RENT-CONTROLLED RESOURCES

WHY ARE WE UNDER-CHARGING AUSTRALIA'S MINING TENANTS?

prosper australia research institute

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Prosper Australia acknowledges the Traditional Custodians of the country throughout Australia and we pay our respect to their elders past and present. We honour their unbroken connection to country, and acknowledge that sovereignty was never ceded.

About Prosper

Prosper Australia is an economic research organisation founded in the Georgist tradition of political philosophy. Our work centres on the monopolistic nature of land and how it shapes our economy and society. Our vision is a just and equitable society, created by ensuring everyone who benefits from our land, natural resources, and natural monopolies pays a fair rent for their use.

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KEY POINTS

- Mineral rights are Crown property, belonging to all Australians.
- Royalties in their current form are an inflexible and inefficient method of pricing public property rights – like rent control for housing, they protect mining tenants from paying full market value.
- State governments, as resource managers, are giving Australia's resource companies a cushy deal at the public's expense.
- If Australia captured resource rents as effectively as Norway, governments could raise up to $66 billion more in revenue each year – enough to fund the abolition of payroll tax and stamp duty.
- A straightforward adjustment to royalty regimes, inspired by Queensland's recent reforms, could yield an additional $14.5 billion per year by way of more commercially-oriented resource pricing.

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1. INTRODUCTION

Australians own the nation's mineral and energy resources. We're the landlords. But we're being short-changed. Our state governments are systematically under-charging resource companies for the transfer of public property into private hands.

When the property manager is mates with the tenant, it's wise to keep a close eye on the rent.

Almost 15 years ago, the Henry Review called for a more commercially-minded pricing arrangement for resources. Despite the numerous political battles since then, most Australians are no closer to receiving a fair return.

Scarred by past debates, the Commonwealth is reluctant to re-engage.

But what if the states could make substantial changes alone?

Queensland has shown the way, with a simple tweak to coal royalties capturing an extra $9.4 billion, or $4,300 per household, in additional revenue over the course of the 2022 to 2023 coal price boom.[1]

The main barrier preventing other states from moving similarly is one of public understanding.

This report explains why the economic rents in resource markets are there for the taking and how by modifying the Queensland approach and applying it to other royalties we could raise billions in extra revenue, quickly and simply.

In this report we:

- Outline the economic problem of pricing state-owned resource rights (what are we trying to achieve?)
- Explain the methods for doing so (what are our options?)
- Propose a novel, simple adjustment to royalty regimes that all states could apply to all resources (how best to do this?)
- Estimate the public revenue gains from this approach to resource pricing (what is this worth?)

The one in five Australians who own a rental property and the two in five working in small business might be surprised to learn how crudely state governments are pricing our resources. But it doesn't have to be this way. The sophistication applied by Australian businesses is within reach of policymakers – given the political will to act.

[1] Additional revenue was $5.8 billion in 2022-23 and $3.6 billion in 2023-24 (Queensland Treasury 2024, p121).

2. THE RESOURCE PRICING PROBLEM

2.1. HOW MUCH COULD WE RAISE?

In Australia, property rights to minerals and energy resources are reserved by the Crown. The state owns them on behalf of the public. Mining companies are granted leases by the state, just as housing tenants are granted leases by landlords.

In this context, royalties are not "taxes" on mining companies any more than rents are taxes on housing tenants or supermarket prices are taxes on customers. State governments are pricing the sale of what we all own.

The debate over resource royalties is about how well they are doing this. Are the shareholders achieving a commercial return?

Failing to sell public property at full value costs the public as much as overpaying in public procurement. Yet in the case of royalties, we seem to forget this.

When the Queensland government blew $1.25 billion on a payroll project described as "the largest IT failure in the southern hemisphere" it led to a commission of inquiry and became a canonical example of procurement failure (Eden and Sedera 2014). But when Western Australia and the Northern Territory blew $13 billion by giving away $149 billion of gas royalty-free over the last four years, it went largely unremarked upon (Ogge et al 2024).

The Henry review concluded that "*Australia's current resource charging arrangements fail to collect an appropriate return for the community from allowing private firms to exploit non-renewable resources*".[2]

How much could we raise if our governments were serious about capturing value for the public?

Norway, the poster child for resource rent capture, funds around one-quarter of state expenses from its petroleum sector. Had Australia captured the same share of resource industry value-added as Norway, state and federal governments would have raised an average $107 billion per year over the last decade – $66 billion more than was collected by existing royalties and taxes. The difference is equivalent to 2.7% of GDP, and is currently being given away to resource company shareholders. This amount could fund the abolition of payroll tax and stamp duty, or pay for the Stage 3 tax cuts three times over (Box 1).

[2] Nobel prize-winning economist Joseph Stiglitz put it less politely: "*you're giving away your natural resources... I find it mind-boggling*" (ABC 2024).

Box 1: Australia and Norway – the lucky country and the savvy

Norway's resource charging arrangements capture up to 90% of petroleum sector supernormal profits (a.k.a. economic rents; see Lund 2014).

A combination of special taxes and direct ownership generated net cash flows for the state over the last decade averaging NOK 500 billion per annum (AUD 66 billion), equivalent to 23% of annual state revenue (Norwegian Ministry of Energy 2024). As petroleum prices boomed over 2022 and 2023 the amount raised more than doubled, to NOK 1,400 billion in 2022 and NOK 1,000 billion in 2023.

Resources dominate Norway's export mix, comprising 40-60% of all exports, similar to Australia's 50-70% (the proportions vary by year).

Norway's petroleum sector accounts for around 19% of national GDP. The equivalent figure in Australia for mining inclusive of oil and gas is 10% (these are 10-year averages to 2023; see Norwegian Ministry of Energy 2024 and ABS 2024a).

As a small, resource-rich country with an economy and exports oriented around commodities, Norway is a model for what Australia could achieve with better resource pricing.

Norway's government captures resource rent from the petroleum sector through three main streams:

- **Taxation:** Ordinary corporate income tax (CIT) of 22% applies to petroleum companies, but is also a deductible expense for the special petroleum tax (SPT), which in combination with the CIT captures a total 78% of petroleum project economic rents and contributes around 53% of the total state cashflow from the petroleum sector (an average NOK 250 billion per annum).
- **Dividends:** The state-owned Equinor, where the government holds a 67% stake, pays dividends contributing another 6% of total state cashflow (NOK 30 billion per annum).
- **SDFI Revenues:** Through the State's Direct Financial Interest program of direct equity ownership in other oil and gas fields, pipelines, and onshore facilities in proportions ranging from 4% to 58% (Petoro 2024), the Norwegian state earns a share of profits proportionate to its ownership stake. This contributes around 41% of total cashflow (NOK 190 billion).

Over the decade to 2023, net cashflow from these three sources was equivalent to 51% of industry value-added (i.e. petroleum sector GDP). If the same proportion of resource industry value-added had been captured here, Australian governments would have raised an average $107 billion per year (in 2023 dollars).

The actual revenue collected by Australian governments over the decade to 2022 averaged $15 billion in state and territory government royalties (EY 2024), $1.5 billion per annum in Petroleum Resource Rent Tax (PRRT), and around $2 billion in oil and gas excise, royalties and fees (APPEA 2022). Another $22 billion per annum was paid in company tax (ATO 2024), adding to a total $41 billion per year stream of public revenue raised from the resource sector across all levels of government.

The $66 billion difference between best-in-class resource rent capture – $107 billion per year, assuming that Norway's rent share of resource industry value-added also applies to Australia and that

a similar proportion can be captured by the state – and the $41 billion collected under current charging arrangements is significant.

The difference is equivalent to 2.7% of GDP, and is more than is collected each year by state payroll tax ($34 billion) and stamp duty ($29 billion) combined (ABS 2024b). This amount is three times the expected cost of the Stage 3 tax cuts of early 2024 (Coates and Moloney 2024). While a $66 billion hand-out to resource companies seems enormous, it needs to be put in context of mining sector company profits, which were $242 billion in 2022-23 (ABS 2024c).

