To tax or to spend? Modelling tax policy responses to oil price shocks

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Abstract

Surges in global crude oil prices in 2022, caused by supply disruptions from Russia's invasion of Ukraine and associated sanctions, have increased the cost of living globally. Various policy measures have been adopted by policymakers around the world to mitigate the damage of high energy prices. In this paper, we use a single-country dynamic computable general equilibrium model with high levels of fiscal detail to assess the efficacy of two fiscal policy responses to temporary supply-side oil price shocks, namely a fuel excise cut and a UK-style energy profits levy. In developing our oil price shock scenario, we take account of Australia's distinctive energy structure. As a net-oil importer, the rise in world oil prices puts downward pressure on the terms of trade and household consumption. The impact at the macro level on real income is damped by a rise in net exports and world liquified natural gas (LNG) prices, a key Australian export. The capacity of this rise in the terms of trade to mitigate the economic damage is however muted, because the LNG sector is capital-intensive and largely foreign-owned. Australians are therefore left to pay higher gas prices as LNG prices rise, with higher LNG sector profits largely accruing to offshore investors. We find a temporary reduction in fuel excise can help damp the overall fall in real GDP and employment, but its positive impact on shock-year household consumption comes at the expense of higher net foreign debt. Rather than strengthening the case for a cut in fuel tax excise rates, we show that higher oil prices weaken the case for excise tax reduction from an allocative efficiency perspective. We conclude by considering an alternative Australian policy response to higher world oil prices: adoption of a UK-style energy profits levy on LNG producers. We find that such a policy would stimulate national income without compromising the budget.

JEL classification: C68; E62; H25; Q43

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Contents

1. Introduction

While much of 2020 and 2021 was shaped by the impact of COVID-19 on global health and economic outcomes, 2022 was marked by geopolitical tensions and the Russian Federation's invasion of Ukraine. As one of the largest producers and exporters of crude oil, the war and the consequent global sanctions on Russian exports have caused a shortage in oil supply. Following the invasion on 24th February 2022, Brent oil prices surged to over US dollar $100 per barrel and remained elevated for about five months. By June 2022, crude oil prices had risen by over 50 percent compared to the previous period.

Surges in oil prices impact households globally, both directly and indirectly, especially in countries that rely on imported oil. They directly face higher costs for energy products such as fuel and gas, and higher prices for goods and services as businesses pass on higher intermediate input costs to consumers.

A wide range of support measures aimed at cushioning the effects of higher energy prices have been implemented by policymakers of oil-importing countries, such as policies impeding price pass-through and measures supporting households and firms. Fuel excise reductions were widely adopted by oil-importing countries during 2022, particularly in Europe (Celasun et al., 2022). While temporary fiscal responses aimed at damping final user price increases can be implemented quickly, and are thus attractive for damping the impact of short-lived shocks, they can also incur substantial fiscal costs, making them difficult to extend if shocks persist (Celasun et al., 2022). The immediate fiscal cost of fuel tax reduction also limits the appeal of the measure for jurisdictions facing underlying fiscal pressures.

In contrast to "tax expenditure" instruments like fuel tax cuts, amongst energy-exporting countries such as the United Kingdom (UK), temporary windfall profit taxes were introduced to capture windfall gains of industries who benefited from the rise in world energy prices. For example, targeting the fossil fuel extraction sectors, the UK government announced the introduction of a temporary Energy Profits Levy on May 2022, at a rate of 25 percent on oil and gas profits on top of existing taxes, accompanied by an additional 80 percent investment allowance to offset the impact of the Levy on sectoral investment decisions. Some European countries also imposed temporary windfall taxes on electricity producers. See the summary and discussion by Vernon and Baunsgaard (2022).

Holding a key position in the global energy supply chain, Australia has significant natural gas reserves and is among the top liquefied natural gas (LNG) exporters in the world. Unlike the unified international crude oil market, the global natural gas market is segmented into three major regional markets with very different pricing mechanisms (Bachmeier and Griffin, 2006; Ji et al., 2014). Australia exports its gas in the form of LNG mainly to the Asian-pacific market, where prices are explicitly linked to oil prices through long-term contracts with a lag of three to six months (Cassidy and Kosev, 2015). As a consequence of this oil price indexation, unlike other regional gas markets gas prices in the Asian market are inextricably linked to world oil prices (Zhang et al., 2018). This is also known as the "oil-gas price linkage", and means that global oil price fluctuations directly pass through to Australian LNG export prices and Australian domestic gas prices. This amplifies the inflationary pressures felt by Australian households when global crude oil and thus refined petroleum rise, while in contrast Australian LNG exporters realise super-normal profits. These super-normal profits largely flow offshore however, with the Australian LNG industry characterised by higher levels of foreign direct equity investment.

In recent years, Australia has gradually reduced its domestic oil production capacity and become more reliant on foreign imports of both crude oil and refined petroleum. This is juxtaposed against its position as one of the largest non-oil energy exporters in the world. As a net oil-importing and non-oil energy exporting country, Australia faces distinct trade-offs in deciding how to respond to world energy price shocks, such as those experienced in 2022 (Peersman and Van Robays, 2012).

In response to the 2022 oil price shocks, starting from 30th March 2022 the Australian federal government imposed a 50 percent fuel excise cut, reducing the excise rate from 44.2 cents to 22.1 cents per litre for six months, estimated to cost about AUD$5.6 billion in lost revenue.

In this paper, we use a recursive dynamic computable general equilibrium (CGE) model of Australia with high levels of fiscal and industry detail to compare the economic impact of two fiscal policy responses to temporary oil price shocks: (i) a temporary 50 percent fuel excise reduction; and, (ii) a temporary 25 percent UK-style energy profits levy. As discussed, while many countries globally responded to the 2022 oil supply shock in similar fashion, the magnitude of the fuel excise cut and energy profits levy we impose are predicated on the responses in Australia and the UK, respectively.

Following the influential work by Hamilton (1983), an extensive body of literature discusses the impact of oil price shocks from the demand- and supply-side and highlights the importance of understanding the causes of these shocks [see, for example, Kilian, (2009), Aastveit et al. (2015) and Peersman and Van Robays (2012)]. Previous studies on oil price shocks predominantly focus on modelling macroeconomies. However, the interpretation of findings often references the structure of the energy industry, indicating that a more thorough investigation of the industrial dimension is needed. For example, with a structural vector autoregressive (SVAR) model, Peersman and Van Robays (2012) compare the dynamic effects of several types of oil shocks across a diverse set of industrialised countries, and find substantial asymmetries in the effects of exogenous oil supply shocks across countries. While their cross-country study highlights the importance of industry structure when studying the effects of oil supply shocks, industry details are absent in their modelling.

Our approach seeks to unpack this aspect by utilising detailed industry-level data within our model. By doing so, we extend previous work by accounting for the complexities of the energy industry structure and providing a more comprehensive understanding of the effects of oil price fluctuations. By taking account of the oil-gas price linkage in particular, we shed light on how energy industry specific detail could drive macro impact of oil price shocks.

Our paper is structured as follows. To begin, we describe the economic consequences of a one-year supply-side oil price shock in Australia, both at the aggregate macroeconomic and sectoral levels. In so doing, we disentangle the impacts of the increase in imported crude oil prices, from the effect of higher LNG export prices for Australia. With regard to the direct impacts of the oil price rise, we find that a 50 percent oil price shock affects drives a shock-year 0.29 percentage point rise in Australia's unemployment rate. This translates to a fall in private consumption of 0.51 percent, and a contraction in real GDP of 0.24 percent relative to baseline. The damage caused by the oil price shock is damped by real currency depreciation and an increase in net exports. The improvement in international competitiveness suggests that export-oriented industries, such as Australia's mining sector, benefit from oil price shocks, while the impact on other industries is dependent on their oil dependence.

When LNG export prices are linked to crude oil prices, two countervailing forces begin to impact Australia's terms of trade. On the one hand, higher global crude oil prices drive up the price of Australian imports, putting downward pressure on the terms of trade. Higher LNG export prices act to offset this effect, improving the terms of trade. The gain to national income from this latter effect is however diluted, for three reasons: (1) the relatively low labour intensity of the LNG industry, which damps the degree to which higher LNG prices translate to real wage gains; (2) the LNG industry is largely foreign-owned, and hence higher profits manifest as increased foreign capital income outflows rather than higher real national income; and, (3) higher domestic gas prices, which put downward pressure on real wages.

With the scenario specified, we then compare the two aforementioned fiscal policy responses. We find that fuel excise reduction can assist in reducing the impact of an oil price shock on real GDP, but the effect on private consumption is contingent on how the policy is financed. If households bear the fiscal costs, for example via temporary increases in direct taxation or reduction in welfare payments, the excise cut would not be effective in easing the cost-of-living pressure for households. Why? In such circumstances, the benefits or the temporary cut are a function of the allocative inefficiency of the tax being reduced. As we show, fuel excises are generally efficient, with low marginal excess burdens of taxation. Because fuel excises in Australia and other regions are generally levied as specific taxes, the allocative efficiency of the tax rises when world crude oil prices rise. This means that the economic impacts of deficit-financed fuel excise cuts in the short-run are very similar to the impacts of deficit-financed direct transfers to households.

