The American Presence Aborad and U.S. Exports

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I. Introduction and Summary

Seldom do technical tax matters receive the widespread and often colorful publicity which has been generated by the recent debate over the taxation of income earned abroad by Americans. Proponents of more stringent policies refer to the pampering of mink swathed Americans and a Treasury Department stance that merits Senator Proxmire's Golden Fleece of the Year Award. Defenders of more lenient treatment for Americans abroad display pictures of foot long cockroaches.

On a less sensational level, recent Tax Court rulings and modifications to the tax law which affect Americans working overseas (section 911 of the Internal Revenue Code) would have resulted in a substantial increase in their tax burdens.[1/] Congress has voted to delay implementing the 1976 reform of section 911 while a new measure is developed that will allow special deductions for some of the additional costs incurred from living overseas.

This turnabout has been a response, in part, to the claim that higher taxation of U.S. citizens working abroad will result in a weakened competitive position for U.S. exports vis a vis those of other countries. If higher taxes are reimbursed by employers and passed on to foreign buyers, U.S. export and subsidiary sales will be less than they

otherwise would have been. As U.S. subsidiary sales decline and employment of Americans overseas falls, the effect on U.S. exports may be compounded. Because Americans may be more familiar with American products, they are more likely to order the purchase of American goods. That is, they can more readily determine the character of U.S. goods, the reliability of any maintenance service to be provided, or the certainty of delivery dates specified, etc. Consequently, fewer Americans abroad would result in fewer export sales.

Quantitative analysis of these claims has been limited. A recent report by Data Resources Incorporated (DRI) for the General Accounting Office (1978) recognizes that both the cost and marketing factors mentioned above may be relevant, but only cost considerations are allowed for in projecting the possible decline in U.S. exports due to increased taxation of Americans abroad. The DRI approach assumes that all Americans living abroad promote exports, that their increased taxes will be reimbursed by their U.S. employers, and that these additional costs will be passed on to foreign buyers through higher export prices. DRI finds that complete repeal of section 911 would result in less than a one percent increase in average export prices. They estimate that the value of exports actually would rise due to the relatively low elasticity of demand for U.S. exports.

(That is to say, the decline in the quantity of U.S. exports would be more than offset by the price increase.)

This focus on the price effect represents only part of the total effect because it ignores the likelihood that Americans abroad have a greater tendency than foreigners to "buy American" in their business and household purchases. The present study attempts to quantify this additional influence by estimating the contribution that Americans abroad make to U.S. exports, while controlling for other relevent factors affecting export patterns. The other factors included here are income per capita in foreign countries, distance to foreign markets, productive capacity abroad, potential to achieve the advantages of large scale production abroad, assets of foreign subsidiaries of U.S. corporations, and cultural- communication ties with foreign countries. Allowing for the role of all these variables in a multiple regression framework acrcss countries indicates that Americans abroad do make an independent and statistically significant contribution to U.S. exports. This effect is not negligible either; a one percent deline in Americans abroad is projected to result in slightly over a half percent decline in the value of U.S. exports. Thus, if the number of Americans abroad were to decline by 10 percent, the value of U.S. exports would be projected to decline by 5 percent.

These findings do not have a clear tax policy implication because the single equation estimated does not indicate the extent to which any tax increase might result in fewer American workers abroad. That point is best dealt with in a broader analysis considering explicitly the demand for and supply of Americans working abroad. This approach also captures the simultaneous nature of the relation between exports and Americans abroad which results if greater U.S. exports require more American service personnel. The single export equation estimates cited above may be misleading since they do not allow for this interdependence. That is to say, one cannot be sure from the single-equation analysis whether Americans abroad promote U.S. exports, or vice versa.

Analysis based on a more complete specification of the causal relationships suggests that:

(1) Americans abroad still appear to be an important determinant of U.S. exports, even after the role of exports in determining the number of Americans abroad is taken into account.

(2) The demand for Americans abroad is positively related to U.S. exports, negatively related to U.S. subisidiary operations, and negatively related to the wage received. The paradoxical result with respect to subsidiary

operations is probably an artifact of the data or the statistical methods.

