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AND INTERNATIONAL ECONOMIC STABILITY

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The Oil-Transfer Problem
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The recent increase in oil prices has had a profound impact on the international economy. Never before except in major wars has such a rapid change occurred in the structure of world trade and payments. Severe effects have been felt in the oil-importing nations in the form of aggravated inflation and unemployment and direct income losses. Furthermore, the inability of the oil producers to increase their absorption of goods and services as rapidly as their revenues means that, in the short term at least, much of the transfer from exporters to importers of increased oil income must take the form of increased lending rather than increased purchases of goods and services.

The resulting large current-account deficits of the oil-importing countries have given rise to fears in many quarters that the international financial consequences of the increased oil prices cannot be handled. Numerous commentators have expressed despair about both the potential havoc to international financial markets from the large accumulation of funds by members of the Organization of Petroleum Exporting Countries (OPEC) and the "hopeless" situation of oil-importing nations, which must struggle to finance their oil deficits and pile up ever-mounting debts that they can have little hope of repaying. Such commentators have frequently concluded that international financial chaos will be the inevitable result of maintaining current levels of oil prices. More optimistic observers have predicted that the inability of some consuming nations to meet high bills for oil at current prices will prompt them to impose restrictive measures that will force down oil prices.

In this essay, I argue that these "optimistic" and "pessimistic" analyses are both incorrect, for the same two reasons.

First, the accumulation of oil debts does not substantially undermine the ability of oil-importing nations as a group to pay them off when payment is required. In the aggregate, the condition obliging these nations to pay their debts—an OPEC current-account deficit—will also allow the payment to be made. On a per-country basis, the prospective accumulation of oil debt will not exceed proportions of exports and gross national product (GNP) that have frequently been experienced in the past without undermining the economic vitality of the capital-im-

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porting nations, creating insurmountable problems of debt servicing, or eroding the confidence of foreign investors.

Second, over the longer run it is quite possible that lower oil prices will lead to *higher* rather than lower current-account imbalances between oil importers and oil exporters.

Neither of these arguments is inconsistent with my personal view that oil prices are much too high for the interests of both oil exporters and oil importers. But this argument must be founded on basic economic grounds, not on balance-of-payments and international financial effects. It is true that oil is a nonrenewable resource, so that efficient pricing would incorporate a shadow cost or rent over and above the physical cost of production. Yet, even under conservative assumptions about the future demand and supply of oil, this scarcity premium does not fully justify the level of pre-October 1973 oil prices, much less the current level (see, for instance, Nordhaus, 1973). A benign view of the ability of the oil-consuming nations to deal with the international financial consequences of the oil-price increases does not, it should be stressed, imply a benign view of their real economic impact.

Sections 1 and 2 of this essay develop my two arguments in some detail. Section 3 assesses the strategy of holding oil in the ground. Section 4 deals with the major complications that large oil transfers have caused for relations among the oil-importing nations. These are (1) the incidence of the oil tax on low-income countries, which cannot reasonably expect to be able to repay additional debt on commercial terms; (2) the financial and exchange-market instability that could result from shifts of oil-producer funds from one market to another; (3) the potential inconsistency of current-account objectives among the oil-importing nations, which in the extreme could lead to a repetition of the trade wars of the 1930s, as nations seek to accomplish individually the restoration of current-account surpluses that are not collectively feasible; and (4) the possible need for official supplements to the private reshuffling of oil-producer funds to allow countries in a basically sound financial position to borrow at reasonable rates if private capital markets charge expensive premiums (i.e., "too far" above prime market rates).

1   Oil Deficits and Ability to Repay

The huge OPEC surplus exceeds the amounts that can in the short run be transferred to the oil-producing countries through the export of goods and services by the consuming countries. Since oil-exporting countries have no reasonable choice but to place their financial accumu-

lations abroad somewhere, an overall balance-of-payments problem will not arise for oil importers as a group. And, as OPEC absorption of goods and services gradually increases over time, more and more payments will be transferred in terms of goods and services.

Collectively, the oil-importing nations will need to make net repayment of their oil debts only as OPEC begins to run an aggregate current-account deficit. Although problems of ability to pay could arise for some countries, particularly the most seriously affected low-income nations, these are problems that are within the power of the oil-importing nations as a group to handle. In terms of the basic economics of the issue, the accumulation of substantial debt by oil importers to oil exporters need not undermine either the solvency or the liquidity of oil importers as a group. Under any realistic assumptions, the aggregate payment of these accumulated debts in real goods and services will be spread over many years. The aggregate need to pay will occur only as the conditions that allow payment develop.

The huge projected debt accumulations of the oil-importing nations as a group represent an episode that will be unique in historical experience in terms of the aggregate amounts of accumulations in relation to the size of the world economy. This does not mean, however, that it is correct to argue that such a development would be unmanageable and would inevitably lead to widespread national bankruptcies and bad debts. When considered on a per-country basis, the average levels of debt accumulation implied by the aggregate projections, while large, would not be outside the range of historical experience. Many examples can be found on a per-country basis of both larger transfer requirements and larger accumulations of international indebtedness in relation to national economic aggregates.

Increased oil payments during 1974 and 1975 are running on the order of 2 to 3 per cent of GNP for the typical oil-importing nation. For some countries, such as Italy and Belgium, the increased oil levy is, according to estimates of the Organization for Economic Cooperation and Development (OECD), in the range of 4 to 5 per cent of total domestic expenditure. Viewed as an international levy, even on a per-country basis, the increased oil payments are exceptionally large. For instance, Machlup (1964) has calculated that the financial transfers associated with German reparations after World War I, which stimulated so much international debate (as well as academic analysis of the transfer problem), represented 3.5 per cent of national income in their peak year (1924), and, for the entire period of 1924 through 1932, averaged only 2.5 per cent of national income. In terms of transfers of real resources or finan-

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cial claims, however, there have been many instances of greater per-country magnitudes. Chenery (1975) has pointed to U.S. Marshall Plan aid after World War II, although of course it represented a "voluntary" transfer. Machlup's analysis indicates that the ratio of U.S. foreign payments to national income over this period was on the order of 3 per cent, or roughly the same as the oil tax for a typical country. As a proportion of exports or imports, however, the U.S. transfers during this period were particularly large, representing some 60 to 80 per cent of the average of total U.S. exports and imports. By contrast, the increased oil payments during 1974 were on the order of one-seventh of world trade.

As another comparison, consider historical examples of large capital outflows. During the second half of the previous century, German and French capital exports averaged on the order of 1.5 and 3.5 per cent, respectively, of national output; British exports amounted to more than 7 per cent of gross domestic product for the decade 1905-1914.

Much of the initial transfer of claims in the past was financed by large capital inflows into the countries that had accumulated the debt obligations. This was the case, for instance, with French reparations after the Franco-Prussian War (see Haberler, 1936). Many countries have imported capital for long periods of time on a scale much larger than implied by the projections of typical countries' capital imports from the oil-exporting countries, without undermining the economic vitality of the capital-importing nations. It is sometimes forgotten that the United States was a substantial net importer of capital in the nineteenth century. United States capital imports reached a peak of more than 1 per cent of GNP during the 1830s. The large capital imports by Canada and Argentina (between 12 and 15 per cent of GNP) are well known. Between 1860 and 1900, moreover, annual Australian capital imports amounted to between 3 and 10 per cent of GNP. Similar ratios held for Norway, Sweden, and Denmark during the latter part of the 1800s, while for Japan a peak ratio of 4 per cent was recorded for the decade 1897-1906. (For greater detail on capital flows, see Kuznets, 1966.)

Nor were such experiences limited to the previous century. As Chenery has recently argued, it has been quite normal in the post-World War II period for developing nations to finance 20 to 30 per cent of imports through foreign borrowing for periods lasting twenty years or more, and service on their external debt often rises to 20 or 25 per cent of exports without jeopardizing their economic prospects or ability to repay.

Even making extremely generous assumptions about rates of interest and the magnitude of OPEC financial accumulations, interest payments

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on OPEC funds are unlikely to exceed 5 per cent of world trade, even at the peak of OPEC financial accumulations. Assuming amortization of the full debt to OPEC over a twenty-year period, the average country would incur a maximum ratio of oil-related debt service to exports on the order of 10 per cent or less.

