The London School of Economics and Political Science

Economic Status and Access to Health Care: An Empirical Study of Egypt and Lebanon

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A thesis submitted to the Department of Social Policy of the London School of Economics for the degree of Doctor of Philosophy, London

2009

Declaration

I certify that the thesis I have presented for examination for the MPhil/PhD degree of the London School of Economics and Political Science is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it).

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Abstract

Economic equality in health care continues to be a policy objective that is difficult to achieve in many countries. The aim of this thesis is to examine the effect of income level and health insurance status on the use of different health services in two contrasting funding systems, using the cases of Egypt and Lebanon. Although these countries share some similarities, they differ from one another with respect to income per capita and public financing systems. Due to these differences, it is hypothesised that the nature of economic barriers to access differs in each country. Methods used to examine the research question include descriptive and multivariate analyses of cross-sectional household survey data from the 2001 Multi-Country Survey Study, a survey conducted by the World Health Organization.

Results from the analyses indicate that Egyptian respondents were more likely to use health services than their Lebanese counterparts, all other factors held equal. This result was especially evident in the case of outpatient care. Having a higher income level and health insurance were each associated with a greater likelihood of using health services, particularly for outpatient services as compared to inpatient services. These effects were also more pronounced in Lebanon. Lower-income groups tended to report worse health levels and higher out-of-pocket payments for health care as a share of income than did higher-income groups. Greater socioeconomic disparities in health were also found in Lebanon than in Egypt. This study shows that greater attention should be paid to the role of social safety nets in reducing inequalities, particularly for outpatient care.

Acknowledgements

I sincerely thank all who lent their time, effort and support in helping me prepare this thesis. I am deeply grateful to my supervisor and mentor, Professor Martin Knapp, whose guidance and insight have been invaluable. Many thanks go to Dr. Jose-Luis Fernandez, my secondary supervisor, for providing helpful comments and suggestions and to Ms. Nirmala Naidoo for facilitating use of the data from the World Health Organization. I appreciate the generous support provided by the Department of Social Policy and the LSE Research Studentship Scheme at the London School of Economics and Political Science, as well as Professors Julian Le Grand, Alistair McGuire, David Piachaud, Dr. Panos Kanavos, Dr. Steven Morris and Ms. Anji Mehta. I am indebted to my brothers, and, most of all, to my mother and father, whose love, inspiration and encouragement along every step of the way made the journey possible.

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Chapter 1. Introduction

'What doubtless remained longer than leprosy... was the meaning of his exclusion.'

Michel Foucault (1961)

1.1. Study context

Emerging studies on income inequality point to a paradox. Despite economic progress, social inequalities such as disparities in wealth and health appear to be widening in many countries (Coburn, 2003). In the case of health, various economic barriers to accessing health care services may exist, such as a low ability to pay and a lack of access to safety nets. This thesis examines the relationship between economic status and the utilisation of health care services in countries with different types of social safety nets for health care. In so doing, the thesis explores the reliance on ability to pay in countries with differing state involvement in financing health services.

Debates exist regarding the question of the role of the state in health care organisation, financing and delivery. These debates relate to the type of financing that should be adopted, which services should be funded by the state, and for which groups of society. Social values help to shape these debates, ultimately influencing the design of health financing policy. The main hypotheses of this thesis is that where health care financing is solidarity-oriented, socioeconomic status plays less of a role in accessing health care services as compared to the role it plays in *privately-oriented* systems; and that the effect of socioeconomic status on access to health care varies across different types of health care services.

How 'fair', or 'equitable', a system is depends on the eye of the beholder. Equity is not necessarily the same 'equality'. Whilst equality denotes identical components, 'equity' implies fairness, impartiality, justice, or 'even-handed dealing' (Le Grand, 1991; Merriam-Webster, 2006). Socio-cultural mores influence what is considered 'just' (Rawls, 1971; Amin, 2006), which is reflected in the area of health. These mores influence what aspect of health should be the aim of policy and how it ought to be distributed across different groups within society.

Equity may be defined as equal levels of health outcomes; but this definition is problematic since some illnesses may be due to complex factors, such as personal risky choices. Equity may mean the same *amount* of treatment provided to all; but this implies that a person with a headache and person with a broken leg both stay in hospital for several days. This thesis adopts the definition of equity as *horizontal equity,* defined as equal access for equal need. This definition refers to the extent to which people with the *same need* get the *same opportunity to access* health care, irrespective of one's ability to pay for health care (Le Grand et al, 1984; Guillford et al, 2002; Barr, 2004).

The relative policy importance of equity versus efficiency or choice can vary depending on social values, but inequity is of particular interest in this thesis due to its association with social, economic and moral concerns. Social unrest, including civil war, economic recession, and 'unhappiness', has been associated with both absolute deprivation and relative inequality (Justino, 2004; Layard, 2005; Biancotti and D'Alessio, 2008). Evidence suggests that inequity in health status as well as access to care exists in both high- and low-income countries (Baker and van der Gaag, 1993; Coburn, 2003; van Doorslaer et al, 2004; Knapp et al, 2006; Oliver et al, 2007). Equity in health can relate to different aspects of health care, such as the distribution of health outcomes, access to treatment, or out-of-pocket payments; it can mean discrimination based on geography, gender, age, or socioeconomic background (Knapp, 2007). This thesis is not necessarily concerned with a comparison of all definitions or types of equity. Rather, it explores *reasons why* economic inequity might exist, particularly reasons related to health financing systems.

The basis for how health care is financed is largely a value judgment. On the one hand, health care may be valued as a quasi-public good, even a right. In this case, services are largely covered through collective state financing. There are two general approaches to state financing: the Beveridge model, based on taxes and general governmental budgets; and the Bismarck model, based on compulsory, social health insurance (Abel-Smith, 1994). The market may be marginally involved, for example, in terms of incentive structures within financing or delivery systems (Titmuss, 1956; Goodin, 1988; Le

Grand, 1991; Klein and Millar, 1995). In general, ability-to-pay is thought to play a minor role where health care is seen as a public good.

On the other hand, health care may be perceived as a quasi-private good. In this case, the market assumes a dominant role in securing access to care (Walker, 1986; Barr, 2004). Examples are private health insurance and direct out-of-pocket payments. Private insurance may be either mandatory or voluntary, with the state playing a regulatory role (Thompson and Mossialos, 2007).

Demand- and supply-side incentives included in different financing mechanisms impact the nature of health care utilisation (Mossialos and Dixon, 2002). State-based systems have mainly been met with the criticisms that they restrict choice, reduce incentives for high quality of care, and can be inefficient depending on how resources are used (Le Grand, 1991; Giddens, 1998). Market-based systems have been criticised on the basis that they fail to allocate resources equitably in the case of health (Arrow, 1963; Le Grand et al, 1984; Kutzin, 2001).

The way the market fails has been used to justify intervention by the state. This is due to the nature of health as a 'commodity' that violates some of the assumptions of a well-functioning market. First, the demand for health care is highly uncertain. Second, information about health and health care is uneven between patient, provider and payors, leading to information assymetry. Third, the social benefit of health care can extend beyond the cost to the beneficiary, known as externalities. These factors have been associated with perverse incentives that can reduce equity and efficiency in health care, unless appropriate state-based interventions are adopted.

In general, tax-financed systems are considered to be more equitable than other systems, as people pay little or no fees at the point of use (Chernichovsky, 1995; Barr, 2004). Examples are health systems found in the United Kingdom and New Zealand (Barnett, 1984; Bloom, 2001; Muennig et al, 2005). Income and insurance tend to influence the chances of seeing doctors more than the chances of hospital admissions. This has been observed in several countries from the United Kingdom to Malaysia (Anderson and Benham, 1970; Anderson and Newman, 1973; Phelps, 1975; Heller, 1982; Ware et al, 1986; Walker, 1986; Van Doorslaer et al, 2004; Morris et al, 2005).

Whilst provider supply is an important factor, out-of-pocket payments for health care can be a barrier to use. Out-of-pocket payments can be official fees or informal payments. Research has shown that out-of-pocket payments can deter access and lower health status. Some of the most telling evidence comes from a longitudinal study in the United States, the Research and Development ('RAND') Health Insurance Experiment (Keeler, 1992). Similar findings have been found for maternal and mental health services internationally (Klavus and Häkkinen, 1996; Palmer et al, 2004; Ensor et al, 2005; Knapp et al, 2006).

Out-of-pocket payments can be a significant source of economic hardship, especially for the poorest of society (Gertler et al, 1984; Litvack and Bodart, 1993; Segall et al, 2002). Insurance tends to reduce the amount of out-of-pocket expenditure in some cases, particularly pharmaceutical expenditure (Kanavos and Gemmill, 2004). Several studies have shown that out-of-pocket payments for health care contribute to poverty. This has been observed throughout Asian countries (Grogan, 1995; O'Donnell et al, 2007; Lu et al, 2007; van Doorslaer et al, 2007).

Although health care is one of many factors that influence health (Marmot, 2005), the importance of health care is expected to grow. This has been attributed to the rising prevalence of chronic health conditions (Cockerham, 2001). These conditions tend to require regular, long-term care which can be complex (Fernandez and Knapp, 2004). The prevalence of chronic health conditions also tends to be higher amongst the worse-off in many societies, and this group is particularly vulnerable in health systems where access depends on ability-to-pay (Walker, 1986; Wiener, 2004; Knapp, 2007). The rapidly increasing prevalence of chronic conditions is cause for concern from an equity perspective.

Hence, economic status appears to pose as a barrier to access to health care services where there exists a high reliance on ability to pay as seen in many countries, yet relatively little evidence exists on the role of economic status in health care systems such as Egypt and Lebanon. Although both countries share social and health system similarities in general, the role of the state and the nature of social safety nets in health care differ between these countries. The Egyptian state plays a relatively large role in the financing and direct provision of health services. The Lebanese health sector relies relatively more on private financing and delivery of care. This thesis aims to compare empirical evidence on the economic determinants of utilisation for different health services from these two contrasting funding systems. Examining how economic status affects access to health care can help shed further light on alleviating barriers to health care in countries similar to Egypt and Lebanon.

1.2. Research questions

The main research question of this thesis is to evaluate the effect of income and health insurance on the utilisation of health services in Egypt and Lebanon, countries with contrasting financing and social safety net systems for health care. The probability of utilisation and the frequency of health care visits for different types of outpatient and inpatient health services are examined. To address this question, the thesis evaluates the following sub-research questions:

1. How are health need and out-of-pocket payments for health care distributed across income levels in different health financing systems?

2. What are the socioeconomic factors that determine the probability of being covered by social and private health insurance schemes?

3. To what extent do economic factors such as income level and health insurance coverage explain the use of various types of outpatient health services?

4. To what extent do economic factors such as income level and health insurance coverage explain the use of various types of hospital-based health services?

5. Based on the study findings regarding economic determinants of utilisation, what are the overall policy implications regarding the design of health financing systems towards the aim of alleviating disparities in access to health care?

6. For each of the research questions, how does the effect of income and insurance compare between Egypt and Lebanon and what are the specific policy implications for each of these two health systems?

The study adopts a quantitative approach. Economic models of the demand for health care are applied to household survey data on Egypt and Lebanon. Each of the countries was also visited in order to gather secondary material on the organisation, finance and delivery of health care. The study assesses how existing paradigms of economic determinants of health care apply to health systems similar to Egypt and Lebanon.

1.3. Thesis structure

This thesis is organised into eight chapters. Following the introductory chapter, *Chapter two* reviews the literature on the relationship between social status and health, particularly regarding the economic determinants of health care. The chapter is divided into two parts. The first part reviews the socio-medical and economic theory regarding the impact of socioeconomic status on the demand for health care. The second part assesses prior empirical evidence regarding the effect of socioeconomic factors on access to health care in different health systems.

Chapter three describes the methods used to examine the research questions. The chapter explains operational definitions for the main parameters of interest in the thesis; the choice of the case studies and their health care systems, with an emphasis on financing arrangements; the main data sources used to examine the research questions; variable specification; analytic methods; and data limitations of the study.

Chapter four presents results on the characteristics of the survey respondents and the determinants of health insurance. These results are based on analysis using *multivariate probit regression.* The meaning of social status is explored by examining the association between income and other socioeconomic characteristics. The chapter concludes with a discussion regarding health insurance and health care seeking behaviour across socioeconomic status.

Chapter five presents results on the income-related distribution of health and health care. These findings are based on three related techniques: (a) for a given indicator, the ratio between the highest- and lowest-income group; (b) the concentration index approach; and (c) the concentration curve approach. The health indicators that are analysed include: (i) health status indicators; (ii) outpatient and inpatient services; (iii) insurance coverage; and (iv) out-of-pocket payments for health care. The overall effect of out-of-pocket payments on poverty is shown. The chapter concludes with a discussion of equity patterns in each country.

Chapter six presents results on how economic factors influence the use of *outpatient* health services. The services that are examined are: (a) 'any' use of outpatient services; (b) general practitioner visits; (c) medical specialist visits; and (d) pharmacy visits. The chapter shows the determinants of the *probability* and the *intensity* of care, based on multivariate regression. The probability of accessing care is assessed using two types of regression models: (i) the probit model and (ii) the recursive bivariate probit model. Intensity was assessed using two types of count data models: (i) the zero-truncated negative binomial model, and (ii) the zero-inflated negative binomial model. The chapter concludes with a discussion of the economic barriers to outpatient care.[1]

Chapter seven explores the economic determinants of the use of *hospital-based* health services. This chapter examine the use of services provided through: (a) hospital outpatient units, and (b) hospital inpatient units. Similar to the structure of Chapter Six, the results explain the determinants of the probability and the intensity of health care utilisation. The chapter ends with a discussion of economic barriers to hospital care across and within each Egypt and Lebanon.

Chapter eight concludes the thesis by discussing the main implications of the results from a policy perspective. The chapter synthesises the main results of the thesis and places them within the context of each country. Implications for health financing policy are drawn towards the aim of equity in health care by considering wider political and economic factors relevant to the health systems found in Egypt and Lebanon. The chapter concludes with implications for future research and overall policy implications towards improving access to health care.

[1] An earlier version of chapters six and seven was presented at the 14th Annual Conference of the Economic Research Forum for the Arab Countries, Iran and Turkey, December 2007, and is available at: http://www.erf.org.eg/CMS/getFile.php?id=1115. A version of chapters six and seven is forthcoming in *Health Economics, Policy and Law*.

Chapter 2. Economic determinants of health care: a review

> To sustain quality social environments with diminished resources is a difficult task. It is possible that societies with high quality social capital will be better able to adjust than will fragmented individualistic societies. Societies that have a strong, coherent sense of what is important, and a collective will, will probably be most successful.
>
> (Frank and Mustard, 1994, pg. 15)

2.1. Introduction

The concept of equilibrium at a social and individual level represents the tension between social status and health. The ancient Greeks and Chinese viewed health as a state of equilibrium between man and environment (Cockerham, 2001). By linking the person's state of being to surrounding conditions, the ancients were the forerunners of social paradigms that relate the environment to well being. In this sense, social paradigms of health are not new, but they have evolved over time.

The theoretical framework for this thesis describes the relationship between socioeconomic factors and the demand for health care, defined as the use of services in this thesis (Anderson and Newman, 1973; Grossman, 1972; Wagstaff et al, 1991; Anderson, 1995; Pohlmeier and Ulrich, 1995; Marmot, 2005). The model for the framework is introduced in Figure 2.1 below and will be elaborated later in the chapter. The model starts by showing the role of social factors that may negatively affect health status. This in turn generates the need for health care, which may lead to the demand or use of health services.

As shown, the path between need and use is mediated by *economic factors*; these factors can *enable* or *bar* the use of services. To understand the model, chapter two provides a review of (i) the theoretical background to the social gradient in health and the role of the state; and (ii) the empirical evidence regarding the impact of income and insurance on health and the use of health services.

2.2. Theoretical framework

2.2.1. Definition of health

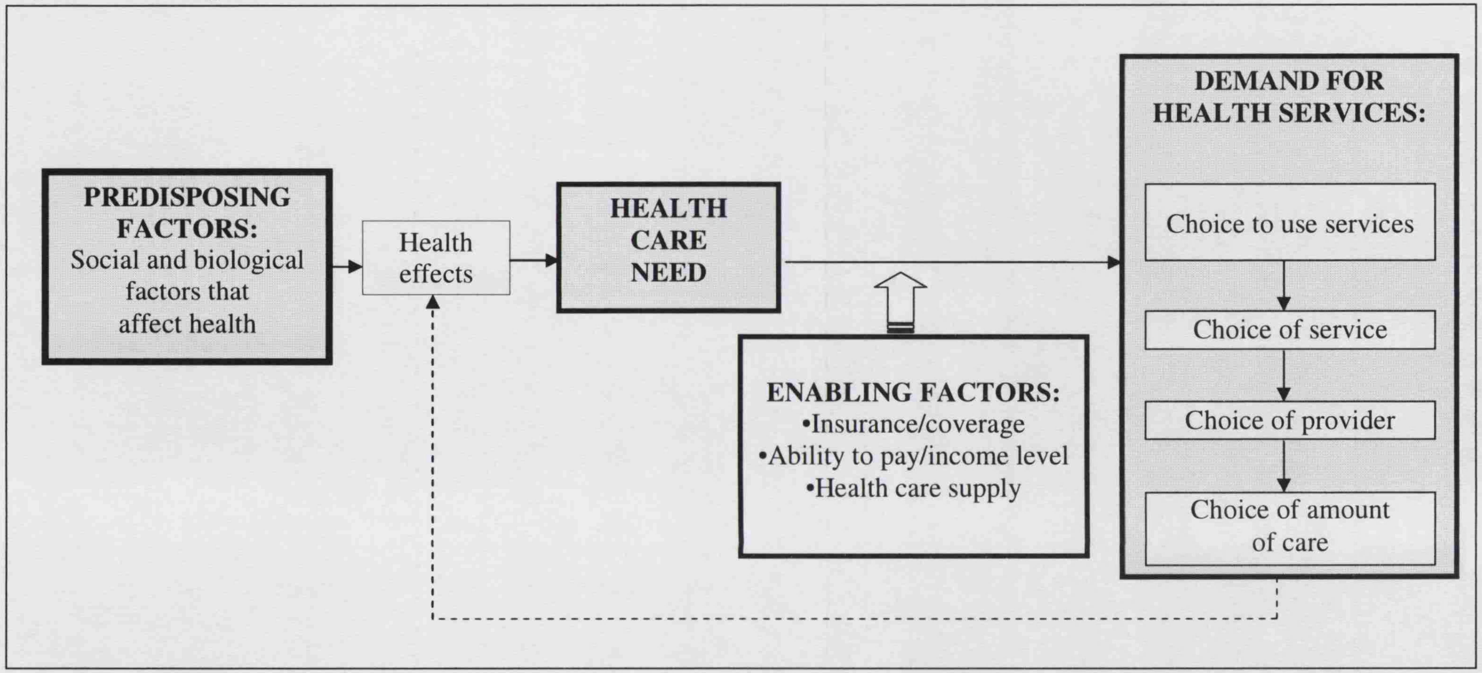
The concept of health as a state of equilibrium paves the way for examining the conditions that affect health status. With the advancement of modern medicine, an approach gradually emerged that emphasised the absence of disease as the definition of health, considered a 'negativist' approach (Leslie, 1980; Cockerham, 2001). For the better part of modern history, this approach has dominated notions of health, focusing on biomedical determinants of disease.

Relatively recent sociological paradigms broaden the range of influences on health, thus adopting the *positivist* approach. A positivist approach views health as the presence of human capital resources, such as overall well-being. For example, the equilibrium concept is evident in the World Health Organization's definition of health. Health is 'a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity' (Breslow, 1989; World Health Organization, 1948).

Such differing notions of health have influenced the nature of health promotion, and, ultimately, the path of health systems development. The holistic, social perspective of health is reflected in a multidimensional approach to health promotion. This approach was first described in late nineteenth century, Germany. In 1847, Rudolf Virchow, a German physician and anthropologist, recommended that 'prosperity, education, and liberty were the remedy to premature death' (Terris, 1992). A century later, the term 'health promotion' was probably first coined. Henry Sigerist, a Swiss medical historian, stated that 'health is promoted by providing a decent standard of living, good labour conditions, education, physical culture, means of rest and recreation'. Importantly, he further advocated for the 'coordinated efforts of statesmen, labour, industry, educators and physicians to this end' (Terris, 1992). In so doing, the recognition of the link between social conditions and health status was becoming clear.

Only in 1986 was the concept of health promotion that included the alleviation of social barriers formally acknowledged. The Ottawa Charter on Health Promotion in 1986 put forth that 'good health is a major resource for social, economic, and personal development and an important dimension for quality of life' (World Health Organization, 1986).

Figure 2.1 Conceptual model of health care utilisation



Sources: Based on Anderson and Newman, 1973, with additional elements adapted from Grossman, 1972; Wagstaff et al, 1991; Anderson, 1995; Pohlmeier and Ulrich, 1995; Marmot, 2005.

The Charter distinguishes between three approaches to health promotion. These include: (1) the biomedical approach, which focuses on diagnosing disease and treatment; (2) the lifestyle approach, which focuses on behavioural attitudes and individual education; and (3) the *socio-environmental approach*, which focuses on high-risk social and economic conditions and their alleviation (World Health Organization, 1986; Labonte, 1993; Raphael, 2000). The socio-environmental approach would be based in part on emerging evidence on the link between ill health and social status. While a number of theories exist regarding a vast array of determinants of health (Murray and Chen, 1993; Evans, 1994), this thesis focuses on the effect of socioeconomic status.

2.2.2. Definition of economic status

The understanding of economic status emerges out the sociological theory of social stratification. Contributions made by Max Weber in the early 1920s have helped to thrust social status at the forefront of health attainment. In his seminal work *Economy and Society* (1978), he defines social status and social class in terms of the 'lifestyle' concept (*Lebensstil* in the original German text). Weber does not consider 'Lifestyle' as a means to an end; rather, 'Lifestyle' is an issue of morality and social responsibility regarding the ethics of stratification (Abel and Cockerham, 1993).

Weber defines 'Lifestyle' as the combination of two concepts. On the one hand are 'life chances' (originally *Lebenschancen*), or class position, a term that entails one's *social conditions* which are largely structural, economic features that partly determine one's life course, such as income, norms, education, and occupational category (Weber, 1978; Abel and Cockerham, 1993).

On the other hand, 'life-conduct' *(Lebensführung)* entails *behaviours and choices* made by the individual, such as smoking habits, eating patterns, and other examples of self-conduct (Weber, 1978; Abel and Cockerham, 1993). Weber's theory has since been adapted to the concept of health lifestyles, where life chances represent the organisational and structural facets of society that influence health (Cockerham, 2001). Ultimately, lifestyles are determined by choices, which are dependent upon an individual's potential emanating from environmental conditions.

Weber's framework provides an important basis for examining structural inequalities that are related to economic deprivation and social exclusion. In this thesis, different types of economic characteristics are used to examine social inequality. Although measures of poverty and income levels are important indicators of social deprivation, they may not indicate the extent to which access to social services are hindered in all cases. A broader concept of social deprivation speaks to notions of social exclusion as described by Silver (1994) and Dean (2004). Whilst a thorough discussion of social exclusion is outside the scope of this thesis, it is important to note for conceptual purposes: inequity in access to social services may be rooted in multiple layers of social exclusion, beyond financial constraints.

Hence, broader notions of social exclusion and economic-inequality may reveal important causes of inequity. As Sen (2004) states, 'income-inequality' and 'economic-inequality' are not necessarily the same. Based on research from Asia, Brazil, and the United States, he suggests that 'inequality comparisons will yield very different results depending on whether we concentrate only on incomes or also on the impact of other economic and social influences on the quality of life' (Sen, 2004; pg. 65).

The concept of economic-inequality is closer to the spirit of Weber's framework than that of income-inequality, allowing a broader understanding of social stratification. Economic-inequality includes elements of social exclusion, such as unemployment, poor education, lack of access to social services, and poor quality of life. For example, income redistribution policies alone may not sufficiently compensate for poor health financing schemes in reducing inequities in access. The distinction is useful to evaluating the causal pathways to inequality and the efficacy of social policies designed to alleviate such disparities. Hence, economic status is in this thesis as both income level and health insurance status; employment status and educational level will be considered as secondary indicators of economic status.

2.2.3. Social gradient in health

Early British and American studies paved the way for research on the social gradient in health. These turn-of-the-century studies show that relatively lower social status is associated with higher rates of death. This observation seems to hold regardless of how 'social status' was defined. Although the methodology used in these early studies was descriptive and relatively basic by current standards, they represent important building blocks.

For example, Titmuss (1943) showed that infant mortality rates in 1911 were highest amongst the lowest occupational level, based on data from the United Kingdom's Registrar-General. Contrary to the belief that national economic progress alone could ameliorate the situation, his study suggested otherwise. For he also found that, not only did the inequality persist over a subsequent twenty-year period, but that the degree of inequality had *grown* by 1932. The striking issue is that although the supply of health services aimed at maternal and child support grew over this period, these services largely catered to the upper classes.

Similarly, Britten (1934) found that the excess mortality rates around the same period in the United States were higher for unskilled and lower-skilled workers than they were for professional workers. For some causes of death in 1930, the social differential in mortality was relatively greater in the United States than it was in England. These causes include cirrhosis of the liver, tuberculosis of the respiratory system, and diabetes, and to a lesser extent, pneumonia, accidents, suicide, cerebral haemorrhage, and nephritis. Notably, such causes also appear to be correlated with both living conditions and behaviours.

Indeed, the reverse was also observed: ill health *reduces* socioeconomic status. In one of the earliest studies to show this, Laughton (1948) assessed cross-sectional panel data for 1923 and 1943 from over 1,300 households from a survey study. Some households reported chronic conditions at neither time point, at one of the time points, or at both time points. 'Economic status' was defined using both reported income as well as asset information relevant at that time, such as taxable value of dwelling, type of employment, number of persons per room, sanitary conditions, and milk supply. The study found that those households that reported chronically ill members had lower socioeconomic levels. But it also showed that households whose socioeconomic status became lower over time were either: (i) initially ill and *remained* so, or (ii) were not ill but *became* so.

By the middle of the twentieth century, two things were becoming evident. First, being on the lower rungs of the socioeconomic ladder can be detrimental to one's health. But, second, falling ill can take one down the ladder even further.

The social gradient in health began receiving greater attention at a policy level in a few countries by the end of the 1970s, such as the United Kingdom. The Black Report, a government-commissioned inquiry into health inequalities in Britain published in 1980, was met with controversy but helped to raise political awareness of the concept of social status-driven inequalities (Townsend et al, 1992). The report found a similar social gradient in mortality as that observed in earlier studies, particularly for deaths due to respiratory illnesses. The report also suggested that the use of preventative services was concentrated amongst the better-off, defined as professional occupations, compared to manual or unskilled workers. These trends persisted into the early 1980s (Townsend et al, 1992).

Yet not until the mid-1980s was the link between social status and ill health to be *causally* established. The most telling example of the causal link would come from Marmot's evidence on the social gradient in mortality amongst British civil servants, based on the Whitehall I Study. Over a ten-year period during which a group of workers was followed, mortality and occupational ranking were inversely correlated (Marmot et al, 1984). This association existed for all causes of death examined, but the association was especially strong in the case of cardiovascular-related death. The Whitehall II Study provided further evidence of the way in which social factors work to influence morbidity (Marmot et al, 1991).

Owing in large part to studies such as the Whitehall study, the concept of the 'social determinants of health' has lent weight to the non-biological factors affecting health (Evans, 1994; Frank and Mustard, 1994). Marmot (2005) describes the social determinants of health as the environmental and social conditions that influence health. These determinants include the social gradient, stress, early life, social exclusion, work, unemployment, social support, social services, addiction, food and transport. The recognition and growing importance of the social determinants of health is evident in the World Health Organization's establishment of the 'Commission on Social Determinants of Health' (World Health Organization, 2005). Although it is difficult to accurately rank the influence of social factors, economic status captures the effect of many social factors simultaneously.

2.2.4. Relevance of chronic health conditions

With the rising prevalence of non-communicable chronic health conditions, the role of social determinants is expected to grow. This is particularly true for the role of health services (Cockerham, 2001; WHO, 2005; Boutayeb and Serghini, 2006; Adeyi et al, 2007). The social determinants framework is particularly relevant to the case of older individuals, lower-income groups, and those diagnosed with chronic health conditions.

Cockerham (2001) explains that medical sociology has assumed a more important role in explaining the prevention, onset, and course of diseases. This is due to the shift that has occurred over the past century in population health. The century has witnessed a shift from communicable and acute needs to a growing need to address non-communicable conditions. Some of the most important factors that have been linked to the prevention of chronic health conditions are societal and structural in nature (Graham and Reeder, 1979). These conditions include socioeconomic status, migration, cultural change, and behavioural patterns.

The burden of chronic health conditions extends beyond mortality. Disability due to chronic illness has implications for the broader society. The World Health Organization (2006a) estimates that the number of deaths attributed to chronic conditions will increase by 17% by 2015. Disability has been associated with poor self-assessed health, affecting older individuals and lower-income groups disproportionately (Sprangers et al, 2000; Molarius and Janson, 2002). Long-term conditions are not homogeneous in their perceived impact, but they generally require long-term, regular care. Although chronic conditions generally account for about 20% of the disease burden, these conditions account for over 70% of health care spending in many high-income countries (Yu et al, 2003). Much of this spending is due to end-stage treatment.

Enabling access to earlier, preventative treatment across social status is emerging as a policy priority in many countries, such as the United Kingdom (Department of Health, 2004; 2007). This commitment is evident by the establishment of (i) universal access to health services with a regulated general-practitioner gate-keeping system between primary and secondary/tertiary care; (ii) exemptions from pharmaceutical payments for vulnerable groups such as older persons, persons with long-term conditions, and lower-income groups; and (iii) National Service Frameworks for chronic conditions such as mental health, diabetes, and cardiovascular disease (Knapp et al, 2005). In this respect, the state plays a role in helping to overcome economic barriers to care, elaborated below.

2.2.5. Social justice and the welfare state

The importance of health is typically not a contentious issue amongst most policy-makers, but the extent of public investment in its promotion is the focus of great debate. Good health can be seen as an investment in human development, a means to progress. Whether such investment is promoted by the *state* is another issue. The way that social determinants of health are addressed at a national policy level depends on underlying social values regarding social justice and the role of the state.

The role of the state in the allocation of social goods such as health care can be assessed through a welfare state typology. 'Welfare state' refers to the state's involvement in the organisation, provision, and/or financing of social goods such as cash benefits, health care, education, food, housing, and other social services (Barr, 2004). The level of involvement varies widely, as does the meaning of the 'welfare state' and its impact on personal liberty (von Hayek, 1959).

The development of a welfare state reflects a given country's history, political institutions, and values; this means they are path-dependent to an extent (Esping-Andersen, 2000; Klein, 2001; Klein, 2003). Underlying the development of the welfare state is the underlying notion of citizenship, which has implications for how policy makers approach social policy (Marshall, 1950). How comprehensive a welfare state is depends on how the aim of social policy is defined. In selecting a social welfare function, Sen (1979, 2004) contends that there may be other principles of social judgement that require non-utility information, such as liberty, non-exploitation, and non-discrimination. Therefore, in designing redistributive policies, a broader understanding of deprivation is needed. This further supports the need to evaluate economic or social inequalities beyond income inequality.

Based on various notions of social justice, four main schools of thought regarding the aim of social policy can be demarcated. These are based on four approaches to distributive justice regarding the allocation of public goods. The <u>first</u> school of thought views the aim of policy as the maximisation of total welfare, known as the *utilitarian* approach, which forms the basis of economic theory on the subject (Barr, 2004). The central assumption of the utilitiarian school of thought concerns the notion of interpersonal comparability of utility, elaborated in detail outside of this thesis. Generally, the assumption is that the welfare gain from a given increase in a social good is the *same* for all members of society. However, many contend this assumption is inaccurate on theoretical and philosophical grounds, (Sen, 1979), lending support to the second school of thought in social policy.

The second school of thought is John Rawls' *justice-as-fairness* theory of social justice, characterised by Rawls' maximin-based theory of distribution, or the difference principle (Rawls, 1971; Freeman, 2007). This approach contrasts with the utilitarian school on the assumption of interpersonal comparability of utility (Rawls, 1971; Sen, 1979, 2004). Two main principles define the Rawlsian school of thought: (a) each person has an equal claim to basic liberties; and (b) the distribution of public goods and liberties should be such that they (i) provide equality of opportunity and (ii) satisfy the maximin criterion. In contrast with the utilitarian view that the benefits accrued from social goods are the same to all members of society, Rawls' formulated the maximin criterion as a test of whether social policy meets its aims. This criterion states that the optimal social welfare function is that which improves the welfare of the worst-off in any group.

The third and fourth schools of thought lie relatively outside the welfarist, or utilitarian, framework. These schools include the *libertarian* and *socialist* frameworks, respectively. Generally, the extra-welfarist approaches assume that the objective of social policy is the attainment of principles that may extend beyond utility-maximisation.

Libertarians value *individual freedom* and view state intervention as *morally corrupt* based on the role of the market espoused by Adam Smith (Esping-Anderson, 1989). By contrast, socialists adopt a collective perspective influenced largely by Marxist thinking on social classes and modes of production (Esping-Anderson, 1989; Barr, 2004). Hence, they largely advocate *egalitarianism* and social solidarity, although many versions of the socialist-Marxist approach exist (Barr, 2004). *Egalitarian* principles often emphasise *equality of opportunity*. This approach has influence the development of more progressive, intermediate models that represent the nexus of Rawlsian, libertarian, and egalitarian principles, known as *social democratic models*.

The political economy of various types of welfare states mirrors the spectrum of these four distributive schools of thought. The classic typology of the welfare state shows a spectrum of state intervention in welfare redistribution (Figure 2.2). This classification was introduced by Titmuss (1958, 1974), and distinguishes between three general types of intervention. On one side of the spectrum is relatively little intervention, known as the 'residual' welfare state. The next type is based on a system of earned benefits such as a social security system, known as the 'industrial achievement/performance' state. On the other end of the spectrum is the most comprehensive type of welfare state, offering a wide array of benefits largely on the basis of citizenship, known as the 'institutional redistributive' model.

Esping-Anderson (1989) would later develop a similar typology that emphasises the historical and political-economic path of development. Importantly, this typology combines economic principles of distributive justice with political concepts of collectivism and democracy. Looking at expenditure patterns for social services alone will fail to accurately describe the nature of the welfare state. Instead, a typology that captures the criteria for selecting beneficiaries, which services are financed, and how financing is arranged is more useful (Castles, 2004).

The first cluster proposed by Esping-Anderson represents the most conservative approach to social benefits, considered the 'liberal welfare state'. Benefits are provided through means-testing and relative modest transfers or social insurance. This model incorporates elements of Titmuss' 'residual' model and Rawls' maximin criterion; it encompasses the 'poor law tradition' in which those who are particularly deprived receive certain types of temporary provisions (Titmuss, 1974; Castles, 2004). The United States and, in some respects, Canada and Australia fall within this group, according to Esping-Anderson (1989). Here, some elements of Rawls' 'maximin' criterion are evident.

The second cluster is the 'corporatist-statist' welfare state, found in France, Germany, Italy, and Austria. Social stratification *per se* is not seen as the object of reform, but, rather, ensuring traditional family-oriented lifestyles and resources is the aim of social policy. This model is based on the 'industrial achievement-performance' scheme that Titmuss (1974) described, which emphasises the active participation of citizens in 'earning' social services. The corporatist model thus harks to the Bismarkian *social security* approach (Castles, 2004). Citizens are provided with *entitlements,* which are discrete in nature and often conditional upon employment.

The final type is generally the smallest cluster, considered the 'social-democratic' regime. Largely found in Scandinavia, the goals of social policy are considered to be universalism and 'de-commodifying social rights extended to new middle classes' (Esping-Anderson, 1989). The United Kingdom falls in this cluster to a degree, incorporating some aspects from the liberal model. The social-democratic regime model promotes equality to the greatest extent. It is similar to the Beveridge model, in which the role of the market is almost entirely absent from social provision.

The 'institutional redistributive' type that Titmuss (1974) proposed is closest to the social-democratic model. In these models, the state ensures that social benefits are accessible to all. In most parts of Scandinavia, the state system achieves this universalism to such a high standard that there is virtually no 'opting-out' by middle and upper classes due to a high satisfaction with the quality of services. By contrast, the British system includes regional variation in quality and a small, private health insurance market for those who are willing to pay for supplementary services or higher quality.

Figure 2.2 Typology of welfare states

	Liberal / Residual	**Conservative / Social Security**	**Social democratic / Statist**
Role of:			
• **Family**	Limited	Significant	Limited
• **Market**	Significant	Limited	Limited
• **State**	Limited	Supplementary	Significant
Social orientation of welfare state	Individual	Kinship / family Federalist	Universal solidarity
International archetypes	USA	Germany Italy France	Sweden UK

Sources: Titmuss, 1956; Esping-Anderson, 1990; Esping-Anderson, 2000, p.85; Castles, 2004.

2.2.6. Role of public financing

In terms of health services, a growing body of research has illustrated the importance of the role of the state in overcoming economic barriers to access. Navarro and Shi (2003) show through a cross-national analysis that 'political traditions more committed to redistributive policies (both economic and social)... were generally more successful in improving the health of populations' (p.195). The 1985 Bellagio conference on health highlighted a number of critical factors for health improvement. Amongst these were a *social welfare orientation* to development and a commitment to health as a *social goal*, as manifested in national policies within and outside of the health sector (Rosenfield, 1985). These factors have been echoed by Frank and Mustard (1994), Stevens (2001), Navarro and Shi (2003), and Knapp et al (2006). As Stevens (2001) states,

> Priority setting and rationing are not pure technical operations. The course and direction of these activities is influenced by the dominant belief system of a nation. Many European countries try to find ways to combine the values of equity, efficiency, and autonomy (Stevens, 2001, p. 161).

The societal perspective towards health largely defines the role of the state in financing the health system. On the one hand, society may value health as a private good akin to any other commodity, with the role of the state limited as far as health care. Left to the private domain, however, the market fails to deliver services efficiently at the technical, allocative, and equity levels for a variety of reasons. Fundamentally, the nature of health differs from other commodities that may be distributed by the market efficiently. It is associated with uncertainty of demand, information asymmetry between consumer and seller/provider, and externalities. These failings render the private market inefficient in the absence of some level of state intervention (Titmuss, 1963; Arrow, 1963; Le Grand and Robinson, 1976; Barr, 2004).

On the other hand, health may be viewed as a public good, with coverage of health care seen as the responsibility of the state. In this case, health care needs are met through collective provision in the interests of society (Titmuss, 1956; Barr, 2004). The state assumes the roles necessary to administering a functional and effective health care system. These may include any or all of the following: *financing*, *provision*, and *regulation* of health care services. The welfare state may be entirely comprehensive, or may include quasi- or mimic markets (Le Grand, 1991; Klein and Millar, 1995; Kutzin, 2001). In theory, the role played by ability to pay in accessing services varies with the nature of the public sector's role in health care as well as other factors. Ability to pay can be explored further within a behavioural framework that helps to explain the demand for health care.

2.2.7. Behavioural model of utilisation

Health care-seeking behaviour is defined as the interrelationships between various factors that influence 'access' to personal health services. The term 'access' to health services can be misleading. Depending on the purpose of measurement, 'access' can mean 'service availability', 'utilisation', 'effectiveness', and 'equity in use' (Guillford et al, 2002). Within the context of this thesis, access to health care is used to refer to utilisation, or the 'realised' access to health services. Health care seeking behaviour is viewed as the choice to use health services, resulting in access to care.

The role played by economic status in models of health care seeking behaviour has been represented in various ways. One of the most widely accepted and applied models of access to health services is the Anderson (1995) framework. The framework is generally considered to be robust yet simple in conceptualising the *nature* of decision-making in health service use.

Andersen's (1975) behavioural model of utilisation characterises the choice to use services as a function of three types of factors. These groups of factors include: (a) *predisposing factors*, or demographic characteristics, social structure and health beliefs; (b) enabling *factors*, or the ability to secure resources in order to access services; and (c) *medical need*, which can be perceived or evaluated (Anderson 1975; Anderson, 1995). Enabling factors can be viewed as components of the aforementioned 'socio-environmental approach', which includes factors such as income, health insurance systems, the distribution and availability of health care providers and treatments, and the prevailing health financing system.

An important contribution of the Anderson (1975) model is its recognition of way in which the relative importance of factors can change across the type of health service. For example, the effects of different factors have been found to vary depending on how discretionary the service is perceived by beneficiaries and providers. Previous research has found that acute, inpatient care is typically less influenced by enabling factors than is preventative, outpatient care (Anderson and Newman, 1973).

The *applicability* of the Anderson model to various social structures is critical to assess. 'Enabling factors' may be defined or behave differently across societies. The nature of social safety nets is one such critical factor that may increase or decrease the role of other enabling factors. Understanding the general political-economic basis for social safety nets will help to unravel broader causes and possible policy responses to structural inequalities.

2.2.8. Demand for health care

Economic models of health care demand provide a framework for measuring the impact of economic status on utilisation, described in greater detail in Chapter Three, 'Methods'. The modelling problem begins with a question: Is health is a *consequence* of factors, or is it *produced by investments*? This dichotomy parallels the dichotomy between the negativist and positivist approaches towards defining 'health'.

The choice between the two approaches depends on the perspective of the researcher. This thesis assumes the *investment approach.* This approach signifies a more active stance in addressing socio-economic conditions that may be modified through *policy.* As Mushkin (1962) states, the *health-as-investment* framework posits the demand for health care as a matter of building *human capital.* Good health comprises an important facet of human capital (Sen, 2001).

Whilst the ultimate outcome of interest is health, the demand for health is difficult to directly access, so proxy measures are used instead. This difficulty arises from its unobservable properties, or its *latent* nature: the demand for health is primarily observed indirectly through the need for health services (Culyer, 1976; Williams, 1978). Therefore, the demand for health care is a *derived* demand for health.

Grossman (1972) expanded the notion that health is a commodity that is *produced* by investments. Classic production theory describes output as a function of labour and capital (Estrin and Laidler, 1995). Grossman translates this concept to show that health ('output') is a function of investment ('labour') and an initial stock of health ('capital'). The choice to seek health and health care under constraints is then posited within an *intertemporal utility maximising function.* Here, an individual's total utility is a function of the utility derived from their inherited initial 'stock of health', the 'stock of health' *over time*, and the consumption of other commodities over time (Grossman, 1972).

Grossman's model can best be described as deterministic and dynamic (van Doorslaer, 1987). In other words, it does not explicitly account for uncertainty, but does take into account changes over time, respectively. Whilst such a description is important to note for conceptual purposes, the theoretical detail to the economic models is beyond the scope of this thesis. Central to Grossman's argument is the notion that the stock of health over time is *modifiable*, a matter of investment. Expressed algebraically, the stock of health in the *i*th time (H_i) is subject to the amount of investment in related goods in the period immediately preceding it:

$$H_{i+1} - H_i = I_i - \delta_i H_i, \quad \textbf{Equation 2.1}$$

where I_i is gross investment in health and δ_i is the rate of depreciation during the *i*th period.

Van Doorslaer (1987) describes a number of derivations of Grossman's model, which can be summarised as stochastic or deterministic, and may be static or dynamic. The 'multiple-indicators multiple-causes model' explicitly introduced the *latent property of health* (Jones and O'Donnell, 2002). In its simplest form, it describes health as unobservable and 'fully characterised by its causes and by its indicators' (van de Ven and Hooijmans, 1991). These 'causes and indicators' include morbidity, mortality, self-assessed health, and *the use of health services.*

Overall, the demand for health services is a function of enabling, predisposing, and medical factors that are context-specific. Three fundamental principles are relevant to understanding the nature of this demand. First, the demand for health care is a derived demand for health. Second, health is an uncertain and latent variable, represented by an array of indicators. Third, the production of health is a function of health status at a given time and other inputs such as medical care, income, education, environmental hazards, and other socio-economic determinants. The relative importance of social status, in turn, depends on the nature of the health system and the underlying welfare state, the subject of emerging empirical research.

2.3. Evidence

2.3.1. Effect of social status on health

Although this thesis focuses on access to health services, a brief look at some empirical research on health status shows important linkages to health services. The research reveals two important findings. First, health status appears to be associated with social status. Second, the relationship between social and health status is mediated by health care as well as numerous other factors. Although the *relative magnitude* of the influence of health care on health outcomes continues to stir debate, its role is nonetheless important.

As early as the 1920s was access to health care associated with better health. In the United Kingdom and the United States, higher income and coverage by some form of *health insurance* was correlated with lower mortality rates (Stevenson, 1923; Dublin, 1928). An individual's income level has been correlated with health status in a number of international studies (Deaton, 2002; Muennig et al, 2005b; Ross et al, 2006; Hernández-Quevedo et al, 2006).

The most telling evidence of the relationship between health insurance and health outcomes came several decades later in the first randomised, controlled trial. This trial was the Rand Health Insurance Experiment, conducted over five years in the United States, between 1977 and 1982 (Newhouse, 1993). The study randomised hundreds of families to different types of private health insurance plans. These plans ranged from those that did not charge any fees for accessing services, considered 'free care' plans, to those that charged high co-payments and included high deductibles. The study revealed that some health outcomes appeared to be worse amongst some individuals randomised to the co-payment plans, as compared to those in the 'free care' plans. Strikingly, there was a greater risk of death amongst the former group on average. Other health effects included poorer cholesterol levels, poorer vision, poorer oral health, and lower general health ratings (Ware et al, 1986; Keeler, 1992).

Other studies support these findings by showing the association between the type of health financing system and self-reported health in chronic conditions. In a four-country comparison by Cutler and Mas (2003), better health was associated with publicly financed systems in which out-of-pocket payments were negligible, as compared to systems that rely heavily on private financing. Individuals with diabetes reported higher levels of self-assessed health in the former. Likewise, higher quality of life has been associated with having health insurance, as well as a higher education and a higher income, in asthma and lung and prostate cancer (Apter, 1999; Camacho et al, 2002; Montazeri et al, 2003; Penson et al, 2001).

Overall, evidence on the social determinants of health suggests that social status plays a significant role in health. A question logically follows. How should economic barriers be overcome? In answering this question, two schools of thought can be considered (Deaton, 2002). On the one hand is that which advocates for *redistributing income*. The implicit assumption is that individuals ought to improve their own welfare through material gain. On the other hand is that which calls for *better health policy*. One such example is the development of more comprehensive *social safety nets*, although other health and extra-health policies are to be pursued. To weigh the options, we turn to evidence regarding the impact of income and insurance on service use.

2.3.2. Effect of income on utilisation

Since the early 1970s, a growing body of research has demonstrated that income and health insurance are strong predictors of health service use, but the evidence is far from homogenous. A review of the evidence points to three main considerations to keep in mind. First, their effects depend on the nature of underlying social safety nets for health. Second, income and insurance may operate complementary to one another; at other times, they each exert independent effects. Third, their influence varies by the type of services. This complexity highlights the necessity of understanding the broader health-financing context within which economic factors operate.

An important facet of income-related inequity is the disproportionate burden of out-of-pocket payments on lower-income groups. Generally, tax-based financing schemes tend to be the most equitable systems, in which there are generally no out-of-pocket payments charged at the point-of-use. Research suggests the systems found the United Kingdom and New Zealand tend to be more equitable than those found in other highly advanced countries (Barnett, 1984; Chernovsky, 1995; Bloom, 2001; Muennig et al, 2005a). Furthermore, health systems primarily financed through social health insurance have been shown to exhibit greater income inequity in financing and utilisation than those that are tax-based (Xu et al, 2003; van Doorslaer et al, 2000, 2004, 2006, 2007; Lu et al, 2007).

Several studies have shown the difference in the effect of income and insurance on acute versus preventative care. Whilst acute needs may be met regardless of financing method due to the nature of their urgency, Cutler and Mas (2003) suggest that this may not be the case for preventative care. Using the example of chronic health conditions, they explain that chronic health conditions require regular, preventative care, where reimbursement gains are lower than for high-technology equipment for more acute cases. As such, providers in privately financed schemes may not have as much of an incentive to attend to preventative needs as to acute needs.

Regular care by a health provider is critical both for ensuring equity and for improving overall health status. For example, regular care for asthma sufferers has been found to *decrease* rates of in-patient hospitalisation and emergency care, whilst improving overall health (Sin et al, 2004; Wisnivesky et al, 2005). The use of general practitioners has been correlated with lower rates of obesity and higher self-assessed health (Morris and Gravelle, 2006; Gravelle et al, 2008). Therefore, the effect of economic status on certain types of health care is particularly useful to understand.

Given the generally discretionary perception of outpatient care, income has been found to play a large role. A higher income has been associated with a greater use of outpatient care, but had a negligible effect on inpatient care. These studies suggested that income was a *greater determinant* of *outpatient use* than of inpatient use (Anderson and Benham, 1970; Phelps, 1975; Ware et al, 1986; Van Doorslaer, 1987). This is especially the case for specialist physicians and dental services (Dowd, 1991; Noro et al, 1999; van Doorslaer, 2004). The effects of a higher education and being employed have also been found to be similar to that of income (Lourenço and Ferreira, 2005; Propper et al, 2005).

In some studies, a higher income was found to be associated with a *lower* likelihood of using certain types of outpatient services, largely due to preferences or opting-out for other types of care. The use of general practitioners has often been associated with lower incomes. At the same time, hospital outpatient care and specialist care have been associated with higher incomes. These observations have been found in Germany (Lengerke et al, 2000), the United Kingdom (Morris et al, 2005), Spain (Gomez and Nicolas, 2007), and elsewhere.

2.3.3. Effect of insurance on utilisation

Likewise, insurance coverage generally increases the use of outpatient care, but can have less of an effect on the likelihood of using inpatient care. It is important to note that the use of outpatient and inpatient care can be complementary or substitutions for one another. This depends on the system of referrals in a given health scheme. In general, however, these findings substantiate Anderson's framework of the economic determinants of non-discretionary versus discretionary services.

Income may indirectly influence the use of health services depending on how privatised the insurance and supply markets are. A sizeable market for voluntary, private health insurance can exacerbate inequity, including cases where social safety nets exist but are relatively weak (Thompson and Mossialos, 2007). In the United States and Spain, income has been found to exert most of its effect through health insurance, where it can be purchased voluntarily (Gemmill et al, 2006; Costa-Font et al, 2007).

Even where health financing is largely public, the supply of *private providers* can also introduce social inequities in *access* to health care. In the early 1980s, governments in the United States, South Africa, and Finland began promoting the privatisation of hospital providers (Walker, 1986; Price 1988; Keskimaki, 2003). The main aims of such efforts were to increase efficiency and reduce the burden on the public purse. In some cases, private providers were still contracted by public entities, with beneficiaries often covered fully. In the case of Finland, primary care hospitals found it more lucrative to move to wealthier locations within cities, catering to higher-income groups who could afford to pay for more services. These results were controversial. Socio-economically disadvantaged areas now faced a triple burden: ill health, a low ability to pay, and fewer local providers. Similarly, in Italy and Malaysia, a higher income has been associated with a lower use of public services, but a greater use of private services (Heller, 1982; Fabbri and Monfardini, 2005).

The distribution of public financing and criteria for coverage can also determine the likelihood of utilisation for different groups. For example, in the United Kingdom and Canada, the use of general practitioner care was directly associated with income, partially explained by the relatively higher supply of physicians in wealthier areas (Bago d'Uva, 2005; Asada and Kephart, 2007). O'Donnell et al (2007) also demonstrated that aggregate public health expenditure tends to be concentrated amongst the relatively well off in several Asian countries. These observations mirror the observation found in England at the turn of the century, regarding the distribution of maternal health services.

Walker (1986) offers a compelling argument against mal-aligned health financing reforms that favour market forces, using empirical evidence available in the mid-1980s. Reforms proposed in the United States affected the extent to which state funding and provision would be shifted to the private sector. Medicare, the federally funded insurance scheme for older citizens, would contract with private providers and private health insurance companies to administer Medicare benefits on behalf of some beneficiaries.

As Walker (1986) points out, the resulting reforms had grave consequences many beneficiaries. These effects were particularly worse for those with a higher-than-average medical need and often could not afford treatment. In particular, access to health services *decreased* for older people and those with chronic health conditions following reforms. At the same time, some forms of insurance may increase the likelihood of certain services whilst decreasing others. In the case of the United States, private insurance has been associated with higher inpatient admissions. Yet coverage by public insurers, such as Medicare, has been associated with higher pharmaceutical and outpatient care, but lower inpatient care (Gemmill et al, 2006). This highlights the importance of considering demand- and supply-side incentives to use care, which ranges from cost-sharing schemes to provider payment mechanisms.

2.3.4. Effect of out-of-pocket payments on utilisation

Evidence of the financial burden of health care is found even in schemes with insurance coverage. The Rand Health Insurance Experiment showed the price sensitivity of co-payments associated with the point-of-use (Keeler, 1992). To some, results were surprising. The study found that the *level* of co-payment did not inhibit use as much as the very *existence* of a co-payment. This suggests both an *affordability issue* as well as *social aversion* regarding out-of-pocket payments for health care.

Although the price-elasticity of demand was higher amongst lower-income groups, the effect was apparent across all income levels. The message was clear: cost sharing tends to reduce service utilisation, holding other factors equal; even with the charge is considered low. Clearly the effect of out-of-pocket payments can vary depending on the incremental benefit to the beneficiary, but these results suggest the *general* role of cost sharing.

Evidence from lower-income countries has demonstrated similar effects regarding privatisation. In the 1990s, the Chinese government began a process of radically reforming its health system, which ultimately disadvantaged lower-income groups (Grogan, 1995). The emphasis of reforms was privatisation of both funding and provision. Reforms saw the collapse of traditional, community health care that was especially valuable to rural communities. These communities were largely outside of the formal employment sector and relatively poorer than their urban counterparts. In time, this led to a growing disparity in access to care between urban and rural populations.

In the absence of comprehensive coverage, user fees have been associated with reduced access to care in less developed countries. Evidence spans a variety of health services, from maternal services to mental health care (Klavus et al, 1996; Palmer et al, 2004; Ensor et al, 2005; Knapp et al, 2006). In a seminal study on user fees in Peru, the *introduction* of co-payments was associated with a *reduction* in health service use (Gertler et al, 1984). Importantly, there was a disproportionately *greater decrease* in demand amongst people at lower socioeconomic levels. Amongst those who did use services, living standards were more negatively affected amongst lower-income groups.

One argument in favour of co-payments suggests that they may not necessarily always decrease utilisation, but the evidence is still far from conclusive. For example, in a study in the Cameroon, the introduction of user fees *in conjunction* with the introduction of previously unavailable medicines was examined (Litvack, 1993). The study found that utilisation increased immediately in cases where fees were associated with medicines. The introduction of fees alone decreased the utilisation of services (Litvack 1993). Whether such an effect can be generalised is questionable, since the study was relatively small in scale and did not cover a long-enough period. Importantly, evidence from the Rand study provides more robust evidence that does not support any long-term benefits of user fees.

Ultimately, lower-income groups face the choice of paying relatively higher opportunity costs to access care, or foregoing care altogether. Indeed, the burden of out-of-pocket health expenditure has been found to exacerbate poverty levels (Lu et al, 2007; van Doorslaer et al, 2007). This suggests that lower-income groups often face no other choice but a relatively higher financial burden in seeking care.

Public financing that is equitably allocated yields a way out. For example, in the case of Vietnam, the introduction of governmental, health insurance in 1992 was associated with a reduction of out-of-pocket payments by 200% (Jowett, 2003). This led to improved access to care and better levels of self-assessed health. Therefore, the role of *appropriately* targeted public financing in health can offer substantial benefits.

2.4. Chapter summary

The role of economic status in access to health care depends on (i) societal perspectives towards health; (ii) the role of the state in health financing; and (iii) the relative impact of other social factors on the demand for health care. A social orientation towards health is associated with comprehensive social safety nets for the provision of health services.

Economic inequity in the use of health services, particularly outpatient care, tends to be lower in health systems in which social safety nets are comprehensive. Inequity has been attributed to several factors such as the distribution of supply and fees charged at the point-of-service. The evidence reviewed in this chapter suggests that health insurance and risk pooling schemes that are not based on ability to pay tend to reduce financial barriers to accessing health care. Therefore, enabling factors such as income level and social or private health insurance coverage become more important in systems where social safety nets do not exist or fail to provide adequate coverage for health care. The conceptual model adapted for the thesis will be explained in the next chapter, showing how the role of economic status in health care can vary depending on the underlying health care financing system, amongst other factors such as supply of health care and behavioural attitudes.

Chapter 3. Methods

3.1. Introduction

This chapter presents the methods used to examine the research questions for the thesis. First, a brief overview of the methodological approach used to address each of the research questions is presented. Second, the choice of countries used for the analysis is explained. Third, the theoretical framework for the analysis is discussed. Fourth, the descriptive and multivariate methods applied to the data are presented. Finally, the chapter concludes with a discussion of the main limitations of the thesis.

3.2. Summary of research questions

The central research question of the thesis is to evaluate the impact of income and health insurance on the demand for health services in different health systems. This overall question is addressed in the thesis by examining a set of individual, inter-related research questions, presented in Chapter One and in Table 3.1 below. The first research question assesses health need in a broad sense, including levels of ill health as well as rates of health care use as reported different income groups. In addition, the financial cost of using health care borne by households is described. It is assumed that health insurance coverage lowers financial barriers for households; the assumption is that out-of-pocket payments may impinge on essential spending for poorer households, representing a barrier to care.

The second question further explores whether income status affects utilisation through the effect of health insurance, by examining if it is a significant determinant of health insurance through regression techniques.

The third and fourth questions examine the *relative* effects of income and insurance in explaining health care use, through regression methods designed to assess the probability and intensity of utilisation.

The fifth question assesses the results and their overall policy implications, in terms of whether economic factors affect the probability and/or intensity of care; whether they have more of an effect on certain services over others; whether these results are consistent with the literature; and the general health policy implications that result for most health systems.

Finally, the <u>sixth</u> question examines policy implications specific to health financing systems in Egypt and Lebanon. Based on differences in the country results, implications for financing systems are drawn that pertain to each country's political and economic circumstances.

Table 3.1 Research Questions

1. How are health need and out-of-pocket payments for health care distributed across income levels in different health financing systems?
2. What are the socioeconomic factors that determine the probability of being covered by social and private health insurance schemes?
3. To what extent do economic factors such as income level and health insurance coverage explain the use of various types of outpatient health services?
4. To what extent do economic factors such as income level and health insurance coverage explain the use of various types of hospital-based health services?
5. Based on the study findings regarding economic determinants of utilisation, what are the overall policy implications regarding the design of health financing systems towards the aim of alleviating disparities in access to health care?
6. For each of the research questions, how does the effect of income and insurance compare between Egypt and Lebanon and what are the specific policy implications for each of these two health systems?

3.3. Country selection

Egypt and Lebanon are used as case studies for four main reasons. First, there is relatively little empirical evidence on the topic in these countries. Second, their health systems differ from one another with respect to the role of the state in health care financing. Third, they share linguistic, social, historical, and cultural backgrounds, allowing the researcher to control for unobservable factors to the extent possible. Since health care practice is also similar, the meaning of the variables is assumed to transcend borders. Fourth, quantitative data required for each country were available from a single international survey, which offers the advantage of direct, cross-national comparability. This data forms the basis of the thesis, supplemented by background information collected from the literature and visits to the countries.

3.4. Contextual background

Egypt and Lebanon are located where three continents meet at the Mediterranean, sharing elements of social values found in Southern Europe, Western Asia, and North Africa (Figure). In particular, this section focuses on the role of the state and citizen in health financing. A comparison of all aspects of the health systems is beyond the scope of this thesis; the main interest is the underlying state-society framework and how this is reflected in health financing systems.

Both Egypt and Lebanon have been engaged in reforming their health care systems since the early 1990s, particularly in the area of quality of care and population coverage. One of the reasons has been a recognition that social outcomes, such as education and health, have lagged behind economic development in comparison to other similar economies. Amongst many possible explanations, lagged social outcomes have been attributed to weak state-society relationships (Turner, 1984; Issawi, 1989; Karshenas and Moghadam, 2006).

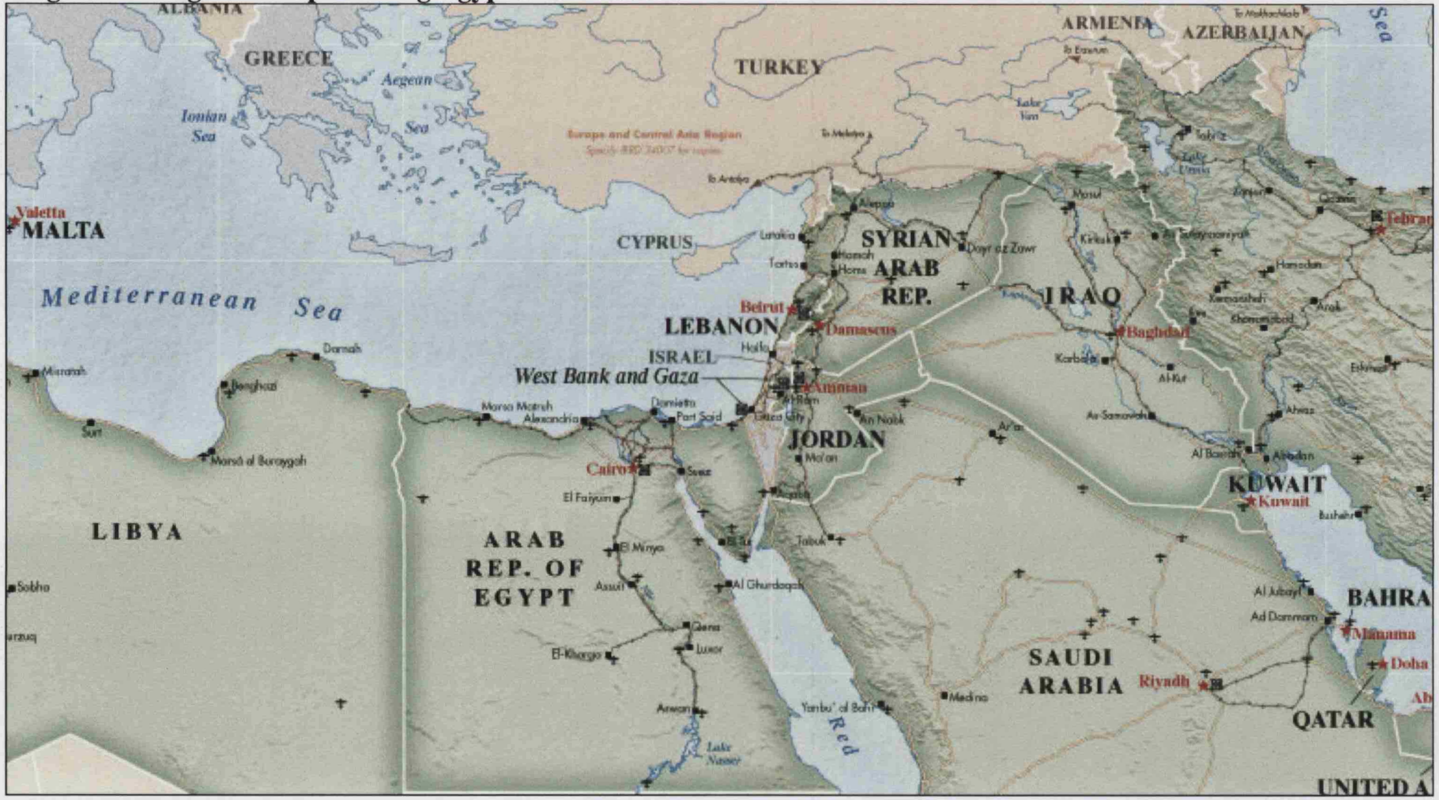
Early scientific and philosophical traditions in the region supported the equilibrium concept of health from a holistic perspective. As early as the ninth century, physicians and philosophers from Cordoba to Cairo recognised the complex relationship between social conditions and well-being (Gran, 1979). The role of the state was seen as necessary to providing the conditions for productive activity according to Ibn-Khaldun, considered to be the forefather of modern production theory (Boulakia, 1971).

The concept of health in the Arab world has since shifted to one that focuses on the 'sick role' and acute illness (Leslie, 1980; Gallagher, 2001; Adib, 2004). This perspective resembles the negative approach to health that emphasises 'disease', as described in the previous chapter. The nature of the health sector in the modern Middle East generally reflects a social emphasis on 'disease', rather than on 'health'. As such, since the creation of modern health systems in most countries in the Middle East during the 1940s-1960s, there has generally been a relatively high proportion of health expenditure on secondary and tertiary care. Preventative and primary health care, with some exceptions due to vertical or selected public health campaigns, have tended to receive relatively little governmental expenditure, with the private sector involved to varying extents.

Egypt and Lebanon share similarities and notable differences in overall health status and health system structures (Table 3.2 and Table 3.3). Both countries currently face a dual burden of communicable- and non-communicable chronic health conditions, due to epidemiological changes (WHO, 2006; Akala and El-Saharty, 2006; Adeyi et al, 2007). A relatively limited political and economic national discourse on health system policy is found in Egypt and Lebanon. Specialists and acute care providers generally dominate the provision of health services, as they do in much of the Middle East (Karshenas and Moghadam, 2005; Jabbour et al, 2006; Maziak, 2006). Family support and social arrangements also play important roles in health care in the Middle East (Zurayk et al, 1997).

Despite many similarities in the epidemiological profile and some dimensions of the health care economy, the role of the state in financing health services differs between Egypt and Lebanon. The next section examines the health financing arrangements against the backdrop of the broader political and economic context in each country.

Figure 3.1 Regional map showing Egypt and Lebanon



Source: World Bank, 2008.

Table 3.2 Egypt and Lebanon: Social and Health Indicators

Indicator	*Egypt*	*Lebanon*
Population (thousands)	74 000[1]	4 050[1]
Date of independence	1923[2]	1943[7]
Political system	1923-52 parliamentary monarchy; 1952-present, multi-party democracy[2]	1943-present, multi-party confessional democracy[7,8]
Orientation to economic development	State-mediated / liberal[3,4]	Liberal, laissez-faire[8,9]
Gross national income per capita (PPP $)	$1260 [1]	$6320 [1]
Unemployment rate (%)	10.2%[5]	11.5%[10,11]
Poverty rate (%)	17%[5,6]	28.5%[12]
Literacy rate, adult average (% literate)	71%[1]	87%[1]
Health status		
Life expectancy at birth, adult average (years)	71[1]	72.5 [1]
Infant mortality rate (deaths / 1,000 live births)	28[1]	30 [1]

Sources: 1. World Bank, 2008 (Egypt: 2005 values. Lebanon: Population and gross national income, 2006; Literacy rate, 2003; health indicators, 2005). 2. Office of the Presidency, Government of Egypt, 2008. 3. Hinnebusch, 2001. 4. El Badawi and Makdisi, 2007. 5. Handoussa et al, 2004 (2000 values). 6. El-laithy et al, 2003. 7. Office of the Presidency, Government of Lebanon, 2008. 8. El-Badawi and Makdisi, 2007. 9. Gaspard, 2004. 10. Kasparian, 2003. 11. World Bank, 2005 (PER). 12. Laithy et al, 2008.

Table 3.3 Egypt and Lebanon: Health System Indicators

Indicator	**Egypt**	**Lebanon**
Supply of health care providers[1]		
Physicians (density per 1 000 population)	0.97[2]	3.25
Nurses (density per 1 000 population)	1.55[2]	1.18
Pharmacists (density per 1 000 population)	0.14[2]	0.95
Hospital beds (per 10 000 population)	21.5[2]	36
National health account indicators[1]		
Total expenditure on health (THE) as % GDP	5.5[3]	11.2[4]
General government expenditure on health (GGHE) as % THE	38.4	28.3
Private expenditure on health (PvtHE) as % THE	61.6	71.7
General government expenditure (GGHE) on health as % GDP	1.8[3]	1.0[5]
Social security expenditure on health as % GGHE	28.6	34.8
Out-of-pocket spending on health as % PvtHE	94.6	82.1
Private prepaid plans expenditure on health as % PvtHE	0.3	15.4
Externally funded expenditure on health as % THE	0.9	1.7
Expenditure on inpatient care as % THE	20.7	30.6
Expenditure on preventative and public health care as % THE	9.6	1.9

Notes: GDP = gross domestic product.
Sources: (1) World Health Organization Statistical Informatic System, 2008. Health supply values shown for Egypt: physicians, 2003; nurses and pharmacists, 2004; hospital beds, 2005. Values for Lebanon, 2001, except hospital beds, 2005. Expenditure values shown for 2005, except expenditure on inpatient and preventative care: Egypt, 2002; Lebanon, 2003. (2) Ministry of Health and Population, Egypt, 2007. (3) Ministry of Finance, Egypt, 2007. (4) Ministry of Finance, Lebanon, 2007. (5) World Bank, 2005.

3.4.1. Egypt

3.4.1.1. Organisation and coverage of health services

'The basis of society is social solidarity... [and] the State shall guarantee cultural, social and health services and shall work to ensure them...', states the Egyptian Constitution (1923/1952, Articles 7 and 16). At nearly eighty million inhabitants, Egypt is one of the oldest nation-states in the world. Many consider it the most politically stable country in the Middle East (UNDP, 2005; El-Zanaty and Way, 2006; World Bank, 2007). This has been attributed to a relatively autocratic style of government combined with a constitutional parliamentary system of government (Fahmy, 2002).

The Egyptian population faces similar challenges as other lower-middle-income countries, such as relatively high rates of poverty, unemployment, and illiteracy (UNDP, 2005; World Bank, 2007). Egypt has managed to eradicate most infectious diseases and greatly improve and maternal and child health since the 1960s, largely due to targeted public health campaigns (El-Zanaty and Way, 2006). This effort has been supported by an emphasis on primary care and nursing training (M. Amin, personal communication, 23 July 2008).

The Ministry of Health and Population oversees the organisation, financing and provision of the Egyptian national health service, as well as other governmental agencies providing separate systems of social health insurance. The Egyptian government finances and provides health care through a universal social safety net system, although many other fragmented, social health insurance schemes operate in parallel. The government runs and operates a universal health system, directly providing services to all citizen through Ministry of Health-operated facilities. The universal national health service system of health care was established in 1952 and reflects the State's commitment to social solidarity and universal coverage as outlined in the Egyptian Constitution (1952). However, since the 1970s, progress in social policy has been relatively fragmented and services have been under-resourced, owing largely to the shift towards liberal economic strategies which have brought the growth of private provision and direct, fee-for-service payments to private providers (Bayat, 2006).

In addition to the universal national health system providing a social safety net to all citizens, numerous other systems operate in parallel (Figure 3.3). In effect, the Ministry of Health network of free care has become the choice of last resort for citizens unable to afford higher-quality care. Coverage of health service benefits and quality of care varies widely between funding schemes (A. Elgazzar, personal communication, 15 Sept. 2008). The Ministry of Health is a general revenue-based service provider offering free care to any citizen. However, quality of care is generally perceived as poor, especially for public outpatient services (Rannan-Eliya et al, 1999; Salem, 2002). Published data on the number of public providers is thought to be underestimated by many in Egypt, but the amount of public expenditure on health is considered relatively low (H. Handoussa, personal communication, 29 December 2007).

The Health Insurance Organisation, established in 1964, operates as a social health insurance scheme under the auspices of the Ministry of Health. Eligibility was initially open to those employed in the formal sector excluding family members, with pensioners and enrolled students later added; half of the Egyptian population is enrolled in the scheme (Salem, 2002; Leila, 2006). The scheme is mainly financed through premiums and employer contributions, supplemented by general revenue funding due to deficits (Abd El Fattah et al, 1997; Nandakumar et al, 1999). Services are provided through integrated facilities or purchased from external providers.

