

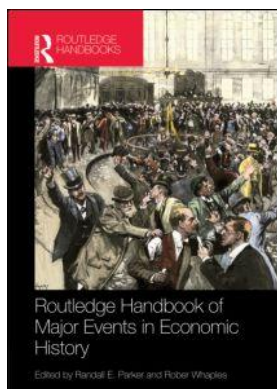
This article was downloaded by: 10.3.97.143

On: 02 Dec 2023

Access details: *subscription number*

Publisher: *Routledge*

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: 5 Howick Place, London SW1P 1WG, UK



## **Routledge Handbook of Major Events in Economic History**

Randall E. Parker, Robert Whaples

### **Development of trade institutions and advent of globalization since the end of World War II**

Publication details

<https://www.routledgehandbooks.com/doi/10.4324/9780203067871.ch29>

Teresa Gramm

**Published online on: 28 Jan 2013**

**How to cite :-** Teresa Gramm. 28 Jan 2013, *Development of trade institutions and advent of globalization since the end of World War II* from: Routledge Handbook of Major Events in Economic History Routledge

Accessed on: 02 Dec 2023

<https://www.routledgehandbooks.com/doi/10.4324/9780203067871.ch29>

**PLEASE SCROLL DOWN FOR DOCUMENT**

Full terms and conditions of use: <https://www.routledgehandbooks.com/legal-notices/terms>

This Document PDF may be used for research, teaching and private study purposes. Any substantial or systematic reproductions, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The publisher shall not be liable for an loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

## 29

# DEVELOPMENT OF TRADE INSTITUTIONS AND ADVENT OF GLOBALIZATION SINCE THE END OF WORLD WAR II

*Teresa Gramm*

### **Introduction**

In the aftermath of World War II and the protectionism of the Depression era, as the decade of the 1950s approached, international trade as a share of world output had fallen to levels not seen since the beginning of the twentieth century. In contrast, the rise of world trade in the second half of the twentieth century, with all the associated gains from trade for all trading partners, was one of the economic miracles of the postwar era.

As much as economists bemoan the protectionism that exists today, the dramatic fall in world-wide tariff rates and the emergence of multilateral trade negotiations and institutions such as the General Agreement on Tariffs and Trade (GATT)/World Trade Organization (WTO) aimed at freeing trade can be seen as a real success of economic reasoning over political expediency. But despite the correlation between falling tariff rates and growing trade, there is the perhaps not-so-obvious question of causality: what explains the growth in world trade?

### **Trade expansion**

The Great Depression, protectionism and World War II together reduced trade considerably. The Smoot–Hawley Tariff of 1930 increased the already high average U.S. tariff rates by about 17 percent from 40.1 percent to 47.1 percent. However, the fact that most duties were specific (as opposed to ad valorem) combined with the massive deflation of the period and served to magnify its effect, so that effective average tariffs increased by a total of 50 percent from 40.1 percent to 60 percent. Due to the increased effective protectionism and the contracting economy, import volumes fell dramatically in the United States. Half of the 40 percent decline in the volume of imports can be attributed to the combined effects of Smoot–Hawley and deflation, while 7 percent was due to Smoot–Hawley alone (Irwin 1998: 333).

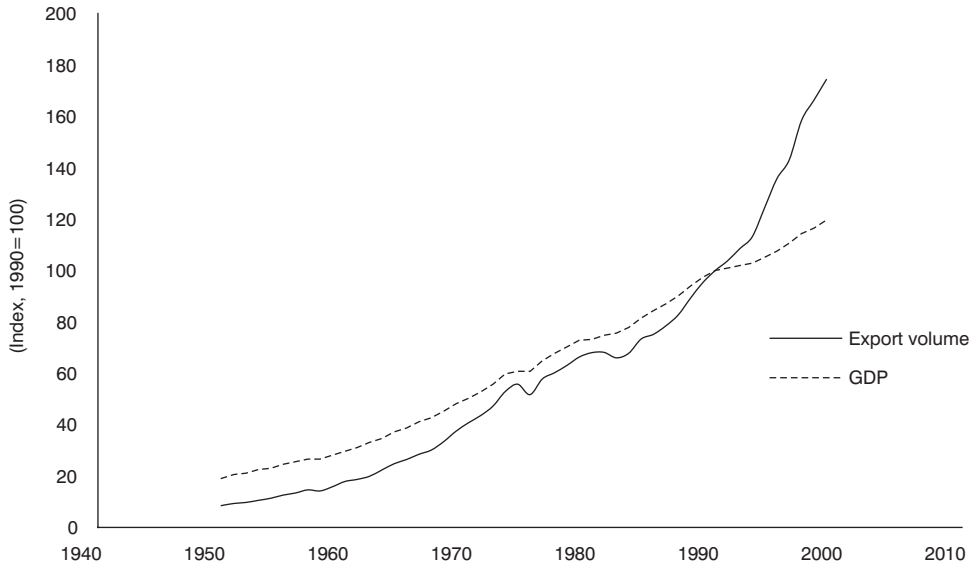


Figure 29.1 World merchandise exports and gross domestic product, 1950–99

Source: International Trade Statistics 2000, WTO, Table II.1

Although effective tariff rates fell from their height in 1932–33, the disaster of the Great Depression was soon followed by World War II and all the major trading economies were decimated, with the exception of the United States.

