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Sources of specialist physician fee variation: Evidence from Australian health insurance claims data

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ABSTRACT

This study explores the variation in specialist physician fees and examines whether the variation can be attributed to patient risk factors, variation between physicians, medical specialties, or other factors. We use health insurance claims data from a large private health insurer in Australia. Although Australia has a publicly funded health system that provides universal health coverage, about 44 % of the population holds private health insurance. Specialist physician fees in the private sector are unregulated; physicians can charge any price they want, subject to market forces.

We examine the variation in fees using two price measures: total fees charged and out-of- pocket payments. We follow a two-stage method of removing the influence of patient risk factors by computing risk-adjusted prices at patient-level, and aggregating the adjusted prices over all claims made by each physician to arrive at physician-level average prices. In the second stage, we use variance-component models to analyse the variation in the physician-level average prices.

We find that patient risk factors account for a small portion of the variance in fees and out-of-pocket payments. Physician-specific variation accounts for the bulk of the vari- ance. The results underscore the importance of understanding physician characteristics in formulating policy efforts to reduce fee variation.

1. Introduction

Some degree of fees dispersion in the market for specialist physician services is expected because there is variation in the costs of providing healthcare across geographical ar- eas, or across different types of patients with varying health conditions. In addition, across medical specialties, procedural services are often more costly to provide than consultation-based services. Even within the same specialty, fees are expected to vary because patients differ in their needs and treatment complexity and physicians differ in their experience and skill levels. But variation in fees can also reflect market power, and excessive variation is often bolstered by opaque information about fees and quality.

Large variation in fees increases consumers' search costs and fosters an environment of low competition in a market with already high entry barriers, primarily driven by long and highly selective training programs. High and unexpected out-of-pocket (OOP) payments create financial uncertainty for consumers who need care, resulting in patients in need not seeking treatment, delaying treatment, or joining the queue for treatment in the public system which charges low or no OOP payments.

In Australia, physician fees in private practices are neither regulated, nor negotiated between insurers and physicians. OOP spending has been rising at an average rate of 6.2 % per year, far outstripping the inflation rate of about 2 % (Australian Institute of Health and Welfare (AIHW), [1]). It accounted for 17 % of Australia's annual health care spending, among the highest in the OECD [2]. Highly variable specialist fees and high OOP payments have been cited as key reasons for the declining private health insurance membership in Australia [3]. They also raise policy concerns since high OOP payments may deter privately insured patients from using private care. Instead, they seek care as fully funded public patients, adding to the demand pressure on the already constrained public hospital system. There is also evidence that, for people with chronic conditions, high OOP payments can act as a significant barrier to care even in Australia where there is universal health

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insurance [2,4].

This study investigates the sources of fee variation in Australia's private in-patient care market. We explore whether the variation in fees can be attributed to variation in patient conditions, physician- or specialty-specific variation, or variation in other fac- tors including market conditions. Understanding the primary source of variation is an important step in developing effective policy responses to reduce fee variation and im- prove price transparency in the market. For example, if the fee variation is primarily at specialty-level, a supply side response by managing workforce planning to increase the supply of in-demand specialties would be appropriate. Obviously, such a strategy will not work if the variation arises from patient case complexity.

Variation in the pricing of healthcare services has been studied largely in the context of hospital or insurance markets with negotiated prices, where payments are negotiated between networks of physicians and insurers [5–10]. However, since prices are negotiated, patients seeing in-network physicians generally face known prices and predictable OOP payments. The observed variation in payments simply reflects relative bargaining power as well as local market conditions [6,8,11, 12]. Large surprise OOP payments can arise in out-of-network care, as Cooper et al. [12] showed in the case of emergency care in the United States. Other studies have examined how doctors, usually primary care physicians, respond to changes in financial incentives or insurance subsidies [13–15]. In another line of research, several studies have focused on aggregate geographic variation in the utilisation rates and costs of healthcare [16–18]. Few studies examine the fee variation of physician services. Among those that do, the focus is mainly on primary care physicians [19–21], or emergency physicians (Cooper et al., [12]), and mostly on factors that affect how these physicians set prices. However, in most OECD countries specialist physicians have higher incomes [22,23], their markets are more concentrated [8,24] and their services are more heterogenous, yet little is known about their price variation.

