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THE EFFECT OF CHANGES IN ECONOMIC ACTIVITY ON U.S. TRADE FLOWS

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The Effect of Changes in Economic Activity on U.S. Trade Flows

A Progress Report

Helen B. Junz and Barbara R. Lowrey*[1/]

Recent events have demonstrated an increasing need to gain a better understanding of how changes in economic activity here and abroad tend to affect U.S. trade flows. During the couple of years leading up to the multilateral realignment of exchange rates at the Smithsonian Conference in December, 1971, the discussion of how changes in business conditions affect trade balances centered upon the question of how to isolate basic trends in trade flows from temporary, and presumably reversible influences. For example, in an attempt to gauge the size of the disequilibrium in the U.S. foreign payments balance that existed in 1971, the Organization for Economic Co-operation and Development (OECD), estimated what amounts cyclical influences might have added to or subtracted from the U.S. current payments balance during that year.[2/] Further attempts to estimate such effects were made subsequently so as to enable policymakers to form an opinion by how much exchange rate changes

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1/ We are grateful to Patricia Dimon and Chiriyan Dominick for undertaking the most onerous parts of the necessary data collection and manipulation and to Arthur Havenner for straightening us out on certain methodological points.

2/ OECD, Economic Outlook, Paris, December 1971.

and other policy measures were affecting underlying trends in the desired direction. That is, these estimates were employed in trying to gauge whether the policy steps taken were likely to ensure external payments equilibrium after a reasonable adjustment period.

More recently, the focus has shifted towards analysis of the factors that operate in transmitting inflationary -- or deflationary -- tendencies from one country to another. The experience of the current year in particular has shown that in formulating policy not only small economies with large trading sectors, but also countries like the United States with a relatively small degree of trade involvement, need to take explicit account of changing economic factors in the rest of the world. The cumulative effects of expansionary measures taken in other countries during 1971 and 1972, combined with the depreciation of the U.S. dollar, resulted in a large increase in outside demand for U.S. goods during 1973. Thus, although exports account for only 10 per cent of U.S. goods GNP in real terms, the growth in export demand between the second half of 1972 and the first half of 1973 added up to almost one-third of the increase in U.S. output of goods (real goods GNP) over that period. These figures make it clear that the growing interdependence of the world's economies is such that even the largest among them must incorporate changing economic trends elsewhere explicitly in policy formulation. An appreciation of how foreign demand for U.S. goods, and U.S. demand for foreign goods, might be affected by changing business conditions forms an integral part of such a process.

The general approach. Estimating the effect of fluctuations in business conditions on trade flows of any particular country requires taking into account the interaction of changing demand and supply conditions in the country itself as well as in other countries. Thus, the effect on imports will depend on how much domestic conditions are above or below some normal or average situation and to what extent foreign supplying economies are operating at normal levels of supply and demand pressure. In the case of exports, cyclical conditions in the country in question need to be brought into relation with those in customer countries and those in competing supplying countries. Clearly estimates of this sort might well be made by using fully articulated models of national economies and by attempting to link these models. Indeed, work in this direction, by an international group of economists, is being attempted under the appropriate title of "Project Link" but is still far from completion. And the use of general trade forecasting equations has proved inadequate, in part because activity variables in these equations generally are not as fully articulated as needed for the current purpose. Therefore, it was necessary to develop an estimating method that incorporated activity variables more specifically than is usual in most forecasting equations, but that was less ambitious than "Project Link".

In attempting to estimate effects on trade that stem solely from fluctuations in cyclical conditions, the setting of a "normal" level of demand pressure and capacity utilization becomes crucial. The word

"normal" itself poses a problem, because it carries a certain normative value implying possible policy aims when so-called "high employment" paths and associated "high employment" trade balances are being estimated. But when the question is that of tracking changes in trade flows during particular cycles, the average of actual demand pressure over the period can be used as the appropriate level with which to compare various stages of any cycle. Thus, we attempt to measure to what extent deviations from trend in demand and capacity utilization explain departures from trend growth in U.S. exports and imports. By focussing on deviations from trend, it was possible to abstract from structural changes in trading conditions, although changes in the trends themselves still pose a problem.