In contrast to our analysis of fuel excise cuts, we find that increased direct payments to households financed via a UK-style energy profits levy would effectively smooth the damage of the oil price shock for households without costing the budget, reorienting part of the windfall financial gains due to high energy prices from foreign-owned LNG producers to domestic households. From an economic welfare perspective, a temporary UK-style LNG industry levy would prove a valuable addition to the taxation toolbox for policymakers seeking to respond to surges in world energy prices.

This paper contributes to the literature on oil price shocks in three ways. First, by examining the oil-gas price linkages and unpacking why only a small part of the terms of trade gains they drive lead to boosts in Australia's national income, we advance the understanding of how a country's distinctive industry profile can have implications for how they respond to world shocks. We also advance an argument presented by Giesecke et al. (2021a), who show how foreign ownership can play an important role in understanding how terms of trade movements flow through to national welfare.

The remainder of this paper is organised as follows. Section 2 outlines the model and scenarios. Section 3 presents and discusses the main results. Section 4 concludes.

2. Methods and scenarios

2.1 Model and data

Our study is performed using a modified version of the multi-regional and multi-sectoral dynamic CGE model, Victoria University Regional Model with Taxation detail (VURMTAX), developed by Nassios et al. (2019). It is a 91-industry, 98-commodity model of Australia designed for detailed taxation analysis.[1]

There are several features of the VURMTAX model and its database that make it well-suited to study the impact of fiscal policies in Australia.

Firstly, the model includes detailed production structure information for Australian industries, enabling sector-specific analysis. Particularly, its database recognises Australia's distinctive oil-importing and LNG exporting structure, with regard to the nation's heavy reliance on crude oil and refined petroleum imports, as well as the largely foreign-owned LNG export sector.

VURMTAX is parametrised using data from various sources, including the Australia's Bureau of Statistics (ABS) Census data, Agricultural Census data, State accounts data, and international trade data. The core model is based on the ABS 2017/18 Input-Output data release, national and state accounts aggregates, together with ABS Government Financial Statistics data and data from various state government budget papers.

Secondly, VURMTAX contains detailed tax-specific features that are crucial for our analysis, enabling us to accurately model the fiscal policy responses we are interested in. Our analysis of fuel tax policy response to an oil price shock (viz., a reduction in the fuel excise rate) required careful calibration of fuel excise collections across households and industries, and subsequent derivation of fuel tax subsidies claimed by industry. ABS Input-Output data is largely silent on the latter of these points. To derive matrices for fuel excises paid by industry, we rely on ABS Input-Output Table data to disaggregate fuel excises paid on the consumption of petroleum products by end-user, either industries or households. We disaggregate this by region using existing regional consumption shares for each industry in VURMTAX.

The fuel tax credit is in effect a rebate of the excise included in the price of fuel, paid to certain industries in Australia. To derive fuel tax credit claims, we use ATO Taxation Statistics data which provides a 20-industry disaggregation of fuel tax credits claimed. We cross-validate this using known fuel excises paid reported in ABS Input-Output Table. The result is a set of revised fuel excise and credits scheme matrices which track collections and credits by industry and region. We plot the top seven industries from which fuel excises are collected in Figure 1 and include any fuel tax credits claimed by these industries. As shown in Figure 1, the private transport industry accounts for the largest share of fuel excise collections, followed by domestic tourism.[2] Fuel tax credits are largely claimed by the road freight and mining industries, of which the latter are largely foreign-owned in the model.

[1] VURMTAX is an extension of the Victoria University Regional Model (VURM) that carries detailed modelling of local, state and federal taxes. A detailed description of VURM is provided by Adams et al. (2015).
[2] The private transport industry is modelled as a dummy industry which takes motor vehicle capital, and intermediate inputs in the form of fuel, electrical componentry and repair services and supplies its output entirely to households.

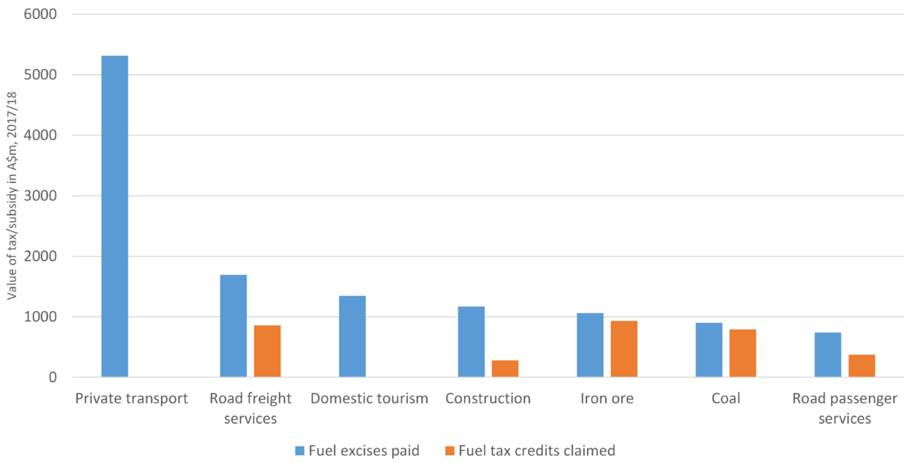


Figure 1. Fuel excise and fuel tax credits claimed across a selection of industries, 2017/18

In addition to these enhancements, VURMTAX contains a number of detailed tax-specific features which facilitate modelling of Australian direct taxes. To accurately model Australia's dividend imputation system, VURMTAX distinguishes between local investors (who can claim franking credits and are largely shielded from corporate taxes, but must pay personal income tax) and foreign investors (who cannot claim franking credits and thus pay corporate income tax, but do not pay personal income tax). For a detailed description of this innovation, we refer the reader to Dixon and Nassios (2018). Herein, we utilise this enhancement to model the UK-style energy profits levy as a rise in the corporate tax rate faced by the LNG industry in Australia, which falls largely on the foreign investor class.

The fiscal policies that we analyse in this paper are all federally imposed taxes. Therefore, our focus is on examining the impact of policies on both the aggregate macroeconomic level and the sectoral level. The regional impact is outside the scope of this paper. Nevertheless, the VURMTAX model contains the desirable properties required of a multi-regional model, as discussed by Giesecke and Madden (2013).

In what follows we briefly describe the key agents in VURMTAX and the optimisation problems that govern their price-sensitive decision making.

Each region in VURMTAX has a single representative household and a single state/local government agent. The foreign sector is described by export demand curves for the products of each region, and by supply curves for international imports to each region. Supply and demand for each regionally produced commodity is the outcome of optimising behaviour. Regional industries are assumed to use intermediate inputs, labour, capital, and land in a cost-minimising way, while operating in competitive markets. Region-specific representative households purchase utility-maximising bundles of goods, subject to given prices and disposable income. Regions are linked via interregional trade, interregional migration and capital movements. Governments operate within a fiscal federal framework. VURMTAX identifies two levels of government, federal and state government. Specifically, each state/territory has its own government that imposes region-specific taxes such as council rates, land tax, payroll tax, conveyancing duties and other state and local government taxes. A federal government operates across all states and territories and levies a range of federal taxes including those we are interested in, such as fuel excise and corporate tax, as well as other federal taxes such as personal income tax, goods and services tax.

Investment in each regional industry is assumed to be positively related to expected rates of return on capital in each regional industry. VURMTAX recognises two investor classes: local investors (i.e., domestic households and government) and foreign investors. The theory underpinning these two investor classes is described in Dixon and Nassios (2018). Capital creators assemble, in a cost-minimising manner, units of industry-specific physical capital for each regional industry.

VURMTAX is dynamic as it provides results for economic variables on a year-on-year basis. The results for a particular year are used to update the database from the previous period. More specifically, the model contains a series of equations that connect capital stocks to past-year capital stocks and net investment. Similarly, debt is linked to past and present borrowing/saving, and the regional population is related to natural growth and to international and interstate migration [see Giesecke and Madden (2013) for a detailed description].

Applications of VURMTAX include analysis of Australia's value-added tax, the Goods and Service Tax [Giesecke and Tran, (2018); Giesecke et al. (2021b)], corporate income tax cuts [(Dixon and Nassios (2018)], state land tax and local council rates [Nassios et al. (2019)], property transfer duties and housing prices [(Nassios and Giesecke (2022a)], and personal income taxes [(Nassios and Giesecke, 2022b)].

2.2 Model closure

We undertake two parallel model runs in solving the model: a baseline simulation and a counterfactual simulation. The baseline simulation is a business-as-usual (BAU) forecast, and the counterfactual simulation is identical to the baseline simulation in all respects other than the addition of shocks we aim to study. We report results as percentage (for unemployment rate, percentage point) deviations in the value of the variables in each year of the counterfactual simulation, away from the baseline value.[3]

In our main analysis, the counterfactual simulations are conducted under the following key model closure:

1. Labour markets are characterised by short-run wage stickiness, with endogenous unemployment rates, transitioning to a long-run environment of wage flexibility with exogenous unemployment rates.
2. Participation rates adjust to deviations in real consumer wages.
3. The saving rate for households is constant, hence private consumption is a given proportion of disposable income.
4. Public consumption spending undertaken by state and local governments is exogenous.
5. The government keeps its fiscal position neutral through a direct tax/subsidy on households. The budget-neutrality assumption is relaxed in Scenario 4 for assessing deficit-financed policy.
6. Investment is exogenous and fixed at baseline value for oil, petrol refining, gas, and LNG industries. This assumption is relaxed in Scenario 5.

