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Financial Policy and Systems

Country Economics Department
The World Bank
January 1989
WPS 134

International Trade in Financial Services

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Country A is richly endowed with highly trained bankers and managers, Country B with capital, and Country C with arable land. Which country is at a comparative advantage in providing financial services to consumers in other countries?

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The issue of trade in services is the subject of increasing interest. Evidence of this is its inclusion in the Uruguay Round of GATT negotiations. As a contribution to the analysis of the issue, in this paper the influence of a country's resource endowments on its net trade in financial services is analyzed.

A modified version of the Heckscher-Ohlin model is developed, which allows for technological differences across countries. This version is then used to explore which productive resources constitute sources of comparative advantage in the provision of financial services. What is the impact of the availability of skilled labor, physical capital, or other productive resources on trade in financial services?

The conclusion? Skilled labor is a source of comparative advantage in financial services.

Conversely, relatively larger endowments of arable land and capital would have a negative impact on trade in those services and can therefore be identified as sources of comparative disadvantage. Land resources tend to be diverted to agricultural use; capital tends to be diverted to manufacturing. Evidence on the effects of unskilled labor endowments is inconclusive.

Future research should focus on the implications of restricting trade in financial services. If financial services are considered as "inputs" in the production of goods and services, might barriers to trade in financial services result in inefficient allocation of productive resources, distorted consumption patterns, and significant welfare losses?

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I am grateful to Bela Balassa, Harry Bowen, Jaime de Melo, Richard Levich, Thomas Pugel, Paul Wachtel and Ingo Walter for their comments. All remaining errors are my sole responsibility.

International Trade in Financial Services

1. Introduction

This paper analyzes the influence of a country's resource endowments on its net trade in financial services. By "trade in financial services" we refer to the provision of financial services by a financial institution in one country to a consumer of those services in another country. Following Walter (1985), we define financial services as comprising the following "products": a) domestic- and foreign-currency deposit-taking and lending to governments, corporations, private individuals, and others; b) specialized forms of lending, including trade financing, loan syndications and participations; c) domestic- and foreign-currency trading and dealing; d) securities brokerage, private placements, financial advisory services, and various other services.

Significant evidence of the increasing practical interest in this issue is given by the inclusion of services in the Uruguay Round of GATT negotiations. Yet, little is known of the determinants of trade in services. The few studies are mostly theoretical (Giddy (1983) and Walter (1985)). Empirical research on the topic is almost non-existing; a notable exception is the work by Sapir and Lutz (1981). This paper attempts to contribute fill this gap by providing some evidence on the direction of trade in financial services.

As in Giddy (1983), we assume that the pattern of trade in financial services is determined by the law of comparative advantage. Our main objective then is to identify those resources which may constitute sources of comparative advantage in the provision of financial services. The theoretical framework developed in section 2 is given by a modified version

of the Heckscher-Ohlin (H-O) model of international trade. We start our analysis with the traditional version of this model and derive a correct expression for trade in a single commodity. Next, we relax the assumption of identical technologies across countries. In this more realistic version, resource endowments are adjusted to account for technological differences.

Both versions of the model are estimated in section 3 by cross-sectional weighted least-squares regression analysis using 1977 data for 44 countries. Results from both models concur with the modified H-O model yielding somewhat more significant results. These results are plausible and lend support to the United States' position in the GATT negotiations. Skilled labor is a source of comparative advantage in financial services. Conversely, relatively larger endowments of arable land and capital would have a negative impact on trade in those services and can therefore be identified as sources of comparative disadvantage. The impact of the availability of unskilled labor is less clear.

2. Theoretical Models

We start with the traditional H-O model of international trade. Next we extend this model, relaxing the assumption of identical technologies across countries. In each case we derive an expression for a country's net exports vector to concentrate then on the specific component of this vector defined to represent trade in financial services. The discussion leads to the formulation of the empirical specification to be used in the estimation of each of the models.

2.1. The Traditional H-O Model of International Trade

Let us assume: (1) a competitive equilibrium with commodity price equalization, (2) constant returns to scale production functions with nonreversible factor intensities for all goods, (3) identical technologies in all countries, (4) identical and homothetic preferences for all

countries, (5) equal numbers of factors and goods¹, and (6) incomplete specialization.

From these assumptions it can be proved (see, for example, Samuelson (1948) and Leamer and Bowen(1981)) that: (i) factor price equalization holds, (ii) the input-output matrix is the same for all countries, and (iii) endowments and trade are related by the system of equations:

$$(1) \quad T_j = A^{-1}(E_j - Ew_j)$$

where

T_j : $n \times 1$ vector of net exports of commodities by country j

A : $n \times n$ input requirement matrix

E_j : $n \times 1$ vector of factor endowments of country j

E : $\sum_j E_j$

$w_j = (Y_j - B_j)/Y$

Y_j : gross national product (GNP) of country j

B_j : country j 's balance on merchandise trade

$Y = \sum_j Y_j$

Given that services are traded internationally, the previous model should be expanded to take this fact into consideration. T_j and B_j are therefore redefined according to the following:

T_j : $n \times 1$ vector of net exports of commodities and services by country j

B_j : country j 's balance on goods and services

Under assumptions (1) to (6) above, after manipulation (1) can be rewritten as:

$$(2) \quad T_j = (A^{-1} - QW'/Y)E_j + B_jQ/Y$$

where Q is the vector of quantities of goods and services produced in the world and W is the vector of world prices of factors of production.

The first term in the RHS of (2) shows the impact of country j 's

factor endowments on the quantities of goods and services traded. Let $N = A^{-1} \cdot QW'/Y$. Each component of the matrix N reflects a production effect, associated with the corresponding component in matrix A^{-1} , and a consumption effect associated with the corresponding component in matrix QW'/Y . The second term in the RHS of (2) captures the role of unbalanced trade.

We are focusing on one specific component of the trade vector, namely, trade in financial services (TF). This can be expressed as:

$$(3) \quad TF_j = \sum_n b_n E_{nj} + b_{n+1} B_j$$

where b_n equals the n -th component in the row of matrix N corresponding to financial services, and b_{n+1} equals the ratio of world production to world income. Given factor price equalization, the coefficients b_n result equal across countries. b_{n+1} is also country-independent.