In contrast to the abysmal record of trade during the interwar era and during World War II, the growth in world trade in the second half of the twentieth century was astounding. However, as Krugman (1995) observes, much of the growth in trade was just recovering what was lost through protectionism and war which followed the first wave of globalization 50 years earlier. Krugman (1995: 331) identifies the first wave as starting in 1859 and lasting until 1913, noting that it was not until sometime between 1973 and 1985 that U.S. trade as a share of GDP finally passed its previous 1913 peak.

The value of world trade grew about 8 percent a year during the 1950s and 1960s according to the WTO, compared to average world GDP growth of 5 percent in that period. Thereafter, trade volumes grew 63 percent in the 1970s, 40 percent in the 1980s and 74 percent in the 1990s. All told, between 1950 and 2000, trade volumes increased by almost 2000 percent. Of course GDP was growing at that time as well, so it is striking to compare trade growth to production growth during that period as well (see Figure 29.1). Trade growth outstripped GDP growth for all but seven years during this period, so that world trade increased 3.7 times as much as world GDP.

Not only the rising volume of trade, but also its changing composition was a hallmark of trade in the latter part of the twentieth century (see Figure 29.2). The merchandise traded was increasingly composed of more manufactured goods relative to raw materials. Furthermore, the manufactured final goods were increasingly complicated and more likely to be traded as intermediate products in their production process. As will be discussed in more detail below, the splitting up of the value chain of a final product, and its production in several countries goes a long way toward explaining why trade has grown so much more than GDP, and why falling trade barriers have such a magnified effect on trade volumes (Yi 2003).

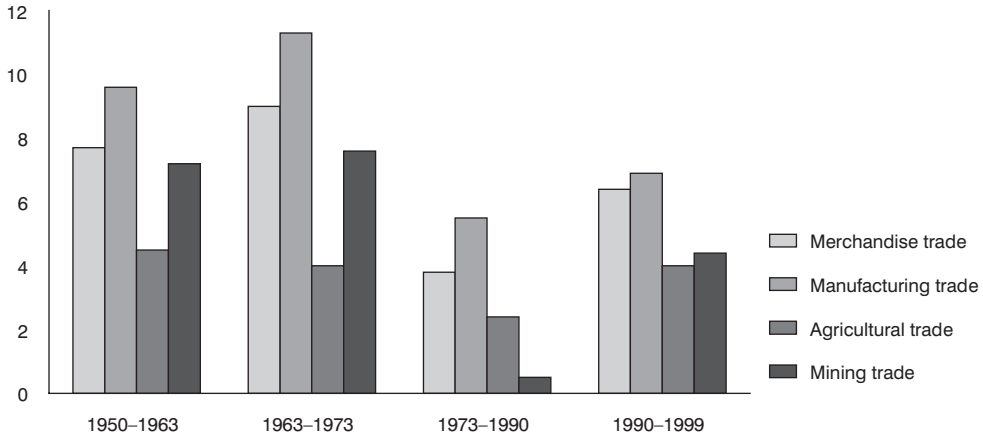


Figure 29.2 Trade by major product group (annual average percentage change in volume)

Source: International Trade Statistics 2000, WTO, Chart II.1

At first glance, the main cause for trade growth seems obvious, namely, barriers to trade fell. But there are the questions as to which barriers fell and how much of their fall can be attributed to GATT/WTO. Barriers to trade are both natural (such as physical distance) and political. The effects of natural barriers have declined due to advances in technology, and while they will make up an important component of the fall in overall barriers, the fall in the cost of physical barriers cannot be attributed to trade institutions. The political barriers seem more likely candidates to be attributable to GATT/WTO, but there is still some question of how much tariff reduction and how much trade growth is due to GATT/WTO membership. A related phenomenon is the rise of the preferential trade agreements (PTAs), bilateral trade agreements which have risen in tandem with GATT/WTO, especially in the last quarter of the century. The expansion of PTAs to encompass 40 percent of world trade (Winters 2011) raises many similar questions about their role in trade expansion and a host of other questions related to whether or not they impede or encourage further trade liberalization. This chapter focuses on explaining the roles of the above in the expansion of world trade.

### Theories to explain increased trade: reduced barriers

As noted in Feenstra (1998), there are four possible explanations for why trade has risen: trade liberalization, lower transportation costs, income convergence<sup>1</sup> and growth, and vertical specialization. Baier and Bergstrand (2001) propose to estimate the relative importance of a subset of these factors using a data set that includes bilateral trade flows among sixteen OECD countries in the periods 1958–1960 and 1986–1988. They estimate that of the 148 percent increase in trade, approximately 100 percentage points were due to income growth, about 38 percentage points were due to lower trade barriers, and about 12 percentage points were due to reduced transportation costs. For their sample, there is little evidence of income convergence as an explanation for the growth in trade, though given their sample of OECD countries, there is too little variation to establish the importance of this variable. Each of these factors is discussed below, in addition to two other determinants of trade that were beyond the scope of the Baier and Bergstrand (2001) study: vertical specialization and reduced communication costs.

