE as compared to a paid employee at 10% threshold level. In contrast, Household head employer, employing less than 10 persons are not likely to have CHE as compared to paid employees at 25% and 40% threshold level. Employers, employing 10 or more persons are 12% and 3% less likely to have CHE as compared to paid employees at 10% and 25% threshold level. Self-employed non-agriculture employees are no likely to have CHE as compared to paid employees at 10%, 25%, and 40% threshold levels. Contributing family members are 12% more likely to have CHE as compared to paid employees at a 10% threshold level. On the other hand, contributing family members are no likely to have CHE as compared to paid employees at 25% and 40% threshold level. Own cultivators are no likely to have CHE as compared to paid employees at these three threshold levels. Sharecroppers are 3% and 1% less likely to have CHE as compared to paid employees at 10% and 40% threshold level. On the other hand, sharecropper is not likely to have CHE as compared to paid employees at a 25% threshold level. Contract cultivators are not likely to have CHE as compared to paid employees at these three threshold levels.

<b>Dep. Var: Dummy Variables</b>	<b>10%</b>	<b>25%</b>	<b>40%</b>
<b>Age</b>			
11-33	0.101*** (0.008)	0.038*** (0.005)	0.003(0.003)
34-65			
>66	0.112*** (0.200)	0.043*** (0.012)	0.014* (0.007)
<b>Province</b>			
Punjab			
Khyber-Pakhtunkhwa	0.110*** (0.009)	-0.002 (0.005)	-0.010*** (0.003)
Sindh	0.074*** (0.008)	-0.023*** (0.004)	-0.016*** (0.002)
Baluchistan	-0.002(0.011)	-0.039*** (0.005)	-0.020*** (0.003)
<b>Region</b>			
Urban			
Rural	0.180*** (0.008)	0.036*** (0.004)	0.007** (0.002)
<b>HHH Gender</b>			
Male			
Female	0.000(0.022)	-0.007(0.011)	-0.005(0.006)
<b>HHH Marital Status</b>			
Married			
Unmarried	0.007(0.021)	0.005(0.011)	0.005(0.008)
Widow/Widower	0.030(0.020)	0.015(0.012)	0.004(0.007)
Divorced	0.226*** (0.066)	0.051(0.043)	0.022(0.027)
<b>HHH Employed</b>			
Yes			
No	0.139(0.125)	0.080(0.085)	0.162(0.100)
<b>HHH Employment status</b>			
Paid employee			
Employer, employing less than 10 persons	-0.073*** (0.024)	-0.019(0.013)	-0.007(0.007)
Employer, employing 10 or more persons	-0.122*** (0.030)	-0.038*** (0.013)	
Self employed non agriculture	-0.008 (0.008)	0.001(0.004)	-0.002(0.002)
Contributing family member	0.123* (0.072)	0.043(0.044)	0.006(0.024)
Own cultivator	-0.009(0.013)	-0.004 (0.006)	-0.006(0.003)
Sharecropper	-0.033* (0.018)	-0.011 (0.009)	-0.013*** (0.004)
Contract cultivator	0.027 (0.029)	0.013 (0.016)	0.007 (0.010)
Livestock	0.010 (0.027)	0.042** (0.017)	0.025** (0.012)
<b>HHH Educated</b>			
Yes			
No	0.092*** (0.007)	0.017*** (0.004)	0.007*** (0.002)
<b>No. of Observations</b>	19526	19526	19325
<b>Prob &gt; Chi<sup>2</sup></b>	0.0000	0.0000	0.0000
<b>Pseudo R<sup>2</sup></b>	0.059	0.028	0.024

**Table 16: Determinants of Catastrophic health expenditure using Probit Regression<sup>33</sup>**

<sup>33</sup> <sup>33</sup> delta method standard error in parentheses and Coefficients are Marginal effect dy/dx, \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.



Individuals having livestock are not likely to have CHE as compared to paid employees at a 10% threshold level. On the other hand, individuals having livestock are 4% and 2% are more likely to have CHE as compared to paid employees at 25% and 40% threshold levels respectively.

Education has significant and positive relationship with the CHE at all threshold levels. Uneducated-headed households are 9%, 1% and 0% are more likely to have CHE as compared to an educated-headed household at these three threshold levels. Being uneducated has positive and significant relationship with CHE because of lack of knowledge and awareness. Another reason could be that uneducated people won't be financially stable to bear high medical expense.

Overall, the Chi-square with a probability of 0.00 shows that this model fits the data well and significant at 10%, 25%, and 40% threshold level. Pseudo R-square with value 0.05, 0.02, 0.02 indicates that this model is statistically significant, coefficients are significant and better than the model with no predictor at these three threshold levels.

### **3.6.2 Results of Quantile Regression**

Table 17 reports the result of quantile regression. We have used the 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> quantiles. This illustrates that for all the quantiles of sample identified as committing CHE under the assumption of Health Expenditures being more than 10% of non-food expenditures.

Age has significant but negative relationship with Health Expenditures. The person's age lies between 11-33 years as compared to 34-65 years the log of health expenditure decreases by the magnitude (for 25<sup>th</sup> quantile it decreases by 0.304, for 50<sup>th</sup> 0.272 and for 75<sup>th</sup> 0.244). When individuals age increases to more than 66 years as compared to 34-65 years the log of health expenditure does not change significantly for all the quantiles. This means the CHE does not significantly reduce after the mid-thirties. Under the quintile regression dispersion with reference to belonging to different groups have been controlled. So, it's the age group which is clearly indicating that for relatively younger people the risks are less as compare to older both groups.

The log of health expenditure decreases if a person belongs to KP as compared to Punjab with a magnitude of coefficient 0.014, 0.102 and 0.161 for 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> quantile respectively. Which means people with high health expenditure will be more affected by living in KP. Whereas the log of health expenditure decreases if a person belongs to Sindh as compared to Punjab with a magnitude of coefficient 0.302, 0.472 and 0.681 respectively for 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> quantile. The log of health expenditure decreases as a person belongs to Baluchistan as

compared to Punjab with a magnitude of coefficient 0.024, 0.036 and 0.171 respectively for 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> quantile. The log of health expenditure decreases in case a person lives in the rural area as compared to an urban area with a magnitude of around 0.3 for all quantiles. Which means people living in rural area and spending moderately will be more affected. However, in the case of Household head marital status, unmarried household head-based families have lesser expenditure as compared to married household head households by 0.206 for the 25<sup>th</sup> quintile and 0.098 for the 50<sup>th</sup>. Whereas in the case of the 75<sup>th</sup> quintile the household head household being unmarried have an insignificant difference with those households whose household heads are married. In the case of Household head marital status being widow/widower household, head-based families have lesser expenditure as compared to married household head households by 0.257 for 25<sup>th</sup> quintile and 0.172 for 50<sup>th</sup>. Whereas in the case of the 75<sup>th</sup> quintile the widow/widower household head the household have insignificant difference with those households whose household heads are married. In the case of the household head being divorced difference is insignificant for all quantiles. The log of health expenditure does not show any significant difference with the household head being unemployed as compared to employed HHH for all quantiles.

Determinants of households facing catastrophic expenditures at 10% threshold using Quantile Regression<sup>34</sup>

<b>Dep. Var: Lnhexp</b>			
<b>Variables</b>	<b>25%</b>	<b>50%</b>	<b>75%</b>
<b>Age</b>			
11-33	-0.304*** (0.032)	-0.272*** (0.029)	-0.244*** (0.033)
34-65			
>66	-0.032 (0.065)	0.117*** (0.059)	0.045 (0.068)
<b>Province</b>			
Punjab			
Khyber-Pakhtunkhwa	-0.014 (0.035)	-0.102*** (0.031)	-0.161*** (0.036)
Sindh	-0.302*** (0.034)	-0.472*** (0.031)	-0.681*** (0.035)
Baluchistan	0.024 (0.050)	-0.036 (0.045)	-0.171*** (0.052)
<b>Region</b>			
Urban			
Rural	-0.298*** (0.029)	-0.318*** (0.027)	-0.269*** (0.030)
<b>HHH Gender</b>			
Male			
Female	0.015 (0.090)	0.018 (0.082)	0.108 (0.094)
<b>HHH Marital Status</b>			
Married			
Unmarried	-0.206** (0.081)	-0.098** (0.074)	0.003 (0.085)
Widow/Widower	-0.257*** (0.078)	-0.172** (0.071)	-0.094 (0.081)
Divorced	-1.075*** (0.199)	-0.621*** (0.182)	-0.834*** (0.208)
<b>HHH Employed</b>			
Yes			
No	0.510 (0.352)	0.365 (0.321)	0.051 (0.368)
<b>HHH Employment status</b>			
Paid employee			
Employer, employing less than 10 persons	0.907*** (0.128)	0.852*** (0.117)	0.634*** (0.134)
Employer, employing 10 or more persons	0.940*** (0.187)	0.914*** (0.170)	0.658*** (0.195)
Self employed non agriculture	0.238*** (0.035)	0.231*** (0.032)	0.305*** (0.037)
Contributing family member	0.363* (0.213)	0.501*** (0.194)	0.233 (0.222)
Own cultivator	0.363*** (0.048)	0.365*** (0.043)	0.343*** (0.050)
Sharecropper	0.327*** (0.065)	0.316*** (0.060)	0.415*** (0.068)
Contract cultivator	0.471*** (0.103)	0.385*** (0.094)	0.337*** (0.108)
Livestock	-0.240** (0.095)	0.258*** (0.086)	0.311*** (0.099)
<b>HHH Educated</b>			
Yes			
No	-0.282*** (0.027)	-0.348*** (0.025)	-0.345*** (0.028)
<b>Constant</b>	9.271*** (0.030)	9.873*** (0.027)	10.451*** (0.031)
<b>No. of observations</b>	6514	6514	6514
<b>Pseudo R<sup>2</sup></b>	0.103	0.124	0.132

**Table 17: Determinants of households facing catastrophic expenditures at 10% threshold using Quantile Regression.**

<sup>34</sup> \*\*\* p<0.01, \*\* p<0.05, \* p<0.1, standard error in parentheses

In the case of Household head employment status. At all quantiles results are significant and positively related to health expenditures. Which means irrespective of occupation, if people have some income then they will use it for medical purpose at all quantiles. being Employer, employing less than 10 persons, Employer, employing 10 or more persons, sharecropper, livestock and Contributing family member, the log of health expenditure does not show any significant difference as compared to paid employees for all quantiles. Whereas in the case of Self-employed non-agriculture, Own cultivator, and Sharecropper the log of health expenditure increases as compared to paid employees' case for all quantiles.

Lastly in the case of a household head being uneducated vs educated household head the log of health expenditure decreases by 0.282, 0.348, and 0.345 for the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> quintile respectively. Which means uneducated people spend less on health as compared to educated people. Of course, Because if they wouldn't have much knowledge about severity of the disease then they won't spend more or might go for short financing. It is totally inline with the Probit regression result.

### 3.7 Revised Estimation Results

#### 3.7.1 Descriptive statistics and Probit Regression

This section is dedicated to revised estimation results. For revised estimates we have redefined the dependent variable. For dependent variable we have created dummy with top decile health expenditures defined as 1 and 0 otherwise. Most importantly we have included survey weights in these revised estimations. Following table presents the updated descriptive statistics followed by Regression Results.

#### Descriptive Statistics (Revised)

Variables	Population percentage
<b>Age</b>	
Between 11 and 33	17.74
Between 34 and 65	74.78
Greater than 66	7.49
<b>Province</b>	
Punjab	43.45
Khyber-Pakhtunkhwa	21.55
Sindh	25.34
Baluchistan	9.66
<b>Region</b>	
Urban	66.57
Rural	33.43
<b>HHH Gender</b>	
Male	90.55

Female		9.45
<b>HHH Marital Status</b>		
Married		90.14
Unmarried		2.56
Widow/Widower		6.97
Divorced		0.33
<b>HHH Employed</b>		
Yes		83.21
No		16.79
<b>HHH Employment status</b>		
Paid employee		62.11
Employer, employing less than 10 persons		1.77
Employer, employing 10 or more persons		1.03
Self-employed non-agriculture		21.25
Contributing family members		0.24
Own cultivator		7.68
Sharecropper		3.21
Contract cultivator		1.24
Livestock		1.47
<b>HHH Educated</b>		
Yes		67.27
No		32.73
<b>Dep variable</b>		
Top decile HE		9.97
Top Quantile	25	2.02
2 SD above median		

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	<b>Obs.</b>	<b>Mean</b>	<b>StdDev</b>	<b>Min</b>	<b>Max</b>
Health expenditures	24168	12225.07	26306.21	20	1160875

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**Table 18: Population Percentage**

In the above table descriptive for the revised data is provided which is used for further regression analysis.

**Probit Regression: Catastrophic Health Expenditure Determinants of Households in top decile, top quantile and 2 SD above median**

Variables	Top Decile	Top Quantile	2SD above median
<b>Age</b>			
Between 11 and 33	-0.017**(0.007)	-0.035***(0.011)	-0.007***(0.002)
Between 34 and 65			
Greater than 66	0.064*** (0.021)	0.108***(0.027)	0.018*(0.010)
<b>Province</b>			
Punjab			
Khyber-Pakhtunkhwa	0.006(0.008)	0.089***(0.012)	0.001(0.003)
Sindh	-0.059***(0.006)	-0.063***(0.010)	0.016***(0.003)
Baluchistan	-0.005(0.011)	0.078***(0.078)	0.006(0.004)
<b>Region</b>			
Urban			
Rural	0.000(0.007)	0.000(0.010)	-0.003(0.002)
<b>HHH Gender</b>			
Male			
Female	0.010(0.021)	-0.001(0.029)	-0.004(0.006)
<b>HHH Marital Status</b>			
Married			
Unmarried	-0.010(0.017)	0.013(0.028)	0.004(0.010)
Widow/Widower	-0.002(0.016)	-0.003(0.025)	-0.002(0.006)
Divorced	-0.038(0.028)	-0.046(0.070)	0.000(0.017)
<b>HHH Employed</b>			
Yes			
No	0.003(0.069)	0.169(0.153)	
<b>HHH Employment status</b>			
Paid employee			
Employer,employing<10	0.155***(0.031)	0.219***(0.037)	0.024(0.015)
Employer,employing>10	0.126***(0.040)	0.231***(0.048)	0.006(0.012)
Self-employed non-agricul	0.044***(0.008)	0.073***(0.011)	0.001(0.003)
Contributingfamily member	0.092(0.072)	0.231**(0.103)	0.032(0.043)
Own cultivator	0.039***(0.012)	0.108***(0.018)	0.004(0.005)
Sharecropper	0.019(0.019)	0.048*(0.026)	0.005(0.014)
Contract cultivator	0.043*(0.025)	0.104***(0.038)	0.017(0.015)
Livestock	0.048*(0.028)	0.047(0.036)	-0.004(0.007)
<b>HHH Educated</b>			
Yes			
No	-0.032***(0.006)	0.064***(0.009)	-0.005*(0.002)

No of Observations 19460 19460 19445

delta method, standard error in parentheses and Coefficients are Marginal effect dy/dx, \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

**Table 19 Probit Regression**

The above table include "Age", "Province", "Region", "HHH Gender", "HHH Marital Status", "HHH Employed", "HHH Employment status", and "HHH Educated" as independent

variables. Now in the case of Age as an explanatory variable the Individuals aged between 34 and 65 tend to have a significantly higher outcome (health expenditures) in all the top decile, top quantile and median with 2 std compared to those aged between 11 and 33 as the coefficients (-.017, -.035, -.007) have a negative sign. However, for the Individuals aged greater than 66 have higher outcomes in all the Top decile, the top quantile and 2SD of Median when compared to those aged between 11 and 33 (.064, .108, .018). However, in each case the Top quantile has a higher coefficient. Now these results are as per the theoretical understanding which is that the expenditures would be higher when you are younger and as when u get old. Next when we look at the impact of provincial variable then we see Khyber-Pakhtunkhwa is associated with an increase in outcomes in the top quantile compared to the reference province (0.89) rest were not significant. While Sindh province has lesser value in case of top decile and quantile but shows positive impact in the last case (-0.059, -0.063 and 0.016). Lastly Baluchistan has a positive significant result in case of the Top quantile (0.078). Next the variables "Region", "HHH Gender", "HHH Marital Status", "HHH Employed" have no significant relationship with any type of the dependent variable. Household employment status has positive significant impact versus the base case of paid employee for the top decile and top quantile case. Whereas in case of the last case of 2SD above median has no significant relation with the dependent variable. Employer employing more than 10 persons and family member contribution had the higher value of 0.231 respectively. Finally in case of household head not being educated has significant impact on the dependent variable for the top decile and top quantiles and 2 SD above the median. whereas in case of top quantile it is positive (0.064).

In our analysis, age, province, HHH employment status and HHH education are found to be significant and important determinant of HH's catastrophic health expenditure. Age (older age) is important because of chronic health diseases and older age complications are major cause of high health care cost.

Next, we did the heterogeneity analysis by the rural urban first. This is done to highlight the differences in the results based on this disaggregation between Rural and Urban area category. Also, provinces play a major role in driving health care cost because in countries like Pakistan there is inequitable and inefficient access to health care provinces as each provinces allocate funds separately which are not adequate normally. Another important factor is education, undoubtedly education and health are highly correlated. Because education influences health literacy, health behaviours and life style choices which of course demand high cost. Then health expenditure would or would not be catastrophic depends on type of employment too. because

high skilled/high paid employment means more income and hence more access to health services. Also, some type of employments like professional and managerial gives health insurance coverage to its employees. While others like unskilled, agricultural or small-scale entrepreneur won't have this facility. Plus, we have enough evidence about these variables in the literature too for example Buigut et al. (2015), Liu et al. (2021), Aregbeshola and Khan (2018) etc. In countries like Nigeria (Cleopatra and Eunice ,2018) and Bangladesh (Ahmed et al. 2021) people are also facing catastrophic health expenditure issue and they found almost same evidence about these factors.

