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U.S. DIRECT INVESTMENT RECEIPTS AND PAYMENTS:
MODELS AND PROJECTIONS

by

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U.S. Direct Investment Receipts and Payments: Models and Projections

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The purpose of this study was to analyze the factors influencing

direct investment receipts and payments and to make projections of net

investment income. The models and techniques used are very similar,

although the receipts side is disaggregated by industry, while the payments

side is not. The paper is divided into three parts: direct investment

receipts are analyzed in Part I, direct investment payments are analyzed

in Part II, and the implications for net direct investment income are

discussed in Part III.

I. Direct Investment Receipts

Direct investment receipts, as reported by the Department of

Commerce, are shown on Table 1. In 1977 28 per cent were from petroleum,

37 per cent were from manufacturing, and 35 per cent were from all other.

Receipts were disaggregated by industry so factors specific to an industry

could be considered, and because relationships need not be identical

across industries. The particular industry breakdown was dictated by the

availability of data. The model is presented in the first section,

followed by a summary of the statistical results. The third section

outlines the assumptions used in making the projections, and the last

section analyzes the projections.

Table 1. U.S. Direct Investment Receipts
(millions of $)

Year	Receipts	Dividends, interest + earnings of affiliates	Reinvested Earnings
1960	3,621	2,355	1,266
1961	3,822	2,768	1,054
1962	4,242	3,044	3,044
1963	4,636	3,129	3,129
1964	5,105	3,674	3,674
1965	5,505	4,963	3,963
1966	5,258	3,467	3,467
1967	5,604	3,847	3,847
1968	6,591	4,151	4,151
1969	7,649	4,819	4,819
1970	8,168	4,992	2,671
1971	9,159	5,983	2,641
1972	10,949	6,416	2,949
1973	16,542	8,384	4,330
1974	19,157	11,379	7,356
1975	16,595	8,547	7,644
1976	18,999	11,303	8,955
1977	19,851	12,540	10,881

a) The Model

Actual receipts on U.S. direct investment (YR) in a particular year are the product of both long run or expected forces (EYR), and temporary or unexpected forces (Xi's). If nothing unexpected happens, the Xi's will be defined equal to one and actual receipts will equal expected receipts.

$$YR = (EYR) \cdot \pi_{i=1}^{n} \cdot X_i^{ai} \tag{1}$$

In order to explore what determines expected receipts, consider a specific direct investment project.[1] It requires a certain dollar expenditure this period (I), and is expected to produce a certain level of average earnings, constant in real terms (EN) in perpetuity.[2] The expected real rate of return on the project (r) equals annual earnings in foreign currency (EN) divided by the foreign currency value of the initial investment (I/π_0)[3], or

$$EN = r \cdot I/\pi_0 \tag{2}$$

If inflation and exchange rate changes do not alter real rates of return on investment in a predictable way, then nominal earnings in a currency would be expected to increase at the same rate as average prices.[4]

$$EN \cdot \frac{P_t}{P_0} = r \cdot \frac{I}{\pi_0} \cdot \frac{P_t}{P_0} \tag{2a}$$

Expected nominal earnings converted to dollars would equal the rate of return times the initial investment adjusted for subsequent exchange rate and price changes.

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[1] An alternative approach would be to assume that expected receipts equal the current rate of return on direct investments times the current market value of assets. The major problem with this approach is that we have no data on the current market value of direct investment assets, and only assumed proxies for the current rate of return.

[2] Lags will be considered later. The assumption of a perpetual income stream is not as far-fetched as it first appears if capital consumption allowances accurately reflect depreciation in the economic sense. The Department of Commerce data excludes depreciation from both income and new investment. The reinvestment of capital consumption allowances maintains the productivity of the capital stock.

[3] π_0 equals the exchange rate (cents per unit of foreign currency) in the year when the investment was made. π_t equals the current exchange rate.