Anderson and van Wincoop (2004) survey the various costs of trade: tariffs, nontariff barriers, and transportation costs both within and between countries. Transportation costs in their estimation include shipping/freight costs, “border barriers” such as currency, information, and contract/insecurity barriers. As we will discuss below, the costs of many of these barriers have been significantly reduced over the last fifty years, but Anderson and van Wincoop note that trade costs (from foreign production point to domestic consumption point) still represent a 170 percent tax equivalent. The 170 percent “tax” can be divided into 44 percent “border costs,” 21 percent transportation costs, and 55 percent wholesale and retail distribution costs<sup>2</sup> (Anderson and van Wincoop 2004: 692). For the purpose of this chapter, the declines in the first two costs are of the most interest for explaining international trade.

### **Institutional changes and the growth of trade: trade liberalization and the decline of border barriers**

#### ***GATT/WTO***

The Bretton Woods Conference of 1944 intended the creation of three institutions of international economic integration: the International Monetary Fund (IMF), the World Bank, and the International Trade Organization (ITO). However, because the U.S. did not ratify the ITO’s charter, this third institution of international economic integration never came into being. Instead, in 1947 the world’s largest trading countries signed the General Agreement on Tariffs and Trade (GATT). There were then eight rounds of tariff negotiations between 1948 and 1994, and the last round resulted in the creation, at long last, of the World Trade Organization. Henceforth, this institutional framework will be referred to as GATT/WTO.

There are three characteristics of GATT negotiations that have been credited with the institution’s success: multilateralism, nondiscrimination, and reciprocity. Multilateralism refers to the negotiations bringing all GATT members together in rounds, rather than piecemeal negotiations between country pairs. Nondiscrimination, or the Most Favored Nation principle, refers to the requirement that each country must extend its lowest tariff rate, i.e., that tariff rate offered to its “most favored” nation, to *all* signatories of GATT. Reciprocity refers to negotiating the mutual lowering of tariffs, with the idea that what production advantage a country loses by reducing its tariff on foreign goods, will be gained in its export sector when the other countries lower their trade barriers. It should be noted that the principles of nondiscrimination and reciprocity largely apply only to negotiations among larger economies.<sup>3</sup>

These principles were primarily time-saving devices intended to increase transparency. Furthermore, according to Bagwell and Staiger (1999), the principles play a role in eliminating a prisoner’s dilemma that resulted from the terms of trade externality (where a large economy can gain from protectionism by depressing the terms of trade for its imported goods). Specifically, the authors assert that there are real terms of trade considerations that lead countries to engage in partial equilibrium optimal tariff setting. They demonstrate that the reciprocity principle of GATT (“We lower tariffs on your exports if you lower them on ours”) leads to efficient tariffs – tariffs that maximize national income (Bagwell and Staiger 1999). Broda, Limão and Weinstein (2008) find empirical support for Bagwell and Staiger’s work. They find evidence that fifteen countries set trade policy according to market power. Specifically, the more market power a country had, the more protectionist its policy, so that GATT/WTO membership resulted in lower tariffs. Furthermore, they find that a country is

less likely to display market power in commodities, and more likely in differentiated goods, so that in a world where trade is increasingly in differentiated products, the existence of WTO to mediate trade disputes would seem even more important.

Krugman (1997) makes a more political economy argument for the benefits of GATT/WTO: governments have the misguided mercantilist attitude that imports impoverish and exports will enrich a country, so GATT/WTO works within this misperception “not to protect us from unfair foreign competition, but to protect us from ourselves” (Krugman 1997: 118). Reciprocity creates the perception of a “win” when the other country reduces barriers on the home country’s exports to compensate for the “loss” of reducing protection against imports from the other country.

Tariffs indeed have fallen dramatically in the post-WWII period. From 60 percent deflation-adjusted tariffs under Smoot–Hawley, the average U.S. tariff rate fell to single digits by the 1970s. During the period of GATT negotiations, from 1947–1992, U.S. tariffs fell from around 20 percent down to 5 percent. It would seem that GATT/WTO has been very successful. Indeed, according to the WTO,

GATT was provisional with a limited field of action, but its success over 47 years in promoting and securing the liberalization of much of world trade is incontestable. Continual reductions in tariffs alone helped spur very high rates of world trade growth during the 1950s and 1960s — around 8 percent a year on average.<sup>4</sup>

However, a large body of literature questions exactly what role GATT/WTO played in reducing tariff rates.

On the surface, since the whole point of GATT/WTO is to liberalize trade, the correlation between the expansion of GATT/WTO and the fall in tariff rates would seem so obviously causal that no one questioned the relationship until recently and with surprising results. Rose (2004a) finds that there is no evidence that GATT/WTO increases trade, and furthermore, Rose (2004b) finds that WTO members do not have more liberal trade policy using 68 different measures of trade policy and trade liberalization. His argument is fairly convincing, if by sheer volume of evidence alone. He considers a wide variety of measures – using both cross-sectional (members versus non-members) and time-series (to determine if liberalization occurs with a lag) data. Grouping countries according to characteristics, such as levels of development, he finds only one measure of liberalization that seems to be consistent with WTO membership: increased freedom according to the Heritage Foundation’s index.

