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Organization of the Petroleum Exporting Countries (OPEC) and Opportunities for Sustainable Development

by Matt Goodlaw, Paul Alexander, and Jessica Nixon

OPEC is in the business of natural resources which inherently connects them to the concept of sustainable development. The main focus of this research is to answer the following question: Does OPEC have the power to implement measures consistent with the concept of sustainable development? During the course of this research, the paper Sustainable Development and OPEC, by Herman E. Daly, was uncovered. Daly proposes a sink tax to be implemented by OPEC. This would act as a global fiduciary which would, in theory, bring the consumption level of oil down to a more sustainable level by raising the price and lowering the demand. The research in this paper finds that Daly's speculative idea, while interesting, is unrealistic; the idea is not feasible given OPECs' stated goals. In addition, there are ethical considerations concerning a conflict of interest on a global and local scale

Introduction

The purpose of this research is to illustrate the relationship between OPEC and the concept of sustainable development. Included in the introduction is a brief history of OPEC, a brief history of the debate on sustainable development, and a review of literature pertaining to the field of sustainable development. The research progresses on to a neo-classical analysis of the oil market (supply and demand, available oil, and the rate of discovery), by which the researchers will illustrate OPEC's control in the oil market in relation to non-OPEC control variables. The paper will determine whether or not OPEC currently has the power to implement policy to enact sustainable development. Given OPEC's oligopolistic market structure coupled with a short-term inelastic demand (lack of

substitutes) and long-term elastic demand (substitutes, renewable energy sources, backstop technology), the research will explore policy options that may lead to a model of sustainable development. Ethical concerns arising out of such models-as they pertain globally-will be discussed from our personal perspectives. The researchers will briefly discuss how these models will affect us locally, thus leading us to the conclusion. In the conclusion, the research will be summarized and the relationship between OPEC and sustainable development re-illustrated.

History of the Debate on Sustainable Development

The term 'sustainable development' was popularized in 1987 after the Bruntland Report, "*Our Common Future*," was published. The Bruntland Report, for the

first time, gave some “direction for comprehensive global solutions” (International Institute for Sustainable Development). Though the term was popularized in 1987, the concept had been brewing for quite some time. In 1962, Rachel Carson published *Silent Spring* which connected human and animal health risks with pesticides. Carson also shed light on the fact that the ecosystem had an absorption capacity for economic development.

Over the next decade, an environmental consciousness began to emerge in the form of global political action. First came The Club of Rome in 1968. Then in 1969 the U.S. passed the National Environment Policy Act (NEPA). In 1972 the United Nations Environment Programme (UNEP) was formed, as well as Environment and Development Action (EDNA) in the Third World (IISD, 1997).

The 1980’s and 90’s proved to be formative years for the concept of sustainable development with both “The North:South-A Program for Survival,” (Brandt Report) and the above mentioned Bruntland Report. In 1992, the U.N. Conference on Environment and Development (UNCED) was held in Rio de Janeiro. (IISD, 1997) In 2002, the (WSSD),

World Summit on Sustainable Development, was held in Johannesburg, South Africa.

History of OPEC

The Organization of Petroleum of Exporting Countries (OPEC) was developed in 1960. Founded by Iran, Iraq, Kuwait, Venezuela, and Saudi Arabia. Over the next 11 years, OPEC formed into a thirteen, now eleven, nation cartel. This includes Qatar (1961) and Libya (1962), Indonesia (1962), United Arab Emirates (1967), Algeria (1969), Nigeria (1971) (Rousseau).

In the 1970’s the world explicitly felt the power OPEC had gained. Both in 1973 and later in 1979, OPEC demonstrated how dependent the world was on the ‘Black Gold’ they possessed. Developed countries were vulnerable to production interruptions. Global economies (primarily the U.S.) reflected such vulnerability on October 6, 1973 when the fourth Arab-Israeli war erupted. (Balaam, Veseth, 365) The details of these “oil shocks” will be discussed further in the paper.

Literature Review

OPEC provides an important resource to the whole world. This topic is of interest to us because oil has a significant effect on our lives in an industrial society. What happens

if the oil supply is depleted? What does OPEC think about the future and their oligopoly? The books and articles the present research has uncovered describe how sustainable development relates to OPEC and illustrates some ethical considerations dealing with this topic.

