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POLICY BRIEF

23-17 America's payoff from engaging in world markets since 1950 was almost $2.6 trillion in 2022

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INTRODUCTION

The goal of preserving and expanding globalization—defined by the International Monetary Fund (IMF) as "the increasing integration of economies around the world, particularly through trade and financial flows"[1]—has suffered multiple setbacks over the last two decades: the death of the World Trade Organization's (WTO) "Doha Round" of trade negotiations in 2011, ten years after it was launched; increasing trade protection actions chronicled by the Global Trade Alert;[2] the unilateral imposition of tariffs in defiance of WTO rules;[3] and the expansion of industrial subsidies to support production and exports by advanced and emerging-market economies alike.[4] While fresh liberalization has been modest since the global financial crisis of 2008-09, damaging import restrictions have been abundant.[5] More specifically, in the United States, President Joseph R. Biden Jr. has kept in place tariffs imposed by his predecessor, former president Donald J. Trump, and called for even greater controls on trade and investment involving sensitive technologies.

But while globalization has waned as a policy goal embraced by senior US officials,[6] world trade and finance have continued to expand in many areas, with notable gains in services trade facilitated by the internet. To be sure, the pace of merchandise trade growth has slowed, and trade volumes declined during the 2008-09 global financial crisis and the 2020 pandemic, but overall, even merchandise trade has expanded since 2001, both in absolute terms and relative to world GDP.[7]

This Policy Brief updates previous estimates of the payoff from globalization to the American economy as outlined in publications by the Peterson Institute for International Economics (PIIE).[8] To be sure, deeper US engagement with the world economy is as much, if not more, due to technological innovations in transportation and communication as policy liberalization. The bottom line, argued here, is that post-World War II engagement with the world economy by the United States generated cumulative gains over several decades that, in the year 2022, lifted annual US GDP by 10 percent in that year, about $2.6 trillion (expressed in 2022 dollars).[9]

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US GDP in 2022 was $25.5 trillion. Without post-World War II engagement in the world economy, our estimates indicate that US GDP in 2022 would have been $22.9 trillion, some $2.6 trillion lower. The update presented here also reflects the impact of inflation as a main driver of the higher payoff since 2016.

The extent of the slowdown in globalization is a matter of debate among economists. The role of trade and investment barriers in contributing to that slowdown is deplored by many economic experts but cheered by economic nationalists. Over the past decade, China has experienced a declining ratio of two-way trade to GDP, while the US ratio has been flat. As early as 2010, Marcus Noland authored "The Twilight of Globalization?" in *Globalization and Economic Integration: Winners and Losers in the Asia-Pacific*, which described fraying US support for international commercial and political engagement. In the same year, *Globalization at Risk: Challenges to Finance and Trade*, by Hufbauer and Kati Suominen, recounted opposing political and economic forces. In 2023, Clyde Prestowitz declared "False Gods Don't Last: Globalism is Dead," acclaiming industrial policy and mercantilism. In the same week, with regret, William A. Reinsch asked, "So Long, Globalization?" Continuing the debate, Robert J. Shapiro took former Labor Secretary Robert Reich to task for endorsing President Joseph R. Biden Jr.'s turn from free trade.

Meanwhile, services play a far larger role in the global economy than they did decades ago. Expressed as a share of world GDP, services trade doubled from 6.0 percent in 1975 to 12.1 percent in 2021.[10] Tariff-equivalent barriers remain much higher on services trade than on manufactured goods.[11] Even so, services accounted for 23 percent of total US two-way trade in 2022, although US barriers on services trade averaged almost 45 percent ad valorem equivalent.[12] Measured in current dollars, US two-way trade in services reached $1,625 billion in 2022, while two-way trade in merchandise was $5,363 billion.[13] US services exports were $929 billion and US services imports were $697 billion.[14] With significant liberalization and new technology, two-way services trade might eventually equal two-way merchandise trade, and the favorable US balance of services trade might expand.

Many critics of globalization on the left and right argue globalization causes losses not gains, worldwide as well in each country. To be sure, the opening of global markets from the mid-1990s to the early 2000s to goods produced by tens of millions of Chinese workers unleashed a massive surge in manufactured exports from China and created a "China shock" felt worldwide. For a variety of reasons, including productivity-enhancing technology innovations, wages for unskilled workers declined relative to skilled workers throughout advanced economies.[15] Yet the gains from globalization to the entire world and to the US economy far exceeded losses to affected segments. Moreover, while public support has declined, a majority of Americans still view trade in a positive light.[16] As well, many firms object to losses incurred when fresh barriers interrupt US commerce.[17]

We measure gains in comparison with a counterfactual scenario of no faster increase in US two-way trade since 1950 than the rate of increase in US GDP. Gains generated by expanded trade were generated not only by liberalization of trade barriers but also, and probably more importantly, by dramatic improvements in transportation and communications technology. Like a cut in tariffs, lower transportation and communications costs reduce the friction in international transactions. The $2.6 trillion in gains in 2022 work out, on average, to about $7,800 per person and $19,500 per household.[18] Average gains in 2022 would

have been considerably larger but for political headwinds that have slowed trade expansion since the global financial crisis of 2008-09. Indeed, nearly all the gains—expressed as a percent of GDP—accrued before the global financial crisis, although gains expressed in dollar terms have continued to grow at a slow rate.

To be sure, averages mask winners and losers from trade expansion. This Policy Brief explores the distribution issue in a separate section below. However much trade can be identified as dislocating workers, trade restrictions are not the answer to income inequality. As argued in a book by Kimberly Clausing[19] and a PIIE Policy Brief by Alan Wolff and colleagues,[20] curbing trade may make inequality worse. To aid those displaced by trade, different policies—especially progressive taxation and safety nets—must be deployed to ensure that both globalization gains and technology gains are broadly shared.

RECKONING THE GAINS

An estimate of the US payoff from globalization requires a basic methodology for measuring the outcome. Our calculations in this Policy Brief build on and update previous PIIE estimates published in Bradford, Grieco, and Hufbauer (2005)[21] and Hufbauer and Lu (2017).[22] See table 1 on the next page for the new set of different computable general equilibrium (CGE) models used in this updated analysis.