Not surprisingly, given the conventional wisdom that GATT/WTO has been responsible for trade liberalization, the responses to Rose’s findings have been numerous. But while the responses have given a more nuanced interpretation to Rose’s results, they have not overturned them. For example, Subramanian and Wei (2007) respond that there is an explanation for Rose’s finding in that WTO rules are not applied evenly: some goods are largely exempt (agriculture) and some countries were exempt from reciprocity requirements (developing countries). They find that once these “asymmetries” were accounted for, GATT/WTO has significantly increased trade (imports). However, GATT/WTO did not promote trade if a country was not a member, if it was developing and came in before the Uruguay Round which ran from 1986–1994, or if a good was exempted or produced primarily by developing countries. Another response, by Broda, Limão and Weinstein (2008) finds evidence of lower tariffs promoting trade for goods in which the importer has market power *with* GATT/WTO, providing support for the idea that this trade institution does play some role in trade liberalization.

Perhaps membership in GATT/WTO is endogenous and therefore a reflection of more fundamental institutional changes: what does explain the fall in tariffs? It is hard to ignore the political economy explanations of protectionism and attribute the fall in tariffs to governments abandoning special interest politics and moving to maximize national income, so perhaps some change in what is traded can help explain broader political support for trade liberalization. Grossman and Rossi-Hansberg (2008) model vertical specialization/trade in tasks and show that reduction in costs of trading can lead to gains to all factors of production, so there is not the distributional conflict from trade in tasks that more typical trade generates. Outlined below is the argument that much of the increased trade is due to vertical specialization, so the resistance to trade liberalization may have declined as there are fewer factors of production that lose from trade and, therefore, fewer protests.

### *Preferential trading agreements*

Preferential trading agreements (PTAs) are intended to enhance trade among signatories by reducing trade barriers between those countries. A free trade agreement (FTA) is the extreme: tariffs are reduced to zero. A customs union is a preferential trading agreement that is a FTA with common external tariffs toward non-member states. As noted in Baier and Bergstrand (2004), in 1996, 289 of 1431 (about 20 percent) of all possible trading country-pairs were in a FTA. Winters (2011) notes that almost every country in the world is in at least one FTA and 40 percent of world trade moves through some sort of PTA. The explosion in the late twentieth century is interesting for two reasons: first, it raises questions about whether the move to regional free trade is welfare improving, and second, it raises questions about what impact growing regionalism will have on multilateralism.

The discussion of the welfare effects of PTAs is much more complicated than the unambiguous benefits of moving to multilateral free trade. First, beginning with Viner's observations in 1950, and using his language, there is a real debate on whether FTAs are trade creating (welfare improving) or trade diverting (welfare reducing). The question is empirical: theory establishes that FTAs can be good or bad for a member country depending on a number of characteristics of the country pair entering into a FTA relative to each other and relative to the world. Still, some explanation of why the question is too complicated to be answered by theory is in order.

The basic intuition of Viner (1950) was that FTAs, and hence PTAs, have a decidedly ambiguous effect on member country welfare (it gets even more complicated when third country non-member welfare is included). Say country C is the lowest-cost producer of a good, charging  $P_c$ . Country B is the lower-cost producer, charging  $P_b$ , and country A is the high-cost producer, charging  $P_a$ , such that  $P_c < P_b < P_a$ . Initially, country A has a tariff  $t$  protecting the industry such that  $t > P_b - P_c$ , imports from country C, and receives tariff revenue. Then countries A and B form a FTA so that only the imports from country C face the tariff such that  $P_b < P_c + t < P_a$ . Trade has been *created* since country A will import more than before the FTA, with all the associated welfare benefits of increase trade. However trade will also be *diverted*, since the low cost producer is no longer supplying the good, and country A has lost the tariff revenue that it earned before the FTA was established, which reduces welfare. It may certainly be the case that the costs of trade diversion outweigh the benefits of trade creation, making member countries worse off.

Adding necessary real world complications to Viner's insight does not reduce the ambiguity of the welfare effects. With the added complication that the PTA is large such that its external tariffs can affect terms of trade with non-members, it is more likely to be

welfare improving for members, but welfare reducing for nonmembers (Winters 2011). Greater differences in comparative advantage between member countries tend to increase trade creation, while the similarity of the combined comparative advantage of the FTA with the rest of the world tends to reduce diversion.

With the added complication of imperfect competition, the analysis is further clouded by gains from exploiting economies of scale and gains from variety weighed against the losses from trade diversion with lost tariff revenues (Krueger 1999). The literature on the impact of PTAs on member and nonmember welfare effects has grown faster than the phenomenon itself, with the current consensus being that whether PTAs are welfare improving or worsening for both member countries and the rest of the world is dependent on so many factors that it is nearly impossible to make generalizations about the welfare effects of PTAs.

Another branch of literature that has grown with the increase in PTAs addresses the question of whether or not the proliferation of PTAs will help or hinder the move toward multilateral opening of trade. And again the literature comes to no consensus, since the discussion moves beyond considerations simply of net welfare gain or loss to include the political economy of who gains or loses from trade liberalization within each country and the theory of the second best.

The camps have drawn on colorful names to describe the different conclusions various models reach: PTAs are stumbling blocks or building blocks (Bhagwati), friends or foes (Winters), bad bilateralism (Krugman) presumably countered with good multilateralism. As with the question of whether PTAs are welfare improving or not, the question of whether they hinder or promote multilateralism will have to be answered empirically in future research.

As a final note on the fall of political barriers to trade, some mention must be made of the “new” (post-WTO) protectionism: dumping accusations. Staiger and Wolak (1994) demonstrate that just the threat of protectionism due to antidumping investigation acts as a significant damper on trade. In the U.S. an ongoing antidumping investigation in the industry for a given product is estimated to have reduced trade in that product by 17 percent on average, so there remain significant political barriers, even when one measure of those barriers, namely tariffs, have fallen significantly.