In the book *Sustainable Development*, Michael Redclift concludes that sustainable development deals with our environment because humanity is using up the available natural resources in keeping businesses afloat. If the environment and how it changes were understood, society could then change along with it. He also describes “the neo-classical case is that the ‘gains from trade’ outweigh the losses.” (56) A consciousness of our use of natural resources is needed.

Another vital source to understand Sustainable Development is the search on Herman Daly’s article “Sustainable Development: Definitions, Principles, Policies”. This article discusses the effects of micro- and macro-economics. It suggests that wealth is necessary up to the point it turns to a throughput whereby it then becomes “uneconomic growth” that doesn’t work for macro-economists. Sustainable Development of the economy means qualitative improvement (development),

without quantitative increase in matter-energy throughput (growth) beyond the absorptive and regenerative capacities of the sustaining ecosystem (Daly). Matter-Energy Throughput is the flow of raw materials from their place in nature, back to nature. The ability of the ecosystem to sustain these flows must be kept up. Especially for underdeveloped poor countries, the main source of their Gross Domestic Product (GDP) is from shelter, food, and clothing. Surviving solely on that can still be an economic way of living. Daly describes that the poor export primary goods to the rich, wherefore the rich give loans to the poor, gaining a hold over the country and being one up from them, having control over the entire trade situation.

Thirdly, Thomas C. Brown, Dawn Nannini, Robert B. Gorter, Paul A. Bell and George L. Peterson wrote a journal article for *Ecological Economics* titled “Judged Seriousness of Environmental Losses: Reliability and Cause of Loss”. The group tested people in the expectation of determining whether or not individuals are affected by environmental loss. Some people felt no effect from environmental loss but most felt a serious loss. The general finding was that there was serious feeling of loss when man rather than natural events created

destruction to the environment. The authors also concluded that separate resources are valued more in destruction than multiple resources that have been ruined.

Finally, Sir John Hicks, in *Value and Capital* defined income as follows:

“The purpose of income calculations in practical affairs is to give people an indication of the amount which they can consume without impoverishing themselves. Following out this idea, it would seem that we ought to define a man’s income as the maximum value which he can consume during a week, and still expect to be as well off at the end of the week as he was at the beginning. Thus, when a person saves, he plans to be better off in the future; when he lives beyond his income, he plans to be worse off.”

This definition is as close as Neo-Classical economics comes to dealing with sustainable development. The reality of this definition shows that Neo-Classical economics is interested only in sustaining consumption and economic growth (as defined below) indefinitely.

OPEC and Sustainable Development

The fact that OPEC is in the business of natural resources inherently connects them

to the concept of sustainable development. Oil and petroleum play a crucial part in economic development - the opposite of sustainable development - because they fuel economic growth. Economic development, as defined by the U.S. Department of Commerce, is:

“an increase in the rate of economic growth, measured in terms of changes in output or income per capita. The theory has two essential dynamics. One, in aggregate models, the rate of saving that supports investment and capital formation drives the growth process. Two, in regional models, factor prices-- specifically, the relative returns on investment and relative wage rates-- stimulate factor flows that result in regional growth. Growth theory suggests that economic developers respect the free market and do what is necessary to support the efficient allocation of resources and the operation of the price mechanism” (U.S. Dept. of Commerce).

Using this definition, economic development focuses on quantitative growth while Daly’s definition of sustainable development highlights qualitative improvement. With that in mind, what can

OPEC do to help in the development of a working model of sustainable development?

OPEC and the Oil Market: An Economic Analysis of OPEC Power

OPEC has been accused of everything from controlling the entire oil market to having absolutely no impact on global oil prices. In examining the oil market, it can be seen that neither of these absolutes are true. As the research will show, the truth lies somewhere in the middle.

OPEC has been said to have completely caused a shortage of oil and the resulting price shock during the early and late 1970s. In fact, Arab OPEC countries did embargo oil exports to countries that were allies of Israel in the Arab-Israeli War but this was only one of several factors that ultimately contributed to a raise in the price of oil. Even during this time oil imports from OPEC producing nations were increasing (See Figure 1). Some other factors included political reaction, interest rates, and production shifts (See Figure 2). In response to the Arab oil embargo of 1973 and 1974 Congress imposed a price ceiling of \$.57 per gallon on gasoline (Case and Fair 78). This artificial ceiling limited the available supply of oil and caused a shortage. Interest rates were also climbing

rapidly which affected overall price of oil (Heal and Chichilnisky, 2-5). In addition, the production of oil was switching hands from seven major international oil companies to the governments of the countries where the oil was located. In anticipation of this change the major oil companies had been overproducing oil to shore up their reserves before they were removed from the countries. This led to the perception of a shortage because the newly installed government overseers were not producing as much as the major companies had been (Heal and Chichilnisky, 58-62). Without taking these other factors into consideration, it is easy, albeit not accurate, to point to OPEC as the cause of all price shocks during the 1970s.