In 2005, PIIE published its first estimate of the payoff to America from engagement with the world economy (Bradford, Grieco, and Hufbauer 2005). Using different methodologies, the authors calculated gains from trade expansion between 1950 and 2003 for US GDP; they also calculated gains on average for US individuals and for statistical households of 2.58 persons (in 2003). The calculations, using an Organization for Economic Cooperation and Development (OECD) model, indicated that the United States gained an additional $1.5 trillion annual GDP in the year 2003 (measured in 2003 dollars), some 13 percent of GDP that year, owing to deeper trade integration over the prior 54-year period from 1950 to 2003. Annual gains in GDP per capita and per household in 2003 were calculated at $5,000 and $12,900, respectively (measured in 2003 dollars). The sources of such large gains from freer trade are familiar to economists: comparative advantage, economies of scale, learning from foreign firms, expansion of more productive domestic firms, and contraction of less productive domestic firms.[23]

For this Policy Brief, we drew on a survey of empirical studies that examined trade liberalization published in a 2010 PIIE analysis by Hufbauer, Jeffrey J. Schott, and Woan Foong Wong.[24] These studies enabled a calculation of the relation between annual induced growth in GDP and expanded two-way trade triggered by both policy liberalization and technological progress. Using the same methodology, in 2017 Hufbauer and Lu calculated an average "dollar ratio" of 0.24 between annual induced dollar GDP gains and annual dollar two-way trade gains based on 12 of the 17 models then reported in the literature.[25] Simply put, the dollar ratio is the dollar increase in GDP divided by the dollar increase in two-way trade. In language familiar to economists, the dollar ratio is the elasticity of income (GDP) with respect to trade. Expressed another way, the calculation indicates that a 1 percent increase in trade yields a 0.24 percent increase in GDP—i.e., a $1 billion increase in two-way trade increases GDP by $240 million.

Table 1
Trade models surveyed to estimate dollar ratios for this updated analysis

Row	Computable general equilibrium (CGE) model	Forecast year	Region covered	Change in two-way trade (billions of US dollars)	Change in GDP (billions of US dollars)	Dollar ratio
1	USITC (2021): US Trade Agreements	2017	US trade with FTA partners	+$207	+$89	0.43
2	WTO (2023): Trade Facilitation Agreement	2016	World trade	+$462	+$92	0.20
3	WTO (2020): US-China Trade Conflict	2023	US trade	-$117	-$41	0.35
4	World Bank (2022): Analysis of RCEP	2035	Japan trade	+$134	+$33	0.25
5	ADB (2021): Analysis of CPTPP	2030	Japan trade	+$200	+$57	0.29
6	ADB (2021): Analysis of RCEP	2030	Japan trade	+$266	+$60	0.23
7	Petri and Plummer (2020): Sustained US-China Trade War	2030	US trade	-$859	-$23	0.03
8	Ciuriak and Xiao (2014): TPP Scenarios	2020	US trade	+$23	+$13	0.57
9	Petri and Plummer (2023): Global Reach Model	2035	US trade	+$670	+$241	0.36
	Average					**0.30**

USITC = US International Trade Commission; FTA = free trade agreement; WTO = World Trade Organization; ADB = Asian Development Bank; CPTPP = Comprehensive and Progressive Agreement on Trans-Pacific Partnership; RCEP= Regional Comprehensive Economic Partnership; TPP = Trans-Pacific Partnership

Note: For detailed sources and calculations, see appendix table A.1 on page 13.

To avoid a common misunderstanding, dollar ratios are *not* multiplier-type estimates of GDP gains from positive export shocks. Instead, dollar ratios reflect supply-side efficiency gains from the simultaneous expansion of imports and exports—balanced two-way trade expansion—beyond the rate of GDP growth. Hufbauer and Lu (2017) used the average dollar ratio of 0.24 to update US gains from "extra" trade integration that occurred between 2003 and 2016—whether caused by policy liberalization or better transportation and communications technology—after allowing for "normal" trade growth associated with economic expansion (GDP growth) over the 13-year period.[26] For example, if US two-way trade over a five-year period increased by $100 billion more than simple GDP growth would predict over that period, then the dollar ratio of 0.24 indicates a $24 billion increase in annual US GDP attributable to channels opened by greater globalization. Using a completely different approach described in appendix B, in a 2019 article, James Feyrer[27] estimated that—as a lower bound—an increase of $100 billion in two-way trade would raise global GDP by $23 billion. Feyrer's estimate strongly supports the 0.24 coefficient applied by Hufbauer and Lu and the updated calculations offered in this Policy Brief.

In the earlier calculation in Bradford Grieco, and Hufbauer (2005), annual gains in 2003 attributable to trade expansion between 1950 and 2003 were $1.5 trillion (measured in 2003 dollars). But measuring this same gain in 2016 dollars comes to $1.9 trillion,[28] after taking into account inflation between 2003 and 2016.[29]

Applying the average dollar ratio of 0.24 to "extra" trade growth (beyond the rate of GDP growth) between 2003 and 2016 suggests that the extra growth contributed $191 billion to annual US GDP in 2016 (measured in 2016 dollars). This translated, in 2016, to about 1 percent of GDP, an additional $590 in GDP per capita (population of 324 million), or an additional $1,493 per statistical household (2.53 persons), in that year.[30]

Adding the Bradford, Grieco, and Hufbauer (2005) estimate ($1.9 trillion in 2016 dollars) and the Hufbauer and Lu (2017) estimate ($191 billion in 2016 dollars) suggests that, since 1950, advances in transportation and communications, together with lower barriers to international trade, generated an annual increase of roughly $2.1 trillion in US GDP in 2016 (measured in 2016 dollars), about 11 percent of GDP in that year. Measured in 2016 dollars, this represented, in 2016, an additional $6,506 GDP per capita (2016 population of 324 million), or $16,460 per household (2.53 persons in 2016) annually from extra trade growth between 1950 and 2016.[31]

US two-way trade in goods and services (measured in 2022 dollars) expanded from $5,958 billion in 2016 to $6,988 billion in 2022,[32] an increase of 17 percent. US GDP (again measured in 2022 dollars) increased from $22.6 trillion in 2016 to $25.7 trillion in 2022,[33] an increase of 14 percent. In other words, US two-way trade grew 3 percentage points faster than US GDP, amounting to about $179 billion measured in 2022 dollars.[34] Slightly faster trade growth between 2016 and 2022, compared with GDP growth, was attributable to communications technology, especially the growth of services trade facilitated by the internet, not to any meaningful policy liberalization.

For this Policy Brief, we calculated a new dollar ratio based on an average of new and different CGE models than the ones analyzed in Hufbauer and Lu (2017). We used new models to be closer to the time period of the new dollar ratio, and we used different models as a check on earlier calculations. The new set of CGE

models indicates an average dollar ratio of 0.30 (see table 1 and box 1), somewhat larger than the Hufbauer and Lu (2017) dollar ratio of 0.24. Worth noting is that the new dollar ratio of 0.30 is approximately in the middle of the CGE models reported in table 1.