[4] If inflation or exchange rate changes alter relative prices, in particular the price of the product produced by the investment relative to the costs of inputs, then real rates of return would be affected.

$$EN \cdot \frac{P_t}{P_o} \cdot \pi_t = r \cdot I \cdot \frac{P_t}{P_o} \cdot \frac{\pi_t}{\pi_o} \qquad (2b)$$

Total expected U.S. receipts on direct investment (EYR) would equal the sum over all previous investments of the rate of return times the initial amount invested adjusted for subsequent price and exchange rate changes.

$$EYR_t = \Sigma_{i=1}^{n} \; r_i \cdot I_i \cdot \left(\frac{P_t}{P_o} \cdot \frac{\pi_t}{\pi_o} \right)_i \qquad (3)$$

If r is redefined as some average rate of return for all investments, then expected receipts equal average r times the "current" dollar value of previous investments.

$$EYR_t = r \cdot \Sigma_{i=1}^{n} \; I_i \cdot \left(\frac{P_t}{P_o} \cdot \frac{\pi_t}{\pi_o} \right)_i = r \cdot AR_t \qquad (3a)$$

This variable, AR_t, does not correspond to the Department of Commerce data on the U.S. direct investment position.[5] The variable AR_t was calculated

by starting with the Department of Commerce 1957 benchmark survey, and each year (1) inflating the asset position by world average price increases adjusted for exchange rate changes and (2) adding the current direct investment outflow.[6] Since assets acquired by the end of the year have not been held on average for the full year and since newly acquired assets may not earn at their full rate immediately, new capital outflows are assumed to effect earnings with a lag.[7]

5/ The Commerce data is the sum over past years of nominal investment flows, it is not in constant or current dollars.

6/ A geometric average of 10 countries was used, with weights dependent on shares in U.S. direct investment according to Department of Commerce data for selected years between 1960 and 1977. Separate weights were calculated for petroleum, manufacturing, and "other".

7/ Assets acquired during year t were assigned a weight of .25 and assets acquired during year t-1 a weight of .50. Assets acquired before year t-1 were assigned a weight of 1.00.

Actual receipts may not always equal expected receipts. Short run or unexpected factors (X_i, s) influence profits by altering demand for the firms output or by changing the relative prices of inputs and outputs. While many such factors influence receipts, only two were included in this study: fluctuations in the growth of aggregate demand and the influence of OPEC price and tax decisions on petroleum receipts. If investors increase capacity on the assumption that aggregate demand and sales will continue their past trends, then if aggregate demand falls below its trend value, profits will be lower than expected. On the other hand, if aggregate demand is above the trend value profits will be higher than expected[8]. The variable (CW) has been included to take this into account. Each country's actual GNP in constant prices is divided by the trend value for 1960-1977; then the country values are averaged.[9]

Nominal petroleum income is likely to rise faster than the world average rate of inflation (adjusted for exchange rate changes) if petroleum prices rise more than other prices. Petroleum income is also affected by

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[8] If capacity is no longer growing at historic trend rates then the assumption that it is will lead us to underestimate profits and U.S. direct investment receipts.

[9] A geometric average of eleven countries (including the U.S.) was used with multilateral trade weights. Trade rather than direct investment weights were used on the grounds that sales and hence profits of U.S. direct investment frequently depend on the world market and not just on the domestic market of the country where the investment was made. The trade weights are shown on Table A6, the CW values on A7.

changes in royalties and tax payments to producing country governments. An additional variable, S, was included in the petroleum regressions to take these influences into account. The variable S equals the price of petroleum per barrel adjusted to subtract royalty and tax payments per barrel divided by the world average general price index adjusted for exchange rate changes. (See Table A7) The special problems encountered when analyzing the petroleum industry are discussed in greater detail in Appendix B.

A dummy variable, DR, was also included to take into account the break in the Department of Commerce direct investment income series, 1965-1966.[10]

In summary, nominal income on U.S. direct investment is a function of the rate of return, the current value of assets, world capacity utilization, a dummy and a petroleum price variable for that industry.[11] The regression equations are as follows:

$$\log YR = a_o + a_1 \log AR + a_2 \log CW + a_3 DR + a_4 \log S \qquad (4)$$

The asset coefficient a_1 is expected to be around 1. It would equal 1 exactly if there were no measurement or specification errors, if we had accounted for all factors which would cause actual earnings to deviate from expected earnings, and if there were no fluctuations or systematic trends in the rate of return on investments. In that case, the average expected real rate of return (r) on U.S. direct investment would equal the antilog of the constant a_o.

