

# Two reasons for increasing the Federal tax on oil: internalizing a negative externality (Pigou's reason) and shifting rents from OPEC to us

Edward Morey, rough draft Dec 5, 2013

## Part 1: shifting rents

There are two reasons why one might want to increase the tax on oil: (1) currently, in the U.S. the private cost of burning oil is less than the social cost, warranting a Pigouvian pollution tax, and (2) many of the barrels burned are purchased from a foreign cartel, OPEC.<sup>1</sup>

While OPEC does not have complete monopoly power in the production of oil, it does have great market power, enough to have significant influence over the world price. Given this, the OPEC countries earn excess profits on their production and sale of oil: profits above and beyond a normal rate of return. One way to transfer some of those excess profits from them to us is with a tax of oil.

In explanation, the oil-importing countries, if they take advantage of it by coordinating, have excess market power (what economists call "monopsony power"). If they can act as a monopsony, either through coordination or happenstance, world oil prices will be determined by a game between two powerful agents, rather than a cartel selling to a bunch of many entities in many countries.<sup>2</sup>

Currently, most of the other major oil importing countries impose high taxes on oil; the U.S. is the exception. The U.S. is also the biggest importer of oil, accounting for xx% of world oil consumption. Raising the U.S. tax on oil would put us more in line with the other big oil importers and help to exert monopsony power on OPEC.

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<sup>1</sup>For the purpose of these notes I am going to ignore the other carbon-based energy sources.

<sup>2</sup>For simplicity, we consider the problem from a static perspective. More generally, the problem is dynamic: a repeated game between two advisories

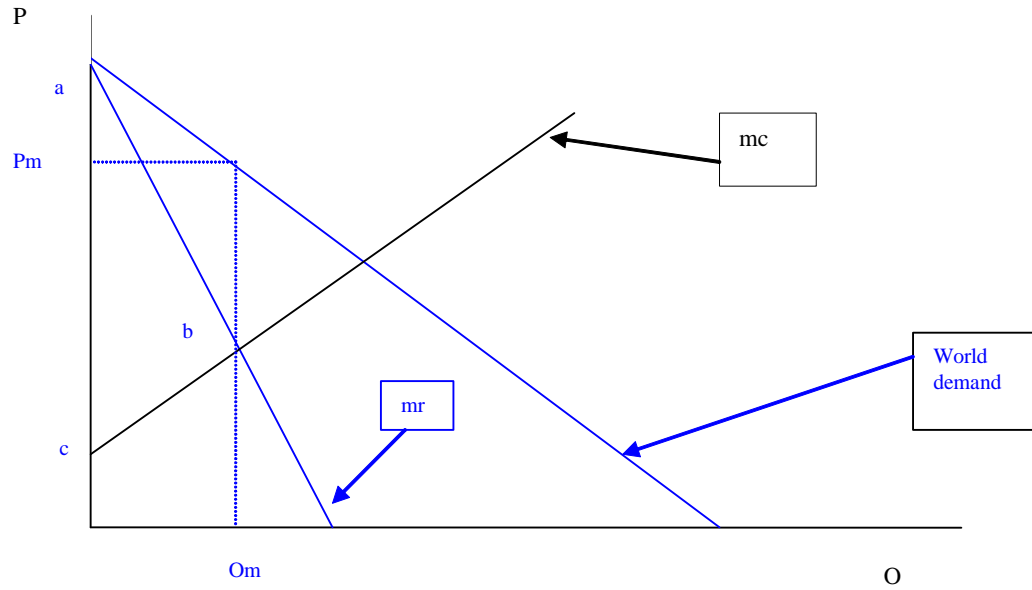


Figure 1: OPEC monopoly profits

Consider how OPEC would behave in the absence of such an import tax; they maximize profits by setting marginal revenue equal to marginal cost. Since the demand curve is downward sloping, price is set above what it would be if the market were competitive, total output is less than it would be if the market were competitive, and the monopolist earns excess profits.

where  $O$  is barrels of oil produced and sold and  $P$  is the price of oil. OPEC exploits its market power, ignores the negative externalities associated with burning oil, and earns near-monopoly profits (the triangle  $a,b,c$ ).<sup>3</sup>

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<sup>3</sup>This result remains basically the same when one accounts for the complication that the OPEC has a finite stock of oil.