3.4.1.2. Finance and Provider Payment Mechanisms

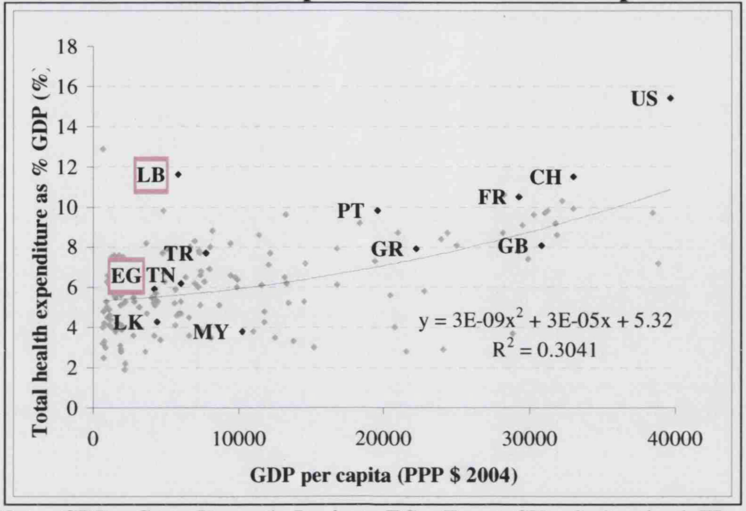
Funding of the health care system in Egypt derives from five main sources, including the Ministry of Health, the Health Insurance Organisation (General Authority for Health Insurance), specific ministries such as Transport and Defence, non-governmental organisations, and households. Private health insurance covers only one percent of the population (UNDP, 2005). Total spending on health care in Egypt is approximately \$60 per capita and 5.5% of gross domestic product, of which 60% is out-of-pocket (Ministry of Health, 2005; Ministry of Finance, 2007; WHO, 2006b). Total health expenditure is relatively similar to other lower-middle income countries (Figure 3.2). Yet the proportion of out-of-pocket expenditure is relatively high compared to other countries with higher or lower income levels, shown in Table 3.4.

Sources of health expenditure in Egypt are a mix between public and private sources (Table 3.5). In 1995, the majority of total health expenditure came from private and mainly out-of-pocket (55%), followed by general revenue sources (25%), and social insurance-based financing (20%) (Rannan-Eliya et al, 1999). In 2006, sources of expenditure were similar to those in 1995: private expenditure (62%), general revenue (27%), and social health insurance (11%) (WHO, 2006b). Health Insurance Organisation spending per capita is approximately double that of Ministry of Health spending (Rannan-Eliya et al, 1999).

The proportion of out-of-pocket spending in Egypt exceeds the World Health Organization-recommended threshold of 50% of total health care spending (WHO, 2006b). Overall, formal and informal out-of-pocket expenditures make up the single largest source of revenue, mainly spent on outpatient services and pharmacy care.

The proportion of out-of-pocket expenditure in Egypt is relatively high by international standards, which is tied to the way in which the vast majority of providers are paid. Most physicians are employed by the public sector and are salaried employees of the Ministry of Health. However, salaries are generally considered too low for basic subsistence in Egypt, and therefore, the government permits most physicians to work in private clinics or own and operate their own private clinics. Within public hospitals and private sector for both outpatient and inpatient care, payments are made on a fee-for-service basis directly to providers for those who are not enrolled in social or private health insurance schemes. There is a weak regulatory system regarding tariffs, fee schedules or utilisation reviews, effectively resulting in a direct, fee-for-service system without any incentives for efficiency or high performance in terms of quality of outcomes.

Figure 3.2 International comparisons of total health expenditure



Note: GDP = Gross Domestic Product. EG = Egypt; CH = Switzerland; FR = France; GB = United Kingdom; GR = Greece; LB = Lebanon; LK = Sri Lanka; MY = Malaysia; PT = Portugal; TN = Tunisia; TR = Turkey; US=United States.

Table 3.4 International comparisons of health status indicators

Country	Private expenditure as % total health expenditure (%)	Adult literacy rate (%)	Infant Mortality Rate (per 1,000 live births)	Health life expectancy at birth (years)	Age-standardized mortality rate for cardiovascular diseases (deaths per 100,000)
Low- and Middle-Income Countries					
Egypt	61.6	71.4	30	59	560
Lebanon	71.7	87.0	28	60	463
Tunisia	55.7	74.3	20	62	417
Turkey	28.6	87.4	26	62	542
Sri Lanka	53.8	90.7	12	62	314
Malaysia	55.0	88.7	10	63	274
High-Income Countries					
Greece	57.2	96.0	4	71	258
Portugal	27.7	93.8	4	69	208
France	20.1	99.0	4	72	118
Switzerland	40.3	99.0	4	73	142
United Kingdom	12.9	99.0	5	71	182
United States	54.9	99.0	6	69	188

Source: World Health Organisation Statistical Information System, 2008. Data are for 2002-2006. Cardiovascular deaths shown as an indicator of the burden of non-communicable diseases in each country.

3.4.1.3. Provision of care and utilisation

Provision of health care services is split between private and public providers. Although 95% of the population is within five kilometres of a medical facility, most public outpatient services are inadequately equipped and staff poorly motivated (El-Zanaty and Way, 2006; Salem, 2002). As a result, seventy percent of outpatient care is obtained privately, largely by the well off, whilst poorer groups who cannot afford private care rely on the Ministry of Health (Ellis et al, 1994). Overall, the wealthy report up to four times as many outpatient-visits and one and a half times the length of inpatient stays as the poor (Rannan-Eliya et al, 1999).

Evidence on the equity effects of financing schemes is limited, but research suggests that the system is associated with income-related inequity in financing and access. In terms of financing, the burden of health expenses is much higher for poorer citizens than their richer countrymen; as a share of household income, the poorest quintile spent 10% as compared to 2% by the richest in 1999 (Rannan-Eliya et al, 1999). Whilst Ministry of Health spending is fairly evenly distributed across income, evidence suggests that Health Insurance Organisation spending for the richest quintile is *double* that for the poorest (Rannan-Eliya et al, 1999).

In terms of reforms aimed at improving access to services, the expansion of Egyptian social health insurance to enrolled children in the early 1990s does not appear to have evened income-associated distribution of utilisation or health spending (Rannan-Eliya et al, 1999). User fee exemptions in the Family Health Fund were considered poorly managed, leading half of all enrolees to opt out of the scheme (Ikegami, 2007).

3.4.1.4. Reform measures for health policy

As part of the Health Sector Reform Programme initiated in the 1990s, the Ministry of Health has been focused on improving access to high quality care, efficiency, choice of providers, alleviating the oversupply of specialists, and strengthening the system's financial sustainability (World Bank, 1998; Ministry of Health, 2005; ADB, 2005; Leila, 2006; Leila, 2007; Egypt SIS, 2007).

The 2007-2008 reform proposals in Egypt primarily call for expanding the Health Insurance Organisation scheme, including the following measures: the separation of funding and provision through the creation of a fund-holding entity in lieu of separate Ministry of Health and Health Insurance Organisation pools; the introduction of a basic benefits package; the introduction of user fees to cover up to one-third the cost of approved medications, ambulatory and hospital services; and the introduction of managed care and competition between providers based upon quality of care (Ministry of Health, 2005; Egypt SIS, 2006; Leila, 2007; Egypt SIS, 2007).

With such major financing proposals under review, a debate has ensued around the expansion of social health insurance and the introduction of strategic purchasing, with concerns voiced regarding equity and provider autonomy effects (Khalil and Ebeid, 2006; El-Khashab, 2007). Overall, the disparity in expenditure and access in Egypt has resulted in a three-tiered system in Egypt: an underlying system based on citizenship, a parallel system based on social insurance, and a complementary system based on ability-to-pay.

Figure 3.3 Egypt: Health Financing System

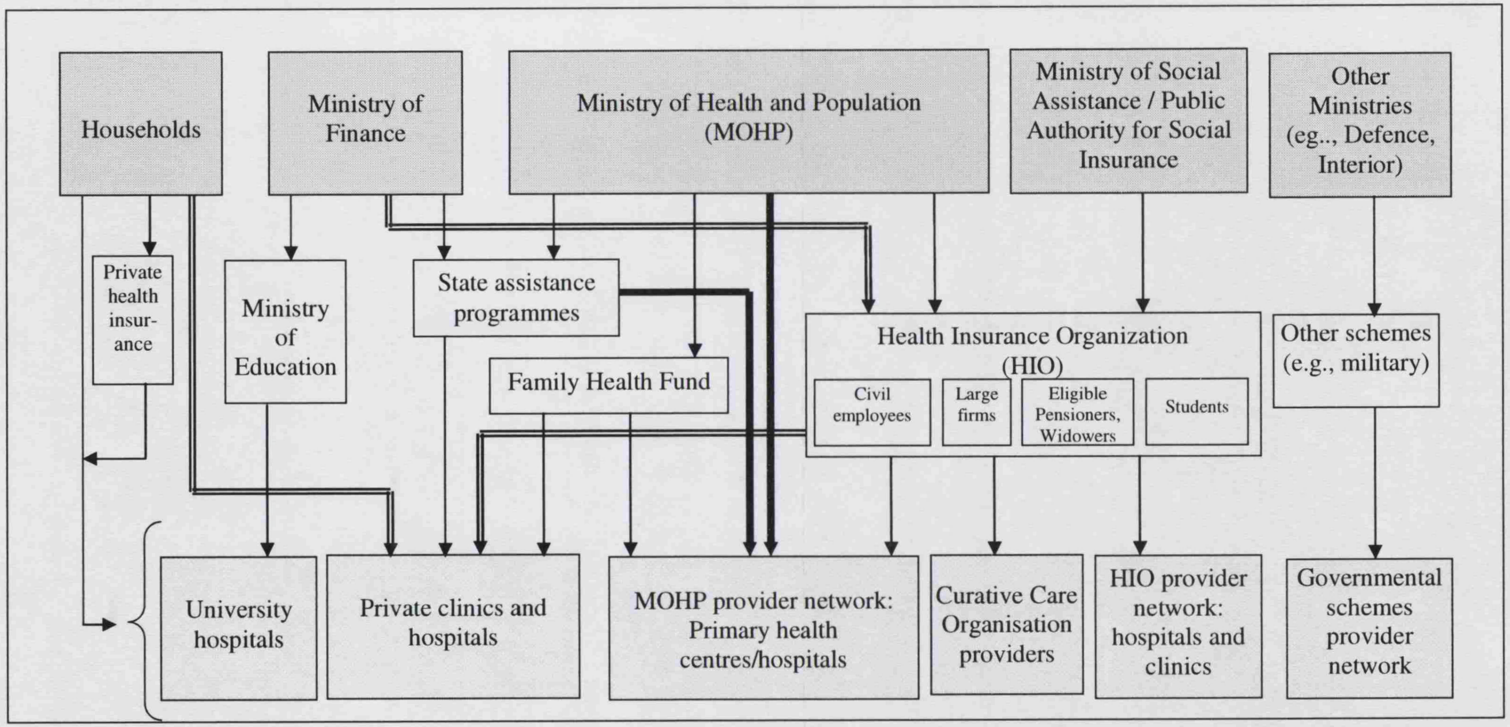


Figure shows flow of funds from the main sources of financing directly or indirectly through intermediaries to providers of health care.
Sources: Abd El Fattah et al, 1997; Rannan-Eliya et al, 1999; Loewe, 2000; Nandakumar et al, 2000; Salem, 2002; Boggatz and Dassen, 2005; Loffredo, 2005; El-Zanaty and Way, 2006; World Bank, 2006; WHO, 2006e; A. Elgazzar, personal communication, 2008).

Table 3.5 Egypt: Health Financing Coverage

Financing Scheme/Eligibility	Benefits	Main sources of financing	Main providers	Coverage rate
Government health services: All citizens are eligible for free subsidized care at designated public providers	**Comprehensive:** • Primary preventive care • Hospital inpatient care • Medications • Laboratory/diagnostic services, • Dental care • Limited long-term care • Referrals to tertiary care providers • Limited overseas treatment	• General revenues, central government budget allocated to Ministry of Health and Population (MOHP) (central and governorate) • Direct budget transfers from Ministry of Finance (MOF) • Budget transfers from Ministry of Higher Education • Nominal user fees	• MOHP primary health care units • MOHP hospitals • For tertiary care, university and teaching hospitals/institutes.	100% of citizens eligible for free services
Health Insurance Organisation (social health insurance): • Public employees • Private employees of formal sector • Enrolled students (infants through voluntary scheme) • Pensioners • Excludes dependents	**Comprehensive:** • Primary care / general practitioner • Primary care / specialist services • Physician home visits • Hospital inpatient care • Medications • Dental care • Prosthesis • Physiotherapy	• Employee and employer contributions (payroll tax) • Tobacco consumption tax for student scheme • Household premium (LE4) • Co-payments • General revenues (MOF)	• Health Insurance Organisation facilities • Health Insurance Organisation-contracted physicians, clinics and hospitals, including Curative Care Organisation, MOHP, and private providers.	48%
Private sector: • Households • Limited private health insurance market	**Variable:** • Dependent on individual's ability to pay and availability of services. **Private health insurance:** • Mainly supplementary and complementary services	• Direct household out of pocket payments • Limited insurance premiums • Private employer contributions.	• Mainly ambulatory care provided by private physicians and clinics • Limited numbers of private/non-governmental hospitals	Majority pay out-of-pocket payments 1% have private health insurance

Sources: Abd El Fattah et al, 1997; Rannan-Eliya et al, 1999; Loewe, 2000; Nandakumar et al, 2000; Salem, 2002; Boggatz and Dassen, 2005; Loffredo, 2005; El-Zanaty and Way, 2006; World Bank, 2006; WHO, 2006e; A. Elgazzar, personal communication, 15 September 2008).

3.4.2. Lebanon

3.4.2.1. Organisation and coverage of health services

'With no natural resources... it has leaned heavily on the export of its services to pay its way in the international market,' wrote historian Philip Hitti (1967). Lebanon's history in social policy is a history in entrepreneurship. Its ancient status as a Phoenician centre of free trade has transcended time; today, it remains the *only* country in the world whose economy is considered to be freely *laissez-faire* (Gaspard, 2004). The Lebanese enjoy a relatively high income per capita and can claim to be the freest democracy in the Middle East (El-Badawi and Makdisi, 2007). Yet the country has also witnessed one of the longest civil wars in world history, between 1975 until 1990.

Ongoing political instability challenges reconstruction efforts, including health policy reform (A. Mroueh, personal communication, 24 April 2007; R. Naaman, personal communication 25 April 2007). Lebanon's modern-day health system was established in 1943 just after independence from the French, with a series of subsequent piecemeal reforms in the midst of recurrent periods of political and economic upheaval (Ammar, 2003; World Health Organization, 2006b).

3.4.2.2. Finance and Provider Payment Mechanisms

In Lebanon, over 70% of total health expenditure is private, whilst 30% is public. Health care is largely financed through social health insurance and private sources, with means-tested benefits provided through general revenues for selected medical treatments. Public expenditure in the Lebanese health system derives from six different sources (Figure 3.4). The Ministry of Public Health finances approximately 48% of expenditures, followed by the National Social Security Fund at 15%, with the remainder of expenditure financed through the Civil Servants Cooperative, State Security, Internal Security Forces, General Security, Army and Ministry of Social Affairs (Ammar, 2003). Occupational group largely determines eligibility to each of these schemes (Table 3.6). However, some civil servants, professionals, and the relatively well off seek supplemental insurance coverage from other schemes due to incomplete coverage for most health care, particularly outpatient services (Lerberghe et al, 1997).

The majority of health expenditure in Lebanon is direct private, household expenditure. In 2005, approximately 80% of this expenditure was comprised of out-of-pocket payments, with the remainder for health insurance premiums (Ammar et al, 2000;

Ammar, 2003). Approximately 14% of total household expenditure goes towards health, and ranges from 20% amongst the poorest quintile to 8% amongst the richest (Ministry of Public Health, 1999). Nearly all providers are paid on a fee-for-service basis through direct, out-of-pocket payments or contracts with social and private health insurance schemes. However, little incentives exist for high quality performance or efficiency.

Amongst 13 categories of household expenditures, health comprised the second-largest expenditure, after food, for the poorest groups, and the fifth for the richest groups. Most out-of-pocket payments to health care in Lebanon go towards outpatient services, but a considerable amount is still spent on hospitalization and pharmaceuticals. On average, 37% of household health expenditure goes towards ambulatory, outpatient care; 15% on pharmaceuticals; 15% on health insurance premiums; 2% on hospital outpatient care; and 22% on dental care (Ministry of Public Health, 1999).

Although the social health insurance schemes should cover the majority of the population, figures suggest that the majority of public financing benefits a relatively small minority. 46% of the population are enrolled in social health insurance schemes, but are largely located in predominately urban, wealthier regions, with private health insurance operating in parallel (Jurjus, 1995; World Bank, 2000; Ammar, 2003).

3.4.2.3. Provision of care and utilisation

Whilst the Ministry of Health should cover uninsured groups, most people do not seek care from Ministry facilities due to a perceived low quality of care. In 1999, the majority of its funds, nearly 78%, were spent on inpatient care and high-technology procedures (World Bank, 2000; Ammar, 2003). In 2006, hospitalisation accounted for 72% of the Ministry's budget, providing hospital care for 4% of the Lebanese public (Ministry of Health, 2007; Ministry of Finance, 2007). Nearly half of the Ministry's hospital budget comprises of reimbursement for services provided through the private sector, which account for 90% of all hospitals (Ministry of Health, 2007). In 2007, the hospital budget was spent nearly evenly between surgical (41%) and medical care (59%).

Pharmaceuticals are increasingly becoming a concern in Lebanon, due to rapidly inflating prices, an increasing reliance on the black market, and the lack of generics.

Nearly 6% of the population receive medications subsidised by the Ministry, accounting for 13% of its budget (Ministry of Finance, 2007). The remainder of the population purchase medicines directly over-the-counter at private pharmacies, with limited coverage offered by social health insurance schemes (Ammar, 2003; Ministry of Health, 2007). Of the citizens who receive medications, 11% received high-cost drugs for chronic health conditions and the remainder received medications listed as essential drugs. Amongst individuals who receive chronic medications, the majority are dispensed cancer-related medications (27.3%) and mental-health related medications (26.7%); the remainder comprise treatments for renal disease, hormonal replacement, organ transplant, and other long-term conditions (Ministry of Health, 2007).

The Ministry of Health does not directly fund primary health care services. Nearly 20% of the public receive primary health care services through the 147 primary health centres in the country, mainly private or charitable organisations (Ministry of Finance, 2007). Of these facilities, 8 centres (5%) are Ministry of Health facilities operated by these organisations. Other basic and health services funded by the Ministry amounted to nearly 5%, and 10% of the budget was administrative.

Since approximately half of the population is not covered for either primary or secondary care, an estimated 14% of all households are enrolled in private health insurance, as of 1995. Between 2003 and 2007, estimates have ranged from 10% (Ministry of Finance, 2007) to 15% (Ammar, 2003). Most of the beneficiaries are pensioners and those with chronic health conditions who face formal or informal exclusion criteria in obtaining public insurance (Jurjus, 1995; Ammar, 2003).

3.4.2.4. Reform measures for health policy

The biggest challenges faced by the Lebanese health sector are related to inefficiency related to a fee-for-service reimbursement system that is relatively unregulated. These include a growing deficit; rapid cost escalation; and a lack of sufficient coverage for the majority of the population (Ammar, 2003; Ministry of Health, 2007). Overall, the problems with macro-inefficiency and lack of coverage have been attributed to a fragmented financing system and a relatively unregulated market for hospital and pharmaceutical services (Ammar, 2003; Ministry of Finance, 2007; A. Mroueh, personal communication, 24 April 2007).

As far as coverage, the spectrum is vast. On the one hand, approximately half of all citizens have relatively adequate coverage for inpatient care and limited outpatient care, but lack coverage for pharmaceuticals. On the other hand, one-third of the population have no coverage whatsoever. Approximately 4% receive coverage for hospital care provided by the Ministry of Health, and 20% receive primary health services through charitable organisations.

Recent calls for reforms have focused on developing a comprehensive funding system that does the following: (i) targets vulnerable groups who are uninsured and (ii) regulates purchasing and delivery of health services on behalf of health insurance schemes (Ammar, 2003; Ministry of Finance, 2007). According to the Government of Lebanon, vulnerable groups are defined as households headed by females (14.2% of the population, of which 3% are considered very poor); working children (10% of children aged 10-19 years); citizens aged over 65 years (8%); people with disabilities (2%, or 25% of individuals aged over 65 years); agricultural and fishery workers (9%); and the unemployed (2%) (Ministry of Finance, 2007).

Through the establishment of a 'strategic purchasing authority' and referral systems, these reforms would help to control cost escalation through regulating which and where services are provided, particularly high-cost treatments at hospitals (Ammar, 2003). Many have echoed calls for improvement in primary health care since this is relatively under-utilised in Lebanon. This under-utilisation has been attributed partially to a lack of investment in facilities, and partially to a low shortage of nurses and general practitioners who practice primary health care, despite the over-supply of specialist physicians (Abyad and Mehio Sibai, 1992; Kassak et al, 2006; El-Jardali et al, 2008; M. Amin, personal communication, 23 July 2008).

Current reform measures are focused on improving efficiency in the hospital and pharmaceutical sectors (Ministry of Health, 2007). These issues are related to the performance of primary health care in (i) gate-keeping care to secondary and tertiary facilities and (ii) prevention of illness requiring such care. Although reform measures for improving efficiency may help contain cost escalation, the uninsured populations remain a concern.

Figure 3.4 Lebanon: Health Financing System

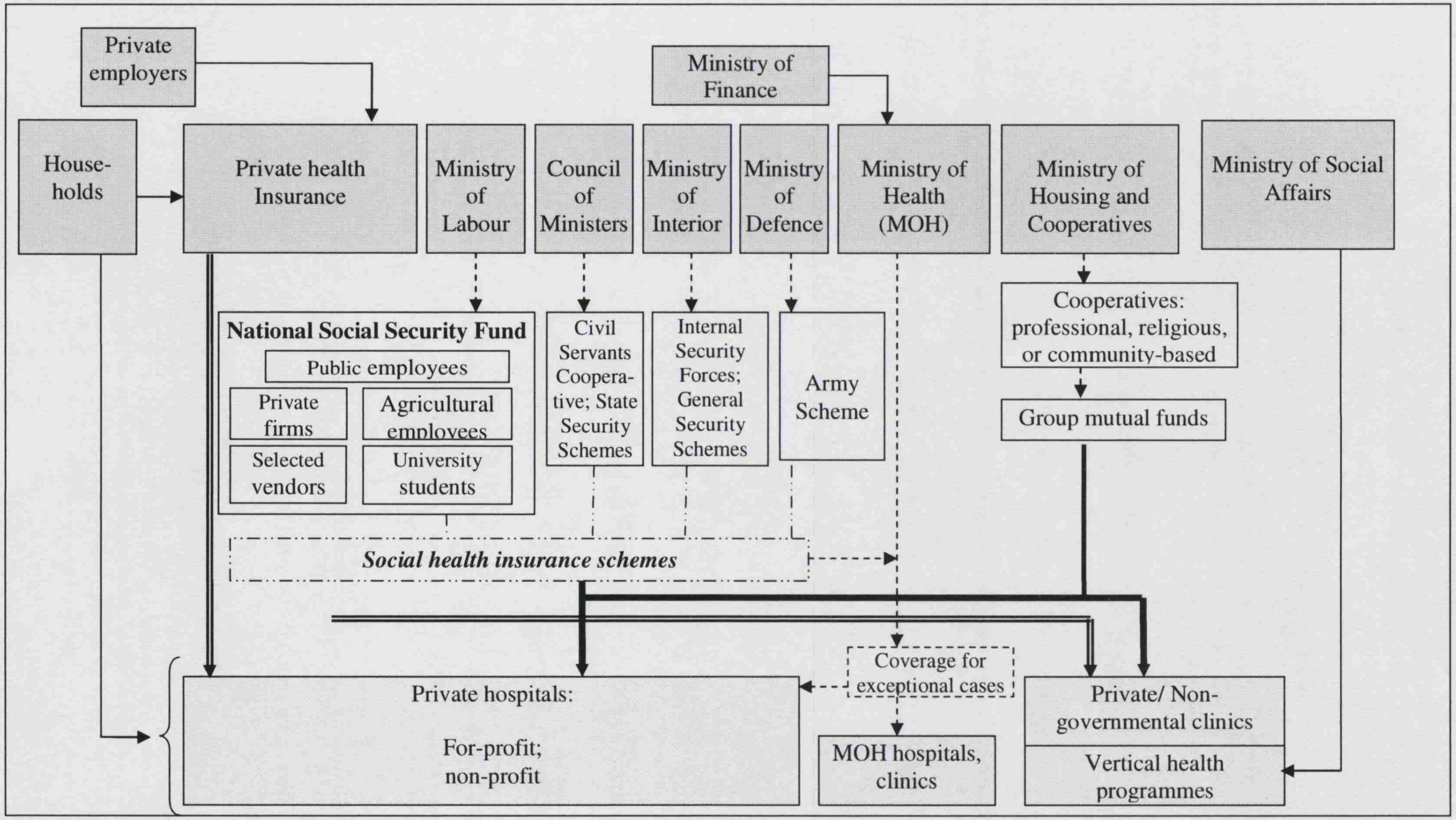


Figure shows flow of funds from the main sources of financing to providers of health care. Sources: Developed based on data from Kronfol and Bachshur, 1989; Kronfol, 2002; Lebanon National Health Accounts, 1998; Ammar, 2003; Consultation and Research Institute, 2005. WHO 2006f.

Table 3.6 Lebanon: Health Financing Coverage

Financing Scheme / Eligibility	Benefits	Main sources of financing	Main providers	Coverage rate
Government reimbursement: Limited to exceptional cases	**Selective:** • Selected diagnostic procedures + co-pay • 100% for high-cost treatments (open-heart surgery, cancer/drugs, renal dialysis, organ transplantation) • Limited hospitalisation + 15% co-pay • Free vaccination	• General revenues, central government budget allocated to Ministry of Health and Population (MOH) (central)	• Private hospitals	~13% (Citizens with demonstrated financial need, typically elderly, unemployed, low-income.)
National Social Security Fund (social health insurance): • Public employees • Private employees of formal sector • Permanent agricultural employees • University students • Includes dependents (partial coverage) • Public teacher, vendors, medical professionals	**Mainly curative care + <10-20% co-pay:** • Hospital inpatient care + 10% co-pay • Limited outpatient care reimbursed + 15% co-pay • Limited dental	• Employee and employer contributions (payroll tax) • Household premium • General revenues • Co-payments	• Private hospitals.	18%
Governmental and mutual funds • Permanent governmental / Uniformed staff • Cooperatives' mutuals • Includes dependents (partial coverage)	**Mainly curative care + 25% co-pay:** • Hospital inpatient care + 10% co-pay • Limited outpatient care reimbursed + 25% co-pay • Army: fully comprehensive	• General revenues • 1% payroll tax • Mutuals: Households, government subsidies.	• Private hospitals	23% (in total)
Private sector: • Households • Sizeable private health insurance market	**Variable:** • Dependent on individual's ability to pay and availability of services. **Private health insurance:** • Comprehensive: physician and hospital care	• Direct household out of pocket payments • Sizeable household premiums • Private employer contributions.	• Specialist care at private clinics • Private hospitals	Majority pay out-of-pocket payments ~10-15% have private health insurance

Sources: Kronfol and Bachshur, 1989; Kronfol, 2002; Lebanon National Health Accounts, 1998; World Bank, 2000; Ammar, 2003; Consultation and Research Institute, 2005. WHO, 2006f; Ministry of Finance, Lebanon, 2007.

3.4.3. Comparative analysis

Egypt and Lebanon share a similar social and cultural orientation, but the overall organisation of the health sector differs between the two countries (Table 3.7). On the one hand, both countries are middle-income countries, although income per capita is considerably lower in Egypt than in Lebanon. In both countries, this economic and social development seems to have been unbalanced, allowing social inequalities to persist. Their common social heritage also translates into similar health perceptions and medical practice.

On the other hand, the underlying political frameworks at a national and health system level contrast between the two countries. Egypt reflects a relatively 'solidarity-based social system, led by a series of powerful leaders. Economic development has generally been state-led, with a combination of nationalisation and privatisation. By contrast, the Lebanese political system is highly fragmented, with powered divided between approximately eighteen different political factions. Its mercantile, laissez-faire economic development has continued through civil war, leaving much of the responsibility for social support to private and non-governmental actors.

The nature of the health financing systems in Egypt and Lebanon also reveals stark differences. Whilst a universal system of health care provisions exists for all citizens to use in Egypt, no such system exists in Lebanon. Social health insurance schemes operate in both countries and are mandatory for most civil servants. Where the private health insurance market is negligible in Egypt, it is relatively thriving in Lebanon, where approximately 15% of the population have voluntarily purchased this type of insurance.

Considerable public provision is found in Egypt, although citizens prefer to go to private outpatient providers. In contrast, the vast majority of provision in Lebanon is private and dominated by hospitals. Furthermore, providers in both countries are generally paid on a fee-for-service basis, and neither health system incorporates substantive systems of performance-based payments. Understanding such similarities and differences between the Egyptian and Lebanese health systems help to unravel demand- and supply-side incentives to utilise certain types of health services over others.

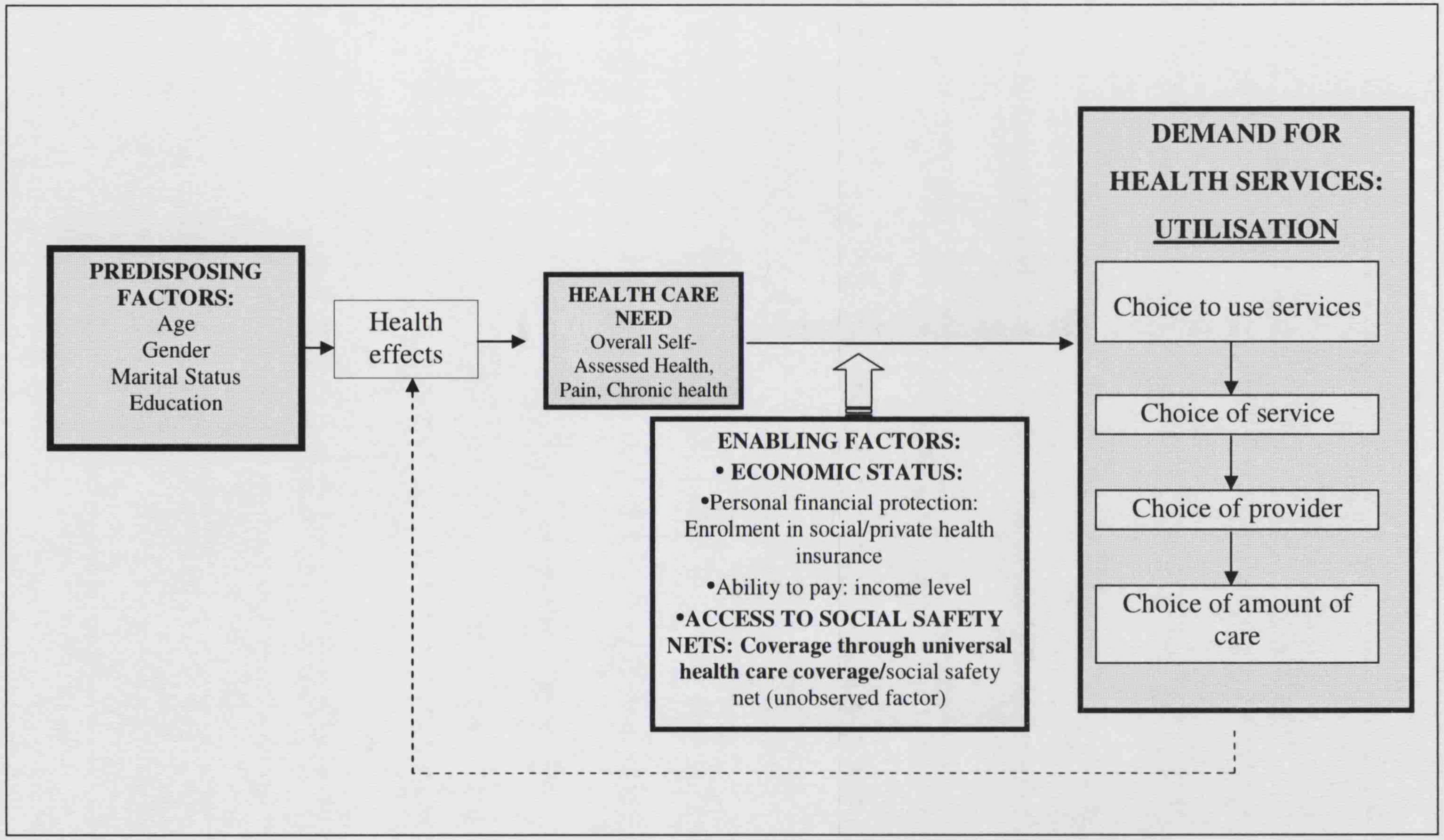
Table 3.7 Summary: Comparison of health system organisation, Egypt and Lebanon

Parameter	Egypt	Lebanon
Overall organisation		
Degree of centralised policy-making and planning by Ministry of Health	Relatively centralised	Relatively fragmented
Financing		
Sources of financing		
• Direct governmental revenues finance universal health system operated by Ministry of Health	National health service provides free care to all citizens	Means-tested coverage for selected treatment provided to 13% of citizens
• Social health insurance	Operates in parallel to national health service (48% of citizens enrolled)	• Social security fund cover 18% of citizens • Other social health insurance cover 23% of citizens
• Private health insurance	Voluntary, supplementary; 1% of citizens enrolled.	Voluntary, comprehensive/supplementary; 15% of citizens enrolled.
• Household out-of-pocket payments	Most households; 58.3% of total health expenditure.	Most households; 58.9% of total health expenditure
Provision		
Outpatient care: % delivered through private providers	~70%	>95%
Inpatient care: % delivered through private providers	~30%	~90%
Presence of functioning gate-keeping system	Relatively weak	Negligible
Predominant provider payment mechanism:		
• Public outpatient clinics	Salary irrespective of output	Not applicable
• Private outpatient clinics	Fee for service	Fee for service or charitable
• Public inpatient hospitals	Fee for service	Fee for service
• Private inpatient hospitals	Fee for service	Fee for service

3.5. Conceptual framework for the analysis

The effect of economic determinants on utilisation is assessed by applying a theoretical and empirical model of the demand for health care, based on the work of Grossman (1972), Anderson (1975), Wagstaff et al (1991), Pohmeier and Ulrich (1995), and others. The conceptual model introduced in Chapter Two is based on the behavioural model of utilisation proposed by Anderson and Newman (1973), shown in Figure 3.5 as adapted in more detail for the analysis in this thesis.

Figure 3.5 Conceptual model used in the thesis: Effect of economic status on utilisation



Sources: Adapted from Anderson and Newman, 1973, as well as Grossman, 1972; Wagstaff et al, 1991; Anderson, 1995; Pohlmeier and Ulrich, 1995; Marmot, 2005.

The conceptual model used in the thesis frames the analysis for examining the effect of enabling factors, such as economic status, which mediate the relationship between health care need and the demand for health services. The additional elements for the model that are proposed in this thesis include: (i) the intermediate component entitled '*health effects*' and (ii) the various associations between enabling factors and *various components* of the demand for health care.

Grossman's (1972) model for the demand for health is based on a human capital approach, in which health is a matter of investment (Mushkin, 1962; Van Doorslaer, 1987). The model stems from production theory and describes health (output) as a function of investment (labour) and an initial stock of health (capital) (Estrin and Laidler, 1995).

The choice to invest in health is posited within a utility maximizing function under constraints, where an individual's total utility is a function of the utility derived from their inherited initial 'stock of health', the 'stock of health' over time, and the consumption of other commodities. In Grossman's model, the stock or amount of health at a given time *t* is subject to the amount of investment in related goods in the period immediately preceding it, such as medical care, length of time, and human capital (Grossman, 1972), expressed as:

$$H_{t+1} - H_t = I_t - \delta_i H_t, \qquad \textbf{Equation 3.1}$$

$$I_t = I_t(M_t, T_t; E_t) \qquad \textbf{Equation 3.2}$$

where I_t is gross investment in health, δ_t is the rate of depreciation during the *t*-th period, M_t is medical care, TH_t is time input, and E_t is the stock of human capital (Grossman, 1972). In effect, the demand for health is only observable through the demand for health care given its latent properties (Culyer, 1976; Williams, 1978).

In this thesis, demand for health care is conceptualised as depicted in Figure 3.4. Based on predisposing factors, such as age, gender, employment status and educational level, and the need for health care, the individual's choice to access, or utilise, health services arises. The bridge between the need for health care and the realised use of services is represented by a set of enabling factors; in this thesis, these are indicated by ability to pay, represented by income level, and coverage of health care services through social or private health insurance; and coverage through universal safety nets. The existence of universal safety nets, such as Egypt's national health system that is available to all citizens, is unobserved in the dataset used for the analysis but is known based on information regarding the health care systems in each country.

The application of this model contributes new evidence to the body of knowledge regarding the economic determinants of the demand for health care in two contrasting funding systems from the Middle East region. The model is applied to the case of various outpatient services and inpatient services. It is also applied to the probability of using services and, conditional upon use, the number of visits to health care providers. In this way, the theory that the determinants of health care vary depending on how discretionary the service is and whether the decision is that of the individual or the agent (provider) is tested in two countries from which such evidence is lacking.

3.6. Empirical framework for the analysis

Following this logic, the demand for health is latent and only observed through the demand for health care (Culyer, 1976; Williams, 1978), where the demand for health care, M_t, is expressed as a function of Anderson's social determinants:

$$M_t = \beta_t X_t + c_t H_t + v, \qquad \textbf{Equation 3.3}$$

where X is a vector of observed characteristics, i.e., predisposing and enabling factors, H_t represents stock of health/medical need at time t, β and c represent parameter estimates, and v represents unobserved disturbance terms (Van de Ven and Van der Gaag, 1982; Wolfe and Behrman, 1984).

Depending on the role of enabling factors such as ability to pay, as indicated by income, the relative importance of socioeconomic status in securing health services and overall equity implications can thus be evaluated.

Empirical Model for the Thesis Equation 3.4

$$UTILISATION = \beta_i(COUNTRY, AGE, MALE, MARRIED, EDUCATION, EMPLOYMENT, INCOME, INSURANCE) + c_i(PAIN\_LEVEL, SELF\_ASSESSED\_HEALTH, CHRONIC\_CONDITIONS) + u_i, \quad i = 1, 2, \ldots, n$$

3.7. Data sources

To address the research questions, this thesis is based on the author's analysis of household survey data from the 2001 Multi-Country Survey Study conducted by the World Health Organization. Several country-specific and international surveys were inventoried on which to conduct analysis, but wide variability in the choice of instruments and questions used to assess self-assessed health, utilisation, and financing were found which could render low inter-comparability.

The 2001 Multi-Country Survey Study was an international survey on health system responsiveness and was found to contain the necessary data for the countries of interest to this thesis. The survey was conducted by the World Health Organization to assess various elements of health system performance with respect to citizens' satisfaction with health care provision in over sixty countries, representing all continents and income levels. Data from the survey have been used to examine reporting bias and disparities in self-reported health (Bago d'Uva et al 2008) and catastrophic expenditures and poverty (Van Doorslaer et al 2006; Van Doorslaer et al, 2007; Jones et al 2007).Samples consisted of men and women aged 18 years or over, non-institutionalised, and living in private households. Multi-stage, stratified random cluster sampling procedures were used to identify eligible respondents, with samples de fact representative of the target populations. One respondent per household was randomly selected using Kish tables, by which an equal probability of selection is given to each eligible individual within a household (Üstün et al, 2003).

To ensure the samples represented the populations from which they were drawn, age and sex distributions were compared to population data from the United Nations (U.N.) database. Deviations were measured using the U.N. Sample Population Deviation Index and adjusted where necessary by applying sample and post-stratification weights to the data prior to release for analysis by researchers (Üstün et al 2003). The sample size for Egypt is n = 4,490 and for Lebanon, n= 3,246. The dataset was not adjusted further as a result, since no additional sample or cluster weights were provided in the dataset made available by the World Health Organization.

The survey instrument is presented and described in detail by Üstün et al (2003). The survey is cross-sectional and was conducted in over sixty countries using a single standardised questionnaire, via face-to-face, telephone, or computer-assisted interviews.

The questionnaire is a module-based instrument that captures a combination of household- and individual-level information, described in subsequent sections in this chapter.

Household-level information includes household composition in terms of age and gender, income, and selected expenditure data. Individual-level information includes demographic characteristics, health insurance, health state descriptions, prevalence of chronic health conditions, utilisation of health services, and perceptions of health system responsiveness such as respect and dignity. Demographic characteristics include age, gender, marital status, education, employment status, and employment type.

3.8. Variable specification

Based on Anderson's (1972) framework adapted for this thesis as shown in Figure 3.4 and Equation 3.4, variables for the analyses were selected that represented the dependent, explanatory, and control factors of interest in this thesis. The variables used in the analysis are summarised at the end of the chapter (Table 3.7 and Table 3.8). Primary dependent variables of interest were the probabilities of using inpatient and outpatient services, whilst primary explanatory variables of interest were income and insurance status. Although enabling factors also include supply-side factors such as distance to providers, public versus private providers, and waiting time (Gravelle et al, 2006), this information was not available from the survey. Control variables included predisposing and medical need factors.

3.8.1. Demographic characteristics

Household-level information includes household members' age and gender. Individual-level information about the respondent includes age, gender, marital status, educational level, employment status, and occupational type. These variables were included in the analysis as control variables.

3.8.2. Health service utilisation

Data were available from the survey concerning the proportion of respondents who had used any outpatient and inpatient health services over a twelve-month recall period, followed by information on the intensity of specific types of services over a one-month recall period. The survey did not collect information on whether services were obtained from private or public providers.

Respondents were asked to indicate if they had used 'any outpatient care' in the questionnaire, defined as 'any place outside your home where you did not stay overnight', such as a doctor's consulting room, clinic, or hospital outpatient unit. This question was intended to capture the aggregate outpatient utilisation.

The intensity of using certain specific services was assessed over a one-month recall period. The number of visits to general practitioners, medical specialists, pharmacies, hospital outpatient units, and hospital inpatient units were assessed. Inpatient care was defined as an overnight stay at a health care centre or hospital.

An attempt was made to create a composite indicator of 'all outpatient visits over one month' and 'all physician visits' to test whether the determinants remain similar after aggregating all types of services. The rationale for aggregating physician is due to the possibility that the roles of physicians and specialists may not differ in all systems. In Egypt and Lebanon, the gate-keeping system between general practitioners and specialists is considered weak, such that individuals often visit specialists directly without a general practitioner's referral. Therefore, general practitioner care may be substituted by specialist care. However, the aggregate indicators consisted of a truncated sample since a large proportion of observations contained missing data for one or more of the services. This truncation resulted in considerable loss of information. Using the aggregate indicators would have resulted in potentially biased and unreliable estimates, as was the case in exploratory analysis. As such, the question posed on 'any outpatient use over twelve months' and the separate physician variables were used to analyses utilisation.

Other information that was collected included whether access to care was refused due to lack of affordability, and whether the respondent did not seek care due to lack of affordability. Information regarding the nature of care that was collected included the general reason(s) for the respondent's last visit and the types of medical service(s) received at the last visit.

3.8.3. Income and expenditure

Data on socioeconomic status available from the survey included self-reported household income and limited information on household expenditure. Generally, information on consumption expenditure or asset information is preferable to self-reported income as a proxy for household living standards, due to measurement error and systematic reporting biases associated with self-reported income (Ferguson et al, 2003; Roy and Howard, 2007).

Household income was used for the analysis as the indicator of household living standards, since data was not available regarding total household expenditures or permanent income indicators. Information on average household income earned per month included income earned from wages, pensions, social insurance benefits, child allowance, and other types of income like rents, before taxes and other deductions. Missing data on income were detected for approximately 17% of the observations from Egypt and 30% of those from Lebanon, found to be missing-at-random and largely due to respondent non-response due to a reluctancy to reveal sensitive income information (N. Naidoo, personal communication, 1 December 2006). In order to preserve the most observations as possible for the analysis, missing values were imputed using multivariate imputation for a single variable of interest (Schenker et al, 2006; Horton and Kleinman, 2007).

Measures of household expenditure are the amount spent on accommodation and food over the last month and on health care over the last year. The amounts spent on insurance, medications, visits to doctors, or 'other' expenditures were captured. This information does not differentiate between other specific types of health expenditures or between expenditure per household member.

In order to allow for cross-national comparisons, expenditure and income data were converted to international dollars using 2001 purchasing power parities and adjusted for household composition (UN Stats, 2007). Adjustments for household composition and size were made by applying an adult equivalency (AE) scale, defined as: $AE = (A + \alpha K)^{\theta}$, where A represents the number of adults in the household, K the number of children, α the cost of children relative to adults, and θ the degree of economies of scale for an average household, ranging from 0 to 1 (Deaton and Zaidi, 2002). For developing countries, values for α typically vary between 0.3-0.5, with values for θ approaching 1 since food is a relatively large share of overall consumption (Deaton and Zaidi, 2002; Wagstaff et al, 2003). In this analysis, values were based on those previously used to assess health equity in Asia, where $\alpha = 0.5$ and $\theta = 0.75$ (Deaton, 1997; Equitap, 2002).

3.8.4. Health need

Health need was represented by variables that capture health status. The underlying assumption was that health status variables capture the majority of health need, although age, gender and unobservable factors may be considered as health need factors (Gravelle et al, 2006).

Health status was defined using 'objective' and 'subjective' measures, although both were self-reported. Objective measures included the proportion of respondents who were diagnosed or had suffered from at least one of sixteen types of chronic health conditions over the past year. Two separate questions were asked of respondents as to whether they had been 'diagnosed' or had 'suffered' from chronic health conditions over the past year, with responses to both questions revealing similar patterns. Therefore, the responses for 'had suffered from chronic health conditions' was used to retain the largest sample size, as there were approximately 10% fewer responses for the question regarding 'diagnosis'. Subjective measures included respondents' ratings on self-assessed health questions. Although self-assessed health represents a useful policy tool that encompasses functionality and perceptions and has been correlated to future changes in health and mortality (Zimmer et al, 2000), some limitations include reporting bias across socioeconomic status and cultural setting (Sutton et al, 1999; King et al, 2003).

The definition and measurement of self-assessed health varies depending on the perspective and theoretical approach regarding measurement and valuation. Psychometric and decision theory approaches yielding two related yet distinct concepts of subjective perceptions of health. Although they represent similar concepts, the terms 'self-assessed health' and 'quality of life' are distinct. *Self-assessed health* represents an individual's description of their health at a given time. *Health-related quality of life* builds on self-assessed health by incorporating an individual's *valuation* of that health state (Kaplan 2004). Increasingly, instruments representing both concepts have been used together to measure an individual's perception of their health status.

From a policy perspective, both concepts are indicative of a subjective perception of *functionality*. Therefore, they can be used interchangeably to indicate levels of illness or disability for purposes of evaluating broader issues related to disparities. Clancy and Eisenberg (1998) describe the power of self-perceived health as a tool for evaluating health system performance. Self-perceived health has been proposed as a tool for determining which populations should be the focus of resource reallocation policies (Sprangers et al, 2000; Fayers and Bjordal, 2001). The concept encompasses an individual's health perceptions, symptoms, functioning, preferences, and values. In this sense, self-perceived health represents the 'continuum of effects of health services on health and well-being, ranging from mortality to patient satisfaction' (Clancy and Eisenberg, 1998).

The self-assessed health module is based on the World Health Organization's International Classification of Functioning, Disability, and Health (WHO, 2002). The health states that were measured in the survey are global health status, pain, mobility, self-care, cognition, interpersonal activities, vision, sleep, and affect. For each state, respondents were asked to rate their health on a five-point ordinal scale.

The choice of self-reported health indicators for the regression analysis was based on (a) the distribution of respondent ratings, and (b) the correlation between various indicators and utilisation based on the literature and results of various regression models tested in this thesis. In addition, the choice of the 'objective' self-reported indicator for chronic health conditions was made in a similar way. The effect of using an aggregate indicator for chronic health conditions was compared to the effect of using disaggregated indicators. This was evaluated by including indicators that were most prevalent amongst respondents.

3.9. Descriptive analyses

3.9.1. Respondent characteristics

Sample characteristics were evaluated for all main variables of interest using two-tailed tests of significance where appropriate. Bivariate analyses were used to examine the relationship between income and health status, insurance coverage, and out-of-pocket payments. Income-associated inequity in the incidence of catastrophic expenditures was assessed using methods developed by van Doorslaer and Wagstaff (1992) and others (Wagstaff et al, 1991; Wagstaff et al, 2003).

3.9.2. Equity: the concentration index approach

The distribution of health indicators can be examined in several ways, ranging from tabulations by income group to numeric indices of total inequality. In this thesis, income-related equity in health need, access, and the economic burden of health care was quantified using the concentration index approach developed by Wagstaff et al (1991). Other approaches include those developed by Kakwani (1977), Le Grand (1978), Collins and Klein (1980).

The concentration index approach, through the convenient regression technique, was applied to measure inequity in health status, use, insurance, out-of-pocket payments, and catastrophic expenditures (van Doorslaer et al, 1993). The main advantages of using the concentration index approach in this thesis is the ability to simultaneously adjust for demographic need factors and to produce a *single numeric indicator* that quantifies the degree of inequity (Wagstaff and van Doorslaer, 1993; O'Donnell et al, 2008).

The concentration curve is a measure of how equally a variable of interest is distributed across a given population (Wagstaff et al, 1991; van Doorslaer et al, 2000; van Doorslaer and Jones, 2004; van Doorslaer et al, 2004). In this thesis, the distribution of 'total ill health' across 'total population income' is measured. Similar to the Lorenz curve of the distribution of income, the concentration curve is defined as the cumulative rate of the incidence of the health variable against cumulative levels of income. To evaluate whether the concentration is skewed towards a particular income group, the curve is compared to the 'line of perfect equality', which indicates a perfectly equal distribution of the health variable against the distribution of income.

In the <u>concentration curve</u> diagrams, the line of perfect equality is a straight diagonal line; a concentration curve that lies <u>along this line</u> represents an income-neutral distribution. A concentration curve that lies <u>above</u> the line represents a health distribution that is skewed towards lower-income groups, or '<u>pro-poor</u>'. A concentration curve that lies <u>below</u> the line represents a distribution that is concentrated amongst higher-income groups, or '<u>pro-rich</u>'.

The concentration index represents twice the difference between the line of equality and the concentration curve for the health care variable. Values equal to zero suggest an income-neutral distribution; values less than zero denote a pro-poor distribution; and values greater than zero denote a pro-rich distribution.

Regarding health status, utilisation, and insurance coverage, inequality and inequity in the health variables are compared in this thesis. Inequality exists if some groups use more health services than others, which is captured in the 'actual' concentration indices in this thesis. However, this inequality may be due to a genuine difference in the need for health care. To test whether this inequality is attributed to differences in health need and/or socioeconomic status, the health variables are also adjusted for need and compared to actual values. After controlling for need, differences that persist across socioeconomic groups indicate that the system is inequitable rather than unequal.

The distribution of the health variables is therefore assessed before and after standardising for need. The distribution of health need, indicated by self-assessed health, pain, and chronic health conditions, was standardised for demographic factors including age and gender. The use of services and health insurance coverage were standardised for health need and demographic factors.

Two types of standardisation techniques exist, direct and indirect (Wagstaff and van Doorslaer, 1993; O'Donnell et al, 2008). The direct method provides general trends by comparing the use of health services by 'matching' demographics across socioeconomic status. However, indirect standardisation is generally preferred as it is a more accurate way of assessing how well need matches utilisation. This approach calculates the rate of health care use that would be expected for a given health need, by regressing health care use on demographic and health need variables (van Doorslaer et al, 2000; O'Donnell et al, 2008). This rate is compared to the actual rate. If utilisation is below what is expected, this constitutes inequity that disadvantages the poor ('pro-rich'). If utilisation is above what is expected, this represents inequity favouring the poor ('pro-poor').

The standardised concentration index summarises the standardised distribution. The same approach is adopted for ill health and health insurance. There was insufficient information on all household members in order to adjust for 'household' health need.

As mentioned, out-of-pocket payments were adjusted for household composition to calculate the amount per capita (per adult equivalent). An attempt was made to adjust for individual-level health need, which showed identical results to the unadjusted concentration index and curve, as expected.

Regarding out-of-pocket payments, the degree of vertical equity is used to assess fairness in financial contributions made by individuals with different levels of ability to pay. Vertical equity captures the notion that those with *different* levels of ability-to-pay are treated *differently* (Wagstaff and van Doorslaer, 1993). This means that poorer groups would pay a smaller share of their income for the same amount of care than richer groups. In a progressive financing system, health care payments rise as a share of income as income rises. Payments are thus linked to income (van Doorslaer and Wagstaff, 1993).

Equity in the number of households that face exceptionally high health expenditures that are expected to impinge on living standards was also assessed. This measure is the incidence of 'catastrophic expenditures'. The threshold for catastrophic health expenditures is typically set at a value between 5% and 25% of total household consumption, expenditure, or income; or can be set at approximately 40% of non-food expenditure (Wagstaff et al, 2003). In this thesis, the threshold was set at 10% of total household income, as neither total household expenditure nor types were available. Therefore, an amount of out-of-pocket payments that exceeds this threshold is considered catastrophic.

3.9.3. Poverty impact of out-of-pocket payments

It was important to understand whether the extent of out-of-pocket payments and catastrophic expenditures would impinge on living standards. Where health care is ideally considered a public or merit good, out-of-pocket payments or exceptionally high payments would violate notions of social justice. This violation would be particularly unacceptable where payments impinge on welfare and disproportionately so for the poorest groups. Most poverty measures do not typically take into account health care-related expenditures or do not explicitly show the contribution of health care payments to poverty levels (Van Doorslaer et al, 2006). Therefore, in this thesis, the poverty headcount was estimated before and after accounting for out-of-pocket payments for health care (Wagstaff et al, 2003). The poverty headcount indicates the percent of households that fall below the poverty line, defined in relative or absolute terms.

Three analyses were conducted to test the sensitivity of using different poverty lines. Three poverty lines were used: a relative poverty line and two absolute poverty lines. The relative poverty line was set equal to one-third the mean national income per capita (Wagstaff et al, 2003). Absolute poverty lines were set according to international poverty lines estimated by the World Bank, although other approaches by which to measure poverty exist as described elsewhere (Coudouel et al, 2002; Wagstaff et al, 2003).

Analysis was conducted using poverty lines of 1993 US$1.08 and US$2.15 per capita per day inflated to 2001 values using average annual consumer price indices for each country, shown in the Appendix A (UN Stats, 2007). Generally, the lower absolute poverty line is used for low- or lower-middle income countries such as Egypt, with the higher line used for upper-middle income countries such as Lebanon (Coudouel et al, 2002).

Using the dollar-a-day poverty line, conversions produce an Egyptian poverty line of US$49.22 per capita per month and a Lebanese poverty line of US$10.23 per capita per month at 2001 prices.

3.10. Multivariate analyses

3.10.1. Background

The use of regression analysis is a recognized tool for evaluating the correlation between an individual factor on an outcome controlling for other factors, and the relative relationships between those factors (Dougherty, 2007). In conjunction with other econometric techniques, it proves valuable in helping to draw causal inferences from cross-sectional data (Winship and Morgan, 1999). Multivariate regression models have been used to address similar questions within the field of health services research (Zimmer et al, 2000; Erbsland et al, 2002; Hotchkiss et al, 2007; Roy and Howard, 2007).

The choice of the regression method is based on the type of assumptions needed to accurately specify the relationship between the dependent and independent variables.

The linear regression model is the most fundamental type of regression, typically estimated using the method of ordinary least squares. However, in the case of most real-world data on health care use, two main drawbacks to applying ordinary least squares regressions are: (a) the assumption of a normal distribution, and (b) the possibility that the model predicts negative values. The first assumption is rarely true for health care utilisation. The second assumption is not applicable. The majority of health care use is typically concentrated amongst a small minority, with long, right tails typical of most distributions. Some techniques that have been used to address these limitations include log transformation and dichotomisation of dependent variables (Welch, 1985; Diehr, 1999; Farrington and Loeber, 2000; Barnett and Franks, 2002). However, the use of alternative regression models have proven more efficient and to be a better fit than transforming the variables alone (Streiner, 2002; Cantoni and Ronchetti, 2006; Royston et al, 2006).

The four regression models used in the analysis are discussed in the next sections. For the probability of using services, two types of regression models were used to assess the binary choice of whether or not to use health services for questions. These models are the *recursive bivariate probit* and the *probit* models. For the intensity of using services, two types of models were used to assess the number of health care visits, characterised as count data. The first type is the *hurdle model,* composed of a binary and a count regression model, with the latter represented by the *zero-truncated negative binomial model.* The second type of model is the *zero-inflated negative binomial model.*

3.10.2. Probability of use

Binary regression models are useful in estimating the probability of an event occurring by assuming either a logistic or normal distribution of the error terms. These distributions give rise to the logit and probit model, respectively (Greene, 1997). The choice between the two is generally arbitrary, as both tend to yield equally satisfactory results in most cases (Amemiya, 1985). The binary regression relationship is denoted by the expression:

$$y_i^* = \beta_i' x_i + u_i, i = 1, 2, \ldots, n, \qquad \textbf{Equation 3.5}$$

where:

$y = 1$ if $y_i^* > 0$ and

$y = 0$ if otherwise.

Here, y_i* represents the main outcome variable of interest, or utilisation; β_i' represents the set of estimate coefficients for a given set of explanatory variables, denoted by x_i; u_i represents the error term, and i represents a given observation. The probit models are used in this thesis. As such, the coefficients β_i' are called probit indices and are on a latent scale. The latent scale represents the *unobserved propensity* for one of two possible outcomes, and therefore the coefficients are not directly interpreted quantitatively, but qualitatively (Jones et al, 2007).

Therefore in the probit model, the coefficients *do not* directly represent a given percent change in y_i* for a unit change in β_i', which is the case in linear regression. In *probit regression*, the coefficients are interpreted qualitatively by assessing (i) the *relative* magnitude of the coefficients to other coefficients, and (ii) the sign of the coefficient which may be negative (-) or positive (+). For purposes outside the scope of this thesis, the coefficients may also be translated into marginal effects in order to predict outcomes for certain combinations of values given to the covariates.

To ensure the reliability of parameter estimates, it is important to test for possible endogeneity amongst explanatory factors. Endogeneity is said to occur if the error term of the independent variables determine the value of the dependent variable, biasing the estimated effects of the independent variables on the outcome (Waters, 1999; Dougherty, 2007). In this case, health insurance was suspected of being endogenous to the model since the likelihood of having insurance may be influenced by unobservable factors, such as the decision of where to live, the type of employment sought, or behavioural attitudes towards risk (Waters, 1999; Ekman, 2007).

To test for endogeneity of the health insurance dummy variable, the *recursive bivariate probit model* was adopted given its utility in similar analyses elsewhere (Waters, 1999; Fabbri et al, 2004; Jones et al, 2004; Jones, 2007). Elaborated in the literature regarding simultaneous equations, the general two-equations model takes the form:

$$y_{1i}^* = \beta_{1i}' y_{2i} + \gamma_{1i}' x_{1i} + u_{1i} \qquad \textbf{Equation 3.6}$$

$$y_{2i}^* = \beta_{2i}' y_{1i} + \gamma_{2i}' x_{2i} + u_{2i}, \qquad \textbf{Equation 3.7}$$

where the main outcome of interest, y_{1i}*,and the 'treatment' or endogenous variable, y_{2i}*, are simultaneously determined (Maddala, 1983). In this analysis, the main outcome of interest, y_{1i}*, represents the likelihood of utilisation, while the endogenous variable, y_{2i}*, represents whether or not the individual is covered by health insurance. The probit model was therefore chosen on the basis that the recursive bivariate probit model incorporates the probit, and not logit, model.

3.10.3. Frequency of use

To assess the determinants of the number of visits, the hurdle model was chosen. Count data regression relates to the relationship between the number of events of interest in a given time interval and a set of covariates (Cameron and Trivedi, 1996). The hurdle model was introduced within the context of health care to model the principal-agency nature of health care (Pohlmeier and Ulrich, 1995; Santos Silva and Windmeijer, 2001). A fundamental assumption of other count regression models is that a single process determines the occurrence of an event. However, in health care, the principal-agency theory has been used to distinguish between two processes underlying an event.

In this framework, the determinants of making the first contact with the health system are considered to be distinct from those determining subsequent events. The hurdle model thus relaxes the assumption of most count models that events are produced from a single process (Pohlmeier and Ulrich, 1995; Cameron and Trivedi, 2001). The hurdle model consists of two parts associated with each process. The model may comprise the same explanatory factors that are interpreted differently depending on the stage of the decision-making process (Pohlmeier and Ulrich, 1995).

The <u>first part of the hurdle model</u> examines factors predicting the probability of having at least one visit as compared to zero visits, also known as the 'contact decision'. This decision was assessed using the recursive bivariate probit model or the standard probit model if the insurance variable was not found to be endogenous to the model.

The <u>second part of the hurdle model</u> examines factors predicting the *intensity* or frequency of visits conditional upon having at least one visit, assessed using the zero-truncated negative binomial model. In this thesis, estimates from each part assessed separately in order to examine each decision-making process.

3.10.3.1. Zero-truncated model

For the second part of the hurdle model, the zero-truncated negative binomial model was used to analyse the data amongst respondents with at least one visit. The rationale for using the zero-truncated negative binomial model lies in its advantage in accurately modelling health care count data for purposes similar to this thesis (Cameron and Trivedi; 1991, Pohlmeier and Ulrich, 1995; Fabbri and Monfardini, 2003; Economou et al, 2007; Asada and Kephart, 2007). Given the fundamental issues regarding linear regression and count data in health care, the Poisson regression model is typically the starting point for modelling utilisation. Poisson regression denotes the analysis of discrete random variables under certain conditions (Cameron and Trivedi, 1986). The main advantages to its use are that count data are allowed to have non-normal distributions, and predictions are restricted to non-negative values.

However, three main conditions of the Poisson distribution are rarely upheld in the case of health care use. The econometric background to these conditions is elaborated in detail in Cameron and Trivedi (1986; 2001), Long and Freese (2006), Winkelmann (2005) and others. These conditions include: (a) that the data exhibit equidispersion; (b) that the same number of zero counts as predicted by the Poisson model; and (c) that the data are not truncated from the left of the distribution. Yet in reality, most health care use data exhibit the following characteristics: (a) overdispersion; (b) excess zeros; and (c) truncation of observations with zero counts.

Equidispersion implies that the mean of the distribution is equal to its variance, where the probability of an event occurring is constant across observations or at any given time in an interval. The mean is often referred to as the expected value of a given variable, and represented by μ. The variance measures the spread of the distribution, with the square root of the variance equal to the standard deviation. However, health care use data often exhibit overdispersion, considered to be the main problem that precludes the use of the Poisson model. Inappropriately applying the Poisson model has been shown to lead to particularly small standard errors, loss of efficiency and consistency, and poor predictions and fit (Cameron and Trivedi, 1986, 1996; McKenzie et al, 1998; Long and Freese, 2006).

Overdispersion has been the source of considerable investigation due to its relatively large role in biasing estimates. Overdispersion implies that the variance of the distribution of events is greater than its mean, and has been attributed to three main causes (Cameron and Trivedi, 1999). First, there may be *unobserved* heterogeneity that is not accounted for in many Poisson models. This problem is often overcome by adapting the Poisson model, generating the negative binomial model. Second, there may be two processes underlying the event, one that determines the first event, and one that determines subsequent events. The hurdle model has been used to address this issue. Third, overdispersion may be caused by interdependence between the occurrences of events, where the probability of one event occurring influences the probability of another event. Interdependence of events is common in health care; for example, multiple visits may be related to the same spell of illness. The negative binomial relaxes the assumption of independence of the occurrence of events.

The negative binomial also addresses the problems of excess zeros and truncation-at-zero. Poisson models have been shown to underestimate the number of zeros in a sample, where the sample exhibits excess zeros than that predicted by the model. This problem has been attributed to the fact that the Poisson model is a function of a single parameter, μ, taking into account only *observed* heterogeneity in a sample with error term ε. The negative binomial model is derived from the Poisson distribution primarily by relaxing its assumptions regarding overdispersion.

The negative binomial accounts for over-dispersion in two ways: (1) the introduction of an additional parameter α that represents *unobserved individual* heterogeneity; and (2) the variance, now a function of α, is not necessarily equal to the mean and can vary across observations. To illustrate the model, the Poisson model is first described, represented by the following expression for a given observation i:

$$\mu_i = E(y_i|x_i) = \exp(x_i'\beta), \qquad \textbf{Equation 3.8}$$

where μ_i is the expected (E) count of a given outcome y_i conditioned on a set of covariates $\mathbf{x}_i$, with y_i assuming a Poisson distribution, and β representing unknown parameters or semi-elasticities (Cameron and Trivedi, 1996; 2001). The conditional variance **V** of the distribution of events **Y** is equal to the conditional mean, as shown by the following expressions:

$$E[Y] = \mu \quad \text{and} \quad V[Y] = \mu \qquad \textbf{Equation 3.9}$$

The negative binomial introduces an error term ε that represents unobserved individual heterogeneity, expressed as:

$$\mu_i = E(y_i|x_i) = \exp(x_i'\beta + \varepsilon_i) \qquad \textbf{Equation 3.10}$$

The conditional mean remains the same as that of the Poisson distribution, where both models would typically yield the same expected rate for a given level of covariates (Cameron and Trivedi, 1986; Long and Freese, 2006). However, the conditional variance is a function of the degree of overdispersion in the model, expressed as:

$$\mathbf{E}[y_i|\mu_i,\alpha] = \mu_i \quad \textbf{and} \quad \mathbf{V}[y_i|\mu_i,\alpha] = \mu_i\,(1+\alpha\mu_i) \qquad \textbf{Equation 3.11}$$

Whilst y_i assumes a Poisson distribution, the variance is influenced by the distribution of the dispersion parameter α, typically the gamma distribution (Γ) (Cameron and Trivedi, 1996; Cameron and Trivedi, 2001; Long and Freese, 2006). The combination of distribution gives rise to the *mixture class* of count data models that characterises the negative binomial model. The classic probability density function for the model is expressed as:

$$\Pr(y_i|x_i) = \frac{\Gamma(y_i+\alpha^{-1})}{y_i!\,\Gamma(\alpha^{-1})}\left(\frac{\alpha^{-1}}{\alpha^{-1}+\mu_i}\right)^{\alpha^{-1}}\left(\frac{\mu_i}{\alpha^{-1}+\mu_i}\right)^{y_i} \quad \textbf{for } y_i = \textbf{0,1,2}\ldots\boldsymbol{i} \qquad \textbf{Equation 3.12}$$

where $\alpha > 0$, which denotes overdispersion in the predicted distribution. As the magnitude of α increases, the degree of dispersion in the predictions increases (Long and Freese, 2006). The model was estimated through maximum likelihood estimation, restricting the predictions to non-negative values (Cameron and Trivedi, 1996).

To allow for truncation in the second part of the hurdle model, the negative binomial model was applied only to those observations with non-zero visits. Hence, the *zero-truncated negative binomial* model follows the same logic behind the classic negative binomial model, but differs in that zeros are excluded from the analysis (Cameron and Trivedi, 1996; Long and Freese, 2006). The endogeneity of the health insurance variable was not assessed in the count data models. This is due to two factors. First, the data did not contain sufficient information on factors that could be used as instrumental variables (Windmeijer and Santos Silva, 1997; Kenkel and Terza, 2001; Romeu and Vera-Hernandez, 2005; Terza et al, 2008). Second, since the health insurance variable was generally not endogenous in the first part of the hurdle models in this thesis, it was assumed that any bias arising from endogeneity in the second part would be minimal.

3.10.3.2. Latent class model

The classic principal-agency theory may not be applicable in all cases in health care. Therefore, an alternative approach as represented by the *zero-inflated negative binomial model* was explored for methodological purposes in the thesis. Previous research shows that (Noro et al, 1999; Santos Silva and Windemeijer, 2001) the hurdle model may not fit count data as well in cases where the visits are due to multiple spells of illness, as compared to a single spell of illness. The zero-inflated model was developed to try to overcome this limitation.

The zero-inflated model has gained popularity in addressing the issue of *excess zeros* in cases where the number of zeros in the sample is larger than that predicted by the classic negative binomial. The model has been applied and found to be superior to its negative binomial cousin in some cases, particularly with longitudinal studies and relatively large datasets (Freund et al, 1999; Sarma and Simpson, 2006). In brief, the zero-inflated binomial model departs from the classic principal-agency approach by analysing the binary choice and the intensity *simultaneously*, rather than in two distinct parts.

The zero-inflated model is a specific type of mixture model that is characterised as a *latent class* model (Mullahy, 1997; Cameron and Trivedi, 2001). Rather than distinguishing between users and non-users based on *observed* use, observations are grouped according to the latent classes of *high* or *low users*, sometimes referred to as *not-always zeros* and *always zeros* depending on the purpose of the analysis (Long, 1997).

One of the main advantages of latent class models over hurdle models is the more accurate estimation of some effects. Some effects may be estimated more accurately than in hurdle models, as found in seminal research using longitudinal data from the Rand Health Insurance Experiment and other large, cross-sectional datasets (Deb and Trivedi, 2002; Bago d'Uva, 2005, 2006; Lourenço and Ferreira, 2005).

The latent nature of the model is its defining feature. The probability of being in each class is based on *unobservable* characteristics, modelled as a binary choice, followed by analysis of the probability of the number of events. The parameters from both components are assumed to be multiples of one another. The zero counts may arise from members of *either* class, with extra weight given to the probability of a zero count (Winkelman and Boes, 2006). The parameters for each component are modelled in a single step, which simultaneously produces separate sets of estimates for each component in the output (Long, 1997). The top half of the output shows the determinants of the *probability* of being an *always zero* user, relative to being *not-always zero*, or a *high user*; the lower half of the output shows the determinants of the *intensity* of use *amongst* high users.

In this thesis, the intensity of use was primarily examined by applying the hurdle model that incorporates the hurdle approach. However, the zero-inflated model was also applied to test the appropriateness of this technique in comparison to the primary method. Estimation results from the zero-truncated negative binomial and those from the zero-inflated models were compared using goodness-of-fit tests described earlier, including the AIC, BIC and Vuong statistics (Appendix H).

The Vuong statistic compares the predictive value of the zero-inflated negative binomial model with the negative binomial regression model, which does not inflate zero-probability (Long and Freese, 2006). The zero-inflated model is preferred if $p<0.05$. Where the zero-inflated model is preferred, results from both models are compared briefly. The coefficients from the zero-inflated models for each type of health service are summarised in Appendix I. The full output for hospital outpatient visits is shown as an example of the model (Appendix G).

3.10.4. Interaction effects

The interrelated effects between country, income, and insurance were explored through the use of interaction terms, which explore the interdependency of effects between variables (Norton et al, 2004). Due to the nature of health care financing in each country, it was hypothesised that the effects of the main explanatory variables may be interrelated in four ways.

First, the effect of insurance on utilisation may depend on income level, leading to the term 'income*insurance'. Second, the effect of insurance on utilisation may vary across countries, generating 'country*insurance'. Third, the effect of income may also be moderated by country, generating 'country*income'. Finally, the relationship between insurance and income may itself depend on the country, leading to 'country*income*insurance'.

