

The Determinants of Private Medical Insurance Prevalence in England, 1997–2000

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Objective. The aim of this paper is to identify the factors that determine the prevalence of private medical insurance (PMI) in England.

Data Sources/Study Setting. Secondary data sources are the British Household Panel Survey (BHPS) 1997–2000, Laing’s Healthcare Market Review 1999–2000, the United Kingdom (U.K.) Department of Health’s National Health Service Waiting Times Team, and the Work Force Statistics Branch of the Department of Health.

Study Design. Logistic regression models for panel data were used to compare non-PMI subscribers with individual subscribers and those with employer-provided PMI.

Data Collection/Extraction Methods. The BHPS data are collected by the Institute for Social and Economic Research at the University of Essex. Other data used were collected by Laing and Buisson and the U.K. Department of Health.

Principal Findings. Individual PMI is more prevalent among the well-educated and healthy. Income, age, sex, and political preference are key determinants of PMI prevalence for both individual and employer paid PMI. Individuals are also likely to reflect on information with regard to waiting times in deciding whether or not to purchase PMI cover. The withdrawal of the tax subsidy in 1997 to PMI subscribers over 60 years of age did not impact on their rate of withdrawal from PMI coverage relative to the rate among all PMI subscribers, but may have discouraged potential new subscribers.

Conclusions. Current trends in the PMI market suggest that, over time, individually purchased PMI is likely to be partially displaced by PMI purchased as part of a company-based plan. However, having PMI is linked to economic factors in both groups, suggesting a similar segment of the population valuing the responsiveness that PMI provides. Geographic factors relating to waiting times and supply-side factors are associated with both individual and company-based PMI. The withdrawal of the tax subsidy to individual subscribers older than age of 60 resulted in a significant decline in the demand for PMI. In particular, the number of new subscribers in this group declined substantially.

Key Words. Insurance, health, private medical insurance, waiting lists, National Health Service, England

The aim of this paper is to examine possible determinants of the prevalence of private medical insurance (PMI) in England. The entire British public has access to free care in the National Health Service (NHS) financed by general

taxation and national insurance paid by all employed United Kingdom (U.K.) residents. There is no option for U.K. residents to opt out of contributing to the NHS, and NHS coverage is comprehensive. Thus, PMI is supplementary, typically purchased to guarantee faster access to health care (particularly specialists) and in some cases, better amenities in health care facilities. In the United Kingdom, PMI covers treatment for curable, short-term illness or injury. PMI does not cover general practitioner (GP) services, chronic conditions, or conditions an individual had prior to taking out insurance. At the end of year 2000, 6.88 million people in the U.K. (approximately 11.5 percent of the population) were covered by PMI and the value of the PMI market was estimated at £2.45 billion (Laing and Buisson 2001), 5.1 percent of the estimated year 2000/2001 NHS expenditure of £48 billion.

Since 1988, Laing and Buisson, an independent specialist consultancy in health and community care, have reviewed the U.K. PMI market. The number of subscribers covered through an employer-paid plan has increased by approximately 23 percent since 1990, while during the same period, the number of subscribers who were either paying individually or as employees (as partial payment of a company plan) declined by about 6 percent (Laing and Buisson 2001). At the end of 2000, 66.5 percent of PMI subscribers were in plans fully paid for by their employer (Laing and Buisson 2001).

Tax policies introduced between 1979 and 1997 encouraged both employer-paid and individual PMI subscription. Employers did not pay employers' National Insurance contributions on PMI provided to employees as a benefit-in-kind.¹ And in 1990, tax relief on the total premium cost, at the marginal tax rate, was provided to holders of individual PMI over age 60 years.