Box 1 Calculating "dollar ratios"

As mentioned, many economists have constructed computable general equilibrium (CGE) models to analyze shocks to the international economy, including both liberalization of existing barriers and imposition of new restrictions. A common but not universal feature of these exercises is the use of the Global Trade Analysis Project (GTAP) model maintained by a team at Purdue University and supported by the World Bank.[1] CGE models differ in their assumptions about competitive or monopolistic markets and identical or heterogeneous firms with respect to their productivity attributes. Some consider terms of trade effects, others do not. As well, differing tariff and nontariff barriers (NTBs) are assumed. In their 2018 review article, John Gilbert, Taiji Furusawa, and Robert Scollay surveyed around 40 CGE models.[2]

Variation in CGE model design enables the calculation of a range of values for the ratio between GDP gains (or losses) and two-way trade expansion (or contraction) triggered by trade barrier liberalization (or restriction). Table 1 summarizes dollar ratios calculated for a sample of 10 CGE models not previously reported by in the 2017 PIIE Policy Brief by Gary Clyde Hufbauer and Lucy Lu.[3] Three calculations are included for Japan, an advanced economy like the United States. Table A.1 in appendix A explains the derivation of figures reported in table 1 from the underlying sources. As a general rule, smaller dollar ratios are found for advanced economies than for developing economies.

Somewhat surprising, however, the USITC model for existing US trade agreements indicates a dollar ratio of 0.43—in other words, $430 million of GDP gains for each two-way trade expansion of $1 billion. Illustrating variation in models, the analysis by Peter Petri and Michael Plummer[4] of the cost to the United States of a sustained trade war with China is quite small (dollar ratio of 0.03), while the WTO analysis[5] of a trade war scenario indicates a substantial cost (dollar ratio of 0.35). The average dollar ratio for all 9 models reported in table 1 is 0.30. This is in the same ballpark but 0.06 points larger than the average dollar ratio for 12 of the 17 different models reported by Hufbauer and Lu (2017).

1 Global Trade Analysis Project, GTAP Models: Current GTAP Model, April 5, 2023.

2 John Gilbert, Taiji Furusawa, and Robert Scollay, The Economic Impact of the Trans-Pacific Partnership: What Have We Learned from CGE Simulation?, *World Economy* 41, no. 3 (March 2018): 831–65. Unfortunately, the survey does not report the dollar volume of trade gains.

3 Gary Clyde Hufbauer and Zhiyao (Lucy) Lu, *The Payoff to America from Globalization: A Fresh Look with a Focus on Costs to Workers*, PIIE Policy Brief 17-16, Peterson Institute for International Economics, May 2017.

4 Peter A. Petri and Michael G. Plummer, *East Asia Decouples from the United States: Trade War, COVID-19, and East Asia's New Trade Blocs*, PIIE Working Paper 20-9, Peterson Institute for International Economics, June 2020.

5 Eddy Bekkers and Sofia Schroeter, *An Economic Analysis of the US-China Trade Conflict*, Staff Working Paper ERSD-2020-04, World Trade Organization, March 19, 2020.

Applying the new dollar ratio of 0.30 (from table 1) to "extra" trade growth between 2016 and 2022 indicates a GDP dividend of $54 billion, measured in 2022 dollars (0.30 times $179 billion). The Bradford, Grieco, and Hufbauer (2005) plus Hufbauer and Lu (2017) calculations of gains between 1950 and 2016 of $2.1 trillion (measured in 2016 dollars), when adjusted for 20 percent inflation between 2016 and 2022 (measured by the GDP deflator[35]), works out to $2.5 trillion (measured in 2022 dollars). In other words, inflation alone increased the annual dollar gains from $2.1 trillion in 2016 to $2.5 trillion in 2022. Combining the inflation-adjusted figure ($2.5 trillion) with additional gains between 2016 and 2022 ($54 billion), we calculate in this Policy Brief that annual GDP gains from postwar trade expansion (1950 to 2022) were approximately $2.6 trillion in 2022 (measured in 2022 dollars), or about 10 percent of US GDP in 2022.[36] In 2022 the US population was 333 million and average household size was 2.5 persons.[37] Thus, measured in 2022 dollars, gains per capita were $7,801, while gains per statistical household were $19,503. These gains measured in 2022 are somewhat larger than gains measured in 2016 (and expressed in 2016 dollars), but mainly due to inflation rather than real two-way trade growth (table 2 briefly summarizes our updated calculation).

Table 2
Summary tabulation of gains calculated from 1950 to 2022

PIIE study	Time period	US gains from "globalization"
Bradford, Grieco, and Hufbauer (2005)	1950-2003	$1.5 trillion annual GDP in 2003 [measured in 2003 dollars]
Hufbauer and Lu (2017)	1950-2003	$1.9 trillion annual GDP [measured in 2016 dollars, adjusting for inflation between 2003 and 2016]
	✚	✚
	2003-2016 *[new calculation in Hufbauer-Lu 2017]*	*$191 billion* annual GDP [measured in 2016 dollars]
	1950-2016	$2.1 trillion annual GDP in 2016 [$1.9 trillion + $191 billion] [measured in 2016 dollars
This Policy Brief	1950-2016	$2.5 trillion annual GDP [measured in 2022 dollars, adjusting for inflation between 2016 and 2022]
	✚	✚
	2016-2022 *[new calculation in this Policy Brief]*	*$54 billion* annual GDP [measured in 2022 dollars]
	1950-2022	**$2.6 trillion annual GDP in 2022 [$2.5trillion + $54 billion] [measured in 2022 dollars]**

Note: See text for detailed explanation, associated sources, and methodologies used.

