

THE TRADE-CREATING EFFECTS OF CAPITAL MOBILITY: RECENT EVIDENCE FROM LATIN AMERICA

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ABSTRACT

The purpose of this paper is to empirically test the impact of capital account liberalization on bilateral trade flows. An extended gravity model is employed for 20 Latin American countries for the time period 1995-1999. The results indicate that a 10 percent reduction in capital flow regulation enhances international trade by roughly 1 percent for the sample. The empirical results grow substantially stronger and more significant over the five-year period, indicating the growing importance of financial liberalization after the Mexican and Brazilian economic crises.

INTRODUCTION

The opening of domestic capital markets to foreigners is perhaps one of the most reviled aspects of globalization. Many academics believe that the ever freer global capital markets were behind the currency and financial crises in the 1990's (Edwards, 2002), and the general public does not perceive asset transactions with foreigners as being welfare enhancing. For example, a recent Associated Press poll revealed that three out of five Americans were in favor of restricting foreign capital flows, and over half of all respondents agreed that foreign investment in the U.S. was "dangerous." (Scheve and Slaughter, 2001). This negative sentiment toward international investment is pervasive worldwide as indicated by the many financial barriers that remain on foreign direct investment, foreign asset flows, and multinational bank lending (Bank of International Settlements, 2001; and UNCTAD, 2001).

Research on the relationship between international investment and macroeconomic factors like economic growth and international trade are still in the early stages. The main problem is that researchers are faced with a lack of historical data and evidence, especially for import-substituting Latin American economies. It was not until the 1980's that many Latin countries started to dismantle the barriers to international trade and investment that were erected after World War II. Moreover, the "deepening" of international investment to include many more types of assets like foreign direct investment (FDI) and international equity (stocks) is a recent phenomenon; it was only twenty years ago when nearly all of the international financing in Latin America was in the form of bonds or bank lending.

With the return of greater international investment, the risks of default and sudden reversal of investment flows have also grown. For example, in the early 1990's capital flows to developing countries rose to new heights, but defaults and sharp reversal of capital flows to Mexico in 1994, a number of East Asian countries in 1997, Brazil in 1998, and Russia in 1999, have caused concern about the volatility of

unregulated international investment markets. It is not surprising that despite the potential welfare gains from international capital flows, there are frequent calls to manage the international investment sector.

Despite these challenges, economists have discovered several benefits from international investment liberalization. Several studies have documented the positive effects of international investment on technological progress (Romer, 1993; Moran, 1998; and Aitken and Harrison, 1999), savings and investment allocation (Feldstein and Horioka, 1980), economic growth (De Long and Summers, 1991; King and Levine, 1993; Borensztein, De Gregorio, and Lee, 1998; and Temple, 1998), and asset diversification (French and Poterba, 1991; and Obstfeld, 1994). But there is little empirical evidence on how international capital flows impact international trade in developing countries. The theory of multinational enterprises suggests that foreign investment and other asset flows decrease trade flows because goods and services that would have otherwise been exported are now being produced by multinational firms. However, trade between domestic and foreign affiliates of the same multinational organization, often called intrafirm trade, grew substantially in the 1990's. Intrafirm trade now constitutes over 30 percent of total world trade, suggesting a complimentary relationship between capital flows and trade flows (Blonigen, 1999). The purpose of this paper is to empirically test the relationship between capital account liberalization and international trade in Latin America.

Using an index of financial freedom, an augmented gravity model is applied to find the quantitative size of financial liberalization on total trade volume (i.e. the sum of imports and exports) and on the export sector. The empirical results indicate that asset liberalization enhances the volume of total trade for the 20 Latin countries tested, and contrary to the arguments of global skeptics (see for example, Rodrik, 1998), capital flow liberalization significantly increases exports, indicating that the trade-creating effects of asset flow liberalization are larger than any negative exchange rate effects resulting from a more open financial sector.

This paper proceeds as follows: First, gravitational underpinnings are used to develop hypotheses about the effects of asset regulation on bilateral trade flows. The next section presents the cross-sectional results for total trade. The third section analyzes how the export sector is affected by asset liberalization. The final section concludes with a review of the findings and the resulting implications.

