

"ROLE OF LONG TERM OIL PRICES
IN THE ENERGY TRANSITION PERIOD"

by

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Since Professor M. Adelman's prediction, in the early sixties, that the price of crude oil in a competitive market should tend towards a dollar a barrel, a lot of things have changed! The successive events that took place during the 1970 decade literally nullified this kind of prediction; nowadays the average price is at least thirty times higher than the predicted dollar a barrel.

However, despite these deceiving predictions, reducing uncertainty concerning future oil prices remains a necessary objective especially during the energy transition period the world will go through during the next twenty years.

The general ideas I would like to set forth today have no other goal than to once again set this important problem, the solution of which will bear considerable effects on the success or failure of an orderly, predictable and least cost transition from the oil era to the alternative energy sources era.

I shall successively stress the following three points:

a) the role of long term oil prices during the energy transition period;
b) the shortcoming of the theoretical market model to settle this problem and c) the necessity of a negotiated agreement between consumer and producer countries and the basic conditions of such an agreement. The very nature of my allocution pushed me to limit as much as possible the technical and theoretical developments.

1) Effects of the uncertainty in long run prices

It is now widely agreed upon that the world is entering a transition period, the goal of which is an orderly substitution from conventional oil to other sources of energy. If possible, these alter-

native sources have to be renewable, non-polluting, economically profitable and geo-politically diversified.

Of course such a transition has many conditions and constraints and cannot be operated in the short run; thus, conventional oil will remain a necessary fuel and input for hundreds of industries for quite some years yet.

If we accept for a moment not to be obsessed by the conjectural surpluses in supply existing on today's market and thus if we accept not to be obsessed by present world prices, two structural realities come to attention. First of all, oil production from the existing easily accessible and economic fields is superior to new discoveries with the same characteristics. In fact, to oppose the existing tendency of diminishing reserves, oil is discovered in places and depths never reached before and secondary recovery in existing wells is becoming an important source of energy. Of course all this is costly and necessitates new exploration, development and recovery technologies that are not always in tune as yet. Secondly, the production of energy from alternative sources requires a long adaptation period and considerable amounts of investment. In other words, two constraints, time and money, are greatly responsible for the delay in the commercialization of these substitutes. For example, a nuclear plant requires a period of eight to ten years before going into production; an oil field, six to ten years; the production delay for solar energy is undetermined. Moreover, the huge investments that were planned for energy production from alternative sources (nuclear, tar sands, coal, shale,...) are also delayed often because of a lack of financial availabilities.

In spite of the importance of technical and ecological constraints, the essential reason to these delays is the uncertainty concerning the future evolution of crude oil prices. The role of these prices and their effects on the future energy market can be summed up as follows:

- a) first they have an effect on the investment decision itself. Investment in energy projects as in most big projects do not obey basic economic principles for they are lump and not marginal investments. In other words, an investment to build a nuclear plant cannot be made in successive portions that reflect economic profitability as compared to other sources of energy. On the contrary, today's relative prices and expectations of tomorrow's are the very basis of these lump investment decisions. Once such a decision is taken, there is no way to back out.
- b) Secondly, because of these effects on investment, private companies hesitate to make and even give up the decisions to invest important sums in the medium and long run without first having an insurance on the profitability of these investments. But profitability is directly linked to future oil prices. As long as this price remains unknown, it would be amazing to see enterprises change their mind and actually engage in prospection, development and production of alternative energy sources.
- c) Thirdly, it has to be recognized that replacing private by state owned companies does not resolve the risk problem brought about by uncertainty concerning future prices. If state owned companies accept the risks the private companies refused, the taxpayers would have to bear such a risk without any guarantees of success.

d) Fourthly, uncertainty prevents the producing states from planning production, in other words chose an optimal depletion rate, in a rational and predictable way. This planning problem is in itself an additionnal disturbance in an already much disturbed market, and reinforces the dependence of production and supply levels on conjec-tural and/or non economic variables. This has been the situation for the past ten years. Small wonder then that the crude oil market is so sensitive, problematic and even dangerous.

e) Finally, it has to be underlined that this uncertainty is more responsible for inflation than the periodic hikes in oil prices. The role of inflationist expectations on current levels of inflation is well known. The strategic and central role of oil in national production and the expectations of higher prices are responsible, through a well known mechanism, for the inflationist move.

