UPDATED CALCULATIONS OF A TAX-CUT EQUIVALENT OF AN

OIL PRICE DECLINE

Staff Memorandum
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The Congress of the United States
Congressional Budget Office

In March 1983 and again in February 1985, the Congressional Budget Office (CBO) was asked to compute the magnitude of a tax cut equivalent to a given reduction in oil prices. We have now been requested by Senator Chiles to update these calculations in light of world oil market and general economic conditions. This memorandum reviews the previous calculations, identifies the altered conditions, and provides new estimates.

PREVIOUS CALCULATIONS

It is important to note at the outset that the February 1985 calculations for a representative $1 per barrel decline were a rough one-sixth scaling of those calculated in March 1983 for a $6 per barrel decline. These calculations can be summarized as:

Cause	→	Effect	-	Offset	=	Result
(ΔP_{oil})	→	$(\Delta$ Income$)$	-	$(\Delta$ Oil Revenues$)$	=	$($ Tax Cut Equivalent $)$
$1/Barrel Decline	→	$5 Billion Increase in Available Consumer Income	-	$3 Billion Loss to Domestic Oil Producer Revenues	=	$2 Billion Net Equivalent to Tax Cut

These calculations were made under the following conditions:

o   The assumed change in oil prices (ΔP_{oil}), was $1 per barrel from an average cost of domestic and imported crude of $29 in February 1985.

o   The change in available consumer income $(\Delta$Income$)$ was based on 10 mbd (million barrels per day) of domestic production plus 5 mbd imports, yielding roughly $5 billion dollars annual change in nominal purchasing power that "would otherwise be spent on oil." Roughly half of this reduction was assumed to accrue to consumers directly through lower costs of petroleum products; the other half reflected lower costs of oil used to produce other goods and services.

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o   The reduction in oil revenues (ΔOil Revenues) for domestic producers of approximately 10 mbd yields the approximately $3 billion offset to consumers' gains.

Thus, the result is simply $5 billion less $3 billion equal to $2 billion "tax cut equivalent". Strong caveats, which should be repeated here, were attached to these rough calculations in both previous studies. A decline in oil prices generates an increase in real disposable income of the population, much as does a reduction in personal income or excise taxes. For this reason, the two are often thought to be equivalent in their macroeconomic effects. In fact, however, a decline in oil prices and an "equivalent tax reduction" may have considerably different effects. For one, an oil price decline represents, among other things, an income transfer from foreign oil producers to American consumers, whereas a tax cut (leaving aside its impact on the structure of incentives) is a redistribution of income within the economy--from the government to taxpayers. Furthermore, the aggregate price level is directly reduced by an oil price decline, which, if not accompanied by any change in monetary policy stance, will lead to lower interest rates. Neither of these effects would be present in the case of a tax cut. Increased Treasury borrowing to finance a tax cut may, in fact, have the opposite effect of increasing interest rates. Short- and medium-term disruptions in petroleum and related industries caused by sharply lower oil prices have contractionary effects very different from those that may be caused by increased Treasury borrowing.

More generally, an oil price decline and a tax cut would have different effects, depending on the degree of slack in the economy, persistence of inflationary expectations, monetary policy response to an oil price reduction, perception of such a reduction as permanent, and on a variety of other factors. Should any of these assumptions be altered, the calculated effects would change accordingly.

Given the many differences between a tax cut and the effects of an oil price decline, especially under current economic conditions, it may be best not to refer to a "tax cut equivalent" of an oil price change, but rather to refer simply to an oil price change effect on domestic income.

ALTERED CONDITIONS
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The world in which oil is selling at $27 per barrel does not provide the same environment for the domestic economy as the world in which oil costs $23, $18, and especially $13 per barrel. In this regard, it is clearly no longer appropriate to extrapolate or scale the March 1983 or February 1985 calculations to obtain the effect of a $1 per barrel oil price change on domestic income. Changed conditions in world oil markets and in the

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economy's performance in 1985-1986 substantially affect these rough calculations and definitely bring to bear the caveats applied to them.

This section summarizes the changes in conditions that would affect the calculations and uses as a reference more detailed discussions from recent CBO documents on this subject. 1/

In brief, CBO's analysis demonstrates that the effects of large oil price declines cannot simply be a straightline extrapolation of those calculated earlier for substantially smaller oil price declines. Assumptions and conditions applicable to a $1 or even $6 per barrel change from a $30 per barrel world oil price need not be applicable to oil price declines of significantly larger magnitude. Late last year, oil industry analysts characterized the $22-23 per barrel price to be the breaking point below which "normal" conditions--both domestic and foreign, oil market and macroeconomic--would no longer apply. By this reasoning, CBO's extrapolation of March 1983 calculations to accommodate the roughly $29 per barrel price of February 1985 may be deemed acceptable. Not so, however, would be similar calculations to accommodate world oil prices of $18 and $13 per barrel. Given altered macroeconomic conditions and policy stances, an extrapolation of these calculations to a $23 per barrel price are suspect as well.