The last closure above indicates a key assumption we make in our main counterfactual analysis, which is that the investors in industries that directly benefit from energy price surges will remain unresponsive to both the oil price shock and fiscal policy responses. In our model, higher global oil prices are caused by temporary supply disruptions due to geopolitical tensions. Therefore, we assume that the standard model-generated investment responses for the Australian domestic oil and refined petroleum industries, as well as the gas and LNG industries that have export prices linked to oil prices, will remain fixed at their baseline level. This assumption reflects our expectation that business investment does not flow into these industries in response to a temporary oil price shock. Typically, companies take many years to realise profits from substantial investments in building gas and LNG plants. As a result, investors are expected to recognise the temporary nature of the shocks and not change their investment behaviour based on temporary energy price fluctuations or associated policy responses.

In Section 3.4, we relax this assumption and quantify the impact of a UK-style energy profits levy in LNG sector investment.

2.3 Baseline forecast and scenario description

2.3.1 Baseline forecast

In our baseline forecast, year-on-year oil price growth is aligned to the reference oil price projection from the U.S. Energy Information Administration (EIA) Annual Energy Outlook 2022. Counterfactual scenarios are understood as deviations from this baseline forecast. The attributes of these scenarios are summarised in Table 1. All counterfactual scenarios share the same set of shocks describing an environment of elevated global energy prices due to a temporary oil supply shortage. Scenarios are distinguished in terms of: (a) policy responses, namely whether fuel excises are cut or UK-style energy profits levy is introduced; (b) model closure assumptions, relating to the financing of government budget deficits and whether industry-specific investment (specifically, for the LNG sector) is fixed at its baseline level.In sections 2.3.2 – 2.3.5, we describe each of scenarios 1 – 5 in Table 1.

[3] See Dixon and Rimmer (2002) for a thorough review of the construction of baseline and policy simulations with a detailed CGE model.

	Scenario 1 Oil price shock	Scenario 2 Fuel excise cut (budget neutral)	Scenario 3 Fuel excise cut (deficit-financed)	Scenario 4 UK-style energy profits levy	Scenario 5 UK-style energy profits levy (flexible investment)	Scenario 1A Oil price shock (flexible investment)
Shocks describing a global oil price shock in Australia						
Elevated foreign oil prices	*	*	*	*	*	*
Elevated foreign refined petroleum prices	*	*	*	*	*	*
Elevated foreign LNG prices	*	*	*	*	*	*
Elevated other energy-intensive commodity foreign prices	*	*	*	*	*	*
Policy response						
Fuel excise cut		*	*			
UK-style Energy Profits Levy				*	*	
Policy financing						
Budget neutral		*		*	*	
Debt financed			*			
Key modelling assumption						
Exogenous industry investment for oil, refined petrol, gas and LNG	*	*	*	*		

Table 1. Summary of scenarios

2.3.2 Scenario 1: oil price shock

Scenario 1 describes the economic impact of a temporary, one-year spike of 50 percent in world crude oil prices for Australia. The shock's size and duration are based on market responses in 2022. During the first half of 2022, Brent crude oil spot prices surged significantly, rising by around 54 percent, from USD$78 per barrel on January 3rd to USD$120 per barrel on June 30th. This surge was primarily due to escalating geopolitical tensions between Russia and Ukraine, culminating in Russia's invasion of Ukraine in February. In the second half of 2022, crude oil prices gradually declined due to higher global crude oil supply from the US and the International Strategic Petroleum Reserve release program, which addressed concerns of supply shortages. By the end of 2022, the Brent crude oil price had fallen to USD$83 per barrel.

Crude oil is the primary raw material used in the production of refined petrol. In studying the macroeconomic impacts of crude oil price increases, we model the pass-through of this shock to refined petroleum prices using the refined petroleum industry cost structure provided in the ABS Input-Output Table. From these tables, crude oil accounts for approximately 32 percent of the total costs of Australian petrol refineries. Ceteris paribus, we anticipate that a 50 percent increase in crude oil prices globally will result in a corresponding 16 percent increase in refined petroleum prices. This is supported by Figure 1, where we plot the refined petroleum price response (orange line) in scenario 1, alongside our shock to crude oil prices (red line) of 50 percent.

Also in Figure 1, we plot the LNG price response (yellow line) from VURMTAX for scenario 1. Implicit in this price response is the active oil-gas price linkage described in section 1. As discussed in section 1, Australia's primary overseas market for LNG exports is the Asian gas market, which predominantly operates on long-term contracts (Cassidy and Kosev, 2015). These contracts link Australia LNG export prices explicitly to global crude oil prices. Based on the study of Zhang et al. (2018) on regional gas markets, the direct oil-indexation mechanism makes oil prices play a bigger role than market fundamentals in determining LNG prices in the Asian gas market.[4]

This oil-gas price linkage has implications for Australian households, which are captured in our modelling. When oil prices surge, Australia's LNG exporters experience windfall gains. However, domestic gas users, particularly

[4] Zhang et al (2018) construct a VAR system that incorporates supply and demand side factors, oil prices, and global economic conditions. They investigate how much oil prices and market fundamentals contribute to natural gas prices in three major regional gas markets: Japan, the US, and Germany. They find that oil price changes alone account for 30 percent of the variation of gas price changes in Japan, while the system other than gas accounts for around 50 percent of gas price variation due to the anchor effect of oil prices.

households, pay the higher world gas price. The 25 percent increase in foreign LNG prices in evident in Figure 1 is based on an assumed 50 percent pass-through from foreign oil price movements to Asian-market LNG prices, which is based on work by Ji et al. (2014).

As a single-country model, foreign currency export and import prices for other commodities are assumed to remain exogenous in VURMTAX by default. Herein, we relax this assumption and account for heterogeneous foreign price responses of other commodities to surges in oil prices. Why are these indirect effects important? When there are increases in world oil prices, foreign prices of energy-intensive products will have more significant upward price revisions compared to products that are less energy-intensive. Under a default VURMTAX closure, holding world prices for goods other than crude oil, LNG and refined petroleum exogenous, would introduce an implicit deterioration in Australian international competitiveness into our results. To account for this, we utilise the extensive industry-specific cost structures implicit in the VURMTAX model, and assume that global unit cost functions match those in Australia. This allows us to use domestic commodity price responses to infer foreign commodity price responses for all goods other than crude oil, LNG and refined petroleum. Our final shocks to the foreign currency import and export prices for these goods thus account for their varying energy intensity in production.[5] Because VURMTAX carries detail for 98 distinct commodities, plotting all the commodity price shocks imposed is not feasible here. Taken together we can however plot import-volume and export-volume weighted indices of all the price shocks we deliver. This is the approach adopted in Figure 1, where we see that taken together, these shocks drive a 1.85 percent increase in the aggregate import price index (green line), and a 2.59 percent increase in the aggregate export price index (brown line).

Figure 2. Foreign shocks (% deviation from baseline)

2.3.3 Scenario 2 & 3: fuel excise cut

Scenarios 2 and 3 are variations of scenario 1, where we overlay temporary fuel excise cuts on top of the temporary oil price shock. In each case, the fuel excise reductions are for one-year, and we reduce the fuel excise rate by 50 percent. With fuel tax credits by industry assumed to be fixed relative to fuel excises paid throughout our counterfactual case, we also reduce fuel tax credits by the same percentage.

As the implementation of a fuel excise cut comes with fiscal costs, the scenarios differ according to the governments financing choice. In Scenario 2, we assume that the federal government maintains budget neutrality

[5] This implicitly assumes that there is no significant difference between domestic and foreign production structures for these commodities.

via a direct tax levied on households.[6] In Scenario 3, we assume the government funds the revenue shortfall caused by the fuel excise cut using debt-financing. This debt is not repaid over the course of the simulation, adding to the nations interest bill.

2.3.4 Scenario 4: UK-style energy profits levy

Scenario 4 is a variation of scenario 1, where we overlay a temporary UK-style energy profits levy policy response on top of the temporary oil price shock. On 26th May, 2022, the British government announced an Energy Profits Levy on oil and gas companies operating in the UK, to help raise funds for direct payments to UK households to ease its cost-of-living crisis. The Levy is an additional 25 percent tax on UK oil and gas industry profits, on top of the existing 40 percent headline rate of tax, taking the combined rate of tax on profits to 65 percent. The levy is intended to be temporary and will be phased out when energy prices return to historical norms. Moreover, the levy includes an 80 percent investment allowance to incentivise investors to reinvest profits.

Australia, while being small in oil production, is a major global gas producer and exporter, with about 80 percent of its gas industry output exported. Importantly, when global oil prices rise, the price of Australian LNG exports also rise via the aforementioned oil-gas price linkage. This poses two challenges. First, because this sector is largely foreign-owned, the rise in LNG export income largely flows offshore unless some portion of the super-profits accruing to the industry are taxed. Second, because domestically produced gas is both an intermediate input to LNG production and a key source of energy for Australian industries and households, domestic gas prices rise, reducing real wages. A revenue-neutral UK-style energy profits levy would go some way to mitigating both these issues; super-profits in the LNG industry would fall under the umbrella of Australian national income and be recycled to households to boost real income. In scenario 4, we assume that instead of responding to the oil price rise by cutting fuel excise rates, Australia responds by imposing a temporary , one-year 25 percent UK style energy profits levy on the oil, gas and LNG industries. This assumed quantum and industry coverage is thus aligned to the UK policy response. The policy is assumed to be revenue-neutral, with the proceeds being distributed to households as direct transfers. This approach mirrors the UK's policy, which uses tax revenue to fund welfare payments. Finally, as discussed in section 2.2, we assume investment levels in the targeted industries are held at their baseline forecast levels when the levy is introduced. This aligns with the UK policy, which includes investment incentives to encourage reinvestment of profits.

