Oil – Revenues and the Intergenerational Equity in OPBC-Core Countries

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OPEC-Core Countries are the OPEC member nations most dependent on oil revenues . They are Saudi Arabia, Kuwait, the UAE, Libya and Qatar. These countries are .faced with a number of economic problems such as economic backwardness and dependence on a single export commodity (oil). They also have to decide on important issues such as inter-generational equity. This article discusses the options available to OPEC-Core producers concerning the division of oil revenues between oiland non-oil generations.

The discovery of oil reserves in an economy is a form of windfall, and it raises the of revenues and

question the of oil uses inter generational Discovering generations.Nation is partially equity.Obviously one option is that allocate various the generation oil reserves consumes all revenues, leaving nothing for future Although this is a purely theoretical conjecture, since no on earth would exploit a non-renewable resource in this manner, it happening. All OPEC Countries, varying to degrees, do part of their oil revenues to subsidies current consumption using means and methods. than for investment, could be justified (in terms of profitability only) if Oil production for our rent consumption, other present investment of an extra $1 will produce a future consumption stream with the purchased consumption value, 1$which implies of course that of the producer's good with this extra dollar also has the same value present as good.1$sold for Under these conditions society is Indifferent as to whether it gets a little more consumption or a little more investment [Little and Mirrlees 1980.

The effect on the development of the economy of purely consuming the natural resource is apparent. This act, apart from the effects of immediate satisfaction, does not lead to economic development in the sense of creating a diversified economy. The absence of capital formation means that this non-renewable resource is being exhausted without actually being replaced by an economic base for the production of goods and services. This state of affairs would resemble the case

of a man who sells his only house and consumes its value rather than subst-ituting it with a productive asset to act as a source of continuing income. To take an extra example, imagine a country like Libya, producing oil and spending all the oil revenues on imported consumer goods, non-productive public works, and salaries of government el1lployees. No part of the oil revenues is invested in productive projects which can act as alternative sources of income in the In this case, in the absence of any endeavour for economic development, the Libyan society will collapse to the state of a subsistenc ~economyas soon as the oil resource base is depleted.

Absence of capital formation is not the only problem facing this policy. Lack of inter-generational equity is another proble11. This policy would allow the consuming generation to enjoy the total utility of this consumption while in the meantime denying it to other generations. Social welfare can be judged to be a function not only of utilities of the individuals who are members of society at present, but the utilities of all future members of society as well (Pigou 1948).

Hence, the strict allocation of oil revenues for current consumption does not help the process of economic development, and ignores the rights of future generations to consume part of it. OPEC-Core countries (the nations Amount of oil revenues allocated for that current consumption which is most dependent on oil revenues) are the sole owners of their oil resources.

They are fully responsible for the design of their oil production policies and for the disposition of their oil revenues. They are expected, therefore, to avoid wasteful use of this resource, and to minimize the socially uneconomical.

One way of. taking into account the interests of future generations is to consider Rawls' rules of a just society [Rawls 1972), especially his max-min criterion. He suggests that we can gain insights into the nature of justice by envisaging individuals behind a.' veil of ignorance' drawing up an agreed contract or set of rules for the operation of a just society. Since individuals cannot know the characteristics of the state into which they will be born, or personal characteristics such ascolor, sex, intelligence and so forth, they will have no incentive to make choices in favor of narrow personal interests (since they will not know what they are). Personal interests can be pursued only by agreeing to just rules for the conduct of society. One of the important rules which Rawls asserts would be adopted is the max-min criterion for assessing the justice –of inequality. He argues that inequality in the distribution of wealth or utility is justified only if it is a necessary condition for improvement in the position of the poorest individual or individuals.

Given various states of nature and various courses of action that could be taken, the max-min principle dictates that we. should first observe all the minimum

pay-offs and then select the highest of these. Referring to matrix1 to use the maxim in principle we circle the minimum pay-offs from each course of action. Then we select the highest minimum pay-off . This is 4 and entails that we would select course of action 3. (Pearce 1983).

Course of action

Course of action	State of nature			
	1	2	3	4
1	②	5	②	5
2	1	④	1	5
3	5	2	6	⓪
4	1			7

Pawls' max-min criterion

Matrix 1

In other words, if social welfare, W, is to be written as a function of Utilities U1' ....Un' then Rawls argues for the particular function $W=$ min(u1'.….. Un)' so that maximizing social welfare amounts to maximizing the Smallest Ui. This welfare function is sensitive only to gains and losses of utility by the poorest person It should be clear that we hold to the standard assumption that at each instant of time consumption is shared equally by the population of the moment The only equity problem that arises is that between instants of time (i.e "generations.")