Moreover, there has been a growing consensus among economic forecasters that the financial accumulations of the oil producers will not reach some of the huge sums predicted last year. Among the most publicized of last year's more pessimistic estimates were those by the International Bank for Reconstruction and Development (IBRD) in July 1974, which projected total OPEC financial accumulations of $653 billion for 1980 and $1,206 billion for 1985. Estimates such as these were disquieting not only because the projected accumulations were so large but also because they were expected to continue through the 1980s. Part of the reason for the large size of the IBRD estimates is that they were expressed in current rather than constant dollars. A deflation of these estimates to 1974 dollars reduces the $653 billion figure to approximately $400 billion.

In an article in the January 1975 issue of *Foreign Affairs*, Hollis B. Chenery, Vice President of the IBRD, presented an estimate of financial accumulations appreciably lower than the original IBRD results. The lower figure resulted from adjustments to the original IBRD estimates to take account of higher-than-anticipated absorptive capacity in the OPEC countries. Chenery foresaw the restoration of approximate current-account balance by 1980, with OPEC financial accumulations reaching only $300 billion in 1974 dollars.

A number of other recent projections (some of which are summarized in Table 1) have been considerably lower still. The increased respectability of these substantially lower projections led me to attach greater probability to the lower range of projections presented in Table 1. By the spring of 1975, my own estimates of the most likely range of OPEC financial accumulations had been broadened from $200-$250 billion to $175-$250 billion in 1974 dollars. (The methodology and details of my projections are presented in the Appendix.)

According to newspaper reports, more recent projections by the IBRD staff have also lowered the estimates of total OPEC financial accumulations in 1980 to the $200-$400 billion range in current dollars. Taking the deflator implicitly used for the earlier IBRD estimates, this converts to around $120-$250 billion in 1974 dollars.

Considerable publicity has also been given to a study by Walter J. Levy that is extremely critical of the "new wave" of low projections. Levy's

TABLE 1

PROJECTIONS OF 1980 OPEC FINANCIAL ACCUMULATIONS
(*in billions of dollars*)

	Current Dollars	Constant 1974 Dollars
Hollis B. Chenery (January 1975)	n.a.	$300
Edward R. Fried (1974)	n.a.	152
EXXON (Spring 1975)	$330–380	200–240
First National City Bank (June 1975)	189	141
IBRD (July 1974)	653	approx. 400
IBRD (July 1975)	200–400	120–250
Irving Trust Case I (March 1975)	248	158
Irving Trust Case II (March 1975)	22	14
Walter J. Levy (June 1975)	449	286
Mobil Oil (Spring 1975)	303	178
Morgan Guaranty (January 1975)	179	114
OECD (July 1975)	n.a.	215
Thomas D. Willett et al. (January-May 1975)	n.a.	175–250

judgment, which I share, is that projections in the $100-$150 billion range for 1980 accumulations are probably unrealistically low. It is interesting to note, however, that even under Levy's new "pessimistic" estimate, 1980 accumulations would still be less than $300 billion, or roughly the same as Chenery's January 1975 projection. While projections of this order may underestimate both the price responsiveness over time of the excess demand for oil imports and the capacity of the oil-exporting countries to increase their own imports, they do not appear beyond the bounds of possibility.

Based on the range of projections now available, it seems likely that if the real price of oil is maintained at approximately 1974 levels, total OPEC accumulations by 1980 will be somewhere in the range of $125-$300 billion in 1974 dollars. Accumulations are unlikely to prove substantially higher in real terms by 1985 than by 1980, and there is a good chance that they will even fall below the 1980 level.

To understand the impact that OPEC accumulations may have, it is helpful to compare them with the size of financial markets in the countries receiving OPEC investments. The value of stocks, bonds, and short-term securities in the major national and international financial markets was about $3 trillion in 1972 dollars at the end of 1972. According to OECD data, the value of securities in U.S. financial markets accounted for roughly three-fourths of the total, or $2.2 trillion. The estimated size of major world financial markets in 1974 was $3.6 trillion.

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If the major world financial markets grew at an annual rate of 10 per cent in nominal terms, and if this nominal value is discounted for inflation at a rate of 12 per cent through 1976 and 7 per cent in the 1977-80 period, the value of the world's financial markets would be $3.8 trillion (in 1974 dollars) in 1980. Since new issues in U.S. financial markets are a much smaller percentage of total new issues than the relative size of the U.S. financial markets would suggest (only 37 per cent in 1972), the U.S. share would decline to about 70 per cent, or $2.7 trillion.

If OPEC accumulations reached $250 billion in 1974 dollars by 1980, they would thus amount to less than 7 per cent of the total value of securities in the major national and international financial markets. For the United States, the relative size of OPEC holdings would almost certainly be considerably smaller. For example, if OPEC invested 20 per cent of its total accumulations in the United States, its holdings would amount to 1.5 to 2 per cent of total U.S. financial markets. As a reasonable upper bound, assume that OPEC invests one-third of its accumulations in the United States (almost twice the proportion for 1974), and that these accumulations are on the high side, say $300 billion. Under these assumptions, the resulting $100 billion OPEC investment in the United States would amount to only 3.6 per cent of the value of U.S. securities in 1980.

Even if U.S. financial markets grew at a much slower rate than projected above, OPEC holdings would not rise substantially above 4 per cent of the value of U.S. securities in 1980. In fact, even in the most improbable event that all OPEC financial accumulations were placed in the United States, they would still amount to less than 10 per cent of the size of U.S. financial markets. For other OECD countries, the relative size of OPEC holdings would be much greater. If 70 to 80 per cent of OPEC funds went to OECD countries other than the United States, OPEC accumulations of $250-$300 billion in 1974 dollars would amount to about 16 to 20 per cent of the value of securities in these financial markets—a high but not overwhelming proportion.

In reality, whether the current-account imbalances and accumulation of financial assets are largely terminated by the late 1970s or continue until the late 1980s will not influence the ability of oil importers to pay off the accumulated debt. In the aggregate, the oil-importing countries will have to pay off the debt only as OPEC begins to run a current-account deficit. It is, then, relatively unimportant to determine when the debt will "come due" for the importing countries as a group. It is a mistake to apply conventional banking standards to this global problem. If the oil-importing countries were going to have to pay off all this

accumulated debt in a single year or two at some time in the early 1980s, the bad-debt analogy might apply. But this seems a most unlikely scenario. It is much more likely that the aggregate accumulated debt will be paid off gradually during the 1980s, and this will not present an impossible situation in terms of ability to pay.

If governments in the oil-importing countries wish to help lessen the future burden that this repayment will place on their citizens, they should encourage greater domestic savings and investment now, to generate the additional capacity to make future payments in real goods and services and to spread more evenly over time the burden of consumption cuts. There is no need for such additional real domestic investment to be financed directly by OPEC funds, as has been implied in some recent analysis. Given the high degree of fungibility of capital, the effects of capital imports on total domestic investment will depend in many nations much more on domestic entrepreneurship and national micro- and macroeconomic policies with respect to savings and investment than on the particular form of capital flows.

It might be objected that the previously mentioned historical episodes of successful experiences with large capital flows are not appropriate analogies to the current accumulation of oil funds, because the historical flows were typically privately motivated and went directly into productive investment. Such objections do not seem appropriate, however. Even when the capital flows went directly into productive investment, these investments were not always of the type that directly expanded future exports. Capital inflows reflect a future claim on a country's economic capacity to produce. For a nation to use these funds to expand capacity, thereby to discharge that claim when it comes due, it is not necessary that the capital imports be employed directly in real investment. Through the fungibility of capital, a placement in government securities, for instance, can lead indirectly to an expansion of private investment as a result of reduced pressures on the aggregate capital market. Even using inflows of oil funds to finance current consumption would not undercut the ability of the economy to make future repayments in real goods and services. It *would* mean, however, that a disproportionate share of the real burden of transferring goods and services abroad to pay for current oil imports had been shifted forward to citizens in the future.