(3) The willingness of Americans to work abroad in response to higher wages is two to three times as great as the reduction in the demand for their services when wages rise. Consequently, more than half of any tax increase facing Americans abroad will be offset by an increase in their before-tax wages. Still, the value of the supply elasticity is quite small, and therefore any tax increase is estimated to have a small effect on the number of Americans working abroad. As a result, even a major policy change, such as eliminating all special preferences for foreign earned income, would result in only a two to three percent decrease in the value of U.S. manufactured exports. Conversely, additional tax breaks for Americans abroad would not lead to any significant substitution of American workers for other factors of production and consequently would not greatly alter U.S. export performance.

These findings are based on a preliminary attempt to analyze more thoroughly the ways Americans working abroad may influence U.S. exports. Because the analysis is being made just as greater attention is being paid to how income earned abroad should be taxed, Congressionally mandated reporting may greatly increase the chance that these initial

findings can be re-examined with more complete data.

Section II of this paper explains the rationale behind the single equation export model, and empirical estimates based on this model are reported in Section III. In Section IV, a more complete model is developed which includes the determinants of the number of Americans abroad. The policy implications suggested by this model are elaborated in Section V.

II. A Basic Model of International Trade

A model commonly used in cross-sectional studies of international trade patterns relates the value of trade between two countries to their income levels, tastes, endowments of factors of production, and trade resistance variables such as transportation costs and tariffs. Leamer and Stern (1970) suggest three alternative rationales for such a formulation.

One alternative is referred to as a gravity model, based on the same principle from physics. In its most mechanistic application, this approach projects the flow of goods between two countries as dependent upon the product of their economic size divided by the square of the distance between them. Regardless of its merits in the context of total trade, this explanation seems considerably less appropriate for trade in specific products, since differences between export and import flows are likely to be much larger at a disaggregated level. The theory provides no explanation for specialization in the production of certain goods, and the consequent unbalanced trade for any given good.

Another alternative is based on a probalistic model of commercial contacts (Savage and Deutsch 1960). Trade between two countries is projected from the product of one country's share of world exports and the other country's

share of world imports, modified by trade resistance variables such as tariffs and transportation costs.

A third approach which rests on specifying the underlying supply and demand equations demonstrates more clearly the determination of these probabilities and the allowance of modifying factors. A country's demand for imports will depend upon its income, the price demanded by the seller, and the price of competing goods produced at home or in other countries. Because part of the price of imported goods is due to tariffs and transport costs, those factors affect relative prices and enter the demand equation. The quantity supplied by the exporting country will depend upon the price offered and the availability of necessary factor inputs. In equilibrium where quantity supplied equals quantity demanded, these two expressions are equal. The endogenous price term is eliminated, and a reduced form expression is derived for the flow of trade between two countries as a function of the exogenous income, population, tariff, distance, and resource variables. This approach has been explored in some detail by Linnemann (1966), and is extended further in the present study.

Consider first the demand for U.S. goods in foreign markets. If U.S. goods, X_{us}, and foreign domestic goods, X_f, and competing goods from other countries, X_{row}, are

imperfect substitutes, then a simplified form of the export demand facing U.S. goods is

$$X_{us} = a\, y_f^{A1}\, [P_{us}(1 + T + K_{us})]^{A2} P_f^{A3}$$

$$[P_{row}(1 + T + K_{row})]^{A4} \qquad (1)$$

where Y_f is foreign income, all P_i are prices of the competing goods expressed in country f's currency, T is an ad valorem tariff rate, and K is transportation cost as a percentage of price. The demand for other goods will be a function of the same variables. Although foreign income represents the scale of economic activity or stage of economic development abroad, two separate variables, income per capita and population, capture the same effect in a more general way, and could be entered instead. This distinction can be particulary important when the goods traded are luxury goods, with an income elasticity of demand greater than one. If two countries have the same national income, but one has a higher per capita income, it will demand more of the luxury good.

