

MACRO-ECONOMIC EFFECTS OF THE IMPORT PARITY PRICING OF OIL

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ABSTRACT

THE introduction of the crude oil levy in 1975 and the subsequent introduction of import parity pricing for all Australian-produced crude oil in August 1978 together with rises in the world price of oil had the consequence of raising the price paid by the refineries for domestic crude oil over a short period of time from below \$3 per barrel to over \$20 per barrel. Previously, Australia had been largely protected from the post-1973 increases in the world price of oil. This paper presents a conceptual framework for analysing the effects of (1) the policy of import parity pricing, and (2) rises in the world price of oil. It discusses the emerging evidence of these effects over the past three years, and examines future policy options for the government.

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1. Introduction.

BECAUSE the price of domestically produced oil was fixed at around \$2.10 per barrel until 19 August 1975, the quadrupling of world oil prices at the beginning of 1974 was not felt directly in Australia. But subsequent theoretical and empirical studies of the effects of the sharp rise in oil prices and the adjustment problems faced by other consuming countries at that time may provide insights into possible macro effects of the crude oil levy first imposed in 1975 and the accompanying price rises in Australia.

Vincent et al. [1979] have examined the effects of an increase in the price of domestically produced oil in Australia by analysis of a simulation model of the Australian economy. Several theoretical studies have examined the relationships between oil prices, employment, output and the price level elsewhere (Bruno and Sachs [1979], Marks [1980], Schmid [1980], Vinals [1980], Chichilnisky [1981], and Dohner [1981]). In this paper, within a framework of analysis of substantial relative price shifts first used by Dohner [1981], we examine the possible macroeconomic effects of the rise in crude oil prices in Australia following the imposition of the crude oil levy and the move to import parity pricing.

In Section 2 we examine the history and structure of the crude oil levy and the import parity pricing policy. In Section 3 we examine the income effects of such a tax and the associated price rises. In Section 4 we examine the effects of the policy on aggregate supply, and in Section 5 possible effects on the price level.

2. The Import Parity Pricing Policy.

In the past eight years awareness of the importance of energy (and in particular of oil) as a factor of production, together with capital and labour, has grown greatly, coupled with recognition that *in situ* oil is a scarce resource and likely to grow scarcer. Amongst other causes, the sharp rise in the world price of oil which occurred in 1973–74 contributed to this awareness, and the further rise of 1979–80 has only reinforced it. But apart from these two jumps, the real price of oil on the world market has remained reasonably stable, even falling slightly between 1974 and 1979. This observation might tend to confirm recent theoretical work which argues that, in the absence of perfect foresight, competitive market forces are not sufficient to allocate stocks of non-renewable natural resource optimally through time (Stiglitz [1974]): even if the necessary condition of equilibrium on the asset market occurs, with the value of stocks of the resource (net of extraction costs) appreciating at a rate equal to the interest rate, the sufficient condition of an initial price which results neither in over-saving (prices too high) nor in excessive consumption of resource (prices too low) will not in general occur.² Moreover, as Marks and Sweeney

1. Australian Graduate School of Management, University of New South Wales. The author thanks the late Malcolm Fisher for his helpful comments. The author requests that the paper not be quoted without his permission.

2. Technically, this is the transversality condition of exhaustion just at the time-horizon date.

[1980] have argued, the short-run tendency will be for the real price to remain constant, rather than to rise, which is similar to the behaviour of the real price of world oil over time, but for the two recent jumps.

This example of apparent market failure might provide justification for government intervention in non-renewable resource markets, such as that for oil, to direct the resource price in order to ensure a better inter-temporal allocation of oil stocks. But in Australia in 1973–74, the government had fixed the price of domestic crude oil below the rising world price, leading to excessive rates of oil consumption as current consumption was subsidised by future consumption, and to possible reductions in domestic reserves as oil-producing firms had increasing incentives to explore for new reserves outside Australia.