To sum up, uncertainty concerning future prices in-troduces additionnal disturbances in the oil as well as alternative energy markets. These disturbances are such that the transition pe-riod may well emerge on a heavier crises than the previous ones in-stead of bringing about a gradual, orderly and profitable change towards new energy sources.

2. Necessities and limits of a price agreement

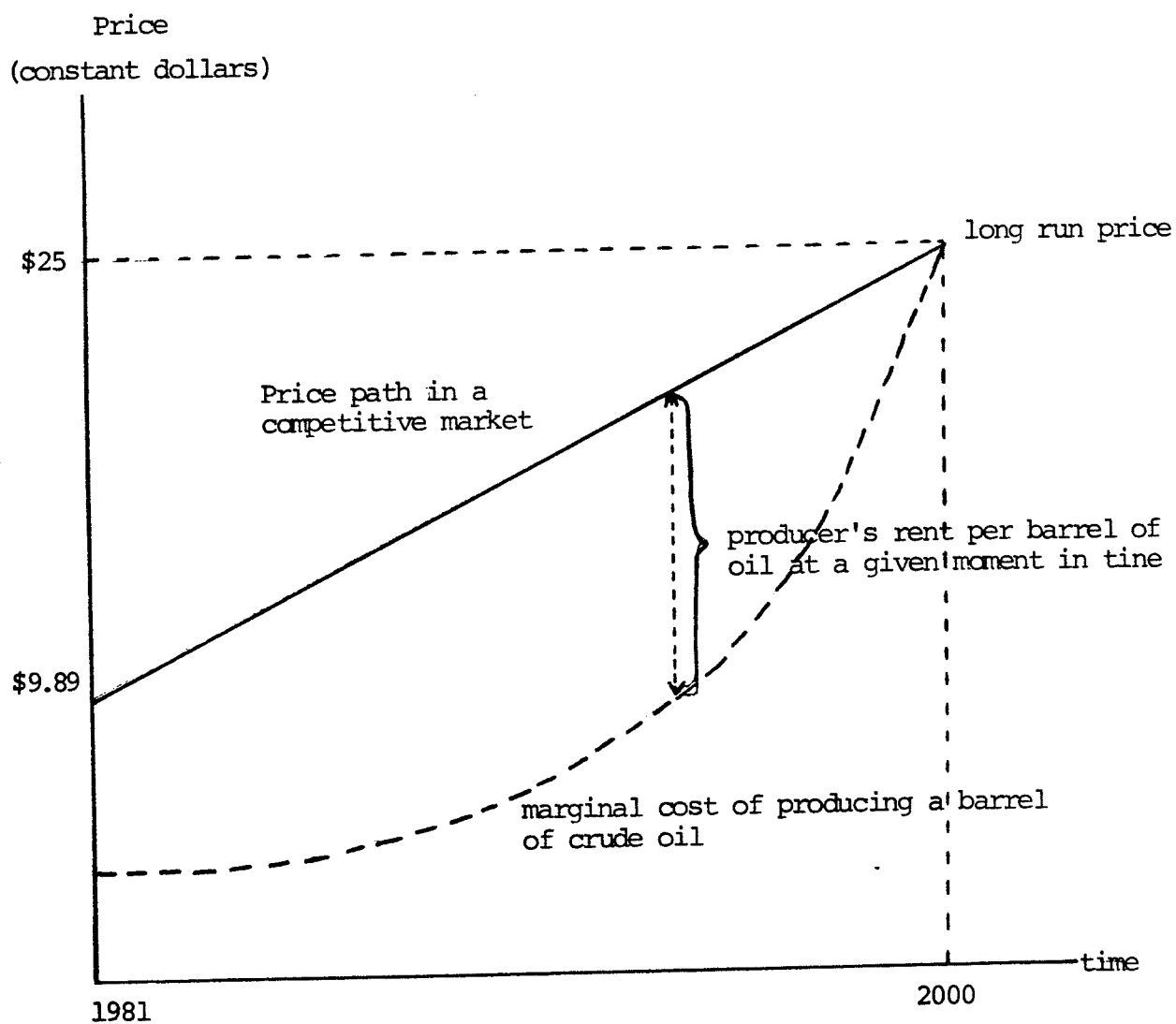
Since the role of oil prices in the long run is so im-portant, how can they be determined? Two global methods are available. The first one, although theoretically elegant, suffers a feasibility drawback: it is the competitive market solution. The second method is theoretically difficult to formulate yet it is the most realistic

approach: a voluntary agreement between consumers and producers.

