**Physician pricing behavior: Evidence from an Australian experiment**

Serena Yua\*, Kees van Goola, Jane Halla, Denzil Fiebigb

a Centre for Health Economics Research and Evaluation (CHERE), University of Technology Sydney, Australia

b Business School, University of New South Wales

Corresponding author: Dr. Serena Yu

Email: serena.yu@chere.uts.edu.au

Phone: +61 2 9514 9884

Address: Building 5 Block D Level 2, 1-59 Quay St, Haymarket NSW 2000

**Declaration of interest**

The authors declare that they have no relevant or material financial interests that relate to the research described in this paper. This research has been supported by an Australian Research Council Grant [DP: 170100642]

**Acknowledgements**

The authors wish to thank Ilyana Kuziemko, and participants at the 2017 Centre of Excellence in Population Ageing Research (CEPAR) Summer Workshop on the Economics of Health and Ageing, particularly Denise Doiron and Carol Propper, for their valuable feedback on this study.

This research uses data from the 45 and Up Study, which is managed by the Sax Institute in collaboration with major partner Cancer Council New South Wales, and partners the Heart Foundation (NSW Division); NSW Ministry of Health; NSW Government Family & Community Services – Ageing, Carers and the Disability Council NSW; and the Australian Red Cross Blood Service. We thank the many thousands of people participating in the 45 and Up Study. This project was undertaken by the University of Technology Sydney and utilised MBS data supplied by the Department of Human Services and linked to the 45 and Up Study by the Sax Institute. The study’s findings are those of the authors’ and all opinions and any mistakes are our own.

**Physician pricing behavior: Evidence from an Australian experiment**

**Abstract**

We examine the unregulated pricing behavior of physicians in response to an exogenous decrease in patient entitlements under a government scheme providing insurance for high out-of-pocket medical costs. We use survey-linked administrative data to estimate the causal effects of the policy change on consultation fees. Adopting a quasi-experimental difference-in-difference model, we find that in response, physicians with knowledge of the patient’s eligibility raised consultation fees by an average 12 percent. The results show significant unintended consequences of the policy change, indicating that a physician’s knowledge of patient eligibility for healthcare benefits may allow them to affect demand for their services.

*Keywords: health providers, policy evaluation, health insurance, applied microeconomics*

*JEL codes: JEL D04, D22, I12*

**Highlights**

* We study unregulated physician fees in response to lower patient public benefits.
* Physicians increased fees 12% when certain of patient eligibility for benefits.
* Physicians’ knowledge of patient receipt of public benefits affects prices.
* Cost of public provision of healthcare to remain high despite fewer beneficiaries.

**Declaration of interest**

The authors declare that they have no relevant or material financial interests that relate to the research described in this paper. This research has been supported by the Australian Research Council [ Grant DP: 170100642].

1. **Introduction**

In the marketplace for healthcare, are health providers – particularly physicians – profit maximizing? To what extent are they able to exercise market power? In this paper, we exploit the unusual Australian setting – unregulated physician fees – and a quasi-experimental change in patient cost-sharing arrangements, to examine physician pricing behavior under asymmetric information conditions.

Health economists have long accepted that physicians are monopolistically competitive, facing a downward sloping demand (McGuire, 2000; Gaynor, 2000; Dranove, Satterthwaite 1992; Frech 1996; Dranove, Satterthwaite 1999). The nature of the healthcare service supports such a structure – physicians sell a service which is inherently heterogeneous (eg patient diagnosis), non-retradeable (ie the patient cannot on-sell the service), and whose quality can only be discerned, if at all, after its consumption (ie an experience good). Under these conditions, and often with a premium placed by the patient on an existing relationship, a physician could plausibly exploit their superior knowledge and a patient’s willingness to pay by influencing both the price and quantity of services demanded (McGuire, 2008). In this study, we test the hypothesis that a physician’s pricing behavior is influenced by their knowledge of the patient’s eligibility for healthcare benefits.

Empirical studies on such physician decision-making reflect closely on the longstanding debate on “*the* major controversy in contemporary health policy, namely, the question whether adequate control over resource allocation to and within health care is best achieved through the demand side, by letting consumers (patients) discipline providers who compete against one another on the basis of quality and price, or through regulatory controls on the supply side” (Reinhardt, 1989: 339). In many studies, the research design has taken advantage of an exogenous change in cost-sharing or other insurance arrangements, and measured responses in the quantities demanded of health services. A large empirical literature suggests that physicians act at least partly in self-interest, and that they are able to exert market power over the quantity of services demanded. In the US, for example, a range of studies have shown that changes in Medicaid and Medicare fees have elicited changes in the volume of health services delivered, and that the direction of these changes depends on the relative importance of substitution versus income effects (Yip 1998; Gruber, Kim, Mayzlin 1999; Mitchell, Hadley, Gasken 2002; Hahn 2013). Lundin (2000) and Iizuka (2012) show that system-level incentives affect the prescribing behavior of physicians in Sweden and Japan, respectively. Hickson et al. (1987) found that physicians receiving fee-for service payments delivered care well in excess of guidelines, but did not do so when paid a salary.

Such studies improve understanding of how variation in the quantity of healthcare services drives overall spending, but to date, research on the impact of prices has been virtually non-existent. Some recent evidence in the U.S suggests that for the privately insured, hospital transaction prices are the primary determinant of overall spending variation, whereas spending on the public Medicare program is driven by quantities of care (Cooper et al, 2015). The dearth of studies on pricing behavior arises due to the prevalence of regulatory controls. Supply constraints in most countries, such as the United States, Germany, France, England and Canada, include prices negotiated administratively between government (or third-party payers) and physicians through reimbursement contracts. Nevertheless, in many countries physicians have some ability to charge fees over and above these negotiated prices that are met by patients directly. This practice is commonly known as balance billing.

This study exploits a feature in the Australian health insurance system which is anomalous among developed economies’ health systems – unregulated physician prices. We investigate the impact on pricing behavior of incentives induced by the operation of the Extended Medicare Safety Net (EMSN) – a policy which covers a substantial proportion (80%) of out-of-pocket expenses for patients reaching a certain threshold each year.

The stated purpose of the EMSN, introduced in 2004, was to protect Australians from high out-of-pocket medical costs (Hansard, 2003). At the time, annual out-of-pocket spending averaged $1101AUD per capita (Australian Institute of Health and Welfare, 2013), and in the state of NSW, about 15 percent of patients reported skipping a medical appointment, medical test, or medication due to cost (Bureau of Health Information (NSW) 2014).

At its introduction, the government estimated that it would cost $440 million in the first three and a half years of operation (Hansard, 2003). It turned out that total expenditure was double that amount. The growth in public spending between 2004 and 2014 is depicted in Figure 1.

The blow-out in expenditure led the government to introduce a series of reforms. In 2006, the government increased the EMSN threshold amounts, making it more difficult for patients to qualify for benefits. This reform was followed by a small and temporary decline in EMSN expenditure. The steeper decline in 2010 occurred following the introduction of capped benefits for certain types of health services. Whilst these services, such as obstetrics and assisted reproductive technology, account for only 1.5% of the types of services funded through Medicare, collectively 60% of EMSN expenditure was spent on these items alone (van Gool et al, 2009). Since the introduction of capped benefits, the growth in EMSN expenditure has tracked more closely to that of Medicare overall. In 2012, the government extended the number of items with caps and in 2015 the threshold to qualify for EMSN benefits was increased. This latter reform is the subject of this analysis.

[*Figure 1 about here]*

Our study exploits an exogenous change in the consumer cost-sharing arrangements of the EMSN. Together with unregulated physician prices, these changes are an opportunity to examine unencumbered physician pricing behavior in healthcare. In the following section, we first set out details of the operation of the EMSN.

# The Extended Medicare Safety Net

Medicare was introduced in Australia in 1984 with the goal of providing affordable, universal, and high-quality health care to all Australians. Medicare subsidizes the cost of services that are privately provided out of hospital. Physicians are paid on a fee-for-service basis, with patients reimbursed a fixed rebate by the government. Those rebates are determined by the Medicare Benefits Schedule (MBS) which sets out over 5700 different types of health services, assigning each an MBS item number that entitles patients to a government controlled rebate amount for each type of Medical service.