Consider the supply relation next. In order to determine U.S. prices endogenously, a supply function for U.S. goods must be specified and demand functions for U.S. goods in all markets. Linnemann develops this argument, but suggests that it is intractable empirically. Instead, his numerical analysis rests on two simplifying assumptions: (a) delivered prices of rest-of-the world goods do not vary across countries; and (b) the trade flow from one country to another involves an unique good which differs from goods exported to other countries. Only the demand and supply functions relevant to the country pair being considered are solved simultaneously to yield a reduced form equation.[2/] Linnemann specifies quantity supplied as a function of price and capacity, and further simplifies the system by constraining capacity to be proportional to income. Consequently, the set of variables which appear in the reduced form equation to be estimated is income, population, and trade resistance variables.

A less extreme approach is followed here. Prices of goods from rest of the world countries are not excluded from the model, since competing foreign exporters may provide the greatest competition to U.S. exporters. That is likely in lesser developed country markets where domestic production of many advanced goods is non-existent. Also, Linnemann's artificial condition that a country will export

a different good to each foreign market is rejected. To avoid the problem of determining prices simultaneously, which prompted Linneman's approach, the assumption made here is that a country's f.o.b. export price is set irrespective of the quantity sold in any single foreign market. Thus, the supply curve is assumed to be infinitely elastic. This simplification has been made quite uniformly in studies that estimate elasticities of substitution in international trade.

Prices do not appear in the present model because they are replaced by the resource variables that determine them. A starting point suggested by the neoclassical Heckscher-Ohlin model is to consider capital-labor endowments across countries. More recent theories that rest on neo-factors of production, such as human capital and technology or on product cycle developments, are more consistent with the framework of product differentiation assumed here. An indication of the potential importance of these distinctions is given in the cross-sectional analysis of disaggregated imports developed by Leamer (1974). He concludes that among the 3 general groups of explanatory variables (stage of development variables such as income, resistance variables such as tariffs and transport, and resource variables), the resource variables as a group are not significant. That finding suggests that an elaborate treatment of these variables probably is not

warranted, and that alternative steps should be taken to improve data sources.

Only two resource-production variables are included in the present study, productive capacity and research and development expenditures. The variable used to represent capacity is income. Greater income reflects both greater productive capacity and the likelihood that products would have been developed for the home market that successfully exploit potential economies of scale. As a consequence, more attractive prices will exist in the country with the larger capacity. The research and development variable (RD) represents a stock of knowledge that makes the availability of high technology goods at attractive prices more likely. Combining these factors, the price equation is

$$P = b\ RD^{B1}\ Y^{B2}\ . \qquad (2)$$

This expression is substituted into equation (1) to yield a reduced form model

$$X_{us} = c\ (Y_f/Pop)^{C1}\ Pop^{C2}\ [(1 + T + K_{us})]^{C3}$$
$$[Y_f RD_f]^{C4} [Y_{row}\ RD_{row}(1 + T + K_{row})]^{C5} \qquad (3)$$

where Y_f/Pop is income per capita and Pop is population in the foreign country.

In explaining U.S. exports, U.S. income and R&D expenditures will be the same in all bilateral flows, and they can be considered as part of the constant term. This simplification is reflected in the expression above. Note that the more general demand formulation, including both income per capita and population, has been used. Because these two variables and the foreign income variable introduced in the price equation are not independent of each other, one of them must be suppressed. In the estimated equations the income and population variables were included; the coefficient for income corresponds to C1-C4, and the coefficient for population to C2-C1.

What justifies the introduction into this equation of variables representing the U.S. presence abroad? American individuals and corporations abroad might be regarded as altering tastes in foreign markets in favor of U.S. goods. This demonstration effect seems plausible both for final consumer goods and intermediate inputs.