2.4.5 Scenario 5: UK-style energy profits levy with endogenous oil and gas investment

Scenario 5 is a variation of scenario 4, where we relax the assumption from scenario 4 that held real investment activity in the oil, gas and LNG sectors at their baseline forecast levels. Our default exogenous investment assumption recognizes the temporary nature of the shocks being considered herein, and that these shocks are therefore unlikely to alter investment decisions for multi-year projects that typify oil, gas and LNG projects.

However, one significant argument in debates about the feasibility of taxing energy companies for windfall gains is that such a tax could damage the economy by discouraging investment in these sectors. To explore this further, in this section we extend scenario 4 by relaxing the assumption of fixed investments in these industries and revisit the implication of a UK-style energy profits levy.

To demonstrate the impact of an energy profits levy policy without the assumption that restricts oil and gas investment in Scenario 5, we compare it with an alternative version of scenario 1, called scenario 1A herein. Scenario 1A differs from scenario 1 in that oil, gas and LNG investment is allowed to respond (in this case, positively) to the strong rise in profitability materializing from the oil price rise.

[6] The idea of maintaining budget neutrality through a direct tax on households serves two purposes. Firstly, it avoids any potential inefficiencies in resource allocation that may arise from introducing or increasing the rate of another tax instrument. This approach ensures that the tax burden is not shifted to other areas of the economy, which could have unintended consequences. Secondly, it allows for a clear interpretation of the policy impact by avoiding any overlay of fiscal contractions or expansions that may have different economic implications.

3. Oil price shocks and fiscal policy responses

3.1 Scenario 1: global oil price shock

3.1.1 Macro impacts and the role of oil-gas price linkage

Figure 3 illustrates the effects on macro variables, measured as deviations from the baseline forecast, of Scenario 1, the oil price shock scenario outlined in Section 2.4.2. Bars in each graph shows the contribution of higher LNG prices and higher oil and petrol prices to the overall effect respectively.

As an oil-importing and gas-exporting economy, an oil price shock that rises foreign prices of oil, petrol and LNG is essentially a mixed term of trade shock. On the one hand, a rise in foreign crude oil and refined petroleum prices drives Australian import prices up, and the terms of trade down. On the other hand, the oil-gas price linkage leads to higher LNG export prices that improves the terms of trade. Overall, we see from Figure 3 that the terms of trade experience a mild appreciation of about 0.7 percent relative to baseline. This suggests that the positive effects on the improved terms of trade resulting from higher LNG export prices outweigh the negative effects on the terms of trade resulting from higher oil and petrol import prices.

Australia's LNG sector is largely foreign-owned. The gains from the rise in the terms of trade caused by higher LNG export prices primarily benefit foreign capital owners as higher profits. Only a small portion of the gains flow directly to Australian households through increased government tax receipts or capital income for domestic owners of LNG capital. Since this industry is highly capital intensive, its expansion does not help generate demand for labour overall. On the contrary, the labour market is adversely affected by the oil-gas price linkage.

Specifically, this represents the net impact of two main countervailing effects. First, the oil-gas price linkage will increase taxation revenue from largely foreign-owned industries, increasing national income, driving unemployment down. The production expansion also demands more labour, but its low labour intensity means the benefit to overall employment is minor. Second, the oil-gas price linkage will increase domestic gas prices, flowing through into domestic production costs. This will drive unemployment up. Figure 3 indicates that the second effect dominates, as the oil-gas price linkage does not provide sufficient benefits to the overall labour market to offset its damages.

Short-run unit labour costs are influenced by the Consumer Price Index (CPI), which is weighted towards imports including fuel and domestic gas. Due to the oil-gas price linkage, higher domestic gas prices further drive up the CPI. As a results, industries that are also large employers, i.e., excluding the LNG sector, see labour costs rise relative to output prices. This leads to a rise in the real producer wage, triggering a fall in aggregate employment in the short run.

Upon impact, the oil price shock results in a 0.29 percentage points increase in the national unemployment rate relative to baseline. This means if the baseline forecast unemployment rate is 3.5 percent before the shock, under the counterfactual scenario this would rise to 3.79 percent. This, in turn, leads a decrease in real wages by 0.15 percent.

As capital is assumed to be fixed in the short run, the weakened labour market drives up the capital-labour ratio. Consequently, capital rentals fall relative to construction costs, causing rates of return to fall below their baseline forecast level. In our model, real investment is an increasing function of the rate of return on capital. With rates of return below the baseline in 2022, there is a reduction in real aggregate investment activity, which falls by 0.34 percent relative to baseline.

With employment depressed relative to baseline, real GDP also falls, by 0.15 percent relative to baseline upon impact. The impact decomposition reveals that the oil-gas price linkage has little effect in mitigating the negative impact of the oil price shock on Australia's GDP.

Real private consumption falls by 0.43 percent relative to baseline in 2022, due in part to the rise in energy prices faced by consumers and also due to increased unemployment. While the oil-gas price linkage helps damp its initial decline, its cushioning effect is limited given the substantial improvement in the terms of trade. There are several factors contributing to this outcome.

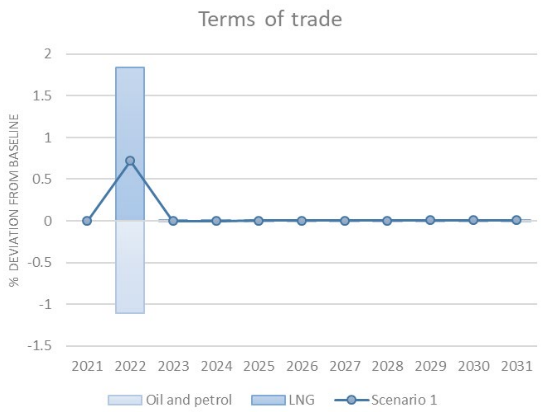
First, the LNG industry is highly capital intensive. This mutes the direct impact of LNG output expansion on the labour market. In addition, with LNG investment held exogenous, as mentioned in Section 2.2, indirect effects on employment via a rise in LNG investment activity does not materialise.

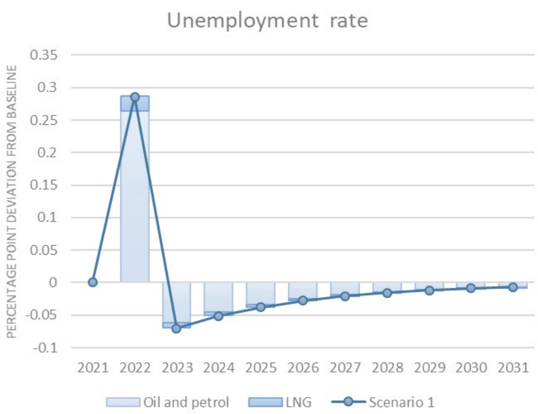
Second, the substantial foreign ownership of the Australian LNG industry dilutes the contribution of the improvement in the terms of trade to national income, as also noted by Cassidy and Kosev (2015).[7] The effect is opposite in sign but functionally similar to the effect noted by Giesecke et al. (2021a). In their study, embargos in Australian coal exports cause a reduction in Australian coal prices, which dampens the terms of trade. The Australian coal industry is however largely foreign owned, so the resulting domestic price fall is mostly a gain for domestic agents.

In contrast, the rise in LNG prices leads to a loss for domestic agents due to the rise in domestic gas prices. Domestically produced gas is consumed by households and other industries as intermediate goods. This analysis finds that the 25 percent higher LNG export prices cause domestic gas prices to rise by 9 percent relative to baseline, weakening household purchasing power and elevating domestic production costs for industries. Nonetheless, the results show the boost in LNG sector profits moderates some of the damage to real private consumption, as corporate income tax receipts rise, and some LNG producers are domestically owned.

With real investment and private consumption down relative to real GDP upon impact, real GNE falls relative to real GDP. The balance of trade thus moves towards surplus, with real export volumes rising by 0.38 percent relative to baseline, and real imports falling by 0.52 percent.

This movement towards surplus in the balance of trade is aided by real depreciation. Domestically produced goods become more competitive in international markets. We thus see expansions in Australian exports as foreign purchasers substitute towards cheaper Australian-produced goods when oil prices are high.





[7] We estimate the foreign ownership of the Australian LNG industry to be 87 percent based on the estimation of the Tax Justice Network in 2017. This number is very close to the estimation of approximately 88 percent of the LNG industry in Western Australia being foreign-owned by the Conservation Council of Western Australia in 2019.