Beginning in 1975, the Australian Government announced policies which at first partially, and by 1978 completely, increased the price paid by refineries for domestic crude oil to world parity. This was said to be in order to achieve three ends:

1. increasing the incentives for exploration by increasing the gross returns on sales from yet-to-be-discovered reserves,
2. increasing the incentives for conservation of petroleum by encouraging substitution to other fuel sources and hence reduction in oil use, and
3. encouraging the development of alternative sources of energy.

Since the Federal Budget of 1975–76, almost every succeeding Budget has produced a change in the government regulation of Australian crude oil prices. From 1970 to 1975 the prices of Australian crude oil fob the refinery nearest to the basin averaged \$2.06 per barrel (Australian Institute of Petroleum [1978]). In the same period the price of Arabian Light crude oil more than quadrupled, resulting in incentives for oil companies to shift their exploration effort from Australia to countries in which their expected unit returns would be higher. As a response, in the 1975–76 Budget, Australian crude oil was categorised either as “old” oil if produced from fields discovered before 14 September 1975 or from new developments within such fields, or as “new” oil if produced from fields discovered after that date. “New” oil is priced at import parity and is not subject to excise duty. The import parity price is now set by the Federal Government every six months, based on the price of Arabian Light crude oil at the refinery port nearest each producing basin and including an appropriate quality differential.

From 19 August 1975 “old” oil was subject to an excise duty of \$2 per barrel, and on 18 September 1975 the prices paid to the producer were allowed to rise by between 15% and 40%. On 18 September 1976 there was a further rise of prices paid to the producer of 45% in the Moonie basin, 6% in the Barrow Island basin, and zero in the Bass Strait basin. In 1975–76 the levy yielded \$257 million (including the LPG levy) following an estimate of \$280 million, and in 1976–77 \$308 million.

The economic rationale for the distinction between “old” and “new” Australian crude oil and their differential treatment in terms of price and duty is that higher prices paid to producers for “new” oil will encourage exploration, resulting in higher reserves than would be the case with pre-1975 prices. The imposition of the the excise duty on “old” oil will increase the prices paid by consumers for petroleum products and encourage conservation and the development of substitutes, without resulting in a windfall profit for the producers of crude oil from known fields.

In the 1977–78 Budget a new scheme was introduced. The excise duty on “old” oil was increased to \$3 per barrel on 16 August 1977, and the pricing of “old” oil changed: under the new scheme an annually increasing specified proportion or six million barrels per field, whichever was the greater, of “old” oil was priced at import parity (including the excise levy)—this is known as “parity-related” oil—and the remainder of the “old” oil—known as “controlled-price” oil—was sold at the fixed price prevailing for each field on 16 August 1977. To 30 June 1978 the specified proportion per field (of greater than six million barrels per year) was 10% of production, rising to 20% for 1978–79, 35% for 1979–80, and 50% for 1980–81. The effect of this was to raise the returns to oil producers and the costs to oil buyers.³ To capture for the Commonwealth some of the windfall profits otherwise accruing to the producers by virtue of the price rises, the Government foreshadowed a Resource Rent Tax, but later announced in July 1978 that no such tax would be imposed. The Government claimed that the reason for allowing the price paid to producers of “old” oil to increase was that this measure would encourage improved exploitation of known reserves (Australia—Treasury [1978]). At the same time, the prices paid by buyers of Australian crude oil (the refineries) would increase, and, insofar as these were passed on to the final consumer, the demand for petroleum products would fall, conserving reserves. There would also be greater incentives for development of substitutes to petroleum products. In 1977–78 the excise levy yielded \$443 million.