By undercharging for resources, the Australian public is missing out on a significant sum of money that could be used to fund major tax cuts or significant public investment aimed at improving productivity, encouraging employment, and boosting household incomes.

2.2. HOW SHOULD WE PRICE OUR RESOURCES?

Industry lobbyists often conflate the price paid for resources with other taxes paid by resource companies, such as company tax and environmental taxes. But pricing and taxation are distinct domains. The taxation of resource companies under rules applicable to all Australian businesses is a separate issue from pricing the sale of public property.

The question of how to price resources has an analogy in pricing access to residential or commercial property.

There are many pricing models in use. Residential landlords usually charge a fixed weekly rent, with regular adjustments to remain in line with market value (i.e. the maximum tenants are prepared to pay). Some commercial landlords, such as shopping mall owners, base rent on the tenant's turnover, often using complex pricing formulas. Other property owners price seasonally, as in peak holiday pricing, or by location, as in franchise models. Property owners can also monetise value by selling their property right and thereby swapping uncertain future returns for an upfront lump sum.

All of these options are available for resource pricing.

But most royalties are instead levied as a fixed percentage of the value of resources extracted – in essence, a simple turnover rent (Box 2). When resource prices rise, the dollar royalty price under a fixed-rate royalty increases proportionately, no matter that extraction costs are unchanged, and profits have therefore risen disproportionately.

This fixed-rate royalty approach has much in common with rent control for residential property. Under rent control, landlords are prohibited from charging sitting tenants market value. This transfers value from owner to tenant. Fixed-rate royalties do the same for resources. They are an unsophisticated approach to pricing a product that has a private value that varies by time and place, and this approach benefits resource companies at the public's expense. Our royalty regimes protect Australia's mining

tenants from the vicissitudes of market-rate pricing in a way the nation's residential tenants can only dream of.

Box 2: Royalty models

Mineral companies paid $32 billion in royalties to state and territory governments in 2022-23 (EY 2024). Most of this was paid in Queensland ($15 billion), Western Australia ($11 billion) and New South Wales ($5 billion). The total represents around 1.2% of GDP, or 8.8% of total state expenses (ABS 2024d). Oil and gas royalties contributed several billion more (APPEA 2023).

There are several basic royalty models:

- **Ad valorem:** The most common model for major resources, calculated as a percentage of the market value of minerals produced (i.e. revenue). For example, Western Australia charges miners a fixed-rate royalty of 7.5% of the value of iron ore extracted (WA Government 2024).
- **Unit-based:** Fixed charges per tonne or unit of resource extracted. For instance, NSW charges between $0.35 and $0.70 per tonne for industrial minerals like bauxite and limestone (NSW Government 2024)
- **Hybrid:** A combination of unit-based and ad valorem. In Queensland, miners pay $1.25 per tonne for iron ore when the average price per tonne is $100 or lower, plus 2.5% of the value above $100 per tonne, when applicable (Queensland Government 2024a).

Beyond the scope of analysis here lies an important question: who exactly owns our resources? Who should receive compensation for extraction?

While the focus here is on royalty design, questions remain about Crown control. Indigenous custodianship and sovereignty have a deep-rooted history that predates colonisation, and there remain unresolved legal and cultural questions. We set aside these issues here to examine only how pricing structures should be designed.

2.3. WHERE THE VALUE OF RESOURCES COMES FROM

When it comes to housing, everyone understands that the value of location explains why houses cost more than the cost of construction.

If a house is worth $1 million for sale, and the replacement cost is $0.5 million, the land will be priced at $0.5 million. The land value is determined as a residual: the developed value minus the development cost.

What does the land itself cost to produce? Nothing. Each location is scarce, unique, and provided to us for free. Land has a price, but no production cost. The value of the house over and above its construction cost therefore generates an economic rent for the location – a return in excess of that necessary to bring the location into use (Box 3).

Economic rents also arise in mineral and energy extraction because, as with the land under houses, these natural resources are scarce, with a market value exceeding extraction costs.

The relative scarcity of accessible deposits means some profits cannot be competed away. Australia is the world's largest exporter of lithium, for instance (ABS 2022), and our higher-grade deposits and renewable energy resources offer the potential to provide an unbeatable cost advantage in refined lithium (McKinsey and Company 2023).

The key difference between resource leases and housing leases is that resource leaseholders typically commit their own capital to the site in the form of equipment, transport networks, and land improvements.

This means part of their profit is not a pure economic rent, but is quasi-rent, meaning a return over and above extraction costs that is necessary to justify the upfront capital investment. The requirement to commit capital to a lease also means that states cannot price access to resources based on market benchmarks, the way residential landlords can. Unlike in housing markets, there is no pool of potential resource leaseholders waiting in the wings, ready to take on a lease yet willing and able to vacate the site if the owner hikes the rent too high.

A resource lease is more like a long-term joint venture between the owner of a plot of land and a leaseholder willing to construct a new house and manage it as a rental. The landowner's pricing problem is this: how should the annual housing rent be divided between the two parties? And if this figure rises or falls, who should bear the risk or reap the reward?

There is no single answer. Commercial arrangements share risks and returns in many ways. But one clear principle is to not fix the return to the property owner far below the value to the beneficiary. This is the effect of fixed-rate royalties, which redistribute value from owner to tenant, just as rent control does.

Box 3: What determines land and resource values?

Economic misunderstandings plague public debates. The most persistent in housing policy is the idea that statutory costs such as property taxes, developer charges, design rules or inclusionary zoning requirements are passed on to buyers in higher house prices.

The assumption underpinning this myth is that land prices are a fixed cost upon which development costs are 'stacked' like building blocks, adding up to determine the house price.

This is an understandable intuition, and is often exploited by lobbyists (see Figure 1 below, which asserts that statutory costs are passed on to home purchasers). After all, land prices are a fixed cost for developers, and the adding-up rule must hold as an accounting identity.

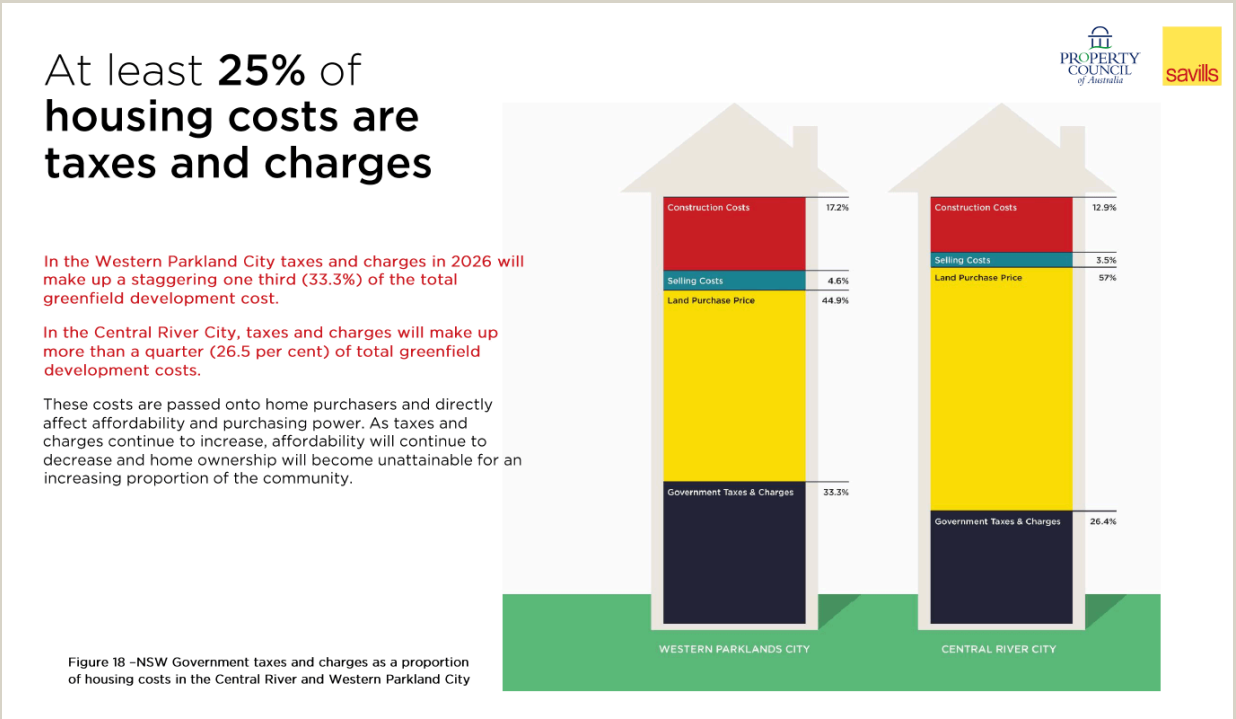
But at the market level this gets the causation of prices backwards. In a market equilibrium, land prices do not set house prices, but rather, the other way around – the market price of housing determines the market price of land. This is an old insight, recognised even prior to 19th-century