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[10] The Commerce Department 1966 D.I benchmark survey led to a substantial revision downward in their estimates of aggregate receipts. The series was revised back to 1966 but the years 1960-1965 were left unrevised. The break in individual industry series was even larger, since after 1966 many firms with a variety of activities were included in the "other" category, rather than having their earnings broken down by industry.

[11] DR equals 1 for the years 1960-1965 and zero for the years 1966-1977.

Table 2. The Regression Equations

Direct Investment Income	Constant*	Capacity Utilization	Dummy	Assets	Petrol S	R^2	D.W.	S.E.R.
Petroleum	-4.35 (-2.37)	4.33 (4.52)	.37 (3.48)	1.08 (14.35)	.32 (4.20)	.96	2.10	.10
Manufacturing	-2.42 (-1.93)	3.10 (4.19)	.37 (4.19)	1.00 (19.62)		.98	1.49	.09
Other	1.24 (1.23)	-.16 (.27)	-.03 (.54)	.85 (20.56)		.99	1.37	.06

*/ The "t" statistic appears in parenthesis below each coefficient.

b) The Regression Results

Annual data for the years 1960-1977 were used in the regressions. Table 2 summarizes the results for the three industry breakdowns: petroleum, manufacturing, and other. The R^2's are all high; the standard errors of the regressions range from .06 to .10. The actual receipts, fitted values and residuals for each industry are shown on Tables A1-A3.

The asset coefficients are significant in all cases: the values vary around 1.[12]/An asset coefficient exactly to 1 would mean that receipts increased proportionately with assets. The capacity utilization coefficients are significant in the petroleum and manufacturing industry regressions, but not in the "other" industry. A one per cent increase in the CW variable produces a 3 to 4 per cent increase in manufacturing or petroleum receipts. The petroleum relative price variable S is also significant, indicating that for each per cent increase in petroleum prices above general inflation, petroleum receipts will increase approximately by .30 per cent.

The average (pre-tax) real rates of return for each industry implicit in the regression results are shown on Table 3 for 1960 and 1977. Currently the real rate of return on petroleum assets is somewhat higher than for other industries. Over the period studied the rates of return appear to have changed appreciably only in the "other" case.[12a]/

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[12]/ The standard error in the other industry case is .04; the asset coefficient is significantly different than 1.

[12a]/ The rates of return on Table 3 are not comparable to what the Department of Commerce calls the rate of return on the U.S. direct investment position for several reasons. The Department of Commerce makes no effort to take into account inflation and how it has affected the value of assets from the date of the initial investment. The Department of Commerce rates are therefore substantially higher than the rates on Table 2. In addition the Department of Commerce uses actual receipts each year to calculate the rate of return. The rates on Table 2 are calculated using a regression estimate of what receipts would have been if the CW variable equaled 1, its average value. The rates shown on Table 2 abstract from the effects of aggregate demand fluctuations.

Table 3. Average Real Rates of Return on US DI by Industry

industry	1960	1977
petroleum	10.2	10.0
manufacturing	8.1	8.0
other	11.7	8.5

c) Assumptions Used in Projecting Receipts

In order to use the regression results, presented in section 2, to project U.S. direct investment receipts for 1979 and 1980, forecasts must first be made for the following variables: the increase in the real value of the U.S. direct investment position in 1979 and 1980, the average change in world prices and the value of the dollar, and the level of average world capacity utilization for those years.

The real value of the U.S. direct investment position was projected first, by calculating the log linear trend from past data (1960-1977).[13] We assumed that asset growth over the next several years would be below the historic trends for both theoretical and empirical reasons. First, both the relative slowing of economic growth in developed countries abroad and the recent exchange rate changes were expected to make investments in productive facilities in the U.S. relatively more attractive. Second, the trend predicted increase in U.S. direct investments abroad implied a higher capital outflow than the rate observed in the first half of 1978. As a result we projected thatU.S. direct investment assets would grow at 4/5 their historic trend rate for 1978, 1979, 1980.