Figure 1

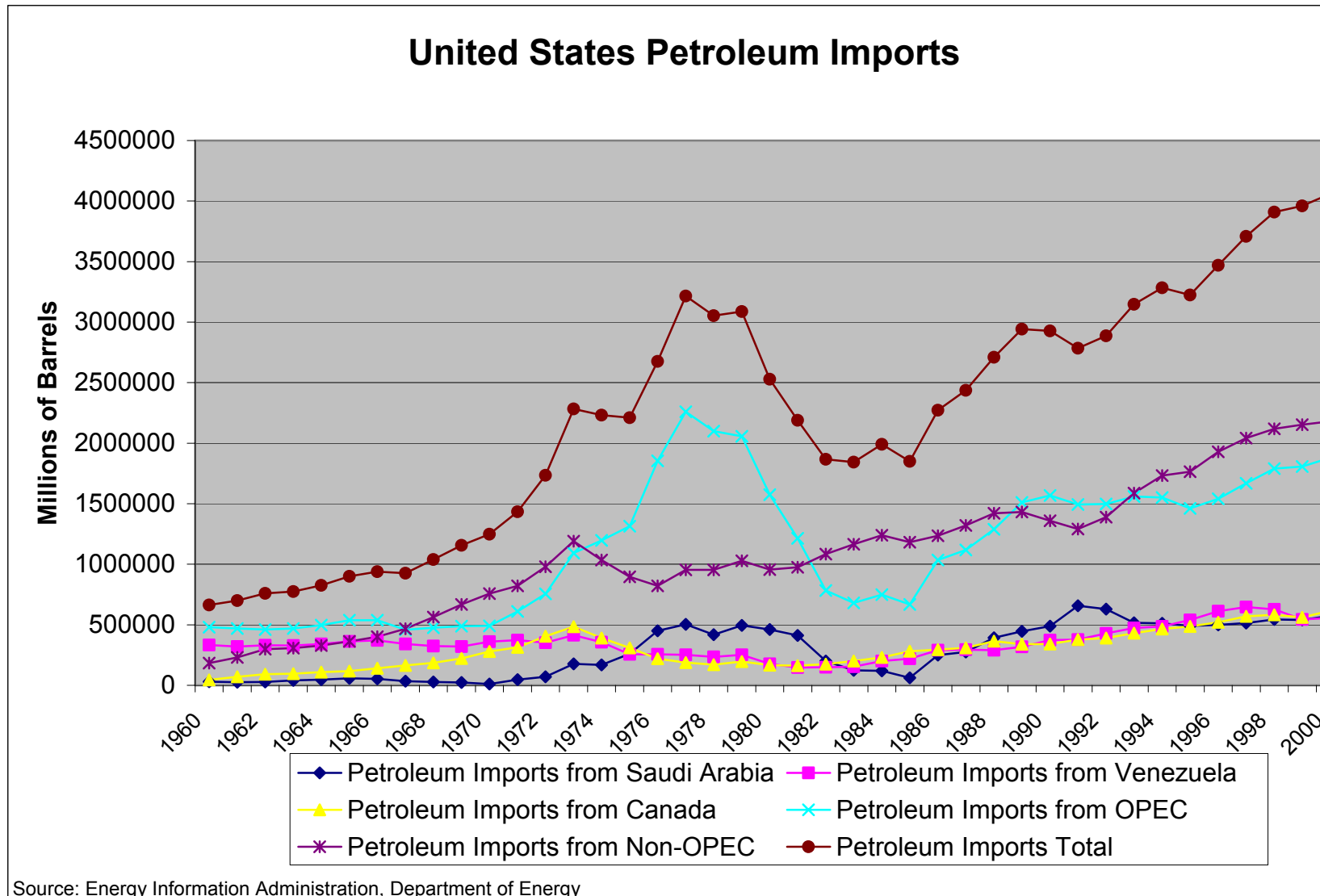