THE GRAVITY MODEL SPECIFICATION OF BILATERAL TRADE

To examine the extent in which financial policy influences trading patterns, one must hold constant all other natural economic determinants. The gravity model has been extensively applied (see, for example, Frankel, Stein, and Wei, 1995; McCallum, 1995; Eichengreen and Irwin, 1995; Deardorff, 1997; Frankel and Romer, 1999; Freund, 2000; and Frankel and Rose, 2002) and widely accepted as the preferred systematic framework for measuring "natural" trade patterns based on economic size (i.e. mass) and geographic distance between economies. In addition to explaining roughly 70 percent of the cross section variation in world trade, the basic gravity equation is theoretically interesting because it can be derived from a number of traditional trade models (Linnemann, 1966; Linnemann, 1969; Leamer and Stern, 1970; Anderson, 1979; and Deardorff, 1997). The purpose of this study is to determine how much of world trade is determined by gravity factors, and how much is left over to be attributed to financial policy, if any at all.

The standard gravity equation, borrowed from physics, specifies trade between a pair of countries to be a negative function of the distance between the countries and a positive function of their combined national products. The underlying “gravitational” relationship is:

$$\text{TRADE}_{ij} = f(\text{GDP}_i \text{GDP}_j / \text{DIST}_{ij}), \quad (1)$$

where TRADE is the total value of bilateral trade between countries *i* and *j*, GDP is the respective Gross Domestic Product in millions of U.S. dollars, and DIST is straight-line distance (in kilometers) between the economic centers of country *i* and *j*. Taking the logs of both sides yields (natural log variables in lower case):

$$\text{trade}_{ij} = a_0 + a_1(\text{gdp}_i \text{gdp}_j) + a_2 \text{dist}_{ij} + u_{ij}. \quad (2)$$

Most studies augment equation (2) with variables to account for geographic, ethnolinguistic, and economic conditions. We follow numerous other authors and specify the following gravity equation to control for the basic determinants of international trade:

$$\text{trade}_{ij} = a_0 + a_1(\text{gdp}_i \text{gdp}_j) + a_2(\text{pop}_i \text{pop}_j) + a_3 \text{dist}_{ij} + a_4 \text{CONT}_{ij} + a_5 \text{LANG}_{ij} \\ + a_6 \text{LINK}_{ij} + a_7 \text{FTA}_{ij} + u_{ij}, \quad (3)$$

where $\text{pop}_i \text{pop}_j$ is the log of the product of the populations in country *i* and *j*, CONT, LANG, LINK, and FTA are dummy variables which take the value 1 for pairs of countries which have a contiguous border, common language, common colonial linkage, and common free trade area agreement, respectively. The anticipated sign on all four dummy variables is positive, reflecting the idea that proximity, common language, historical links, and political agreements are trade-promoting networks.

To estimate the impact of financial freedom on trade, an additional variable which captures freedom of exchange in financial markets (FINFREE) is added. FINFREE comes from Gwartney, Lawson, and Samida (2001). They have constructed one of the most comprehensive sets of cross-section capital mobility indicators. Their index has a value range from 1 to 10, where the value 1 is given to countries with severe restrictions on the freedom of its citizens, banks, and other financial institutions to engage in capital transactions with foreigners. An index value of 10 is reserved for those countries with no capital controls. The variable captures the degree in which markets are used to allocate foreign investment. One potential limitation of the FINFREE variable is that it is somewhat correlated with a general movement toward economic freedom in other areas including labor markets, political environment, and macroeconomic policies. When the FINFREE variable is used in the gravity equation, it is the average of country *i* and *j*’s index. The model now becomes:

$$\text{trade}_{ij} = a_0 + a_1(\text{gdp}_i \text{gdp}_j) + a_2(\text{pop}_i \text{pop}_j) + a_3 \text{dist}_{ij} + a_4 \text{CONT}_{ij} + a_5 \text{LANG}_{ij} \\ + a_6 \text{LINK}_{ij} + a_7 \text{FTA}_{ij} + a_8 \text{FINFREE}_{ij} + u_{ij}. \quad (4)$$