### **Technological changes**

In addition to the political barriers to trade, there are the more prosaic “natural” barriers: it is costly to move goods from one point to another, and more so when the two points lie in different countries.

#### ***Transportation costs and quality***

Hummels (2007) has done the definitive work on transportation costs in international trade in the last half of the twentieth century. He notes that three big changes have occurred in international transportation since World War II: Jets, container shipping, and a change in the types of goods shipped. These three developments have had an impact on the quality and quantity of shipments. There has been a dramatic increase in air transport as measured by share of value of goods shipped and miles shipped, largely due to the change in the composition of the goods we now ship (lightweight, expensive electronics versus heavy, inexpensive raw materials) and due to the decline in the marginal cost of an additional air mile shipped. However, the share of goods transported by air remains relatively small



compared to the share shipped by sea. By one measure, the cost of transport by ship did not decline significantly in the post-World War II period. Gains in efficiency due to containerization (see discussion of Levinson (2006) below) were balanced with the dramatic increases in cost of fuel in the 1970s. And although the fall in fuel prices in the mid-1980s did subsequently reduce ocean shipping costs in particular, Hummels (2007) speculates that there are unmeasured quality improvements from containerization (increased speed, increased efficiency/reduced uncertainty) that have aided the rapid increase in trade, rather than a large decline in shipping costs per ton.

Levinson (2006) describes the revolution of container shipping which began in the mid-1950s and dramatically decreased the labor portion of shipping costs. Because of the high start-up costs and fixed costs of capital, it took a while to catch on, but there has been a dramatic shift to the use of containers from the labor-intensive, non-standardized shipping, which is clear evidence of cost effectiveness. Levinson makes a convincing qualitative argument that the move to container shipping drastically reduced the cost of shipping, relative to what it would have been otherwise. The increased fuel costs of the 1970s and early 1980s certainly put upward pressure on transportation costs, but without the downward pressure on costs from containerization, the impact on trade of the oil shock would have been significantly negative. Although Levinson deems that the “revolution” was over by the early 1980s, he notes that the effects have been much longer-lived as the volume of sea freight shipped in containers increased 400 percent over the last two decades of the century. Low-cost container shipping allowed for trade in low-cost products around the world, which would have been impossible otherwise (Levinson 2006: 271).

There is some question of why distance between two countries matters so much in determining trade volumes between them. Clearly distance relates to transportation costs, but there is increasing evidence that even more so it is a proxy for information costs. Interestingly, the evidence for the importance of information costs in trade comes from the research on cross-border equity flows by Portes and Rey (2005). They use a gravity model<sup>5</sup> to explain asset trade and make a strong case that distance proxies for information costs as well: financial assets are nearly costless to “transport.” Furthermore, when other variables that more closely represent information flows (as related to financial assets), like telephone communication or foreign bank branches in the country, are included in the model they are all statistically significant. When they estimate the same model using trade data rather than financial data, they find similar effects. Their results are robust to including the usual language/border/shared colonial history variables that often appear in the gravity model of trade. This confirms the importance of the second set of technological advances used to explain increased trade volumes: improved communication technology.

### ***Communication costs and quality***

The cost of communication is important to trade in final goods because these goods must be marketed, distributed and adapted to match the export market, which is costly, and even more so if gathering information about the foreign market is costly. As noted in Krugman (1995), distance matters, as seen in gravity model estimations, perhaps because it is correlated with the degree of contact between consumers and producers, and between manager and factory, among others. Not only have technological changes reduced the time it takes to move a quantity of goods, but they have also reduced the time required to communicate a quantity of information.

Freund and Weinhold (2004) test a model of imperfect competition and segmented markets for which there are fixed costs of entry into an export market. They hypothesize that

the internet, by reducing the fixed costs of entry (specifically the costs of finding information on new markets, costs of advertising) contributes to export growth. Their data cover host sites by country for 56 countries in the period 1995–1999 (during which time the mean number of country host sites went from about 30,000 to over 260,000). They find that between 1997 and 1999 a 10 percentage point increase in host sites leads to export growth of 0.2 percent – a significant amount given the very rapid growth of host sites over this time period.

Like Portes and Rey (2005), Freund and Weinhold (2002) look at the “transportation costs” of something costless to transport to make inferences on what the true transportation costs are for goods. Specifically, they consider the impact of the internet on trade in services. This consideration is nontrivial. On the one hand the relationship would seem an obvious one as the electronic transmission of data would make the “transportation” of many services costless. The study is particularly interesting in that it gives a way to explore how much distance proxies for other “transportation” costs such as differences in language, culture, and legal systems that are not as easily overcome by the costless transfer of data. Using U.S. bilateral service trade with 31 countries, they find that a 10 percent increase in internet host sites results in a 1.7 percent increase in exports to the U.S. and a 1.1 percent increase in imports from the U.S. They do not include intrafirm trade in services, noting that this omission of approximately one-third of U.S. trade in services biases downward their estimates of the role of the internet in trade in services. This is important to note because one aspect of the increase of trade as a share of GDP is growth in vertical specialization and intrafirm trade in goods, which is attributable in part to lower communication costs. This relationship should also carry over to intrafirm trade in services, and hence is another contributor to the increase in vertical specialization detailed below.