The factors that should be taken into account under present world conditions are the following:

> The Change in Oil Consumption: At $27 to 30 per barrel, calculations were based on consumption estimated at 15 mbd (10 mbd domestic production plus 5 mbd gross imports). Domestic production has remained at 10 mbd, but we now calculate imports on a net basis at 4 mbd at the $23 price. Thus, we have changed the base to which calculations are applied. Furthermore, in earlier analyses, small changes in the price of oil were assumed to have no appreciable short-run effect on the quantity of oil demanded--a reasonable assumption. But in fact real demand does respond both to changes in price and income, and price and income elasticities are used as indicators of the

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1.   See CBO The Budgetary and Economic Effects of Oil Taxes (April 1986), and "The Economic and Budgetary Consequences of the Recent Oil Price Decline", CBO Staff Memorandum (March 1986), prepared at the request of Representative Lynn Martin.

sensitivity of demand to changes in these factors. 2/ For large oil price changes, both the elasticities and alterations to the base will change the result. Also to be recognized are the macroeconomic effects on incomes resulting from current economic conditions and current fiscal and monetary policies that are different from the past.

The Change in Oil Revenues: The "break point" of $22-23 per barrel mentioned earlier applies to domestic oil production from marginal wells. In addition, OPEC strategic cohesiveness deteriorates rapidly below that break point. Shut-ins of domestic wells at an $18 price and below could be substantial. This will obviously increase the revenue loss to producers. In fact, disruptions to the domestic oil industry from dramatically lower oil prices will force many smaller oil producing firms out of the business altogether. Finally, not only current oil revenues, but current and future investment decisions by the oil industry will be severely affected by the lower oil prices and the uncertainty they engender. As a consequence, there will be revenue losses within those industries that supply and service the oil producers, with a concomitant reduction in corporate tax payments to the federal government.

Federal Budget Effects: Several additional federal budget offsets need to be considered. At prices below $18 per barrel, the windfall profits tax all but disappears and, consequently, tax revenues are reduced. Second, to the extent that disruptions in the oil industry (particularly in the Southwest) increase demands on federal outlays (through unemployment insurance and the like), these will affect the federal deficit. Third, revenues from sales from Naval Petroleum Reserves and federal oil royalty receipts are reduced at lower oil price levels.

Finally, calculations should ideally reflect macroeconomic changes of a more general but equally important nature. For example, changes in foreign real growth rates could have major implications for U.S. international trade. Demand for U.S. exports will increase from oil-importing countries because they benefit from lower world oil prices. On the other hand, demand for U.S. exports will decrease from oil-exporting countries because they experience reduced oil revenues.

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2.   The price (income) elasticity of real oil demand is the total percentage change in the quantity of oil demanded in response to a sustained 1 percent change in the relative price of oil (in income).

While it would be extremely difficult to incorporate all of the changed economic conditions into a revised estimate of oil price effects on domestic income, it is possible to examine the sensitivity of these calculations at alternative oil base prices under a common set of basic assumptions. These are:

o   A 10 mbd base for domestic production;

o   A 4 mbd base for net imports;

o   A short-run price elasticity of demand of 0.1 in moving from one base price to another, but a zero price elasticity in computing the effects of marginal price changes from each base; and

o   A 0.1 mbd domestic production shut-in for each $1 per barrel decline in average oil prices in the $17-$21 range, a 0.2 mbd shut-in for each $1 decline in the $14-$17 range, and a 0.3 mbd shut-in for each $1 decline below $14 per barrel.

Under these simple assumptions, rough calculations of the effects of a $1 oil price decline are given in Table 1, at base prices of $23, $18, and $13 per barrel, respectively.   At the $23 base price, the main difference between these results and those calculated in February 1985 is attributable to the change to the lower base volume of net imports. At the $18 and $13 baseline prices, additional major changes result because of shut-in domestic production and because of price elasticity effects on domestic demand. 3/

Note that the results from the following table should not be extrapolated, especially at base prices below $13 per barrel. In fact, under some assumptions, the decline in the estimated impact on domestic incomes ceases. At some base prices below $13 per barrel the impact may begin to rise again.   Also note that the results apply to a one-to-two year time horizon only; in the long run, the price elasticity of oil demand would exceed its short-run value. Quantities of oil demanded at base prices used in our calculation would thus be larger, thereby increasing the change in available consumer income above the levels computed for the short run.

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3.   The different base price scenarios assume major macroeconomic variables are held constant.

TABLE 1.   SENSITIVITY TO $1 DECLINE IN WORLD OIL PRICE
(In billions of dollars except as noted)

At Per-Barrel Base Price of:	$23	$18	$13
Change in Available Consumer Income	5.11	5.22	5.33
Change in Domestic Oil Revenues	-3.65	-4.20	-4.60
Net Change in Domestic Incomes	1.46	1.02	0.73

Source: Congressional Budget Office.