An interesting feature of equation 3 is that the balance on goods and services appears as an explanatory variable. In general, existing studies analyzing trade in a specific commodity along the lines of the traditional H-O model assume, either explicitly or implicitly, that trade is balanced, that is, that $B_j=0$, and therefore omit this variable (see, for example, Bowen (1983)). Correlation between the omitted variable and the included independent variables would give rise to misspecification biases in the parameter estimates. If, as in the case of our study, the omitted variable -balance on goods and services- is uncorrelated with the included variables -resource endowments-, the misspecification bias may be zero, and the omission of the balance on goods and services variable then has no consequence as far as the parameter estimates corresponding to the included variables are concerned. However, if the excluded variable is relevant, the explanatory power of the misspecified models will be lower than that of the complete model.

2.2. A Modified Version of the H-O Model: Introduction of Neutral Technology Differences

Now relax the assumption of identical technologies in all countries. Assume that technological differences across countries are neutral, namely, that they result in "savings" of all input requirements proportionately.² Furthermore, assume Leontief technologies across countries.

For simplicity in the exposition we will develop the model within a two country-two product-two factor-framework, where the two countries are country 1 and country 2, the two "products" are products X and Y, and the two factors are capital (K) and labor (L).

Trade is related to output and consumption by the identity:

$$(4) \quad T_j = Q_j - C_j \quad \text{with } j=1,2$$

Given the assumptions of Leontief technologies and neutral technological differences across countries, for any wage-rental ratio, the K/L ratio for each product is constant across countries. Furthermore, the input-output coefficients for each product in country 1(2) will be a multiple of the input-output coefficients for the same product in country 2(1). This can be expressed as:

$$(5) \quad A(2) = A(1)D$$

where

$A(j)$: 2 x 2 matrix of factor input requirements where the element $a_{fi}(j)$ indicates the amount of factor f used to produce one unit of product i in country j ($i=X,Y$; $j=1,2$; $f=K,L$)

Within this framework, it can be shown that the net trade vector for countries 1 and 2 is given respectively by:

$$(6) \quad T_1 = A^{-1}(1)E_1 - [A^{-1}(1)E_1 + D^{-1}A^{-1}(1)E_2]w_1$$

and

$$(7) \quad T_2 = D^{-1}A^{-1}(1)E_2 - [A^{-1}(1)E_1 + D^{-1}A^{-1}(1)E_2]w_2$$

Adjustment of the resource endowments in country 2 allows us to go back to a framework where there is a unique input-output matrix across countries. The required adjustment implies expressing country 2's resource endowments in units of resources that are comparable to those of country 1. By comparable we mean resources of equal quality or equal productivity.

In an n-country world, $A(j) = A(1)D(j)$, for $j=1, \dots, n$, where $D(j)$ is country j's diagonal matrix of technological differences with respect to country 1, and $D(1)$ is the identity matrix.

Letting A equal $A(1)$, country j's net exports vector can be expressed as:

$$(8) \quad T_j = D^{-1}(j)A^{-1}E_j - [\sum_j D^{-1}(j)A^{-1}E_j]w_j$$

The first term in the RHS of (8) shows country j's production of goods and services. The second term shows its consumption.

After transformation, and letting $M = I - [\sum_j D^{-1}(j)A^{-1}E_j]P'/Y$ where P stands for the vector of world prices of goods and services, (8) can be rewritten as:

$$(9) \quad T_j = MD^{-1}(j)A^{-1}E_j + (B_j/Y) \sum_j D^{-1}(j)A^{-1}E_j$$

As in expression (2) corresponding to the traditional version of the H-O model, the first term in the RHS of (9) captures the impact of country j's endowments on its trade vector. The second term centers on the role of unbalanced trade.

Let the h-th element of country j's trade vector represent this country's net trade in financial services (TF_j). TF_j can then be expressed as:

$$(10) \quad TF_j = m_{h1}[v_{11}(E_{1j}/d_{11}(j)) + \dots + v_{1n}(E_{nj}/d_{11}(j))] + \dots \\ + m_{hn}[v_{n1}(E_{1j}/d_{nn}(j)) + \dots + v_{nn}(E_{nj}/d_{nn}(j))] + B_jQ/Y$$

where m_{hi} and v_{hi} are the i-th element of the h-th row of matrixes M and

A^{-1} respectively.

Assume country 1 is the most technologically advanced country. $d_{ii}(j)$ indicates the i -th diagonal element of country j 's matrix of technological differences and equals the ratio of any particular input-output factor requirement associated to the production in country " j " of any good or service " i " to the input-output coefficient associated to the same factor of production and the same good or service in the most technologically advanced country. In our empirical analysis we proxy a country's level of technological development by different functional forms of the ratio of current expenditures in research and development (RD) to GNP. Unfortunately, this ratio is not readily available on a sectoral basis across different countries in the world. Our empirical analysis is therefore constrained by the additional assumption that technological differences are constant across sectors. So let:

$$(11) \quad d_{ii}(j) = d(j) \quad \text{for } i=1, \dots, n$$

Expression (10) can therefore be rewritten as:

$$(12) \quad TF_j = \sum_n g_n [E_{nj}/d(j)] + g_{n+1} B_j$$

where $g_n = \sum_i m_{hi} v_{in}$ and $g_{n+1} = Q/Y$.

The functional form of (12) is identical to that of the empirical specification associated to the traditional version of the H-O model -expression (3)-, except that in (12) the resource endowment variables are adjusted to reflect each country's stage of technological development. As indicated before, the required adjustment implies expressing country j 's resource endowments in units of resources that are comparable -that is, of equal quality or equal productivity- to those of the most technologically advanced country.

The coefficients associated to the resource endowment variables, which in (3) were both mathematically simple and intuitively explainable,

result in (12) more complex. In return for this increased complexity, the coefficients allow for the consideration of technological differences across countries.

3. Empirical Tests

We proceed to the estimation of each of the two models developed above -equations (3) and (12). We start analyzing the empirical specifications of these models. We then comment on the data and the statistical methodology, and conclude with a discussion of the empirical results.