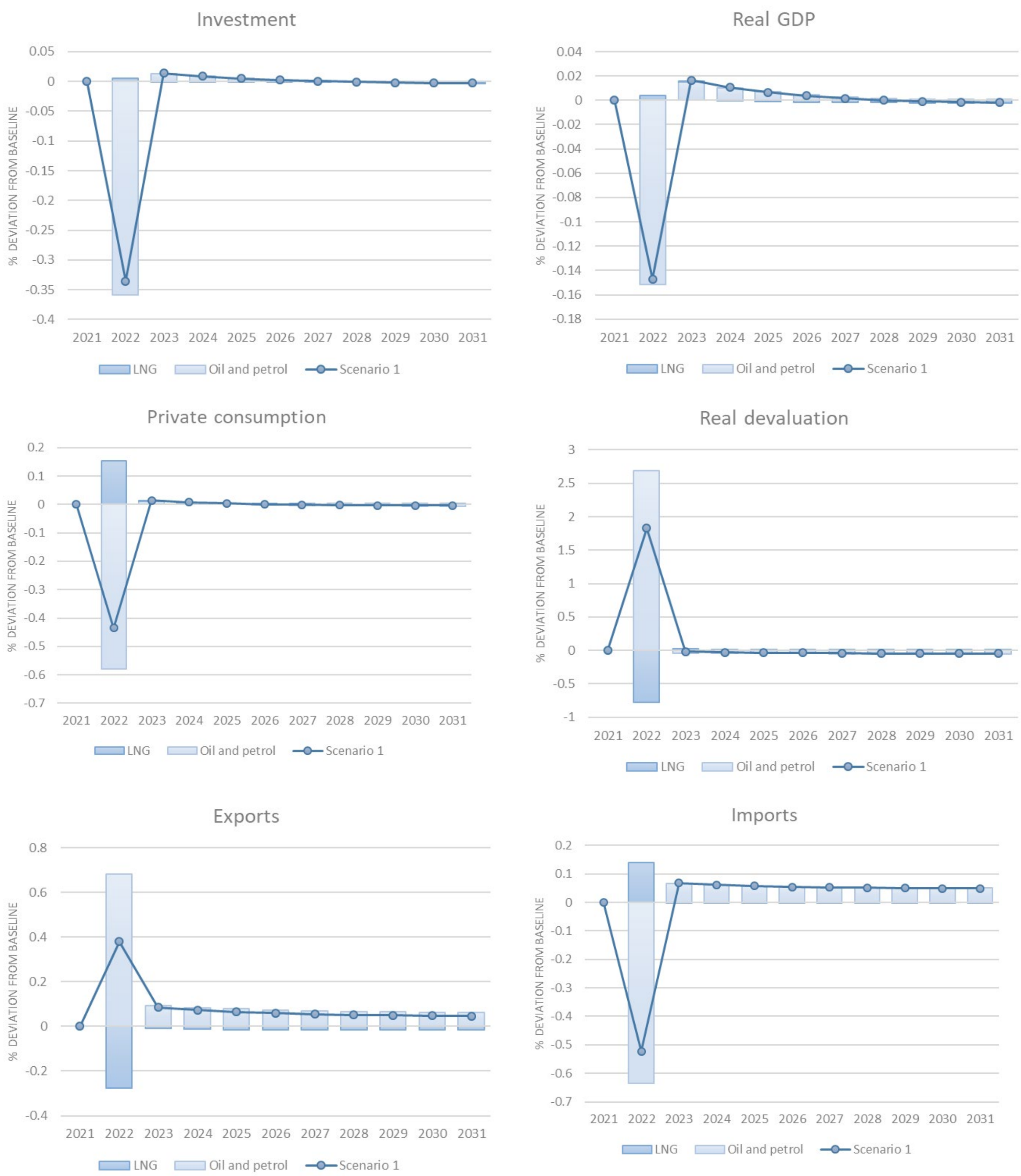


Figure 3. Temporary 50% oil price shock (Scenario 1), deviation from baseline

3.1.2 Industry impacts

Figure 4 illustrates the sectoral short-run impact of the oil price shock of Scenario 1 in the shock year. To facilitate the presentation of results and aid our discussion, we have aggregated the results for the 98 commodities identified by VURMTAX into 20 broad categories that align closely with the Australian Bureau of Statistics ANZSIC level 1 industry aggregation.

Importantly, we can see that the mining industry is the only industry that benefits from the oil price shock, with its total industry output increasing by 0.51 percent. As shown in Figure 3, higher oil prices lead to depreciation in Australian dollar. As a net exporter of minerals and metals, a weaker Australia dollar makes Australian exports more competitive in international markets, thereby increasing demand for Australian mining products.

Figure 4 shows the dwelling service industry output is largely unchanged yet Figure 3 shows real private consumption falls upon the shock. The explanation is substitution by the household sector. When the price of refined petroleum (and thus transport) and gas rises, households substitute towards consumption of other commodities. Consumption of dwelling services is a major component of household consumption and is thus a beneficiary of the expenditure-switching induced by the oil price shock.

Industries that largely supply to the public sector, such as public administration and defence, remain largely unaffected, as they are heavily reliant on government spending. This is a direct consequence of our closure assumption, which holds federal and state government real consumption exogenous.

All the other industries experience a decrease in output in response to the increase in oil prices. Accommodation and food industries are the most affected, with an output decrease of 0.56 percent relative to baseline due to increased costs associated with transportation and logistics. The transport industry is also significantly impacted, with a decrease of 0.48 percent. This is because it is intensive in the use of refined petroleum.

With relatively low energy dependence, service industries are generally less affected by the oil price shock compared to other more energy-intensive industries. While higher energy and transportation costs cause output contraction in many industries, sectors such as retail trade and arts and recreation, which sell relatively large shares of outputs to households, also suffers from declined household consumption.

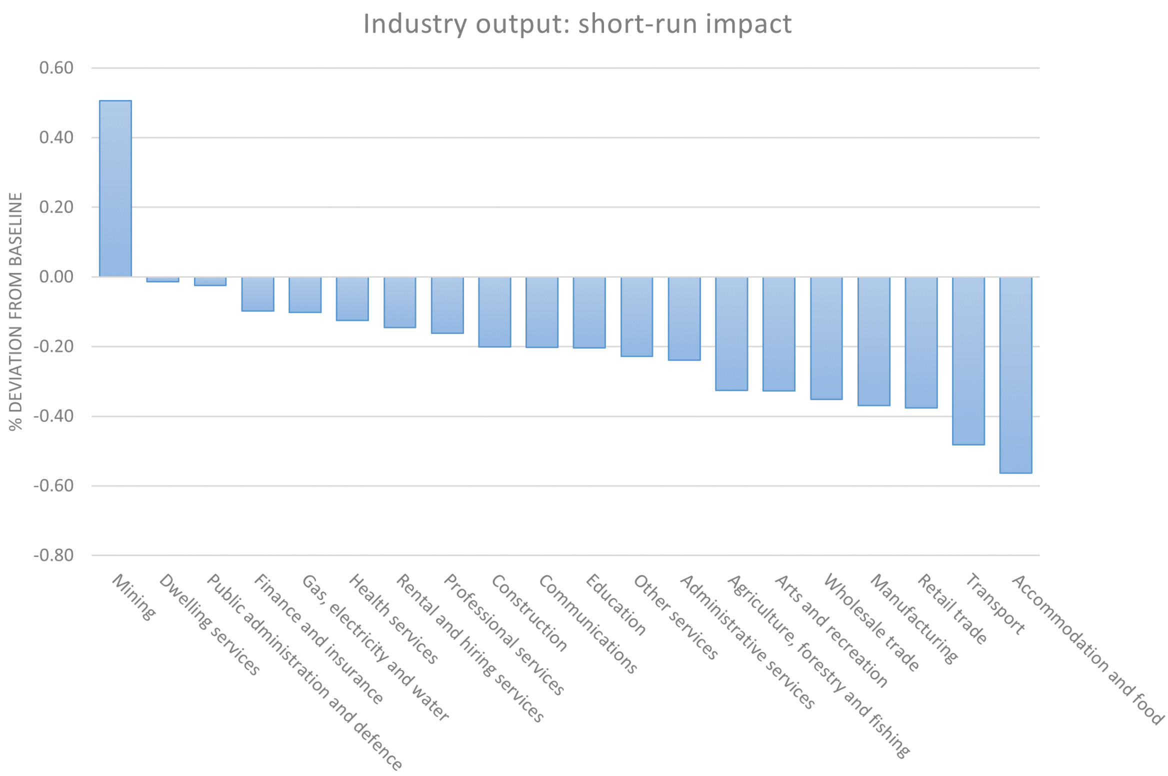


Figure 4. Industry output: short-run impact

3.2 Scenario 2 & 3: Policy response - fuel excise cut

In this section we examine the capacity of a 50 percent cut in the rate of fuel excise to damp the economic damage of the oil price shock to Australia. As described in Section 2.4.3, we explore two funding models for this policy response. In Scenario 2, we model the implementation of the fuel excise cut to be budget neutral (BN) and financed via a direct tax on households. In Scenario 3, we model the fuel excise cut to be deficit-financed (DF), i.e., the government borrow money to offset the revenue loss, which would add to the overall debt level.

Figure 5 illustrates the different fiscal impact of a fuel excise cut under different funding sources in response to the oil price shock by showing the dynamic responses of selected macro variables of Scenario 1 (oil price shock), Scenario 2 (budget-neutral fuel excise cut), and Scenario 3 (deficit-financed fuel excise cut) relative to baseline.