The inflation and exchange rate projections used are based on the assumption that relative purchasing power parity will hold in 1979 and 1980. We assume that foreign prices adjusted for exchange rate changes will increase as rapidly as U.S. prices. U.S. prices are assumed to increase 7.5 per cent in both 1979 and 1980.[14]

The world-wide average capacity utilization variable is assumed to stay at the 1978 level in 1979 and 1980. The petroleum S variable is calculated assuming a 15 per cent average price hike in 1979, and no further change in the real price of petroleum in 1980.

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[13] The average percentage increase in real assets over the period 1960-1977 were 6.0 per cent for petroleum, 9.6 per cent for manufacturing and 7.7 per cent for "other". The annual percentage increases are shown on Table A5.

[14] See the Wall Street Journal, March 9, 1979, page 1 for a discussion of Administration inflation estimates.

These assumptions are undoubtedly subject to a substantial margin of error. Therefore we will also explore the sensitivity of the projections to variations in these assumptions.

d) The Projections

The projections of percentage increases in direct investment receipts based upon the regression coefficients and the assumptions specified in the previous section are shown on Table 4. Overall, the model projects continued rapid growth in U.S. direct investment receipts. The projected percentage increase in receipts in 1979 is particularly large for the petroleum industry.

These projected percentage increases would, of course, be altered by any change in the assumptions specified in part 3. A rough idea of the affect can be obtained by using the regression coefficients on Table 1. For example, if either real asset growth or world prices were 1 per cent higher or lower, direct investment receipts from manufacturing would change by roughly 1 per cent. If OPEC price increases in 1979 were limited to the 10 per cent average originally announced then petroleum receipts would increase only about 14 per cent in 1979.[15] Petroleum profits are also likely to be sensitive to OPEC decisions on output and taxes.

Projections of the value of direct investment receipts in 1979 and 1980 can be obtained by adding the model's projected percentage annual increases to the fitted value for 1977. These projections are also shown on Table 4. They are based upon the fitted rather than Department of Commerce value for 1977 for several reasons. First, the Commerce data are still preliminary; they have, not yet been revised on the basis of firms' annual reports. Second, realized and unrealized capital gains (losses) cause temporary fluctuations in reported

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[15] This is the effect, assuming no change in inflation rates, exchange rates, and capacity utilization.

Table 4. Projections of Direct Investment Receipts

industry	1978		1979		1980	
	bil. of $	per cent change	bil. of $	per cent change	bil of $	per cent change
petroleum	5.8	+6.8	6.7	+15.6	7.7	+13.9
manufacturing	8.4	+12.7	9.5	+13.7	11.0	+15.7
other	8.2	+14.2	9.2	+11.9	10.3	+12.0
Total	22.4	11.7	25.5	13.6	29.0	13.9

receipts. Using the fitted value for 1977 rather than the Commerce figure
will give more accurate projections, if the difference between the two is
accounted for by temporary factors.

The treatment of capital gains (losses) presents special problems.
If the subsidiary of a U.S.firm bought an asset ten years ago and sells it
today at a higher nominal price, but the same real price, the Department
of Commerce data will shown higher income for this year. Although some of
the variables in the model might influence these capital gains and although
the receipts data used in estimating the coefficients does include them, it
is unlikely that the model will accurately predict the size or timing of
these realized gains.

The same is generally true for unrealized capital gains or losses
due to exchange rate changes, reported in receipts since 1976. Since the
currency denominations of firm's assets and liabilities can be altered, one
cannot necessarily project that what happened in the past will be repeated as
the result of a similar exchange rate movement.

The influence of these temporary factors is one possible reason
why the model's projections for 1978 differ from the Department of Commerce's
preliminary data. Annual data by industry is not yet available, but the
Department of Commerce preliminary aggregate estimate is $24 billion, in
contrast to the models' projected $22.4 billion. On the basis of three
quarters, it appears that the model's projection for petroleum will be slightly
above the Commerce Departments figure, while the model's projection
for manufacturing will be substantially below. In the case of petroleum, there
is partial evidence that receipts, as reported by the Department of Commerce
were temporarily depressed by foreign currency translations losses.[16] In the

16/According to the Wall Street Journal (January 26, 1979, p. 6) Exxon reported
translation losses of $307 million in 1978 and Texaco reported $105 million.

case of manufacturing, it is possible that firms had capital gains associated with the depreciation of the dollar, but there is no firm evidence at this date.