### ***Networks and migration***

Another change in the postwar period that explains some increase in trade is the rise in migration. Unlike trade policy, migration policy has become more restrictive in OECD countries, and yet there has been a significant increase in migration, especially to developed countries. According to the UN, since 1990 migrants have made up about 3 percent of world population, but the share of migrants in developed country populations has grown substantially from 7.2 percent in 1990 to 8.7 percent in 2000, and 10.3 percent in 2010.<sup>6</sup>

In his seminal work, Gould (1994) proposes that immigration increases trade not only by creating domestic markets for foreign goods, but by reducing information and other transaction costs associated with international trade. These transaction costs include anything from language barriers to understanding of foreign market preferences, regulations, or contracting mechanisms. His empirical analysis finds that immigrants have a greater impact on exports than imports, and more of an impact on consumer goods (which tend to be more differentiated) than on producer goods.

Rauch (1999) extends his more micro-oriented research (Rauch 1996) on the effect of networks on trade to a macro model. Specifically, he uses the gravity model to determine if historical (colonial) and cultural (language) links have different impacts on trade in different types of goods. Specifically, he hypothesizes that, compared to homogenous goods, trade in differentiated products which do not have an organized exchange or reference price will be more sensitive to the presence of networks needed to address the problem of imperfect information. Given that the growth in trade (as measured by value) has been primarily in differentiated (manufactured) products, this is an important consideration. Using data for 63 countries in 1970, 1980, and 1990, he finds evidence that networks are also important for *both*

homogenous and differentiated goods, though he does not find much support that “links” between countries have a significantly different impact on differentiated goods compared to homogenous goods.<sup>7</sup>

### **Summary: the decline of barriers**

The barriers to trade have fallen precipitously in the post-war period, but there are two important caveats. First, barriers to trade remain a significant tax on trade. Anderson and van Wincoop (2004: 723) estimate a 44 percent border barrier “tax” due to trade policy restrictions (8 percent), language differences (7 percent), currency differences (14 percent) and information and security costs (9 percent).<sup>8</sup> The other important caveat is that, without further understanding of how the composition of trade has changed, it is difficult to justify the rapid growth in trade volumes using just the declines in barriers.

### ***Income convergence***

According to the trade models of monopolistic competition as summarized by Helpman and Krugman (1985), income convergence can explain increased trade. Helpman (1987) in particular develops the testable implications of the theory of monopolistic competition and trade: size convergence between countries and increased size (as a share of world GDP) both lead to an increase in trade as a share of GDP. As countries with similar income levels will demand similar types of goods, the theory predicts that increased similarity will lead to increased trade (as a share of GDP) of differentiated products between countries. In addressing the question of whether the increase in trade relative to GDP since World War II is due to greater size similarity between countries (income convergence) there are two papers of particular note.

Hummels and Levinsohn (1995) turn to the data of trade between 26 OECD countries during the period 1961–1983. They explain 98 percent of trade using a model that only contains fixed effects and a measure of income similarity between country pairs, offering initial support for the theory of Helpman (1987). However, when the same estimating equation is used to explain trade for non-OECD countries for which the monopolistic competition model clearly would not apply, income similarities still explain up to 67 percent of trade. They conclude that while increased income similarities may explain increased trade, the theoretical underpinnings of monopolistic competitions are not found in the data.

Debaere (2005) adapts the estimating equations to better reflect Helpman’s testable implications (regarding size convergence between countries and increased size – as a share of world GDP – both leading to an increase in trade as a share of GDP) and changes the estimation techniques to deal better with the vagaries of the data. He also finds that both convergence and larger size relative to the world economy explain increased trade/GDP among OECD countries. However, when he looks at non-OECD countries, increased trade is explained by larger GDP, not convergence, offering support for the suitability of using income convergence between OECD countries to explain some of the growth in trade. Still, the final explanation considered, vertical specialization, is arguably more compelling.

### ***Vertical specialization***

Our concept of trade often involves the increasingly outmoded idea of final goods being imported and exported. The growth in what Hummels et al. (2001) term “vertical

specialization” has been the greatest change in trade patterns in the late twentieth century. Hummels et al. (2001) define vertical specialization as occurring when the production of a final good can be broken down into multiple, sequential stages, which occur in different countries so that the intermediate goods cross international borders, possibly multiple times, before becoming the final product – which then may be exported itself. Using input–output tables of countries contributing 82 percent of world exports, they find that the vertical specialization share of exports rose by about 40 percent between 1970 and 1995 (from 18 percent to 25 percent). Another, slightly less exact measure of the expansion of vertical specialization is to note that intermediate good trade has grown faster than trade in final goods, so that by the end of the twentieth century, intermediate goods represented 30 percent of world trade in manufacturing according to Yeats (1998). The fall in trade barriers has made this expansion of vertical specialization possible. But then again, vertical specialization explains why the fall in trade barriers has had a magnified impact on trade.