With this approach, the major part of effects of relative international price changes on trade flows is appropriately excluded. The cyclical factors estimated should include only the effects of cyclical fluctuations in prices. These would tend to be the immediate effects on trade of deviations from the trend of relative inflation rates. But, because of the long lags with which relative price movements tend to be translated into movements of goods, the immediate effects on the value of trade flows would be small. The major parts of relative price changes, thus, are treated as affecting trend developments. This seems appropriate particularly in view of the stickiness of prices in a downward direction. In the case of commodity prices, where this might not be true, price movements tend to be worldwide, so that changes in relative price positions would not be important.

The basic question in any estimate of cyclical effects on trade flows clearly centers on the definition of the activity variables themselves. Most trade equations have used either a GNP-gap variable or some ratio of actual industrial production to its trend value, or some combination of both, to capture changes in pressure of demand and capacity utilization.3/ However, a measure of aggregate demand pressure probably is not adequate to track influences of activity changes on trade at each stage of the cycle. This is because different stages of the cycle affect different sectors of the economy in varying ways and each of these, in turn, may evoke a different trade response. Therefore, a certain measure of disaggregation appears to be indicated and this could be thought of in three major ways:

a) the composition of demand at home and abroad crucially affects trade flows of individual countries. For example, in the early stages of a cyclical upswing, demand for industrial materials may be the major dynamic factor; in the second stage, demand for finished consumer goods may become more important; and finally, demand for capital goods may add a further dimension. Each of these demand

3/ For example, F.G. Adams, H. Eguchi, and F. Meyer-zu-Schlochtern, An Econometric Analysis of International Trade, OECD, Paris, 1969, and Evelyn Parrish and Anthony Dilullo, "U.S. Merchandise Trade Projections" Survey of Current Business, U.S. Department of Commerce, Washington, D.C., May 1972.

components has a different degree of trade involvement and, therefore, changes in the composition of demand will affect trade flows, even if aggregate demand were to remain unchanged. Thus, there is an argument for disaggregation by major commodity groups;

b) certain economies tend to be rather more intertwined than others, so that cyclical changes in one country may affect activity in other countries differentially. This is generally recognized and therefore, some sort of weighted average of changes in business conditions in customer and/or supplying countries is incorporated in most trade equations. However, these weighting patterns are necessarily crude and, at times, tend to obscure important relationships. Therefore, an argument can be made for a certain degree of geographical disaggregation;

c) finally, there are arguments for disaggregating the cycle itself. When changes in demand or supply conditions are incorporated in trade equations in a general way, the implicit assumption is that the effects of upward changes are symmetrical to those of downward changes and that the rate at which activity variables change does not have a special effect on trade flows. However, this is not necessarily true. A very fast upswing is likely to create bottlenecks,

which may affect trade flows in specific ways. A rate of growth less than the long-run average occuring at the top of the cycle tends to indicate supply constraints and, therefore, would have a very different effect on trade patterns than would the same growth rate near the bottom of the cycle.

For these reasons, the estimates described below incorporate elements of disaggregation intended to deal with these problems.

Method of Estimation. To estimate the effects of fluctuations in economic activity on U.S. trade flows, exports and imports each were related to two demand variables and two or three supply variables. The dependent variable was expressed as a deviation from trend, where the trend value is estimated as a semi-log function of time, such that trend exports or imports = Ae^{rt}. The demand and supply variables were expressed also as deviations from their trend or average values. They were stated in volume terms, but were related to trade values.

The first demand variable in each equation was chosen (as described below) so as to measure the pressure of demand in the importing country. The second demand variable attempts to capture differences associated with different stages of the cycle. Thus, the variable is concerned with the rate of growth of demand. It is defined as the actual growth rate minus the trend rate and therefore, can be used to separate the cycle into four segments: 1) pressure of demand below average, but

rate of growth above average, generally the "recovery" phase of the cycle; 2) pressure of demand above average, and growth rates above or equal to average, generally the "boom" phase of the cycle; 3) pressure of demand above average or average, but growth rates below average, generally the "top" of the cycle and the beginning of the downturn phase and 4) pressure of demand and growth rates both below average, generally the "bottom" phase of the cycle.

