Does Trade with Low-Wage Countries Hurt American Workers?

*Stephen Golub**

There are gaping disparities in wages and benefits around the world. In 1996, average hourly earnings of production workers in manufacturing were $31.50 in West Germany, $17.20 in the United States, $1.51 in Mexico, and less than $0.50 in India and China. How can such huge wage differences exist? Are American workers' wages and benefits forced down by competition from low-wage countries? Are trade barriers the solution? While there are some genuine problems raised by trading with low-wage countries, this article will try to show that popular fears are based on misunderstanding of the causes and effects of wage disparities.

The following quotation, from the concluding article in the September 1996 *Philadelphia Inquirer* series "America: Who Stole the Dream?" by Donald Barlett and James Steele, forcefully expresses the widely held view that competition from goods produced in low-wage countries is unfair and detrimental to American workers.

> "Companies that produce goods in foreign countries to take advantage of cheap labor should not be permitted to dictate the wages paid to American workers."
>
> "A Solution: Impose a tariff or tax on goods brought into this country equal to the

*Steve Golub is professor and chair, Department of Economics, Swarthmore College, Swarthmore, PA. When this article was written, he was a visiting scholar in the Research Department of the Philadelphia Fed.

wage differential between foreign workers and U.S. workers in the same industry. That way competition would be confined to who makes the best product, not who works for the least amount of money.

"Thus, if Calvin Klein wants to make sweatshirts in Pakistan, his company would be charged a tariff or tax equal to the difference between the earnings of a Pakistani worker and a U.S. apparel worker....

"If this or some similar action is not taken, the future is clear. Wages of American workers will continue to slip, as well as their standard of living."

These arguments ignore a fundamental point: differences in wage rates between countries largely reflect differences in labor productivity (output per hour worked). For example, wages are low in India because productivity is low. Thus, the costs of producing goods are not as different across countries as wage rates suggest. Indeed, the United States as a whole benefits from international trade, irrespective of the wage levels of its trading partners, by specializing in what we do well and importing goods that are most efficiently produced elsewhere. By increasing efficiency, international trade, like technological change, increases the size of the economic pie available to the nation. Granted, international trade does adversely affect some industries and individuals, especially in the short run, but there are more than offsetting benefits to the rest of the economy. Rather than hobbling the efficiency of the American economy with trade restrictions, it is better to ease the burden on the minority of Americans who are adversely affected.

MAGNITUDE OF INTERNATIONAL DIFFERENCES IN WAGES AND BENEFITS

Labor costs in the industrialized countries are much higher than those in the developing countries, although labor costs vary greatly within each group, too (Table 1; Figure 1). U.S. manufacturing wages are well below those of

TABLE 1

Indicators of Hourly Labor Costs For Production Workers in Manufacturing

Selected Countries, 1996[a]

	Labor Costs (in $U.S.)	Labor Costs (As a Percent of U.S. Labor Cost)
United States	17.74	100
Canada	16.66	94
France	19.34	109
Germany	31.87	180
Italy	18.08	102
Japan	21.04	119
United Kingdom	14.19	80
Hong Kong	5.14	29
Korea	8.23	46
Mexico	1.50	8
Singapore	8.32	47
Sri Lanka[b]	0.48	3

[a]Labor costs in other countries are converted to U.S. dollars at the market exchange rate. Labor costs include wages and fringe benefits.
[b] 1995

Source: U.S. Bureau of Labor Statistics

Germany but above those of the United Kingdom. For medium-income countries like Korea, labor compensation levels in manufacturing have reached nearly half of those in the United States, while low-income countries such as Sri Lanka, India, and China have labor costs that are less than 5 percent of U.S. levels.[1]

THE PRINCIPLES OF COMPARATIVE AND ABSOLUTE ADVANTAGE

Popular discussions confuse the relationships between international trade, wages, and labor productivity. Wages are determined by the overall productivity of labor (absolute advantage) and are therefore not an independent source of international competitiveness. Trade patterns depend on comparative advantage: industry-by-industry differences in productivity across countries. We will first consider these basic principles before turning to the evidence.

The important distinction between comparative and absolute advantage, first put forth by David Ricardo in 1817, is best explained with a simple example (Table 2). With no international trade, the United States demonstrates higher productivity than Mexico in both industries in this example, but the productivity ratio is greater in computer chips (10 to 1) than in shirts (2 to 1).

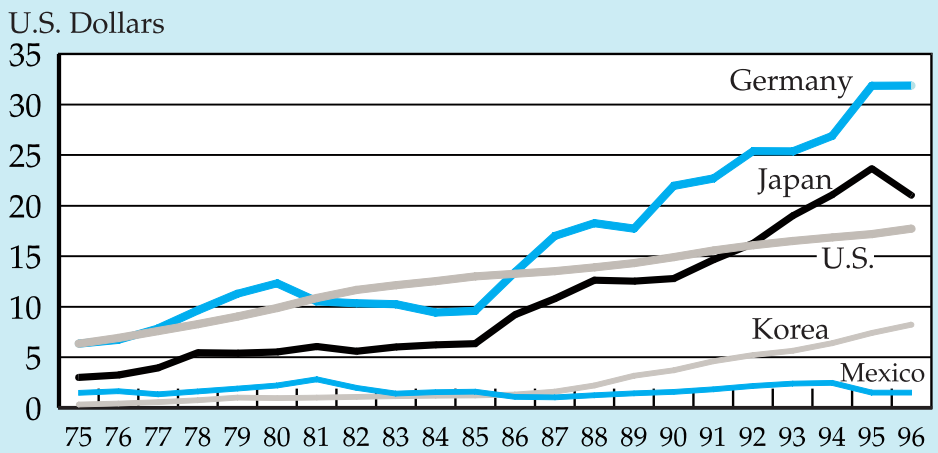
To produce more shirts, a country must sacrifice chip output and vice versa, given a limited supply of workers. The number of chips that must be given up to produce, say, one more shirt is what economists call the "opportunity

[1]Labor costs in manufacturing differ by industry; however, these industry variations are swamped by the overall differences in wages between countries. Therefore, it is not misleading to focus on manufacturing averages.

FIGURE 1

Hourly Labor Compensation Of Production Workers in Manufacturing*

Selected Countries



*Labor costs in other countries are converted to U.S. dollars at the market exchange rate. Labor costs include wages and fringe benefits.

Source: U.S. Bureau of Labor Statistics

TABLE 2
Output per Worker Per Hour

	Computer Chips	Shirts
United States	10	2
Mexico	1	1

cost" of a shirt. Since a worker in the United States can produce 10 chips or two shirts, the opportunity cost of one shirt is five chips. In Mexico, since a worker can produce one chip or one shirt, the opportunity cost of one shirt is one chip. Thus, the opportunity cost of shirts is higher in the United States than in Mexico. Therefore, Mexico has a "comparative advantage" in producing shirts, since it has a lower opportunity cost: that is, producing shirts "costs" fewer chips. Similarly, the United States has a comparative advantage in producing chips, since its opportunity cost in that industry is lower.