The interaction effects were tested iteratively. Four versions of the pooled model and two versions of the country-specific model per health services were used to assess the effects. In the pooled analyses, the first model included the country variable alone, denoted as Model 1. For the pooled probit model for outpatient care, Model 1 is expressed as:

[Model 1] **Equation 3.13**

$$y_i = \beta_i' x_i + u_i,\ i = 1, 2, \ldots, n,$$
$$or,\ OUTPT = \beta_{iCOUNTRY} COUNTRY + u_i,\ i = 1, 2, \ldots, n$$

The addition of the other explanatory variables leads to Model 2, the main effects model:

[Model 2] **Equation 3.14**

$$OUTPT = \beta_{iCOUNTRY} COUNTRY + \beta_{iAGE} AGE + \beta_{iMALE} MALE + \beta_{iMARRIED} MARRIED + \beta_{iEMPLYD} EMPLYD + \beta_{iLOGINC} LOGINC + \beta_{iOPINS} OPINS + \beta_{iPAIN} PAIN + \beta_{iSAH} SAH + \beta_{iCHRONIC} CHRONIC + u_i,\ i = 1, 2, \ldots, n$$

The three pair wise interaction terms were added to form Model 3, including the interactions between income*insurance, country*insurance, and country*income:

[Model 3] **Equation 3.15**

$$OUTPT = \beta_{iCOUNTRY} COUNTRY + \beta_{iAGE} AGE + \beta_{iMALE} MALE + \beta_{iMARRIED} MARRIED + \beta_{iEMPLYD} EMPLYD + \beta_{iLOGINC} LOGINC + \beta_{iOPINS} OPINS + \beta_{iPAIN} PAIN + \beta_{iSAH} SAH + \beta_{iCHRONIC} CHRONIC + \beta_{iINC*INS} INC*INS + \beta_{iCNTRY*INS} CNTRY*INS + \beta_{iCNTRY*INC} CNTRY*INC + u_i,\ i = 1, 2, \ldots, n$$

Finally, the addition of the triple interaction term, country*income*insurance, generates Model 4:

[Model 4] **Equation 3.16**

$$OUTPT = \beta_{iCOUNTRY}COUNTRY + \beta_{iAGE}AGE + \beta_{iMALE}MALE + \beta_{iMARRIED}MARRIED + \beta_{iEMPLYD}EMPLYD + \beta_{iLOGINC}LOGINC + \beta_{iOPINS}OPINS + \beta_{iPAIN}PAIN + \beta_{iSAH}SAH + \beta_{iCHRONIC}CHRONIC + \beta_{iINC*INS}INC*INS + \beta_{iCNTRY*INS}CNTRY*INS + \beta_{iCNTRY*INC}CNTRY*INC + \beta_{iCNTRY*INC*INS}CNTRY*INC*INS + u_i,\ i = 1, 2, \ldots, n$$

The country-specific models explored the interactions in a similar way. In each country-specific regression model, Model 1 denotes the main effects model. Model 2 denotes the main effects model with the addition of the income*insurance interaction term.

3.10.5. Summary of multivariate methods

A summary of all regression models that were developed for the thesis is shown at the end of this chapter (Table 3.7). Determinants of health insurance were assessed using three models, for 'any insurance', 'outpatient insurance', and 'inpatient insurance'.

Probability models were developed separately for overall outpatient care, inpatient care, and 'any care' over the twelve-month recall period. Probability models were also developed for each of the separate outpatient services as well as overall inpatient care over the one-month recall period. Results are discussed regarding outpatient and inpatient health services in order to address the main research questions, as these results are viewed as more relevant to informing policy implications for health financing. Multivariate probit results for 'any care' are shown in Appendix C.

Count models were developed for each of the separate outpatient services and for overall inpatient care over the one-month recall period. In order to examine the effect of country setting on utilisation, models of health service utilisation were applied by pooling observations from the two countries, and consequently, by applying the models to separate country samples.

The criteria used to select variables for inclusion in the model were based on (i) the distribution of responses; (ii) previous literature on the predictive value of a variable; and (iii) the correlation between variables. The choice of health need variables is based on the regression models shown in Appendix E. Based on the results, the use of 'overall self-assessed health' and 'pain' as the subjective health indicators appear to be more closely correlated with utilisation than 'difficulty moving', 'difficulty with daily work', 'difficulty with self-care' or 'feeling sadness'. In addition, the addition of these four variables does not substantially change the effects of income and insurance on utilisation. The use of disaggregated variables for chronic health conditions also does not appear to substantially change the effects of income and insurance on utilisation (Appendix F). For purposes of the main questions for this thesis, health need is therefore represented by 'self-assessed health', 'pain', and 'chronic health conditions'. These results are discussed in Chapter Six.

The degree of multicollinearity, or correlation between the explanatory variables, was assessed using (i) the variance inflation factor test (Rabe-Heskith and Everitt, 2007); and (ii) excluding and including in a step-wise fashion income, insurance, or employment status variables (Dougherty, 2007), in order to test for collinearity between these variables in particular as they are central to the analyses. The results of the variance inflation factor test indicate there is a moderate degree of multicollinearity, as the variance inflation factor is less than 10 (Appendix B). The variance between specific combinations of variables central to the analysis was also tested. These results show that the variance is barely above 1, suggesting a small degree of collinearity that is not expected to substantially alter results.

To test the measure of fit for each model as a whole, log-likelihood measures were used, with the addition of model comparisons for the two types of count regressions (Long and Freese, 2006; Dougherty, 2007). These measures include (i) log-likelihood for maximum likelihood estimation (ML); (ii) likelihood ratio test of chi-squared, testing if coefficients in the model are zero ($p<0.05$, reject hypothesis); and (iii) for count-data models, in addition to the chi-squared test, the Akaike's and the Bayesian information criteria (AIC and BIC, respectively). The AIC and BIC are two different measures used to compare the fit of the zero-truncated and zero-inflated negative binomial models. The smaller the AIC, the better the fit; the more negative the BIC, the better the fit (Long and Freese, 2006).

Regression models were developed using a forward strategy based on the likelihood ratio test (criterion 0.05). Estimates include probit indices, beta coefficients, robust standard errors, p-values, and 95% confidence intervals. Examples of the full Stata output based on the case of outpatient care are shown in Appendix D. The RESET functional form test results are presented in the output tables in each chapter. Marginal effects for the main inpatient and outpatient models are presented in the Appendix. All analyses employed two-tailed significance levels of $p<0.05$ and were conducted using Stata 10 SE (StataCorp LP, College Station, Texas, USA).

3.11. Data limitations

The limitations of the data are introduced in this section, with further limitations discussed in the final chapter based on additional findings gleaned from conducting the analysis. First, cross-sectional data poses some challenges for inferring causality, as longitudinal panel data are preferred. However, the multivariate methods used in this thesis and knowledge of previous longitudinal research allow the researcher to draw conclusions regarding the associations between the dependent and independent variables (Winship and Morgan, 1999).

Next, data on the use of health services were not available for all time frames or for all types of health services. Data were available regarding the probability of care over twelve months for aggregate outpatient and inpatient measures; and on the intensity of care for services over one-month recall. Data were not available on the intensity of care over a longer time frame, or whether the service was obtained at a private or public facility. Early in planning the thesis, there was an interest in evaluating the determinants of utilisation amongst chronic health conditions such as chronic kidney disease and diabetes, given their significant health and economic burdens. However, in light of the lack of survey data with which to assess these aspects, the present research questions were deemed important in their own right, prior to addressing more detailed, condition-specific issues.

Data on length of stay for hospital inpatient care were not collected in the thesis. Instead, the number of inpatient visits is examined. Data on the probability of inpatient care over a twelve-month period may be more reliable than over a one-month period. Since few respondents were hospitalised (less than 10%), the longer recall period provides a larger sample size. Visit-specific information regarding the illness or injury and the severity of disease for which care was sought was not available.

Income and expenditure data were collected at an aggregate, household level, with no information collected on either income or expenditure of individual household members. It is assumed that all members in a given household share the same economic status. Other researchers in the field have dealt with this limitation by using this assumption and incorporating adjustments for household size and age structure as necessary (Roy and Howard, 2007). The survey did collect information on aggregate out-of-pocket payments but did not distinguish by type of specific service or by sector, such as public or private providers. Information was not available on all types of household expenditure, and regarding health, only physician and medication payments were collected.

A minority of respondents (less than 1%) provided information on 'other' costs, but whilst this information was included in the aggregation of 'total out-of-pocket health expenditures', the sample size was considered too small to conduct equity analyses. In addition, the degree of missing income data may be due to respondents' reluctance to provide information, as observed by the interviewers (personal communication, N. Naidoo, World Health Organisation, 1 December 2006). This issue was addressed through the use of imputation to complete the data.

Finally, cross-national comparisons may be imperfect, since interpretability by respondents can vary across difference cultures (King et al, 2003). The relationships between variables may also differ across countries, as pointed out in a critique of the 2000 World Health Report on equity (Nord, 2002). Some factors may also be unique to certain settings. Ayé finds that 'social capital', or informal social solidarity, in the Ivory Coast is a determinant of access to health care particularly for individuals unable to afford out-of-pocket payments (2002).

Since the Egyptian and Lebanese societies are relatively similar, these limitations are not considered significant. Also, although the population samples collected in the Multi-country Survey Study were weighted to represent population distributions on age and gender, residual bias may still exist. In sum, the limitations of the data provide both important caveats in interpreting results, as well as interesting avenues for future research in the area of health care utilisation.

Table 3.8 Variable definitions

Variable	Type	Definition (Statistics by country are presented in Chapter 4)
Dependent variables		
• Any care	Binary*	Dummy variable =1 if respondent has visited any health care providers over past 12 months.
• Any Outpatient care	Binary	Dummy variable =1 if visited any type of outpatient provider over past 12 months.
• General practitioners	Binary	Dummy variable =1 if visited general practitioners over past month.
• Specialists	Binary	Dummy variable =1 if visited medical specialists over past month.
• Pharmacy	Binary	Dummy variable =1 if visited pharmacists over past month.
• Hosp Outpatient	Binary	Dummy variable =1 if visited hospital outpatient units over past month.
• Hosp Inpatient-12-mo	Binary	Dummy variable =1 if visited hospital inpatient units over past 12 months.
• Hosp Inpatient-1-mo	Binary	Dummy variable =1 if visited hospital inpatient units over past month.
• General pract visits	Count	Number of general practitioner visits over past month.
• Specialist visits	Count	Number of hospital inpatient visits over past month.
• Pharmacy visits	Count	Number of pharmacy visits over past month.
• Hosp Outpatient visits	Count	Number of hospital outpatient visits over past month.
• Hosp Inpatient visits	Count	Number of visits to hospital inpatient units over past month. (12-month not available)
Dependent and Independent variables		
Enabling factors		
• Any health insurance	Binary	Dummy variable = 1 if respondent has insurance coverage for any type of health care.
• Outpatient insurance	Binary	Dummy variable = 1 if coverage for outpatient care.
• Inpatient insurance	Binary	Dummy variable = 1 if coverage for inpatient care.
Independent variables		
Demographic factors		
• Country	Binary	Dummy variable = 1 if respondent resides in Egypt, 0 if resides in Lebanon
• Log income	Continuous	Log of reported household income per adult equivalent over past 12 months.
• Age	Continuous	Years of age
• Male	Binary	Dummy variable =1 if male
• Married	Binary	Dummy variable =1 if married
• Secondary education	Binary	Dummy variable =1 if completed at least secondary education, 0 if less than secondary education
• Employed	Binary	Dummy variable =1 if respondent is employed
• Gov employee	Binary	Dummy variable = 1 if governmental employee
• Nongov employee	Binary	Dummy variable = 1 if employee in private sector or non-governmental organisation
• Self-employed	Binary	Dummy variable = 1 if self-employed
• Unpaid work	Binary	Dummy variable = 1 if employed as volunteer
• Student	Binary	Dummy variable = 1 if student
• Homemaker	Binary	Dummy variable = 1 if homemaker
• Retired	Binary	Dummy variable = 1 if retired
• Unemployed-Unable	Binary	Dummy variable = 1 if unemployed and unable to work
• Unemployed - Able	Binary	Dummy variable = 1 if unemployed but able to work

*For binary variables, reference category = 0.

Table 3.7 Variable definitions (continued)

Variable	Type	Definition
Independent variables (continued)		
Health need factors		
• Self-assessed health	Categorical	Self-assessed health, i.e., 'In general, how would you rate your health today?' 1 = Very good; 2 = Good; 3 = Moderate; 4 = Bad; 5 = Very bad.
• Pain	Categorical	'Overall in the last 30 days, how much pain or discomfort did you have?' 1 = None; 2 = Mild; 3 = Moderate; 4 = Severe; 5 = Extreme.
• Chronic	Binary	Dummy variable =1 if diagnosed with at least one chronic health condition over past 12 months.
• Depression	Binary	Dummy variable =1 if depression
• High blood pressure	Binary	Dummy variable =1 if high blood pressure
• Heart disease	Binary	Dummy variable =1 if heart disease
• Diabetes	Binary	Dummy variable =1 if diabetes
Interaction terms		
• Income*OP Insurance	Interaction term	Log income by outpatient insurance.
• Income*IP Insurance	Interaction term	Log income by inpatient insurance.
• Country*Income	Interaction term	Country by log income
• Country*OP Insurance	Interaction term	Country by outpatient insurance
• Country*IP Insurance	Interaction term	Country by inpatient insurance
• Country*Income*OP Insurance	Interaction term	Country by log income by outpatient insurance
• Country*Income*IP Insurance	Interaction term	Country by log income by inpatient insurance
Out-of-pocket payments (descriptive analyses only; not used for multivariate analyses)		
• Total payments	Continuous	Total out-of-pocket payments for any health care over past 12 months (PPP $)
• Physicians	Continuous	Amount of out-of-pocket payments for physician visits over past 12 months (PPP $)
• Medications	Continuous	Amount of out-of-pocket payments for medications over past 12 months (PPP $)
• Catastrophic expenditure	Percentage	Proportion of households surveyed that spent equal to or greater than 10% of total household income on out-of-pocket payments for health care over past 12 months.

Table 3.9 Summary of multivariate regression models developed

Analyses	Pooled				Country-specific			
Model Number	*1*	*2*	*3*	*4*	*1*	*2*	***Disaggregation tests***	***Multicollinearity tests***
Description	*Income only*	*Main effects: all main independent variables*	*Model 2 + income*insur, country*insur, country*income*	*Model 3 + country*inc*insur*	*Main effects*	*Model 1 + income*insur*	*Effect of disaggregating employment and chronic health (5 Models)*	*Effect of including / excluding insurance/income (5 models)*
INSURANCE: PROBABILITY								
Any health insurance								
Outpatient insurance			n/a			n/a	n/a	n/a
Inpatient insurance								
UTILISATION:								
PROBABILITY								
Any care								
Any Outpatient care								
General practitioners								
Medical specialists								
Pharmacists								
Hospital outpatient								
Inpatient (12 month)								
Inpatient (1-month)								
INTENSITY								
General practitioners								
Medical specialists								
Pharmacists								
Hospital outpatient								
Inpatient (1-month)								

Shaded represents models developed for the thesis. n/a = not applicable.

Chapter 4. Determinants of health insurance

4.1. Introduction

This chapter examines health status and health insurance coverage in Egypt and Lebanon. Two fundamental questions are examined in this chapter. First, what is the nature of economic status and health need in each country? Second, what determines the likelihood that people are covered by group health insurance schemes?

Results presented in this chapter include: (i) the general characteristics of the respondents; (ii) the association between socioeconomic status and health status; (iii) health insurance coverage rates across different occupational categories; and (iv) estimates from multivariate analyses showing the determinants of health insurance, with an emphasis on socioeconomic status. The chapter concludes with a brief discussion of how health status and health insurance coverage compare between the two countries.

4.2. Demographic characteristics

Table 4.1 presents descriptive statistics for each sample, with tests of significance shown where applicable. The mean age of the Egyptian sample was 39 years, ranging between 18 and 96 years. In Lebanon, the mean age was 42 years, ranging between 18 and 101 years. Males accounted for half of all respondents in each country. More respondents in Lebanon had completed secondary education than had respondents in Egypt (53% versus 40%, respectively). These figures show that the samples are relatively similar in age and gender, although the Lebanese group appears relatively more educated the Egyptian group.

The employment rate in each country was approximately 44%, which includes governmental employment, non-governmental employment, and self-employment. This employment rate is relatively low by international standards. Half of all Egyptian respondents lived in urban areas; information on geographic location was not collected in the Lebanese survey. Average annual household income was calculated using data from (i) actual values reported by households and (ii) imputed values for households where information on income was missing.

For actual values, the Lebanese sample reported twice the mean per capita income as the Egyptian sample ($2,989 versus $1,579, respectively). Average income was also calculated after imputing values for most of the observations with randomly missing income data. Average imputed income in Egypt was $1,580 per capita and $3,480 per capita in Lebanon, similar to the observed values. These figures are also consistent with published data. For example, the World Bank (2001) estimated that gross national income per capita for 2001 was $4,010 in Lebanon and $1,530 in Egypt at international exchange rates.

4.3. Health characteristics

Regarding health status, the Lebanese sample reported a relatively lower health status on average than did the Egyptian sample (Table 4.2). For example, twice as many respondents in Lebanon as in Egypt reported a 'bad' or 'very bad' self-assessed health status (8.4% versus. 4.5%, respectively). The same was found for 'severe' or 'extreme' pain (8.3% versus 4.7%, respectively). Similarly, the aggregate incidence of chronic health conditions was similar between samples, with 57% and 58% reporting at least one chronic health condition in Egypt and Lebanon, respectively.

A closer look reveals important differences regarding specific types of conditions (Table 4.3). The incidence of several individual conditions was higher in the Lebanese sample, such as heart disease, high blood pressure, asthma, back problems, depression, and vision problems. At the same time, the incidence of arthritis and 'other' conditions was higher among Egyptian respondents. Conditions classified as 'other' were specified in the Lebanese sample only and include conditions such as allergy, anaemia, bone disorders, diabetes, thyroid problems, kidney disease, uterine/prostate problems, and rheumatism.

More respondents in Egypt than in Lebanon utilised health services overall, as shown in Table 4.4 (61% versus 42%, respectively). Of those who sought care, outpatient services were more frequently utilized in Egypt than in Lebanon (56% versus 35%, respectively), while less inpatient care was sought in Egypt than in Lebanon (6% versus 13%, respectively). More respondents in Lebanon than in Egypt reported foregoing care due to affordability (25% versus 12%, respectively). The number of visits to health care providers over the past month was between 0 to 2 visits in general. As is common to health care data, the distributions of visits across the population were skewed in both countries. Given that the standard deviations shown in Table 4.4 are relatively high in both countries, the data are skewed to similar degrees in Egypt and Lebanon. Histograms for the pooled sample show relatively high proportions of observations with zero number of visits, representing a skewed distribution with a long right tail (Figure 4.1 through Figure 4.5).

Regarding health care affordability, the majority of respondents in both samples were not covered by any health insurance (Table 4.5). 47% of Lebanese respondents had some form of insurance, compared to only 32% in the Egyptian sample. These figures are relatively similar to published data showing that social health insurance covers 45.9% of the Lebanese population and 45% of the Egyptian population (WHO, 2006a; WHO, 2006b). At the same time, Lebanese respondents reported higher average out-of-pocket payments than Egyptian respondents as shown. This result may reflect both the degree of financial risk as well as inherent differences in the price of health care. It is important to note that in the Arabic-administered version of the questionnaire, 'health insurance' was distinguished from 'free care', such that these figures should capture enrolment in social or private health insurance exclusively.

Table 4.1 Demographic characteristics

	Egypt			Lebanon		
	mean	sd (min, max)	n	mean	sd (min, max)	n
Age* (years)	39	14 (18, 96)	4480	42	17 (18, 101)	3220
Male* (%)	56		4479	51		3245
Married* (%)	74		4484	63		3236
Secondary education* (%)	40		4480	53		3211
Employed (%)	44		4478	43		3218
Government employee* (%)	41		4478	14		3218
Annual income (PPP $), actual	$1,579	$1,707 ($21, $29,557)	3703	$2,989	$14,050 ($1.25, $597,730)	1960
Richest 20%	$3,795			$7,863		
2nd richest	$1,608			$2,916		
Middle	$1,224			$2,090		
2nd poorest	$931			$1,484		
Poorest 20%	$581			$838		
Annual income (PPP $), imputed	$1,580	$1,718 ($21, $29,557)	4342	$3,480	$11,698 ($1.25, $597,730)	2899
Richest 20%	$3,910			$8,852		
2nd richest	$1,836			$3,762		
Middle	$1,321			$2,413		
2nd poorest	$928			$1,624		
Poorest 20%	$362			$801		
Log of annual income, imputed	7.14	0.73 (0, 10.3)	4342	7.75	0.90 (0.22, 13.3)	2899

*Difference is significant with a 95% confidence interval. ‘n’ = sample size. ‘sd’ = standard deviation. For binary variables, percentages for the reference category are shown. A two-tailed t-test was used to test for significant differences between means for continuous variables; the z-statistic was used to test for differences between proportions for binary variables. Significance test was not applied to income.

Table 4.2 Self-reported health characteristics

	Egypt (N=4485)	Lebanon (N=3243)
	%	%
Self-assessed health		
Very good	37.8	33.2
Good	34.8	33.2
Moderate	22.9	25.3
Bad	3.4	6.8
Very Bad	1.1	1.6
Self-reported pain		
None	58.2	57.4
Mild	23.2	19.7
Moderate	13.9	14.5
Severe	4.1	7.5
Extreme	0.6	0.8
Difficulty with moving around		
None	63.6	75.6
Mild	19.0	12.2
Moderate	12.8	8.2
Severe	4.1	3.6
Extreme/cannot do	0.6	0.5
Difficulty with self-care		
None	81.6	87.9
Mild	9.9	6.5
Moderate	6.4	3.8
Severe	1.7	1.3
Extreme/cannot do	0.4	0.5
Difficult with work or household activities		
None	66.4	72.8
Mild	17.5	13.3
Moderate	11.4	8.3
Severe	3.7	4.2
Extreme/cannot do	1.0	1.4
Amount of distress, sadness, or worry		
None	59.8	59.7
Mild	23.6	18.3
Moderate	12.1	13.8
Severe	4.0	7.3
Extreme	0.5	0.8

Table 4.3 Prevalence of chronic health conditions

	Egypt		Lebanon	
	Percent	n	Percent	n
Chronic health conditions	58.2	4416	57.1	3174
Arthritis/arthrosis*	25	4451	12	3195
Heart disease/coronary disease/heart attack*	4	4444	7	3192
Asthma*	6	4441	8	3191
Depression/anxiety*	7	4444	17	3189
Diabetes	5	4445	5	3192
High blood pressure/hypertension*	12	4447	14	3192
Chronic bronchitis*	2	4442	3	3191
Back pain/disc problems*	19	4448	22	3196
Migraine	13	4443	13	3191
Stroke*	0.4	4442	1	3187
Sleep problems*	6	4444	12	3190
Hearing problems*	3	4445	5	3190
Vision problems*	11	4446	18	3191
Gastritis/ulcer	16	4443	15	3194
Tumour/cancer	0.5	4436	0.3	3180
Other*	20	4124	14	2668

*Difference is significant with a 95% confidence interval. See text for description of 'other' conditions.

Table 4.4 Characteristics of health care use

	Egypt			Lebanon		
	mean/ %	sd (min, max)	n	mean /%	sd (min, max)	n
Visited any health care provider over past 12 months* (%)	61		4466	42		3246
Outpatient care* (%)	59		4490	39		3246
Inpatient care* (%)	6		4490	13		3246
Number of visits to providers over past month (no./person/month):						
General practitioners	0.87	1.49 (0, 15)	672	0.53	1.28 (0, 25)	1136
Medical specialists	1.39	1.25 (0, 12)	1267	0.69	1.14 (0, 12)	1139
Pharmacists	1.40	1.89 (0, 15)	745	0.74	1.60 (0, 15)	1120
Hospital outpatient unit	1.11	1.66 (0, 20)	701	0.16	0.70 (0, 12)	1090
Hospital inpatient unit	0.41	0.99 (0, 10)	517	0.12	0.96 (0, 25)	1085

*Difference is significant with a 95% confidence interval.

Figure 4.1 Histogram of general practitioner visits, pooled sample

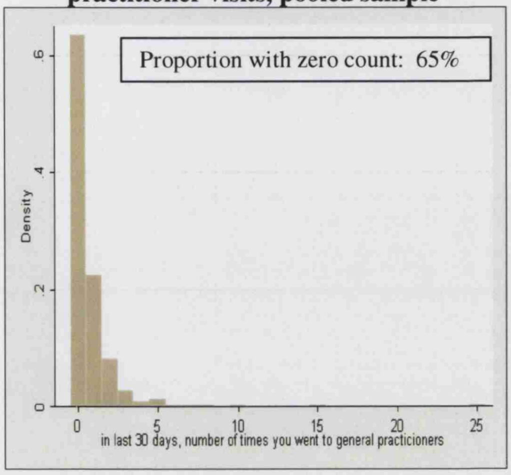


Figure 4.3 Histogram of pharmacy visits, pooled sample

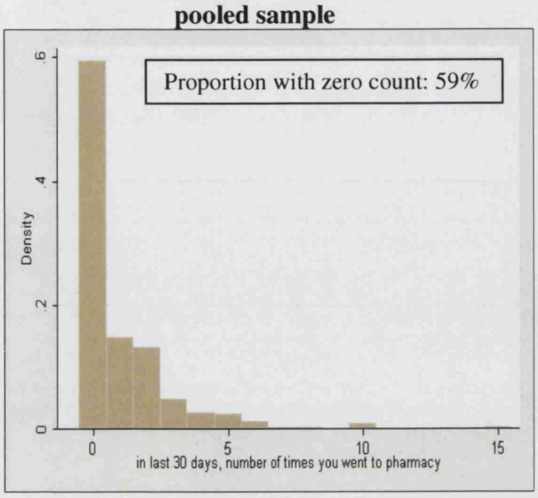


Figure 4.2 Histogram of medical specialist visits, pooled sample

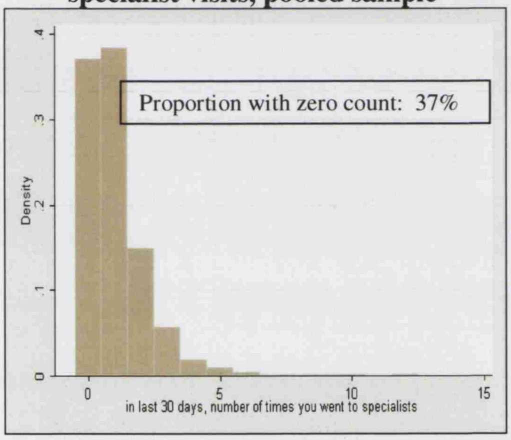


Figure 4.4 Histogram of hospital outpatient visits, pooled sample

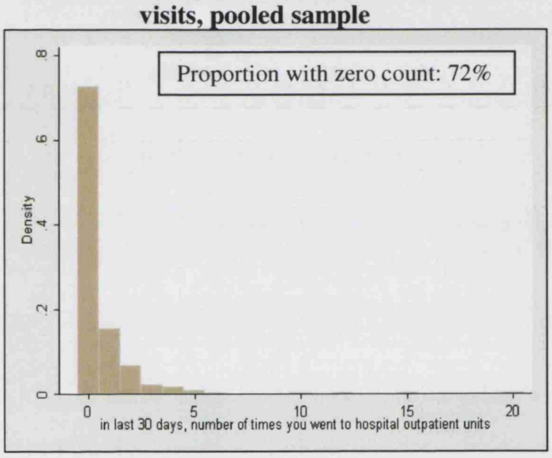


Figure 4.5 Histogram of hospital inpatient visits, pooled sample

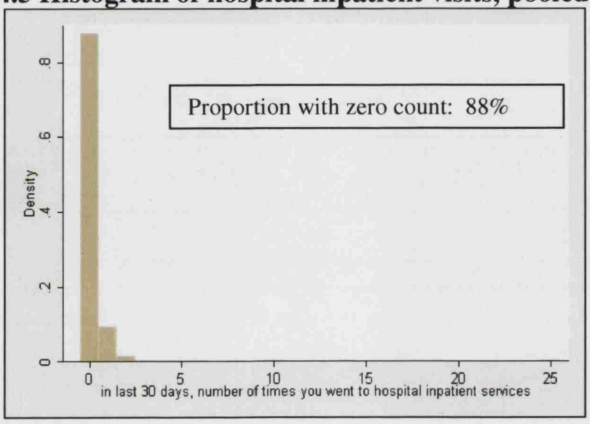


Table 4.5 Characteristics of health care coverage and payments

	Egypt		Lebanon	
	mean	n	mean	n
Insurance (%)[N.B.]				
Any coverage*	32.5	4352	47.8	3223
Outpatient care*	25.1	4352	35.2	3223
Inpatient care*	27.4	4352	47.1	3223
Both outpatient and inpatient care*	20.0	4352	33.8	3223
Outpatient only*	5.1	4352	0.8	3223
Inpatient only*	7.4	4352	12.8	3223
No insurance coverage*	67.5	4352	52.5	3223
Out-of-pocket payments as a share of household income (%)	8.5	3680	16.9	2445
Foregone health care visits (%)				
Was refused care because could not afford*	12	4490	5	3246
Did not seek care because could not afford*	12	4490	20	3246

*Difference is significant with a 95% confidence interval. Significance test was not applied to out-of-pocket payments. N.B. = Note below: Insurance covers refers to coverage by social or private health insurance. A state, national health service exists in parallel in Egypt automatically to all citizens, and hence was not included in questions regarding 'health insurance'.

4.4. Income distribution across socioeconomic characteristics

To explore how income is distributed, income level across age, gender, marital status, educational level, and employment status is shown in Table 4.6. Mean income in Egypt and Lebanon did not appear to vary substantially by age. Average income was somewhat higher in the 18-26 years' group and the 43-54 years' groups as compared to other age groups in general. Regarding education, there were noticeable differences in income by different educational levels.

Respondents who had completed a secondary level education or reported an average income that was double that of respondents who had a lower level of education. This result was found in both countries. Income appears to vary by gender and marital status. The average per capita income reported by females was somewhat higher than that reported by males in both countries. Likewise, the average per capita income reported by married individuals was somewhat higher than that reported by unmarried individuals.

Income did not appear to vary considerably in either country according to whether or not the individual was employed. In Egypt, the average income of those employed by the government, non-government entities, or who were self-employed was somewhat *lower than average income*. At the same time, those who were *not employed by these* *entities* reported an income that was slightly *above average*. In Lebanon, average income was the same across employment status.

By contrast, there were some differences in income by specific *occupational status* in each country. In terms of occupational groups, in Lebanon the most prevalent occupation in the sample was homemaker, comprising nearly one-third of the sample. Approximately a fourth of the sample was self-employed. 14% were non-governmental employees, with half as many respondents employed by the government. In Lebanon, the occupational group that reported the highest income was the *unemployed group that was otherwise able to work*, followed by *students* and *governmental employees*. The poorest respondents were the unemployed who were *unable to work*. As the survey was conducted amongst individuals aged over 18 years, individuals identifying themselves as students are largely enrolled in higher education and typically come from higher socioeconomic backgrounds.

Table 4.6 Per capita income by demographic characteristics

	Egypt ($) (n = 3703) mean	Lebanon ($) (n = 1960) mean
All respondents	1579	2998
Age group		
(1) 18-26 years	1609	2996
(2) 27-35 years	1468	2421
(3) 36-42 years	1605	2809
(4) 43-54 years	1798	3112
(5) 55-95 years	1421	3693
Gender		
Female	1717	3566
Male	1469	2488
Marital status		
Single	1522	2746
Married	1599	3121
Educational status		
No schooling to primary level	1240	1905
Secondary level or above	2084	3978
Employment status		
Unemployed (excl gov/nongov/self)	1415	2984
Employed (incl gov, nongov, self)	1786	2983
Occupational type		
Governmental	1913	3824
Non-governmental	1641	2777
Self-employed	1704	2823
Non-paid work	1546	2205
Student	2782	4284
Homemaker	1283	2220
Retired	1645	2586
Unemployed – able to work	1473	6587
Unemployed – unable to work	861	2176

Note: Per capita income based on actual income values. $ = purchasing power parity exchange rate.

The occupational picture in Egypt differs from that in Lebanon. Again, the most common occupation in the sample was homemaker. One-fifth of respondents were self-employed and one-fifth of the reported working for the government. Hence nearly three times as many Egyptian respondents as Lebanese were governmental employees (18% versus 6.5%, respectively). By contrast, only 5% of Egyptians were self-employed, whilst five times as many respondents in Lebanon were self-employed (24%). In Egypt, respondents who reported the highest per capita income were *students*, followed by *retired individuals* and *governmental employees.* Respondents who reported the lowest income were the unemployed who were unable to work.

4.5. Distribution of health indicators across income level

Health status across socioeconomic status is assessed in several ways. First, the types of chronic health conditions reported by different socioeconomic groups are described. The rates of foregone care and, amongst respondents who used care, the reason for and type of service(s) received at their last visit. Further analysis of equity is presented in Chapter Five by adjusting for demographic characteristics such as age and gender. Patterns of ill health, as indicated by the specific types of chronic health conditions across income, were found to vary between the countries as illustrated by Table 4.7.

In Egypt, the conditions that varied the most across income included asthma, migraine headaches, stroke, sleep disorders, and arthritis, with the lower three income categories reporting higher rates of chronic conditions. In Lebanon, poorer groups also reported higher rates of chronic health conditions, particularly high blood pressure, heart disease, asthma, stroke, depression, sleep disorders, hearing and vision problems, ulcers, and arthritis. Overall, the income-associated differences in the types of chronic health conditions between countries were due mainly to the higher rates of illness amongst the lowest income quintile in Lebanon as compared to Egypt.

Table 4.8 shows reasons for foregoing health care utilisation across income. In Egypt, the poorest quintiles were five times more likely to forego care, whether because they were refused care due to a lack of affordability or whether they did not seek care due to the same reason, with nearly equal rates amongst the poorest group regarding being refused and avoiding care. In Lebanon, nearly seven times as many respondents in the poorest quintile as compared to the richest reported being refused care, and three times as many of the poorest did not seek care altogether.

Table 4.7 Incidence of chronic health conditions across income level

Income quintile	**Poorest**	**2nd Poorest**	**Middle**	**2nd Richest**	**Richest**	**Total**	**Ratio***
Arthritis/arthrosis							
Egypt (n = 4342)	0.29	0.26	0.26	0.22	0.16	**0.26**	**1.8**
Lebanon (n = 2899)	0.20	0.19	0.12	0.08	0.09	**0.12**	**2.2**
Asthma							
Egypt	0.06	0.06	0.08	0.07	0.04	**0.06**	**1.5**
Lebanon	0.09	0.08	0.09	0.09	0.07	**0.08**	**1.3**
Depression/anxiety							
Egypt	0.07	0.08	0.07	0.06	0.05	**0.07**	**1.4**
Lebanon	0.25	0.19	0.19	0.13	0.16	**0.17**	**1.6**
High blood pressure/hypertension							
Egypt	0.13	0.12	0.13	0.11	0.11	**0.13**	**1.2**
Lebanon	0.20	0.15	0.17	0.12	0.12	**0.14**	**1.7**
Chronic bronchitis							
Egypt	0.02	0.02	0.02	0.01	0.01	**0.02**	**1.18**
Lebanon	0.04	0.04	0.03	0.02	0.02	**0.03**	**2.0**
Back pain/disc problems							
Egypt	0.20	0.20	0.19	0.17	0.16	**0.19**	**1.25**
Lebanon	0.30	0.28	0.24	0.18	0.20	**0.22**	**1.5**
Migraine							
Egypt	0.14	0.13	0.15	0.13	0.09	**0.14**	**1.6**
Lebanon	0.15	0.16	0.15	0.12	0.13	**0.13**	**1.15**
Stroke							
Egypt	0.002	0.005	0.007	0.001	0.006	**0.004**	**0.3**
Lebanon	0.04	0.004	0.007	0.005	0.01	**0.01**	**4.0**
Sleep problems							
Egypt	0.06	0.05	0.06	0.04	0.05	**0.05**	**1.2**
Lebanon	0.18	0.15	0.13	0.08	0.11	**0.12**	**1.5**
Hearing problems							
Egypt	0.04	0.03	0.03	0.03	0.02	**0.03**	**2.0**
Lebanon	0.07	0.06	0.06	0.04	0.03	**0.05**	**1.4**
Vision problems							
Egypt	0.12	0.11	0.11	0.10	0.09	**0.11**	**1.3**
Lebanon	0.23	0.20	0.13	0.18	0.18	**0.18**	**1.3**
Gastritis/ulcer							
Egypt	0.17	0.16	0.17	0.15	0.14	**0.16**	**1.2**
Lebanon	0.21	0.21	0.18	0.13	0.13	**0.15**	**1.6**
Tumour/cancer							
Egypt	0.005	0.006	0.004	0.001	0.01	**0.005**	**0.5**
Lebanon	0.0	0.008	0.004	0.003	0.003	**0.003**	**0**
Total: At least one chronic condition							
Egypt	0.63	0.59	0.60	0.54	0.44	**0.58**	**1.4**
Lebanon	0.69	0.64	0.62	0.50	0.54	**0.57**	**1.3**

*Ratio of poorest to richest.

Table 4.8 Foregone health care by income level

Income quintile	Poorest	2nd Poorest	Middle	2nd Richest	Richest	Total	Ratio*
Did not seek because could not afford							
Egypt	0.19	0.13	0.08	0.05	0.04	**0.12**	**4.75**
Lebanon	0.34	0.36	0.23	0.15	0.12	**0.20**	**2.8**
Refused care because of affordability							
Egypt	0.21	0.13	0.09	0.05	0.04	**0.12**	**5.25**
Lebanon	0.10	0.09	0.04	0.04	0.03	**0.05**	**3.3**

*Ratio of poorest to richest.

Amongst those respondents who used services, Table 4.9 describes the main reason or reasons for seeking health care for the most recent visit across income levels. In Egypt, the most common reason cited for visiting health care providers was for a chronic health condition-related check-up, comprising 68% of respondents, followed by chronic health condition-related treatment (21%) and acute care (17%). Treatment follow-up and preventative care whilst not sick were each cited by approximately 4% of respondents.

The distribution of reasons across income levels was fairly even, with slightly more respondents in the richest group reporting chronic health condition-related check-ups. In Lebanon, the most common reasons reported by respondents for seeking health care were for chronic care in general (approximately 40% each for treatment and check-up), followed by acute care (36%) and treatment follow-up (27%). Preventative care whilst not sick was reported by approximately 12% of respondents.

Reasons that were cited somewhat more commonly amongst the poorest groups included chronic health-related care, treatment follow up, and preventative care. Amongst the richest group, 'other' causes were more common than amongst the poorest group, which largely included surgical or other technology-intensive procedures. In general, 'other' causes for which treatment was sought in both countries included surgical operations, echocardiography, x-rays, and medical scans.

In terms of what types of medical services were provided at the last visit, results are presented by income in Table 4.10. Being examined was received by nearly 100% of all respondents in either country, after which the patterns change somewhat between countries. In Egypt, the next most common medical service provided was obtaining a medication or prescription, at nearly 92% of respondents, which was generally equally cited by all income groups. Next, receiving treatment and discussing specific health problems were cited by approximately 72% each by respondents. More respondents in the richest quintile as the poorest cited receiving treatment by 15%, whilst the richest cited discussing health problems 32% more than the poorest.

By contrast, Lebanese respondents cited receiving treatment as the second-most common medical service received, at 82% of respondents. This medical service was fairly equally cited across all income groups. Next, discussing health problems was cited by nearly 80% of respondents at any income level, followed by 75% who received medications or prescriptions. Regarding diagnostic or laboratory tests, slightly more respondents in the poorest quintile as the richest reported receiving these medical services.

'Other' treatments received in both Egypt and Lebanon included allergy treatment, birth, surgery, and treatment for renal disease, goiter, hypertension, infections, respiratory ailments, and other specific types of conditions. Overall, the type of medical services received by respondents who utilised health services did not appear to vary considerably by income level. The provision of medical treatment at the visit varied somewhat more so in Egypt than in Lebanon.

4.6. Health insurance by occupation

In both Egypt and Lebanon, approximately 96% of governmental employees report having any type of health insurance (Table 4.11 and Table 4.12). As such, this group has the highest coverage rate as compared to the rest of the sample. However, the gap in coverage rates between governmental and non-governmental workers is much larger in Egypt than it is in Lebanon.

For example, in Lebanon, 96% of governmental employees have health insurance, as compared to 66% amongst non-governmental employees and 34% amongst the self-employed. In Egypt, 96% of governmental employees had health insurance coverage, as compared to 28% and 12% for the other two groups, respectively. Therefore, whilst 1.5 times as many governmental employees as non-governmental employees (excluding the self-employed) had health insurance coverage in Lebanon, this ratio was 3.5 times as many in Egypt. These results indicate that health insurance is associated to a larger extent with governmental employment in Egypt than it is in Lebanon.

Table 4.9 Reason for last health care visit across income level

Income quintile	Poorest	2ⁿ Poorest	Middle	2ⁿ Richest	Richest	Total	Ratio*
Check-up for chronic condition							
Egypt	0.64	0.68	0.69	0.72	0.68	**0.68**	**0.9**
Lebanon	0.50	0.35	0.47	0.40	0.39	**0.42**	**1.3**
Medical care for chronic condition							
Egypt	0.22	0.17	0.23	0.21	0.26	**0.21**	**0.8**
Lebanon	0.49	0.44	0.40	0.40	0.35	**0.40**	**1.4**
Medical care for acute illness or injury							
Egypt	0.19	0.14	0.17	0.18	0.22	**0.17**	**0.9**
Lebanon	0.36	0.46	0.32	0.32	0.37	**0.35**	**1.0**
Treatment follow-up							
Egypt	0.04	0.05	0.05	0.06	0.03	**0.05**	**1.3**
Lebanon	0.35	0.27	0.27	0.26	0.25	**0.27**	**1.4**
General medical exam/tests							
Egypt	0.03	0.05	0.03	0.04	0.04	**0.04**	**0.75**
Lebanon	0.22	0.10	0.11	0.09	0.11	**0.12**	**2.0**
Other							
Egypt	0.07	0.08	0.09	0.10	0.10	**0.08**	**0.9**
Lebanon	0.09	0.08	0.09	0.12	0.14	**0.11**	**0.8**

*Ratio of poorest to richest.

Table 4.10 Nature of health care treatment received at last visit across income

Income quintile	Poorest	2^{nd} Poorest	Middle	2ⁿ Richest	Richest	Total	Ratio*
Medical exam							
Egypt	0.90	0.92	0.93	0.96	0.96	**0.93**	**1.0**
Lebanon	0.99	0.95	0.94	0.95	0.96	**0.96**	**1.0**
Laboratory/diagnostic test							
Egypt	0.43	0.47	0.44	0.49	0.60	**0.46**	**0.7**
Lebanon	0.68	0.59	0.59	0.53	0.59	**0.59**	**1.1**
Medical treatment							
Egypt	0.71	0.67	0.73	0.74	0.82	**0.71**	**0.9**
Lebanon	0.85	0.88	0.78	0.82	0.81	**0.82**	**1.0**
Discuss specific health problem							
Egypt	0.65	0.68	0.78	0.80	0.86	**0.73**	**0.8**
Lebanon	0.82	0.73	0.78	0.76	0.80	**0.78**	**1.0**
Discuss health in general							
Egypt	0.52	0.58	0.65	0.73	0.77	**0.62**	**0.7**
Lebanon	0.57	0.46	0.56	0.54	0.64	**0.58**	**0.9**
Received medication							
Egypt	0.90	0.91	0.92	0.94	0.96	**0.92**	**1.0**
Lebanon	0.79	0.74	0.71	0.76	0.77	**0.75**	**1.0**
Other							
Egypt	0.05	0.07	0.10	0.10	0.11	**0.08**	**0.5**
Lebanon	0.18	0.17	0.18	0.20	0.17	**0.18**	**1.0**

*Ratio of poorest to richest.

Homemakers in Lebanon tend to report relatively higher rates of coverage for insurance than in Egypt. For example, 44% of homemakers in Lebanon reported having any insurance as compared to just 8% in Egypt. These results may be due to differences in coverage policies for social health insurance beneficiaries and their dependents. In Lebanon, dependents are generally included with certain caveats, but they are generally excluded from most schemes in Egypt.

Retired individuals reported similar health insurance coverage rates in Egypt and Lebanon for most of the insurance categories. However, for exclusively outpatient insurance, the coverage rate amongst retired individuals was 9% in Egypt but only 2% in Lebanon. This difference may reflect differences in social health insurance policies associated with certain occupations. Nonetheless, this result suggests that social health insurance in Egypt appears to be more generous in terms of outpatient coverage on aggregate than it is in Lebanon.

Regarding the unemployed but able to work, the results suggest that they had higher rates of coverage in Lebanon than in Egypt. For example, for any insurance coverage, 30% of this group reported having any insurance in Lebanon, as compared to only 10% in Egypt. As shown, this group also tends to have a relatively high income and average educational level that is similar to the self-employed and non-governmental employees. These findings suggest that those who are unemployed but able to work may be able to afford purchasing private health insurance and are likely wealthy and voluntarily choose not to work. In many parts of the Middle East and notably in Lebanon, wealth generated through property, other assets, or remits from abroad is not uncommon.

Similarly, a higher proportion of the unemployed but unable to work reported having insurance coverage in Lebanon than in Egypt. In contrast to those unemployed but able to work, this group in Lebanon may represent beneficiary dependents or individuals with certain disabilities who are covered by social health insurance. By contrast, the unemployed but unable to work in Egypt typically rely on public providers or pay out-of-pocket for health care. The rate of foregone care for either reason was also highest amongst homemakers and unemployed respondents in both countries (Table 4.13).

Table 4.11 Health insurance by occupational type

% with insurance	Any insurance		Outpatient insurance		Inpatient insurance	
	Egypt	Lebanon	Egypt	Lebanon	Egypt	Lebanon
Occupational type						
Governmental	0.96	0.95	0.71	0.76	0.92	0.95
Non-governmental	0.28	0.65	0.22	0.46	0.19	0.63
Self-employed	0.12	0.34	0.10	0.23	0.05	0.33
Non-paid work	0.65	0.60	0.54	0.40	0.65	0.60
Student	0.79	0.61	0.64	0.41	0.63	0.60
Homemaker	0.08	0.44	0.07	0.34	0.05	0.43
Retired	0.74	0.70	0.55	0.52	0.65	0.69
Unemployed – able to work	0.09	0.30	0.08	0.20	0.06	0.28
Unemployed – unable to work	0.11	0.33	0.06	0.24	0.09	0.32
Total	0.33	0.48	0.25	0.35	0.27	0.47

Table 4.12 Health insurance by occupational type (continued)

% with insurance	Only outpatient insurance		Only inpatient insurance		Both types of insurance	
	Egypt	Lebanon	Egypt	Lebanon	Egypt	Lebanon
Occupational type						
Governmental	0.04	0.0	0.25	0.19	0.67	0.76
Non-governmental	0.09	0.01	0.05	0.19	0.14	0.45
Self-employed	0.07	0.01	0.01	0.11	0.04	0.22
Non-paid work	0.0	0.0	0.12	0.20	0.54	0.40
Student	0.15	0.005	0.15	0.20	0.49	0.41
Homemaker	0.03	0.002	0.01	0.10	0.04	0.33
Retired	0.09	0.02	0.19	0.19	0.46	0.50
Unemployed – able to work	0.03	0.02	0.01	0.10	0.05	0.19
Unemployed – unable to work	0.03	0.009	0.06	0.09	0.03	0.23
Total	0.05	0.008	0.07	0.13	0.20	0.34

Table 4.13 Foregone health care by occupational type

% did not receive needed care	Did not seek		Refused care	
	Egypt	Lebanon	Egypt	Lebanon
Occupational type				
Governmental	0.04	0.06	0.04	0.005
Non-governmental	0.13	0.13	0.13	0.03
Self-employed	0.13	0.17	0.14	0.05
Non-paid work	0.12	0.13	0.12	0.0
Student	0.05	0.07	0.05	0.005
Homemaker	0.14	0.26	0.15	0.07
Retired	0.08	0.14	0.07	0.04
Unemployed – able to work	0.13	0.23	0.12	0.08
Unemployed – unable to work	0.37	0.32	0.34	0.08
Total	0.12	0.20	0.12	0.05

4.7. Determinants of health insurance

Determinants of the probability of having three types of insurance are explored: (a) coverage for any type of service ('any insurance'); (b) coverage for outpatient services (or 'outpatient insurance'); and (c) insurance for inpatient services (or 'inpatient insurance'). The primary explanatory variables of interest are income and occupational type. The determinants of insurance are discussed based on results from two sets of analysis: (a) the pooled model, which primarily evaluates the effect of country on the probability of insurance coverage; and (b) the country-specific models, which primarily evaluate the effects of income and employment type in each setting.

4.7.1. Any insurance

4.7.1.1. Pooled model

The pooled model consists of five versions. Model 1 shows the effect of country without controlling for any other factor. Model 2 shows the same model with the addition of other covariates, representing the main effects model. This model contains an aggregated indicator for employment status, representing whether or not the individual is employed regardless of the type of occupation.

Model 3 is identical to Model 2, with the exception that the employment variable has been replaced with a set of disaggregated occupational indicators. Model 4 is similar to Model 3, with the addition of the interaction term for country*gov-employee. Model 5 is also similar to Model 3, with the addition of the interaction term for country*income.

Regarding the effect of country on the probability of having any insurance, in Model 1 the country effect was highly significant and negative in direction (Table 4.14). This result suggests that the likelihood of having any insurance is significantly higher in Lebanon than it is in Egypt. After adding the other covariates and interaction terms in Models 2 through 5, the country effect remains significant and negative, controlling for other factors.

Governmental employment was a significant and positive determinant, indicating that it increases the likelihood of having health insurance in both countries. This factor was the most important determinant of having any insurance in the pooled model. The interaction term for country*government was significant and positive. This finding suggests that the effect of governmental employment on the likelihood of insurance coverage is *higher* in Egypt than it is in Lebanon, controlling for other factors. The effect of income was also significant and positive, as was the interaction term for country*income. This finding suggests that income is a positive determinant of insurance coverage, and that its effect is stronger in Egypt than it is in Lebanon.

Most of the health need variables were not significant determinants of having insurance in the pooled model. In Model 2, diabetes and depression were significant at the 90% confidence level, but they were no longer significant after disaggregating the employment variable. Diabetes exerted a positive effect, indicating that those diagnosed with diabetes were somewhat *more likely* to have health insurance than those without diabetes. Depression exerted a negative effect, suggesting that those diagnosed with depression were somewhat *less likely* to have health insurance than those without depression.

Since the effects of depression and diabetes disappear after disaggregating the health insurance variable, it is possible that there is a degree of collinearity between these variables and certain types of occupational categories. This observation supports the method used in evaluating the effects of separate occupations.

4.7.1.2. Country-specific models

For the country-specific models, three versions are discussed (Table 4.15). In order to compare the effect of income without controlling for other factors, Model 1 consists of the income variable exclusively. Model 2 expands upon Model 1 by adding the other covariates, representing the main effects model. Model 3 is similar to the main effects model except that the aggregated employment variable is replaced with the set of disaggregated occupational variables.

Income was a significant and positive determinant in all three models for both countries. The magnitude of the effect was relatively larger in Egypt than it was in Lebanon, consistent with the significant and positive effect of country*income from the pooled model. Being employed was significant and positive in both countries, and was also relatively stronger in Egypt.

Governmental employment was the strongest predictor of having any insurance coverage in both countries. The effect was relatively larger in magnitude in Egypt. Other occupational types also exerted significant and positive effects. Being a non-governmental employee positively determined insurance, and tended to exert a stronger effect in Lebanon than in Egypt.

Being a student was a positive determinant of insurance, exerting a stronger effect in Egypt than in Lebanon. This may be due to the fact that students are eligible for certain social health insurance schemes in Egypt, but otherwise do not receive health insurance. By contrast, students in Lebanon are generally covered as beneficiaries' dependents. In addition, being retired was a positive determinant of insurance, and also exerted a stronger effect in Egypt than in Lebanon. Whilst retirees are covered by social health insurance schemes in Egypt, they are generally excluded from coverage in Lebanon, unless they qualify for coverage as beneficiaries' dependents under certain conditions.

In terms of health need and age, these effects were generally small in both countries. Most of the health variables were not significant. In Egypt, high blood pressure was significant and positive in Model 3, exerting a relatively small effect. In Lebanon, self-assessed health was significant and negative, exerting a relatively small effect. These results suggest that having high blood pressure in Egypt and a poor perception of one's health in Lebanon tend to increase the likelihood of having health insurance.

Age was significant and positive in both countries, but the magnitude of the probit index was approximately zero. Education exerted a significant and positive effect in both countries. The magnitude of its effect was relatively larger in comparison to other variables. It was also a relatively stronger determinant in Egypt than in Lebanon.

Table 4.14 Probability of Any Insurance, pooled

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*
	Coeff. (SE)	*Coeff. (SE)*	*Coeff. (SE)*	*Coeff. (SE)*	*Coeff. (SE)*
Country (1=Egypt, 0=Lebanon)	-0.391***	-0.175***	-0.595***	-0.625***	-1.667***
	(0.030)	(0.037)	(0.045)	(0.044)	(0.381)
Age		0.015***	0.010***	0.010***	0.010***
		(0.001)	(0.002)	(0.002)	(0.002)
Male		-0.067	0.177**	0.170**	0.177**
		(0.042)	(0.063)	(0.063)	(0.063)
Married		0.094*	0.202***	0.192***	0.200***
		(0.037)	(0.046)	(0.046)	(0.046)
Secondary education		0.844***	0.400***	0.394***	0.392***
		(0.037)	(0.044)	(0.044)	(0.043)
Employed		0.421***			
		(0.043)			

(continued)

Table 4.14 Probability of Any Insurance, pooled (continued)

	Model 1 Coeff. (SE)	Model 2 Coeff. (SE)	Model 3 Coeff. (SE)	Model 4 Coeff. (SE)	Model 5 Coeff. (SE)
Income (log)		0.224***	0.238***	0.240***	0.183***
		(0.024)	(0.027)	(0.027)	(0.034)
Self-assessed health		-0.021	-0.017	-0.018	-0.018
		(0.025)	(0.028)	(0.028)	(0.028)
Self-reported pain		0.019	0.005	0.005	0.005
		(0.024)	(0.026)	(0.026)	(0.026)
Chronic		-0.018	-0.032	-0.028	-0.026
		(0.041)	(0.047)	(0.047)	(0.047)
High blood pressure		0.012	0.085	0.085	0.082
		(0.055)	(0.061)	(0.061)	(0.061)
Diabetes		0.140+	0.134	0.132	0.130
		(0.076)	(0.083)	(0.084)	(0.083)
Heart disease		0.131	0.125	0.123	0.122
		(0.082)	(0.091)	(0.091)	(0.091)
Depression		-0.103+	-0.082	-0.083	-0.088
		(0.060)	(0.065)	(0.065)	(0.065)
Gov employee			2.803***	2.099***	2.811***
			(0.125)	(0.187)	(0.127)
Nongov employee			0.846***	0.850***	0.845***
			(0.102)	(0.103)	(0.102)
Self-employed			0.139	0.147	0.134
			(0.101)	(0.101)	(0.100)
Unpaid work			1.516***	1.526***	1.501***
			(0.241)	(0.242)	(0.242)
Student			1.410***	1.410***	1.403***
			(0.123)	(0.123)	(0.122)
Homemaker			0.072	0.090	0.070
			(0.099)	(0.099)	(0.098)
Retired			1.507***	1.531***	1.508***
			(0.135)	(0.135)	(0.135)
Unemp - unable			-0.075	-0.069	-0.073
			(0.139)	(0.139)	(0.139)
Country*Gov-empl				0.855***	
				(0.190)	
Country*Income					0.144**
					(0.051)
Constant	-0.063**	-3.066***	-3.181***	-3.164***	-2.741***
	(0.022)	(0.201)	(0.238)	(0.238)	(0.287)
N	7575	6885	6885	6885	6885
ll	-4973.154	-3914.283	-2984.608	-2975.966	-2979.996
chi2	174.437	1173.996	1828.669	1968.401	1765.045
p	0.000	0.000	0.000	0.000	0.000

* p < 0.05 ** p < 0.01 *** p < .001. Coeff = coefficient. SE = standard error.

Table 4.15 Probability of Any Insurance, by country

	EGYPT			LEBANON		
	Model 1	*Model 2*	*Model 3*	*Model 1*	*Model 2*	*Model 3*
	Coeff.	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*
	(SE)	*(SE)*	*(SE)*	*(SE)*	*(SE)*	*(SE)*
Income (log)	0.435***	0.240***	0.297***	0.280***	0.220***	0.211***
	(0.033)	(0.033)	(0.042)	(0.035)	(0.034)	(0.035)
Age		0.023***	0.010***		0.007***	0.010***
		(0.002)	(0.003)		(0.002)	(0.002)
Male		-0.314***	0.081		0.229***	0.266***
		(0.058)	(0.100)		(0.061)	(0.080)
Married		-0.003	0.024		0.183***	0.313***
		(0.053)	(0.070)		(0.053)	(0.062)
Secondary education		1.174***	0.486***		0.424***	0.271***
		(0.052)	(0.066)		(0.056)	(0.059)
Employed		0.556***			0.240***	
		(0.060)			(0.062)	
Self-assessed health		0.035	0.032		-0.135***	-0.116**
		(0.035)	(0.041)		(0.039)	(0.040)
Self-reported pain		-0.006	-0.027		0.013	0.014
		(0.035)	(0.043)		(0.033)	(0.034)
Chronic		0.007	0.026		0.020	-0.019
		(0.055)	(0.069)		(0.064)	(0.067)
High blood pressure		0.051	0.181*		0.027	0.035
		(0.075)	(0.089)		(0.084)	(0.086)
Diabetes		0.128	0.150		0.126	0.130
		(0.096)	(0.117)		(0.121)	(0.122)
Heart disease		0.167	0.111		0.186+	0.188+
		(0.119)	(0.156)		(0.112)	(0.114)
Depression		-0.100	-0.165		-0.078	-0.070
		(0.098)	(0.126)		(0.074)	(0.077)
Gov employee			3.024***			2.122***
			(0.210)			(0.195)
Nongov employee			0.785***			0.920***
			(0.210)			(0.118)
Self-employed			0.256			0.110
			(0.201)			(0.117)
Unpaid work			1.879***			1.000**
			(0.330)			(0.372)
Student			2.102***			0.898***
			(0.224)			(0.142)
Homemaker			0.027			0.224+
			(0.201)			(0.115)

(continued)

Table 4.15 Probability of Any Insurance, by country (continued)

	EGYPT			LEBANON		
	Model 1 Coeff. (SE)	*Model 2* Coeff. (SE)	*Model 3* Coeff. (SE)	*Model 1* Coeff. (SE)	*Model 2* Coeff. (SE)	*Model 3* Coeff. (SE)
Retired			1.843***			0.907***
			(0.229)			(0.186)
Unemp - unable			0.393			-0.068
			(0.367)			(0.150)
Constant	-3.567***	-3.790***	-4.235***	-2.227***	-2.389***	-2.790***
	(0.243)	(0.264)	(0.370)	(0.274)	(0.285)	(0.302)
N	4218	4133	4133	2878	2752	2752
ll	-2560.022	-1989.475	-1245.288	-1935.618	-1790.419	-1634.580
chi2	169.358	951.161	1456.540	64.069	207.492	413.530
p	0.000	0.000	0.000	0.000	0.000	0.000

*p < 0.05 ** p < 0.01 *** p < .001. Coeff = coefficient. SE = standard error.

4.7.2. Outpatient insurance

4.7.2.1. Pooled model

For outpatient insurance, the country effect was significant and negative on the likelihood of outpatient insurance, even after controlling for other factors (Table 4.16). The effect of governmental employment was significant and positive. This suggests that being a governmental employee increases the probability of having outpatient insurance across countries. The interaction term for country*government was significant and positive. This finding suggests that the effect of governmental employment on the likelihood of outpatient insurance coverage is *higher* in Egypt than it is in Lebanon, holding other factors constant.

Income exerted a significant and positive effect on the probability of having outpatient insurance. Similarly, the interaction term for country*income was significant and positive. This finding suggests that a higher income increases the likelihood of being insured, and that this effect is stronger in Egypt than it is in Lebanon.

Most of the health status effects were not significant in the pooled model. Diabetes exerted a significant positive effect in Model 2, but was significant at the 90% confidence level in Models 3, 4, and 5. These findings suggest that those diagnosed with diabetes were somewhat *more likely* to have outpatient insurance coverage than did those without diabetes. Depression was significant at the 90% confidence level in Model 2 only, where it was negative. This indicates that those diagnosed with depression were somewhat *less likely* to have health insurance than those without depression, but this effect disappears after disaggregating the employment variable.

These results are similar to those found for the effect of health status on the probability of any insurance coverage.

4.7.2.2. Country-specific models

The effect of income was significant in both countries and remained so after adding the other covariates (Table 4.17). The magnitude of the effect was relatively larger in Egypt than it was in Lebanon. Being employed was a significant and positive determinant in both countries. However, its effect was relatively greater in Egypt than in Lebanon. Governmental employment was the strongest predictor of having outpatient insurance coverage in both countries. The effect was positive in both countries, but was relatively stronger in Egypt.

Similar to any insurance, some of the other occupational categories were significant and positive determinants of outpatient insurance. Being a non-governmental employee positively determined insurance, and tended to exert a stronger effect in Lebanon than in Egypt. Unpaid work was positively associated with outpatient insurance to a greater degree in Egypt than in Lebanon. In Lebanon, the effect of unpaid work was significant only at the 90% confidence level. Being a student was a positive determinant of outpatient insurance, exerting a stronger effect in Egypt than in Lebanon. Being retired was positively associated with insurance, having a stronger effect in Egypt than in Lebanon.

Health and age tended to be relatively weakly associated with outpatient insurance in both countries. Most of the health variables were not significant. In Lebanon, the effect of depression was significant and negative, exerting a relatively small effect. These results suggest that having depression in Lebanon tend to *decrease* the likelihood of having health insurance. Age was significant and positive only in Egypt, but the magnitude of the probit index was approximately zero. Education exerted a significant and positive effect in both countries, and had a relatively greater effect in Egypt than in Lebanon.

Table 4.16 Probability of Outpatient Insurance, pooled

	Model 1 Coeff. (SE)	Model 2 Coeff. (SE)	Model 3 Coeff. (SE)	Model 4 Coeff. (SE)	Model 5 Coeff. (SE)
Country (1=Egypt, 0=Lebanon)	- 0.276***	-0.110**	-0.420***	-0.453***	-2.269***
	(0.031)	(0.038)	(0.043)	(0.045)	(0.358)
Age		0.011***	0.007***	0.007***	0.007***
		(0.001)	(0.002)	(0.002)	(0.002)
Male		-0.028	0.152**	0.141*	0.146**
		(0.043)	(0.055)	(0.055)	(0.055)
Married		0.098**	0.189***	0.180***	0.186***
		(0.038)	(0.044)	(0.044)	(0.045)
Secondary education		0.699***	0.328***	0.322***	0.312***
		(0.038)	(0.043)	(0.043)	(0.043)
Employed		0.339***			
		(0.044)			
Income (log)		0.183***	0.175***	0.178***	0.073*
		(0.024)	(0.026)	(0.026)	(0.031)
Self-assessed health		0.015	0.026	0.024	0.023
		(0.025)	(0.027)	(0.027)	(0.027)
Self-reported pain		0.023	0.009	0.010	0.008
		(0.024)	(0.026)	(0.026)	(0.026)
Chronic		-0.020	-0.029	-0.028	-0.017
		(0.041)	(0.044)	(0.044)	(0.044)
High blood pressure		-0.024	0.021	0.020	0.014
		(0.057)	(0.060)	(0.060)	(0.061)
Diabetes		0.164*	0.158+	0.156+	0.155+
		(0.077)	(0.081)	(0.081)	(0.081)
Heart disease		0.064	0.047	0.047	0.041
		(0.083)	(0.088)	(0.088)	(0.088)
Depression		-0.104+	-0.079	-0.079	-0.090
		(0.060)	(0.062)	(0.062)	(0.062)
Gov employee			1.711***	1.470***	1.715***
			(0.106)	(0.141)	(0.106)
Nongov employee			0.697***	0.699***	0.698***
			(0.105)	(0.106)	(0.105)
Self-employed			0.124	0.130	0.115
			(0.103)	(0.103)	(0.103)
Unpaid work			1.243***	1.251***	1.216***
			(0.229)	(0.230)	(0.230)
Student			1.136***	1.135***	1.129***
			(0.121)	(0.121)	(0.120)
Homemaker			0.061	0.081	0.062
			(0.102)	(0.102)	(0.101)

(continued)

Table 4.16 Probability of Outpatient Insurance, pooled (continued)

	Model 1 Coeff. (SE)	Model 2 Coeff. (SE)	Model 3 Coeff. (SE)	Model 4 Coeff. (SE)	Model 5 Coeff. (SE)
Retired			1.144***	1.166***	1.145***
			(0.130)	(0.131)	(0.130)
Unemp - unable			-0.047	-0.044	-0.046
			(0.142)	(0.142)	(0.142)
Country*Gov-empl				0.318*	
				(0.124)	
Country*Income					0.246***
					(0.047)
Constant	-0.395***	-2.910***	-2.874***	-2.867***	-2.046***
	(0.023)	(0.204)	(0.229)	(0.230)	(0.269)
N	7575	6885	6885	6885	6885
ll	-4530.829	-3750.105	-3263.148	-3259.909	-3248.218
chi2	80.952	795.242	1600.636	1643.927	1565.600
p	0.000	0.000	0.000	0.000	0.000

*p < 0.05 ** p < 0.01 *** p < .001. Coeff = coefficient. SE = standard error.

Table 4.17 Probability of Outpatient Insurance, by country

	EGYPT			*LEBANON*		
	Model 1 *Coeff.* *(SE)*	*Model 2* *Coeff.* *(SE)*	*Model 3* *Coeff.* *(SE)*	*Model 1* *Coeff.* *(SE)*	*Model 2* *Coeff.* *(SE)*	*Model 3* *Coeff.* *(SE)*
Income (log)	0.438***	0.256***	0.267***	0.170***	0.133***	0.114***
	(0.035)	(0.035)	(0.039)	(0.032)	(0.033)	(0.033)
Age		0.019***	0.010***		0.003	0.004+
		(0.002)	(0.003)		(0.002)	(0.002)
Male		-0.232***	0.060		0.228***	0.256***
		(0.060)	(0.080)		(0.062)	(0.076)
Married		-0.035	0.024		0.202***	0.292***
		(0.054)	(0.066)		(0.054)	(0.062)
Secondary education		0.993***	0.441***		0.302***	0.161**
		(0.053)	(0.063)		(0.057)	(0.060)
Employed		0.421***			0.250***	
		(0.062)			(0.063)	
Self-assessed health		0.022	0.014		-0.035	-0.013
		(0.036)	(0.039)		(0.038)	(0.040)
Self-reported pain		-0.002	-0.010		0.021	0.015
		(0.037)	(0.040)		(0.033)	(0.034)
Chronic		-0.032	-0.038		0.076	0.053
		(0.056)	(0.062)		(0.065)	(0.067)
High blood pressure		0.003	0.062		-0.024	-0.012
		(0.079)	(0.089)		(0.085)	(0.086)

(continued)

Table 4.17 Probability of Outpatient Insurance, by country (continued)

	EGYPT			LEBANON		
	Model 1 Coeff. (SE)	*Model 2* Coeff. (SE)	*Model 3* Coeff. (SE)	*Model 1* Coeff. (SE)	*Model 2* Coeff. (SE)	*Model 3* Coeff. (SE)
Diabetes		0.151	0.168		0.130	0.131
		(0.101)	(0.113)		(0.121)	(0.122)
Heart disease		0.060	0.008		0.110	0.101
		(0.122)	(0.139)		(0.113)	(0.116)
Depression		-0.022	-0.006		-0.176*	-0.176*
		(0.097)	(0.107)		(0.075)	(0.077)
Gov employee			1.822***			1.543***
			(0.199)			(0.149)
Nongov employee			0.671**			0.766***
			(0.215)			(0.121)
Self-employed			0.236			0.117
			(0.204)			(0.121)
Unpaid work			1.630***			0.721+
			(0.317)			(0.375)
Student			1.741***			0.697***
			(0.221)			(0.145)
Homemaker			0.024			0.194
			(0.204)			(0.119)
Retired			1.386***			0.782***
			(0.228)			(0.180)
Unemp - unable			-0.017			-0.017
			(0.399)			(0.155)
Constant	-3.820***	-3.821***	-3.981***	-1.702***	-2.051***	-2.251***
	(0.256)	(0.272)	(0.346)	(0.252)	(0.276)	(0.292)
N	4218	4133	4133	2878	2752	2752
ll	-2287.720	-1910.053	-1541.981	-1847.431	-1733.812	-1627.613
chi2	156.898	715.077	1313.703	28.113	107.419	293.967
p	0.000	0.000	0.000	0.000	0.000	0.000

* $p < 0.05$ ** $p < 0.01$ *** $p < .001$. Coeff = coefficient. SE = standard error.

4.7.3. Inpatient insurance

4.7.3.1. Pooled model

For inpatient insurance, country was a significant and negative determinant of the probability of inpatient insurance (Table 4.18). Consistent with the other insurance models, the probability of having inpatient insurance is greater in Lebanon than in Egypt. This effect was remained even after controlling for other factors. Governmental employment was a significant and positive determinant of having inpatient coverage. The interaction term for country*government was significant at the 90% confidence level and positive. This finding suggests that the effect of governmental employment on the likelihood of inpatient insurance coverage is *somewhat higher* in Egypt than it is in Lebanon, holding other factors constant.

Income exerted a significant and positive effect on the probability of having inpatient insurance. Yet the interaction term for country*income was significant and *negative.* These results suggest that a higher income increases the likelihood of having inpatient insurance. However, this effect is stronger in *Lebanon* than it is in Egypt, controlling for other factors. This finding suggests that a private health insurance schemes may account for a large proportion of inpatient coverage in Lebanon. These results contrast with those found for outpatient insurance, where the effect of income on outpatient insurance was greater in *Egypt* that it was in Lebanon.

Most of the health status effects were not significant. Heart disease was significant at the 90% confidence level and positive. Depression was significant in Model 1 only, exerting a negative effect. These findings suggest that those diagnosed with heart disease were *somewhat more likely* to have inpatient insurance coverage than did those without heart disease. In addition, individuals diagnosed with depression were somewhat *less likely* to have health insurance than those without depression, but this effect disappears after disaggregating the employment variable.

4.7.3.2. Country-specific models

The effect of income on the likelihood of inpatient insurance was significant and positive in Egypt only for Models 1 and 2, consisting of the aggregated employment variable (Table 4.19). The effect of income was not significant in Egypt after disaggregating the employment variable in Model 3. In Lebanon, the effect of income was significant and positive in all versions. In addition, the magnitude of the effect of income was relatively larger in Lebanon than it was in Egypt.

Being employed significantly increased the probability of having inpatient insurance coverage in both countries. The magnitude of its effect was relatively larger in Egypt than in Lebanon. Governmental employment was the most important determinant of inpatient insurance coverage in both countries. The effect was positive in both countries, although it was relatively greater in Egypt. Other occupational categories were predictors of having inpatient insurance. Being a non-governmental employee increased the likelihood of having insurance, and tended to exert a stronger effect in Lebanon than in Egypt. Unpaid work positively predicted having insurance to a greater degree in Egypt than in Lebanon. Being a student tended to increase the likelihood of being covered for inpatient care, exerting a stronger effect in Egypt than in Lebanon. Being retired was positively associated with inpatient insurance, and also had a stronger effect in Egypt than in Lebanon.

Health and age had relatively small effects on the probability of having inpatient insurance across countries. In Lebanon, the effect of self-assessed health was significant and negative, exerting a relatively small effect. These results suggest that having poor self-reported health in Lebanon tends to increase the likelihood of having inpatient insurance. In Egypt, heart disease was significant and positive in Model 2, but was not significant in Model 3 after disaggregating the employment variable. At the same time, high blood pressure became significant at the 90% confidence level in Egypt after disaggregating the employment variable in Model 3. These results indicate that both 'heart disease' and 'high blood pressure' signify heart conditions in general. Age was significant and positive in both countries, with a relatively small effect. Education tended to increase the likelihood of having inpatient insurance. Similar to the other models, its effect was relatively stronger in Egypt than it was in Lebanon.