Some of these incentives were weakened in 1997. Tax relief for individual PMI premiums paid by those over the age of 60 years was discontinued (Laing and Buisson 2000b) and the Insurance Premium Tax on all PMI policies (in effect, a sales tax on PMI purchase) was increased to 5 percent from 4 percent (introduced in October 1994 at an initial rate of 2.5 percent [HM Customs and Excise 2001]). Also, in April 2000 the government extended employer-paid national insurance contributions² to cover PMI benefits in kind (Laing and Buisson 2000b). Evidence exists to suggest that incentives intended to increase PMI prevalence were expensive, and largely unsuccessful in

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stimulating demand (Emmerson, Frayne, and Goodman 2001). Furthermore, the elimination of tax relief for those over age 60 years increased premiums for individual subscribers in this age group by 29.9 percent (Emmerson, Frayne, and Goodman 2001).

The future trend of PMI prevalence may be influenced by two factors: substantial increases in premiums on individual PMI policies (over the calendar year 1999 they were estimated to have increased by over 15 percent or five times the rate of inflation in 1999 [Laing and Buisson 2001; U.K. National Statistics 2001] and the current government's significant increase in funding to the NHS, pledging to increase real NHS spending by 7.3 percent in each year until 2007 [HM Treasury 2002]).

Data from the British Household Panel Survey (BHPS) 1997–2000, the U.K. Department of Health and Laing's Healthcare Market Review 1999–2000, are used in this analysis. The panel nature of the survey allows a national, representative sample of households to be followed over the years for which data on PMI subscription are available. The BHPS has not previously been used to examine determinants of PMI prevalence. Previous analysis utilized cross-sectional data that do not well reflect the dynamic nature of the PMI market. Insurance status, PMI policy changes, individual circumstances and waiting lists are all subject to change over time. Our analysis also incorporates data from other sources. We include data on inpatient and outpatient waiting times estimated at the health authority (HA) and regional level (provided by the NHS Waiting Times Team), as well as data on the number of private acute care beds, at the regional level (Laing and Buisson 2000a), and estimates of the regional distribution of physicians working in the private health care sector (DH 2001). The results provide new evidence as to what factors determine the size of the PMI market in England.

MODELLING THE DECISION TO PURCHASE PMI

Several factors impact on the decision to purchase PMI. These include the perceived magnitude of a potential loss because of illness, relative to income and an individual's degree of risk aversion (Cutler and Zeckhauser 2000; Santerre and Neun 2000). Choice and convenience, as offered by a private health care alternative, are also benefits sought by PMI subscribers (Bosanquet and Pollard 1997; Barr 1998). In some cases quality of care available through private insurance, relative to that available through an NHS system, may also be an incentive (Besley, Hall, and Preston 1999).

Price effects are also important. The recent increase in premiums in the individual PMI market, and the concurrent decline in the prevalence of individual PMI coverage, may reflect relatively high price elasticity in this market.

The theory of insurance markets places significance on the concept of risk aversion (Cutler and Zeckhauser 2000). An individual is risk averse if he or she is willing to pay to guarantee certainty and avoid a potential loss of uncertain size. Measuring risk aversion is difficult, however. At best, surveys are able to measure factors that contribute to uncertainty and the potential for loss. In a health system where services are publicly financed, care is typically provided free at the point of use and therefore uncertainty of financial loss relating to poor health does not exist.

Within the U.K. context, a key motivating factor in choosing to purchase PMI is to avoid waiting for treatment within the NHS. The impact of waiting times on PMI prevalence may reflect, to a degree, a preference for timely health care as opposed to having to wait for care. Waiting times are only one aspect of NHS performance that may influence demand for PMI, however. Quality, in terms of health outcomes and facilities, and patient experiences are other important factors (Besley, Hall, and Preston 1999).

Other supply-side factors may also be relevant. While the BHPS data do not indicate whether or not respondents are aware of the accessible private facilities in their area, data on their prevalence can be used to indicate the likely impact they have in the decision by individuals to purchase PMI coverage (Propper, Rees, and Green 2001). The relative significance of individual awareness of accessible facilities versus their actual prevalence may be minor if the individual is reliant on their GP for advice with regard to the merits of the private versus the public sector.