As the example suggests, the determination of comparative advantage depends only on the ratio of productivity in the two industries within each country. For example, if Mexican productivity were to double, so that each worker could produce either two chips or two shirts, the opportunity cost would be unchanged, and Mexico would retain its comparative advantage in producing shirts.

A related concept is that of absolute advantage. A country is said to have an absolute advantage in producing a good if a worker in that country can produce more of the good than a worker in the same industry in a different country. In the example above, the United States has an absolute advantage in producing both chips and shirts because a U.S. worker could produce more of either good than a Mexican worker.

Despite this absolute advantage, however, the total output of the world economy—and the standard of living in each country—will be higher if U.S. workers produce more of those items in which they have a comparative advantage and Mexican workers do the same, and the two countries trade. In general, absolute advantage determines the overall level of wages in each country, and comparative advantage determines trade patterns.

To put this concept simply, let's suppose wages in the United States are five times those in Mexico—as they were before Mexico's currency crisis in 1994—in both the shirt industry and the chip industry.[2] Since U.S. workers can produce 10 times as many chips as their counterparts in Mexico, but their wages are only five times as high, the United States will have *lower* labor costs per chip. Similarly, since U.S. workers produce only twice as many shirts as Mexican workers, but their wages are five times as high, the United States will have *higher* labor costs per shirt. So, ideally, Mexico should produce more shirts, the United States should produce more chips, and the two countries should trade. Such a transaction produces more goods at lower cost because it allows each country to produce more goods in the industry in which it has a comparative advantage.

Both countries' living standards will increase from trading according to comparative advantage because the resulting world pattern of production is more efficient than if each country produces only for its own market. The United States can obtain shirts more cheaply from Mexico than by producing shirts itself, paying for these shirt imports with chip exports. International trade does not cost U.S. jobs, but it does change the industry mix of U.S. output and employment. American production of

[2]Wages for workers with similar characteristics will be the same in different industries within a country if the labor market is competitive and workers can freely move between industries.

chips will expand while shirt production contracts, resulting in corresponding shifts in labor demand. The reverse happens in Mexico.

There are two qualifications to this characterization of the benefits of trade. First, relocating workers between the shirt and chip industries may be difficult in the short run, resulting in some unemployment of former shirt workers in the United States. Second, this kind of trade may reduce unskilled workers' real wages in the United States, even after workers are relocated, if the chip industry employs a higher ratio of skilled to unskilled workers than the shirt industry. In the United States, as chip production expands and shirt production falls, the demand for skilled labor rises, while the demand for unskilled labor declines. As discussed later, however, the proper response to these distribution effects is not to restrict trade but to ease the transition by retraining displaced workers.

These days, international trade, which is often conducted by multinational corporations, increasingly takes the form of trade in intermediate products, but the basic gains from trade are unaffected. American companies locate the simpler parts of their production processes in developing countries, while the more sophisticated components are produced at home. For example, 21 months after the North American Free Trade Agreement (NAFTA) went into effect, the Key Tronic company, a large manufacturer of computer keyboards, laid off 277 workers in Spokane, Washington, as it relocated some of its assembly jobs to a plant in Cuidad Juarez, Mexico. But Key Tronic's chief financial officer reported that employment in its Spokane plants actually increased overall because many of the components used in the keyboards are made in Washington, and the lower costs of assembly in Mexico enabled the company to lower prices and increase sales.[3]

Other studies show that economic integration with Mexico has entailed a boom in manufacturing production in U.S. cities along the border because Mexican factories specialize in assembly, which makes intensive use of unskilled labor, while border regions in the United States specialize in high-technology tasks such as production of components and product design.[4] This international division of labor follows the principle of comparative advantage. The United States is likely to have an absolute advantage in all stages of the production process, because American workers are, on average, more skilled and educated than those in developing countries, and infrastructure in the United States is superior. But the United States' advantage in terms of efficiency is likely to be greatest in high-technology production processes, for which a highly skilled work force is critical. The United States gains from the increase in efficiency resulting from the global division of labor, just as in the simple chip/shirt example.[5]

In fact, the chip/shirt example illustrates a key point: low wages most likely reflect low productivity. Furthermore, if low wages were all that mattered in international trade, countries with rock-bottom labor costs, such as Bangladesh, Bolivia, and Burundi, would be major exporters. Yet, popular concern often focuses on countries such as Mexico and South Korea—countries with wages well above those in Africa and South Asia. Clearly, labor productivity matters, too.

Some people worry that as low-wage coun-

[3]"NAFTA Tradeoff: Some Jobs Lost, Others Gained," *New York Times,* October 7, 1995.

[4]See the article by Gordon Hanson.

[5]Robert Feenstra and Gordon Hanson provide a theoretical analysis of this form of comparative advantage. One difference between their results and the textbook analysis is that skilled labor reaps the gains from trade in *both* the United States and the low-wage country. This result is consistent with some evidence that the gap between the wages of skilled and unskilled workers is widening in developing countries, just as it is in developed countries.

tries acquire technology and capital, their productivity will rise, giving them a competitive edge. But there are two reasons not to be concerned about this. First, as productivity in a country rises, wages tend to rise as well, so the competitive edge lessens. Second, other factors, such as low levels of human capital (knowledge and skills) as well as poor public infrastructure and transportation services, tend to hold down productivity in low-wage countries, even when they acquire new physical capital (computers and factories). Except for products and production processes that require large amounts of unskilled labor, these factors offset the appeal of low wages for companies considering relocating their production to poor countries.

In addition, developing countries may have higher costs of other inputs, such as capital, energy, and raw materials. Prices of these inputs are more likely than wage rates to be similar across all countries, because, unlike labor, nonlabor inputs can be moved across borders in response to international price differences. Nonetheless, capital, energy, and raw material *costs per unit of output* could be higher in developing countries if these countries use nonlabor inputs less efficiently than developed countries.

In summary, both developed and developing countries can benefit from specializing in what each produces relatively efficiently, regardless of the overall level of labor costs, because low wages do not necessarily mean low production costs across the board. Low wages may be offset by either low labor productivity or higher costs of nonlabor inputs such as capital, energy, and raw materials. Only in low-skill industries and unsophisticated production processes are developing countries likely to have lower average costs of production and, hence, a comparative advantage.[6]

[6]China's efforts to develop an aircraft industry are often presented as a counterexample. But China's exports consist overwhelmingly of low-technology items such as clothing, shoes, and toys.

WAGES, PRODUCTIVITY, AND TRADE: EVIDENCE

Wages and labor productivity are related (Figure 2).[7] For example, in 1990 wages in Malaysia were 10 percent of wages in the United States. But Malaysian labor productivity was also about 10 percent of the U.S. level in 1990. This means that unit labor costs (the ratio of wages to productivity) were approximately the same in Malaysia and the United States because the difference in productivity almost exactly offset the difference in wages between the two countries. In this case, companies have no incentive to shift production from the United States to Malaysia.

