Moral Hazard and the Impact of Private Health Insurance on the Utilisation of Health Care in Malaysia

(Bahaya Moral dan Kesan Insurans Kesihatan Swasta ke atas Penggunaan Penjagaan Kesihatan di Malaysia)

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ABSTRACT

In Malaysia, private health insurance coverage is usually limited to inpatient treatment or hospitalisation. With private health insurance, there is a possibility that individuals will use health care services more frequently or spend more on health care (known as moral hazard effects) because they know they are protected. This study estimates the importance of factors affecting the demand for private health insurance and how it affects health care utilisation. This paper also provides an empirical test for the existence of moral hazard effects in health care utilisation. The analysis uses the second and third National Health and Morbidity Surveys (NHMS), which were conducted in 1996 and 2006. The analysis applies a bivariate probit model to estimate the demand for private insurance and its effect on the utilisation of health care. Utilisation of health care is defined as being admitted to either a public or private hospital. The results show that taking up private health insurance is lower among disadvantaged individuals, such as those with lower income, a lower level of education, those living in less developed regions and the unemployed. The findings also show that health conditions have a very strong effect on the hospitalisation decision. Furthermore, the results demonstrate that evidence of moral hazard existed in the 1996 but not in the 2006 data. From the results, policy makers can target an appropriate population for providing health subsidies if the National Health Insurance Scheme is implemented.

Keywords: Private health insurance; health care financing; moral hazard; health care utilisation

ABSTRAK

Di Malaysia, perlindungan insurans kesihatan swasta adalah terhad kepada rawatan pesakit dalaman atau kemasukan ke wad. Dengan insurans kesihatan swasta, terdapat kemungkinan seseorang individu akan menggunakan perkhidmatan kesihatan dengan lebih kerap atau memperuntukkan perbelanjaan yang lebih besar ke atas kesihatan (dikenali sebagai kesan bahaya moral) kerana mereka dilindungi. Kajian ini menganggarkan faktor-faktor penting mempengaruhi permintaan ke atas insurans kesihatan swasta dan bagaimana ia mempengaruhi penggunaan kesihatan. Kertas kerja ini juga mengkaji kewujudan kesan bahaya moral dalam penggunaan kesihatan. Analisis menggunakan data Kajian Kesihatan dan Morbiditi Kebangsaan 1996 dan 2006. Kaedah penganggaran menggunakan model bivariate probit. Penggunaan kesihatan didefinasikan sebagai kemasukan ke wad hospital awam atau swasta. Keputusan kajian menunjukkan permintaan ke atas insurans kesihatan swasta adalah rendah di kalangan golongan kurang berkemampuan seperti individu berpendapatan rendah, berpendidikan rendah, tinggal di kawasan kurang membangun dan juga golongan penganggur. Kajian juga menunjukkan status kesihatan mempunyai kesan kuat dalam mempengaruhi penggunaan kesihatan. Keputusan kajian turut membuktikan wujudnya bahaya moral dalam tahun 1996 tetapi tidak bagi tahun 2006. Daripada keputusan kajian, pembuat dasar boleh mensasarkan golongan yang tepat dalam pemberian subsidi sekiranya Skim Insurans Kesihatan Kebangsaan diperkenalkan.

Kata kunci: Insurans kesihatan swasta; pembiayaan kesihatan; bahaya moral; penggunaan kesihatan

INTRODUCTION

Malaysia's health care service is shifting from a largely public-sector-provided system financed by general revenue sources toward relying on private sector services financed through fee-for-service models (National Household Health Expenditure Survey (NHHES) Final Report 1996). Although the government still heavily subsidises public health care at a nominal cost or for free, the health care system is shifting away from the

universal welfare model of public health care through several policy decisions. Such decisions are being made for several reasons: first, to generate more income from co-payments; second, to promote private health insurance and savings for health care through social security funds such as the Employees Provident Fund (EPF) (EPF is a social security institution that provides retirement benefits for private and non-pensionable public sector employees by managing their savings efficiently. There are two EPF accounts, namely, Account I and Account II. Withdrawals for medical expenses for EPF members and their families are allowed from Account II) or the Social Security Organisation (SOCSO) (SOCSO provides two social security schemes for private employees: the Employment Injury Insurance Scheme and the Invalidity Pension Scheme. These two social insurance schemes provide medical coverage and financial guarantees and protection to employees and their families in the event of accidents that result in outcomes such as disability or death or affliction with occupational diseases); third, to encourage non-government organisations, charitable bodies and firms to provide health service as a charitable act; fourth; to corporatise some hospitals; and finally to privatise some health services and foster the commercial private health care sector (Barraclough 1999). The most recent policy decision by the government is to introduce the 1Care for 1Malaysia concept that can create an efficient health care system through a national health care financing and delivery system (MOH 2011-2015).

The private health insurance sector in Malaysia is relatively new but is growing. In 1999, total expenditures by health insurance were 4.5% (Chee & Barraclough 2007). The percentage increased to 15% in 2006 (Central Bank of Malaysia 2005). Private health insurance coverage is usually limited to hospital inpatient treatment (either in a public or private hospital), and the patient is typically required to pay the hospital bill first and subsequently make a claim with the insurance company. To counter the effects of adverse selection, that is, when those with higher risks are more likely to take out insurance, all private health insurance is risk-rated. Higher risk individuals or patients with pre-existing conditions may be either precluded from insurance or face higher policy premiums. There are four common types of private health insurance: hospitalisation and surgical insurance, critical illness insurance, hospital income insurance and accidental and hospitalisation insurance (Pee 2008). Hospitalisation and surgical insurance is the most popular private health insurance in Malaysia.

Nevertheless, with private health insurance, the possibility exists that individuals have better information about their probability for illness than do insurance companies, which can lead to an adverse selection problem. Individuals may also spend more on health care because they know the cost of marginal expenditure is lowered by insurance. This can result in a moral hazard

effect (Neudeck & Podczeck 1996; Feldstein 1973). For individuals, taking up private health insurance can significantly reduce out-of-pocket expenditures for health care treatment, especially in the private health sector, which charges higher fees. Normally, the co-payment is either 20% or 10% depending on the type of the private health insurance coverage purchased (Pee 2008).

Studies on market failure (either moral hazard or adverse selection) have been discussed in much of the previous literature (Rothschild & Stiglitz 1976; Buchanan, Keeler, Rolph & Holmer 1991; Manning & Marquis 1996; Rosset & Huang 1973; Manning, Newhouse, Duan, Keeler & Leibowitz 1987; Propper 1989, 1993; Newhouse 1993). Because all private health insurance is risk-rated and the insurance company can opt to terminate or not renew a health insurance policy, adverse selection may not be a strong feature of the private health insurance industry in Malaysia. The present study, however, might expect a moral hazard effect on utilisation associated with private health insurance and might observe selection behaviour by insurers.

The present study estimates the importance of factors affecting the demand for private health insurance and how private insurance affects health care utilisation. The analysis uses the second and third National Health and Morbidity Surveys (NHMS), which were conducted in 1996 and 2006. A seemingly unrelated bivariate probit analysis is used to estimate the demand for private insurance and its effect on the utilisation of health care, which is defined as being admitted to either a private or public hospital. In Malaysia, private health insurance coverage is usually limited to inpatient treatment or hospitalisation. The results show that taking up private health insurance is lower among disadvantaged individuals, such as those with lower income, a lower level of education, those living in less developed regions and the unemployed. The findings also show that health conditions have a very strong effect on the hospitalisation decision. Furthermore, the results demonstrate evidence of moral hazard in the 1996 date, but the effect is reduced considerably in the 2006 data. This might be explained by the newly introduced private health insurance industry in the market in the mid-1990s, which might have triggered higher demand for medical care.