Table 4.18 Probability of Inpatient Insurance, pooled

	Model 1 Coeff. (SE)	*Model 2* Coeff. (SE)	*Model 3* Coeff. (SE)	*Model 4* Coeff. (SE)	*Model 5* Coeff. (SE)
Country (1=Egypt, 0=Lebanon)	-0.517***	-0.379***	-0.919***	-0.951***	-0.294
	(0.030)	(0.037)	(0.046)	(0.046)	(0.370)
Age		0.014***	0.010***	0.010***	0.010***
		(0.001)	(0.002)	(0.002)	(0.002)
Male		-0.010	0.206**	0.197**	0.208***
		(0.043)	(0.063)	(0.063)	(0.063)
Married		0.113**	0.222***	0.212***	0.223***
		(0.037)	(0.048)	(0.047)	(0.048)
Secondary education		0.804***	0.318***	0.312***	0.323***
		(0.038)	(0.045)	(0.045)	(0.045)
Employed		0.456***			
		(0.043)			
Income (log)		0.158***	0.163***	0.165***	0.193***
		(0.023)	(0.026)	(0.026)	(0.035)
Self-assessed health		-0.033	-0.035	-0.036	-0.035
		(0.026)	(0.029)	(0.029)	(0.029)

(continued)

Table 4.18 Probability of Inpatient Insurance, pooled (continued)

	Model 1 Coeff. (SE)	Model 2 Coeff. (SE)	Model 3 Coeff. (SE)	Model 4 Coeff. (SE)	Model 5 Coeff. (SE)
Self-reported pain		0.020	0.008	0.008	0.009
		(0.024)	(0.027)	(0.027)	(0.027)
Chronic		0.019	0.019	0.022	0.015
		(0.041)	(0.048)	(0.048)	(0.048)
High blood pressure		0.007	0.085	0.085	0.087
		(0.056)	(0.062)	(0.063)	(0.062)
Diabetes		0.105	0.089	0.087	0.090
		(0.077)	(0.085)	(0.085)	(0.085)
Heart disease		0.162*	0.160+	0.159+	0.162+
		(0.082)	(0.092)	(0.092)	(0.091)
Depression		-0.111+	-0.087	-0.088	-0.084
		(0.060)	(0.066)	(0.066)	(0.066)
Gov employee			2.756***	2.127***	2.758***
			(0.119)	(0.186)	(0.119)
Nongov employee			0.841***	0.846***	0.842***
			(0.104)	(0.105)	(0.105)
Self-empl			0.062	0.069	0.065
			(0.103)	(0.103)	(0.103)
Unpaid work			1.707***	1.718***	1.717***
			(0.250)	(0.252)	(0.250)
Student			1.404***	1.405***	1.410***
			(0.126)	(0.126)	(0.127)
Homemaker			0.070	0.089	0.070
			(0.101)	(0.101)	(0.102)
Retired			1.491***	1.517***	1.493***
			(0.136)	(0.136)	(0.136)
Unemp - unable			-0.106	-0.100	-0.107
			(0.141)	(0.141)	(0.141)
Country*Gov-empl				0.734***	
				(0.180)	
Country*Income					-0.084+
					(0.049)
Constant	-0.084***	-2.580***	-2.552***	-2.535***	-2.796***
	(0.022)	(0.192)	(0.227)	(0.227)	(0.292)
N	7575	6885	6885	6885	6885
ll	-4781.881	-3821.089	-2836.019	-2829.064	-2834.516
chi2	297.140	1146.999	2054.466	2258.049	2088.910
p	0.000	0.000	0.000	0.000	0.000

* $p < 0.05$ ** $p < 0.01$ *** $p < .001$. Coeff = coefficient. SE = standard error.

Table 4.19 Probability of Inpatient Insurance, by country

	EGYPT			*LEBANON*		
	Model 1 Coeff. (SE)	*Model 2* Coeff. (SE)	*Model 3* Coeff. (SE)	*Model 1* Coeff. (SE)	*Model 2* Coeff. (SE)	*Model 3* Coeff. (SE)
Income (log)	0.297***	0.068*	0.060	0.279***	0.223***	0.214***
	(0.032)	(0.032)	(0.041)	(0.035)	(0.035)	(0.035)
Age		0.023***	0.010***		0.006***	0.009***
		(0.002)	(0.003)		(0.002)	(0.002)
Male		-0.241***	0.135		0.247***	0.280***
		(0.060)	(0.094)		(0.061)	(0.080)
Married		0.023	0.061		0.177***	0.306***
		(0.055)	(0.077)		(0.053)	(0.062)
Secondary education		1.143***	0.358***		0.409***	0.253***
		(0.054)	(0.072)		(0.056)	(0.059)
Employed		0.629***			0.241***	
		(0.062)			(0.062)	
Self-assessed health		0.015	0.003		-0.128***	-0.110**
		(0.035)	(0.044)		(0.039)	(0.041)
Self-reported pain		-0.006	-0.030		0.018	0.019
		(0.035)	(0.045)		(0.033)	(0.034)
Chronic		0.058	0.113		0.026	-0.012
		(0.057)	(0.072)		(0.064)	(0.067)
High blood pressure		0.033	0.177+		0.044	0.053
		(0.077)	(0.094)		(0.084)	(0.086)
Diabetes		0.064	0.087		0.111	0.113
		(0.100)	(0.122)		(0.121)	(0.122)
Heart disease		0.253*	0.225		0.177	0.179
		(0.117)	(0.155)		(0.111)	(0.114)
Depression		-0.116	-0.156		-0.071	-0.062
		(0.102)	(0.138)		(0.074)	(0.077)
Gov employee			2.806***			2.163***
			(0.217)			(0.195)
Nongov employee			0.678**			0.921***
			(0.228)			(0.118)
Self-employed			-0.028			0.119
			(0.222)			(0.118)
Unpaid work			2.056***			1.043**
			(0.332)			(0.373)
Student			1.920***			0.922***
			(0.235)			(0.143)
Homemaker			-0.164			0.240*
			(0.222)			(0.115)
Retired			1.683***			0.878***
			(0.242)			(0.184)

(continued)

Table 4.19 Probability of Inpatient Insurance, by country (continued)

	EGYPT			LEBANON		
	Model 1 Coeff. (SE)	*Model 2* Coeff. (SE)	*Model 3* Coeff. (SE)	*Model 1* Coeff. (SE)	*Model 2* Coeff. (SE)	*Model 3* Coeff. (SE)
Unemp - unable			0.236			-0.065
			(0.395)			(0.151)
Constant	-2.724***	-2.818***	-2.632***	-2.237***	-2.434***	-2.854***
	(0.230)	(0.255)	(0.359)	(0.274)	(0.286)	(0.304)
N	4218	4133	4133	2878	2752	2752
ll	-2440.082	-1899.698	-1108.646	-1934.080	-1793.531	-1634.842
chi2	87.782	829.445	1827.233	63.349	197.658	406.941
p	0.000	0.000	0.000	0.000	0.000	0.000

* p < 0.05 ** p < 0.01 *** p < .001. Coeff = coefficient. SE = standard error.

4.8. Discussion: Society, health, and health insurance

4.8.1. Comparative demographics

Overall, Egyptian respondents were relatively less wealthy and less educated than their Lebanese counterparts. However, whilst both groups reported similar aggregate levels of chronic health conditions, the Egyptians reported better self-assessed health levels than did the Lebanese. A higher proportion of Egyptian respondents reported having visited health care providers, particularly outpatient facilities, than did the Lebanese respondents. The differences between countries in health care-seeking behaviour may be due to differences found regarding the nature of chronic health conditions, the perceived severity of disease, and the nature of public supply of outpatient services.

4.8.2. Framing economic status

Understanding how social stratification varies by country provides more accurate information with which to assess social inequalities. Overall, income did not appear to vary by age substantially in either country. In both countries, a higher income was generally associated with being married and female. Educational status and employment information revealed the most telling information about income. Although completing secondary education or above was more common amongst the higher income groups in both countries, the gap between the richest and the poorest groups was greater in Egypt than it was in Lebanon. In addition, the completion rates were nearly identical across income in both countries, except for the poorest quintile, where the completion rate in Egypt was much lower than in Lebanon. These results suggest that socioeconomic inequality in Egypt may be due to the vulnerability of the poorest groups in society to missed educational attainment, although the same holds true for Lebanon to a somewhat lesser extent.

Employment appears to be similar between countries when considering aggregate gainful employment rates, but the detailed exploration found important differences pertaining to socioeconomic status. Gainfully employed was defined as being a governmental employee, non-governmental employee, or self-employed. Overall, approximately 44% in each country were gainfully employed, with nearly 50% more respondents in the richest as poorest quintiles employed. However, considerably more people in Egypt were government employees than in Lebanon. Conversely, considerably more people in Lebanon were self-employed.

These results suggest that indicators of social stratification may differ across countries. Educational level and occupational status appear to be important indicators of socioeconomic status in Egypt. By contrast, reported income and education seem to represent socioeconomic status in Lebanon. Although similar in many social and cultural respects, the structure of socioeconomic classes does not necessarily translate across borders. These findings could also mean that, on the one hand, socio-cultural and epidemiological patterns might be attributed to environment and history. On the other hand, class structure might be explained by the macro-economic environment, which directly or indirectly affects state versus private labour structure, social benefits, income generation, and, ultimately, social inequalities. With this development also come different patterns and consequences of social exclusion.

4.8.3. Health-care seeking behaviour

Other important indicators of socioeconomic status included the specific types of chronic health conditions afflicting different income groups and their health care-seeking behaviours. Contrary to previous research in developed countries showing that some chronic conditions are more frequently reported amongst the relatively rich, this research found that chronic conditions of most types are more common amongst the relatively poor in both countries. However, the types of conditions that were reported differed to an extent between settings. More respondents in Egypt reported arthritis and somewhat more reported ulcers than in Lebanon. Heart disease, depression, and vision problems were amongst the conditions that were more prevalent in Lebanon. The greatest income-associated inequality was found in Egypt in arthritis, asthma, migraine headaches, and hearing problems, whilst in Lebanon, inequality was greatest in heart disease, stroke, arthritis, high blood pressure, and ulcers.

These results suggest that respondents in the poorest quintiles report different conditions in each country due to several possible factors. First, etymological differences in disease due to environmental or other risk factor differences amongst poorer groups could differ between settings. Second, reporting relatively more treatment-intense conditions in Lebanon than in Egypt could be related to reporting bias, due to demand-side incentives to obtain coverage or supply-side incentives to generate demand. Finally, utilisation and treatment patterns amongst the poor could be less clinically effective for certain conditions in Lebanon than in Egypt, and vice versa.

Reasons for seeking care and the type of care received varied somewhat across income group. First, of those who did receive care, the reasons were fairly evenly distributed across income in Egypt. Yet in Lebanon, poorer groups tended to report less acute reasons than did richer groups, whilst the latter reported treatment-intense reasons more often. At the visit, receiving treatment, tests, and discussing specific health problems was more common in Lebanon than in Egypt. The results also show that poorer groups tended to avoid seeking care due to financial constraints between 3-5 times more often than richer groups in both countries. However, more of the poorest respondents in Lebanon than in Egypt were actually refused care due to financial constraints. These results suggest that the nature of care sought appears to be more acute and/or more technology-intense in Lebanon than in Egypt.

4.8.4. Economic determinants of health insurance

Overall, the government employment was the most important predictor of health insurance. Other important predictors were other types of employment, country, education, and income, whilst age played a minor role. Being male and being married were significant only in Lebanon, where they played a moderate role. Thus, income *per se* was not necessarily the most important determinant of health insurance, as employment or being a dependent appears to be the main route to securing health insurance in both countries.

However, income plays a greater role in Lebanon than in Egypt. In the pooled models, the probability of having insurance was higher in Lebanon than in Egypt; however, this effect disappears in the case of inpatient insurance after accounting for the interaction between country*income. This suggests that the country effect for inpatient care is mainly explained by the greater effect of *income* in Lebanon, rather than another quality about the Lebanese system. This enhanced effect of income in Lebanon is likely tied to the fact that voluntary private health insurance is purchased by approximately 20% of the Lebanese population. By contrast, the influence of being a government employee on having insurance was significantly *higher* in Egypt than it was in Lebanon. Since voluntary private insurance in Egypt is nearly non-existent, those who do have health insurance are typically civil servants.

Finally, the effects varied by the type of health insurance. Governmental employment generally played a stronger role in determining inpatient insurance than it did for outpatient insurance. Income was a larger determinant of outpatient insurance in Egypt than it was in Lebanon. In Egypt, a few other differences were observed between outpatient and inpatient insurance. Income was no longer a predictor of inpatient insurance *after* accounting for employment type, reinforcing that the effect of income in Egypt may be largely due to its effect *through employment type.* Being employed was a larger determinant of inpatient care than it was for outpatient care. These effects support the idea that social structure and acquiring coverage for health care differs somewhat between countries.

4.9. Chapter summary

The Egyptians and Lebanese are similar in some respects, yet social disparities in health and health insurance depend on the way social groups are defined in each country. A higher income per capita and a higher secondary education completion rate was found in the Lebanese sample, likely due to the relatively more advanced stage of economic development in Lebanon as compared to Egypt. By contrast, governmental employment is relatively higher in Egypt. This result may be explained by both the structure of the employment sector in Egypt and the incentives to work for the state there, given higher-quality and more comprehensive social benefits available, beyond services provided universally.

Regarding health, poorer groups appear to be afflicted by certain conditions more often than richer groups in both settings. In Lebanon, the poor also tend to report higher rates of illness for a greater *number* of conditions than they do in Egypt. These results indicate that income disparities in self-reported illness exist in both countries, but to a greater extent in Lebanon than in Egypt. Regarding health care-seeking behaviour, income-disparities in the use of high-technology services appear to be greater in Lebanon than in Egypt.

The economic determinants of health insurance in Egypt and Lebanon are similar to those reported for other contexts, although the ranking of predictors varies somewhat. Being a civil servant matters the most in Egypt and Lebanon. Despite the option to purchase private health insurance in Lebanon, governmental employment is still far more important than income in having insurance. At the same time, income is an important predictor of having insurance coverage in both countries. Therefore, in considering the effects of insurance and income on utilisation, it is important to note that these variables are highly correlated. The *nature* of economic inequality may therefore differ between countries, which can be further explored by quantifying the degree of inequity.

Chapter 5. Distribution of health and health care

5.1. Introduction

This chapter presents results regarding the distribution of health status and health care in Egypt and Lebanon. Findings are presented on the patterns of health care utilisation by income, measures of equity, and how health care payments can affect income level.

The first section of the chapter shows how levels of health indicators are distributed across income quintiles. The associated concentration indices and concentration curves are described for each health indicator, including health status, health care utilisation, health insurance coverage, and out-of-pocket payments. The index provides a summary measure of how equitable the distribution is, whilst the concentration curve visually depicts how equity changes along the income spectrum. The second section further illustrates the effect of inequity by showing the impact of out-of-pocket payments on income levels and poverty rates.

In presenting the distribution of health indicators and their associated equity measures, actual and need-standardised values are reported. For health status, values were adjusted by accounting for demographics, represented by age and gender. For utilisation and insurance, values were adjusted by accounting for health need, represented by these demographics and the three main health indicators, represented by self-assessed health, self-reported pain, and chronic health conditions. Out-of-pocket payments were not standardised for need, due to two reasons: (a) out-of-pocket payments were collected at the household level and (b) limited information was available in order to adjust for aggregate household health need. However, out-of-pocket payments were adjusted for household composition.

5.2. Health status

5.2.1. Self-assessed health

The actual proportion of respondents who rated themselves as having a 'moderate or below' health status was relatively higher amongst the poorest quintile as compared to the richest (Table 5.1). The gap was wider in Lebanon (twice as high amongst the poorest) than in Egypt (40% higher amongst the poorest). As shown in the table and Figure 5.1, the concentration indices are negative and statistically significant at the 95% confidence level. These results suggest that self-assessed ill health is concentrated amongst lower-income groups, known as a 'pro-poor' distribution.

The distribution is more pro-poor in Lebanon, since the magnitude of the index is larger in Lebanon than it is in Egypt. After standardising for age and gender, ill health is still more prevalent amongst the poorest quintile relative to the richest, but the gap is not as wide. The standardised indices show significantly pro-poor distributions in both countries, but the magnitude is smaller than the actual indices as shown in Table 5.1 and Figure 5.2. Overall, the degree of pro-poor inequity in self-assessed ill health in Lebanon is greater than it is in Egypt.

As shown in Figure 5.3 and Figure 5.4, the actual and standardised curves lie above the entire line of equality, respectively. Therefore, self-assessed ill health is pro-poor across all levels of income. However, in Egypt the curves lie further above the line for the upper 40% of the income distribution; this shows that ill health is more skewed towards lower incomes amongst people whose earnings are above average.

Since the standardised curves lie above but closer to the line of equality relative to the actual curves, the standardised distribution is slightly less pro-poor. Because the income gaps narrow somewhat after standardisation but still remain pro-poor, factors such as age and gender partially explain why lower-income groups are more likely to report feeling ill.

5.2.2. Self-reported pain

Approximately 1.5 times as many of the poorest group as the richest suffered from pain in Egypt and in Lebanon (Table 5.1). Overall, the indices show significantly pro-poor distributions, but more in Egypt (Figure 5.1). After standardisation, the indices continue to be pro-poor but relatively less so (Figure 5.2). All of the curves show a pro-poor distribution of pain, but somewhat less so after standardisation (Figure 5.5 and Figure 5.6). However, in Egypt pain appears more pro-poor amongst the upper income levels.

Table 5.1 Concentration indices for ill health

	Proportion reporting ill health (%)								
(Actual)	Poorest 20%	2nd poorest	Middle	2nd richest	Richest 20%	Total	Ratio	N	C.I.
SAH									
Egypt	0.309	0.264	0.296	0.231	0.224	0.274	1.4	4484	-0.052*
Lebanon	0.505	0.432	0.382	0.295	0.254	0.330	2.0	3243	-0.215*
Pain									
Egypt	0.472	0.413	0.439	0.365	0.310	0.418	1.5	4482	-0.112*
Lebanon	0.548	0.506	0.467	0.391	0.362	0.421	1.5	3233	-0.055*
CHC									
Egypt	0.630	0.590	0.597	0.540	0.443	0.582	1.4	4416	-0.038*
Lebanon	0.694	0.639	0.620	0.620	0.503	0.539	1.4	3174	-0.074*
(Standardised)									
SAH									
Egypt	0.308	0.290	0.311	0.251	0.251	0.290	1.2	4471	-0.033*
Lebanon	0.423	0.408	0.357	0.301	0.250	0.315	1.7	3216	-0.151*
Pain - any									
Egypt	0.468	0.434	0.451	0.383	0.333	0.430	1.4	4469	-0.073*
Lebanon	0.479	0.483	0.445	0.400	0.400	0.361	1.2	3206	-0.041*
CHC									
Egypt	0.631	0.609	0.609	0.555	0.458	0.594	1.4	4405	-0.031*
Lebanon	0.628	0.619	0.599	0.512	0.537	0.560	1.2	3148	-0.047*

*Statistically significant at 95% confidence level. C.I. = CONCENTRATION INDEX: <0 = pro-poor; 0 = income-neutral; >0 = pro-rich. 'Ratio' refers to percentage amongst the poorest 20% relative to richest 20%. Standardised sample size is lower since observations with predicted negative values for standardisation were dropped. SAH = Self-assessed health, where dummy variable: 1 = moderate or below; 0 = very good or above. Pain refers to dummy variable: 1 = any level of pain; 0 = no pain reported. CHC = Chronic health conditions, where dummy variable: 1 = diagnosis of at least one chronic health condition, and 0 = no diagnosis.

5.2.3. Chronic health conditions

In both countries, the rate of chronic health conditions was 40% higher amongst the poorest quintile than amongst the richest (Table 5.1). Overall, the indices show significant pro-poor distributions, but more so in Lebanon (Figure 5.1). After standardisation, chronic health conditions are pro-poor, suggesting that the distribution of chronic health conditions is not entirely explained by age and sex differences (Figure 5.2). The indices in both countries show pro-poor distributions, but more so in Lebanon. Figure 5.7 and Figure 5.8 show that all four curves indicate pro-poor rates.

Figure 5.1 Equality in health with confidence intervals

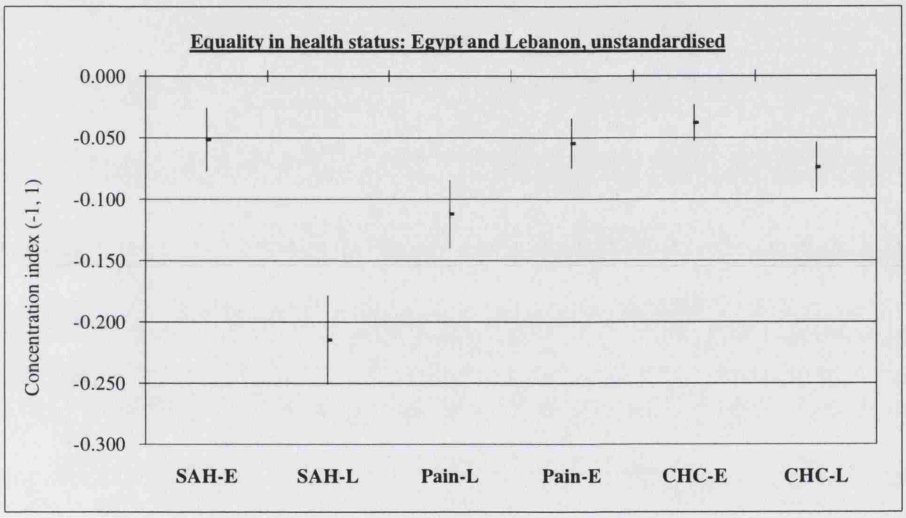
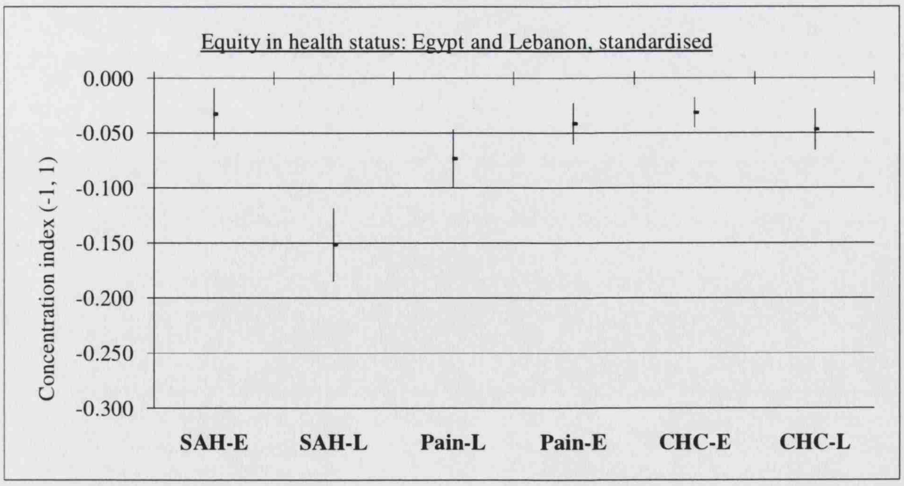


Figure 5.2 Equity in health with confidence intervals



CONCENTRATION INDEX: <0 = pro-poor; 0 = income-neutral; >0 = pro-rich.

Figure 5.3 Concentration curve for self-assessed health (actual)

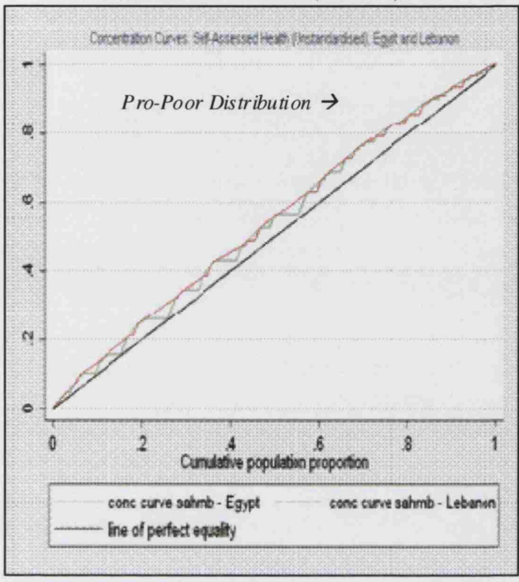


Figure 5.4 Concentration curve for self-assessed health (standardised)

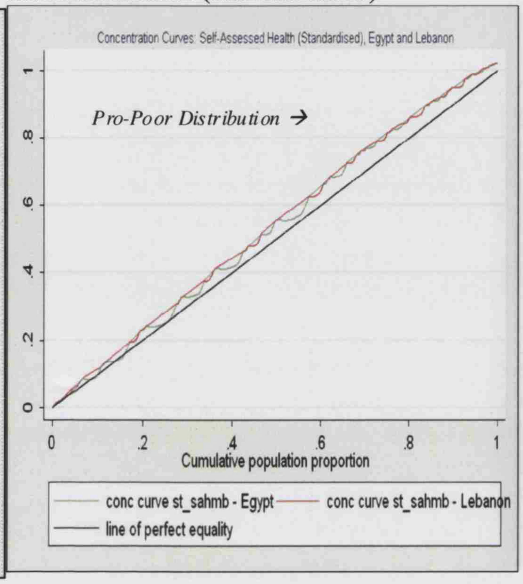


Figure 5.5 Concentration curve for pain (actual)

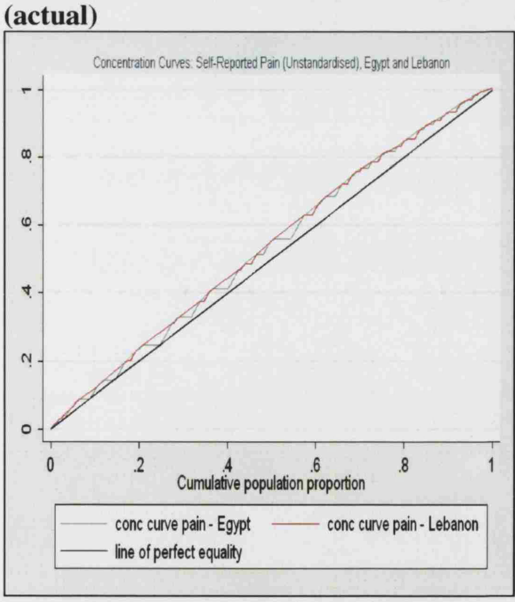
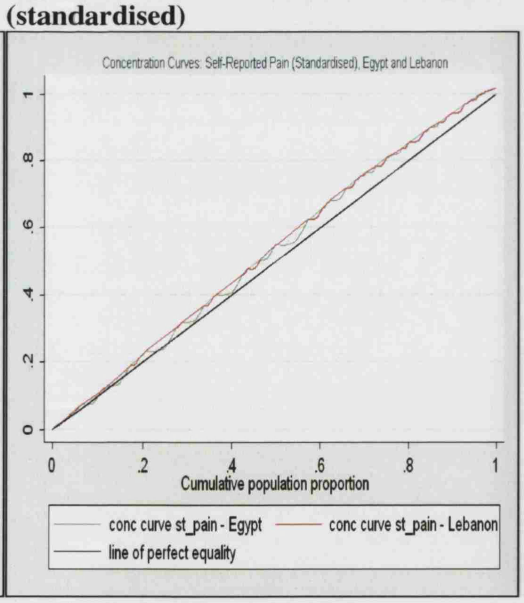


Figure 5.6 Concentration curve for pain (standardised)



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

Figure 5.7 Concentration curve for chronic health conditions (actual)

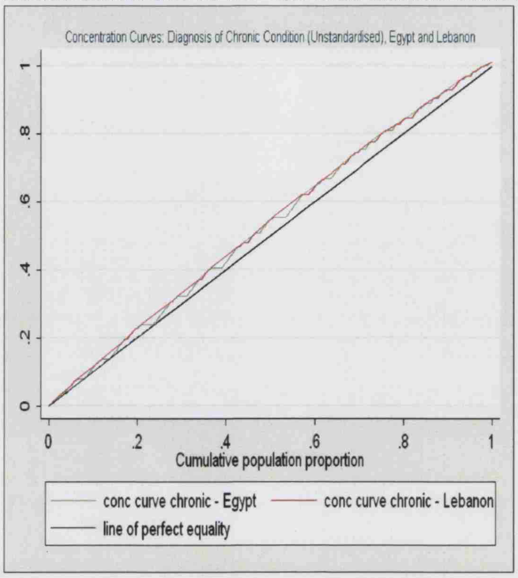
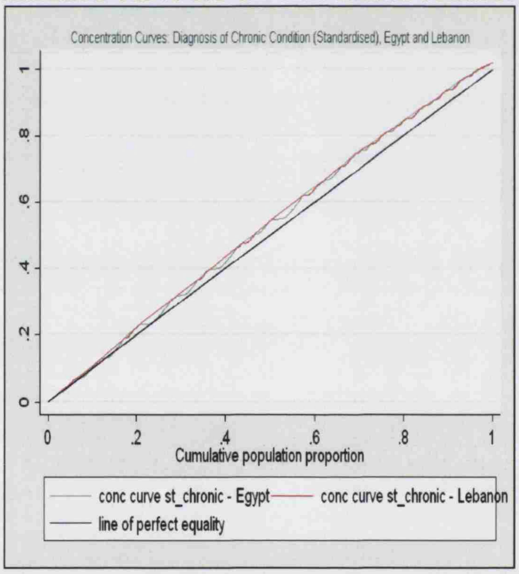


Figure 5.8 Concentration curve for chronic health condition (standardised)



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

5.3. Any outpatient care

Any outpatient care was defined as the proportion of respondents who reported having visited any type of outpatient providers, or outpatient contact. In both countries, the poorest groups were 20-30% more likely to visit 'any' outpatient care than the richest (Table 5.2). The actual indices point to a significant pro-poor distribution in Lebanon and an income-neutral distribution in Egypt (Figure 5.9).

The standardised rate of outpatient use is income-neutral in both countries, indicating that health need largely explains the actual, pro-poor distribution in Lebanon (Figure 5.10). The actual and standardised curves generally show pro-poor 'any' outpatient use in both countries (Figure 5.11 and Figure 5.12). However, after standardisation outpatient use in Egypt is slightly pro-rich amongst the lowest third of the income distribution.

5.4. General practitioner care

5.4.1. Contact

General practitioner visits were 30-50% more common amongst the poorest quintiles than the richest in both countries (Table 5.2). The indices show that the Egyptian pattern was income-neutral and the Lebanese pattern was significantly pro-poor (Figure 5.9). The standardised indices show general practitioner contact is significantly pro-poor in both countries, but more in Lebanon (Figure 5.2). In both countries, the actual and standardised curves show pro-poor distribution for the lower-income groups, and pro-rich distribution for upper-income groups (Figure 5.13 and Figure 5.14).

5.4.2. Intensity

Amongst those who visited general practitioners, the poorest quintiles in both countries reported 20% more frequent visits as the richest (Table 5.3). Overall, the actual and standardised indices show income-neutral distributions (Figure 5.15 and Figure 5.16). Based on Figure 5.17 and Figure 5.18, general practitioner visits appear pro-rich for the lower-income groups and pro-poor for upper-income groups.

5.5. Medical specialist care

5.5.1. Contact

Actual rates of specialist contact appear income-neutral in both countries, although the indices suggest a slightly pro-rich distribution (Table 5.2 and Figure 5.9). The standardised indices are significantly pro-poor in Lebanon and income-neutral in Egypt (Figure 5.10). The actual and standardised curves for specialist care in Egypt and Lebanon indicate pro-rich distributions for lower-income levels and pro-poor for upper-income levels (Figure 5.19 and Figure 5.20).

5.5.2. Intensity

The actual and standardised average number of visits was approximately 1.7 per month in both countries (Table 5.3). All of the indices show income-neutral distributions (Figure 5.15 and Figure 5.16). All of the curves show a slightly pro-rich pattern amongst lower-income levels and slightly pro-poor amongst higher-income levels (Figure 5.21 and Figure 5.22).

5.6. Pharmacists

5.6.1. Contact

The proportion of respondents who visited pharmacists was similar across quintiles in both countries (Table 5.2). The indices for both countries were not significant; the index is slightly pro-poor in Egypt and pro-rich in Lebanon (Figure 5.9). After standardisation, neither index is significant, though slightly pro-poor in Egypt and income-neutral in Lebanon (Figure 5.10). The actual curves for both countries show that contact is somewhat pro-rich for lower-income groups and pro-poor for upper-income groups (Figure 5.23). The standardised curves lie on opposite sides of the line of equality relative to the actual curves, indicating a pro-poor distribution for lower-income groups and pro-rich for upper-income groups (Figure 5.24).

5.6.2. Intensity

In Egypt and Lebanon, the average number of conditional visits was nearly 2.5 per person per month, and the richest-to-poorest ratio appears somewhat pro-poor (Table 5.3). The standardised and actual indices are similar, suggesting that the intensity of pharmacy visits is income-neutral (Figure 5.15 and Figure 5.16). All of the curves show that pharmacy visits are pro-rich amongst lower-income groups and slightly pro-poor amongst the upper-income groups (Figure 5.25 and Figure 5.26).

Table 5.2 Concentration indices for various types of outpatient contact

	Proportion of users (%)								
(Actual)	**Poorest 20%**	**2nd poorest**	**Middle**	**2nd richest**	**Richest 20%**	**Total**	**Ratio**	**N**	**C.I.**
Any outpatient care									
Egypt	0.612	0.604	0.604	0.587	0.503	0.595	1.2	4490	-0.007
Lebanon	0.439	0.421	0.443	0.376	0.339	0.385	1.3	3246	-0.052*
General practitioners									
Egypt	0.490	0.559	0.390	0.417	0.333	0.463	1.5	672	-0.137
Lebanon	0.378	0.382	0.252	0.283	0.299	0.303	1.3	1136	-0.223*
Specialists									
Egypt	0.784	0.830	0.851	0.832	0.827	0.823	0.9	1267	0.019
Lebanon	0.397	0.407	0.414	0.406	0.404	0.406	1.0	1139	0.034
Pharmacy									
Egypt	0.507	0.584	0.697	0.561	0.449	0.574	1.1	745	-0.010
Lebanon	0.290	0.386	0.285	0.287	0.285	0.295	1.0	1120	0.020
(Standardised)									
Any outpatient care									
Egypt	0.581	0.607	0.592	0.622	0.586	0.598	1.0	4401	0.023*
Lebanon	0.351	0.369	0.404	0.410	0.373	0.384	0.9	3134	0.010
General practitioners									
Egypt	0.383	0.489	0.151	0.165	0.300	0.333	1.3	304	-0.087
Lebanon	0.415	0.497	0.311	0.279	0.255	0.306	1.6	326	-0.097*
Specialists									
Egypt	0.523	0.492	0.363	0.750	0.601	0.522	0.9	1043	-0.012
Lebanon	0.507	0.312	0.340	0.230	0.435	0.365	1.2	446	-0.070*
Pharmacy									
Egypt	0.360	0.239	0.234	0.250	0.241	0.274	1.5	421	-0.055
Lebanon	0.476	0.605	0.370	0.326	0.391	0.397	1.2	314	-0.001

*Statistically significant at 95% confidence level. C.I. = CONCENTRATION INDEX: <0 = pro-poor; 0 = income-neutral; >0 = pro-rich.
Standardised sample reduced since observations with predicted negative values for standardisation were dropped. Ratio: poorest 20% to richest 20%.

Figure 5.9 Equality in outpatient contact with confidence intervals

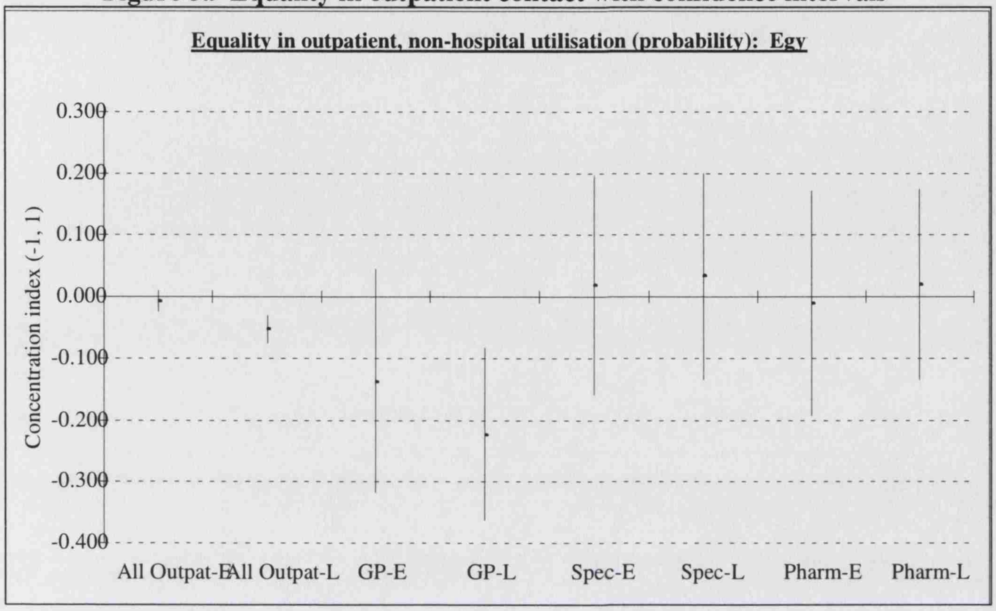
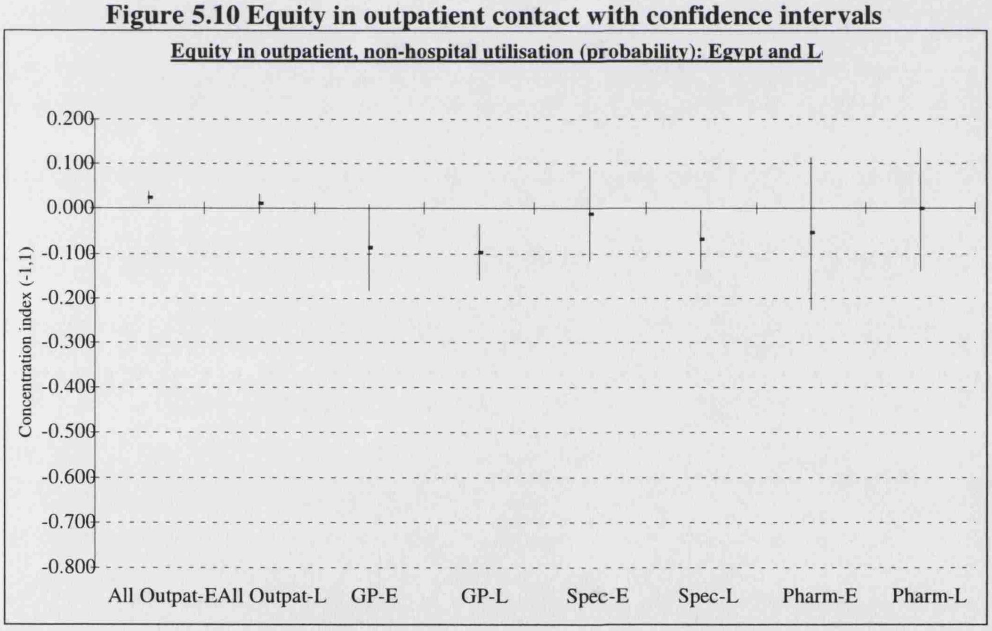


Figure 5.10 Equity in outpatient contact with confidence intervals



CONCENTRATION INDEX: <0 = pro-poor; 0 = income-neutral; >0 = pro-rich.

Figure 5.11 Concentration curves for any outpatient contact (actual)

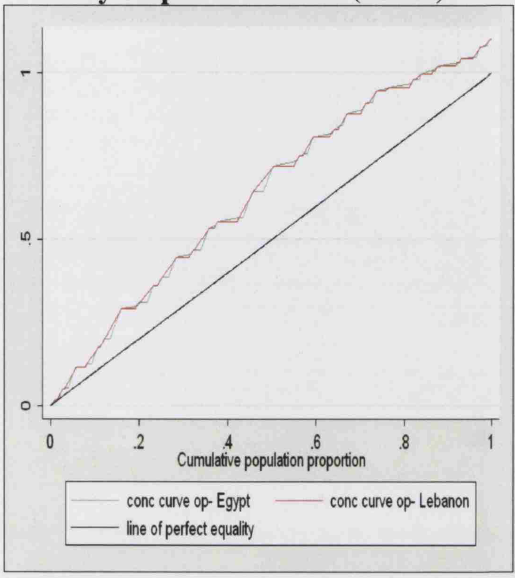


Figure 5.12 Concentration curves for any outpatient contact (standardised)

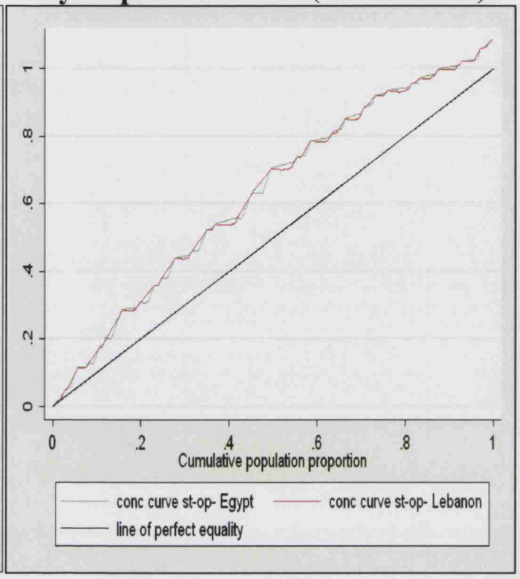


Figure 5.13 Concentration curves for general practitioner contact (actual)

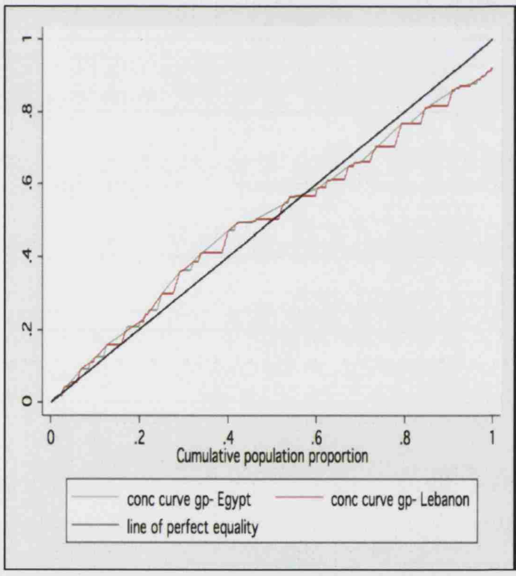
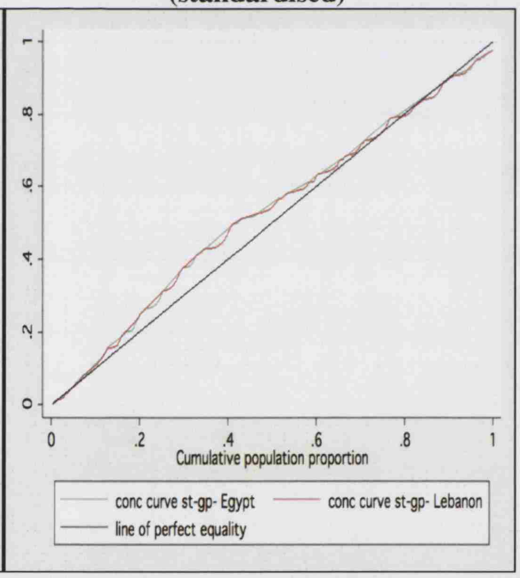


Figure 5.14 Concentration curves for general practitioner contact (standardised)



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

Table 5.3 Concentration indices for outpatient intensity

	Average no. of visits per person per two weeks								
(Unconditional. actual)	**Poorest 20%**	**2nd poorest**	**Middle**	**2nd richest**	**Richest 20%**	**Total**	**Ratio**	**N**	**C.I.**
General practitioners									
Egypt	0.782	1.073	0.801	1.031	0.433	0.867	1.8	672	n/a
Lebanon	0.732	0.831	0.388	0.480	0.490	0.527	1.5	1136	n/a
Specialists									
Egypt	1.246	1.460	1.503	1.347	1.364	1.389	0.9	1267	n/a
Lebanon	0.740	0.758	0.670	0.626	0.632	0.664	1.2	1139	n/a
Pharmacy									
Egypt	1.128	1.426	2.011	1.271	0.783	1.401	1.4	745	n/a
Lebanon	0.637	0.898	0.715	0.789	0.712	0.737	0.9	1120	n/a
(Conditional, actual)									
General practitioners									
Egypt	1.596	1.919	2.057	2.475	1.300	1.871	1.2	311	0.021
Lebanon	1.938	2.176	1.537	1.698	1.639	1.739	1.2	349	-0.020
Specialists									
Egypt	1.589	1.758	1.767	1.620	1.648	1.688	1.0	1043	0.045
Lebanon	1.865	1.865	1.618	1.539	1.565	1.635	1.2	470	-0.092
Pharmacy									
Egypt	2.223	2.441	2.885	2.267	1.742	2.440	1.3	427	0.011
Lebanon	2.194	2.324	2.508	2.750	2.500	2.498	0.9	331	0.005
(Conditional, standardardised)									
General practitioners									
Egypt	1.607	2.002	2.092	2.542	1.389	1.922	1.2	304	0.015
Lebanon	1.957	1.992	1.463	1.646	1.600	1.683	1.2	326	-0.022
Specialists									
Egypt	1.607	1.761	1.765	1.644	1.675	1.699	1.0	1043	0.048
Lebanon	1.889	1.835	1.595	1.507	1.538	1.614	1.2	446	-0.091
Pharmacy									
Egypt	2.235	2.421	2.761	2.376	1.713	2.418	1.3	421	0.013
Lebanon	2.231	2.402	2.532	2.694	2.518	2.510	0.9	314	0.003

*Statistically significant at 95% confidence level. C.I. = CONCENTRATION INDEX: <0 = Pro-Poor; 0 = Income-Neutral; >0 = Pro-Rich. Ratio: poorest 20% to richest 20%

Figure 5.15 Equality in outpatient intensity with confidence intervals

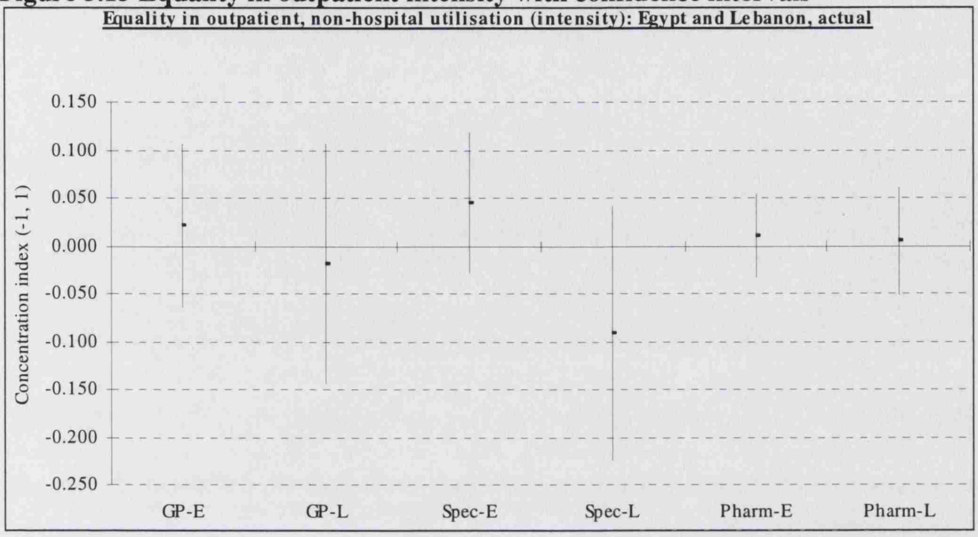
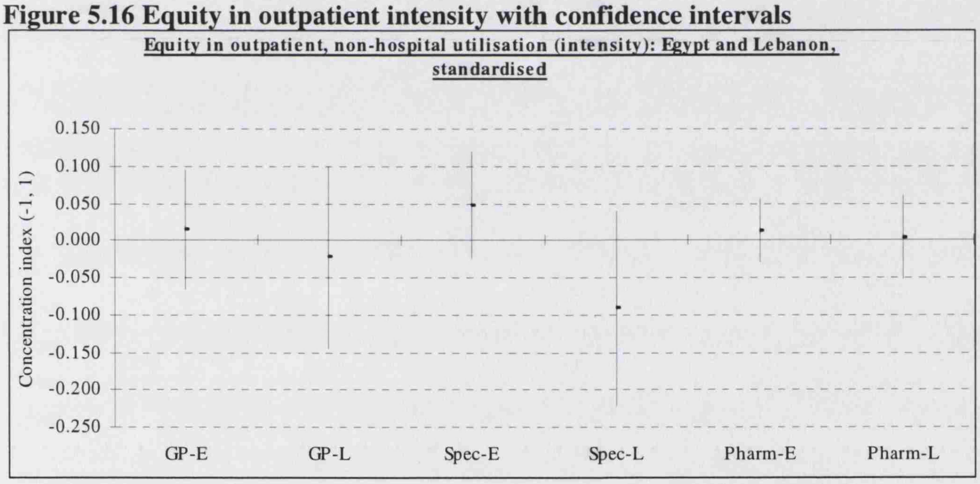


Figure 5.16 Equity in outpatient intensity with confidence intervals



CONCENTRATION INDEX: < 0 = pro-poor; 0 = income-neutral; > 0 = pro-rich.

Figure 5.17 Concentration curves for general practitioner intensity (actual)

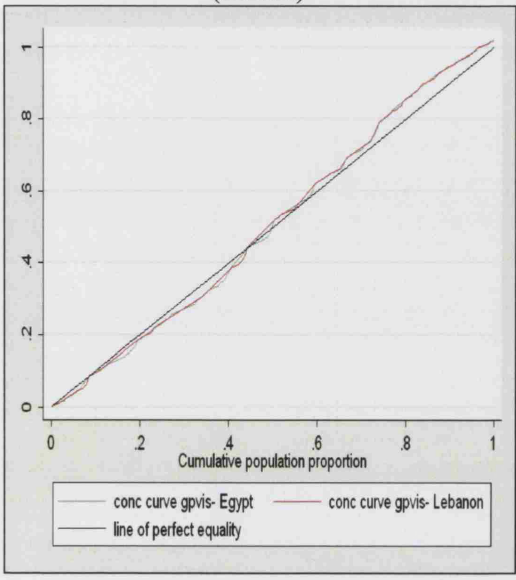


Figure 5.18 Concentration curves for general practitioner intensity (standardised)

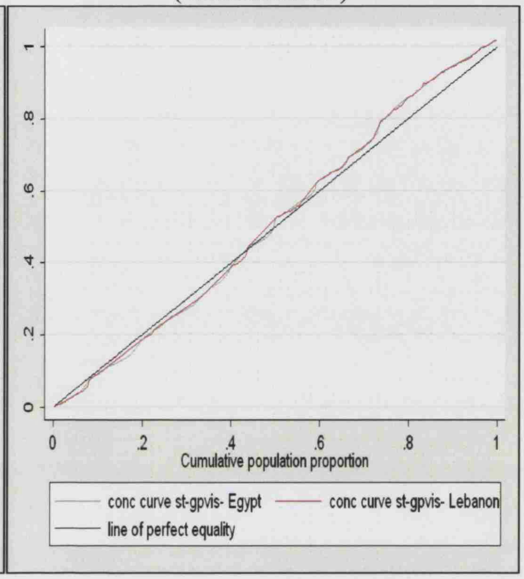


Figure 5.19 Concentration curves for specialist contact (actual)

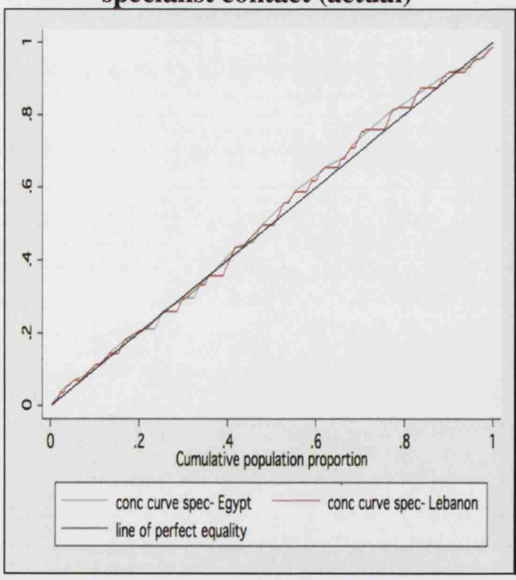
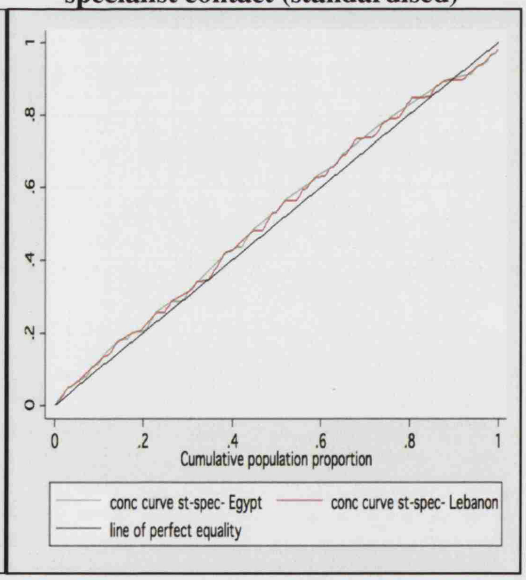


Figure 5.20 Concentration curves for specialist contact (standardised)



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

Figure 5.21 Concentration curves for specialist intensity (actual)

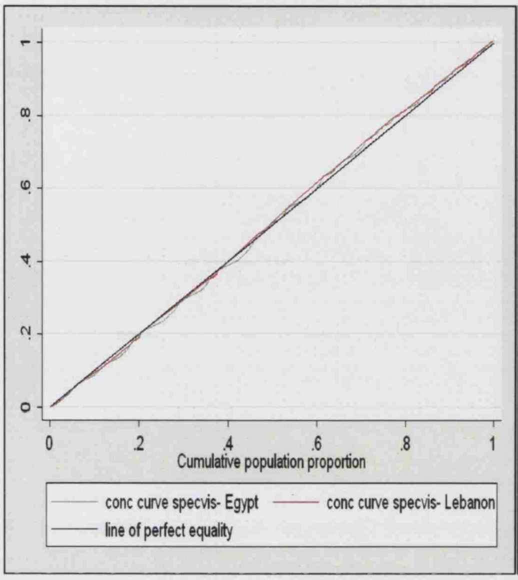


Figure 5.22 Concentration curves for specialist intensity (standardised)

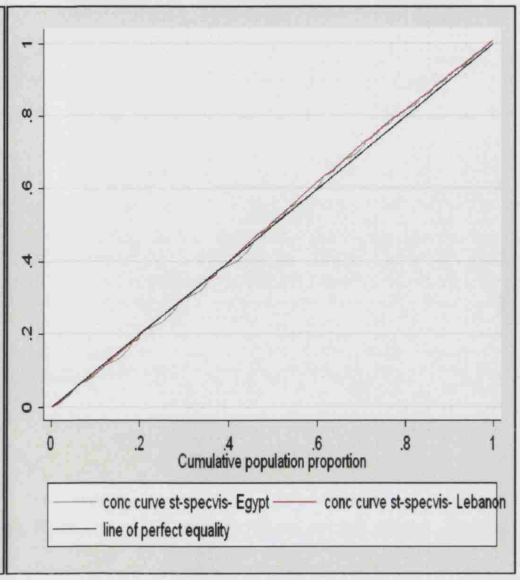


Figure 5.23 Concentration curves for pharmacist contact (actual)

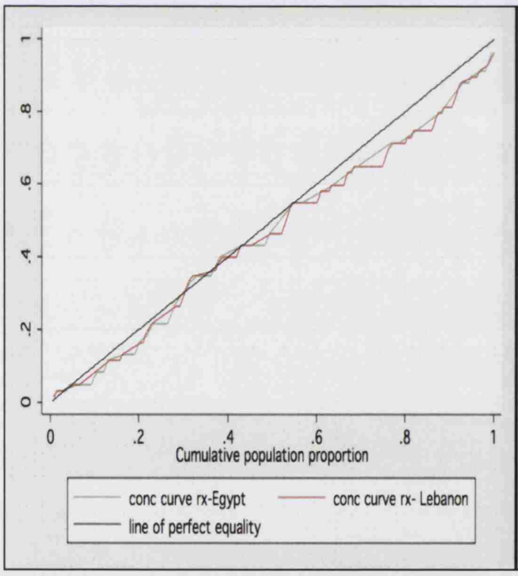
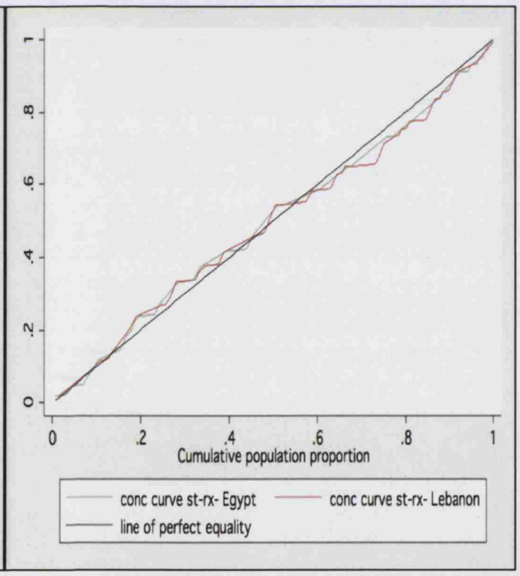


Figure 5.24 Concentration curves for pharmacist contact (standardised)



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

Figure 5.25 Concentration curves for pharmacy intensity (actual)

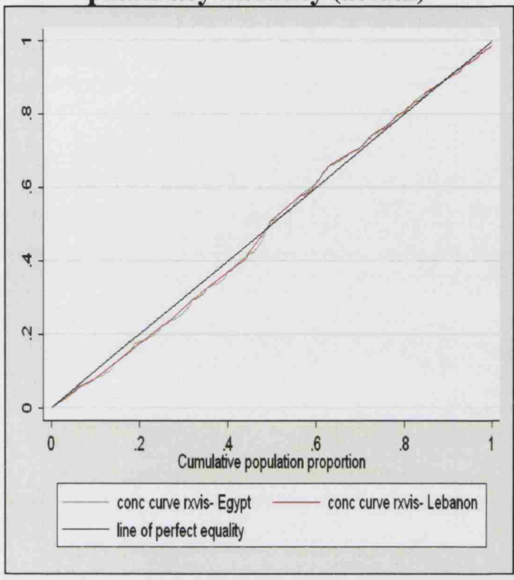
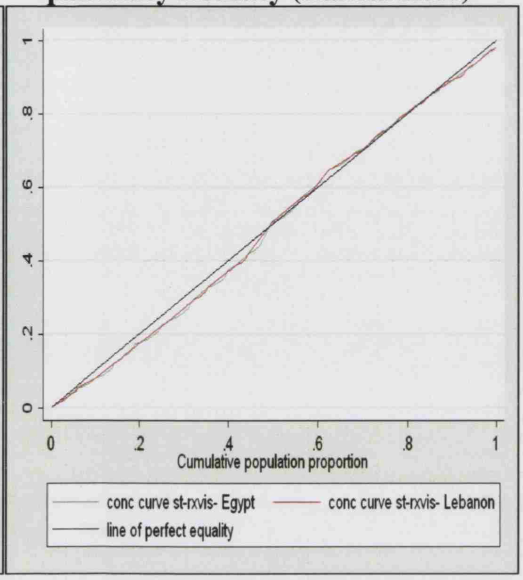


Figure 5.26 Concentration curves for pharmacy intensity (standardised)



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

5.7. Hospital outpatient care

5.7.1. Contact

In Egypt, 20% more respondents in the poorest income group had visited hospital outpatient units as compared to the richest income, but rates were similar between these quintiles in Lebanon (Table 5.4). The actual and standardised indices show that hospital outpatient contact is income-neutral in both countries, but somewhat pro-rich in Egypt (Figure 5.27 and Figure 5.28). All of the curves suggest that contact is mostly pro-poor, but pro-rich amongst both extremes of the income spectrum (Figure 5.29 and Figure 5.30).

5.7.2. Intensity

Amongst Egyptian and Lebanese respondents, the indices suggest that the conditional number of visits was income-neutral, although somewhat pro-rich (Table 5.5 and Figure 5.31). After standardisation, the intensity of hospital outpatient visits was income-neutral in Egypt and Lebanon, but somewhat pro-rich in Egypt and pro-poor in

Lebanon (Figure 5.32). The actual and standardised curves for both countries show a mostly pro-rich distribution but pro-poor for the upper-most income groups (Figure 5.33 and Figure 5.34). However, in Lebanon the number of visits was relatively more pro-poor than that in Egypt.

5.8. Hospital inpatient care

5.8.1. Contact over twelve months

In Egypt, over twice as many respondents in the poorest quintile were admitted as the richest, but only 30% more of the poorest had in Lebanon (Table 5.4 and Figure 5.27). The actual index for Egypt was negative but not significant, but was significantly pro-poor in Lebanon. After standardisation, the indices are income-neutral (Figure 5.28). All of the curves are a somewhat pro-rich (Figure 5.35 and Figure 5.36). The actual curves show that admissions are pro-poor for the lowest income levels.

5.8.2. Contact over one month

In Egypt, four times as many of the poorest quintile as the richest had been admitted over one month, but in Lebanon half as many of the poorest had admissions as the richest (Table 5.4). The actual indices show an income-neutral distribution overall, although somewhat pro-poor (Figure 5.27). After standardisation, the indices show that admissions are income-neutral in both countries (Figure 5.28). Actual and standardised curves show income-neutral distributions in both countries, but somewhat pro-rich in Lebanon for upper incomes (Figure 5.37 and Figure 5.38).

5.8.3. Intensity over one month

Over one month, the average number of conditional visits was slightly higher in Lebanon than in Egypt (Table 5.3). The actual and standardised indices were income-neutral, though slightly pro-rich in Egypt and slightly pro-poor in Lebanon (Figure 5.31 and Figure 5.32). All of the curves show that admission frequency is mostly pro-rich, but pro-poor amongst the lowest income deciles (Figure 5.39 and Figure 5.40).

Figure 5.27 Equality in hospital contact with confidence intervals

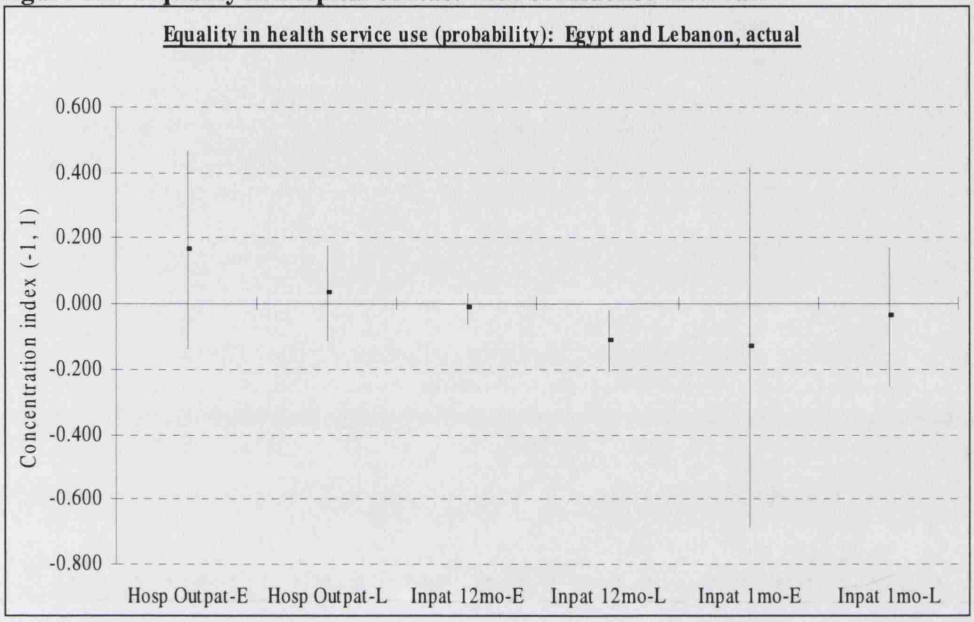
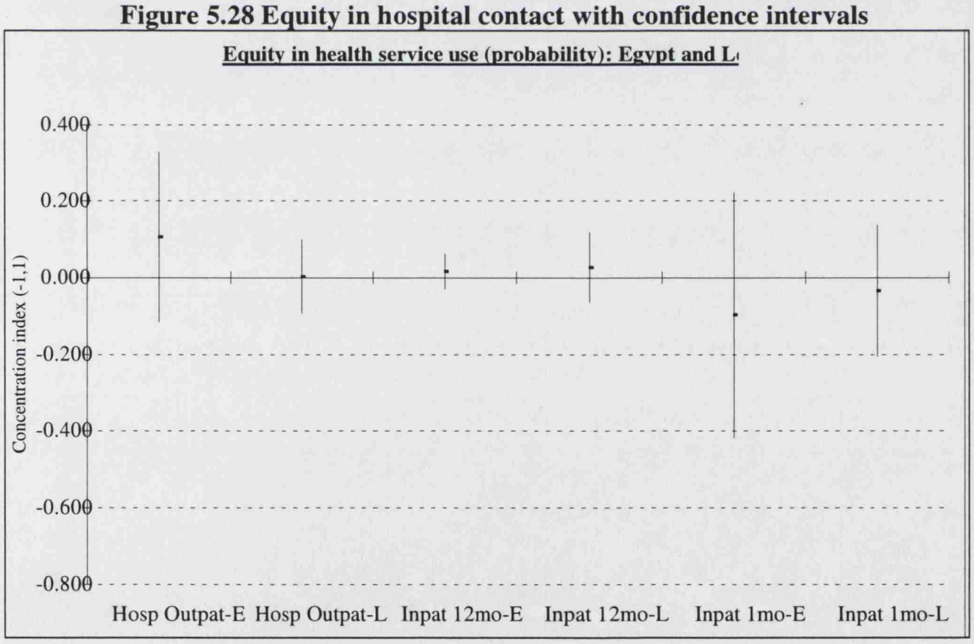


Figure 5.28 Equity in hospital contact with confidence intervals



CONCENTRATION INDEX: < 0 = pro-poor; 0 = income-neutral; > 0 = pro-rich.

Table 5.4 Concentration indices for contact with hospital providers

	Proportion of users (%)								
(actual)	**Poorest 20%**	**2nd poorest**	**Middle**	**2nd richest**	**Richest 20%**	**Total**	**Ratio**	**N**	**CI**
Hospital outpatient units									
Egypt	0.604	0.551	0.550	0.588	0.500	0.569	1.2	701	0.164
Lebanon	0.075	0.060	0.082	0.079	0.083	0.079	0.9	1090	0.031
Hospital inpatient-12 mo									
Egypt	0.060	0.056	0.060	0.054	0.028	0.055	2.2	4490	-0.015
Lebanon	0.146	0.127	0.162	0.117	0.115	0.129	1.3	3246	-0.114*
Hospital inpatient-1 mo									
Egypt	0.302	0.313	0.266	0.214	0.080	0.264	3.8	517	-0.134
Lebanon	0.025	0.095	0.044	0.037	0.060	0.050	0.4	1085	-0.039
(standardised)									
Hospital outpatient units									
Egypt	0.197	0.397	0.463	0.250	0.374	0.332	0.5	386	0.105
Lebanon	0.210	0.238	0.106	0.095	0.202	0.162	1.0	85	0.002
Hospital inpatient-12 mo									
Egypt	0.058	0.062	0.061	0.064	0.045	0.060	1.3	4401	0.015
Lebanon	0.111	0.099	0.149	0.123	0.122	0.124	0.9	3134	0.026
Hospital inpatient-1 mo									
Egypt	0.071	0.061	0.106	0.045	0.156	0.083	0.5	129	-0.098
Lebanon	0.103	0.173	0.068	0.044	0.100	0.087	1.0	62	-0.035

*Statistically significant at 95% confidence level. C.I. = CONCENTRATION INDEX: < 0 = Pro-Poor. 0 = Income-Neutral. > 0 = Pro-Rich. Standardised sample size reduced since observations with predicted negative values for standardisation were dropped. Ratio: poorest 20% to richest 20%

Table 5.5 Concentration indices for intensity of hospital services

		Average no. of visits per person per two weeks							
(Unconditional. actual)	**N**	**Poorest 20%**	**2nd poorest**	**Middle**	**2nd richest**	**Richest 20%**	**Total**	**Ratio**	**C.I.**
Hospital outpatient units									
Egypt	701	0.922	1.186	1.309	1.202	0.875	1.104	1.1	n/a
Lebanon	1090	0.167	0.120	0.164	0.139	0.143	0.148	1.2	n/a
Hospital inpatient-1 mo									
Egypt	517	0.453	0.484	0.404	0.443	0.080	0.413	5.7	n/a
Lebanon	1085	0.058	0.143	0.078	0.042	0.144	0.097	0.4	n/a
(Conditional visits, actual)									
Hospital outpatient units									
Egypt	399	1.527	2.151	2.378	2.045	1.750	1.942	0.9	0.019
Lebanon	92	2.222	2.000	2.000	1.765	1.724	1.870	1.3	0.011
Hospital inpatient-1 mo									
Egypt	136	1.500	1.550	1.517	2.067	1.000	1.566	1.5	0.029
Lebanon	62	2.333	1.500	1.778	1.125	2.381	1.918	1.0	-0.020
(Conditional, standardardised)									
Hospital outpatient units									
Egypt	386	1.551	2.151	2.412	2.086	1.856	1.971	0.8	0.021
Lebanon	85	2.368	1.519	1.993	1.600	1.459	1.719	1.6	-0.047
Hospital inpatient-1 mo									
Egypt	129	1.484	0.148	1.503	2.217	0.968	1.551	1.5	0.040
Lebanon	62	2.499	1.672	1.757	0.991	2.295	1.894	1.1	-0.041

*Statistically significant at 95% confidence level. n/a = not applicable. C.I. = CONCENTRATION INDEX: < 0 = Pro-Poor. 0 = Income-Neutral. > 0 = Pro-Rich. UNCONDITIONAL refers to average number of visits for entire sample, including non-users and users of health services. Instead, C.I. is calculated for probability of visits separately from the number of visits CONDITIONAL upon being a user (i.e., having at least one visit). Ratio: poorest 20% to richest 20%.