Another possible explanation of why the model's projection of receipts might be too low has to do with the CW variable. Profits and hence receipts are assumed to vary with real GNP relative to its trend value. In recent years real GNP growth has been substantially below previous historic trends in many countries. As a consequence, it is not unlikely that investors would revise their plans downward. Capacity would grow more slowly. Capacity utilization and hence profits would not be as low as implied by the CW variable. If we assume that CW in 1978 stayed at its 1977 level, instead of falling, the model's projection of receipts for 1978 would increase $.7 billion.

Although it is not yet possible to judge whether the difference between the model's forecast for 1978 and the preliminary Commerce estimate is due to permanent or temporary factors, we can calculate how much higher receipts would be if the shift were assumed permanent. The projection for 1979 would be $27.3 billion and 1980 would be $31.0 billion.

II. Direct Investment Payments

The framework used in analyzing and projecting direct investment payments is very similar to that used for receipts. The major difference is that payments are not disaggregated by industry: data by industry are not readily available on a consistent basis for years before 1974. The model and the data are discussed in detail in the first section, followed by a summary of the statistical results. Then there are sections discussing the assumptions used in making the projections and the projections themselves.

a) the model and the data

The payments·model is analogous to the receipts model presented in part I, section a. Actual payments are assumed to be the product of both expected and unexpected factors. Expected nominal payments (EYP) equal the sum over all previous investments of the rate of return times the initial investment times the change in the price level since the initial investment was made.[17]

$$EYP_t = \Sigma_{i=1}^{n} r_i \cdot I_i \cdot \frac{P_t}{P_o} \qquad (5)$$

If r is redefined as an average rate of return then

$$EYP_t = r \cdot \Sigma_{i=1}^{n} I_i \cdot \frac{P_t}{P_o} = r \cdot AP_t \qquad (6)$$

Actual payments (YP) will not always equal expected payments because of U.S. business fluctuations. The higher real U.S. GNP compared to its trend value (CUS), the higher business profits and payments are expected to be.

Because the Department of Commerce payments data is not a consistent series, a dummy variable (DP) was included in the regression equation and certain adjustments were made in the data. The line between portfolio and direct investment was redrawn in 1974 to include as direct investment any interest greater than 10 per cent (instead of 25 per cent). Some increase in payments would be expected as a result, but it is not possible to use overlapping data to judge how much.[18] A dummy variable equal to zero from 1974 was included in the regression equation to take into account this change in definition.

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[17]Recent capital flows are assumed to have the same lagged affect on payments as on receipts.

[18] The overlapping data is strongly affected by a revision in the treatment of a petroleum company.

From 1974 on, unrealized capital gains (losses) are included both in payments and capital inflows. Table 5 shows payments and capital inflows including and excluding estimated capital gains (losses). These capital gains and losses largely reflect changes in the values of insurance companies' portfolios. In the statistical analysis and projections, consistent series excluding capital gains have been used for both direct investment payments and capital inflows. In order to project the Department of Commerce direct investment payments number, capital gains on insurance company portfolios would also have to be projected.[19]

b) the Regression Equations

The regression equation was

$$\log YP = a_1 + a_2 \log AP + a_3 \log CUS + a_4 DP \qquad (7)$$

The regression results using annual data since 1962 are shown on Table 6. The R^2 is .99; the D.W. statistical does not indicate serial correlation in the residuals. Both the asset and the income coefficients are statistically significant. The asset coefficient is just slightly below 1, indicating that the increase in payments has been almost proportionate with the increase in assets. The income coefficient indicates that payments are rather sensitive to U.S. business fluctuations. The 1977 implied real "long run" rate of return on foreign direct investments is approximately 8 per cent.[20]

c) The Projections

In order to use the model to project future direct investment payments, projections are needed of (1) the real growth of foreign direct investment in the U.S.,(2) U.S. price changes, and (3) U.S. GNP growth relative to trend.

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[19] These capital gains or losses would reflect stock and bond price movements and the skills of portfolio managers. According to anecdotal evidence, these managers have adjusted portfolios to avoid repetition of the 1974 losses.
[20] The "long run" rate of return is the rate for 1977 (before taxes), if U.S. GNP had equaled its trend value.