ALTERNATIVE ESTIMATES BY OTHER AUTHORS

Economists have applied different methods to calculate the gains from trade. Very early, Bela Balassa (1966) observed that the "East Asian tigers" (Singapore, Hong Kong, South Korea, and Taiwan) flourished through rapid trade expansion.[38] In the 1990s, PIIE (then IIE) authors calculated the cost of sectoral trade protection and by implication the gains from liberalization.[39] Cross-country regression analysis in 2003 by the OECD[40] showed that a 10 percent increase in trade exposure spelled a 2 percent increase in per capita income in the long run.[41]

Sophisticated "gravity models" have also been applied to calculate GDP gains from increased trade. "Gravity models" are so named because they explain the magnitude of bilateral trade flows by the negative force of distance between partners and the positive force of their economic size. Jeffrey Frankel and Andrew Rose, using a gravity model with multiple countries and control variables, found in a 2022 article that a 1.0 percentage point increase in the trade-to-GDP ratio led to a 0.33 percentage point increase in income between 1970 and 1990.[42]

In 2014 Arnaud Costinot and Andrés Rodríguez-Clare[43] used different versions of a gravity model to calculate that a shift from autarky (roughly the US situation at the end of the World War II) to 2008 trade levels raised US GDP between 2 and 10 percent. Applying an even more sophisticated gravity model, in 2019 Feyrer[44] concluded that a 10 percent increase in trade causes at least a 2.3 percent increase in global per capita income for countries around the world.

Appendix B summarizes these and other approaches to calculating gains from trade found in the literature.

WHO WINS? WHO LOSES?

Despite clear documentation that overall gains from globalization have been considerable since 1950, the distribution of gains is unequal, inflicting losses on some segments of the US population. One estimate holds that 2.4 million US workers lost their jobs because of Chinese imports between 2000 and 2011,[45] a small number in the context of roughly 50 million US workers changing jobs each year[46] but a large impact on parts of the American industrial belt.

Manufacturing workers whose jobs are taken by imports attract the most attention. Hufbauer and Lu (2017) calculated that, between 2001 and 2016, a maximum of 312,500 US workers were "adversely affected"—i.e., lost or changed jobs—annually because of increased imports of manufactured goods.[47] Of these, some 200,000 were manufacturing jobs and 112,500 were jobs in agriculture, mining, and (mainly) support services. As explained below, some adversely affected workers are unemployed, while others move quickly to a different job.

The concept of workers adversely affected by imports is spelled out in Section 222 of the Trade Act of 1974, which established the Trade Adjustment Assistance (TAA) program. In short, adversely affected workers are those who lose their jobs (total separation) or whose work hours and therefore wages are reduced (partial separation and/or decreased sales and production) as a result of import competition.

Different from workers adversely affected by imports are "displaced workers." These are defined by the Bureau of Labor Statistics as "persons 20 years and over who lost or left jobs because their plant or company closed or moved, there was insufficient work for them to do, or their position or shift was abolished"—in

other words, laid off. Workers are often displaced for reasons other than trade—in particular, industrial automation and firm closures owing to domestic competition. Available data do not, however, separate workers displaced by trade from other displaced workers.

To a large extent, workers adversely affected by imports (as defined for TAA) are also displaced workers, but the concepts are not the same, for the simple reason that, in a strong economy, many workers quickly shift between jobs as old positions shut down and new positions open up. That said, an estimate of jobs "adversely affected" by imports suggests the maximum number of workers who might have lost or changed jobs because of rising imports.

In summary, the concept "displaced workers" covers a much broader range than "workers displaced by imports." Moreover, "workers adversely affected by imports" probably covers a broader range than "workers displaced by imports." These distinctions are important to bear in mind when assessing the impact of enlarged trade.

Between 2019 and 2022 (bridging the pandemic, which started in 2020 and mostly receded by December 2021), with substantial growth in manufactured imports, the maximum number of US workers who lost or changed jobs because of increased imports, calculated using by the Hufbauer and Lu (2017) methodology, was at most 242,000 annually.[48] But this figure clearly exaggerates the number of "displaced workers," given the low level of unemployment and the high number of job vacancies as the pandemic receded. In June 2022, the unemployment rate was 3.6 percent, or about 6.3 million workers. The number of job vacancies was about 11.7 million.[49] In 2021 and 2022, most workers with manufacturing skills could easily find new jobs. According to the Bureau of Labor Statistics, Job Openings and Labor Turnover Survey, at the beginning of 2022, for example, the US economy had 905,000 manufacturing job vacancies versus 460,000 manufacturing job separations.[50]

Compared with our estimate of US workers who lost or changed jobs because of increased imports (242,000 annually between 2019 and 2022), roughly 50 million American workers change their jobs each year.[51] A small fraction of these workers is "displaced," meaning laid off, including a smaller fraction displaced by imports. Displacement reduces earnings over the long term. Throughout the vast US economy over the past two decades, annual displacement ranged from under 1 percent to over 3.5 percent of the labor force (1 million to 5 million workers).[52] All displaced workers, including those displaced by trade, deserve better public safety nets.

Conspicuous winners are workers employed to produce rising exports, especially of manufactured goods. Hufbauer and Lu (2017) calculated that, between 2001 and 2016, about 156,250 US jobs were added annually in the production of manufactured exports, of which 100,000 were in manufacturing industry and 56,250 in supporting sectors.[53] However, between 2019 and 2022 (bridging the pandemic), real export growth was negative, indicating a loss of manufacturing jobs during that three-year period.[54]

Analysis by J. David Richardson of 1992 data showed that workers in exporting firms enjoyed a wage premium of about 10 percent over comparable nonexporting firms, and a value added per worker premium of about 16 percent.[55] Research by Andrew Bernard and colleagues in 2018, discussed in appendix B,

confirmed that value added by exporting firms exceeded nonexporting firms by about 19 percent.[56]

Larger and less visible gains accrue to the economy as a whole through reduced prices, greater variety, and the rise of more productive firms. These are the sorts of gains captured by CGE models. Gains are distributed to households through lower prices, higher wages, and increased profits. Lower-income households spend a larger share of their earnings on goods than upper-income households. Accordingly, they may benefit proportionally more from reduced prices on imported merchandise.[57] That said, CGE models do not attempt to calculate the distribution of gains by household income quartiles.

In 2015, anticipating negotiations for the Trans-Pacific Partnership (TPP) and the Trans-Atlantic Trade and Investment Partnership (TTIP), President Barack Obama's Council of Economic Advisers issued a report titled *The Economic Benefits of U.S. Trade*.[58] The report summarizes multiple benefits flowing from international trade and investment, with readable text, tables, and figures.

While rising income inequality among American households over the past 30 years is often associated with globalization, the connection is much disputed, as some experts show. Bruce Sacerdote argues that declines among middle-income households have been seriously exaggerated: Most households are better off today than 30 years ago measured by number of cars and size of homes.[59] Michael Strain goes further and characterizes middle-class income stagnation as a myth.[60] In any event, technological advances over three decades have amplified demand for workforce skills, skewing the distribution of labor earnings—very likely to a greater extent than increased trade flows.