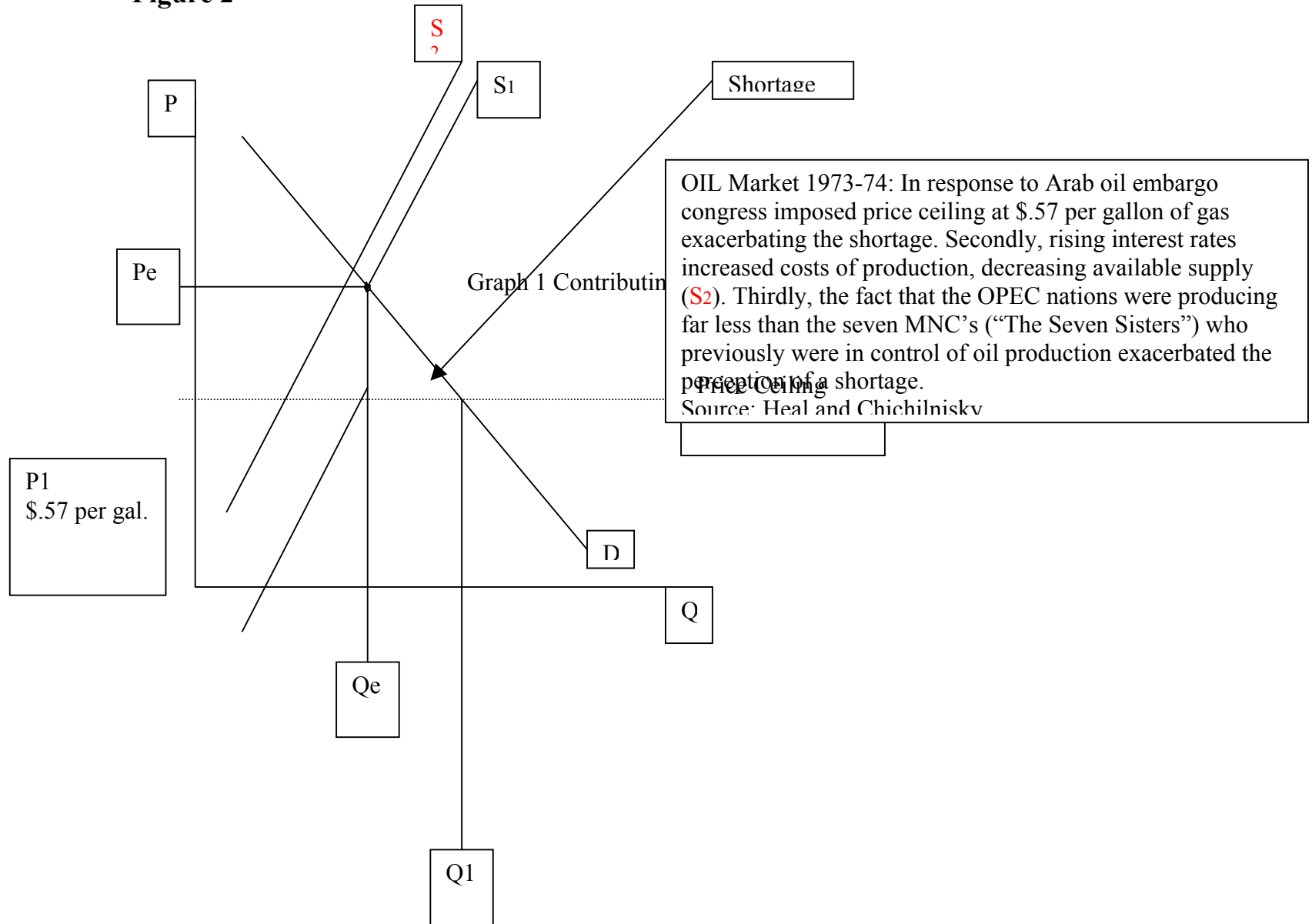