According to this criterion, Solow [!974] argues that if consumption per head were higher for a later than for an earlier generation, then social welfare would be increased if the earlier generation were to save and invest less, or to consume capital, so as to increase its own consumption at the expense of the later generation.if Consumption head were higher for an earlier than for a later generation, then social welfare would be increased if the early generation were to consume less and correspondingly, save and invest more, so as to permit higher Consumption in the future Thus the max-min principle tells us that consumption per head should be the same for all generations

Suppose population is constant and there is no technical progress then the max-min criterion implies constant consumption per head and keeping the value of oil reserves constant If P is the price per unit of the

resource and R the total reserves, then the criterion calls for a consumption of $Co = rp_0R_0$, where r is the rate of interest Thus one option is to draw enough oil from the ground so as to maintain that level of consumption If the price of oil rises at the rate of discount, then

$Pt = Poe^{rt}$

and $Rt = R_0e^{-rt}$

Then $PtRt = poe^{rt}R_0e^{-rt}$

$= P_0R_0$

This is a feasible strategy for a marginal producer where he can keep a constant level of consumption over time at lower rate of depletion. This case is shown graphically in Figure 1 below.

Now population N is growing at a rate n, then suppose consumption per head (c) is:

$Co = Co/No = (r-n)P_0R_0 = (r-n)t$

Now $R_t = R_0e$

$Pt = P_0e\ P^{rt}$

$Nt = N_0e\ N^{nt}$

So $Ct = (n-r)RtPt/Nt = (n-r)R_0e^{-(r-n)t}_{po}e^{rt}/N_0e^{nt}$

$= (n-r)R_0p_0/N_0$

and $P_t\ Rt_. = R_0 - (r-n)t_{p_0}^{rt}$

$P_tR_t = P_0R_0e^{nt}$

Even though the value of reserves increases due to increase in the population, as shown in Figure 2, consumption per head is decreasing. Here the max-min rule, as Solow 1974 put it: the initial generation should invest only enough to provide capital for the

increase in population, over time, at the initial capital-lab our ration. However, an economy can do better than that. Leaving oil in the ground is form of investment. This a policy alternative entails Deferring production until some future time, This kind of postponement is one way of accomplishing physical conservation, and scarcely happens in practice in its pure form. That the act of physical conservation of the oil resource, or for that matter natural resource, is unjust to current any generations is very clear. This policy simply means depriving Those generations of the benefits that might to them as a result of accrue exploiting the oil resource

. However, since physical conservation invd0les abstention- from Production now, and exploitation by future generations, it is difficult to conceive how this policy is also not entirely favorable to future generations. It is true that the oil resource is being entirely shifted, in this instance for the disposition of future generations. This leads to increasing the utility of future generations at the expense of current generations. The desirability 0£ leaving oil in the ground should be judged in relation to the rate of return on alternative investment projects. MOreover, the advantage of investments other than keeping oil in the ground is that it benefits all varieties of technical progress. Here the following considerations are relevant:
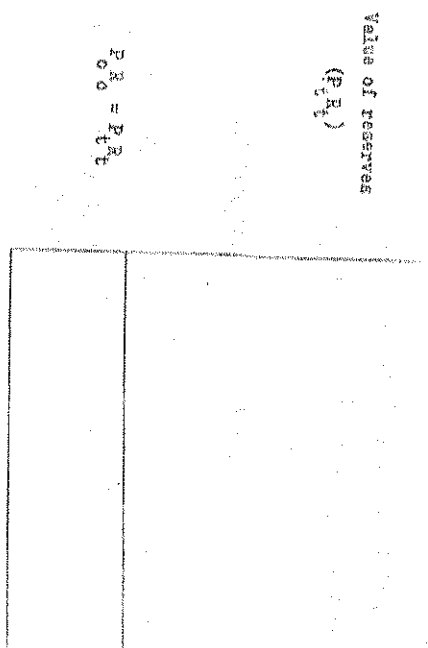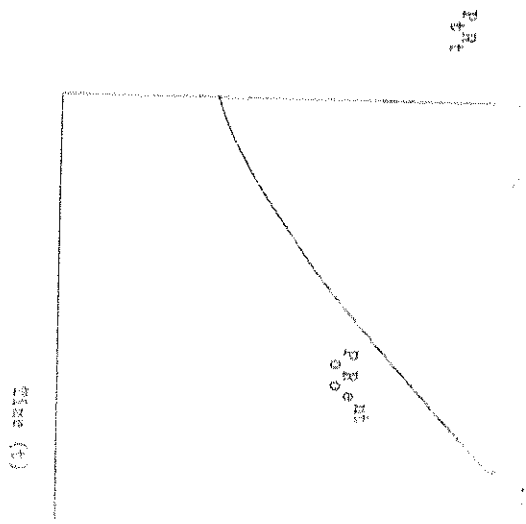
Figure 2

Figure 1

Value of reserves

$PA = QB = 0.0$

(PB)

مهمة العامل (الفائض)

(a) **Technical change**, in particular those which augment energy resources, would adversely affect the price of oil, thus the rate of return from leaving oil in the ground may well be less than what it would be in the absence of technical change. Moreover, a technical change which reduces the value of oil would also increase the rate of return on reproducible capital goods.