In the framework suggested by Roemer (1977), a country will export proportionately more of its weakest

manufacturing sectors in its economic sphere of influence than outside of that sphere. Alternatively stated, for those goods where the U.S. market position is weak worldwide relative to competing exporters, the U.S. market share will be higher in countries where U.S. influence is greatest. The empirical measures of this influence used in the present study are the presence of U.S. individuals and corporations abroad.[3/]

Another explanation is that the effective price of U.S. goods for foreign buyers includes more than U.S. production costs, transportation charges and import levies. An additional information cost is entailed to determine the quality of the good sold, the reliability of any maintenance service to be provided, the certainty of delivery dates specified, etc. Because American businesses and businessmen already have greater familiarity with U.S. goods, identically priced U.S. and foreign goods result in a lower effective price of the U.S. good to the American buyer. The complete expression to estimate becomes

$$X_{us} = c\ (Y_f/Pop)^{C1}\ Pop^{C2}\ [(1 + T + K_{us})]^{C3}\ .\ [Y_f RD_f]^{C4}\ .\ [Y_{row}\ RD_{row}\ (1 + T + K_{row})]^{C5}\ .\ USA^{C6} \qquad (4)$$

where USA represents factors that reflect the American presence abroad. In terms of the issues raised by Roemer, the coefficient of the USA term will be larger for those goods which are relatively less competitive in world export markets. Such goods will command a larger market share in countries where American influence is greater. More competitive U.S. exports will sell themselves and therefore be less dependent on this U.S influence. Instead, they are likely to gain a high market share in all markets, regardless of the American presence.[4,5/]

The American sphere of influence may depend on a common language and cultural heritage, factors that will be left unchanged even if tax practices are modified. If these other factors are omitted but they also are correlated with the number of Americans abroad, the influence attributed to the physical presence of Americans abroad may be overstated. One way of

meeting this objection is to use a dummy variable to reflect a common language. The proxy adopted here is U.S. tourist expenditures in a country. The implicit assumption that tourism depends upon common culture and language does not appear too unrealistic; U.S. expenditures in the U.K. are nearly twice the amount they are in France, and roughly five times the amount in Brazil, despite such attractions as the Louvre and carnival in Rio.

III. The Estimated Export Equation

The model described by equation (4) was estimated using cross-sectional data for the year 1974. The sample consists of U.S. exports of 14 three and four-digit SITC industry goods to 26 countries. The particular industries chosen are intended to reflect a representative sample of U.S. manufactured exports. Comparable data are not available for service industries such as contract construction, where U.S. personnel costs may be a higher share of total costs than in manufacturing. No attempt is made to analyze trade in agricultural products. These products are an important component of total U.S. exports, but such trade appears to be more dependent on specific natural resource endowments and government restrictions and subsidies, than on the factors analyzed here. Consequently, the applicability of the present results is limited to manufactured products.

A highly disaggregated approach is adopted in order to reduce the extent to which any export category is composed of very heterogeneous goods. Otherwise, U.S. exports to some countries may be much more advanced technologically than exports of the same general category of goods to other countries. If the U.S. share of all world markets is quite strong in the first instance but relatively weak in the second case, the differential importance of the American sphere of

influence suggested by Roemer will be lost due to the aggregation of dissimilar goods.

The 14 goods are chosen to reflect a range of industries with both strong and weaker U.S. market-positions worldwide. In addition, the goods selected must also be important enough in world trade that the reported flows to different countries will not include a large random component due to reporting and rounding errors. Table 1 shows the industries used in this study. The countries chosen include all major developed countries with market economies and major developing countries from all continents.[6/]

The data source for the GNP and population figures is from IMF, International Financial Statistics. Export flows and average exchange rates for 1974 are from the OECD, Trade Statistics, Series C and A, respectively. Nautical distances are calculated from Distances between Ports, U.S. Navel Oceanographic Office. Distances from ports to commercial centers are based on Linnemann's adjustments. A fixed distance component is added to reflect the nonlinearity of transport costs as a function of distance, due in part to fixed costs of loading and unloading. Aggregate R&D expenditures were collected from the OECD over 8 years to represent a stock of knowledge available for

producing technologically advanced goods. Two variables which reflect the U.S. presence in a given country, are the assets of controlled foreign subsidiaries of U.S. manufacturing corporations and the number of Americans working abroad. This information is available from Treasury Department compilations.

The estimates are made by pooling all industry observations. Pooling does not force the behavioral coefficients to be the same for all goods, and in fact, whether the coefficients across goods are statistically different from each other emerges as an easily testable hypothesis. (Johnston 1972; for an extensive application see Ginsburg 1969). Often heteroskedasticity is a major problem in cross-sectional studies, which leads to misplaced confidence in the significance of the estimates made. Test statistics indicated that was not the case here. (See Goldfeld and Quandt).