2 Oil Prices and Current-Account Balances

In the preceding section, it was argued that the large current-account deficits projected to result from oil payments need not undermine the

creditworthiness of the oil-importing nations as a group and should not imply insurmountable transfer problems, even though the magnitude of the effective tax levied by the increased oil prices is without historical precedent on an aggregate basis. In this section, it is further argued that large current-account deficits would emerge even if oil prices were cut substantially. The analysis of projections of oil imports over the medium and longer term under different price assumptions indicates that concern to avoid large current-account imbalances and financial accumulations by OPEC does not provide a motive for the importing countries to seek oil-price reductions. Analysis of such projections does, however, suggest another powerful rationale for oil-price reductions: the longer-run economic self-interest of the oil producers.

Over the short run, both world demand and the non-OPEC supply of oil are extremely inelastic. The oil-price increases have unquestionably led to a substantial increase in producer revenues in the short term; a decrease in prices would reduce these revenues and reduce current-account imbalances over the next year or two. But the longer-run elasticities of oil demand and supply, while still low in comparison with most products, are much higher than those that prevail over the short run. Furthermore, the demand for oil imports is an excess-demand function, a function of domestic consumption demand minus domestic supply, and hence displays an elasticity related to the *sum* of the underlying demand and supply curves for consumption and production.

Even relatively conservative assumptions about the price responsiveness of oil demand and supply suggest that, if oil prices were lowered during 1975, annual oil-producer revenues would be greater during the 1980s than if the current real level of prices were maintained. Furthermore, the decline in total annual revenues by 1980 generated by maintenance of the current level of prices understates the degree to which current-account balances will be affected. As is well known, the oil producers differ widely in their capacity to absorb substantial increases in imports of real resources over the next decade or so. Some nations, such as Indonesia, should be able to use fully at home any increased foreign-exchange earnings with a reasonably short lag, while for others, such as Saudi Arabia, the rate of increase in imports will for many years be relatively independent of the rate of increase in oil revenues. (For a breakdown of the oil producers along these lines, see Chenery, 1975.)

The tremendous differences in short- and medium-term absorptive capacities of the oil producers indicate the extreme importance of the distribution of oil revenues in determining the current-account balances likely to result from any level of total revenues. Many projections of the distribution of oil revenues by country in 1980 have assumed that these

revenues will be divided roughly in line with pre-boycott projections of 1980 productive capacity. At the current level of prices, however, projections of 1980 demand for oil imports fall far below pre-boycott projections of 1980 OPEC productive capacity. It is, of course, uncertain how the production cutbacks or forgoing of capacity expansion necessary to maintain the current level of prices would be shared among oil producers. If some effective system of prorationing of required production cutbacks, say in proportion to productive capacity, were worked out within the cartel, the relation between total revenues and current balances would be roughly independent of the total value and volume of oil sales. A number of analysts have suggested, however, that, if the oil cartel is to be successfully maintained over the medium term, a disproportionate share of the production cutbacks will have to be borne by the Persian Gulf producers, which by and large have the lowest absorptive capacities. If such a view proves correct, the revenues of the Persian Gulf producers will be particularly sensitive to the overall volume of oil exports. Under such assumptions, lower oil prices would not only increase the total revenues of all oil producers by the late 1970s or early 1980s but would also disproportionately increase the revenues of the low-absorbing countries.

Thus, as is illustrated in the Appendix, it would be possible for a much larger aggregate current-account imbalance between oil exporters and importers to result from total revenues of, say, $60 billion, if production cuts were prorated within OPEC, than from revenues of $100 billion, if the required production cuts were borne heavily by the low-absorbing oil exporters. If the low-absorbing countries play the role over time of the residual maintainers of the cartel, lower prices leading to increased export volume over the medium and longer term would greatly increase the export proceeds of this group.

Thus the low-absorbing producers have a strong economic interest in lower oil prices, but such a reduction would not represent a cure for large current-account imbalances and financial accumulations by oil producers. For the first few years, a reduction in oil prices would also reduce current-account imbalances, but after four or five years current-account imbalances could be larger and might persist through most of the 1980s. This finding, detailed in the Appendix, holds even under pessimistic assumptions about the growth and price elasticities of oil demand and supply.

The basic point—that an oil-price reduction will not prevent large current-account imbalances over the next decade—should not be surprising: pre-crisis projections based on the maintenance of prices far below current levels showed large current-account imbalances by the

late 1970s. Under any realistic price scenario for the next decade, unusually large current-account imbalances will occur. It is not implausible (and indeed my own projections suggest it is quite likely) that the cumulative current-account imbalances over the next decade or two will be smaller if the current high oil prices are maintained than if prices are substantially reduced. With lower prices, the total of imbalances during the 1980s might exceed the total during the 1970s.

In closing this section, let me stress that the arguments presented here do not represent a case against substantially lower oil prices. Current-account balances and the size of total OPEC financial accumulations are not appropriate measures of the effects of the oil-price increases on the economic welfare of either oil producers or oil consumers, since resource misallocation and wealth transfers will continue as long as the relative price of oil remains high. Even extremely conservative projections of the responsiveness of oil import demand to price suggest that lower prices are in the long-run economic interest of oil producers as well as consumers.

3   Reducing Oil Production to Avoid Recycling

In the preceding section, it was pointed out that the OPEC countries have to invest their surplus revenues abroad in some form or other, so that funds will be automatically recycled. But there is, of course, the alternative of holding oil in the ground. For this strategy to make sense on a strictly economic basis, the expected rate of return on withholding an incremental barrel from the market today and selling it in the future would have to be greater than the expected rate of return on selling the barrel now and investing the proceeds. Some have expressed the fear that holding back production of this nonrenewable resource will become a rational economic strategy if sufficiently attractive investment outlets are not made available to the producers. On the basis of even quite pessimistic projections for the growth and price elasticities of demand and supply of oil, however, the underlying economics of the energy market over the medium and long run suggests that the present real level of oil prices cannot be maintained throughout the 1980s.

It must be remembered that, from the standpoint of economic maximization for an oil exporter, the barrel of oil withheld from the market today becomes the last barrel in the queue. Unless at some point in the future the market price rises above the shadow price given by compounding upward the initial price at the rate of return available on alternative investments, withholding oil from the market is a poor investment.

Even with such a rise in the market price, moreover, the probability is not very high that producers will deem it profitable to shift forward in time a large quantity of sales on these terms. For Venezuela, for instance, the barrel withheld today is likely to become the last barrel sold from its resource base, say in the 1990s, unless it can convince other producers to make additional future production cutbacks to allow additional sales by Venezuela at some earlier time. Similarly, for a country with the vast reserves of Saudi Arabia, a decision to reduce oil production today would not mean increased sales until the next century.

Given the abundance of substitutes for OPEC oil that will be available over the longer term at real costs below or not far above current oil prices, the expected rate of return on holding oil in the ground must be judged to be much lower than the interest rate presently available in financial markets, even if there were no possibility of a breakup of the cartel (see, for instance, Nordhaus, 1973). Even a moderately negative real rate of return on financial investments would undercut economic incentives to withhold oil from the market. At oil prices of $1 or $2 per barrel, there might be economic incentives to restrict production as part of an optimal long-term allocation program; at oil prices of $10 or $11 per barrel, there are not.

4   Problems among the Oil-Importing Nations

Recycling will occur automatically. The major concern with recycling is the pattern in which funds are recycled—which countries receive the funds, what types of investments are made, and the terms on which the funds are recycled. Attention should thus really be focused on the possible need for reshuffling funds into a more desirable distribution or on more appropriate terms, rather than on overall recycling.[1] Were there only one oil-importing country with an integrated capital market, recycling or reshuffling problems would clearly not arise. It is the fact that the collectivity of oil importers comprises many individual nations in different economic circumstances that gives rise to a number of potential problems.

The Most Seriously Affected Countries

One of the gravest problems from the standpoint of economic welfare is that some low-income countries cannot pay the oil tax of 2 or 3 per cent of GNP out of current consumption without imposing severe eco-

[1] I am indebted to Charles A. Cooper for the suggestion that "reshuffling" is a more descriptive term for this problem than the more commonly used "recycling."

nomic hardships (see, e.g., Michalopoulos, 1975). This set of countries, frequently referred to as the most seriously affected (MSAs), cannot realistically borrow and repay on commercial terms; humanitarian considerations call for concessional aid. The amount of concessional aid needed has been estimated to be on the order of $1 to $3 billion per year, not a large sum in relation to aggregate oil transfers. In terms of human welfare, however, such aid is extremely important.