Thus, the theory and evidence on the PMI purchase decision suggests examining factors relating to the impact of personal characteristics such as income, employment status, age, and attitude to the private sector, along with premium costs, risk aversion, NHS performance, and the prevalence of private facilities. The data from the BHPS and our other sources are suitable for examining some of these factors but not others. The impact of disposable income, age, political preference, employment sector, waiting times, and the supply of private facilities can be assessed with the data assembled.

METHODS

The BHPS began including questions relating to the prevalence of PMI in its sixth wave, in 1996. The BHPS is conducted by the Institute for Social and

Economic Research (ISER) at the University of Essex. The initial sample for Wave One of the BHPS consisted of 8,167 issued addresses in Britain, drawn from the Postcode Address File. The initial selection of households for inclusion in the survey was made using a two-stage clustered probability design and systematic sampling (ISER 2001). The sample for the subsequent waves consists of all individuals over age 15 in all households containing at least one member who was resident in a household interviewed at Wave One. Further information on the sampling and survey design is available from the BHPS Online documentation (ISER 2001).

Three questions in the BHPS describe PMI coverage. Respondents are asked if they are covered by PMI, how the insurance is paid for (if they are covered), and what is the cost to the respondent of the medical insurance. The possible determinants of medical insurance prevalence identified in the BHPS were: age, educational achievement, income, area of residence, whether the respondent is in paid employment, political party supported, sex, self-reported health status, whether the respondent smokes, whether the respondent lives alone or with a partner, and whether or not there are children living in the respondent's household.

Data on waiting lists and waiting times, aggregated by health authorities, were linked to individual responses according to their place of residence.³ The geographic unit of place of residence in the BHPS is local authority. Because local authorities and health authorities are not co-terminus, some waiting times data were averaged across health authorities. The indices employed were the percentage of patients who waited over 6 months for an inpatient stay and the percentage of patients who waited over 13 weeks for an outpatient appointment. While it is true that waiting lists and waiting times would not necessarily be consistent within a HA, and thus would not influence individuals within a HA identically, this seemed the most appropriate way to take account of the extent to which respondents were influenced by the level of wait encountered in the NHS. Sensitivity analysis incorporating regionally aggregated waiting times data was conducted to determine if the unit of aggregation of waiting times data influenced the results. Finally, because variations exist in how waiting lists are determined in England, Scotland, and Wales, we restricted our analysis to residents of England.

We obtained data on the supply of private beds, at the regional level, in 1997 (Laing 1997). Within much of England, the distribution of private facilities is such that the population will not have access to more than one facility. This is not the case in London and the southeast, however, where the concentration of facilities is relatively high. For this reason, we used the wider

regional level to assign access to private beds to respondents. The number of private acute medical and surgical beds per 100,000 population was calculated for each region (ONS 1998).

Additionally, we examined the effect of the regional distribution of physicians and surgeons working in the private sector. To approximate this data we included the number of NHS physicians and surgeons working under maximum part-time and part-time contracts per 100,000 population in each of the eight regions in England as of September 2000.⁴ The distribution of surgeons across contract type varies considerably from that of consultant physicians overall, with a greater proportion of them working under maximum part-time contracts. Based on Department of Health data taken in September 2000, 26.7 percent of consultant physicians were working under maximum part-time contracts, while within the surgical group the corresponding percentage was 43.9 percent (DH 2001). This data may not accurately reflect private work, however, as many physicians may be working part-time in the NHS to allow for time to utilize in other ways.

With both the private bed and physician data, the regional classification was based on aggregation across health authorities. These data were linked to local authority place of residence of individuals as described above for the waiting times data.

The BHPS data differentiates between individuals who purchase PMI individually, and those who receive PMI as an employment benefit for which they do not pay directly. Some individuals report being covered under a policy in a family member's name. It is not always clear from the data, however, if the person under whose name they receive coverage paid the insurance premiums individually or through an employment-based plan. As such, respondents covered by a family member's coverage are excluded from our primary analysis.