In Table 2 estimates of equation (4) are presented in summary form only, in order to focus on the estimated coefficients of the behavioral variables. Constant terms are omitted, although the separate dummies corresponding to each good were often significantly different from each other. These dummies also were used multiplicatively with the independent variables representing the U.S. presence abroad, to allow for possible differences in this behavioral parameter

across goods. In no case did allowing for different coefficients across goods result in a significant reduction in the residual sum of squares, and the null hypothesis of homogeneous slopes could not be rejected.

The numerical estimates show a surprising degree of agreement with previous studies. Attempts to distinguish among different explanations of the American sphere of influence, though, result in multicollinearity between the included variables and reduce the size and significance of the more traditional variables. The estimated values are similar to the priors specified by Leamer in his Bayesian analysis of U.S. imports. From his review of previous studies, Leamer set the GNP elasticity equal to .8, the population elasticity to -.2 and the distance elasticity to , -1.0. The GNP elasticities reported here are slightly lower possibly due to the greater importance of economies of scale in the production of these goods. Since GNP is used to represent a country's productive capacity and the ability to exploit economies of scale at home, an important downward influence on the GNP coefficient is introduced. The population elasticities are somewhat greater in absolute value, probably because of the greater income elasticity of demand for these goods; this coefficient becomes more negative the more the income elasticity of demand exceeds one. The distance elasticities are smaller than reported by

Leamer, due to the smaller role of transportation costs in the sale of these goods than agricultural products and crude materials, which are included in more aggregative studies.

The R&D variable and the income capacity variable are highly collinear. Due to this lack of independent variation, their separate effects on exports cannot be distinguished and the R&D variable was dropped. The estimates do confirm that the U.S. exports proportionately more to countries whose other trading partners are less likely to exhaust potential economies of scale.

Turning from these preliminary comments to the primary focus on the American sphere of influence and exports, two points stand out:

(1) High levels of U.S. exports are associated with the presence of Americans abroad. Both the after-tax income and controlled foreign asset variables are statistically significant when entered either separately or together in the basic trade model. The magnitude of the estimated coefficients is not trivially small, either. A one percent decrease in Americans abroad, is estimated to decrease the value of exports by somewhat over half a percent.[7/]

An attempt was made to determine whether the effect of Americans abroad on export performance was not a simple

proportional one. For instance, it might be necessary for some threshold level of business activity within a country to be American before any great effect on U.S. export performance would emerge. As the American presence increased beyond this point, its further effectiveness might become progressively smaller. Horst (1978) reports findings of this type with respect to foreign subsidiary production in a country and U.S. exports to it. In the present analysis this non-linear pattern was observed, but the estimated coefficients were statistically insignificant.

(2) The importance of Americans abroad appears to be greater for weak exports, i.e., those goods where the U.S. has a relatively smaller share of the world market. This possibility is investigated by creating an interaction term, the number of Americans abroad multiplied by the U.S. share of the world market for a particular good. The negative sign obtained indicates that as the U.S. market share becomes larger, the importance of Americans abroad as a determinant of export sales becomes smaller. The estimated coefficient seems unreasonably large, and it also is sensitive to the exact specification of the estimated equation. Consequently, any definitive statement regarding the numerical importance of this effect is premature.

IV. The Simultaneous Determination of Exports and the Number of Americans Abroad

The reduced-form export equation estimated above cannot answer a critical policy-related question. To what extent would less favorable tax treatment of Americans working abroad worsen the U.S. balance of payments? A more explicit model of the determinants of Americans working abroad is necessary to indicate whether fewer Americans would be willing to work overseas if after-tax income were to fall, or whether U.S. employers would reimburse their employees and pass this additional cost on to foreign buyers. Such a model can also allow for the possibility that exports and the number of Americans abroad may be simultaneously-determined variables, due to increased export sales requiring greater skilled service personnel.