3.2.1 Scenario 2: Budget-neutral policy

By comparing Scenario 2 with Scenario 1, we can see that the budget-neutral 50 percent fuel excise cut can help damp the short-run harm of the oil price shock to the labour market. Specifically, in 2022 the shock year, the unemployment rate decreased by 0.15 percentage points in Scenario 2, compared to 0.29 percentage points in Scenario 1, which implies that the fuel excise cut can help dampen the negative effect on employment by about half.

While this contributes to a favourable household consumption response, real private consumption remains 0.38 percent below the baseline in Scenario 2 in 2022. Compared to a decline of 0.43 percent in Scenario 1, the small improvement of 0.05 percentage points is because the policy response is budget-neutral and funded via a direct tax on households. With only small allocative efficiency gains, the resulting improvement in household incomes and thus real consumption are only small.

Despite small gains for households, the policy response does reduce fuel and transport costs, aiding international competitiveness. Its effect in muting the initial fall of real GDP is noticeable, with the GDP downturn being alleviated from -0.15 percent in Scenario 1 to -0.06 percent in Scenario 2.

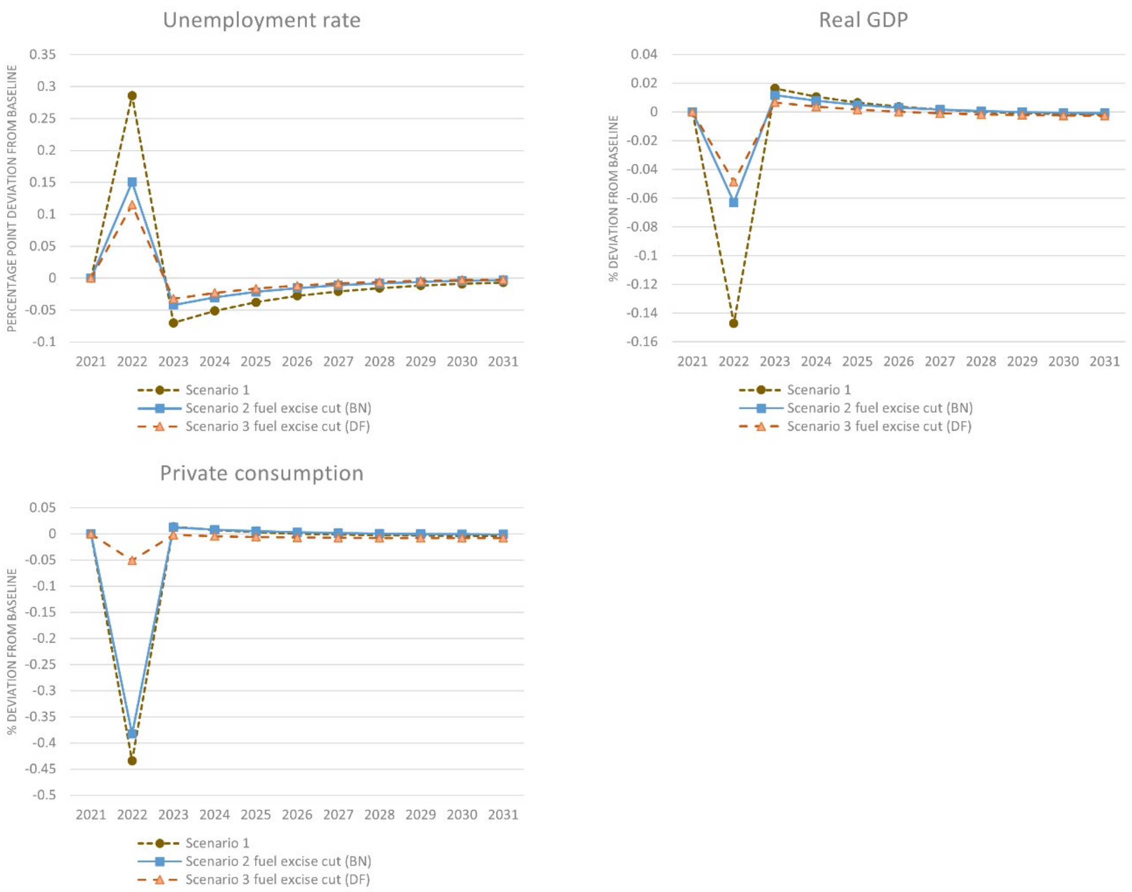


Figure 5. Oil price shock (Scenario 1) and fuel tax policies (Scenario 2 and 3), deviation from baseline

3.2.2 Scenario 3: Deficit-financed policy

Scenario 3 revisits the financing assumption for the fuel excise cut studied in Section 3.2.1. Unlike Scenario 2, which assumes the budget-neutral approach that let households bear the cost of the policy, Scenario 3 assumes the federal government finance the fuel excise cut through borrowing, resulting in federal budget position moving towards deficit and net debt rising.[8] Hence households will benefit from the lower fuel excise without paying for its costs in the short run.

As Figure 5 shows, the short-run damage of the oil price shock to real private consumption is largely neutralized by this policy. In Scenario 3, private consumption only falls by 0.05 percent relative to baseline with the implementation of the deficit-financed 50 percent fuel excise cut upon the impact of the 50 percent oil price shock.

Supported by strong real private consumption, the short-run negative impact of the global oil price shock on the labour market and real GDP are further mitigated compared to the budget-neutral case. Compared to Scenario 2, the rise in unemployment rate caused by the oil price shock is further damped by 0.03 percentage points, from 0.15 percentage points in Scenario 2 to 0.12 percent in Scenario 3. The real GDP downturn in Scenario 3 is -0.05 percent relative to baseline, 0.01 percentage point higher than in Scenario 2. It indicates the deficit-financed policy has slightly stronger stimulus impact to the overall economy than the budget-neutral case.

While the debt-financed fuel tax policy smooths the negative consequences of high oil prices on the economy in the short-run, interest payments on the higher net debt position rise, damping the post-shock recovery path. Compared to Scenario 2, the short-run damage to private consumption in Scenario 3 is largely mitigated by the deficit-financed policy, but the post-shock level is impeded as households are burdened with the interest payments on the higher debt.

3.2.3 Excess burden evaluation of fuel tax policy

The fuel excise in Australia is a specific tax that is levied as a fixed rate per litre of fuel, i.e., imposed on the quantity of fuel purchased rather than the value of fuel purchased. When oil prices rise, fuel prices also rise, which results in a decrease in the ad valorem rate of the fuel excise. This occurs because the value of one litre of fuel increases while the tax paid on one litre of fuel remains fixed.

The economic distortions of the fuel excise thus fall as oil prices rise, and so does the merit of cutting the fuel excise tax cut (relative to cutting other taxes) on pure efficiency grounds. To explore this effect further, in this section we define and evaluate the marginal excess burden of fuel excise against two baseline forecasts: (i) the U.S. EIA business-as-usual (BAU) oil price forecast as described in Section 2.4.1; and (ii) in the presence of 50 percent rise in oil prices relative to the U.S. EIA BAU forecast as detailed in Section 2.4.2.

Following Nassios et al. (2019), we define the excess burden as the ratio of the change in leisure-adjusted real national income, to the change in real government lump sum transfers to households. Specifically, the efficiency loss caused by a tax policy package in year t (EB_t) at the national level is evaluated according to the formula:

$$EB_t = -100\left(\frac{\Delta GNI_t + \Delta VLEIS_t}{\Delta LST_t}\right) \tag{1}$$

ΔGNI_t is the deviation in real gross national income (GNI) in year t expressed as the difference between the counterfactual simulation and baseline simulation values for GNI in year t. $\Delta VLEIS_t$ is the deviation in the value of leisure at time t, which is calculated as the product of the real consumer wage and the proportion of the working population that is not participating in the labour force. ΔLST_t is the deviation in revenue-neutral lump-sum transfer in year t.

Since the implementation of the 50 percent fuel tax cut aligns with the duration of the temporary oil price shock, our assessment of the allocative efficiency change is made by comparing the marginal excess burdens in the year 2022.

In the U.S. EIA BAU case, the 50 percent fuel excise cut drives an allocative efficiency gain of 15 cents per dollar of tax revenue foregone by the year 2022. This is very small when compared to some other Australian taxes, e.g., property transfer duty, which carries a marginal excess burden of 82 cents per dollar estimated by Nassios and Giesecke (2022b). This suggests that the deadweight loss of the fuel excise is small.

[8] We also explore an alternative scenario where the federal government finances its revenue loss resulting from both the oil price shock and the fuel excise cut through deficit financing. Our findings suggest that the impact of higher oil prices on the government's fiscal position is relatively minor, with the primary influence on the budget position coming from the policy response.

As expected, the allocative efficiency gain is lower when oil prices are elevated, with the marginal excess burden estimated to be 14.4 cents per dollar of tax revenue foregone when the foreign-currency price of crude oil is 50 percent higher than the U.S. EIA BAU forecast level in 2022.

Overall, the assessment of the excess burden of cutting fuel excises indicates that there is only a small efficiency gain from such a cut, compared to other taxes. Moreover, higher oil prices further reduce the merit of such policy and weaken its capacity to reduce tax distortions from an efficiency standpoint.