In the existing literature, few empirical studies have examined the effect of health insurance on utilisation in Malaysia. For example, Wan Abdullah & Ng (2009a) examined the practices of two private hospitals, comparing their different charging practices for insured versus uninsured patients. Using data from insurance companies, they found no difference in private hospital expenditures for people who were insured versus uninsured. Wan Abdullah & Ng (2009b) also explored the effect of employer-based health insurance on the health services utilisation in Malaysia. They used private insurance company data and compared the frequencies of health claims made by employees and

their dependants from 10 companies that provided health insurance benefits to their employees. They found that the behaviour of the insured did not result in an increased rate of service utilisation. These studies do not support the finding of moral hazard in Malaysia. The present study provides further understanding of the impact of private health insurance, in particular its effect on the utilisation of health care using a nationwide survey data, that is, the NHMS.

The remainder of this manuscript is organized as follows. Section 2 reviews related literature on the demand for private health insurance and its effect on the utilisation of health care. Section 3 describes the data and empirical models used in the estimation, and section 4 discusses the results. Finally, section 5 concludes with some policy implications.

LITERATURE REVIEW

Most studies on the demand for health insurance and its effect on the utilisation of health care have been conducted in developed countries, which have an established health care system such as the United States, the United Kingdom and Australia. In the United States, the private health sector dominants and the public sector acts only as a safety net for the disadvantaged. In contrast, the United Kingdom health sector is highly subsidised by the government and dominated by the public sector, although the system has shifted to more of a public-private mixed health care system (Bartlett & Phillips 1996). Meanwhile, Australia has a mixed public-private health care system that provides a publicly financed health scheme, known as Medicare plus a significant private sector constituting about 47% of total health expenditures (Doorslaer, Clarke, Savage & Hall 2008).

Since the 1970s, researchers have been investigating the determinants of health demand and expenditures in order to suggest policies that might help lessen the burdens on low income groups. Earlier empirical work in the United States on the demand for health care showed that a greater local availability of hospital beds increased the quantity of health services demanded directly as well as through lower prices (Feldstein 1971). Later, Feldstein (1977) showed how higher quality or more expensive hospital care increases the demand for health care. From 1958 to 1973, across all states in the United States, dramatic changes in the quality of care were said to be caused by increased demand stimulated by the growth of private and public insurance. Population density and other demographic factors have also been found to have influenced the demand for health care (Feldstein 1977).

Furthermore, several studies have shown that price indeed affects demand for medical care. Price elasticity of demand in various types of settings can be substantial, for example, hospital stays ranging from -0.63 (Feldstein, 1971) to -0.47 (Davis & Russell, 1972), physician care

from -0.14 (Phelps & Newhouse, 1972) and overall elasticity of demand for medical care as large as -1.5 (Rosett & Huang 1973). In China, Ying, Hu, Ren, Chen, Xu & Huang (2007) estimated the demand for health insurance for three types of insurance and found that the price elasticity of demand for major catastrophic disease insurance is -0.27, for inpatient expenses insurance -0.34 and for outpatient expenses insurance -0.42. Because private health insurance is an important source of health financing in developed countries, many studies have discussed the demand for health insurance and the factors that affect it. In Australia, Cameron, Trivedi, Milne & Piggot (1988) found that income was an important factor in determining health insurance choice, whereas in England and Wales, Propper (1989) found that income and employment status increased the probability of health insurance purchase.

In economic theory, people are predicted to spend more on health because they are insured and buy more insurance because of the high cost of health care (Feldstein, 1973). This behaviour may cause a moral hazard problem, which is one of two main types of market failure often associated with asymmetric information in providing insurance. Ex-ante moral hazard predicts that people with insurance may take greater risks than they would without it, because they know they are protected (retrieved from http://www.economist.com). Ex-post moral hazard concerns increased spending by an insured individual. Adverse selection is a second type of market failure that occurs when persons with poor health tend to choose insurance with high benefits and persons with good health tend to avoid such insurance because of its high cost (Rothschild & Stiglitz 1976; Marquis & Phelps 1987). Selection based on privately known risk aversion can be advantageous if those who are more risk averse buy more insurance coverage and have lower risks. In other words, the direction of insurance selection that results when individuals have private information about multiple dimensions of relevant information is unclear (de Meza & Webb 2001).

In developed countries much evidence suggests that health insurance may cause both moral hazard and adverse selection. Early theoretical studies on moral hazard were conducted by Arrow (1963), Pauly (1968, 1974) and Zeckhauser (1970). Arrow for example, considered moral hazard an imperfection, as does Zeckhauser. Pauly (1968) discussed the response of seeking more medical care as a consequence of rational economic behaviour. Since then, many researchers have estimated optimal health care insurance contracts and the types of market failure (i.e., moral hazard and adverse selection) such as Buchanan et al. (1991) and Manning & Marquis (1996). Furthermore, many early studies investigated the existence of market failure associated with private health insurance and factors that affect it, including Rosset & Huang (1973), Manning et al. (1987), Propper (1989; 1993) and Newhouse (1993).

The effect of private health insurance on utilisation of medical care has also been studied in many developed countries. Significant effects of health insurance on the demand for health services (i.e., moral hazard) have been found in the literature from the United States (Newhouse 1993; Manning & Marquis 1996). A study conducted by Wolfe & Goddeeris (1991) specifically observed pensioners who owned a Medicare supplementary policy called Medigap, and they provided some evidence of adverse selection and that the moral hazard effect is overstated if adverse selection is not considered. A study by Dave & Kaestner (2006) also found evidence of a direct (Dave and Kaestner (2006) defined direct moral hazard as the loss of health insurance resulted from the change in individuals' health behaviour that reduced the risk or severity of illness) moral hazard effect in the Medicare insurance market, where private health insurance reduces prevention and increases unhealthy behaviours among elderly men. By looking at customers of similar health condition, Koc (2005) found that moral hazard effect for physician visits was higher for those in relatively better health. Other studies by de Meza (1983), Nyman (1999, 2003) and Nyman & Maude-Griffin (2001) found that consumer's willingness to pay for treatment was altered by health insurance coverage. While findings in many empirical studies have shown a strong relationship between risk and insurance coverage, Fang, Keane & Silverman (2008) found that risk preferences do not appear to be a main source of advantageous selection; instead, the results suggest that cognitive ability plays an important role.

In Australia, Cameron et al. (1988) suggested that for a broad range of health care services, both moral hazard and self-selection were important determinants of utilisation of health care services. Savage & Wright (2003) found that moral hazard could substantially increase the expected length of hospital stay when the endogeneity of the insurance decision was considered. Using the same set of data, Barret & Conlon (2003) compared singles' and families' health care utilisation. They found that from 1989 to 1995, insured persons were individuals with both bad health risks (indicating adverse selection behaviour) and good health risks. They also found, however, an increase in the degree of adverse selection within the privately insured population during this period.