### 3.7.2 Heterogeneity analysis

#### Heterogeneity Analysis: Rural/Urban

Variables	Rural	Urban
<b>Age</b>		
Between 11 and 33	-0.025**(0.011)	-0.013(0.009)
Between 34 and 65		
Greater than 66	0.033(0.027)	0.095*** (0.031)
<b>Province</b>		
Punjab		
Khyber-Pakhtunkhwa	0.020(0.015)	-0.002(0.010)
Sindh	-0.059***(0.011)	-0.059***(0.008)
Baluchistan	0.006(0.020)	-0.011(0.013)
<b>HHH Gender</b>		
Male		
Female	-0.018(0.034)	0.025(0.026)
<b>HHH Marital Status</b>		
Married		
Unmarried	0.001(0.029)	-0.016(0.022)
Widow/Widower	-0.000(0.028)	-0.006(0.019)
Divorced	0.014(0.060)	-0.082***(0.011)
<b>HHH Employed</b>		
Yes		
No	0.012(0.085)	-0.021(0.085)
<b>HHH Employment status</b>		
Paid employee		
Employer, employing less than 10 persons	-0.002(0.052)	0.180***(0.034)
Employer, employing 10 or more persons	0.076(0.093)	0.135***(0.043)
Self-employed non-agriculture	0.030*(0.016)	0.049***(0.009)
Contributing family members	0.113(0.094)	0.067(0.126)
Own cultivator	0.032**(0.013)	0.059**(0.032)
Sharecropper	0.024(0.021)	-0.001(0.047)
Contract cultivator	0.042(0.026)	0.018(0.066)
Livestock	0.051(0.033)	0.034(0.046)
<b>HHH Educated</b>		



Yes		
No	-0.041***(0.010)	-0.025***(0.008)

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No of Observations	6579	12881
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delta method, standard error in parentheses and Coefficients are Marginal effect dy/dx, \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

**Table 20: Heterogeneity Analysis Rural/Urban**

In case for the regional categorization there were difference between results. For individuals aged between 11 and 33 in rural areas, there is a statistically significant decrease in the outcome variable compared to the reference category (-.025). while no statistically significant association is observed for individuals aged between 34 and 65 or those aged greater than 66 in rural areas. But in urban areas age greater than 65 does matter for that category.

Being in Punjab is not statistically associated with the outcome variable in rural areas. Being in Khyber-Pakhtunkhwa is associated with a statistically significant increase in the outcome variable compared to the reference province in rural areas. Being in Sindh is associated with a statistically significant decrease in the outcome variable compared to the reference province in both rural and urban areas. And lastly being in Baluchistan is not statistically associated with the outcome variable in rural areas.

Being female is associated with a slight increase in the outcome variable compared to being male in urban areas, but the association is not statistically significant. For the married category

Being unmarried is associated with a statistically significant decrease in the outcome variable compared to being married in urban areas. Being divorced is associated with a statistically significant decrease in the outcome variable compared to other marital statuses in urban areas.

Being unemployed is associated with a slight decrease in the outcome variable compared to being employed in both rural and urban areas, but the association is not statistically significant. Being an employer employing less than 10 persons is associated with a statistically significant increase in the outcome variable compared to the reference category in rural areas.

Being an employer employing 10 or more persons is associated with a statistically significant increase in the outcome variable compared to the reference category in both rural and urban areas.

For the education of the household head is very important. Being uneducated is associated with a statistically significant decrease in the outcome variable compared to being educated in both rural and urban areas.

In the next phase we checked the heterogeneity based on the provinces.

### Heterogeneity Analysis: Province wise

Variables	KP	Punjab	Sindh	Balochistan
<b>Age</b>				
Between 11 and 33	0.017	-0.021*	-0.015	-0.050**
Between 34 and 65				
Greater than 66	0.067	0.049	0.035*	0.132***
<b>Region</b>				
Urban				
Rural	0.014	-0.007	-0.008	0.026
<b>HHH Gender</b>				
Male				
Female	-0.067***	0.055	-0.008	0.150*
<b>HHH Marital Status</b>				
Married				
Unmarried	-0.024	-0.009	-0.006	-0.019
Widow/Widower	0.008	0.008	0.006	-0.280***
Divorced	0.001	-0.052		
<b>HHH Employed</b>				
Yes				
No	0.003	-0.031		
<b>HHH Employment status</b>				
Paid employee				
Employer, employing < 10 persons	-0.002	0.224***	0.065***	0.158***
Employer, employing 10 or more persons	0.195**	0.075	0.065**	0.171**
Self-employed non-agriculture	0.056***	0.039***	0.034***	0.070***
Contributing family members	0.175	0.100	0.151**	
Own cultivator	0.041	0.040**	0.044**	0.014
Sharecropper	-0.032	0.071	0.031**	-0.063
Contract cultivator	0.047	0.037		0.376***
Livestock	0.048	0.044	0.013	0.093
<b>HHH Educated</b>				
Yes				
No	-0.023	-0.031***	-0.033***	-0.055***
<b>No of Observations</b>	3710	8290	5461	1989

delta method, Coefficients are Marginal effect dy/dx, \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

Table 21 Heterogeneity analysis province wise

In case of individuals aged between 11 and 33 in Khyber-Pakhtunkhwa (KP) have a slightly positive association with the outcome variable compared to the reference category. Individuals aged between 11 and 33 in Punjab have a slightly negative association with the outcome variable compared to the reference category, with the association being statistically significant.

Individuals aged between 11 and 33 in Sindh have a slightly negative association with the outcome variable compared to the reference category.

Individuals aged greater than 66 in KP have a positive association with the outcome variable compared to the reference category. Individuals aged greater than 66 in Punjab have a positive association with the outcome variable compared to the reference category. Individuals aged greater than 66 in Sindh have a positive association with the outcome variable compared to the reference category, with the association being statistically significant. Individuals aged greater than 66 in Balochistan have a negative association with the outcome variable compared to the reference category, with the association being statistically significant.

Living in urban areas in KP is associated with a slightly positive association with the outcome variable compared to living in rural areas. Living in rural areas in Punjab and Sindh is associated with a slightly negative association with the outcome variable compared to living in urban areas.:

Being female is associated with a negative association with the outcome variable compared to being male in KP, with the association being statistically significant. Being female is associated with a positive association with the outcome variable compared to being male in Balochistan, with the association being statistically significant.

In HHH Marital Status, being widowed/widower is associated with a strongly negative association with the outcome variable compared to being married in Balochistan, with the association being statistically significant.

Being an employer employing less than 10 persons, self-employed non-agriculture, and owning cultivator are associated with positive associations with the outcome variable compared to the reference category across different provinces and employment statuses.

Being an employer employing 10 or more persons and contributing family members are associated with mixed associations with the outcome variable compared to the reference category across different provinces and employment statuses. Being a paid employee, being unemployed, and being a sharecropper are associated with mixed associations with the outcome

variable compared to the reference category across different provinces and employment statuses. Being uneducated is associated with a negative association with the outcome variable compared to being educated across different provinces, with the association being statistically significant in Punjab and Sindh.

Next, we did the heterogeneity test considered the gender difference.

### Heterogeneity Analysis: Gender wise

Variables	Male	Female
<b>Age</b>		
Between 11 and 33	-0.018**(0.075)	0.084(0.136)
Between 34 and 65		
Greater than 66	0.060***(0.021)	0.134*(0.077)
<b>Province</b>		
Punjab		
Khyber-Pakhtunkhwa	0.011(0.009)	-0.120***(0.038)
Sindh	-0.056***(0.006)	-0.135***(0.040)
Baluchistan	-0.002(0.011)	-0.155***(0.040)
<b>Region</b>		
Urban		
Rural	0.001(0.007)	-0.014(0.043)
<b>HHH Marital Status</b>		
Married		
Unmarried	-0.010(0.017)	-0.038(0.038)
Widow/Widower	-0.016(0.018)	
Divorced	-0.028(0.033)	
<b>HHH Employed</b>		
Yes		
No	0.000*(0.080)	-0.055(0.090)
<b>HHH Employment status</b>		
Paid employee		
Employer, employing less than 10 persons	0.160***(0.031)	-0.073*(0.044)
Employer, employing 10 or more persons	0.117***(0.039)	0.681***(0.182)
Self-employed non-agriculture	0.045***(0.008)	0.036(0.047)
Contributing family members	0.208(0.126)	0.100(0.152)
Own cultivator	0.041***(0.012)	-0.034(0.055)
Sharecropper	0.020(0.019)	
Contract cultivator	0.041(0.025)	0.305(0.243)
Livestock	0.053*(0.028)	-0.070*(0.040)
<b>HHH Educated</b>		
Yes		
No	-0.033***(0.006)	-0.001(0.049)
No of Observations	18782	670

delta method, standard error in parentheses and Coefficients are Marginal effect dy/dx, \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

### Table 22 Gender wise heterogeneity

For individuals aged between 11 and 33, being female is associated with a statistically significant decrease in the outcome variable compared to being male. For individuals aged greater than 66, being male is associated with a statistically significant increase in the outcome variable compared to being female.

In case of provinces being in Punjab or Khyber-Pakhtunkhwa (KP) is not statistically associated with the outcome variable compared to the reference category for both males and females. Being in Sindh or Baluchistan is associated with a statistically significant decrease in the outcome variable compared to the reference province for both males and females, with the association being stronger for females.

While considering the region: Living in urban areas is not statistically associated with the outcome variable compared to living in rural areas for both males and females.

Being unmarried or divorced is not statistically associated with the outcome variable compared to being married for both males and females. So does the status of employment reflects this.

Being unemployed is associated with a statistically significant decrease in the outcome variable compared to being employed for females, but not for males. Being an employer employing less than 10 persons is associated with a statistically significant increase in the outcome variable compared to the reference category for males, but a decrease for females. Being an employer employing 10 or more persons is associated with a statistically significant increase in the outcome variable compared to the reference category for females, but not for males.

Lastly being uneducated is associated with a statistically significant decrease in the outcome variable compared to being educated for both males and females, with the association being stronger for males.

Next we did the heterogeneity analysis based on occupation status.

### Heterogeneity Analysis: Occupation wise

Variables	Self Employed	Paid Employee
<b>Age</b>		
Between 11 and 33	-0.025(0.021)	-0.015*(0.008)
Between 34 and 65		
Greater than 66	0.055(0.034)	0.087**(0.037)
<b>Province</b>		
Punjab		

Khyber-Pakhtunkhwa	0.013(0.018)	0.001(0.010)
Sindh	-0.064*(0.025)	-0.058***(0.007)
Baluchistan	0.011(0.028)	-0.015(0.012)
<b>Region</b>		
Urban		
Rural	-0.012(0.019)	0.007(0.007)
<b>HHH Marital Status</b>		
Married		
Unmarried	-0.113*(0.067)	0.004(0.020)
Widow/Widower	-0.053(0.040)	0.010(0.023)
Divorced		-0.011(0.036)
<b>HHH Employed</b>		
Yes		
No		0.058(0.101)
<b>HHH Gender</b>		
Male		
Female	0.063(0.053)	0.003(0.023)
<b>HHH Educated</b>		
Yes		
No	0.000(0.017)	-0.033***(0.006)

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No of Observations	4122	12086
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delta method, standard error in parentheses and Coefficients are Marginal effect  $dy/dx$ , \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

### Table 23 occupation wise heterogeneity

As in earlier case the age was a significant variable, so is the case here. For individuals aged between 11 and 33, being self-employed is not statistically associated with the outcome variable compared to being a paid employee. For individuals aged between 34 and 65, being self-employed is associated with a slight increase in the outcome variable compared to being a paid employee, but the association is not statistically significant. For individuals aged greater than 66, being self-employed is associated with a slight increase in the outcome variable compared to being a paid employee, but the association is not statistically significant.

While in case of provinces Punjab is associated with a statistically significant decrease in the outcome variable compared to the reference category for both self-employed individuals and paid employees. Being in Khyber-Pakhtunkhwa (KP) or Sindh is not statistically associated with the outcome variable compared to the reference province for both self-employed individuals and paid employees. Being in Baluchistan is not statistically associated with the outcome variable compared to the reference province for self-employed individuals, but it is associated with a slight decrease for paid employees.

While on the regional side; living in rural areas is not statistically associated with the outcome variable compared to living in urban areas for both self-employed individuals and paid employees. And lastly being unmarried is associated with a statistically significant decrease in the outcome variable compared to being married for self-employed individuals, but not for paid employees. Being widowed/widower or divorced is not statistically associated with the outcome variable compared to being married for both self-employed individuals and paid employees. Being unemployed is not statistically associated with the outcome variable compared to being employed for both self-employed individuals and paid employees.

Being female is associated with a slight increase in the outcome variable compared to being male for both self-employed individuals and paid employees, but the association is not statistically significant. Being uneducated is associated with a statistically significant decrease in the outcome variable compared to being educated for paid employees, but not for self-employed individuals.

Below we have reported the similar studies on the same perspective.

### 3.7.3 Study Comparison

To conclude, results of current analysis indicate that social and economic determinants are somehow responsible for incidence of catastrophic health expenditures in Pakistan. Table 24 presents the comparison of these results with findings of the previous studies. Studies mentioned below have some similarities with findings of present study. For example, in the study of [Aregbeshola and Khan \(2018\)](#) common significant factors are age, education, geographical location and socio-economic status. Then again age and employment status in [Cleopatra and Eunice \(2018\)](#) are significant like present analysis. Similar to this study, In [Mulaga et al. \(2021\)](#) economic status and area of residence are found significant too. Lastly, In [Pal \(2012\)](#) presence of children and elderly members, education, and rural area residents are the similar significant factors.

Author	Data	Significant Factors	Findings' Similarity
<a href="#">Aregbeshola and Khan (2018)</a>	Harmonized Nigeria Living Standard Survey of 2009-2010	age, education, health insurance status, geo-political zone, type of health facility, and type of illness	Similar

Cleopatra and Eunice (2018)	Nigeria General Household survey 2015-2016	socio-economic status, age, dwelling, employment, and health status of family members	Similar
Mulaga et al. (2021)	Integrated Household Survey of Malawi 2016-2017	hospitalizations, large household size, higher economic status, visiting health facility, individuals lived in rural and central region	Partially similar
Pal (2012)	Consumer Expenditure Survey 2004-2005	Family size, Presence of children and elderly member, education, people living rural area	Partially similar

**Table 24 Comparison of empirical results**

### 3.8 Conclusion and Policy Recommendations

#### 3.8.1 Conclusion

Catastrophic health expenditure is an escalating issue in Pakistan where many people cannot afford health care services when these expenditures increase up to a certain level. It should be the government's foremost objective to reduce the prevalence of CHE and to achieve this objective it is therefore important to analyze the determining factors of CHE in Pakistan. To find the determinants of CHE, we have used the Probit and quantile models using different threshold levels and quintiles. We have also explored the incidence of CHE in Pakistan. The result of our research shows that individuals between age 34 to 65, KP province, people living in an urban area, Male HHH, Married HHH, Employed HHH, and individuals working as self-employed in the non-agricultural sector have high incidence to have CHE. On the other hand, people above age 60 years, individuals residing in Baluchistan, people living in a rural area, Female HHH, Unemployed HHH, Employer employing more than 10 persons have the least incidence to face CHE.

Specifically, the result of the Probit model shows that people between age 11 to 34, individuals above 65 years, individuals residing in rural areas, Educated HHH, people having livestock are significant and have more chances to suffer from CHE at these different thresholds. However, Divorced HHH and people living in KP have significant and more chances to get suffered at only a 10% threshold level. On the other hand, for people living in Baluchistan, Employer employing more than 10 persons and sharecroppers are significantly fewer chances to have



CHE at these threshold levels. However, Employer employing less than 10 persons have significantly less chance to have CHE at only a 10% threshold level. Furthermore, KP is more likely to have CHE at a 10% threshold and less likely to have CHE at a 40% threshold. On the other side, Sindh significantly has more chance at the 10% threshold level and fewer chances to have CHE at the 25% and 40% threshold level.

The result of the quantile model shows the difference between households who have close to threshold health expenditures and those who are above in quantile references. The results show that in the case of the younger age group of 11-33 the household health expenditures reduce whereas for the higher age group it does not change significantly. This means the CHE does not significantly reduce after the mid-thirties.

Health expenditures decrease if for households belonging to KP, Baluchistan, and Sindh as compared to Punjab, but the difference is highest for Sindh. Rural areas present a case with lesser household health expenditures as compared to urban. There was no difference in health expenditures based on household head gender. However, in the case of Household head marital status, there are differences. Unmarried and widow/widower household head-based families have lesser expenditure as compared to married household head households. While in the case of the household head being divorced difference is insignificant for all quintiles.

Similarly, there is no significant difference with the household head being unemployed as compared to employed HHH for all quintiles. Almost similar results prevailed for Household head employment status in categories. Lastly in the case of a household head being uneducated vs. an educated household head the log of health expenditure decreases which may be a result of unattended medical conditions being lesser educated and lesser motivation to respond to a health issue.

Given situation on health outcomes and existing health markets major reforms on health care financing and health policies are required to improve the efficiency and equity in the health care system of Pakistan. Such as development of Health Insurance Markets, Use of Cost-effective Health Technologies and Considering the Ageing Population better preventative Health Care Measures. Our Analysis brings out the plight of Catastrophic health expenditures, which calls for an affordable health insurance mechanism or some small-scale health insurance programs to protect people against health expenditure catastrophe.