In the 1978–79 Budget the Government announced that, from 16 August 1978, all Australian-produced crude oil would be priced to refineries at import parity levels, so that consumers of petroleum products would in future pay prices based on world oil prices. A proportion of “old” oil, estimated by the Government to be 30% in 1978–79 (Australia—Treasury [1978]), was already bought by refineries at import parity. The price of the remainder was raised to import parity by increasing the excise duty (the crude oil production levy) on this controlled-price oil by the amount necessary, without increasing the price paid to producers.⁴ The Government estimated that this would increase the price of premium petrol by about 3½ cents per litre, an increase of from 16% to 20%, to earn an estimated \$804 million in additional revenue in a full year, or \$676 million in 1978–79 (Australia—Treasury [1978]). In 1978–79 the levy yielded \$1,189 million.

Following rises in the price of Saudi Arabian light crude from \$11.62 per barrel on 1 January 1979 to \$16.32 per barrel five months later, on 29 June 1979 the Government announced new levy arrangements to apply to parity-related oil, which divide this oil into three classifications: for oil from “small” fields of less than 2 million barrels per year, the levy remained unchanged at \$3 per barrel; for oil from “medium” fields of between 2 million and 15 million barrels per year, the levy was \$3 per barrel plus 75% of increases after 30 June 1979 in the import parity price; for “large” fields, the levy was \$3 per barrel

3. One effect of these measures was that the price of crude oil from the smallest basin, Moonie, rose most, the price paid to the producer (excluding excise duty) rising from \$4.35 to \$10.00 per barrel on 17 August 1977. The Barrow Island price rose from \$2.88 to \$6.67 per barrel, and the Bass Strait price from \$2.33 to \$3.45 (AIP [1978]).

4. For controlled-price Bass Strait oil the new rate of excise levy was set at \$10.26 per barrel from 16 August 1978 to 31 December 1978, and for controlled-price Barrow Island oil \$9.76 per barrel, according to figures in the 1978 Budget (Australia - Treasury [1978]).

plus the increases on 1 January and 1 July 1979 to the import parity price (with the price to producers indexed) (Australia—Treasury [1979]). The result of these changes was to reduce the increased revenues to producers following the import parity price rises, and to increase the Government's revenue. Following an estimate of \$2023 million in the previous Budget, the levy yielded \$2,227 million in 1979–1980, which was equivalent to about 70% of the total cost to refineries of domestically produced oil (Australia—Treasury [1980]).

In the 1980 Budget, the Treasurer was able to announce that one effect of increased price of domestically produced oil was that consumption of major petroleum products had fallen by 1.5% in 1979–80. Significantly, he also announced that the revenue of \$204 million in excess of the Budget estimates for 1979–80 from the crude oil levy had been used to reduce the Budget deficit further. The Government estimated that the levy would yield \$3,054 million in 1980–81 (Australia—Treasury [1980]). In April 1981, the Australian Industries Development Association used various production forecasts and oil price assumptions to analyse future crude oil levy receipts (AIDA [1981]). Its forecast for 1980–81 was \$2,850 million, a reduction from the Treasurer's estimate due to reduced production from strikes. In fact, in 1980–81 the levy yielded \$3019 million (Australia - Treasury [1981]). Assuming no import parity price rises, the AIDA forecast receipts from the levy of \$3,090 million in 1981–82, although a 15% per annum price rise would result in revenue of \$3,668 million from levy.

In the 1981 Budget, the Government announced that for fields producing more than 15 million barrels per annum the proportion of production attracting parity related returns was to be held at 50%, but that for smaller fields this proportion should rise in steps of 5% per year, to 65% from 1 July 1983. The Treasurer's estimate of revenue from the crude oil levy was \$3,357 million for 1981–82. In 1980–81 the Government's excise "take" was equivalent to 71% of the average price to refineries, for domestically produced crude oil, of \$28.89 per barrel (Australia—Treasury [1981]).

From production data provided in AIP (1981) and from figures in AIDA (1981) the author has estimated that the average price to refineries for domestically produced crude oil was almost identical to the import parity price for Bass Strait crude oil. The 1981 Budget gives this price, fob Westernport, as \$12.59 from 1 July 1978, \$13.66 from 1 January 1979, \$18.66 from 1 July 1979, \$24.77 from 1 January 1980, \$27.50 from 1 July 1980, \$30.23 from 1 January 1981, \$30.79 from 1 July 1981 (Australia—Treasury [1981]).