Specific to the Australian health care markets, several studies have found evidence of large variation in fees for specialist consultations and treatment across and within med- ical specialties [25–27]. A few studies have attempted to explain fee variation. McRae and van Gool [28] argued that the causes of fee variation are essentially market-related. Johar et al. [29] study differences in specialist physician fees charged to high and low-income patients and show a large variation in the gap fee across specialties, while Yu et al. [30] explore special- ists' price discrimination according to patients' access to additional subsidies through the Extended Medicare Safety Net (EMSN) scheme and document an increase in fees for patients who are likely to reach eligibility for higher benefits. Both studies examine out-of-hospital services using a sample of patients older than 45 years old. Ḿendez et al. [31], in a recent study using data from a longitudinal survey of doctors, found that self-reported consultation fees were higher for physicians who owned their own practice, or were associated with personality traits that reflect their bedside manner, but fees did not seem to have any association with competition. Few studies focus on in-hospital care services, and among those that do, none has attempted to decompose the variation.

To the best of our knowledge, our study is the first to investigate in-hospital special- ist physician services and evaluate the variation in fees after risk adjusting for patient risk factors using detailed patient data. In so doing, we are able to assess the relative importance of patient risk factors in affecting the variation in fees and OOP payments. We are also the first study to systematically decompose the variation. Our use of Australian data allows us to make a unique contribution to the US-dominant literature on healthcare price setting, since unlike physicians in the US whose ability to set prices are limited by negotiated in-network prices, physicians in Australia are free to set their fees.

We use administrative claims data (2012–2019) for in-hospital medical services from one of the largest private health insurers in Australia. We examine two types of prices: total fees charged by physicians and OOP payments incurred by patients. They differ by the amount of subsidies from the government and payouts from private health insurers. The claims data show large variation in fees. Typical examples include knee replacement surgeries, for which in 2019, reported total fees ranged from $260 to more than $16,000 with a mean fee of about $2000; and OOP payments ranged from $0 to about $12,000 with a mean of about $650. Additional examples can be found in Section 3 below where we show the variation in fees and OOP payments of several common procedures. Note that these fees, while varied widely, were not adjusted for patient characteristics or risk factors, to which the variation is often attributed.

We use a two-stage method of first risk adjusting for patient factors and then decompos- ing the adjusted fees using variance decomposition techniques. Our findings suggest that patient factors account for a very small variation in total fees and OOP payments. We further show that, after risk adjustment, the remaining fee variation tends to be dominated by the variation between physicians; in comparison, variation between specialties and other residual factors plays a minor role. Our findings highlight the importance of understanding physician characteristics in formulating effective policy responses to improve price transparency.

2. Materials and methods

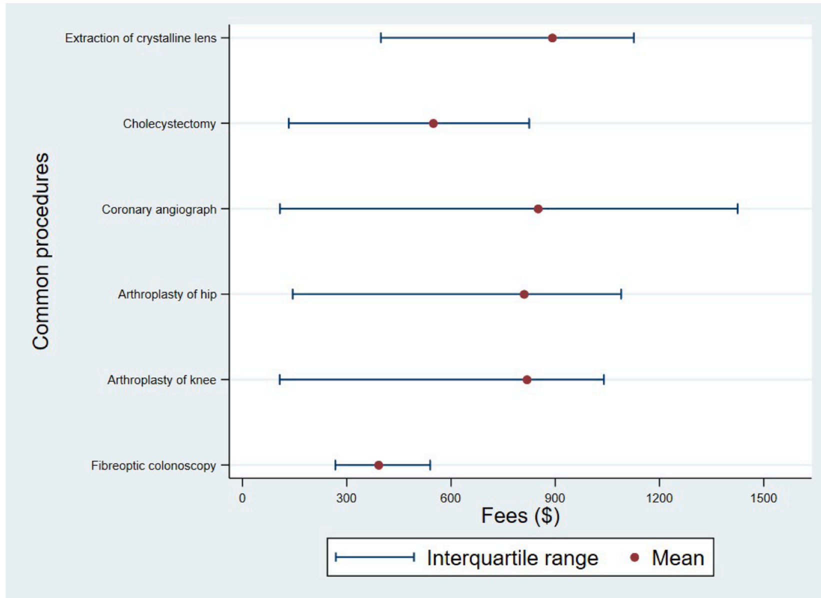
2.1. Background

Australia has a mixed public-private health system. A universal and tax-funded public insurance scheme, Medicare, funds about 68 % of total health care costs. The remain- ing 32 % are funded from private health insurance and other sources, including direct OOP payments from consumers (AIHW, [1]). In-patient care services provided to public patients (mostly in public hospitals) are jointly funded by the federal and state governments; public patients do not incur OOP payments.