economist David Ricardo's famous statement that "*corn [the grain price] is not high because a rent is paid, but a rent is paid because corn is high*".

It occurs because land prices are not grounded in any production cost, so are a floating quantity. Competition drives this quantity towards the value in use minus the costs of use. In development feasibility analysis this quantity is called the residual land value. When there is a change in development costs (including statutory costs), this changes the residual value, not the value in use (in Figure 1, higher taxes will reduce the land price, not increase the total house price).

Since land of any given quality is limited in supply, residual land values can never be competed down to zero. Resource rents persist for the same reason. Supply constraints limit the degree of competition, with global prices determining the margin of profitable extraction, and lower-cost mines or fields within this margin enjoying supernormal profits (rents) which cannot be competed away.

Figure 1: The back-to-front economics of house and land prices



Source: Property Council of Australia (2024)

2.4. VARIATION IN ECONOMIC RENT ACROSS SPACE AND TIME

Setting resource prices to capture economic rents is made difficult due to variation in rents over two key dimensions:

- across locations, according to the accessibility and grade of the resource;
- over time, as market conditions change.

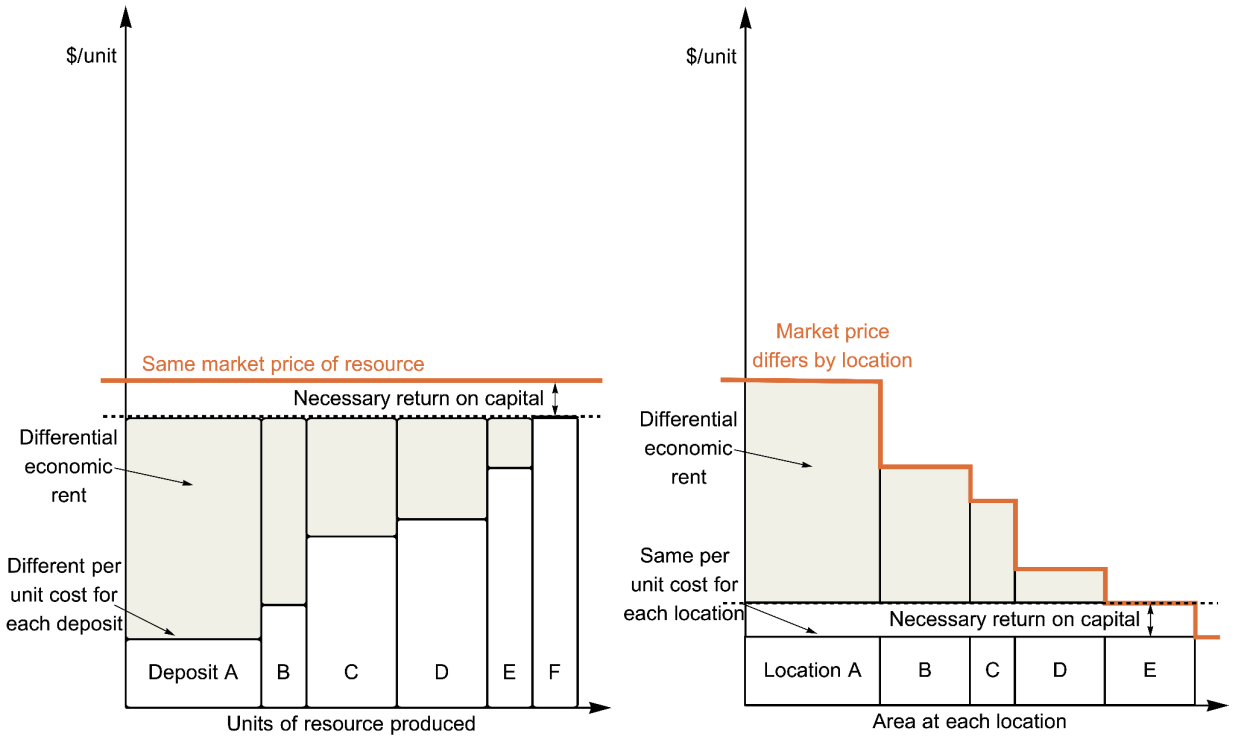
Deposits closer to transport networks or with minerals nearer the surface feature lower transport and extraction costs than other deposits, leading to rents varying by location ('differential rents').

Figure 2 illustrates this point. The left panel of Figure 2 shows a cost curve (supply curve) which combines the unit costs of extraction by deposit and the number of units available per deposit, ordered by unit cost from low to high.

Economic rents are the difference between the market price and unit cost, including a necessary return on capital. These vary by deposit. Rents are highest for the lowest-cost deposit (deposit A) and decline as costs rise all the way to zero for the highest-cost or 'marginal' deposit (deposit F).

The idea of differential rents applies to land under houses, too, but primarily as a reflection of differences in location value, not unit production cost. This is illustrated in the right panel of Figure 2.

Figure 2: How differential rents arise in resources and land markets



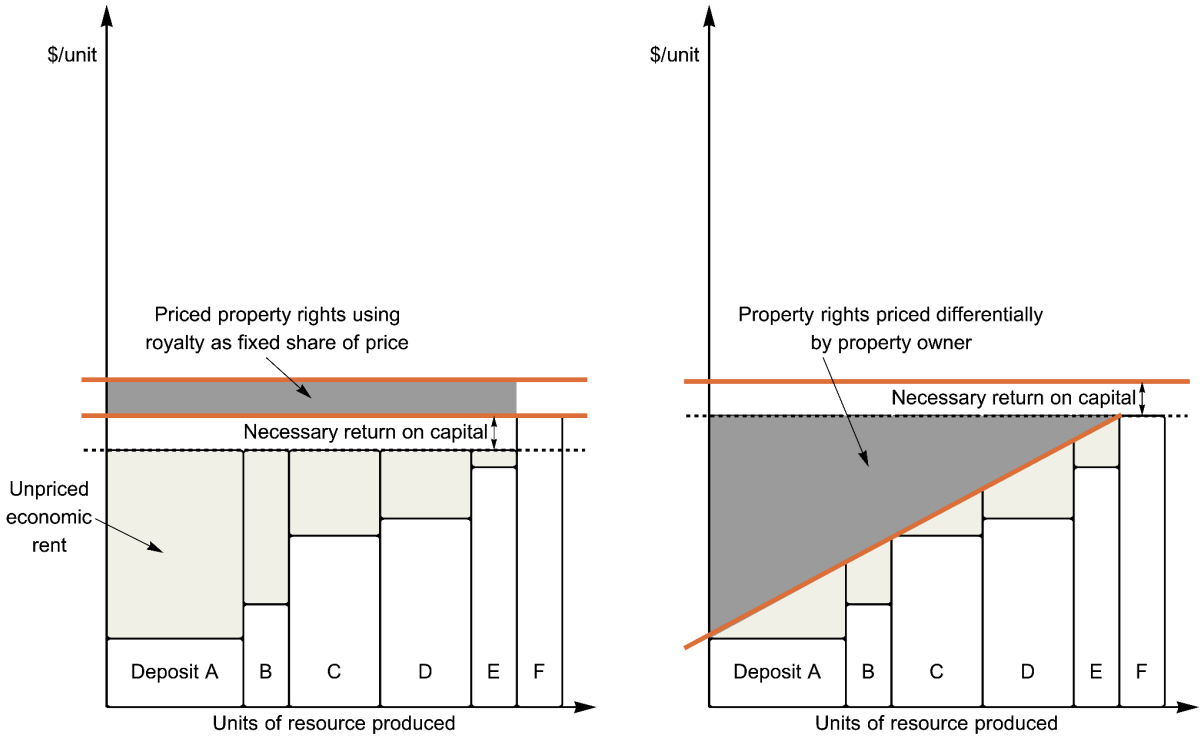
Source: Prosper Australia.