The MBS rebate, however, may differ from the physician’s actual fee. In Australia, physicians’ fees are unregulated, and physicians can (and do) charge any fee to any patient at any time. Where the physician chooses to charge a fee that is equal to the MBS rebate, there is no copayment. However, when the physician fee is higher than the MBS rebate, the patient must pay the difference; this gap is referred to here as a co-payment. No supplementary private health insurance is available for out-of-hospital services that are covered by Medicare.

Medicare is strictly a patient reimbursement scheme. Historically, the patient settled the account with the physician and then seeks to be at least partially reimbursed by Medicare. Patients have a range of options to seek reimbursement via direct deposit into their bank account, via mail, visiting a Medicare office, or more recently, claiming reimbursement online from the physician’s office. These arrangements mean that physicians have limited information on their patients’ Medicare entitlements, particularly their EMSN entitlement. The exception to this occurs when a patient incurs sufficiently high out-of-pocket costs with one physician to reach their EMSN threshold. In this paper, we test the importance of asymmetric information across physicians about their patient’s healthcare entitlements on physician pricing behavior.

Since 2004, the EMSN provides additional coverage for families who have incurred high out-of-pocket costs by providing benefits that are in addition to the Medicare rebate. All Australians are eligible but they only qualify for EMSN benefits once they have incurred a threshold in out-of-pocket costs within a calendar year. When the threshold is reached, the patient receives EMSN benefits that cover 80% of the gap between the physician’s fee and the MBS rebate. Once the new calendar year starts, patients must qualify again by reaching their threshold. The EMSN only covers services that are funded by Medicare that are delivered in the out-of-hospital setting. Box 1 provides an example of how Medicare and the EMSN work in practice – here, family A has not exceeded its annual EMSN threshold, while family B has. When a member from family B next attends their specialist physician, faced with a consultation fee of $150 and a Medicare rebate of $72.75, the patient receives an additional EMSN benefit and consequently pays a co-payment of $15.45 only. By contrast, a member from family A, faced with the same fee and rebate, pays the full gap amount of $77.25.

*[Box 1 about here]*

Since its introduction, there has been a lower EMSN threshold for concession cardholders, and a higher threshold for the general population, and both are indexed by the Consumer Price Index annually. Concession card holders include those who receive the Age Pension, receive government welfare payments (including unemployment benefits, carer payments, disability pension), or meet an income test for a low-income concession card. At its introduction, the EMSN thresholds were $300 and $700 for concessional and general patients, respectively.

A 2009 Review of the EMSN found that since the introduction of the EMSN, average physician fees increased by around 4.2 per cent per year (excluding general practice and pathology), over the rate of inflation (van Gool et al, 2009). Using aggregated data, reviews have found that the EMSN saw substantially higher-than-expected government expenditures (van Gool et al., 2011). This was explained through higher than expected utilization of medical services as well as an unanticipated inflationary impact on physician fees for some specialists’ services. Indeed, the 2009 review found that the increase in physician fees led to a substantial proportion of government spending going towards higher physician revenues rather than reducing patient out-of-pocket costs (Savage et al., 2009). A conservative estimate was that, for every dollar spent on the EMSN in 2008, physicians received 43 cents and patients received 57 cents (van Gool et al., 2009). One of the main findings of the review, however, was that the inflationary effect of the EMSN was not consistent and, in fact, limited to a set of medical fields consisting of obstetrics, assisted reproductive technology services and, to a more limited extent, psychiatry and radiation oncology. The EMSN appeared to have had no inflationary impact on medical services such as general practice consultations or pathology.

As described earlier, the higher than expected costs of the EMSN resulted in a series of reforms starting in 2010. In the most recent of these reforms, the government increased the general threshold of the EMSN to $2000 from 1 January 2015, from a threshold of $1221.90 at the time of announcement in 2013. The purpose of the changes was to support the fiscal sustainability of EMSN arrangements, and at the time was forecast to save $48.5 million in the first year of operation (and $105.6 million over 4 years) ([Parliament of the Commonwealth of Australia, 2014](#_ENREF_36))([Parliament of the Commonwealth of Australia, 2014](#_ENREF_36)). The concession card threshold was unaffected. The changes in the EMSN general and concession thresholds over time are shown in Table 1.

*[Table 1 about here]*

The introduction of the EMSN fundamentally changed public insurance arrangements for out-of-hospital services. Prior to the EMSN, the Australian Government’s spending on Medicare was a function of the volume of services claimed and the Medicare rebate, which are set by government. With the introduction of the EMSN, the Australian Government’s spending on Medicare also became a function of the fees charged by physicians. This meant that the amount of Medicare spending was exposed to both volume and price movements. Whilst Medicare places a limit on the rebate it provides per service, the EMSN provides benefits that increase with physician fees. Under imperfect market conditions and/or inelastic supply, this has the potential for the EMSN to impact on physician fees. Although the EMSN covers all out-of-hospital medical services, including primary care, we focus on specialists’ services. Previous research has found that over 90% of all EMSN expenditure goes towards specialist care (van Gool, 2011). This is an artefact of the low co-payments faced by patients for primary care services and the relatively high co-payments for specialist care. This, in turn, reflects the relatively high degree of competition among primary care physicians compared to their specialist counterparts.

A conceptual illustration of the impact of the EMSN on specialist fee-charging behavior is presented in Figure 2. Suppose that *D* in Figure 2 represents the demand for a particular medical service that takes into account a given Medicare rebate of $50 per consultation. We assume that the physician is able to influence both fees and the quantity of services provided, and faces a downward sloping demand curve. Under monopolistic competition, the patient has limited substitutes available. Indeed, we anticipate relatively inelastic demand for specialists services due to: 1) information asymmetry, whereby specialist visits require a referral from a general practitioner (GP) and the patient is thus convinced that specialist care is needed; and 2) high switching costs where, unlike in the primary care market, a patient seeking to switch specialist doctors faces getting a new GP referral, waiting periods for an appointment, and typically high, yet unknown, fees.

Both producers and consumers potentially stand to gain when a patient qualifies for EMSN benefits, particularly when the consumer knows that they (or their family) are likely to require health care within the calendar year. The incentive exists then for physicians to raise prices for patients known to be near their EMSN threshold; moreover, for families where the expected benefits of qualifying are high, their willingness to reach the EMSN threshold as quickly as possible are also high. For this framework to hold however, the physician must have some knowledge about the patient’s likelihood to reach the threshold. In the Australian setting, this is far from clear to the physician. Physicians have limited knowledge of their patients’ EMSN entitlements unless a patient has reached their threshold with the single physician.

Under these conditions, suppose that the physician chooses a fee of $100 per consultation service. Therefore the patient faces a $50 co-payment cost for each consultation (not shown in Figure 2). In the absence of the EMSN, the physician is constrained by market demand *D* in Figure 2 and delivers *Qa* units of healthcare at a price of $100 per consultation and a $50 co-payment for the patient. Physician prices are constrained from below by the $50 Medicare rebate.

Under the EMSN, the demand curve swivels to *D’* for patients who have reached their annual threshold for out-of-pocket costs (while EMSN-ineligible patients remain on demand curve *D*). For EMSN-eligible patients, a $100 physician’s fee now results in a $10 co-payment cost and a higher quantity of services delivered (*Qb*). Now, charging a fee of $300 to the EMSN-eligible patient results in the same $50 co-payment cost as charging $100 to an EMSN-ineligible patient. Without the EMSN, the $300 fee would shrink the quantity demanded to *Qc*; instead the physician is able to levy the higher fee while delivering the higher *Qa* units of healthcare to eligible patients. In effect, the EMSN allows the physician to extract producer surplus (the shaded area in Figure 2) beyond what the patient would otherwise be willing to pay.

*[Figure 2 about here]*

Our study exploits an exogenous change in the EMSN threshold to examine physician pricing behavior in the context of unregulated prices and fee-for-service delivery of health services. The 2015 increase in the EMSN threshold effectively scaled back the generosity of EMSN benefits. In the context of the conceptual exposition above, such a policy change should induce a reduction in fees charged as both provider and patient are sensitized to the patient’s greater out-of-pocket costs. Our main hypothesis is that as a physician grows more certain of the probability of a patient’s eligibility for EMSN benefits, the more likely they are to change their fee charging behavior. In our sample of specialist physicians, many would have a high level of predictability about each patient’s utilisation, for example radiation oncologists (where chemotherapy protocols exist) and psychiatrists (where multiple visits are virtually certain). To the best of our knowledge, this is the first time that this hypothesis has been tested. Previous reviews have been based on aggregate data only, which does not allow for close examination of the distribution of out-of-pocket costs, particularly the extreme values which typically qualify a patient for EMSN benefits. For this reason, this paper’s use of micro-level data of physicians and patients will provide further insights into this issue. We now turn to our empirical data and model.