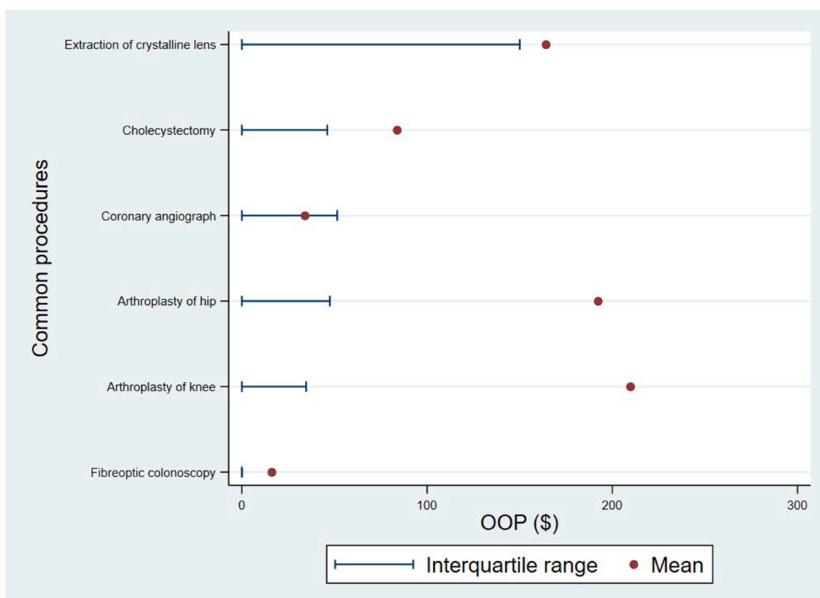
On top of Medicare, about 44 % of Australians have private health insurance coverage. The government encourages the purchase of private health insurance through a combi- nation of tax penalty (on high-income households without private health insurance) and subsidy policies. The latter consists of a premium rebate scheme that provides rebates ranging from 24 % to 30 % of insurance premium, depending on income. The premium subsidies total about A$6 billion a year in recent years (AIHW, [1]). In addition, the government subsidises the use of private health care through Medicare rebates, which subsidises private in-patient care provided in private or public hospitals. The subsidy partially covers the total fee, the remainder is covered by private health insurers and patients themselves.

The Medicare Benefit Schedule (MBS) defines a list of schedule fees for care services, including consultations, diagnostic tests, and medical and surgical procedures. The schedule fees determine the amount of subsidy provided to patients by the Australian government in the form of Medicare rebates. For in-patient services, government subsidy is typically set at 75 % of the schedule fees, with the remaining 25 % borne by private insurers. However, physicians in private practice are free to charge more than the MBS schedule fees, in which case there will be a 'gap' payment that is typically borne by consumers as OOP payments. Furthermore, physicians can price discriminate, such that patients receiving the same treatment from the same physician can be charged different fees and OOP payments.

In the event that the physician charges more than the MBS schedule fee, the difference between what the physician charges (the total fee) and Medicare rebates will be covered by a varying mix of private health insurance and patient OOP payments. The extent of OOP payments also depend on whether the physician has an agreement with the patient's private health insurer to either charge no OOP payments ('no gap' cover where the insurer pays the excess of total fees over the Medicare rebates), or to charge an agreed OOP amount ('known gap' cover). Even where physicians have entered into such an agreement, they can choose whether to invoke the agreement or not. Patients therefore face



(a) Unadjusted Total Fees



(b) Unadjusted OOP Payments

Fig. 1. Fees and OOP payments of six common procedures.

uncertainty not only about whether they will face OOP payments, but also the size of the payment. In all settings, the physician can choose to set their fee equal to the Medicare subsidy (i.e., at 75 % of the MBS schedule fee) such that patients face no OOP payments. This is known as 'bulk billing.' In recent years about 70 % of specialist physician claims were bulk billed, although it should be noted that most bulk billed claims have been in high volume diagnostic services such as pathology and radiology. Furthermore, since an episode of care typically involves multiple claims from different specialist physicians, the proportion of bulk billed patients, i.e., those facing no OOP payments for their entire episode of care, is substantially lower.