When prices are unregulated, housing markets will price locations in accordance with differentials in location value, thus maximising returns to the owners. But non-market pricing of resources rarely achieves this. Royalties charged on a per unit or ad valorem basis instead underprice access to low-cost or high-value deposits while overpricing marginal deposits.

This leaves too much rent with most leaseholders, yet also discourages investment at the margin. This is shown in the left panel of Figure 3, where a fixed-rate royalty renders deposit F uneconomic. By contrast, pricing differentially by location, as shown in the right panel, would allow the resource owner to capture more value from those who can afford to pay more without deterring investment from those who cannot.

Many businesses practise market segmentation or price discrimination to achieve this outcome. Cinemas and hospitality venues offer student or senior discounts, for example, while franchise owners capture differential location rents through location-specific franchise fees. Revenue-based royalties are by comparison an unsophisticated way to price access to resource deposits of differing value.

Figure 3: Fixed-rate royalties vs differential pricing by location



Source: Prosper Australia.

The second challenge in resource pricing is to systematically reflect variation in the market price of resources over time. How can resource owners share in revenue risk – the rise and fall in the value of resources to the leaseholder?

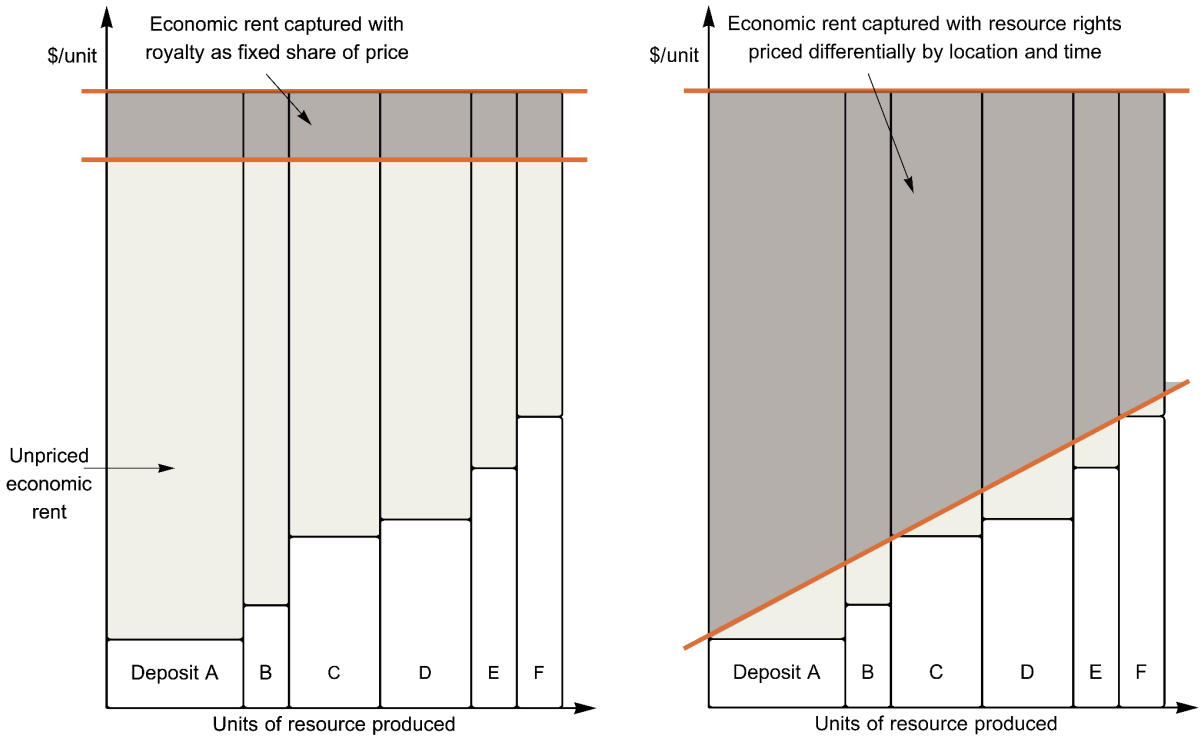
Retail landlords often use turnover-based rents to share risk and reward from fluctuations in trading conditions. Holiday accommodation is priced seasonally, with premium prices for high-demand periods. Surge pricing for taxis operates on the same principle.

Commercially-oriented resource pricing should likewise reflect changes in the value of resources to mining tenants over time.

In that context, Figure 4 contrasts fixed-rate royalties with a more commercial pricing approach, amid a period of temporarily elevated prices. Fixed-rate royalties capture some of the upside gains, as shown in the left panel, but differential pricing by location and time would capture more, as in the right panel.

The challenge for policy design is to achieve this in practice – that is, to price resources in accordance with differences in the value of resources to the leaseholder over space and time, so as to capture as much economic rent as possible without discouraging investment.

Figure 4: Fixed-rate royalties vs differential pricing by time



Source: Prosper Australia.

3. RESOURCE PRICING MECHANISMS

Shaped by historical arrangements and political or administrative realities, three main models of resource pricing are now in use:

1. Direct ownership;
2. Resource rent taxes;
3. Royalties based on revenue or production.

How well does each approach reflect variation in economic rent by location and time?

3.1. DIRECT OWNERSHIP

Many resource-rich countries maintain majority ownership of resource companies. Saudi Aramco is almost entirely owned by the Saudi government, for instance. Norway's Equinor is 67% publicly owned, and since 1985 the Norwegian government has acquired equity stakes in all new private oil and gas projects (see Box 1 above).

Direct ownership solves the spatial and temporal pricing problems, avoiding the need to disentangle normal investment returns from economic rents.

When specific deposits yield higher profits, direct ownership ensures these are captured for the state. When prices are abnormally high, temporary windfall profits are captured too. Risk and reward are shared without complex policy design.

To extend the real estate analogy, direct ownership is like a firm owning the building it operates from and capturing the joint surplus from both its business operation and the valuable location it occupies.

Table 1 shows the popularity of direct ownership. So effective is this model at capturing resource rents that certain countries, notably in the Gulf, have avoided taxing their working citizens entirely, and instead fund three-quarters or more of state expenses from resource rents (Oliver Wyman 2019).

Some state acquisitions were controversial, with foreign companies nationalised without compensation, while others were achieved through partnerships with foreign companies or equity purchases.

Australia is an outlier amongst resource-rich countries for its lack of significant state ownership. Ironically, other nations find Australian resources valuable to own – Australian coal miner Yancoal is majority-owned by the Chinese government, and the Japanese government owns 19% of Inpex, a gas producer with facilities in the Browse Basin off WA. Underpricing our resources delivers healthy returns not only to private owners but to foreign governments too.[3]

[3] Inpex has paid no gas royalty or PRRT since it began operation in 2018 (Inpex Australia 2020; Ogge et al 2024).

