

# The Gains from Trade in Rich and Poor Countries

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Over the postwar period, the world has experienced a rapid process of globalization. A simple way to measure this process is by looking at worldwide imports and exports relative to world GDP. From 1960 to 2016, this measure of globalization increased from around 25 to 60 percent. As we face a backlash against this process, exemplified most notably by Brexit and the election of Trump in the United States, it is useful to pause and reflect on what the trade literature has to say about the welfare implications of trade. Trade is of course not the only dimension of globalization—multinational production, capital flows, and migration are also important—but in this chapter, I will focus exclusively on trade.

The trade literature has made significant progress over the last decades in mapping trade models to data to provide more credible quantitative answers to crucial questions in the field, such as the welfare effects of trade. There was certainly an important literature starting in the late 1970s on computable general equilibrium that had the same goals, but for various reasons the computable general equilibrium program was somewhat divorced from the academic literature. Spurred in large part by Jonathan Eaton and Samuel Kortum (2002), there has been an ongoing effort to use standard trade theories for quantitative analysis. Costas Arkolakis, Arnaud Costinot, and Rodríguez-Clare (2012) have shown that under standard (although strong) assumptions, and conditional on the magnitude of trade flows and value of the *trade elasticity*—a parameter governing the sensitivity of trade flows to trade costs that can be estimated using the gravity equation (see Head and Mayer, 2014)—several different trade theories ranging from the

Ricardian to the Melitz (2003) model actually lead to equivalent implications for the welfare effects of trade.

## Measuring the Gains from Trade

The quantitative analysis that emerges can best be illustrated with the answer to a simple question: What are the overall gains from trade for some given country? Defining the gains from trade as the negative of the losses associated with a move to autarky, the analysis in Arkolakis, Costinot, and Rodríguez-Clare (2012) shows that the gains from trade can be computed by a simple formula that depends on two sufficient statistics: how much the country trades and the trade elasticity. This simple formula implies that the gains from trade range from around 2 percent for the United States to around 8 percent for Hungary (see Costinot and Rodríguez-Clare 2014). Adding some realistic features to the framework, such as multiple sectors and an input-output structure that maps onto the input-output matrix of each country (as in Caliendo and Parro 2015), the gains increase significantly. For example, the gains for the United States increase to 8 percent. If one follows recent empirical findings and allows for inputs to be strong complements in production then the gain gains from trade would be even larger (see Baqaee and Fahri, 2019).

The same mode of analysis can illuminate counterfactual scenarios more realistic than a return to autarky. For example, what are the implications of a tariff war (Ossa 2011), removing all remaining import tariffs in the world (see Caliendo et al. 2017, and Kucheryavyi, Lyn, and Rodríguez-Clare 2017), or Brexit (see Dhingra et al. 2017)?

It is important to acknowledge that the results from this analysis come from calibrating a standard gravity model to be consistent with the observed cross-section of trade flows in the data, and so there are strong parametric assumptions needed for the extrapolation necessary to infer welfare under the counterfactual scenario. Clearly much more work is needed to test the validity

of these extrapolations. Ideally, we would exploit quasi-natural experiments with trade policy and check actual effects against those predicted by the calibrated models, but this is obviously challenging. Two papers by Jim Feyrer (2009a, 2009b) have received a lot of attention in this regard. He used the differential growth of trade by air and sea along with the closing of the Suez Canal to construct instrumental variables for the variation in trade exposure over time so that the regression of real income on trade could be run as a panel with country fixed effects. The estimated welfare gains from trade in these papers are significantly higher than those implied by the quantitative analysis in Costinot and Rodríguez-Clare (2014). As discussed at length by Dave Donaldson (2015), this gap between empirics and quantitative analysis could be due to an upward bias in Feyrer's empirical analysis. But it could also owe to a problem in the way that the trade elasticity is normally estimated and/or the theory's failure to capture the different channels through which trade raises welfare. I discuss these possibilities next.