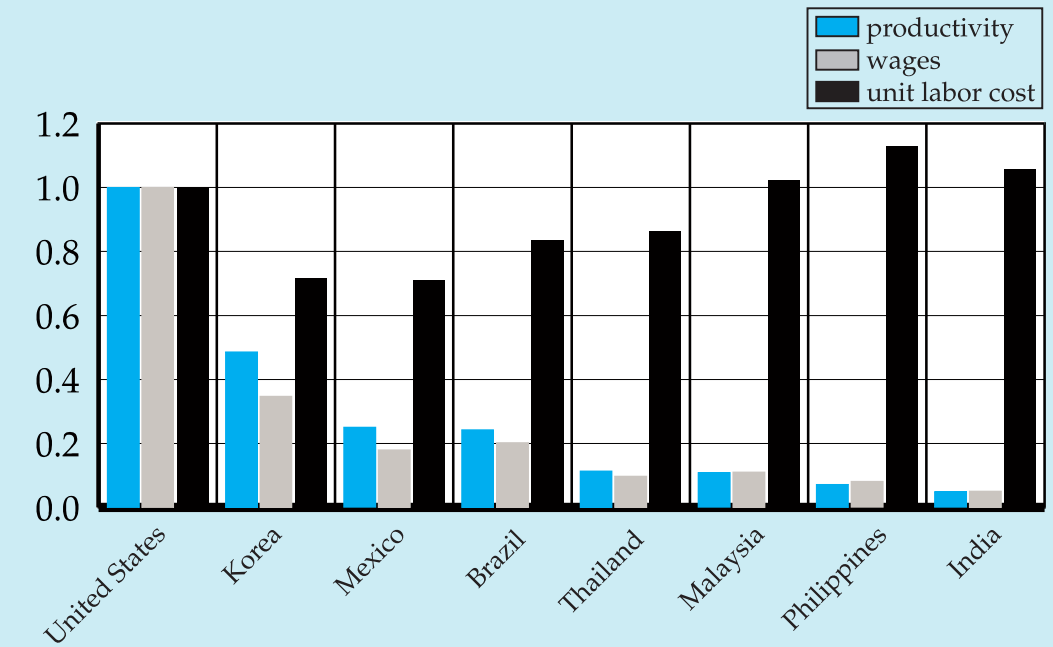
In general, international differences in unit labor costs are much smaller than differences in wage rates because the huge international disparities in wages mostly reflect equally large differences in productivity. In fact, these calculations indicate that, in 1990, unit labor costs in the Philippines and India were actually higher than those of the United States, that is, the productivity difference was even bigger than the wage difference.

Some disparities between wages and productivity are to be expected for several reasons.

[7]Productivity is calculated as real value-added per employee. Value-added is the value of output minus the costs of raw materials and other intermediate inputs. Wages are defined as earnings per employee. Earnings here include all direct payments, including maternity and vacation pay and payment in kind, but exclude employer contributions to social insurance funds, as data on the latter are not available for most developing countries. The exclusion of social insurance costs is likely to overstate relative labor costs in developing countries, but only to a minor extent. Direct pay is still, by far, the larger part of compensation, accounting for 70 to 90 percent of total labor compensation even for the United States and other rich countries. The ratio of employer-paid benefits to total labor costs is not that much higher in developed countries compared with the few developing countries for which this information is available. For details on sources and methods of the calculations of wages and productivity, see my 1995 article.

FIGURE 2

Labor Productivity, Wages, and Unit Labor Costs in Developing Countries, Relative to the United States



Source: Golub (1995)

First, differences in wages sometimes reflect temporary exchange-rate movements, which may have little effect on long-term business decisions about the location of production. For example, the appreciation of the dollar against the mark and the yen in the early 1980s sharply lowered German and Japanese wages measured in U.S. dollars (see Figure 1). The depreciation of the dollar in the late 1980s and early 1990s, however, led to a large increase in German and Japanese wages expressed in U.S. dollars.[8] Second, as noted above, some differences in unit labor costs may be offset by nonlabor costs, so low unit labor costs do not necessarily imply a competitive advantage. Third, the available measures of labor costs and productivity are not always fully reliable and comparable, especially for developing countries. Despite these qualifications, a fairly close correlation between la-

[8]German unit labor costs in the mid-1990s reached levels nearly double those of the United States, as German labor compensation rose well above U.S. wages and German productivity remained at about 80 percent of the U.S. level. Germany's high unemployment may reflect, in part, the relatively high level of German labor costs. The depreciation of the mark in 1996-97 has partially restored Germany's cost competitiveness. A similar description applies to recent Japanese unit labor costs, but to a lesser extent.

bor costs and labor productivity is observed across countries.

Wages and labor productivity also move together over time for individual countries. For example, Korea experienced both high wage growth and high productivity growth in manufacturing over 1970-95, compared with the United States (Figure 3). In 1970, Korean wages were 8 percent of U.S. wages, while Korean productivity was 14 percent of U.S. productivity. By 1995, Korean productivity had reached 69 percent of the U.S. level, while Korean wages grew to 48 percent of American wages. Note that U.S. manufacturing productivity and wages grew steadily over this period, so Figure 3 indicates very strong growth in Korean wages and productivity. Korean workers have greatly benefited from Korea's phenomenal economic growth.

In Mexico, wages and productivity moved closely together until the outbreak of the debt crisis in 1982. This crisis led to policies of extreme austerity and steep depreciation of the peso to enable Mexico to service its foreign debt and, in turn, caused a steep decline in the dollar value of Mexican wages (Figure 4). Mexican wages recovered relative to productivity after 1986, but fell back after 1994. This decline in Mexican wages and unit labor costs in 1994-95 and the subsequent shift of the Mexican trade balance from deficit to surplus are often inappropriately cited by U.S. opponents of the North American Free Trade Agreement as vindication of their views that NAFTA would create a "large sucking sound" of jobs being siphoned off to Mexico. As in the early 1980s, the drop in Mexican wages after 1994 reflects the collapse of the peso and deep recession in Mexico. Indeed, manufacturing employment in Mexico dropped nearly 10 percent in 1995. As the Mexican economy recovers from the crisis, its wages and unit labor costs are likely to increase, as they did from 1987 to 1991.