# Data

We use data from the first wave of the Sax Institute’s 45 and Up Study, which comprises 267,153 non-institutionalized individuals aged 45 and over in the state of New South Wales (NSW) in Australia. Prospective participants were randomly sampled from the enrolment database of Medicare Australia, which provides near complete coverage of the population. Participants completed a baseline questionnaire (between January 2006 and December 2009) and gave signed consent for follow-up and linkage of their information to administrative health databases. The sample comprises about 10 percent of the total NSW population aged 45 and over, and is representative of the population in terms of demographic characteristics including age, gender and marital status (Johar, Jones, Savage 2012), as well as a range of health risk factors (Mealing et al., 2010). The study collects a rich range of data, including data on demographic characteristics, self-reported health status, diagnoses and medications, as well as lifestyle behaviors and activities. The conduct of the 45 and Up Study was approved by the University of New South Wales Human Research Ethics Committee (HREC). Approval for this study was provided by XXX.

The 45 and Up Study is linked by the Sax Institute to national administrative datasets, including to Medicare Benefits Scheme (MBS) claims data provided by the Commonwealth Department of Human Services. The MBS data covers the date, MBS fee rebate, the physician’s fee, and the benefit paid for services funded by Medicare. The benefit paid is equal to the rebate plus the EMSN benefit (if any). These data allow us to calculate the co-payment for each Medicare funded claim delivered outside of hospital. It also enables a calculation of the aggregate out-of-pocket costs incurred by patients over any specified time period.

The empirical strategy detailed below involves the comparison of quasi-experimental treatment and control groups. The main control group comprises concession cardholding patients. The Medicare data does not explicitly identify concession cardholder status. We identify concession cardholders using a combination of linked Pharmaceutical Benefits Scheme (PBS) (available for 2014 only) and self-reported data. We assume that those identified as receiving PBS concessional rates at any time in 2014 remained concession cardholders in 2015. Using this method, 82.2 percent of the sample aged 65 and over, and 21.3 percent of those aged between 45 and 64, are estimated to be concession cardholders. This closely approximates figures reported by the Department of Social Services (77.7% of those aged 65 and over, and 22.8 percent of those between 45 and 64, hold concession cards – Department of Social Services, 2017). However, about 9.0 percent of those aged 65 and over, and 40.6 percent of those aged between 45 and 65 do not have discernible concession card status based on PBS data. For these patients, we use their self-reported concession status; the vast majority of these patients report not being concession cardholders (96.1% of those aged 45-65; 85.2% of those aged 65 and over). We provide a number of robustness checks for this definition of the control group.

# Empirical Strategy

We adopt a quasi-experimental, difference-in-difference framework to exploit the exogenous increase in the EMSN general threshold. This allows a comparison of outcomes between general and concession patients. We further exploit the fact that Medicare is strictly a patient reimbursement scheme which implies that physicians have limited knowledge of their patients’ EMSN entitlements unless a patient has reached their threshold with a single physician. Our empirical framework therefore also distinguishes between those patients who reach the EMSN threshold with a single physician, and other patients who also reach the threshold but through claims with multiple physicians.

The key challenge facing this study is the identification of the “treatment group” of patients affected by the increase in the EMSN general threshold from $1248.70 to $2000. We are interested in the change in fees faced by a treatment group of general (ie non-concessional) patients, versus a control group of concessional patients. However, for the vast majority of patients and services in our dataset, annual out-of-pocket costs are well below the relevant EMSN threshold. Table 2 shows that around 28.9 percent of concession cardholders had zero out-of-pocket costs in 2014, while for those with positive out-of-pocket costs, almost 95 percent of patients fell below the EMSN threshold of $624.10. Similarly, for general patients with positive out-of-pocket expenses, the 95th percentile in annual costs was $1067, well below the EMSN threshold of $1248.70 in 2014. Equally, a small minority of patients – less than 1% - have high out-of-pocket costs above their EMSN threshold. While only a small proportion of the population qualifies for EMSN benefits, it is well understood that high-needs, high-cost individuals account for a disproportionately large share of overall healthcare spending across many high-income countries (e.g. Berk & Monheit, 2001; Rais et al, 2013; Calver et al. 2006).

The change in the general EMSN threshold is most likely to elicit a response from patients and their physicians where the annual out-of-pocket costs are near the EMSN threshold. For example, the kernel density plots presented in Figure 3 show that there was indeed some sensitivity in costs for general patients between the old and new EMSN thresholds. Figure 3 presents the annual out-of-pocket costs incurred at each physician by general (Panel A) and concession (Panel B) patients in 2014 and 2015. The values have been limited to those above the EMSN threshold and below $2000, and show that the probability of higher costs (ie closer to the new threshold of $2000) was greater in 2015; there was no commensurate increase amongst concession patients.

*[Insert Table 2 about here]*

*[Insert Figure 3 about here]*

We postulate that the change in the general EMSN threshold is most likely to elicit a response from physicians where the annual out-of-pocket costs are near the EMSN threshold, and where individual physicians have knowledge that their patient has reached or is likely to reach the threshold. Our main model defines the treatment group as patients whose annual out-of-pocket costs with a single physician reached $1248.70 in 2014 and $1277.50 in 2015, the latter being the 2014 threshold had there been no policy change adjusted by the Consumer Price Index.. This excludes the vast majority of patients whose out-of-pocket costs were well below these thresholds in both years. In addition, we exclude patients whose out-of-pocket in each year costs were in excess of $2000 (the new 2015 threshold) and also less likely to be sensitive to the policy change. The treatment group therefore includes only general patients whose out-of-pocket costs are between the old and new EMSN thresholds; the control group is defined as concessional patients whose out-of-pocket costs with a single physician in either year exceeded the concessional EMSN threshold, and also capped at $2000. We accept that this model is a crude approximation for the hypothesized and unobserved point at which physicians change their fee-charging behavior, and present an alternative specification.

This second model defines the treatment group as general patients with annual out-of-pocket costs with a single physician within specific bounds of their EMSN threshold. This allows for changes in pricing behavior as a patient approaches and then exceeds their threshold. We test for changes in physician fees as general patients reach 25, 50 and 75 percent bounds of their EMSN threshold. The control group is defined in a similar fashion as concessional patients reaching 25, 50 and 75 percent bounds of the concessional EMSN threshold, respectively. We assume that the closer a general patient is to their threshold, the more likely a physician is to raise their fees, as eligibility for EMSN benefits becomes more certain.

While both specifications sample from high-cost patients, this does not invalidate the identifying assumption underlying the difference-in-difference framework. The ‘common trends’ assumption requires that in the absence of the policy change, the treatment and control groups exhibit similar trends in fees. In both specifications, our assumption is that general and concession patients with high out-of-pocket costs face similar increases in fees. We present a number of robustness checks below to support our empirical strategy.

While annual out-of-pocket costs are used to define our sample of individuals for both models, the outcome of interest is the fee charged by a doctor for each visit made by our sampled individuals. The resulting sample characterized in Table 3 consists of 2730 consultation services delivered out of hospital to 55 general patients, and 18,969 services to 337 concession cardholders.

Both models assume that the difference in fee outcomes between general and concessional patients following the change in the EMSN general threshold are explained by the reform. We use the following specification for both models:

1. $ y\_{iht}=α\_{0}+α\_{1}T\_{i}+α\_{2}D\_{t}+βT\_{i}.D\_{t}+δX\_{it}+ε\_{iht}$

where *i* indexes the patient; *h* tracks multiple visits of patient *i* within a year; $D\_{t} $is a time dummy denoting 2015 and $X\_{it}$is a vector of patient-level control variables. $T\_{i}$ is a treatment group dummy, denoting a general patient (*Ti*=1) rather than a concessional patient (*Ti* =0). In this case, the variables should control for observed differences between the treatment and control group, and include geographical remoteness, age, private health insurance status, level of education, gender and socioeconomic status.