Financial- and Exchange-Market Instability

A second type of consideration concerns the potential threat to the stability of exchange markets and financial institutions brought about by the centralization of control over huge amounts of funds in the hands of a small number of OPEC countries. This threat, too, has been frequently exaggerated. While it is true that large shifts of liquid funds at short notice can disrupt financial and exchange markets and impair the liquidity of otherwise sound financial institutions, there are strong economic incentives against such behavior by OPEC investors. Securities and financial regulations leave little scope to corner financial markets and manipulate them for economic gain, as sometimes occurred in the younger days of our nation. In the absence of a monopoly position, large sudden shifts of funds will turn prices and exchange rates against the one making the transfer. Thus OPEC investors have strong economic incentives to be responsible investors and indeed have been so to date.

Those who fear large, sudden shifts of oil money also often overlook the strong defense mechanisms against disruptive capital flows that have been developed by the international community. Through the use of owned reserves, borrowing arrangements with the International Monetary Fund, and, for many countries, bilateral swap lines, countries have considerable scope for offsetting the potentially disruptive effects of short-term capital flows. In addition, cooperation among the major central banks can prevent large shifts of OPEC or other funds from leading to the collapse of basically sound financial institutions.

But because there is no single true international central bank to serve as lender of last resort for countries and individual financial institutions, there is always the possibility that a failure of cooperation among the major industrial countries could result in financial or exchange-market disruption. As a result of, say, squabbles between the Bank of England and the Federal Reserve about responsibility and jurisdiction, a London subsidiary of an American bank operating in the Eurocurrency market could, in theory, go under because of illiquidity generated by a sudden

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shift of deposits. Yet the history of cooperation among major governments and central banks in handling short-term financial crises makes extremely remote the probability that such jurisdictional disputes would lead to a major financial collapse.

Although it has been useful for central banks to seek to clarify their spheres of responsibility concerning financial institutions with international operations, major new international institutional arrangements are not required as protection from potential financial disruptions. The cooperative application of the present institutional framework appears to be sufficient on this score.

The increased international mobility of funds caused by the OPEC accumulations, together with the increased uncertainties for individual countries generated by the oil situation, have bolstered the case for exchange-rate flexibility. In recent years it has become increasingly difficult to attempt to maintain a par value that is viewed with suspicion in the private market. The oil situation may be said to have contributed to the desirability of the change to widespread floating of exchange rates, but this was an institutional change that had become necessary anyway. Thus, while the oil situation has quieted some of the strongest advocates of a rapid return to fixed rates, it is doubtful if such a return would have been feasible or desirable in any event.

Consistency of Balance-of-Payments Objectives

The heart of the reshuffling problem is to achieve consistency in a socially desirable manner between the pattern of international capital flows and the current-account positions that countries are willing to accept (for a discussion of this problem, see Pollack, 1975). There are two potential dangers of uncoordinated policies. Some countries that would be willing to borrow to cover large, but not unreasonable, current-account deficits might be unable to attract capital on "reasonable" terms, while other countries that could easily attract large capital inflows might be unwilling to run the resulting large current-account deficits.

In a world of purely economic goals, these considerations would not present problems under floating exchange rates. Exchange rates would adjust so as to maintain consistency between net capital and current positions, and while there might be considerable movement of exchange rates and changes in current-account positions, there would be no need for countries to suffer reserve losses or to restrict domestic economic growth on balance-of-payments grounds.

From time to time, fears have been expressed that the United States would prove to be a capital sink—that a high proportion of OPEC funds would be placed in the United States and that, owing to the large size of the U.S. capital markets and the sterilization policies of the Federal Reserve, little of the money would flow back out again to more needy countries and capital markets. Even if this were descriptive of the gross and net patterns of capital flows (and to date it has not been, with respect to either the amount of OPEC capital placed in the United States or the amount of private capital flows out of the United States), it would present a major problem for other countries only under a system of fixed exchange rates. Under fixed rates, an additional net inflow of capital into the United States would be accompanied by an accumulation of reserves rather than by a change in the U.S. current account, and large placements of OPEC funds in the United States unaccompanied by increased capital outflows could create balance-of-payments problems for other countries and hinder their ability to achieve desired rates of domestic economic growth.

Under freely floating exchange rates, however, no such reserve drain would occur. Large OPEC placements in New York would push up the value of the dollar on the exchange markets and result eventually in higher U.S. imports and lower exports. (In the short term, moreover, private speculation would be likely to dampen the magnitude of exchange-rate movements and net capital flows.) Thus floating rates are sufficient to handle the balance-of-payments problems caused by the oil transfers. Large net inflows of capital to particular countries would be "recycled" through increased imports and reduced exports rather than through financial flows.

Potentially disruptive inconsistencies could nonetheless arise. In the political world in which we live, many countries have displayed concern about their current-account (or trade-balance) positions and/or the value of their exchange rates. They have target balances or rates. The international monetary system is thus faced with the potential problem that some countries may take measures to keep their exchange rates above market-clearing levels, while others may seek to restore traditional current-account surpluses to a degree that is not collectively feasible.

Given many countries' histories of desiring to run current-account surpluses for quasi-mercantilistic reasons, there is the possibility that the oil-consuming countries will individually seek to finance their increased oil payments more by current-account adjustment and less by borrowing than is collectively feasible without radical changes in the terms of trade. An individual country can fully adjust its current ac-

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count to increased oil payments with less change in its terms of trade if other countries do not also adjust. If, however, a substantial number of countries attempt to eliminate most or all of their current-account deficits in the short run, either the current-account deficits of other oil-importing countries must worsen to an even greater degree than implied by their increased oil payments, or there will have to be a substantial further deterioration in the terms of trade of the oil-importing nations vis-à-vis OPEC so as to reduce the aggregate current-account imbalance.

In the short run, unless the cartel breaks, it is doubtful that a significant reduction in the aggregate current-account imbalance is feasible even with a substantial change in exchange rates and terms of trade. Consequently, attempts by individual countries to adjust could degenerate into beggar-thy-neighbor policies that would cause economic damage over and above the damage caused directly by the oil-price increases.

Thus, all the countries of the system have a collective interest in encouraging each individual country to avoid taking adjustment measures that would exceed some "fair share" of the total scope for adjustment available to the group. Such concern was reflected in the Rome Communiqué of the Committee of Twenty in January 1974, which recognized the inevitability of large current-account deficits and indicated agreement that ". . . in managing their international payments, countries must not adopt policies which would merely aggravate the problems of other countries." The Committee particularly stressed the importance of avoiding "competitive depreciation and the escalation of restrictions on trade payments."

Criteria for sharing current-account deficits. There is no one way to determine an individual oil-importing country's share of the collective current-account deficit vis-à-vis the OPEC countries. Judgments about desirable patterns of current-account positions will be influenced by a wide variety of considerations. For instance, while I argued earlier that oil-related current-account deficits should not create unmanageable debt-service problems for the oil-importing countries as a group, many individual countries already faced debt-service problems before the sharp increase in oil prices. It would not seem reasonable to expect these countries to take on as great a proportion of oil-related debt as countries that were initially in strong debt-service positions.

In purely economic terms, an optimal pattern of current-account deficits might be related to marginal productivities of capital and perhaps other economic variables. In practice, however, it would be virtually impossible to produce generally accepted estimates of such parameters (see, e.g., the wide range of estimates presented in Crockett and Ripley,

1975). Furthermore, proponents of the use of some such set of estimates for international policy coordination tend to overlook the fact that governmental concern over current-account positions is primarily based on political and quasi-mercantilist grounds rather than on economic reasoning. Responses to questions on the basis for concern over current-account deficits frequently are couched in such terms as preserving national strength, reducing protectionist pressures, or preserving domestic jobs. Seldom in public discussion is an answer based on the optimal distribution of net national investment between domestic and foreign economies.