In other countries, Sapelli & Vial (2003) showed adverse selection existed, specifically moral hazard in the Chilean health insurance industry among both independent and dependent workers. According to Sapelli & Vial (2003), a dependent worker is any person that works in a subordinate relationship with a contract. Independent workers are all active persons not included in the previous definition. In Germany, where 90% of the population is publicly insured, Riphahn, Wambach & Million (2003) confirmed the existence of adverse selection, with high-risk individuals being more likely

to purchase supplemental add-on insurance. Another study in Germany by Hullegie & Klein (2010) analysed the effect of private health insurance on medical care utilisation. Using the German Socio-Economic Panel from 1995 to 2006, the authors found negative effects of private health insurance coverage on the number of doctor visits, no effects on the number of nights spent in a hospital, and positive effects on health. Geil, Million, Rotte & Zimmermann (1997), meanwhile, found no relationship between insurance coverage and the hospitalisation decision. In Belgium, Schokkaert, Van Ourti, De Graeve, Lecluyse & Van De Voorde (2009) used the bivariate probit model, finding weak evidence of adverse selection in the coverage of supplemental health insurance.

While the standard economic treatment of moral hazard emphasises the negative aspect and finds large effects, Nyman (2004) suggested that much of moral hazard is actually efficient and benefits the consumer. He argued that moral hazard can generate welfare gains, for example, when people have a serious illness, are involved in serious procedures or need life-saving medical care where extra income from insurance can be used to purchase other important procedures. Although conventional theories have often suggested cost sharing policies to reduce moral hazard and increase welfare, Nyman (2004) suggested that the generated medical spending produces an overall welfare gain and that subsidising insurance premiums could be beneficial. High prices for health care are harmful, however, and above all, the new theory suggests that health insurance provides economy wide redistribution of income from the healthy to those who become ill. As a result, 'efficiency' is the new argument for national health insurance.

Extensive discussion has ensued, therefore, regarding the demand for private health insurance and its effect on the utilisation of health care in developed countries with established health insurance markets. Nevertheless, many developing countries are still relying heavily on the government to finance health care. Although several ASEAN economies have recently extended coverage of their social health insurance schemes among the poor (Thailand and the Philippines), others are considering introducing some form of social or national health insurance (Malaysia, Indonesia and Vietnam) (Sidorenko & Butler 2007). Such considerations stem from new developments in health insurance markets, but limited empirical studies have been conducted in developing countries. Therefore, many of the studies in health care financing in developing countries have focused on the health systems themselves and health sector reforms (Wagstaff 2007; Hearst & Blas 2001) including Malaysia.

In a developing country such as Malaysia, where private health insurance is a relatively new phenomenon and where there is a lack of data, limited empirical studies have been conducted on the relationship between health insurance and the utilisation of health care. Most

of the previous literature in Malaysia has emphasised issues such as the development of health care systems and affordability and equity issues (Yu, Whynes & Sach 2008; Chee 2008; Saleh & Ibrahim 2005; Yon 2004). Generally, these studies are descriptive. In Malaysia, an empirical study on the determinants of the demand for medical care was conducted by Heller (1982). The results showed that total medical demand (the absolute volume of outpatient and inpatient consumption) was highly inelastic to the cash price and the cost at the time of utilisation. Total medical demand was also inelastic with respect to income.

Until now, limited empirical evidence has emerged on the effect of health insurance on utilisation due to a lack of data, in part because private health insurance in Malaysia is still new and growing. Because studies by Wan Abdullah & Ng (2009a; 2009b) have not looked for the existence of moral hazard in Malaysia, the present study attempts to find empirical evidence of moral hazard effect from the use of private health insurance and how private health insurance influences health care utilisation in Malaysia.

DATA AND DESCRIPTIVE STATISTICS

This study used data from the second (1996) and third (2006) National Health and Morbidity Surveys (NHMSII and NHMSIII). From the NHMSII, this study drew information from Modules A, C, F, G, H, I, J and N. Data drawn from the NHMSIII questionnaire covers Module A (socio-demography) to Module V (women's health). For the purpose of this research, information from Module A2, B, C, D, E, G, O, R and S was used because they are comparable with the NHMSII data. The NHMSII and NHMSIII are population-based surveys administered by trained interviewers.

The NHMS lacks detailed health expenditure data, and indeed, no available single survey provides both health and expenditure data. In undertaking this research, therefore, other survey data in Malaysia are referenced, such as the Household Expenditure Survey (HES), in order to obtain the most representative variables for the analysis. The data from HES, however, cannot be used alone because it lacks data on health and diseases. The analysis was conducted based on available out-of-pocket expenditure data, which were extracted from Module D: Health Care Cost in the NHMSII questionnaire and Module B: Health Expenditure, Hospitalisation and Private Health Insurance from the NHMSIII.

SAMPLE SELECTION

The present study's analysis is confined to adults over the age of 21 years old, as it is plausible that parents make decisions for individuals below that age. The final

samples were 29,690 observations from the NHMSII and 29,654 observations from the NHMSIII. A seemingly unrelated bivariate probit estimation is applied. To adjust for differences in probability of selection, this study used a post-stratification weight, which considered population by state, region, ethnic and age group.

The variables used in the present study are similar to those used in Schokkaert et al. (2009). We estimate the effect of private health insurance on health care utilisation with demographic, socioeconomic and numerous health status variables. In the present study, the dependent variables are admission to hospitals and health insurance. Admission to hospitals is defined as being admitted to either a government or private hospital as reported by the respondent in the past 12 months. Meanwhile, information on health insurance was generated from question S12 of Module A in the NHMSII, which asked, "Who pays for health care?" The health insurance variable was generated from the respondents who choose "insurance" at least once in the multiple answers of free, self, employer, insurance, donation or other type of payments. Variable health insurance was derived from question 8 in Module B3 of the NHMSIII survey. The question asked, "Do you have a private health insurance purchased by yourself?" with choices for a 'yes' or 'no' answer.

Table 1 shows the distribution of health care payment methods in NHMSII and NHMSIII. In 1996, the NHMSII data show that the main source of financing came from out-of-pocket payment, with 62.4% of the respondents using their own resources for payment. This is followed by employer-based health benefits (19.6%), a combination of self–employer-insurance (3.7%), free services (3.5%), a combination of self–employer (2.9%), a combination of free–self (1.7%), and a combination of free–employer–self (0.4%). Payment by insurance alone was only 0.1%. In 2006, the NHMSIII data show that 20% of respondents have private health insurance. Among these respondents, 8.5% have health insurance as part of a life insurance scheme, 4.6% own private health insurance, 6.7% have both types of insurance and 0.3% has other types of health insurance. In addition to data on out-of-pocket and private health insurance, the NHMSIII data have no information on other types of health care payment, such as employer, donation, free, and other types of payment.

The independent variables such as socioeconomic indicators (such as household monthly income, education levels, job status and job sector), demographic characteristics (such as gender, age, marital status and ethnicity), geographical indicators (such as state grouping and region), and health conditions and lifestyles (such as hypertension, diabetes, asthma, and smoking status) were also used in the analysis. All variables are dummy variables. One limitation of using the NHMS data is that the NHMSII and NHMSIII ask a slightly different set of questions. For the purpose of estimation, the present study chose health and lifestyles variables that were available in both datasets, such as hypertension, diabetes, asthma and

TABLE 1. Distribution of Health Care Payment in NHMSII and NHMSIII

Types of payment	Freq	%
NHMSII		
Self payment	18,534	62.43
Employer	5,826	19.62
Self-Employer-Insurance	1,109	3.74
Free	1,030	3.47
Self-Employer	870	2.93
Free-Self	498	1.68
Free-Employer-Insurance	107	0.36
Insurance	32	0.11
Other combinations	1,457	4.91
Missing, refused to answer or don't know	227	0.77
No. of observations	29,690	100.00
NHMSIII		
Health insurance	5,946	20.05
Type of private health insurance:		
A.Part of life insurance scheme	2,487	8.44
B.Medical health insurance scheme	1,350	4.60
C. Others	90	0.31
A and B	1,947	6.57
A, B and C	14	0.05
A and C	6	0.02
B and C	2	0.01
Missing	50	0.17
Not applicable	23,280	79.66
No. of observations	29,226	100.00

Source: Author's estimation

smoking to ensure that the results were comparable. There may be some concerns about the endogeneity of some of the independent variables treated as exogenous in each of the two cross-sectional data sets. It would be ideal to have instruments for marital status, labour force status, income and smoking. As we have remarked previously, however, the data is quite restrictive, and because it is focussed on health rather than being a general survey, credible instruments do not exist. We also note that the majority of the literature that has faced the same data problems has treated these variables as exogenous. Table 2 includes the definition of all variables used in the analysis.