2.2. Data

The data were extracted from the claims records of a large private health insurer in Australia. With presence in every state and close to 30 % market share nationwide, the insurer is one of the largest health insurers in Australia. The claims data are for in-hospital services, and contain patient characteristics (age, gender, etc.), detailed diag-nostic and procedure information in the form of International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) and Australian Classification of Health Interventions (ACHI) codes. In addition, detailed information on different types of prices are available. For this study, we use information on two types of prices: total fees charged by physicians and OOP payments paid by patients.

The data are available as claims records, where a claim is a transaction record sub- mitted by the physician for services rendered and coded according to Medicare item number(s). An episode of care may involve several claims since it may involve several specialist physicians performing different tasks, e.g., a surgery may involve a surgeon, an anesthetist, and a surgical assistant. Each specialist physician may use a different billing scheme and submit a different claim to the insurer. Thus, an episode may involve multiple claims from different physicians that may demand different OOP payments from the patient. From the patient's point of view, the price for the whole episode of care is relevant, whereas for physicians the fee for their claim(s) is what matters. We are interested in the variation in fees and OOP payments from the physician's perspective since they set the fees. The analysis will be conducted initially at the claims level and then aggregated to physician-year level.

2.3. Methods

We examine two prices: total fees charged and OOP payments. The analysis proceeds in two stages. In stage 1, we standardise the two prices by removing as much as possible the influence of patient characteristics, treatment received, complexity and risk factors via a risk adjustment process performed at the claims level. Risk adjusted prices are aggregated in stage 2 to the physician-year level, on which the variances of total fees and OOP payments will be decomposed into different sources of variation. (Detailed specifications of the models are included in Appendix A.1).

In stage 1, we specify a risk adjustment equation using a generalised linear model (GLM), which comprises a link function and a distribution. For total fees, we specify the link as an identity function with Gaussian distribution, while for OOP payments, we specify a log link function with Poisson distribution because the data show an excess of zeros and are highly skewed. For both equations, patient risk factors and controls include age, gender, whether the claimed episode was elective, involved ICU stay, was a same- day stay, and the number of diagnoses and procedures performed. The last two are count measures, with larger numbers indicating more complex and severe conditions. The following fixed effects are also included: ICD-10 Principal Diagnostic Chapters (19 chapters), patient postcodes (more than 1200 postcodes) and physician IDs (more than 36,000 IDs). In addition, we further include ACHI Block 1 and Block 2 combinations (more than 1800 combinations) as fixed effects. An ACHI block is a grouping of rela- tively homogeneous interventions, e.g., procedures on cardiovascular system are coded into some 1000 ACHI codes, which are in turn grouped into 177 ACHI blocks. Most interventions involve two or more ACHI blocks since a surgery (grouped under an ACHI block) typically also involves anaesthesia whose ACHI code will be grouped into another ACHI block.

Note that the physician ID fixed effects are not included in computing the risk-adjusted total fees and OOP payments for the next stage, since the purpose of risk adjustments is to remove the influence of patient factors, not physician effects. However, the physician fixed effects are included as a control to avoid omitted variable bias in the estimation.

After estimating the risk adjustment equations, we obtain predicted fees and OOP pay- ments using the estimated coefficients, but with physician fixed effects excluded. In stage 2, we calculate the average annual adjusted fees (and OOP payments) of a spe- cialist physician as the difference between the observed and predicted fees (and OOP payments) averaged over all claims for a given year. We call this the risk adjusted fee (and OOP payment), which we derive at the physician-year level. We next decompose the variance of the risk adjusted fees (and OOP payments) by estimating a three-level random effects model. The objective is to decompose the total variance in adjusted to- tal fees (and OOP payments) into between-specialty variance, between-physician (within specialty) variance, and the residual variance. The estimates of these variances are de- noted respectively as $\hat{\sigma_s}$, $\hat{\sigma_v}$, and $\hat{\sigma_\epsilon}$.