Table 1: Major state-owned oil and gas companies around the world

Company	Country	State ownership	Company	Country	State ownership
Saudi Aramco	Saudi Arabia	100%*	Eni	Italy	30.1%
NIOC	Iran	100%	INOC	Iraz	100%
CNPC	China	100%	NNPC	Nigeria	100%
PDV	Venezuela	100%	EGPC	Egypt	100%
Gazprom	Russia	50.002%	Equinor	Norway	67%
KPC	Kuwait	100%	ONGC	India	69.23%
Pemex	Mexico	100%	CNOOC	China	100%
Petrobas	Brazil	28.7%	Kazmunaigas	Kazakhstan	100%
Sonatrach	Algeria	100%	PDO	Oman	60%
Rosneft	Russia	75.16%	Socar	Azerbaijan	100%
QP	Qatar	100%	Uzbekneftgas	Uzbekistan	100%
Adnoc	UAE	100%	Ecopetrol	Colombia	88.49%
Sinopec	China	75.79%	OMV	Austria	31.5%
Petronas	Malaysia	100%	PTT	Thailand	51.1%

*Source: Arbatli (2018).*1.5% of shares were sold in 2019.*

3.2. RESOURCE RENT TAXATION

The challenge of efficiently capturing economic rent motivates resource rent taxation as outlined by Garnaut and Clunies-Ross (1983) and subsequently enacted in Australia via the 1988 Petroleum Resource Rent Tax (PRRT) and short-lived Minerals Resources Rent Tax (MRRT).

A resource rent or super profit tax is levied on project profits only above a certain threshold. This exempts from taxation the normal returns to capital investment, taxing only the economic rent. Instead of providing for depreciation, a rent tax allows for 100% immediate deductibility of capital expenses for exploration and development, with losses carried forward to reduce future tax payable.

The resource owner shares in upside and downside risk, effectively making the state a silent equity partner in the project: if the project is unprofitable, no tax is paid; if it is highly profitable, a large share goes to the state. This is efficient in terms of raising revenue from lower-cost projects without deterring higher-cost projects.

The key design feature distinguishing rent taxation from royalties is the deduction for costs. Royalties are typically based on revenue, while the rent tax base is revenue minus costs. In theory this means a rent tax can be used to price resource rights at their private value – the residual of revenue less costs, including a normal return on capital.

In practice, the treatment of costs in rent taxation is fraught with difficulty. Whenever key parameters are set conservatively to avoid deterring investment this can result in inadequate revenue, and the inherently complex design of a rent tax can prompt gaming.

A single company may own many projects, for instance, producing many margins for accounting trickery. Companies may spend on exploration without success, and the allocation of overheads, branding, and other costs can be manipulated whenever the entity spans jurisdictions and activities. Low and declining revenue from the PRRT prompted a 2016 review that highlighted such issues but led to few changes (Commonwealth of Australia 2017).

Effective rent taxation requires strict accounting practices and inside knowledge of firm operations, making implementation challenging. It is not simply federal political reluctance that stands in the way of replacing royalties with a rent tax.

3.3. ROYALTIES

Simplicity and political practicality make royalties a common pricing model. On these grounds, Professor John Freebairn amongst others suggests that Australian states should stick with their royalty regimes. Freebairn also argues that "*it cannot be assumed that the ideal efficiency of a resource rent tax will be translated in practice*" (Freebairn 2015).

For Australia's major minerals and gas, ad valorem royalties are the dominant model (Table 2).

Unit-based royalties provide a steadier revenue stream, but ad valorem royalties allow states to share in upside revenue risk. At prevailing royalty rates, however, risk-sharing is limited. Royalties also cannot discriminate between higher- and lower-cost deposits, except when different rates are levied on different classes of deposit (such as for coal in NSW).

Table 2: Key royalty rates in Australia

Resource	Major states (% of total)	Royalty rate	Note
Coal	Queensland (57%)	Between 7% and 40% marginal rate depending on coal price.	Tiered rate structure
	New South Wales (42%)	• Open-cut mines: 9.8% • Underground: 8.8% • Deep underground: 7.8%	Differential royalty by mine type
Iron ore	Western Australia (99%)	7.5% of Platts premium benchmark price plus 25c per tonne after 15 years of mine operation	
LNG	Queensland (30%)	Marginal rates depending on sale price: • Project gas: Between 3% and 12.5% • Supply gas: Between 5% and 12.5% • Domestic gas: Between 2% and 10%	Tiered rate structure
	Western Australia (incl. offshore) (56%)	North-West shelf: 10% to 12.5% of well-head value (market price net of operating and capital costs).	Federal PRRT applies

Sources: Queensland Government (2024a), NSW Government (2024), Queensland Government (2024b), ANAO (2016)

4. VARIABLE ROYALTIES: AN ANSWER TO THE RESOURCE PRICING PROBLEM

Rent taxation is challenging to implement, and nationalising resource companies would be politically contentious. The most promising way to increase public revenue without deterring investment is to redesign royalties to better reflect variation in the value of resources extracted by leaseholders by location and over time.

Using different royalty rates for different classes of deposit is an effective way to ease the trade-off between capturing value and deterring investment across deposits with different extraction costs. It creates additional complexity, however, and requires discretion in design. Coal royalties in NSW and gas royalties in Queensland are already levied on this basis (Table 2).

Can royalties be redesigned to better reflect resource rent variation through time?

Yes – royalties are blind to cost-side differences, but not revenue differences. They can therefore be redesigned to reflect the revenue-side drivers of economic rents, and share in temporal variation in profits. Better royalties can let the state share in more upside risk during market booms and more downside risk when prices are low, de-risking private investment like a resource rent tax.

This is the idea behind variable royalties which fluctuate with market conditions (Fleming et al 2022; the title of this section comes from their report).

Variable royalties vis-a-vis resource rent taxation can be explained by analogy to real estate. Suppose a landlord were unable to price their premium locations more highly than other locations. How could they maximise their revenue? By charging more at peak times. Even when location pricing is ruled out, that is, time-based pricing helps capture value. In the resources context, royalty rates which vary over time in accordance with market conditions can likewise be a second-best alternative to a rent tax.

We propose here a novel and simple form of variable royalty that could be retrofitted to existing state royalties without complex redesign or rate-setting processes.

Our model builds on Queensland's coal royalties, which capture a higher share of revenue when coal prices are higher by way of a progressive royalty rate structure much like the personal income tax scale. At the same time, our proposal generalises and simplifies Queensland's approach.

Until July 2022 Queensland charged coal royalties via a three-tier scale:

- 7% of the value of coal sold below an average price of AUD$100 per tonne;
- 12.5% of the value sold between $100 and $150 per tonne; and
- 15% of the value above $150 per tonne.

The higher rates in this scale only apply to the share of value above the threshold, so that the royalty as a share of revenue rises smoothly with the coal price (at a price of $150/tonne, for example, the royalty is 8.83% of revenue, not 12.5%). The higher the revenue per tonne, the higher the royalty share of revenue – just as higher incomes incur higher average tax rates in a progressive income tax structure.

From July 2022, three more tiers were added to Queensland's coal royalty scale:

- a 20% rate above $175 per tonne;
- a 30% rate above $225 per tonne; and
- a 40% rate above $300 per tonne.

Queensland's variable coal royalties allowed the state to capture a larger share of profit from the coal price boom of 2022 to 2023 than NSW achieved with its flat-rate royalty of 8.2%. Had NSW adopted Queensland's system, it could have raised an extra $7-9 billion or more than $2,000 per household over the course of the boom (Saunders and Campbell 2023).

Queensland has now extended this variable royalty approach to gas. Liquified gas royalties from July 2023 apply as shown below, with similar structures in place for other categories of gas:

- 3% of revenue for prices received below $50 per barrel (/bbl);
- 11.5% above $50/bbl; and
- 12.5% above $100/bbl.