In the present study, the income variable was categorised into eight groups, with the lowest income group earning RM 0 to RM 400 to the highest group, with income higher than RM 5,000. The categories were developed following the income category in the NHMSIII dataset given by the Ministry of Health. The most prevalent household income group was the middle income group, which earns between RM 1,000 and RM 2,000. This was chosen as the reference group. Data from the Third Outline Perspective Plan (2001–2010) show that the mean monthly household income in Malaysia increased significantly from RM 2,472 in 1999 to RM 3,249 in 2004. Income in urban areas is much higher than income in rural areas. The average annual growth rate of income between 2000 and 2004 is 5% in urban and 1.8% in rural areas. Meanwhile, the incidence of poverty decreased from 8.5% in 1999 to 5.7% in 2004. According to Malaysia's income poverty line, people are considered 'poor' if they have household monthly income less than RM 720 in Peninsular Malaysia, RM 960 in Sabah and Labuan and RM 830 in Sarawak (retrieved from http://www.kpkt.gov.my/kpkt/main.php). Table 3

TABLE 2. Definition of Variables from NHMSII and NHMSIII

Variables	Definition
Dependent variables:	
PHI	= 1 if respondent's payment for health care is made by insurance
HOSP	= 1 if respondent has been admitted to any hospitals during the past 12 months
Independent variables:	
Household income	
HHINC0_399	= 1 if average monthly income is between RM0 – RM400
HHINC400_699	= 1 if average monthly income is between RM400 – RM699
HHINC700_999	= 1 if average monthly income is between RM700 – RM999
HHINC1000_1999*	= 1 if average monthly income is between RM1000 – RM1999
HHINC2000_2999	= 1 if average monthly income is between RM2000 – RM2999
HHINC3000_3999	= 1 if average monthly income is between RM3000 – RM3999
HHINC4000_4999	= 1 if average monthly income is between RM4000 – RM4999
HHINC5000	= 1 if average monthly income is above RM5000
Education	
PRIMARY	= 1 if completed primary education
SECONDARY*	= 1 if completed secondary education
TERTIARY	= 1 if completed tertiary education
NO_EDUC	= 1 if has no formal education

Job status	
GOVEMP*	= 1 if works in government sector
PVTEMP	= 1 if works in private sector
SELFEMP	= 1 if self-employed
HOUSEWIFE	= 1 if a housewife
UNEMPLOYED	= 1 if unemployed
Job sector	
PROF_TECH	= 1 if works as a professional or technical and related works
CLERICAL	= 1 if works in the clerical sector
SERVICE_SALES*	= 1 if works in the service or sales sector
PRODUCTION	= 1 if works in the production sector
AGRICULTURE	= 1 if works in the agriculture sector
OTHER_JOBSECTOR	= 1 if works in other sectors
*Age*sex*	
AGEM21_35*	= 1 if male and aged between 21 – 35
AGEM36_45	= 1 if male and aged between 36 – 45
AGEM46_55	= 1 if male and aged between 46 – 55
AGEM56_65	= 1 if male and aged between 56 – 65
AGEM66	= 1 if male and aged above 65
AGEF21_35	= 1 if female and aged between 21 – 35
AGEF36_45	= 1 if female and aged between 36 – 45
AGEF46_55	= 1 if female and aged between 46 – 55
AGEF56_65	= 1 if female and aged between 56 – 65
AGEF66	= 1 if female and aged above 65
Marital status	
MARRIED*	= 1 if married
SINGLE	= 1 if single
Ethnic	
MALAY*	= 1 if Malay
CHINESE	= 1 if Chinese
INDIAN	= 1 if Indian
OTHER_BUMIS	= 1 if Bumiputera other than the Malays such as the Indigenous people or tribal ethnic in Sabah and Sarawak
OTHER_ETHNIC	= 1 if belongs to other ethnic groups
State grouping	
WEST_COAST*	= 1 if live in Johor, Malacca, Negeri Sembilan, Selangor, Perak, Penang, Kedah or Perlis in the West Coast of Peninsular Malaysia
EAST_COAST	= 1 if live in Kelantan, Terengganu or Pahang in the East Coast of Peninsular Malaysia
EAST_MSIA	= 1 if live in Sabah or Sarawak in the East Malaysia region
Region	
URBAN*	= 1 if living in urban area
RURAL	= 1 if living in rural area
Health and lifestyles	
HPT	= 1 if having hypertension
DIABETES	= 1 if having diabetes
ASTHMA	= 1 if having asthma
SMOKE	= 1 if currently smokes
Admission to private hospital	
PVTCARE	= 1 if respondent has been admitted to any private hospitals during the past 12 months

Note: Variable name with * is the reference group.

TABLE 3. Mean Monthly Gross Household Income and Incidence of Poverty by Region in Malaysia, 1999 and 2004

Strata	In current prices (RM)		Average annual growth rate (%) 2000 - 2004	Incidence of poverty (%)	
	1999	2004		1999	2004
Malaysia	2,472	3,249	5.6	8.5	5.7
Urban	3,103	3,956	5.0	3.3	2.5
Rural	1,718	1,875	1.8	14.8	11.9

Source: The Third Outline Perspective Plan 2001 – 2010, Malaysia (2001)

shows the distribution of income and incidence of poverty in Malaysia.

Education in Malaysia is highly centralised and is administered by the Ministry of Education and the Ministry of Higher Education. Children begin primary school at the age of seven for six years (standard 1–6), whereas secondary education extends for five years (form 1–5). In the analysis, the levels of education available were no formal education, primary, secondary and tertiary education. Meanwhile, the variable job status refers to respondents who are working as government employees, private employees, self-employed, housewife or unemployed. Those who are employed are categorised into job sectors such as professional and technical, clerical, service and sales, agriculture, production and other job sectors.

To determine whether age and gender influence the utilisation of health care, interaction variables were created for each age group and gender. It was expected that women in the reproductive period of 21 to 35 years old would have a significant effect on the utilisation of health care. The variable marital status was included to determine the same effect. Ethnicity was also predicted to influence the utilisation of health care. This variable was divided into five categories: Malay, Chinese, Indian, other Bumiputeras (e.g., tribal groups in Sarawak and Sabah such as Bajau, Kadazan, Melanau and Iban) and other ethnicities such as Europeans and other Asians. In 2000, the Population and Housing Census reported that of the total population of 22 million, Bumiputera (Bumiputera are Malays and other indigenous ethnic groups such as the Orang Asli (aborigines) in Peninsular Malaysia and the tribal peoples in Sabah and Sarawak) comprised 65.1%, Chinese 26.0% and Indians 7.7%, with the remaining consisting of a variety of ethnicities, among them the indigenous Orang Asli people (Department of Statistics 2000). The Population and Housing Census 2000 is the fourth census implemented since Malaysia was formed. The previous censuses were conducted in the 1970, 1980 and 1991.