3.1. Specifications

Along the lines of traditional research in the determinants of comparative advantage in goods, the endowments included in our study are: capital (C), skilled labor (SL), unskilled labor (L), and arable land (AL). Apart from endowments we must also include as an independent variable the balance on goods and services (B).

The estimation equation derived from the traditional H-O model of international trade is therefore:

$$(13) \quad TF_j = b_0 + b_1C_j + b_2SL_j + b_3L_j + b_4AL_j + b_5B_j + e_j$$

where e_j is the error term. The estimation equation derived from our modified version of the H-O model is:

$$(14) \quad TF_j = g_0 + g_1ZC_j + g_2ZSL_j + g_3ZL_j + g_4ZAL_j + g_5B_j + u_j$$

where for each resource endowment of country j (E_j), $ZE_j = E_j/d(j)$, and u_j is the error term. In both cases the error term is assumed to be uncorrelated with the variables included in the model.

We expect the production of financial services to be intensive in human capital (highly trained bankers and managers) and physical capital

(equipment, particularly electronic devices to deal with information). (See Walter (1985).) Consequently, the Rybczinsky theorem would suggest that an increase in the supply of any of these two factors should lead to an increase in the output of financial services. Furthermore, if the assumption of identical homothetic tastes holds, then results concerning production translate into results concerning the difference between production and consumption, that is trade. Therefore, in terms of the H-O theory we expect an increase in the relative abundance of either skilled labor or capital to lead to increased net exports of financial services. On the other hand, an increase in the endowment of unskilled labor or arable land would, *ceteris paribus*, lead to the opposite result.

However, if the assumption of identical preferences for all countries does not hold, it is impossible on the basis of the remaining assumptions to derive theoretically an expectation on the sign of the endowment coefficients. The parameters of the model reflect both a production effect and a consumption effect. If the assumption of identical preferences for all countries does not hold, the consumption effect may dominate the production effect and increased endowments of skilled labor or capital, for instance, may impact negatively on net trade in financial services.

Finally, the coefficient of B_j should equal world output over world income, and should therefore be positive.

It is worth noting that our analysis does not imply a test of the H-O theory. As pointed out by Bowen, Leamer and Sveikauskas (1984), the H-O theory identifies the relation among three separately observable phenomena: trade, factor input requirements and factor endowments. Consequently, a proper test of the theory requires measurement of all three of these variables. Our tests are based on measurements of only two of the three

variables, namely, trade and endowments. They can thus be thought of as inferring factor input requirements and prices of the resources, but not as tests of the H-O theory.

3.2. Data and Statistical Methodology

Model specifications (13) and (14) were estimated using 1977 data for 44 countries.³ Data sources are described in Appendix A.

Measurement of trade in financial services was constrained by the non-availability of data referring to a wide-variety of "products" included in our definition in Section 1.⁴ Available data refer exclusively to deposit-taking and lending activities by deposit banks. The coverage of our empirical analysis is consequently constrained to one type of financial institutions, namely deposit banks, and two categories of financial services, namely deposit-taking and lending. We are implicitly assuming that the volume of financial services is highly correlated with the dollar value of loans plus deposits. On these bases, we proxy (i) exports of financial services by the dollar value of loans plus deposits such that the bank offering the service -taking the deposit or lending the funds- is located in country j , and the client is located in the rest of the world, and (ii) imports of financial services by the dollar value of loans plus deposits such that the bank offering the service is located in the rest of the world. Net trade in financial services is defined as the difference between exports and imports.

Measurement of resource endowment variables follows the guidelines set forth by previous research and is described in Appendix B. Technological differences are measured as three alternative functions of the ratio of RD to GNP: (1) the ratio itself (Q), (2) Q^2 , which allows for a positive and marginally increasing impact of the stage of technological

development on factor endowments, and (3) $\ln Q$, which allows for a positive but marginally decreasing impact of the stage of technological development on factor endowments.⁵ Finally, the balance on goods and services is measured by the balance of goods, services and income -as reported by the IMF Balance of Payments Yearbook- net of all those entries that represent returns to the factors of production included in the model. (Note that according to the specification of the model, all resources available in a country are included as part of its resource endowments, independently of their owner's nationality. As a consequence, all current account entries representing returns to the productive factors included in the model must be excluded from the final balance.)

For the variables SL, L, B and RD we faced the problem of missing observations. These were filled in by the predicted values in a least-squares regression of the relevant variable on a set of regressors economically related to the independent variable. Details on these derivations are provided in Appendix C.

Equations (13) and (14) were estimated on a cross-section data set after correcting for heteroscedasticity due to differences in country size using the adjustment suggested by Glejser (1969). Next, we tested for model specification using the P_F tests suggested by MacKinnon et al. (1983). In these tests the null hypothesis is that the specification corresponding to the traditional version of the H-O model is true, or alternatively, that the specification corresponding to the modified version of the H-O model is true.⁶

3.3 Statistical Results

Table 1 reports the estimation results for model specifications (13) and (14) corresponding respectively to the traditional and the modified versions of the H-O model. For specification (13) we present three sets of

estimates associated to three alternative adjustments of the resource endowment variables to account for technological differences across countries.

Our estimates indicate that skilled labor is a source of comparative advantage in financial services. In fact, the parameter estimate associated to this variable is always positive and significant at the 5% level.

Conversely, relatively larger endowments of arable land and capital would have a negative impact on trade in those services and can therefore be identified as sources of comparative disadvantage. Arable land is intensively used in the agricultural sector. In fact it has been found to be a source of comparative advantage in the agricultural products (see for example Leamer (1984)). An increase in the endowment of this resource results in an increase in their production, and causes the remaining resources to be drawn from the other sectors of the economy, such as the financial services sector, decreasing their output. Under the assumption of identical and homothetic tastes across countries, production results translate into net exports results, and therefore, everything else constant, net trade in financial services also decreases.