#### *Fall in trade barriers and the expansion of vertical specialization*

Vertical specialization allows efficiency gains and cost savings from comparative advantage realized across *multiple stages* of the production process. But as noted by McLaren (2000), vertical specialization also promotes efficiency gains by making more efficient organizational forms possible. McLaren uses a transaction costs model to demonstrate that increased openness (lower transportation costs, lower tariffs, etc.) will lead to vertical specialization as input suppliers are no longer locked into supplying local firms and, therefore, no longer require costly contracts to incur the sunk costs of specializing in a particular input. Hanson, Mataloni, and Slaughter (2005) using data on intrafirm trade, note that while higher trade costs make foreign direct investment (FDI)<sup>9</sup> a more attractive option (produce close to the market rather than export to the market), their data also indicate that higher trade costs change how goods are produced as firms try to reduce their use of imported inputs. Their findings that intrafirm trade is indeed sensitive to trade costs support the theoretical model in Yi (2003) outlined below. Specifically, they find evidence that multinationals decide between horizontal and vertical foreign direct investment, with increased vertical FDI occurring in countries with lower trade costs and lower labor costs.

The importance of the improvement in communication and transportation is highlighted in Grossman and Rossi-Hansberg (2008) which models “trade in tasks.” The production process is broken down into small pieces of value added or tasks which are then performed in different countries according to their comparative advantage/differences in factor cost. It is hard to imagine such trade in tasks occurring in a world without reliable communications or with uncertainty that intermediate goods would be delivered in a timely manner. Finally, one reason for the growth in vertical specialization may be because the type of final product being traded lends itself to segmentation. As mentioned in the introduction, we trade manufactured goods with many parts, versus commodities of a century ago.

#### *Vertical specialization and trade expansion*

Vertical specialization explains how we see magnified effects of reduced trade barriers on international trade volumes. One of the “mysteries” of the growth in trade is that it is so much greater than the fall in transportation, communication, and tariff costs, given reasonable assumptions about elasticities of substitution. As Yi (2003: 53) notes, tariffs on

manufactured goods have fallen 11 percentage points while trade has grown by 340 percent in the same period. Furthermore, in the final years of the twentieth century, trade was increasingly sensitive to tariff barriers, so there is a nonlinear relationship between trade and tariffs. Yi explains this phenomenon by modeling a final good that crosses borders (as intermediate goods) numerous times in its production process, gaining value added in each country, so that lower tariffs (and by extension other trade costs) have a compounded effect. Trade expansion is explained both by falling barriers and by a change in the relationship between barriers and trade volumes due to vertical specialization.

### Conclusions

A few conclusions are clear: trade has risen as the world economy has grown and as barriers have fallen since the end of World War II. Much of the fall in barriers is attributable in one form or another to technological advance. Whether it is faster jets to transport the goods, faster communication to aid in both production and distribution, or the very fact that the goods we consume are high-tech manufactured goods that lend themselves to multiple, separable production stages, technology is central to globalization. The role institutional changes have played is considerably less clear. On the one hand, the dramatic fall in tariffs could be deemed an institutional change that has promoted trade. But the impact of actual international institutions, such as GATT/WTO and preferential trading agreements, is much less clear in the data, though still largely accepted by conventional wisdom.

### Notes

- 1 Inasmuch as income level determines the types of goods in a country's consumption bundle, countries with similar income levels produce and consume similar, though differentiated, products. Therefore, it is predicted that income convergence between two countries can lead to higher trade volumes as their demand becomes more similar.
- 2 Note that these costs are "compounding":  $1 + 1.70 \approx 1.44 \times 1.21 \times 1.55$ .
- 3 See the discussion in Subramanian and Wei (2007) on the exclusion of developing economies from these principles.
- 4 [www.wto.org/english/thewto\\_e/whatis\\_e/tif\\_e/fact4\\_e.htm](http://www.wto.org/english/thewto_e/whatis_e/tif_e/fact4_e.htm)
- 5 The gravity model, first introduced by Tinbergen (1962), is the workhorse model for predicting bilateral trade flows between countries  $i$  and  $j$ ,  $V_{ij}$ , as a function of country sizes as measured by GDP,  $Y_i$  and  $Y_j$ , their distance from one another,  $D_{ij}$ , and various other factors that impede or promote trade,  $Z_n$ ,  $n=1 \dots N$ :

$$V_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} D_{ij}^{\beta_3} \left( \prod_{n=1}^N Z_n^{\gamma_n} \right)$$

$\beta_1$  is the elasticity of trade with respect to changes in the income of country one,  $\beta_2$  is the elasticity of trade with respect to changes in the income of country two,  $\beta_3$  is the elasticity of trade with respect to changes in the distance between countries who trade, etc.

- 6 <http://esa.un.org/migprofiles>
- 7 For other important works on the relationship between immigration and trade see Combes et al. (2005), Head and Ries (1998), and Rauch and Trindade (2002). For the impact of immigration on foreign direct investment see Javorcik et al. (2011).
- 8 Note that these costs are "compounding":  $1.44 \approx 1.08 \times 1.07 \times 1.14 \times 1.09$ .
- 9 FDI entails the acquisition of a controlling share of a foreign company or building a new facility in the foreign country that is headquartered in the home country.