ESTIMATION AND FINDINGS

Most studies estimate equations (3) and (4) by using double logarithmic form. Ordinary least squares estimation permits the coefficients to be interpreted as

elasticities. However, one problem with this technique is that country pairs whose bilateral trade is zero are omitted. Roughly twenty-five percent of the observations on TRADE_{ij} are zero for our sample, meaning that for any given year, Latin American countries have no trade flows with roughly 25 percent of the selected 74 countries in the research sample. These omitted observations contain information about why some countries do not trade with Latin America at all.

One solution is to specify the dependent variable in levels and use Tobit estimation. Interpretation of Tobit output is complicated by the fact that coefficients and standard errors are normalized during estimation, and the constant elasticity relationship is lost. The approach employed in this study is the scaled OLS (SOLS) technique of Eichengreen and Irwin (1995), which yields results similar to Tobit estimation while maintaining the double log form. Here the dependent variable is expressed as $\log(1 + \text{TRADE}_{ij})$. For small values of TRADE_{ij} the logarithm is close to zero, and for large values of TRADE_{ij} the logarithm of the transformed variable is close to the logarithm of TRADE_{ij} ; therefore approximating a “semi-log Tobit relationship.” When an equation is estimated with SOLS, the least squares estimates are multiplied by the reciprocal of the proportion of the observations in which TRADE_{ij} does not equal zero. William Green (2000) states, “A striking empirical regularity is that the maximum likelihood estimates can often be approximated by dividing the OLS estimates by the proportion of nonlimit observations in the sample” (Greene, 2000; pp. 912). The empirical results from both SOLS and Tobit estimation techniques are reassuringly similar. We therefore focus on SOLS estimates, which have a much easier interpretation.

Scaled OLS estimates for equation (3) are summarized in Table 1. All of the arguments of the augmented gravity model have the correct sign and almost all are significantly different than zero. None of the independent variables have a correlation of above 0.5, implying that excessive multicollinearity is not a problem. Geographic distance and economic size matter for bilateral trade across the 74 country sample. For example, the coefficient on distance is -0.713 in 1999, suggesting that for every 10 percent increase in distance; bilateral trade is reduced by 7.13 percent. It is important to note that common membership in a regional free trade area (FTA) enhances trade among member countries. The statistically significant coefficient on FTA is 0.325 for the year 1999, suggesting that, *ceteris paribus*, countries with common membership trade roughly 38 percent ($e^{0.325} - 1 = 0.384$) more than they do when there is no common regional trading agreement. This result reinforces Frankel, Stein, and Wei (1995) who argue that free trade areas have contributed to the growth of regionalism, and that the “regionalization” of world trade may reduce world economic welfare relative to a most favored nation norm.

Table 2 reports the results of equation (4). The augmented gravity model results in Table 1 do not change significantly with the addition of FINFREE , indicating the importance of geographic and institutional variables on trade. The FINFREE coefficient is significantly positive for all years in which data are available. Notice that the size of the coefficient doubled over the five-year period, ranging from 0.049 in 1995 to 0.108 in 1999. This indicates that a country’s financial environment became increasingly important to international trade flows on average during the late 1990’s. A 10 percent increase in financial freedom increased trade by 1.1 percent in 1999. These results indicate that financial openness complements international trade flows in Latin America. Countries with unequal treatment of foreign capital inflows will on average trade less with other countries over time.