Also, some individuals pay part of the premium for employment-based group coverage. Some of these individuals would be in a position to choose whether or not to subscribe, given that the premiums are coming out of their earnings. Thus, they are expressing demand for PMI. We can also assume, however, that the premiums they pay as part of a group plan are less than that, which they would have encountered had they purchased individually. So while some may have purchased PMI regardless, some may have chosen not to purchase PMI if they had been faced with a higher premium. Because of the variability in the circumstances likely within this subgroup, and the fact that they represent only 1.7 percent of the total sample (2000 data), we chose to exclude them from the primary analyses. To determine the extent of the effect

of these exclusions, we conducted a sensitivity analysis comparing all respondents with PMI coverage with those without PMI.

By focusing on the PMI purchase decision, net of demand, and supply effects, we will be estimating a “reduced-form” equation. Reduced-form equations show how the equilibrium values of the endogenous variables change as a function of the exogenous variables (Besanko and Braeutigam 2002). This approach limits us in being able to show the structure of causalities, however, and does not allow us to estimate the impact of specific factors on either side of the market. Attempting to estimate the full structural model would require identifying the demand and supply functions separately in two independent models. This would require identifying exogenous variables that relate exclusively to either changes in demand or supply. The nature of the PMI market makes this task very difficult because of the fact that many effects are likely to simultaneously impact on demand and supply. Note also that structural models would also require information on price and cover for each respondent.

The data were first modeled using a random effects logistic regression model for the 1997–2000 BHPS data (model 1) comparing individual subscribers with nonsubscribers. The within-respondent effect across the panels of data was accounted for in the model. A similar model was then run on the subset of employed respondents comparing those who receive PMI as a benefit from their employer and nonsubscribers (model 2). Data for 1996 were not included in either of these models because of the unavailability of outpatient waiting times at the HA level for this year. In the case that data for a particular respondent were not available for one of the years considered, the model allowed for inclusion of data for those years that were available.

The panel nature of the data also allows for consideration of lagged effects. Because the effect of NHS waiting times may not have an immediate impact on the insurance purchase decision, models were considered in which NHS waiting times data from 1997, 1998, and 1999 were matched by HA to BHPS data for 1998, 1999, and 2000, respectively. Again, random effect logistic regression models that incorporated the within-respondent effect across the panel were estimated, comparing individual subscribers with nonsubscribers (model 3) and those with employer-paid PMI with employed nonsubscribers (model 4).

An additional analysis estimated the price elasticity of demand for PMI within the subsample of individual subscribers over age 60 years. The change in tax treatment of PMI premiums for this group is suited for assessing the effect of a change in price of PMI on demand. Variations in demand are

minimized by comparing similar individuals before and after the tax reform (Gruber and Poterba 1994). The percentage change in the proportion of individuals with individual PMI before and after 1997, when tax relief on premiums for the over 60s was withdrawn, was taken as an estimate of the crude change in demand. The product of an individual's PMI premium and their marginal tax rate⁵ (based on their reported income) estimates the change in the purchase price of PMI. The percentage change in purchase price was estimated as the ratio of this change in price to the real (subsidy adjusted) price. This assumes that insurers did not substantially alter the premiums charged to this group in response to the change in tax treatment.

The statistical package *STATA* was used to estimate the significance level of each term in the models (that is, the significance level of each effect over and above that observed from the other effects in the model) (STATA 1999). In all the models we deemed *p*-values below 0.05 to indicate statistical significant associations.

RESULTS

The 1996 sample of the BHPS included 7,910 individuals who reside in England. In the years 1997, 1998, 1999, and 2000 the sample lost 7.6 percent, 8.0 percent, 8.0 percent, and 8.1 percent respondents, respectively. The overall sample size increased, however, to 8,529 individuals in 2000. This is the result of additional individuals being included in the sample as individuals come to share a household with an original sample member.

The 2000 sample included 383 individuals who had individually purchased PMI (4.5 percent of sample), 134 who were part of a company PMI plan in which the premium was deducted from their salary (1.6 percent), 452 who received PMI as a benefit from their employer (5.3 percent), and 439 who were covered by a plan held by a family member (5.1 percent). Six hundred and eighty-one respondents (8.0 percent) did not complete the BHPS PMI questions in the year 2000. Table 1 lists comparisons of the insurance type subgroups.