From 1975–76, when the \$2 per barrel levy was first imposed, to 1980–81, the receipts from the levy as a proportion of total Commonwealth Government receipts rose from 1.4% to 8.6%, with a slight proportional drop estimated for 1981–82 to 8.2%. The crude oil levy has undoubtedly been a valuable source of government revenue, with the further attractions to the Government that the levy is an unavoidable indirect tax and that paying the higher replacement cost for their oil has encouraged Australians to reduce the growth of their oil consumption and even to reduce it. (There was a fall in per capita consumption of petrol from 1977–78 to 1979–80, and a slight fall in consumption of petroleum products from 1977 to 1978 [AIP(1981)]). But the import parity pricing policy has more than doubled the price of petrol in Australia in less than five years (from 14.6 ¢/litre in 1975 to 31.9 ¢/litre in 1980), and has increased the receipts of both the Government and the domestic oil producers at the expense of households. What, if any,

macroeconomic effects has the levy resulted in?

3. The effects of an oil price rise on aggregate demand.

IN A concise survey paper, Dohner [1981] examines the effect of an increase in the relative price of oil using a simple aggregate supply-and-demand model. Vinals [1980] reaches very similar conclusions using a general equilibrium model of a small, open economy, which explicitly addresses the specification of the technology, the degree of flexibility of real wages, and the existence of liquidity constraints. Figure 1 plots an aggregate demand curve and an aggregate supply curve. The aggregate demand curve shows demand for output falling as the price level P rises: with a given supply of money an increase in the price level lowers the real supply of money, raising interest rates and lowering interest-sensitive components of aggregate demand. Moreover, the rise in the price level also lowers the real value of household wealth, and this too may reduce desired expenditure in aggregate, (even though households may attempt to increase their real assets through additional purchases).

With prices of inputs fixed, an individual firm has an upward-sloping marginal cost curve as diminishing returns to additional variable inputs are encountered. For the economy as a whole, if variable input costs (wage rates and the prices of energy and materials) are given, then the aggregate supply curve plots the prices necessary to bring forth various levels of output from the economy's fixed capital stock. A higher price level leads to higher output, greater employment of labour, and greater use of energy. If input costs rise, then the price necessary to call forth a given level of output must rise in proportion, and the aggregate supply curve will shift up. For this reason there is a dynamic mechanism associated with the aggregate supply curve, which may cause it to shift over time.⁵ If output rises, so will employment, creating an upward pressure on wages, which are part of costs; and vice versa—if output falls, both employment and wages will decline relative to what they would have been otherwise.

In response to a sufficient increase in the relative price of oil, costs of production will increase at given wage and output levels, since oil, as energy, is an input to the production process. Thus, the supply price will rise, and the aggregate supply curve will shift up. As Vinals points out, unlike a microeconomic analysis, in which tastes are independent of technology and hence shifts in supply and demand are unrelated, in a macroeconomic analysis a supply shock such as an oil price rise will result in related shifts in supply and demand curves. But the effects of such a price rise on aggregate demand are ambiguous, especially if as in Australia's case the rise is partly in response to an excise tax, for the revenues accruing to the Government and the oil producers must be accounted for separately. If the Government improves its Budget position as its oil levy receipts increase (that is, if the deficit falls), and if some of the oil producers' receipts are expatriated or spent on imports in the absence of compensating foreign capital inflows, then there are strong reasons for concluding that the net effect of the oil price rise will be a leftward shift in the aggregate demand curve, as shown in Figure 1. If energy (or oil) use is relatively inelastic, expenditure on energy must rise, so, unless total spending is

5. Indeed, some authors plot the supply and demand curves in the inflation–output plane (Dornbusch and Fischer [1978]).

increased, expenditure on other goods will fall (with an unchanging exchange rate). The increase in prices will tend to reduce the attractiveness of exports, and this too will result in a fall in aggregate demand. The resulting leftward shift in the aggregate demand curve will reduce total output and employment, although moderating the rise in prices.