(b) Leaving aside the considerations of economic development, -the Uncertainty about the future course of oil prices calls for a diversification of investment. In general, the alternatives to keeping oil in the ground are: (1) foreign financial investment, and (2) domestic investment.

(1) **Foreign fiancial investment:**

Even though financial Surplus is subject to erosion in real terms, through the depredations of inflation and the depreciating dollar, investment. Abroad offers probably high rates of another option for diversified investment and probably high rates of return (badare 1988)

Moreover, domestic consumption and investment policies may suit a large Core Country like Saudi Arabia. This kind of policy may not be appropriate for smaller states with small populations, such as Kuwait or Qatar. In this case it might be wise invest oil revenues abroad as long as its profitability is higher than the expected of interest. The fact that the Core

Countries continue rate. produce oil at rates far above what is necessary to meet their financial requirements is a f Unction of their concern for the world economy rather than their individual interests. It shows a recognition they that own cannot develop within the context of a healthy world properly except but financial sacrifice less does make the that not any economy, unpalatable to public opinion in the countries concerned.

Another perhaps even more important lesson learned by the oil producers is the of development should not be the accelerated beyond that pace capacity to absorb it in a fruitful way, whether economically, politically or socially (Abusnina 1996). the oil producers, particularly the Cartel Core Countries, are coming to feel that their developmental transformation should proceed at a more measured pace, and cannot possibly be completed in the span of a few five-year plans

Besides physical or financial assets in the hands. of a host a country abroad are always subject to the risks of nationalization, expropriation freezing, or depreciation [the freezing of Iranian assets in the U.S.A., a the time of American Embassy crises in Iran, and freezing Iraqi assets before British – American in vetoing in march 2003. served as a vivid example of the vulnerability of these investments.[On the other hand, for a private investor who is not concerned with economic development non-pecuniary benefits are

immaterial to him and. he is always willing to invest abroad if the rate of return is worth the risk.But it must be mentioned here that I do not consider as "investment abroad" any investment carried out within a single family of countries which are seeking economic integration and eventually unity, such as investment in the Arab Countries However, besides the accruing pecuniary - benefits domestic investment yields significant non-pecuniary benefits in the form of external economies, while investment abroad yields pecuniary benefits only.

(2) Oil producti.on and ~stic investment of oil revenues:

Now production for immediate satisfaction by consumption does not provide any future satisfaction physical future generations, to and complete conservation ignores the welfare of the present generation. An alternative policy, (bearing mind the problems of investment abroad)is domestic investment which transforms the natural resource into physical and human capital for the benefit of present and future generations. For this reason I will assume at this stage that domestic investment needs provide the Cartel-Core Countries with the least production level (floor Production).

This will vary with the price level. If the investment requirement is lt

and the price level Pt' floor production is defined by q = lt/pt.

The production at the level of domestic investment (as a lower bound.) Together with the maximum attainable capacity (as a higher bound) Constitute the limits of which OPEC-Core and OPEC as whole can be a stabilised.

Governments can reduce aggregate private consumption, and thus increase savings, by taxation. On the other hand, taxation has administrative and political costs so perhaps i t is money in the hands of the government which should be considered to be more valuable than private consumption.

This view is strengthened by the fact that a rational government should see that the value of its expenditure at the margin is equal in all lines, whether it be defence, agricultural extension, education, or investing in industry.

The most socially acceptable policy in Core Countries (Saudi Arabia, the UAE, Kuwait, Libya and Qatar), is to produce oil at the maximum absorption capacity level. - Some economists such as Usa Teece and gerltin [1982] adopted this view to formulate their models of OPEC behavior.Oil production and investment of oil revenues should serve as a basis for formulating government policies concerning the utilization of oil in opec Countries. The reason is that this policy serves best the interests of present and

fut~re generations on the hand, and acts as the prime initiator of economic development in these countries on the other [Zainy 1981.[

To illustrate he connection between oil production and absorptive capacity in a Core Country, let us examine Figure 3.First, Figure 3 (a) shows a graphical relationship between aggregate investment (I) in one year and the corresponding social rate of return on investment (r) in that year. The period -of one year is taken arbitrarily. The social rate of return is a function of many variables such as investment level (I), labors

supply (L), technology (T), management (M), etc. In functional notation: r = f(l, L , T, M. . . ,.) As the investment level is raised, putting further strain on the other input variables which are assumed to be fixed during this period of time, the rate of return after a certain investment level starts declining. this is in effect the law of diminishing returns or variable proportion. The graphical relationship between r and I is a curve with a negative slope indicating declining rate of return with higher investment. Each additional amount of investment has a corresponding rate of return. If the socially acceptable rate of return is r1' then the allowable level of investment in that year is I1. Any further investment beyond I1 will be socially unprofitable. However, if the socially acceptable rate of

return is lowered to r2' the level of investment that can be absorbed profitably in that year will increase to I2.