This division of the cycle may not be the most appropriate for estimating how different phases affect trade flows. It may well be, that a different type of separation, for example, isolating the very top part of the cycle, when demand pressure is high but growth rates are slowing, may be more appropriate. At that stage, imports may be pulled in and supply constraints may impede exports, so that a slowing growth rate would be associated with a trade balance deterioration, resulting in a negative cyclical coefficient, while normally a positive coefficient might have been expected. However, this would require a subjective evaluation of the phase of each cycle, and it was therefore decided to accept, at least in the first instance, the ambiguity of the sign attaching to the cyclical coefficient under these conditions.

The supply variables are based on the capacity utilization indexes developed by the Wharton School.[4/] The supply constraint variable

4/ Wharton Econometric Forecasting Unit, "Economic Newsletters" Wharton School of Finance and Commerce, University of Pennsylvania.

for the United States appears to affect trade to any significant degree only when capacity utilization is 3-1/2 per cent or more above its average value. For foreign countries, the supply variable exercised a significant influence at levels of average or above average capacity utilization. This may well reflect the fact that the levels of capacity utilization in other countries over the period under consideration have averaged above those in the United States, so that capacity constraints already may appear abroad at the average utilization rate. Only in the case of Japan did a below average capacity utilization rate seem to affect exports significantly.

The demand and supply variables described were brought in relation to the trade variable and single equation estimates were obtained by the use of ordinary least squares estimation techniques. The equations are estimated in log-linear form for the time period 1961-1972. In order to capture changes in the structure of international trade, the period was divided into 1961-65 and 1966-72 for purposes of deriving a weighting pattern used to obtain the various variables for the geographic areas under consideration. Trend values were fitted to the weighted variables.

The equations were estimated on basis of semi-annual data. These were thought to represent the best time frame, because unaveraged quarterly or monthly observations are subject to so great a degree of random fluctuations, that estimation results are not very meaningful.

Six-months data were obtained in a moving-average-type operation that still left four observations per annum, i.e. in addition to the customary observation periods January-June and July-December, observations for April-September and October-March were also included. This increase in the number of observations was useful because of the number of explanatory variables considered and was warranted because there was no serial correlation in the initial quarterly series.[5/]

In order to test the validity of the logic pointing towards a need for disaggregation, separate equations were estimated for several commodity and regional groups. On the commodity side, trade flows and the associated explanatory variables were disaggregated into three groups: a) industrial supplies, b) consumer goods and c) capital goods. Agricultural goods were excluded from the analysis because fluctuations in trade for these goods seem to relate more to supply conditions than to cyclical changes in demand. In addition, trade estimated to be the direct effect of the U.S.-Canadian automobile agreement was excluded as was special category trade and imports of fuels, all of which were considered to be dominated by factors other than cyclical fluctuations in demand.

5/ See H. Theil, Principles of Econometrics, John Wiley and Sons, 1971, p. 242, where it is shown that inclusion of additional observations of the type described will not introduce serial correlation problems if the initial quarterly series is not serially correlated.

The demand pressure variables explaining trade flows in consumer and capital goods were private sector expenditures for each category in the importing countries. Expenditures (in real terms) are a better indicator of demand pressure than industrial production, because at the top of the cycle output is limited by capacity constraints and, therefore, cannot properly reflect rising demand pressures. In the case of industrial supplies, where expenditure data are not available, demand pressure was measured by deviations from trend in industrial output and in business inventories. The supply variables were the Wharton School capacity indexes for the appropriate economic sectors.

On the side of geographical disaggregation, it was thought particularly important to consider Japan and Canada separately from other industrial countries. Thus, equations were estimated for four geographical subsections: a) Canada, b) Japan, c) other industrial countries, defined as Western Europe, Australia, New Zealand, South Africa, Brazil, Mexico and Hong-Kong, and d) rest of the world. Trade with the Sino-Soviet and the oil-producing countries was excluded from the analysis because it was thought to be mainly responsive to factors other than business cycle fluctuations.

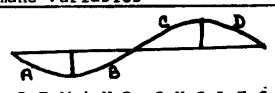
The demand and supply variables for the "other industrial countries" are based on a weighted average of fluctuations in demand and capacity utilization in the United Kingdom, France, Germany, Italy,

Belgium, the Netherlands, Sweden and Austria, the only countries for which quarterly data were available or could reasonably be constructed. For the rest of the world lagged export receipts were used to represent the demand variable.