Dohner [1981] discusses at length the effects of an increase in the relative price of oil on the aggregate demand curve of Figure 1. In an economy which imports some oil, part of the income generated by the purchase of oil will go to foreigners. If the price of oil rises, then domestic income will fall; the extent of the income drop depends on the share of imported oil in total costs, as well as the possibilities for substitution away from the imported input. The greater the degree of substitution, the less the drop in domestic income. U.S. data suggest an elasticity of substitution of about 0.24 (Dohner [1981]), or between 0.2 to 0.6 (Hogan and Manne [1977]).

If some oil is produced domestically and the rest is imported, as is the case in Australia and the U.S.A., then part of the increased payments for oil inputs will accrue as income to the domestic petroleum sector. But through the crude oil levy, the Government has been taxing most⁶ of this higher income from the domestic producers. To the extent that the increased tax revenues from the levy might enable the government to reduce other taxes, keeping total receipts constant or not raising them, the first effect of the rise in oil prices will be to lower the income received by domestic inputs of production at any level of total production.

But the effects of the receipts from the crude oil levy have not been fiscally neutral, as the Treasurer's comment reported above makes clear: from Table 1 it is clear that as the Crude oil levy has risen, so has Total excise duty (for the three years from 1 July 1978 the increase in the levy has been at least 80% of the increase in excise duty), and so has Total revenue (between the years 1977–78 and 1978–79 the increase in the levy was 35.6% of the increase in Government revenue, falling over following years to an estimated 6.1% between 1980–81 and 1981–82). Between the years 1978–79 and 1979–80 the increase in the levy of \$1,038 million was 71.9% of the fall of the Total deficit, and to the following twelve months the proportion rose to 87.3%, which suggests that, in the absence of the increased receipts from the levy, the Government would have had difficulty in improving its Budget position to the extent that it did.

Moreover, measured in terms of a weighted group of goods including direct consumption of oil as well as domestic goods, the lower income will represent a lower real income: the real income effect of the rise in oil prices will tend to reduce the quantities demanded of both oil and other domestic goods. But the oil price rise also creates a substitution away from oil and towards non-oil domestic goods. If the substitution effect is small, then consumer demand for domestic goods will fall after the price rise.

But expenditures on domestic goods and on oil are not the only alternatives for disposal of income: changes in savings may absorb some of the effects of the relative price change. A fall in savings may support expenditures, either because of the negative income elasticity of consumption, or because, during adjustment of consumption patterns, consumption is financed from savings. The reduction of savings will moderate the effects

6. About 70% in 1979–80 and 1980–81, according to the Budget papers and the author's calculations.

TABLE 1. Fiscal Importance of the Crude Oil Levy
(\$ million, Crude oil levy as a percentage of each amount)

	1975-6	1976-7	1977-8	1978-9	1979-80	1980-1	1981-2 ^(b)
Crude oil levy	257 ^(a)	308	443	1,189	2,227	3,019	3,357
Total excise duty	2,332 11.0%	2,486 12.4%	2,734 16.2%	3,845 30.9%	4,965 44.9%	5,833 51.8%	6,250 53.7%
Total receipts	18,275 1.4%	21,384 1.4%	23,469 1.9%	25,567 4.7%	29,661 7.5%	35,146 8.6%	40,716 8.2%
Total outlays	21,860 1.2%	24,124 1.3%	26,802 1.7%	29,045 4.1%	31,695 7.0%	36,274 8.3%	40,862 8.2%
Total deficit	3,585 7.2%	2,740 11.2%	3,333 13.3%	3,478 34.2%	2,034 109.5%	1,127 267.9%	146 2,300%
Savings ratio ^(c)	14.95%	14.40%	13.88%	15.18%	12.93%		

SOURCE: Australia—Treasury, Budget Paper No. 1, Annual.