The volume of trade is also inconsistent with fears about the competitiveness of low-wage countries (Table 3). Many developing countries' exports of manufactures to the industrial countries have increased rapidly, but the majority of these developing countries continue to run trade deficits in manufactures, as their imports

FIGURE 3

Wages and Labor Productivity, Expressed as a Ratio of U.S. Wages and Productivity KOREA

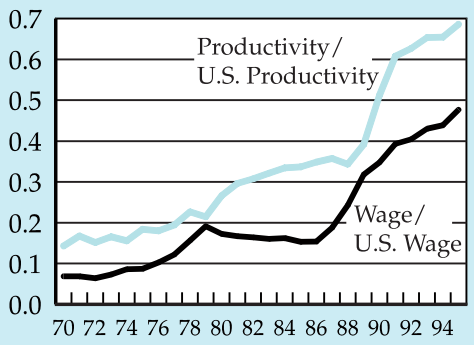


FIGURE 4

Wages and Labor Productivity, Expressed as a Ratio of U.S. Wages and Productivity MEXICO

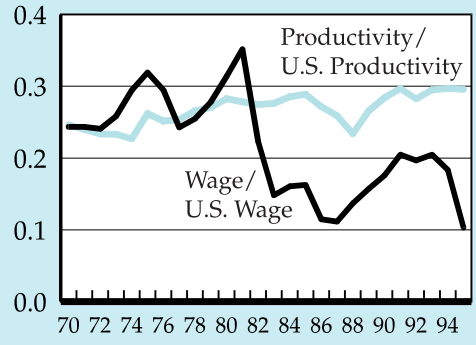


TABLE 3

Developing Countries' Trade in Manufactured Goods with All Industrial Countries, Selected Years, as a percent of Developing Countries' GDP

		Exports to Industrial Countries	Imports From Industrial Countries	Trade Balance
Brazil	1970	0.3	2.8	-2.5
	1980	1.1	2.2	-1.1
	1990	2.2	1.5	0.6
	1995	1.7	3.1	-1.4
India	1980	1.1	1.8	-0.7
	1990	2.1	2.2	-0.1
	1995	3.8	3.3	0.5
Korea	1970	6.1	9.8	-3.7
	1980	14.3	11.4	2.9
	1990	15.2	11.6	3.5
	1995	12.3	13.9	-1.6
Malaysia	1970	8.0	13.6	-5.5
	1980	9.3	19.1	-9.8
	1990	19.1	31.3	-12.2
	1994	33.2	45.0	-11.8
Mexico	1970	0.8	4.3	-3.4
	1980	0.7	5.7	-5.1
	1990	3.7	6.8	-3.1
	1995	19.3	16.8	2.5
Thailand	1970	1.3	9.6	-8.3
	1980	4.2	9.4	-5.2
	1990	10.7	17.3	-6.6
	1995	12.8	21.9	-9.1

Sources: United Nations, International Monetary Fund.

have grown nearly as much. For many of these developing countries, two-way manufacturing trade with the industrial countries is now quite large in relation to their gross domestic product (Brazil and India are exceptions). Trade in manufactures is, on the whole, much more important for the developing countries than for the developed countries, as measured by share of respective GDP.

In summary, wage differences do mostly reflect productivity differences. Macroeconomic shocks and exchange-rate fluctuations, however, can entail large discrepancies for several years.

INTERNATIONAL TRADE AND THE U.S. LABOR MARKET

U.S. Employment Performance. Critics argue that the overall U.S. trade deficit and the deficits with particular developing countries such as China and Mexico reduce the number of jobs in the United States. As evidence, they often cite the decline of manufacturing employment. They claim that other countries, such as Japan and those in Western Europe, have less open markets and consequently do not run trade deficits like the United States. But these arguments ignore the fact that overall U.S. employment growth has been extraordinarily impressive, far outpacing that of Europe and Japan. Indeed, there has been much discussion in these countries about how to emulate U.S. employment performance. In 1997, the U.S. unemployment rate fell below 5 percent, its lowest level since the early 1970s. In recent years, the labor force and employment have increased more rapidly than the population of working age: 4 million workers were added in 1996 and the first half of 1997 alone. The *New York Times* reported recently that the demand for labor is so strong that "companies are recruiting among those ignored in the past: mothers at home with their children, older men who had retired or been laid off, students, immigrants, people with criminal records. State officials [in Louisville, Kentucky] who help former prisoners get jobs say companies now reject fewer convicted felons."[9]

Therefore, while the U.S. trade deficits do displace some workers, any associated job losses have been more than offset by overall job creation. In fact, the causation runs in the reverse direction: the strength of the U.S. economy, which manifests itself in employment growth, is an important cause of the overall U.S. trade deficit, since imports rise with incomes. Recessions in Japan, Europe, and Latin America, meanwhile, have held down U.S. exports.

Even in manufacturing, international trade has had a secondary role in affecting employment trends. In 1994, manufacturing accounted for 16 percent of all U.S. jobs, down from 26 percent in 1970. A recent study found that the U.S. trade deficit accounted for only one tenth of this decline; the remainder is mostly due to the difference in productivity growth between manufacturing and the service sector.[10] As manufacturing productivity increases, fewer workers are needed to produce a rising volume of output, and the released workers shift to the service sector. Much the same occurred in agriculture earlier in the century. Technological change and capital investment lowered the share of employment in agriculture from 44 percent in 1900 to 3 percent today. This process was undoubtedly painful for many displaced workers, but few today would consider reversing the clock on the gains in standard-of-living afforded by the growth in agricultural productivity.

Nor is it true that the overall "quality" of jobs has declined as the quantity has increased.

[9] "Jobs Opening Faster Than They Can Be Filled," *New York Times,* July 10, 1997.

[10] See the article by Robert Rowthorn and Ramana Ramaswamy.

Careful studies show a mixed picture. Job growth has been strong in high-paying as well as low-paying occupations, as industries have shifted the occupational mix of their employees. Between 1983 and 1994, jobs in managerial, professional, and technical occupations grew more rapidly than overall U.S. employment.[11] Once again, this does not deny that some workers have suffered because of job dislocation and wage declines, sometimes caused by competition from imports. The overall performance of the labor market, however, is at variance with the popular view that international trade is devastating American labor.

Wage Inequality. Increased inequality of wages has been one of the most salient features of the American labor market in recent decades. While average family income has increased, the gap between higher-paid and lower-paid workers has widened sharply.[12] Much of the increase in wage inequality reflects a greater demand for skilled labor, as evidenced by a large increase in the wages of college graduates relative to the wages of workers without a college education. While increased wage inequality is not necessarily a bad thing in itself, as it may reflect a more competitive and discerning labor market, the plight of those at the lower end of the income distribution is a source of concern. The question here is the role international trade is playing.

As suggested by the Mexico shirt/ U.S. computer chip trade example, international trade with poor countries can be expected to increase the relative demand for skilled labor in the United States, since the United States expands production in industries that make intensive use of skilled labor and it imports goods created largely by unskilled labor. Such trade may cause not just a widening in the wage gap between skilled and unskilled labor but also an absolute decline in the real income of unskilled workers. Also, the widening wage inequality has coincided with an increase in international trade with low-wage countries, suggesting a possible connection.

Although there may be a connection between increased trade and income inequality, many studies conclude that international trade with low-wage countries has played, at most, a secondary role in increasing income inequality. As a recent survey of the literature concludes, "Nearly all of this research finds only a modest effect of international trade on wages and income inequality."[13] The small effect of trade on wage inequality in the United States is not so surprising when one considers the small size of such trade. Although imports of manufactured goods from developing countries have expanded rapidly, in 1995 they still amounted to only 3 to 4 percent of U.S. gross domestic product (GDP) and 7 percent of the value of manufacturing production. More than half of U.S. imports of manufactured goods still come from other industrialized countries, some of which have higher wages than the United States (see Table 1). Most economists think that technological change, which has increased demand for workers with higher skills, is mainly responsible for the rise in the demand for skilled rather than unskilled labor and the resulting increase in wage inequality. Many economists believe that advances in information technology, such as computers and telecommunications, are at the heart of the changes affecting the U.S. economy.