Standard quantitative analysis evaluates the size of the trade elasticity by relying on the gravity equation to estimate how trade flows respond to trade costs via a cross-section regression across country pairs (with origin and destination fixed effects). That method relies mostly (and often uniquely) on the variation in an importer's demand across different supplier countries, with little (or none) of that variation capturing the way in which trade costs affect substitution between imports and domestic purchases. And yet as discussed in Costinot and Rodríguez-Clare (2014), it is this last elasticity (i.e., between domestic and foreign goods and services) that matters for the gains from trade. A recent paper by Robert Feenstra and coauthors (2018) uses cross-section and time-series variation to estimate the elasticity for domestic versus foreign goods and services as well as the more standard elasticity across alternative import sources estimated from the gravity equation. The results imply that the former elasticity is significantly

lower than the latter, which in turn implies that the gains from trade are three times higher (at least) than those estimated in the standard cross-section gravity approach. This alone could close the gap between the empirical and quantitative estimates of the gains from trade discussed by Donaldson (2015).

Over and above this issue of a potential mismeasurement of trade elasticities, standard calibrated trade models may be overlooking important transmission channels. One stems from the complementarity between trade and multinational production, as argued by Natalia Ramondo and Rodríguez-Clare (2013). We conclude that such complementarity could lead to a doubling of the gains from trade relative to standard models with no multinational production. Moreover, as formalized most recently by Francisco Buera and Ezra Oberfield (2016), trade may serve as a conduit for flows of ideas that increase productivity in the recipient countries (see also Ufuk Akçigit's chapter in this volume). Although in principle this channel may help in closing the gap, one concern is that the timing may not work: whereas the large gains estimated by Feyrer take place in a matter of a few years, the dynamic gains studied by Buera and Oberfield are likely to materialize only after decades of integration.

I now turn to a more practical question: Do poorer countries gain less or more from trade? There is a simple theoretical reason for why they should be expected to gain more: since poorer countries are economically smaller, then they should be more open, and more open countries generally gain more from trade. Thus, among the countries included in the analysis by Costinot and Rodríguez-Clare (2014), Denmark and Belgium have gains from trade of 41 and 54 percent, respectively, and Slovenia has gains of 58 percent—all of which are much higher than the 8 percent gains of the United States or 21 percent gains of Germany. Michael Waugh (2010) explores this question directly with a much larger sample that includes many poor countries.

Surprisingly, he concludes that poor countries do not systematically gain more from trade. This finding implies that poor countries must also systematically have larger barriers to trade. In principle, this could be because they are more remotely located relative to the large markets of North America, Europe, and East Asia, but Waugh's analysis suggests that the problem arises because of the high costs that poor countries face in exporting their products to rich countries. These costs could partly be explained by the higher tariffs that rich countries impose on the agricultural and labor-intensive goods that poor countries tend to export, but it could also come from the problems of infrastructure that lead to high export costs in poor countries. An alternative explanation that does not rely on higher trade barriers is that, because of non-homothetic preferences, poor countries devote more of their income to spending on less tradable goods (see Fielser 2011), implying lower trade shares and lower gains from trade.

## Gains from Trade in Poor Countries

Are there reasons besides differences in trade shares that would imply larger or smaller gains from trade in poorer countries? A restrictive assumption of the quantitative analysis in Costinot and Rodríguez-Clare (2014) is the assumption that the production possibilities frontier across multiple sectors is linear. Thus, if the economy moves to autarky, it can simply start substituting domestic production for imports without suffering from increasing marginal costs. The associated losses come only from the fact that domestic goods are imperfect substitutes for imports, but not from the classic theoretical story about the increasing opportunity cost of producing a good as its sector expands. As an illustration, consider the case of the oil sector. The trade elasticity in this sector is obviously high, as this is a simple commodity, and hence the standard quantitative analysis implies that the losses from not being able to import oil are not that big, even in a country that only produces a small share of the oil it absorbs. In fact, increasing the

production of oil may be extremely costly and could lead to huge losses for oil-importing countries that move to autarky.

Thibault Fally and James Sayre (2017) explore the implications of extending the gravity model at the heart of the quantitative analysis discussed above but now allowing for the importance of natural resources and commodities (e.g., oil). Consistent with the logic above, they find that the gains from trade are higher for countries that have uneven endowments of natural resources; such countries would suffer more from moving to autarky than implied by the standard model with a linear production possibilities frontier. In other words, trade openness measured as in the simple model is no longer a sufficient statistic for the gains from trade. We also need to know how diversified that trade is across different commodities. Importantly, since poor and small countries tend to have uneven resource endowments, they tend to have production structures highly specialized in a few commodities, implying higher gains from trade than large or rich countries reap, even conditioning on the degree of openness.