Figure 2



As Figure 1 shows the United States has been able to reduce their dependency on OPEC oil throughout the years. The U.S. now imports more from non-OPEC countries than they do from OPEC member nations. In addition, the U.S. has a strategic reserve of 550 million barrels of oil as of 2001. This is held in case of a drop in imports or an embargo from oil producing nations that would threaten the United State's available oil supply. The United States imports 27% of its oil and petroleum from OPEC so an embargo by OPEC would have an effect on available supply. The U.S. was 54% dependent on imported oil to meet its consumption demands in 2001 so the strategic reserve and oil producing capabilities of the U.S. would help to alleviate a drop in available import supply (Energy Information Administration, Department of Energy). It is anticipated that OPEC's market share will continue to drop as they have ceded it to other countries in order to sustain their target prices (Williams). Obviously, OPEC is a major factor in the U.S. oil market; however, the U.S. is not nearly as dependent on them as they once were.

When examining OPEC in terms of an oligopoly, several unique factors must be taken into consideration. The first is their

ability to influence market prices rather than take it as given. Oligopoly pricing strategies will cause prices to be above the competitive market price in some circumstances and below the market price in others (Heal and Chichilnisky, 8-12). Heal and Chichilnisky (8) state "Monopoly in the oil market cannot result in prices uniformly higher than competitive prices at all dates." Further, "this is a sharp contrast to the usual static microeconomic theory of monopoly, where a monopolist sells less output than a competitor, at a higher price." It is not in the advantage of a profit-maximizing firm to sell product uniformly above or below market price. In a competitive market total consumption equals total supply. Selling above the market price will leave an oligopoly with unsold goods and lost revenue in the long term. This is incompatible with maximization of profits. There are competitive and political reasons that could motivate an oligopoly to price above or below market prices, but it would not be to their benefit as a profit-maximizing firm to do so. In OPEC's case in particular, it would be dangerous to set oil price higher than the market could bear. In examining a traditional monopoly, neo-classical economics only takes into account partial equilibrium (one market at a time). Theory

of partial equilibrium states that an oligopoly is able to set an output price without worrying about how it would affect the general equilibrium (whole market) (Heal and Chichilnisky, 38-39). Most OPEC nations are reliant on imports from the same industrial countries that they are exporting oil to. For example, if OPEC raised the price of oil above market prices, then the price of imports to their countries would also rise. In fact, research shows that the real price of oil from OPEC countries needs to be relative to what those countries import (Heal and Chichilnisky, 39-41):

$$\text{real price of oil from OPEC countries} = x/a$$

x = OPEC influence on price of oil

a = non-OPEC influence on price of oil + OPEC trading partners' exported goods price

Research indicates that while OPEC may be able to influence market prices it may not be in their advantage to do so. The research will next examine the power of their cartel given that the member nations have divided interests. Countries with small amounts of oil reserves, such as Iran and Iraq (Hawks), generally want to obtain

higher prices rather than increase demand. Countries with large reserves, such as Saudi Arabia (Doves), would rather protect the longevity of their supplies by ensuring that demand remains constant. They also have the monetary wealth to spare. In fact, in 1980 there was a disagreement within OPEC as to the target price of \$34/barrel. The Saudis believed that this price was too high, and, between 1980 and 1982, as most OPEC countries were cutting back, Saudi Arabia was increasing their exports in an attempt to drive prices down (See Figure 3). Once OPEC reduced its official price, Saudi Arabia cut back significantly on their production to maintain the agreed-upon price (Heal and Chichilnisky, 48-49). This lack of solidarity in all situations decreases the oligopoly power of OPEC significantly. OPEC's role as an oligopoly can be questioned because of these special factors, and they must be taken into consideration when examining OPEC's power in the market.