One frequently mentioned criterion for allocating oil deficits is in proportion to increased oil payments. This criterion has some economic merit in the very short term, as it would tend to minimize initial current-account adjustments in real as opposed to nominal terms. Its philosophy is that adjustment actions ought not to be taken by the oil-importing nations as a group in response to the increased oil payments. As a type of temporary standstill arrangement to avoid massive, precipitous adjustment actions during an initial period when the implications of the oil situation were still generally poorly understood, such a sharing criterion had some rationale. In the longer term, however, this rationale disappears. Measures of increased oil payments do not give a good indication of the total impact of the energy situation on different economies and their international prospects. While it remains true over the longer term that it is the currrent-account imbalances vis-à-vis the oil exporters that keep the OECD countries, for instance, from restoring their traditional aggregate surplus on current account, it does not follow that the appropriate composite of current-account balances among these countries should bear a fixed relation to their increased oil payments. Likewise, there is no particular economic merit to the argument that the collective current-account deficits of the industrial countries should be shared according to their GNPs or GDPs. (For further discussion and critiques of various proposals for sharing oil deficits, see Solomon, 1975.)

While discussions of sharing the current-account oil deficits have been useful in focusing attention on the possibility that inconsistent objectives could lead to beggar-thy-neighbor behavior, they have frequently failed to focus on the need to achieve consistency between financing and adjustment. Indeed, failure to stress this type of consistency issue has been apparent in many discussions both of recycling and of allocating current-account deficits.

It seems doubtful that any particular criterion for allocating current-account deficits could, in fact, be agreed upon. Furthermore, given the uncertainties both of economic forecasting and of the balance-of-pay-

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ments effects of changes in various types of policies, it is not clear how closely any particular set of targets could be implemented even if such agreement could be reached.

Agreement on procedures rather than outcomes.[2] A more fruitful way to avoid a replay of the economic warfare of the 1930s might be to secure general agreement on appropriate procedures to be followed by oil-importing countries. Agreement to refrain from excessively deflationary macroeconomic policies, restrictive trade and capital measures, and substantial reserve accumulations to hold down exchange rates may be both feasible and sufficient to avoid economic conflict resulting from attempts to achieve collectively inconsistent improvements in current-account positions.

At this point, countries seem well aware of the dangers of such actions and their collective stake in avoiding them. Furthermore, we have numerous international mechanisms for reviewing the international adjustment process and the appropriateness of economic policies. While we have no guarantee that such a qualitative approach stressing the avoidance of internationally destructive policies will be sufficient, there is some basis for optimism. In particular, as a result of many years of international discussions of consistency in the adjustment process, particularly by Working Party Three of the OECD, and as a side effect of rapid worldwide inflation that has brought home the domestic benefits of imports, most industrial countries seem to be in a much better position to cope with large current-account deficits than they would have been a decade ago. Traditional quasi-mercantilist yearnings for export surpluses have been at least partially counterbalanced by increased recognition of the benefits of import surpluses in reducing rises in domestic prices.

Provision of Loans at "Reasonable" Rates

The other major aspect of the recycling or reshuffling problem concerns the possible inability of countries to borrow at reasonable rates. It is difficult to give an unambiguous definition of "reasonable" in this context, but we may think of it in terms of countries which, though following basically sound macroeconomic and exchange-rate policies, must pay interest rates substantially above prime rates on foreign-currency-denominated loans. The case for official international recycling facilities is that, in some circumstances, it is in the collective interest of countries

[2] Again, I am indebted to Charles A. Cooper for suggesting this approach.

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to make loans available on terms more favorable than those demanded by the private market. As indicated earlier, it may be desirable to furnish concessional loans to very poor countries that cannot reasonably be expected to repay loans on commercial terms. This subsection will discuss cases in which collective official recycling on commercial terms might be desirable.

There are several reasons why the private market might be willing to lend to particular countries only on terms substantially above prime rates, while richer countries might find it in their collective interest to extend such loans at rates closer to market levels.

The loan in question may be risky in financial or economic terms but be judged worth the cost on political grounds. "Bailing out" a country is obviously not a task the private market would choose to undertake.

Even if the loan is not a bad financial risk from the standpoint of the system as a whole, private lenders might still be willing to lend only at premium rates because of formal or informal institutional constraints on the amount of lending to particular countries. For instance, most private banks have rough country limits on their lending and are not willing to exceed these limits substantially. Phrased technically, interest arbitrage schedules may be very elastic over a given range, say capital movements of $10 to $20 billion, but become increasingly inelastic as greater transfers are required. The amount of recycling undertaken through the commercial banking sector is very likely to be constrained by this inelasticity of interest arbitrage schedules beyond a certain point. It is not at all clear, however, that this will also prove true with respect to the whole broad range of private financial markets.

Substantial risk premia on private lending to individual countries might also be imposed because of differing assessments of individual versus collective riskiness resulting from the oil imbalances. As was argued in section 1, for the oil-importing nations as a group, the increased indebtedness will have to be paid off only gradually as the OPEC countries eventually move into an aggregate current-account deficit. Thus, from the standpoint of the group, the oil situation need not imply any substantial decrease in the creditworthiness of oil importers. If countries wish to maintain their original rates of accumulation of domestically owned wealth, they can take measures to increase domestic saving and investment to offset the net dissaving and external disinvestment implied by their current-account deficits. Even if countries do not stimulate domestic saving and investment, the result for the typical country will not be net national dissaving, but rather a reduction on the order of 20 or 25

per cent in its rate of domestically owned real wealth accumulation (i.e., the size of the transfers are on the order of one-fourth or one-fifth of national savings).

The primary problem with the accumulated debt-service obligation to OPEC countries stems not from its absolute size but from how rapidly it will have to be paid off. I have already pointed out that, in aggregate, this will be determined by the rate at which the OPEC current account eventually moves into deficit. Accordingly, repayment will probably occur fairly smoothly for the group as a whole. But large portions of the accumulated debt of an individual country might be called at one time. As individual countries pile up debt, loans to them may appear increasingly risky to the private market, especially since the debt position of a country includes non–oil-related borrowings as well. When the problem is confined to short-term shifts of OPEC money, our existing international financial arrangements should be sufficient. When such shifts are not reversed, however, there may be a need for longer-term official lending, with the assumption of risk, though not necessarily the actual provision of funds, spread across the members of the group. Standby arrangements among a small group of the major industrial countries should be sufficient to internalize the major portion of this externality.

The mere existence of a substantial backstopping facility might be sufficient to reduce the need for its use. Assurance that countries will have access to official financing if needed in the face of a large shift should substantially reduce the perceived risk to the private market in lending to individual countries.

Official financing arrangements by the oil-importing countries, such as the $25 billion financial safety net that the United States and other OECD countries have agreed to establish, can also provide a basis for greater direct borrowing by oil-importing nations from oil-producing countries. The major danger of heavy direct borrowing from oil producers is the economic and political leverage such loans might give the oil producers over the oil importers. Such leverage, however, comes primarily not from the amount lent but from the degree to which the lending countries can achieve the position of lender of last resort. To the extent that the oil-importing nations act collectively as lender of last resort, the oil-exporters' leverage should be substantially reduced.

5 Summary and Conclusions

The purpose of this essay has been to analyze the effects of the recent oil-price increases on the international monetary system. The following are some of the major conclusions:

a. There is no reason why large accumulations of financial assets by oil producers should lead to international financial collapse or to insurmountable problems of debt service. For the oil-importing nations as a group, the condition that will oblige them to pay off the debt (an OPEC current-account deficit) will also provide the means for doing so.

b. Although the aggregate magnitude of the oil transfers is unprecedented in relation to the size of the world economy, on a per-country basis the capital inflows implied for the typical oil-importing country are well within the range of historical experience. Even under the most liberal projections of total OPEC financial accumulations, the inflows would be small in relation to the capital markets and fixed assets of the oil-importing nations.

c. To repay future debts without shifting a substantial burden of the real cost of current oil payments to future generations, the oil-importing nations should increase their domestic savings and investment. Given the fungibility of capital, there is no particular need to channel oil-producer funds directly into equity and direct investments in order to accomplish this objective.

d. In the aggregate, there is no overall balance-of-payments or recycling problem between oil exporters and oil importers. The oil producers have no sensible alternative to investing their current-account surpluses in oil-importing nations. It does not make economic sense to hold back oil production instead. At anything like the current price of oil, the real rate of return attached to shifting forward substantial quantities of production would be strongly negative.

e. Reductions in oil prices, while in the economic interest of both oil exporters and oil importers, will not prevent large OPEC financial accumulations. Oil-price reductions would reduce current-account imbalances over the next several years, but they would be likely to lead to large current-account surpluses in the 1980s. Unless the oil exporters make effective agreements for prorationing production, the revenues of the large low-absorbing oil producers, and hence medium-term current-account imbalances, will be extremely sensitive to price.

f. The large oil payments present a number of problems for international financial relations among the oil-importing nations. In addition to precluding possible inconsistencies in current-account objectives, there is the need to provide collective financial facilities to internalize the risk of shifts of oil funds and assure the availability of funds on reasonable terms to countries following sound financial policies. Such problems present a strong challenge to international financial cooperation and management, but they are not insoluble. Sharing current-account deficits on the

basis of increased oil payments is not a good long-run criterion for the coordination of current-account objectives. A more fruitful approach might be to stress the need to maintain consistency between current- and capital-account positions and to avoid economic policies such as trade restrictions that are destructive to the functioning of the world economy.