The random effects are assumed uncorrelated with each other. This effectively rules out, for example, physicians sorting into specialties. Estimates of the intra-class correlations indicate the proportion of the variance attributable to specialty- and physician-specific variation; the remaining fraction is the contribution of the residual errors which we attribute to market conditions and other factors. We denote the intra-class correlations as ρ(*specialty*) and ρ(*physician*), which are estimated as the ratio of the respective variance estimate ($\hat{\sigma_s}$ or $\hat{\sigma_v}$) to the sum of the variance estimates ($\hat{\sigma_s} + \hat{\sigma_v} + \hat{\sigma_\epsilon}$).

3. Results

The sample covers a nine-year period from 2012 to 2019 and contains 15.9 million claims in total. An overview of the sample is shown in Table 1. It comprises about 2 million claims each year made by 20,000–25,000 specialist physicians on about 700,000 episodes and 400,000 patients. The data suggest that an episode typically involved 2 to 3 claims. The median number of claims per episode is 3 and the mean is 4.3.

Table 2 presents summary statistics about total fees and OOP payments per claim. Average total fees and OOP payments were respectively \$608.6 and \$94.4 per claim, both were highly skewed as indicated by the much smaller median values. About 72.3 % of claims did not require any OOP payments from patients, notably the proportion was steadily declining over time except for 2019. Additional summary statistics on total fees and OOP payments, and on patient characteristics and risk factors are given in Appendix A.2.

There is a high degree of variation in physician fees and OOP payments within and across procedures. Fig. 1 illustrates this by showing the means and interquartile ranges of six common procedures, selected using the first two ACHI blocks combinations which we use as fixed effects in the estimation. Fig. 1(a) shows that fees can vary substantially, not only between procedures but also within procedures. The variation in OOP payments is even more pronounced due to the presence of no-gap claims, as shown in Fig. 1(b). Some procedures, such as 'arthroplasty of knee', have mean OOP payments that are way beyond their interquartile ranges, a reflection that while a significant proportion of patients incur no OOP payments, a few others are paying significant amount.

We next examine the risk adjusted total fees and OOP payments, which we derive from the risk adjustment equations. The distributions of risk adjusted total fees and OOP payments, together with those of their unadjusted counterpart, are shown in Appendix A.3. The distributions of the risk adjusted prices were more symmetric than those of the unadjusted prices, and correspondingly there was a shift in the location parameters to the left.

Table 3 presents measures of dispersion of risk adjusted and unadjusted total fees and OOP payments, in addition to the respective mean and median values. Note that negative values are possible after risk adjustment, since the risk adjusted total fees and OOP payments include the constant from the respective risk adjustment equation. This means that the risk adjusted prices were distributed around the mean. We interpret the negative values as indicating that some physicians were charging their patients less than the average prices charged by their peers, after allowing for patient risk factors and complexity. This likely happened to physicians who bulk-billed or used 'no gap' cover for most of their patients, i.e., charging no OOP payments.

Table 3 shows that both the mean and median values of the adjusted total fees and OOP payments were substantially smaller than their

Table 1
Sample overview.

Admission Year	No. patients	No. physicians	No. episodes	No. claims
2012	420,465	21,055	697,434	1907,918
2013	425,072	21,570	712,248	1960,462
2014	428,075	22,370	724,900	1996,341
2015	429,231	23,179	734,757	2022,560
2016	420,786	24,034	735,851	2020,110
2017	411,468	25,239	727,432	2016,814
2018	399,765	25,367	706,971	1972,762
2019	394,860	25,086	700,824	1961,796
All years	1643,032	41,933	5740,417	15,858,763

Table 2
Total fees and OOP payments per claim, summary statistics by year.