### **3.8.2 Policy Implications and Recommendations**

- Given that, the government's current spending on health is not sufficient. A sharp and immediate increase in health expenditures is recommended to achieve cost-effectiveness, efficiency, and equity in the health care system.
- The lack of adequate healthcare infrastructure is one of Pakistan's biggest challenges. There is an extreme shortage of healthcare facilities, including hospitals, clinics, and diagnostic centers. Also, Pakistan needs to overcome its workforce shortage in health care sector.
- Government should protect the poor from the health expenditure catastrophe but simultaneously it is also essential to protect non-poor or middle-income people from health expenditure shock. In this regard, some major reforms on health care financing and health policies are required to improve the efficiency and equity in the health care system of Pakistan.
- CHE is an emerging debate in Pakistan and the fact is that it can be overcome by providing health care protection. Catastrophic health expenditures call for an affordable health insurance mechanism or some small-scale health insurance programs to protect people against health expenditure catastrophe. So apart from health care financing policies, there should be legislation for health insurance in Pakistan. It will also pave the way to universal health coverage.
- The poor and even middle-income groups lack access to satisfactory health care services. It is, therefore, necessary to monitor the performance of public as well as private health care services.
- Policymakers and public researchers should upgrade household survey instruments to better capture the household health spending e.g. some health insurance-related variables etc.

### **3.8.3 Limitation of the study**

There are few limitations of the study. First, the HIES data set used in this study only reports the direct health care cost of the households. It doesn't capture the payments paid by a third party. Secondly, some variables like Health insurance coverage, presence of a disabled person, HH member with chronic illness, etc. which were found significant in most previous studies were not available in the HIES dataset. Thirdly, some studies used the household capacity to pay method for the identification of CHE but a majority of the studies have used the same

methodology (Out of pocket health expenditure method) to measure the presence of CHE in the households. Moreover, the current study used only the non-food expenditure approach. Because the incidence of households with CHE was higher in the non-food expenditure approach than the total expenditure approach.

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**CHAPTER 4**  
**SOCIO-ECONOMIC DETERMINANTS FOR**  
**INSURANCE PURCHASE DECISION IN PAKISTAN**

## **ABSTRACT**

Other than monetary; social, psychological and emotional factors also exist that influence consumer's insurance purchase decision. The purpose of this study is to examine the socio-economic determinants that influence the purchase of health Insurance in Pakistan. Pakistan Demographic and Health Survey (PDHS) of 2017-2018 for ever-married men and ever-married women was used in this study. For this purpose, few assumptions were tested using probit model. As anticipated some socio-economic factors were found significant.

**Keywords:** socio-economic, insurance, determinants



## 4.1 Introduction

Pakistan being lower-middle income country, spends only 1.2%<sup>35</sup> of GDP on health sector. Annual per capita expenditure (US\$48.1) on the health for Pakistan are also lower than regional countries like India (US\$73) and Bhutan (US\$103)<sup>36</sup>. This results in Pakistan faring poorly in comparison with its regional neighbours for health outcomes and it has not been able to meet its MDGs targets as well. It is more exposed to disease burden such as malnutrition, tuberculosis and it also has high mortality rates. Pakistan is one of the last three countries where Polio still exists. Furthermore, Pakistan has an endemicity of hepatitis B and C, also Pakistan stands at 7<sup>th</sup> position for diabetes prevalence. Besides these the Gender discrimination, Poverty, low literacy, joblessness, and enormous treatment gap have directed to an indistinguishable burden of psychological health complications (Rizvi, 2021).

As would have been expected from the relatively low levels of government expenditures, out-of-pocket payments played a very large role in Pakistan. These stand at 65% (% of current health expenditures) of the total financing in 2017-2018, which is extremely high in global terms (Rizvi, 2021). As a matter of fact, these high OOP leads to financial burden on households and hence people face catastrophic health expenditures. The only way to curb these OOP health expenditures is to have health insurance coverage at national level. Health insurance can provide a solution as it has been prescribed as a vehicle for financial risk protection that provides safe access to effective and quality health care by making it affordable. This is why WHO encourages countries to achieve universal health coverage for all their citizens.

Health insurance refers to the payment approaches where the costs of healthcare are covered by insurance providers. Health insurance protects from unexpected and catastrophic cost of illness. Health insurance can protect people by reducing costs and provide safety in the face of unpredictable health expenditures. The insured persons themselves or government or the employer pays the premium. It pools resources and acts like a risk pooling financial vehicle. However, in Pakistan health care financing is a severe problem. The government has launched various vertical and horizontal health programs but their coverage has been dismal. The

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<sup>35</sup> Pakistan Economic Survey (2020-2021)

<sup>36</sup> National Health Accounts (2017-18)

government has also taken direct policy measures in the form of action plans for achieving the Millennium development goals and a Medium-term development framework to address health issues. However, these steps have not been able to address the health crisis and stats show that Pakistan faces a double burden of diseases; that is 58% of the burden is caused due to nutrition and reproductive health problems whereas non-communicable diseases still make 11% of the Burden of Disease (BOD) as a result of habits, pollutions and dietary factors.

Studies have shown that absence of mechanisms such as the health insurance has a bad impact on health status of people. Access to health care services and catastrophic health care expenditures are known to be major causes of poverty in developing countries. In other words, in developing nations illness is related to unemployment and low income. Literature provides evidence that health insurance plays an important role in decreasing these health care costs. Although in developed nations health insurance caused excessive utilization of health care services which in long run decreases the wellbeing of the society but still, that's the prevalent way of financing health care especially the catastrophic ones. In the current scenario of high out of pocket spending and issues such as quality, equality and effectiveness of health care policy makers are turning their attention towards promoting health insurance.

Pakistan's Public health expenditure stands at 1.1%<sup>37</sup> of GDP showing a public spending of \$15 per capita whereas total expenditure account for \$ 43 showing that major spending is private that is around \$27. The majority of the hospitals are private and therefore expensive for a huge part of the population and expensive premium costs make healthcare and insurance expensive and unattainable for the poor of the country.

In case of developing countries like Pakistan new private health care systems are mushrooming and health care facilities are upgrading from consultations to all under one roof healthcare solutions. The agency risks increase with high OOP based health financing, which unfortunately in case of Pakistan are anecdotally reported as well. Patients complain about too high costs and poor health outcomes. In such circumstances health insurance setups can provide the solution because it resolves the agency problem and pave the way for quality and tailored health services at the lowest cost possible.

Even though the Pakistan government aims to achieve insurance coverage for all, the population growth shows that Pakistan is among the most populous countries in the world and

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<sup>37</sup> Source: World Development Indicators, World Bank

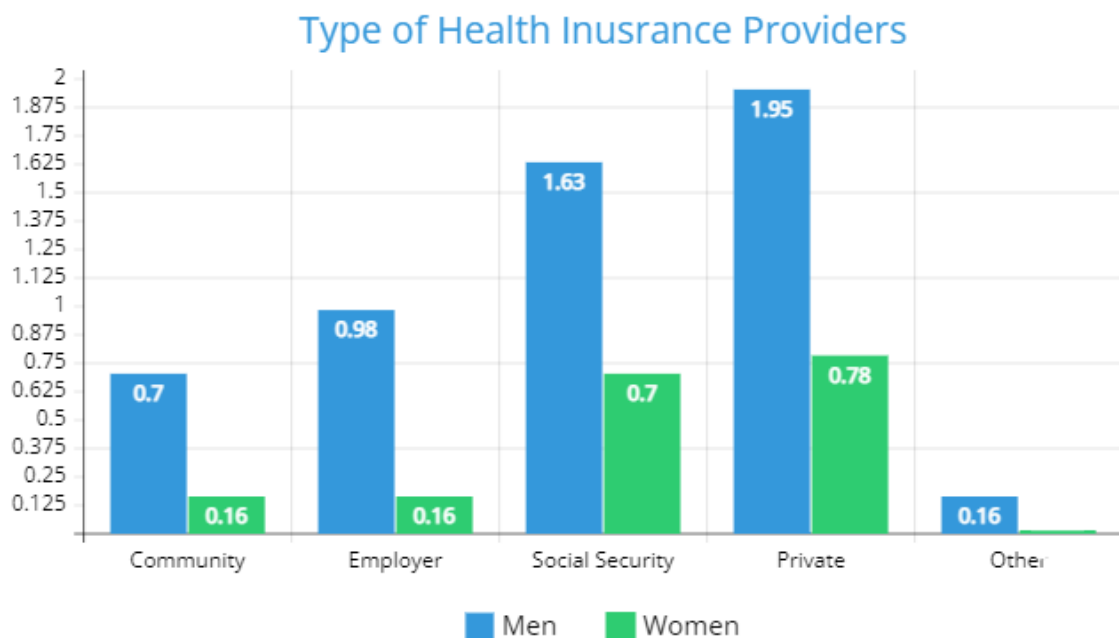
this will make it impossible for the government to provide health insurance for all (Manzoor, Hashmi & Mukhtar, 2009). Private health insurance on the other hand, could provide solutions here. However, its costly and less regulated. Unfortunately, these two public and private health insurance systems are not interconnected and working parallel (Lashari, 2005). Private and government health financial systems are working in isolation with no connection which makes health financing conditions abysmal.

In Pakistan a significant number of population face risk of catastrophic health expenditures because of uncovered health care cost. Mostly, government employees have health insurance coverage through government run hospitals where the cost of treatment for them is free but rest of the population have no prepayment mechanism which leads to high OOP health expenditure and hence low access to health care.

Health insurance acts as a safety net; for the rich it is management of financial stress and for poor it covers the health risk. Ideally preventive health care is considered better than therapeutic care but one can get unexpectedly sick or have other morbidities. For coverage of health costs related to these one can't arrange or at times even afford to pay. Being unable to fund the cost of health services purchase often quality or adequacy of such purchases may also be compromised. Which means even if health expenditures are met by OOP these may be suboptimal.

#### **4.1.1 Health Insurance Coverage in Pakistan:**

There are mainly four types of health insurance providers. Health insurance covered by Community, Employer based insurance, Social Security and Private Health insurance. We have used the Pakistan Demographic and Health Survey 2017-18 data for reporting the health insurance prevalence. Here in Sample only 0.70% males and 0.16% females have health insurance by the community. Then 0.98% men and 0.16% female are employer-based insured. While 1.63% men and 0.70% are covered by Social Security, 1.95% men and 0.78% females by a private provider, and 0.16% men and 0.01% females are willing to buy other sources. This shows that the population willing to buy health insurance is by private providers (1.95% and 0.78%) which is highest in men and females both as compared to all other types of insurance coverage.



**Figure 4. 1: Types of health Insurance Providers**

*Source: Pakistan Demographic and Health Survey (PDHS) 2017-18*

Pakistan currently has no universal social insurance system designed specifically for health, though there are some health insurance programmes, covering no more than 5% of total population (especially designed for poor) that are rolled out either in some districts/provinces or for specific lower class. For Example, Waseela-e-Sehat by Benazir Income Support Programme (BISP). The majority of the beneficiaries belong to the lowest and second lowest wealth quintile (30% of women and 32% of men). People living in Rural areas women and men have benefited more from the programme than people from urban area. Among the regions, the coverage is higher in Sindh, Khyber Pakhtunkhwa, FATA and Gilgit Baltistan<sup>38</sup>.

<sup>38</sup> Pakistan Demographic and Health Survey 2017-18.

Besides in recent times government launched Sehat Sahulat Program, which is covering almost 10 million families<sup>39</sup> across Pakistan. Also, there are some Employees Social Security Institutions (ESSI) working in four provinces that provide medical coverage to employees and their dependents<sup>40</sup>.

While the private sector is minuscule with a total of only 38 health insurance companies in the country and the size cannot match the population-wise need. Coupled with that, SBP shows that insurance market share as a percentage of GDP is extremely low along with low demand and high premiums. With a low purchasing power and lack of institutional capabilities, access to insurance is not possible in such a scenario.

As mentioned before, in Pakistan most of the Public Health insurance programmes are designed for poor, government employees or for specific province etc. On the contrary, the private sector has unestablished insurance market with very high cost. Hence, it is crucial to study the factors affecting decision to purchase health insurance for those who are not eligible for any public health insurance programme and for people belonging to various economic class.

It is a fact that monetary factors play a major role in formation of consumer's insurance decision but apart from monetary factors, social, psychological and emotional factors play less critical but significant part in the adoption of insurance. Psychological factors such as language can stoke unnecessary fears and that could also prevent the adoption. For example, the word protection has negative connotations as it suggests a cost while insurance is an investment and suggests a positive connotation. (Kunreuther & Pauly, 2005). Similarly, it is also better to be specific in naming insurance items (e.g., flight insurance) for consumers is more appealing than general insurance (Kunreuther & Pauly, 2005). Emotional factors such as feelings also play a major role in influencing the purchase intention of consumers. For example, people are more likely to purchase insurance if the object offered to them is considered special or treasured and they will likely avoid something that is not special (Kunreuther & Pauly, 2005). It shows that people will buy insurance for the fear of not having insurance in a potential bad occurrence. An example of social factor is that people also buy insurance because other people are also buying it. Similarly, the negative experience of others can prevent the adoption of health insurance (Kunreuther & Pauly, 2005).

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<sup>39</sup> THE LANCET *Regional Health southeast Asia*.

<sup>40</sup> National Health Accounts 2017-18.

Also, literature like Ogundeji et al. (2019), Yadav and Sudhakar (2018), Mhlanga and Dunga (2020), Owusu-Sekyere and Chiaraah (2014) and others suggests that socio-economic determinants play an important role in consumer's insurance decision. For example, household size, level of education, income, occupation, age, marital status, gender and place of residence are found to be significant factors in influencing the decision to join insurance schemes.

#### **4.1.2 Objective of the study**

The decision to purchase health insurance depend on many factors. It is important to get information about purchase willingness of the potential clients and to examine the factors affecting this choice. This can help in designing an adequate health insurance framework. The purpose of this study is to examine the socio-economic determinants that influence the purchase of health Insurance in Pakistan. The Results of this study will help policy makers in knowing the determining factors that affect the insurance purchase decision in a Pakistani household. Further it will help them to formulate insurance policies and to improve the existing ones.

In this regard, the aim of this research is to assess the purchase decision of health insurance in Pakistan and assist the policy makers in formulating a national health insurance programme that meets the needs of the potential beneficiaries (households) and the society by lowering the disease burden. The specific objectives of the study are as follows:

- A. Investigate the socio-economic and demographic characteristics that influence the purchase decision of health insurance in Pakistan:
  - i. To determine the relationship between levels of education and insurance purchase decision.
  - ii. To assess the linkage of individual's wealth and insurance purchase decision.
  - iii. To evaluate if place of residence (Province) affects the decision to purchase health insurance.
- B. To assess the role of gender in insurance purchase decision

#### **4.2 Literature Review**

In the following chapter we have provided some literature on the determinants of health insurance purchase decision. At the end of the chapter brief summary and research gap is provided.

The Yadav and Sudhakar (2018), checked the impact of socioeconomic factors on selecting health insurance corporations either government or private. They have used a structured

questionnaire to collect the data from the insurance policy buyers. Then, the data has been utilized to analyze the relationship between socioeconomic factors and health insurance company choice through regression. They found that there was a significant impact of marital status, coverage of health insurance, income, age, and gender on choosing the health insurance institutions. The research has revealed that most of the health insurance policy buyers were married, workers of private organization total guaranteed amount was two to five lac and covered inpatients, individuals have higher income levels, between 41 to 50 years and males.

Jahangeer and Haq (2015), investigated the readiness to buy health insurance and its relationship with socioeconomic and demographic features in Pakistan. They have collected household survey data through a random sampling method and applied the logistic regression method. The result indicates that a Household's economic position, place of residence, awareness, and type of illness seems as significant characteristics in an individual's readiness to buy health insurance. The richest households are more likely to buy health insurance as compared to the poorest, poor, and middle class. The Households residing in Gilgit Baltistan, Azad Jammu Kashmir, and Balochistan more probably to acquire health insurance. However, awareness and households having an individual with chronic illness have a positive and noteworthy relationship with willingness to buy health insurance.

Mhlanga and Dunga (2020) narrated the factors of health insurance purchase in Africa. The data has been collected by household's survey 2018 and a Logit regression model was applied to find the significant determinants. The results indicate that likelihood of health insurance increase with race, white have greater likelihood as compared to other race; in gender, male have greater likelihood as compared to female; in marital status, married individuals have greater likelihood as compared to unmarried, single and divorced individuals. However, there was a positive significant impact of age and higher education on health insurance. Nevertheless, there was a negative association between chronic disease and health insurance.

Yadav and Tiwari (2012) on the other hand emphasize increasing awareness about health insurance in the Jabalpur district of Madhya Pradesh. The study also asserts that the market size of private life insurers is increasing due to a rise in public's trust and the availability of better services by insurance companies. The paper studies 150 policyholders of various insurance companies and find that demographic factors also play an integral role in the purchase of insurance policies. The study suggests that spreading more awareness, reducing premium prices and providing need-based innovative options could be good for the future. Age

and income are found to positively affect the decision whereas there is no relationship between occupation and insurance buying decision. Apart from that company's reputation, money-back guarantee, low premium, larger risk coverage and easy access to agents are deemed as the most attractive features of any policy. The nature of the study is exploratory and descriptive whereas both primary and secondary sources have been used for data collection. The study uses stratified and purposive sampling methods while testing is conducted with the help of several statistical tools like correlation, chi-square and weighted average method.

Owusu-Sekyere and Chiaraah (2014) have looked at the overall demand for health insurance in Ghana and found the majority of the respondents favour health insurance instead of Cash and Carry systems that demand payment at the point of service delivery. The paper utilizes descriptive statistics-Logit and Probit Models and the results indicate the marital status, sex and cost of curative care are the main factors in influencing the decision to join insurance schemes. The marginal effects and odd ratios, on the other hand, indicate that income, education level and poor ill health also affect the decision to enrol in any insurance scheme. Both primary and secondary data analysis has been used in the study. It also suggests that future public endeavours aimed at increasing enrolment should be guided by the above-mentioned factors and generating awareness about how insurance works are integral to increase enrolment.