Such conclusions should not lead us to underrate the seriousness of the economic effects of the oil-price increases. The substantial economic costs of these increases will continue for as long as the real price of oil is maintained above competitive market levels. If that turns out to be a long time, the higher oil price may cause the greatest peacetime misallocation of economic resources the world has ever seen. And this misallocation could persist long after the trade positions of the oil-exporting nations are restored to balance. While income transfers and current-account imbalances will decline over time as the elasticities of energy demand and supply increase, the economic costs of misallocation of resources are likely to grow.

APPENDIX

CALCULATIONS OF OPEC OIL REVENUES AND FINANCIAL ACCUMULATIONS IN 1980

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This appendix presents the calculations of oil revenues and current-account balances on which the discussion in section 2 of the text is based. Section A-1 describes the model used to project OPEC oil revenues in 1980 and presents oil-revenue estimates under different assumptions concerning some of the key parameters of the model. Section A-2 describes how the estimates of OPEC current-account balances for 1980 are derived. Section A-3 presents the range of OPEC financial accumulations in 1980 that is derived from the previous results.

A-1 Revenue-Projection Model and Revenue Estimates

The demand for OPEC oil is an excess demand, reflecting the difference between the quantity of petroleum demanded and the quantity supplied in the consuming countries at different oil prices. Consistent with this characterization of the oil market, the projections of the volume of OPEC oil exports are based on a broad division of the world oil market into two aggregates: the oil-consuming countries, which are net importers of petroleum as a group, and OPEC, which is a net oil exporter. This division implies, of course, that the export price for OPEC oil will set the market price, assuming competitive conditions in the consuming countries. In addition to this division of the world oil market, OPEC is divided into two mutually exclusive groups, OAPEC (Organization of Arab Petroleum Exporting Countries) and non-OAPEC, in order to determine the effects of different distributions of OPEC oil revenues on the aggregate current-account surplus of the OPEC countries.

Because the demand for OPEC oil is an excess demand, it will tend to be more price elastic than the total demand for oil, assuming that there is some indigenous supply of oil in the consuming countries. Formally, the price elasticity of demand for OPEC oil is

$$e = e_D + (S/Q)(e_D + e_S),$$

where e_D is the price elasticity of the demand for oil in consuming coun-

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tries, e_S is the price elasticity of non-OPEC supply, S is equal to non-OPEC supply, and Q is equal to OPEC exports. (Here and hereafter, demand elasticities are defined to be positive.) Thus $e \gtreqqless e_D$ as $S \gtreqqless 0$.

The projections of oil exports therefore take as their basis different assumptions about indigenous petroleum supply and demand in the non-OPEC world and derive elasticities of import demands facing various groups of oil exporters at different prices. The greater the proportion of total supply not accounted for by the set of quantity-restricting monopolists, the greater is the elasticity of excess demand they face at any point. If only OAPEC is the quantity-restricting group, for instance, it would confront a much higher elasticity of demand for its exports than if all of OPEC were willing to join in restricting quantity to maintain price.

The effect of the oil-price increase is to reduce the growth in consumption and increase the growth in indigenous production in the consuming countries, as adjustments to the higher oil price. Of course, while these adjustments are being made, income and population growth (which increases the demand for petroleum) and technological change (which increases the supply of oil) are both taking place. After the adjustments to the new price level, the actual growth rates in consumption and production would again be determined by these shift factors.

The projection model used here, where price effects are incorporated explicitly, approximates closely the "real" world. This model can be contrasted with some "less sophisticated" projections that use a price-adjusted income elasticity of demand to derive their consumption estimates. These less elaborate models err by assuming that the price effect changes the growth in oil consumption *permanently*, rather than the level of consumption at any given point in time. (Of course, it would be possible for the changed conditions in the oil market to influence the long-run rate of change of the shift factors, but adequate treatment of such possible interdependencies would require a much more thorough analysis. This possibility does not provide a justification for merely reducing the rate of growth of consumption by some factor as a method of capturing the effects of higher oil prices.)

In projecting the volume of OPEC oil exports in 1980, the model disaggregates the supply and demand conditions into two components: the price-elasticity effect, following from producer and consumer reactions to the oil-price increase along given supply and demand schedules, and the shift effect, reflecting the movement over time of these schedules. Shifts in the supply and demand schedules of the consuming

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countries are a convenient device for incorporating the effects of such factors as technological change in the oil-producing industry and the growth of income in the consuming countries. Thus, a typical projection will be based upon assumptions regarding the price elasticities of supply and demand as well as the growth rates of these shift factors.

In the absence of any change in the price of oil, the non-OPEC demand curve would be expected to shift out over time as a result of the general growth in income and aggregate demand. Similarly, technological change and new discoveries would cause non-OPEC supply to increase over time as well. It might be argued, however, that a negative rate of growth of supply is possible because of the nonrenewable nature of oil and the observation that production has been falling in the United States despite substantial increases in prices. Ultimately, of course, the nonrenewable nature of oil means that the flow-supply schedule will begin to shift backward, but that consideration does not seem applicable to the behavior of the supply schedule over the next decade or two. At least some of the offshore oil brought in over the next decade will carry costs below the real pre-October 1973 level of oil prices in the United States.

The main reason production in the United States declined at former oil prices was because of a substitution by the oil companies of low-cost Middle Eastern oil for higher-cost American crude. It made little sense for oil companies to search extensively for moderate- to high-cost oil in other regions when billions of barrels of oil were located in and around the Persian Gulf at production costs of 10 to 20 cents per barrel.

More formally, the model used in these projections has a demand curve for oil in 1980 with the following specifications:

$$D_{80} = D_{73}[(1 + g_D)^7][(P_{80}/P_{73})^{-e_D}],$$

where D_t = volume of oil demanded in year t, P_t = price of oil in 1974 dollars in year t, g_D = growth rate of the shift factor on demand over the 1973-80 period, and e_D = long-run price elasticity of demand.

According to this specification, the demand for oil in 1980 is the product of two terms. The first term represents the shift in demand from 1973 to 1980, with the annual shift factor (g_D) a parameter of the projections. The second term represents the price-elasticity effect, where e_D is the price elasticity of demand and is also a parameter of the projection. By positing different values for g_D, e_D, and P_{80}, it is possible to derive a range of oil-demand forecasts for 1980.

The supply of oil in the consuming countries is specified similarly:

$$S_{80} = S_{73}[(1 + g_S)^7][(P_{80}/P_{73})^{e_S}],$$

where $S_t =$ volume of oil supplied in year t, $P_t =$ price of oil in 1974 dollars in year t, $g_s =$ growth rate of the shift factor on supply over the 1973-80 period, and $e_s =$ long-run price elasticity of supply.

The specification of the indigenous supply of oil in the consuming countries is very similar to the specification of the demand for oil. The supply in 1980 is again the product of two terms: a shift term and a price-elasticity term. The shift term depends on an annual shift factor (g_s), which is specified exogenously, while the price-elasticity effect is a function of the assumed 1980 price of oil (P_{80}) and the elasticity of supply (e_s). Once again, by varying the assumptions about the shift factor, elasticity of supply, and the 1980 oil price, one can derive a range of estimates for indigenous supply in the consuming countries.