Notes: (a) including the LPG levy,
(b) estimates,
(c) seasonally adjusted.

of the oil price rise in reducing non-oil consumption demand, for constant government revenue. The most recent figures available on the savings ratio are presented in Table 1. There is evidence of a drop in the ratio from 1978-79 to 1979-80, but in the absence of later data this is not clearly related to the levy.

If the prices of other inputs of production do not fall, then a sufficient rise in oil prices will increase the general price level, as prices of petroleum products rise, and as additional oil costs are passed through in the prices of other products. The consequent reduction in the real value of household assets will lower the wealth, and therefore the expenditures of domestic households (although there might be an expenditure rise to raise the level of real household assets). Any reduction in household liquidity will also reduce expenditures.

To the extent that oil is an energy input in production, a rise in oil prices may well have an effect on investment demand. If capital and oil are substitutes in production, a rise in oil prices will result in an increased investment demand; if, however, they are complements in production, an oil price rise will result in a fall in investment demand. It might be that energy and installed capital are complements, but that energy and new capital are substitutes, in which case the increase in investment demand following an oil price rise will partly offset any fall in household income. Vinals presents empirical results from Kulatilaka of capital-energy complementarity in the U.S. (-1.09) and from

Pindyck [1979] of substitutability in the U.S. (1.77) and in “Europe” (0.60). Dohner [1981] concludes that there is insufficient evidence to decide whether energy (and hence oil) and capital are complements or substitutes in production.

A fall in household income might also be offset by accelerated investment in the domestic oil sector: the returns to factors employed in the oil sector will increase as the price increases, especially since any new discoveries can be sold by the producer at the import parity price. There has been a marked upturn in Australian oil exploration since 1975: an increase of 3.7 times in metres drilled and exploratory and developmental wells drilled (AIP [1981]).

If the receipts from the crude oil levy enable the Government to maintain or reduce its demand for borrowed domestic funds, the interest rate will not increase, and investment demand will not be discouraged as households lend to the Government rather than investing in productive capital. Other obvious factors have led to the present high interest rates.

The imposition of import parity pricing and the consequent increase in oil prices will have been translated into an increase in the overall price level, which will have reduced the attractiveness of Australian produced goods for export. But some of the leakage of receipts to foreign oil producers will return as demand for exports. If the substitution effects of the relative oil price rise are weak, then net effect on demand for oil-importing country output will probably be positive, given that the import parity pricing policy leads to increased receipts for foreign-owned domestic oil producers.

4. The effects of an oil price rise on aggregate supply.

IF OIL prices rise and other input prices do not fall, then domestic input prices will rise, approximately by the proportion of oil in total costs. Several studies have been made examining the effects on the price level of an oil price rise (Australia—Industries Assistance Commission [1976], Australia—Commonwealth Government [1978], Institute of Applied Economic and Social Research [1979]). This increase in prices shifts the aggregate supply curve upward, as shown in Figure 1.

The change in relative factor prices alters the desired input proportions, factor productivity, and even desired output. At a given level of output, with a rise in oil prices, the firm will substitute other energy inputs or labour for oil inputs if possible. (As mentioned above, it may be that oil and capital are substitutes only in the longer run.) This will lower the average and marginal products of labour, as the ratio of labour to other inputs increases, for a given level of output. Thus, the full employment wage will fall in terms of the price of the domestic product. Vinals (1980) emphasises the importance in the behaviour of the real wages in determining how much the economy is affected by a supply shock, such as a rise in the relative price of oil. To the extent that wages rise as a result of oil price rises (due to indexing in the National Wage Case), then the upward shift of the aggregate supply curve will be magnified. But the empirical evidence of the extent of substitution possibilities and the effect of the rise in oil prices on labour demand and the labour product is inconclusive.