Health care is administered at the federal level; however, significant state differences in utilisation may indicate regional supply differences. Thus, states were grouped into three regions: West Coast of Peninsular Malaysia, East Coast of Peninsular Malaysia and East Malaysia. The West Coast region is more developed than the East Coast and East Malaysia. Variables of urban and rural were also included to determine any differences exist that are associated with living in or outside a city.

To compare the results from NHMSII and NHMSIII, the reference group for each indicator was kept the same. The reference groups were individuals with household income between RM 1,000 and RM 2,000, a secondary education, government employees, service and sales sector, male aged between 21 to 35 years old, married, Malay, and live in the West Coast of Peninsular Malaysia and urban areas.

THE MODEL

To determine the extent of moral hazard effect of health insurance on health utilisation, the variable health insurance (*PHI*) was included in the hospital admission equations. A significantly positive coefficient means that people utilise more health care when they are insured. From the data, it is expected that health insurance will have a positive relationship with admission to hospitals.

Recognising the possible endogeneity of private health insurance status in explaining health care use, the present study used a recursive and seemingly unrelated bivariate probit model. The bivariate probit model with endogenous dummy variables belongs to the general class of simultaneous equation models that Heckman (1978) introduced. It builds on a first reduced-form equation for the potentially endogenous dummy and a second structural-form equation to determine the outcome of interest (Fabbri, Monfardini & Radice, 2004). As Fabbri et al. (2004) described, the equation can be written as below:

$$y_{1i}^* = \beta_1' x_{1i} + \mu_{1i} \qquad [1]$$

$$y_{2i}^* = \beta_{2i}' x_{2i} + \mu_{2i} = \delta_1 y_{1i} + \delta_2' z_{2i} + \mu_{2i} \qquad [2]$$

where y_{1i}^* and y_{2i}^* are latent variables, y_{1i} and y_{2i} are dichotomous variables observed following the rule:

$$\begin{cases} y_{1i} = 1 \; if \; y_{1i}^* > 0 \\ y_{2i} = 1 \; if \; y_{1i}^* > 0 \end{cases} ; l = 1,2; \qquad [3]$$

where x_{1i} and z_{2i} are vectors of exogenous variables, β_1 and δ_2 are parameter vectors, δ_1 is a scalar parameter, and $\beta_2' = (\delta_1 \delta_2')'$. The error terms are assumed to be

independently and identically distributed as bivariate normal, as shown in Equation 4:

$$\begin{pmatrix} \mu_{1i} \\ \mu_{2i} \end{pmatrix} \sim IIDN \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix} \right) \qquad [4]$$

In the estimation, the exogenous vectors include private socioeconomic variables, demographic variables, geographical indicators, health and lifestyle variables, and private inpatient care utilisation. The model consists of two structural form equations for health insurance (y^*_{iPHI}) and health care utilisation (y^*_{iHOSP}) as presented in Equations 5 and 6:

$$y^*_{iPHI} = \alpha'_{PHI} SOCIO_i + \beta'_{PHI} DEMO_i + \gamma'_{PHI} GEO_i + \delta'_{PHI} HEALTH_i + \varepsilon_{iPHI} \qquad [5]$$

$$y^*_{iHOSP} = \alpha'_{HOSP} SOCIO_i + \beta'_{HOSP} DEMO_i + \gamma'_{HOSP} GEO_i + \delta'_{HOSP} HEALTH_i + \vartheta'_{iHOSP} PVTCARE + y_{iPHI} + \varepsilon_{iHOSP} \qquad [6]$$

where

y^*_{iPHI} = Private health insurance status;

y^*_{iHOSP} = Health care utilisation (admission to either government or private hospital);

$SOCIO_i$ = Socioeconomic variables such as household monthly income, education level, job status and job sector;

$DEMO_i$ = Demographic variables such as age, gender, marital status andethnicity;

GEO_i = Geographical indicator of state grouping and region variables;

$HEALTH_i$ = Health and lifestyle variables;

$PVTCARE$ = Private inpatient care variable.

In the absence of mandatory private health insurance, the demand for private health insurance is potentially driven by the rising cost of health care so that individuals who expect to use health services are more likely to demand private health insurance. The bivariate probit model allows for correlations between the unobserved determinants of private health insurance and health care utilisation. As discussed, this endogeneity is accounted for in the econometric specification. Dealing with other possible sources of endogeneity in addition to this issue is difficult because of the nature of the data and added econometric complications.

DESCRIPTIVE STATISTICS

Table 4 presents the descriptive statistics of all variables used in the econometric analysis. The summary statistics are provided for all respondents and for individuals with private health insurance. This section discusses the means for individuals with private health insurance. In 1996, the weighted means for all respondents show that 5% of the respondents had private health insurance, which increased to 21% in 2006. The figures show that within 10 years, it became more popular for Malaysians to pay for private health insurance. For individuals with private health insurance, 10% were hospitalised in 1996, which decreasing to 4% in 2006. Among these, 3% and 2% went to private hospitals in 1996 and 2006, respectively.

In 1996, the data show a strange picture in which 22% of individuals with the lowest income (below RM 400) owned private health insurance; in second place are individuals with income between RM 1,000 and RM 1,999, whereas the highest income group (household income more than RM 5,000) has the lowest percentage of people opting for private health insurance (1%). Because the more affluent group usually comprises people who take up private health insurance, there is a possibility that some households underreported their income or over-reported their insurance. Nevertheless, in 2006 the data show a significant decrease of individuals with private health insurance below the income of RM 400 from 22%

TABLE 4. Sample Means, 1996 and 2006

Variable	1996		2006	
	All	With PHI	All	With PHI
	n=29,690		n=29,654	
PHI	0.05	-	0.21	-
HOSP	0.09	0.10	0.05	0.04
PVTCARE	0.02	0.03	0.01	0.02
Household income				
HHINC0_399	0.23	0.22	0.09	0.01
HHINC400_699	0.18	0.18	0.14	0.03
HHINC700_999	0.10	0.10	0.11	0.05
HHINC1000_1999	0.13	0.15	0.27	0.22
HHINC2000_2999	0.03	0.03	0.16	0.21
HHINC3000_3999	0.01	0.01	0.08	0.15
HHINC4000_4999	0.00	0.01	0.04	0.09
HHINC5000	0.01	0.01	0.10	0.23