The results. The equations shown in Table 1 seem to support the hypothesis that disaggregation both by commodity and by geographic area improves the explanatory power of the cyclical variables. Equation results for estimates that were not based on a disaggregation of the cycle are not shown, because they generally were not statistically satisfactory. Coefficients were seldom significantly different from zero and the overall fit of the equations was inferior to that of the disaggregated equations. Various discrete lags were tried, but only the equations yielding statistically the best results - i.e. those equations that appeared to have both the expected sign attached to the coefficients and a relatively respectable t-statistic - are shown. Because of the use of two-term quarterly moving averages, a 2 period lag represents a one-half year lag, a 4 period lag represents a full year lag, etc.

On the export side, the "total" export equation has an explanatory power of only 40 per cent and only one of the variables - the downward phase of the cycle - appears to be statistically significant at the 95 per cent confidence level. This equation already incorporates some degree of disaggregation, because the demand variables were obtained by weighting together fluctuations in demand for the separate commodity

Table 1: Equation Results A. EXPORTS

	Demand Variables					Supply Variables			R^{2} 1/
									
	Demand Pressure Imp. Country	DEMAND CYCLES A	B	C	D	U.S. Capacity	Competing Exporters' Capacity	Importing Country's Capacity	
TOTAL EXPORTS									
Coefficients	0.60	2.58	-1.61	1.03	2.09	0.38	0.99	--	0.398
t-Statistics	1.08	4.34	1.42	1.91	1.50	1.39	1.22	--	
Lags	2	0	0	0	0	2	4	--	
Disaggregated by commodity									
Industrial Materials									
Coefficients	1.40	1.61	-1.46	-2.65	2.72	0.50	1.27	--	0.528
t-Statistics	2.71	1.64	1.28	2.37	1.36	1.62	2.39	--	
Lags	0	0	0	0	0	2	2	--	
Finished manufactures									
Coefficients	0.19	2.13	-2.23	-0.80	0.56	0.27	0.93	--	0.526
t-Statistics	0.66	6.15	3.33	1.86	0.80	3.37	4.30	--	
Lags	2	0	0	0	0	2	0	--	
Disaggregated by geographic area									
Canada									
Coefficients	1.70	0.95	1.11	0.92	2.16	-0.35	-0.29	1.54	0.795
t-Statistics	7.84	2.28	1.98	1.49	3.93	1.08	0.69	3.23	
Lags	2	0	0	0	0	0	0	0	
Japan									
Coefficients	1.67	4.96	3.33	3.09	6.89	-0.66	1.31	1.08	0.420
t-Statistics	3.06	2.90	3.46	0.91	1.98	0.53	1.11	0.51	
Lags	2	0	0	0	0	4	4	4	
Other industralized countries									
Coefficients	0.24	2.10	0.40	0.48	3.57	-1.33	0.37	1.69	0.332
t-Statistics	0.41	2.67	0.18	0.70	2.27	3.06	0.59	2.39	
Lags	2	0	0	0	0	4	4	4	
Rest of world									
Coefficients	0.19	0.06	-0.09	-0.04	0.54	-0.54	1.93	--	-0.030
t-Statistics	0.99	0.22	0.43	0.04	0.81	1.15	1.64	--	
Lags	6	0	0	0	0	2	0		
Disaggregated by commodity and area									
Industrial supplies									
Canada									
Coefficients	0.29	1.10	-0.58	-0.73	-0.23	-0.60	-0.34	1.23	0.491
t-Statistics	0.79	1.55	0.49	0.90	0.23	2.04	0.97	3.83	
Lags	0	0	0	0	0	4	0	4	
Japan									
Coefficients	1.19	4.16	-0.38	1.25	3.05	-0.22	0.80	1.33	0.436
t-Statistics	2.18	2.65	0.20	0.80	1.43	0.23	1.00	1.39	
Lags	0	0	0	0	0	0	4	4	
Other industrialized countries									
Coefficients	3.13	-0.08	0.01	-0.14	-0.03	0.27	1.97	0.97	0.646
t-Statistics	4.84	3.00	0.32	3.96	1.15	0.66	3.88	2.04	
Lags	0	0	0	0	0	2	0	4	
Rest of world									
Coefficients	0.16	0.29	0.10	0.02	0.29	1.27	-1.43	--	0.102
t-Statistics	0.40	0.86	0.07	0.06	0.86	2.80	0.90	--	
Lags	2	0	0	0	0	2	0	--	
Finished manufactures									
Canada									
Coefficients	1.13	0.24	1.51	0.38	0.28	-0.56	-1.72	0.61	0.893
t-Statistics	6.26	0.66	3.37	1.02	0.63	2.57	7.38	3.89	
Lags	2	0	0	0	0	0	2	0	
Japan									
Coefficients	0.82	1.88	0.20	-1.10	0.93	1.41	2.54	0.74	0.554
t-Statistics	1.32	1.42	0.08	1.07	0.37	1.81	2.10	1.27	
Lags	0	0	0	0	0	2	2	4	
Other industralized countries									
Coefficients	0.94	1.91	0.97	-0.37	2.00	-0.15	1.28	--	0.437
t-Statistics	2.72	3.47	0.59	0.68	1.82	1.04	3.74	--	
Lags	2	0	0	0	0	4	0	--	
Rest of world									
Coefficients	0.26	0.13	-0.24	-0.23	0.51	-0.19	1.29	--	0.628
t-Statistics	1.23	0.39	0.22	0.92	0.92	0.69	2.11	--	
Lags	6	0	0	0	0	0	0	--	