Although greater substitutability of labour for oil in production involves a fall in labour productivity, it would be incorrect to conclude that greater substitutability is costly: substitution leads to lower production costs and a reduction in payments to oil. The substitution of labour for oil may also buffer the unemployment effects of a fall in

output.

5. The effects of an oil price rise on inflation.

IF WAGES and other factor returns were completely flexible, then a change in the relative price of oil would not necessarily result in a change in the general price level: in response to an increase in the price of oil other factor returns could fall sufficiently to allow output prices to fall, and a general price index might remain unchanged. (The monetary authorities might try to encourage this by a restrictive money supply policy.) But if prices of other inputs cannot or do not fall, then a rise in the relative price of oil can only result in a rise in the general price level.

If the rise in the relative price of oil occurs at a time of continuing inflation, it will result in a once-and-for-all jump in the price level, in the absence of flexibility in the prices of other inputs. But in practice it will be difficult to put a figure on the extent of the inflationary effect of an oil price rise, because as well as the direct effects on the general price level of higher prices for petroleum products (petrol, distillate, heating oil, kerosene), there will be indirect effects as prices of goods with high petroleum content (such as petrochemicals and artificial fertilisers) rise reasonably quickly, and as the prices of other goods, such as those which use petroleum products as intermediate inputs, rise more slowly.

At successive National Wage Cases since 1975, the Government and the employers have argued that the Consumer Price Index (CPI) should be discounted for the extent to which the excise on crude oil has contributed to its rise. The Government has distinguished between the direct effects of the price rises on the CPI, and the indirect effects, which occur as the increased costs of oil as an intermediate good have been passed on in the form of higher prices for final goods. As a general rule the Government has estimated the indirect effects as over half the direct effects, as for instance in the May 1978 hearing, when the direct effect was claimed to be 0.34 index points and the indirect effect 0.23 index points, in response to an increase of 8.7% in the price of domestic and foreign produced petroleum products (Australia—Commonwealth Government [1978]). In a study on crude oil pricing (Australia—IAC [1976]), which examined the consequences of import parity pricing (from \$2.33 per barrel to \$11 per barrel, the then world price for oil), the IAC estimated that the direct effect on the CPI would be a rise of 1.89% (with exporting and importing competing industries not passing on cost increases), and that the total effect on the CPI would be a rise of 2.84% (with all industries passing on cost increases), which implies an indirect effect in that case of 0.95%, just over half the direct effect. It is likely that since 1976 the oil price elasticity of the CPI has fallen as new investment has embodied greater substitutability between oil and other inputs.

Data from the National Wage Cases, presented in Table 2, are useful in providing two sorts of information: the Government's estimates of the direct and indirect effects of the crude oil levy and import parity pricing on the CPI, and the extent to which wages were discounted for these effects, ignoring the effect of "wage drift" above the Arbitration Commission's rulings. Adding the percentage increases in the CPI since the beginning of the December 1978 quarter⁷ we find that the CPI had risen by about 23.4%

to the end of the March 1981 quarter. During this period the cumulative direct and indirect effects of import parity pricing were claimed to be at least 4.5%. National Wage Case decisions during this period totalled 19.2%, with the CPI discounted for a total of 4.2%. Of this 4.2%, 0.9% was the automatic 20% discount of the March 1981 Case, and 3.3% was the discount for the effects of the import parity pricing policy on the CPI. We can compare this with the figures of Table 3: the change in the petrol

TABLE 2. Change in Petrol & Total (CPI) Index Points

Quarter	Change in Petrol	Change in Total	Total
Sept 1978			252.4
Dec 1978	+1.8	+5.6	258.0
Mar 1979	+0.3	+4.4	262.4
June 1979	+1.1	+7.0	269.4
Sept 1979	+1.0	+6.3	275.7
Dec 1979	+1.3	+8.2	283.9
Mar 1980	-0.3	+6.2	290.1
June 1980	+2.0	+8.2	298.3
Sept 1980	-0.7	+5.6	303.9
Dec 1980	+0.4	+6.3	310.2
Mar 1981	+1.2	+7.4	317.6

Source: Australia—Bureau of Statistics,
Consumer Price Index (Quarterly)

component of the CPI over the period was 8.1 points, and the total change was 65.2 points, or 25.8%. This means that the total effect of changes in the petrol component on the CPI in this period was 3.2%.