A high level of correlation was observed between the supply of private beds, the prevalence of part-time surgeons, and the prevalence of part-time physicians. For this reason, each model was estimated with each term individually and the results compared. In each case the prevalence of private surgeons contributed the most to the overall significance of the model.

Model 1 results deemed statistically significant determinants of individual PMI prevalence to be education, income, sex, job stature, age, political

Table 1: Comparison of Demographic Characteristics by Type of PMI Cover (2000 Data)

	<i>Individual</i> (<i>n</i> = 423)	<i>Company Plan—Employee Financed</i> (<i>n</i> = 148)	<i>Company Plan—Employer Financed</i> (<i>n</i> = 501)	<i>Covered by Family Member</i> (<i>n</i> = 479)	<i>No PMI</i> (<i>n</i> = 7,163)
Age (years, mean)	50.7	40.9	38.5	40.3	45.7
Monthly income (mean)	£1,731	£1,977	£2,462	£964	£953
% female	43.5	27.7	30.9	75.4	55.7
% with post-secondary education	53.1	48.6	64.0	43.7	34.0
% in poor health	5.9	2.7	3.0	4.4	10.9
% resident in London	11.2	14.9	16.6	14.6	10.1

PMI = private medical insurance.

preference, inpatient and outpatient waiting times, and supply of private surgeons in the region (see Table 2). With respect to education, those with a basic level of education (up to age 17 years) or above were over six times as likely to have PMI relative to those without this level of education. Age illustrates an association that change at different points in its distribution. This is reflected in the significance of both linear and squared terms for this variable. The association between smoking and not having individual PMI approached statistical significance ($p = .079$).

In the comparison of those receiving PMI as a fully paid benefit from their employer and employed nonsubscribers, the significant determinants were education, income, job stature, sex, age, being a nonsmoker, political preference, outpatient waiting times, supply of private surgeons in the region, and living with children (see Table 2). As in the previous model, the effect of age is nonlinear.

Those in professional or managerial occupations were over nine times as likely to have employer paid PMI than other workers. Employer-paid PMI was also significantly more prevalent among men, non-smokers, and Conservative voters. It was significantly less prevalent among those living in a household with children. And as the prevalence of private surgeons in the respondents region of residence increased, so too did the prevalence of employer paid PMI.

The two models were repeated in analyses accounting for the potential lag between receipt of information on waiting times and its effect on the decision to purchase PMI. This analysis incorporated data for 1998, 1999, and

Table 2: Determinants of PMI Prevalence, 1996–2000

<i>Independent Variables</i>	<i>Model 1: Individually Purchased PMI (n = 8,025)</i>		<i>Model 2: Employer-Financed PMI (n = 5,069)</i>	
	<i>Odds Ratio</i>	<i>p-Value</i>	<i>Odds Ratio</i>	<i>p-Value</i>
Resident in London. . .relative to all other regions	0.69	.204	1.53	.219
Post secondary school qualifications. . .	7.92	<.001	6.31	<.001
Secondary school. . .	7.00	<.001	10.53	.002
Basic. . .relative to less than basic qualification	8.54	<.001	5.64	<.001
In paid work. . .relative to not in paid work	2.13	.001	–	–
Income (for every extra £1/month)	1.0002	<.001	1.001	<.001
Professional or manager. . .relative to semi-skilled, unskilled, or unemployed	1.84	.005	9.58	<.001
Female. . .relative to male	0.32	<.001	0.20	<.001
Age (for each added year)	1.29	<.001	1.67	<.001
Age ²	0.999	<.001	0.99	<.001
Good health. . .	1.33	.239	1.51	.253
Average health. . .relative to poor health	1.10	.689	0.75	.444
Smoker. . .relative to nonsmoker	0.69	.079	0.28	<.001
Living with spouse or partner. . .relative to living without spouse or partner	1.15	.498	0.97	0.899
Center-Right voter. . .relative to Center-Left, other, or undecided voter	3.44	<.001	2.28	<.001
Inpatient waiting times	1.04	.002	0.99	.413
Outpatient waiting times	0.98	.020	1.03	.015
Supply of private surgeons	1.67	.041	3.22	<.001
Child in household	0.76	.155	0.65	.054
Over age 60 and post-1997	1.07	.758	n.a.	n.a.
Model probability > χ^2	<0.0001		<0.0001	

PMI = private medical insurance.