The outcome variable $y\_{iht}$ refers to the logarithm of the physician’s charges for individual consultation services. Heterogeneity across the MBS items generally, which include episodes of radiation oncology, and out-of-hospital surgery, may otherwise render our estimates imprecise. Consequently, we narrow our focus to a small number of specialist consultation services. The included services were specialist and consultant physician attendances.

The average impact of the increase in the EMSN general threshold on physician fees is measured by the coefficient $β$ on the interaction term $T\_{j}D\_{t}$, which takes on the value of 1 if a physician provided an MBS service to a treated general patient in 2015, and zero otherwise. A group effect, measuring the average percentage difference in fees between the treatment and control groups, is captured by the coefficient $α\_{1}$. Two-way cluster-robust standard errors (clustered on individual patients and doctors) are used to account for correlation in fees charged to individual patients by individual physicians across possibly multiple consultations.

The identifying assumption underlying the difference-in-difference strategy is that of ‘common trends’; that is, in the absence of the change in EMSN threshold, EMSN-eligible treatment (general) and control (concessional) patients would have experienced similar trends in consultation fees. A key concern then, is the comparability of general and concessional patients. We overcome these concerns in three key ways. First, the difference-in-difference model represents a form of fixed-effects estimation, whereby unobserved, time-invariant patient group differences are effectively differenced away. Second, we use rich survey and administrative data to control for observed differences between the two groups, which we report in Table 3 below. Third, we test the robustness of our results as follows:

1. We test the main model by using an alternative control group of general patients (rather than concession patients) who were eligible for EMSN benefits, but who reached their annual threshold by attending multiple physicians. In this scenario, no single physician would have knowledge that the patient had reached the threshold, so isn’t incentivised to raise fees. We define this second alternative control group as EMSN-eligible patients whose out-of-pocket expenses with a single physician were no more than $600 in each year (less than half the EMSN threshold in 2014). Note that the treatment dummy $T\_{j}$ then distinguishes different types of general patients.
2. We also test the main model by using a second alternative control group defined as concession patients whose out-of-pocket costs were between the old and new *general* EMSN thresholds. This addresses the possibility that control group concession patients in our main model differed from – that is, were lower cost and potentially healthier than - our treatment group because of the substantially lower concession EMSN threshold.
3. We provide two placebo tests to ensure our main model has not detected spurious treatment effects. In the first test, we define the placebo treatment group as EMSN-eligible general patients who reached their threshold using multiple doctors. Physicians treating these patients have no direct knowledge of the patients’ eligibility for EMSN benefits, and there should be no treatment effect. As a control group, we use the same group of concessional patients as defined in the main model. In the second placebo test, we transplant the main model analysis to the years 2013 and 2014 – years in which there were no policy changes, and where we consequently expect to detect no treatment effects.

Table 3 compares the characteristics of the treatment (general) and control (concessional) patients from the main model by a range of characteristics. The data shows that general patients are younger, more likely to have higher levels of education, and less likely to live in regional or remote areas. In addition, general patients are more likely to have private health insurance, and less likely to experience socioeconomic disadvantage. While the income data indicates that general patients are much more likely to be in the high income bracket of $70,000 and above, there were significant proportions of both groups of patients which chose not to respond to this question. As a proxy for health status, we use the patient’s number of annual GP visits. Concession cardholders have 12.7 annual visits on average, while general patients have around 8 visits.

Table 3 also provides the basic difference-in-difference measure. That is, on average, consultation fees for treatment group patients rose from $175 to $199 (an increase of 13.7%), while shifting only 2.5 percent for control group patients ($106 to $109). In a basic version of Equation (1), controlling only for group and time effects, the estimated treatment effect was a statistically significant 13.5 percent increase. This figure is very close to our main result in the next section, even after implementation of the regression difference-in-difference and a range of alternative specifications.

Finally, Table 3 also shows the mean number of annual services delivered to each patient by each physician. The count of services includes consultations as well as other Medicare services. The data shows that for both general and concession patients, the number of services delivered annually was slightly down in 2015 relative to 2014. Consequently, while changes in volume are not the focus of this paper, estimation of Equation (1) using the number of annual consultations as the outcome variable showed no significant effect on volumes (with the same definition of treatment and control groups as our main model above).

*[Table 3 about here]*

# Results

# Regression Results

Table 4 presents the difference-in-difference results, estimating the impact on general patients whose out-of-pocket costs with a single physician were between the old and new EMSN thresholds in 2015, and whose out-of-pocket costs were incurred with the same physician. The results in Panel A show that the higher EMSN threshold caused physicians to raise their consultation fees by approximately 12 percent.

This result was found to be robust to two alternative control groups. Panel B used a control group of general patients who were eligible for EMSN benefits, but who reached their threshold across multiple physicians. This addresses the possibility that unobserved differences between general and concession patients affect results in our main model. Panel B in Table 4 shows that this identified a treatment effect which was virtually the same in magnitude, and clearly well within the confidence intervals of the main specification (Panel A).

Panel C presents results using another alternative control group, defined as concession patients with out-of-pocket costs between the old and new *general* EMSN thresholds. This addresses the possibility that concession patients in our main model control group may differ from the treatment group by virtue of the substantially lower concession EMSN threshold. The results in Panel C demonstrate a similar treatment effect as the main model, although given the smaller sample size, year and group effects became statistically insignificant.

The large observed differences between our main treatment and control groups (Table 3) may challenge our ability to capture all relevant differences between the two. The observed differences between the main treatment group, and the alternative control group of Panel B were much smaller (provided at Appendix 1), and made little difference to the results in Table 4 (Panel B). It bears noting that a similar treatment effect of 14% was found for the main specification in Panel A when covariates were excluded. The primary effect of excluding observed covariates was to increase the size of the group effect. These results are available upon request.

*[Table 4 about here]*

In addition, the main specification was found to be robust to two placebo tests (Table 5); in the first, the treatment group was defined as EMSN-eligible general patients who reached their EMSN threshold through the use of multiple doctors. For these patients, no single doctor would have knowledge of their EMSN eligibility, and no treatment effect should be identified. The control group was defined in the same way as the main model. Panel A in Table 5 shows a small and statistically insignificant treatment effect for the first placebo model (3 percent), as expected. Interestingly, a large, negative group effect was identified in the placebo model. This suggests that while overall general patients are charged more than concession patients (Table 3), patients whose (single) physician are certain of their patient’s eligibility for EMSN benefits are charged more than patients whose multiple doctors lack knowledge of their eligibility – regardless of their concession status.

In the second placebo test, we re-estimate our main model using the years 2013 and 2014 to mark the ‘before’ and ‘after’ periods. There were no policy changes in these years, and we should consequently detect no treatment effects. Panel B in Table 5 shows a small, and statistically insignificant, treatment effect in 2014 (relative to 2013) – as expected.

Together, the results in Tables 4 and 5 indicate that the identifying assumption of the main specification – the comparability of general and concession patients – is valid.

The analysis also found weakly significant and positive time effects, and large and positive group effects (with general patients being charged higher consultation fees). In addition, patients living in remote areas or in socioeconomically disadvantaged areas also attracted lower consultation fees. Patients with private health insurance, or with higher levels of education, also incurred higher consultation fees. These results bear out the expectation that patients with greater resources (as proxied by these different measures) are more likely to be charged higher consultation fees (Johar et al., 2017).

*[Table 5 about here]*

Table 6 shows our alternative specification. In the main model, we identify general patients who are ‘close enough’ to their EMSN threshold to elicit a change in physician behavior as those having annual out-of-pocket costs being between the old and new EMSN thresholds (ie capped at $2000). Table 6 shows the impact of defining the treatment group as general patients whose annual out-of-pocket costs was within 25, 50, and 75 percent bounds of their EMSN threshold. The control group is defined similarly, as concession patients reaching 25, 50 and 75 percent bounds of the concessional EMSN threshold. We would expect that patients closest to their EMSN threshold (ie within 25 percent bounds) would elicit the largest response from their physicians.

The results bear out our expectations, namely that the closer the patient is to their EMSN threshold, the greater the increase in fees – for patients within a 25 percent bound of their threshold, the treatment effect was an 18 percent increase in consultation fees. This effect fell to 7 percent for patients within a much wider 75 percent bound, yet remained statistically significant.