The volume of OPEC oil exports is thus the difference between oil demanded and oil supplied in 1980 in the non-OPEC world, i.e., $D_{80} - S_{80}$. The model is presented here in a nondynamic form, because adjustment to the higher oil price on the part of consumers and producers is presumed to occur by 1980.

Given the projected level of total OPEC oil exports in 1980, the model then calculates the distribution of this export volume between two subsets of OPEC countries: the Arab (OAPEC) members and the non-Arab (non-OAPEC) members. The OAPEC group includes the Arab Persian Gulf countries plus Iraq, Libya, and Algeria and is roughly equivalent to the group of "low import-absorbing" members of OPEC. Strictly speaking, the low-absorbing group excludes Iraq and Algeria, which are members of OAPEC, but these countries represent only a relatively small proportion—around 17 per cent in 1973—of total OAPEC production. The non-OAPEC group, then, is roughly comparable to the "high import-absorbing" subset of OPEC countries. In the text and Appendix, the term "low-absorbing countries" is used to denote the OAPEC group.

Two different production-sharing arrangements are specified in the model. Under the first, all OPEC members operate at the same percentage of 1980 capacity. This we call Version A and refer to as "production prorationing." The capacity figure for 1980 on which the production estimates are made is based on internal government projections. Under the second production-sharing arrangement, Version B, it is assumed that only the low-absorbing countries will undertake whatever production cutbacks relative to capacity are necessary to maintain the given real price of oil. The high-absorbing countries produce at full capacity in this version.

Version B follows from the low-absorber–high-absorber dichotomy

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within OPEC. The high-absorber members are assumed to be able by 1980 to use fully all the oil revenues they receive. Some analysts of the oil market have argued that under these conditions the high-absorbing countries will resist cutbacks in production relative to their capacity, leaving the task of maintaining the market price to the low-absorbing countries.

Given the projected volume and distribution between low-absorbing and high-absorbing members of OPEC oil exports in 1980, oil revenues for 1980 can be calculated. The earnings of the oil exporters are derived by adjusting the assumed market price for production costs, which include company profits and transportation expenses. Some estimates of total OPEC revenues and their distribution between high- and low-absorbing countries are presented in Table A-1 for different assumptions about price elasticities and growth rates of the shift factor.

The revenue projections of Table A-1 are calculated on the assumption that the current real price of oil is maintained by the exporters. The price elasticities of 0.2 and 0.3 cover the likely range of price responsiveness for both crude-oil demand and non-OPEC supply. These figures bracket the implicit price elasticities contained in the OECD (1974) study of 0.2 on supply and 0.285 on demand.

TABLE A-1

PROJECTIONS OF 1980 REVENUES FOR LOW-ABSORBING OIL PRODUCERS
IF CURRENT REAL PRICES ARE MAINTAINED
(in billions of 1974 dollars)

Elasticities of Non-OPEC Demand and Supply			Rates of Growth of Non-OPEC Demand and Supply		1980 OPEC Revenues		
					Total OPEC	Low-Absorber	
e_D	e_S		D	S		Version A	Version B
0.2	0.2	Case I	0.05	0.05	$ 87	$ 57	$ 22
0.3	0.2		0.05	0.05	65	43	0.1
0.3	0.3		0.05	0.05	52	34	(negative)
0.2	0.2	Case II	0.054	0.033	103	68	39
0.3	0.2		0.054	0.033	81	53	16
0.3	0.3		0.054	0.033	69	45	4
0.2	0.2	Case III	0.065	0.025	123.5	80	58
0.3	0.2		0.065	0.025	99	65	34
0.3	0.3		0.065	0.025	88	57	22

Three sets of growth-rate assumptions for supply and demand are used. Under the first set (Case I), both supply and demand shift by 5 per cent per year. In Case II, supply is projected to grow at only 3.3 per

cent, while demand grows at 5.4 per cent. Case III is even more pessimistic: supply grows at only 2.5 per cent, while demand grows at 6.5 per cent. The growth-rate assumptions for the supply and demand schedules in the last two cases are calculated from the OECD study for two different base-case assumptions on price. The Case II growth rates are derived from the base case assuming supply and demand curves of constant price elasticity. In this case, the base price rises slightly between 1973 and 1980. When the base price is held constant, Case III growth rates are derived using the same supply and demand assumptions.

Table A-1 presents estimates of low-absorber revenues under two production-sharing arrangements. The column headed "Version A" represents the strict production prorationing case, where 1980 production in all countries is at the same percentage of capacity. The column headed "Version B" represents the case where low-absorbing countries accept all the cutback in production relative to capacity that is necessary to maintain the current real level of oil prices.

Table A-1 illustrates the high degree of sensitivity of low-absorber revenues both to supply and demand conditions in the world oil market and to the manner of production sharing. Depending on the assumptions, low-absorber oil revenues in 1980 can range from $80 billion to negative values (implying that high-absorber full-capacity production is by itself in excess of market demand). Even for given elasticity and growth-rate assumptions, different production-sharing arrangements yield differences in low-absorber 1980 oil revenues of as much as $40 billion.

In Table A-2, low-absorber revenues for 1980 are given for Case I growth-rate assumptions at different prices. Low-absorbing countries, it is further assumed, take the full brunt of any cutbacks. As Table A-2 indicates, under even the most conservative elasticity assumptions low-

TABLE A-2

PROJECTIONS OF 1980 LOW-ABSORBER OIL REVENUES AT DIFFERENT PRICES UNDER
VERSION B, ASSUMING THAT NON-OPEC OIL DEMAND AND SUPPLY
GROW AT 5 PER CENT PER YEAR
(*in billions of 1974 dollars*)

Demand Elasticity	Supply Elasticity	1980 Annual Revenues at Different Prices: a. C.i.f. price per barrel b. Government take per barrel		
		a. $4.50 b. 3.00	a. $7.50 b. 6.00	a. $10.50 b. 9.00
0.2	0.2	$24	$29	$25
0.3	0.2	22	19	6
0.3	0.3	21	14	(negative)

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absorber revenues are reduced substantially in the absence of prorationing. Prices below current levels lead to substantial increases in revenues under the medium and more optimistic elasticity assumptions, and to a more moderate increase (at least in the range of around $6 per barrel government take) under the conservative set of assumptions. Consequently, a substantial reduction in oil prices could increase low-absorber oil revenues over the latter part of the 1970s. Given the implications of the low absorptive capacity of the OAPEC group for the total current-account balance of OPEC, lower oil prices, rather than reducing the OPEC current-account surplus, may instead increase it.

A-2   Estimates of OPEC Current-Account Surpluses in 1980

Estimates of OPEC current-account balances in 1980 use the oil-revenue figures of Table A-2 in conjunction with internal OECD projections of OPEC imports, non-oil export earnings, services, and private and official transfers.

The internal OECD current-account estimates, which assumed that the OPEC countries operate at roughly the same percentage of capacity, are adjusted by varying the distribution of oil revenues between the low-absorbing and the high-absorbing groups. The slight difference in definition between OAPEC and the low-absorbing group has the effect of biasing the estimated surpluses of OAPEC on the high side, since OAPEC imports, which include imports by Iraq and Algeria, will be greater than those for the more narrowly defined low-absorber group.

The adjustment of these internal OECD estimates leaves unchanged the current-account position projected for the high-absorber group in 1980. Since financing is likely to be the binding constraint on the size of the high-absorber deficit, the current-account position of the high-absorbing countries will be insensitive to the size of their oil-export earnings. Another way of stating this same point is that by 1980 the marginal propensity to import out of oil-export earnings is unity for the high-absorbing group.

Given this assumption, the effect of altering the distribution of oil revenues between the high-absorbing and low-absorbing groups is to change the 1980 current-account balance of the latter while leaving the former unchanged. The overall effect of this adjustment on the total OPEC current-account balance in 1980 can be considerable.