Figure 5.29 Equality in hospital intensity with confidence intervals

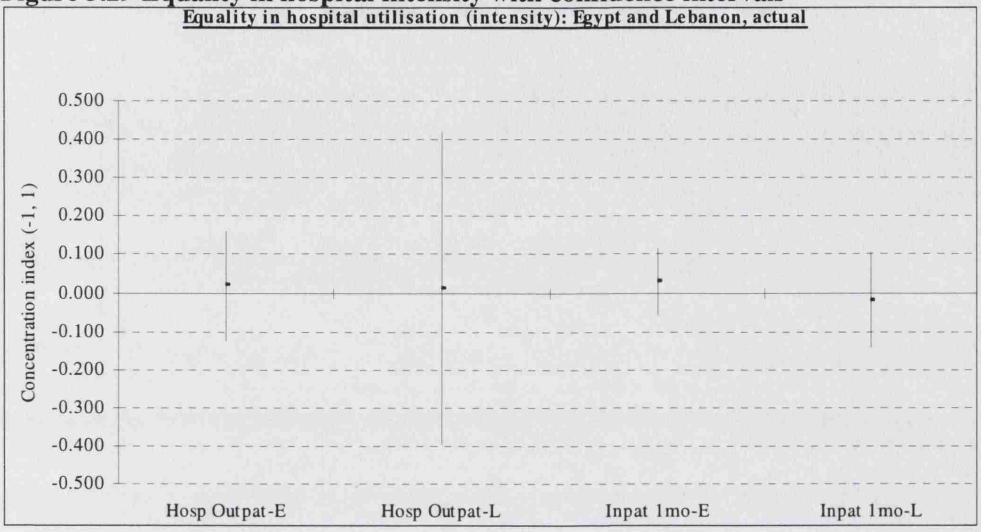


Figure 5.30 Equity in hospital intensity with confidence intervals

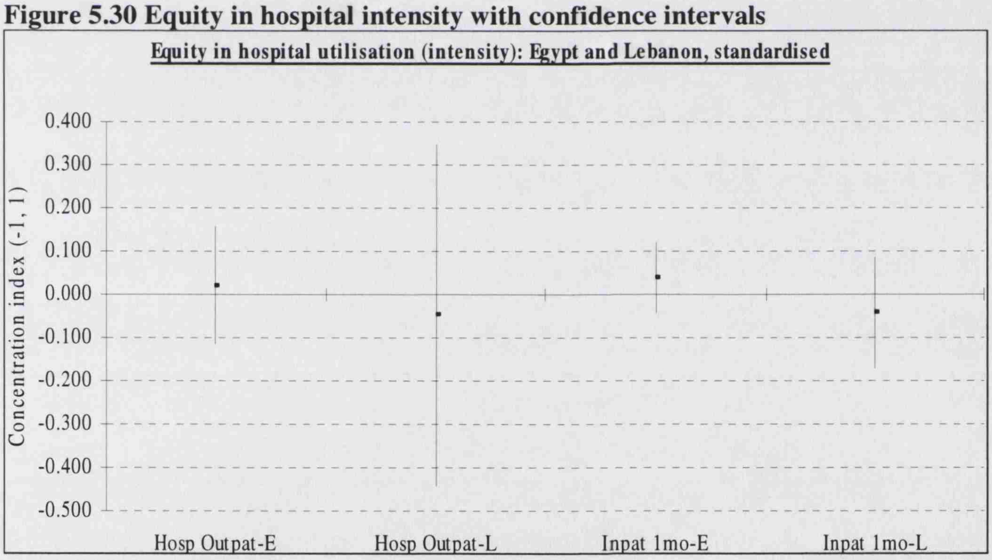


Figure 5.31 Concentration curves for hospital outpatient contact (actual)

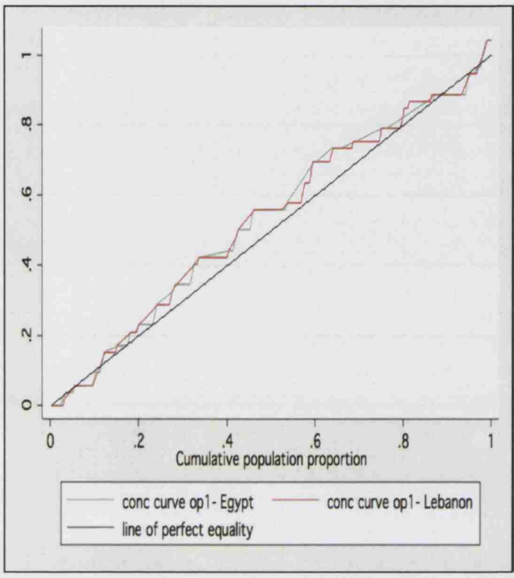


Figure 5.32 Concentration curves for hospital outpatient contact (standardised)

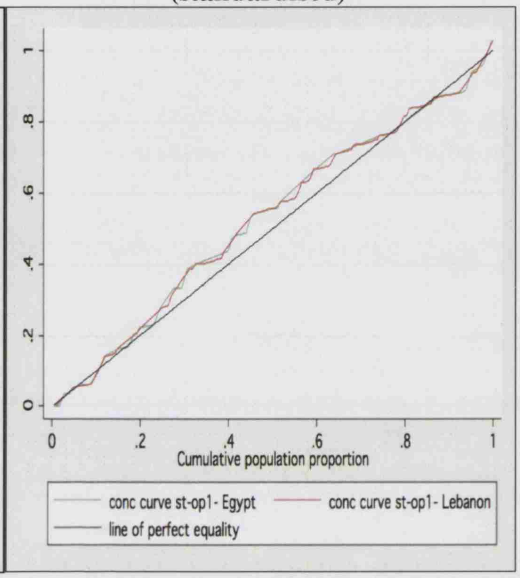


Figure 5.33 Concentration curves for hospital outpatient intensity (actual)

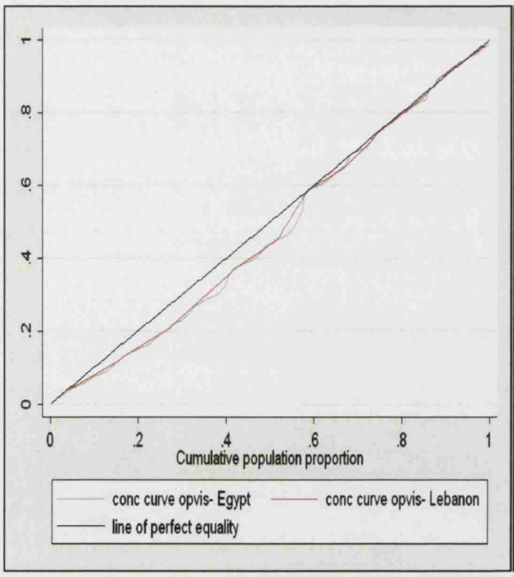
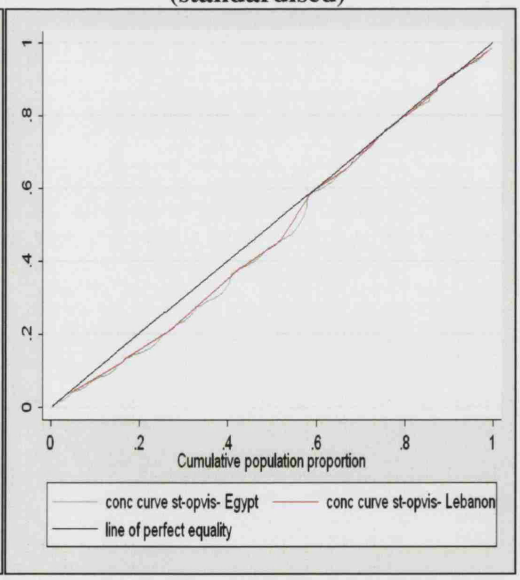


Figure 5.34 Concentration curves for hospital outpatient intensity (standardised)



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

Figure 5.35 Concentration curves for inpatient contact (12-mo., actual)

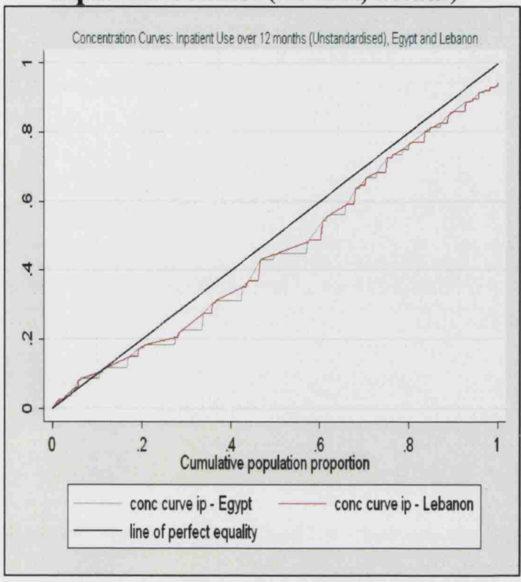


Figure 5.36 Concentration curves for inpatient contact (12 mo., standardised)

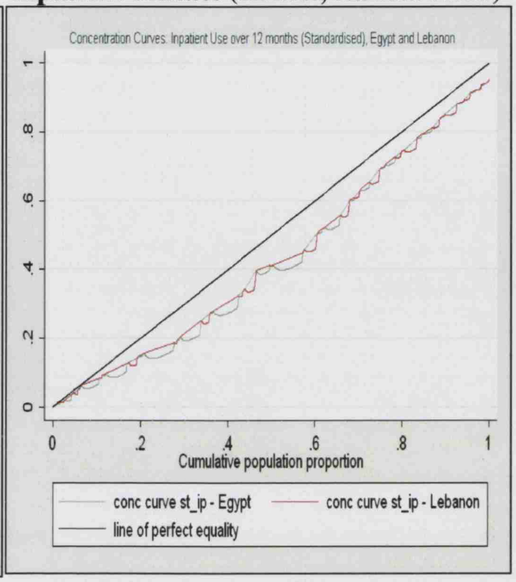


Figure 5.37 Concentration curves for inpatient contact (1-mo., actual)

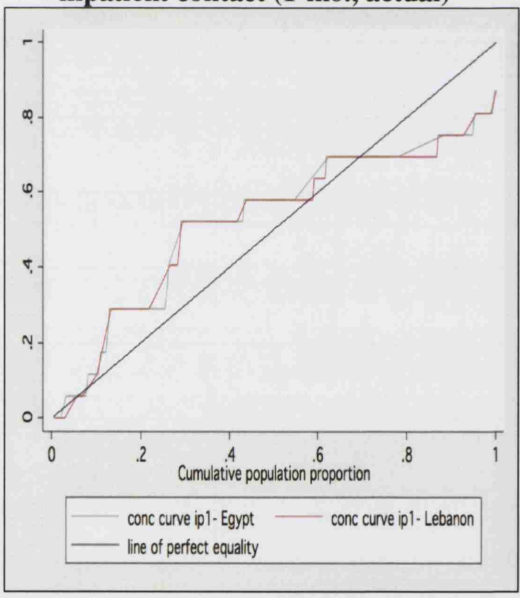
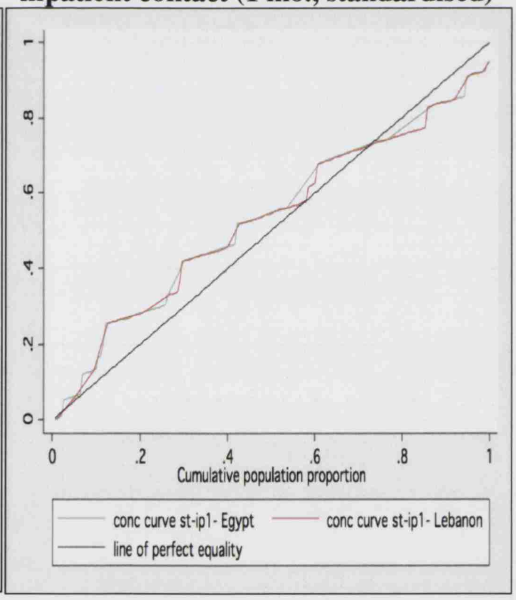


Figure 5.38 Concentration curves for inpatient contact (1 mo., standardised)



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

Figure 5.39 Concentration curves for inpatient intensity (actual)

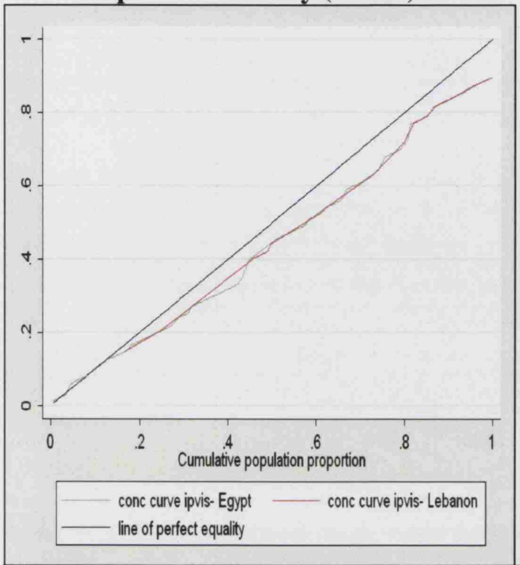
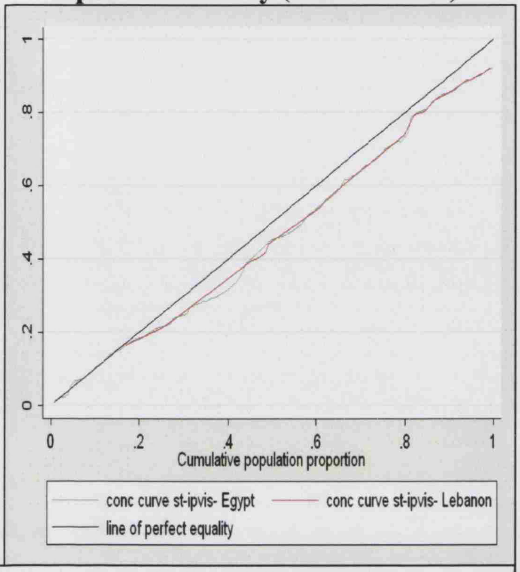


Figure 5.40 Concentration curves for inpatient intensity (standardised)



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

5.9. Health insurance

5.9.1. Any health insurance

In both countries, nearly 60-70% fewer respondents in the poorest quintile had insurance coverage of any type as compared to the richest (Table 5.6). The actual and standardised indices show significant pro-rich distributions, but more in Lebanon (Figure 5.41 and Figure 5.42). All curves indicate that 'any' insurance is pro-rich, but income inequality is relatively greater amongst middle-income groups (Figure 5.43 and Figure 5.44).

5.9.2. Outpatient insurance

Outpatient insurance rates were 60-70% lower amongst the poorest quintile than amongst the richest (Table 5.6). The actual and standardised indices show significantly pro-rich coverage in both countries (Figure 5.42 and Figure 5.42). All curves show that outpatient insurance is pro-rich, but is relatively less after standardisation (Figure 5.45 and Figure 5.46). It is mostly pro-rich, but pro-poor amongst the top 10% of the income distribution. Income inequity is higher amongst middle-income groups.

5.9.3. Inpatient insurance

The inpatient insurance rate was twice as high in Lebanon as in Egypt, and generally 60% higher amongst the richest quintiles relative to the poorest. Overall, the actual and standardised indices illustrate that coverage is significantly pro-rich, but more so in Lebanon (Figure 5.41 and Figure 5.42). Figure 5.47 and Figure 5.48 show that it is consistently pro-rich, particularly amongst middle-income levels.

5.10. Household out-of-pocket payments for health care

Over one year, virtually all households in both countries paid out-of-pocket fees for health care, whether for physician visits or medications (Table 5.7). The proportion of households that paid fees to physicians was slightly lower in Lebanon than in Egypt, but for medications the proportions were nearly equal. Within each country, the proportions of households reporting payments for doctor visits and medications were nearly equal between the poorest and richest quintiles.

Whilst the average share of income spent on health care was relatively high by international standards, the share found in Lebanon was twice that found in Egypt (17% versus 8%, respectively). In Egypt the total share spent by the poorest quintile was five times greater than that spent by the richest in Egypt, but in Lebanon it was twelve times greater.

As a percent of income, a larger share was spent on medications than on physician visits in both countries. In Egypt, the dollar amount spent on medications was nearly 3.5 times as much as that spent on physician fees. The lowest-income quintile spent 3.6 times as much on medications as on physicians, whilst the poorest-income quintile spent nearly 3 times as much on medication as on physicians.

In Lebanon, approximately 2.2 times as much was spent on medications as on physicians overall. Similar to Egypt, the poorest quintile spent approximately 2.6 times as much on medications than on physician fees. The ratio was nearly 2 times amongst the richest quintile.

These results suggest that (i) the lower-income groups utilise physicians less than the richest; or (ii) that lower-income groups tend to visit providers that are associated with relatively lower fees, such as public or charitable providers. The indices show that all out-of-pocket payments were significantly pro-poor (i.e., higher amongst the relative poor), but relatively more in Lebanon (Table 5.8). In both countries, income-related inequity in out-of-pocket payments was relatively greater for medications than it was for physician visits.

Figure 5.41 Equality in health insurance with confidence intervals

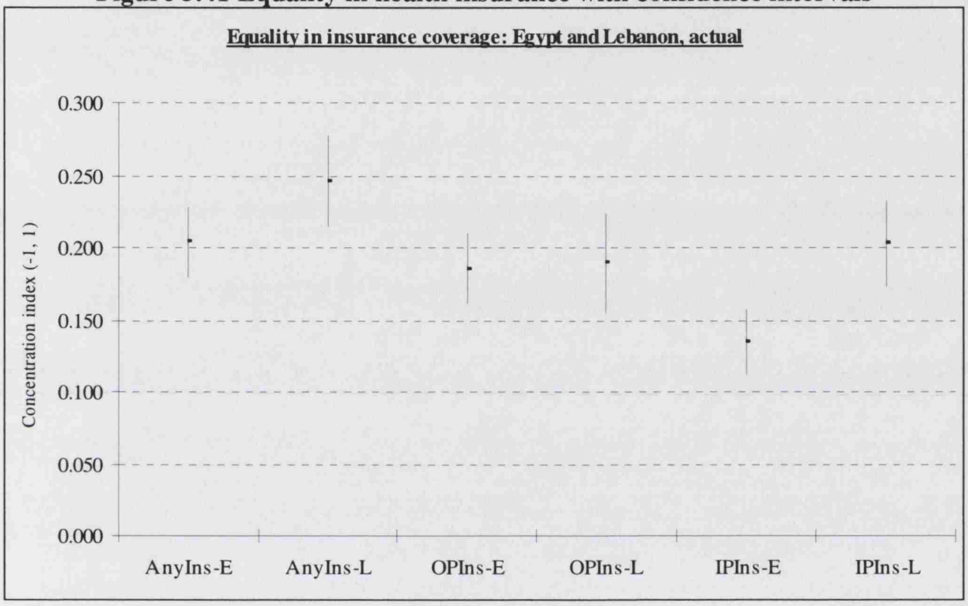


Figure 5.42 Equity in health insurance with confidence intervals

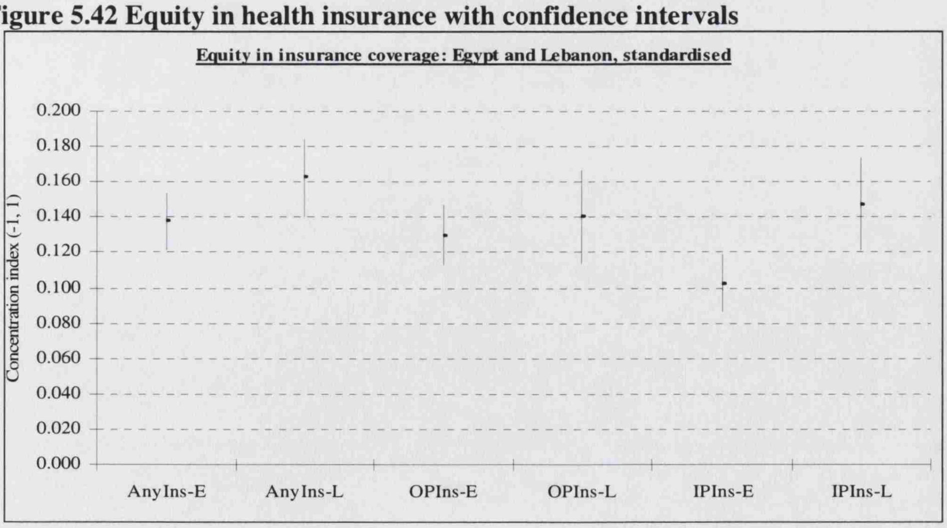


Table 5.6 Concentration indices by type of health insurance

	Proportion with health insurance (%)								
(Actual Proportions)	Poorest 20%	2nd poorest	Middle	2nd richest	Richest 20%	Total	Ratio	N	C.I.
Any insurance									
Egypt	0.204	0.281	0.345	0.422	0.599	0.325	0.3	4352	0.204*
Lebanon	0.245	0.323	0.398	0.529	0.589	0.478	0.4	3223	0.246*
OP Insurance									
Egypt	0.161	0.202	0.242	0.345	0.528	0.251	0.3	4352	0.186*
Lebanon	0.172	0.237	0.326	0.415	0.406	0.352	0.4	3223	0.190*
IP Insurance									
Egypt	0.179	0.238	0.312	0.364	0.404	0.274	0.4	4352	0.134*
Lebanon	0.236	0.319	0.396	0.523	0.578	0.471	0.4	3223	0.203*
(Standardised Proportions)									
Any insurance									
Egypt	0.317	0.406	0.477	0.568	0.726	0.454	0.4	2855	0.138*
Lebanon	0.377	0.466	0.586	0.713	0.757	0.652	0.5	2051	0.162*
OP Insurance									
Egypt	0.298	0.341	0.401	0.482	0.628	0.393	0.5	2855	0.130*
Lebanon	0.343	0.402	0.520	0.607	0.600	0.543	0.6	2051	0.140*
IP Insurance									
Egypt	0.276	0.327	0.386	0.442	0.527	0.362	0.5	2855	0.102*
Lebanon	0.379	0.439	0.553	0.651	0.688	0.600	0.6	2051	0.147*

*Statistically significant at 95% confidence level. C.I. = CONCENTRATION INDEX: <0 = pro-poor; 0 = income-neutral; >0 = pro-rich. Standardised sample size reduced since observations with predicted negative values for standardisation were dropped. Ratio: poorest 20% to richest 20%

Figure 5.43 Concentration curves for any health insurance (actual)

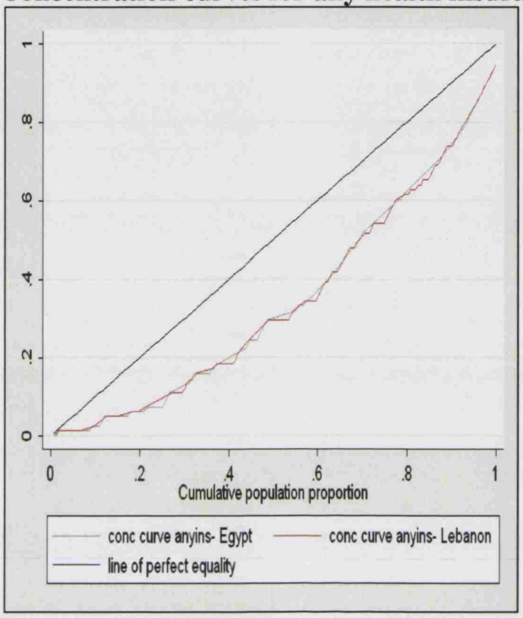
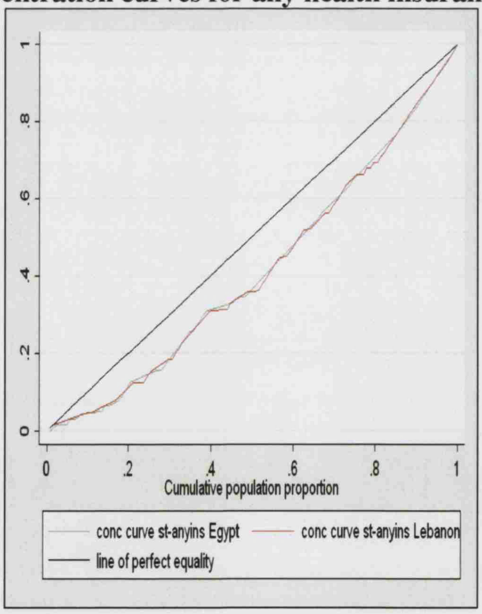


Figure 5.44 Concentration curves for any health insurance (standardised)



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

Figure 5.45 Concentration curves in outpatient insurance (actual)

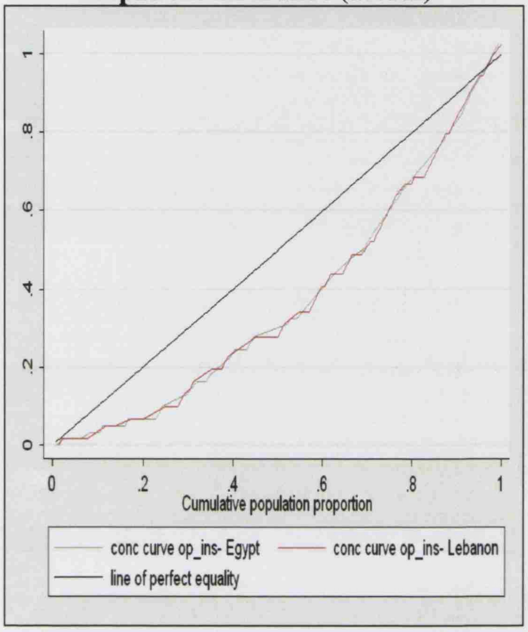


Figure 5.46 Concentration curves for outpatient insurance (standardised)

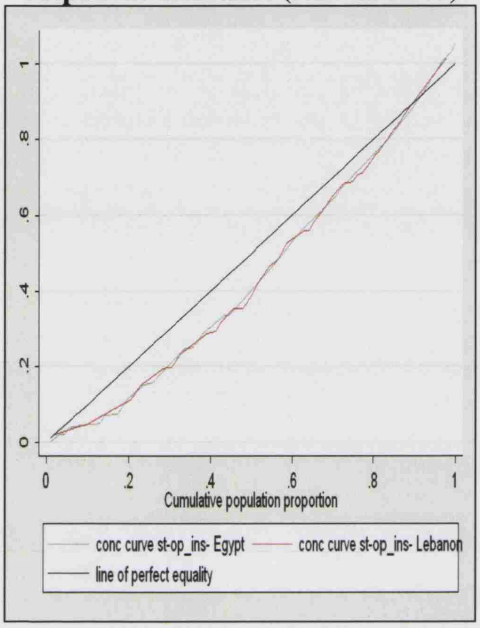


Figure 5.47 Concentration curves for inpatient insurance (actual)

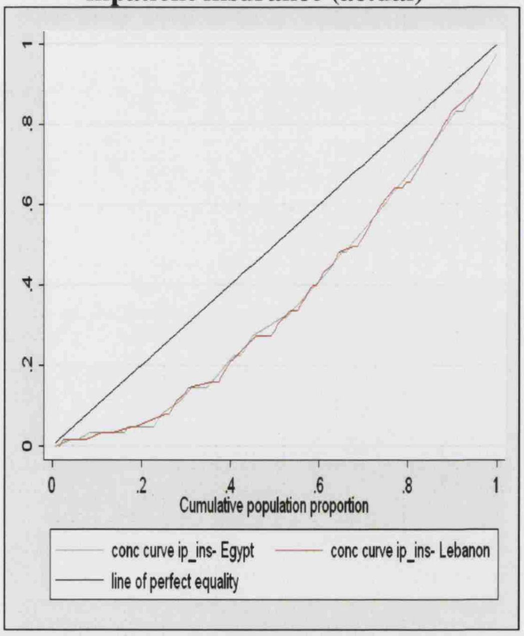
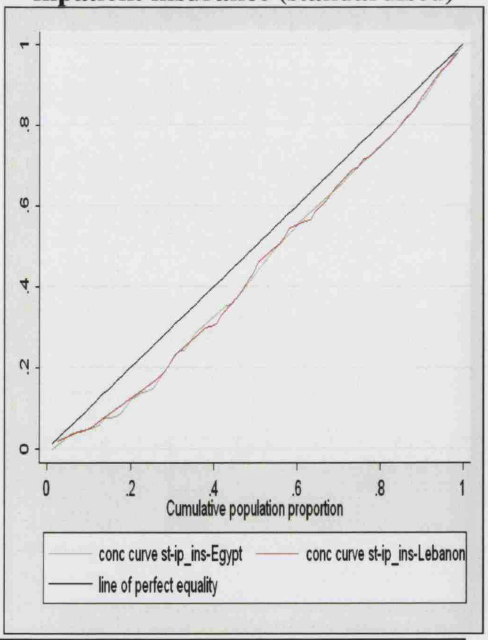


Figure 5.48 Concentration curves for inpatient insurance (standardised)



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

Table 5.7 Amount and incidence of out-of-pocket expenditures for health care, by type and income

	Poorest 20%	2nd poorest	Middle	2nd richest	Richest 20%	Total	Ratio	N
Out-of-pocket payments, total (PPP$ per capita)								
Egypt	86	106	136	162	151	120	0.6	3680
Lebanon	309	322	367	380	409	376	0.8	2445
Out-of-pocket payments, total (incidence)								
Egypt	0.99	0.99	0.99	0.99	0.97	0.99	1.0	3011
Lebanon	0.96	0.94	0.95	0.96	0.96	0.96	1.0	1547
Physician visit fees (PPP$ per capita)								
Egypt	18	21	30	35	36	26	0.5	3708
Lebanon	85	96	100	124	124	113	0.7	2478
Physician visit fees (incidence)								
Egypt	0.98	0.97	0.98	0.98	0.93	0.97	1.1	3032
Lebanon	0.88	0.87	0.89	0.88	0.90	0.89	1.0	1565
Medications (PPP$ per capita)								
Egypt	66	81	100	121	105	90	0.6	4086
Lebanon	218	229	261	246	270	253	0.8	2811
Medications (incidence)								
Egypt	0.99	0.99	0.99	0.99	0.97	0.99	1.0	3375
Lebanon	0.97	0.95	0.95	0.96	0.96	0.96	1.0	1761

PPP = purchasing power parity exchange rate. 'Incidence' = percent of households that reported paying out-of-pocket payments.

Table 5.8 Concentration indices for out-of-pocket payments

	Average share of income spent out-of-pocket on health (%)								
	Poorest 20%	2nd poorest	Middle	2nd richest	Richest 20%	Total	Ratio	N	C.I.
Out-of-pocket payments, total (share)									
Egypt	0.131	0.081	0.070	0.055	0.028	0.084	4.7	3011	-0.196*
Lebanon	0.695	0.195	0.147	0.100	0.060	0.169	11.6	1547	-0.440*
Physician visit fees (share)									
Egypt	0.028	0.016	0.016	0.012	0.007	0.018	4.1	3032	-0.183*
Lebanon	0.193	0.058	0.041	0.031	0.019	0.049	10.4	1565	-0.407*
Medications (share)									
Egypt	0.101	0.063	0.052	0.042	0.017	0.064	5.9	3375	-0.208*
Lebanon	0.440	0.141	0.103	0.066	0.040	0.117	11.1	1761	-0.431*

*Statistically significant at 95% confidence level. C.I. = CONCENTRATION INDEX: < 0 = Pro-Poor; 0 = Income-Neutral; > 0 = Pro-Rich.

Figure 5.49 Equality in out-of-pocket payments with confidence intervals

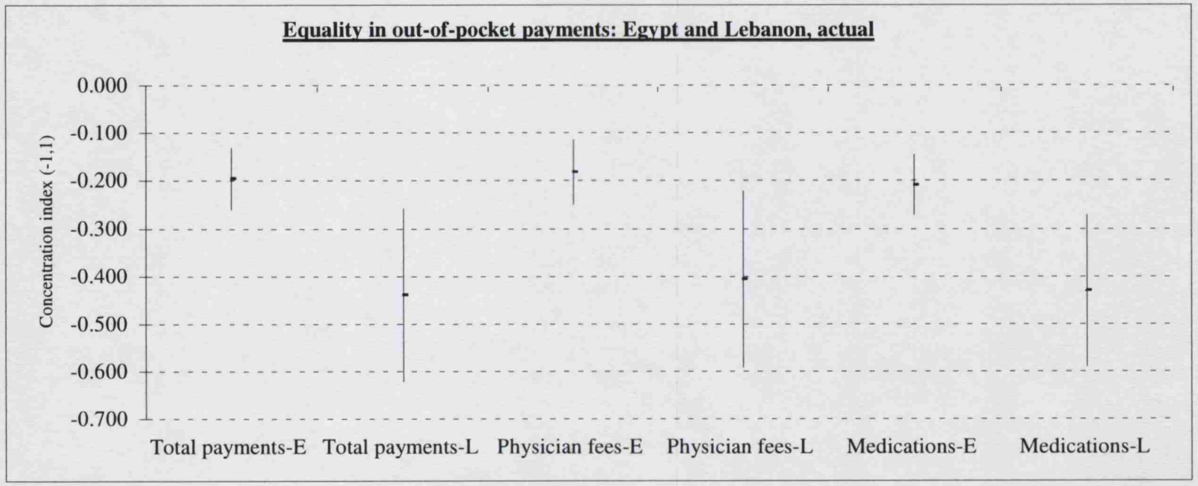


Figure 5.50 Concentration curves for total out-of-pocket payments

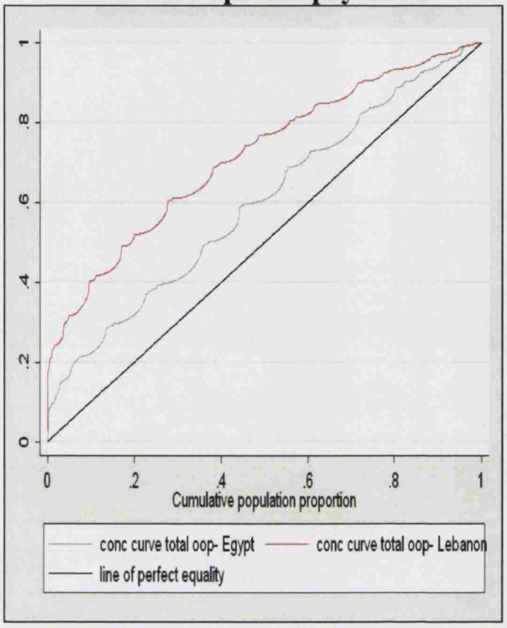


Figure 5.51 Concentration curves for out-of-pocket payments to doctors

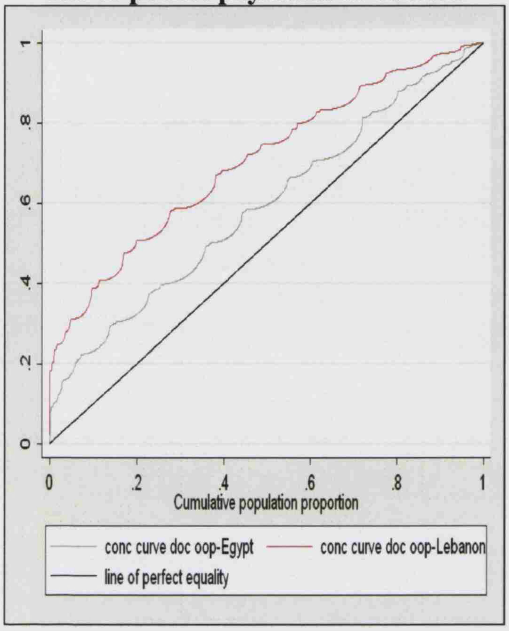
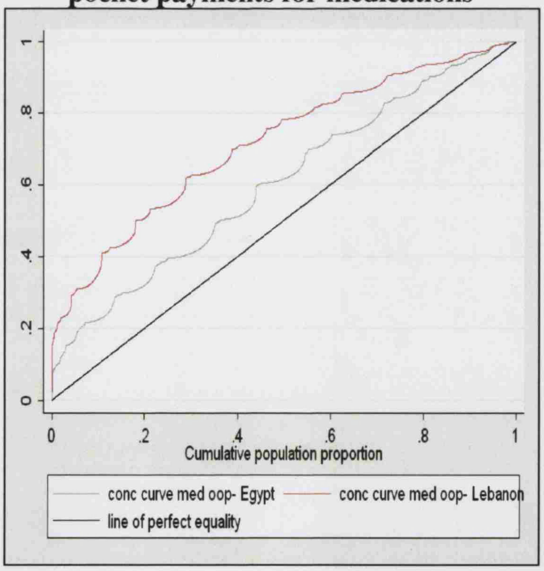


Figure 5.52 Concentration curves for out-of-pocket payments for medications



Concentration curves ABOVE line of perfect equality = Pro-Poor distributions.
BELOW the line = Pro-Rich
ALONG the line = Income-Neutral

5.10.1. Catastrophic expenditures

Catastrophic payments were defined as total out-of-pocket payments that were equal to 10% or more of annual, total household income. Total out-of-pocket payments included physician fees, medications, and 'other' health services. The proportion that had catastrophic payments in Lebanon was double that in Egypt (38% versus 21%, respectively), as shown in Table 5.7. Catastrophic payment rates were several times higher amongst the poorest quintiles than the richest, but were more pro-poor in Lebanon than in Egypt.

Table 5.9 Incidence and concentration index for catastrophic payments*

Income Quintile	Egypt (%)	Lebanon (%)
Richest 20%	9.7	12.6
2nd richest	17.2	23.7
Middle	16.6	40.5
2nd poorest	22.8	48.8
Poorest 20%	34	64.7
Total	**20.9**	**38.3**
Concentration index	-0.0242	-0.0529

*Percent of households with 10% or more of income spent on health care.

5.10.2. Poverty impact of out-of-pocket payments

The poverty rates were estimated before and after accounting for household health care payments using relative and absolute poverty lines (Table 5.10 and Table 5.11). Due to their income levels, the international poverty lines used to discuss results are $1-a-day for Egypt and $2-a-day for Lebanon. In both countries, health care payments account for a considerable proportion of poverty, but to a larger extent in Lebanon. These results were found regardless of which poverty line was used. After accounting for payments, twice as many households fall below the poverty line in Egypt using the international poverty line of $1 per day. In Lebanon, approximately four times as many households fall into poverty at using $2 per day.

In addition, while this effect is largely driven by the poorest income quintile in Egypt, some households in higher income groups are also driven into poverty in Lebanon. Using the relative poverty line for Lebanon, 2%, 10%, and 41% more households in the middle, second poorest, and poorest income quintiles, respectively, fall below the poverty line after payments are accounted for.

Table 5.10 Poverty impact of out-of-pocket payments, Egypt

Poverty headcount	**Richest 20%**	**2nd richest**	**Middle**	**2nd poorest**	**Poorest 20%**	**Total**
Poverty line of $1.08 per day						
Pre-payment headcount	0	0	0	0	32.8	**7.5**
Post-payment headcount	0.2	0.2	0.4	2.3	63.1	**14.9**
Percentage change	+0.2	+0.2	+0.4	+2.3	+92.4	**+100.0**
Poverty line of $2.15 per day						
Pre-payment headcount	0	0	7.9	1	1	**45.9**
Post-payment headcount	0.2	3.5	68.5	1	1	**56.1**
Percentage change	+0.2	+3.5	+767.0	0	0	**+22.2**
Relative poverty line						
Pre-payment headcount	0	0	0	0	28.3	**6.5**
Post-payment headcount	0.2	0.2	0.4	1.5	40.8	**9.7**
Percentage change	+0.2	+0.2	+0.4	+1.5	+44.2	**+49.2**

Table 5.11 Poverty impact of out-of-pocket payments, Lebanon

Poverty headcount	**Richest 20%**	**2nd richest**	**Middle**	**2nd poorest**	**Poorest 20%**	**Total**
Poverty line of $1.08 per day						
Pre-payment headcount	0	0	0	0	1.6	**0.4**
Post-payment headcount	0	0	0.9	1.0	8.1	**2.0**
Percentage change	0	0	+0.9	+1.0	+400.0	**+400.0**
Poverty line of $2.15 per day						
Pre-payment headcount	0	0	0	0	3.0	**0.7**
Post-payment headcount	0	0	0.9	1.0	11.0	**2.6**
Percentage change	0	0	+0.9	+1.0	+267.0	**+271.0**
Relative poverty line						
Pre-payment headcount	0	0	0	0	60.7	**13.3**
Post-payment headcount	0.3	0.3	2.1	9.6	85.7	**19.6**
Percentage change	+0.3	+0.3	+2.1	+9.6	+41.2	**+47.4**

5.11. Discussion: Representations of health care inequity

5.11.1. Health status

The distribution of health variables presented in this chapter suggests a paradox of progress. Lebanese respondents reported worse levels of ill health than did Egyptian respondents – but were less likely to access health care services. There was also relatively greater inequity in health insurance coverage and out-of-pocket payments in Lebanon than in Egypt, as summarised in Table 5.12. This was found despite the observation that the Lebanese had higher incomes and higher levels of education. Herein lies the paradox; that a relatively wealthier society reflects relatively greater inequity than a relatively poorer one.

Overall, the distribution of self-assessed health and chronic conditions by socioeconomic status appears more pro-poor amongst Lebanese respondents than their Egyptian counterparts. The degree of inequity regarding self-reported pain is somewhat more pronounced in Egypt than in it is in Lebanon. After standardising for health need, the risk of having at least one chronic health condition increases by 40% in Egypt when moving from the richest to the poorest quintile; in Lebanon, the risk increases by 20%. These findings suggest that lower income groups tend to report worse health levels, particularly in Lebanon. In addition, the greatest degree of inequality was found in self-reported pain in both countries, followed by the prevalence of chronic health conditions and self-assessed health.

5.11.2. Health care utilisation

Since health need is concentrated amongst the relatively poor, the use of health services is expected to be concentrated amongst the poor before standardising for health need. After standardising for health need, assuming income largely captures enabling factors, it is expected that utilisation would become income-neutral, since a horizontally 'equitable' distribution is reflected in 'equal access for equal [medical] need'. Significant differences in the rates of at least one visit were found in some cases, but in neither country did the intensity of using services vary significantly across income.

Analysis of the proportion of users showed that before standardising for health need, poorer groups used some services significantly more than richer groups in Lebanon, including overall outpatient services, general practitioners, and inpatient care. However, although not statistically significant, the rich in Lebanon tended to use specialist, pharmacy, and hospital outpatient care more than the poor. After standardising for health need, general practitioner use in Lebanon continues to be significantly concentrated amongst the poor, as does the rate of specialist care.

This finding may mean that, given unequal need amongst the poor relative to the rich, the poor use general practitioners and inpatient care more often than the rich, but no significant differences in other types of services are found by income level. Assuming equal need between the poor and rich, however, the rates of general practitioner and specialist care are higher amongst the poor, with no significant differences found in other types of services.

In Egypt, there were some non-significant trends favouring pro-poor use before standardisation for any outpatient, general practitioner, pharmacy and inpatient care. Non-significant pro-rich use was found for specialist and hospital outpatient care. After standardisation, the rates of general practitioner visits continued to be significantly more concentrated amongst the poor, whilst any outpatient care was significantly more concentrated amongst the rich, possibly due to the non-significant pro-rich use of hospital-based outpatient and inpatient care.

The use of other services was not significantly different across income. Therefore, other factors besides health need and income likely explain the preponderance of physician use amongst the poor in Lebanon and Egypt, assuming medical need is equal across income. These factors may include other enabling factors including other measures of socioeconomic status such as education and employment, social capital factors such as marital status, or additional unobservable factors such as the nature, quantity, and quality of care of health services.

Likewise in Egypt, after assuming equal medical need, the pro-rich use of hospital outpatient services may be explained by factors such as: (a) a preference for high technology offered at hospitals, (b) better quality of free care at public facilities located in relatively wealthier areas, and (c) social health insurance coverage for hospital outpatient care at contracted facilities. These factors may stimulate demand for inpatient care earlier than would normally be expected based on the severity of illness, or for inpatient care for less-severe cases that could be treated at outpatient facilities. Regarding the intensity of use, the findings from this analysis indicate that once contact with the health service is made, the intensity of visits is less explained by individual-level socioeconomic factors, but likely by medical need and provider decisions.

5.11.3. Health insurance

Given the possibility that the distribution of services across income could be due to insurance coverage, equity in insurance coverage was assessed. Results overwhelmingly pointed to the concentration of all types of insurance amongst the relatively rich. In addition, the concentration was most skewed towards the rich in Lebanon, and especially for inpatient insurance coverage. Interestingly, the opposite is true in Egypt, where the inequity in insurance is more exacerbated for outpatient coverage than inpatient coverage. Aside from other socioeconomic factors, these findings partially explain the standardised pro-rich use of hospital outpatient care in Egypt, and hospital outpatient and inpatient care in Lebanon.

5.11.4. Out-of-pocket payments

The burden of out-of-pocket payments was found to be relatively higher amongst poorer groups in both countries, but more so in Lebanon. Since the poor are also less likely to be covered by health insurance for any type of care in Lebanon, they are therefore more likely to face higher out-of-pocket payments as a share of income. In Egypt, inequity in out-of-pocket payments is relatively lower than in Lebanon; although they are more likely to use outpatient services than their Lebanese counterparts, these services are usually free or nearly free at the point of use due to public provision. Nonetheless, poor quality of free care means that the poor may have to pay higher informal fees or seek care from relatively lower-priced private providers often.

5.11.5. Economic impact of out-of-pocket payments

Before accounting for out-of-pocket payments, the poverty rate in Egypt and Lebanon was found to be just less than 10% for Egypt and less than 1% for Lebanon, which are relatively similar rates as those published for the year 2001. Figures for Egypt from the World Bank (2007) suggest the poverty headcount was 2.58% in 1995 and 3.08% in 2000, whilst Jolliffe et al (2004) estimate the headcount was 7.6% in 1997.

The percentage changes in poverty levels for Egypt and Lebanon appear relatively large as compared to findings from other countries, suggesting that the impact of out-of-pocket payments on living standards is particularly high. For example, the percentage change in headcount appears to be lower in Vietnam (pre-payment headcount of 3.6%

versus post-payment headcount of 4.7%, respectively; change of 30%), Indonesia (7.9% versus 8.6%, respectively; change of 8.7%), and Sri Lanka (3.8% versus 4.1%, respectively; change of 8.3%) as reported by Van Doorslaer et al (2006).

These findings are likely due to differences in health financing policy and utilisation practices, among other considerations. Although validating poverty rates in Egypt and Lebanon may be difficult due to relatively little data, this analysis suggests that the relative impact of out-of-pocket payments on living standards can be substantial. In addition, this effect is largely relegated to the poorest groups but can be felt to some extent across the socioeconomic spectrum.

Table 5.12 Summary of equity results (standardised)

	Egypt			**Lebanon**		
	Pro-poor	**Income Neutral^**	**Pro-rich**	**Pro-poor**	**Income Neutral**	**Pro-rich**
Health Status						
Self-assessed health	x*			$\boxed{x*}$		
Pain	$\boxed{x}$*			x*		
Chronic health conditions	x			$\boxed{x*}$		
Probability of care						
Any use of outpatient services			x*		x	
General practitioners			x	$\boxed{x*}$		
Specialists		x		x*		
Pharmacists			x		x	
Hospital outpatient			x		x	
Hospital inpatient (12-month recall)		x				x
Hospital inpatient (1-month recall)	$\boxed{x}$			x		
Intensity of visits						
General practitioners		x		x		
Specialists			x	x		
Pharmacists		x			x	
Hospital outpatient			x	x		
Hospital inpatient (1-month recall)			x	x		
Health insurance						
Any			x*			$\boxed{x}$*
Outpatient			x*			$\boxed{x}$*
Insurance			x*			$\boxed{x}$*
Out-of-pocket payments						
Total	x*			$\boxed{x}$*		
Physician fees	x*			$\boxed{x}$*		
Medications	x*			$\boxed{x}$*		

^ = Income neutral defined as (-0.01, 0.01). * = Statistically significant at 95* confidence level. Survey data did not contain information on intensity for 'any use of outpatient' or hospital inpatient care over 12-month recall.

5.12. Chapter summary

Evaluating the income-distribution in health care is one aspect of equity. Why are Lebanese respondents less likely to use health services than Egyptian respondents, despite having higher levels of ill health? So far the analysis suggests that horizontal equity in affordability is relatively greater in Egypt than in Lebanon. Yet the determinants of health care use warrant closer examination.

Understanding the role of socioeconomic factors in decision-making can help to inform and target health-financing policies. For example, what are the factors that inhibit illness-stricken people with fewer socioeconomic resources from seeking certain types of care? According to the findings from this chapter, insurance coverage and the nature of care are but two of the possible explanatory factors. Controlling for a broad range of individual-level factors may help to further elucidate the nature of inequity in health care.

Chapter 6. Effect of economic status on outpatient care

6.1. Introduction

Results are presented on how economic status affects the use of outpatient services. Findings are based on multivariate regression models. This relationship may depend on the nature of the service and how other factors play a role. Outpatient care is generally thought to be relatively less acute and perceived by citizens as somewhat discretionary. In this analysis, outpatient services are defined as services that are not located at hospitals, such as general practitioner services, medical specialist services, and pharmacies.

Chapter six is divided into two main sections. The first section presents estimation results and the second discusses overall findings. Results from the pooled and country-specific analyses are described, including: (i) whether health insurance is endogenous to models of outpatient care, (ii) the effect of country of residence, (iii) the effect of income, (iv) the effect of insurance, and (v) the interaction effects. The effects of the control variables are discussed briefly. Because the relationships between dependent and independent variables may vary by country, emphasis is given to the country-specific models.

6.2. Any use of outpatient services

6.2.1. Probability: pooled model

The effects of income and insurance on the probability and frequency of outpatient visits were evaluated through multivariate regression. To ensure validity of the results, the endogeneity of the insurance variable was assessed using the recursive bivariate probit model.

The recursive model simultaneously adjusts for endogeneity and provides an estimate of the difference in fit between the standard probit and recursive models. If the models are not statistically significant from one another, then health insurance is assumed to be exogenous to the model. In this case, the standard probit model is used to discuss the variable effects.

For 'any use of outpatient care', results from testing the various models show that the probit model is valid for drawing conclusions. This is due to the fact that health insurance was not endogenous to the model for any outpatient use, as shown in results from the pooled recursive model (Table 6.1, Models 2 through 4). Here, the Wald test of rho gives a chi-squared statistic that is not statistically significant. Therefore, health insurance and outpatient visits are not co-determined. This result validates using the standard probit model, instead of having to correct for co-determination by using the recursive model.

The probability of any use of outpatient services is significantly higher for respondents living in Egypt than for those in Lebanon, all other factors held equal. All of the probit models show a statistically significant, positive probit index, or coefficient. The country effect remains after successively adding covariates, including: (i) other factors that lead to the 'main effects' model (Model 2); (ii) the three interaction terms representing the inter-relationships between income, insurance, and country (Model 3), and (iii) the triple-interaction term representing the simultaneous inter-relationship between income, insurance, and country (Model 4).

Since the triple-interaction term is not significant, inferences regarding the effects of covariates will be drawn from Model 3, which did include a significant interaction term. Other significant determinants of outpatient use in the pooled model were: being male, being married, having a lower self-assessed health status, pain, and being diagnosed with having one or more chronic health conditions. Neither age nor being employed was significant.

The effect of insurance on the probability of outpatient use is stronger in Egypt than in Lebanon. The only interaction term that was significant was country*insurance, as shown in probit-Model 3. This indicates that the effect of insurance depends on the country; since the sign of the coefficient is positive, the effect is stronger in Egypt. However, the pooled effects should be interpreted with some caution due to country-specific differences in endogeneity.

6.2.2. Probability: country models

For the probability of any outpatient use, results are based on the probit estimates for Egypt and the recursive estimates for Lebanon. These models are valid because insurance was not endogenous in Egypt for any outpatient use, but was endogenous in Lebanon (Table 6.2). This shows that the relationship between dependent and independent variables can differ across countries.

Having insurance coverage is associated with a higher likelihood of visiting outpatient providers in both countries, although the effect is relatively larger in Lebanon than in Egypt. This is due to the fact that the coefficient in Lebanon is relatively greater than in Egypt.

Insurance was also the most important factor determining whether a respondent visited outpatient providers in Lebanon. The effect of insurance in Lebanon may have been underestimated in the probit model, which does not adjust for the 'selection bias' that arises from endogeneity. For the probability of any outpatient care, these findings show greater insurance-related inequity in Lebanon than in Egypt.

Income does not significantly affect outpatient use in either country. However, the coefficient was positive in Egypt and negative in Lebanon. These results suggest that income somewhat increases the likelihood of outpatient use in Egypt, but somewhat decreases the likelihood in Lebanon. The interaction term for income*insurance is not significant in either country. However, the negative value suggests that as income increases, insurance tends to become slightly less important in explaining outpatient use.

Other factors increase the probability of outpatient use in Egypt are: poor self-assessed health, pain suffering, having chronic health conditions, being married, being relatively more highly educated, and being older in age. Employment status did not have a significant effect. These results suggest that being older, having a worse health status, and being married each increase the likelihood of outpatient use, all other factors held equal. Amongst the three variables representing health need, chronic health conditions exerted the strongest effect.

In Lebanon, other positive determinants include: a poor self-assessed health, pain suffering, having chronic health conditions, being married, being unemployed, being relatively less highly educated, and age. These factors had the same general effect as they did in Egypt.

The employment effect suggests those who are employed by the government, non-governmental firms, or self-employed have lower chances of visiting outpatient providers than do those not employed. In contrast, employed respondents in Egypt have somewhat higher chances of using outpatient care than unemployed respondents.

The validity of the results was tested by checking for inconsistencies due to income-insurance collinearity and the use of aggregated variables for employment and chronic health conditions (Table 5.3 and Table 6.4). Aggregating variables may lead to loss of information, biasing some of the results. After including and excluding the relevant variables, results show that the effects of income and insurance in both countries remain largely the same. This suggests that collinearity and the use of aggregated variables do not affect the results for outpatient services. Similar results were found for most other health services tested in this thesis (Appendix F).

Table 6.1 Probability of any outpatient use, pooled model

	RECURSIVE				PROBIT			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Outpatient								
Country (1=Egy, 0=Leb)	0.531***	0.711***	1.030**	0.787+	0.531***	0.741***	1.019**	0.766+
	(0.029)	(0.052)	(0.333)	(0.421)	(0.029)	(0.041)	(0.336)	(0.421)
Insured (outpatient)		-0.456	-0.070	-0.353		0.056	0.314	-0.090
		(0.354)	(0.798)	(0.866)		(0.040)	(0.366)	(0.522)
Age		0.001	0.000	-0.000		-0.001	-0.001	-0.001
		(0.002)	(0.003)	(0.003)		(0.001)	(0.001)	(0.001)
Male		0.241***	0.253***	0.253***		0.245***	0.255***	0.254***
		(0.044)	(0.045)	(0.045)		(0.044)	(0.044)	(0.044)
Married		0.175***	0.180***	0.179***		0.176***	0.179***	0.178***
		(0.038)	(0.039)	(0.039)		(0.039)	(0.039)	(0.039)
Secondary education		0.189*	0.127	0.111		0.076+	0.061	0.062
		(0.086)	(0.126)	(0.133)		(0.040)	(0.041)	(0.041)
Employed		0.034	0.005	-0.006		-0.025	-0.029	-0.032
		(0.060)	(0.076)	(0.079)		(0.045)	(0.045)	(0.045)
Income (log)		0.033	0.055	0.035		0.003	0.041	0.024
		(0.031)	(0.046)	(0.052)		(0.023)	(0.038)	(0.042)
Self-assessed health		0.216***	0.219***	0.220***		0.222***	0.221***	0.221***
		(0.027)	(0.027)	(0.027)		(0.027)	(0.027)	(0.027)
Self-reported pain		0.264***	0.269***	0.270***		0.271***	0.272***	0.271***
		(0.027)	(0.027)	(0.027)		(0.026)	(0.026)	(0.026)
Chronic		1.024***	1.044***	1.047***		1.050***	1.052***	1.052***
		(0.056)	(0.052)	(0.048)		(0.040)	(0.040)	(0.040)
Income*OPInsurance			-0.036	0.010			-0.048	0.003
			(0.051)	(0.068)			(0.046)	(0.066)
Country*OPInsurance			0.206*	0.988			0.208*	1.026
			(0.083)	(0.703)			(0.083)	(0.700)
Country*Income			-0.049	-0.016			-0.046	-0.012
(continued)			(0.044)	(0.057)			(0.045)	(0.056)

Table 6.1 Probability of any outpatient use, pooled model (continued)

	RECURSIVE				PROBIT			
	Model 1 Coeff. (SE)	**Model 2** Coeff. (SE)	**Model 3** Coeff. (SE)	**Model 4** Coeff. (SE)	**Model 1** Coeff. (SE)	**Model 2** Coeff. (SE)	**Model 3** Coeff. (SE)	**Model 4** Coeff. (SE)
Country*Income* OPInsur.				-0.103				-0.108
				(0.092)				(0.091)
Constant	-0.292***	-2.375***	-2.534***	-2.387***	-0.292***	-2.202***	-2.438***	-2.307***
	(0.022)	(0.213)	(0.338)	(0.387)	(0.022)	(0.198)	(0.310)	(0.341)
Insured (outpatient)								
Age		0.013***	0.013***	0.013***				
		(0.001)	(0.001)	(0.001)				
Male		-0.026	-0.027	-0.027				
		(0.043)	(0.043)	(0.043)				
Secondary education		0.692***	0.692***	0.692***				
		(0.038)	(0.038)	(0.038)				
Employed		0.343***	0.342***	0.342***		n/a		
		(0.043)	(0.043)	(0.043)				
Income (log)		0.183***	0.183***	0.183***				
		(0.024)	(0.024)	(0.024)				
Country (1=Egy,0=Leb)		-0.094*	-0.092*	-0.092*				
		(0.037)	(0.037)	(0.037)				
Constant		-2.860***	-2.860***	-2.860***				
		(0.197)	(0.197)	(0.197)				
athrho								
Constant		0.314	0.177	0.129				
		(0.229)	(0.328)	(0.343)				
ρ		0.304	0.175	0.129				
N	7736	6885	6885	6885	7736	6885	6885	6885
Log-likelihood	-5195.131	-7227.256	-7222.822	-7222.223	-5195.131	-3469.374	-3464.432	-3463.768
χ^2	329.330***	2850.003***	2734.684***	2706.856***	329.330***	1866.907***	1872.430***	1872.641***

RESET test: chi2(1) = 2.02 Prob > chi2 = 0.1550 chi(2) = 1.05; Prob > chi2 = 0.3048

n/a = not applicable. *p < 0.05; **p < 0.01; ***p < 0.001. ρ = rho, signifying endogeneity if *, denoting use of the RECURSIVE model is needed; otherwise PROBIT. χ^2 = chi-squared, signifying high degree of goodness-of-fit for overall model if *.

Table 6.2 Probability of any outpatient use, country models

	BIVARIATE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Outpatient Insured (outpatient)	-0.193	0.965	1.030***	1.129*	0.120*	0.918+	-0.039	-0.180
	(0.548)	(1.090)	(0.234)	(0.547)	(0.059)	(0.503)	(0.056)	(0.492)
Age	0.006+	0.004	-0.007***	-0.007***	0.004*	0.005*	-0.006**	-0.006**
	(0.003)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male	0.299***	0.321***	0.057	0.056	0.317***	0.320***	0.163*	0.162*
	(0.069)	(0.069)	(0.067)	(0.067)	(0.061)	(0.061)	(0.067)	(0.067)
Married	0.170**	0.160**	0.180***	0.179***	0.166**	0.161**	0.205***	0.205***
	(0.053)	(0.056)	(0.052)	(0.052)	(0.053)	(0.054)	(0.059)	(0.059)
Secondary education	0.275+	0.178	-0.147*	-0.148*	0.186***	0.187***	-0.042	-0.042
	(0.163)	(0.203)	(0.061)	(0.061)	(0.055)	(0.055)	(0.061)	(0.061)
Employed	0.094	0.050	-0.221***	-0.221***	0.057	0.054	-0.140*	-0.141*
	(0.086)	(0.101)	(0.064)	(0.064)	(0.061)	(0.061)	(0.067)	(0.068)
Income (log)	-0.003	0.008	-0.018	-0.016	-0.024	0.009	0.039	0.033
	(0.052)	(0.054)	(0.033)	(0.037)	(0.033)	(0.042)	(0.032)	(0.040)
Self-assessed health	0.218***	0.220***	0.247***	0.246***	0.219***	0.220***	0.285***	0.284***
	(0.037)	(0.037)	(0.041)	(0.042)	(0.037)	(0.037)	(0.042)	(0.042)
Self-reported pain	0.182***	0.184***	0.298***	0.296***	0.185***	0.184***	0.346***	0.346***
	(0.041)	(0.041)	(0.038)	(0.039)	(0.041)	(0.041)	(0.035)	(0.035)
Chronic	1.390***	1.400***	0.400***	0.399***	1.402***	1.400***	0.463***	0.462***
(continued)	(0.063)	(0.051)	(0.065)	(0.065)	(0.051)	(0.051)	(0.065)	(0.065)

Table 6.2 Probability of any outpatient use, country models (continued)

	BIVARIATE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Income*OPInsur		-0.111		-0.011		-0.109		0.018
		(0.079)		(0.055)		(0.068)		(0.062)
Constant	-1.831***	-1.879***	-1.454***	-1.472***	-1.657***	-1.893***	-1.978***	-1.932***
	(0.388)	(0.450)	(0.319)	(0.338)	(0.254)	(0.314)	(0.277)	(0.335)
Insured (outpatient)								
Age	0.019***	0.019***	0.005**	0.005**				
	(0.002)	(0.002)	(0.002)	(0.002)				
Male	-0.232***	-0.231***	0.209***	0.209***				
	(0.060)	(0.060)	(0.060)	(0.060)				
Secondary education	0.997***	0.995***	0.299***	0.299***				
	(0.053)	(0.054)	(0.056)	(0.056)				
Employed	0.408***	0.410***	0.247***	0.247***		n/a		
	(0.061)	(0.061)	(0.061)	(0.061)				
Income (log)	0.257***	0.257***	0.141***	0.141***				
	(0.035)	(0.035)	(0.033)	(0.033)				
Constant	-3.841***	-3.845***	-2.069***	-2.074***				
	(0.266)	(0.268)	(0.265)	(0.269)				
athrho								
Constant	0.185	-0.019	-0.781**	-0.796**				
	(0.328)	(0.392)	(0.247)	(0.257)				
ρ	0.183	-0.019	-0.653**	-0.662**				
N	4133	4133	2752	2752	4133	4133	2752	2752
Log-likelihood	-3834.591	-3833.612	-3200.986	-3200.967	-1922.890	-1921.691	-1456.438	-1456.399
χ^2	2159.836***	2121.757***	1036.045***	1048.155***	1377.364***	1377.327***	614.887***	614.971***

RESET test: chi(2) = 0.09; Prob > chi2 = 0.7703 | chi(2) = 1.71; Prob > chi2 = 0.1914

n/a = not applicable. *p < 0.05 **p < 0.01 ***p < 0.001.

Table 6.3 Collinearity in probability of any outpatient use: probit model, Egypt

	Model 1: Inc alone Coeff. (SE)	Model 2: Inc, no Ins Coeff. (SE)	Model 3: Ins, no Inc Coeff. (SE)	Model 4: Main effects Coeff. (SE)	Model 5: Main+Intx Coeff. (SE)	Model 6: Main-Empl Coeff. (SE)	Model 7: No empl-CC Coeff. (SE)	Model 8: Main-All Coeff. (SE)
Income (log)	-0.092***	-0.010		-0.024	0.009	0.010	0.012	0.010
	(0.027)	(0.032)		(0.033)	(0.042)	(0.041)	(0.042)	(0.041)
Age		0.004*	0.004+	0.004*	0.005*	.004+	0.002	0.001
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male		0.298***	0.311***	0.317***	0.320***	0.357***	0.275***	0.351***
		(0.060)	(0.060)	(0.061)	(0.061)	(0.080)	(0.048)	(0.080)
Married		0.170**	0.162**	0.166**	0.161**	0.159**	0.177***	0.173**
		(0.052)	(0.053)	(0.053)	(0.054)	(0.057)	(0.053)	(0.057)
Secondary education		0.224***	0.159**	0.186***	0.187***	0.169**	0.187***	0.161**
		(0.052)	(0.053)	(0.055)	(0.055)	(0.060)	(0.055)	(0.060)
Employed		0.085	0.057	0.057	0.054			
		(0.060)	(0.061)	(0.061)	(0.061)			
Self-assessed health		0.221***	0.210***	0.219***	0.220***	0.222***	0.212***	0.214***
		(0.036)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Self-reported pain		0.190***	0.196***	0.185***	0.184***	0.189***	0.184***	0.190***
		(0.039)	(0.040)	(0.041)	(0.041)	(0.041)	(0.041)	(0.042)
Chronic		1.386***	1.408***	1.402***	1.400***	1.402***	1.363***	1.364***
		(0.050)	(0.050)	(0.051)	(0.051)	(0.051)	(0.054)	(0.054)
Insured (outpatient)			0.113+	0.120*	0.918+	0.890+	0.978+	0.936+
			(0.058)	(0.059)	(0.503)	(0.513)	(0.503)	(0.515)
Income*OPInsur.					-0.109	0.101	-0.117+	-0.109
					(0.068)	(0.041)	(0.068)	(0.069)
Gov employee						-0.241		-0.235
						(0.170)		(0.168)
Nongov employee						-0.158		-0.154
						(0.181)		(0.179)
Self-employed						-0.217		-0.212
						(0.166)		(0.164)

(continued)

Table 6.3 Collinearity in probability of any outpatient use: probit model, Egypt (continued)

	Model 1: Inc alone Coeff. (SE)	**Model 2:** Inc, no Ins Coeff. (SE)	**Model 3:** Ins, no Inc Coeff. (SE)	**Model 4:** Main effects Coeff. (SE)	**Model 5:** Main+Intx Coeff. (SE)	**Model 6:** Main-Empl Coeff. (SE)	**Model 7:** No empl-CC Coeff. (SE)	**Model 8:** Main-All Coeff. (SE)
Unpaid work						-0.287		-0.293
						(0.294)		(0.293)
Student						-0.467*		-0.460*
						(0.202)		(0.199)
Homemaker						-0.313+		-0.319+
						(0.169)		(0.167)
Retired						-0.135		-0.139
						(0.209)		(0.210)
Unemp - unable						-0.614+		-0.577+
						(0.327)		(0.341)
High blood pressure							0.304***	0.305***
							(0.091)	(0.091)
Diabetes							0.359*	0.361*
							(0.143)	(0.142)
Heart disease							0.327+	0.317+
							(0.175)	(0.175)
Depression							-0.250*	-0.231*
							(0.101)	(0.102)
Constant	0.890***	-1.756***	-1.771***	-1.657***	-1.893***	-1.608***	-1.780***	-1.518***
	(0.193)	(0.249)	(0.112)	(0.254)	(0.314)	(0.338)	(0.311)	(0.338)
N	4342	4253	4257	4133	4133	4133	4141	4133
ll	-2928.738	-1998.470	-1978.694	-1922.890	-1921.691	-1916.821	-1910.642	-1900.991
chi2	11.694***	1402.573***	1418.105***	1377.364***	1377.327***	1378.010***	1349.733***	1351.000***
p	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 6.4 Collinearity in probability of any outpatient use: recursive model, Lebanon

	Model 1: Inc alone Coeff. (SE)	Model 2: Inc, no Ins Coeff. (SE)	Model 3: Ins, no Inc Coeff. (SE)	Model 4: Main effects Coeff. (SE)	Model 5: Main+Intx Coeff. (SE)	Model 6: Main-Empl Coeff. (SE)	Model 7: No empl-CC Coeff. (SE)	Model 8: Main-All Coeff. (SE)
Outpatient care								
Income (log)	-0.090***	0.035		-0.018	-0.016	-0.012	0.089**	-0.011
	(0.027)	(0.032)		(0.033)	(0.037)	(0.038)	(0.031)	(0.038)
Age		-0.006**	-0.007***	-0.007***	-0.007***	-0.008***	-0.003	-0.010***
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male		0.157*	0.161*	0.057	0.056	-0.008	0.201***	-0.007
		(0.066)	(0.064)	(0.067)	(0.067)	(0.076)	(0.048)	(0.076)
Married		0.203***	0.237***	0.180***	0.179***	0.133*	0.151***	0.139*
		(0.058)	(0.056)	(0.052)	(0.052)	(0.057)	(0.041)	(0.056)
Secondary education		-0.046	-0.042	-0.147*	-0.148*	-0.134*	0.147**	-0.139*
		(0.060)	(0.056)	(0.061)	(0.061)	(0.062)	(0.053)	(0.062)
Employed		-0.146*	-0.134*	-0.221***	-0.221***			
		(0.067)	(0.065)	(0.064)	(0.064)			
Self-assessed health		0.278***	0.292***	0.247***	0.246***	0.244***	0.194***	0.232***
		(0.042)	(0.040)	(0.041)	(0.042)	(0.042)	(0.033)	(0.042)
Self-reported pain		0.348***	0.349***	0.298***	0.296***	0.297***	0.240***	0.292***
		(0.035)	(0.034)	(0.038)	(0.039)	(0.039)	(0.031)	(0.040)
Chronic		0.467***	0.459***	0.400***	0.399***	0.399***	0.290***	0.367***
		(0.065)	(0.062)	(0.065)	(0.065)	(0.066)	(0.050)	(0.068)
Insured (outpatient)			-0.035	1.030***	1.129*	1.107*	-1.828***	1.143*
			(0.054)	(0.234)	(0.547)	(0.551)	(0.324)	(0.551)
Income*OPInsurance					-0.011	-0.007	0.049	-0.007
					(0.055)	(0.055)	(0.041)	(0.055)
Gov employee						-0.225+		-0.213
						(0.133)		(0.131)
Nongov employee						-0.159		-0.160
						(0.112)		(0.110)
Self-employed						-0.180		-0.177
(continued)						(0.111)		(0.110)

Table 6.4 Collinearity in probability of any outpatient use: recursive model, Lebanon (continued)

	Model 1: Inc alone Coeff. (SE)	**Model 2:** Inc, no Ins Coeff. (SE)	**Model 3:** Ins, no Inc Coeff. (SE)	**Model 4:** Main effects Coeff. (SE)	**Model 5:** Main+Intx Coeff. (SE)	**Model 6:** Main-Empl Coeff. (SE)	**Model 7:** No empl-CC Coeff. (SE)	**Model 8:** Main-All Coeff. (SE)
Student						-0.084		-0.095
						(0.135)		(0.133)
Homemaker						0.139		0.138
						(0.105)		(0.104)
Retired						0.090		0.088
						(0.166)		(0.163)
Unemp – unable						0.060		0.036
						(0.139)		(0.138)
High blood pressure							0.102	0.150*
							(0.062)	(0.075)
Diabetes							-0.078	-0.117
							(0.092)	(0.111)
Heart disease							0.204*	0.258*
							(0.085)	(0.103)
Depression							0.025	0.006
							(0.055)	(0.065)
Constant	0.403+	-1.952***	-1.695***	-1.454***	-1.472***	-1.474***	-1.613***	-1.401***
	(0.208)	(0.277)	(0.123)	(0.319)	(0.338)	(0.351)	(0.260)	(0.352)
Insurance (inpatient)								
Age				0.005**	0.005**	0.005**	0.005**	0.005**
				(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male				0.209***	0.209***	0.210***	0.208***	0.210***
				(0.060)	(0.060)	(0.060)	(0.057)	(0.060)
Secondary education				0.299***	0.299***	0.298***	0.283***	0.299***
				(0.056)	(0.056)	(0.056)	(0.055)	(0.056)
Employed				0.247***	0.247***	0.248***	0.233***	0.248***
				(0.061)	(0.061)	(0.061)	(0.049)	(0.061)
Income (log)				0.141***	0.141***	0.141***	0.146***	0.142***
(continued)				(0.033)	(0.033)	(0.033)	(0.031)	(0.033)

Table 6.4 Collinearity in probability of any outpatient use: recursive model, Lebanon (continued)

	Model 1: Inc alone Coeff. (SE)	**Model 2:** Inc, no Ins Coeff. (SE)	**Model 3:** Ins, no Inc Coeff. (SE)	**Model 4:** Main effects Coeff. (SE)	**Model 5:** Main+Intx Coeff. (SE)	**Model 6:** Main-Empl Coeff. (SE)	**Model 7:** No empl-CC Coeff. (SE)	**Model 8:** Main-All Coeff. (SE)
Constant				-2.069***	-2.074***	-2.073***	-2.083***	-2.077***
				(0.265)	(0.269)	(0.269)	(0.253)	(0.269)
athrho								
Constant				-0.781**	-0.796**	-0.797**	1.546***	-0.845**
				(0.247)	(0.257)	(0.263)	(0.291)	(0.281)
N	2899	2773	3050	2752	2752	2752	2752	2752
ll	-1926.587	-1466.523	-1601.387	-3200.986	-3200.967	-3198.641	-3190.246	-3192.226
chi2	11.257***	618.898***	700.267***	1036.045***	1048.155***	1050.840***	1703.654***	1102.981***
p	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*p < 0.05 **p < 0.01 ***p < 0.001.

6.3. General practitioners

6.3.1. Probability: pooled model

The country effect was not significant, indicating that the probability of general practitioner care is similar across countries, holding other factors equal (Table 6.5, probit models). The effects of income and insurance did not appear to depend on the country. Health insurance is not endogenous to the pooled model (recursive models 2 through 4).

6.3.2. Probability: country models

In both countries, neither insurance nor income was a significant determinant of general practitioner use (Table 6.6). In Egypt, the probability of visiting general practitioners was higher amongst females as well as respondents with relatively lower levels of education, holding other factors constant. In Lebanon, pain was the only significant determinant. Insurance was not endogenous to either country model (recursive models). Age was not significant, although its effect was negative in both countries. Education was not found to be a significant predictor in either country, but the negative value suggests that the use is somewhat concentrated amongst respondents who are less highly educated. Whilst education was not significant in Lebanon, the magnitude of its effect was found to be larger for general practitioners than it was for outpatient services. This result suggests that the significant, negative value found for outpatient care is likely driven by its effect on general practitioner care.

6.3.3. Intensity: pooled model

A greater intensity of visits is predicted for Lebanese respondents as compared to their Egyptian counterparts, amongst respondents who used services (Table 6.7). The income*insurance interaction term is significant and negative, suggesting that as income increases, the effect of insurance in explaining the intensity of general practitioner care decreases. The country*insurance interaction term is significant and negative, suggesting that the role of insurance is greater in Lebanon in explaining the intensity of use. In addition, the country*income interaction term is significant yet positive, indicating that the effect of income in explaining intensity of general practitioner use was greater in Egypt.