Kirigia et al. (2005) have studied the individual and household variables in Sub-Saharan African women as they are found to be important determinants of health ownership in the developed countries. The paper mainly examines the effect of educational, economic, and demographic characteristics on health insurance ownership among South African women. The results show a positive relationship between residence, environment rating, education, income, age, smoking, marital status and health insurance ownership. Another finding shows that women with education above 10<sup>th</sup> standard, high income and living in affluent areas have a greater chance of getting insured. The study employs empirical model and chi-square tests for data analysis along with regression analysis. In contrast, health rating, household size, employment, occupation, age squared, contraceptive usage, and alcohol usage have an adverse effect on health insurance ownership. The authors suggest economic development, poverty reduction, and better job opportunities for women can improve women's standard of living and this could increase access to health insurance.

Bhat and Jain (2006) analyze the factors that determine the demand for health insurance in the setting of a micro-insurance scheme. The study has utilized a two-stage model and the first



stage of the study examines the factors that influence the decision to purchase micro health insurance. The second stage uses Heckman two-stage estimation procedure to study the amount of insurance purchase. The study has collected primary data with the use of a questionnaire from Anand District, Gujrat where Charotar Arogya Mandal is the provider of the health insurance scheme. The results of the study show that purchase insurance is mainly affected by income and healthcare expenditure while there is also a positive relation between purchase decision and age, insurance knowledge, and coverage of illness. Moreover, income was found to have an important but non-linear relationship with the amount of health insurance purchase. Apart from that age, the number of children in the family and perception of future health expenditure also have a considerable effect on insurance purchase. The study raises a significant question despite access and affordability majority of the population does not get insured via these schemes.

Yellaiah and Ramakrishna (2012) specifically examine socio-economic determinants of health insurance in Hyderabad, India. The study finds that the main determinants include income, occupation, awareness, and health expenditure where income and age are important but not statistically important. The study has conducted a structured sample survey based on 200 participants with the dominant group being 31-40-years old for primary data collection. However secondary data has also been used and obtained from reports of the Ministry of Health and Family Welfare. Logistic regression and logit models have been used mainly for the purpose of data analysis. The population has been studied using various demographic indicators such as gender, age, caste, tribe. Findings show males have a higher rate of public insurances whereas single families have a higher rate of adoption in comparison to joint families. Employees who belong to private jobs were more insured due to payments deductions and schemes offered by private employers. The study suggests that government and organisations should spend awareness about public health insurance and as they can reduce health expenditures for poor people in the country. The provision of insurance should be extended to all hospitals as only a few hospitals accept health insurance and the incomes of the people as it can speed up access to health insurance.

Aregbeshola and Khan (2018) investigate predictors involved in the enrolment of women of reproductive age in the National Health Insurance Scheme launched in Nigeria. The study shows that despite the implementation of NHIS since 2005, the enrolment in NHIS has not seen improvement and the number is still low. The study has purely conducted a secondary data analysis based on the Nigerian Demographic and Health Survey (NDHS) conducted in

2013 which looked at demographic and socio-economic factors of women by utilizing univariate, bivariate and multivariate analyses. The study has conducted a retrospective cross-sectional data analysis on 38,948 women falling in the age group of 15 to 49. Further, the STATA software has also been used and Pearson's chi-square analysis and multivariate logistic regression are conducted to test the associations between variables. The study reveals that despite an NHIS scheme 97.1% of the women of reproductive age did not have health insurance. The multivariate analysis conducted as part of the study shows education, age, employment status, socio-economic status and geo-political zone to be among the list of predictors with a significant effect on enrolment. The study shows that young women aged between 25-34 are most likely to adopt health insurance schemes as they do not have financial security like older women because most of these young women work in the informal sector compared to older women with a higher percentage of formal employment. The study concludes that the government could launch a tax-based health insurance scheme to attract women because most of them are young, poor, uneducated and employed in the informal sector of the economy. More specifically, the study suggests launching a tax-financed non-contributory health insurance scheme for such women. However, the increased risk of illness in older women is more important in older women to pick up health insurance. The study discounts factor-like place of residence but find a positive relationship between education and insurance adoption as most women with secondary and higher secondary were more likely to adopt insurance in comparison to uneducated women.

Wan, Peng, Shi & Coyte, (2020) observed which factors affecting the decision to buy private health insurance (PHI). They have used the fourth wave of the China Household Finance Survey and stratified random sampling including all counties nationwide, in the dataset people above 18 years and above were included. The Andersen model was applied for the usage of health facilities, which comprises three groups of elements that were needs-centered, predisposing, and enabling elements. They have used a Logistic regression model to analyze the relationship between PHI and those factors. The results revealed that in the predisposing factors, level of education, age, and being married indicated a significant positive relationship and family size represented a significant negative relationship to purchase PHI. In enabling factors geographical factors play a significant role. Especially, people residing in eastern zones had a greater inclination to obtain PHI than middle zones and the least inclination to buy PHI in western zones. The individuals residing in urban areas were more likely to buy PHI than rural areas. Employment status was an important factor, employees of public sector/cooperative

enterprises and private/foreign established enterprises were more expected to obtain PHI than other kinds of enterprises. However, there was a positive significant relationship between household incomes, increased medical spending, on the other hand, there was a negative significant relationship between medical debt and willingness to buy PHI. Need-based factors indicated that healthy persons were risk-averse and more likely to buy PHI. Similarly, Kapur (2020), observed in Ireland the trends and determinants of private health insurance. The data has been collected from 2009 to 2017 by a nationwide bi-annual survey and multivariate Probit models applied. The trend of private health insurance (PHI) depicts that there was an inverse relationship between unemployment and PHI over time. The result indicates that marital status showed a significant role in PHI decision, married individuals were more likely to have PHI than single, separated, and divorced individuals. Although, females, very unhealthy individuals, professional class, and senior citizens older than 65 years were more likely to have PHI. The Irish insurance market can have adverse selection problems due to the high demand for PHI of older and unhealthy people. Irish and UK-based persons were more likely to have PHI than other countries of origin.

Finn and Harmon (2006) examine the health insurance buying behaviour in the Irish Healthcare System to identify the factors affecting the propensity of individuals and households to purchase private insurance. The study reveals that people with better education, wealth and health condition are more likely to buy insurance but the influence of health condition is more prominent in comparison with health and wealth. Even the government-sponsored incentives are also more effective on people with better health, income and education but further enticements are likely to encourage the non-insured to purchase health insurance in future. However, there are other factors such as heterogeneity and state dependence that also affect the decision to buy private insurance because the public healthcare system in Ireland is considered more effective than the private health system. The study uses the Utility Theory and Theory of Adverse selection to discuss the different buying behaviours and risk factors applicable in specific situations. The study mainly utilizes panel data analysis and conducts a comparison between three different approaches including Fixed effects models like Random Effects Model and Static Model and Mundlak-Chamberlain's Random Effects Model and dynamic specification.

Wo et al. (2020) analyse the factors that influence the individual adoption of tax-subsidised private health insurance in China. The study finds that demographic variables such as level of education, marital status and number of elderly family members to support, mainly influence

the decision to obtain tax-subsidized private health insurance. Surprisingly, the study negates the effects of age and gender on insurance take-up unlike the other studies discussed above. Disease history and ratio of income to deduction are found to have a positive correlation with insurance buying behaviour as people with disease history and fewer income deductions are more likely to purchase tax-subsidized private health insurance. The study is conducted on a total of 1610 participants based in Huangzhou, China in a cross-sectional community-based questionnaire survey for the purpose of primary data collection. Logistic Regression and Standardized Pearson test were used in the study for data analysis whereas a receiver operating characteristic (ROC) curve was generated for quantitatively examining the predictive ability. The study suggests more information about tax-subsidized health insurance, a rise in deductions and motivating employers to provide health insurance for the individual and family would increase adoption of tax-subsidized private health insurance.

Ulbinaitė, Kucinskiene, Moullec (2013), examined the factor affecting the willingness to purchase health insurance in Lithuania. They have collected data by questionnaire-based survey and employed Factor analysis as well as multiple regression method. The result indicates that insurance consumption decisions generally affected by monetary respect, for instance, customer's assessment of insurance facilities in financial terms and to find the opportunity to decrease the total payment outstanding for insurance. However, men's insurance choice is based on the acceptability of insurance circumstances, and on the other hand women and youth decide on the insurance facility provider's competence. Further, mature individuals think about the opportunity to decrease the expense of payment owed for insurance.

Azhar et al. (2018) analyzed the factors affecting the willingness to pay (WTP) for health insurance, they collected the data by in-person interview method through random sampling in Sarawak, Malaysia. The contingent valuation method has been used for bidding the amount that individuals are ready to pay for health insurance. Logistic regression analysis was used to find out the factor affecting the WTP for health insurance. Among our respondents greater than half (53%) individuals were not ready to reimburse health insurance premium because they were unable to afford it as well as they thought it's the government duty to pay the health insurance cost. Around lesser than half (47%) were ready to pay the specific amount for health insurance. Nevertheless, above than half respondents were ready to bear the MYR20 or less. Willingness to pay for health insurance premiums increases for the individuals residing in urban area and acquired a higher level of education. Likewise, higher income level and inclination for Private health care providers were a significant positive factor for WTP.

Ogundeji et al. (2019) analyzed how we can avoid catastrophic health expenditure by pre-payment schemes and factors impacting readiness and capability to pay in Nigeria. They have collected data by using household surveys through the cluster sampling technique. The Logistic regression model was applied to examine the relationship between socioeconomic status and willingness to pay (WTP). The individuals residing in urban areas were willing to pay more premium for health insurance than rural areas. Male and unmarried people were willing to pay more than female and married participants. The regression results revealed that there was a significant direct variation between income and WTP. Furthermore, there was an inverse significant variation between education level and WTP.

Kansara and Pathania (2012) study the awareness of health insurance and the factors affecting its adoption in Jalandhar, Punjab. The results show that despite a good awareness about health insurance only 11.5% of the sample population have subscribed to health insurance and five main factors including formalities bottlenecks, agent related problems, coverage issues, awareness, and negative feedback are the main obstacles. The paper applies the descriptive research design whereas sampling is conducted via convenience sampling technique and chi-square and factor analysis have been applied for data descriptive statistics. The study proves that awareness is not the defining factor in the adoption of health insurance as 73% of the participants without insurance were aware of health insurance. The results negate the relationship between health insurance subscription and age while also denying the association with age as well.

Hence, we can conclude that there are significant number of studies that suggest that socio-economic factors have significant influence on insurance purchase decision. But unfortunately, health insurance-based research is being ignored in Pakistan.

#### **4.2.1 Research Gap**

From the above review of literature, we can deduce that the insurance purchase decision has many important determinants which varies across different segment of the society. Employers decision for insurance provision may also depend on the regulatory requirements rather than the behavioral response of workers to an insurance incentive. Especially in Pakistan health insurance markets are underdeveloped, on top there is still a dearth of research on health insurance and its demand. In Pakistan little research is found on healthcare financing and among those which exist, the focus has remained on government's health expenditures while, health insurance demand and determinates were neglected. We have hardly found any study

that has analyzed the socio-economic determinants for insurance purchase decisions in Pakistan. Which is crucial for understanding the dynamics of health insurance and its market. Further, to the best of our knowledge, none of the studies in past have used PDHS Data set to analyze the factors that effect the Insurance Purchase decision in Pakistan. Here using PDHS data set will give a fresh perspective on this topic and will enrich the literature.

Therefore, in this study we will provide some important insights into characteristics of households that influence the decision to purchase health insurance and also at different wealth index thresholds to fill the gap in the literature regarding health insurance demand and determinants in Pakistan. This study will also fill the knowledge gap in understanding the behaviour of households and gender roles for purchase of health insurance so that while designing a health insurance mechanism as an alternate health financing mechanism insight can be drawn.

### **4.3 Methodology**

According to Jahangeer and Haq (2015), utility theory explains well that individuals need to maximise health outcomes within budget constraint. As a matter of fact, good health can be attained by healthy lifestyle and health care. Hence, they demand for health services and eventually health insurance. People will buy health insurance to avail health services and to avoid unexpected and unaffordable health care payments. Which makes it important to understand the key factors that can influence individual's insurance purchase decision. Existing literature suggests that income/wealth, health status, education, age, risk-aversion behaviour, health related information and available health services can affect these decisions. But due to data limitations, in this study we will just discuss socio-economic factors.

The analysis will use a binary dependent variable coded as 1 if the household member has health insurance and zero if not. This Health insurance consumption is a function of the Household's several socio-economic and demographic factors such as Region, age, education, family size, wealth index and work status. All these factors are used as explanatory variables. We have used three models in the study. Model 1 includes a dummy for men with health insurance coverage as dependent variable, along with above mentioned explanatory variables. While Model 2 includes a dummy variable for women with health insurance coverage as dependent variable and same explanatory variables. We have used separate models for men and women because first, the data is already available separately for both genders. Secondly,

its interesting to see how these socio-economic factors will affect both genders in their decision to purchase insurance. The study will use Probit regression on both models to examine the impact of various factors on the insurance purchase decision. Also, to access the role of gender in insurance purchase decision, we have Model 3. It includes a dummy variable for gender. The general form of the models are:

$$\text{Model 1 } Y_{men} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \beta_k X_k$$

$$\text{Model 2 } Y_{women} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \beta_k X_k$$

$$\text{Model 3 } Y_{pooled} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \beta_k X_k$$

In the above equations, Y (health coverage) is the dependent variable as 1 when individual has health insurance and 0 otherwise.  $X_1, X_2, X_3, X_k$  are explanatory variables,  $\beta_1, \beta_2, \beta_3, \beta_k$  are coefficients of independent variables. The independent variables used in this Probit regression equation are Education, number of children, family size, internet usage, wealth index, work status, region etc.

#### 4.4 Data and Variables

Data is taken from the 2017-18 Pakistan Demographic and Health Survey (PDHS). PDHS was conducted in four provinces; Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan, also in two regions of Azad Jammu Kashmir and Gilgit Baltistan; in Islamabad and FATA. Total 14,540 Households were interviewed. In which 3691 all ever-married men of age 15-49 and 12708 all ever-married women of age 15-49 were interviewed.

➤ **Dependent Variable:**

Health insurance Coverage is the dependent variable with Binary values i.e 0=Not insured and 1= insured

➤ **Independent Variables:**

Education, number of children, family size, wealth index (as proxy for income), internet usage (as a proxy for technology), work status, region etc.

Variables	Population Percentage Women	Population Percentage Men
Health Insurance Coverage		

No	98.27	94.61
Yes	1.73	5.39
<b>Age</b>		
Between 15-30	62.06	33.41
Between 31-49	37.94	66.59
<b>Region</b>		
Urban	44.14	51.04
Rural	55.86	48.96
<b>Province</b>		
Punjab	21.71	23.11
Sindh	17.93	21.08
KPK	16.50	13.68
Balochistan	11.87	14.14
GB	7.20	5.69
ICT	6.37	7.18
AJK	10.39	9.10
FATA	8.03	6.01
<b>Family Size</b>		
Between 1-10	69.03	74.80
Between 11-20	27.75	22.62
Between 21-40	3.21	2.57
<b>Number of Children</b>		
Between 0-4	75.60	77.35
Between 5-8	21.91	20.64
Between 9-13	2.49	2.00
<b>Use of Internet</b>		
No	88.18	66.68
Yes, within last 12 months	11.19	31.37
Yes, before last 12 months	0.63	1.95
<b>Employment</b>		
No	88.37	5.18
Yes	11.63	94.82
<b>Occupation</b>		
Not working	88.31	4.33
Professional	2.71	21.35
Agriculture	3.69	21.02
Skilled manual	4.70	27.20
Unskilled	0.59	26.11
<b>Education</b>		
No Education	51.40	23.54
Primary	13.51	17.01
Secondary	20.75	35.84
Higher	14.34	23.60
<b>Wealth Index</b>		
Poorest	22.88	18.21
Poorer	22.86	21.70
Middle	19.75	19.18
Richer	17.49	19.64
Richest	17.03	21.27



<b>Total Observations</b>	12708	3691
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**Table 25: Descriptive Statistics**

Descriptive statistics shown in table 25 displays that for age group 15 to 30 years, population percentage of women is higher than men (62.06% and 33.41%). However, among the individuals among the age group between 31-49 years men are more in numbers as compared to females (66.59% vs 37.94 %). According to the provincial distribution of the interviewed individuals revealed that percentage of population in Punjab is highest among both women and men (21.71% and 23.11%) respectively as compared to all other provinces. On the other hand, more women (55.86%) are living in rural areas, while most of the men (51.04%) are living in urban area. The major proportion of the population of both women and men (98.27% and 94.61%) have no health insurance coverage, only a small proportion of the population of both women and men have health insurance coverage (1.73% and 5.39%). Most of the population in the data set have family size between 1-10 members. Similarly, largely number of children within a family is between 0-4.

Most of the women (88.18%) and men (66.68%) have never used internet. Due to which lack of social awareness can be witnessed. Almost 51% women are uneducated and hence the percentage of non-working women is 88.37%. While most of the men have secondary education and doing skilled manual work. According to the statistics, a significant number of both women and men belongs to poor class.

## **4.5 Empirical Results**

### **4.5.1 Results of Probit model**

Table 26 reports the results of socio-economic determinants that influences insurance purchase decision. According to our estimation among two age groups, Women and Men of age 31-49 have 6% and 18% respectively have more chance to buy health insurance as compared to men and women of younger age. In both cases men and women, the group with older people are supposed to buy insurance in latter ages of their lives because older people as compared to young are at a greater risk of getting sick.

Also, men and women both in Gilgit Baltistan have a greater chance to purchase health insurance not just as compared to Punjab but also from other provinces. Anecdotal evidence show that the penetration of social welfare organizations is quite high in that region specifically

AKRSP<sup>41</sup>. Social mobilization may have played a significant role in educating the masses for basic wellbeing decisions. Our results are comparable to Jehangir and Haq (2018).