2000 matched with waiting times from 1997, 1998, and 1999, respectively. As the majority of parameters found to be significant in the previous model retained a significant association, with similar coefficients, the results are not presented in detail. Inpatient waiting times were found to be significant in the individual purchase decision ($p = .041$). Outpatient waiting times, however, were not found to be significant to either the individual or employer-provided PMI purchase decisions.

Sensitivity analysis that considered the effect of aggregating waiting times data at the regional level produced results that were consistent with the use of HA-based waiting times data.

In the analysis that compared all respondents with PMI with those without PMI, the results were again similar with the primary analyses. Neither

the effect of living in London relative to the rest of England nor the effect of gender was significant. The latter result may reflect the large number of women excluded in our primary analysis because of having PMI coverage through a family member.

Model 1 suggested that the removal of the tax subsidy to individual PMI subscribers over age 60 years was not statistically significantly associated with the prevalence of PMI. Looking at the overall sample, the percentage of individual subscribers who gave up their coverage in the years 1997, 1998, 1999, and 2000 were 23.7 percent, 20.0 percent, 24.9 percent, and 21.4 percent respectively. Within the over 60-subsample, the corresponding dropout rates were 25.9 percent, 17.6 percent, 24.2 percent, and 18.8 percent. What was apparent, however, was that in each year during this period, the ratio of new individual subscribers to withdrawals was lower within the over 60 years subsample than in the overall sample. In the overall sample in 1997, new subscribers exceeded withdrawals by 11 percent, while among those over 60 years there were 39 percent fewer new subscribers than withdrawals. In 1998, the number of new subscribers exceeded the number of withdrawals by 23 percent in the overall sample yet there were 22 percent fewer new subscribers than withdrawals in the over-60 years subsample. In 1999, there were 19 percent fewer new subscribers than withdrawals in the overall sample, while in the over 60 years subsample, there were 70 percent fewer new subscribers than withdrawals. And in 2000, the number of new subscribers exceeded the number of withdrawals by 31 percent in the overall sample and by 12 percent in the over 60 years subsample.

The change in the proportion of those over age 60 years with individual PMI after the removal of the tax subsidy in 1997 was a reduction of 17.6 percent. It was estimated that the percentage change in price, as a result of removing the tax subsidy was an increase of 35.9 percent. This gives a price elasticity of demand of 0.50. That is, a 1 percent increase in price would result in a 0.5 percent decrease in demand for PMI.

DISCUSSION

Limitations

We are unable to draw direct conclusions from the data on issues related to the effect of risk aversion and attitudes toward the public and private sectors, because of the fact that the available data are not amenable to examining these specific topics. But in some cases, proxy data, such as age as a proxy of risk

aversion, may be used to gain some insight into the nature of their relationship to the PMI purchase decision.

There are other limitations in the use of the BHPS data set. While the survey exceeds other large surveys in the number of questions relating to PMI coverage, data on premium costs are only available for individual subscribers. Also useful would be data on the extent of PMI cover. Each PMI plan will offer different levels of and options for treatment. And limited data on out-of-pocket payments exists. Less than 4 percent of BHPS respondents without PMI who had a private hospital inpatient stay or visited a private consultant or specialist paid for these services out-of-pocket. This rate is lower than other estimates of the prevalence of out-of-pocket payments (OFT 1996). Comparing PMI subscribers with out-of-pocket health purchasers would be an interesting exercise, but given the apparent low prevalence of the latter group in the BHPS data, the results may be misleading.