*[Table 6 about here]*

## Policy implications

We provide some back-of-the-envelope estimates of the impact that higher physician fees had on patients’ EMSN eligibility following the change in the general EMSN threshold. This is of policy significance because the rationale for the higher threshold was to reduce the number of EMSN beneficiaries, and thereby reduce public EMSN expenditures. A natural next-step is to model the welfare implications of the fewer initial EMSN beneficiaries, but higher physician fees, as a consequence of the higher EMSN threshold; however, we are limited in our calculations due to a dearth of data on the number and profile of EMSN benefit-recipients, and associated expenditures.

Nonetheless, using the unit-record Medicare data, we estimate the number of patients forecast to be ruled newly ineligible for EMSN benefits by the threshold change, in the absence of physician behavior change. This comprises of general patients with annual out-of-pocket expenses in 2014 between $1248.70 and $2000 (the difference between the old and new thresholds). There were 57 patients identified through this process. The number of patients with annual expenses over $2000 (and eligible for EMSN benefits before and after the threshold change) was 106. In 2015, the actual number of patients newly ineligible for EMSN benefits (again with annual out-of-pocket expenses between $1248.70 and $2000) was 97, almost double the 2014 figure. The number of patients with annual costs over $2000 was 103, virtually the same as that in 2014.

While these figures seem very small, we emphasize that it is the relative change in the number of eligible patients, and not the absolute number that is important. Our figures severely underestimate the number of EMSN benefit recipients for four important reasons. First, although NSW is the most populous state in Australia, we do not have nationwide data. Second, we are unable to identify household-level EMSN eligibility (the data is at patient-level, whereas eligibility can be reached through household healthcare expenditure). Third, as our data is for patients aged 45 and over, we do not observe younger patients, particularly those receiving obstetric and IVF treatments, which contribute substantially to EMSN expenditures. And finally, we have modelled changes in fee-charging behavior for consultation services only, excluding over 5000 other services provided under Medicare.

The data suggests that as physicians raised their fees by an average of 12 percent, the distribution of patient annual out-of-pocket expenses – in the area most sensitive to the EMSN threshold level has shifted higher, as shown in the density plots in Figure 3 – indeed the 95th percentile of annual expenses rose by approximately 14 percent from $1151 in 2014 to $1311 in 2015 in our data. While the 2015 data suggests that the number of patients newly ineligible for EMSN benefits was substantially (and perhaps counterintuitively) higher than – almost double – that predicted by the 2014 data, it also alludes to the possibility that with ongoing fee increases over time, the number of EMSN-eligible patients will quickly catch up to the number pre-threshold-change. As discussed earlier, many other studies have shown the ability of physicians to increase the quantities demanded of their services, and with this study showing physicians responding by increasing fees, the government’s actual savings – underpinned by fewer EMSN benefit-recipients – will likely fall short of the projected $105.6 million over four years.

# Discussion

In the empirical literature on the behavior of physicians, researchers have found that physicians act at least in part in self-interest, and are able to influence the quantity demanded of health services. Due to pricing constraints that prevail in most modern health systems, there have been virtually no studies on the pricing behavior of physicians.

We exploit the relatively anomalous feature of the Australian health system – unregulated physician prices – to examine physician pricing behavior in response to an exogenous change in consumer cost-sharing arrangements. These arrangements, under the auspices of the Extended Medicare Safety Net, cover 80 percent of a patient’s out-of-pocket costs once an annual threshold has been met. We use rich, administratively-linked survey data on patients’ fees and out-of-pocket costs with individual physicians to identify where a physician has certain knowledge of the patient’s eligibility for EMSN benefits.

We find that in response to an exogenous increase in this threshold for general patients – a reduction in insurance coverage – the average *increase* in consultation fees among physicians with knowledge of their patient’s eligibility for EMSN benefits was approximately 12 percent. This was a robust finding, ranging from 7 to 18% depending on the definitions of treatment and control groups. Savage et al. (2009) reported that the introduction of the EMSN in Australia raised physician revenues rather than lowering patient out-of-pocket costs. Our results here provide a causal interpretation underlying these earlier aggregate results.

These results were despite an initial expectation, detailed in our conceptual exposition, that a scaling back of the generosity of the EMSN program would lead to *lower* fees as both provider and patient responded to higher patient out-of-pocket costs. Our contention is that the results are driven primarily by the responses of physicians, although patients near their EMSN threshold also benefit from gaining eligibility for benefits. This view is supported by two aspects of our results: first, we find no evidence of a change in the amount of health care utilization despite the increase in the price faced by some patients because of the increase in the threshold. Second, our results are robust across different definitions of treatment and control groups. These results are also consistent with the analysis of [Aron-Dine et al. (2015](#_ENREF_1)), which showed that patients respond to both future and spot prices in making their health utilization decisions. In this case, patients are willing to pay higher consultation fees to qualify for EMSN benefits and thereby reduce future co-payments.

The pricing decisions of doctors that we observe in our analysis are not compatible with a competitive market where prices are known, and patients face low switching costs. On the contrary, the market for specialist consultations is characterized by high switching costs and often high and unknown fees. The main driver of our results then is knowledge of a patient’s likelihood of reaching the EMSN threshold, that physicians can exploit because of their monopoly power.

Our back-of-the-envelope calculations suggest that while the higher EMSN threshold has initially resulted in fewer beneficiaries, higher fees are likely to see a greater-than-forecast number of eligible patients. Over time, the effect on public expenditures will likely be less than the projected savings of $105.6 million over four years.

There are several implications of our findings. The literature on demand for healthcare has shown a strong role for health insurance (Newhouse 1993; Zweifel, Manning 2000). However, there has been relatively little consideration of how patient eligibility for benefits might influence physician behavior, particularly in a system where physicians can exert influence over their own fees. Our study shows that conditions of eligibility for healthcare benefits entail a level of informational complexity which demands greater empirical attention. Physicians with knowledge of a patient’s eligibility for public benefits are able to charge higher fees, knowing that these will be absorbed largely by the government instead of the patient. The change in fee-charging behavior relates directly to how close a patient is to qualifying for benefits. As policy makers consider whether the optimal channels for limiting growth in healthcare expenditure lie on the demand or supply side, our research strongly suggests that physician behavior must be considered in order to mitigate unintended consequences.

BOX 1: Example of how the Extended Medicare Safety Net operates for a typical physician consultation

|  |  |  |  |
| --- | --- | --- | --- |
|  | Family A |   | Family B |
| **Qualified for EMSN benefits?** | No |   | Yes |
| **Physician fee** | $150.00 |   | $150.00 |
| **MBS rebate** | $72.75 |   | $72.75 |
| **EMSN Benefit (80% of gap)** | $0 |   | $61.80 |
| **Total Medicare benefit** | $72.75 |   | $134.55 |
| **Co-payment** | $77.25 |   | $15.45 |

Table 1—Extended Medicare Safety Net Thresholds by year

|  |  |  |
| --- | --- | --- |
| Year | Concessional | General  |
| 2004 | 300 | 700 |
| 2005 | 306.90 | 716.10 |
| 2006 | 500 | 1000 |
| 2007 | 519.50 | 1039.00 |
| 2008 | 529.30 | 1058.70 |
| 2009 | 555.70 | 1111.60 |
| 2010 | 562.90 | 1126.00 |
| 2011 | 578.60 | 1,157.50 |
| 2012 | 598.80 | 1,198.00 |
| 2013 | 610.70 | 1,221.90 |
| 2014 | 624.10 | 1,248.70 |
| 2015 | 638.40 | 2,000.00 |

*Source:* (Commonwealth of Australia 2003; 2004; 2005; 2006; 2007; 2008; 2009; 2010; 2011; 2012; 2013; 2014)

Table 2—Distribution of annual out-of-pocket costs, 2014

|  |  |  |  |
| --- | --- | --- | --- |
|   | n | Proportion with zero costs | Distribution of non-zero out-of-pocket costs (percentile) |
|   | 5th | 25th | 50th | 75th | 95th | 99th | Maximum |
| General patients | 57,029 | 28.9 | 26.7 | 77.3 | 160.4 | 311.0 | 649.6 | 1,008.5 | 10,015.8 |
| Concession patients | 130,729 | 16.0 | 33.0 | 106.9 | 235.5 | 472.5 | 1,066.9 | 1,489.0 | 11,914.7 |