Similar to the results of Mhalaya and Daya (2020) our results in case of men’s model, People with family size of 11-20 have lesser chance to buy insurance as compared to people with family size of 1-10. It Might be due to financial constraints as supporting a big family is a challenge itself. And at the end they are not in a position to buy health insurance.

As mentioned earlier we have taken use of internet as a proxy for technology. Results show that individuals who have used internet within last 12 months have more chances to buy health insurance as compared to the people who haven’t used internet at all. One of the potential reason is because internet/social media is an important source of awareness about health information and awareness. These results are in conformity with those of Kirigra et.al. (2005).

Women with higher education level are more likely to purchase health insurance. The analysis result is true to believe because it’s obvious that as compared to uneducated ones, people with higher education have more knowledge and exposure. Hence, they can better understand the importance of health insurance coverage. Likewise, as compared to poorer class, Men with stable (middle class) and strong (rich class) financial status are more likely to buy a health insurance. Which is of course understandable as one can buy health insurance only if he can afford it unless it’s provided by employer or state. Which in case of Pakistan is more pronounced as the employer insurance is almost non-existent because of limited bigger formal sector corporation/businesses. Other factors like region, number of children, working status, and Occupation have no significant association with insurance purchase decision.

While result of pooled model for the variable gender is found to be significant. That means gender play a substantial role in insurance purchase decision.

<b>Variables</b>	<b>Women</b>	<b>Men</b>	<b>Pooled</b>
<b>Dependent Var: Insured</b>			
<b>Age</b>			
Between 15-30			
Between 31-49	0.006*	0.018*	0.008**
	(2.26)	(2.19)	(3.15)

<sup>41</sup> The Aga Khan Rural Support Programme (AKRSP) is a private, non-profit company, established by the Aga Khan Foundation in 1982 to improve the quality of life of the people of Gilgit Baltistan and Chitral (GBC).

<b>Region</b>			
Urban			
Rural	-0.003 (-1.32)	0.009 (0.99)	-0.001 (-0.49)
<b>Province</b>			
Punjab			
Sindh	-0.007** (-2.67)	-0.026* (-2.35)	-0.011*** (-3.93)
KPK	0.024*** (4.96)	-0.025* (-2.26)	0.016*** (3.68)
Balochistan	-0.008** (-2.93)	-0.004 (-0.31)	-0.009** (-2.75)
GB	0.044*** (5.25)	0.134*** (3.95)	0.059*** (6.52)
ICT	0.002 (0.53)	-0.032** (-2.94)	-0.004 (-1.14)
AJK	0.002 (0.65)	0.054** (2.77)	0.013* (2.14)
FATA	-0.007* (-2.21)	-0.008 (-0.40)	-0.009* (-2.33)
<b>Family Size</b>			
Between 1-10			
Between 11-20	-0.002 (-1.03)	-0.024** (-2.74)	-0.006* (-2.51)
Between 21-40	-0.003 (-0.52)	-0.01 (-0.45)	-0.004 (-0.66)
<b>Number of Children</b>			
Between 0-4			
Between 5-8	0.006 (1.71)	0.020 (1.72)	0.008* (2.33)
Between 9-13	0.022 (1.79)	0.0385 (0.89)	0.030* (2.27)
<b>Use of Internet</b>			
No			
Yes, within last 12 months	0.021*** (3.48)	0.028** (2.58)	0.021*** (4.32)
Yes before last 12 months	-0.006 (-0.73)	-0.00227 (-0.10)	-0.002 (-0.26)
<b>Employment</b>			
No			
Yes	0.003 (0.26)	-0.009 (-0.37)	0.001 (0.15)
<b>Occupation</b>			
Not working			
Professional	0.027 (1.13)	0.039 (1.83)	-0.026 (1.84)
Agriculture	-0.005 (-0.60)	0.005 (0.25)	-0.001 (-0.17)

Skilled manual	-0.005 (-0.62)	0.022 (1.10)	0.006 (0.66)
Unskilled	0.023 (0.74)	0.013 (0.68)	0.003 (0.40)
<b>Education</b>			
No Education			
Primary	-0.000 (-0.23)	0.010 (0.71)	-0.001 (-0.33)
Secondary	-0.004 (-1.40)	0.004 (0.40)	-0.004 (-1.35)
Higher	0.012* (2.32)	0.018 (1.16)	0.011* (2.20)
<b>Wealth Index</b>			
Poorest			
Poorer	-0.002 (-0.53)	0.002 (0.32)	-0.000 (-0.21)
Middle	0.000 (0.04)	0.028* (2.44)	0.006 (1.58)
Richer	0.003 (0.77)	0.054*** (3.53)	0.013** (2.63)
Richest	-0.002 (-0.54)	0.058** (3.25)	0.008 (1.58)
<b>Gender</b>			
Male			
Female			-0.010* (-2.11)

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<b>Observations</b>	12458	2746	15204
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t statistics in parentheses and coefficients are marginal effect dy/dx

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

**Table 26 Probit Regression**

#### 4.5.2 Robustness Check

To test model robustness, I have used logit model as an alternative model specification. Results for logit regression are presented in appendix. These results are perfectly consistent with our baseline results i.e. Probit model. Like Probit model, these results also show that variables like age, province, family size, education, internet usage and wealth showed up as significant determinants to influence health insurance purchase decision. While few factors like region, number of children, working status and Occupation are not found significant enough to affect consumer's decision.

### **4.5.3 Heterogeneity by decision taker**

For post estimations, I also checked heterogeneity by decision taker that means the person who is responsible for greater decisions in the house, specifically health related decisions. I have checked this separately for both men appendix and women models in appendix too. We had four groups for this variable in each sample; respondent, spouse, both and someone else. But due to data availability I was to able to estimate only two groups in both samples. In men's model it was respondent and both partners, while rest of two were not estimable due to limited observations. Since in table 4 we have men sample data, so most of socio-economic factors are found significant when respondent is responsible for decisions. Which means more people are insured when the health decisions are taken by men vs decision taken by both partners. While in women model, we were able to estimate only two groups, both partners and spouse. Some socio-economic factors were found significant when decisions taken by their spouse, i.e. men. while few were significant when taken by both. Which reinforces the fact that mainly men are responsible for making health insurance purchase decision. whereas women solely have almost insignificant role while making insurance purchase decision. So, this distribution of samples by decision taker is very consistent with our results. Also, these results are very believable because as a matter of fact, Pakistan has a male dominating and most of the decisions are taken by men solely and by both partners only in few cases.

## **4.6 Revised Estimations**

### **4.6.1 Descriptive statistics and Regression Results**

For revised estimates we have redefined the dependent variable. We have restricted the sample to Household's paying to obtain Health insurance. Out of 1.73% insured women only 0.77% were privately insured, while out of 5.39% only 1.95% men were privately insured. We have also used survey weights in this sample. Further to incorporate threshold effect we have used three wealth index dummies defined by thresholds; at least middle, at least richer, at least richest. we also did heterogeneity analysis but most of them were not estimable because of restricted sample and less observations. Below are the descriptive statistics of the sample, followed by estimation results.

## Descriptive Statistics

Variables	Population Percentage Women	Population Percentage Men
<b>Private Health Insurance</b>		
No	99.23	98.05
Yes	0.77	1.95
<b>Age</b>		
Between 15-30	62.06	33.41
Between 31-49	37.94	66.59
<b>Region</b>		
Urban	44.14	51.04
Rural	55.86	48.96
<b>Province</b>		
Punjab	21.71	23.11
Sindh	17.93	21.08
KPK	16.50	13.68
Balochistan	11.87	14.14
GB	7.20	5.69
ICT	6.37	7.18
AJK	10.39	9.10
FATA	8.03	6.01
<b>Family Size</b>		
Between 1-10	69.03	74.80
Between 11-20	27.75	22.62
Between 21-40	3.21	2.57
<b>Number of Children</b>		
Between 0-4	75.60	77.35
Between 5-8	21.91	20.64
Between 9-13	2.49	2.00
<b>Use of Internet</b>		
No	88.18	66.68
Yes, within last 12 months	11.19	31.37
Yes, before last 12 months	0.63	1.95
<b>Employment</b>		
No	88.37	5.18
Yes	11.63	94.82
<b>Occupation</b>		
Not working	88.31	4.33
Professional	2.71	21.35
Agriculture	3.69	21.02
Skilled manual	4.70	27.20
Unskilled	0.59	26.11
<b>Education</b>		
No Education	51.40	23.54
Primary	13.51	17.01
Secondary	20.75	35.84
Higher	14.34	23.60

**Wealth Index**

Poorest	22.88	18.21
Poorer	22.86	21.70
Middle	19.75	19.18
Richer	17.49	19.64
Richest	17.03	21.27

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<b>Total Observations</b>	12708	3691
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**Table 27 descriptive statistics**

From the above table it is evident that the health insurance purchase is not a significant option exercised in Pakistan. Especially for females the insurance purchase is almost non-existent (.77 percent in this sample vs male 1.95). This reflects either the family priorities or the low capacity to purchase such an option.

**Men's Model with different wealth thresholds**


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<b>Variables</b>	<b>Middle</b>	<b>Richer</b>	<b>Richest</b>
<b>Dependent Var: Insured</b>			
<b>Age</b>			
Between 15-30			
Between 31-49	0.006 (0.004)	0.007 (0.004)	0.017*** (0.006)
<b>Region</b>			
Urban			
Rural	0.006 (0.004)	0.009 (0.005)	0.004 (0.007)
<b>Province</b>			
Punjab			
Sindh	-0.010** (0.004)	-0.003 (0.007)	-0.012 (0.009)
KPK		-0.015*** (0.005)	-0.021*** (0.008)
Balochistan	-0.003** (0.009)	-0.001 (0.011)	-0.010 (0.012)
GB	-0.006 (0.006)	-0.009 (0.007)	-0.018* (0.009)
ICT		-0.011* (0.006)	-0.014 (0.010)
AJK	0.001 (0.010)	-0.001 (0.010)	-0.008 (0.012)
FATA		-0.008 (-0.40)	
<b>Family Size</b>			

Between 1-10			
Between 11-20	-0.008***	-0.013***	-0.006
	(0.003)	(0.003)	(0.016)
Between 21-40			0.016
			(0.032)
<b>Number of Children</b>			
Between 0-4			
Between 5-8	-0.002	0.012	0.015
	(0.005)	(0.011)	(0.011)
Between 9-13	0.0434	0.051	0.021
	(0.045)	(0.044)	(0.029)
<b>Use of Internet</b>			
No			
Yes, within last 12 months	0.005	0.011	0.008
	(0.009)	(0.010)	(0.010)
Yes before last 12 months	0.039	0.033	0.020
	(0.414)	(0.036)	(0.032)
<b>Employment</b>			
No			
Yes	-0.042	-0.037	-0.040
	(0.034)	(0.033)	(0.039)
<b>Occupation</b>			
Not working			
Professional	-0.000	0.018	0.034*
	(0.010)	(0.015)	(0.018)
Agriculture	-0.005	-0.006	-0.003
	(0.110)	(0.011)	(0.132)
Skilled manual	0.016	0.015	0.019
	(0.014)	(0.015)	(0.017)
Unskilled	-0.000	-0.000	-0.002
	(0.011)	(0.012 )	(0.014)
<b>Education</b>			
No Education			
Primary	0.000	0.003	0.009
	(0.008)	(0.009)	(0.010)
Secondary	-0.010	-0.005	-0.001
	(0.008)	(0.008)	(0.008)
Higher	-0.003	-0.017	0.012*
	(0.010)	(0.010)	(0.012)

---

**Observations**

1959

2509

2572

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Standard error in parentheses and coefficients are marginal effect dy/dx

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

**Table 28: Men's model (Probit Regression)**

Now the above model is for the insurance purchase decision of the male. The table provides a detailed view of the coefficients and standard errors for each independent variable across



different wealth groups, helping to understand the relationships between these variables and insurance coverage for male.

For each wealth group (Middle, Richer, Richest), the coefficients show the impact of each independent variable on the likelihood of being insured, controlling for other variables in the model. In case of the "Age" variable, the coefficients indicate the change in the likelihood of being insured associated with different age groups, compared to the reference group. The results show that if the individual is in age group 31-49 then there's a 0.006 increase in the likelihood of being insured for the Middle group, a 0.007 increase for the Richer group, but these two are insignificant and only a significant 0.017 increase for the Richest group only.

Regional in terms of rural and urban variation does not significantly change the probability of being insured in our sample. Which is logical as the region does not specifically increase or decrease the health hazard hence no impact on the decision making.

However, compared to Punjab all provinces show a relatively lesser chances of buying insurance. Sindh and Baluchistan is associated with a significant decrease in insurance likelihood for the Middle income group (-0.010 and -0.003 respectively), for KPK both richer and richest group shows a significant decrease in likelihood for purchasing an insurance (-0.015 and -0.021). Gilgit Baltistan when compared to Punjab shows a decrease of likelihood in insurance purchase for richest group (-0.018) and for ICT it is for the richer group (-0.011). While AJK and FATA doesn't show any significant change.

Having a family size between 11-20 vs. a smaller size of 1-10 is associated with a significant decrease in insurance likelihood for all groups: but its significant only for Middle (-0.008) and Richer (-0.013).

Among occupations, being a professional is associated with a significant increase in insurance likelihood for the Richest group (0.034). Further Higher education is associated with a significant increase in insurance likelihood for the Richest group only (0.012).

Whereas having a younger share of family members measured by number of children, use of internet as a proxy for information and development, employment status doesn't have any impact on the likelihood for the insurance purchase decision. This is contrary to the expectations because one feels obliged to protect the youngers welfare, or the availability of information and in general development and lastly being employed-means consistent source of income vs. unemployed should have some impact on the insurance purchase decision. But

in case of Pakistan, it doesn't seem to be the case primarily because of weak health insurance markets and general tendency of being myopic in preferences.

Overall, this regression analysis provides insights into the factors influencing insurance coverage across different wealth groups, helping to understand the dynamics of insurance uptake in the population.

### Women's Model with different wealth thresholds

Variables	Middle	Richer	Richest
<b>Dependent Var: Insured</b>			
<b>Age</b>			
Between 15-30			
Between 31-49	0.004** (0.001)	0.006*** (0.002)	0.007*** (0.006)
<b>Region</b>			
Urban			
Rural	0.000 (0.001)	0.000 (0.001)	- 0.004 (0.002)
<b>Province</b>			
Punjab			
Sindh		-0.001 (0.001)	-0.002 (0.001)
KPK	0.000 (0.001)	-0.002 (0.001)	-0.004** (0.001)
Balochistan			
GB	0.019*** (0.005)	0.022*** (0.005)	0.024*** (0.005)
ICT		-0.002*** (0.001)	-0.000 (0.021)
AJK	0.004 (0.001)	-0.000 (0.001)	-0.001 (0.001)
FATA			
<b>Family Size</b>			
Between 1-10			
Between 11-20	0.000 (0.001)	-0.002** (0.001)	-0.002 (0.001)
Between 21-40			
<b>Number of Children</b>			
Between 0-4			
Between 5-8	0.000 (0.001)	-0.000 (0.002)	-0.001 (0.002)

Between 9-13	0.001 (0.004)	0.001 (0.005)	0.001 (0.006)
<b>Use of Internet</b>			
No			
Yes, within last 12 months	0.003 (0.002)	0.003* (0.001)	0.009*** (0.002)
Yes before last 12 months			
<b>Employment</b>			
No			
Yes	-0.004** (0.001)	-0.004** (0.002)	-0.004 (0.003)
<b>Occupation</b>			
Not working			
Professional	0.019* (0.011)	0.027* (0.014)	0.023 (0.014)
Agriculture	0.037 (0.027)	0.019 (0.017)	0.018 (0.018)
Skilled manual		0.003 (0.005)	0.000 (0.004)
Unskilled			
<b>Education</b>			
No Education			
Primary	0.007** (0.003)	0.008** (0.003)	0.008** (0.003)
Secondary	0.002 (0.001)	0.004** (0.002)	0.004** (0.002)
Higher	0.006* (0.003)	0.008*** (0.002)	0.013*** (0.003)
-----			
<b>Observations</b>	6473	9584	2572
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Standard error in parentheses and coefficients are marginal effect  $dy/dx$   
 \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ . Blank spaces indicates not estimable

#### Table 29 women's model (Probit Regression)

In case of females for the Age variable having category of Between ages 31-49 vs. 15-30 years of age, there's a significant increase in the likelihood of being insured for all wealth groups: Middle (0.004), Richer (0.006), and Richest (0.007). But for the regional variable Rural residence does not significantly affect insurance likelihood for women in any wealth group like the male case.

Now for the Provinces, being in KPK, is associated with a significant decrease in insurance likelihood for the Richest group (-0.004), while being in GB is associated with a significant increase for all groups (0.019, 0.022, 0.024) shows a different contrast. Again GB is standing

out from the group because of the social developed led through interventions by the NGOs. Especially for females case it has been effective as the males case didn't show these results.

Having a family size between 11-20 is associated with a significant decrease in insurance likelihood for the Richer group (-0.002), but no significant effects for the other groups. Which is the same in case of number of children, as it does not significantly affect insurance likelihood for women in any wealth group.

Now the use of Internet within the last 12 months for women is different from male because here it is associated with a significant increase in insurance likelihood for the Richer group (0.003) and the Richest group (0.009), but no significant effect for the Middle group.

On the other hand, being employed is associated with a significant decrease in insurance likelihood for women in all wealth groups (Middle: -0.004, Richer: -0.004, Richest: -0.004), though not significant for the Richest group. Being a professional is associated with a significant increase in insurance likelihood for the Middle and Richer groups (0.019, 0.027), but not for the Richest group. Lastly higher levels of education are associated with significant increases in insurance likelihood for all wealth groups: Middle (0.006), Richer (0.008), and Richest (0.013).