The variable royalty we propose would enact the same principle as Queensland's progressive-scale royalties but in a generalised way, avoiding the need to specify multiple rates and thresholds for each resource.

The royalty rate would be calculated by scaling a fixed 'base rate' by a time-varying 'scaling factor', the latter calculated as the ratio of the current benchmark price to the long-term (10-year) median price.

Existing fixed-rate royalties could be reformed into variable royalties simply by setting the base rate equal to the current fixed rate and specifying a relevant benchmark price.

The royalty rate as a percentage of revenue under this model would be:

$$Royalty\ rate\ (\%) = \frac{Current\ benchmark\ \ price}{Median\ price\ over\ 10yrs} \times Base\ rate\ (\%)$$

On a per-unit basis (e.g. $ per tonne), the royalty price would be:

$$Royalty\ price\ (\$/unit) = \frac{Current\ benchmark\ \ price}{Median\ price\ over\ 10yrs} \times Base\ rate\ (\%) \times Current\ benchmark\ price$$

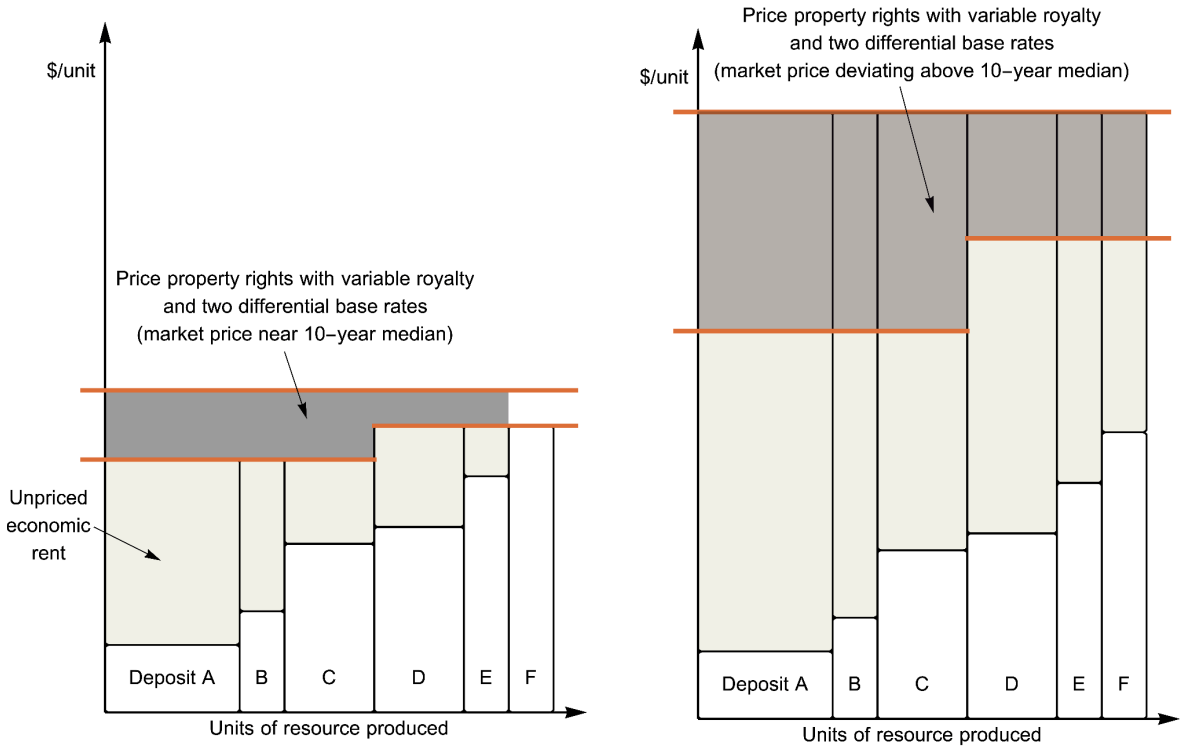
Instead of relying on actual prices received, royalties would be linked to a market benchmark price or index, the same way gold royalties in Western Australia are linked to spot prices on the London Bullion Market (WA Government 2024).

By way of numerical example, with an iron ore royalty base rate of 7.5% (as in WA) and a 10-year median benchmarked export price of $100/tonne, the applicable royalty rate for any period in which the benchmark price was $200/tonne would be twice the base rate: 15% of revenue, or $30/tonne.

In this example, the existing fixed-rate royalty and the proposed variable royalty would raise the same $7.50/tonne when prices are at their historical median level. But while the fixed-rate royalty captures just $7.50/tonne of the $100/tonne price movement above this level, our variable royalty would capture $22.50/tonne on this price increment – with the $30/tonne royalty applying at the higher price effectively comprising $7.50/tonne on the first $100/tonne of value and $22.50/tonne on the second.

The effect of using a variable royalty alongside multiple royalty base rates for different classes of deposit is shown in stylised form in Figure 5, which can be contrasted with the left panel of Figure 4 above.

Figure 5: Variable royalties with differential base rates by class of deposit



Source: Prosper Australia.

Relative to fixed-rate royalties, the proposed variable royalty would share risk two ways:

- **Dampening short-term price fluctuations:** when prices fluctuate around the long-term median, the royalty rate will be below the base rate half the time and above the base rate half the time. Resource firms will pay lower royalty rates when prices are low and higher rates when prices are high, de-risking their net-of-royalty revenue stream relative to fixed-rate royalties.
- **Temporarily capturing or compensating for the effects of long-term changes in resource value:** the longer-term effects of inflation, currency trends, and structural changes in demand on the market price of resources will automatically but temporarily flow through to the royalty price paid, via the 10-year median. Fixed-rate and tiered royalties, by contrast, require nominal figures to be manually adjusted to respond to such long-term changes, creating political challenges.

Resource prices exhibit unpredictable and substantial peaks (spikes) in prices. De-risking net-of-royalty revenue is therefore likely to encourage investment. Although long-term contracts already smooth revenue to some extent, these are renegotiated regularly, and often retain partial exposure to spot prices. De-risking the net-of-royalty spot price will support further de-risking of actual revenue streams, reducing investment risk.

To the extent our variable royalty increases overall revenue, however, there may be an offsetting investment effect by way of reduced profitability of marginal deposits. Past economic modelling has found royalties in general to be highly distortionary (KPMG Econtech 2010), although this finding is contested (see Ergas and Pincus 2014). Whatever the effect of fixed-rate royalties in general, however, a variable royalty that raises additional revenue only during (and proportional to) spikes in market prices is likely to have substantially different incentive effects, since it so closely targets windfall gains.[4]

A key feature our model shares with resource rent taxation and with commercially-priced property rights is that it provides leveraged exposure to the underlying risk in the resource price.