Education				
PRIMARY	0.30	0.32	0.30	0.15
SECONDARY	0.39	0.41	0.47	0.57
TERTIARY	0.11	0.08	0.11	0.26
NO_EDUC	0.18	0.17	0.11	0.01
Job status				
GOVEMP	0.12	0.10	0.10	0.22
PVTEMP	0.29	0.28	0.31	0.42
SELFEMP	0.21	0.25	0.20	0.20
HOUSEWIFE	0.25	0.23	0.25	0.11
UNEMPLOYED	0.10	0.08	0.08	0.02
Job sector				
PROF_TECH	0.08	0.08	0.18	0.41
CLERICAL	0.05	0.04	0.06	0.10
SERVICE_SALES	0.16	0.16	0.17	0.19
PRODUCTION	0.15	0.19	0.06	0.07
AGRICULTURE	0.11	0.10	0.08	0.03
OTHER_JOBSECTOR	0.07	0.08	0.10	0.07
*Age*sex*				
AGEM21_35	0.18	0.18	0.14	0.20
AGEM36_45	0.11	0.11	0.11	0.17
AGEM46_55	0.08	0.09	0.09	0.13
AGEM56_65	0.05	0.06	0.06	0.04
AGEM66	0.03	0.04	0.04	0.01
AGEF21_35	0.23	0.20	0.19	0.19
AGEF36_45	0.13	0.14	0.14	0.14
AGEF46_55	0.08	0.08	0.12	0.09
AGEF56_65	0.06	0.06	0.06	0.03
AGEF66	0.04	0.04	0.05	0.00
Marital status				
MARRIED	0.64	0.66	0.78	0.80
SINGLE	0.36	0.34	0.13	0.17
Ethnic				
MALAY	0.45	0.48	0.54	0.40
CHINESE	0.26	0.34	0.22	0.41
INDIAN	0.07	0.09	0.09	0.12
OTHER_BUMIS	0.16	0.04	0.10	0.05
OTHER_ETHNIC	0.07	0.04	0.05	0.02
State				
WEST_COAST	0.56	0.92	0.66	0.75
EAST_COAST	0.14	0.02	0.14	0.11
EAST_MSIA	0.30	0.07	0.20	0.14
Strata				
URBAN	0.55	0.57	0.64	0.80
RURAL	0.45	0.43	0.36	0.20
Health and lifestyle				
HPT	0.10	0.10	0.15	0.11
DIABETES	0.04	0.05	0.08	0.05
ASTHMA	0.04	0.04	0.05	0.03
SMOKE	0.31	0.34	0.34	0.34

Note: Descriptive statistics are calculated using cross-section sample weights.
Source: Author's estimation

in 1996 to only 1% in 2006. The data show that people with middle income buy more private health insurance than the higher income groups.

The summary statistics show that taking up private health insurance is highest among individuals with secondary education, private sector employees, working in service and sales (in 1996), married, Malay and Chinese, and living in West Malaysia or urban areas. Among different age groups, both males and females in the age range from 21 to 46 are the most prevalent group with private health insurance. The means for the health conditions variables show that people with hypertension bought more private health insurance compared to people with diabetes and asthma. The small differences between the means for the entire population and those with private health insurance in 1996 suggests—as expected in a strongly risk-rated system—limited adverse selection. Furthermore, the lower rates for those with insurance in 2006 may suggest favourable selection on these conditions. Whereas more than 30% of smokers had private health insurance in both 1996 and 2006, little difference was observed between the entire population and those with insurance. This runs counter to the common finding of lower rates of smoking among the insured.

RESULTS

This section presents the results of a seemingly unrelated bivariate probit model that jointly models the uptake of private health insurance and the probability of at least one night's stay in a hospital. The findings for 1996 and 2006, reported in Table 5, include the z-statistics and the marginal effects (ME), that is, the change in the absolute probability of having private health insurance or being admitted to hospital. The first four columns of the estimates are the results for 1996; the last four columns report results for 2006. The barely significant and insignificant coefficients on the insurance dummy in the hospitalisation equations show that when observables are taken into account adequately, limited evidence emerges of moral hazard in 1996 and none in 2006. Furthermore, as observed in the raw differences in prevalence of conditions across the insured and uninsured, there is no evidence of adverse selection. There is evidence, however, in 2006 that diabetics are significantly less likely to hold insurance, perhaps because insurers offer unfavourable contracts or even refuse coverage.

The Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) were used to select the best model. We tested three model specifications: without exclusions of the health condition variables in Equations 1 and 2; with exclusion in Equation 1 only; and with exclusions in Equations 1 and 2. Based on the lowest AIC and BIC, the present study chose the bivariate probit model without the exclusion. Table 6 shows the AIC

and BIC results with (minus health and lifestyle variables) and without exclusion restrictions. Although Maddala (1983) argued that the parameters of the second equation are not identified if there were no exclusion restrictions on the exogenous regressors, Wilde (2000) proved that the classic identification problem actually does not exist. Problems will occur only if too small variations exist in the data. Given this evidence, the analysis used the bivariate probit model without any exclusion restrictions.

FACTORS AFFECTING THE DEMAND FOR PRIVATE HEALTH INSURANCE AND ITS IMPACT ON UTILISATION IN 1996

In 1996, the bivariate probit results show that the socioeconomic factors associated with higher private health insurances are income, education, job status, job sector, ethnicity, states and lifestyles. Compared to the omitted group, individuals with income between RM1,000 and RM 1,999, individuals with a lower level of income (RM 400–RM 699, RM 700–RM 999 and middle income from RM 2,000–RM 3,000) are less likely to purchase private health insurance. Furthermore, compared to individuals with secondary education, individuals with tertiary education are also less likely to buy private health insurance. This is most likely the case because highly educated individuals have access to generous health subsidies from their employer. For example, in the government sector, government employees enjoy free treatment at government clinics and hospitals (Government of Malaysia, 1974). In the private sector, top management or executives are subsidised by their employer, especially when they visit panel clinics or panel hospitals. Individuals who have no formal education, the professionals, those working in the production sector, the Chinese and smokers are more likely to have private health insurance. Individuals with no formal education are more likely to have private health insurance, because they are most likely to be self-employed and not covered by either the government or private employers. As such, they need private health insurance more than individuals who have higher educational levels. As expected, the unemployed are also less likely to buy private health insurance, whereas professional, technical and production sector workers have a higher probability of purchasing private health insurance.

In 1996, the results also show that demographic indicators such as ethnicity influence the probability of taking up private health insurance. The Chinese, for example, are more likely to have private health insurance, whereas individuals who live in less developed regions, such as the East Coast and East Malaysia, are less likely to buy private health insurance compared to individuals living on the West Coast. As expected, with the prevalence of risk rating, the present study found that health condition variables have no effects on people's

TABLE 5. Bivariate Probit and Marginal Effects for Private Health Insurance and Admission to Hospitals in Malaysia, 1996 and 2006