After looking into the results and considering the literature determining factors like Age, Province and education seems more important. Age group influences health purchase decision because at different life stages comes with different health and care needs. Plus, in old age people become fragile and hence they have more probability to become sick. Hence, they prefer to purchase health insurance at that stage of life. Secondly, education influence awareness and decision power especially regarding health. Also, people with higher education can better understand the importance of health insurance coverage. Then Province is another important factor that can affect health insurance purchase decision because besides socio economic factors every province has different health facilities, health care infrastructure, cultural values and norms etc. In addition, these factors were consistently found significant in our models. And we have evidence in literature too that these factors play a vital role in insurance purchase decisions. For example, in case of countries like Kenya<sup>42</sup> where we have evidence that among all other demographic and socio-economic determinates, household's education, age and place

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<sup>42</sup> Kimani, J. K., Ettarh, R., Warren, C., & Bellows, B. (2014). Determinants of health insurance ownership among women in Kenya: evidence from the 2008–09 Kenya demographic and health survey. *International journal for equity in health*, 13, 1-8.

of residence does influence health insurance coverage. Also, we found same results for Ghana<sup>43</sup>, where higher educated people, older people are more likely to have insurance and geographic location does influence the insurance decision. While in both Kenya and Ghana, rural/urban residence and family composition also plays a significant role in purchasing health insurance but on the contrary in our case, these two are not playing significant role in Pakistan.

#### 4.6.2 Heterogeneity Analysis

We have also checked heterogeneity across urban/rural, provinces and occupations. We have checked heterogeneity on individuals' sample that belong to at Richest wealth threshold. Because those who lie in the middle and richer are already included in the richest threshold. Also due to the low number of observations, most of the variables were not estimable in middle and richer threshold.

#### Heterogeneity analysis: Rural/Urban

Variables	Urban	Rural	Rural	Urban
Dependent Var: Insured	Men	Men	Women	Women
<b>Age</b>				
Between 15-30				
Between 31-49	0.024**	0.018**	0.008***	
	(0.011)	(0.008)	(0.003)	
<b>Province</b>				
Punjab				
Sindh	-0.008	-0.028**	-0.001	
	(0.016)	(0.011)	(0.003)	
KPK	-0.013	-0.028**	-0.001**	
	(0.015)	(0.012)	(0.003)	
Balochistan	-0.002	-0.015		
	(0.018)	(0.019)		
GB	-0.008	-0.022	0.014***	
	(0.022)	(0.013)	(0.005)	
ICT	-0.006	-0.020		
	(0.017)	(0.017)		
AJK	0.00	-0.013	-0.005	
	(0.019)	(0.019)	(0.001)	
FATA				
<b>Family Size</b>				
Between 1-10				
Between 11-20	0.024		-0.001	
	(0.027)		(0.002)	

<sup>43</sup> Salari, P., Akweongo, P., Aikins, M., & Tediosi, F. (2019). Determinants of health insurance enrolment in Ghana: evidence from three national household surveys. *Health policy and planning, 34*(8), 582-594.

Between 21-40		0.054	
		(0.056)	
<b>Number of Children</b>			
Between 0-4			
Between 5-8	0.049	0.005	-0.001
	(0.032)	(0.012)	(0.002)
Between 9-13	0.000	0.084	0.001
	(0.024)	(0.079)	(0.006)
<b>Use of Internet</b>			
No			
Yes, within last 12 months	0.002	0.024	0.013***
	(0.015)	(0.019)	(0.005)
Yes before last 12 months		0.065	
		(0.074)	
<b>Employment</b>			
No			
Yes		-0.059	-0.005*
		(0.050)	(0.003)
<b>Occupation</b>			
Not working			
Professional		0.029	0.036
		(0.028)	(0.024)
Agriculture		-0.004	0.015
		(0.020)	(0.014)
Skilled manual		0.015	
		(0.025)	
Unskilled		-0.001	
		(0.021)	
<b>Education</b>			
No Education			
Primary	0.028	0.007	0.007*
	(0.018)	(0.015)	(0.004)
Secondary	0.012	-0.007	0.004*
	(0.014)	(0.013)	(0.012)
Higher	0.023	0.005	0.013***
	(0.018)	(0.018)	(0.004)

---

<b>Observations</b>	1103	1051	4762
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Standard error in parentheses and coefficients are marginal effect dy/dx  
\*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

**Table 30: Heterogeneity analysis Rural Urban<sup>44</sup>**

For the first case of heterogeneity analysis based on rural and urban categorization has different results for male and female in each case and across the categorization of rural and urban. For the ages 31-49, there's a significant increase in the likelihood of being insured for men in urban

<sup>44</sup> Missing values represent not estimable values

areas (0.024) and women in both urban (0.018) and rural (0.008) areas. Which in case of different provinces did have different effects on insurance likelihood across different groups, with some provinces showing significant effects for men and women in urban and rural settings. But in case of family Size variable for the case of between 11-20 is associated with a significant increase in insurance likelihood for men in urban areas (0.024), but not significant for other groups.

Number of children does not significantly affect insurance likelihood for men in urban areas, while for women, having between 5-8 children is associated with a significant increase in insurance likelihood in urban areas (0.024). While using the internet within the last 12 months is associated with a significant increase in insurance likelihood for women in rural areas (0.013), but not significant for other groups. Being employed is associated with a significant decrease in insurance likelihood for women in urban areas (-0.005), but not significant for other groups. Occupationally speaking a professional is associated with a significant increase in insurance likelihood for men in urban areas (0.029), while not significant for other groups. And for higher levels of education are associated with significant increases in insurance likelihood for women in urban areas (0.007), but not significant for other groups.

#### Heterogeneity analysis: Province wise

Variables	Punjab	Sindh	Punjab	Sindh
Dependent Var: Insured		Men	Women	
<b>Age</b>				
Between 15-30				
Between 31-49	0.031***	0.014	0.012**	
	(0.011)	(0.012)	(0.006)	
<b>Region</b>				
Urban				
Rural	0.016	-0.027	0.004	
	(0.012)	(0.022)	(0.005)	
<b>Family Size</b>				
Between 1-10				
Between 11-20	0.007	-0.002	0.000	
	(0.024)	(0.020)	(0.005)	
Between 21-40				
<b>Number of Children</b>				
Between 0-4				
Between 5-8	0.026	0.135	0.003	

	(0.019)	(0.082)	(0.009)
Between 9-13			
<b>Use of Internet</b>			
No			
Yes, within last 12 months	0.002	0.045	0.013**
	(0.017)	(0.033)	(0.006)
Yes before last 12 months			
<b>Employment</b>			
No			
Yes	-0.238		-0.012**
	(0.164)		(0.005)
<b>Occupation</b>			
Not working			
Professional	0.072		0.077
	(0.042)		(0.051)
Agriculture	-0.003		0.050
	(0.013)		(0.049)
Skilled manual	0.053**		
	(0.025)		
Unskilled	0.002		
	(0.015)		
<b>Education</b>			
No Education			
Primary	0.021		
	(0.020)		
Secondary	-0.002		
	(0.015)		
Higher	-0.005	0.000	
	(0.020)	(0.038)	
-----			
<b>Observations</b>	619	241	1603
-----			

Standard error in parentheses and coefficients are marginal effect  $dy/dx$   
 \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .



## Heterogeneity analysis: Province wise

Variables	KPK	Balochistan	KPK	Balochistan
Dependent Var: Insured	Men		Women	
<b>Age</b>				
Between 15-30				
Between 31-49		-0.404**		
		(0.206)		
<b>Region</b>				
Urban				
Rural		-0.050		
		(0.192)		
<b>Family Size</b>				
Between 1-10				
Between 11-20	0.012	0.146		
	(0.075)	(0.234)		
Between 21-40				
<b>Number of Children</b>				
Between 0-4				
Between 5-8	0.006	0.289		
	(0.046)	(0.287)		
Between 9-13				
<b>Use of Internet</b>				
No				
Yes, within last 12 months	-0.045			
	(0.039)			
Yes before last 12 months				
<b>Employment</b>				
No				
Yes				
<b>Occupation</b>				
Not working				
Professional				
Agriculture				
Skilled manual				
Unskilled				
<b>Education</b>				
No Education				
Primary				

Secondary

Higher

---

<b>Observations</b>	46	28	2
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Standard error in parentheses and coefficients are marginal effect dy/dx  
 \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

**Table 31: Heterogeneity analysis province wise**

In case of provincial heterogeneity analysis was performed. Except for the Punjab rest of the provinces didn't show much difference, even in that case also only the age group (31-49) significantly differed from the group 15-30 for both men and woman case.

**Heterogeneity analysis: Occupation wise**

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<b>Variables</b>	<b>Professional Men</b>	<b>Agriculture Men</b>	<b>Professional Women</b>	<b>Agriculture Women</b>
<b>Dependent Var: Insured</b>				
<hr/>				
<b>Age</b>				
Between 15-30				
Between 31-49	0.048** (0.021)	0.013** (0.007)	0.031 (0.044)	
<b>Region</b>				
Urban				
Rural	0.019 (0.031)	0.003 (0.008)	0.063 (0.052)	
<b>Family Size</b>				
Between 1-10				
Between 11-20	-0.052*** (0.033)		-0.018 (0.059)	
Between 21-40	0.033 (0.090)			
<b>Number of Children</b>				
Between 0-4				
Between 5-8	0.142** (0.065)	0.009 (0.010)		
Between 9-13	0.309 (0.221)			
<b>Use of Internet</b>				
No				
Yes, within last 12 months	0.063*** (0.024)	0.027 (0.037)	0.203*** (0.031)	
Yes before last 12 months	0.188 (0.135)			

**Employment**

No  
Yes

**Province**

Punjab  
Sindh

0.033 -0.002 0.082  
(0.042) (0.005) (0.097)

KPK

-0.014 0.042  
(0.031) (0.092)

Balochistan

-0.001 0.010  
(0.041) (0.011)

GB

0.012 0.339  
(0.040) (0.060)\*\*\*

ICT

0.022 -0.011  
(0.044) (0.048)

AJK

0.027 0.382 -0.022  
(0.040) (0.260) (0.042)

FATA

**Education**

No Education

Primary

0.011  
(0.010)

Secondary

Higher

0.012  
(0.010)

---

**Observations**

524 278 225 3

---

Standard error in parentheses and coefficients are marginal effect  $dy/dx$

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

**Table 32: Heterogeneity analysis Occupation wise**

Lastly the heterogeneity analysis was carried out using the occupational lense for men and woman. The results did show significant difference for those men working in professional occupations vs. the agriculture. However, for the female case information on agriculture-based workers was not available.

**4.7 Conclusion and Policy Recommendations**

Pakistan is faced with a high incidence of OOP (out of pocket) health expenditures. This would further increase in case of the rural side of Pakistan as public sector coverage for health is less and insufficiently funded. These OOP expenditures become catastrophic in case of the poor segments of the society. It also shows the inadequacy of system support in developing countries

like Pakistan; in the absence of Health Insurance main responsibility falls on the government to manage it by taxing and providing necessary services. Pakistan has an underdeveloped Health Insurance sector. The coverage is very small and that too is limited mostly to employer financed basis insurance protection. There is no motivation to top-up employer-based insurance coverage. The recent DHS shows that only 5.39% of men were insured. Among them employer based 0.98%, self-basis 1.95% and social security 1.63%. Further women coverage was almost non-existent (1.77%). There could be various factors responsible for limited insurance coverage in Pakistan but in current study we are discussing the socio-economic factors only.

We have used Probit regression to see if these socio-economic factors have a crucial role in insurance purchase decision. Results have shown that some factors like region, number of children, working status and Occupation are not found significant enough to affect consumer's decision. While rest of the factors like age, province, family size, education, internet usage and wealth showed up as significant determinants to influence health insurance purchase decision. Heterogeneity analysis was also performed to check the robustness of the results.

Irrespective of the significant level, results for provinces dummy are found significant for most of the provinces in both models. Similarly, in case of results for the education are also significant only for Higher education for women only. Likewise, wealth index is found significant too but only for men's model. The variable 'gender' is found to be significant in the pooled model. When we look at the heterogeneity analysis then results seemed to be quite robust. So the results of the study can assist policy makers while designing and formulating the social security or national insurance system. They can think about focusing on the factors that are found significant in the study and use these for pushing forward a more health insured society.

#### **4.7.1 Policy Recommendation and future work**

1. In Pakistan, usually the insurance programs are rolled out either province wise or district wise. So, Research at provincial/district level is required to analyze how these factors influence the purchase decision.
2. More factors can be incorporated in the future studies for example out of pocket expenditures, illness of household, awareness about insurance programs, health status, quality of health service etc.
3. Our results propose that the government should launch some health insurance awareness programs to educate people about its importance and benefits. It would raise the probability of acquiring health insurance for those at least who can afford it.

4. There is very little penetration of insurance sector in households' health decision. Health markets need to be broadened from pure service delivery to health financing markets as well. This will help increase access and manage the catastrophic oops.

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## APPENDIX

Variables	Men	Women
<b>Dependent Var: Insured</b>		
<b>Age</b>		
Between 15-30		
Between 31-49	0.023*	0.006*
	(2.34)	(2.35)
<b>Region</b>		
Urban		
Rural	0.010	-0.003
	(1.04)	(-1.12)
<b>Province</b>		
Punjab		
Sindh	-0.025*	-0.006*
	(-2.25)	(-2.21)
KPK	-0.027*	0.023***
	(-2.39)	(4.92)
Balochistan	-0.002	-0.008**
	(-0.18)	(-2.90)
GB	0.140***	0.045***
	(4.01)	(5.41)
ICT	-0.03**	0.003
	(-2.83)	(0.89)
AJK	0.049*	0.003
	(2.55)	(0.87)
FATA	-0.007	-0.008*
	(-0.32)	(-2.52)
<b>Family Size</b>		
Between 1-10		
Between 11-20	-0.025**	-0.002
	(-2.92)	(-1.12)
Between 21-40	-0.007	-0.003
	(-0.29)	(-0.56)
<b>Number of Children</b>		
Between 0-4		
Between 5-8	0.0221	0.006
	(1.84)	(1.70)
Between 9-13	0.049	0.026*
	(1.06)	(1.97)
<b>Use of Internet</b>		
No		
Yes, within last 12 months	0.030**	0.021***
	(2.65)	(3.54)
Yes before last 12 months	-0.002	-0.006



	(-0.12)	(-0.82)
<b>Employment</b>		
No		
Yes	-0.006	0.011
	(-0.28)	(0.62)
<b>Occupation</b>		
Not working		
Professional	0.037	0.011
	(1.76)	(0.62)
Agriculture	0.003	-0.009
	(0.17)	(-1.32)
Skilled manual	0.021	-0.008
	(1.08)	(-1.13)
Unskilled	0.014	0.019
	(0.70)	(0.63)
<b>Education</b>		
No Education		
Primary	0.014	-0.000
	(0.90)	(-0.07)
Secondary	0.006	-0.004
	(0.46)	(-1.42)
Higher	0.019	0.012*
	(1.19)	(2.33)
<b>Wealth Index</b>		
Poorest		
Poorer	0.003	-0.001
	(0.41)	(-0.44)
Middle	0.028*	0.000*
	(2.43)	(0.20)
Richer	0.058***	0.003
	(3.63)	(0.61)
Richest	0.057**	-0.002
	(3.18)	(-0.44)

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<b>Observations</b>	2746	12458
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t statistics in parentheses and coefficients are marginal effect  $dy/dx$

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 33 Logit Regression**

Variables Dependent Var: Insured	Decision taker	
	respondent	Both
<b>Age</b>		
Between 15-30		
Between 31-49	0.0148 (1.30)	0.0278 (1.60)
<b>Region</b>		
Urban		
Rural	0.006 (0.48)	0.011 (0.60)
<b>Province</b>		
Punjab		
Sindh	-0.034* (-2.40)	-0.023 (-1.12)
KPK	-0.012 (-0.81)	-0.026 (-0.92)
Balochistan	0.025 (1.15)	-0.037 (-1.49)
GB	0.140*** (3.30)	0.129* (2.06)
ICT	-0.021 (-1.37)	-0.045* (-2.30)
AJK	0.051 (1.74)	0.081* (2.30)
FATA	0.003 (0.12)	-0.032 (-0.79)
<b>Family Size</b>		
Between 1-10		
Between 11-20	-0.025* (-2.27)	-0.029 (-1.57)
Between 21-40	0.008 (0.25)	0
<b>Number of Children</b>		
Between 0-4		
Between 5-8	0.004 (0.29)	0.035 (1.52)
Between 9-13	0.000 (0.01)	0.046 (0.48)
<b>Use of Internet</b>		
No		
Yes, within last 12 months	0.021 (1.44)	0.038 (1.83)
Yes before last 12 months	0	0.02 (0.54)
<b>Employment</b>		

No		
Yes	-0.026 (-0.72)	0.047 (1.61)
<b>Occupation</b>		
Not working		
Professional	0.043** (2.61)	-0.115 (-0.75)
Agriculture	0.040 (1.91)	-0.182 (-1.20)
Skilled manual	0.029 (1.76)	-0.129 (-0.86)
Unskilled	0.035* (2.00)	-0.158 (-1.05)
<b>Education</b>		
No Education		
Primary	0.010 (0.59)	0.021 (0.79)
Secondary	0.009 (0.69)	0.030 (1.29)
Higher	0.042 (1.76)	0.031 (1.08)
<b>Wealth Index</b>		
Poorest		
Poorer	0.004 (0.41)	-0.012 (-0.46)
Middle	0.030 (1.78)	0.010 (0.37)
Richer	0.054* (2.40)	0.032 (1.01)
Richest	0.062** (2.23)	0.038 (1.08)
-----		
<b>Observations</b>	1297	1043
-----		

t statistics in parentheses and coefficients are marginal effect dy/dx

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

**Table 34 Heterogeneity analysis for men**

<b>Variables</b>	<b>Decision taker</b>	
	<b>Both</b>	<b>Spouse</b>
<b>Dependent Var: Insured</b>		
-----		
<b>Age</b>		
Between 15-30		
Between 31-49	-0.000 (-0.04)	0.007 (1.82)
<b>Region</b>		
Urban		
Rural	-0.004 (-0.91)	-0.001 (-0.38)
<b>Province</b>		
Punjab		
Sindh	-0.010* (-2.16)	-0.015** (-2.77)
KPK	0.008 (0.90)	0.021** (2.69)
Balochistan	-0.008 (-1.21)	-0.015** (-2.83)
GB	0.094*** (4.72)	0.006 (0.76)
ICT	0.003 (0.45)	-0.009 (-1.11)
AJK	0.005 (0.72)	0.003 (0.39)
FATA	0	-0.015** (-2.81)
<b>Family Size</b>		
Between 1-10		
Between 11-20	-0.010* (-2.25)	0.004 (0.94)
Between 21-40	0	-0.004 (-0.63)
<b>Number of Children</b>		
Between 0-4		
Between 5-8	0.000 (0.11)	0.009 (1.90)
Between 9-13	0	0.020 (1.50)
<b>Use of Internet</b>		
No		
Yes, within last 12 months	0.019* (2.50)	0.017 (1.28)
Yes before last 12 months	0.000 (0.03)	0
<b>Employment</b>		
No		
Yes	-0.007	0.757

	(-0.54)	(0.03)
<b>Occupation</b>		
Not working		
Professional	0.057 (1.32)	-0.061 (-0.03)
Agriculture	0.035 (1.09)	0
Skilled manual	0.005 (0.26)	-0.063 (-0.03)
Unskilled	0	-0.058 (-0.03)
<b>Education</b>		
No Education		
Primary	0.009 (1.90)	-0.002 (-0.40)
Secondary	0.005 (0.80)	-0.008 (-1.89)
Higher	0.014 (1.70)	0.016 (1.47)
<b>Wealth Index</b>		
Poorest		
Poorer	-0.020* (-2.09)	0.005 (0.93)
Middle	-0.013 (-1.29)	-0.001 (-0.30)
Richer	0.001 (0.13)	0.002 (0.28)
Richest	0.002 (0.18)	-0.010 (-1.70)
-----		
<b>Observations</b>	4163	5293
-----		

t statistics in parentheses and coefficients are marginal effect dy/dx

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

**Table 35 Heterogeneity analysis for women**

**CHAPTER 5**  
**GENERAL CONCLUSION**

## 5.1 General Conclusion

It is a well-known fact that investment in health sector is crucial for an economy to fight against poverty, improve its health outcomes and to have economic stability. In developing countries, national health expenditures are inadequate. As a result, public is left with no option but to pay their medical expenses from their pocket, which are widely called out-of-pocket expenditures.