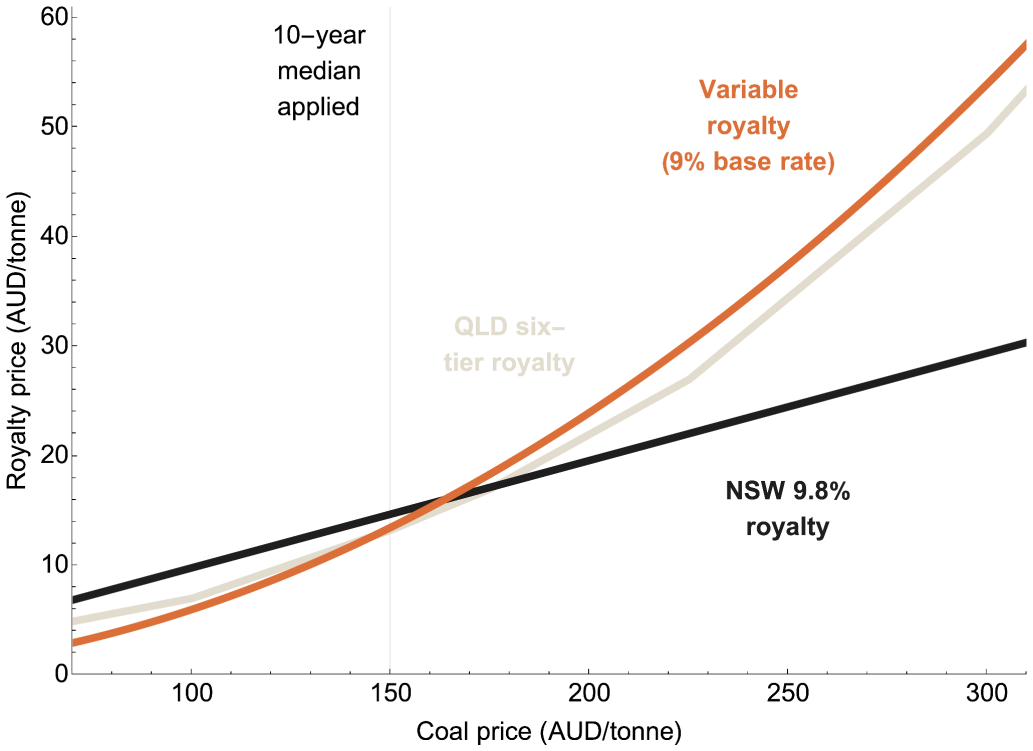
When house prices rise, land values increase disproportionately, in accordance with the degree of land leverage in the property (the land value share of the property price). For instance, a 20% increase in the price of a $1 million house on $0.5 million of land increases the value of the site by 40%, not 20%.

Profit-maximising resource pricing should likewise generate value from the property right (i.e. the ownership of resources) that varies more than proportionately to variation in the final product value after investment (i.e. the market price of resources).

Figure 6 shows how the proposed variable royalty does this by responding more than linearly to price variation around the median.

[4] We consider it unlikely that capital investment is to any significant degree contingent on rare price spikes to compensate for long periods of uneconomic operation at typical prices. The global coal price surge of 2022 was unanticipated by major forecasters, for instance (see IEA 2019, KPMG 2019).

Figure 6: How fixed-rate, tiered and variable royalties vary with the resource price



Source: Prosper Australia. Calculation based on a 10-year median benchmark coking coal price of AUD$150 and a 9% base royalty rate.

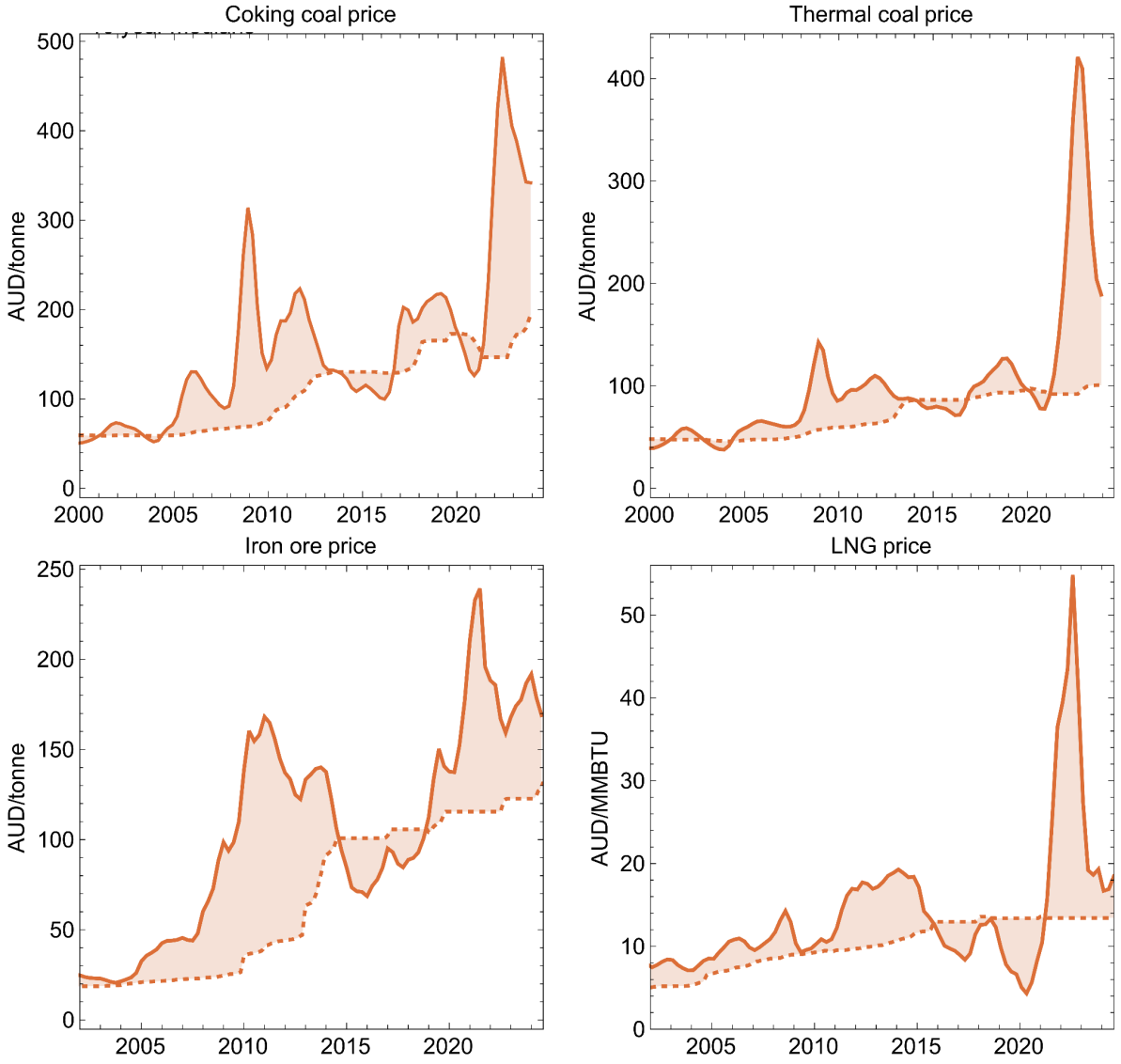
5. VARIABLE ROYALTIES IN PRACTICE

What would variable royalties look like in practice for Australia's major resource exports in terms of royalty rates, net-of-royalty prices, and royalty revenue?

Figure 7 plots the price trends for coal, iron ore and gas over the last two decades (the solid lines).

A key feature of the data is the presence of large yet brief spikes in the benchmark prices. The 10-year median prices (dashed lines) remain stable throughout these short-term booms, but respond over time to structural change, as can be seen most clearly in the iron ore price.

Figure 7: Price variation over time for Australia's major export resources



Source: Prosper Australia using data from DISR (2023), IMF (2024). Coal and iron ore prices are actual prices received by exporters. Coking coal price is the average of high and low grades weighted by production. Gas prices are Asian benchmark LNG price.

The gap between current and 10-year median prices can be substantial over short periods, while tending to converge over time, making this difference a reasonable proxy for windfall profits that can be temporarily captured from existing projects without deterring investment in new, higher-cost projects.

The proposed variable royalty would not only implement a more efficient time-based market-linked pricing approach, but would likely raise more revenue for the resource owners.

Figure 8 shows royalty prices and net-of-royalty revenue since 2000 for major export resources under fixed-rate and variable royalty regimes. The fixed-rate lines are based on typical prevailing rates, and are also used as the base rates for the variable royalty. The rates used are:

- 9% for coal, as per current NSW and historical Queensland rates;
- 7.5% for iron ore, as per the current rate in WA; and
- 4% for gas, which is an Australian average based on the ratio of royalty revenue to value of exports over the last four years, as presented in Table 2 of Ogge et al (2024).