In the case of technological change, the benefits to the overall standard of living outweigh

[11]See the study published by the Committee on Economic Development.

[12]See Peter Gottschalk's article for a summary of the facts and other articles in the same issue of the *Journal of Economic Perspectives* for further discussion.

[13]See the article by Matthew Slaughter and Phillip Swagel.

the associated dislocations to those whose skills become obsolete. The economic effects of international trade are similar: trade and new technology both raise the general standard of living while hurting those whose occupational skills are devalued. Why accept technological change while restricting trade? Many people recognize that new technology entails a shift in the composition of jobs rather than a net loss of jobs but fail to understand that the same is true for international trade. But, as discussed previously, by specializing according to comparative advantage, countries increase their productive efficiency with little net effect on job creation.

Although technological change is far more important than international trade as a cause of wage inequality, trade does adversely affect some workers. Rather than restrict trade, the United States should offer a social safety net and retraining, which are better ways of helping displaced workers. That way, society can reap the gains from trade and share them more equally.

CONCLUSIONS

Trade between the United States and low-wage countries benefits most people in both places, irrespective of wage differences. Differences in wages largely reflect differences in labor productivity and are not a form of unfair competition. Developing countries tend to specialize in products created mostly by unskilled labor while the United States specializes in more sophisticated goods. Some unskilled workers in the United States are adversely affected by such trade, although factors other than trade are more important in accounting for increases in wage inequality. In any event, restricting trade is an inferior solution—it is better to help displaced workers adjust rather than deny society the gains from specialization according to comparative advantage.

REFERENCES

Barlett, Donald L., and James B. Steele. *America: Who Stole the Dream?* Kansas City: Andrews and McNeel, 1996. Reprinted from *Philadelphia Inquirer* series, September 1996.

Committee on Economic Development. *American Workers and Economic Change.* CED: Washington, 1996.

Feenstra, Robert C., and Gordon H. Hanson. "Foreign Investment, Outsourcing and Relative Wages," in Robert C. Feenstra and Gene M. Grossman, eds., *Political Economy of Trade Policy: Essays in Honor of Jagdish Bhagwati.* Cambridge: MIT Press, 1995.

Golub, Stephen S. "Comparative and Absolute Advantage in the Asia-Pacific Region," Pacific Basin Working Paper Series, Federal Reserve Bank of San Francisco, No. PB95-09, October 1995.

Gottschalk, Peter. "Inequality, Income Growth, and Mobility: The Basic Facts," *Journal of Economic Perspectives* 11, Spring 1997.

Hanson, Gordon H. "Economic Integration, Intraindustry Trade, and Frontier Regions," *European Economic Review* 40, April 1996.

Rowthorn, Robert, and Ramana Ramaswamy. "Deindustrialization: Causes and Implications," IMF Working Paper WP97/42, April 1997, forthcoming in International Monetary Fund *Staff Studies for the World Economic Outlook.*

Slaughter, Matthew J., and Phillip Swagel. "The Effect of Globalization on Wages in the Advanced Economies," IMF Working Paper WP97/43, April 1997, forthcoming in International Monetary Fund *Staff Studies for the World Economic Outlook.*

Has Globalization Created a Borderless World?

*Janet Ceglowski**

The newest buzzword in the popular business press is *globalization*, a word that evokes images of a world in which goods, services, capital, and information flow across seamless national borders. In this world, the choices over where to produce, shop, invest, and save are no longer confined within national borders but have taken on a decidedly global orientation. Some analysts speculate that globalization has blurred the economic distinctions between countries, creating a "borderless world" in which economic decisions are made without reference to national boundaries. For instance, in describing the sphere in which the major industrial economies operate, Kenichi Ohmae asserts that "national borders have effectively disappeared and, along with them, the economic logic that made them useful lines of demarcation in the first place."

The view that national borders have become economically meaningless is controversial. But, if correct, it has potentially important implications for the world's economies and their policymakers. One current concern is that, by enhancing access to the labor resources and products of low-wage countries, globalization

*Janet Ceglowski is an associate professor, Department of Economics, Bryn Mawr College, Bryn Mawr, PA. When this article was written, she was a visiting scholar in the Research Department of the Philadelphia Fed.

could already be stunting workers' living standards in relatively high-wage countries like the United States.[1] A truly borderless world would place great limits on the ability both to confine the effects of domestic economic policy within national borders and to insulate countries from foreign economic shocks. In such a world, financial capital, production activities, and even workers could move in response to better opportunities elsewhere in the world almost as easily as they could within a given country, thereby undermining efforts to maintain economic or financial conditions at home that diverge substantially from those abroad.

The overall level of international economic activity has escalated in recent years, spurred by a variety of factors ranging from innovations in information technology to efforts by national governments to liberalize and deregulate markets. The result has been an impressive expansion in world trade, investment in overseas operations, and international flows of financial capital. Casual observation suggests that international economic developments are attracting greater attention from policymakers, producers, and even individuals in their roles as workers and consumers. Both the growth in international economic activity and heightened public awareness are indications of strengthening economic ties between countries. The United States has participated in this trend and, by most measures, is considerably more open today than it was even 25 years ago.

Does all this mean that national borders no longer matter for economic decisions? This article assesses the relevance of the "borderless world" view for U.S. product markets. Although the U.S. economy has become more open, recent research finds that national borders continue to affect U.S. trade flows and product prices. In fact, the estimates of the border's effects are substantial. A number of factors could be responsible for this finding, including government-imposed barriers to trade, fluctuations in exchange rates, and a variety of noneconomic factors such as national historical and cultural ties. Even in the current environment of global and regional trade liberalization, there is little reason to expect that the influence of these factors on U.S. product markets is about to disappear.

GLOBAL AND REGIONAL INTEGRATION: EVIDENCE FOR U.S. PRODUCT MARKETS

National economies are linked through trade in goods and services, cross-border flows of financial assets, and labor migration. International economic integration is the process by which reducing barriers between national economies strengthens these ties. In the economics literature, integration traditionally has been associated with explicit government actions to lower tariffs and other artificial barriers to the international movement of goods, services, and inputs. Recent advances in communication and information technologies have also promoted economic integration by enhancing knowledge of and access to foreign consumers and products. Both trade liberalization and advances in communication and information continue to be operative factors in the U.S. economy.

Have U.S. product markets become more integrated with the world economy as a result?[2]

[1] This is, itself, a hotly debated issue among economists. The debate centers on the impact of trade on jobs, wages, and income distribution. See, for instance, the article by Paul Krugman and Robert Z. Lawrence and the symposium papers in the *Journal of Economic Perspectives*, 9 (Summer, 1995), pp. 15-80.