The Government's advocates at the National Wage Cases claimed that if wages were indexed for the effects of rises in the prices of petroleum products then "the Government's policy objective of more restrained energy use would be thwarted" (Australia—Treasury [1978], p.19), although such an argument assumes that the income elasticity of demand for energy is one, a highly unlikely event.⁸ It is true, however, that to maintain a given level of employment after a rise in relative energy prices has resulted in an increased share of energy in production costs, will require a fall in the real wage, defined in terms of output prices, (with constant productivity). To the extent that the National Wage Case decisions have discounted for the effects of import parity pricing, real wages will have fallen by 3.4% over this period. But, to maintain a constant consumption real wage with a rise in the relative price of energy, wages will have to *rise* relative to output prices, so the real discount will have been greater.

7. Adding percentages is only a good approximation with small percentages. From Table 3, the correct figure is a rise of 65.2 points, or 25.8%.

8. Jones and Perkins (1981) argue that the Government's case against increasing wages by as much as the increase in CPI ought to have been simply that this would make inflation worse.

If wages rose as a result of higher oil prices, then the aggregate supply curve of Figure 1 would shift up further, as increasing wage costs raised the supply price of output. Prices would rise, lowering the real wage, and output would fall, raising unemployment. Attempts to raise output and employment by shifting the aggregate demand curve would further raise prices, and might simply prolong the adjustment to an equilibrium wage. (This question of the optimal macroeconomic policy response to an exogenous rise in energy prices is examined by Bruno and Sachs [1979], Pindyck [1980], and Mork and Hall [1981]. In their simulation study of the Australian economy, Vincent et al. [1979] suggest a short-run squeeze on the cost of labour to reduce possible increases in unemployment.)

In 1979, prices rose by 10%, compared with a rise of 7.8% over the previous twelve months. As well as the introduction of full import parity pricing in August 1978, a reduction in the Government subsidy for health care later in the year, together with higher food prices, contributed to the increased inflation in 1979. Hughes [1980] concludes that the effect of government policy on inflation (as measured by the CPI) in 1979 was around 2 percentage points.

6. Conclusion

THE imposition of import parity pricing has resulted in a sharp increase in the relative price of crude oil in Australia since 1978, both because of the rise of previously controlled-price oil to world parity, and because of subsequent increases in the world price of oil. At the same time, through the crude oil levy, the Government has allowed the average price received by Australian oil producers to rise only slowly, with the result that the levy is equivalent to about two-thirds of the total cost to refineries of domestically produced crude oil. In successive National Wage Cases the Government has had some success in convincing the Full Bench of the Arbitration Commission that indexation of wages should not always include the direct and indirect effects of the price rises on the CPI, and this discounting, while reducing the real wages level, has perhaps contained the inflation and unemployment which might otherwise have resulted as domestic factors of production competed for shares of the lower national income.

The Government's avowed aims in imposing import parity pricing have been to encourage oil exploration, to encourage conservation of oil, and to encourage development of alternative energy sources. It has argued that compensating wage-earners for most of the income effect of higher oil prices would thwart the second and third aims, despite the fact that the substitution effects of higher prices would only be slightly reduced by full indexation of wages. Moreover, the Government has not used the very large revenues generated by the crude oil levy and import parity pricing policy to offset the inflationary impact of higher oil prices on the CPI by reducing other taxes or charges while maintaining the aggregate Budget position. Apart from import parity pricing the Government has virtually no energy policy. It is difficult to avoid the conclusion that the crude oil levy and import parity pricing are primarily for revenue purposes and only secondarily for purposes of conservation.

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