Specifically in case of Pakistan due to relatively low levels of government expenditures, out-of-pocket payments played a very large role in Pakistan. These stand at 65% (% of current health expenditures) of the total financing in 2017-2018, which is extremely high in global terms (Rizvi, 2021). As a matter of fact, these high OOP leads to financial burden on households and hence people face catastrophic health expenditures. The only way to curb these OOP health expenditures is to have health insurance coverage at national level. Health insurance can provide a solution as it has been prescribed as a vehicle for financial risk protection that provides safe access to effective and quality health care by making it affordable. This is why WHO encourages countries to achieve universal health coverage for all their citizens.

Health insurance refers to the payment approaches where the costs of healthcare are covered by insurance providers. Health insurance protects from unexpected and catastrophic cost of illness. Health insurance can protect people by reducing costs and provide safety in the face of unpredictable health expenditures.

## 5.2 Summary of results

There are massive Health Care Challenges across the globe with varying nature and complexities. However, it has been well recognized e.g. out of the Eight MDGs three focused on health. Even in the new frameworks of development like the SDGs these are given extreme importance. SDG 3 directly talks about health and all other goals are indirectly linked to better health. Countries across the globe are increasing expenditures to improve outcomes but still outcomes are not the same. Some are more efficient in approaching the health outcomes and some are less. Considering the importance of these productivity differences it was essential to see the drivers of health expenditures across countries for better understanding and possible policy framework. Therefore, in **chapter 2** we took a sample of 108 developing countries and including time period 2002-2021. As anticipated, determinants were found to effect health expenditures differently both in short run and long run. Income levels mattered the most in case

of inducing higher levels of health care expenditures. In long run school enrollment taken as a proxy of basic level of education effects health expenditures significantly and negatively. while Population of age 65 and above has positive and significant impact on health care cost in short run.

In **chapter 3** for the case study of Pakistan it was seen from the descriptive analysis that Catastrophic Health expenditure is an escalating issue in Pakistan where many people cannot afford health care services when these expenditures increase up to a certain level. In terms of the determinants of CHE result of our research show that individuals between age 34 to 65, KP province, people living in an urban area, Male HHH, Married HHH, Employed HHH, and individuals working as self-employed in the non-agricultural sector have high incidence to have CHE. On the other hand, people above age 60 years, individuals residing in Baluchistan, people living in a rural area, Female HHH, Unemployed HHH, Employer employing more than 10 persons have the least incidence to face CHE.

Specifically, the result of the Probit model shows that people between age 11 to 34, individuals above 65 years, individuals residing in rural areas, Educated HHH, people having livestock are significant and have more chances to suffer from CHE at these different thresholds. However, Divorced HHH and people living in KP have significant and more chances to get suffered at only a 10% threshold level. On the other hand, for people living in Baluchistan, Employer employing more than 10 persons and sharecroppers are significantly fewer chances to have CHE at these threshold levels. However, Employer employing less than 10 persons have significantly less chance to have CHE at only a 10% threshold level. Furthermore, KP is more likely to have CHE at a 10% threshold and less likely to have CHE at a 40% threshold. On the other side, Sindh significantly has more chance at the 10% threshold level and fewer chances to have CHE at the 25% and 40% threshold level.

The result of the quantile model showed the difference between households who have close to threshold health expenditures and those who are above in quantile references. The results show that in the case of the younger age group of 11-33 the household health expenditures reduce whereas for the higher age group it does not change significantly. This means the CHE does not significantly reduce after the mid-thirties.

Further health expenditures decrease if for households belonging to KP, Baluchistan, and Sindh as compared to Punjab, but the difference is highest for Sindh. Rural areas present a case with lesser household health expenditures as compared to urban. There was no difference in health



expenditures based on household head gender. However, in the case of Household head marital status, there are differences. Unmarried and widow/widower household head-based families have lesser expenditure as compared to married household head households. While in the case of the household head being divorced difference is insignificant for all quintiles.

Similarly, there is no significant difference with the household head being unemployed as compared to employed HHH for all quintiles. Almost similar results prevailed for Household head employment status in categories. Lastly in the case of a household head being uneducated vs. an educated household head the log of health expenditure decreases which may be a result of unattended medical conditions being lesser educated and lesser motivation to respond to a health issue.

Lastly **chapter 4** delves into the issue of insurance purchase decision it was observed that Pakistan is faced with a high incidence of OOP (out of pocket) health expenditures. This problem exacerbate in case of the rural side of Pakistan as public sector coverage for health is less and insufficiently funded. These OOP expenditures become catastrophic in case of the poor segments of the society. It also shows the inadequacy of system support in developing countries like Pakistan; in the absence of Health Insurance main responsibility falls on the government to manage it by taxing and providing necessary services. Pakistan has an underdeveloped Health Insurance sector. The coverage is very small and that too is limited mostly to employer financed basis insurance protection. There is no motivation to top-up employer-based insurance coverage. The recent PDHS shows that only 5.39% of men were insured. Among them employer based 0.98%, self-basis 1.95% and social security 1.63%. Further women coverage was almost non-existent (1.77%). There could be various factors responsible for limited insurance coverage in Pakistan but in current chapter we have discussed the socio-economic factors only.

Results of the study can assist policy makers while designing and formulating the social security or national insurance system. They can think about focusing on the factors that are found significant in the study and use these for pushing forward a more health insured society. Study used Probit regression to see if these socio-economic factors have a crucial role in insurance purchase decision. Results have shown that some factors like region, number of children, working status and Occupation are not found significant enough to affect consumer's decision. While rest of the factors like age, province, family size, education, internet usage and wealth showed up as significant determinants to influence health insurance purchase decision.

Irrespective of the significant level, results for provinces dummy are found significant for most of the provinces in both models. Similarly, in case of results for the education are also significant only for Higher education for women only. Likewise, wealth index is found significant too but only for men's model. The gender variable is found to be significant in the pooled model.

### **5.3 Policy Recommendations from the Thesis**

In order to achieve SDG targets related to health outcomes governments need to increase resource allocation as well as identify means for better, equitable and affordable Health Care Systems. Having said that policy prescription for developing countries could be to focus on it's the level of resource allocation and improvement in system such as better curriculum for preventive health care, investing more in research sector, accountability and supervision in institutions etc.

Specifically, for Pakistan the study recommends that:

- Given that, the Pakistan government's current spending on health is not sufficient. A sharp and immediate increase in health expenditures is recommended to achieve cost-effectiveness, efficiency, and equity in the health care system.
- Government should protect the poor from the health expenditure catastrophe but simultaneously it is also essential to protect non-poor or middle-income people from health expenditure shock. In this regard, some major reforms on health care financing and health policies are required to improve the efficiency and equity in the health care system of Pakistan.
- CHE is an emerging debate in Pakistan and the fact is that it can be overcome by providing health care protection. Catastrophic health expenditures call for an affordable health insurance mechanism or some small-scale health insurance programs to protect people against health expenditure catastrophe. So apart from health care financing policies, there should be legislation for health insurance in Pakistan. It will also pave the way to universal health coverage.
- The poor and even middle-income groups lack access to satisfactory health care services. It is, therefore, necessary to monitor the performance of public as well as private health care services.
- policymakers and public researchers should upgrade household survey instruments to better capture the household health spending e.g. some health insurance-related variables etc.

- Government should launch health insurance awareness programs to educate people about its importance and benefits. It would raise the probability of acquiring health insurance by those at least who can afford it.

#### **5.4 Limitation and Future Recommendations**

The current thesis can serve as a basis for possible future extensions and research. First of all, in chapter two since some variables were proxied to the best possible extent hence results may improve more if purpose-built data is collected. Also, there could be factors other than those mentioned in the study, that play significant role in driving health cost. For example, health insurance which was used in many studies, but it couldn't be included in this study due to data constraint. Secondly, in most of the developing countries data on health care expenditures are collected through survey so usual limitations to these holds. Also, An extension of our empirical work could also consist of looking for other instrumental variables. Then, in chapter three, there are few limitations of the study. First, the HIES data set used in this study only reports the direct health care cost of the households. It doesn't capture the payments paid by a third party. Secondly, some variables like Health insurance coverage, presence of a disabled person, HH member with chronic illness, etc. which were found significant in most previous studies were not available in the HIES dataset. Thirdly, some studies used the household capacity to pay method for the identification of CHE but a majority of the studies have used the same methodology (Out of pocket health expenditure method) to measure the presence of CHE in the households. Moreover, the current study used only the non-food expenditure approach. Because the incidence of households with CHE was higher in the non-food expenditure approach than the total expenditure approach. Other methodologies and approaches can be used for future work.

In Pakistan, usually the insurance programs are rolled out either province wise or district wise. So, Research at provincial/district level is required to analyze how these factors influence the purchase decision. In chapter 4 we have used few variables due to data constraint, but more factors can be incorporated in the future studies for example out of pocket expenditures, illness of household, awareness about insurance programs, health status, quality of health service etc.

**CHAPTER 6**  
**RESUME EXTENSIF EN FRANÇAIS**

## 6.1 Contexte

Les questions de santé dans les pays en développement sont une préoccupation majeure pour la santé mondiale. Ces pays sont souvent confrontés à une série de problèmes de santé étroitement liés à la pauvreté, au manque d'accès aux soins de santé et à l'insuffisance des infrastructures. Bien que les problèmes de santé spécifiques puissent varier d'une région à l'autre, certains thèmes communs prévalent dans les pays en développement.

S'attaquer aux problèmes de santé dans les pays en développement exige une approche multidimensionnelle. Il s'agit notamment d'accroître l'accès aux services de santé, d'améliorer l'assainissement et l'accès à l'eau potable, et de lutter contre la pauvreté et la malnutrition. De plus, il faut investir dans l'éducation et l'infrastructure pour s'assurer que les personnes disposent des connaissances et des ressources dont elles ont besoin pour faire des choix sains. Outre le financement, cet achat de services de santé est également l'un des principaux enjeux. En s'attaquant à ces problèmes, les résultats en matière de santé des habitants des pays en développement peuvent être améliorés et promouvoir l'équité en santé mondiale.

L'investissement dans le secteur de la santé peut conduire à un résultat bénéfique à long terme. Il est utile pour promouvoir les résultats en matière de santé, réduire la pauvreté et aider à stimuler la croissance économique. Malgré cela, les dépenses de santé publique sont restées squattées dans les pays émergents et l'ensemble du public n'a d'autre choix que de supporter les dépenses de santé de sa poche, qui a persisté comme principale source de financement de la santé. À l'échelle mondiale, 32 % des dépenses de santé étaient à la charge des patients en 2015. Parmi ceux-ci, l'Organisation mondiale de la santé estime que les dépenses personnelles consacrées aux établissements de soins de santé plongent 4100 millions de personnes dans la pauvreté chaque année. Cependant, près de 150 millions de personnes supportent des calamités monétaires dues aux dépenses de santé personnelles (OMS, 2015). Les dépenses de santé catastrophiques sont des coûts de soins de santé ou des dépenses personnelles qui dépassent un seuil bien défini de consommation globale ou de dépenses de consommation non alimentaire d'un ménage par an (Aregbeshola et Khan, 2018; Choi et coll., 2016).

En particulier dans le cas du Pakistan, en raison des niveaux relativement faibles des dépenses publiques, les paiements directs ont joué un rôle très important au Pakistan. Ceux-ci représentent 65% (% des dépenses de santé courantes) du financement total en 2017-2018, ce qui est extrêmement élevé en termes mondiaux (Rizvi, 2021). En fait, ces POO élevées entraînent un fardeau financier pour les ménages et, par conséquent, les gens sont confrontés à des dépenses de santé catastrophiques. La seule façon de réduire ces dépenses de santé OOP

est d'avoir une couverture d'assurance maladie au niveau national. L'assurance maladie peut fournir une solution car elle a été prescrite comme un véhicule de protection contre les risques financiers qui offre un accès sûr à des soins de santé efficaces et de qualité en les rendant abordables. C'est pourquoi l'OMS encourage les pays à parvenir à la couverture sanitaire universelle pour tous leurs citoyens.

L'assurance maladie fait référence aux approches de paiement où les coûts des soins de santé sont couverts par les fournisseurs d'assurance. L'assurance maladie protège contre les coûts imprévus et catastrophiques de la maladie. L'assurance maladie peut protéger les gens en réduisant les coûts et en assurant la sécurité face aux dépenses de santé imprévisibles.

## **6.2 Aperçu des chapitres**

Cette thèse comprend quatre chapitres et une conclusion générale. Le premier chapitre fournit une introduction générale sur les dépenses de santé et l'état de santé dans le monde. Il fournit également le contexte et la motivation de la thèse. Le chapitre deux souligne l'importance d'étudier les dépenses de santé et leurs déterminants dans les pays en développement, notamment au Pakistan. Ensuite, le chapitre trois propose un examen théorique et empirique pour identifier les facteurs pouvant conduire à des dépenses de santé catastrophiques au Pakistan. En outre, nous avons également discuté des déterminants socio-économiques qui influencent l'achat d'une assurance maladie au Pakistan au chapitre quatre.

C'est un fait bien connu que le bien-être économique d'un pays dépend fortement des résultats en matière de santé et du bien-être des personnes vivant dans ce pays. Parce qu'une population en bonne santé assure le bien-être économique d'un pays. Mais cette population en bonne santé a besoin de disponibilité et d'accessibilité aux établissements de santé à un coût raisonnable. Récemment, une forte croissance des dépenses de santé dans le monde a accru les préoccupations des décideurs et des chercheurs, en particulier dans les pays en développement. En raison de contraintes budgétaires, les pays en développement veulent toujours réduire leurs dépenses de santé, ce qui finit par augmenter les dépenses de santé à la charge des patients. Par conséquent, le financement de la santé est devenu un sujet brûlant qui intrigue les chercheurs pour qu'ils étudient davantage les tendances, les modèles et les déterminants des dépenses de santé.

Selon Poullier et al. (2002), les dépenses de santé sont très inégales dans le monde. Certaines régions, par exemple l'Amérique, qui ont moins de population, investissent un pourcentage vraiment plus élevé de leur PIB dans le secteur de la santé. D'autre part, certains pays asiatiques

ont une population plus élevée, mais ils dépensent beaucoup moins dans le secteur de la santé. De plus, les régions qui dépensent moins pour le secteur de la santé semblent avoir de meilleurs résultats en matière de santé que celles qui dépensent plus. Ce qui suggère clairement que ce n'est pas seulement le niveau des dépenses, mais il y a peut-être d'autres raisons ou facteurs qui peuvent conduire aux résultats souhaités en matière de santé. En fait, la littérature suggère que ces autres facteurs pourraient être des facteurs sociaux, démographiques, monétaires et institutionnels qui influent considérablement sur les dépenses de santé. Il est donc urgent d'explorer et d'étudier ces facteurs pour mieux comprendre la dynamique des modèles de dépenses de santé. À cet égard, le chapitre deux de la thèse étudie l'impact des facteurs potentiels (déterminants) sur les dépenses de santé dans les pays en développement. Ici, dans le chapitre deux, nous avons utilisé le revenu, le rapport coût-efficacité, le vieillissement de la population, l'éducation, l'espérance de vie, le chômage et les services médicaux, etc., pour voir comment ils affectent les dépenses de santé dans les pays en développement. Pour l'estimation, nous avons d'abord utilisé un modèle statique (effet fixe et aléatoire), puis un modèle dynamique (MGM) en utilisant le logarithme naturel des dépenses de santé par habitant comme variable dépendante et les variables indépendantes incluent la population âgée de 65 ans et plus, la scolarisation, les dépenses de R & D, l'efficacité du gouvernement, le PIB par habitant, le chômage, l'espérance de vie et le nombre de médecins pour 1000 personnes. Les données sont tirées des indicateurs du développement dans le monde (WDI) de la Banque mondiale et de 108 pays en développement pour les 20 dernières années (2002-2021). Les résultats montrent que le revenu est le facteur le plus important dans l'augmentation des dépenses de santé. Alors que l'éducation affecte les dépenses de santé de manière significative et négative. Cependant, la population âgée de 65 ans et plus a un impact significatif et positif sur les dépenses de santé.