Concerning the impact of the capital endowment, even when the production of financial services may be relatively capital intensive, it is clear that this resource is intensively used in manufacturing as well. Within a general equilibrium framework then, the negative sign obtained in our estimation might indicate that the impact of an increase in the capital endowment is absorbed by the manufacturing sector, which in turn pulls resources away from the other economic sectors affecting their level of output. Within this framework, and with preference similarity, an increase in capital supply would result, *ceteris paribus*, in a decrease in net exports of financial services.⁷

Conclusions concerning the impact of the availability of unskilled labor on trade in financial services are less clear. For the traditional version of the H-O model the estimate is negative and insignificant; in the models corresponding to the modified version, the estimates are always positive, and significant in two of the three cases. It is possible that the inconsistent performance of the unskilled labor variable is a consequence of the problems faced with its measurement and that of the skilled labor variable. In fact, lack of available data for specific countries included in our sample prevented us from using a comprehensive proxy for the skilled labor force that included not only the number of professional, technical and related workers but also the number of administrative and managerial workers. These were instead computed as part of the unskilled labor. To the extent that administrative and managerial workers may account for a significant share of the labor force in the financial services sector, measurement errors of this type might have led to the apparent inconsistencies in our estimations. The balance on goods and services is positive as expected in three of the four final specifications, and significant in one of those three cases.

An interesting characteristic of the estimates reported under Model 2 in Table 1 is that all the parameter estimates associated to the resource endowment variables are statistically significant. This characteristic becomes even more important given the high correlation existing among these variables. Multicollinearity increases the variance of the estimated coefficients and individual tests of the coefficients indicating insignificance may be misleading. Our results, however, allow us to obviate these problems.

Despite the similarities between the estimates of the models derived from the original and the modified versions of the H-O theory, the latter

performs better basically in terms of global fit, or more specifically in terms of adjusted- R^2 and F-statistics, and significance of the resource endowment variables. Further partial support for the relatively superior performance of the empirical models derived from our modified version of the H-O theory was confirmed to some extent by the tests reported in Table 2. The P_E tests for model specification suggested by MacKinnon et al. (1983) reject the null hypothesis that the specification corresponding to the traditional version of the H-O model is true, while they fail to reject the null hypothesis that the specification corresponding to the modified version of the H-O model where resource endowments are adjusted by Q^2 is true.

4. Conclusions

The statistical results discussed above suggest that our introduction of technological differences across countries is an important contribution to the analysis of net trade in financial services.

An interesting next step in the research in the area should be the refinement of the new theoretical framework developed in this paper. Coupled with improved measurements of the relevant variables, this should enhance further the fitness of our model to explain the pattern of net trade in financial services today. Future research in the area should also focus on the so far unexplored issue of the effective-protective implications of deviations from free trade in financial services. With the exception of retail business, financial services can be essentially considered inputs to be used in the production of other goods and services (Walter (1985)). Barriers to trade in financial services may therefore result in inefficiencies in the allocation of productive resources, distorted consumption patterns, and significant static and dynamic welfare losses. We hope that our study of the sources of comparative advantage in

financial services can serve as a useful first step to the analysis of these other complex and challenging issues.

Footnotes

1. This assumption is made for the purpose of simplicity.
2. Arrow et al. (1961) find evidence that production functions between countries differ only by a constant scale factor.
3. Countries included in the sample are: Argentina, Austria, Bangladesh, Barbados, Botswana, Canada, Cyprus, Denmark, Egypt, Ethiopia, Fiji, France, The Gambia, Germany, Ghana, Guyana, Ireland, Israel, Ivory Coast, Jamaica, Japan, Kenya, Liberia, Malaysia, Mauritius, Netherlands, Norway, Panama, Papua New Guinea, Paraguay, Philippines, Singapore, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Togo, Trinidad and Tobago, United Kingdom, United States, Uruguay, Venezuela, and Zambia.
4. In fact, the lack of adequate data appears to act as a formidable hinderance to the understanding of trade in various types of services. See Sapir and Lutz (1981).
5. Given that the theoretical model does not constrain the specification of the adjustment for technological differences, the use of alternative adjustment mechanisms is desirable as a means of introducing some flexibility into the empirical estimation.
6. An interesting characteristic of the P_E tests is that they allow for different transformations of the dependent variable, as those deriving from different heteroscedasticity adjustments. P_E tests therefore enable us to

contrast those specifications that yielded the relatively best results for each model.

7. Alternatively, preference dissimilarity might lead the consumption effect to dominate the production effect and reverse the expected positive sign of the coefficient.

TABLE 1

Method of Estimation: WLS

Dependent Variable: Trade in Financial Securities

<u>Model</u>	<u>Res. Adj. Var.</u>	<u>Weight Var.</u>	<u>Constant</u>	<u>C</u>	<u>SL</u>	<u>L</u>	<u>AL</u>	<u>B</u>	<u>Adj-R²</u>	<u>F-Stat</u>
1		FPCNP2	-1219.56 (-0.25)	-0.34 (-3.37)(a)	0.09 (4.78)(a)	-0.91 (-1.19)	-1.99 (-2.78)(a)	6.32 (1.96)(b)	0.40	6.69(a)
2	Q	FPCNP	-2847.11 (-1.13)	-0.04 (-5.87)(a)	7.10 (7.05)(a)	0.19 (1.64)(b)	-0.20 (-3.66)(a)	4.17 (1.32)(c)	0.67	18.69(a)
3	Q ²	FPCNP2	1906.68 (-1.29)	-0.02E-1 (-5.57)(a)	0.42 (6.70)(a)	0.01 (1.33)(c)	-0.02 (-5.17)(a)	0.76 (-0.33)	0.78	31.67(a)
4	lnQ	FPCNP2	1620.94 (-0.46)	0.21 (-5.36)(a)	65.56 (6.98)(a)	0.20 (0.31)	-1.24 (-3.78)(a)	4.85 (1.49)(c)	0.63	15.94(a)

Notes:

- (i) All coefficients have been multiplied by 10,000 for easier exposition
- (ii) t-statistic in parenthesis. Significance level (a) 5%, (b) 10%, (c) 20%.
- (iii) Weight variables

FPCNP: fitted value of regression of corresponding OLS residuals on per capita GNP (PCNP)

FPCNP2: fitted value of regression of corresponding residuals on per capita GNP squared (PCNP²)

TABLE 2

PE Tests for Model Specification

PE1 Null Hypothesis: the specification corresponding to the traditional version of the H-C model is true.