In the long run, higher productivity is the pathway to better living standards. At a time when labor productivity in the manufacturing sector is growing at less than 2 percent annually,[61] the United States needs all the sources of productivity growth that it can find. While dismissed by today's fashionable critics, greater US engagement with the world economy remains a proven source of higher productivity.[62]

NO MORE POLICY LIBERALIZATION

Upon taking office in January 2017, President Donald J. Trump halted US policy liberalization, as he had promised in his 2016 presidential campaign. In fact, trade policy went into reverse. Prior to Trump's election, the American appetite for liberalization was flagging, for multiple reasons, including the failure of the Doha Round of multilateral trade negotiations, presidential candidate Hillary Clinton's decision to abandon the Trans-Pacific Partnership (TPP)—the cornerstone of President Barack Obama's "pivot to Asia"—as well as continued congressional support for the "sacred cows" of trade protection, such as sugar quotas, the Jones Act, and extreme antidumping duties.

Trump immediately withdrew from the TPP in 2017 and threatened to do the same from the North American Free Trade Agreement (NAFTA). Instead, NAFTA was renegotiated as the US-Mexico-Canada Agreement (USMCA) to ensure higher North American content in auto production, forceful arbitration of labor disputes, and weakened guarantees for foreign direct investment. Trump also imposed dubious "national security" tariffs on imports of steel and aluminum and erected high penalty tariffs on imports from China. Coupled with inflamed rhetoric ("trade

wars are good, and easy to win"[63]), Trump's policies reversed the Republican Party's post-World War II embrace of open markets.

Meanwhile, the progressive wing of the Democratic Party characterized globalization as the source of rising inequality, stagnant wages, environmental damage, labor abuses, worsening conditions for minorities, and excessive corporate power. After President Biden was elected in 2020, two of his senior officials—Trade Representative Katherine Tai and National Security Advisor Jake Sullivan—revised the telling of postwar trade history, faulting freer trade for these and other problems in American life, as well as for posing threats to national security.[64]

In the Tai-Sullivan revisionist history, lower US tariffs play an outsized role. But in fact, as a consequence of the Uruguay Round of multilateral trade negotiations (1986 to 1995) and bilateral free trade agreements (FTAs), US weighted average tariffs only declined from 3.9 percent in 1990 to 1.5 percent in 2020.[65] The Tai-Sullivan implication that the drop of 2.4 percentage points in the average US tariff wall created so many calamities is not persuasive. Foreign tariff liberalization between 1990 and 2020 was often much more significant than US tariff liberalization.[66]

During the years of when the Uruguay Round and FTAs were negotiated and then implemented, technological advances very likely did more to enlarge US trade than tariff cuts. The maximum size of ships increased almost four times, lowering the cost of transporting each container. which meant more goods could now be exported and imported.[67] Between 1955 and 2004, the cost of air cargo fell by a factor of ten. Before 1960, air cargo was negligible; by 2004, air transport carried over half of US exports by value (excluding Mexico and Canada).[68] To summarize, cheaper transportation was a bigger spur to trade than tariff cuts. More dramatic still was the rise of the internet. In 1996 there were 46 million users worldwide; today the number exceeds 5 billion.[69] Prominent among users, of course, are multinational corporations (MNCs) engaged in trading and producing worldwide. Internet communications enable sourcing of intermediate goods from multiple countries and selling final goods to multiple destinations. These supply chain activities boosted the volume of merchandise and services trade alike.

The offshoring of production by MNCs, facilitated by falling transportation and communication costs and a favorable tax regime, may have had some impact along the lines of the Tai-Sullivan narrative, but empirical research indicates that MNC investment abroad actually strengthens the US economy in three ways: fostering exports, increasing R&D, and spurring investment at home.[70]

From a policy standpoint, of greater importance than lower tariffs in trade agreements were assurances that Mexico (NAFTA), China (permanent normal trade relations), and a few others gave MNCs about investing in those countries for production on a global scale. With the eruption of US-China geopolitical tensions and nationalist resurgence in Mexico, those assurances have now lost some of their value. Still, it's questionable whether a "great reshoring" or "friendshoring" of manufacturing production is at hand. Our recent PIIE Policy Brief reports, for example, only marginal changes in US-China, US-Mexico or China-Mexico trade shares since President Trump imposed high penalty tariffs on US imports from China.[71]

After the conclusion of the Uruguay Round in 1995 and three promised supplementary agreements (information technology products,

telecommunications, and financial services), the WTO's only successes in further liberalizing barriers were the Trade Facilitation Agreement of 2015 (TFA) and the updated Information Technology Agreement of 2015 (ITA) to cover new products.

Through the TFA, WTO members committed to streamlining customs and logistics to ease the shipment of goods. At the time of TFA's creation, it was estimated that full implementation by all WTO members would equate to an average 14.4 percent tariff reduction.[72] The WTO (2015)[73] itself projected that, by 2030, the agreement would increase world exports by as much as 2.7 percent and world GDP by 0.54 percent. In 2023, however, the WTO reassessed the fruits of the TFA and estimated far more modest results.[74]

POTENTIAL GAINS FROM RENEWED POLICY LIBERALIZATION

US attitudes toward globalization must reverse from hostile to friendly before US engagement with the world economy shows a marked increase on account of policy liberalization. Nothing in the current political scene indicates a U-turn. Whatever gains from globalization that American households enjoy in the near term will arise from technological innovation, not policy liberalization. That said, it is worth speculating on the magnitude of potential gains if attitudes and policy do reverse.

For a useful forecast, the recent work of Peter Petri and Michael Plummer provides the foundation. They calculated potential gains from the creation of an expanded Comprehensive and Progressive Agreement on Trans-Pacific Partnership (CPTPP) that would include the United States, China, and the European Union.[75] Of course, from a geopolitical perspective, such a pact is most unlikely, but the Petri-Plummer calculations illustrate the potential of freer global commerce. Expressed in 2022 dollars, US two-way trade would be $690 billion larger through membership in this improbable pact.[76] Applying a dollar ratio of 0.30 to this trade growth indicates potential US GDP gains of $207 billion in 2035.[77] In 2035, US population is projected to reach 360 million.[78] Based on projected population and current household size (2.5 persons),[79] the potential increment in annual gains work out to about $575 per person and $1,438 per household.