Notre troisième chapitre porte sur les dépenses de santé catastrophiques et leurs déterminants au Pakistan. Le Pakistan, en tant que pays à revenu intermédiaire de la tranche inférieure, est toujours en mesure d'allouer environ 2% du PIB au secteur de la santé, ce qui est très faible parmi tous les pays de la région ainsi qu'en termes mondiaux. En raison du faible investissement du gouvernement dans le secteur de la santé, le public n'a pas d'autre choix que de payer les frais médicaux de sa poche. ce qui les pousse dans une détresse financière et leurs dépenses de santé deviennent catastrophiques. Ainsi, en raison du faible niveau des dépenses publiques, les dépenses à la charge des patients ont joué un rôle important au Pakistan à 65% (% des dépenses de santé courantes), ce qui est extrêmement élevé dans le contexte mondial,

où la moyenne est de 18,5% en 2015-2016. Le Pakistan, qui est un pays à revenu intermédiaire de la tranche inférieure et le 6ème pays le plus peuplé, est actuellement confronté à de nombreux défis socio-économiques tels que la pauvreté, le manque d'installations et d'infrastructures de santé, le chômage, l'analphabétisme, etc. qui affecte indéniablement la santé et le développement d'une nation. Les indicateurs de santé du Pakistan montrent un taux de croissance démographique élevé, une mortalité infantile élevée et une espérance de vie plus faible, et l'une des raisons potentielles est l'insuffisance des investissements dans le secteur de la santé et en raison de laquelle les gens sont confrontés à des dépenses de santé catastrophiques.

Dans le chapitre trois, nous avons discuté des dépenses de santé catastrophiques du Pakistan et exploré les facteurs qui peuvent rendre les ménages pakistanais plus vulnérables aux dépenses de santé catastrophiques. À cet égard, nous avons peu d'hypothèses de test; premièrement, il n'y a pas de relation significative entre l'éducation des chefs de famille et le fait d'avoir un CHE. Deuxièmement, il n'y a pas de relation significative entre le sexe des chefs de famille et le fait d'avoir CHE et troisièmement, il n'y a pas de relation significative entre la région (urbaine ou rurale) et le CHE. Pour tester ces hypothèses, nous utiliserons la méthodologie proposée par des études antérieures par exemple Wagstaff et Doorslaer (2003), Aregbeshola et Khan (2018), Cléopâtre et Eunice (2018), Attia-Konan et al. (2020). Selon cette méthodologie, les dépenses totales de santé (dépenses remboursables) en tant que ratio des dépenses non alimentaires doivent être considérées sur différents seuils (10%, 25%, 40%). Si les dépenses de santé sont supérieures à la valeur seuil, cela signifie que le ménage (HH) a fait face à des dépenses de santé catastrophiques. Une fois que le ménage est identifié comme subissant CHE en fonction de l'analyse du seuil, alors, à des fins d'estimation, le modèle Probit a été utilisé pour examiner la relation entre l'ECH et les déterminants. Les données proviennent de l'Enquête économique intégrée auprès des ménages (HIES) du Pakistan pour l'année 2015-2016 pour<sup>45</sup> 24 238 ménages. Il contient des informations sur les ménages, y compris l'éducation, le revenu, les dépenses de consommation et les dépenses de santé. La variable dépendante est un modèle nominal défini comme 1 pour l'occurrence de CHE dans le ménage et 0 autrement. Les variables indépendantes utilisées dans cette équation de régression Probit sont l'âge, la province, la région, le sexe du chef de ménage, l'état matrimonial HHH, l'emploi HHH et le niveau de scolarité HHH. Les résultats du modèle probit montrent que les personnes âgées de 11 à 34 ans, âgées de plus de 65 ans, instruites, vivant dans des zones rurales et ayant du bétail

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<sup>45</sup> Dernières données disponibles sur la consommation pour le Pakistan.



sont plus susceptibles de faire face au CHE. Alors que HHH qui sont divorcés et les personnes vivant dans KP ont plus de chances d'avoir CHE seulement à 10% seuil. Tandis que, pour les personnes vivant au Baloutchistan, les employeurs employant plus de 10 personnes et les métayers ont beaucoup moins de chances d'avoir CHE à ces niveaux seuils. Cependant, l'employeur employant moins de 10 personnes a beaucoup moins de chances d'avoir CHE à seulement un seuil de 10%. En outre, KP est plus susceptible d'avoir CHE à un seuil de 10% et moins susceptible d'avoir CHE à un seuil de 40%. De l'autre côté, le Sindh a beaucoup plus de chances au seuil de 10% et moins de chances d'avoir CHE au niveau de seuil de 25% et 40%.

De plus, nous avons également testé nos hypothèses en utilisant la régression quantile. Nous avons utilisé les 25e, 50e et 75e quantiles pour l'échantillon de ménages dont les dépenses de santé représentent plus de 10 % des dépenses non alimentaires. Dans la régression quantile, la variable dépendante était le logarithme des dépenses de santé, tandis que les mêmes variables indépendantes ont été utilisées. Le résultat du modèle quantile montre la différence entre les ménages qui ont des dépenses de santé proches du seuil et ceux qui sont au-dessus des références quantiles. Dans le cas des personnes âgées de 11 à 33 ans, les dépenses de santé des ménages diminuent, alors que pour le groupe d'âge supérieur, elles ne changent pas de manière significative. La différence de dépenses de santé entre le Pendjab et le Sindh est maximale. En outre, les dépenses de santé des ménages dans les zones rurales sont moindres que dans les zones urbaines. Les familles non mariées et veuves/veuves chefs de famille ont des dépenses moindres que les ménages mariés chefs de ménage. Alors que des résultats presque similaires prévalaient pour le statut d'emploi du chef de ménage dans les catégories. Enfin, dans le cas d'un chef de ménage non instruit par rapport à un chef de ménage instruit, le logarithme des dépenses de santé diminue.

Le chapitre quatre traite des déterminants socio-économiques qui influencent l'achat d'une assurance maladie au Pakistan. Le Pakistan, pays à revenu intermédiaire de la tranche inférieure, ne consacre que 1,2 % de <sup>46</sup> son PIB au secteur de la santé. Les dépenses annuelles par habitant (48,1 dollars) pour la santé au Pakistan sont également inférieures à celles de pays régionaux comme l'Inde (73 dollars) et le Bhoutan (103 dollars).<sup>47</sup> Il en résulte que le Pakistan obtient de piètres résultats par rapport à ses voisins régionaux en matière de santé et n'est même pas en mesure d'atteindre ses objectifs de développement.

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<sup>46</sup> Etude économique du Pakistan (2020-2021)

<sup>47</sup> Comptes nationaux de la santé (2017-18)

Comme on pouvait s'y attendre compte tenu des niveaux relativement faibles des dépenses publiques, les paiements directs sont d'environ 65%, ce qui est extrêmement élevé en termes globaux. En fait, ces POO élevées entraînent une charge financière pour les ménages et, par conséquent, les gens sont confrontés à des dépenses de santé catastrophiques (CHE). La seule façon d'éviter CHE est d'avoir une couverture d'assurance maladie. Au Pakistan, on trouve peu de recherches sur les soins de santé et parmi celles qui existent, l'accent est resté mis sur les dépenses de santé du gouvernement. Il y a encore une pénurie de recherches sur les associés de la demande d'assurance maladie au Pakistan. Le chapitre 4 a fourni des informations importantes sur les caractéristiques des ménages qui influencent la décision de souscrire une assurance maladie.

Dans le chapitre quatre, nous avons discuté et examiné les déterminants socio-économiques qui influencent l'achat d'une assurance maladie au Pakistan. Les objectifs spécifiques de l'étude sont les suivants :

- C. Étudiez les caractéristiques socio-économiques et démographiques qui influencent la décision d'achat d'une assurance maladie au Pakistan.
  - iv. Déterminer la relation entre les niveaux d'éducation et la décision d'achat d'assurance.
  - v. Évaluer le lien entre le patrimoine de l'individu et la décision d'achat d'assurance.
  - vi. Évaluer si le lieu de résidence (province) influe sur la décision de souscrire une assurance maladie.
- D. Évaluer le rôle du genre dans la décision d'achat d'assurance.

À cet égard, nous avons peu d'hypothèses de test.  $H_01$  : Il n'y a pas de relation significative entre les provinces et la décision d'achat d'assurance du particulier.  $H_02$  : Il n'y a pas de relation significative entre l'éducation et la décision d'achat d'assurance de l'individu.  $H_03$  : Il n'y a pas de relation significative entre l'indice de richesse de l'individu et sa décision d'achat d'assurance.  $H_04$ : Le genre ne joue aucun rôle dans la décision d'achat d'assurance.

Selon une étude de Jahangeer et Haq (2015), les gens doivent maximiser les résultats en matière de santé dans les limites des contraintes budgétaires, ce qui n'est possible qu'en présence d'une assurance maladie. L'assurance maladie est le seul moyen par lequel une personne peut bénéficier des services de santé et éviter des dépenses de santé inattendues et inabordables. Il est donc important de comprendre les facteurs clés qui peuvent influencer la décision d'achat d'assurance d'un individu. La littérature suggère que la richesse, l'état de santé, le niveau de

scolarité, l'âge, les comportements d'aversion au risque, l'information liée à la santé et les services de santé disponibles peuvent influencer sur ces décisions. À cet égard, nous utiliserons l'ensemble de données de l'Enquête démographique et de santé du Pakistan (PDHS) pour l'année 2017-18. La couverture d'assurance maladie est la variable dépendante avec des valeurs binaires a été utilisée comme variable dépendante. Alors que le niveau de scolarité, le nombre d'enfants, la taille de la famille, l'indice de richesse, l'utilisation d'Internet, la situation professionnelle et la région ont été utilisés comme variables indépendantes.

Pour l'analyse, nous avons utilisé une variable dépendante binaire codée comme 1 si le membre du ménage a une assurance maladie et zéro sinon. Cette consommation d'assurance maladie est fonction de plusieurs facteurs socio-économiques et démographiques du ménage tels que la région, l'âge, l'éducation, la taille de la famille, l'indice de richesse et le statut professionnel. Nous avons utilisé trois modèles dans l'étude. Le modèle 1 comprend un mannequin pour les hommes dont la couverture d'assurance maladie est une variable dépendante, ainsi que les variables explicatives mentionnées ci-dessus. Alors que le modèle 2 comprend une variable nominale pour les femmes ayant une couverture d'assurance maladie comme variable dépendante et les mêmes variables explicatives. L'étude a utilisé la régression Probit sur les deux modèles pour examiner l'impact de divers facteurs sur la décision d'achat d'assurance. Ensuite, pour accéder au rôle du genre dans la décision d'achat d'assurance, nous avons utilisé le modèle 3. Il comprend une variable nominale pour le sexe. Encore une fois, le modèle probit a été utilisé avec la couverture d'assurance maladie comme variable dépendante comme 1 lorsque la personne a une assurance maladie et 0 autrement. Alors que les variables indépendantes utilisées sont l'éducation, le nombre d'enfants, la taille de la famille, l'utilisation d'Internet, l'indice de richesse, le statut professionnel, la région, etc.

Les résultats suggèrent que certains facteurs tels que la région, le nombre d'enfants, le statut professionnel et la profession ne sont pas jugés suffisamment importants pour influencer sur la décision du consommateur. Alors que le reste des facteurs comme l'âge, la province, la taille de la famille, le niveau de scolarité, l'utilisation d'Internet et la richesse se sont révélés être des déterminants importants pour influencer la décision d'achat d'une assurance maladie.

Quel que soit le niveau significatif, les résultats pour les mannequins des provinces sont jugés significatifs pour la plupart des provinces dans les deux modèles. Ce qui signifie que nous devons rejeter notre hypothèse nulle 1 ( $H_01$ ) et accepter une hypothèse alternative. De même, dans le cas de résultats pour l'éducation ne sont également significatifs que pour l'enseignement

supérieur pour les femmes seulement. Par conséquent, nous rejetterons à nouveau notre hypothèse nulle 2 ( $H_02$ ) pour le modèle féminin. De même, l'indice de richesse est également significatif, mais uniquement pour le modèle masculin. Cela signifie que nous rejetterons l'hypothèse nulle 3 ( $H_03$ ) pour le modèle masculin et accepterons pour le modèle féminin. La variable « sexe » est jugée significative dans le modèle regroupé. Par conséquent, nous rejetterons notre hypothèse nulle 4 ( $H_04$ ) et accepterons l'hypothèse alternative.

### **6.3 Suggestions et implications politiques**

Afin d'atteindre les cibles des ODD liées aux résultats sanitaires, les gouvernements doivent augmenter l'allocation des ressources et identifier des moyens pour des systèmes de soins de santé meilleurs, équitables et abordables. Cela dit, la prescription politique pour les pays en développement pourrait être de se concentrer sur le niveau d'allocation des ressources et l'amélioration du système, comme un meilleur programme d'études pour les soins de santé préventifs, investir davantage dans le secteur de la recherche, la responsabilisation et la supervision dans les institutions, etc.

Mais plus précisément, pour le Pakistan, l'étude recommande que les dépenses actuelles du gouvernement pakistanais en matière de santé ne soient pas suffisantes. Une augmentation marquée et immédiate des dépenses de santé est recommandée pour atteindre la rentabilité, l'efficacité et l'équité dans le système de soins de santé. En outre, le gouvernement devrait protéger les pauvres de la catastrophe des dépenses de santé, mais il est également essentiel de protéger les personnes non pauvres ou à revenu intermédiaire contre le choc des dépenses de santé. À cet égard, des réformes majeures du financement et des politiques de santé sont nécessaires pour améliorer l'efficacité et l'équité du système de soins de santé du Pakistan.

Ensuite, dans le cas du chapitre trois, CHE est un débat émergent au Pakistan et le fait est qu'il peut être surmonté en fournissant une protection des soins de santé. Les dépenses de santé catastrophiques nécessitent un mécanisme d'assurance maladie abordable ou des programmes d'assurance maladie à petite échelle pour protéger les gens contre la catastrophe des dépenses de santé. Donc, en dehors des politiques de financement des soins de santé, il devrait y avoir une législation pour l'assurance maladie au Pakistan. Il ouvrira également la voie à la couverture sanitaire universelle. Pour le chapitre quatre, nous recommandons que les décideurs et les chercheurs publics améliorent les instruments d'enquête auprès des ménages afin de mieux saisir les dépenses de santé des ménages, par exemple, certaines variables liées à l'assurance maladie, etc. En outre, le gouvernement devrait lancer des programmes de

sensibilisation à l'assurance maladie pour éduquer les gens sur son importance et ses avantages. Cela augmenterait la probabilité d'acquiescer une assurance maladie par ceux qui peuvent au moins se le permettre.

#### **6.4 Limites et recommandations futures**

La thèse actuelle peut servir de base à d'éventuelles extensions et recherches futures. Tout d'abord, dans le chapitre deux, étant donné que certaines variables ont été regroupées dans la meilleure mesure possible, les résultats peuvent s'améliorer davantage si des données spécialement conçues sont recueillies. En outre, il pourrait y avoir des facteurs autres que ceux mentionnés dans l'étude, qui jouent un rôle important dans la conduite des coûts de santé. Par exemple, l'assurance maladie qui a été utilisée dans de nombreuses études, mais elle n'a pas pu être incluse dans cette étude en raison de contraintes de données. Deuxièmement, dans la plupart des pays en développement, les données sur les dépenses de santé sont recueillies au moyen d'enquêtes, de sorte que les limites habituelles de ces retenues sont limitées. En outre, une extension de notre travail empirique pourrait également consister à rechercher d'autres variables instrumentales. Ensuite, dans le chapitre trois, il y a peu de limites de l'étude. Premièrement, l'ensemble de données HIES utilisé dans cette étude ne rapporte que le coût direct des soins de santé des ménages. Il ne saisit pas les paiements payés par un tiers. Deuxièmement, certaines variables comme la couverture d'assurance maladie, la présence d'une personne handicapée, d'un membre HH atteint d'une maladie chronique, etc. qui se sont révélées significatives dans la plupart des études précédentes n'étaient pas disponibles dans l'ensemble de données HIES. Troisièmement, certaines études ont utilisé la méthode de la capacité de payer des ménages pour l'identification de l'ECH, mais la majorité des études ont utilisé la même méthodologie (méthode des dépenses de santé remboursables) pour mesurer la présence de l'ECH dans les ménages. En outre, la présente étude n'a utilisé que l'approche des dépenses non alimentaires. Parce que l'incidence des ménages atteints d'ECH était plus élevée dans l'approche des dépenses non alimentaires que dans l'approche des dépenses totales. D'autres méthodologies et approches peuvent être utilisées pour les travaux futurs.

Au Pakistan, les programmes d'assurance sont généralement mis en œuvre par province ou par district. Des recherches au niveau provincial / district sont donc nécessaires pour analyser comment ces facteurs influencent la décision d'achat. Dans le chapitre 4, nous avons utilisé peu de variables en raison de la contrainte des données, mais d'autres facteurs peuvent être incorporés dans les études futures, par exemple les dépenses personnelles, la maladie du

ménage, la connaissance des programmes d'assurance, l'état de santé, la qualité des services de santé, etc.