PE1 Null Hypothesis: The specification corresponding to the modified version of the H-O model is true.

Resource Adjustment		$\hat{\alpha}$	
Variable	PE1		PE2
Q	0.85 (7.80)(a)		-0.51 (-3.63)(a)
Q ²	0.73 (7.78)(a)		-0.07 (-0.59)
ln Q	1.35 (5.62)(a)		-0.83 (-2.42)(b)

Note: t-statistics in parenthesis. Significance levels: (a) 1%, (b) 5%

Appendix A

Sources of Data

<u>Variables</u>	<u>Sources</u>
BD, BL, ML, D, NBD, NBL, GNP	International Monetary Fund. International Financial Statistics. Various issues.
C	Bowen (1980, 1983) The World Bank. Handbook on National Accounts. (Economic and Social Data Division. Economic Analysis and Projections Department. Development Policy Staff.)
SL, L, EAP	International Labor Office. Yearbook of Labour Statistics. Various issues. FAO. Production Yearbook. 1978.
AL	FAO. Production Yearbook. 1978.
B	International Monetary Fund. Balance of Payments Yearbook. Various issues.
RD	UNESCO. Statistical Yearbook. Various issues.
XR	UNESCO. Statistical Yearbook. Various issues. International Monetary Fund. International Financial Statistics. Various issues.

Appendix B

Measurement of Resource Endowment Variables

Capital

The historical difficulties with the definition and measurement of capital are well known. Neither of these issues has been fully clarified in the existing economic literature, and dealing with them is well beyond the scope of this research. We have therefore followed the path set forth by previous research in the area (see, for example, Balassa (1979), Bowen (1980, 1983), Leamer (1984)). Capital is thus defined as physical capital, and estimated according to the procedures described below.

Physical capital endowment data correspond to 1975 and are taken from Bowen (1980, 1983). Additional data, to enlarge the sample size are computed following identical methodology. Namely, net capital stocks are computed by:

- * summing annual real gross domestic investment flows beginning with 1960;
- * depreciating, using the double declining balance method, and assuming an average asset life of fifteen years;
- * converting to nominal terms in local currency (the index used for this conversion is the price deflator implicit in the gross domestic investment figures, i.e., 1975 nominal gross domestic investment over 1975 real gross domestic investment); and, finally,
- * converting to U.S. dollars, using the average exchange rate for 1975.

Gross domestic investment comprises gross domestic fixed capital formation and the increase in stocks. "Gross domestic fixed capital formation measures outlays by both the private and the public sectors in the form of purchases and own-account production of additional durable goods for their stock of fixed assets, less their net sales of similar secondhand and scrapped goods. The increase in stocks is the physical change during the period in the stocks of materials, supplies, work-in-progress excluding construction projects, finished products, livestock raised for slaughter and merchandise held by resident industries, as well as changes in the stocks of strategic materials and emergency stocks of important products held by government services, all at market value" (The World Bank, 1982).

Skilled Labor

Skilled labor is measured in terms of number of professional, technical and related workers (major group 0/1 of the International Standard Classification of Occupations (ISCO - 1968)). Use of a more comprehensive measure including both this group and the number of administrative and

managerial workers (major group 2 of the ISCO) was hindered by the non-availability of the corresponding data.

Unskilled Labor

Unskilled labor is computed by subtracting from the total economically active population (EAP) the number of workers included as skilled labor.

Arable Land

Arable land refers to land under temporary crops, temporary meadows for mowing or pasture, land under market and kitchen gardens, and land temporarily fallow or lying idle (FAO, 1978).

Appendix C

Derivation of Missing Observations

For the variables skilled labor (SL), unskilled labor (L), balance on goods and services (B) and current expenditures in research and development (RD) we faced the problem of missing observations. These were filled in by the predicted values in a least-squares regression of the relevant variable on a set of regressors economically related to the independent variable. Following we discuss these derivations.

Estimation of Missing Values of Skilled Labor

For the estimation of missing values of skilled labor we specified "ad hoc" that this variable is a function of the total economically active population (EAP), the dollar value of GNP (DGNP), arable land (AL) and capital (C).

Our selection of these particular independent variables is based on the following. First, the number of skilled workers is a percentage of the economically active population. The inclusion of this variable therefore allows for the consideration of the impact of the size of the labor force on the dependent variable. Furthermore, we may implicitly hypothesize that the number of skilled workers is affected by the degree of development of the country which might be proxied by the ratio of the dollar value of GNP to the economically active population. Finally, the inclusion of the variables arable land and capital is suggested by the analysis in Caves et al. (1980) where missing observations are replaced by the predicted values in a regression of the relevant independent variable on the subset of complete independent variables. In our case, AL and C are the only two complete independent variables, namely the only two independent variables for which there are no missing observations. Therefore we included them as explanatory variables in the model used to predict the unavailable data on the number of skilled workers.

Since the dependent variable can take only positive values, for estimation purposes we used a logarithmic specification. The empirical equation is the following:

$$\ln SL_j = a + b \ln EAP_j + c \ln DGNP_j + d \ln AL_j + f \ln C_j + e_j \quad (\text{Equation AC.1})$$

where e_j is the error term associated to observation j and assumed to be uncorrelated with the independent variables included in the model.

Least squares estimators are the best linear unbiased estimators, and yield the best linear unbiased predictions. Consequently we estimated equation AC.1 using ordinary least squares.¹

Table C.1 shows the estimation results. The corresponding coefficient vector was then used to make a point prediction of the missing values of SL. (See Table C.2)

Estimation of Missing Values of Unskilled Labor

Values for unskilled labor were computed by subtracting from the variable economically active population the estimated value for skilled labor. Table C.2 shows the results.

Estimation of Missing Values of the Balance on Goods and Services

Missing values for B result from the unavailability, for a group of countries, of data corresponding to items such as "shipment", and "other goods, services and income."