[2] While this paper is concerned with the economic integration of U.S. markets for goods and services, the term can also be applied to markets for inputs like labor and financial capital. By and large, labor market integration is limited by government-imposed barriers to international migration. In contrast, financial capital is perceived as highly mobile internationally. That view is supported by

One common approach to quantifying the strength of an economy's ties with the rest of the world is to measure the share of its economic activity made up of exchanges with other countries. A larger share is indicative of a more "open" economy, one with stronger links to the world economy. According to this measure, markets for goods in the United States have become more open. Measured relative to gross domestic product (GDP), merchandise trade more than doubled between 1970-71 and 1995-96 as a result of significant growth in both exports and imports (Table 1). Much of that gain occurred in the 1970s, so that by 1980-81 merchandise trade was 16.5 percent of GDP. The expansion in U.S. trade resumed in the 1990s, albeit at a somewhat slower pace. Though

the fact that, at least for the major currencies, interest rate differentials between identical offshore and domestic assets are insignificant. But as Martin Feldstein observes, this merely reveals that financial capital can and does move across national borders. In fact, despite the substantial holdings of foreign stocks and bonds, recent research indicates that investors exhibit a strong home bias in their investment portfolios (see the articles by Kenneth French and James Poterba; and Linda Tesar and Ingrid Werner). The implication is that international capital markets are not fully integrated.

TABLE 1
U.S. Trade in Goods and Services Relative to U.S. GDP
(annual averages; in percent)

		1970-71	1980-81	1990-91	1995-96
Merchandise, excluding military		8.0	16.5	15.4	18.5
of which:	exports	4.0	7.8	6.9	8.0
	imports	4.0	8.7	8.5	10.5
Private services		1.8	2.5	4.2	4.8
of which:	exports	0.9	1.4	2.5	2.9
	imports	0.9	1.1	1.7	1.9
Merchandise & services		9.8	19.0	19.6	23.3
of which:	exports	4.9	9.2	9.4	10.9
	imports	4.9	9.8	10.2	12.4

Notes: The totals are the sums of the individual percentages for exports and imports. Private services trade is calculated as total services trade minus transfers under U.S. military sales contracts, direct defense expenditures, and U.S. government miscellaneous services.
Source: Author's calculations based on data from Bureau of Economic Analysis

smaller in value than goods trade, services trade has grown even faster: measured relative to GDP, it has nearly tripled since 1970-71. Together, exports and imports of goods and services have expanded from under 10 percent of GDP in 1970-71 to over 23 percent in 1995-96.[3]

Do similar measures show evidence of growing *regional* integration? Recent trade agreements between the United States, Canada, and Mexico have created a tri-national free trade area; the Canada-United States Free Trade Agreement (CUSFTA) liberalized trade between the United States and Canada in 1989 and the North American Free Trade Agreement (NAFTA) extended the free trade area to Mexico in 1994. As a result, numerous formal barriers to trade and investment between the three countries have been or will be eliminated. The reduction in economic barriers should promote greater integration of the three economies. In fact, merchandise trade with Canada and Mexico grew from 2.3 percent of U.S. GDP in 1970-71 to 5.4 percent in 1995-96 (Table 2). Some of that growth predates the creation of the North American free trade area, suggesting an ongoing process of economic integration between the United States and the two other NAFTA countries. However, the recent trade

[3]It could be argued that trade statistics underestimate the extent of product market integration because they do not fully account for the contributions of companies' overseas operations. For example, foreign companies have invested heavily in U.S. production facilities over the last 15 years or so. The result has been a significant rise in the level of economic activity of foreign companies operating in the United States. In fact, the Bureau of Economic Analysis estimates that the output of U.S. affiliates of foreign companies has grown faster than total U.S. output; as a share of gross output originating in private industries, it has increased from 2.3 percent in 1977 to 6 percent in 1995.

TABLE 2

U.S. Trade with Canada and Mexico Relative to U.S. GDP

(annual averages; in percent)

		1970-71	1980-81	1990-91	1995-96
Merchandise		2.3	3.9	4.1	5.4
of which:	Canada	2.0	2.9	3.0	3.8
	Mexico	0.3	1.0	1.1	1.6
Private services		NA	NA	0.71	0.69
of which:	Canada	0.30	0.28	0.45	0.44
	Mexico	NA	NA	0.26	0.25

Notes: The individual percentages for Canada and Mexico represent the ratios of the sum of exports and imports to U.S. GDP. The totals for merchandise and services are the sums of the individual percentages for Canada and Mexico.
Source: Author's calculations based on data from Bureau of Economic Analysis

agreements could have played a part in the significant gain since 1990-91. They might also be a factor in the sustained rise in the share of private services trade with Canada.

IS THE U.S. BORDER IRRELEVANT?

The preceding analysis indicates that U.S. product markets have become more integrated with global markets. There is some indication of the same phenomenon at the regional level. But evidence of greater economic integration is not the same as evidence that national borders no longer matter for the worldwide distribution of goods and services. Although this distinction may appear to be simply a matter of degree, it is important. In a truly borderless world, the strength of the economic ties between markets would not depend on whether they are located in the same country. In particular, consumers and producers within a given country would not trade more among themselves simply because of shared nationality. In the language of economic integration, borderless product markets would be tantamount to complete integration.

Do borders still matter for U.S. product markets? The border between the United States and Canada is the most likely place to find evidence that they don't. Complete economic integration requires that there be no trade barriers between countries. Therefore, the strongest evidence of borderless product markets should be found among countries that have largely eliminated barriers to trade between them. The United States and Canada are clear candidates: not only have CUSFTA and NAFTA eliminated numerous barriers to bilateral trade but, for many goods, tariffs and other formal trade barriers between the United States and Canada were low or nonexistent well before the recent trade agreements.

Several other features of the two countries favor the development of strong bilateral economic links. Geographic proximity is one such feature. Greater distances between markets mean larger costs of transporting goods and services between them, encumbering trade and the development of close economic ties.[4] But the United States and Canada share a long border, much of which is easily negotiated by land or water. Moreover, some Canadian cities are closer to urban centers in the United States than they are to other major Canadian cities. Indeed, over three-fourths of Canada's population lives within 100 miles of the U.S. border. The nearness of the two countries extends beyond mere physical proximity: Canada and the United States share a number of social, political, and cultural traditions, and a majority of people in both countries speak the same language. Both the geographic proximity and cultural similarities of the two countries are propitious for bilateral trade and other cross-border economic activities.

In fact, Canada and the United States have long been major destinations for each other's products and foreign investment. They currently exchange close to $1 billion in goods and services each day, making theirs among the world's largest bilateral trade flows. But how are we to gauge whether this cross-border economic activity is evidence that the U.S.-Canada border no longer matters? One approach would be to evaluate the economic ties between a Canadian market (say, Toronto) and a U.S. market (say, Philadelphia). The strength of the ties between any such pair of markets could depend on a number of factors, including the geographic distance between them and the composition and sizes of their respective economies. But if economic activity were unaffected by the political border between Canada and the United States, the strength of the ties would not depend on the fact that the two markets are lo-

[4]James Rauch argues that for all but a few relatively standardized products such as those traded in organized global markets, greater distances can also raise the costs of locating appropriate sellers or buyers in foreign markets.

cated in different countries. Evidence to the contrary would imply that the border does matter and that the two economies cannot be characterized as completely integrated.