Consider the demand equation first. Demand for Americans working abroad will be a function of the scale of operations that require the special skills which Americans offer and of the wage paid. The relevant expression to estimate is

$$USA = F + F1 \cdot EX + F2 \cdot CFC + F3 \cdot WAGE \qquad (5)$$

where EX is total manufactured exports, and CFC is U.S. manufacturing subsidiary assets, and WAGE is the nominal wage rate. However, to the extent that citizens of other countries are very close substitutes for Americans abroad, the demand for Americans alone can be viewed as a residual

function, derived from the total demand for skilled labor inputs less the quantity supplied by other nationals.

The supply of Americans willing to work in a country may be influenced by a variety of factors, including a common language and cultural ties or a favorable climate, and the real return or monetary rewards from working there. The first factor may be captured by the tourism variable explained earlier. The second variable is the nominal wage rate adjusted downward for the higher cost of living in the given foreign country. That adjustment is calculated from the U.S. State Department cost of living and quarters allowances. Again expressing all variables in logarithms, the algebraic model is

$$USA = G + G1 \cdot TOURSM + G2 \cdot (WAGE-COL) \qquad (6)$$

where COL is the cost of living adjustment factor, TOURSM represents tourist expenditures in a given country.

These two equations, together with the reduced form export equation analyzed in the preceeding section, constitute an overidentified, simultaneous system that can be estimated using two-stage least squares. With respect to the ordinary least squares estimates of the export equation reported above, the importance of Americans abroad may be understated due to the correlation of a regressor with the error term. For example, suppose a randomly caused reduction in the number of Americans abroad leads to a reduction in U.S. exports which causes a further reduction

in the number of Americans required abroad. An estimate which picks up both pieces of the reduction in Americans abroad and correlates them with the decline in exports would understate the export impact of the initial exogenous decline in Americans abroad.

Estimates of this simultaneous model are reported in Table III. The coefficients of the reduced-form export equation are not altered greatly. The major difference is that the coefficient of the interaction term, which shows whether the importance of Americans abroad varies with the world market share of the good considered, is much smaller in magnitude and statistically insignificant.

The demand for Americans abroad is a positive function of U.S. exports, a negative function of the wage rate, and unexpectedly, a negative function of U.S. manufacturing subsidiary assets abroad. This surprising result may be due to the omission of other relevant variables or to the fact that subsidiary assets may not be a good indication of the scale of foreign activities. No adjustment could be made for any qualitative differences of Americans working in different countries. This shortcoming undoubtedly limits the precision of the estimates and may bias the elasticity of demand downward. On the other hand, since the share of Americans abroad in the total cost of sales is so small, it is not surprising that the derived demand would be small.

The supply equation yields the expected result that as the average real wage increases, the number of Americans working in the country will rise. Because this result is obtained in a cross-sectional model, it requires further interpretation. Such a model provides a basis for projecting how a change in the French income tax could affect the number of Americans living in France; real wages in one country are changed, assuming that they remain constant elsewhere. Since a change in American tax laws may change real wages in all foreign countries, the estimated equation should not be construed as indicating the effect on Americans living abroad. Instead, the estimate does provide an upper bound projection of this responsiveness to changes in income. A reduction in real wages everywhere will lead to less movement out of France than when real wages fall only in France because other overseas locations become relatively more attractive.

V. Policy Implications and Conclusions

The estimates reported above from the more complete model allow a tentative response to the balance-of-trade-taxation-of-Americans-abroad issue raised at the outset. The estimates also address the distributional issue of the incidence of any increased tax liability of Americans abroad.

Treating the incidence issue first, less than half of any increase in the tax liability of Americans abroad is likely to be borne by them.[8/] This result occurs because the effect of a tax increase is for some Americans to return to the U.S. As a consequence, before-tax wages rise for those who remain abroad and also for other nationals, who are attracted by the increased wages and can by substituted for Americans. An important feedback effect is that fewer Americans abroad lead to fewer U.S. exports and reduced demand for skilled sales and service personnel overseas. This factor depresses the wage paid and further reduces the after-tax wage received by Americans abroad.