For the estimation of these missing values we used the following relationship:

$$B_j = a + bMB_j + cPGNP_j + e_j \quad (\text{Equation AC.2})$$

where MB_j stands for country j 's merchandise balance, $PGNP_j$ is country j 's per capita dollar value of GNP and e_j is the error term associated to observation j .

The inclusion in equation AC.2 of the merchandise balance was suggested by the high correlation between this variable and the balance on goods and services observed in a sample of 58 countries for which both series were available.² The inclusion of the per capital dollar value of GNP is founded on the assumption that trade in services in general is related to the stage of economic development, proxied by that variable.

Equation AC.2 was estimated through OLS regression analysis using the above mentioned 58-country sample. Table C.3 shows the estimation results. The corresponding coefficient vector was then used to make a point prediction of the missing values of B. Predicted values are shown in Table C.2.

Estimation of Missing Values of Current Expenditures in Research and Development

Our estimation of the missing values of the variable current expenditures in research and development is based on the assumption of a high correlation of this variable with the stage of development of a country proxied by its per capital income, and the number of skilled workers. Consequently we estimated the following relationship:

$$\ln RD_j = n_0 + n_1 \ln DGNP_j + n_2 \ln SL_j + n_3 \ln EAP_j + e_j \quad (\text{Equation AC.3})$$

where e_j is the residual term assumed to be uncorrelated with the independent variables included in the model. (The logarithmic specification is adopted to deal with the fact that the dependent variable is bounded below by zero.)

We selected from our data bank all those 49 countries for which information on the three independent variables was available.³ The methodology used to estimate Equation AC.3 was OLS regression analysis. Table C.4 reports the results of this estimation. The corresponding

coefficient vector was then used to make a point prediction of the missing values of RD. Predicted values are shown in Table C.2.

Footnotes

1/ The sample used for this estimation was composed of the following 34 countries: Afghanistan, Argentina, Austria, Bangladesh, Benin, Bermuda, Bulgaria, Burma, Canada, Central African Empire, Cuba, Czechoslovakia, Denmark, Egypt, France, Germany, Ireland, Israel, Japan, Netherlands, Norway, Panama, Philippines, Singapore, Spain, Sri Lanka, Sweden, Switzerland, Thailand, United Kingdom, United States, Uruguay, Venezuela, and Zambia.

2/ This sample was composed of: Algeria, Argentina, Australia, Austria, Barbados, Bolivia, Botswana, Brazil, Canada, Chile, Colombia, Costa Rica, Cyprus, Denmark, Ecuador, Fiji, Finland, France, Gabon, The Gambia, Germany, Greece, Guyana, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Korea, Kuwait, Libya, Malaysia, Mauritius, Morocco, Netherlands, Nicaragua, Norway, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Portugal, Spain, South Africa, Sweden, Switzerland, Thailand, Togo, Trinidad and Tobago, Tunisia, United Kingdom, United States, Uruguay, Venezuela, Yugoslavia, and Zaire.

3/ The 49 countries are: Algeria, Argentina, Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, Cyprus, Denmark, Ecuador, Egypt, Finland, France, Germany, Ghana, Greece, Indonesia, Iran, Ireland, Israel, Italy, Japan, Jordan, Korea, Kuwait, Mauritius, Netherlands, New Zealand, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Portugal, Singapore, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Trinidad and Tobago, United Kingdom, United States, Uruguay, Venezuela, and Zambia.

TABLE C.1

Estimation of Equation AC.1

Method of Estimation: OLS

Dependent Variable: ln SL

Constant	ln EAP	ln DGNP	ln AL	ln C
-3.261 (-11.09) (1)	0.556 (6.15) (1)	0.528 (2.36) (1)	-0.010 (-0.23)	-0.080 (- 0.42)

$R^2 = 0.97$

Adjusted $R^2 = 0.97$

$F(4,29) = 238.02$

Note: t-statistics in parenthesis.

Significance levels:

(1) 5%

TABLE C.2

Estimated Values for Missing Observations

<u>Country</u>	<u>SL</u> <u>(in thousands)</u>	<u>L</u> <u>(in thousands)</u>	<u>B</u> <u>(in millions of SDRs)</u>	<u>RD</u> <u>(in thousands of \$)</u>
Bangladesh	-	-	-412	5001
Barbados	-	-	-	1231
Botswana	12	334	-	429
Egypt	-	-	-1 526	-
Ethiopia	257	1 21 32	-85	2458
Fiji	-	-	-	1627
The Gambia	9	254	-	83
Ghana	-	-	-39	-
Guyana	-	-	-	535
Ivory Coast	166	34 31	-	-
Jamaica	59	851	-	-
Kenya	179	5288	-21	-
Liberia	22	594	-16	891
Malaysia	258	4088	-	32920
Papua New Guinea	56	1 383	-	2768
Singapore	-	-	-1538	-
Sri Lanka	-	-	42	-
Thailand	-	-	-	25193
Togo	30	964	-	-
Tunisia	-	-	-	9970
Zambia	-	-	106	-

TABLE C.3

Estimation of Equation AC.2.

Method of Estimation: OLS

Dependent Variable: B

Constant	MB	PGNP
-22.335 (-0.07)	0.831 (18.19) (1)	-15.240 (-0.57)

$R^2 = 0.86$

Adjusted $-R^2 = 0.85$

$F(2,55) = 165.57$

Note: . t-statistics in parenthesis

Significance levels:

(1) 5%

TABLE C.4

Estimation of Equation AC.3

Method of Estimation: OLS

Dependent Variable: ln RD

Constant	ln DGNP	ln SL	ln EAP
1.906 (1.10)	1.257 (4.64)(1)	0.774 (1.68)(2)	-0.909 (-2.94)(1)

$R^2 = 0.79$

Adjusted $-R^2 = 0.77$

$F(3,45) = 54.52$

Note: t-statistic in parenthesis

Significance levels:

- (1) 5%
- (2) 10%

References

- Arrow, K., H. Chenery, B. Minhas and R. Sollow, "Capital-Labor Substitution and Economic Efficiency", Review of Economics and Statistics 43 (3) (1961), 225-250.
- Balassa, Bela, "The Changing Pattern of Comparative Advantage in Manufactured Goods". Review of Economics and Statistics (May 1979).
- Bowen, Harry P. Resources, Technology and Dynamic Comparative Advantage: A Cross-Country Test of the Product Cycle Theory of International Trade. Ph.D. Th., University of California (Los Angeles), 1980.
- Bowen, Harry P., "Resources, Technology and Dynamic Comparative Advantage", Review of Economics and Statistics 65 (3) (1983), 414-420.
- Bowen, Harry P., Edward E. Leamer and Leo Sveikauskas, "Multicountry, Multifactor Tests of the Factor Abundance Theory", Working Paper (1984).
- Caves, Richard E., Michael E. Porter and A. Michael Spence, with John T. Scott. Competition in the Open Economy - A Model Applied to Canada. (Cambridge: Harvard University Press, 1980).
- Cline, William R., Ed., Trade Policy in the Eighties, Institute for International Economics, Washington, D.C. (1983).
- Food and Agriculture Organization. Production Yearbook. 1978.
- Giddy, Ian H., "The Theory and Industrial Organization of International Banking", in Research in International Business and Finance, Vol. 3 (Connecticut: JAI Press Inc., 1983).
- Glejser, H., "A New Test for Heteroscedasticity", Journal of the American Statistical Association 64 (325) (1969). 316-323.
- Leamer, Edward E., Sources of International Comparative Advantage: Theory and Evidence (Massachusetts: The MIT Press, 1984).
- Leamer, Edward E. and Harry P. Bowen, "Cross-Section Tests of the Heckscher-Ohlin Theorem: Comment", American Economic Review 71 (5) (1981), 1040-1043.
- MacKinnon, James G., Halbert White and Russell Davidson, "Tests for Model Specification in the Presence of Alternative Hypotheses", Journal of Econometrics 21 (1) (1983) 53-70.
- Organisation for Economic Co-Operation and Development, "International Trade in Services: Banking", Paris (1983).
- Samuelson, Paul, "International Trade and the Equalization of Factor Prices", Economic Journal 58 (230) (1948), 165-184.

Sapir, Andre and Ernst Lutz, "Trade in Services: Economic Determinants and Development-Related Issues". World Bank Staff Working Paper No. 480 (August 1981).

The World Bank. Handbook on National Accounts. Economic and Social Data Division. Economic Analysis and Projections Department. Development Policy Staff. Washington, 1982.

Walter, Ingo, "Barriers to Trade in Banking and Financial Services" (London: Trade Policy Research Centre, 1985).

Attachment IDerivation of Expressions in the TextI. Expression (2)

Let us start with expression (1) that relates endowments and trade:

$$(1) T_j = A^{-1}(E_j - Ew_j)$$

Substituting $(Y_j - B_j)/Y$ for w_j , (1) can be rewritten as:

$$(1.1) T_j = A^{-1}[E_j - E(Y_j - B_j)/Y]$$

By definition, Y_j can be expressed as the cross-product of the vector of world prices of goods and services (P) and the vector of nationally produced quantities of goods and services (Q_j). The vector Q_j , in turn, can be expressed as the product of the inverse of the input-output matrix and the vector of factor endowments. So,

$$(1.2) Y_j = P'A^{-1}E_j$$

Taking these transformations into account, (1.1) can be reformulated as:

$$(1.3) T_j = A^{-1}(I - EP'A^{-1}/Y)E_j + A^{-1}EB_j/Y$$

where

I: $n \times n$ identity matrix

Given the assumption of identical technologies across countries,
 $A^{-1}E = Q$. So,

$$(1.4) \quad T_j = (A^{-1} - QP'A^{-1}/Y)E_j + B_jQ/Y$$

With perfectly competitive markets the value of country j 's national production must equal the return to the factors of production.

Namely,

$$(1.5) \quad P'Q_j = W'_jE_j$$

where

W_j : $n \times 1$ vector of factor prices in country j

Given the assumptions of the traditional Heckscher-Ohlin (H-O) model, we obtain factor price equalization, and therefore

$$(1.6) \quad W_j = W$$

for all j s, that is, for all countries in the world.

Consequently, the value of country j 's national production must equal the return to the factors of production at world prices. That is,

$$(1.7) P'Q_j - W'E_j$$

Substituting $A^{-1}E_j$ for the production vector Q_j , it follows that

$$(1.8) P'A^{-1}E_j - W'E_j$$

and

$$(1.9) P'A^{-1} - W'$$

So (1.4) can be rewritten as

$$(2) T_j - (A^{-1} - QW'/Y)E_j + B_jQ/Y$$

II. Expressions (6) and (7)

Trade is related to output and consumption by the identity:

$$(4) T_j = Q_j - C_j \quad \text{with } j = 1, 2$$

Given the assumptions of Leontief technologies and neutral technological differences across countries:

$$(5) A_2 = A(1) D$$

where

$A(j)$: 2×2 matrix of factor input requirements where the element $a_{fi}(j)$ indicates the amount of factor f used to produce one unit of product i in country j ($i = X, Y$; $j = 1, 2$; $f = K, L$)

D : 2×2 diagonal matrix of technological differences where $d_{ii} = a_{fi}(2)/a_{fi}(1)$

The vectors of quantities of X and Y produced by country 1 can therefore be expressed as:

$$(5.1) Q_1 = A^{-1}(1) E_1$$

Similarly for country 2:

$$(5.2) Q_2 = D^{-1}A^{-1}(1) E_2$$

Since both countries face the same prices and their preferences are identical and homothetic, their relative consumption of each commodity is the same. So, for country j ($=1,2$) consumption can be expressed as:

$$(5.3) C_j = Qw_j$$

where

Q : 2×1 world output vector

$$(5.4) Q = Q_1 + Q_2 = A^{-1}(1)E_1 + D^{-1}A^{-1}(1)E_2$$

Consequently, the net trade vector for countries 1 and 2 is given respectively by:

$$(6) T_1 = A^{-1}(1)E_1 - [A^{-1}(1)E_1 + D^{-1}A^{-1}(1)E_2]w_1$$

and

$$(7) T_2 = D^{-1}A^{-1}(1)E_2 - [A^{-1}(1)E_1 + D^{-1}A^{-1}(1)E_2]w_2$$

Expanding system of equations 5.1 or 5.2 gives a good insight into the nature of our adjustment to the traditional H-O model to introduce neutral technology differences.