	1996				2006			
	PHI		HOSP		PHI		HOSP	
	ME	z-stat	ME	z-stat	ME	z-stat	ME	z-stat
HHINC0_399	0.0006	0.13	0.0059	0.82	-0.067	*6.35**	0.002	0.41
HHINC400_699	-0.0139	*2.94**	-0.0082	-0.91	-0.073	*9.94**	0.006	1.38
HHINC700_999	-0.0196	*3.66**	0.0232	*1.87*	-0.030	*4.05**	-0.002	-0.36
HHINC2000_2999	-0.0168	*2.28**	-0.0008	-0.05	0.047	*7.29**	0.002	0.57
HHINC3000_3999	-0.0149	-1.42	-0.0464	*1.69*	0.102	*11.89**	-0.003	-0.61
HHINC4000_4999	-0.0078	-0.48	-0.0293	-0.88	0.112	*9.66**	-0.002	-0.31
HHINC5000	0.0140	0.74	-0.0439	*2.17*	0.137	*15.47**	-0.010	*1.83*
PRIMARY	-0.0011	-0.25	-0.0108	-1.45	-0.065	*12.52**	0.000	0.05
TERTIARY	-0.0208	*3.83**	-0.0091	-0.61	0.055	*7.45**	-0.008	-1.61
NO_EDUC	0.0106	*1.74*	0.0026	0.25	-0.096	*10.18**	-0.008	-1.59
PVTEMP	-0.0091	-1.55	-0.0361	*3.95**	-0.049	*8.03**	-0.013	*3.15**
SELFEMP	0.0084	1.33	-0.0446	*5.12**	-0.040	*5.55**	-0.012	*2.61**
HOUSEWIFE	-0.0043	-0.62	-0.0060	-0.51	-0.108	*14.10**	0.001	0.24
UNEMPLOYED	-0.0145	*1.98*	0.0150	1.16	-0.098	*10.32**	0.008	1.23
PROF_TECH	0.0248	*2.79**	-0.0056	-0.46	0.087	*11.25**	0.003	0.51
CLERICAL	0.0050	0.32	0.0029	0.15	0.074	*7.07**	0.006	0.87
PRODUCTION	0.0122	*2.04**	0.0088	0.85	0.007	0.79	-0.005	-0.77
AGRICULTURE	-0.0013	-0.21	0.0187	1.55	-0.033	*3.32**	0.005	0.88
OTHER_JOBSECTOR	0.0071	0.92	-0.0043	-0.27	-0.018	*2.26**	0.001	0.21
AGEM36_45	-0.0041	-0.67	0.0080	0.65	0.012	1.57	-0.006	-1.01
AGEM46_55	-0.0037	-0.55	0.0286	*1.93*	-0.017	*2.04**	0.001	0.24
AGEM56_65	0.0029	0.34	0.0356	*2.28**	-0.085	*10.03**	0.010	1.38
AGEM66	0.0155	1.42	0.0522	*2.62**	-0.129	*12.23**	0.018	*2.03**
AGEF21_35	-0.0007	-0.09	0.1463	*7.76**	-0.044	*5.93**	0.034	*5.37**
AGEF36_45	0.0036	0.45	0.0545	*3.80**	-0.028	*3.36**	0.009	1.41
AGEF46_55	-0.0053	-0.67	0.0069	0.50	-0.045	*5.03**	0.004	0.56
AGEF56_65	0.0008	0.09	0.0020	0.14	-0.080	*7.58**	-0.007	-0.95
AGEF66	0.0019	0.17	0.0322	1.69	-0.125	*9.44**	0.019	*2.11**
SINGLE	-0.0024	-0.49	-0.0114	-1.60	-0.022	*3.69**	-0.005	-1.09
CHINESE	0.0068	*1.65*	-0.0348	*4.16**	0.258	*36.21**	-0.019	*4.07**
INDIAN	-0.0080	-1.37	0.0418	*3.94**	0.156	*16.97**	0.011	*2.27**
OTHER_BUMIS	0.0152	1.10	0.0331	1.06	0.036	*3.58**	0.017	*3.00**
OTHER_ETHNIC	0.0010	0.09	0.0127	0.69	-0.036	*3.13**	-0.011	*1.88*
EAST_COAST	-0.0592	*6.68**	0.0283	*2.60**	0.020	*3.08**	0.013	*3.45**
EAST_MSIA	-0.0531	*9.71**	-0.0053	-0.37	-0.043	*6.74**	-0.012	*2.99
RURAL	-0.0052	-1.50	0.0209	*3.17**	0.003	0.61	-0.000	-0.00
HPT	-0.0008	-0.17	0.0430	*5.27**	-0.002	-0.28	0.030	*7.70**
DIABETES	-0.0055	-0.82	0.0616	*5.39**	-0.020	*2.20**	0.041	*8.03**
ASTHMA	-0.0045	-0.62	0.0727	*6.07**	-0.013	-1.21	0.046	*7.72**
SMOKE	0.0106	*2.25**	0.0148	*1.94*	-0.007	-1.19	0.015	*4.04**
PHI	-	-	0.1129	*1.83*		-	-0.014	-1.05
PVTCARE	-	-	0.9496	*32.43**		-	0.965	*128.40**
CONSTANT	-	*14.35**		*14.16**		*13.77**		*20.57**
Sample size		21,292				29,654		
χ² (df)		14,379.64 (82)				61826.29 (82)		
Rho (t)		0.1439 (-1.83)				0.1023 (1.07)		
Log likelihood		-3099584.1				-5956409.0		

Note: * Significant at 10% level. ** Significant at 5% level.
Source: Author's estimation

TABLE 6. AIC and BIC Results

	AIC	BIC
1996 (n=21,292)		
Full bivariate probit model	6202435	6203113
Bivariate probit model without health and lifestyles variables in equation 1	6205884	6206529
Bivariate probit model without health and lifestyles variables in equation 1 and 2	6257409	6258023
2006 (n=29,654)		
Full bivariate probit model*	1.19e+07	1.19e+07
Bivariate probit model without health and lifestyles variables in equation 1	1.19e+07	1.19e+07
Bivariate probit model without health and lifestyles variables in equation 1 and 2	1.20e+07	1.20e+07

Source: Author's estimation

Based on the 1996 data, we selected the full bivariate probit model even though the AIC and BIC in 2006 for full bivariate probit model and bivariate probit model without health and lifestyles variables in equation 1 are the same

decision to buy private health insurance. Nevertheless, smoking is found to be positively significant for people to take up health insurance.

The marginal effects in the private health insurance equation are very small and do not show a significant impact of the variables on the probability of having private health insurance. Overall, the highest effect is seen for the geographic indicator, which shows a 10% decrease in living in the East Coast and East Malaysia decreases the propensity to take up private health insurance for 5.9 and 5.3% respectively.

The second equation examined the factors affecting hospitalisation at government and private hospitals, conditional on private health insurance ownership. We found that individuals with income between RM 700 and RM 999, a group less likely to have private health insurance, are more likely to be admitted to hospitals. While those in the higher income category (RM 3,000–RM 4,000 and above RM 5,000) are less likely to be admitted. Compared to government employees, private employees and the self-employed are less likely to be admitted to hospitals. Notably, level of education and job sector have no significant effect on hospitalisation.

The demographic indicators show that age has strong effects on hospitalisation. Older males (older than 45 years old) and females in the reproductive age (aged 21 to 45 years old) are more likely to be hospitalised than other age groups. Compared to the Malays, the Chinese are less likely to be hospitalised, whereas the Indians are more likely to be hospitalised. Individuals living on the East Coast and in rural areas bring a positive effect on hospitalisation. Most importantly, all health condition and lifestyles variables show a positive relationship with hospitalisation. Choosing private care also shows a highly significant effect on hospitalisation. Finally, the 1996 results show that individuals with private health insurance are 11.3% more likely to visit a hospital. This indicates that these individuals seek more care when they get sick, consistent with moral hazard behaviour. The effect is only significant, however, at the 10% level. The effect is insignificant in the 2006 data.

The highest marginal effects in the hospitalisation equation show that a 10% increase in being female aged 21 to 35 years old increases hospitalisation by 14.6%. Private care increases hospitalisation by 11.3%, asthma by 7.3%, and diabetes by 6.2%.

The *rho* estimate reported at the end of Table 5 measures the correlation of the residuals from the two models. After accounting for the impacts of observable individual heterogeneity and other factors, a negative correlation (−1.83) is found between taking up private health insurance and hospitalisation in 1996. This indicates that unobserved characteristics of the sample (or random factors) that endow individuals with a higher a probability of having private health insurance also give them a lower probability of being admitted to hospitals. There are potentially important unobserved household characteristics such as family size or number of children that might positively affect the probability of purchasing private health insurance, but at the same time those unobservable also negatively affect hospitalisation.