Recent research finds that the relatively innocuous U.S.-Canada border has significant economic effects. The evidence is twofold. First, studies of Canadian merchandise trade reveal that the average Canadian province trades much more with other Canadian provinces than with U.S. states of similar economic size and geographic distance.[5] Ontario, for instance, is roughly equidistant from British Columbia and the state of Washington. Yet in 1990, it traded over seven times more with British Columbia than with Washington, despite the fact that Washington's economy was almost twice the size of British Columbia's. This suggests significant home bias in Canadian merchandise trade vis-a-vis the United States.

Second, evidence also comes from comparisons of consumer prices in the United States and Canada. If the U.S.-Canada border were economically irrelevant, there would be no large, persistent differences between the prices of identical products in Canadian and U.S. markets, once they were expressed in terms of the same currency. As every consumer has experienced firsthand, price differentials for the same good can and do exist at any single point in time. According to economic theory, however, the actions of buyers in search of low prices and sellers in pursuit of profits should minimize these price differences over time. Economists acknowledge that this process can take a considerable amount of time. They also recognize that prices of similar products in different locations may not be exactly equalized, owing to such factors as the cost of transporting the products between locations. When markets are integrated, however, the forces of competition should ensure that such prices move in parallel with one another over the long run. Yet recent research finds little evidence of such a correspondence between the U.S. dollar prices of consumer goods in U.S. and Canadian markets, even in the long run.[6]

The empirical evidence clearly indicates that the border has economic effects—that is, the border "matters"—for product markets in the United States and Canada. This conclusion may not be terribly surprising. After all, the free trade arrangement between Canada and the United States stops far short of establishing an economic union. A more interesting issue concerns the magnitude of the border's effects. That is, if the border matters, does it matter a lot? The answer appears to be yes. By one estimate, a Canadian province engages in 20 times more merchandise trade with another Canadian province than with an equidistant U.S. state of comparable economic size.[7] Preliminary evi-

[5]See the papers by John McCallum and John Helliwell. It is possible that the effects attributed to the border actually derive from differences in the composition of state and provincial production. That is, interprovincial trade could exceed trade between Canadian provinces and U.S. states not because of the border, but simply because the provinces can obtain more of what they want from other provinces. However, when McCallum explicitly controls for this possibility, he finds that it does not account for the large effect of the border on provincial trade patterns.

[6]John Rogers and Michael Jenkins analyze ratios of U.S. prices to Canadian prices (both expressed in U.S. dollars) for various categories of consumer products. In constructing the ratios, they carefully pair U.S. consumer products with similar Canadian products to ensure that they are comparing the prices of like goods. Even so, they fail to find evidence of a stable, long-run relationship between most product pairs. In a related study, Charles Engel compares the variability of price ratios for pairs of consumer products in the United States and Canada. He reports that the variation in the dollar price ratio of similar Canadian and U.S. consumer products is typically much larger than the variation in the price ratio of two different consumer goods in either the United States or Canada.

[7]This estimate comes from the studies by McCallum and Helliwell. Shang-Jin Wei comes up with much smaller estimates of home bias for the merchandise trade of a broader

dence indicates the home bias is apt to be even larger for U.S.-Canada services trade.[8] Another study translates the impact of the U.S.-Canadian border on consumer prices into an equivalent physical distance, estimating that crossing the border is equivalent to adding a distance of 1780 miles between markets.[9] Whether measured in miles or trade volumes, the economic effect of the U.S.-Canada border is considerable.

Two conclusions can be inferred from this evidence. First, the U.S.-Canada border has a surprisingly large impact on both trade patterns and product prices in the two-country region. Second, if the relatively open U.S.-Canada border exhibits such substantial economic effects, it is likely that borders have even greater impacts on trade flows and relative prices between the United States and other countries. But why do borders appear to have such large effects?

THE ECONOMIC ROLE OF THE BORDER

National borders can influence economic activity in a number of ways. As political and legal boundaries, they provide a means for governments to erect barriers to international flows of goods, services, and factors of production. These measures take a variety of forms and are instituted for a number of reasons. Tariffs drive a wedge between a domestic market and foreign supplies, frequently with the intention of offering protection to domestic industries.[10] The same is true of quotas, nontariff trade barriers that impose quantitative restrictions on imports.

Other so-called nontariff barriers often have the same effect but may or may not be erected for trade policy purposes. This broad category of barriers includes technical standards, licensing and certification requirements, health and safety regulations, border formalities, and government procurement practices. There are numerous instances in which regulators have been accused of imposing measures to protect domestic industries under the guise of other concerns such as the environment or public health. For example, in the early 1990s, Ontario levied a 10-cent tax on all beer sold in cans. The stated objective was to encourage container re-use. But U.S. beer manufacturers viewed the tax as protectionist because, unlike Canadian beer, most American beer is sold in cans and is thus subject to the levy. Practically speaking, of course, determining whether a specific nontariff barrier was intended to shelter domestic markets from foreign competition or had some other primary objective is often difficult.

Other examples of government-imposed barriers include controls on international flows of capital and labor, limitations on holdings of foreign exchange, and market-entry and ownership restrictions. All of these measures differentiate the products and inputs of the do-

sample of industrialized countries. However, reconciling Wei's findings with those for U.S.-Canadian merchandise trade is complicated by conceptual and measurement differences in the two sets of studies.

[8]See the paper by Helliwell and McCallum. This is likely for two reasons. First, the free trade agreements between the U.S. and Canada did not include some service sectors, such as health, transportation, basic telecommunications, and legal services. Second, national regulations in two important service sectors, broadcasting and finance, could limit the bilateral exchange of these services.

[9]See Engel and Rogers (1996). Their study covers the period 1978-93 while McCallum's analysis of merchandise trade is based on data for 1988. Because the two studies include data from the period prior to the implementation of the Canada-United States Free Trade Agreement, it might be supposed that their estimates overstate the current impact of the U.S.-Canada border. However, Engel and Rogers find that the border's effect is no smaller when data prior to 1990 are excluded. Likewise, Helliwell's update of McCallum's work finds comparable estimates for merchandise trade through 1990. This could reflect the fact that the effective trade barriers between the United States and Canada were already low before the agreement. An alternative interpretation is that adjustment to the free trade agreement was not complete by the early 1990s.

[10]Tariffs also raise revenue for the government.

mestic economy from those originating outside the border, effectively contributing to the establishment of an economic frontier between a country and the rest of the world.

Tariffs and other formal barriers to trade between the United States and Canada have long been lower than in most other parts of the world. Thus, it is unlikely that they can account for the lion's share of the estimated border effects. A potentially larger effect could come from past trade policies. High tariffs were key components of Canada's National Policy, which was instituted in the latter part of the 19th century. The policy sought to promote economic development and east-west transportation and trade links within Canada. To the extent that it led to the integration of Canadian markets and the formation of strong internal distribution networks, this policy could bear some responsibility for the current home bias in Canadian merchandise trade.[11] Informal trade barriers or nontariff barriers in both countries could also contribute to the segmentation of U.S. and Canadian markets.