6.3.4. Intensity: country models

For general practitioner care, insurance in Egypt was significant and positive at the 90 percent level (Table 6.8). This result shows that those with insurance tend to have a more visits to general practitioners than those without insurance. Having a higher income in Egypt was also significantly associated with more visits. Neither income nor insurance were significant determinants of the intensity of general practitioner visits in Lebanon. The results of the zero-inflated model were similar to the negative binomial model. In Egypt, the interaction effect representing income*insurance was significant, although it was negative. The interaction effect in Lebanon was not significant, yet was negative with a relatively large value. These results suggest that as income increases, the effect of insurance on the intensity of using general practitioner care decreases.

Although age was not significant in the probability models, age was a significant factor predicting the frequency of general practitioner visits in Egypt, but not in Lebanon. In Egypt, its value was negative, indicating that older individuals were predicted to visit general practitioners less frequently over one month than younger counterparts, all other factors held equal. In Egypt, the coefficient of education in the general practitioner model was negative and significant at the 90 percent confidence level. Therefore, just as respondents with a higher education are less likely to visit general practitioners, the frequency of visits is also predicted to decrease as the level of education increases. The value of the coefficient of education was also largest in the general practitioner care for Egypt as compared to the other service-specific intensity models in Egypt. Whilst it was not significant in Lebanon in any of the models, its value was also negative and largest in magnitude in the intensity models for general practitioners.

Pain was a significant, positive predictor in both Egypt and Lebanon, although the effect was slightly greater in Egypt than in Lebanon. Neither self-assessed health nor chronic conditions exerted a significant effect in either country, similar to results in both countries regarding the probability of seeking care. Being married tended to increase the intensity of general practitioner care in Egypt but was not significant in Lebanon.

Goodness-of-fit tests indicated the negative binomial regression model to be preferred over the zero-inflated model; however, the results for the effects of health need variables on the intensity of general practitioner care were consistent between both models.

Table 6.5 Probability of general practitioner visit, pooled model

	RECURSIVE				PROBIT		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 2**	**Model 3**	**Model 4**
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
General practitioners							
Country (1=Egy, 0=Leb)	0.410***	0.410***	0.768	0.221	0.405***	0.653	0.184
	(0.062)	(0.075)	(0.581)	(0.846)	(0.072)	(0.635)	(0.744)
Insured (outpatient)		0.181	-1.691*	-1.250	-0.058	-0.333	-0.911
		(1.775)	(0.820)	(2.941)	(0.075)	(0.711)	(0.926)
Age		-0.003	0.002	-0.001	-0.002	-0.002	-0.002
		(0.006)	(0.004)	(0.009)	(0.002)	(0.002)	(0.002)
Male		-0.198	-0.068	-0.162	-0.182*	-0.183*	-0.183*
		(0.139)	(0.124)	(0.220)	(0.084)	(0.084)	(0.084)
Married		0.082	0.074	0.081	0.082	0.083	0.081
		(0.074)	(0.063)	(0.074)	(0.074)	(0.075)	(0.075)
Secondary education		-0.183	0.093	-0.088	-0.145+	-0.141+	-0.137+
		(0.284)	(0.183)	(0.446)	(0.078)	(0.078)	(0.079)
Employed		0.025	0.252+	0.111	0.064	0.067	0.065
		(0.301)	(0.135)	(0.407)	(0.088)	(0.088)	(0.089)
Income (log)		-0.080	0.046	-0.061	-0.062	-0.062	-0.083
		(0.134)	(0.105)	(0.214)	(0.041)	(0.055)	(0.058)
Self-assessed health		-0.014	-0.007	-0.009	-0.014	-0.012	-0.009
		(0.046)	(0.040)	(0.046)	(0.046)	(0.047)	(0.047)
Self-reported pain		0.114**	0.095*	0.113**	0.114**	0.114**	0.114**
		(0.039)	(0.042)	(0.042)	(0.038)	(0.038)	(0.038)
Chronic		0.142	0.112	0.130	0.144	0.138	0.130
		(0.102)	(0.090)	(0.102)	(0.101)	(0.102)	(0.102)
Income*OPInsurance			0.065	0.119		0.038	0.112
(continued)			(0.077)	(0.124)		(0.091)	(0.118)

Table 6.5 Probability of general practitioner visit, pooled model (continued)

	RECURSIVE				PROBIT		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 2**	**Model 3**	**Model 4**
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Country*OPInsurance			-0.046	1.565		-0.040	1.638
			(0.133)	(1.721)		(0.161)	(1.489)
Country*Income			-0.063	0.026		-0.032	0.033
			(0.086)	(0.128)		(0.087)	(0.103)
Country*Income*OPInsur.				-0.214			-0.224
				(0.227)			(0.197)
Constant	-0.504***	-0.070	-0.924	-0.210	-0.199	-0.216	-0.056
	(0.039)	(1.036)	(0.743)	(1.499)	(0.359)	(0.464)	(0.483)
Insured (outpatient)							
Age		0.010***	0.009***	0.010***			
		(0.002)	(0.003)	(0.002)			
Male		0.189*	0.184*	0.189*			
		(0.089)	(0.088)	(0.088)			
Secondary education		0.466***	0.469***	0.468***			
		(0.080)	(0.077)	(0.079)			
Employed		0.460***	0.437***	0.455***			
		(0.093)	(0.098)	(0.099)			
Income (log)		0.232***	0.235***	0.233***		n/a	
		(0.046)	(0.045)	(0.046)			
Country (1=Egy, 0=Leb)		-0.117	-0.111	-0.115			
		(0.077)	(0.075)	(0.078)			
Constant		-3.109***	-3.098***	-3.111***			
		(0.370)	(0.369)	(0.370)			

(continued)

Table 6.5 Probability of general practitioner visit, pooled model (continued)

	RECURSIVE				PROBIT		
	Model 1	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
athrho							
Constant		-0.144	0.928	0.176			
		(1.078)	(0.916)	(1.566)			
ρ		-.1429994	.7297149	.1745335			
N	1808	1572	1572	1572	1572	1572	1572
ll	-1164.682	-1891.451	-1890.920	-1890.427	-988.850	-988.567	-987.825
chi2	43.578***	238.288***	473.491***	258.275***	83.626***	84.095***	86.100***

RESET test: shown for probit model (recursive model shows insurance not endogenous; probit therefore used.) RESET test: chi2(1) = 0.28; Prob > chi2 = 0.5965

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 6.6 Probability of general practitioner visit, country models

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
General practitioners								
Insured (outpatient)	-0.318	1.045	0.796	-1.669+	-0.070	0.505	-0.039	-0.939
	(1.938)	(4.573)	(2.242)	(0.973)	(0.136)	(1.176)	(0.093)	(0.931)
Age	-0.003	-0.006	-0.002	0.001	-0.004	-0.004	-0.000	-0.001
	(0.011)	(0.015)	(0.005)	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)
Male	-0.289+	-0.300*	-0.192	-0.054	-0.297*	-0.295*	-0.125	-0.129
	(0.150)	(0.133)	(0.193)	(0.147)	(0.131)	(0.131)	(0.110)	(0.110)
Married	0.129	0.111	0.003	0.001	0.124	0.120	-0.000	0.001
	(0.128)	(0.147)	(0.091)	(0.091)	(0.122)	(0.122)	(0.096)	(0.096)
Secondary education	-0.146	-0.303	-0.137	-0.001	-0.217+	-0.210	-0.070	-0.072
(continued)	(0.575)	(0.783)	(0.188)	(0.131)	(0.131)	(0.132)	(0.098)	(0.099)

Table 6.6 Probability of general practitioner visit, country models (continued)

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1 Coeff. (SE)	Model 2 Coeff. (SE)	Model 1 Coeff. (SE)	Model 2 Coeff. (SE)	Model 1 Coeff. (SE)	Model 2 Coeff. (SE)	Model 1 Coeff. (SE)	Model 2 Coeff. (SE)
Employed	0.047	-0.092	0.028	0.174	-0.011	-0.011	0.116	0.111
	(0.470)	(0.705)	(0.292)	(0.132)	(0.138)	(0.138)	(0.117)	(0.117)
Income (log)	-0.050	-0.080	-0.085	-0.027	-0.076	-0.053	-0.039	-0.072
	(0.216)	(0.246)	(0.120)	(0.086)	(0.075)	(0.088)	(0.051)	(0.059)
Self-assessed health	-0.084	-0.083	0.075	0.077	-0.085	-0.082	0.080	0.081
	(0.070)	(0.070)	(0.063)	(0.059)	(0.070)	(0.070)	(0.063)	(0.063)
Self-reported pain	0.051	0.052	0.147+	0.150**	0.052	0.051	0.159***	0.160***
	(0.065)	(0.065)	(0.083)	(0.052)	(0.065)	(0.065)	(0.048)	(0.048)
Chronic	0.183	0.185	0.021	0.022	0.190	0.181	0.027	0.023
	(0.185)	(0.177)	(0.122)	(0.119)	(0.177)	(0.178)	(0.127)	(0.127)
Income*OPInsurance		-0.105		0.118		-0.079		0.115
		(0.255)		(0.115)		(0.159)		(0.118)
Constant	0.524	0.842	-0.424	-0.677	0.749	0.594	-0.736	-0.483
	(1.887)	(2.237)	(1.090)	(0.566)	(0.596)	(0.676)	(0.455)	(0.511)
Insured (outpatient)								
Age	0.020***	0.020***	0.005+	0.005+				
	(0.005)	(0.005)	(0.003)	(0.003)				
Male	-0.000	-0.009	0.248*	0.255*				
	(0.156)	(0.158)	(0.119)	(0.109)				
Secondary education	0.883***	0.889***	0.239*	0.245**				
	(0.147)	(0.140)	(0.098)	(0.093)				
Employed	0.800***	0.809***	0.250*	0.256*		n/a		
(continued)	(0.164)	(0.162)	(0.124)	(0.114)				

Table 6.6 Probability of general practitioner visit, country models (continued)

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Income (log)	0.445***	0.430***	0.174**	0.168***				
	(0.112)	(0.121)	(0.060)	(0.051)				
Constant	-5.443***	-5.343***	-2.300***	-2.264***				
	(0.808)	(0.924)	(0.454)	(0.420)				
athrho								
Constant	0.146	-0.205	-0.557	0.474				
	(1.158)	(1.793)	(1.825)	(0.596)				
ρ	0.145	-0.202	-0.506	0.442				
chi2_c	0.016	0.013	0.093	0.633				
N	616	616	956	956	616	616	956	956
ll	-683.982	-683.847	-1169.729	-1169.121	-415.976	-415.842	-565.583	-564.993
chi2	162.941	159.760	73.794	89.627	18.823	18.973	32.735	34.485
p	0.000	0.000	0.000	0.000	0.043	0.062	0.000	0.000

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 6.7 Intensity of general practitioner visits, pooled model

	Model 1 Coeff. (SE)	Model 2 Coeff. (SE)	Model 3 Coeff. (SE)	Model 4 Coeff. (SE)
General practitioners				
Country (1=Egy 0=Leb)	0.206	0.069	-3.980*	-4.625**
	(0.197)	(0.179)	(1.577)	(1.766)
Insured (outpatient)		-0.279	3.872+	3.027
		(0.207)	(2.314)	(2.799)
Age		-0.009	-0.009	-0.009
		(0.006)	(0.006)	(0.006)
Male		-0.204	-0.126	-0.123
		(0.191)	(0.185)	(0.185)
Married		0.371+	0.277	0.269
		(0.196)	(0.194)	(0.196)
Secondary education		-0.380+	-0.455*	-0.454*
		(0.201)	(0.199)	(0.199)
Employed		-0.288	-0.174	-0.182
		(0.199)	(0.194)	(0.194)
Income (log)		-0.069	-0.064	-0.083
		(0.100)	(0.153)	(0.159)
Self-assessed health		-0.040	-0.026	-0.023
		(0.101)	(0.098)	(0.098)
Self-reported pain		0.407***	0.372***	0.370***
		(0.099)	(0.093)	(0.094)
Chronic		0.160	0.254	0.249
		(0.283)	(0.275)	(0.275)
Income*OPInsurance			-0.502+	-0.392
			(0.297)	(0.361)
Country*OPInsurance			-1.034*	1.647
			(0.427)	(3.581)
Country*Income			0.596**	0.687**
			(0.220)	(0.247)
Country*Income*OPInsurance				-0.363
				(0.479)
Constant	-18.895	-1.277	-1.177	-1.022
		(1.197)	(1.431)	(1.487)
lnalpha				
Constant	19.451	1.519	1.204	1.198
		(0.967)	(0.774)	(0.781)
N	660	576	576	576
ll	-792.747	-657.947	-651.431	-651.208
chi2	1.091	36.581***	52.943***	55.897***

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 6.8 Intensity of general practitioner visits, country models

	EGYPT		LEBANON	
	Model 1	**Model 2**	**Model 1**	**Model 2**
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
General practitioners				
Insured (outpatient)	-0.678*	3.809+	-0.003	3.636
	(0.267)	(2.023)	(0.286)	(2.814)
Age	-0.022***	-0.022***	0.003	0.005
	(0.006)	(0.006)	(0.010)	(0.010)
Male	-0.363+	-0.331	0.238	0.292
	(0.210)	(0.209)	(0.307)	(0.319)
Married	0.409*	0.375+	0.333	0.333
	(0.197)	(0.197)	(0.307)	(0.297)
Secondary education	-0.443+	-0.425+	-0.450	-0.449
	(0.253)	(0.250)	(0.292)	(0.297)
Employed	-0.316	-0.298	-0.111	0.008
	(0.218)	(0.215)	(0.324)	(0.336)
Income (log)	0.307*	0.458**	-0.172	-0.071
	(0.135)	(0.160)	(0.131)	(0.163)
Self-assessed health	-0.017	0.007	-0.071	-0.069
	(0.103)	(0.102)	(0.170)	(0.168)
Self-reported pain	0.407***	0.386***	0.345*	0.320*
	(0.104)	(0.102)	(0.140)	(0.138)
Chronic	0.189	0.157	0.192	0.222
	(0.323)	(0.310)	(0.452)	(0.440)
Income*OPInsurance		-0.617*		-0.473
		(0.282)		(0.362)
Constant	-2.198+	-3.228*	-16.156***	-17.309***
	(1.136)	(1.303)	(1.878)	(1.802)
lnalpha				
Constant	-0.421	-0.494	16.721***	17.017***
	(0.602)	(0.614)	(1.092)	(0.848)
N	291	291	285	285
ll	-331.889	-330.438	-313.667	-312.656
chi2	59.145	63.545	23.199	22.306
p	0.000	0.000	0.010	0.022

*p < 0.05 **p < 0.01 ***p < 0.001.

6.4. Medical specialists

6.4.1. Probability: pooled models

Results show that Egyptian respondents are more likely to visit specialists than Lebanese counterparts to an extent; but having insurance in Lebanon closes this gap. The country effect was significant only in the bivariate model (Table 6.9, Model 1) and the main effects model (recursive Model 2). However, after accounting for the significant interactions between country, income, and insurance in Models 3 and 4, the country effect is no longer significant.

These results suggest that before accounting for the interaction between country, income and insurance, respondents in Egypt appear to be more likely to visit specialists than in Lebanon, holding other factors constant. After accounting for these interactions, the net effect of country on specialist care is negligible. This suggests that the effect of country is largely explained by income and insurance differences between the countries.

The models incorporating interaction terms (Models 3 and 4) both show that there are significant interactions between country, insurance, and income. Model 3 reflects that the income*insurance term is significant and negative, suggesting that the effect of insurance tends to decrease as income increases. In addition, the effect of country*insurance is also significant and negative, suggesting that the effect of insurance is greater in Lebanon than it is in Egypt. Model 4 shows that the coefficient for country*income*insurance is significant.

Health insurance was endogenous to the main effects model (Model 2), but was not endogenous after adding the interaction terms between income, insurance, and country (Models 3 and 4). Given differences in endogeneity between the two countries in the specialist models, however, the country-specific effects of income, insurance, and income*insurance were explored using country-specific analyses.

6.4.2. Probability: country models

Insurance is a significant and positive determinant of specialist contact in both countries, although the effect is larger in Egypt than in Lebanon (Table 6.10, probit models). These results imply having insurance coverage is predicted to increase the likelihood of seeing specialists, and that the effect is relatively more pronounced in Egypt. Health insurance is not endogenous to either country models, which indicates that the probit models should be used to assess effects. Income was also a significant determinant of specialist care in Egypt. In Egypt having a higher income increases the chances of visiting specialists. These results suggest that income-associated inequity exists in Egypt in relation to the probability of specialist care. In Lebanon, income plays a very small role as the coefficient is nearly zero and is not significant.

The interaction effect of income*insurance was significant in Egypt, but was not significant in Lebanon. These results indicate that the effect of insurance on the use of specialists in Egypt was moderated by income: the effect of insurance on determining the likelihood of visiting specialists diminishes as income increases. In Lebanon, the interaction term was not significant, although directionally it was similar.

Age was a significant factor and positive in Egypt, meaning that older respondents were more likely to visit specialists than their younger counterparts, controlling for other factors. Whilst age was not significant in Lebanon for specialist care, its effect was similar in direction and its magnitude slightly smaller than in Egypt. Education was found to be marginally significant in Egypt, as indicated by the significance of the indices at a 90 percent confidential level.

Interestingly, the direction of the education variable is the opposite of that observed for general practitioner care and in both countries. That is to say, whilst a higher education reduces the likelihood of using general practitioner services, it increases the likelihood of seeking specialist care. However, this effect was more pronounced in Egypt than in Lebanon for both types of physician care, as evident by the relatively larger coefficients of education in Egypt as compared to Lebanon.

6.4.3. Intensity: pooled model

The effect of country on specialist intensity was not significant, although the effect had a positive direction (Table 6.11, Model 2). These results indicate that the frequency of specialist visits did not differ significantly between Egypt and Lebanon, holding other factors constant. Respondents in Egypt reported marginally more frequent visits. The interaction effects in the pooled model were not significant. Hence, the magnitude of the effects of income and insurance on specialist intensity does not depend on country.

6.4.4. Intensity: country models

In Egypt, insurance coverage is marginally significant and tends to decrease the frequency of specialist visits (Table 6.12). Insurance coverage does not play a statistically significant role in Lebanon, but the size of the coefficient is relatively large and exerts a negative effect. These results suggest that either (i) the uninsured have more intense visits to specialists, while the insured seek care elsewhere; or (ii) the nature of visits to specialists is different for the insured and the uninsured, which is not always obvious by looking at the quantity of visits. As income increases, the intensity of visiting medical specialists increases significantly in Egypt. In addition, the interaction term for income*insurance was significant and positive in Egypt. So as income increases, insurance becomes gradually more important in explaining the frequency of use. Neither income nor the interaction term is significant determinants in Lebanon, with the income coefficient almost equal to zero.

In Lebanon, being employed significantly decreases the frequency of specialist visits. Employment status was not significant in Egypt. The magnitude of the coefficient in Lebanon is relatively large, relative to other coefficients in the Lebanese specialist intensity model and to the employment coefficient in other Lebanese intensity models. These results suggest two points. First, amongst respondents in Lebanon who visited specialists at least once over a month, the unemployed are predicted to have more frequent visits than the employed, all other factors being equal. Second, employment status tends to play a relatively important role in the intensity of specialist care in particular.

Regarding health need and age, the only need variable in Egypt that is significant was pain. In Egypt, the effect of health need on the probability and intensity of use differ. Health need was not found to significantly predict probability, although a worse health perception and having chronic health conditions exerted a slightly negative effect. Pain significantly increases the intensity of use amongst those who seek care. Although age was significant in the Egyptian probability model for specialist care, age significantly decreases frequency of visits only in Egypt. This finding means that although the probability of seeing specialists increases with age, the frequency of visits is predicted to decrease with age.

In Lebanon, pain and self-assessed health were significant, but self-assessed health played a negative role. The worse the perception of health status, the fewer are the visits that a respondent is predicted to have. The magnitude of the coefficients associated with these health need variables in Lebanon was also relatively large. Being male in Lebanon was associated with less frequent specialist visits. Age was not a significant factor in Lebanon regarding the frequency of visits.

Table 6.9 Probability of specialist visits, pooled model

	RECURSIVE				PROBIT		
	Model 1	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Specialists							
Country (1=Egy, 0=Leb)	1.148***	1.161***	0.539	-0.513	1.266***	0.505	-0.569
	(0.056)	(0.105)	(0.451)	(0.671)	(0.068)	(0.590)	(0.683)
Insured (outpatient)		-0.752*	3.117***	1.630	0.135*	2.213**	0.467
		(0.370)	(0.703)	(1.111)	(0.068)	(0.697)	(0.875)
Age		0.007**	-0.003	0.000	0.004	0.004+	0.004*
		(0.002)	(0.003)	(0.004)	(0.002)	(0.002)	(0.002)
Male		0.092	0.091	0.093	0.099	0.100	0.094
		(0.074)	(0.068)	(0.073)	(0.076)	(0.076)	(0.076)
Married		0.155*	0.130**	0.140*	0.163*	0.158*	0.154*
		(0.064)	(0.049)	(0.062)	(0.068)	(0.068)	(0.069)
Secondary education		0.207*	-0.249+	-0.114	0.046	0.072	0.081
		(0.091)	(0.132)	(0.176)	(0.070)	(0.071)	(0.071)
Employed		0.072	-0.291**	-0.216	-0.071	-0.050	-0.066
		(0.096)	(0.099)	(0.136)	(0.079)	(0.079)	(0.079)
Income (log)		0.095*	-0.062	-0.063	0.033	0.054	0.002
		(0.046)	(0.063)	(0.071)	(0.040)	(0.052)	(0.055)
Self-assessed health		-0.035	-0.024	-0.034	-0.038	-0.044	-0.041
		(0.040)	(0.035)	(0.041)	(0.042)	(0.043)	(0.043)
Self-reported pain		0.129***	0.099*	0.129**	0.138***	0.141***	0.142***
		(0.035)	(0.049)	(0.041)	(0.037)	(0.037)	(0.037)
Chronic		-0.053	-0.068	-0.069	-0.063	-0.059	-0.068
(continued)		(0.079)	(0.066)	(0.077)	(0.086)	(0.085)	(0.085)

Table 6.9 Probability of specialist visits, pooled model (continued)

	RECURSIVE				PROBIT		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 2**	**Model 3**	**Model 4**
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Income*OPInsurance			-0.198+	-0.062		-0.255**	-0.032
			(0.113)	(0.100)		(0.088)	(0.111)
Country*OPInsurance			-0.287+	3.345*		-0.344*	3.825**
			(0.163)	(1.492)		(0.145)	(1.325)
Country*Income			0.071	0.247*		0.118	0.268**
			(0.077)	(0.105)		(0.081)	(0.094)
Country*Income*OPInsur				-0.489*			-0.551**
				(0.198)			(0.174)
Constant	-0.221***	-1.448***	-0.137	-0.314	-1.048**	-1.267**	-0.874+
	(0.037)	(0.353)	(0.689)	(0.659)	(0.337)	(0.432)	(0.447)
Insured (outpatient)							
Age		0.012***	0.011***	0.012***			
		(0.002)	(0.002)	(0.002)			
Male		-0.031	-0.038	-0.038			
		(0.075)	(0.074)	(0.075)			
Secondary education		0.559***	0.552***	0.562***			
		(0.068)	(0.069)	(0.068)			
Employed		0.463***	0.458***	0.461***			
		(0.076)	(0.076)	(0.077)			
Income (log)		0.238***	0.235***	0.232***		n/a	
		(0.041)	(0.040)	(0.040)			
Country (1=Egy, 0=Leb)		-0.072	-0.074	-0.079			
		(0.064)	(0.064)	(0.064)			
Constant		-3.176***	-3.129***	-3.132***			
(continued)		(0.332)	(0.330)	(0.328)			

Table 6.9 Probability of specialist visits, pooled model (continued)

	RECURSIVE				PROBIT		
	Model 1	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
athrho							
Constant		0.575*	-1.463	-0.656			
		(0.289)	(1.305)	(0.662)			
ρ		.5193037	-.8982118	-.5758165			
N	2406	2130	2130	2130	2130	2130	2130
ll	-1363.076	-2344.829	-2338.786	-2334.507	-1166.859	-1160.832	-1155.942
chi2	423.845***	847.177***	1308.870***	844.764***	414.875***	433.330***	432.087***
RESET test: shown for probit model (recursive model shows insurance not endogenous; probit therefore used.)					RESET test: chi2(1) = 0.03; Prob > chi2 = 0.8681		

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 6.10 Probability of specialist visits, country models

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Specialists								
Insured (outpatient)	-0.884	5.067***	-0.691	-0.680	-0.007	4.402***	0.225*	0.414
	(0.665)	(0.999)	(1.521)	(2.232)	(0.109)	(0.991)	(0.088)	(0.887)
Age	0.010*	-0.001	0.004	0.004	0.006+	0.008*	0.002	0.002
	(0.004)	(0.006)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Male	0.048	0.222+	0.144	0.143	0.108	0.113	0.067	0.069
	(0.118)	(0.120)	(0.154)	(0.163)	(0.112)	(0.112)	(0.104)	(0.104)
Married	0.242*	0.171*	0.062	0.062	0.225*	0.218*	0.067	0.068
	(0.096)	(0.086)	(0.084)	(0.084)	(0.100)	(0.101)	(0.093)	(0.093)
Secondary education	0.352+	-0.226	0.084	0.084	0.125	0.194+	0.012	0.013
	(0.189)	(0.257)	(0.161)	(0.170)	(0.108)	(0.112)	(0.095)	(0.095)
Employed	0.005	-0.396**	0.115	0.115	-0.151	-0.162	0.014	0.016
(continued)	(0.156)	(0.142)	(0.204)	(0.217)	(0.112)	(0.112)	(0.111)	(0.112)

Table 6.10 Probability of specialist visits, country models (continued)

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Income (log)	0.135+	0.109	0.084	0.083	0.075	0.249**	0.019	0.025
	(0.073)	(0.141)	(0.122)	(0.126)	(0.069)	(0.078)	(0.049)	(0.056)
Self-assessed health	-0.091	-0.081	0.043	0.043	-0.098	-0.100	0.046	0.045
	(0.059)	(0.058)	(0.054)	(0.053)	(0.061)	(0.062)	(0.061)	(0.061)
Self-reported pain	0.049	0.053	0.181*	0.182+	0.051	0.056	0.201***	0.201***
	(0.057)	(0.052)	(0.089)	(0.097)	(0.061)	(0.061)	(0.046)	(0.046)
Chronic	-0.122	-0.132	-0.079	-0.079	-0.136	-0.155	-0.086	-0.085
	(0.132)	(0.116)	(0.108)	(0.108)	(0.137)	(0.136)	(0.120)	(0.120)
Income*OPInsur		-0.527**		-0.001		-0.602***		-0.024
		(0.184)		(0.112)		(0.134)		(0.113)
Constant	-0.397	-0.020	-1.481**	-1.481**	0.174	-1.107+	-1.197**	-1.242**
	(0.620)	(1.027)	(0.557)	(0.558)	(0.522)	(0.591)	(0.429)	(0.477)
Insured (outpatient)								
Age	0.019***	0.020***	0.005+	0.005+				
	(0.004)	(0.003)	(0.003)	(0.003)				
Male	-0.324**	-0.324**	0.248*	0.248*				
	(0.108)	(0.108)	(0.107)	(0.108)				
Secondary education	0.900***	0.933***	0.210*	0.210*				
	(0.110)	(0.102)	(0.094)	(0.094)				
Employed	0.631***	0.630***	0.295**	0.295**		n/a		
	(0.108)	(0.107)	(0.111)	(0.112)				
Income (log)	0.323***	0.300***	0.198***	0.198***				
(continued)	(0.071)	(0.061)	(0.053)	(0.053)				

Table 6.10 Probability of specialist visits, country models (continued)

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Constant	-4.260***	-4.158***	-2.517***	-2.517***				
	(0.521)	(0.483)	(0.417)	(0.417)				
athrho								
Constant	0.550	-0.967	0.627	0.622				
	(0.481)	(0.759)	(1.354)	(1.502)				
ρ	0.500	-0.748	0.556	0.552				
chi2_c	1.305	1.624	0.214	0.171				
N	1166	1166	964	964	1166	1166	964	964
ll	-1054.062	-1044.080	-1233.511	-1233.511	-525.753	-516.122	-629.441	-629.418
chi2	293.589	406.492	94.880	95.687	17.183	40.111	41.552	41.539
p	0.000	0.000	0.000	0.000	0.070	0.000	0.000	0.000

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 6.11 Intensity of specialist visits, pooled model

	Model 1	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Specialists				
Country (1=Egy, 0=Leb)	0.068	0.150	-1.166	-0.206
	(0.110)	(0.133)	(1.114)	(1.216)
Insured (outpatient)		-0.080	-1.107	1.312
		(0.116)	(1.337)	(2.594)
Age		-0.008*	-0.008*	-0.008*
		(0.004)	(0.004)	(0.004)
Male		-0.217+	-0.204+	-0.195
		(0.125)	(0.124)	(0.122)
Married		-0.001	-0.002	0.003
		(0.118)	(0.120)	(0.120)
Secondary education		0.018	-0.018	-0.020
		(0.121)	(0.122)	(0.123)
Employed		-0.219+	-0.238*	-0.224+
		(0.125)	(0.121)	(0.119)
Income (log)		-0.038	-0.161	-0.091
		(0.071)	(0.120)	(0.128)
Self-assessed health		-0.089	-0.093	-0.092
		(0.072)	(0.073)	(0.072)
Self-reported pain		0.223***	0.223***	0.220***
		(0.055)	(0.055)	(0.054)
Chronic		-0.137	-0.135	-0.131
		(0.162)	(0.159)	(0.157)
Income*OPInsurance			0.104	-0.208
			(0.163)	(0.328)
Country*OPInsurance			0.373	-3.257
			(0.296)	(2.849)
Country*Income			0.159	0.028
			(0.150)	(0.163)
Country*Income*OPInsur				0.478
				(0.366)
Constant	-0.963**	-0.164	0.921	0.405
	(0.310)	(0.613)	(0.959)	(1.053)
lnalpha				
Constant	0.969*	0.735+	0.701	0.666
	(0.469)	(0.442)	(0.434)	(0.419)
N	1513	1358	1358	1358
ll	-1702.353	-1533.561	-1531.166	-1529.967
chi2	0.385	28.989**	32.476**	32.354**

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 6.12 Intensity of specialist visits, country models

	EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Specialists				
Insured (outpatient)	0.027	-1.987+	-0.350	0.767
	(0.130)	(1.201)	(0.228)	(2.450)
Age	-0.010*	-0.011**	-0.003	-0.002
	(0.004)	(0.004)	(0.008)	(0.008)
Male	-0.075	-0.075	-0.595*	-0.571*
	(0.134)	(0.134)	(0.293)	(0.290)
Married	-0.042	-0.041	-0.002	0.009
	(0.140)	(0.140)	(0.244)	(0.248)
Secondary education	0.038	0.029	-0.198	-0.198
	(0.136)	(0.138)	(0.252)	(0.255)
Employed	-0.140	-0.133	-0.656*	-0.629*
	(0.131)	(0.130)	(0.309)	(0.304)
Income (log)	0.020	-0.080	-0.099	-0.066
	(0.080)	(0.092)	(0.127)	(0.143)
Self-assessed health	-0.015	-0.012	-0.407*	-0.408*
	(0.077)	(0.077)	(0.175)	(0.172)
Self-reported pain	0.176**	0.176**	0.328**	0.323**
	(0.062)	(0.061)	(0.104)	(0.102)
Chronic	-0.116	-0.120	-0.099	-0.087
	(0.177)	(0.174)	(0.359)	(0.359)
Income*OPInsurance		0.276+		-0.144
		(0.166)		(0.315)
Constant	-0.236	0.504	-14.665***	-14.034***
	(0.586)	(0.646)	(2.009)	(1.830)
lnalpha				
Constant	0.134	0.115	17.065***	16.133***
	(0.433)	(0.428)	(1.691)	(1.362)
N	966	966	392	392
ll	-1108.307	-1106.940	-414.660	-414.545
chi2	17.706	19.543	19.551	19.782
p	0.060	0.052	0.034	0.048

*p < 0.05 **p < 0.01 ***p < 0.001.

6.5. Pharmacists

6.5.1. Probability: pooled model

The insurance effect is relatively more important than country in explaining pharmacy contact, as evident in the way the model changes after accounting for interactions (Table 13, probit models). The country effect is initially significant and positive, shown in the first two of the four models (Models 1 and 2, respectively). After taking into account the significant and negative country*insurance interaction, the effect of country setting is no longer significant (Model 3). Insurance plays a stronger role in Lebanon than in Egypt in determining pharmacy care, an effect that ultimately reduces the country effect. Health insurance is not endogenous to the pooled model for the probability of pharmacy care.

6.5.2. Probability: country models

Insurance is a not a significant determinant of pharmacy care in Egypt, but it is marginally significant and positive in Lebanon (Table 6.14, probit models). These results suggest that having insurance coverage tends to increase the probability of visiting pharmacists in Lebanon. Insurance is not endogenous to either model.

Income is not a significant determinant of the use of pharmacists in either country (probit Model 1). However the coefficient signs indicate that a higher income is associated with a higher probability in Egypt of visiting pharmacists, but with a lower probability in Lebanon. The indices have a moderate to small magnitude in both settings. The interaction term for income*insurance is significant and negative in Egypt at the 90 percent confidence level, but is not significant in Lebanon. These results suggest that as income increases in Egypt, the effect of insurance on the probability of visiting pharmacies decreases.

Education is found to be marginally significant and negative in Egypt, but it is not significant in Lebanon. Therefore, the more highly educated were respondents in Egypt, the less likely they were to visit pharmacists, all other factors held constant. In Egypt, pain is significant and positive at the 95 percent confidence level. Likewise, self-assessed health and chronic conditions are positive, yet significant at the 90 percent confidence level. Chronic conditions exert the largest effect in terms of magnitude amongst all three health need variables, controlling for other factors.

In Egypt, being married tends to increase the probability of seeking pharmacist care. None of the health need variables are significant in Lebanon, although they are all positive in direction, similar to the results found in Egypt. Age is a significant, negative determinant of the probability of visiting pharmacists in both countries.

This finding suggests that older individuals were less likely to visit pharmacists than their younger counterparts. In addition, the magnitude of the age variable is larger in both countries than its effect on other outpatient services, indicating that the role played by age is most prominent in the probability of visiting pharmacists than for any other type of outpatient care.

6.5.3. Intensity: pooled model

Country does not exert a significant effect on the intensity of pharmacist care, all other variables held equal (Table 6.15). The interaction term for country*insurance is significant and negative. This result suggests that the effect of insurance is moderated by country setting, with a greater effect of insurance predicted for Lebanon.

6.5.4. Intensity: country models

Insurance is not a significant determinant of the conditional number of pharmacy visits in Egypt or Lebanon, though the coefficient is positive in Egypt and negative in Lebanon (Table 6.16). This might suggest that insurance may tend to increase the frequency of pharmacist visits in Egypt, but decrease the frequency in Lebanon. Income is not a significant determinant of the intensity of pharmacy visits in either Egypt or Lebanon.

However, the zero-inflated model was preferred over the negative binomial according to goodness-of-fit tests (Appendix H). The results of the effect of insurance were thus compared to those found from the negative binomial. The significance of the effect of insurance on the intensity of seeking pharmacy care is the same in Lebanon in both models. Whilst the effect of insurance is significant at the 90 percent confidence level in the negative binomial in Egypt, the effect is significant at the 95 percent confidence level in the zero-inflated model.

This indicates that the strength of the effect is accentuated in Egypt in the zero-inflated model relative to its effect in the negative binomial. These findings indicate that the zero-inflated model is more sensitive in detecting the significance of the effect of insurance on decreasing the intensity of seeking pharmacy care in Egypt. The effects of the other variables are largely the same between the zero-inflated and zero-truncated models.

Based on the zero-truncated models, the income*insurance interaction term is not significant in either Egypt or Lebanon. These results show that the effect of insurance on the intensity of pharmacy visits does not depend on income level. For Egypt, the results in the zero-inflated model show that the interaction term is significant and negative for the frequency of pharmacy visits, whilst it is negative but not significant in the zero-truncated. The zero-inflated model appears to detect significance of the interaction term to a greater extent than does the zero-truncated model.

Pain is the main health determinant in Egypt. In contrast to the probability model, self-assessed health and chronic conditions do not influence the frequency of subsequent use in Egypt. Although the goodness-of-fit tests favour the zero-inflated model for the intensity of pharmacy visits, the results for health need are similar in both models. The exception is chronic conditions in Egypt, where it significantly increases the intensity of pharmacy visits in the zero-inflated model, but not in the zero-truncated model.

In Lebanon, a worse health perception and the existence of chronic conditions significantly increase intensity of pharmacy care. Whilst none of the health need variables were found to influence the probability of visiting pharmacists, they tend to influence the intensity of use. Age is significant and negative in both countries, as was the case for probability. Therefore, both the probability and intensity of pharmacy visits decrease with age. For intensity, the effect of age is slightly larger in Lebanon than it is in Egypt.

Table 6.13 Probability of pharmacy visit, pooled model

	RECURSIVE				PROBIT		
	Model 1	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Pharmacy							
Country (1=Egy, 0=Leb)	0.722***	0.739***	0.202	-0.399	0.739***	0.114	-0.472
	(0.061)	(0.072)	(0.675)	(0.770)	(0.071)	(0.637)	(0.756)
Insured (outpatient)		0.365	2.417*	1.469	0.054	1.126	0.196
		(0.510)	(0.999)	(1.260)	(0.075)	(0.729)	(0.940)
Age		-0.015***	-0.016***	-0.016***	-0.014***	-0.014***	-0.014***
		(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male		-0.077	-0.104	-0.103	-0.065	-0.069	-0.072
		(0.086)	(0.083)	(0.083)	(0.084)	(0.084)	(0.084)
Married		0.208**	0.177*	0.179*	0.210**	0.202**	0.199**
		(0.074)	(0.072)	(0.070)	(0.074)	(0.074)	(0.074)
Secondary education		-0.171	-0.268*	-0.249*	-0.120	-0.099	-0.097
		(0.111)	(0.130)	(0.119)	(0.076)	(0.078)	(0.078)
Employed		-0.037	-0.134	-0.121	0.007	0.024	0.018
		(0.116)	(0.150)	(0.134)	(0.088)	(0.089)	(0.089)
Income (log)		-0.051	-0.091	-0.111+	-0.028	-0.031	-0.056
		(0.058)	(0.057)	(0.061)	(0.044)	(0.060)	(0.063)
Self-assessed health		0.095*	0.083+	0.089+	0.096*	0.096*	0.099*
		(0.046)	(0.047)	(0.045)	(0.046)	(0.046)	(0.046)
Self-reported pain		0.084*	0.077*	0.079*	0.085*	0.084*	0.085*
		(0.037)	(0.033)	(0.034)	(0.038)	(0.038)	(0.038)
Chronic		0.140	0.106	0.105	0.143	0.131	0.124
		(0.098)	(0.098)	(0.095)	(0.099)	(0.099)	(0.099)
Income*OPInsurance			-0.153+	-0.046		-0.123	-0.004
(continued)			(0.081)	(0.114)		(0.093)	(0.120)

Table 6.13 Probability of pharmacy visit, pooled model (continued)

	RECURSIVE				PROBIT		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 2**	**Model 3**	**Model 4**
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Country*OPInsurance			-0.361**	1.622		-0.369*	1.848
			(0.134)	(1.380)		(0.156)	(1.444)
Country*Income			0.081	0.166		0.101	0.183+
			(0.101)	(0.111)		(0.087)	(0.104)
Country*Income*OPInsurance				-0.263			-0.294
				(0.183)			(0.190)
Constant	-0.537***	-0.168	0.139	0.272	-0.338	-0.371	-0.181
	(0.039)	(0.470)	(0.510)	(0.520)	(0.366)	(0.491)	(0.516)
Insured (outpatient)							
Age		0.011***	0.011***	0.011***			
		(0.002)	(0.002)	(0.002)			
Male		0.097	0.088	0.090			
		(0.087)	(0.088)	(0.088)			
Secondary education		0.484***	0.483***	0.485***			
		(0.076)	(0.075)	(0.075)			
Employed		0.398***	0.387***	0.389***			
		(0.089)	(0.094)	(0.092)			
Income (log)		0.237***	0.247***	0.245***		n/a	
		(0.043)	(0.046)	(0.044)			
Country (1=Egy, 0=Leb)		-0.083	-0.072	-0.077			
		(0.072)	(0.074)	(0.072)			
Constant		-3.134***	-3.201***	-3.187***			
(continued)		(0.355)	(0.363)	(0.357)			

Table 6.13 Probability of pharmacy visit, pooled model (continued)

	RECURSIVE				PROBIT		
	Model 1	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
athrho							
Constant		-0.188	-0.774	-0.660			
		(0.315)	(0.780)	(0.583)			
ρ		-.186	-.649	-.578			
N	1865	1639	1639	1639	1639	1639	1639
ll	-1188.270	-1949.725	-1945.976	-1944.717	-1009.485	-1006.234	-1004.980
chi2	140.940***	341.889***	422.438***	396.300***	192.779***	198.601***	200.028***

RESET test: shown for probit model (recursive model shows insurance not endogenous; probit therefore used.) RESET test: chi2(1) = 8.56; Prob > chi2 = 0.0034

*p < 0.05 **p < 0.01 ***p < 0.001. Results should be treated in an exploratory way since RESET test shows model may be mis-specified. Due to small sample size for disaggregated outpatient services such as pharmacy services, results from aggregated outpatient analyses will be used to draw main thesis conclusions.

Table 6.14 Probability of pharmacy visit, country models

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Pharmacy								
Insured (outpatient)	-0.098	2.754*	1.041	1.790	-0.084	1.883+	0.160+	0.334
	(0.738)	(1.320)	(0.829)	(1.277)	(0.130)	(1.118)	(0.093)	(0.933)
Age	-0.018**	-0.021***	-0.012***	-0.012***	-0.018***	-0.018***	-0.011***	-0.011***
	(0.006)	(0.005)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)
Male	-0.169	-0.139	-0.074	-0.096	-0.169	-0.162	0.002	0.004
	(0.132)	(0.129)	(0.135)	(0.131)	(0.131)	(0.131)	(0.110)	(0.111)
Married	0.345**	0.309**	0.129	0.121	0.344**	0.335**	0.138	0.138
	(0.118)	(0.118)	(0.090)	(0.085)	(0.117)	(0.117)	(0.096)	(0.096)
Secondary education	-0.241	-0.407+	-0.090	-0.106	-0.245+	-0.223+	-0.026	-0.025
(continued)	(0.255)	(0.226)	(0.109)	(0.100)	(0.127)	(0.128)	(0.098)	(0.098)

Table 6.14 Probability of pharmacy visit, country models (continued)

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Employed	-0.009	-0.124	-0.062	-0.090	-0.012	-0.015	0.034	0.036
	(0.186)	(0.177)	(0.157)	(0.153)	(0.134)	(0.134)	(0.118)	(0.119)
Income (log)	0.058	0.094	-0.120+	-0.118*	0.057	0.140	-0.070	-0.065
	(0.097)	(0.102)	(0.066)	(0.060)	(0.072)	(0.086)	(0.055)	(0.062)
Self-assessed health	0.117+	0.116+	0.064	0.056	0.117+	0.121+	0.070	0.070
	(0.069)	(0.068)	(0.063)	(0.062)	(0.069)	(0.069)	(0.065)	(0.065)
Self-reported pain	0.178**	0.176**	0.031	0.031	0.178**	0.179**	0.031	0.031
	(0.063)	(0.062)	(0.044)	(0.042)	(0.063)	(0.063)	(0.048)	(0.048)
Chronic	0.304+	0.274+	0.072	0.063	0.304+	0.285+	0.084	0.084
	(0.164)	(0.162)	(0.117)	(0.114)	(0.164)	(0.164)	(0.123)	(0.124)
Income*OPInsur		-0.303*		-0.062		-0.268+		-0.022
		(0.148)		(0.106)		(0.151)		(0.119)
Constant	-0.388	-0.536	0.328	0.313	-0.377	-0.977	0.019	-0.018
	(0.812)	(0.844)	(0.540)	(0.511)	(0.570)	(0.652)	(0.463)	(0.525)
Insured (outpatient)								
Age	0.021***	0.022***	0.006*	0.005*				
	(0.005)	(0.004)	(0.003)	(0.003)				
Male	-0.152	-0.160	0.226*	0.221*				
	(0.148)	(0.146)	(0.110)	(0.112)				
Secondary education	0.983***	0.990***	0.205*	0.206*				
	(0.134)	(0.131)	(0.093)	(0.093)				
Employed	0.598***	0.595***	0.268*	0.259*		n/a		
	(0.148)	(0.147)	(0.120)	(0.127)				
Income (log)	0.360***	0.354***	0.200***	0.207***				
(continued)	(0.085)	(0.080)	(0.054)	(0.056)				

Table 6.14 Probability of pharmacy visit, country models (continued)

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Constant	-4.734***	-4.695***	-2.512***	-2.554***				
	(0.668)	(0.646)	(0.426)	(0.440)				
athrho								
Constant	0.008	-0.379	-0.612	-0.906				
	(0.423)	(0.429)	(0.748)	(0.973)				
ρ	0.008	-0.362	-0.546	-0.719				
chi2_c	0.000	0.781	0.669	0.867				
N	687	687	952	952	687	687	952	952
ll	-748.091	-746.076	-1161.335	-1161.185	-438.050	-436.336	-561.767	-561.749
chi2	189.045	190.663	63.249	81.903	52.814	55.454	21.990	22.094
p	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.02

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 6.15 Intensity of pharmacy visits, pooled model

	Model 1	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Pharmacy				
Country (1=Egy, 0=Leb)	-0.041	-0.157	0.317	-0.381
	(0.098)	(0.104)	(0.886)	(0.939)
Insured (outpatient)		-0.194+	0.510	-1.213
		(0.116)	(1.306)	(1.778)
Age		-0.013***	-0.012***	-0.012**
		(0.004)	(0.004)	(0.004)
Male		-0.086	-0.102	-0.103
		(0.133)	(0.137)	(0.135)
Married		0.106	0.092	0.097
		(0.109)	(0.109)	(0.108)
Secondary education		-0.116	-0.082	-0.087
		(0.107)	(0.110)	(0.110)
Employed		0.017	0.025	0.028
		(0.133)	(0.134)	(0.133)
Income (log)		0.024	0.048	0.014
		(0.060)	(0.080)	(0.080)
Self-assessed health		0.119+	0.128*	0.131*
		(0.062)	(0.061)	(0.061)
Self-reported pain		0.173**	0.166**	0.167**
		(0.056)	(0.056)	(0.056)
Chronic		0.364*	0.347*	0.336*
		(0.158)	(0.157)	(0.156)
Income*OPInsurance			-0.063	0.157
			(0.169)	(0.230)
Country*OPInsurance			-0.480*	3.283
			(0.237)	(2.401)
Country*Income			-0.045	0.051
			(0.120)	(0.128)
Country*Income*OPInsur				-0.500
				(0.317)
Constant	0.433***	-0.080	-0.356	-0.107
	(0.094)	(0.493)	(0.661)	(0.649)
lnalpha				
Constant	-0.078	-0.315	-0.345	-0.353
	(0.221)	(0.221)	(0.217)	(0.216)
N	758	682	682	682
ll	-1262.311	-1117.824	-1115.437	-1114.235
chi2	0.177	57.342***	71.555***	74.654***

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 6.16 Intensity of pharmacy visit, country model

	EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Pharmacy				
Insured (outpatient)	-0.395*	1.979	0.023	-0.703
	(0.160)	(1.564)	(0.167)	(1.677)
Age	-0.012**	-0.012**	-0.015*	-0.015*
	(0.005)	(0.005)	(0.006)	(0.006)
Male	-0.257	-0.252	0.044	0.043
	(0.174)	(0.169)	(0.230)	(0.230)
Married	0.194	0.187	0.000	0.008
	(0.130)	(0.130)	(0.175)	(0.174)
Secondary education	-0.105	-0.102	-0.068	-0.075
	(0.146)	(0.145)	(0.162)	(0.162)
Employed	-0.056	-0.055	0.094	0.100
	(0.173)	(0.168)	(0.214)	(0.213)
Income (log)	-0.012	0.056	0.029	0.015
	(0.090)	(0.096)	(0.078)	(0.084)
Self-assessed health	0.029	0.032	0.223*	0.225*
	(0.066)	(0.066)	(0.112)	(0.111)
Self-reported pain	0.339***	0.339***	-0.052	-0.050
	(0.069)	(0.069)	(0.087)	(0.087)
Chronic	0.347	0.330	0.480*	0.473*
	(0.239)	(0.238)	(0.207)	(0.205)
Income*OPInsurance		-0.326		0.093
		(0.213)		(0.216)
Constant	0.052	-0.425	-0.111	-0.014
	(0.669)	(0.748)	(0.669)	(0.709)
lnalpha				
Constant	-0.803**	-0.821**	0.015	0.011
	(0.276)	(0.274)	(0.344)	(0.344)
N	406	406	276	276
ll	-644.336	-643.253	-460.551	-460.474
chi2	77.537	81.982	13.518	13.514
p	0.000	0.000	0.196	0.261

*p < 0.05 **p < 0.01 ***p < 0.001.

6.6. Discussion: Effects of economic factors on outpatient utilisation

6.6.1. Country effect

Overall, the analysis of outpatient care reveals an interesting switch in health care patterns between Egypt and Lebanon, summarised in Table 6.17. Egyptians are predicted to more likely to use outpatient care, but once contact has been made, more frequent visits are predicted in Lebanon. These results could suggest (a) a overall greater opportunity of access regardless of ability to pay and insurance status in Egypt, and/or (b) a greater supplier-induced demand or a less efficient use of resources in Lebanon that increase the frequency of visits amongst users.

Because they can rely on free and subsidised health care covered by the Ministry of Health, Egyptian respondents may be more likely to seek care. Since public financing in the Egyptian health system is relatively constrained, health care is likely to be rationed explicitly or implicitly, with relatively little incentive amongst providers to provide a high quantity or quality of care. This observation has been found in some tax-based systems elsewhere. In the fee-for-service, heavily privatised system in Lebanon, fewer respondents may have the opportunity to seek care due to lack of insurance coverage, but once contact has been made, due to the private nature of care, there is an incentive for providers to stimulate demand, offering further access to high-technology services.

6.6.2. Effect of income

Overall, controlling for all else, income per se was not a large factor explaining the contact decision regarding outpatient care, except in the case of specialist care in Egypt, where inequity in the probability of seeking care was observed, favouring the relatively well off. The results indicated that there exist income-associated inequities in Egypt for the probability of specialist care and the frequency of using general practitioner, but not for pharmacy care. In Lebanon, income alone did not appear to contribute to inequities, although insurance did appear to play a role in exacerbating inequity. The effect of income in Lebanon could also reflect a more even distribution in income. Income-inequity in specialist care in Egypt may be explained by the idea that the relatively well-off are more likely to purchase the more preferred, higher-quality <u>private outpatient care</u>. Although information on the distinction between public and private facilities was not available, literature on patterns of care in Egypt support this possibility.

6.6.3. Effect of insurance

Insurance was a positive factor in Lebanon determining the likelihood of using any outpatient care, hospital outpatient units, specialists, pharmacists, and inpatient care. In Egypt, insurance played a somewhat larger role in determining the frequency of use than it did the probability. It positively influenced the probability of specialist care; yet it influenced the intensity of hospital outpatient and specialist care negatively, and general practitioner and pharmacist care positively. These findings suggest a greater degree of inequity in Lebanon than in Egypt regarding the probability of using 'any outpatient care' over twelve months, favouring the insured over the uninsured.

Similar to findings from the literature, insurance played a relatively larger role in regards to the amount of services as opposed to the contact decision. One explanation fort this effect is supplier-induced demand that can arise when third-party payers reimburse providers for services. In the case specialist care, it is possible that in Egypt insurance may have reduced the intensity of these services due to the following possible explanations.

In the case of specialist care, which is split nearly equally in terms of provision between the private and public services in Egypt, those with insurance coverage fewer visits than those without, but more visits to general practitioners than those without, controlling for income and other factors. Indeed, amongst those with insurance, there is a greater incentive on the part of the insurer to encourage preventative care, often provided by general practitioners and covered by insurance, whilst specialist care in Egypt is often provided on a fee-for-service, out-of-pocket basis. Hence, insurance in Egypt may encourage beneficiaries to substitute specialist care for general practitioner care, thus explaining these results.

Table 6.17 Summary of multivariate outpatient results: income and insurance

	Egypt		Lebanon		Country with
Probability of care	Income	Insurance	Income	Insurance	greater use
Any use of outpatient services		x		xx	Egypt
General practitioners					Egypt
Specialists	x	xx		x	ns
Pharmacists		x		x	ns
Intensity of visits					
General practitioners	x	xx			Lebanon
Specialists		(x)			ns
Pharmacists	(x)				ns

ns = differences are not statistically significant. n/a = not applicable.
xx = relatively larger coefficient compared to other country. (x) = difference is significant in favour of uninsured/lower-income. Intensity data not collected in survey for 'any use of outpatient services'.

6.6.4. Interaction between income and insurance

The interaction between income and insurance was detected mainly in the probability of specialist care and the intensity of general practitioner and pharmacy care in Egypt, but was not detected in Lebanon. The negative interaction between income and insurance regarding physician services is similar to those findings from the literature, in which the role of insurance tends to decrease as income increases. Insurance tends to reduce the price sensitivity on the part of beneficiaries, especially for lower-income groups. It is important to note that such an effect was not detected in Lebanon, possibly due to two reasons: (1) the sample sizes may not have been sufficient, since the direction of the effect was usually negative, thus supporting the general relationship; (2) the distribution of income in Lebanon is relatively more equal. With a relatively more equal income distribution such as that found in Lebanon as compared to Egypt, the differential effect of insurance may be more difficult to detect. Nonetheless, these results suggest that the effect of insurance is itself prominent in Lebanon.

6.6.5. Effects of other factors

6.6.5.1. Health need

The effect of health needs on outpatient care depends on the type of service, summarised in Table 6.18. At times pain is the health indicator that has the largest effect, at other times it is having a chronic health condition. Pain was the prime health determinant for the probability and the intensity of general practitioner and specialist visits. Chronic health conditions were more important in predicting the probability and intensity of pharmacy care and the probability of 'any' outpatient use. Self-assessed health generally played a limited role in predicting the use of health care, except in 'any' use of outpatient care and case of pharmacy care in Egypt, elaborated below. These results show that perceptions of ill health are more important than 'objective' measures in the probability of seeking care for physician services, but the reverse seems to be true for less discretionary care, such as medications and outpatient use in general.

Health status may increase the use of some services, whilst decreasing the use of others. Although not significant, the direction of the effect of self-assessed health was negative in some cases (specialist care) and positive in others (pharmacy care). Chronic conditions appeared to exert a significant negative effect in the case of inpatient care over a one-month recall, although the effect was positive in the case of the longer recall period. The longer-recall period for inpatient is likely more reliable; nonetheless, these overall findings point to an interesting possibility. The negative effect of chronic health conditions and self-assessed health may suggest that overnight admissions and specialist care may be substituted for other types of care in some cases, such as outpatient care, home-based care, or family/social support. Individuals with chronic health conditions may have a greater need for non-acute care than acute care, but this may also depend on the specific nature of the condition, which was outside the scope of this thesis.

Table 6.18 Summary of multivariate outpatient results: health need

	Self-assessed health	Pain	Chronic Health Conditions
Probability of care			
Any use of outpatient services	x	x	x
General practitioners	--	x	--
Specialists	--	x (LEB)	--
Pharmacists	x (EGY)	x	x
Intensity of visits			
Any use of outpatient services	n/a	n/a	n/a
General practitioners	--	x	--
Specialists	--	x	--
Pharmacists	x	x	X

x = Effect is statistically significant at 95% confidence level. -- = not significant. n/a = not applicable. Intensity data was not collected for 'any' outpatient use.

6.6.5.2. Age

Overall, the effect of age on the probability of using outpatient services was relatively small or negligible for most types of care. It tended to decrease the use of health care mainly for 'any' outpatient probability, physician intensity, and pharmacy intensity, and more so in Egypt. These results are consistent with other findings in Egypt and Jordan that indicate that the use of health care generally decreases with age, although the relationship may not necessarily be linear (Nandakumar et al, 2000; Ekman, 2007). It is possible that age represents unobservable factors that influence the demand for health care, such as health need, mobility, and co-dependence. Similarly, the literature suggests that older individuals in the Middle East rely heavily on family care-giving, where social capital plays a big role.

6.6.5.3. Education

Overall, education played a relatively modest role in determining the probability and intensity of 'any' outpatient care and physicians' visits, with the effect more pronounced in Egypt. A higher education predicts a lower likelihood of using most outpatient services, with the exception of specialist care in Egypt. The findings are consistent with those elsewhere showing that a higher education tends to increase the use of specialist care (Nandakumar et al, 2000), whilst decreasing the use of general practitioners (Morris et al, 2005). The role played by education may represent three unobservable factors. The first is the level of knowledge and awareness of one's health condition; second, health-related behaviour including lifestyle and habits that improve health; third, social status and unobserved preferences for certain health services and providers over others. These effects of education seem to affect the use of physician services more than the use of other services.

6.6.5.4. Employment status

Being employed tends to lower the probability of seeking outpatient care in Lebanon, whilst it lowers the frequency of visits for hospital outpatient care in Egypt and specialist visits in Lebanon. Results can be explained using three implications of employment status. First, similar to the effect of education, the employed tend to be exposed to more information and knowledge regarding health, thereby increasing their efficiency at producing good health. Second, the employed in both countries are more likely to be covered by social health insurance than the unemployed, especially in Egypt. The employed may be more likely to seek care earlier and reduce the risk of more serious illness. Finally, the opportunity cost of absenteeism and disability is relatively high for the employed, providing an incentive to take preventative measures.

In general, the negative effect of being employed on the use of outpatient health services in Egypt and Lebanon closely corresponds to results found in other countries.

6.6.5.5. Gender and marital status

Gender and marital status influence the type of health service sought, but as control variables in this thesis, their effects were relatively modest. Being male and being married were associated with a higher likelihood of outpatient use in Egypt, whilst married did so in Lebanon. Being male was associated with a significantly lower likelihood of general practitioner care in Egypt and a lower intensity of specialist visits in Lebanon. Gender and marital likely represent opportunity, preferences, differences in the nature of health need, and factors associated with social capital that influence patterns of health care, as well as family and social care-giving.

6.7. Chapter summary

Income-inequity favouring the rich was found in Egypt regarding the contact decision for specialists and the intensity of general practitioner care. Greater insurance-related inequity was found in Lebanon than in Egypt regarding probability of visiting any outpatient facility and specialists. In Egypt, insurance- inequity was found regarding the intensity of visiting general practitioners. Pain and chronic health conditions were the most important determinants of outpatient care in Egypt and amongst the most important in Lebanon, particularly for physician and pharmacy care.

The effects of insurance and income were consistent with the theoretical role of ability-to-pay. Where tax-based, universal health systems exist, inequity in access to outpatient care is relatively less than in systems without universal coverage. Yet poor quality and comprehensiveness of care is a common problem of some tax-based systems, where people may choose to seek health care in the private sector instead as in the case of specialist care. Interestingly, it is for services that appear more affordable in Egypt that ability-to-pay played a greater role in Lebanon, such as 'any' outpatient care and pharmacy visits. In sum, insurance and income-related disparities found in the use of pharmacists and physicians have critical implications for individuals equal in health need but unequal in ability to pay. Despite having a relatively higher income in Lebanon than in Egypt, even amongst the insured, respondents in Lebanon were less likely to access pharmacists, possibly attributed to country differences in coverage, preferences, supplier-induced demand, and incentives to access certain services.

Chapter 7. Effect of economic status on hospital-based care

7.1. Introduction

Compared to outpatient services as examined in the previous chapter, hospital-based health care is generally considered to be relatively more acute and less discretionary in nature. This difference may affect the role played by economic status. This chapter examines results regarding the influence of economic status on the use of hospital services, based on multivariate regression analysis. The main types of hospital care that are assessed include: (a) hospital-based outpatient units; and (b) hospital inpatient admissions assessed through (i) 12-month recall and (ii) one-month recall periods. The first half of the chapter reviews the estimation results, and the second half of the chapter discusses the main findings. Similar to Chapter Six, results from pooled and country-specific analyses are presented. Since the relationships between the dependent and independent variables may vary by country, emphasis is paid to the country-specific results. The discussion focuses on: (i) the endogeneity of health insurance, (ii) the country effect, (iii) the income effect, (iv) the insurance effect and (v) the interaction effects.

7.2. Hospital outpatient services

7.2.1. Probability: pooled model

The effects of income and insurance on the probability and frequency of hospital care, as described in the methods chapter. To ensure that the models are valid, endogeneity of the insurance variable was also tested using the recursive bivariate probit model. Regarding endogeneity of health insurance in the pooled hospital outpatient analysis, insurance is not endogenous in the main effects model (Model 2), but is endogenous in the interactions models (Models 3 and 4). Respondents in Egypt are more likely to have used services as compared to Lebanese respondents, controlling for other factors (Table 7.1). Insurance is not a significant determinant in the pooled analysis. The negative coefficient suggests that having insurance coverage somewhat reduces the likelihood of visiting hospital outpatient clinics, although not significantly so. Income does not exert a significant influence, with a value that approaches zero. None of the interaction effects between income, insurance, and country are significant for hospital outpatient care. These findings suggest that ability to pay does not significantly influence the likelihood of using hospital outpatient services, and the effect of insurance is not moderated by income or country of residence. Likewise, the effect of income does not depend on country of residence.

Besides being a residence of Egypt, the other significant factors that influence the probability of hospital outpatient visits are self-reported pain, chronic conditions, and being female, with gender significant at the 90 percent confidence level. Based on results from the recursive model, the most important factors explaining insurance coverage for outpatient care are have a secondary education or above, being employed, have a higher income, and being relatively older. Gender and country of residence are not significant determinants of hospital outpatient insurance coverage.

7.2.2. Probability: country models

In Egypt, neither insurance nor income is a significant determinant of hospital outpatient care (Table 7.2). In addition, the income variable is approximately equal to zero and has a negative sign, suggesting it has a negligible effect. The interaction term for income*insurance is significant and positive, which indicates that the effect of insurance tends to increase as income increases. This may suggest that insurance coverage stimulates the use of certain types of hospital outpatient care, for example, the use of relatively expensive procedures or the use of quasi-private hospitals. Health insurance is not endogenous in Egypt in the main effects model (Model 1), but is endogenous after adding the interaction term (Model 2). Regarding the control variables, being female, pain and chronic health conditions are significant predictors. Pain and chronic conditions have relatively large coefficients and collectively explain most of the probability of hospital outpatient visits. Age, marital status, education, employment status, and self-assessed health are not significant predictors.

Since health insurance is endogenous in Lebanon in the main and interaction effects' models, the recursive model is used to assess the effects of the explanatory variables. Insurance is a relatively large and significant positive predictor of hospital outpatient care, whilst income exerts a relatively small influence on reducing the likelihood of hospital outpatient care. The magnitude of the income variable is also relatively small. The interaction term for income*insurance is not significant in Lebanon, indicating that the effect of insurance on hospital outpatient care is not moderated by income level. With respect to control factors, being female, pain, and chronic health conditions are significant, positive factors. Age, marital status, education, employment status, and self-assessed health are not significant determinants.

7.2.3. Intensity: pooled model

Based on pooled Models 1 and 2, the country effect is statistically significant and negative. This indicates that the number of hospital outpatient visits is higher in Lebanon (per person, per month) amongst respondents who had at least one visit (Table 7.3). Therefore, whilst respondents in Egypt are more likely to utilise these services, the number of visits is greater in Lebanon amongst users. The effect of insurance is significant at the 90 percent confidence level and negative, suggesting that having insurance coverage for outpatient care reduces the frequency of visits to hospital outpatient units (Model 2). Income is not a significant determinant.

After adding the three interaction terms in Model 3, the effect of insurance and income remain the same. The interaction term for income*insurance is significant at the 90 percent confidence level and negative, suggesting that the effect of insurance on increasing the intensity of hospital outpatient care is lower for higher income levels (Model 3). The interaction of country*insurance is also significant and negative, which suggests that the effect of insurance on the intensity of hospital outpatient care is higher in Lebanon than in Egypt. In addition, the interaction of country*income is significant and positive, indicating that the role played by income on intensity of utilisation is greater in Egypt than in Lebanon. The triple-interaction term for country*income*insurance is not significant, which means that the relationship between income and insurance is basically similar in both countries (Model 4).

Regarding the effects of the control variables on intensity of use, significant demographic and need factors associated with a higher intensity are self-reported pain, relatively younger age, and being female. Age and gender are relatively less important than pain, since they are significant only at the 90 percent confidence levels. The effects of the other covariates remain unchanged after the addition of the interaction terms.

7.2.4. Intensity: country models

In Egypt, the effect of insurance is significant and negative for the frequency of hospital outpatient visits, controlling for other factors (Table 7.4). This result indicates that respondents with insurance coverage are predicted to have fewer hospital outpatient visits than those without insurance. Income in Egypt is a significantly positive factor associated with the intensity of visiting hospital outpatient units. The interaction term for the intensity of hospital outpatient use is not significant in Egypt, although positive in direction. Regarding the effects of the control variables, younger age, being female, self-reported pain, and being unemployed are significant predictors of the intensity of hospital outpatient visits in Egypt. The zero-inflated model is preferred over the negative binomial according to goodness-of-fit tests; however, the effects of the covariates are similar across both techniques (Appendix I).

In Lebanon, neither income nor insurance is a statistically significant determinant of the intensity of hospital outpatient use overall, but there is evidence to suggest that insurance matters more to relatively lower-income groups. The interaction term for income*insurance is significant and positive in Lebanon. These results indicate that as income increases, the effect of insurance increases. After adding the interaction term, the effects of income and insurance remain non-significant but the magnitude of the insurance effect increases. This means that effect of insurance appears larger after adding the interaction term is more important in enabling utilisation for lower-income groups.

Self-reported pain is predicted to significantly increase the number of hospital outpatient visits, holding all other factors constant. None of the other demographic or health need variables are significant determinants in Lebanon, such as age, gender, marital status, educational level, employment status, self-assessed health, and chronic health conditions.

Results from the Lebanese hospital outpatient model should be interpreted cautiously since the overall model does not reach statistical significance as evident by the chi-squared value that is greater than 0.05. Hence, it does not explain most of the variation in hospital outpatient care. This may be due to the small sample size for this model (n=73). The zero-inflated model is also preferred in the case of Lebanon over the negative binomial according to goodness-of-fit tests; however, the effects of the covariates are similar across both techniques.

Table 7.1 Probability of hospital outpatient visits, pooled model

	RECURSIVE				PROBIT		
	Model 1	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Hospital outpatient							
Country (1=Egy, 0=Leb)	1.550***	1.433***	1.735**	1.877*	1.622***	1.800*	1.689+
	(0.072)	(0.358)	(0.640)	(0.780)	(0.089)	(0.749)	(0.895)
Insured (outpatient)		-0.740	-1.837*	-1.616	0.236**	-0.495	-0.705
		(0.870)	(0.801)	(1.101)	(0.090)	(0.871)	(1.310)
Age		0.001	0.002	0.002	-0.002	-0.002	-0.002
		(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Male		-0.247+	-0.234*	-0.227*	-0.301**	-0.311**	-0.310**
		(0.127)	(0.100)	(0.101)	(0.098)	(0.099)	(0.099)
Married		-0.001	0.008	0.009	-0.008	-0.004	-0.005
		(0.083)	(0.077)	(0.076)	(0.091)	(0.091)	(0.091)
Secondary education		0.162	0.212*	0.224*	-0.018	-0.013	-0.013
		(0.188)	(0.101)	(0.101)	(0.095)	(0.097)	(0.097)
Employed		0.046	0.067	0.074	-0.055	-0.059	-0.059
		(0.139)	(0.102)	(0.102)	(0.104)	(0.104)	(0.104)
Income (log)		0.028	0.038	0.055	-0.052	-0.072	-0.080
		(0.096)	(0.083)	(0.093)	(0.053)	(0.082)	(0.089)
Self-assessed health		-0.029	-0.025	-0.025	-0.033	-0.032	-0.032
		(0.051)	(0.047)	(0.046)	(0.055)	(0.055)	(0.055)
Self-reported pain		0.138*	0.128**	0.125**	0.155**	0.156**	0.156**
		(0.058)	(0.046)	(0.046)	(0.049)	(0.049)	(0.049)
Chronic		0.468**	0.430***	0.422***	0.522***	0.518***	0.515***
(continued)		(0.166)	(0.125)	(0.123)	(0.138)	(0.139)	(0.139)

Table 7.1 Probability of hospital outpatient visits, pooled model (continued)

	RECURSIVE				PROBIT		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 2**	**Model 3**	**Model 4**
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Income*OPInsur			0.122	0.086		0.102	0.128
			(0.094)	(0.148)		(0.110)	(0.166)
Country*OPInsur			-0.073	-0.554		-0.070	0.307
			(0.161)	(1.506)		(0.189)	(1.699)
Country*Income			-0.051	-0.075		-0.021	-0.005
			(0.090)	(0.114)		(0.101)	(0.122)
Country*Income*OPInsur				0.064			-0.050
				(0.198)			(0.221)
Constant	-1.376***	-1.895***	-1.880**	-1.977**	-1.535***	-1.412*	-1.352+
	(0.054)	(0.470)	(0.581)	(0.636)	(0.444)	(0.650)	(0.698)
Insured (outpatient)							
Age		0.010***	0.011***	0.011***			
		(0.002)	(0.002)	(0.002)			
Male		0.042	0.040	0.039			
		(0.089)	(0.089)	(0.089)			
Secondary education		0.517***	0.517***	0.517***			
		(0.078)	(0.078)	(0.078)			
Employed		0.272**	0.269**	0.269**		n/a	
		(0.092)	(0.091)	(0.091)			
Income (log)		0.235***	0.238***	0.239***			
		(0.045)	(0.045)	(0.045)			
Country (1=Egy, 0=Leb)		-0.047	-0.048	-0.047			
		(0.075)	(0.074)	(0.074)			
Constant		-3.042***	-3.069***	-3.078***			
(continued)		(0.368)	(0.371)	(0.372)			

Table 7.1 Probability of hospital outpatient visits, pooled model (continued)

	RECURSIVE				PROBIT		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 2**	**Model 3**	**Model 4**
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
athrho							
Constant		0.659	0.876**	0.944**			
		(0.753)	(0.333)	(0.355)			
ρ		.5777509	.7046473	.7369017			
N	1791	1550	1550	1550	1550	1550	1550
ll	-794.604	-1557.521	-1556.009	-1555.954	-655.940	-655.198	-655.170
chi2	459.791***	714.926***	799.511***	821.715***	418.932***	415.369***	415.046***

RESET test: shown for probit model (recursive model shows insurance not endogenous; probit therefore used.) RESET test: chi2(1) = 0.02; Prob > chi2 = 0.8837

n/a = not applicable. *Statistically significant at 95% confidence level; **99% confidence level; ***99.9% confidence level. ρ = rho, signifying endogeneity if *, denoting use of the RECURSIVE model is needed; otherwise PROBIT. χ^2 = chi-squared, signifying high degree of goodness-of-fit for overall model if *.