For example, the high degree of sensitivity of the OPEC balance to the assumptions made about production sharing in the group is illustrated in Table A-3 for three alternative projections of OPEC revenues. Assuming total revenues of $103 billion in 1980, as in Case II of Table A-1, the OPEC current-account surplus could vary from $50.6 to $21.6

billion in 1974 dollars. The higher figure results from an assumption of strict production prorationing, where each OPEC member operates at the same degree of capacity utilization. Under this assumption (Version A), low-absorber revenues are relatively high. The lower figure results from an assumption that the low-absorbing countries bear the entire burden of the production cutbacks relative to capacity that are necessary to maintain price (Version B). In this case, low-absorber revenues are relatively low. Comparing these two production-sharing arrangements, it is possible for a larger 1980 balance to be generated when OPEC oil revenues in 1980 total only $65 billion than when revenues total $103 billion. If the lower 1980 revenue figure is accompanied by production prorationing, a current surplus as high as $25.6 billion in 1974 dollars could result. On the other hand, total OPEC revenues of $103 billion could yield a surplus of only $21.6 billion if low-absorbers alone restrict production to maintain price.

TABLE A-3

THE EFFECT OF DIFFERENT PRODUCTION-SHARING ARRANGEMENTS
ON THE 1980 OPEC CURRENT-ACCOUNT SURPLUS
(in billions of 1974 dollars)

Total OPEC Revenues	Production-Sharing Arrangement	
	Version A	Version B
$ 65	$25.6	—$17.4
81	33.5	— 2.0
103	50.6	21.6

A-3 Projections of OPEC Financial Accumulations

The projected levels of OPEC oil revenues in 1980 can be used to derive estimates of OPEC real financial accumulations. These estimates are made by adjusting internal OECD projections of OPEC financial accumulations and import expenditures for different levels of low-absorber revenues. By adjusting both the level of total OPEC revenues and its distribution between high- and low-absorbing countries, different estimates of the real additions to total OPEC financial accumulations are calculated for 1980. This procedure is similar to the one used above to estimate the OPEC current-account balance in 1980 under different production-sharing assumptions.

OPEC accumulations will be sensitive to both the level of oil revenues and their distribution among OPEC members. Insofar as a large proportion of the revenues goes to the low-absorbing countries, which

have relatively low marginal propensities to import, OPEC financial accumulations will be higher. This analysis suggests that an "equitable" sharing of production cutbacks, where production is prorationed, would lead to greater financial accumulations by OPEC as a whole.

A distinction is made here between estimates of the OPEC current-account surplus in 1980 and the real additions to OPEC financial accumulations. The two are not typically the same, even when both are measured in constant dollars. For example, an OPEC current-account surplus in 1980 of $40 billion (in 1974 dollars) does not imply that OPEC financial accumulations measured in 1974 dollars increased by $40 billion in that year.

The difference between the current-account surplus and the increase in real financial accumulations results from the effects of inflation on the real value of the stock of previously accumulated financial assets. The additions to real financial accumulations can be considered to be the difference between a gross addition to these accumulations, which consists of the current-account surplus in constant dollars, and the loss due to inflation in the real value of previously accumulated financial assets. The net addition in real terms to the financial accumulations, therefore, will typically be smaller than the current-account surplus measured in constant dollars. In practice, the addition to OPEC accumulations in real terms in any given year will be equal to the sum of the trade balance (as opposed to the current-account balance) and the real interest rate times the level of previously accumulated real financial assets. Thus, if OPEC holdings were $200 billion and the inflation rate were 5 per cent, OPEC would have to run a nominal current-account surplus, including interest income, of $10 billion (0.05 $\times$ $200 billion) in order to hold constant the real value of its accumulation. The estimate of a peak in the real value of OPEC accumulations is not inconsistent with continuing current-account surpluses after 1980 if inflation is an important component in nominal rates of return.

After an estimate of real additions to OPEC financial accumulations in 1980 was derived on the basis of adjustments to OECD data, estimates of real additions were made for the preceding four years as well. These estimates were based on successively smaller adjustments to the nearer-term OECD figures, so that by 1975 our estimate of the OPEC cumulative surplus in constant dollars was the same as the OECD's internal projections. The rationale for this manner of adjustment is that the divergence between our estimate and the preliminary internal OECD projections will occur well before 1980, with the difference increasing over time.

In deriving the estimates of OPEC financial accumulations, assumptions are made about production sharing and the real price of oil. Two different production-sharing arrangements are envisioned: prorationing and the assumption by low-absorbing countries of all the required cutbacks. Similarly, two different oil prices are assumed: maintenance of the current real price and a decline in the price to $7.20 per barrel, f.o.b., in 1974 dollars. These price and cutback assumptions are used to project low-absorber revenues for 1980 in 1974 dollars under the projection model described above. The actual 1980 estimates employed were rough averages of results furnished by the model under different elasticity and growth-rate assumptions.

The combination of the two price assumptions and the two cutback-sharing assumptions gives a total of four projections of low-absorber revenues in 1980. The four scenarios are as follows:

Scenario 1: Current real price maintained, production cutbacks shared. In this case, current real prices are maintained and production cutbacks are shared roughly in line with prospective capacity. These assumptions suggest that low-absorber revenues are likely to fall in the range of $40 to $50 billion in 1974 dollars.

Scenario 2: Current real prices are maintained, low absorbers take all the production cutbacks. Under this scenario, the projections center around low-absorber revenues on the order of $20 billion, with a range of $0 to $39 billion if outlying cases are ignored.

Scenario 3: Moderate reductions in price, production cutbacks shared. Under this scenario, low-absorber revenues are most likely to be on the order of $40 billion, with a range of $31 to $56 billion.

Scenario 4: Moderate reductions in price, low absorbers take all the production cutbacks. Under this scenario, most revenue projections fall between $38 to $48 billion, with a full range from $10 to $53 billion.

Using the procedure described above, each estimate of OPEC oil revenues in 1980 can be translated into an estimate of the additions to OPEC real accumulations in that year. Scaling these estimates back in time permits us to derive projections of total OPEC financial accumulations by 1980. These are given in Table A-4.

In interpreting the figures in Table A-4 it is important to keep in mind that the estimates are expressed in 1974 dollars. For purposes of evaluating the transfer problem associated with the oil-price increase, constant-dollar calculations are clearly preferable, since they indicate the command over real goods and services implied by the accumulations.

The four scenarios give a range of OPEC real financial accumulations

TABLE A-4

OPEC REAL FINANCIAL ACCUMULATIONS
(in billions of 1974 dollars)

Year	Accumulation under Scenario:			
	1	2	3	4
1974	$ 62.0	$ 62.0	$ 62.0	$ 62.0
1975	53.0	53.0	53.0	53.0
1976	38.4	33.0	37.4	38.0
1977	31.8	21.0	29.8	31.0
1978	20.2	4.0	17.2	19.0
1979	18.6	−3.0	14.6	17.0
1980	12.0	−13.5	7.0	10.0
Total	$236.0	$156.5	$221.0	$230.0

between 1974 and 1980 of $156.5 to $236.0 billion. Adding to these the OPEC financial holdings at the end of 1973 (approximately $14 billion) would yield a range for total real holdings in 1980 of $165.0 to $245.5 billion.

Scenario 2, which yields the lowest figures, appears somewhat on the optimistic side, assuming as it does that the low absorbers take the full brunt of production cutbacks and that the resulting large reduction in revenues below those originally projected by the OECD does not cause a reduction in imports even though the low absorbers move into current-account deficits.

An alternative version of the second scenario would be to assume that the low-absorbing countries take a disproportionate share but less than all of the required production cutbacks. In such a case, low-absorber revenues for 1980 on the order of $30 to $35 billion might be more likely than the $20 billion or so resulting from assumption by the low absorbers of the entire cutback or the $40 to $50 billion that might result from a proportionate sharing of production cutbacks. This would lead to a 1980 low-absorber current surplus on the order of $10 to $15 billion. In the manner of Table A-4, this would yield accumulated OPEC holdings for 1974 through 1980 of about $200 billion.

It seems likely that total OPEC accumulations by 1980 will be on the order of $175 to $250 billion (measured in 1974 dollars), and that the OPEC aggregate current position will turn negative in real terms by the early 1980s, so that the accumulation is unlikely to be substantially higher in 1985 than in 1980. Indeed, unless the real price of oil is lowered substantially, real 1985 holdings could be well below the 1980 level. While lower prices would lead to lower OPEC revenues over the next

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several years because of the very low short-run demand and supply elasticities for oil, revenues would be substantially higher over the longer run because of the higher long-run elasticities of demand and supply.

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