The foregoing payoff forecast reflects the potential of *dramatic* policy liberalization. A free trade group that includes the United States and China seems inconceivable given hostile geopolitical relations. But whatever happens to US-China bilateral trade, further technological progress in transportation and communications—if not offset by higher barriers—should boost the scope of US trade expansion with the rest of the world and deliver additional benefits to American households. Pessimists can, of course, claim that internet technology and artificial intelligence (AI) will dislocate millions of workers by making multiple services tradable across space and time.[80] The future is fair game for speculation, but technology has historically contributed to American prosperity, not the reverse. The challenge facing US leadership and policymakers over the next decade is to approach the global opportunities enabled by emerging technologies sensibly with an open mind, while ensuring potential gains more broadly shared.

APPENDIX A

Table A.1
Methods of calculating trade and GDP changes in table 1

Table 1 row number	CGE model	Source	Changes in two-way trade	Changes in GDP
1	USITC: US Trade Agreements	United States International Trade Commission, *Economic Impact of Trade Agreements Implemented Under Trade Authorities Procedures, 2021 Report*, publication no. 5199, June 2021, https://www.usitc.gov/publications/332/pub5199.pdf.	Table 3.7, row 2 (US trade with FTA partners): change in exports ($89.5 billion) + change in imports ($117.7 billion) = **$207.2 billion**	Table 3.6, row 1 (Real GDP (billion $)): change = **$88.8 billion**
2	WTO: Trade Facilitation Agreement	Cosimo Beverelli, Isabella Gourevich, Inga Heiland, Alexander Keck, Mario Larch, Yoto V. Yotov, *Trade and Welfare Effects of the WTO Trade Facilitation Agreement*, Staff Working Paper ERSD-2023-04, World Trade Organization, February 28, 2023, https://www.wto.org/english/res_e/reser_e/ersd202304_e.pdf.	Table 7, row 12 (World): absolute change in world exports = $231,104 million, or $231.1 billion. Import gain assumed the same. Change in exports ($231.1 billion) + change in imports ($231.1 billion) = **$462.2 billion**	Table 5, row 12 (World): real GDP increases by 0.12% from 2016 (baseline equilibrium of the model is calibrated to the year 2016, see pg. 23). World GDP in 2016 was $76.46 trillion, or $76,460 billion, according to the World Bank (https://data.worldbank.org/indicator/NY.GDP.MKTP.CD). Change in GDP = 0.0012*76,460 billion = **$91.8 billion**

Table 1 row number	CGE model	Source	Changes in two-way trade	Changes in GDP
3	WTO: US-China Trade Conflict	Eddy Bekkers and Sofia Schroeter, *An Economic Analysis of the US-China Trade Conflict*, Staff Working Paper ERSD-2020-04, World Trade Organization, March 19, 2020, https://www.wto.org/english/res_e/reser_e/ersd202004_e.pdf.	Figure 8: percent change in US real exports by 2023 under trade conflict scenario = -4.71%. 2022 total US exports = $2,089.9 billion, according to United States Census Bureau FT900, Exhibit 12 (https://www.census.gov/foreign-trade/Press-Release/ft900_index.html). US export loss = -0.0471*$2,089.9 billion = -$98.4 billion. Figure 8: percent change in Chinese real exports by 2023 under trade conflict scenario = -3.24%. Chinese export loss is assumed to be entirely in exports to the US (i.e., US imports from China). 2022 Chinese exports to the US = $577.1 billion, according to General Administration of Customs People's Republic of China (http://stats.customs.gov.cn/indexEn). Chinese export loss (i.e., US import loss) = -0.0324*$577.1 billion = -$18.7 billion. Change in US exports (-$98.4 billion) + change in Chinese exports (i.e., change in US imports, -$18.7 billion) = **-$117.1 billion**	Figure 7: percent change in US real GDP by 2023 under trade conflict scenario = -0.16%. 2022 US GDP = $25,462.7 billion according to Bureau of Economic Analysis Gross Domestic Product (Second Estimate), Corporate Profits (Preliminary Estimate), First Quarter 2023 table 3, row 1 (https://www.bea.gov/sites/default/files/2023-05/gdp1q23_2nd.pdf). Change in GDP = -0.0016*$25,462.7 billion = **-$40.7 billion**

Table 1 row number	CGE model	Source	Changes in two-way trade	Changes in GDP
4	World Bank: Analysis of RCEP	Carmen Estrades Pineyrua, Maryla Maliszewska, Israel Osorio-Rodarte, and Maria Filipa Seara E Pereira, *Estimating the Economic and Distributional Impacts of the Regional Comprehensive Economic Partnership*, Policy Research Working Paper 9939, World Bank Group, February 2022, https://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-9939.	Table 2, row 4 (Japan): percent change in exports under RCEP scenario relative to 'Business-as-usual' scenario, 2035 = 7.6%. 2022 total Japanese exports = $746.7 billion, according to UN Comtrade (https://comtradeplus.un.org/). Estimated real growth of 2% per year (same rate of growth as GDP is assumed for merchandise trade, see cell E6) for 13 years = $746.7 billion + [$746.7 billion*((1.02^13)-1)] = $965.9 billion in 2035. Japanese export gain = 0.076*$965.9 billion = $73.4 billion. Table 2, row 4 (Japan): percent change in imports under RCEP scenario relative to 'Business-as-usual' scenario, 2035 = 5.2%. 2022 total Japanese imports = $898.6 billion, according to UN Comtrade (https://comtradeplus.un.org/). Estimated real growth of 2% per year for 13 years = $898.6 billion + [$898.6 billion*((1.02^13)-1)] = $1,162.4 billion in 2035. Japanese import gain = 0.052*$1,162.4 billion = $60.4 billion. Change in Japanese exports ($73.4 billion) + change in Japanese imports ($60.4 billion) = **$133.8 billion**	Page 13: percent change in Japanese real income gains (i.e., GDP) under RCEP scenario relative to 'Business-as-usual' scenario, 2035 = 0.5%. 2021 Japanese GDP = $4.94 trillion, or $4,940 billion, according to the World Bank (https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=JP). Between 2021 and 2035, the Japan Center for Economic Research (JCER) estimates 2% growth per year (https://english.kyodonews.net/news/2022/01/fdd2b85e6293-s-korea-taiwan-expected-to-top-japan-in-gdp-per-capita-in-2027-2028.html). Estimated real GDP growth of 2% per year for 14 years = $4,940 billion + [$4,940 billion*((1.02^14)-1)] = $6,518.2 billion. Change in GDP = 0.005*$6,518.2 billion = **$32.6 billion**
5	ADB: Analysis of CPTPP	Cyn-Young Park, Peter A. Petri, and Michael G. Plummer, *Economic Implications of the Regional Comprehensive Economic Partnership for Asia and the Pacific*, EWP no. 639, Asian Development Bank, October 2021, https://www.adb.org/sites/default/files/publication/740991/ewp-639-regional-comprehensive-economic-partnership.pdf.	Table 4, row 15 (Japan): incremental exports under CPTPP scenario = $100 billion. Import gain assumed the same. Change in exports ($100 billion) + change in imports ($100 billion) = **$200 billion**	Table 3, row 15 (Japan): incremental income (i.e., change in GDP) under CPTPP scenario = **$57 billion**
6	ADB: Analysis of RCEP		Table 4, row 15 (Japan): incremental exports under RCEP scenario = $133 billion. Import gain assumed the same. Change in exports ($133 billion) + change in imports ($133 billion) = **$266 billion**	Table 3, row 15 (Japan): incremental income (i.e., change in GDP) under RCEP scenario = **$60 billion**