Table 1
Augmented Gravity Model Of Trade

	1995	1996	1997	1998	1999
Constant	-3.799 (-8.05)**	-4.042 (-8.66)**	-5.939 (-7.73)**	-3.969 (-7.52)**	-3.373 (-6.75)**
gdp _i gdp _j	0.545 (42.59)**	0.572 (44.38)**	0.579 (42.30)**	0.588 (41.05)**	0.569 (42.64)**
pop _i pop _j	-0.123 (-7.19)**	-0.129 (-7.59)**	-0.109 (-6.11)**	-0.087 (-4.65)**	-0.095 (-5.36)**
dist _{ij}	-0.629 (-14.03)**	-0.663 (-15.04)**	-0.715 (-15.56)**	-0.710 (-14.45)**	-0.713 (-15.09)**
CONT	0.607 (3.43)**	0.434 (2.49)**	0.494 (2.73)**	0.500 (2.59)**	0.463 (2.49)**
LANG	0.149 (1.73)*	0.303 (2.74)**	0.237 (2.06)**	0.313 (2.56)**	0.256 (2.17)**
LINK	0.154 (1.57)	0.132 (1.37)	0.009 (0.08)	-0.004 (-0.04)	0.040 (0.39)
FTA	0.558 (4.62)**	0.395 (5.33)**	0.399 (5.18)**	0.475 (5.78)**	0.325 (4.11)**
Adjusted R ²	0.729	0.749	0.743	0.734	0.735

Notes: Figures in parentheses are heteroskedasticity-consistent *t*-statistics. ** indicates significant at the 95% level, and * at the 90% level. There are 1270 data points. Countries include: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad & Tobago, Uruguay, and Venezuela.

Table 2
Financial Freedom And Total Trade For Latin American Countries

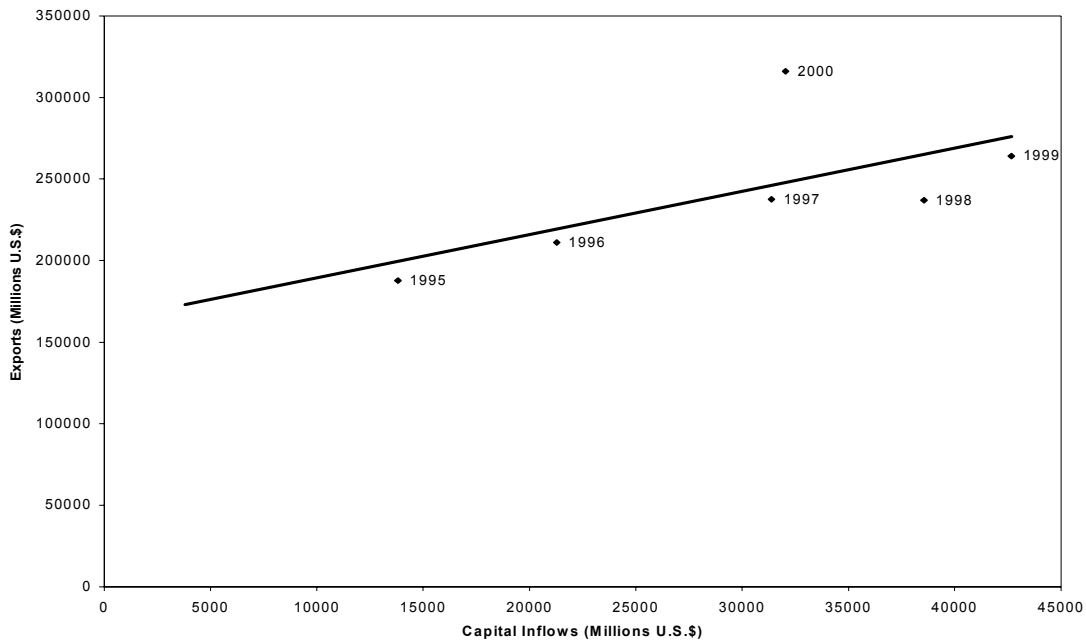
	1995	1996	1997	1998	1999
Constant	-3.777 (-14.13)**	-4.067 (-8.76)**	-3.885 (-15.73)**	-4.175 (-7.94)**	-3.672 (-15.19)**
gdp _i gdp _j	0.522 (32.27)**	0.535 (33.05)**	0.540 (31.99)**	0.546 (32.52)**	0.529 (33.12)**
pop _i pop _j	-0.089 (-3.96)**	-0.072 (-3.17)**	-0.047 (-1.98)**	-0.018 (-0.74)	-0.025 (-1.08)
dist _{ij}	-0.634 (-14.13)**	-0.668 (-15.21)**	-0.719 (-15.73)**	-0.717 (-14.71)**	-0.712 (-15.19)**
CONT	0.618 (3.49)**	0.446 (2.58)**	0.498 (2.77)**	0.494 (2.58)**	0.452 (2.45)**
LANG	0.130 (1.16)	0.268 (2.44)**	0.199 (1.74)*	0.269 (2.21)**	0.211 (1.79)*
LINK	0.134 (1.36)	0.105 (1.09)	0.012 (0.13)	-0.066 (-0.65)	0.033 (0.32)
FTA	0.323 (4.25)**	0.357 (4.79)**	0.367 (4.75)**	0.442 (5.41)**	0.302 (3.84)**
FINFREE	0.049 (2.35)**	0.084 (3.85)**	0.092 (3.95)**	0.112 (4.59)**	0.108 (4.49)**
Adjusted R ²	0.731	0.752	0.746	0.738	0.739