Let us take, for instance, system of equations 5.2, representing country 2's production vector. The components of this vector, that is, country 2's production of X and Y, are respectively

$$(5.2.1) Q_{X2} = a_{11}(-1)(K_2/d_{xx}) + a_{12}(-1)(L_2/d_{xx})$$

$$(5.2.2) Q_{Y2} = a_{21}(-1)(K_2/d_{yy}) + a_{22}(-1)(L_2/d_{yy})$$

These results indicate that for each specific product, adjustment of the resource endowments of country 2, the less technologically advanced country, would allow us to go back to a framework where there is a unique input-output matrix across countries. The required adjustment implies expressing country 2's resource endowments in units of resources that are comparable to those of country 1. By comparable we mean resources of equal quality or equal productivity. The same adjustment mechanism proves

useful to deal with consumption.

III. Expressions (9), (10) and (12)

Let us start with:

$$(8) T_j = D^{-1}(j) A^{-1}E_j - [\sum_j D^{-1}(j) A^{-1}E_j] w_j$$

If w_j is substituted for by $(Y_j - B_j)/Y$, country j 's income (Y_j) is substituted for by the cross-product of the vector of world prices (P) and country j 's production vector (Q_j), and $A^{-1}(1)E_j$ substitutes the latter,

(8) can be rewritten as:

$$(8.1) T_j = [I - (\sum_j D^{-1}(j) A^{-1}E_j) P' / Y] D^{-1}(j) A^{-1}E_j + (B_j / Y) \sum_j D^{-1}(j) A^{-1}E_j$$

For simplicity purposes let

$$(8.2) M_{n \times n} = I - (\sum_j D^{-1}(j) A^{-1}E_j) P' / Y$$

So,

$$(9) T_j = M D^{-1}(j) A^{-1}E_j + (B_j / Y) \sum_j D^{-1}(j) A^{-1}E_j$$

As in system of equations 5, corresponding to the traditional version of the Heckscher-Ohlin model, the first term in the RHS of system of equations 13 captures the impact of country j 's endowments on its trade vector. The second term centers on the role of trade imbalances.

We are focusing on one specific component of the trade vector, namely that corresponding to financial services. In order to visualize the mathematical expression corresponding to this component, let us first calculate each of the components of the vector $D^{-1}(j)A^{-1}E_j$ which appears in both terms of the RHS of 9. (For simplicity let's v_{hi} be the i -th element of the h -th row of matrix A^{-1} .)

$$(9.1) D^{-1}(j)A^{-1}E_j = \begin{bmatrix} 1/d_{11}(j) & \dots & 0 \\ \cdot & \dots & \cdot \\ \cdot & \dots & \cdot \\ 0 & \dots & 1/d_{nn}(j) \end{bmatrix} \begin{bmatrix} v_{11} & \dots & v_{1n} \\ \cdot & \dots & \cdot \\ \cdot & \dots & \cdot \\ v_{n1} & \dots & v_{nn} \end{bmatrix} \begin{bmatrix} E_{1j} \\ \cdot \\ \cdot \\ E_{nj} \end{bmatrix}$$

Computing the product of $D^{-1}(j)$ and A^{-1} we obtain:

$$(9.2) D^{-1}(j)A^{-1}E_j = \begin{bmatrix} v_{11}/d_{11}(j) & \dots & v_{1n}/d_{11}(j) \\ \cdot & \dots & \cdot \\ \cdot & \dots & \cdot \\ v_{n1}/d_{nn}(j) & \dots & v_{nn}/d_{nn}(j) \end{bmatrix} \begin{bmatrix} E_{1j} \\ \cdot \\ \cdot \\ E_{nj} \end{bmatrix}$$

Finally:

$$(9.3) D^{-1}(j)A^{-1}E_j = \begin{bmatrix} v_{11}(E_{1j}/d_{11}(j)) + \dots + v_{1n}(E_{nj}/d_{11}(j)) \\ \cdot & \dots & \cdot \\ \cdot & \dots & \cdot \\ v_{n1}(E_{1j}/d_{nn}(j)) + \dots + v_{nn}(E_{nj}/d_{nn}(j)) \end{bmatrix}$$

So, for country j , the h -th element of the trade vector will be equal to the cross-product of the h -th row of the M matrix times the column vector $D^{-1}(j)A^{-1}E_j$ plus the product of country j 's balance on goods and services times the ratio of world production to world income.

Let the h -th element of country j 's trade vector represent this country's net exports of financial services TF_j . TF_j can then be expressed as:

$$(10) \quad TF_j = m_{h1}[v_{11}(E_{1j}/d_{11}(j)) + \dots + v_{1n}(E_{nj}/d_{11}(j))] + \dots + m_{hn}[v_{n1}(E_{1j}/e_{nn}(j)) + \dots + v_{nn}(E_{nj}/d_{nn}(j))] + B_j Q/Y$$

Letting $d_{ii}(j) = d(j)$ for $i = 1, \dots, n$, (10) can be rewritten as:

$$(10.1) \quad TF_j = m_{h1}[\sum_i v_{1i}(E_{ij}/d(j))] + \dots + m_{hn}[\sum_i v_{ni}(E_{ij}/d(j))] + B_j(Q/Y)$$

$$= (m_{h1}v_{11} + \dots + m_{hn}v_{n1})E_{1j}/d(j) + \dots + (m_{h1}v_{1n} + \dots + m_{hn}v_{nn})E_{nj}/d(j) + B_j(Q/Y)$$

For further simplification let:

$$(10.2) \quad \xi_n = \sum_i m_{hi}v_{in}$$

and

$$(10.3) \quad \xi_{n+1} = Q/Y$$

and

Expression (10.1) can then be reformulated as:

$$(11) \quad TF_j = \sum_n g_n(E_{nj}/d(j)) + g_{n+1}B_j$$

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