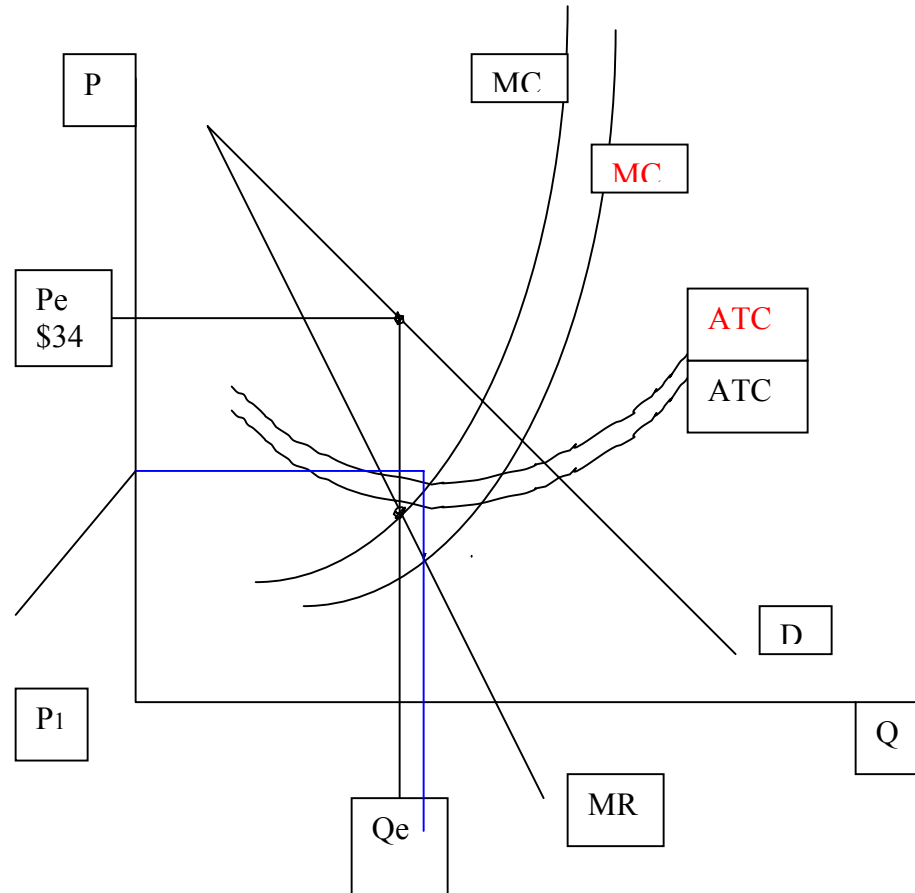
Price and income elasticity of demand for oil plays an interesting role in the market as well. In the short-run, demand is relatively inelastic and unresponsive with respect to price. This happens because the market has no way to react drastically in the short term. In the long term, however, oil

demand has a tendency to be very elastic (Heal and Chichilnisky, 27-30). A higher price will force lower demand through more efficient technologies (discussed in next section) and methods, but it will take a period of time for these to appear. Effects of the income elasticity of demand are seen much sooner. In the industrial sector, energy consumption rises as national income rises. More economic activity results in an increase in production, revenue, and a rise in demand. Households respond similarly as there is a bare minimum amount of energy a household will use. Beyond that, oil is a complimentary good to many normal goods, and there will be an increase in demand as income rises (although it will not be proportional). The following research displays how technology can affect this elasticity.

Backstop Technologies

As was discussed earlier, technology can affect demand by creating more efficient means of consumption. Backstop technology is defined as a technology that would be used to produce unlimited supplies of a perfect substitute for oil at a price. Fusion power, shale oil, and other synthetic fuels have been considered at one time or another as a backstop technology (Heal and

Figure 3



Q1

Saudi Arabia increased oil supply in order maintain lower prices and steady demand. The MC curve can be seen as the supply curve for the cartel. It states the agreed upon supply schedule for the cartel. This move by Saudi Arabia, although beneficial to the global market, brought to question solidarity of the cartel during that time.
 Source: Heal and Chichilnisky

Chichilnisky, 17). Since there are currently no feasible backstop technologies available, this will remain theoretical. If a backstop technology were discovered it would play a very interesting role in the oil market. The price of the backstop technology would immediately become the price ceiling for oil. In a competitive market system, the price of oil would rise along with interest rates until it reached the price of the backstop (Heal and Chichilnisky, 18). At this point, the backstop would take over as a replacement for oil. In a monopolistic market, the monopoly, acting as a profit-maximizing firm, would most likely follow the same path as the competitive market. The only difference would come about if the monopoly decided to use limit pricing to raise the price of oil to just below the price of the backstop technology. This would limit the entry of competition into the market, but it poses a risk because the elasticity of oil becomes very great at higher prices (Heal and Chichilnisky, 21). A small change in the price of the backstop technology could push the price of oil above the ceiling; at which point, there would be zero demand for oil. The rate of research towards a backstop technology varies depending on the price of oil. In the 1970s there was a surge of research into oil alternatives including

fusion, shale oil, and synthetic fuels (Heal and Chichilnisky, 24). Research slowed as prices dropped, and, in the 1990s oil glut, it is possible to see a step backwards as SUVs and other gas-guzzling vehicles skyrocket in popularity. Public policy and subsidies have the potential to dictate how further research is handled, unless scarcity of oil or environmental factors push advancements without the need for governmental involvement.