FACTORS AFFECTING THE DEMAND FOR PRIVATE HEALTH INSURANCE AND ITS IMPACT ON UTILISATION IN 2006

In 2006, the NHMSIII data show that almost all variables have significant effects on the decision to purchase private health insurance. First, the results show strong socioeconomic differences. Purchasing private health insurance is associated with higher income when individuals with household monthly income of more than RM 1,000 to RM 1,999 (the reference group) are more likely to have private health insurance, whereas on the other hand, individuals with monthly income lower than the reference group are less likely to buy private health insurance. Education also plays an important role in determining the probability of having insurance. The results suggest that compared to individuals with secondary education, individuals with primary education or who received no formal education are less likely to

have private health insurance. In contrast, maybe due to many interesting health insurance policies available in the market and with better information from higher education, individuals with tertiary education are more likely to purchase private health insurance in 2006.

Notably, the sample means in Table 4 show that 42% of private employees have private health insurance. The bivariate probit results, however, show that individuals who work as private employees are less likely to have private health insurance than government employees. The self-employed, housewives and the unemployed are also less likely to purchase private health insurance compared to government employees. The introduction of CuepacsCARE for government employees and civil servants in 1999 increased the trend of taking up private health insurance among public sector employees. Furthermore, because government employees must pay out-of-pocket when they seek treatment at private hospitals, they are likely to purchase private health insurance to avoid the waiting lists and longer waiting times at government hospitals. On the other hand, most private employees do not purchase private health insurance, because they have access to treatment at private hospitals through their employment health benefits. Meanwhile, individuals who are working as professionals, technical or clerical workers are more likely to have private health insurance, whereas persons who are working in agriculture and other job sectors are less likely to have private health insurance.

Older men above the age of 45 years and all women aged 21 years and above as well as individuals who are not married are less likely to have private health insurance. Compared to Malays, the Chinese, Indian and other Bumiputeras have a higher probability of securing private health insurance, whereas other ethnicity variables show otherwise.

Despite living in the least developed states, individuals in the Eastern Region (Pahang, Terengganu and Kelantan) are more likely to purchase private health insurance compared to individuals who live on the West Coast. This might be the case because the distribution of government employees is higher on the East Coast (11.9%) than on the West Coast (9.3%) and in East Malaysia (11.8%). As noted, the present study found that government employees are more likely to have private health insurance. Because most insurance companies exclude individuals with pre-existing conditions from purchasing private health insurance, the present study found that similar to 1996 results, all health condition variables were not significant in determining the purchase of private health insurance except for those with diabetes. Because private health insurance plans do not cover pre-existing illnesses or conditions, individuals with diabetes are less likely to purchase private health insurance.

In 2006, the marginal effects for the private health insurance equation shows that taking up private health insurance correspond to changes in income. Indeed, a 10% increase of income beyond RM 3,000 increases the probability of having private health insurance by more than 10%. Being a housewife, male or female aged above 66 years and Chinese also increases the probability of purchasing private health insurance by more than 10%. Among all the dependent variables, being Chinese shows a very significant effect with a marginal effect of 25.8%.

Results from the hospitalisation equation show that income does not significantly affect the probability of being admitted to hospitals except for individuals with income higher than RM 5,000. This income group is less likely to be admitted to hospitals. Education levels have no effect on hospitalisation. Nevertheless, the probability of being admitted to hospital is influenced by job status, whereby private employees and the self-employed are less likely to be admitted. In 2006, only males and females older than 66 and females in the reproductive years of 21 to 35 are more likely to be admitted. Ethnicity variables show that the Chinese and other ethnicities are less likely to be admitted, whereas Indians and other Bumiputeras are more likely to be admitted to hospitals than Malays. States variables show that individuals who live on the East Coast are more likely to be admitted to hospitals, whereas people living in East Malaysia are less likely to be hospitalised compared to the West Coast. Similar to the results in 1996, heath condition and lifestyle variables as well as the private care variable show a strongly positive relationship with being admitted.

Comparing the marginal effects between 1996 and 2006 for the private health insurance and hospitalisation equations shows that the effects of having private health insurance are higher in 2006, whereas the marginal effects for hospitalisation are higher in the 1996 data. Finally, this study found that the private health insurance variable is not significant in influencing hospitalisation behaviour. This means that there is no moral hazard effect from the purchase of private health insurance. Overall the results show that these two equations are not correlated (*rho*=0.10), which is not statistically significant.

CONCLUSION

The present research investigated factors that influence private health insurance ownership and admission to hospitals in Malaysia using National Health and Morbidity Survey data from 1996 and 2006. Within 10 years, health insurance became more popular due to rising health care expenses in the private health sector. Given the possibility that individuals with health insurance will utilise more health care, as predicted by the moral hazard theory, the present study examined the size of the potential association between health insurance and admission to hospitals. The present study estimated a bivariate probit model in which the two behavioural equations were jointly estimated as a system with

correlated error terms to model an individual's choice of health insurance and admission to hospitals.

In the analysis, the effects of income, education level, job status, job sector, age, gender, marital status, ethnicity, states, region, and health conditions and lifestyles on the two behavioural models were tested. Using the 1996 data, the results suggest that income, education, job status, job sector, ethnicity, states and smoking influence the decision to purchase private health insurance. In 2006, however, almost all variables influence the health insurance decision (except region and health conditions such as hypertension, asthma and smoking).

From the analysis, several points are important to highlight. First, in 1996, the lower income groups were less likely to have private health insurance, but higher income was not significant in affecting the decision for private health insurance. In 2006, the lower income group was still less likely to have private health insurance, but the higher income groups were now more likely to have private health insurance. This might be explained by the country's steady economic growth and higher individual income in 2006. Rising income also increases expectations and demands for better health care, which leads to an increase in the costs of treatment (Economic Planning Unit, 1996). This, in turn, increases the demand for private health insurance. Moreover, the increasing popularity of private health insurance to cover increasing health care costs is an important factor that influences the private health insurance decision. Second, individuals with a higher educational level were more likely to have private health insurance in 2006 compared to 1996. Increasing awareness among the population about the importance of having health insurance to cover health care costs might be one of the reasons for this finding. Third, among different ethnic groups, only the Chinese were found to be more likely to have private health insurance in 1996. In 2006, however, the Chinese, Indians and other Bumiputeras are significant in influencing the decision for private health insurance. This findings show that private health insurance has become more popular and larger in terms of coverage and also more affordable among ethnicities other than the Chinese.

The present study also found that the health insurance variable is not significant in the admission model, which suggests no evidence exists of moral hazard behaviour in the 2006 data. In Malaysia, private health insurance is used commonly for hospitalisation and surgical treatment at both the government and private hospitals. Because the government and private hospitals are usually located in urban areas, the use of private health insurance is limited to individuals who live in these areas. As a result, the findings demonstrate that individuals with lower income, a lower level of education, living in rural areas or in less developed regions, being a housewife, a student or unemployed are less likely to have private health insurance or have someone else pay for their health care. Being in these disadvantaged groups

might affect an individual decision to go to hospital or to get treatment. Moreover, the 1996 and 2006 data show that people with health insurance tend to visit private hospitals. Since the government is planning to introduce a national health insurance scheme, this study supports the findings of Alvin (1996) which recommended that in addition to the existing methods of financing, Malaysia should introduce social insurance that subsidises the poor and provides little or no subsidy to the upper and middle income groups. If the government plans to introduce a new health financing scheme in the future, any policy reforms should consider its consequences on the less advantaged group especially the poor.

In the future, with the availability of comprehensive health insurance data, research on asymmetric information such as adverse selection effects should be conducted. It is hoped that the present study's findings will assist policy makers fill the knowledge gap created by the limited number of empirical studies on the importance of health care financing alternatives in Malaysia.

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