Year	Total Fees Mean($)	Median($)	s.d.	Out of Pocket Mean($)	Median($)	s.d.	Prop no OOP
2012	588.4	337.9	786.8	85.5	0.0	472.5	0.737
2013	594.9	340.3	820.7	85.5	0.0	529.5	0.746
2014	600.8	346.1	807.6	88.0	0.0	525.1	0.741
2015	607.6	356.2	824.5	95.0	0.0	548.8	0.721
2016	612.8	365.4	830.5	97.3	0.0	520.2	0.707
2017	612.8	365.4	830.0	97.2	0.0	540.5	0.708
2018	620.5	365.4	860.2	102.0	0.0	579.9	0.703
2019	630.2	372.0	859.0	104.6	0.0	581.2	0.720
All years	608.6	359.8	827.9	94.4	0.0	540.5	0.723

unadjusted counterpart. In particular, median total fees and OOP payments were both negative, suggesting that physicians in more than half of the sample were in effect 'undercharging' their patients once patient risk factors were taken into account.

We use three common measures of dispersion, the variance, interquartile range and the difference between the 90th and 10th percentile, to measure the variation in adjusted and unadjusted total fees and OOP payments. The results are shown in Table 3. We can see that much of the dispersion in total fees and OOP payments remains after risk adjustment. For example, using variance as the dispersion measure, the variance of risk adjusted total fees was approximately 96.3 % of the variance of unadjusted total fees, while for OOP payments the percentage was 94.4 %. Allowing for patient characteristics and risk factors has reduced the total variance by respectively 3.7 % and 5.6 %. Using two other common measures, there was no decrease but an increase in dispersion. Both the interquartile range and the 90th and 10th percentile range have increased after risk adjustment, and substantially so in the case of OOP payments.

After estimating the risk adjustment equation, we obtained the risk adjusted total fees and OOP payments. Recall that these prices were aggregated from claims into physician- year unit. We decomposed the total variance into components comprising specialty- and physician-specific variation, with the residual errors capturing the variation of all other factors. Table 4 shows the variance estimates and intra-class correlation coeffi- cients, $\rho(specialty)$ and $\rho(physician)$, which give the proportions of the total variance attributable to respectively specialty- and physician-level variation.

The estimates in Table 4 suggest that specialty-level variation accounts for respectively 16.0 % and 4.8 % of the total variance of total fees and OOP payments. In comparison, 65.3 % and 71.5 % of the total variance of total fees and OOP payments can be attributed to between-physician variation. After accounting for these two sources of variation, the remaining 19.5 % and 23.7 % of the total variance of total fees and OOP payments are accounted for by other factors attributed to the residuals.

3.1. Robustness

To check the robustness of our results, we perform a series of six sensitivity analyses. First, we repeat our analysis by excluding claims of two laboratory-based specialties: pathology and radiology, which tend to have higher claims volumes per physician, lower total fees and a greater proportion of zero OOP payments than other specialties. Applying this exclusion criterion removed 4836 physicians (12.9 %) and close to 4 million claims (25 %) from the full sample. The results, summarised in Appendix A.4, were similar and our conclusions remained the same.

In our second robustness check, we exclude specialist physicians who made small volume of claims during the sample period to avoid the results being skewed by those with few claims. For this, we define small volume as having 9 or fewer claims for the entire data period. This exclusion criterion removed 54,260 physician-year observations or 30.5 % of the full sample. The restricted sample contains 123,669 observations and 18,569 unique physician IDs who made at least 10 claims. We find similar results as before. The estimation results are shown in Appendix A.5.

For our third robustness check, we extend the variance component model to a four-level model. We consider a model that includes a measure of competition—the number of competitors in each specialist physician's catchment—as an additional level in between the specialty and physician levels. As described in Appendix A.6, the catchment is intended to capture the notion that it is an area from which a physician draws most of his or her patients. The results, reported in Appendix A.6, show that specialty- and physician-level variations remain the dominant sources of variation, only a negligible proportion of the variance of both total fees and OOP payments can be attributed to the variation on the number of competitors.

The next robustness check excludes two specialty areas, obstetrics and gynaecology (OBG), and ophthalmology, both are likely affected by policy changes in relation to the EMSN scheme, which was designed to increase Medicare benefits to patients facing very high healthcare expenses. After its introduction, government expenditures increased dramatically and Van Gool et al. [32] showed that a large proportion of these expen- ditures were allocated to wealthier areas and specific specialties, such as OBG. This led to reforms that capped the benefits on a larger list of items in 2012 and increased the thresholds in 2015 [30]. These changes might have affected patients whose treatment requires extensive in and out of hospital care, like OBG and ophthalmology. In

Table 4
Variance components: Three-level variance decomposition.