If the rather drastic step were taken of repealing all special treatment of foreign earned income under Section 911, the initial impact would be to reduce after-tax income of Americans abroad by roughly 11 percent compared to the situation under 1975 law. This impact obviously varies

across individuals and the countries where they work, but on average such a tax change would be estimated to result in an increase in before-tax wages rates of 6 percent and a decline in after-tax wages of 5 percent. (See Appendix A). This projection illustrates why Americans abroad have been particularly active in trying to reverse the 1976 reforms which reduced the tax benefits applicable to income earned abroad. Because not all of any tax increase will be reimbursed by their U.S. employers as assumed in the DRI analysis, Americans abroad are not indifferent to the tax legislation adopted.

From the same set of parameter estimates, the effect on the value of U.S. manufactured exports from repealing Section 911 is projected to be a decline of roughly 2.7 percent. The effect differs from the improved trade balance predicted by DRI. This difference occurs because the present study does quantify the alleged buy-American practices of Americans abroad. The magnitude of the balance of trade change still is much less than that attributable to the annual rate of expansion of U.S. exports.

These findings are based on a preliminary attempt to analyze more thoroughly the ways Americans abroad may influence U.S. exports. Efforts to improve the data used and the procedures applied are needed to confirm or negate the reported results. Since the results presented in this

paper are preliminary, it is important to recognize the proper context in which to apply them and to do so with caution.

Table 1

U.S. Share of World Export Markets, 1974

SITC Number	Industry	Percentage of Market
714.9	Office Machinery	53.7
718.4	Construction and Mining Machinery	39.2
861.7	Medical Instruments	34.0
711.6	Gas Turbines	32.2
541.3	Antibiotics	30.5
712	Agricultural Machinery	29.8
719.3	Mechanical Handling Equipment	26.6
724.9	Telephone and Telegraph Equipment	21.5
678.2	Seamless Tubes and Pipes	17.9
694	Nails, Screws, Fasteners, etc.	14.8
812.4	Lighting Fixtures	11.4
717.1	Textile Machinery	9.4
891.1	Phonographs and Tape Recorders	8.7
673	Iron and Steel Bars, Rods, Angles, etc.	4.4

Table 3

2SLS Estimates of the Simultaneous Model

$$EX = 1.55 + \underset{(.55)}{.10Y} - \underset{(-1.1)}{.12\ POP} - \underset{(-2.7)}{.33\ DREL} - \underset{(-2.8)}{1.34\ YREL} + \underset{(3.9)}{.67\ USA} - \underset{(-.4)}{.03\ INTERACT}$$

$$+ .15\ TOURISM + .16\ CFC \qquad F_{21,342} = 29.23$$

$$USA = 5.1 + \underset{(4.8)}{.84\ EX} - \underset{(-.76)}{.07\ CFC} - \underset{(-.78)}{.32\ WAGE}$$

$$F_{3,22} = 13.2$$

$$USA = 8.4 + \underset{(3.4)}{.23\ TOURISM} + \underset{(.92)}{.85\ (WAGE\text{-}COL)}$$

$$F_{2,23} = 5.9$$

All numbers in parentheses are t statistics.

Table 2

OLSQ Estimates of the Export Equation

Y	POP	DREL	YREL	USA	CFC	TOURSM	INTERACT	R
.850	-.465	-.615	-1.95	.320				.59
(8.58)	(-5.84)	(-6.36)	(-4.32)	(3.16)				
.819	-.451	-.541	-1.95	.634			-.266	.60
(8.28)	(-5.72)	(-5.45)	(-4.35)	(4.18)			(-2.76)	
.405	-.297	-.461	-1.65	.647	.248		-.221	.63
(3.23)	(-3.63)	(-4.74)	(-3.77)	(4.42)	(5.10)		(-2.37)	
.399	-.220	-.407	-1.78	.543		.206	-.139	.61
(2.70)	(-2.22)	(-3.91)	(-4.04)	(3.60)		(3.76)	(-1.38)	
.320	-.239	-.426	-1.64	.613	.210	.072	-.184	.63
(2.17)	(-2.45)	(-4.16)	(-3.75)	(4.10)	(3.58)	(1.10)	(-1.84)	

All numbers in parentheses are t statistics.