3.3 Scenario 4: Policy response - UK-style energy profits levy

As mentioned in Section 2.4.4, energy producers can accrue significant windfall gains when energy prices rise due to dramatic changes in economic circumstances. While the recent rise in global crude oil prices has driven up profits for oil producers, prices for other energy commodities such as LNG have also risen. The impact of the oil-gas price linkage in Australia was studied in Section 3.1.1, where we analysed the effects of the oil price shock on Australia and discussed the specific contribution of oil-indexed LNG export prices.

As illustrated in Figure 3, the significant gains in terms of trade that materialise when oil prices rise, even for oil-importing but non-oil energy exporting countries like Australia, do not necessarily translate to large national income and real consumption stimulus. We explained that this was partly due to high levels of foreign ownership, low labour intensity, and the fact that higher LNG export prices drive up domestic gas prices, making gas less affordable for domestic users.

In Australia, the actual policy response to this situation was to deliver economic stimulus via a temporary fuel tax cut, which we examined the impact of such a policy in detail in Sections 3.2. In this section, we explore the impact of an alternative fiscal policy response: a 25 percent UK-style energy profits levy on the Australian oil, gas and LNG industries. As detailed in Section 2.4.4, we study a case where the implementation of the energy profits levy closely aligns with the actual measures used by the UK government in response to the oil supply shortage in 2022.

Figure 6 illustrates the impact of a 25 percent UK-style energy profits levy in response to the oil price shock by showing the dynamic responses of selected macro variables of Scenario 1 (oil price shock) and Scenario 4 (energy profits levy) relative to baseline. Notably, the dynamic responses are primarily driven by the levy on the gas and LNG industries. The industry size of Australia's oil production is so small that the impact of taxing its excess profits is negligible at a macro level. In Scenario 4, we have included the oil production industry as one of the targets of the energy profits levy to align with the actual implementation of such a policy in the UK.

Our findings suggest implementing this policy can effectively mitigate the negative impact of the oil price shock on private consumption. Specifically, our results show that the 25 percent UK-style energy profits levy could reduce the extent of damage from 0.43 percent in Scenario 1 to 0.1 percent in Scenario 4, thereby mitigating the initial decline by about 77 percent. There is achieved by re-directing super-profits generated by largely foreign gas producers and exporters towards household through lump-sum transfer.

Due to the policy's specific focus on oil, gas, and LNG producers, which have lower labour intensity compared to other sectors, its short-term effect on the broader labour market and, consequently, the real GDP is positive but limited.

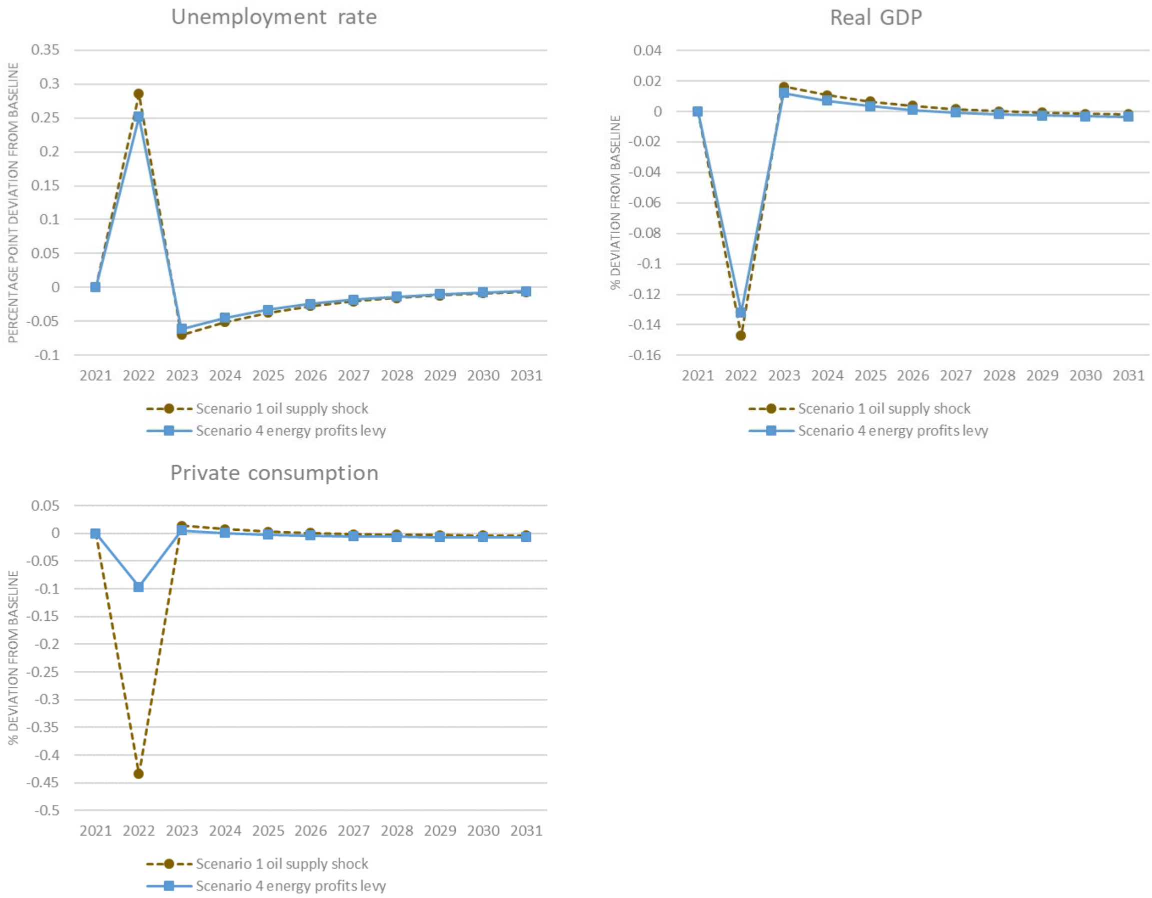


Figure 6. Oil price shock (Scenario 1) and UK-style Energy Profits Levy (Scenario 4), deviation from baseline

In what follows we compare the policy impact of the two policy responses, the 50 percent fuel excise cut in Section 3.2 and the 25 percent energy profits levy in Section 3.3. While in Section 3.2 we find that fuel excised cut can stimulate the general economic activities, it is fiscal costly and thus the funding sources of the revenue shortfall have drastically different implication on household consumption. In contrast, in Section 3.3 we find the UK-style energy profits levy can help households ease the cost-of-living pressure without costing the budget.

We compare the impact of two policy responses: the 50 percent fuel excise cut (Section 3.2) and the 25 percent energy profits levy (Section 3.3) relative to the oil price shock scenario (Section 3.1).

While the fuel excise cut can stimulate economic activities, it is costly for the budget, and the funding sources for the revenue shortfall have different effects on household consumption. That means the effectiveness of fuel excise cut to help households depends on whether households bear the cost of the policy.

If the fuel excise cut is implemented in a budget-neutral way and households bear the fiscal cost, it will not effectively alleviate the cost-of-living pressure that arises from higher energy prices for households. Its capability to smooth the damage to households depends on whether the government is in a good fiscal position to run a deficit to finance it. Policymakers should also account for the long-term cost of a deficit-financed fuel excise cut, which result in increased national debt burden. This is a particularly important consideration for Australia given its already high level of household indebtedness.

Furthermore, in Section 3.2.3, we evaluated the excess burden and determined that the allocative efficiency gain of the policy is relatively small. Additionally, higher oil prices further diminish its ability to reduce efficiency distortion.