Table 5. U.S. Direct Investment Payments and Capital Inflows
Including and Excluding Capital Gains a/
(millions of dollars)

Year	Payments b/ excluding C.G.	including C.G.	Direct Investment excluding C.G.	Inflow c/ including C.G.
1962	399.3		346.4	
1963	459.0		231.0	
1964	528.7		321.8	
1965	656.6		414.9	
1966	710.9		425.2	
1967	821.1		698.1	
1968	876.3		807.3	
1969	847.9		1,262.7	
1970	874.5		1,463.5	
1971	1,163.7		367.4	
1972	1,255.7		949.0	
1973	1,609.6		2,800.0	
1974	1,908.8	1,330.8	5,338.2	4,760.2
1975	1,891.3	2,234.3	2,260.0	2,603.0
1976	2,620.3	3,110.3	3,856.5	4,346.5
1977	2,742.9	2,828.9	3,251.7	3,337.7

a/ Capital gains (losses) are approximate figures from a partial sample, provided
by the Department of Commerce. They should be treated as rough estimates.
b/ Survey of Current Business, Table 1, U.S. International Transactions,
line 27, Direct Investment Payments.
c/ Line 65, Direct Investment Capital Inflow.

Table 6. Regression Results Explaining U.S. Direct Investment Payments

Variable	coefficient	T value
constant	-1.65	1.15
log nominal Direct Investment Assets	.96	16.37
log U.S. GNP actual/trend	4.30	5.17
dummy	-.17	1.77
R^2 .99		
DW 1.96		
S.E.E. .07		

Since 1962 the real growth of foreign   direct investments in the U.S. has averaged about 8 per cent per year. Since 1973 assets have increased more rapidly, about 12.5 per cent per year. This higher rate of increase has been used in the projections on the grounds that the forces that have attracted foreign investors to the U.S. since 1973 are likely to continue into 1979 and 1980.[21/] These forces include exchange rate changes and the slowing down of economic growth relative to historic trends in Japan and many European countries. The nominal direct investment capital inflow for 1978 implied by a 12.5 per cent real growth in assets would be approximately $6 billion.

U.S. prices are assumed to increase 7.5 per cent in 1978, 1979, 1980. U.S. real GNP is assumed to have grown 3.9 per cent in 1978, and capacity utilization is assumed to stay at the 1978 level in 1979 and 1980. Again, these assumptions may be subject to a wide margin of error. The reader can use the regression coefficients on Table 6 to adjust the projections for changes in assumptions.

Combining these assumptions with the regression coefficients provides estimates of the percentage increase in U.S. direct investment payments for 1978, 1979, 1980., shown on Table 7. Also shown are dollar projections, calculated

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21/ Since 1973 the annual percentage increases have varied widely (between 7 per cent and 22 per cent). If we are correct in assuming a distributed lag between new investments and payments, then the increase in payments will be steadier than the growth of real assets, and assuming that real assets are growing at the average rate will not cause serious errors in projections of payments. See Appendix Table A5 for the yearly percentage changes.

by adding the predicted percentage changes to the model's fitted value for 1977.

Table 7. Projected Direct Investment Payments

Year	Per cent change	Payments (mil. $)
1978	22	3,644
1979	20	4,377
1980	20	5,258

The model projects continued rapid growth in direct investment payments, assuming no slowdown in U.S. economic growth. If, on the other hand, U.S. real GNP growth in 1979 were only 2 per cent, then the percentage increase in payments would fall to approximately 12 per cent. The payments projection is very sensitive to the U.S. real GNP growth assumption. Revision of the inflation assumptions would also change the payments projection; for each additional per cent increase in U.S. prices, payments would increase .96 per cent.

The reader should keep in mind that the projections on Table 7 exclude capital gains or losses on firms' asset portfolios. It is therefore not possible to check the model's prediction for 1978 against the Department of Commerce figures, until estimates of capital gains and losses are also available. The preliminary Department of Commerce estimate for direct investment payments (including capital gains) is $3,730 million for 1978, almost $100 million higher than the models projection (excluding capital gains).