Appendix A

From equations (4), (5) and (6) in the text, multiplier relationships for the three endogenous variables (value of U.S. exports, number of Americans abroad and wages of Americans abroad) can be derived with respect to a change in U.S. tax policy. The expressions for these solutions are as follows:

$$\frac{dEX}{EX} = \frac{G2.F3.C6}{G2(1-F1.C6)-F3} \quad \frac{dTax}{Wage}$$

$$\frac{dUSA}{USA} = \frac{F3-G2}{G2(1-F1.C6)-F3} \quad \frac{dTax}{Wage}$$

$$\frac{dWage}{Wage} = \frac{G2(1-F1.C6)}{G2(1-F1.C6)-F3} \quad \frac{dTax}{Wage}$$

Footnotes

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1/ The Tax Court ruled that allowances and expenses paid by an employer on behalf of an employee, such as housing, education, and travel expenses, are includable in the employee's gross income. The Tax Reform Act of 1976 reduced the amount of income earned abroad that is excluded from taxation, taxed remaining income at the higher rate that would apply if excluded income were subject to tax, and disallowed a credit for foreign taxes attributable to the excluded income (U.S. Treasury, 1978).

2/ This rationalization still seems incomplete theoretically. Assuming that a different good is exported to each market does avoid the necessity of aggregating demand equations across all countries to give a total market demand function. However, while quantity demanded in each market thereby depends on the relevant variables from a single country only, quantity supplied by the U.S. to that market will depend upon what is supplied to other markets. This interdependence exists as long as resource requirements are not identical in the production of all goods. Different factor requirements imply increasing opportunity cost as output of one good expands.

3/ Roemer claims that multinational subsidiaries can be rejected as a possible determinent of a country's sphere of influence, since eliminating intrafirm trade does not affect his non-parametric analysis of U.S. trade patterns. This interpretation a priori rules out the claims cited above that U.S. controlled foreign corporations may have an economic incentive to buy American in general, which other foreign corporations would not have.

4/ To capture the effect of Americans abroad suggested in the DRI analysis requires an additional term. The supply equation should be modified to include the wage rate of Americans abroad, since American labor is regarded as an input used in fixed proportions to make export sales. This input concept may be particularly appropriate for high technology export goods which do require American sales and service personnel. Such a term was included in the analysis, but not surprisingly it was statistically insignificant. That result follows from the DRI estimate that the elasticity of demand for U.S. exports is approximately one, in which case either a higher or a lower wage rate will not affect the value of export sales.

5/ Information on the number of other foreign nationals in a given country would be of interest too, but it is not available. Any bias from omitting it is not clear. If the foreign presence were closely correlated with a U.S. presence, as might be the case if large potential markets were to attract foreigners from all competing suppliers, then the estimated coefficient for the U.S. variable would be biased downward. If instead the U.S. presence were weakest where foreign competitors were most active, the estimated coefficient for the U.S. would be biased upward. For an example of the econometric relationships that support these statements, see Johnston, pp. 168-169.

6/ The countries included in the study are: Canada, Japan, Australia, Belgium-Luxembourg, France, Germany, Italy, the Netherlands, Sweden, Switzerland, the United Kingdom, Algeria, Nigeria, South Africa, Mexico, Venezuela, Brazil, Israel, Saudi Arabia, Iran, Pakistan, India, Indonesia, the Phillipines, South Korea and Taiwan.

7/ This interpretation ignores whether results obtained across countries at a given point in time can be used to explain responses in a particular country over time. The implicit claim is that if the American presence were scaled back in a particular country, the effect on exports could be inferred from the import behavior of countries where the U.S. presence is smaller, all else constant. To pursue this point further it would be desirable to allow for separate country dummies to test

whether the behavioral coefficients did vary significantly across countries. Doing so would require that data be available for at least one other year; otherwise, these additional variables would be colinear with the included set of variables. This extension may be possible in the future, since the increased economic importance of the issues involved has resulted in more complete data collection and compilation.

8/ This phrase more precisely refers to an increase in the U.S. tax liability of those working abroad after allowing for the foreign tax credit. Subsequent references in this section also imply a net figure which includes the increased total U.S. tax liability less the increased ability to offset this liability with taxes paid to foreign governments.

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