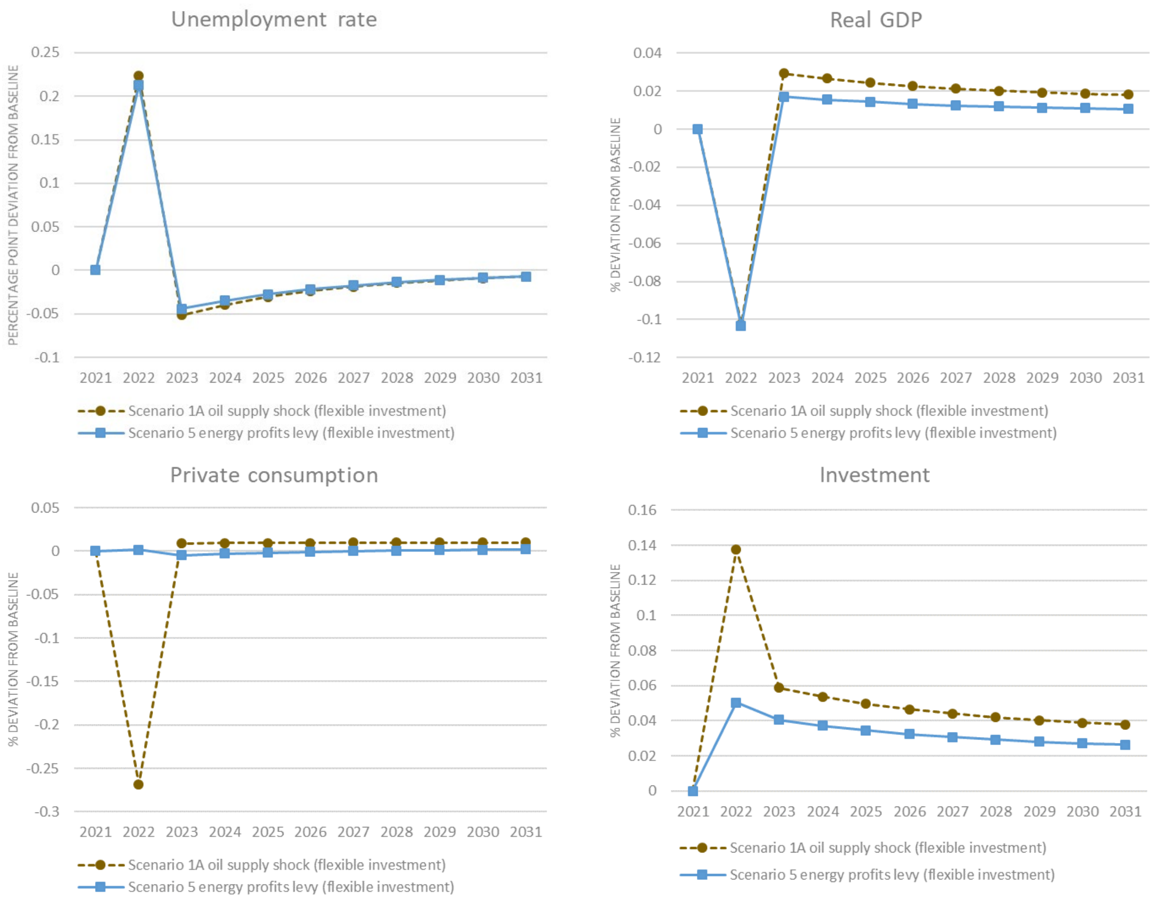
In contrast, in this Section we find a UK-style energy profits levy could effectively alleviate the cost-of-living pressures caused by rising energy prices for households without costing the budget. By redirecting profits from foreign investors to domestic households, such a policy hence promotes household consumption without negatively impacting the budget.

3.4 Scenario 5: Revisit oil price shock and energy profits levy with different investment assumption

As discussed by Section 2.4.5, in this Section we re-assess the impact of the UK-style energy profits levy with the exogenous oil and gas investment assumption relaxed. We compare Scenario 1A, the alternative oil price shock scenario that describe the environment, with Scenario 5, the alternative UK-style energy profits levy scenario. Both scenarios allowing for oil and gas investment to respond to rate of return upon shocks, unlike Scenario 1 and 4 that assume exogenous oil and gas investment. This comparison is shown in Figure 7.

As we allow for endogenous investment responses in oil and gas industries, capital flows into these industries when energy prices rise upon the shock year, leading to an increase in national investment by 0.14 percent above baseline in Scenario 1A. However, a 25 percent UK-style energy profits levy would suppress the initial rise in investment by mainly damping the investment response of the oil production industry. Despite the tax, the LNG production and exporting industry still experience significant capital inflows, indicating the sizable windfall gain generated from oil-indexed LNG export prices by this particular industry. An additional 25 percent taxation to its profits does not have much impact to its investment response.

In contrast, the damages caused by the oil price shock to private consumption appears to be almost fully offset by this policy. While Scenario 5 shows a slightly lower initial unemployment rate compared to Scenario 1A, this indicates that the benefits of an increase in national income outweigh any damages to the labour market overall. Comparing Scenario 1A with Scenario 5, our results suggest the impact on real GDP is also marginal.



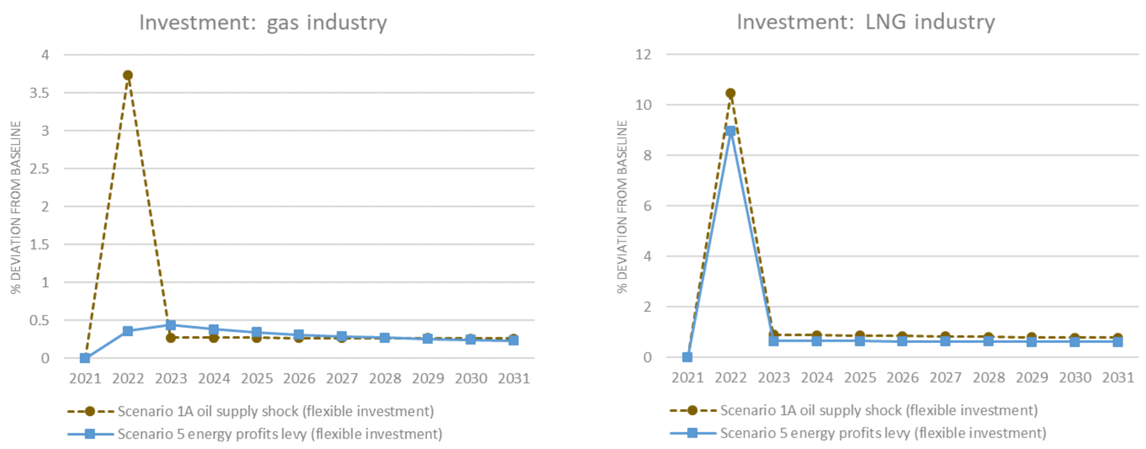


Figure 7. Oil price shock (Scenario 1A) and UK-style Energy Profits Levy (Scenario 5), flexible investment, deviation from baseline

4. Concluding remarks

This paper investigates the impact of a temporary global oil price shock on the Australian economy and studies the effects of two fiscal policy responses, namely a fuel excise cut and a UK-style energy profits levy. The counter-factual scenarios are set up based on observed oil market responses following Russia's invasion of Ukraine, as well as fiscal policies implemented by the Australian and the UK governments in 2022.

In Scenario 1 we investigate how a 50 percent oil price shock would affect Australia's economy, taking account of its distinctive oil-importing and gas-exporting energy structure and the oil-gas price linkage of its LNG export market. Our analysis elucidates what a shock of this nature would mean for Australian labour markets, real GDP, household consumption and industry prospects. We also investigate how the increased oil-indexed LNG export prices could mitigate the economic impact of elevated oil prices, and find that the oil-gas price linkage significantly improves the terms of trade. However, the benefits to the domestic economy are limited by several factors, including (1) the muted response in the labour market due to the low labour intensity of gas production, (2) the high foreign ownership of gas production, resulting in most of the profits flowing offshore, and (3) the higher domestic gas prices that negatively impact households and businesses relying on gas for heating, cooking, and energy.

We then examined the degree to which cuts in Australian fuel excise can attenuate these adverse economic impacts. The reduction of fuel excise carries a high fiscal cost, and different funding sources used to offset the resulting revenue loss would lead to different fiscal impacts. We analyse two scenarios: a budget-neutral situation (Scenario 2), where the revenue shortfall is compensated by a direct tax on households, and a deficit-financed scenario (Scenario 3), where the government borrows to finance the fiscal cost.

Our findings show that a reduction in fuel excise can help decrease the impact of an oil price shock on real GDP, but its effect on private consumption depends on how the government finances the fiscal costs of such a policy. If households bear the fiscal costs, the policy would not be effective in alleviating the cost-of-living burden for households. Conversely, a deficit-financed fuel excise cut could mostly offset the short-term damage of a temporary oil price shock on private consumption, but it would come at the expense of increased interest payments and a damped post-shock economic recovery path.

Additionally, we take an allocative efficiency perspective and assess the excess burden of such a fuel excise cut. We conclude that the allocative efficiency benefit is relatively small, and increased oil prices further compromise the merit of the fuel excise tax cut and mitigate its capability to reduce tax distortion.

Last, we investigate the policy impact of a UK-style energy profits levy on the mostly foreign-owned gas and LNG industry in Scenario 4. By reorienting part of the windfall financial gains due to high energy prices from largely foreign-owned LNG producers to domestic households, such a policy could help improve private consumption without costing the budget. We also study an extension where we relax the fixed gas and LNG investment assumption and re-investigate the implication of this policy to household, investors and the general economy in Scenario 5. Our findings suggest such a budget-improving policy should be considered as a valuable addition to the taxation toolbox for Australian policymakers, to help households cope with financial hardship caused by energy price inflation.

Importantly, while our findings indicate a UK-style energy profits levy can be a valuable policy tools for policymakers in responses to oil price surges, we restrict our focus on analysing the key resource redistribution mechanism of such a policy within a CGE modelling framework. Various other potential implications and difficulties that may arise when considering its practical implementation, which beyond the scope of this paper, should be taken into account by policymakers.

Policy consistency is one significant practical challenge when it comes to crafting the actual implementation of such a UK-style energy profits levy, or any kinds of measures that aim to redistribute excess profits made by gas producers and exporters from temporary higher energy prices. It must be highlighted that a clear perspective should be set out within a predictable and sound taxation system in order to minimise such concerns. An arbitrary tax may compound uncertainty and thus impair investor confidence both in the short run and in the long run. Moreover, solid monitoring and regulation would be necessary to ensure such tax cannot be entirely passed to domestic consumers.

While our study focuses on the short-term impact of temporary oil price shocks and fiscal policy responses, it is important to note that these events have highlight the need for greater attention towards renewable energy and accelerating the energy structure transition in the longer term. This would involve more investment in renewable energy sources and more measures promoting energy efficiency. These interesting topics are beyond the scope of this paper and are left for future research.

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