*Source:* Commonwealth of Australia Medicare administrative unit-record data

Table 3—Sample means for main model treatment and control groups

|  |  |  |  |
| --- | --- | --- | --- |
|   | Panel A. General patients |   | Panel B. Concession patients |
|   | 2014 | 2015 |   | 2014 | 2015 |
| Age | 66.0 | 65.8 |   | 77.4 | 78.1 |
| Female | 0.47 | 0.55 |   | 0.53 | 0.53 |
| Married/partnered | 0.71 | 0.71 |   | 0.72 | 0.71 |
| Non-English speaking background | 0.86 | 0.93 |   | 0.67 | 0.68 |
| Level of education |   |   |   |   |   |
| Year 11 or below | 15.6 | 11.2 |   | 36.2 | 36.6 |
| At least year 12 | 35.5 | 34.7 |   | 45.4 | 43.0 |
| Degree or higher | 48.9 | 54.2 |   | 18.5 | 20.4 |
| Geographical location |   |   |   |   |   |
| Major cities | 74.7 | 73.9 |   | 52.0 | 53.1 |
| Inner regional | 18.0 | 17.9 |   | 29.6 | 30.1 |
| Outer Regional | 3.7 | 7.2 |   | 17.3 | 15.9 |
| Remote | 1.1 | 0.3 |   | 0.8 | 1.0 |
| Very remote | 2.5 | 0.7 |   | 0.3 | 0.0 |
|  |   |   |   |   |   |
| Has private health insurance | 0.12 | 0.06 |   | 0.06 | 0.07 |
| Income bracket |   |   |   |   |   |
| Less than $30,000 | 5.3 | 2.8 |   | 39.2 | 39.9 |
| $30,000 to $69,000 | 17.6 | 23.8 |   | 31.5 | 29.9 |
| $70,000 and above | 66.3 | 65.8 |   | 9.9 | 11.6 |
| Did not respond | 10.8 | 7.7 |   | 19.3 | 18.4 |
| Socioeconomic disadvantage |   |   |   |   |   |
| Quintile 1 (Most disadvantaged) | 0.0 | 3.7 |   | 10.5 | 11.5 |
| 2 | 7.8 | 6.8 |   | 19.8 | 18.7 |
| 3 | 22.9 | 19.4 |   | 25.6 | 23.9 |
| 4 | 18.3 | 21.2 |   | 19.6 | 19.8 |
| Quintile 5 (Least disadvantaged) | 51.1 | 49.1 |   | 24.6 | 26.2 |
|  |   |   |   |   |   |
| Mean number of annual GP visits | 8.8 | 8.4 |   | 12.7 | 12.7 |
| Mean consultation fee | $175 | $199 |   | $106 | $109 |
| Mean number of services received per physician | 15.4 | 14.4 |  | 14.0 | 13.7 |
|  |   |   |   |   |  |
| Number of consultations | 1,252 | 1,478 |   | 9,180 | 9,789 |

*Source:* Commonwealth of Australia Medicare administrative unit-record data

A small discrepancy in sample size exists between Table 3 and 4 due to incomplete data for a small number of observations which were consequently excluded from the regression model.

Table 4—Main specification results

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|   | Panel A. |   | Panel B. |   | Panel C. |  |
| **Effect of higher EMSN threshold** | **0.12\*\*** |  | **0.12\*\*** |  | **0.14\*\*** |  |
|  | (0.05) |  | (0.05) |  | (0.06) |  |
| Year effect | 0.03\* |  | 0.05\*\*\* |  | 0.01 |  |
|  | (0.02) |  | (0.01) |  | (0.03) |  |
| Group effect | 0.15\*\*\* |  | 0.39\*\*\* |  | 0.12 |  |
|  | (0.05) |  | (0.06) |  | (0.07) |  |
| Age | -0.02\*\*\* |  | -0.01\*\*\* |  | -0.02\*\*\* |  |
|  | (0.00) |  | (0.00) |  | (0.00) |  |
| Female | 0.08\*\*\* |  | 0.02 |  | 0.11\*\*\* |  |
|  | (0.02) |  | (0.02) |  | (0.04) |  |
| Geographical location |  |  |  |  |  |  |
| Inner regional | -0.07 |  | -0.05 |  | -0.11 |  |
|  | (0.04) |  | (0.03) |  | (0.07) |  |
| Outer regional | -0.08\* |  | -0.04 |  | -0.15\*\* |  |
|  | (0.05) |  | (0.04) |  | (0.07) |  |
| Remote | -0.22\*\*\* |  | -0.20\*\*\* |  | -0.40\*\*\* |  |
|  | (0.07) |  | (0.07) |  | (0.13) |  |
| Very remote | 0.17\* |  | 0.38\*\*\* |  | 0.18\* |  |
|  | (0.10) |  | (0.06) |  | (0.10) |  |
| Educational Attainment |  |  |  |  |  |  |
| At least Year 12 | 0.05\*\* |  | 0.02 |  | 0.08\* |  |
|  | (0.03) |  | (0.02) |  | (0.05) |  |
| Bachelor degree and above | 0.15\*\*\* |  | 0.03 |  | 0.16\*\*\* |  |
|  | (0.03) |  | (0.02) |  | (0.05) |  |
| Has private health insurance | 0.12\*\*\* |  | 0.14\*\*\* |  | 0.11\*\* |  |
|  | (0.03) |  | (0.04) |  | (0.05) |  |
| Socioeconomic disadvantage |  |  |  |  |  |  |
| Quintile 1 (Most disadvantaged) | -0.07\* |  | -0.16\*\*\* |  | -0.05 |  |
|  | (0.04) |  | (0.04) |  | (0.07) |  |
| Quintile 2 | -0.08\* |  | -0.08\*\* |  | -0.03 |  |
|  | (0.04) |  | (0.04) |  | (0.06) |  |
| Quintile 3 | -0.05 |  | -0.10\*\*\* |  | -0.05 |  |
|  | (0.04) |  | (0.03) |  | (0.07) |  |
| Quintile 4 | -0.05 |  | -0.05\* |  | -0.07 |  |
|  | (0.04) |  | (0.02) |  | (0.06) |  |
| Number of annual GP visits | 0.00\*\* |  | 0.00 |  | 0.00 |  |
|  | (0.00) |  | (0.00) |  | (0.00) |  |
| No. Observations | 21,123 |   | 16,559 |   | 8,081 |  |

 *Notes:* This table reports estimates from equation (1). The dependent variable in each panel is the logarithm of the consultation fee charged by the physician. Panel A reports the main specification and defines the treatment (control) group as general (concession) patients whose annual out-of-pocket costs were above the counterfactual 2015 EMSN threshold and capped at the new 2015 threshold ($2000). Panel B uses an alternative control group of EMSN-eligible general patients who reached their threshold using multiple physicians. Panel C models general and concession patients with out-of-pocket costs between the old and new general EMSN threshold.\*\*\* Significant at the 1 percent level. \*\* Significant at the 5 percent level.\* Significant at the 10 percent level. Clustered standard errors reported in parentheses.