The conclusions emerging from this analysis by Fally and Sayre line up with those discussed above in connection to the paper by Feenstra and coauthors (2018). Indeed, allowing for natural resources is likely to lower the trade elasticity for domestic versus imported goods below that prevailing across different sources of foreign goods, just as found by Feenstra and coauthors. In future research, it would be important to test whether the implications emerging from Fally and Sayre, in particular a lower implied trade elasticity between domestic and foreign goods in poor and small countries, is something that can be detected directly in the data through the estimation procedure used by Feenstra and coauthors.

Another complication that may matter for the computation of the gains from trade is the presence of domestic distortions. We know from basic trade theory that if such distortions are

present, the gains from trade may be higher or lower than those computed in a first-best environment, and they could in principle even be negative. An interesting recent paper in this regard is by Tomasz Swiecki (2017). This paper studies the implications of a wedge preventing labor from moving from agriculture to manufacturing to equalize the value of the marginal product of labor across the two sectors. Thus, since in autarky the economy is already devoting too much labor to the agricultural sector, countries that specialize in agricultural exports would be exacerbating that distortion, leading to lower gains from trade. In contrast, countries specializing in manufacturing goods would have larger gains from trade. One complication here is that it is difficult to measure the agriculture-manufacturing wedge, and there are in fact authors who argue that it does not exist (see, for example, Young 2013). Swiecki computes the wedge by looking at the ratio of value added per worker (adjusting for labor shares) across sectors and finds that the gains from trade are systematically lower in poor countries than in rich ones—again because these countries tend to specialize in sectors with lower marginal productivity of labor. For example, the gains from trade for Ethiopia, a country heavily specialized in agriculture, are 6.4 percentage points lower than the 28.1 percent gains implied by the standard model.<sup>1</sup>

Importantly, the existence of such distortions or wedges implies that trading economies may obtain large benefits from policies designed to correct them. Whereas in closed economies the welfare gains derived from such interventions are limited by the negative feedback arising from domestic demand, in a trading economy such feedbacks are naturally weaker. This implies that policies to neutralize domestic distortions may be complementary to trade liberalization, as

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<sup>1</sup> Another reason why poor countries may gain more from trade than richer ones is that these countries are farther from the global frontier and hence have more to grow as they converge to that frontier. Thus if trade facilitates convergence, then it should lead to larger gains than for poor countries. For a discussion of the case for such “dynamic gains from trade,” see Harrison and Rodríguez-Clare 2010; Costinot and Rodríguez-Clare 2018.

discussed by Roberto Chang, Linda Kaltani, and Norman Loayza (2009) and Ann Harrison and Rodríguez-Clare (2010).

## Concluding Remarks

Several broad points are crucial to emphasize in closing. First, the gains from trade may be quite large once we consider that the relevant trade elasticity is lower than the one estimated from a gravity equation, which is the one that is commonly used in quantitative analysis. Second, such gains from trade miss complementarities between trade and multinational production or the flow of ideas, implying an even larger understatement of potential trade gains. Third, since poor countries tend to have less diversified endowments of natural resources, they are likely to gain more from trade than rich countries do (at least compared with the gains implied by the standard quantitative analysis), except if they end up specializing in sectors that have relatively low productivity due to domestic distortions.

Finally, the discussion above has ignored distributional considerations that empirical research has shown to be important. In the case of poorer countries, the empirical evidence is discussed by Nina Pavcnik in *chapter 8* of this volume. Simon Galle, Rodríguez-Clare, and Moises Yi (2017) offer a recent study extending the quantitative analysis of Arkolakis, Costinot, and Rodríguez-Clare (2012) to allow for distributional implications, but their findings apply exclusively to the gains from trade and the welfare effects of the China shock (as conceptualized in Autor, Dorn, and Hanson 2013) in the United States. This paper finds that overall trade and events like the China shock may increase inequality a bit in the United States, so if social welfare is decreasing in inequality, then the gains from trade or from the China shock would be lower than those that the standard analysis implies. For reasonable degrees of inequality aversion, however, the downward adjustment is small. More generally, finding a way to understand and

deal with income distribution effects is an important task in that it may help mitigate the backlash against globalization that we have seen across the United States and some other advanced economies in recent years (see Costinot and Werning 2018 for a broad theoretical treatment of this question).

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