Associations

As with other studies, the association between each of income, age, level of education, and the prevalence of individual PMI is evident (Propper 1993; Hall and Preston 1998). A possible conclusion to be drawn from this result is that these factors are all linked to disposable income and significantly impact on the ability to purchase PMI. The lower prevalence of PMI in households with children (although not statistically significant) supports this conclusion. Income is difficult to measure, however, as survey questions on income may be met with reserve because of concerns about confidentiality (Lansing and Morgan 1971) and income data obtained may have not included investment income (Papatheodorou 1999).

Some of these associations may have alternative explanations. The effect of age supports the hypothesis of PMI demand increasing as individuals get older and become more concerned about being able to access health care. It is assumed that concern over timely access to care increases with age, although the nonlinear association with PMI suggests this relationship is more apparent at certain age ranges than at others.

High-educational achievement may relate to greater support for prioritization of health issues, and may also reflect a desire for greater individual responsibility.

Political affiliation appears to be significant in the PMI purchase decision. Our analysis showed that over the 4 years of data, a significant association exists between having support for the Conservative Party and having PMI coverage—both in the individual and company-paid PMI markets.

The Conservative Party introduced tax incentives for PMI subscribers when in power and currently advocate a greater role for PMI in the financing of health care (The [U.K.] Conservative Party 2003).

The finding of a significantly greater number of men having PMI is in line with results from previous studies. Besley, Hall, and Preston (1999) also observed a greater proportion of women having no insurance as compared with men among individual or company-plan PMI subscribers. This association is not accountable by differences in income as the model calculates the marginal significance of each term, but appears to be influenced by a greater proportion of women than men being covered by a family member and thus being excluded from our primary analyses.

Employment-related factors do appear to be significant in the employer-financed PMI market. Strong associations were observed with income and employment in professional or managerial positions. Also, the greater prevalence of employer-financed PMI among men is consistent with the gender imbalance in managerial and service industries. Many other demographic factors were also significant, however, suggesting other potential conclusions are likely to exist regarding demographics in this sector of the PMI market.

Our finding of an association between smoking and a lesser likelihood of having employer-paid PMI differs with Propper's (1989) finding that smoking was not significantly associated with PMI coverage.

To date, conflicting results have been observed with respect to an association between the perceived quality of the NHS and demand for PMI. Our analysis found statistically significant associations between waiting times and having PMI. Lagging the waiting times data produced similar results. These associations are consistent with the findings of Besley, Hall, and Preston (1999).⁶ They observed an association between waiting times and demand for PMI among those with employer-provided PMI (Besley, Hall, and Preston 1999).

We hypothesized that the effect of current waiting times is not specific to the wait in an individual's local HA, but is a function of recent media reports on waiting times, which, for the most part, are referenced in the media on a national basis. Thus the perception of the waiting list problem is likely of more relevance than the actual experiences. If this were true, negative press reports on the NHS would likely stimulate a demand for PMI (Couchman 1999), and be reflected in a lagged effect. Also of importance is the influence of GPs who will have information on waiting times. Our results suggest, however, that the association between inpatient waiting times and PMI prevalence is stronger without the time lag incorporated.

The number of patients with experience of private care is increasing substantially over time, through receipt of NHS contracted and out-of-pocket-purchased private services. A focus group study reported that speed of access, time spent with staff, and a nicer environment were seen as the main benefits of private care (Coulter and Magee 2003). However, participants of the study did not associate private health care with better clinical care. Thus, while there may be an increase in demand for PMI based on the perceived nonclinical advantages of the private sector, as is the case currently, even those patients with PMI will use the NHS for a large proportion of their care.

Results from our analysis of supply-side factors suggest that prevalence of surgeons on part-time contracts is associated with higher employer-paid PMI. This result is consistent with the finding by Propper, Rees, and Green (2001) that the supply of private hospitals and part-time physicians is significantly associated with having PMI coverage.