*Source:* Commonwealth of Australia Medicare administrative unit-record data

Table 5—Placebo test results

|  |  |  |  |
| --- | --- | --- | --- |
|   | Panel A. |   | Panel B. |
| **Effect of higher EMSN threshold** | **0.03** |  | **-0.03** |
|  | (0.03) |  | (0.04) |
| Year effect | 0.03\* |  | 0.03\* |
|  | (0.02) |  | (0.02) |
| Group effect | -0.17\*\*\* |  | 0.25\*\*\* |
|  | (0.03) |  | (0.04) |
| Age | -0.01\*\*\* |  | -0.02\*\*\* |
|  | (0.00) |  | (0.00) |
| Female | 0.04\*\* |  | 0.07\*\*\* |
|  | (0.02) |  | (0.02) |
| Geographical location |  |  |  |
| Inner regional | -0.05 |  | -0.06\* |
|  | (0.03) |  | (0.04) |
| Outer regional | -0.06 |  | -0.09\* |
|  | (0.04) |  | (0.04) |
| Remote | -0.15\*\* |  | -0.21\*\*\* |
|  | (0.06) |  | (0.06) |
| Very remote | -0.01 |  | 0.07 |
|  | (0.08) |  | (0.10) |
| Educational Attainment |  |  |  |
| At least Year 12 | 0.05\*\* |  | 0.06\*\* |
|  | (0.02) |  | (0.02) |
| Bachelor degree and above | 0.09\*\*\* |  | 0.17\*\*\* |
|  | (0.03) |  | (0.03) |
| Has private health insurance | 0.12\*\*\* |  | 0.12\*\*\* |
|  | (0.03) |  | (0.03) |
| Socioeconomic disadvantage |  |  |  |
| Quintile 1 (Most disadvantaged) | -0.09\*\* |  | -0.09\*\* |
|  | (0.04) |  | (0.04) |
| Quintile 2 | -0.09\*\* |  | -0.07\* |
|  | (0.04) |  | (0.04) |
| Quintile 3 | -0.06\* |  | -0.07\* |
|  | (0.03) |  | (0.04) |
| Quintile 4 | -0.07\* |  | -0.05 |
|  | (0.04) |  | (0.04) |
| Number of annual GP visits | 0.00\* |  | 0.00\*\*\* |
|  | (0.00) |  | (0.00) |
| No. Observations | 25,668 |   | 30,942 |

Panel A models a placebo treatment group of general patients who used multiple-physicians to reach their EMSN threshold. Panel B is a second placebo model using 2013 and 2014 as the ‘before’ and ‘after’ years, where no policy changes took place. \*\*\* Significant at the 1 percent level. \*\* Significant at the 5 percent level.\* Significant at the 10 percent level. Clustered standard errors reported in parentheses.

*Source:* Commonwealth of Australia Medicare administrative unit-record data

Table 6—Alternative specification results

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Panel A. |   | Panel B. |   | Panel C. |
|   | 25% bounds |   | 50% bounds |   | 75% bounds |
| **Effect of raising general EMSN threshold** | **0.18\*\*\*** |  | **0.13\*\*\*** |  | **0.07\*\*\*** |
|  | (0.05) |  | (0.03) |  | (0.02) |
| Year effect | 0.02 |  | 0.03\*\*\* |  | 0.03\*\*\* |
|  | (0.02) |  | (0.01) |  | (0.00) |
| Group effect | 0.15\*\*\* |  | 0.15\*\*\* |  | 0.15\*\*\* |
|  | (0.04) |  | (0.02) |  | (0.01) |
| Age | -0.01\*\*\* |  | -0.01\*\*\* |  | -0.01\*\*\* |
|  | (0.00) |  | (0.00) |  | (0.00) |
| Female | 0.05\*\*\* |  | 0.04\*\*\* |  | 0.02\*\*\* |
|  | (0.02) |  | (0.01) |  | (0.01) |
| Geographical location (relative to metro) |  |  |  |  |  |
| Inner regional | -0.06\*\* |  | -0.04\*\* |  | -0.03\*\* |
|  | (0.03) |  | (0.02) |  | (0.01) |
| Outer regional | -0.08\*\* |  | -0.05\* |  | -0.03 |
|  | (0.04) |  | (0.03) |  | (0.02) |
| Remote | -0.16\*\* |  | -0.09\* |  | -0.06\*\* |
|  | (0.07) |  | (0.05) |  | (0.03) |
| Very remote | -0.18\*\*\* |  | 0.25\*\* |  | 0.17 |
|  | (0.05) |  | (0.11) |  | (0.12) |
| Educational Attainment (relative to Year 11 and below) |  |  |  |  |  |
| At least Year 12 | 0.03 |  | 0.04\*\*\* |  | 0.03\*\*\* |
|  | (0.02) |  | (0.01) |  | (0.01) |
| Bachelor degree and above | 0.13\*\*\* |  | 0.12\*\*\* |  | 0.09\*\*\* |
|  | (0.02) |  | (0.02) |  | (0.01) |
| Has private health insurance | 0.12\*\*\* |  | 0.08\*\*\* |  | 0.06\*\*\* |
|  | (0.02) |  | (0.01) |  | (0.01) |
| Socioeconomic disadvantage (relative to least disadvantaged) |  |  |  |  |  |
| Quintile 1 (Most disadvantaged) | -0.07\*\* |  | -0.09\*\*\* |  | -0.08\*\*\* |
|  | (0.03) |  | (0.02) |  | (0.02) |
| Quintile 2 | -0.03 |  | -0.07\*\*\* |  | -0.07\*\*\* |
|  | (0.03) |  | (0.02) |  | (0.01) |
| Quintile 3 | -0.07\*\* |  | -0.09\*\*\* |  | -0.08\*\*\* |
|  | (0.03) |  | (0.02) |  | (0.02) |
| Quintile 4 | -0.02 |  | -0.03 |  | -0.05\*\*\* |
|  | (0.03) |  | (0.02) |  | (0.01) |
| Number of annual GP visits | 0.00\*\* |  | 0.00\*\*\* |  | 0.00\*\*\* |
|  | (0.00) |  | (0.00) |  | (0.00) |
| No. Observations | 18,907 |   | 52,801 |   | 150,686 |

 *Notes:* This table reports estimates from equation (1). The dependent variable in each panel is the logarithm of the consultation fee charged by the physician. Panel A defines the treatment and control groups as general and concessional patients, respectively, within 25 percent bounds of their EMSN thresholds. Panel B defines the treatment and control groups as general and concessional patients, respectively, within 50 percent bounds of their EMSN thresholds. Panel C defines the treatment and control groups as general and concessional patients, respectively, within 75 percent bounds of their EMSN thresholds. \*\*\* Significant at the 1 percent level. \*\* Significant at the 5 percent level.\* Significant at the 10 percent level. Clustered standard errors reported in parentheses.

*Source:* Commonwealth of Australia Medicare administrative unit-record data

Figure 1. Growth in Expenditure on the Extended Medicare Safety net, 2004 - 2014

*Source*: Department of Health (2015)

Fee ($)

Number of consultations

300

100

Qa

Qc

Qb

D

D’

50

Figure 2. The Physician’s opportunity Under the Extended Medicare Safety Net

Panel A. General Patients

Panel B. Concession Patients

Figure 3. Kernel Density plots of Annual out-of-pocket costs per patient per physician.

To show the effect of the change in the EMSN threshold, changes in annual costs for patients between the 2014 and 2015 EMSN thresholds are plotted. Panel A shows the distribution of annual costs with single physicians for general patients. Panel B shows costs for concession patients.

APPENDIX 1

Table 6—Sample means for main treatment and alternative control groups

|  |  |  |  |
| --- | --- | --- | --- |
|   | Panel A. Single doctor general EMSN patients |   | Panel B. Multiple doctor general EMSN patients |
|   | 2014 | 2015 |   | 2014 | 2015 |
| Age | 66.0 | 65.8 |   | 66.2 | 68.0 |
| Female | 0.47 | 0.55 |  | 0.62 | 0.55 |
| Married/partnered | 0.71 | 0.71 |  | 0.75 | 0.80 |
| Non-English speaking background | 0.86 | 0.93 |  | 0.96 | 0.95 |
| Level of education |  |  |  |  |  |
| Year 11 or below | 15.6 | 11.2 |  | 15.1 | 16.0 |
| At least year 12 | 35.5 | 34.7 |  | 35.1 | 37.6 |
| Degree or higher | 48.9 | 54.2 |  | 49.7 | 46.5 |
| Geographical location |  |  |  |  |  |
| Major cities | 74.7 | 73.9 |  | 74.6 | 76.1 |
| Inner regional | 18.0 | 17.9 |  | 17.9 | 17.4 |
| Outer Regional | 3.7 | 7.2 |  | 7.0 | 6.2 |
| Remote | 1.1 | 0.3 |  | 0.5 | 0.3 |
| Very remote | 2.5 | 0.7 |  | 0.0 | 0.0 |
|  |  |  |  |  |  |
| Has private health insurance | 0.12 | 0.06 |  | 0.07 | 0.08 |
| Income bracket |  |  |  |  |  |
| Less than $30,000 | 5.3 | 2.8 |  | 3.4 | 3.6 |
| $30,000 to $69,000 | 17.6 | 23.8 |  | 20.1 | 18.2 |
| $70,000 and above | 66.3 | 65.8 |  | 60.0 | 58.6 |
| Did not respond | 10.8 | 7.7 |  | 16.5 | 19.6 |
|  |  |  |  |  |  |
| Socioeconomic disadvantage (SEIFA) |  |  |  |  |  |
| Quintile 1 (Most disadvantaged) | 0.0 | 3.7 |  | 2.1 | 3.2 |
| 2 | 7.8 | 6.8 |  | 8.0 | 7.7 |
| 3 | 22.9 | 19.4 |  | 16.9 | 14.2 |
| 4 | 18.3 | 21.2 |  | 16.6 | 17.6 |
| Quintile 5 (Least disadvantaged) | 51.1 | 49.1 |  | 56.4 | 57.2 |
|  |  |  |  |  |  |
| Mean number of annual GP visits | 8.8 | 8.4 |  | 11.4 | 11.6 |
| Mean consultation fee | $175 | $199 |  | $109 | $113 |
|  |  |  |  |  |  |
| Number of consultations | 1,252 | 1,478 |   | 5,365 | 8,756 |