Figure 3-(b) shows the level of aggregate invest Eli:. in a particular year and amount of oil production Q in this year reqrired to finance this the investment. The

Figure 3 —b Aggregate investment versus social rate of return
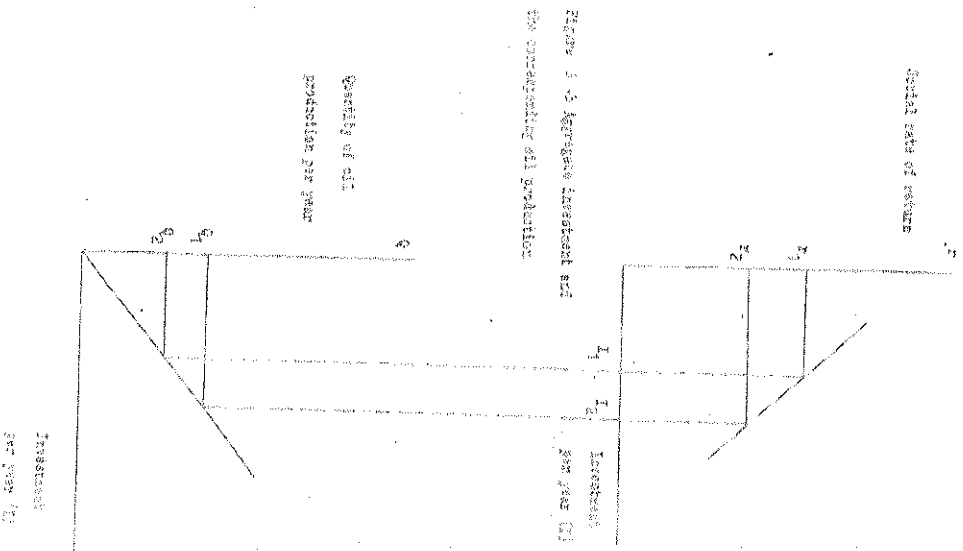
curve is a straight line passing through the origin

Assuming fixed oil prices during the year (this assumption is only to simplify the presentation of the argument) , and that oil is produced only to finance investment. If investment levels I1 and I2 from Figure 3-(a) are projected on Figure 3-(b) , the corresponding required amount Q1 and Q2 of oil production can be determined .

If an OPEC-Core country can market as much oil as it produce, the proposed scenario of oil production as constrained by investment requirements will be the following. suppose the socially acceptable-rate of return is r1 as in Figure 3-(a) . any investment more than I1 will entail a social loss corresponding to what additional costs might have been avoided by the country had the amount of investment been I1 and not more ,

The optimum amount of investment which maximizes the social benefits of the country is I1. Thus there is a maximum capacity of the country to absorb investment capital , commensurate with a specified acceptable social rate of return . The corresponding optimum oil production rate will be Q2.

Considering the option of producing oil at the leg-el of domestic Investment only is also unrealistic because target revenue does not depend on

target investment . Target revenue depends on the price of oil which is a function of world supply and

demand for the commodity. When demand exceeds supply, oil prices rise. Word oil producers, especially OPEC-Core, would be better off; there would be large revenues for both consumption and investment. Conversely, if supply exceeds demand and the price fall, it will not be easy for OPEC-Core Countries to manage consumption and investment. The degree which they would suffer depends on the new level of output to and prices.

However, the oil market not supply and consequently oil prices do not actually depend on a single country's production policy. They are rather an outcome of different oil producers' policies. At the present time world oil producers seem to produce more oil than the market needs. The lack of coordination and cooperation between the coin unity of oil producing countries has eventually resulted in lower prices. Such behavior would make planning for present consumption and investment a hard task for the authorities in OPEC-Core Countries. Furthermore, it would be even harder and uncertain to plan for future generations. Thus the distribution of oil revenues between present and future generations depends, to a great extent, on uncertain oil prices. Therefore, the OPEC-Core Countries must carefully ration their consumption and avoid committing themselves to large scale projects which require huge capital and continuous government subsidies. Small and effective

projects seem to be a convenient option for such countries.

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