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 7.2 Probability of hospital outpatient visits, country models

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Hospital outpatient								
Insured (outpatient)	-0.876	-2.947**	2.111***	-1.250	0.143	-0.378	0.310*	-0.746
	(0.688)	(1.123)	(0.170)	(1.310)	(0.132)	(1.093)	(0.126)	(1.348)
Age	0.007	0.010*	-0.006+	-0.004	0.000	0.000	-0.005	-0.005
	(0.006)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Male	-0.351**	-0.355**	-0.370***	-0.266+	-0.309*	-0.315*	-0.313*	-0.317*
	(0.133)	(0.132)	(0.110)	(0.146)	(0.133)	(0.134)	(0.146)	(0.146)
Married	0.037	0.077	0.035	-0.027	0.007	0.011	-0.029	-0.027
	(0.117)	(0.108)	(0.082)	(0.137)	(0.121)	(0.121)	(0.141)	(0.141)
Secondary education	0.396	0.552**	-0.177+	-0.050	0.055	0.051	-0.082	-0.090
	(0.268)	(0.174)	(0.102)	(0.144)	(0.133)	(0.133)	(0.142)	(0.143)
Employed	0.046	0.089	-0.237*	-0.033	-0.050	-0.054	-0.076	-0.083
	(0.156)	(0.140)	(0.118)	(0.156)	(0.136)	(0.137)	(0.162)	(0.162)
Income (log)	0.023	-0.008	-0.138*	-0.040	-0.070	-0.092	-0.035	-0.075
	(0.098)	(0.079)	(0.060)	(0.096)	(0.071)	(0.086)	(0.080)	(0.091)
Self-assessed health	-0.011	-0.001	-0.019	-0.045	-0.019	-0.020	-0.047	-0.047
	(0.067)	(0.062)	(0.053)	(0.087)	(0.070)	(0.070)	(0.090)	(0.090)
Self-reported pain	0.112	0.087	0.106+	0.173*	0.132+	0.133+	0.176*	0.177*
	(0.070)	(0.065)	(0.056)	(0.069)	(0.068)	(0.068)	(0.072)	(0.072)
Chronic	0.433*	0.399**	0.312+	0.557*	0.479**	0.486**	0.581*	0.572*
	(0.169)	(0.147)	(0.163)	(0.226)	(0.180)	(0.181)	(0.231)	(0.231)
Income*OPInsurance		0.223+		0.139		0.071		0.135
		(0.130)		(0.167)		(0.149)		(0.171)
Constant	-0.632	-0.503	-0.543	-1.446+	0.145	0.309	-1.604*	-1.294+
(continued)	(0.825)	(0.642)	(0.547)	(0.739)	(0.569)	(0.673)	(0.660)	(0.737)

Table 7.2 Probability of hospital outpatient visits, country models (continued)

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Insured (outpatient)						n/a		
Age	0.024***	0.024***	0.005+	0.005+				
	(0.005)	(0.004)	(0.003)	(0.003)				
Male	-0.297*	-0.287*	0.180+	0.247*				
	(0.150)	(0.146)	(0.101)	(0.110)				
Secondary education	1.077***	1.056***	0.223*	0.207*				
	(0.138)	(0.142)	(0.091)	(0.094)				
Employed	0.309*	0.299*	0.234*	0.271*				
	(0.155)	(0.152)	(0.109)	(0.115)				
Income (log)	0.349***	0.364***	0.190***	0.202***				
	(0.082)	(0.082)	(0.050)	(0.051)				
Constant	-4.573***	-4.678***	-2.353***	-2.507***				
	(0.671)	(0.669)	(0.402)	(0.423)				
athrho								
Constant	0.679	1.274+	-1.959***	0.301*				
	(0.601)	(0.682)	(0.579)	(0.149)				
ρ	0.591	0.855	-0.961	0.292				
chi2_c	1.275	3.489+	11.440***	4.054*				
N	628	628	922	922	628	628	922	922
ll	-704.055	-702.821	-819.245	-821.394	-414.760	-414.638	-240.217	-239.843
chi2	191.580***	283.806***	462.686***	60.178***	26.464**	26.644**	23.282**	23.684*
p	0.000	0.000	0.000	0.000	0.003	0.005	0.010	0.014

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 7.3 Intensity of hospital outpatient visits, pooled model

	Model 1	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Hospital outpatient				
Country (1=Egy, 0=Leb)	0.077	0.092	-3.854*	-2.545
	(0.240)	(0.246)	(1.658)	(2.191)
Insured (outpatient)		-0.409+	2.969+	5.997*
		(0.213)	(1.608)	(3.050)
Age		-0.011+	-0.010+	-0.011+
		(0.006)	(0.005)	(0.005)
Male		-0.445+	-0.438+	-0.472*
		(0.228)	(0.225)	(0.232)
Married		0.077	-0.013	-0.016
		(0.200)	(0.194)	(0.194)
Secondary education		-0.068	-0.067	-0.076
		(0.196)	(0.191)	(0.192)
Employed		-0.237	-0.246	-0.259
		(0.230)	(0.226)	(0.229)
Income (log)		0.105	-0.190	-0.064
		(0.100)	(0.205)	(0.250)
Self-assessed health		-0.128	-0.127	-0.123
		(0.099)	(0.096)	(0.097)
Self-reported pain		0.509***	0.509***	0.512***
		(0.092)	(0.087)	(0.087)
Chronic		0.129	0.201	0.236
		(0.362)	(0.313)	(0.312)
Income*OPInsurance			-0.340+	-0.734+
			(0.205)	(0.396)
Country*OPInsurance			-1.123*	-5.228
			(0.477)	(3.527)
Country*Income			0.596*	0.418
			(0.232)	(0.301)
Country*Income*OPInsur				0.540
				(0.460)
Constant	-1.758	-1.321	0.639	-0.304
	(1.844)	(0.989)	(1.671)	(2.016)
lnalpha				
Constant	2.411	0.442	0.175	0.199
	(2.079)	(0.603)	(0.526)	(0.533)
N	491	432	432	432
ll	-648.360	-547.709	-541.285	-540.690
chi2	0.103	53.100***	61.292***	64.225***

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 7.4 Intensity of hospital outpatient visits, country models

	EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Hospital outpatient				
Insured (outpatient)	-0.691**	0.459	0.428	4.676
	(0.229)	(1.681)	(0.454)	(3.678)
Age	-0.012*	-0.012+	0.002	-0.001
	(0.006)	(0.006)	(0.015)	(0.015)
Male	-0.744**	-0.719**	0.601	0.470
	(0.243)	(0.247)	(0.524)	(0.543)
Married	-0.027	-0.032	0.065	-0.013
	(0.204)	(0.204)	(0.512)	(0.509)
Secondary education	-0.029	-0.013	-0.250	-0.270
	(0.202)	(0.204)	(0.500)	(0.495)
Employed	-0.488*	-0.472*	0.370	0.363
	(0.227)	(0.234)	(0.530)	(0.532)
Income (log)	0.280*	0.334*	-0.251	-0.083
	(0.114)	(0.150)	(0.235)	(0.267)
Self-assessed health	-0.086	-0.087	-0.273	-0.246
	(0.103)	(0.103)	(0.271)	(0.271)
Self-reported pain	0.464***	0.464***	0.433+	0.447+
	(0.089)	(0.089)	(0.250)	(0.257)
Chronic	0.291	0.284	0.071	0.233
	(0.324)	(0.320)	(0.969)	(0.978)
Income*OPInsurance		-0.157		-0.552
		(0.230)		(0.476)
Constant	-1.924*	-2.340*	0.187	-1.050
	(0.897)	(1.147)	(2.417)	(2.623)
lnalpha				
Constant	-0.147	-0.155	0.688	0.596
	(0.534)	(0.531)	(1.458)	(1.434)
N	359	359	73	73
ll	-447.391	-447.180	-90.222	-89.490
chi2	62.111	62.181	9.300	10.763
p	0.000	0.000	0.504	0.463

*p < 0.05 **p < 0.01 ***p < 0.001.

7.3. Hospital inpatient care

7.3.1. Probability over twelve months: pooled model

The country effect is significant and positive, based on the pooled probit models 1 and 2 (Table 7.5). These results indicate that respondents in Egypt are significantly less likely to visit inpatient care than Lebanese counterparts. Insurance is a significant, positive determinant of the probability of admissions.

Income is positive but not statistically significant. After adding the interaction terms, the only interaction term that is found to be significant is income*insurance (Model 3). The positive sign of the interaction term indicates that the effect of insurance on the probability of admissions tends to increase as income increases. Results suggest that a negative but non-significant effect of country setting exists after controlling for other factors.

Therefore, respondents in Egypt are marginally less likely to be admitted to inpatient care than their Lebanese counterparts. The country effect is no longer significant, although it remains negative. Insurance is no longer significant, but the sign is negative. The effect of income does not change after the addition of the interaction terms.

The most important factors in the recursive model that are associated with the likelihood of have insurance coverage for inpatient care are secondary education, being employed, being a resident of Lebanon, have a higher income, and being older. Results from the recursive model show that the chi-squared statistic for rho is not significant, indicating that health insurance is not endogenous to the pooled inpatient, twelve-month model. Other significant determinants of inpatient care are being married, have a relatively low educational level, low self-assessed health status, pain, and have chronic conditions. Neither age nor gender is significant.

7.3.2. Probability over twelve months: country models

Health insurance is not endogenous in the case of Egypt; therefore the probit model is used to assess the explanatory factors. Significant determinants of inpatient insurance coverage in Egypt are secondary education, being employed, being female, higher income, and being older. In Egypt, neither income nor insurance is a significant determinant of inpatient use (Table 7.6). Nonetheless, the value of income is negative in direction and approached zero. After including the insurance*income interaction term as shown in Model 2, results show that the interaction term is not significant in Egypt, although positive in direction. These findings indicate that the effect of insurance on utilising inpatient services is not moderated by income level. Overall, health status is the most important factor positively determining inpatient use in Egypt. Other significant determinants are chronic health conditions, pain, and low self-assessed health status. Age, gender, marital status, educational level, employment status, and income level are not significant factors.

In Lebanon, results from the recursive model are discussed, since health insurance is endogenous to the model. Insurance is a significant determinant. It exerts a negative effect; but it exerts a positive effect when specific types chronic health conditions are included in the model (Table 7.6). This suggests that the effect of insurance is sensitive to the choice of control variables that represent health need.

A higher income significantly increases the probability of inpatient care in Lebanon. After including the insurance*income interaction term, results show that the interaction term is not significant in Lebanon, although positive in direction (Model 2). These findings indicate that the effect of insurance on utilising inpatient services is not moderated by income level.

Other significant determinants of hospital inpatient care in Lebanon (12-month recall) are being married, have lower self-assessed health levels, have worse pain levels, and have chronic health conditions. Factors that are not significant included age, gender, educational level, and employment status. The ranking of factors that determine insurance coverage in the recursive model are secondary education, being employed, higher income, being male, and age.

Table 7.5 Probability of inpatient care over 12 months, pooled model

	RECURSIVE				PROBIT			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Inpatient Care								
Country (1=Egy,0=Leb)	-0.464***	-0.350***	-0.159	-0.208	-0.464***	-0.442***	-0.135	-0.099
	(0.041)	(0.079)	(0.424)	(0.528)	(0.041)	(0.051)	(0.453)	(0.543)
Insured (inpatient)		0.838+	0.315	0.291		0.103*	-0.780	-0.745
		(0.431)	(1.311)	(1.258)		(0.051)	(0.517)	(0.644)
Age		-0.003	-0.004	-0.004		0.000	0.000	0.000
		(0.003)	(0.004)	(0.004)		(0.002)	(0.002)	(0.002)
Male		-0.055	-0.053	-0.053		-0.047	-0.049	-0.049
		(0.056)	(0.055)	(0.055)		(0.057)	(0.057)	(0.057)
Married		0.155**	0.156**	0.155**		0.169**	0.174**	0.175**
		(0.053)	(0.058)	(0.058)		(0.054)	(0.054)	(0.054)
Secondary education		-0.291**	-0.323+	-0.326+		-0.107+	-0.112+	-0.112+
		(0.108)	(0.184)	(0.177)		(0.057)	(0.058)	(0.058)
Employed		-0.243**	-0.262*	-0.264*		-0.137*	-0.143*	-0.143*
		(0.079)	(0.114)	(0.111)		(0.060)	(0.060)	(0.060)
Income (log)		-0.014	-0.034	-0.037		0.025	-0.001	0.001
		(0.036)	(0.050)	(0.055)		(0.031)	(0.048)	(0.052)
Self-assessed health		0.144***	0.141***	0.141***		0.149***	0.149***	0.149***
		(0.033)	(0.034)	(0.034)		(0.034)	(0.034)	(0.034)
Self-reported pain		0.194***	0.192***	0.191***		0.202***	0.203***	0.203***
		(0.030)	(0.034)	(0.034)		(0.029)	(0.029)	(0.029)
Chronic		0.283***	0.280***	0.279***		0.297***	0.298***	0.299***
		(0.063)	(0.070)	(0.069)		(0.063)	(0.063)	(0.063)
Income*IPInsur			0.073	0.078			0.111+	0.106
			(0.087)	(0.091)			(0.066)	(0.082)
Country*IPInsur			0.179	0.320			0.123	0.009
			(0.143)	(0.967)			(0.110)	(0.995)
Country*Income			-0.033	-0.027			-0.048	-0.053
(continued)			(0.059)	(0.074)			(0.062)	(0.074)

Table 7.5 Probability of inpatient care over 12 months, pooled model (continued)

	RECURSIVE				PROBIT			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Country*Income* IPInsur				-0.019				0.015
				(0.126)				(0.133)
Constant	-1.132***	-1.943***	-1.727***	-1.700**	-1.132***	-2.304***	-2.098***	-2.113***
	(0.028)	(0.344)	(0.522)	(0.559)	(0.028)	(0.257)	(0.383)	(0.413)
Insured (inpatient)								
Age		0.016***	0.016***	0.016***				
		(0.001)	(0.001)	(0.001)				
Male		-0.014	-0.014	-0.014				
		(0.042)	(0.042)	(0.042)				
Secondary education		0.799***	0.799***	0.799***				
		(0.038)	(0.038)	(0.038)				
Employed		0.463***	0.463***	0.463***				
		(0.043)	(0.043)	(0.043)				
Income (log)		0.160***	0.158***	0.159***		n/a		
		(0.022)	(0.022)	(0.022)				
Country (1=Egy, 0=Leb)		-0.350***	-0.353***	-0.353***				
		(0.036)	(0.036)	(0.036)				
Constant		-2.608***	-2.592***	-2.592***				
		(0.186)	(0.186)	(0.186)				
athrho								
Constant		-0.460	-0.529	-0.539				
		(0.298)	(0.573)	(0.558)				
ρ		-0.430	-0.485	-0.492				
N	7736	6885	6885	6885	7736	6885	6885	6885
Log-likelihood	-2205.898	-5557.957	-5555.972	-5555.960	-2205.898	-1727.194	-1724.825	-1724.818
χ^2	125.428***	1713.078***	1745.040***	1752.194***	125.428***	452.734***	457.521***	457.464***
RESET test: chi2(1) = 1.55; Prob > chi2 = 0.2133					RESET test: chi2(1) = 0.48; Prob > chi2 = 0.4870			

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 7.6 Probability of inpatient care over 12 months, country models

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Inpatient Care								
Insured (inpatient)	0.847+	0.138	-0.762*	-1.325*	0.094	-0.785	0.080	-0.785
	(0.510)	(1.164)	(0.309)	(0.633)	(0.081)	(0.741)	(0.067)	(0.662)
Age	-0.006	-0.006	0.003	0.002	-0.001	-0.002	0.001	0.001
	(0.004)	(0.004)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Male	-0.077	-0.083	0.059	0.036	-0.094	-0.101	-0.005	-0.012
	(0.079)	(0.079)	(0.078)	(0.081)	(0.081)	(0.081)	(0.080)	(0.080)
Married	0.017	0.025	0.233***	0.243***	0.050	0.055	0.253***	0.253***
	(0.081)	(0.083)	(0.070)	(0.072)	(0.078)	(0.078)	(0.074)	(0.074)
Secondary education	-0.304+	-0.288	0.016	-0.028	-0.070	-0.077	-0.134+	-0.135+
	(0.159)	(0.177)	(0.093)	(0.097)	(0.085)	(0.087)	(0.075)	(0.076)
Employed	-0.186+	-0.176	-0.109	-0.143	-0.061	-0.062	-0.201*	-0.209*
	(0.109)	(0.119)	(0.087)	(0.089)	(0.086)	(0.085)	(0.084)	(0.084)
Income (log)	-0.034	-0.058	0.126**	0.062	-0.026	-0.058	0.057	0.007
	(0.046)	(0.052)	(0.045)	(0.059)	(0.047)	(0.053)	(0.041)	(0.053)
Self-assessed health	0.104*	0.104*	0.158***	0.165***	0.110*	0.108*	0.171***	0.172***
	(0.048)	(0.049)	(0.045)	(0.046)	(0.050)	(0.050)	(0.048)	(0.048)
Self-reported pain	0.232***	0.234***	0.166***	0.172***	0.238***	0.239***	0.182***	0.180***
	(0.045)	(0.045)	(0.037)	(0.038)	(0.046)	(0.046)	(0.038)	(0.038)
Chronic	0.281**	0.285**	0.289***	0.303***	0.285**	0.288**	0.317***	0.318***
	(0.089)	(0.089)	(0.082)	(0.084)	(0.092)	(0.091)	(0.086)	(0.086)
Income*IP Insurance		0.088		0.102		0.122		0.112
		(0.109)		(0.083)		(0.102)		(0.084)
Constant	-1.933***	-1.784***	-2.821***	-2.470***	-2.210***	-1.973***	-2.643***	-2.261***
(continued)	(0.405)	(0.420)	(0.329)	(0.422)	(0.361)	(0.398)	(0.345)	(0.432)

Table 7.6 Probability of inpatient care over 12 months, country models (continued)

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Insured (inpatient)								
Age	0.025***	0.025***	0.007***	0.007***				
	(0.002)	(0.002)	(0.002)	(0.002)				
Male	-0.227***	-0.227***	0.217***	0.217***				
	(0.060)	(0.060)	(0.060)	(0.060)				
Secondary education	1.133***	1.133***	0.429***	0.429***				
	(0.053)	(0.053)	(0.055)	(0.055)				
Employed	0.627***	0.627***	0.258***	0.257***				
	(0.061)	(0.061)	(0.061)	(0.061)				
Income (log)	0.068*	0.067*	0.232***	0.231***		n/a		
	(0.032)	(0.032)	(0.034)	(0.034)				
Constant	-2.815***	-2.806***	-2.605***	-2.599***				
	(0.248)	(0.248)	(0.279)	(0.277)				
athrho								
Constant	-0.452	-0.403	0.570*	0.395+				
	(0.325)	(0.365)	(0.247)	(0.221)				
ρ	-0.423	-0.383	0.516*	0.376+				
N	4133	4133	2752	2752	4133	4133	2752	2752
Log-likelihood	-2697.021	-2696.694	-2734.629	-2733.629	-793.725	-793.117	-927.496	-926.319
χ^2	999.366***	1001.147***	556.701***	499.114***	153.205***	153.151***	251.039***	256.091***

*p < 0.05 **p < 0.01 ***p < 0.001.

7.3.3. Probability over one month: pooled model

Over a one-month period, the effect of country setting is significant and positive (Table 7.7, probit models). This result means that respondents in Egypt are more likely to be admitted than their counterparts in Lebanon, holding other factors constant. The magnitude of the country coefficient is relatively large, indicating a particularly strong effect of country setting. Insurance is significant and positive in the main effects model, suggesting that insurance increases the likelihood of inpatient admissions. However, income is not a significant factor. Based on the pooled analysis, the chi-squared statistic for rho is not significant, indicating that health insurance is not endogenous to the inpatient model for the one-month recall period. The most important factors explaining inpatient insurance coverage including having a secondary education, being employed, being a resident of Lebanon, have a higher income, age, and being male.

After adding the interaction terms to the model, a significant negative interaction is found between income and insurance, indicating that as income increases, the effect of insurance becomes gradually less. A significant negative interaction is also found between country and income, suggesting that the effect of income depended on the country and exerted a relatively greater effect in Lebanon. This interaction between country and insurance is significant at the 90 percent confidence level and negative, indicating the insurance effect is higher in Lebanon. Finally, a significant interaction is found between country, income, and insurance at the 90 percent confidence level, showing that the relationship between income and insurance varies by country setting.

After taking into account the interaction terms in Model 3, the insurance effect remains unchanged, but after adding the triple interaction term in Model 4, insurance is significant and positive. Similarly, after accounting for the interactions between income, country and insurance in Models 3 and 4, income becomes significant in both of these models although not significant in the main effects model. The results from Models 3 and 4 suggest that after accounting for the different relationships between insurance, income, and country, insurance coverage and higher income each tend to independently increase the likelihood of inpatient admissions, effects that are masked when ignoring the moderating effects of income and country setting.

Other significant demographic and health need determinants of inpatient admissions are being female, pain, and not having chronic health conditions. Those factors that are not significant are age, marital status, educational level, and employment status. After accounting for the significant interactions in Model 4, the effects of the demographic and health need variables remain largely unchanged.

7.3.4. Probability over one month: country models

Over a one-month recall period, insurance is not significant in Egypt and is relatively small in magnitude. However, income is a significant determinant in a negative sense. These results indicate that poorer individuals in Egypt are more likely to be admitted to hospital than wealthier individuals, holding all other factors constant. The interaction term for income*insurance is not significant in Egypt, with a value that approached zero. In Egypt, the chi-squared statistic for rho is not significant, indicating that health insurance is not endogenous to the one-month recall probability model for inpatient care (Table 7.8). The most important factors determining inpatient insurance coverage based on a one-month recall period are secondary education, being employed, and age.

Self-assessed health and pain variables are significant and positive determinants of the likelihood of being admitted, with self-assessed health significant at the 90 percent level. Chronic health conditions' variable is significant and negative in direction. These results suggest that poorer self-assessed health and pain levels increase the likelihood of inpatient admissions, but having a chronic health condition decreases the likelihood of admission.

The chi-squared statistic for rho is not statistically significant in Lebanon, suggesting that health insurance is not endogenous in the inpatient model for the one-month recall period. The most important factors that increases the likelihood of inpatient insurance coverage in Lebanon are being employed, have a secondary education or above, being male, have a higher income, and age.

Insurance is a significant determinant in Lebanon. The probit index is positive and is the largest factor in comparison to other explanatory variables. Hence, in Lebanon, have insurance coverage is the most important factor determining the probability of being admitted to hospital, holding all other factors constant. Over the one-month recall period, income is also significant and positive in Lebanon. In Lebanon, richer individuals are more likely to be admitted than poorer individuals, holding other factors constant, suggesting that income-associated inequity in the probability of admissions exists in Lebanon. These results suggest that there exists insurance- and income-associated inequity in Lebanon with regards to the probability of inpatient admission.

In Lebanon, the interaction term is significant and negative with a relatively large value. Hence, as income increases in Lebanon, the effect of insurance became less important in explaining the probability of being admitted to hospital. Whilst insurance is not significant in the main effects model, it became significant and positive after taking into account the interaction between income and insurance. Income also became significant at the 95 percent level and positive after taking into account the interaction term. The effects of other covariates remained largely unchanged. Other significant demographic and health need factors that are associated with the likelihood of inpatient admission over a one-month recall period in Lebanon are being female and have a poor self-reported level of pain. Demographic and health need factors that are not significant included age, marital status, educational level, employment status, self-assessed health, and chronic health conditions.

7.3.5. Intensity over one month: pooled model

Regarding the frequency of inpatient admissions, the effect of country setting is significant and negative, according to the zero-truncated negative binomial model (Table 7.9). These results suggest that amongst respondents that had been admitted, respondents in Egypt reported fewer visits than Lebanese counterparts, holding other factors constant. The magnitude of the probit index is also relatively large, suggesting a particularly country effect.

However, the goodness-of-fit tests favoured the zero-inflated negative binomial model, which showed that the country effect is not significant and is positive in direction (Appendix I). These findings indicate that respondents in Egypt reported somewhat more frequent visits. As the effects of most of the other covariates remained the same, the zero-truncated model will be used to evaluate most of the effects.

Based on Model 2 in the zero-truncated set of regressions, insurance is a positive predictor of the intensity of inpatient admissions conditional upon use, significant at the 90 percent confidence level. Insurance exerts a relatively large effect as evident by the coefficient's large value. Income is not a significant predictor of the intensity of being admitted to hospital over the one-month recall period.

The interaction terms between, income, insurance, and country setting as shown in Models 3 and Model 4 are not significant. These results show that the effect of insurance on the likelihood of inpatient admissions is not moderated by income. In addition, the individual effects of insurance and income each on the likelihood of admissions does not depend on country setting. Other significant demographic and health need factors that are associated with a higher intensity of inpatient admissions over one month are age, being married and self-reported pain. Demographic and health need factors that are not significant determinants are gender, educational level, employment status, self-assessed health status, and chronic health conditions.

7.3.6. Intensity over one month: country models

In Egypt, insurance does not significantly impact the frequency of inpatient admissions, but is generally a positive influence (Table 7.10). Income is not significant either. The interaction term is not significant in Egypt but is negative and relatively large in magnitude. This result suggests that as income increases, the effect of insurance tends to decrease slightly. Demographic and health need factors that predict a higher number of inpatient visits in Egypt are younger age, being married, and pain. Gender, educational level, employment status, self-assessed health and chronic conditions are not significant determinants.

In Lebanon, insurance significantly increases the number of hospital inpatient visits, holding other factors equal. Income is not a statistically significant factor, although positive in direction. The interaction term is not significant in Lebanon but is negative and relatively large in magnitude. Hence, the effect of insurance tends to decrease somewhat as income increases. A higher intensity of inpatient admissions is associated with relatively young age, being married, and pain.

Table 7.7 Probability of inpatient care over 1 month, pooled model

	RECURSIVE				PROBIT		
	Model 1	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Inpatient							
Country (1=Egy, 0=Leb)	0.945***	1.058***	3.508***	4.531***	1.064***	3.508***	4.580***
	(0.085)	(0.111)	(0.837)	(0.985)	(0.104)	(0.837)	(0.985)
Insured (inpatient)		0.034	0.975	2.121	0.088	1.057	2.738*
		(0.323)	(1.065)	(1.364)	(0.111)	(0.996)	(1.340)
Age		0.002	0.001	0.003	0.001	0.001	0.001
		(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)
Male		-0.338**	-0.297*	-0.261*	-0.342**	-0.302*	-0.307*
		(0.121)	(0.125)	(0.129)	(0.119)	(0.122)	(0.122)
Married		-0.019	-0.008	0.002	-0.019	-0.008	-0.002
		(0.110)	(0.111)	(0.106)	(0.110)	(0.111)	(0.111)
Secondary education		-0.153	-0.142	-0.036	-0.164	-0.155	-0.158
		(0.133)	(0.145)	(0.178)	(0.122)	(0.125)	(0.126)
Employed		-0.177	-0.179	-0.090	-0.186	-0.190	-0.191
		(0.139)	(0.146)	(0.173)	(0.129)	(0.131)	(0.131)
Income (log)		-0.030	0.185*	0.304**	-0.034	0.179*	0.257**
		(0.062)	(0.093)	(0.103)	(0.056)	(0.085)	(0.094)
Self-assessed health		0.105	0.122+	0.109	0.105	0.122+	0.114
		(0.070)	(0.072)	(0.071)	(0.070)	(0.072)	(0.072)
Self-reported pain		0.211***	0.209***	0.209***	0.211***	0.209***	0.216***
		(0.056)	(0.056)	(0.057)	(0.056)	(0.056)	(0.056)
Chronic		-0.352*	-0.369**	-0.336*	-0.352*	-0.369**	-0.350*
		(0.143)	(0.142)	(0.142)	(0.143)	(0.143)	(0.143)
Income*IPInsurance			-0.138	-0.350*		-0.140	-0.355*
(continued)			(0.125)	(0.164)		(0.125)	(0.171)

Table 7.7 Probability of inpatient care over 1 month, pooled model (continued)

	RECURSIVE				PROBIT		
	Model 1	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Country*IPInsurance			0.201	-3.349+		0.203	-3.175+
			(0.229)	(1.790)		(0.228)	(1.848)
Country*Income			-0.340**	-0.492***		-0.339**	-0.485***
			(0.112)	(0.128)		(0.112)	(0.132)
Country*Income*IPInsurance				0.472*			0.450+
				(0.236)			(0.244)
Constant	-1.579***	-1.696***	-3.351***	-4.165***	-1.669***	-3.317***	-3.922***
	(0.061)	(0.492)	(0.756)	(0.781)	(0.468)	(0.714)	(0.785)
Insured (inpatient)							
Age		0.011***	0.011***	0.011***			
		(0.002)	(0.002)	(0.002)			
Male		0.159+	0.158+	0.159+			
		(0.091)	(0.091)	(0.091)			
Secondary education		0.530***	0.530***	0.530***			
		(0.081)	(0.081)	(0.081)			
Employed		0.446***	0.446***	0.443***		n/a	
		(0.095)	(0.095)	(0.095)			
Income (log)		0.240***	0.241***	0.243***			
		(0.047)	(0.047)	(0.047)			
Country (1=Egypt, 0=Lebanon)		-0.335***	-0.335***	-0.333***			
		(0.081)	(0.081)	(0.081)			
Constant		-2.996***	-2.996***	-3.013***			
		(0.379)	(0.379)	(0.382)			
athrho							
Constant		0.032	0.041	0.369			
(continued)		(0.185)	(0.240)	(0.418)			

Table 7.7 Probability of inpatient care over 1 month, pooled model (continued)

	RECURSIVE				PROBIT		
	Model 1	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
ρ		.0324401	.0411388	.3533874			
N	1602	1382	1382	1382	1382	1382	1382
ll	-535.561	-1249.262	-1244.529	-1242.874	-420.918	-416.186	-414.649
chi2	122.336***	323.619***	329.177***	369.667***	140.757***	152.173***	151.581***

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 7.8 Probability of inpatient care over 1 month, country models

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Inpatient								
Insured (inpatient)	0.064	-0.459	-0.133	2.698*	0.279	-0.159	-0.008	2.817*
	(0.630)	(1.528)	(0.194)	(1.332)	(0.176)	(1.300)	(0.147)	(1.314)
Age	0.006	0.006	-0.001	-0.002	0.004	0.004	-0.002	-0.002
	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Male	-0.249	-0.256	-0.375*	-0.356+	-0.243	-0.250	-0.389*	-0.368*
	(0.171)	(0.171)	(0.167)	(0.188)	(0.171)	(0.171)	(0.166)	(0.171)
Married	0.067	0.072	-0.050	-0.052	0.061	0.065	-0.050	-0.052
	(0.165)	(0.164)	(0.157)	(0.158)	(0.164)	(0.163)	(0.158)	(0.159)
Secondary education	-0.075	-0.064	-0.168	-0.160	-0.155	-0.159	-0.183	-0.174
	(0.297)	(0.300)	(0.168)	(0.179)	(0.189)	(0.190)	(0.170)	(0.171)
Employed	-0.210	-0.204	-0.152	-0.138	-0.257	-0.259	-0.167	-0.151
(continued)	(0.213)	(0.216)	(0.179)	(0.202)	(0.177)	(0.177)	(0.178)	(0.183)

Table 7.8 Probability of inpatient care over 1 month, country models (continued)

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Income (log)	-0.205*	-0.223*	0.123	0.253*	-0.212*	-0.229*	0.110	0.242**
	(0.091)	(0.102)	(0.078)	(0.111)	(0.086)	(0.099)	(0.078)	(0.093)
Self-assessed health	0.171+	0.168+	0.057	0.052	0.171+	0.169+	0.057	0.052
	(0.095)	(0.095)	(0.108)	(0.108)	(0.096)	(0.095)	(0.108)	(0.108)
Self-reported pain	0.207*	0.208*	0.185*	0.195*	0.208*	0.209*	0.185*	0.195*
	(0.082)	(0.082)	(0.077)	(0.078)	(0.082)	(0.082)	(0.077)	(0.078)
Chronic	-0.610**	-0.602**	-0.095	-0.075	-0.611**	-0.604**	-0.096	-0.075
	(0.203)	(0.204)	(0.215)	(0.215)	(0.203)	(0.205)	(0.216)	(0.216)
Income*IPInsurance		0.067		-0.361*		0.061		-0.362*
		(0.179)		(0.167)		(0.179)		(0.168)
Constant	0.348	0.468	-2.635***	-3.676***	0.426	0.548	-2.558***	-3.608***
	(0.718)	(0.786)	(0.689)	(0.905)	(0.658)	(0.745)	(0.689)	(0.808)
Insured (inpatient)								
Age	0.020***	0.020***	0.009**	0.009**				
	(0.005)	(0.005)	(0.003)	(0.003)				
Male	-0.197	-0.197	0.283**	0.283**				
	(0.173)	(0.173)	(0.107)	(0.107)				
Secondary education	1.172***	1.172***	0.319***	0.319***				
	(0.157)	(0.157)	(0.094)	(0.094)				
Employed	0.677***	0.677***	0.325**	0.325**		n/a		
	(0.174)	(0.174)	(0.113)	(0.113)				
Income (log)	0.099	0.099	0.277***	0.277***				
(continued)	(0.089)	(0.089)	(0.055)	(0.055)				

Table 7.8 Probability of inpatient care over 1 month, country models (continued)

	RECURSIVE				PROBIT			
	EGYPT		LEBANON		EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Constant	-2.852***	-2.854***	-3.092***	-3.091***				
	(0.695)	(0.694)	(0.451)	(0.450)				
athrho								
Constant	0.125	0.148	0.077	0.068				
	(0.350)	(0.359)	(0.078)	(0.302)				
ρ	0.124	0.147	0.077	0.068				
chi2_c	0.127	0.171	0.986	0.051				
N	461	461	921	921	461	461	921	921
ll	-440.213	-440.150	-779.515	-777.426	-234.105	-234.053	-179.708	-177.611
chi2	141.411	142.434	85.652	89.460	48.099	47.739	17.645	25.063
p	0.000	0.000	0.000	0.000	0.000	0.000	0.061	0.009

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 7.9 Intensity of inpatient care over 1 month, pooled model

	Model 1	Model 2	Model 3	Model 4
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Inpatient				
Country (1=Egypt, 0=Lebanon)	-0.667	-0.395	3.019	2.414
	(0.560)	(0.502)	(3.827)	(5.596)
Insured (inpatient)		0.614+	6.067	5.324
		(0.369)	(4.688)	(7.103)
Age		-0.040**	-0.041**	-0.041**
		(0.013)	(0.013)	(0.013)
Male		-0.375	-0.296	-0.289
		(0.488)	(0.500)	(0.503)
Married		1.527**	1.416**	1.408**
		(0.507)	(0.506)	(0.508)
Secondary education		-0.596	-0.560	-0.562
		(0.538)	(0.531)	(0.529)
Employed		-0.706	-0.519	-0.506
		(0.520)	(0.543)	(0.548)
Income (log)		-0.063	0.406	0.342
		(0.302)	(0.493)	(0.592)
Self-assessed health		-0.219	-0.208	-0.203
		(0.273)	(0.271)	(0.278)
Self-reported pain		0.771**	0.795**	0.788**
		(0.292)	(0.268)	(0.280)
Chronic		-0.397	-0.289	-0.288
		(0.524)	(0.555)	(0.555)
Income*IPInsurance			-0.635	-0.540
			(0.574)	(0.881)
Country*IPInsurance			-1.258	0.028
			(1.053)	(8.034)
Country*Income			-0.377	-0.298
			(0.495)	(0.728)
Country*Income*IPInsurance				-0.172
				(1.050)
Constant	-16.714***	-17.132***	-21.504***	-21.767***
	(0.436)	(2.679)	(3.968)	(5.285)
lnalpha				
Constant	17.654***	17.676***	17.960***	18.712***
	(0.039)	(0.673)	(0.968)	(4.215)
N	198	165	165	165
ll	-207.018	-139.135	-138.282	-138.271
chi2	-----	25.978**	36.110**	38.755***

*p < 0.05 **p < 0.01 ***p < 0.001.

Table 7.10 Intensity of inpatient care over 1 month, country models

	EGYPT		LEBANON	
	Model 1	Model 2	Model 1	Model 2
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Inpatient				
Insured (inpatient)	0.437	7.581	1.987*	10.093
	(0.588)	(4.686)	(0.840)	(11.236)
Age	-0.034*	-0.034*	-0.063*	-0.077*
	(0.014)	(0.014)	(0.028)	(0.033)
Male	-0.057	0.369	-1.226	-1.154
	(0.605)	(0.550)	(0.899)	(0.909)
Married	1.132*	1.023+	2.624**	2.855*
	(0.569)	(0.594)	(1.017)	(1.177)
Secondary education	0.022	0.066	-2.374*	-2.079+
	(0.664)	(0.648)	(1.133)	(1.212)
Employed	-0.497	-0.186	-0.754	-1.193
	(0.604)	(0.575)	(1.537)	(1.866)
Income (log)	-0.270	-0.057	0.367	0.965
	(0.360)	(0.414)	(0.686)	(1.032)
Self-assessed health	-0.019	0.032	-1.109	-1.177
	(0.303)	(0.314)	(0.878)	(0.946)
Self-reported pain	0.691*	0.723*	0.700	0.838
	(0.327)	(0.311)	(0.636)	(0.708)
Chronic	-0.686	-0.616	1.461	2.065
	(0.538)	(0.535)	(1.612)	(1.805)
Income*IPInsurance		-1.006		-1.048
		(0.682)		(1.412)
Constant	-1.117	-2.791	-18.377**	-25.757**
	(5.640)	(4.747)	(6.780)	(8.391)
lnalpha				
Constant	2.148	1.706	16.775***	19.251***
	(5.296)	(4.169)	(4.648)	(2.144)
N	117	117	48	48
ll	-92.894	-92.136	-41.976	-41.730
chi2	19.760	30.171	32.035	35.800
p	0.032	0.001	0.000	0.000

*p < 0.05 **p < 0.01 ***p < 0.001.

7.4. Discussion: Effects of economic factors on hospital utilisation

7.4.1. Country effect

The 'country effect' represents unobservable factors for which data for this analysis, such as universal health care provision, the clinical causes behind seeking health care, the type of treatments received, cultural preferences, and other factors. The main assumption in this thesis was that clinical practice patterns and cultural preferences would largely be the same in the two countries. Hence, the 'country effect' may largely be explained by differences in access to free, publicly-financed and provided health care. Access to hospital care seems relatively income-neutral compared to outpatient care, and even pro-poor in some cases. The summary table for this chapter's results shows this pattern, particularly for the probability of accessing care (Table 7.11). First, this analysis shows that whilst respondents in Egypt are more likely to be admitted than Lebanese counterparts, once admitted, they tend to report fewer subsequent admissions than in Lebanon. These results could suggest various phenomena regarding incentives to seek care, such as: (a) an overall greater opportunity to access services regardless of ability to pay and insurance status in Egypt, (b) a greater supplier-induced demand in Lebanon, or (c) a less efficient use of resources in Lebanon.

Whilst individuals may be less likely to be admitted due to a lack of affordability in Lebanon, once in the system, they appear to receive more intense services, possibly due to the incentives for supplier-induced demand for high-technology services inherent in a privately-financed and -provided system. Other possible explanations relate to the theory that a more efficient production of health outcomes arises as a result of greater awareness of illness, knowledge of lifestyle and health care effects, and the earlier use of preventive services. This notion may help to explain the lower probability of inpatient admissions in Lebanon, but not necessarily the higher intensity in Lebanon. If it is assumed that because a greater proportion of Lebanese respondents had a secondary education or higher than Egyptian respondents, it may also be assumed that Lebanese respondents tends to be able to produce health without visiting inpatient care as often.

However, these results are obtained after controlling for the effect of education, which indicates that the lower probability of admissions in Lebanon may not be due to knowledge and health behaviour, unless these are considered unobservable factors that are not necessarily captured in the education variable. Nonetheless, if this notion is true, then the intensity of services would also be lower in Lebanon; instead, the intensity is higher in Lebanon, controlling for all factors including educational level. Therefore, the country effect regarding probability is likely due to greater access to free care in Egypt, and the country effect regarding intensity is likely due to supplier behaviour in Lebanon.

Table 7.11 Summary of multivariate hospital results: income and insurance

	Egypt		Lebanon		Country with greater use
Probability	Income	Insurance	Income	Insurance	
Hospital outpatient		(x)	(x)	x	Egypt
Hospital inpatient - 12-mo.			x	(x)	Lebanon
Hospital inpatient - 1-mo.	(x)		x	x	Egypt
Intensity					
Hospital outpatient	x	(x)			Lebanon
Hospital inpatient - 1-month recall				x	ns

ns = differences are not statistically significant. (x) = difference is significant in favour of uninsured/lower-income. Intensity data not available for inpatient – 12 month.

7.4.2. Effect of income

The effect of income in Egypt depends on the recall period. In Egypt, neither insurance nor income played a significant role in determining the probability of inpatient admissions for twelve-month recall, but income is significant and negative for one-month recall. In Lebanon, income is positive determinant of inpatient hospital care, but somewhat reduces the likelihood of hospital outpatient care. In contrast, income increases the use of hospital outpatient care in Egypt. Since the range of hospital outpatient and inpatient services is vast, these results suggest that there are differences across income that may be related to preferences, the use of private or public providers, or reasons for using hospital-based care.

7.4.3. Effect of insurance

The effect of insurance in Lebanon depends on the recall period. It exerted a negative effect a twelve-month recall, but a positive effect over a one-month recall. Insurance is a positive factor in Lebanon determining the likelihood of using hospital outpatient units. Since the effect of insurance in Lebanon is typically positive, a one-month recall period may not be appropriate to measuring the use of inpatient health care services in Lebanon. In Egypt, insurance reduces intensity of hospital outpatient care. Since the majority of hospital outpatient care in Egypt is public, individuals with group insurance coverage may be substituting subsequent hospital care for private physician or inpatient care, as higher-quality, quasi-public and private providers levy co-payments which often covered by supplemental insurance.

7.4.4. Interaction between income and insurance

The one-month pooled model detected significant, negative interactions between country and income, country and insurance, and the triple interaction term simultaneously assessing the relationship between income and insurance by country. These results suggest that the effects of income and insurance are greater in Lebanon, and that the interaction between income and insurance differed by country, effects that are not detected in the twelve-month model. The interaction between income and insurance is only significant in Lebanon and only in the one-month model, negatively so. These results suggest that pooling the data tends to mask the unique direction and strength of the effects of and interactions between income and insurance in each country. Furthermore, the one-month recall models appear to be more sensitive at detecting effects and interactions than do the twelve-month models. Although some effects from the one-month models are statistically significant, they may not be significant in an economic sense since a longer recall period may be more appropriate for examining inpatient care.

7.4.5. Effects of other factors

7.4.5.1. Health need

Overall, the effect of health need is prominent in hospital-based care, summarised in Table 7.12. The variables for health need are the only significant predictors of inpatient admission over 12 months in Egypt and have relatively large effects. In contrast, health need is not the only significant factor determining the probability of inpatient admission in Lebanon, with demographic factors and employment status also playing a role. Regarding the intensity of inpatient admissions, the coefficients of health need variables increase in magnitude considerably, particularly for pain. These findings support the principal-agency theory by showing that medical need plays a relatively larger role in the amount of care than in the probability. Even though the health need variables in Lebanon were not statistically significant for intensity, the effect of pain was noticeable. The effect of pain may be somewhat inflated, since subjective perceptions of health are thought to be influenced by clinical diagnoses. People in greater need of medical care may visit providers more frequently; but they are also more likely to report higher levels of illness because they visit health care providers often.

Table 7.12 Summary of multivariate hospital results: health need

	Self-assessed health	Pain	Chronic Health Conditions
Probability of care			
Hospital outpatient	--	x (LEB)	x
Hospital inpatient - 12-month recall	x	x	x
Hospital inpatient - 1-month recall	--	x	(x) (EGY)
Intensity of visits			
Hospital outpatient	--	x	--
Hospital inpatient - 12-month recall	n/a	n/a	n/a
Hospital inpatient - 1-month recall	--	x (EGY)	--

x = Effect is statistically significant at 95% confidence level. (x) = effect has negative direction. -- = not significant. n/a = not applicable. Intensity data were not collected for 12-month recall inpatient use.

7.4.5.2. Age

Age played a relatively minor role in the use of hospital care, although its effect was somewhat more pronounced in Egypt. The chances of seeking hospital outpatient care go up as a person grows older; but the frequency of inpatient admissions tends to go down with age. These results may be explained by considering the role of age in three ways. First, although older individuals may have less frequent admissions, they may be in hospital for longer periods of stay at a time due to unobservable health need. This has been observed in other research. Second, although the probability of having insurance coverage has been controlled for, the nature of insurance coverage has not been fully accounted for in the models. Amongst some pensioners who have insurance coverage, co-payment rates in plans for retirees or dependents may be higher for certain services than co-payment rates in other insurance schemes. This may deter pensioners from seeking health care. Finally, older individuals and their families may be less willing to be admitted to hospital and detached from social and familial connections, particularly in the Middle East.

7.4.5.3. Education

Education played a larger role in determining hospital utilisation in Lebanon than in Egypt. This finding is based on the significance and magnitude of the effects on the probability and intensity of use. In Lebanon, the lower the educational level, the more likely and the more frequent are hospital admissions, with the effect less pronounced in Egypt. The educational gap in health is particularly evident for frequency of admissions. Individuals who have relatively higher levels of education may be more efficient at producing health due to an inherently broader access to knowledge and information about health behaviour and preventative care. At the same time, the availability of public services evens out the playing field for different educational levels.

7.4.5.4. Employment status

In Lebanon, employment does not influence the probability of visiting hospital outpatient units nor is it a significant predictor of the frequency of outpatient visits. In Egypt, the employed tends to have less frequent visits as compared to their unemployed counterparts, all other factors being equal. The opportunity cost of seeking hospital care may be higher for the unemployed than the cost of visiting other providers such as physicians' clinics and pharmacies. As shown in chapter six, employment status was not as great a factor for these services.

7.4.5.5. Gender and marital status

Females used hospital outpatient services more often than males in both countries. Marital status was mainly a factor in Lebanon, where marriage is associated with more frequent inpatient admissions. Marital status is an indicator of social capital, such as social and family networks. This may convey a similar effect as education in raising awareness of illness and financial and non-financial resources for obtaining care. The opportunity cost of delaying necessary care may be higher for married individuals who care for spouses or other family members, encouraging more use of health care amongst married people.

7.5. Chapter summary

This analysis shows that greater economic inequality was found in Lebanon for inpatient contact; and in Egypt, for inpatient intensity and hospital outpatient contact. Insurance was a relatively bigger barrier to hospital outpatient contact than inpatient contact, which may explain why people in Lebanon are less likely to seek hospital outpatient care. The higher intensity of inpatient care in Lebanon may be a function of provider behaviour and incentives. In assessing the role of economic barriers to hospital care, other determinants should also be considered, such as the complex nature of acute health need, treatment patterns, social preferences, and incentives to seek certain services over others.

Chapter 8. Conclusions and Policy Implications

8.1. Review of Research Aims

The aim of this thesis is to evaluate the impact of economic status as indicated by income level and health insurance coverage on the use of health care services in two health systems. Two main hypotheses were examined in this thesis. The first hypothesis was that the influence of economic status on health care varies between both health systems in which the role of the state varies. The second hypothesis was that this effect depends on the type of health service. Since different forms of social exclusion may persist when income levels rise (Foucault, 1961; Dean, 2003; Sen, 2004), economic status was defined as income level as well as health insurance coverage. The research questions are shown in Table 8.1 for reference.

Table 8.1 Review of research questions

1. How are health need and out-of-pocket payments for health care distributed across income levels in different health financing systems?
2. What are the socioeconomic factors that determine the probability of being covered by social and private health insurance schemes?
3. To what extent do economic factors such as income level and health insurance coverage explain the use of various types of outpatient health services?
4. To what extent do economic factors such as income level and health insurance coverage explain the use of various types of hospital-based health services?
5. Based on the study findings regarding economic determinants of utilisation, what are the overall policy implications regarding the design of health financing systems towards the aim of alleviating disparities in access to health care?
6. For each of the research questions, how does the effect of income and insurance compare between Egypt and Lebanon and what are the specific policy implications for each of these two health systems?

8.2. Review of Methods

The research questions were examined through quantitative analysis. Household survey data on Egypt and Lebanon were obtained from the 2001 Multi-Country Survey Study.

The study was conducted by the World Health Organization to measure health system responsiveness in several countries.

First, the correlation between income and health need was assessed in each country. Health need was primarily defined as: (i) self-assessed overall health; (ii) self-reported pain; and (iii) diagnosis of chronic health conditions. Three methods were used. The difference in ill health between the richest and poorest was compared. The concentration index was used to measure overall inequity. The concentration curve was used to understand how inequity compares between income groups. Health need was also explored by examining the correlation between income and health care use. Similar methods as described above were used. Health care use was defined as the use of: (i) 'any' outpatient services, (ii) general practitioners, (ii) specialists, (iii) pharmacy care, (iv) hospital outpatient services and (iv) inpatient care.

Next, to understand the economic burden of health care use, two approaches were used. First, the correlation between income and health insurance coverage was evaluated. Insurance indicators include: (i) 'any' health insurance, (ii) outpatient insurance, (iii) inpatient insurance, and (iv) out-of-pocket payments to health care. Second, the impact of out-of-pocket payments on household economic status was assessed. The impact was measured by the frequency of catastrophic expenditures as well as the extent that out-of-pocket payments contribute to poverty levels.

Following these bivariate analyses, the effect of income and insurance was simultaneously examined in order to explain patterns of utilisation. First, the extent to which income *determines* the chances of having insurance was evaluated. Binary regression was used to this end. The three dependent variables were the three types of insurance coverage.

Independent variables included: (i) demographic factors, such as age, gender, marital status, employment, occupational type, and education; (ii) income; and (iii) health need. Next, the *relative* influence of economic status on access to health care was examined. This effect was assessed by simultaneously controlling for the effects of factors generally thought to influence the use of health care, as shown in the diagrammatic model of utilisation in chapters two and three (Anderson and Newman, 1973). These are: (i) *predisposing* factors, or the demographic factors mentioned above; (ii) *enabling* factors, or income and insurance; and (iii) *health need.*

The determinants of health care use were assessed through the use of binary and count-data regression models. The dependent variable was the use of different types of health services, with separate models developed for the health services described earlier. The independent variables were predisposing, enabling, and need factors. The probability of care and the frequency of visits were assessed. Results were compared across models to understand which services and which aspects of utilisation are influenced by income and health insurance.

8.3. Summary of main results

Overall, the thesis results validate the main hypothesis, but reveal a complex relationship between economic status and access to health care (Table 8.2). *Economic status posed as less of a barrier in Egypt, which has somewhat of a solidarity-oriented health system with a universal safety net, than in Lebanon, which has a privately-oriented system; but only to an extent.*

First, the association between income level and the utilisation of health care was relatively weaker than the association between income level and health status, health insurance coverage, and out-of-pocket payments. Income-associated inequity in the probability of care was found in outpatient care in Egypt, and in inpatient care in Lebanon, based on the concentration index approach; and of the concentration index was larger regarding health status (Table 8.3).

Second, the factor that is most closely associated with being covered by group health insurance is governmental employment. The effect of government employment was especially apparent in Egypt. Education and income were also important determinants in both countries. Although more Lebanese had health insurance than did Egyptians, most respondents were not covered by insurance. Since governmental jobs are few and private health insurance is expensive, a system of health care that is much less dependent on market forces would be accessible to more people.

Third, economic status is more closely associated with outpatient care than with inpatient care. This conclusion is illustrated by the large effect of insurance on the probability of most outpatient services, including hospital outpatient, relative to that of inpatient care (Table 8.4 and Table 8.5). This is consistent with most of the literature that shows that income and insurance influence the use of preventative and outpatient services to a greater extent that of than acute, urgent services (Anderson and Benham, 1970; Phelps, 1975; Ware et al, 1986; van Doorslaer, 1987; Dowd, 1991; Noro et al, 1999; van Doorslaer, 2004).

Yet the *direction* of the effect depends on the type of outpatient service. The thesis found that low-income groups are more likely to use general practitioners, and occasionally hospital outpatient centres, than high-income groups. This finding is consistent with the literature regarding the use of general practitioners in Germany, the United Kingdom, and Spain (Lengerke et al, 2000; Morris et al, 2005; Gomez and Nicolas, 2007). General practitioners may be concentrated in poorer areas or may charge relatively lower user fees than other providers.

Similarly, perceptions of ill health may also have a larger effect on the use of outpatient care than on inpatient care. Self-reported pain was the prime health determinant for physician use. Chronic health conditions were more important for pharmacy care and hospital-based care. However, pain exerted a strong effect in the case of hospital-based care as it did with physician care. This may support the notion that the use of physician services and hospital-based care is correlated (Davis and Russell, 1972).

Fourth, health care use was found to be more closely associated with insurance than with income, particularly in Lebanon. Insurance was generally more important than income, given the size of the coefficients. Insurance also played a greater role in Lebanon than in Egypt for most health services. This was especially the case for physician, pharmacy, and hospital outpatient care. These results help to explain why the Lebanese were less likely to use outpatient services than Egyptians, despite the Lebanese having a higher income.

The findings are consistent with those from other countries, which indicate that people are more likely to use health care in systems that are not heavily based on ability-to-pay (Newhouse, 1993; van Doorslaer et al, 2004; van Doorslaer et al, 2006). It also supports the notion that insurance is more beneficial to the worse-off (Wagstaff and van Doorslaer, 2001; Jowett et al, 2003).

Fifth, the relationship between economic status and utilisation differs between the probability and the intensity of care. In Lebanon, income and insurance influenced the *probability* of care, but not necessarily the *number* of visits. The Lebanese case is an example of a market-based financing system. The few who can afford to *contact* the system do; amongst those individuals, *intensity* is largely determined by health need and providers' choices. This pattern is similar to that found in other market-based systems (Anderson and Newhouse, 1973; Pohlmeier and Ulrich, 1995; Santos Silva and Windmeijer, 2001).

By contrast, whilst economic factors matter relatively less in Egypt for the *probability* of use, economic status matters relatively more in Egypt for the *intensity* of care than in Lebanon. The Egyptian case is an example of a two-tiered system. Public services are made available, but many people seek care in the private sector. This may be explained by evidence that shows quality of care is perceived to be better in the private sector than in the public (Rannan-Eliya, 1999; Salem, 2002; World Bank, 2006).

Table 8.2 Summary of concentration indices

	Egypt			Lebanon		
	Pro-poor	**Income Neutral^**	**Pro-rich**	**Pro-poor**	**Income Neutral**	**Pro-rich**
Probability of care						
Any use of outpatient care			x*		x	
General practitioners			x	$\boxed{x^*}$		
Specialists		x		x*		
Pharmacists			x		x	
Hospital outpatient			x		x	
Hospital inpatient (12-month recall)		x				x
Hospital inpatient (1-month recall)	$\boxed{x}$			x		
Intensity of visits						
General practitioners		x		x		
Specialists			x	x		
Pharmacists		x			x	
Hospital outpatient			x	x		
Hospital inpatient (1-month recall)			x	x		

Table 8.3 Summary of multivariate results: effect of income

	Egypt			Lebanon		
	Pro-poor	**Income Neutral^**	**Pro-rich**	**Pro-poor**	**Income Neutral**	**Pro-rich**
Probability of care						
Any use of outpatient care		x			x	
General practitioners		x			x	
Specialists			x		x	
Pharmacists		x			x	
Hospital outpatient		x		x		
Hospital inpatient (12-month)		x				x
Hospital inpatient (1-month)	x					x
Intensity of visits						
General practitioners			x		x	
Specialists		x			x	
Pharmacists	x				x	
Hospital outpatient			x		x	
Hospital inpatient (1-month)		x			x	

^ = Income neutral if coefficient not statistically significant at 95% confidence level.

Table 8.4 Summary of multivariate results: effect of insurance

	Egypt			Lebanon		
	Negative	**None**	**Positive**	**Negative**	**None**	**Positive**
Probability of care						
Any use of outpatient care			x			x
General practitioners		x			x	
Specialists			x			x
Pharmacists			x			x
Hospital outpatient	x					x
Hospital inpatient (12-month)		x		x		
Hospital inpatient (1-month)		x				x
Intensity of visits						
General practitioners			x		x	
Specialists	x				x	
Pharmacists		x			x	
Hospital outpatient	x				x	
Hospital inpatient (1-month)		x				x

'Negative' means effect has a negative sign, indicating those with insurance coverage are less likely to use services. 'Postive' indicates insurance coverage increases likelihood of using services. 'None' if insurance coefficient is not statistically significant at 95% confidence level.

Table 8.5 Summary of main results

1. The use of health care is somewhat associated with income, but greater income-inequity exists in health need, health insurance and out-of-pocket payments.
2. The factors most closely associated with being covered by group health insurance are governmental employment, educational level, income level, and gender.
3. Economic status is more closely associated with outpatient care, particularly physician and hospital outpatient care, than with inpatient care.
4. Health care use is more closely associated with insurance than with income, particularly in Lebanon.
5. The relationship between economic status and utilisation differs between the *probability* and *intensity* of care.

8.4. Policy implications

Based on the main results, general and country-specific implications are drawn in this section (Table 8.6). Following the general implications, each of the countries is considered in turn.

8.4.1. General policy implications

First, the nature of health insurance coverage can lead to large differences in its effect on using services. This includes the probabilty and the intensity of health service utilisation. .Demand- and supply-side incentives to use outpatient care in particular should be considered carefully in policy-setting. This equally applies to other forms of 'insurance', such as universal, public provision. Although comparisons of aggregate expenditures may suggest that the amount of public expenditure is similar between countries, the nature of expenditure is often more important (Castles, 2004).

Although the magnitude of inequity in Egypt was found to be less than in Lebanon, inequity in Egypt persists despite the existence of a universal social safety net for health care as represented by the national health service. This finding leads to questions regarding the whether the concentration of public resources on hospital care and in relatively well-off areas exacerbates inequity. These issues are common to other tax-based systems, such as the National Health Service in the United Kingdom, Portugal, Italy, Spain, and Greece (Le Grand, 1993; O'Donnell et al, 1993; Pereira and Pinto, 1993; Morris et al, 2005; Lopez-Casasnovas, 2007). This highlights that it is not just sufficient for the state to *spend.* It is equally if not more important to *spend appropriately.*

Second, the utilisation of health care amongst the worst-off citizens should be addressed in order to improve overall equality in health care. This research found that the degree of inequity in health care was driven by patterns amongst the poorest 20% in Lebanon and the poorest 40% in Egypt. The findings on inequity in ill health and out-of-pocket payments are consistent with those from other studies on Egypt and Lebanon (Jurjus, 1995; Ellis et al, 1994; Rannan-Eliya, 1999; Nandakumar et al, 2000). They are also consistent with findings from other countries (Deaton, 2002; Muennig et al, 2005; Ross et al, 2006; Hernandez-Quevedo et al, 2006), including the concentration of inequity amongst the lowest-income groups (Gottschalk and Wolfe, 1993).

Therefore, health insurance schemes and service delivery systems should prioritise the needs of those at the lowest-ends of the income ladder. Eligibility criteria for risk-pooling schemes are central. Lower-income groups tend to face a higher burden of out-of-pocket payments. They are more likely to be pushed further into poverty as a result of using health care. Yet insurance coverage tends to be more concentrated amongst the well off, which only exacerbates inequity.

Although social values play a part in shaping criteria, nonetheless, the most vulnerable should at the very least be relieved of economic burdens associated with care. Because the must vulnerable pay for health care does not mean they can 'afford' the costs; costs extend beyond financial consequences (Russell, 1996). They include opportunity costs such as foregoing essential necessities, selling assets, reshuffling family labour arrangements, and delaying other health care needs. These consequences have been observed in many societies (Russell, 1996; Segall et al, 2002; Russell, 2005). This evidence shows that 'affordabilty', 'ability-to-pay' and 'willingness-to-pay' are not synonymous. Providing protection from unforeseen health and economic consequences should reduce the likelihood that people delay necessary care, which leads to a vicious cycle of ill health and poverty.

Third, the role of State-funded, comprehensive social safety nets for health care may partially explain why the effect of income and insurance are relatively smaller in Egypt than in Lebanon, particularly for outpatient care. Because social safety nets are relatively more comprehensive in Egypt, people may be more encouraged to seek care when needed regardless of ability to pay or enrolment in health insurance schemes other than the national health service system. Although certain types of health care financing may not alleviate income inequality *per se*, universal social safety nets, for example, provide a means of alleviating health care inequality for those who are otherwise unequal based on income. At the same time, a number of other factors may have explained the difference in the effects of income and insurance, such as differences between countries regarding the quality of service delivery; the nature and distribution of the supply of health services and providers; and social beliefs about curative versus preventative care. In this thesis, it was assumed that differences in access to different types of services and levels of quality were captured in the 'income' and 'insurance' variables, or in the error terms for each model, since separate indicators for health care supply were not available and are likely acting through socioeconomic and unobservable factors in each country.

8.4.2. Implications for Egypt

Several implications arising from the differential effect of income and health insurance on the use of various health services in Egypt arise. First, poorer groups tended to have a higher probability of inpatient care and intensity of pharmacy visits, and a lower probability and intensity of physician care and intensity of hospital outpatient care. The implication is that poorer groups are deferring to inpatient and pharmacist care, whilst richer groups have greater access to physician and hospital outpatient care. *These findings imply that poorer groups may be unable to pay for outpatient physician services, instead opting to go directly to hospital inpatient care or pharmacies.* Since hospital inpatient care in Egypt is dominated by the public sector with relatively low fees at the point of use, and outpatient care by the private sector funded through direct, out-of-pocket payments, increasing the role of the state in financing outpatient services which meet the preferences of citizens in Egypt will likely alleviate outpatient inequities.

Second, health insurance coverage in Egypt tended to increase the probability of most outpatient health services, with no impact found regarding inpatient care. This finding suggests that health insurance coverage in Egypt is used mainly to gain access to non-governmental health services, which are free regardless of insurance coverage. It also suggests that health insurance plays a relatively minor role, on aggregate, in access to hospital inpatient care. *These observations imply that even for those at the same income level, incentives provided through health insurance to utilise outpatient health services should be expanded to those without health insurance coverage.*

Third, amongst people who visited outpatient health services, the intensity of specialist and hospital outpatient facilities is greater for those without insurance than for those with insurance. Insurance did not affect the intensity of inpatient utilisation. These finding may seem counterintuitive, since it is assumed that due to moral hazard, insurance would increase the overall utilisation of health services due to a reduction in the price sensitivity of potential consumers of health care. *Since insurance reduces the intensity of outpatient use in Egypt, these results imply that those with health insurance may be utilising more effective providers of health care, thus reducing the number of visits amongst those with insurance coverage.*

The Egyptian health system has an important yet under-resourced asset, a universal system of health care provision, which has operated in parallel to several fragmented insurance schemes. Recent governmental proposals have called for the expansion of social health insurance schemes, although the introduction of social health insurance thus far has not been found to have improved overall equity, with the exception of equity amongst middle-income groups (Rannan-Eliya, 1999; Yip and Berman, 2001. Many of the conditions necessary for an equitable social health insurance system to function are lacking in Egypt. These include a large formal employment sector, substantial premium rates, well regulated and high-quality service providers, a clear separation of purchasers and providers, and well-defined fee structures.

Even in countries where these conditions are met, societies with health insurance-based systems struggle to maintain equity, suggesting that more investment in Egypt's public outpatient facilities in recommended. This is due to concerns with insurance-based systems such as: (i) cost-escalation and inefficiency associated with administrative costs and supplier-induced demand, forcing payers to ration care; (ii) implicit or explicit risk selection on the part of insurers; and (iii) discrepancies in benefits covered by different schemes (Abel-Smith, 1994; van Doorslaer et al, 2004; Mossialos and Thompson, 2007). Given the relative lack of economic barriers to inpatient care in Egypt, replicating this success with outpatient health services in Egypt will likely alleviate economic inequality in health care.

8.4.3. Implications for Lebanon

In neighbouring Lebanon, the probability of accessing health services, particularly outpatient physician care, was lower than in Egypt, all else held equal. Combined with the remainder of the findings, the main policy implications for the Lebanese health system revolve around reducing economic barriers to health care in general, such as low income and lack of health insurance, particularly the probability of care.

First, the low levels of outpatient use in general should be addressed. This thesis showed that Lebanese individuals who have health insurance coverage, who account for only half of the population, use outpatient services more often than their un-insured counterparts. Since outpatient services are perceived to be relatively discretionary, they are a classic example of market failure in Lebanon in which intervention by the state may alleviate the mal-distribution of access to health services. Currently, the Lebanese health system spends relatively little on preventative care by international comparisons. These cost-effective services are important to preventing serious illness and the need for complex and expensive treatment. *These results imply that incentives to utilise outpatient services for non-insured individuals should be improved.*

Second, this thesis found that economic hurdles to the probability of inpatient care for the lowest-income groups exist in Lebanon, regardless of insurance status. Higher-income groups had a higher likelihood of inpatient admissions, whilst lower-income groups had a higher likelihood of hospital outpatient services. On the one hand, lower-income groups may be unable to afford inpatient health care, since the social safety net system in Lebanon is not universal and reserved for the most urgent or dire situations. On the other hand, higher-income groups may be unwilling to utilise outpatient services. *These results imply that there may be a substitution effect between outpatient and inpatient hospital services in general, which may be resolved through improved incentives or better social safety nets to receive the type of care required.*

Third, neither income nor insurance tended to play a role in Lebanon regarding the intensity of health service utilisation. Amongst those who were able to access services at least once in Lebanon, the findings suggested that health need is the most important determinant of the number of visits to health care providers, as expected based on a principal-agency framework regarding the utilisation and frequency of health care utilisation. *These results imply that in Lebanon, inequity in health care is driven largely by inequities in the probability of using services, not the amount of health care received per person. Policy efforts should therefore focus on broadening the 'reach', not the 'depth', of health care services in Lebanon.*

Lebanon is a country that spends nearly the highest percentage of its national product on health care in the world; yet has relatively lower levels of access to care and health outcomes than expected. The country's largest social health insurance scheme also faces a risk of bankruptcy and reports indicate that hospitals have refused to provide health care for patients covered by the scheme (World Bank, 2007b; Challita, 2007). The price of medical care has been inflating more rapidly than in most other countries (World Bank, 2000; Ammar, 2003). Charitable organisations and international donors also play a large part in providing care for some of the poorest regions in the country, particularly South Lebanon and areas with large refugee communities (Abyad, 1994; World Bank, 2000; Ammar, 2003). Overall, the current system is neither sustainable nor equitable. Reducing economic barriers related to income and insurance will help to increase the likelihood of accessing outpatient and inpatient care in Lebanon.

Table 8.6 Summary of policy implications

1. The utilisation of health care amongst the worst-off citizens should, at a minimum, be addressed in order to improve overall equity in health care.
2. The role of social safety nets may partially explain why Egyptians are more likely to access health care than Lebanese, particularly outpatient care.
3. In Egypt, improving inequity in the intensity and nature of health service utilisation may alleviate inequity to an extent, particularly regarding physician outpatient care.
4. Inequity in the Lebanese system may be alleviated to an extent by ensuring more people are able to utilise services, particularly the probability of inpatient and outpatient health care alike.

8.5. Strengths and limitations of the thesis

This thesis provides evidence on the economic determinants of health care use from two countries on which relatively little evidence is available, despite limitations described below. First, a cross-national design was useful in testing the role of factors in different contexts. Second, the evaluation of different health care services is beneficial to understanding whether results can be generalised. Third, the combination of quantitative methods improves the validity of conclusions. These methods include: (i) pooled versus separate country analyses; (ii) descriptive versus multivariate techniques; and (iii) different multivariate approaches. Fourth, to the author's knowledge, the data from the Multi-Country Survey Study have not been used before to empirically compare Egypt and Lebanon. Fifth, the use of data from a single source is more reliable than from multiple sources in comparative studies. Lastly, since the data are relatively recent, the thesis evidence is applicable to current policy debate.

The thesis has various limitations to keep in mind when interpreting results. Many are often encountered in similar research. Cross-sectional data were used to *infer* causal relationships to the extent possible. However, longitudinal data are needed to *establish* causal relationships. The use of recognised econometric techniques in this thesis helped to overcome this limitation. Qualitative research would have also been useful for a detailed understanding how families cope with health care costs in different contexts. Collinearity between the independent variables may bias results. In particular, collinearity was important to consider between income, educational status, and employment; and between health need indicators. However, collinearity in this thesis does not appear to be a significant problem, since results were stable for different combinations of variables.

Some of the information on dependent variables was limited. Information that would have been useful is: (i) the sector where health care was sought, whether public or private; (ii) the underlying medical cause of the visit; (iii) the severity of the medical cause; (iv) the kind of the treatment received; (v) and the price of care to the beneficiary, or amount of out-of-pocket payments paid per visit, per person. Although not necessarily crucial to the thesis, it was not possible to make a detailed assessment of household health expenditures. This was due to a lack of information on total and itemised household expenditures. This includes a lack of data on out-of-pocket payments for health services such as: (i) inpatient service; (ii) outpatient service; (iii) preventative care; (iv) acute care; (v) tertiary or rehabilitative care; (vi) laboratory and diagnostic procedures; (vii) surgical treatment; and (viii) non-physician health care providers, such as nurses and therapists.

Data on hospital length of stay and intensity data over a long period of time were not available. This would have permitted more understanding of the intensity of care. This is because the effect of economic status may differ for the length-of-stay versus the number-of-admissions. For example, in tax-based systems with capitated provider payments, there may be an incentive to increase the number of visits, whilst reducing the length of stay. In systems financed by bundled payments or diagnostic-related groups in a retrospective, private reimbursement scheme, there may be an incentive for more frequent visits, but even shorter stays. In private, fee-for-service schemes, there may be an incentive for less frequent visits, but longer lengths of stay; and so on.

Another limitation is the lack of information on whether the number of visits to health care providers was related to the *same* underlying or initial medical need, or whether they were due to *different* medical needs. This affects how the regression results are interpreted. If the visits are not related to the same need, then it may be difficult to assume that the intensity results represent the intensity of 'subsequent' care. Instead, the intensity results may be describing the intensity of 'all care' in general. This suggests that the principal-agency theory is still valid. It may explain why some people have more health care visits than others *in general*, irrespective of whether they are for the same illness or not. Providers (agency) may be influencing those who do seek care by increasing the chances that they will seek care *for other illnesses when they occur.* People may be less likely to consider their economic status in these cases since they may be more risk-averse than those who do not seek care.

The data with which to measure income level were limited. In this thesis, reported income was used. This may not adequately capture income level due to recall bias and respondent reluctance to provide accurate figures. If different income groups behave the same way, then the *relative* income differences do not change, and it makes little difference whether there is bias or not. Otherwise, it matters. Since it can be difficult to readily confirm this, household consumption expenditure or permanent asset indicators can be used instead. They have been shown to be more reliable in some cases than the use of reported income. This depends on the type of questions asked. Given the relatively large effect of insurance and the minor effect of income, it seems unlikely that the use of expenditure data would change results substantially. Although debate is also found regarding the handling of missing data, standard univariate imputation techniques were adopted to calculate missing income for approximately 20-30% of the sample. The resulting estimates were consistent with the observed values and with published literature.

The meaning of explanatory factors may vary across countries. This may bias results (Nord, 2002). This thesis used two relatively similar countries, which increases the comparability of variable meanings (Lahelma et al, 1994; Lahelma, 2002; Gusmano et al, 2007). In addition, self-assessment of health is generally thought to be sensitive to cross-cultural differences in interpretation (King et al, 2003). Egypt and Lebanon are considered culturally similar regarding the sick role (Gallagher, 2001; Adib, 2004). Although bias may still exist, it is considered relatively low.

Bias arising from endogeneity of explanatory variables can be a problem. In particular, endogeneity of the health insurance variable was mainly relevant in this thesis. This was tested in the pooled and country-specific analyses, using the recursive bivariate probit model. Results show that endogeneity is usually not a significant problem. Since one-fifth of Lebanese households have private health insurance (Ammar, 2003), it makes sense that endogeneity was occasionally found there. Estimates were corrected where this was the case. Based on these findings, endogeneity in the count data was not considered to be a significant problem.

Therefore, standard techniques such as the zero-truncated and zero-inflated models were considered valid. Analytic techniques for endogeneity in count data that exist are generally data-intensive, such as the instrumental variables approach (Windmeijer and Santos Silva, 1997; Terza, 1998; Kenkel and Terza, 2001; Terza et al, 2008a; Terza et al, 2008b). Information in the survey was insufficient to create such variables. They should be factors that determine health insurance, but not utilisation. A general household survey may be more useful for this approach. This is applicable to countries where voluntary, private health insurance is widespread.