Daly's Options for the Promotion of Sustainable Development

As the data and research clearly show, OPEC has considerable but not total market share. In his article, "Sustainable Development and OPEC", Herman Daly proposes a plan that would effectually levy more monopoly power into the hands of the OPEC cartel. It is a scary thought at first glance. However, when reviewed in the context of sustainable development, the argument becomes more appealing. Daly views the production of oil as being two separate but interdependent markets: the source function (market) and the sink function (market). The source function is that which supplies the oil. The sink function is that which charges for the output of carbon-dioxide from burning a barrel of

petroleum. This is similar to the total charge a customer pays for water, water supply and sewerage fees (Daly, 6).

“New institutions are being designed to take the sink function out of the open access regime and recognize its scarcity (Kyoto)” (Daly, 5). “OPEC assuming it could increase its degree of monopoly of the source, may be in a position to preempt the function of the failing Kyoto accord by incorporating sink rents, and even externalities, into the prices at the source end of the petroleum throughput” (Daly, 6). Essentially what this means is that there would be an added charge to the price of oil that OPEC would collect, which would increase price and decrease demand for oil. This added charge in the form of sink rents could then be distributed to developing countries of the South.

“In addition to effecting this transfer, the expanded role of OPEC as global fiduciary might increase the willingness of other petroleum producers (e.g. Norway) to join OPEC, thus increasing its monopoly power and ability to function as here envisioned.” (Daly, 7) OPEC then would have monopolistic powers over the source market and the sink market and would then be expected, as Daly states, to act “as a global fiduciary on the sink side” controlling

the “net flow of sink rents from North to South.” OPEC has already formed the OPEC Development Fund, which is a donation based fund created to “promote cooperation between OPEC member countries and other developing countries as an expression of South-South solidarity” and to “help particularly the poorer, low-income countries in pursuit of their social and economic advancement” (OPEC Fund).

Daly continues with an explanation of the difficulties in assigning or determining costs to sink rents. He suggests that “since the sink side is now the more limiting function...it should be as much as the source rents.” These sink rents would then be included in an “expanded OPEC Development Fund dedicated entirely to global sustainable development in poor countries, especially investments in renewable energy efficiency” (Daly, 7). This option does however inherently contain some distinct ethical concerns and feasibility issues. These concerns will be discussed in the following two sections.

Feasibility of Daly’s Proposal

The definition of a feasible plan or proposition is one that is capable of being accomplished or brought about. There are several obstacles in Daly’s proposal that

threaten its feasibility. The first is the conflict of interest between OPEC's stated economic goals and the outcomes of Daly's proposal. OPEC states that "We need to invest in oil exploration and development in order to have production capacity available as demand rises in the years ahead, but we also need to be sure that there will be enough demand for that oil and that we will get a reasonable price." The outcomes of Daly's proposal will increase price thus decreasing demand.

This increase in price has the potential to spur research and development towards a new backstop technology. As discussed earlier, once the price of a backstop technology reached the price of oil, oil would become perfectly elastic. This would nullify any effect that Daly's proposed sink tax might have because the tax would not be applied to the new technology. In theory, this backstop technology would also bring the global consumption of oil down to a more sustainable level.

The final question of the feasibility of Daly's proposal dealt with in this paper has to do with OPEC operating as a global fiduciary. Daly proposes using an expanded version of the currently existing OPEC Fund for International Development to facilitate

the distribution of sink rents from the North to the South. As stated above, one of OPEC Fund's goals is to "promote cooperation between OPEC member countries and other developing countries as an expression of South-South solidarity" (OPEC Fund). However, it appears that the OPEC Fund is more of a loan broker to the South rather than an aid distributor. Only 6% of the US\$4,274.5 million in disbursements from the OPEC Fund were given in the form of grants. A significant majority of the money was used to fund loans to encourage development in the South (OPEC Fund). In this regard, it appears that the OPEC Fund may be nothing more than a smaller version of the IMF or World Bank.

Ethical Considerations of Daly's Proposal

There are several important ethical factors to consider when evaluating the plausibility of Daly's suggestions. Is it ethical for the world to place more power into the hands of an already powerful cartel? Can the same cartel be trusted to administer a fund whose main purpose would be to funnel millions of dollars into developing countries? Who exactly would be the recipient of funds collected as a sink tax? Is there a global organization, such as the U.N., capable of the kind of oversight that

would be necessary for such a program? Could the global community agree to an equitable plan that was both efficient and effective? How would this increase in price through tax affect local consumers and how would they feel about paying money into a tax that would most likely never be spent in their own country? The questions that could be raised are almost endless so our research will only discuss a few choice ones below.