The withdrawal of the tax subsidy for individual PMI subscribers over the age of 60 years appears to have had the effect of discouraging potential subscribers in this age group, although the rate of withdrawal from PMI among individual subscribers over 60 was not higher than for the overall sample. This result deviates from our hypothesis. The ability to delineate the effect of the removal of the tax subsidy on PMI withdrawals may be hampered by the fact that concurrent to this change were premium increases for all subscribers. Despite this we speculate that the lack of a greater proportion of withdrawals among subscribers over age 60 years may be because of greater likelihood of utilizing health services. That is, the over 60's are likely to place a greater value on their PMI cover than younger subscribers. The price elasticity of 0.50 is greater than observed in other studies (Gruber and Poterba 1994), and on the one hand we would expect this elasticity to be lower given that it pertains to the over 60 years age group. But in the U.K., the loss of PMI does not result in a lack of cover as NHS services exists, and are free at the point of use, for those who give up their individual PMI.

CONCLUSION

The BHPS is the best available data set, despite its limitations, for analyses of the associations between the personal characteristics and situational circumstances of individuals and PMI insurance coverage in the U.K. Individual respondents are followed over time, and thus changes that take place over time, such as insurance status and health status, are incorporated in the analysis of

associations between the independent variables and PMI coverage. Lagged effects were also considered. The analyses are further enhanced by linking in NHS waiting times data and data on the supply of private hospital beds and physicians working on part-time contracts. The analysis was also the first of its kind to consider the effect of changes in government policy toward PMI.

The results suggest that disposable income may be more important than income in considering whether or not to purchase PMI. The further profile of the typical individual PMI subscriber is that of a well-educated individual, most likely male, who politically supports the center-right and comes to consider PMI as his or her age makes health care needs more likely.

Current trends in the PMI market suggest that, over time, individually purchased PMI is likely to be partially displaced by PMI purchased as part of a company-based plan. Because of the increasing prevalence of employer-paid PMI in certain employment sectors, it is likely that employment-related factors such as income and type of job will have a diminishing impact on individual PMI demand.

The profile of the employer-paid PMI recipient is similar to that of the private subscriber. Because the typical subscriber in a company-based, employer-paid plan is younger, the growth of these plans may shift private sector resources away from the types of services required by the elderly, in particular, acute care (Wilkin and Hughes 1986).

Further analysis, that incorporates premium costs for all subscribers, as well as the extent of PMI coverage for each individual and their perceptions of the quality of private health care relative to the NHS, is necessary to determine accurate estimates of the magnitude of the effects observed.

The results suggested that waiting times information is relevant to the decision to purchase PMI cover. Also, the prevalence of private services appears to have some bearing on the decision to pay for PMI cover. Improvements in the data availability must be made to obtain a clearer picture of this effect. Ideal information would allow for each individual, or their GP, to assess the availability of private care beds to which they have access. These data, along with a lengthier panel of data from the BHPS, will give clearer information on the PMI purchase decision.

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NOTES

1. However, employees were (and still are) required to pay income tax on the value of the benefit-in-kind.
2. Currently, the employer's contribution to National Insurance is 12.8 percent on earnings (including earnings in kind) above \$4,615 yearly (see <http://www.inlandrevenue.gov.uk/pdfs/emp2003/ca38.pdf>).
3. Inpatient waiting times data are population based and include ordinary admissions and day case waiting lists for every HA in England averaged over the calendar year. Outpatient waiting times data are also population based and include details for first outpatient appointments for each HA in England averaged over the calendar year.
4. Part-time is used here to refer to contracts. Consultants on maximum part-time contracts receive 10/11 of the full NHS salary and are not subject to a limit on their private earnings. Herein, we refer to private physicians and private surgeons to refer to physicians and surgeons on maximum part-time and part-time contracts.
5. Historical marginal tax rate data were obtained from the website of the U.K. government's Department of Inland Revenue: http://www.inlandrevenue.gov.uk/stats/tax_structure/00ap_a2d_2.htm (accessed on 25 March 2003).
6. Propper, Rees, and Green (2001) did not find an association between waiting lists and PMI purchase.

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