There were some instances in the thesis in which results from different count regression models were not the same. For example, the effects of income and insurance may have been statistically significant in one model, but not in the other. The differences could be explained in two ways. First, the sample size in the zero-truncated model is smaller and includes both 'zero' and 'non-zero' counts. There may be more non-zero users ('potential' users) than actual users in the sample. This means the model may mix the probability and intensity of care for some observations. Income and insurance generally play a bigger role in the probability of care.

Second, the zero-inflated model is preferred over the hurdle model in the case of inpatient care, which makes sense. The zero-inflated model does not separate the decision to seek care from the decision of *how much subsequent care* to use. For inpatient care, the decision to be admitted and how much care to receive is very closely tied, since the health need is usually acute and urgent. In contrast, the decision to seek outpatient care and how much to receive may be relatively more disconnected. This is based on the theory of principal-agency, which considers the initial choice of seeking care as driven by the patient, whilst subsequent care depends on provider behaviour. As such, the determinants of the first decision are based on need as well as enabling and predisposing factors, whilst the second decision is based largely on need. Although the results show that this is model is generally true for outpatient care, this may not be the case for inpatient care.

The choice between the hurdle model tested in this thesis and the zero-inflated negative binomial model may not make a difference in the case of cross-sectional, health care data, where there is not always an opportunity to identify the *first* and *subsequent* visits for a single spell of illness. The choice may also make little difference in the case of datasets that are relatively 'small', i.e., containing less than several thousand observations. Future research may help to address these methodological limitations.

8.6. Theoretical and methodological implications

From a theoretical perspective, two main lessons arise, which are summarised in Table 8.7. Measures of social stratification other than income may be more relevant for identifying economic inequalities in health care in certain contexts. The regression approach revealed greater inequality than the concentration index approach. The effects of insurance and income also tended to *increase* after including other variables and the interaction effects. In some contexts, health insurance status, educational level, occupation, and indicators of social capital or social exclusion might better represent social status.

This research also proposes an alternative way of classifying the determinants of health care use as either <u>principal</u> or <u>mediating</u> factors, with economic status an example of a mediator. The demand for health care arises because of a medical need (*principal* determinant), but the *process* of obtaining care may be affected by economic status (*mediator*).

This approach builds on the theoretical models developed by Grossman (1972), Anderson (1975), and others, which represents an avenue for future research. Mediating factors such as insurance status, income level, educational level, occupation, and the health financing system represent factors that are both influential and potentially modifiable in the near-term.

Regarding methodological implications, this thesis proposes several areas that may help to address some of the limitations that were encountered. To gauge the relative effect of health financing-related factors as compared to other factors such as supply-side characteristics, it is important to accurately control for coverage by and the nature of different types of health insurance, social safety nets, and supply-side factors over time.

Longitudinal quantitative evaluations, together with qualitative measures, would help to elucidate the causal relationship and the impact of health care financing schemes on household utilisation of health services. The comparison of multivariate techniques in thesis showed that the hurdle regression and latent class models perform similarly in the case of cross-sectional data, but it would be useful to evaluate if this is the case when using longitudinal data. This type of comparison will help confirm whether the conclusions regarding the probability and intensity of care in Egypt and Lebanon are valid over the long run.

Table 8.7 Summary of methodological implications

1. Measures of social stratification other than income may be more relevant for identifying economic inequalities in health care in certain contexts, such as health insurance status, educational level, and occupation.
2. This research proposes an alternative way of classifying the determinants of health care use as either *principal* or *mediating* factors, with economic status an example of a mediator.
3. Longitudinal and qualitative research will help confirm whether the conclusions of the thesis are valid over the long run regarding the probability and intensity of care; and the long-term impact of health financing arrangements on households.

8.7. Implications for future research

The role of economic status in health care may depend on other factors that were outside the scope of this thesis. These include the quality of care; the nature and distribution of supply; and social beliefs about curative versus preventative care. Specifically, how do income and insurance affect the use of *private* versus *public* services? How does the amount of user fees charged influence the use of different services? Does the effect of income vary if other indicators for income are used, such as expenditure or assets? Finally, how do the effects of economic factors compare across gender and a country's geography? Informing these questions will help further in the design of effective health financing policies.

8.8. Thesis Conclusions

Overall, this thesis provides evidence on the way that economic status affects the use of health care in different financing systems. The research has lent support to the notion that 'equality of status is more important than equality of income' (Marshall, 1950). Whilst a number of other factors should be considered to improve equity, this thesis has illustrated the importance of coherent, state-led health financing policy in three ways. First, it has shown that health care coverage systems that rely on risk-pooling are associated with greater access to services, particularly for the worse-off. Income status may increase the intensity of care once contact has been made. Second, it has indicated that improving equity in outpatient care can go a long way towards improving overall equity, assuming that this care meets medical needs. Finally, this thesis provides comparative evidence from Egypt and Lebanon that highlights the importance of comprehensive health financing policy in alleviating economic barriers towards accessing health care.

Appendix

Chapter 3: Methods

A. Currency conversion and inflation factors

	Egypt	Lebanon
Official exchange rate, 2001 (local currency units to $) (1)	3.97 LE*	1507.50 LL*
Purchasing power parity (PPP) conversion factor, 2001 (local currency units to international $) (1)	1.11	986.79
Alternative PPP conversion factor, 2001 (local currency units to international $) (2)	1.4	1579.4
Consumer price index, 1993 (3)	67.99	310.31
Consumer price index, 2001 (3)	102.22	97.0
Adult equivalence adjustment factor (calculated)	2.9	2.86

*Note: LE = Egyptian Pound. LL = Lebanese Lira. Sources: 1. Heston et al, 2006. 2. United Nations Statistics Division, 2007a. 3. United Nations Statistics Division, 2007b.

B. Multicollinearity: Variance inflation factor test (VIF)

The following tables show the degree of collinearity amongst independent variables for regression models by country. For individual variables, VIF values greater than 1 show a high degree of collinearity with other variables; for overall model, VIF values greater than 10 show a high degree of collinearity. Shown below: VIF = regression model type (i.e., probit) + dependent variable (i.e., any care) + independent variables + country filter (i.e., if country = EGY).

1. VIF: probit anycare anyins age male married educlev emplyd loginc_allimp sah pain chronic_1 if country== EGYPT ("EGY")

```
    Variable |       VIF       1/VIF
-------------+----------------------
loginc_all~p |     20.11    0.049725
         age |     12.14    0.082362
         sah |     10.89    0.091836
        pain |      8.55    0.117019
     married |      3.97    0.251833
        male |      3.59    0.278200
  chronic_1 |      3.25    0.307525
      emplyd |      3.09    0.323259
     educlev |      2.46    0.405923
      anyins |      2.02    0.494907
-------------+----------------------
    Mean VIF |      7.01
```

2. VIF: probit anycare anyins age male married educlev emplyd loginc_allimp sah pain chronic_1 if country== LEBANON ("LBN")

```
    Variable |       VIF       1/VIF
-------------+----------------------
loginc_all~p |     18.62    0.053693
         sah |     12.22    0.081833
         age |     10.78    0.092762
        pain |      6.91    0.144799
   chronic_1 |      3.53    0.283232
     married |      2.96    0.337346
        male |      2.94    0.340232
     educlev |      2.87    0.348932
      emplyd |      2.67    0.374909
      anyins |      2.07    0.483074
-------------+----------------------
    Mean VIF |      6.56
```

3. VIF probit anycare anyins loginc_allimp if country=="EGY"

Variable	VIF	1/VIF
anyins	1.53	0.651493
loginc_all~p	1.53	0.651493
Mean VIF	1.53	

4. VIF: probit anycare anyins loginc_allimp if country=="LBN"

Variable	VIF	1/VIF
anyins	1.98	0.505977
loginc_all~p	1.98	0.505977
Mean VIF	1.98	

5. VIF: probit anycare anyins emplyd if country=="EGY"

Variable	VIF	1/VIF
anyins	1.48	0.674553
emplyd	1.48	0.674553
Mean VIF	1.48	

6. VIF: probit anycare anyins emplyd if country=="LBN"

Variable	VIF	1/VIF
anyins	1.33	0.752941
emplyd	1.33	0.752941
Mean VIF	1.33	

7. VIF: anycare loginc_allimp emplyd if country=="EGY"

Variable	VIF	1/VIF
emplyd	1.81	0.551982
loginc_all~p	1.81	0.551982
Mean VIF	1.81	

8. VIF: probit anycare loginc_allimp emplyd if country=="LBN"

Variable	VIF	1/VIF
emplyd	1.79	0.559266
loginc_all~p	1.79	0.559266
Mean VIF	1.79	

9. VIF: probit anycare loginc_allimp educlev if country=="EGY"

Variable	VIF	1/VIF
educlev	1.74	0.575002
loginc_all~p	1.74	0.575002
Mean VIF	1.74	

10. VIF: probit anycare loginc_allimp educlev if country=="LBN"

Variable	VIF	1/VIF
educlev	2.30	0.434381
loginc_all~p	2.30	0.434381
Mean VIF	2.30	

11. VIF: probit outpt op_ins age male married educlev emplyd loginc_allimp sah pain chronic_1 if country=="EGY"

Variable	VIF	1/VIF
loginc_all~p	20.13	0.049677
age	11.99	0.083418
sah	10.87	0.091964
pain	8.54	0.117132
married	3.98	0.251431
male	3.58	0.279232
chronic_1	3.24	0.308380
emplyd	3.06	0.326481
educlev	2.35	0.424926
op_ins	1.65	0.605996
Mean VIF	6.94	

12. VIF: probit outpt op_ins age male married educlev emplyd loginc_allimp sah pain chronic_1 if country=="LBN"

Variable	VIF	1/VIF
loginc_all~p	18.21	0.054905
sah	12.18	0.082079
age	10.75	0.093029
pain	6.94	0.144077
chronic_1	3.52	0.283711
married	2.95	0.339004
male	2.93	0.341105
educlev	2.85	0.350989
emplyd	2.67	0.375097
op_ins	1.61	0.622715
Mean VIF	6.46	

13. VIF: probit inpt ip_ins age male married educlev emplyd loginc_allimp sah pain chronic_1 if country=="EGY"

Variable	VIF	1/VIF
loginc_all~p	20.32	0.049206
age	12.20	0.081985
sah	10.87	0.091966
pain	8.54	0.117139
married	3.98	0.251219
male	3.57	0.280151
chronic_1	3.24	0.308375
emplyd	3.13	0.319372
educlev	2.43	0.411623
ip_ins	1.82	0.549885
Mean VIF	7.01	

14. VIF: probit inpt ip_ins age male married educlev emplyd loginc_allimp sah pain chronic_1 if country=="LBN"

Variable	VIF	1/VIF
loginc_all~p	18.49	0.054075
sah	12.24	0.081683
age	10.78	0.092744
pain	6.94	0.144078
chronic_1	3.52	0.283744
married	2.95	0.339497
male	2.93	0.341252
educlev	2.87	0.347859
emplyd	2.66	0.375608
ip_ins	2.04	0.491197
Mean VIF	6.54	

C. Estimation results for 'Any Care'

1. Estimation Results for 'Any Care': RECURSIVE BIVARIATE PROBIT MODEL

	Model 1, Egypt Coeff. (SE)	Model 2, Egypt Coeff. (SE)	Model 1, Lebanon Coeff. (SE)	Model 2, Lebanon Coeff. (SE)
Any Care				
Insured (any care)	-0.380	-0.338	-1.366***	-1.851***
	(0.394)	(0.725)	(0.112)	(0.366)
Age	0.008*	0.008*	-0.001	-0.001
	(0.003)	(0.003)	(0.002)	(0.002)
Male	0.275***	0.276***	0.206***	0.201***
	(0.072)	(0.073)	(0.060)	(0.059)
Marital status	0.154**	0.154**	0.157***	0.156***
	(0.054)	(0.054)	(0.047)	(0.046)
Educational level	0.350*	0.348*	0.227***	0.231***
	(0.148)	(0.154)	(0.059)	(0.059)
Employment status	0.141	0.140	0.006	0.004
	(0.088)	(0.091)	(0.064)	(0.063)
Log of annual income	0.008	0.009	0.156***	0.130***
	(0.043)	(0.048)	(0.030)	(0.037)
Self-assessed health	0.216***	0.216***	0.244***	0.242***
	(0.038)	(0.038)	(0.036)	(0.036)
Self-reported pain	0.235***	0.235***	0.286***	0.283***
	(0.042)	(0.042)	(0.035)	(0.034)
Chronic health con~s	1.402***	1.403***	0.359***	0.357***
	(0.064)	(0.065)	(0.057)	(0.055)
Income*AnyInsurance	-0.005		0.061	
	(0.068)		(0.045)	
Constant	-1.968***	-1.977***	-2.250***	-2.033***
	(0.324)	(0.360)	(0.247)	(0.298)
Insured (any care)				
Age	0.025***	0.025***	0.007***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)
Male	-0.304***	-0.304***	0.219***	0.219***
	(0.058)	(0.058)	(0.060)	(0.060)
Educational level	1.172***	1.172***	0.451***	0.450***
	(0.052)	(0.052)	(0.055)	(0.055)
Employment status	0.545***	0.545***	0.274***	0.274***
	(0.059)	(0.059)	(0.061)	(0.061)
Log of annual income	0.235***	0.235***	0.233***	0.234***
	(0.033)	(0.033)	(0.034)	(0.034)
Constant	-3.754***	-3.754***	-2.652***	-2.662***
	(0.258)	(0.258)	(0.277)	(0.278)
athrho				
Constant	0.253	0.249	1.207***	1.238***
	(0.245)	(0.255)	(0.250)	(0.250)
N	4116	4116	2732	2732
ll	-3831.811	-3831.809	-3219.728	-3218.842
chi2	2402.767***	2401.550***	1727.853***	1746.773***
rho	0.248***	0.244***	0.836***	0.845***

2. Estimation results for 'Any Care': PROBIT MODEL

	Model 1, Egypt Coeff. (SE)	Model 2, Egypt Coeff. (SE)	Model 1, Lebanon Coeff. (SE)	Model 2, Lebanon Coeff. (SE)
Insured (any care)	0.043	0.222	-0.058	-0.543
	(0.059)	(0.488)	(0.055)	(0.487)
Age	0.005**	0.005**	-0.006**	-0.006**
	(0.002)	(0.002)	(0.002)	(0.002)
Male	0.310***	0.311***	0.142*	0.138*
	(0.063)	(0.063)	(0.067)	(0.068)
Marital status	0.148**	0.147**	0.215***	0.215***
	(0.054)	(0.054)	(0.059)	(0.059)
Educational level	0.199***	0.200***	-0.015	-0.015
	(0.057)	(0.057)	(0.061)	(0.061)
Employment status	0.070	0.069	-0.167*	-0.171*
	(0.063)	(0.063)	(0.068)	(0.068)
Log of annual income	-0.020	-0.011	0.052	0.024
	(0.033)	(0.044)	(0.032)	(0.044)
Self-assessed health	0.219***	0.219***	0.315***	0.315***
	(0.038)	(0.038)	(0.043)	(0.043)
Self-reported pain	0.239***	0.239***	0.378***	0.377***
	(0.042)	(0.042)	(0.036)	(0.036)
Chronic health con~s	1.424***	1.424***	0.488***	0.488***
	(0.051)	(0.051)	(0.065)	(0.065)
Income*AnyInsurance		-0.025		0.062
		(0.066)		(0.062)
Constant	-1.736***	-1.800***	-2.102***	-1.885***
	(0.259)	(0.330)	(0.279)	(0.361)
N	4116	4116	2732	2732
ll	-1844.649	-1844.584	-1431.534	-1431.024
chi2	1410.614***	1410.318***	659.188***	657.250***

Chapters 3 and 6:

D. Stata output for outpatient regression models

The following tables show examples of the all regression output in this thesis, using the case of Outpatient Probability, 12-month recall, by country, including recursive bivariate probit model (all versions) and probit model (all versions).

1. RECURSIVE, MODEL 1 (MAIN EFFECTS), "EGY"

Seemingly unrelated bivariate probit — Number of obs = 4133; Wald chi2(15) = 2159.84; Log pseudolikelihood = -3834.591; Prob > chi2 = 0.0000

	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
outpt						
op_ins	-.1931162	.5476893	-0.35	0.724	-1.266568	.8803351
age	.0061241	.003398	1.80	0.072	-.0005359	.0127841
male	.299472	.0694694	4.31	0.000	.1633146	.4356295
married	.1701107	.0533093	3.19	0.001	.0656263	.274595
educlev	.2751914	.1630972	1.69	0.092	-.0444732	.5948561
emplyd	.0935835	.0861678	1.09	0.277	-.0753024	.2624693
loginc_all~p	-.0026164	.0516727	-0.05	0.960	-.1038931	.0986603
sah	.2179823	.0372483	5.85	0.000	.144977	.2909876
pain	.1823119	.0408977	4.46	0.000	.1021538	.2624699
chronic_1	1.3898	.063267	21.97	0.000	1.265799	1.513801
_cons	-1.831444	.3879845	-4.72	0.000	-2.59188	-1.071008
op_ins						
age	.0192046	.0018145	10.58	0.000	.0156482	.0227611
male	-.2315722	.0599892	-3.86	0.000	-.3491489	-.1139954
educlev	.996973	.052808	18.88	0.000	.8934711	1.100475
emplyd	.4084017	.0608541	6.71	0.000	.2891299	.5276735
loginc_all~p	.2565685	.0345671	7.42	0.000	.1888182	.3243187
_cons	-3.840618	.2661057	-14.43	0.000	-4.362176	-3.31906
/athrho	.1851042	.3279443	0.56	0.572	-.4576548	.8278633
rho	.1830187	.3169595			-.4281709	.679327

Wald test of rho=0: chi2(1) = .31859 Prob > chi2 = 0.5725

2. RECURSIVE, MODEL 2 (MAIN EFFECTS AND INTERACTION TERM), EGY"

```
Seemingly unrelated bivariate probit              Number of obs   =       4133
                                                  Wald chi2(16)   =    2121.76
Log pseudolikelihood = -3833.6121                 Prob > chi2     =     0.0000
------------------------------------------------------------------------------
             |               Robust
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
outpt        |
      op_ins |   .9653815    1.08992     0.89   0.376    -1.170823    3.101586
         age |   .0044185   .0040863     1.08   0.280    -.0035905    .0124275
        male |   .3213649   .0691239     4.65   0.000     .1858846    .4568453
     married |     .16002   .0556255     2.88   0.004     .0509961    .2690439
     educlev |   .1777748   .2025615     0.88   0.380    -.2192384     .574788
      emplyd |   .0504214   .1011751     0.50   0.618    -.1478781    .2487209
loginc_all~p |   .0077112   .0539407     0.14   0.886    -.0980106    .1134331
         sah |   .2196004   .0371109     5.92   0.000     .1468643    .2923365
        pain |   .1837522   .0407422     4.51   0.000     .1038989    .2636056
   chronic_1 |   1.400423   .0511713    27.37   0.000     1.300129    1.500717
logincXop_~s |   -.111227   .0792333    -1.40   0.160    -.2665213    .0440674
       _cons |   -1.87861   .4504975    -4.17   0.000    -2.761568   -.9956507
-------------+----------------------------------------------------------------
op_ins       |
         age |   .0192558   .0018038    10.68   0.000     .0157205    .0227911
        male |  -.2310876   .0600864    -3.85   0.000    -.3488547   -.1133205
     educlev |   .9948401   .0537838    18.50   0.000     .8894257    1.100254
      emplyd |   .4102341   .0610517     6.72   0.000      .290575    .5298931
loginc_all~p |   .2568643   .0348799     7.36   0.000     .1885009    .3252277
       _cons |  -3.845311   .2684078   -14.33   0.000     -4.37138   -3.319241
-------------+----------------------------------------------------------------
     /athrho |  -.0187839    .392246    -0.05   0.962    -.7875719    .7500041
-------------+----------------------------------------------------------------
         rho |  -.0187817   .3921076                     -.6570313    .6351514
------------------------------------------------------------------------------
Wald test of rho=0:                 chi2(1) =  .002293    Prob > chi2 = 0.9618
```

3. RECURSIVE, MODEL 1 (MAIN EFFECTS), "LBN"

```
Seemingly unrelated bivariate probit              Number of obs   =       2752
                                                  Wald chi2(15)   =    1036.05
Log pseudolikelihood =  -3200.986                 Prob > chi2     =     0.0000
------------------------------------------------------------------------------
             |               Robust
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
outpt        |
      op_ins |   1.030297   .2344406     4.39   0.000     .5708021    1.489792
         age |  -.0071323   .0019032    -3.75   0.000    -.0108624   -.0034022
        male |   .0574434   .0670797     0.86   0.392    -.0740304    .1889173
     married |   .1798607   .0522212     3.44   0.001      .077509    .2822124
     educlev |  -.1468658   .0606016    -2.42   0.015    -.2656428   -.0280888
      emplyd |  -.2211996   .0638383    -3.46   0.001    -.3463204   -.0960788
loginc_all~p |  -.0184846   .0331386    -0.56   0.577    -.0834351     .046466
         sah |    .247476   .0414485     5.97   0.000     .1662385    .3287135
        pain |   .2975562   .0380827     7.81   0.000     .2229154     .372197
   chronic_1 |   .4002903   .0648668     6.17   0.000     .2731537     .527427
       _cons |  -1.454219   .3194405    -4.55   0.000    -2.080311   -.8281275
-------------+----------------------------------------------------------------
op_ins       |
         age |   .0051452   .0016774     3.07   0.002     .0018576    .0084327
        male |    .208766   .0603905     3.46   0.001     .0904029    .3271292
     educlev |   .2991572   .0563268     5.31   0.000     .1887587    .4095558
      emplyd |   .2467306   .0613378     4.02   0.000     .1265108    .3669504
loginc_all~p |   .1407201   .0325919     4.32   0.000     .0768412     .204599
       _cons |  -2.069007   .2653632    -7.80   0.000    -2.589109   -1.548905
-------------+----------------------------------------------------------------
     /athrho |  -.7813271   .2465887    -3.17   0.002    -1.264632   -.2980221
-------------+----------------------------------------------------------------
         rho |  -.6534678   .1412904                     -.8523361   -.2895015
------------------------------------------------------------------------------
Wald test of rho=0:                 chi2(1) =  10.0397    Prob > chi2 = 0.0015
```

4. RECURSIVE, MODEL 2 (MAIN EFFECTS AND INTERACTION TERM), "LBN"

Seemingly unrelated bivariate probit — Number of obs = 2752; Wald chi2(16) = 1048.16; Prob > chi2 = 0.0000

Log pseudolikelihood = -3200.9668

	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
outpt						
op_ins	1.129466	.5465909	2.07	0.039	.0581672	2.200764
age	-.0071357	.0018991	-3.76	0.000	-.0108579	-.0034135
male	.0563736	.0671156	0.84	0.401	-.0751706	.1879178
married	.1790147	.052163	3.43	0.001	.0767771	.2812524
educlev	-.1482413	.0610401	-2.43	0.015	-.2678777	-.028605
emplyd	-.2213486	.0636285	-3.48	0.001	-.3460583	-.096639
loginc_all~p	-.0155825	.0374289	-0.42	0.677	-.0889419	.0577769
sah	.2464409	.0416927	5.91	0.000	.1647246	.3281572
pain	.2961826	.0386431	7.66	0.000	.2204436	.3719216
chronic_1	.3987361	.0652352	6.11	0.000	.2708775	.5265946
logincXop_~s	-.010952	.0549921	-0.20	0.842	-.1187346	.0968306
_cons	-1.472105	.3377093	-4.36	0.000	-2.134003	-.8102073
op_ins						
age	.0051428	.0016778	3.07	0.002	.0018545	.0084312
male	.2087069	.0603555	3.46	0.001	.0904124	.3270015
educlev	.2991677	.0563209	5.31	0.000	.1887809	.4095546
emplyd	.2467144	.0613084	4.02	0.000	.1265522	.3668765
loginc_all~p	.1413593	.0330142	4.28	0.000	.0766526	.2060659
_cons	-2.073935	.2686143	-7.72	0.000	-2.600409	-1.54746
/athrho	-.796106	.2570277	-3.10	0.002	-1.299871	-.292341
rho	-.6618542	.1444365			-.86169	-.2842881

Wald test of rho=0: chi2(1) = 9.59361 Prob > chi2 = 0.0020

5. PROBIT, MODEL 1 (MAIN EFFECTS), "EGY"

Probit regression — Number of obs = 4133; Wald chi2(10) = 1377.36; Prob > chi2 = 0.0000; Pseudo R2 = 0.3116

Log pseudolikelihood = -1922.8901

outpt	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
op_ins	.1198578	.0589338	2.03	0.042	.0043496	.235366
age	.0044706	.0019699	2.27	0.023	.0006096	.0083316
male	.3172151	.0609617	5.20	0.000	.1977325	.4366978
married	.1660575	.0534802	3.11	0.002	.0612384	.2708767
educlev	.1855941	.0552145	3.36	0.001	.0773757	.2938125
emplyd	.0571735	.0611138	0.94	0.350	-.0626073	.1769543
loginc_all~p	-.0242732	.0329199	-0.74	0.461	-.0887951	.0402487
sah	.2194194	.0370717	5.92	0.000	.1467602	.2920787
pain	.1845492	.0406792	4.54	0.000	.1048194	.2642791
chronic_1	1.401586	.0510841	27.44	0.000	1.301463	1.501709
_cons	-1.657343	.2540305	-6.52	0.000	-2.155233	-1.159452

6. PROBIT, MODEL 2 (MAIN EFFECTS AND INTERACTION TERM), "EGY"

```
Probit regression                                 Number of obs   =       4133
                                                  Wald chi2(11)   =    1377.33
                                                  Prob > chi2     =     0.0000
Log pseudolikelihood =  -1921.691                 Pseudo R2       =     0.3120
------------------------------------------------------------------------------
             |               Robust
       outpt |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      op_ins |    .917866   .5032249     1.82   0.068    -.0684366    1.904169
         age |   .0045895   .0019708     2.33   0.020     .0007269    .0084521
        male |   .3197609   .0611181     5.23   0.000     .1999716    .4395502
     married |   .1607409   .0535325     3.00   0.003      .055819    .2656627
     educlev |   .1870895   .0553715     3.38   0.001     .0785633    .2956157
      emplyd |   .0543037   .0612189     0.89   0.375     -.065683    .1742905
loginc_all~p |   .0092473   .0417695     0.22   0.825    -.0726194     .091114
         sah |    .219625   .0371155     5.92   0.000     .1468799      .29237
        pain |   .1837078   .0407431     4.51   0.000     .1038529    .2635628
   chronic_1 |   1.400431   .0511042    27.40   0.000     1.300269    1.500594
loginсXop_~s |  -.1090931   .0678802    -1.61   0.108    -.2421358    .0239497
       _cons |   -1.89329   .3135841    -6.04   0.000    -2.507903   -1.278676
```

7. PROBIT, MODEL 1 (MAIN EFFECTS), "LBN"

```
Probit regression                                 Number of obs   =       2752
                                                  Wald chi2(10)   =     614.89
                                                  Prob > chi2     =     0.0000
Log pseudolikelihood = -1456.4384                 Pseudo R2       =     0.2052
------------------------------------------------------------------------------
             |               Robust
       outpt |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      op_ins |  -.0392147   .0562969    -0.70   0.486    -.1495546    .0711252
         age |  -.0059905   .0020531    -2.92   0.004    -.0100145   -.0019665
        male |   .1630466   .0665395     2.45   0.014     .0326316    .2934616
     married |   .2048049    .058741     3.49   0.000     .0896747    .3199352
     educlev |  -.0422516   .0607448    -0.70   0.487    -.1613092    .0768061
      emplyd |  -.1403049   .0674478    -2.08   0.038    -.2725001   -.0081097
loginc_all~p |   .0386525   .0317464     1.22   0.223    -.0235693    .1008743
         sah |   .2845784   .0419095     6.79   0.000     .2024373    .3667195
        pain |   .3457332   .0352476     9.81   0.000     .2766492    .4148172
   chronic_1 |   .4628502   .0651868     7.10   0.000     .3350865    .5906139
       _cons |  -1.978409   .2774972    -7.13   0.000    -2.522294   -1.434525
```

8. PROBIT, MODEL 2 (MAIN EFFECTS AND INTERACTION TERM), "LBN"

```
Probit regression                                 Number of obs   =       2752
                                                  Wald chi2(11)   =     614.97
                                                  Prob > chi2     =     0.0000
Log pseudolikelihood = -1456.3989                 Pseudo R2       =     0.2052
------------------------------------------------------------------------------
             |               Robust
       outpt |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      op_ins |  -.1799035   .4921073    -0.37   0.715    -1.144416     .784609
         age |   -.005987    .002053    -2.92   0.004    -.0100109   -.0019632
        male |   .1619881   .0666352     2.43   0.015     .0313854    .2925908
     married |    .204996   .0587438     3.49   0.000     .0898602    .3201317
     educlev |  -.0419998   .0607802    -0.69   0.490    -.1611267    .0771271
      emplyd |  -.1413507   .0675741    -2.09   0.036    -.2737936   -.0089078
loginc_all~p |   .0327739   .0398599     0.82   0.411      -.04535    .1108979
         sah |   .2844613   .0419205     6.79   0.000     .2022987     .366624
        pain |   .3457373   .0352531     9.81   0.000     .2766425    .4148321
   chronic_1 |   .4624879   .0651829     7.10   0.000     .3347318     .590244
loginсXop_~s |   .0179783   .0624594     0.29   0.773    -.1044398    .1403965
       _cons |  -1.932338   .3348245    -5.77   0.000    -2.588582   -1.276094
```

Chapters 3, 6 and 7:

E. Effects of additional self-reported health indicators

Additional health indicators include 'difficulty moving,' 'difficulty with self-care,' 'difficulty with daily work,' and 'feeling sadness'. Results for the effects of income and insurance are consistent with those presented in Chapters 6 and 7.

1. probit outpt if country=="EGY"

Probit regression	Number of obs	=	4126
	Wald chi2(15)	=	1382.27
	Prob > chi2	=	0.0000
Log pseudolikelihood = -1914.88	Pseudo R2	=	0.3134

outpt	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
op_ins	.1292446	.0645236	2.00	0.045	.0027808	.2557085
age	.0044586	.002032	2.19	0.028	.000476	.0084413
male	.3162327	.0638153	4.96	0.000	.1911569	.4413085
married	.1748971	.054189	3.23	0.001	.0686887	.2811056
educlev	.1903551	.0576725	3.30	0.001	.077319	.3033912
emplyd	.0698732	.0715081	0.98	0.329	-.0702802	.2100266
loginc_all~p	-.0248062	.0330426	-0.75	0.453	-.0895685	.0399561
sah	.2077835	.0385621	5.39	0.000	.1322032	.2833638
pain	.159263	.0577242	2.76	0.006	.0461257	.2724004
chronic_1	1.380375	.0512938	26.91	0.000	1.279841	1.480909
gov_i	-.0213983	.0832861	-0.26	0.797	-.184636	.1418394
moving	.1037468	.0551693	1.88	0.060	-.004383	.2118766
selfcare	-.1622405	.0639293	-2.54	0.011	-.2875397	-.0369414
diffwork	-.0277729	.0610055	-0.46	0.649	-.1473416	.0917957
sad	.0851092	.0509766	1.67	0.095	-.0148032	.1850216
_cons	-1.634963	.2549172	-6.41	0.000	-2.134592	-1.135335

2. probit outpt if country=="LBN"

Probit regression	Number of obs	=	2719
	Wald chi2(15)	=	628.73
	Prob > chi2	=	0.0000
Log pseudolikelihood = -1430.185	Pseudo R2	=	0.2089

outpt	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
op_ins	-.025029	.058021	-0.43	0.666	-.138748	.08869
age	-.0054843	.0020938	-2.62	0.009	-.0095881	-.0013806
male	.1589295	.0670982	2.37	0.018	.0274194	.2904395
married	.1960218	.0593672	3.30	0.001	.0796643	.3123793
educlev	-.0431082	.0616409	-0.70	0.484	-.1639222	.0777058
emplyd	-.156426	.0702532	-2.23	0.026	-.2941197	-.0187322
loginc_all~p	.0366343	.0319112	1.15	0.251	-.0259106	.0991792
sah	.2937149	.0441238	6.66	0.000	.2072339	.3801959
pain	.3623121	.0428172	8.46	0.000	.2783919	.4462323
chronic_1	.4499402	.0658554	6.83	0.000	.320866	.5790144
gov_i	-.0696007	.1217449	-0.57	0.568	-.3082164	.169015
moving	-.013761	.0574874	-0.24	0.811	-.1264344	.0989123
selfcare	-.1526954	.0697668	-2.19	0.029	-.2894358	-.015955
diffwork	.0092393	.0498033	0.19	0.853	-.0883733	.106852
sad	.0375361	.0366992	1.02	0.306	-.0343931	.1094653
_cons	-1.889764	.2822714	-6.69	0.000	-2.443005	-1.336522

3. probit inpt if country=="EGY"

Probit regression

Number of obs = 4126
Wald chi2(15) = 175.49
Prob > chi2 = 0.0000
Log pseudolikelihood = -788.41219
Pseudo R2 = 0.0942

inpt	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ip_ins	.0604884	.1036135	0.58	0.559	-.1425903	.2635671
age	-.0029004	.0028797	-1.01	0.314	-.0085444	.0027436
male	-.1138365	.0860728	-1.32	0.186	-.2825361	.0548632
married	.0647714	.0798961	0.81	0.418	-.0918221	.2213649
educlev	-.0819404	.0880655	-0.93	0.352	-.2545457	.0906649
emplyd	-.0964661	.106797	-0.90	0.366	-.3057843	.1128521
loginc_all~p	-.0213808	.0472449	-0.45	0.651	-.1139791	.0712175
sah	.0816401	.0532101	1.53	0.125	-.0226498	.1859301
pain	.0996624	.0718087	1.39	0.165	-.0410801	.240405
chronic_1	.2986849	.0920079	3.25	0.001	.1183528	.479017
gov_i	.1026436	.1468643	0.70	0.485	-.1852051	.3904923
moving	-.0193441	.0664431	-0.29	0.771	-.1495702	.1108821
selfcare	.0215819	.0589896	0.37	0.714	-.0940356	.1371993
diffwork	.1284789	.0680854	1.89	0.059	-.004966	.2619239
sad	.0744423	.0599229	1.24	0.214	-.0430044	.191889
_cons	-2.222249	.3649149	-6.09	0.000	-2.937469	-1.507029

4. probit inpt if country=="LBN"

Probit regression

Number of obs = 2719
Wald chi2(15) = 264.17
Prob > chi2 = 0.0000
Log pseudolikelihood = -901.04471
Pseudo R2 = 0.1256

inpt	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ip_ins	.070914	.0693413	1.02	0.306	-.0649925	.2068204
age	-.0013291	.0024873	-0.53	0.593	-.0062042	.003546
male	.0171008	.0815513	0.21	0.834	-.1427368	.1769383
married	.2674341	.0759344	3.52	0.000	.1186053	.4162628
educlev	-.1451323	.0765734	-1.90	0.058	-.2952133	.0049487
emplyd	-.2032481	.0887214	-2.29	0.022	-.3771389	-.0293574
loginc_all~p	.0607635	.0407568	1.49	0.136	-.0191183	.1406453
sah	.1246898	.0512584	2.43	0.015	.0242251	.2251545
pain	.096907	.0492044	1.97	0.049	.0004681	.1933459
chronic_1	.3318223	.0875132	3.79	0.000	.1602996	.503345
gov_i	.1258156	.1458388	0.86	0.388	-.1600231	.4116543
moving	-.0127202	.0594431	-0.21	0.831	-.1292266	.1037863
selfcare	.0861875	.0647566	1.33	0.183	-.0407332	.2131082
diffwork	.1327391	.0533484	2.49	0.013	.0281783	.2373
sad	.0189797	.0409143	0.46	0.643	-.061211	.0991703
_cons	-2.679563	.3456612	-7.75	0.000	-3.357047	-2.00208

Chapters 3, 6 and 7:

F. Effects of disaggregated chronic health conditions

Chronic health conditions include heart disease, diabetes, and depression. Example are shown using regression models for frequency of visits, indicating that the results for income and insurance are similar those in Chapters 6 and 7.

1. probit ipvisits if country=="LBN": disaggregated variables.

```
Probit regression                                 Number of obs   =        929
                                                  Wald chi2(12)   =      21.84
                                                  Prob > chi2     =     0.0394
Log pseudolikelihood = -178.89733                 Pseudo R2       =     0.0532
------------------------------------------------------------------------------
             |               Robust
    ipvisits |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      ip_ins |  -.0088442   .1480426    -0.06   0.952    -.2990024    .2813141
         age |  -.0014913   .0049291    -0.30   0.762    -.0111523    .0081696
        male |  -.3930025   .1665681    -2.36   0.018      -.71947   -.0665351
     married |  -.0388102   .1576107    -0.25   0.805    -.3477216    .2701011
     educlev |   -.199489   .1720102    -1.16   0.246    -.5366227    .1376448
      emplyd |  -.1761073   .1803269    -0.98   0.329    -.5295416     .177327
 loginc_all~p |   .1083042    .078579     1.38   0.168    -.0457078    .2623162
         sah |   .0196803   .1060324     0.19   0.853    -.1881393       .2275
        pain |   .1660382    .075963     2.19   0.029     .0171534     .314923
    heartd_i |  -.1668672   .2193636    -0.76   0.447     -.596812    .2630776
      diab_i |   .2227417   .2342195     0.95   0.342    -.2363202    .6818035
       dep_i |   .2053081   .1516077     1.35   0.176    -.0918376    .5024539
       _cons |  -2.549482   .6960064    -3.66   0.000     -3.91363   -1.185335
```

2. probit ipvisits if country=="LBN": aggregated variable.

```
Probit regression                                 Number of obs   =        921
                                                  Wald chi2(10)   =      17.65
                                                  Prob > chi2     =     0.0612
Log pseudolikelihood = -179.70784                 Pseudo R2       =     0.0468
------------------------------------------------------------------------------
             |               Robust
    ipvisits |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      ip_ins |  -.0075857    .147158    -0.05   0.959    -.2960102    .2808387
         age |   -.001672   .0048661    -0.34   0.731    -.0112094    .0078654
        male |  -.3888224   .1659537    -2.34   0.019    -.7140856   -.0635592
     married |  -.0498246    .157667    -0.32   0.752    -.3588463    .2591971
     educlev |  -.1832769   .1698171    -1.08   0.280    -.5161123    .1495585
      emplyd |  -.1668179   .1776477    -0.94   0.348     -.515001    .1813652
 loginc_all~p |   .1104862   .0782147     1.41   0.158    -.0428118    .2637843
         sah |   .0572761   .1077879     0.53   0.595    -.1539844    .2685365
        pain |    .185135    .077286     2.40   0.017     .0336573    .3366127
   chronic_1 |  -.0957579   .2159219    -0.44   0.657     -.518957    .3274413
       _cons |  -2.557906   .6894742    -3.71   0.000    -3.909251   -1.206562
```

3. probit ipvisits if country=="LBN": disaggregated variable and interaction term for income*insurance.

Probit regression — Number of obs = 929; Wald chi2(13) = 29.39; Prob > chi2 = 0.0058; Pseudo R2 = 0.0644

Log pseudolikelihood = -176.78127

ipvisits	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ip_ins	2.828358	1.334117	2.12	0.034	.2135366	5.44318
age	-.0016736	.0049597	-0.34	0.736	-.0113944	.0080472
male	-.3749396	.1716118	-2.18	0.029	-.7112926	-.0385866
married	-.0433886	.1578631	-0.27	0.783	-.3527947	.2660174
educlev	-.1912581	.1731381	-1.10	0.269	-.5306026	.1480864
emplyd	-.1590194	.1866131	-0.85	0.394	-.5247744	.2067357
loginc_all~p	.238338	.0948642	2.51	0.012	.0524077	.4242683
sah	.0159592	.1063203	0.15	0.881	-.1924247	.2243432
pain	.1775756	.0758717	2.34	0.019	.0288697	.3262815
logincXip_~s	-.3630352	.1707271	-2.13	0.033	-.6976542	-.0284163
heartd_i	-.1944453	.2202907	-0.88	0.377	-.6262071	.2373165
diab_i	.2321515	.2366458	0.98	0.327	-.2316658	.6959688
dep_i	.1981399	.1531152	1.29	0.196	-.1019604	.4982402
_cons	-3.576737	.813381	-4.40	0.000	-5.170934	-1.982539

4. probit ipvisits if country=="EGY": disaggregated variables and interaction term for income*insurance.

Probit regression — Number of obs = 465; Wald chi2(13) = 52.95; Prob > chi2 = 0.0000; Pseudo R2 = 0.1208

Log pseudolikelihood = -232.52852

ipvisits	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ip_ins	-.2009412	1.321953	-0.15	0.879	-2.791922	2.39004
age	.0024041	.005276	0.46	0.649	-.0079368	.0127449
male	-.2338258	.1774916	-1.32	0.188	-.5817031	.1140514
married	.1242735	.1629928	0.76	0.446	-.1951865	.4437335
educlev	-.07619	.1869918	-0.41	0.684	-.4426871	.2903071
emplyd	-.253676	.1833956	-1.38	0.167	-.6131248	.1057729
loginc_all~p	-.2241707	.0991776	-2.26	0.024	-.4185552	-.0297861
sah	.2050319	.0970522	2.11	0.035	.014813	.3952508
pain	.199968	.0810597	2.47	0.014	.0410939	.358842
logincXip_~s	.0714942	.180659	0.40	0.692	-.2825909	.4255794
heartd_i	.5125315	.2607752	1.97	0.049	.0014216	1.023641
diab_i	-.3744661	.2333359	-1.60	0.109	-.8317961	.0828638
dep_i	-.5570236	.1766147	-3.15	0.002	-.9031821	-.2108651
_cons	.0346548	.7310516	0.05	0.962	-1.39818	1.46749

5. probit opvisits if country=="LBN": disaggregated variables and interaction term for income*insurance.

Probit regression — Number of obs = 930; Wald chi2(13) = 35.13; Prob > chi2 = 0.0008; Pseudo R2 = 0.0761

Log pseudolikelihood = -238.61955

opvisits	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
op_ins	.179569	.2089585	0.86	0.390	-.2299821	.5891201
age	-.0080116	.0045011	-1.78	0.075	-.0168337	.0008104
male	-.2828291	.1457088	-1.94	0.052	-.5684132	.002755
married	-.0132449	.1397121	-0.09	0.924	-.2870756	.2605859
educlev	-.1221248	.1392045	-0.88	0.380	-.3949605	.150711
emplyd	-.0326951	.1591664	-0.21	0.837	-.3446555	.2792654
loginc_all~p	-.0174049	.0799726	-0.22	0.828	-.1741483	.1393386
sah	-.0690431	.0909973	-0.76	0.448	-.2473945	.1093083
pain	.1952486	.0721357	2.71	0.007	.0538652	.3366319
logincXip_~s	.0209342	.0271218	0.77	0.440	-.0322236	.074092
heartd_i	.603076	.1724332	3.50	0.000	.2651132	.9410388
diab_i	.2309191	.200176	1.15	0.249	-.1614186	.6232568
dep_i	.1400165	.1357638	1.03	0.302	-.1260757	.4061087
_cons	-1.286082	.6257973	-2.06	0.040	-2.512622	-.0595418

6. probit opvisits country=="LBN": three disaggregated variables (heart disease, diabetes, and depression).

```
Probit regression                                 Number of obs   =        930
                                                  Wald chi2(12)   =      35.00
                                                  Prob > chi2     =     0.0005
Log pseudolikelihood = -238.88416                 Pseudo R2       =     0.0751
------------------------------------------------------------------------------
             |               Robust
    opvisits |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      op_ins |   .3106334   .1254788     2.48   0.013     .0646996    .5565673
         age |  -.0076368   .0044603    -1.71   0.087    -.0163788    .0011053
        male |   -.277568   .1455117    -1.91   0.056    -.5627658    .0076297
     married |  -.0044654    .140932    -0.03   0.975     -.280687    .2717562
     educlev |  -.1114556   .1391646    -0.80   0.423    -.3842131     .161302
      emplyd |  -.0303657   .1588373    -0.19   0.848    -.3416812    .2809497
loginc_all~p |  -.0021476   .0771145    -0.03   0.978    -.1532892     .148994
         sah |  -.0720522   .0911311    -0.79   0.429    -.2506659    .1065615
        pain |   .1950306   .0721791     2.70   0.007     .0535621    .3364991
    heartd_i |    .602412   .1726128     3.49   0.000     .2640971     .940727
      diab_i |   .2372571   .2008151     1.18   0.237    -.1563332    .6308475
       dep_i |   .1451488   .1367202     1.06   0.288    -.1228178    .4131155
       _cons |  -1.399081   .6080113    -2.30   0.021    -2.590762   -.2074009
```

7. probit opvisits if country=="LBN": four disaggregated variables (high blood pressure, heart disease, diabetes, and depression).

```
Probit regression                                 Number of obs   =        929
                                                  Wald chi2(13)   =      40.28
                                                  Prob > chi2     =     0.0001
Log pseudolikelihood = -237.06011                 Pseudo R2       =     0.0819
------------------------------------------------------------------------------
             |               Robust
    opvisits |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      op_ins |   .3227305   .1257774     2.57   0.010     .0762114    .5692496
         age |  -.0104149   .0047974    -2.17   0.030    -.0198176   -.0010123
        male |  -.3003798   .1466996    -2.05   0.041    -.5879058   -.0128539
     married |   -.007228   .1404681    -0.05   0.959    -.2825404    .2680845
     educlev |  -.1129149   .1397212    -0.81   0.419    -.3867633    .1609336
      emplyd |  -.0522408   .1613983    -0.32   0.746    -.3685757     .264094
loginc_all~p |  -.0009292   .0769703    -0.01   0.990    -.1517882    .1499298
         sah |  -.0920491   .0918131    -1.00   0.316    -.2719994    .0879013
        pain |   .2014668   .0718275     2.80   0.005     .0606876     .342246
       hbp_i |   .3085157   .1669738     1.85   0.065    -.0187469    .6357783
    heartd_i |   .5444506   .1725873     3.15   0.002     .2061857    .8827154
      diab_i |   .1691239   .2084498     0.81   0.417    -.2394302    .5776781
       dep_i |   .1419551   .1379176     1.03   0.303    -.1283584    .4122687
       _cons |  -1.295079   .6211854    -2.08   0.037     -2.51258   -.0775777
```

8. probit opvisits if country=="LBN": aggregated variable.

```
Probit regression                                 Number of obs   =        922
                                                  Wald chi2(10)   =      23.28
                                                  Prob > chi2     =     0.0098
Log pseudolikelihood = -240.21728                 Pseudo R2       =     0.0586
------------------------------------------------------------------------------
             |               Robust
    opvisits |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      op_ins |   .3097448   .1261423     2.46   0.014     .0625104    .5569792
         age |  -.0045365   .0042567    -1.07   0.287    -.0128795    .0038065
        male |  -.3125125   .1464854    -2.13   0.033    -.5996186   -.0254065
     married |  -.0291917   .1405324    -0.21   0.835    -.3046301    .2462468
     educlev |  -.0824413   .1417268    -0.58   0.561    -.3602206     .195338
      emplyd |  -.0756686    .161616    -0.47   0.640    -.3924302    .2410931
loginc_all~p |  -.0353599   .0803831    -0.44   0.660    -.1929079    .1221882
         sah |  -.0468189   .0901663    -0.52   0.604    -.2235416    .1299038
        pain |   .1756576   .0723719     2.43   0.015     .0338112     .317504
   chronic_1 |   .5806205   .2309333     2.51   0.012     .1279996    1.033241
       _cons |  -1.604186   .6601626    -2.43   0.015     -2.89808   -.3102906
```

9. probit opvisits if country=="EGY": aggregated variable.

```
Probit regression                                 Number of obs   =        628
                                                  Wald chi2(10)   =      26.46
                                                  Prob > chi2     =     0.0032
Log pseudolikelihood = -414.75994                 Pseudo R2       =     0.0328
```

opvisits	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
op_ins	.1427467	.1322977	1.08	0.281	-.1165521	.4020455
age	.0001932	.0040785	0.05	0.962	-.0078006	.008187
male	-.3090975	.1329378	-2.33	0.020	-.5696508	-.0485441
married	.0070112	.1211005	0.06	0.954	-.2303414	.2443639
educlev	.0547152	.1332407	0.41	0.681	-.2064319	.3158622
emplyd	-.0504553	.1361542	-0.37	0.711	-.3173126	.216402
loginc_all~p	-.06952	.0713971	-0.97	0.330	-.2094556	.0704157
sah	-.0187472	.0701203	-0.27	0.789	-.1561804	.118686
pain	.1323612	.0676873	1.96	0.051	-.0003033	.2650258
chronic_1	.4789597	.1799381	2.66	0.008	.1262876	.8316319
_cons	.1449309	.5690546	0.25	0.799	-.9703956	1.260257

10. probit opvisits if country=="EGY": disaggregated variable and interaction term.

```
Probit regression                                 Number of obs   =        628
                                                  Wald chi2(11)   =      26.64
                                                  Prob > chi2     =     0.0052
Log pseudolikelihood = -414.63841                 Pseudo R2       =     0.0331
```

opvisits	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
op_ins	-.3775136	1.093094	-0.35	0.730	-2.519939	1.764911
age	.0000571	.0041006	0.01	0.989	-.0079799	.0080942
male	-.3149768	.1339594	-2.35	0.019	-.5775324	-.0524212
married	.0106639	.1213975	0.09	0.930	-.2272709	.2485986
educlev	.0511363	.1334559	0.38	0.702	-.2104325	.3127052
emplyd	-.0543478	.1366164	-0.40	0.691	-.3221111	.2134155
loginc_all~p	-.0922681	.0862658	-1.07	0.285	-.2613459	.0768097
sah	-.019796	.0700621	-0.28	0.778	-.1571152	.1175231
pain	.132532	.0676845	1.96	0.050	-.0001272	.2651911
chronic_1	.4861592	.1807801	2.69	0.007	.1318368	.8404817
logincXop_~s	.0710984	.1486235	0.48	0.632	-.2201983	.362395
_cons	.3090114	.6729336	0.46	0.646	-1.009914	1.627937

Chapters 6 and 7:

G. Marginal effects for pooled analyses for the probability of any care, outpatient and inpatient care.

```
. dprobit anycare anyins agesq male married educlev emplyd loginc_allimp sah pain
chronic_1 egypt_i logincXa
> nyins egyptXanyins egyptXloginc,  robust nolog

Probit regression, reporting marginal effects           Number of obs =   6848
                                                        Wald chi2(14) =1973.13
                                                        Prob > chi2   = 0.0000
Log pseudolikelihood = -3361.5273                       Pseudo R2     = 0.2898

------------------------------------------------------------------------------
         |               Robust
 anycare |      dF/dx   Std. Err.      z    P>|z|     x-bar  [    95% C.I.   ]
---------+--------------------------------------------------------------------
  anyins*|  -.0948106   .1422699    -0.66   0.506   .389457  -.373655  .184033
   agesq |  -4.73e-06   6.16e-06    -0.77   0.442   1845.18  -.000017  7.3e-06
    male*|   .0928721   .0179833     5.15   0.000   .540596   .057626  .128119
 married*|   .0705418   .0155347     4.54   0.000   .699328   .040094  .100989
 educlev*|   .0280186   .0164287     1.70   0.088   .463493  -.004181  .060218
  emplyd*|  -.0177825   .0183322    -0.97   0.332   .442027  -.053713  .018148
loginc~p |   .0129215   .0159033     0.81   0.416   7.39156  -.018248  .044091
     sah |   .0936613   .0109074     8.58   0.000   2.00409   .072283  .115039
    pain |   .1246639   .0107752    11.53   0.000   1.68093   .103545  .145783
chroni~1*|   .4073606   .0138872    26.74   0.000   .578271   .380142  .434579
 egypt_i*|   .3989314   .1178785     3.09   0.002   .601051   .167894  .629969
log~yins |   .0076086   .0179896     0.42   0.672   2.98295   -.02765  .042867
egyptXa~*|   .0852511   .0312693     2.68   0.007    .19816   .023964  .146538
egyptX~c |  -.0228826   .0178334    -1.28   0.199   4.29579  -.057835   .01207
---------+--------------------------------------------------------------------
  obs. P |    .531396
 pred. P |   .5444048  (at x-bar)
------------------------------------------------------------------------------
(*) dF/dx is for discrete change of dummy variable from 0 to 1
    z and P>|z| correspond to the test of the underlying coefficient being 0

. dprobit outpt op_ins agesq male married educlev emplyd loginc_allimp sah pain
chronic_1 egypt_i logincXop_
> ins egyptXop_ins egyptXloginc,  robust nolog

Probit regression, reporting marginal effects           Number of obs =   6885
                                                        Wald chi2(14) =1872.98
                                                        Prob > chi2   = 0.0000
Log pseudolikelihood = -3464.1967                       Pseudo R2     = 0.2739

------------------------------------------------------------------------------
         |               Robust
   outpt |      dF/dx   Std. Err.      z    P>|z|     x-bar  [    95% C.I.   ]
---------+--------------------------------------------------------------------
  op_ins*|    .123933    .142767     0.86   0.392    .29557  -.155885  .403751
   agesq |  -6.43e-06   5.99e-06    -1.07   0.283   1844.96  -.000018  5.3e-06
    male*|   .0998465   .0177027     5.61   0.000   .539869    .06515  .134543
 married*|   .0704332   .0154198     4.55   0.000   .698765   .040211  .100655
 educlev*|   .0237073    .016129     1.47   0.142   .464488  -.007905   .05532
  emplyd*|  -.0133824   .0180155    -0.74   0.458   .441975  -.048692  .021927
loginc~p |   .0162185   .0151167     1.07   0.283   7.39271   -.01341  .045847
     sah |   .0885775   .0107303     8.25   0.000   2.00203   .067547  .109609
    pain |    .108512   .0105144    10.31   0.000    1.6793   .087904   .12912
chroni~1*|   .4009523   .0138166    26.26   0.000   .576906   .373872  .428032
 egypt_i*|   .3879782   .1167011     3.03   0.002    .60029   .159248  .616708
l~op_ins |  -.0191934   .0183523    -1.05   0.296   2.26298  -.055163  .016776
e~op_ins*|   .0825683   .0325936     2.51   0.012   .153667   .018686  .146451
egyptX~c |  -.0183626    .017752    -1.03   0.301   4.29076  -.053156  .016431
---------+--------------------------------------------------------------------
  obs. P |   .5092229
 pred. P |   .5109223  (at x-bar)
------------------------------------------------------------------------------
(*) dF/dx is for discrete change of dummy variable from 0 to 1
    z and P>|z| correspond to the test of the underlying coefficient being 0
```

```
. dprobit inpt ip_ins agesq male married educlev emplyd loginc_allimp sah pain chronic_1
egypt_i logincXip_i
> ns egyptXip_ins egyptXloginc,  robust nolog

Probit regression, reporting marginal effects           Number of obs =    6885
                                                        Wald chi2(14) = 458.29
                                                        Prob > chi2   = 0.0000
Log pseudolikelihood = -1724.7617                       Pseudo R2     = 0.1290

------------------------------------------------------------------------------
         |               Robust
    inpt |      dF/dx   Std. Err.      z    P>|z|     x-bar  [    95% C.I.   ]
---------+--------------------------------------------------------------------
 ip_ins*|  -.0808714    .0484283   -1.51   0.131   .355701  -.175789  .014046
   agesq |   7.69e-07   2.20e-06    0.35   0.727   1844.96  -3.5e-06  5.1e-06
   male*|  -.0052391    .0068986   -0.76   0.446   .539869   -.01876  .008282
married*|   .0198674    .0058108    3.26   0.001   .698765   .008478  .031256
educlev*|  -.0127725    .0067883   -1.87   0.061   .464488  -.026077  .000532
 emplyd*|  -.0162741    .0070541   -2.28   0.022   .441975    -.0301 -.002448
loginc~p |  -.0001362    .0057336   -0.02   0.981   7.39271  -.011374  .011102
     sah |   .0175042    .0040781    4.27   0.000   2.00203   .009511  .025497
    pain |   .0241193    .0035456    6.87   0.000    1.6793    .01717  .031069
chroni~1*|    .034249    .0070496    4.69   0.000   .576906   .020432  .048066
egypt_i*|  -.0162835    .0564473   -0.30   0.768    .60029  -.126918  .094351
l~ip_ins |   .0131245    .0078344    1.67   0.094    2.7235  -.002231   .02848
e~ip_ins*|   .0154904    .0148714    1.11   0.268   .166594  -.013657  .044638
egyptX~c |  -.0057247    .0073497   -0.78   0.436   4.29076   -.02013  .008681
---------+--------------------------------------------------------------------
  obs. P |   .0836601
 pred. P |   .0600932  (at x-bar)
------------------------------------------------------------------------------
(*) dF/dx is for discrete change of dummy variable from 0 to 1
    z and P>|z| correspond to the test of the underlying coefficient being 0
```

Chapters 3, 6 and 7:

H. Examples of output for zero-inflated negative binomial model

1. HOSPITAL OUTPATIENT VISITS: EGYPT

Zero-inflated negative binomial regression		Number of obs =	628
		Nonzero obs =	359
		Zero obs =	269
Inflation model = probit		LR chi2(11) =	53.04
Log likelihood = -864.1402		Prob > chi2 =	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
opvisits						
op_ins	-.1605826	1.060325	-0.15	0.880	-2.238781	1.917616
age	-.0039596	.0038387	-1.03	0.302	-.0114833	.003564
male	-.5193871	.1291651	-4.02	0.000	-.772546	-.2662282
married	.0023529	.114959	0.02	0.984	-.2229626	.2276684
educlev	.0353185	.1284697	0.27	0.783	-.2164775	.2871144
emplyd	-.2173504	.1326718	-1.64	0.101	-.4773823	.0426814
loginc_all~p	.115304	.0844659	1.37	0.172	-.0502461	.280854
sah	-.0804194	.0636822	-1.26	0.207	-.2052342	.0443954
pain	.3070046	.0621979	4.94	0.000	.185099	.4289103
chronic_1	.1403294	.2066784	0.68	0.497	-.2647528	.5454117
logincXop_~s	-.0023105	.1445885	-0.02	0.987	-.2856987	.2810776
_cons	-.7527771	.6693335	-1.12	0.261	-2.064647	.5590925
inflate						
op_ins	2284.413	7236675	0.00	1.000	-1.42e+07	1.42e+07
age	3.588444	8905.988	0.00	1.000	-17451.83	17459
male	-1.166049	79228.13	-0.00	1.000	-155285.4	155283.1
married	-23.68139	105486.9	-0.00	1.000	-206774.1	206726.7
educlev	-.1849868	76768.88	-0.00	1.000	-150464.4	150464.1
emplyd	9.809671	28478.02	0.00	1.000	-55806.09	55825.71
loginc_all~p	320.0842	971095.5	0.00	1.000	-1902992	1903632
sah	-82.05164	234084.9	-0.00	1.000	-458880.1	458716
pain	-14.21667	14611.22	-0.00	0.999	-28651.68	28623.24
chronic_1	-158.121	463867.5	-0.00	1.000	-909321.8	909005.5
logincXop_~s	-284.9652	905939.8	-0.00	1.000	-1775894	1775325
_cons	-2516.171	7662815	-0.00	1.000	-1.50e+07	1.50e+07
/lnalpha	-.6622219	.166652	-3.97	0.000	-.9888538	-.3355901
alpha	.5157042	.0859431			.3720028	.7149161

Vuong test of zinb vs. standard negative binomial: z = 4.25 Pr>z = 0.0000

2. HOSPITAL OUTPATIENT VISITS: LEBANON

```
Zero-inflated negative binomial regression        Number of obs    =        922
                                                  Nonzero obs      =         73
                                                  Zero obs         =        849

Inflation model = probit                          LR chi2(11)      =      40.59
Log likelihood  = -315.8905                       Prob > chi2      =     0.0000

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
opvisits     |
      op_ins |   2.545924   2.612554     0.97   0.330    -2.574587    7.666435
         age |   .0006015   .0099701     0.06   0.952    -.0189396    .0201426
        male |  -.0030745   .3549622    -0.01   0.993    -.6987877    .6926387
     married |    .557895   .3232864     1.73   0.084    -.0757347    1.191525
     educlev |   .1385679   .3425592     0.40   0.686    -.5328358    .8099716
      emplyd |  -.0748893   .3562416    -0.21   0.833      -.77311    .6233315
loginc_all~p |   .0906441   .1893367     0.48   0.632    -.2804491    .4617372
         sah |  -.0241794   .2002042    -0.12   0.904    -.4165725    .3682136
        pain |   .5634377   .1531557     3.68   0.000     .2632581    .8636174
   chronic_1 |   .4536703   .5506045     0.82   0.410    -.6254947    1.532835
logincXop_~s |  -.2722575   .3358449    -0.81   0.418    -.9305014    .3859863
       _cons |  -4.733108   1.723606    -2.75   0.006    -8.111312   -1.354903
-------------+----------------------------------------------------------------
inflate      |
      op_ins |   2233.956    5849930     0.00   1.000    -1.15e+07    1.15e+07
         age |   15.01389   36893.19     0.00   1.000     -72294.3    72324.33
        male |    608.109    1210516     0.00   1.000     -2371959     2373175
     married |   1109.318    2753122     0.00   1.000     -5394911     5397129
     educlev |   485.8841    1231670     0.00   1.000     -2413544     2414515
      emplyd |    119.456   141458.3     0.00   0.999    -277133.7    277372.6
loginc_all~p |   376.7443   917631.5     0.00   1.000     -1798148     1798901
         sah |   245.4015   519078.3     0.00   1.000     -1017129     1017620
        pain |   82.95651   216098.1     0.00   1.000    -423461.6    423627.5
   chronic_1 |  -813.8128    1906019    -0.00   1.000     -3736543     3734916
logincXop_~s |  -306.7729   807637.6    -0.00   1.000     -1583247     1582634
       _cons |   -5679.49   1.33e+07    -0.00   1.000    -2.60e+07    2.60e+07
-------------+----------------------------------------------------------------
    /lnalpha |     1.9673   .2107945     9.33   0.000     1.554151     2.38045
-------------+----------------------------------------------------------------
       alpha |   7.151345   1.507464                      4.731068    10.80977
------------------------------------------------------------------------------
Vuong test of zinb vs. standard negative binomial: z =     5.36  Pr>z = 0.000
```

I. Goodness-of-fit tests for count regression models

Shown are results based on Note: PRM = Poisson regression model; NBRM = negative binomial regression model; ZINB = zero-inflated negative binomial

1. Hospital outpatient visits, pooled analysis

```
Tests and Fit Statistics

PRM          BIC= -8013.147  AIC=     2.138  Prefer  Over  Evidence
-------------------------------------------------------------------------
  vs NBRM    BIC= -8446.784  dif=   433.636  NBRM    PRM   Very strong
             AIC=     1.855  dif=     0.283  NBRM    PRM
             LRX2=  440.982  prob=    0.000  NBRM    PRM   p=0.000
-------------------------------------------------------------------------
  vs ZINB    BIC= -8414.580  dif=   401.433  ZINB    PRM   Very strong
             AIC=     1.834  dif=     0.304  ZINB    PRM
-------------------------------------------------------------------------
NBRM         BIC= -8446.784  AIC=     1.855  Prefer  Over  Evidence
-------------------------------------------------------------------------
  vs ZINB    BIC= -8414.580  dif=   -32.204  NBRM    ZINB  Very strong
             AIC=     1.834  dif=     0.021  ZINB    NBRM
             Vuong=   3.807  prob=    0.000  ZINB    NBRM  p=0.000
```

2. General practitioner visits, pooled analysis

```
Tests and Fit Statistics

PRM           BIC= -7771.427  AIC=      2.379  Prefer  Over  Evidence
-------------------------------------------------------------------------
  vs NBRM     BIC= -8126.926  dif=    355.499  NBRM    PRM   Very strong
              AIC=     2.149  dif=      0.230  NBRM    PRM
              LRX2=  362.860  prob=     0.000  NBRM    PRM   p=0.000
-------------------------------------------------------------------------
  vs ZINB     BIC= -8065.714  dif=    294.287  ZINB    PRM   Very strong
              AIC=     2.147  dif=      0.232  ZINB    PRM
-------------------------------------------------------------------------
NBRM          BIC= -8126.926  AIC=      2.149  Prefer  Over  Evidence
-------------------------------------------------------------------------
  vs ZINB     BIC= -8065.714  dif=    -61.212  NBRM    ZINB  Very strong
              AIC=     2.147  dif=      0.002  ZINB    NBRM
              Vuong=   2.824  prob=     0.002  ZINB    NBRM  p=0.002
```

3. Specialist visits, pooled analysis

```
Tests and Fit Statistics

PRM           BIC=-10221.236  AIC=      2.839  Prefer  Over  Evidence
-------------------------------------------------------------------------
  vs NBRM     BIC=-10321.623  dif=    100.387  NBRM    PRM   Very strong
              AIC=     2.789  dif=      0.050  NBRM    PRM
              LRX2=  108.051  prob=     0.000  NBRM    PRM   p=0.000
-------------------------------------------------------------------------
  vs ZINB     BIC=-10255.293  dif=     34.057  ZINB    PRM   Very strong
              AIC=     2.788  dif=      0.051  ZINB    PRM
-------------------------------------------------------------------------
NBRM          BIC=-10321.623  AIC=      2.789  Prefer  Over  Evidence
-------------------------------------------------------------------------
  vs ZINB     BIC=-10255.293  dif=    -66.331  NBRM    ZINB  Very strong
              AIC=     2.788  dif=      0.001  ZINB    NBRM
              Vuong=   0.755  prob=     0.225  ZINB    NBRM  p=0.225
```

4. Pharmacy visits, pooled analysis

```
Tests and Fit Statistics

PRM           BIC= -6768.802  AIC=      3.239  Prefer  Over  Evidence
-------------------------------------------------------------------------
  vs NBRM     BIC= -7637.522  dif=    868.720  NBRM    PRM   Very strong
              AIC=     2.706  dif=      0.533  NBRM    PRM
              LRX2=  876.122  prob=     0.000  NBRM    PRM   p=0.000
-------------------------------------------------------------------------
  vs ZINB     BIC= -7593.182  dif=    824.381  ZINB    PRM   Very strong
              AIC=     2.693  dif=      0.546  ZINB    PRM
-------------------------------------------------------------------------
NBRM          BIC= -7637.522  AIC=      2.706  Prefer  Over  Evidence
-------------------------------------------------------------------------
  vs ZINB     BIC= -7593.182  dif=    -44.339  NBRM    ZINB  Very strong
              AIC=     2.693  dif=      0.012  ZINB    NBRM
              Vuong=   3.367  prob=     0.000  ZINB    NBRM  p=0.000
```

5. Hospital inpatient visits, pooled sample

```
Tests and Fit Statistics

PRM           BIC= -8457.861  AIC=      1.073  Prefer  Over  Evidence
-------------------------------------------------------------------------
  vs NBRM     BIC= -8657.073  dif=    199.211  NBRM    PRM   Very strong
              AIC=     0.925  dif=      0.148  NBRM    PRM
              LRX2=  206.442  prob=     0.000  NBRM    PRM   p=0.000
-------------------------------------------------------------------------
  vs ZINB     BIC= -8597.623  dif=    139.762  ZINB    PRM   Very strong
              AIC=     0.923  dif=      0.150  ZINB    PRM
-------------------------------------------------------------------------
NBRM          BIC= -8657.073  AIC=      0.925  Prefer  Over  Evidence
-------------------------------------------------------------------------
  vs ZINB     BIC= -8597.623  dif=    -59.450  NBRM    ZINB  Very strong
              AIC=     0.923  dif=      0.002  ZINB    NBRM
              Vuong=   2.531  prob=     0.006  ZINB    NBRM  p=0.006
```

Chapters 3, 6 and 7:

J. Estimates summary for zero-inflated negative binomial models

Probability of always zero	Hospital Outpatient		GP		Specialists		Pharmacists		Inpatient	
Pooled analysis*										
country (1 = Egy; 0 = Leb)	-9.635		-12.323		4.059		**4.184**		**-5334.377**	
Country-specific analyses	**EGY**	**LEB**	**EGY**	**LEB**	**EGY**	**LEB**	**EGY**	**LEB**	**EGY**	**LEB**
logincome	**320.084**	**64.838**	**314.773**	**54.005**	**-145.216**	**-63.555**	**-1.040**	-0.070	**311.222**	**-1956.187**
insurance	**2284.413**	**223.956**	**3248.354**	**334.946**	**-2474.283**	**172.085**	**1763.723**	**-1.887**	**1207.698**	**-13329.920**
logincomeXinsurance	**-284.965**	**-306.773**	**-442.077**	**-34.748**	**321.502**	**-5.207**	**-268.101**	0.214	**-172.322**	**1972.876**
age	**3.588**	**15.014**	**-3.585**	**-11.797**	**-7.397**	**-10.422**	**6.644**	0.010	**-0.812**	**-35.682**
male	**-1.166**	**608.109**	**71.618**	**145.798**	**83.457**	**-358.608**	**-139.064**	0.018	**-58.405**	**2601.136**
married	**-23.681**	**1109.318**	**-41.547**	**68.967**	**-256.748**	**203.331**	**-76.236**	-0.189	**151.463**	**-496.829**
educlev	-0.185	**485.884**	**-99.341**	**145.007**	**167.408**	**67.357**	**79.469**	0.027	**-20.568**	**-623.008**
employed	**9.810**	**119.456**	**-247.841**	**239.526**	**-128.428**	**-291.270**	-329.272	0.042	**-76.953**	**2611.818**
sah	**-82.052**	**245.402**	**135.279**	**-127.468**	**150.533**	**-174.244**	**-56.408**	0.008	**112.170**	**1278.379**
pain	**-14.217**	**82.957**	**-159.927**	**-147.604**	**-60.686**	**45.518**	**-54.181**	-0.062	**-182.607**	**-1447.326**
chronic	**-158.121**	**-813.813**	**30.932**	0.193	**84.185**	**-217.808**	**-70.264**	0.081	**90.475**	**404.071**
_cons	**-2516.171**	**-5679.490**	**-2433.036**	**-128.199**	**620.888**	**1027.764**	**47.953**	-0.780	**-2382.956**	**12523.450**
Intensity amongst potential users	**Hospital Outpatient**		**GP**		**Specialists**		**Pharmacists**		**Inpatient**	
Pooled analysis*										
country (1 = Egy; 0 = Leb)	**-2.787**		-2.196		-0.760		0.703		3.461	
Country-specific analyses	**EGY**	**LEB**	**EGY**	**LEB**	**EGY**	**LEB**	**EGY**	**LEB***	**EGY**	**LEB**
logincome	0.115	0.091	**0.299**	-0.065	0.029	-0.038	0.111	-0.015	0.025	0.082
insurance	-0.161	2.546	**3.056**	0.409	0.329	0.788	**2.728**	-1.628	1.285	3.730
logincomeXinsurance	-0.002	-0.272	**-0.472**	-0.056	-0.043	-0.082	**-0.417**	0.214	-0.151	-0.343
age	-0.004	0.001	**-0.016**	0.000	-0.003	-0.001	**-0.015**	-0.014	-0.006	**-0.032**
male	**-0.519**	-0.003	**-0.330**	-0.020	0.005	***-0.248***	**-0.347**	0.043	-0.263	0.024
married	0.003	***0.558***	**0.284**	0.050	0.018	0.049	**0.291**	0.024	**0.498**	0.004
educlev	0.035	0.139	**-0.353**	-0.205	0.085	-0.034	-0.114	-0.053	-0.153	**-1.168**
employed	***-0.217***	-0.075	-0.212	0.185	**-0.112**	**-0.296**	-0.147	0.149	**-0.561**	0.852
sah	-0.080	-0.024	0.017	0.001	-0.008	***-0.147***	0.070	***0.222***	**0.299**	**0.553**
pain	**0.307**	**0.563**	**0.170**	**0.298**	***0.082***	**0.277**	**0.307**	-0.044	**0.224**	-0.024
chronic	0.140	0.454	0.215	0.042	-0.072	-0.189	**0.322**	***0.418***	**-0.571**	0.210
_cons	-0.753	**-4.733**	**-1.905**	-0.880	0.195	0.035	-0.813	0.167	-1.588	-3.025

*For Pooled analysis, only the country effect is presented for brevity, with other effects shown for country-specific models. **BOLD:** Statistically significant at 95% level.

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