1/ R^2 corrected for degrees of freedom.

Table 1: Equation Results B. IMPORTS

	Demand Variables					Supply Variables			R^2 [1/]
	Demand Pressure Imp. Country	DEMAND CYCLES A	B	C	D	U.S. Capacity	Competing Exporters' Capacity	Exporting Country's Capacity	
TOTAL IMPORTS									
Coefficients	0.57	-0.05	-0.30	4.19	0.53	-1.32	--	-2.67	0.598
t-Statistics	3.92	0.15	0.51	6.48	1.27	4.84	--	5.59	
Lag	2	0	0	0	0	4	--	0	
Disaggregated by commodity									
Industrial materials									
Coefficients	0.33	0.60	0.44	1.74	1.87	0.60	--	-1.27	0.340
t-Statistics	2.20	1.50	0.77	2.06	2.80	2.13	--	3.72	
Lags	0	0	0	0	0	0	--	0	
Consumer goods									
Coefficients	-0.42	-0.32	3.85	0.43	0.89	-0.07	--	0.02	0.297
t-Statistics	0.90	0.34	3.08	0.50	0.77	0.22	--	0.83	
Lags	0	0	0	0	0	0	--	0	
Capital goods									
Coefficients	0.50	1.52	-1.34	-1.05	0.26	1.90	--	-0.03	0.768
t-Statistics	3.59	3.18	1.80	1.52	0.38	6.07	--	0.11	
Lags	6	0	0	0	0	0	--	4	
Finished manufactures [2/]									
Coefficients	-0.17	-0.05	2.14	-0.85	0.24	0.35	--	-0.73	0.121
t-Statistics	0.52	0.10	1.75	1.10	0.26	1.07	--	1.23	
Lags	2	0	0	0	0	0	--	2	
Disaggregated by geographic area									
Industrial materials									
Canada									
Coefficients	0.21	0.72	1.32	1.17	0.87	0.23	-0.44	-0.42	0.340
t-Statistics	1.80	0.19	2.96	1.13	1.63	1.09	1.29	1.97	
Lags	0	0	0	0	0	0	0	2	
Japan									
Coefficients	0.76	-0.65	-2.88	3.97	2.11	0.51	0.48	-0.68	0.629
t-Statistics	2.68	0.68	2.61	2.03	1.61	1.00	0.59	1.63	
Lags	0	0	0	0	0	0	0	0	
Other industrialized countries									
Coefficients	1.00	-0.63	2.49	2.91	1.42	0.55	-1.94	-1.02	0.548
t-Statistics	3.59	0.70	2.43	1.75	1.22	1.10	2.72	1.54	
Lags	0	0	0	0	0	0	0	0	
Rest of world									
Coefficients	0.35	0.52	1.27	0.96	1.69	0.52	--	--	0.173
t-Statistics	1.53	0.83	1.55	0.97	1.33	0.94	--	--	
Lags	0	0	0	0	0	0	--	--	

1/ R^2 corrected for degrees of freedom.

2/ Sum of consumer and capital goods.

groups according to their importance in imports of each customer country. The countries, themselves, were weighted by their relative importance in U.S. exports.