	RA Total **fees**			**RA OOP**		
	Coeff.	s.e.	*p*-val	Coeff.	s.e.	*p*-val
$\hat{\sigma_s}$	314.65	45.38	< 0.001	117.10	17.33	< 0.001
$\hat{\sigma_v}$	635.19	2.63	< 0.001	449.97	1.85	< 0.001
$\hat{\sigma_\epsilon}$	339.74	0.64	< 0.001	258.49	0.49	< 0.001
$\rho(specialty)$		0.160			0.048	
$\rho(physician)$		0.653			0.715	
No. obs.		173,968			177,674	
No. physicians		33,850			37,556	

Table 3
Dispersion of unadjusted and risk adjusted prices.

	Total fees Unadj.	Adj.	Ratio	Out of Pocket Unadj.	Adj.	Ratio
	(*U*)	(*A*)	(*A*/*U*)	(*U*)	(*A*)	(*A*/*U*)
Mean ($)	779.1	105.0		167.2	−235.9	
Median ($)	522.1	−80.2		5.5	−298.7	
Variance	687,808.9	662,696.9	0.963	292,253.0	275,838.3	0.944
Interquartile range ($)	687.5	769.3	1.119	98.0	259.5	2.648
p90th-10th percentile	range($) 1458.3	1551.9	1.064	410.6	587.8	1.431

No. of physicians 37,605.
No. of obs. 177,929.

this robustness check, we re-estimate our results by excluding the two specialty areas. This excludes 906,375 observations or about 5.7 % of the volume of claims in our data. The results, summarised in Appendix A.7, differ only slightly from our main results. The variance decomposition results suggest that specialty-specific variation account for slightly smaller shares in the total variance in fees and OOP payments than in our main results. This is to be expected as the exclusion of two specialty areas will have reduced specialty-specific variation in the data.

In our fifth robustness check, we exclude observations with extremely high total fees and OOP payments. To do this, we exclude observations with reported fees or OOP payments of more than A$8000. The value of A$8000, although arbitrary, seems rea- sonable to use as the cutoff for the maximum charges in the context of private in-hospital care in Australia. In total, 18,800 observations, or about 0.12 % of the total volume of claims, are excluded. The results are summarised in Appendix A.8. As expected, means and variances of total fees and OOP payments are substantially lower. However, our results are unaffected, since both risk-adjusted and unadjusted fees are affected almost equally by the exclusion of outliers. It is also worth noting the shares of specialty- and physician-specific variation in our variance component estimation are largely unchanged. Consequently, we do not see any material impacts whether the outliers are excluded or not.

Our sixth and final robustness check is to address the concern that our calculations of the risk adjusted fees and OOP payments, and consequently our results, may be affected if we were to allow the coefficients of covariates such as age or gender to vary by diagnosis or intervention. To test this, we identify the five largest ICD-10-AM chapters in terms of volume of claims: (i) Diseases of the digestive system, (ii) neoplasms, (iii) diseases of the musculoskeletal system and connective tissue, (iv) diseases of the circulatory system, and (v) diseases of the genitourinary system. Together they account for 8.8 m observations, or about 55 % of the total volume of claims in our data. We implement a separate risk adjustment estimation for fees and OOP payments for each of the ICD chapter, then pool all risk adjusted fees and OOP payments into a single sample to carry out the second-stage variance component estimation. The results are summarised in Appendix A.9. We find our results are essentially unchanged whether we estimate the first stage risk adjustment separately or using a pool sample approach as we did in our main analysis.

4. Discussion

This study is the first to describe and decompose the variation in specialist physician fees and OOP payments in Australia's private specialist care market. We show that, in an environment of unregulated and non-negotiated fees, physician-specific variation accounts for close to 65 % of the total variance in total fees and 72 % of OOP payments. Observed patient characteristics and risk factors, such as patient health conditions, case complexity, procedure-specific factors, age, gender, location, etc., helped explain away little of the variation in fees and OOP payments, by approximately 4 % and 6 % respectively.