Notes: Figures in parentheses are heteroskedasticity-consistent *t*-statistics. ** indicates significant at the 95% level, and * at the 90% level. There are 1270 data points. Countries include: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad & Tobago, Uruguay, and Venezuela.

RESULTS FROM THE EXPORT SECTOR

This section tests the impact of capital account liberalization on export growth, and provides some further insight into the export-asset flow relationship. Standard economic theory suggests that major capital inflows cause an appreciation of the real exchange rate, which may reduce trade liberalization reform by depressing the export sector’s ability to compete. In fact, the flow of direct investment of capital to the sample of Latin America countries tripled during the time period analyzed, jumping from nearly \$15 billion in 1995 to \$45 billion in 1999. Some countries took steps to reduce foreign inflows. For example, the Chilean government worried about abnormally large current-account deficits stemming from the massive capital transactions, and imposed taxes on short-term inflows of capital from April 1991 through September 1998. Interestingly, the Latin region’s export sector (including Chile’s) grew substantially over the same time period in which capital inflows grew so rapidly; total exports for the countries increased from \$180 billion in 1995 to \$264 billion in 1999, see Figure 1 below.

Figure 1
Regional Exports And Capital Inflows



Using the same independent variables as the augmented gravity model in equation (4), the export model becomes:

$$\text{export}_{ij} = a_0 + a_1(\text{gdp}_i \text{gdp}_j) + a_2(\text{pop}_i \text{pop}_j) + a_3 \text{dist}_{ij} + a_4 \text{CONT}_{ij} + a_5 \text{LANG}_{ij} + a_6 \text{LINK}_{ij} + a_7 \text{FTA}_{ij} + a_8 \text{FINFREE}_{ij} + u_{ij}, \quad (5)$$

where export_{ij} is the log of the value of total exports from country i to country j . That is, it is the outflow of goods and services from Latin American countries to their trading partners. The results from this regression are reported in Table 3 below.

Table 3
Financial Freedom And Exports Growth
For Latin American Countries

	1995	1996	1997	1998	1999
Constant	-2.791 (-5.68)**	-2.850 (-5.69)**	-2.367 (-4.64)**	-2.318 (-4.25)**	-1.762 (-3.37)**
$\text{gdp}_i/\text{gdp}_j$	0.418 (24.78)**	0.425 (24.37)**	0.426 (24.15)**	0.429 (24.59)**	0.434 (26.01)**
$\text{pop}_i/\text{pop}_j$	-0.029 (-1.23)	-0.012 (-0.49)	-0.013 (-0.55)	-0.033 (-1.33)	-0.011 (-0.45)
dist_{ij}	-0.572 (-12.24)**	-0.608 (-12.84)**	-0.683 (-14.31)**	-0.724 (-14.29)**	-0.750 (-15.33)**
CONT	0.837 (4.55)**	0.701 (3.87)**	0.760 (4.05)**	0.673 (3.39)**	0.492 (2.55)**
LANG	0.048 (0.41)	0.200 (1.69)*	0.097 (0.81)	0.104 (0.82)	0.001 (0.01)
LINK	0.130 (1.27)	0.085 (0.82)	-0.007 (-0.01)	0.009 (0.08)	0.099 (0.94)
FTA	0.253 (3.19)**	0.257 (3.20)**	0.290 (3.60)**	0.363 (4.28)**	0.331 (4.03)**
FINFREE	0.045 (2.06)**	0.057 (2.79)**	0.069 (2.84)**	0.097 (3.85)**	0.103 (2.89)**
Adjusted R ²	0.647	0.654	0.664	0.657	0.665