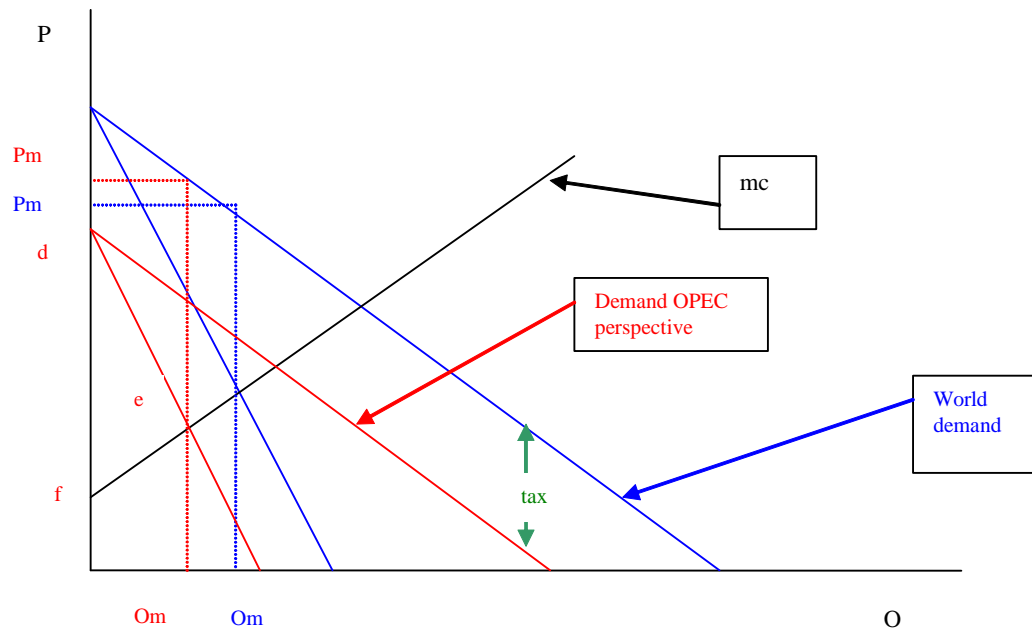


Figure 2: OPEC profits with tax

Consider how the story changes if oil is highly taxed by the oil-importing countries. In that case, one must distinguish between price paid by the consumer and the price received by OPEC (the producer price) - the difference is the tax. The consumer cares only about the tax-inclusive price. The above figure now has two demand curves: the original demand function - the one in the above graph - and the demand function for oil as perceived by OPEC.

In explanation, the demand curve as perceived by OPEC lies below demand curve for oil by the amount of the tax.

The tax has lowered OPEC's marginal revenue for every level of output they sell. The likely outcome is OPEC will sell less oil, and the excess profits it earns will decline - OPEC's excess profits after the tax are reduced to the triangle  $d,e,f$  - the reduction in their excess profits is ....

The decrease in excess profits will be transferred, in terms of increased tax revenue, to the treasuries of the oil-importing countries. Put simply, even if burning oil did not produce pollution externalities, the oil-importing countries would want to get together and tax oil if much of that oil was produced by a cartel like OPEC.

Notice the price of oil increases by less than the increase in the tax.

This component of the tax might only tax imported oil. The Pigouvian part of the tax would be on all oil.

Summarizing, a number of things will happen:

1. Domestic price of oil will increase, including price of gas and all products that have oil as an input, but not by as much as the import tax.
2. Domestic demand for oil and gasoline will decrease because of the price increase, leading to reduced CO2 emissions, a secondary effect of imposing the import tax.<sup>4</sup>
3. OPEC profits will decline.
4. If the tax revenues from the import tax are equally distributed among U.S. citizens, on average, an individual will get a bigger tax rebate than they pay in increased expenditures on oil, Making the tax a PPI. For example, if the tax is \$5 a barrel, the U.S. collects \$5 in revenues for each barrel of oil imported but the price of oil to domestic consumers will go up, but by less than \$5, so if the \$5 is returned to the public, we will get more back than we pay in increased oil prices.
5. People who consume large amounts of oil, either directly or indirectly, after the tax is imposed will be made worse off by this deal.
6. The rest of us will be made better off. Many individuals will get a rebate check larger than the increased cost of consuming their original amount of oil, making these individuals better off even if they continue to consume the same amount of oil - they won't; they will reduce their consumption which will further increases their utility. Others would would be worse off if they continued to consume their original amount of oil but will be better off because they decrease their consumption of oil.