## References

- Anderson, J.E. and van Wincoop, E. (2004) 'Trade costs', *Journal of Economic Literature*, 42: 691–751.
- Bagwell, K. and Staiger, R.W. (1998) 'Will preferential agreements undermine the multilateral trading system?' *Economic Journal*, 108: 1162–82.
- Baier, S.L. and Bergstrand, J.H. (2001) 'The growth of world trade: tariffs, transport costs, and income similarity', *Journal of International Economics*, 53: 1–27.
- Baier, S.L. and Bergstrand, J.H. (2004) 'On the economic determinants of free trade agreements', *Journal of International Economics*, 64: 29–63.
- Broda, C., Limão, N. and Weinstein, D.E. (2008) 'Optimal tariffs and market power: the evidence', *American Economic Review*, 98: 2032–65.
- Combes, P., Lafourcade, M., and Mayer, T. (2005) 'The trade-creating effects of business and social networks: evidence from France', *Journal of International Economics*, 66: 1–29.
- Debaere, P. (2005) 'Monopolistic competition and trade, revisited: testing the model without testing for gravity', *Journal of International Economics*, 66: 249–66.
- Feenstra, R.C. (1998) 'Integration of trade and disintegration of production in the global economy', *Journal of Economic Perspectives*, 12: 31–50.
- Freund, C. and Weinhold, D. (2002) 'The internet and international trade in services', *American Economic Review*, 92: 236–40.
- Freund, C. and Weinhold, D. (2004) 'The effect of the internet on international trade', *Journal of International Economics*, 62: 171–89.
- Gould, D.M. (1994) 'Immigrant links to the home country: empirical implications for U.S. bilateral trade flows', *Review of Economics and Statistics*, 76: 302–16.
- Grossman, G.M. and Rossi-Hansberg, E. (2008) 'Trading tasks: a simple theory of offshoring', *American Economic Review*, 98: 1978–97.
- Hanson, G.H., Mataloni, R.J., Jr. and Slaughter, M.J. (2005) 'Vertical production networks in multinational firms', *Review of Economics and Statistics*, 87: 664–78.
- Head, K. and Ries, J. (1998) 'Immigration and trade creation: econometric evidence from Canada', *Canadian Journal of Economics*, 31: 47–62.
- Helpman, E. (1987) 'Imperfect competition and international trade: evidence from fourteen industrial countries', *Journal of the Japanese and International Economics*, 1: 62–81.
- Helpman, E. and Krugman, P. (1985) *Market Structure and Foreign Trade*, Cambridge, MA: MIT Press.
- Hummels, D. (2007) 'Transportation costs and international trade in the second era of globalization', *Journal of Economic Perspectives*, 21: 131–54.
- Hummels, D. and Levinsohn, J. (1995) 'Monopolistic competition and international trade: reconsidering the evidence', *Quarterly Journal of Economics*, 110: 799–836.
- Hummels, D., Ishii, J. and Yi, K. (2001) 'The nature and growth of vertical specialization in world trade', *Journal of International Economics*, 54: 75–96.
- Irwin, D.A. (1998) 'The Smoot–Hawley Tariff: a quantitative assessment', *Review of Economics and Statistics*, 80: 326–334.
- Javorcik, B., Ozden, C., Spatareanu, M. and Neagu, C. (2011) 'Migrant networks and foreign direct investment', *Journal of Development Economics*, 94: 231–41.
- Krueger, A.O. (1999) 'Are preferential trading agreements trade liberalizing or protectionist?', *Journal of Economic Perspectives*, 13: 105–24.
- Krugman, P. (1995) 'Growing world trade: causes and consequences', *Brookings Papers on Economic Activity*, 1995: 327–77.
- Krugman, P. (1997) 'What should trade negotiators negotiate about?', *Journal of Economic Literature*, 35: 113–20.
- Levinson, M. (2006) *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger*, Princeton, NJ: Princeton University Press.
- McLaren, J. (2000) 'Globalization and vertical structure', *American Economic Review*, 90: 1239–54.
- Portes, R. and Rey, H. (2005) 'The determinants of cross-border equity flows', *Journal of International Economics*, 65: 269–96.
- Rauch, J.E. (1996) 'Trade and search: social capital, sogo shosha, and spillovers', National Bureau of Economic Research, Working Paper No. 5618.
- Rauch, J.E. (1999) 'Networks versus markets in international trade', *Journal of International Economics*, 48: 7–35.

- Rauch, J.E. and Trindade, V. (2002) 'Ethnic Chinese networks in international trade', *Review of Economics and Statistics*, 84: 116–30.
- Rose, A.K. (2004a) 'Do we really know that the WTO increases trade?', *American Economic Review*, 94: 98–114
- Rose, A.K. (2004b) 'Do WTO members have more liberal trade policy', *Journal of International Economics*, 63: 209–35.
- Staiger, R.W. and Wolak, F.A. (1994) 'Measuring industry specific protection: antidumping in the United States', National Bureau of Economic Research, Working Paper No. 4696.
- Subramanian, A. and Wei, S. (2007) 'The WTO promotes trade, strongly but unevenly', *Journal of International Economics*, 72: 151–75.
- Tinbergen, J. (1962) *Shaping the World Economy*, New York: The Twentieth Century Fund.
- Viner, J. (1950) *The Custom Union Issue*, New York: Carnegie Endowment for International Peace.
- Winters, L.A. (2011) 'Preferential trading agreements: friend or foe', in K.W. Bagwell and P.C. Mavroidis (eds.) *Preferential Trade Agreements: A Law and Economics Analysis*, New York: Cambridge University Press.
- Yeats, A. (1998) 'Just how big is global production sharing', World Bank Policy Research Working Paper No. 1871.
- Yi, K. (2003) 'Can vertical specialization explain the growth of world trade?', *Journal of Political Economy*, 111: 52–102.