Notes: Figures in parentheses are heteroskedasticity-consistent t -statistics. ** indicates significant at the 95% level, and * at the 90% level. There are 1270 data points. Countries include: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad & Tobago, Uruguay, and Venezuela.

The empirical results from export-equation (5) are similar to the total trade results reported in Table 2. As with the total trade results, the coefficient on financial freedom increases over the time period tested, rising from a low of 0.045 in 1995 to a high of 0.103 in 1999. This result can be partially explained by the dramatic changes in capital account policies in several Latin American countries in response to the Mexican and Brazil financial crisis in 1994 and 1997, respectively. It is also important to note that financial freedom does not reduce the export sector as some skeptics argue. Rather these results provide evidence that the trade-creating effects of capital flows outweigh potential exchange rate shocks. Trade is enhanced through many channels, including intrafirm trade, an elevated demand for products originating in the multinational's home country, and economies of scale.

CONCLUSION

Despite the well-know uncertainties of the global financial market, there are many reasons why economists support international investment liberalization. Recent research on international investment points to several channels through which international asset flows can lead to an improvement in economic welfare. They include facilitating international transfers of technology, improvements in the

allocation of savings to investments, enhancing economic growth, and diversifying asset portfolios.

The purpose of this article is to test for an additional association, namely if there is a significant relationship between international investment liberalization and bilateral trade volume in Latin America. Using an extended gravity model that controls for geographical factors, support for a significantly positive relationship between asset flow openness and international trade is found. The findings suggest that a 10 percent decrease in barriers toward foreign assets transactions will increase international trade by roughly 1 percent in 1999. This result is significant for other emerging regions like Asia and Africa because many countries in these regions have erected significant barriers to capital account transactions.

COUNTRY APPENDIX

Algeria	Estonia	Malaysia	South Africa
Argentina	Finland	Mexico	Spain
Australia	France	Nepal	SriLanka
Austria	Germany	Netherlands	Sweden
Bangladesh	Greece	New Zealand	Switzerland
Belgium	Guatemala	Nicaragua	Tanzania
Bolivia	Honduras	Nigeria	Thailand
Brazil	Hong Kong	Norway	Trinidad & Tobago
Canada	Hungary	Panama	Tunisia
Chile	India	Papua New Guinea	Turkey
China	Indonesia	Paraguay	Ukraine
Colombia	Ireland	Peru	United Kingdom
Costa Rica	Italy	Philippines	United States
Czech Republic	Jamaica	Poland	Uruguay
Denmark	Japan	Portuga	Venezuela
Dominican Rep.	Korea	Romania	Zambia
Ecuador	Latvia	Russian Federation	Zimbabwe
Egypt	Lithuania	Singapore	
El Salvador	Malawi	Slovak Republic	

DATA APPENDIX

International trade data are taken from the International Monetary Fund's *Direction of Trade Statistics Yearbook, 2000*. Data for Gross Domestic Product in millions of U.S. dollars, population, common members of regional trade blocks [Andean Group, Asia Pacific Economic Cooperation (APEC), Association of Southeast Asian Nations (ASEAN), European Union (EU), Latin American Integration Association (LAIA), Southern Cone Common Market (MERCOSUR), North American Free Trade Area (NAFTA), and Southern Africa Development Community (SADC)] come from the World Bank's *2001 World Development Indicators*. The distance is the number of kilometers between capital cities, and comes from the U.S. Geological Survey at <ftp://kai.er.usgs.gov/pub/>. Data on common border, common language, and common colonial link come from the *CIA World Factbook 2000* at <http://www.cia.gov/cia/publications/factbook/>.

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