Disaggregation into two commodity groups, industrial materials and finished manufactures (finished manufactures were not subdivided into capital and consumer goods because of the relatively small weight of the latter group in total U.S. exports during most of the period considered) raises the explanatory power to 53 per cent for each of the groups. On the whole, cyclical influences on exports of industrial materials appear to be greater than those on finished manufactures. In both cases, however, the U.S. supply constraint variable appears to have the opposite than expected sign: when U.S. capacity utilization is high, exports seem to rise. But, the coefficient on supply constraints of competing suppliers is significant, has the right sign, and is fairly substantial in size as well.

Disaggregation by geographic area also produces generally more satisfactory results than does the overall equation. Cyclical factors appear to explain 80 per cent of the deviation from trend in exports to Canada and the U.S. capacity constraint variable shows the expected sign, although its t-statistic is low. But the supply constraint and the demand pressure variables in Canada are highly significant and the coefficients are fairly large. The equation for exports to Japan shows demand conditions in Japan itself to be most important, while for other industrial countries capacity constraints in the importing countries as well as in the

United States seem to be most important. The equation for the rest of the world shows that export flows to this wide range of countries clearly are explained by more complex variables than their earning power of a few periods prior to that under consideration.

Disaggregation by commodity group as well as by geographic area improves the general results still further. Exports of industrial materials to Canada seem to be related primarily to capacity constraints in Canada itself, implying that the United States is the marginal supplier. In turn, willingness to supply also depends significantly on supply conditions in the United States. As could be expected, demand pressures in Japan are most important in determining U.S. exports of industrial materials to that area. The same is true for the other industrial country group, although there supply conditions in the importing area and in competing supplying countries are also important. The "rest of the world" equation is very slightly improved and implies that U.S. exports to that area are positively related to U.S. capacity levels a half a year earlier -- perhaps supporting the hypothesis that some of these countries tend to respend earnings of previous periods.

The equations for exports of finished manufactures to various regions seem the most satisfactory of all. The Canadian equation explains 89 per cent of deviations of exports from trend and both the Canadian activity variables and the U.S. supply variables are significant and have the expected sign. The explanatory power of the equation for exports to

Japan is fairly high, but the only variable that seems to be significant is the supply constraint in competing supplying countries. In the "other industrial" countries, demand conditions in the importing region and capacity constraints in competing supplying countries seem to be of importance. The importance of supply conditions in the importing region could not be estimated separately because of the large amount of intra-trade among the "other industrial" countries. Capacity constraints in these countries are subsumed in the supply variable for competing suppliers. The interpretation of the coefficient attached to that variable, therefore, is somewhat ambiguous and could also be taken to indicate a fair amount of dependence upon supply conditions in the "other industrial" countries themselves. The explanatory power of the equation for the rest of the world is much improved, but as for Japan, the only variable of real significance appears to be the supply condition in competing countries.

The total import equation, at first glance, seems to yield rather better results than the total export equation. However, although the explanatory power seems fairly high, the equation implies the odd conclusion that U.S. imports rise as capacity utilization falls. Disaggregation by commodity group yields a clue to the reason for this result: the equation for imports of consumer goods also leads to this anomalous conclusion. And this might be so, because the trend growth in consumer goods imports has been so strong, that deviations from this trend appear insignificant. The equation, however, does imply that exporting countries'

capacity constraints have a significant effect on U.S. imports of consumer goods.

The equation for imports of capital goods has a very high explanatory power and shows a significant relationship of imports to both U.S. activity variables as well as to the supply variable in the exporting country. Cyclical factors appear to explain a smaller part of the deviations from trend of U.S. imports of industrial materials than they do in the case of capital goods imports. However, disaggregation by area helps considerably in this case. It seems that U.S. imports of industrial materials from Canada are influenced to a large extent by factors other than changes in demand and supply conditions. But a considerable amount of the fluctuations in U.S. imports of industrial materials from Japan and from the other industrial countries is explained by cyclical factors. In the case of capital goods, it was not possible to see whether disaggregation by area would improve the equation results still further because of data difficulties for the years prior to 1965.