III. Projections of Net Investment Income

Combining the projections of direct investment receipts and direct investment payments produces the projections of net direct investment income shown on Table 8. Over the next several years payments are expected to grow at a more rapid rate than receipts. But since the absolute size of receipts is

many times larger, the dollar growth in receipts is larger. Net direct investment

income is projected to increase in 1979 and 1980.

Table 8. Projected Net DI Income

	DI receipts	DI payments	net DI income
1978	24.0	3.7	20.3
1979p	25.5	4.4	21.1
1980p	29.0	5.3	23.7

p = projected

Table A1. Petroleum Industry Receipts
(millions of dollars)

Year	Actual	Fitted	Residual
1960	1,309	1,314	-5
1961	1,497	1,420	77
1962	1,713	1,557	156
1963	1,835	1,723	112
1964	1,821	1,935	-114
1965	1,853	2,147	-294
1966	1,496	1,647	-151
1967	1,765	1,721	44
1968	1,983	1,915	68
1969	2,026	2,245	-218
1970	2,456	2,448	8
1971	2,878	2,632	246
1972	3,095	3,341	-246
1973	5,717	4,897	820
1974	6,963	6,841	122
1975	4,795	4,323	472
1976	5,123	6,007	-884
1977	5,481	5,450	31

Table A2. Manufacturing Receipts (millions of dollars)

Year	Actual	Fitted	Residual
1960	1,181	999	182
1961	1,161	1,129	32
1962	1,265	1,318	-53
1963	1,527	1,524	3
1964	1,827	1,884	-57
1965	1,989	2,254	-265
1966	1,868	1,860	8
1967	1,863	2,083	-220
1968	2,411	2,434	-22
1969	3,113	2,895	218
1970	3,133	3,332	-199
1971	3,492	3,808	-316
1972	4,740	4,526	214
1973	6,579	5,791	788
1974	6,684	6,324	360
1975	5,998	6,305	-307
1976	7,223	7,009	214
1977	7,326	7,452	-126

Table A3 Other Industries' Receipts (millions of dollars)

Year	Actual	Fitted	Residual
1960	1,131	1,119	12
1961	1,164	1,180	-16
1962	1,264	1,260	4
1963	1,274	1,356	-82
1964	1,457	1,453	4
1965	1,663	1,566	97
1966	1,895	1,779	116
1967	1,977	1,974	3
1968	2,198	2,173	25
1969	2,510	2,389	121
1970	2,580	2,692	-111
1971	2,790	3,070	-280
1972	3,113	3,537	-424
1973	4,246	4,119	127
1974	5,509	4,893	616
1975	5,802	5,806	-4
1976	6,653	6,575	78
1977	7,044	7,189	-145

Table A4. Direct Investment Payments
(millions of dollars)

Year	Actual	Fitted	Residual
1962	399	426	-26
1963	459	459	-0
1964	529	523	6
1965	657	610	47
1966	711	727	-16
1967	821	765	56
1968	876	878	-2
1969	848	964	-116
1970	875	946	-72
1971	1,164	1,044	120
1972	1,256	1,266	-9
1973	1,610	1,547	62
1974	1,909	1,852	57
1975	1,891	1,875	16
1976	2,620	2,481	138
1977	2,743	3,011	-268

Table A5. Annual Percentage Increases in Real
          U.S. Direct Investment Assets Abroad and Foreigners'
          Direct Investment Assets in the U.S.

Year	U.S. Assets by Industry			Foreigners' Assets
	petroleum	manufacturing	other	
1960	5.8	14.7	8.9	
1961	8.6	8.2	7.4	
1962	6.2	10.1	7.5	5.3
1963	7.1	13.8	5.0	3.3
1964	4.9	15.1	4.2	4.4
1965	6.4	13.6	9.1	5.3
1966	5.3	11.1	11.7	5.0
1967	6.7	7.9	7.6	7.7
1968	6.7	8.1	7.5	7.9
1969	3.9	10.0	7.9	10.9
1970	8.6	7.4	9.6	10.7
1971	6.8	7.7	6.8	2.3
1972	4.7	7.7	5.6	5.7
1973	3.8	9.5	8.5	15.0
1974	7.2	8.9	10.5	22.4
1975	8.5	5.1	6.9	7.1
1976	3.1	5.0	5.7	10.7
1977	3.6	3.8	6.2	7.6