Table 1 row number	CGE model	Source	Changes in two-way trade	Changes in GDP
7	Petri and Plummer: Sustained US-China Trade War	Peter A. Petri and Michael G. Plummer, *East Asia Decouples from the United States: Trade War, COVID-19, and East Asia's New Trade Blocs*, PIIE Working Paper 20-9, Peterson Institute for International Economics, June 2020, https://www.piie.com/sites/default/files/documents/wp20-9.pdf. This model assumes a sustained trade war scenario between the United States and China, meaning that "US-China trade and investment barriers will remain indefinitely at levels reached under the phase one agreement of January 2020."	Table B1, row 7 (United States): incremental export effects with US-China trade war, under trade war scenario = -$396 billion. Table B1, row 11 (China): incremental export effects with US-China trade war, under trade war scenario = -$463 billion. China export losses are assumed to all be US import losses. Change in US exports (-$396 billion) + change in Chinese exports (i.e., change in US imports, -$463 billion) = **-$859 billion**	Table 4, row 7 (United States): incremental change in real income (i.e., change in GDP) under US-China trade war scenario = **-$23 billion**
8	Ciuriak and Xiao: TPP Scenarios	Dan Ciuriak and Jingliang Xiao, *The Trans-Pacific Partnership: Evaluating the 'Landing Zone' for Negotiations*, SSRN, September 21, 2014, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2550935.	Table 6a, row 10 (United States): accumulated change in exports to TPP partners in 2020 = $11.5 billion. Import gains assumed the same. Change in exports ($11.5 billion) + change in imports ($11.5 billion) = **$23 billion**	Table 7, row 10 (USA): GDP change under full TPP liberalization in 2020 = **$13 billion**
9	Petri and Plummer: Global Reach Model	Peter A. Petri and Michael G. Plummer, Scenarios for a Global New Normal and ASEAN Value Chains, chapter 6 in *ASEAN and Global Value Chains: Locking in Resilience and Sustainability*, Asian Development Bank, March 2023, https://ssrn.com/abstract=4426334.	Table 6.8, row 7 (United States): export changes under global reach scenario = $335 billion. Import gain assumed the same. Change in exports ($335 billion) + change in imports ($335 billion) = **$670 billion**	Table 6.7, row 7 (United States): income changes (i.e., GDP changes) under global reach scenario = **$241 billion**

CGE = computable general equilibrium; USITC = US International Trade Commission; FTA = free trade agreement; WTO = World Trade Organization; ADB = Asian Development Bank; CPTPP = Comprehensive and Progressive Agreement on Trans-Pacific Partnership; RCEP= Regional Comprehensive Economic Partnership; TPP = Trans-Pacific Partnership

APPENDIX B

ALTERNATIVE METHODS FOR CALCULATING THE PAYOFF FROM INTERNATIONAL TRADE

In the 2014 *Handbook of International Economics*, Arnaud Costinot and Andrés Rodríguez-Clare authored a chapter laying out the estimation of quantitative gains using augmented gravity models.[81] Augmentation involves specification of trade costs and the nature of markets (e.g., monopolistic competition). Models developed by the authors emphasize three features that determine the extent of gains from globalization: the elasticity of trade, meaning the response of volume to changes in price; the share of foreign goods and services in national expenditures; and the height of trade costs (including transportation and communications costs), expressed as ad valorem tariffs.

Table 4.1 in the Costinot and Rodriguez-Clare chapter reports national gains generated by moving from autarky (not all that different from trade circumstances at the end of World War II) to 2008 levels of trade for a large number of countries. Assuming multiple sectors and intermediate goods, with perfect competition, their calculation suggests US gains of 8.3 percent of GDP.[82] Changing the market structure assumption to monopolistic competition, as modeled by Marc Melitz in a 2003 article,[83] raises their calculation of US gains to 10.3 percent of GDP. Both calculations are in the same ballpark as estimates offered in this Policy Brief (about 10 percent of US GDP in 2022).

In a 2019 article, James Feyrer[84] used novel time-varying geographic instruments to calculate the causal impact of two-way trade on income levels across a large panel of countries over the period 1960 to 1995. Time-varying geographic instruments represent a marked improvement over the pioneering 1999 article by Jeffrey Frankel and David Romer,[85] who used a time-invariant instrument. The lowest elasticity coefficient as between income and trade that Feyrer estimated in an ordinary least squares regression was 0.23 (Feyrer 2019, 26). This coefficient indicates that if country A transacts 10 percent more trade than otherwise similar country B, country A will enjoy 2.3 percent higher per capita income than country B. However, using more sophisticated estimation techniques, Feyrer concluded that, in general, the elasticity coefficient has a lower bound of 0.5, meaning that 10 percent greater trade causes 5 percent higher per capita income (p. 26).

In a pathbreaking 2018 article, Andrew B. Bernard, J. Bradford Jensen, Stephen J. Redding, and Peter K. Schott constructed a new theoretical framework to explain the decisions of "global firms"—commonly called MNCs.[86] The framework explains how firms with large market shares (and thus the ability to affect prices) make simultaneous decisions on various margins of participation in the international economy: production locations, export markets, input sources, products to export, and inputs to import.

To paraphrase the authors, a firm's decision on one margin affects its decisions on the other margins. For example, by incurring the fixed export cost for reaching an additional market, the firm increases its annual revenue, making it more likely to incur the fixed cost of importing inputs from another country. In turn, that reduces variable production costs and prices, further increasing revenue, making it more likely that the firm will incur the fixed export cost for another market.