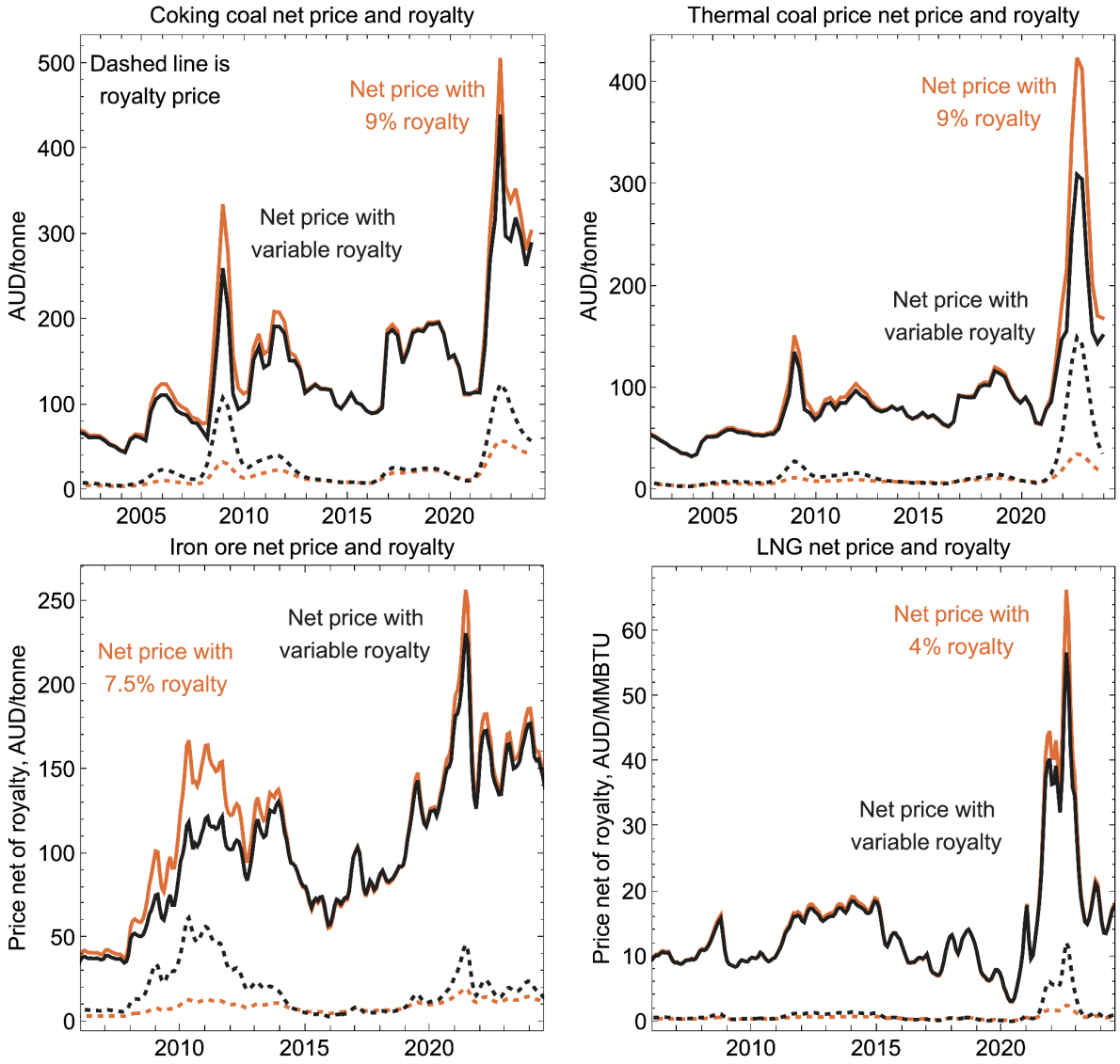
The low share of the market price submitted as royalty under existing policy settings is clear to see (the dashed lines). Although variable royalties would capture more during periods of high prices, the net-of-royalty prices (solid lines) still show significant windfall price gains for leaseholders, resulting from the differences between fixed-rate and variable royalties being small in relation to the scale of fluctuations in market prices. Under prevailing base rates, variable royalties would therefore temper price booms to only a moderate extent, though with higher base rates the effect would be amplified.[5]

For coking coal, a variable royalty with a base rate equal to the existing fixed royalty rate would have been lower than the fixed rate for around 15% of the past decade. For thermal coal, this would have been the case for around 38% of the decade. For iron ore, the variable royalty would have been lower for 40% of the decade, and for gas, it would have been lower for more than half of the decade (58%).

Due to asymmetric price variation around the median – notably, prices tend to rise above the median more than they fall below the median – variable royalties would have raised more revenue overall, despite often applying at lower rates (especially in the case of gas).

[5] The standard deviation of net-of-royalty prices since 2000 for coking coal is 88 (based on pre-2022 Queensland royalties), versus 76 for variable royalties at base rate 9%, and for thermal coal is 69 (under pre-2024 NSW royalties), versus 49 for variable royalties with a 9% base rate.

Figure 8: Royalties and net-of-royalty prices – fixed and variable royalties



Source: Prosper Australia using data from DISR (2023), IMF (2024).

Over the decade to 2023, variable royalties for coal would have raised $38 billion or 71% more than the $53 billion that would have been collected under a 9% fixed rate (2023 dollars). Over the same period, variable iron ore royalties would have raised an additional $33 billion, or 33% more than the estimated $101 billion from a 7.5% fixed-rate royalty.

Gas comparisons are made more complex by the predominance of longer-term contracts, a variety of product types, and complexities of existing royalty and super-profit tax regimes. As a ballpark figure, $40 billion would have been paid over the decade had a 4% fixed rate applied, while a variable royalty with a 4% base rate would have raised an additional $74 billion (182%) more.

In total, across these four commodities, variable royalties could have raised around $145 billion or $14.5 billion per year in additional revenue over the past decade just by capturing a modest share of windfall price gains during periods of high prices with no increase in the royalty rates prevailing during normal pricing periods.

In light of the historically large boom in prices over the decade this dollar figure may not be representative of future performance. If such price spikes do occur in future, however, the automatic adjustment built into a variable royalty means that states would capture a far larger share of revenue windfalls than they could with fixed royalties, while also aiding investment incentives by de-risking revenue during normal periods of market volatility.

6. CONCLUSION

The failure of states to enact a more commercially-oriented approach to pricing mineral and energy resources has short-changed the Australian public. Relative to Norway, the world's poster child for resource rent capture, Australian governments are giving away as much as $66 billion in value each year which could be captured for the public and used for tax cuts or public investments.

States face a difficult problem when pricing resource property rights – one also present in other property rights systems, ranging from intellectual property to land markets.

Pricing resources efficiently to encourage investment while also maximising revenue requires the resource owner to price differentially by location and time in accordance with variation in economic rent.

The cleanest way to do so is to nationalise resource companies, thereby side-stepping the pricing problem by taking on a significant share of revenue risk and internalising variation in profitability across deposits and time. Resource rent taxation, an alternative with the same goals, has proven difficult to implement.

Short of resource nationalisation, a second-best approach is to reform royalties to better reflect variation in economic rents. States already practise some degree of differential pricing by deposit type, but the potential for time-varying royalties to capture a far greater share of windfall gains under fluctuating market conditions is under-recognised.

Our variable royalty proposal offers a way forward, based on Queensland's successful reforms. By scaling existing fixed-rate royalties by the ratio of benchmark prices to historical medians, the proposed variable royalties could capture a large share of the windfall revenue gains resource companies currently enjoy during boom periods, without increasing royalty rates during periods of normal market operation. The proposed variable royalties, unlike Queensland's tiered royalties, would also automatically adjust to longer-term market trends to avoid deterring new investment.

Over the past decade, had this simple tweak to royalty regimes been in place, states would have raised an estimated additional $14.5 billion per annum in royalty revenue across major export resources alone. To capture more of the proceeds of future booms, states could simply convert existing royalties to variable royalties on this basis, thereby returning to the owners of these resources – the public – a fairer share of the value of public property that is currently going into the pockets of shareholders.

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