Make sure you understand and can explain these summary points.

## Part 2: taxing the externality (the Pigouvian component of the tax)

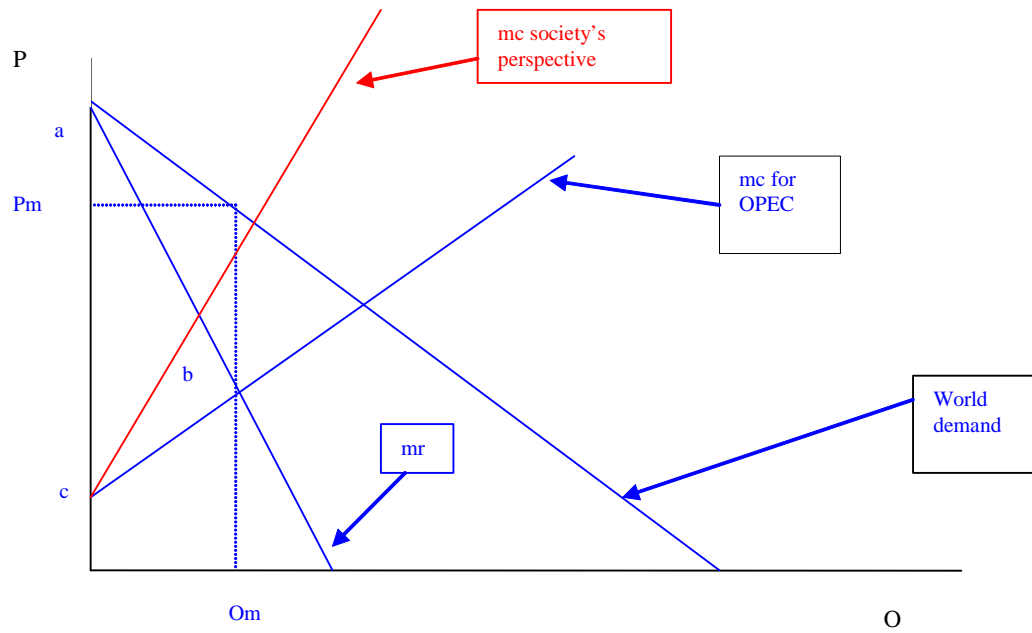
But burning oil does produce damaging pollution so the tax needs to take account of this as well.

This is the component of the tax most often considered by environmental economists. The argument, first put forward by A.C. Pigou, is that the tax should be set so that the marginal private cost of burning oil equals the marginal social cost of burning oil. And it should if the goal is efficiency—burning oil produces negative effects on others, and this should be reflected in the price the burners (us) pay. Most recent studies suggest this component of the tax should be about **\$1?** a gallon. The current rate on gasoline, which includes a Federal tax of xx a gallon and a state tax which varies by state, averages about 40 cents.

One way to view the what is going on is that the social cost of producing oil is greater than the private cost of extracting oil because extracted oil is burnt and this causes negative external effects. These external effects can be viewed as

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<sup>4</sup>Assuming we don't switch to coal, a substitute for oil.



driving a wedge between a consumer's willingness to pay to burn another barrel of oil and society's WTP to burn another barrel of oil- society's WTP is less by the amount of the external damages. Interprets the externality as driving a wedge between marginal private costs and marginal social costs, Figure one really need two marginal cost functions: one for OPEC and one for the oil-importing countries. For example,

### In summary

So, in summary there are two reasons to increase the tax on oil, one is to get us to account for the negative damages we produce when we burn a barrel of oil, and the other is to transfer some of the excess profits OPEC currently earns to the U.S. treasury.

Consumers will be prone to argue that they cannot afford to pay more for oil, but that can be fixed.

## A trust

The U.S. government could set up a trust that collects all of the tax revenues from oil and then return those revenues to the American people in terms of a yearly payment to every tax payer - we would each, for example, get a check or tax credit for \$100 bucks, or whatever is the amount collected divided by the number of taxpayers. Or, the tax revenues could go into the social security fund. Or, we could do what England does, use the money to pay for schools.