Table A6. Trade and Direct Investment Weights

Country	Direct Investments Petroleum	Manufacturing	Other	Trade Weights
Canada	.485	.438	.605	.072
Japan	.048	.028	.021	.107
U.K.	.186	.219	.102	.094
Germany	.107	.118	.044	.164
France	.046	.074	.032	.103
Italy	.041	.034	.014	.071
Belgium	.015	.035	.033	.050
Netherlands	.047	.029	.018	.065
Switzerland	.002	.018	.124	.028
Sweden	.023	.007	.007	.033
U.S.				.213

Table A7. Variable Values: S, CW, CUS

Year	S	CUS	CW
1960	1.50	.96	.96
1961	1.42	.96	.97
1962	1.31	.98	.98
1963	1.17	.98	.98
1964	.94	1.00	1.01
1965	.89	1.02	1.01
1966	.86	1.05	1.01
1967	.80	1.04	1.01
1968	.68	1.05	1.02
1969	.64	1.04	1.04
1970	.55	1.00	1.04
1971	.50	1.00	1.03
1972	.59	1.02	1.03
1973	.89	1.04	1.05
1974	2.26	.99	1.02
1975	.73	.94	.95
1976	1.40	.97	.95
1977	.86	.98	.94

Appendix B: The Petroleum Industry: Special Problems

The variable S is included in the regression analysis, as an index of petroleum companies' revenues per barrel produced. This improves our ability to explain fluctuations in receipts from petroleum, but many problems remain.

First, the measure of company revenues per barrel produced is crude. Only one petroleum price series is use (light crude, Ras Tanura, Saudi Arabia). In the early years of this study, transactions did not necessarily take place at the posted price, so the actual average price is difficult to calculate.[*] No account is taken of divergent price movements or shifts in proportions between different grades. No account is taken of differences in taxes or other charges between Saudi Arabia and other producer governments.

Second, revenues depend on output as well as profits per barrel. U.S. firms do not have the same percentage interest in all producing countries. When world demand fluctuates, U.S. receipts will also depend on which producing countries cut or expand production. In the OPEC context, this is a political decision and not necessarily predictable on the basis of past behavior. Similarly, the impact of the current crisis in Iran on U.S. petroleum receipts will depend not just on what happens to petroleum prices and producer country taxes, but also on how large the U.S. interest is in the countries that expand output.

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[*] Edelman, M.A., The World Petroleum Market Johns Hopkins University Press, Baltimore Maryland, 1972 pp.160-194

Third, recorded direct investment capital flows in the petroleum industry do not always reflect changes in claims on profits. Because of the accounting practices of certain companies, fluctuations in the rate of production cause large recorded capital flows that do not necessarily cancel each other out within a calendar year.

Fourth, takeovers of increased ownership by producing countries may not be accurately measured in recorded capital flows and if accurately measured would not affect U.S. receipts with the same distributed lag that is assumed for increases in U.S. assets abroad. For example, Venezuela has yet to complete compensation payments to petroleum companies for takeovers in 1976.

Fifth, the FASB accounting standards in force starting 1976 require reporting unrealized capital gains or losses as part of income. The petroleum companies typically have assets denominated in dollars and liabilities denominated in foreign currency. As a result, when the U.S. dollar depreciates, petroleum receipts appear temporarily depressed compared to what they otherwise would have been.

Finally, it is puzzling why the asset coefficient in the petroleum regression is greater than 1. This implies, in a sense, that the marginal return on investment has been greater than the average during the period studied. One possible explanation is that the variable S does not adequately deal with the shift in earnings due to OPEC actions from 1973 on. An alternative hypothesis might be that the petroleum companies' perception of the risk of investment in many countries has increased over the period studied, and hence the rate of return necessary to induce new investment

has increased. A second tentative hypothesis might be that there has

been a shift in the mix of petroleum companies' activities away from

capital intensive production to services and distribution. Many

producing countries have taken over ownership of production assets,

but the companies have continued to make profits from activities in these

countries. It is possible that in the future petroleum receipts will not

continue to grow-more rapidly than assets, despite the regression

coefficient of 1.08.