REFERENCES

Aron-Dine, A., Einav, L., Finkelstein, A., Cullen, M., 2015. Moral hazard in health insurance: Do dynamic incentives matter? Review of Economics and Statistics, 97(4), 725-741.

Australian Institute of Health and Welfare, 2013, Health expenditure Australia 2011–12. AIHW, Canberra, pp. Supplementary tables 3.10 and 13.11.

Berk, M., Monheit, A., 2001. The concentration of health care expenditures, revisited. Health Affairs, 20(2).

Bureau of Health Information (NSW), 2014, Healthcare in focus 2013: how does NSW measure up? In: N. Health (Ed.), Chatswood, NSW, pp. p.ii.

Calver, J., Bramweld, K., Preen, D., Alexia, S., Boldy, D., McCaul, K., 2006. High-cost users of hospital beds in Western Australia: A population-based record linkage study. Medical Journal of Australia, 184(8), 393-397.

Commonwealth of Australia, 2003, Medicare Benefits Schedule Book: Operating from 01 January 2004. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Commonwealth of Australia, 2004, Medicare Benefits Schedule Book: Operating from 01 January 2005. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Commonwealth of Australia, 2005, Medicare Benefits Schedule Book: Operating from 01 January 2006. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Commonwealth of Australia, 2006, Medicare Benefits Schedule Book: Operating from 01 January 2007. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Commonwealth of Australia, 2007, Medicare Benefits Schedule Book: Operating from 01 January 2008. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Commonwealth of Australia, 2008, Medicare Benefits Schedule Book: Operating from 01 January 2009. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Commonwealth of Australia, 2009, Medicare Benefits Schedule Book: Operating from 01 January 2010. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Commonwealth of Australia, 2010, Medicare Benefits Schedule Book: Operating from 01 January 2011. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Commonwealth of Australia, 2011, Medicare Benefits Schedule Book: Operating from 01 January 2012. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Commonwealth of Australia, 2012, Medicare Benefits Schedule Book: Operating from 01 January 2013. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Commonwealth of Australia, 2013, Medicare Benefits Schedule Book: Operating from 01 January 2014. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Commonwealth of Australia, 2014, Medicare Benefits Schedule Book: Operating from 01 January 2015. In: Department of Health (Ed.). Commonwealth of Australia, Canberra.

Cooper, Z., Craig, S., Gaynor, M., Van Reenen, J., 2015, The price ain't right? Hospital prices and health spending on the privately insured. National Bureau of Economic Research, Working Paper 21815, Cambridge, Massachusetts.

Department of Health, 2015, Submission to the Senate Community Affairs Legislation Committee for the Inquiry into the Health Insurance Amendment (Safety Net) Bill 2015. In: Department of Health (Ed.). Australian Government, Canberra.

Department of Social Services, 2017, DSS Demographics June 2015. Payment recipients by payment type by state and territory by age group, Canberra, Australia.

Dranove, D., Satterthwaite, M., 1992. Monopolistic competition when price and quality are imperfectly observable. RAND Journal of Economics, 23(4), 518-534.

Dranove, D., Satterthwaite, M., 1999, The industrial organization of health care markets. In: A.J. Culyer, J.P. Newhouse (Eds.). Handbook of health economics. Elsevier, Amsterdam.

Frech, H.E.T., 1996, Competition and monopoly in medical care. AEI Press, Washington, DC.

Gaynor, M., Vogt, W., 2000, Antitrust and competitition in health care markets. In: A.J. Culyer, J.P. Newhouse (Eds.). Handbook of health economics. Elsevier, Amsterdam.

Gruber, J., Kim, J., Mayzlin, D., 1999. Physician fees and procedure intensity: The case of cesarean delivery. Journal of Health Economics, 18(4), 473-490.

Hahn, Y., 2013. The effect of Medicaid physician fees on take-up of public health insurance among children in poverty. Journal of Health Economics, 32(2), 452-462.

Hansard, 2003, Health Legislation Amendment (Medicare) Bill second reading speech. In: H.o. Representatives (Ed.), Canberra, Australia.

Iizuka, T., 2012. Physician agency and the adoption of generic pharmaceutical. The American Economic Review, 102(6), 2826-2858.

Johar, M., Jones, G., Savage, E., 2012. Healthcare Expenditure Profile of Older Australians: Evidence from Linked Survey and Health Administrative Data. . Economic Papers, 31(4), 451-463.

Johar, M., Mu, C., van Gool, K., Wong, C.Y., 2017. Bleeding Hearts, Profiteers, or Both: Specialist Physician Fees in an Unregulated Market. Health Economics, 26(4), 528-535.

Lundin, D., 2000. Moral hazard in physician prescription behavior. Journal of Health Economics, 19(5), 639-662.

McGuire, T., 2008, Physician fees and behavior: Implications for structuring a fee schedule. In: F. Sloan, H. Kasper (Eds.). Incentives and choice in health care. The MIT Press, Cambridge, Massachusetts.

Mealing, N., Banks, E., Jorm, L., Steel, D., Clements, M., Rogers, K., 2010. Investigation of relative risk estimates from studies of the same population with contrasting response rates and designs. . BMC Medical Research Methodology, 10, 26.

Mitchell, J., Hadley, J., Gasken, D., 2002. Spillover effects of Medicare fee reductions: Evidence from opthalmology. International Journal of Health Care Finance, 2(3), 171-188.

Newhouse, J.P., 1993, Free for all? Lessons from the RAND Health Insurance Experiment. Harvard University Press, Cambridge, Massachusetts.

Parliament of the Commonwealth of Australia, 2014, Health Legislation Amendment (Extended Medicare Safety Net) Bill 2014: Explanatory memorandum. In: House of Representatives (Ed.), Canberra, Australia.

Rais, S., Nazerian, A., ARdal, S., Chechulin, Y., Bains, N., Malikov, K., 2013. High-cost users of Ontario's healthcare services. Health Policy, 9(1), 44-51.

Reinhardt, U., 1989. Economists in health care: Saviors, or elephants in a porcelain shop? The American Economic Review, 79(2), 337-342.

Savage, E., van Gool, K., Haas, M., Viney, R., Vu, M., 2009, Extended Medicare Safety Net: Review report 2009. In: D.o.H.a. Ageing (Ed.). Centre for Health Economics Research and Evaluation, Sydney, NSW.

van Gool, K., Savage, E., Johar, M., Knox, S., Jones, G., Viney, R., 2011, Extended Medicare Safety Net: Review of capping arrangements report 2011. In: D.o.H.a. Ageing (Ed.). Centre for Health Economics Research and Evaluation, Sydney, NSW.

van Gool, K., Savage, E., Viney, R., Haas, M., Anderson, R., 2009. Who's getting caught? An analysis of the Australian medicare safety net. . Australian Economic Review, 42(2), 143-154.

Yip, W., 1998. Physician response to Meidcare fee reductions: Changes in the colume of coronary artery bypass graft (CABG) surgeries in the Medicare and private sectors Journal of Health Economics, 17(6), 675-699.

Zweifel, P., Manning, W., 2000, Moral hazard and consumer incentives in health care. In: A.J. Culyer, J.P. Newhouse (Eds.). Handbook of health economics. Elsevier, Amsterdam.