Physician-specific variation, responsible for much of the variation in total fees and OOP payments, could include physician characteristics that patients value, such as bedside manner, experience or reputation, or factors related to physicians' circumstances or preferences. A key physician-level factor that may drive the variation is the perception of quality or skill differences between physicians. This perception can come from either consumers or physicians themselves about their quality or skill levels in comparison to other physicians in the physician's local market. As discussed in a recent qualitative study [33], such perception can be a major consideration in the pricing decision of specialist physicians. The ability to price differentiate based on quality perception contributes to the market power commanded by physicians, which can lead to large price variation and non-transparency of fees.

Our findings highlight the importance of understanding physician-specific characteristics in formulating effective policy responses aiming at reducing fee variation and improving price transparency. In this regard, the current strategy of the Australian government and several large national private health insurers to improve price transparency by em- powering consumers to make more informed choice may prove to be inadequate. By setting up dedicated websites with information on fees and OOP payments by small area, these initiatives hope to improve the bargaining power of consumers in their search for specialist physicians in their local market. However, without information on qual- ity, consumers could perceive high fees as a signal for high quality. This in turn could strengthen physicians' ability to price differentiate based on perceived quality, resulting in an increase in fee variation. To be effective, these strategies not only have to promote transparency about fees and OOP payments but also on quality of care and outcomes, so that consumers can be better informed about the value of their choice (Hills, et al., [27]).

However, the government's ability to directly restrict the pricing practice of specialist physicians is limited by the relevant provisions in the Australian Constitution McDon- ald et al. [34]. Nonetheless, the government, private health insurers and physicians themselves could still play a bigger role in improving the transparency of fees and OOP payments. The government, for example, could mandate the disclosure of fees and qual- ity metrics for procedures that receive MBS benefits. A voluntary scheme could be set up such that specialist physicians who want to receive Medicare rebates must register and, in return, be subject to a range of transparency requirements on quality and fees [34]. Similarly, major insurers, in their role as payers, can provide incentives for providers to disclose information about fees and quality on a voluntary ba- sis. General practitioners can also play a more active role through their referral process by referring patients to specialist physicians who are willing to be transparent about their fees and quality.

Our study has several limitations. First, we rely on data from a single, albeit large, national private health insurer. As such, we do not observe pricing practices by specialist physicians on episodes of care outside of this insurer. Second, the lack of information about physicians in our data precludes further analyses on how physician characteristics, such as their experience and practice styles, influence their pricing decisions. Third, our data lack information about health habits and behaviour, such as smoking or exercise habits, which may be observed by the attending physicians and taken into consideration when setting fees and OOP payments.

5. Conclusions

This study investigated the variation in specialist physician fees and out-of-pocket pay- ments using a two-stage analysis. The first stage isolated patient characteristics and risk factors via risk adjustment and the second stage decomposed the variance of risk adjusted prices into physician- and specialty-level variation. We find that patient characteristics and risk factors accounted for little of the variation in total fees and out- of-pocket payments. Variance decomposition of the risk adjusted prices suggested that most of the total variance in total fees and out-of-pocket payments can be attributed to physician-level variation.

Our findings underscore the importance of understanding physician characteristics that influence their pricing behavior. Accounting for physician-level factors in pricing, such as the difference in practice styles and perception of quality differences between physicians, will be crucial in formulating policy efforts to improve the price transparency of markets for specialist physician services.

The government, private health insurers and physicians themselves could all play a more active role than they currently do. The government, for example, could mandate the disclosure of price and quality information for all procedures that receive government subsidies, insurers could provide incentives for the disclosure of such information, and physicians could change their referral practice to give preferences to other physicians who are willing to be transparent about their prices and quality.

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CRediT authorship contribution statement

Jongsay Yong: Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Adam G Elshaug:** Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Susan J Mendez:** Writing – review & editing, Writing – original draft, Visualization, Validation, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Khic-Houy Prang:** Writing – review & editing, Writing – original draft, Visualization, Validation, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Anthony Scott:** Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization.

Declaration of competing interest

All authors declare no conflict of interest.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.healthpol.2024.105119.

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