As our research has shown, OPEC plays a significant, although not total, role in the American oil market. In order for Daly's suggestion to be effective, the U.S. would need to have a large majority of their oil come from OPEC countries. The easiest way to do this would be to have non-OPEC countries such as Norway and Canada join the cartel in order to further their control of the market. These countries have traditionally been resistant to joining OPEC, but a concept such as sustainable development might just be the motivation needed in order to have them join the cartel. It has also been suggested that in a total monopoly of natural resources "prices to consumers would be fixed lower than the long-run interests of the public would justify." (Ise, 1925). Such a monopoly seems much more favorable to consumers

once you take into account oil's non-renewable nature and continuing scarcity.

Having the same monopoly responsible for the sale of oil, collection of a sink tax, and distribution of the same tax could pose problems with conflict of interest. It would be very easy for the interests of the profit-maximizing cartel to become confused with the goal of sustainable development. OPEC has already created a separate non-profit group that is used to support developing countries. The OPEC Fund is in a very unique place to assist in the administration of monies collected from a sink tax. With some oversight from an international group, such as the U.N., it could be assured that the goals of the sink tax program were being met in an equitable and efficient manner. Yearly audits and other standard accounting practices administered by the U.N. could be used to quantify how much money was collected and how it was used.

As has been seen recently with both the Kyoto Treaty and the WSSD in South Africa, the international community is not always prepared to act in unison on matters such as sustainable development and environmental damage. In particular, the U.S. has done very little to curb their consumption of petroleum products and,

with their withdrawal from the Kyoto Treaty, there appears to be no immediate plans to do so. The sink tax would correct the market failure and force action on the U.S. without having to worry about complete international agreement on the issue. Market forces would then take effect, and, most likely, oil consumption and prices would become more realistic for a polluting, non-renewable product.

Once these market forces were in effect, local consumers would be hit hard with increased prices both at the gasoline pump and in products that relied on petroleum in their production process. Daly's model has most of the money from taxes flowing from the North to the South to be used in developing countries. Thus, American consumers would pay significant amounts of money that would not be spent for improvements in the U.S. Daly's proposal assumes that it is in the best interest of the less developed countries of the South to mirror the growth pattern that the countries of the North have exhibited. Unfortunately, all consumers of oil are contributing to the reduction of sink resources, and the only equitable solution appears to be one in which the consumers are helping to offset their own consumption.

Conclusion

The amount of data and prior research done on both OPEC and sustainable development is enormous to say the least. Because of time and size limitations, this paper is only able to touch on the issues presented. Given more time, the researchers would have tried to explore ways of quantifying the sink market. They would have also liked to explore the ethical considerations prompted by the apparent inequity in the relationships of developed nations who consume oil and undeveloped nations who produce oil. The researchers also recognize that Daly's suggestions for OPEC monopolization and the creation of a sink tax to spur sustainable development would cause a raise in price and a drop in demand for oil. This is in direct conflict with OPEC's own stated vision: "We need to invest in oil exploration and development in order to have production capacity available as demand rises in the years ahead, but we also need to be sure that there will be enough demand for that oil and that we will get a reasonable price."

Given this, does OPEC have the power to implement measures to enact the concept of sustainable development? The researchers believe that in the current market OPEC does not have the power to

implement Daly's proposal for sustainable development nor is it feasible or ethical for them to do so. Economic analysis of OPEC's power in the oil market clearly shows that OPEC does not have the total control necessary to enact Daly's proposal. Because of OPEC's stated economic goals, backstop technology, and OPEC Fund's role as a loan broker, Daly's proposal lacks feasibility. Finally, the ethical concerns that arise from such a proposal make it impossible to implement. These concerns include the conflict of interest of OPEC acting as a global fiduciary and Daly's assumption that the South should mirror the development patterns of the North.

Using this paper and its conclusions as a starting off point, there are many avenues for future research to explore. The issues of gender equality and wealth distribution in OPEC nations are prime examples. Given that oil is the primary factor in GDP for many of the OPEC nations, it would be interesting to examine how the measures discussed in this paper would affect local culture. There are also obvious environmental issues that could be further explored such as sink resources and renewable energy resources.

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