I shall explore the second approach but let me first sum up the bases and limits of the competitive market approach.

2.1 Price determination through the competitive market

The market model is based on two general propositions: one is the determination of long term prices, and the other is the linkage of that price to present market prices through a mechanism that will lead present day price to long run ones within a given time period. The following figure illustrates those two propositions:



The underlying hypothesis of this model are:

- 1) the evolution of oil demand is determined by the world economic growth rate and progressive substitution towards other energy sources;
- 2) a uniform price of \$25. per barrel of oil equivalent will be reached on a 19 year time bargain with a complete exhaustion of reserves at that time (year 2000);
- 3) a real discount rate (corrected for inflation) of 5%. Under these hypothesis and in a competitive market, today's price should thus be $\$25./ (1.05)^{19}$ which is approximatively \$9.89. This price is higher than marginal cost of producing a barrel and will thus create a producer's rent, the "reward" given to a producer to compensate for scarcity. Today's price would slowly and gradually rise to reach \$25. in 19 years at which time reserves will be entirely depleted and substitutes will be available on the energy market.

As can easily be seen, this model is not a feasible solution for the following reasons:

- a) at the present time, no time bargain exists for crude oil and one cannot without difficulty imagine that such a market will exist in the near future be it for oil or substitute sources of energy. The idea of creating such a market to erase uncertainty for both consumers and producers had already been set forth a few years ago. However, the enormous difficulties of creating and operating such a market nullified this proposition.
- b) A second fundamental hypothesis underlying this model - perfect competition - is also very strong since elasticities of supply and demand for this product are very low and constant at least in the

medium run. As a matter of fact, many authors doubt that a competitive market can be efficient in the case of such a strategic sector as energy production and distribution.

c) if, notwithstanding the objections hereabove raised, a competitive market could exist and would be the best type of structure for the efficient allocation of scarce resources through time and between alternative uses, such a market does simply not take into account such goals as energy independence, national sovereignty and accelerated development of producing countries. And these are the variables that dominate and shape the present oil market.

2.2 Price determination through a voluntary agreement

If, as we saw, the market cannot in practice determine the path of future oil prices, the only possibility left is a voluntary agreement negotiated between the consumers and producers. Such an agreement to be successful has to be included in a more global project concerning the exploration, development and production of alternative energy sources.

A rapid examination of the particular situations of OPEC, industrialized and less developed countries should show some real complementarities that may become mutually beneficial through the creation of an "energy triangle".

OPEC countries have to take advantage of their oil rents for they are not eternal and they will insure that future generations will have, if not the same, at least comparable incomes. This is called intergeneration equity of justice and does not go against economic rationale. It is thus normal for these countries to plan the post-oil

era especially since they often dispose of financial assets far greater than their capacity of absorption. Those assets, presently more or less profitably invested in the international financial and banking markets, could well become a powerful element of this triangular cooperation. They could be invested in exploration and production projects for less readily accessible oil fields as well as in research and production projects for substitutes. Accepting to invest those assets would so to speak lengthen the lifetime of the economic rent the producing countries perceive today in compensation for the depletion of their domestic oil reserves.

The industrialized countries face two problems. First, huge rises in their oil bill compelled them to make some economic adjustments that lessened their capacity to invest in the short and medium range. On the other hand, in order to find a solution to their energy problems, enormous investment in research projects on alternative energy sources have to be made. But the financial assets are not available. Industrialized countries however possess an impressive technological know how capable of taking up the future energy challenge. Financing these projects at least in part, with OPEC's petrodollars would lighten the short and medium term economic adjustment burden of the industrialized countries whilst allowing them to make the necessary investments today. No need to add that the implementation of such projects will also have overall positive effects on their economies, especially on unemployment and inflation.

Finally, in most cases, the IDCs offer appreciable energy potentials (solar and hydroelectric energy but also gas and oil)

but they lack financial assets and technology to take profit of their situation. More than anywhere else, production and consumption of national energy sources would lighten the burden of balance of payment deficits, diminish debts and stimulate the economy.

I think this rapid overview of the particular situations of these three groups of countries is sufficient to suggest that the long term price determination of oil problem, notwithstanding the technical and practical obstacles, can be solved through negotiation. However, energy group of countries will have to be convinced that the energy transition phase cannot be successful without this mutually beneficial cooperation.