The economic impact attributed to the border might actually reflect the effects of geographic distance between markets. If transportation and information costs increase with distance, trade flows should be larger between markets that are geographically close to one another than between more distant markets. For the same reasons, price differentials across markets should be smaller when the markets are close to one another. Indeed, geographic distance is a significant factor in both merchandise trade flows and price dispersion within the U.S.-Canada region. But the border between Canada and the United States appears to have a separate effect on both measures of economic integration. As stated earlier, trade between two Canadian provinces is substantially greater than that between a province and an equidistant U.S. state. Moreover, even after controlling for distance, the variability of consumer prices between a city in Canada and a city in the United States is considerably higher than that between either two U.S. cities or two Canadian cities.[12]

The economic impact attributed to the border might actually reflect the effects of geographic distance between markets.

Borders are usually demarcations between currency areas. Consequently, most international transactions require the exchange of one currency for another. Currency exchanges typically entail some small cost associated with translating one currency into another. A small cost for each of millions of transactions can amount to a considerable sum; one estimate places foreign-exchange costs in Germany at 1 percent of GDP.[13] However, there is a risk of

[11]It could be argued that Canada's current trade patterns are appropriate in view of its strong internal distribution networks. But a quick glance at a map suggests that, were it not for Canada's National Policy, Ontario might today have stronger links with, say, New York than with British Columbia.

[12]See Engel and Rogers' 1996 paper.

[13]See "When the Walls Come Down," *The Economist*, July 5, 1997, pp. 61-63.

substantially larger costs when a contract between parties in two countries calls for future payment. Between the time the price is set and settlement is made, unexpected changes in the value of the exchange rate will alter the ultimate price of the transaction for one of the parties involved. Unlike exchanges within a single country or currency area, international transactions often entail exchange-rate risk. This risk could act as a barrier to international trade. In empirical studies of international trade, currency risk is commonly measured by the volatility of the relevant exchange rate. However, perhaps because financial instruments such as forward exchange contracts are available to reduce or eliminate currency risk, such studies have yielded mixed results, and there is currently no consensus among economists that exchange-rate volatility has had a significant negative impact on trade volumes.

When price comparisons are used to measure border effects, the exchange rate matters in a different way. International price comparisons are made by using the nominal exchange rate to translate prices into a common currency. However, the nominal exchange rate is typically more variable than product prices. By implication, much of the variation in the relative dollar prices of Canadian and U.S. consumer products could simply reflect fluctuations in the nominal exchange rate between the two countries. Indeed, the empirical evidence indicates that changes in the exchange rate are significant factors in the volatility of relative U.S.-Canadian prices. But they are far from the whole story.[14]

Several economists have noted that consumers exhibit a distinct home bias, preferring to deal with firms in their own country and to purchase domestic products. Little is known about the precise reasons for this preference, but a number of factors may be involved. To the extent that they define social boundaries, national borders may also represent the economic effects of distinct tastes, history, traditions, and cultures. Alternatively, a preference for home products may simply reflect ignorance about or lack of access to alternatives. Regions within a common border typically share networks of associations, as well as legal, financial, and regulatory systems. Not only can this ease the acquisition of information but, once obtained, such knowledge is often universally applicable within the border. In addition, marketing and distribution networks for goods, services, and inputs may be more integrated within each country than they are across borders.[15] These networks may make it easier to learn about and gain access to domestic products, contributing to a home bias. Although it is difficult to measure the contribution of these factors to the economic role of the border, they should not be dismissed as necessarily trivial.

CONCLUSION

Despite evidence that the U.S. economy has become more open, recent empirical research finds that the border between the United States and Canada has a very large impact on bilateral trade flows and relative prices. Given the relative openness of the U.S.-Canada border, it is unlikely that the border's effects are any less significant between product markets in the United States and other countries. This contradicts the notion that globalization has already rendered national borders economically meaningless. But because most of the evidence is based on relatively recent data, it is not known

[14]Engel and Rogers (1996) explore the possibility that the effect attributed to the U.S.-Canada border is, in fact, the product of fluctuations in nominal exchange rates and rigidity in local prices. They find that while local price rigidity is responsible for part of the measured border effect, it accounts for less than half of it.

[15]See the 1995 paper by Engel and Rogers for a model of international trade with marketing costs.

whether the border's economic impacts are actually smaller now than in the past.

The reasons for the border's substantial effects are not yet completely understood. Consequently, it is difficult to speculate how recent advances in communication like the Internet will ultimately reduce the economic boundaries between nations. However, the effects of the border appear to extend beyond the economic impacts of geographic distance and formal trade barriers. By implication, merely liberalizing trade or reducing transportation costs between national markets may not be enough to cause the border to disappear.

References

Engel, Charles. "Real Exchange Rates and Relative Prices," *Journal of Monetary Economics*, 32 (1993), pp. 35-50.

Engel, Charles, and John Rogers. "Regional Patterns in the Law of One Price: The Roles of Geography vs Currencies," Working Paper 5395, National Bureau of Economic Research (1995).

Engel, Charles, and John Rogers. "How Wide Is the Border?" *American Economic Review*, 86 (December, 1996), pp. 1112-25.

Feldstein, Martin. "Tax Policy and International Capital Flows," Working Paper 4851, National Bureau of Economic Research (1994).

French, Kenneth, and James Poterba. "Investor Diversification and International Equity Markets," *American Economic Review*, 81 (May, 1991), pp. 222-26.

Helliwell, John. "Do National Borders Matter for Quebec's Trade?" *Canadian Journal of Economics,* 29 (August, 1996), pp. 507-22.

Helliwell, John, and John McCallum. "National Borders Still Matter for Trade," *Policy Options*, 13 (July/August, 1995), pp. 44-48.

Krugman, Paul, and Robert Z. Lawrence. "Trade, Jobs, and Wages," *Scientific American* (April, 1994), pp. 44-49.

McCallum, John. "National Borders Matter: Canada-U.S. Regional Trade Patterns," *American Economic Review*, 85 (June, 1995), pp. 615-23.

Ohmae, Kenichi. *The Borderless World.* New York: Harper Business, 1990.

Rauch, James. "Networks Versus Markets in International Trade," Working Paper 5617, National Bureau of Economic Research (1996).

Rogers, John, and Michael Jenkins. "Haircuts or Hysteresis? Sources of Movements in Real Exchange Rates," *Journal of International Economics,* 38 (1995), pp. 339-60.

Tesar, Linda, and Ingrid Werner. "Home Bias and the Globalization of Securities Markets," Working Paper 4218, National Bureau of Economic Research (1992).

Wei, Shang-Jin. "Intra-national versus International Trade: How Stubborn Are Nations in Global Integration?" Working Paper 5531, National Bureau of Economic Research (1996).