Estimated Effects of Changes in Economic Activity Variables on U.S. Trade Flows. Estimates of the magnitudes of cyclical effects on U.S. trade flows derived from the equations are shown in Table 2. The effects of changes in economic activity on U.S. exports were estimated from the equations for industrial materials and finished manufactures disaggregated by area. Effects on imports were derived from the geographically disaggregated equations for industrial materials and from the

overall equation for capital goods. No estimates were made for the effects of cyclical variations on U.S. imports of consumer goods, because these variations were swamped by the strong trend growth of imports.

The absolute amounts added to, or subtracted from, the level of U.S. exports and imports because of changes in economic activity here or abroad are fairly substantial, amounting at times to about 5 per cent of total exports and 8 per cent of total imports. (See Table 2). When imports are netted against exports, cyclical factors at times explain almost the entire balance. But comparison of the absolute size of the cyclical effects with overall levels of trade is only of interest in terms of the general magnitudes. The considerable importance that changes in the economic climate exert on trade flows is only clearly demonstrated when their role in the change in exports and imports from one period to another is examined.

As shown in Table 3, cyclical factors more often than not explain one half or more of the change in the U.S. trade balance in any one year during the past decade. In certain instances, changes in business conditions proved to be the predominant element in the period-to-period change in the U.S. trade balance. For example, in 1969 a strong upsurge in demand in foreign countries served to increase U.S. exports and a slowing rate of growth in the United States moderated the growth of imports sufficiently to produce an improvement in the U.S. trade balance in spite of the strong negative influence of other factors.

Table 3. Effects of Changes in Economic Activity on the U.S. Trade Balance 1962 - 1972 (year to year changes, billions of dollars)

	Change in trade balance of which:	Due to cycle	Due to other factors
1962	-0.9	-0.5	-0.4
1963	+0.7	-0.3	+1.0
1964	+1.8	+1.3	+0.5
1965	-1.9	-1.1	-0.8
1966	-1.3	-1.4	+0.1
1967	+0.2	+0.8	-0.6
1968	-3.3	-0.6	-2.7
1969	+0.5	+2.0	-1.5
1970	+1.4	+1.6	-0.2
1971	-4.7	-1.5	-3.2
1972	-4.4	-1.0	-3.4

Source: Table 2.

The trend deterioration in the U.S. trade balance since 1967 becomes clearly apparent once cyclical influences are removed. Of course, it should be remembered that the changes in the trade balance excluding cyclical effects -- the last column on Table 3 -- reflect not only changes in trend but also irregular factors other than changes in economic activity. For example, effects of strikes, of temporary import surcharges or changes in tax treatment of traded goods and a host of other influences are included in the trade balance adjusted for business cycle conditions. Therefore, these adjusted balances must be examined carefully before any conclusion about changes in underlying trends can be drawn. In 1970, for example, temporary dimunition of the negative influence on the trade balance of factors other than the business cycle would have led to erroneous policy conslusions if it had been attributed to an improvement in the underlying trend.

Still, as much as irregular factors of some sort or other might have influenced the cyclically adjusted trade balance, the strong trend deterioration in the closing years of the 'Sixties and in the early 'Seventies shows through clearly. And isolation of the effect of changes in economic activity on the trade balance in 1972 appears to support the conclusion that very little, if any, of the effects of the exchange rate changes of 1971 could be perceived in the year-to-year change in the adjusted balance. In terms of influences of foreign trade on activity rates, the cyclical increase in the trade balance in 1970 for example

shows the desirable support the foreign sector provided to activity rates in the United States in a year when real GNP registered on absolute decline. The cyclical increase in the trade balance in 1964, on the other hand, amy have been somewhat less desirable as it coincided with a strong domestic expansion.

Conclusions. The need to strengthen understanding of the extent to which changes in economic activity are transmitted from one country to another is unquestionable, as is the need to isolate temporary factors from more permanent ones in the observed changes in trade flows. Quantification of the effects of cyclical changes on trade flows appears to require disaggregation of both trade and the associated activity variables into broad commodity categories as well as by geographic area. In addition, it has proved to be necessary to disaggregate the cycle itself into its major components. However, it appears that further work needs to be done in this respect. Separation of the segments of the cycle mainly on the bais of capacity utilization, rather than primarily on basis of changes in the rate of economic growth may prove helpful.

Estimates of the effects of business fluctuations on trade flows show that these, indeed, exert a powerful influence. The ability to isolate this influence allows explicit policy consideration of their effect on domestic economic activity as well as a first cut at the isolation of changes in underlying trends in exports and imports.