While the mathematical underpinnings of the new framework are formidable, the empirical confirmation and results are easily understood. Allowing for industry fixed effects, US exporting firms are larger than nonexporters, by 111 percent for employment and 135 percent for shipments. Exporting firms are also more productive, by 19 percent for value added per worker and 4 percent for total factor productivity (TFP). Importantly, the expansion of stronger firms and contraction of weaker firms concurrent with trade liberalization was earlier documented by Bernard, Jensen, and Schott in a 2003 paper.[87]

In 2007, just 35 percent of US manufacturing firms exported. Greater engagement by US firms in exporting their products would simultaneously foster greater engagement in importing and raise US manufacturing productivity. In 2019, average direct manufacturing value added per worker was $168,000, but for firms engaged in exporting, the figure was closer to $200,000.[88]

APPENDIX C
DAMAGE FROM IMPORT RESTRICTIONS

Opponents of free trade customarily ignore or dismiss the damage done by import restrictions. Recent research shows that the damage is not trivial. Moreover, since Abba Lerner's seminal 1936 paper, economists have known that import tariffs approximately work as a tax on exports.[89] Hence a brief survey of recent research findings, largely derived from "big data" analysis, is worthwhile.

Mary Amiti, Stephen J. Redding, and David E. Weinstein analyzed President Trump's 2018 trade war tariffs on imports from China, finding that "the full incidence of the tariffs has fallen on domestic consumers and importers so far, and our estimates imply a reduction in aggregate US real income of $1.4 billion per month by the end of 2018."[90] Contrary to Trump's declarations, Americans, not the Chinese, paid the tariffs.

In a similar vein, Pablo D. Fajgelbaum, Pinelopi K. Goldberg, Patrick J. Kennedy, and Amit K. Khandelwal constructed a general equilibrium model in a 2019 article to calculate the short-run costs of protectionism under the Trump administration, taking into account China's retaliatory tariffs.[91] They found costs to US consumers of $51 billion, and a US GDP loss of $7.2 billion (0.04 percent).

Zeroing in on the US manufacturing sector—Trump's central political concern—Aaron Flaaen and Justin Pierce[92] found more harm than benefit from the trade war. They assessed the impact on manufacturing employment of President Trump's tariffs both on steel and aluminum and on a wide range of Chinese imports. They found that US industries more exposed to tariff increases experienced relative reductions in employment, since the small positive effect from import protection was offset by larger negative effects from rising input costs and retaliatory tariffs: "…shifting an industry from the 25th percentile to the 75th percentile in terms of exposure to [the three] channels of tariffs is associated with a reduction in manufacturing employment of 1.4 percent, with the positive contribution from the import protection effects of tariffs (0.3 percent) more than offset by the negative effects associated with rising input costs (-1.1 percent) and retaliatory tariffs (-0.7 percent)."[93] In short, President Trump's tariffs, largely kept in place by President Biden, have the opposite impact on manufacturing employment than intended by both presidents.

In a 2020 NBER Working Paper, Kyle Handley, Fariha Kamal, and Ryan Monarch examined the impact of Trump tariffs (2018-19) on US export growth owing to supply chain linkages.[94] Paraphrasing the findings, the authors used 2016 confidential firm-trade linked data to identify companies that faced tariff increases. These firms accounted for 84 percent of all US exports and represented 65 percent of US manufacturing employment. For the average affected firm, the implied cost of higher tariffs was $900 per worker in new duties. Higher costs spelled lower exports. The decline in export growth in the third quarter of 2019, for example, had the equivalent effect of an ad valorem tariff on US exports of 2 percent for typical products and up to 4 percent for products with higher-than-average exposure.

In a 2023 paper, Xavier Jaravel and Erick Sager examined price behavior over a long period for detailed products imported by the United States from China.[95] They concluded that a 1.0 percentage point increase in market penetration by Chinese products typically caused a 1.9 percent decrease in US consumer prices for the product category, imports plus domestic production, relative to products less

exposed to imports. Consumer prices were thus reduced much more than standard models have predicted. This beneficial price effect for Americans could reverse as the United States slashes imports from China.

ENDNOTES

1 IMF Staff, *Globalization: Threat or Opportunity?*, *Globalization: Threat or Opportunity?*, International Monetary Fund, April 12, 2000.

2 Global Dynamics, Global Trade Alert (accessed July 26, 2023).

3 Chad P. Bown, Trump's Steel and Aluminum Tariffs Are Cascading out of Control, PIIE RealTime Economics blog, Peterson Institute for International Economics, February 4, 2020.

4 Simon J. Evenett and Johannes Fritz, *28th Global Trade Alert Report*, Global Trade Alert, October 25, 2021.

5 Appendix C provides examples of the harm caused.

6 Office of the United States Trade Representative, Remarks by Ambassador Katherine Tai at American University Washington College of Law, April 2023. See also White House, Remarks by National Security Advisor Jake Sullivan on Renewing American Economic Leadership at the Brookings Institution, April 27, 2023. For a critical comment, see Gary Clyde Hufbauer, Washington's Turn to Neo-Mercantilism, *East Asia Forum*, June 4, 2023.

7 In 2000, measured in current dollars, two-way world merchandise trade was $13.2 trillion; in 2022 the figure was $50.7 trillion. See World Bank, Merchandise exports (current US$) (accessed October 24, 2023), and Merchandise imports (current US$) (accessed October 24, 2023). Relative to world GDP, the percentages were 38.7 and 50.6 percent. See International Monetary Fund, GDP, Current Prices (accessed July 26, 2023); World Integrated Trade Solution (WITS), World Trade Summary (accessed July 26, 2023), and UN Comtrade Database (accessed July 26, 2023).

8 See Scott C. Bradford, Paul L. E. Grieco, and Gary Clyde Hufbauer, The Payoff to America from Global Integration, chapter 2 in *The United States and the World Economy: Foreign Economic Policy for the next Decade*, ed. C. Fred Bergsten (Washington: Peterson Institute for International Economics, 2005). See also Gary Clyde Hufbauer and Zhiyao (Lucy) Lu, *The Payoff to America from Globalization: A Fresh Look with a Focus on Costs to Workers*, PIIE Policy Brief 17-16 (Peterson Institute for International Economics, May 2017).

9 Here and in other places, current dollars for year t are converted to dollars for year ($t+n$) by applying the change in the US GDP price deflator between year t and year ($t+n$) to the year t current dollar figure. The Bureau of Economic Analysis reports annual GDP price deflators.

10 Trade data come from World Bank, Trade in Services (% of GDP) (accessed July 26, 2023).

11 In a 2016 PIIE analysis, Hufbauer reported that national tariff-equivalent barriers on services trade ranged from 20 percent (Singapore) to 73 percent (Mexico). See Gary Clyde Hufbauer, Liberalization of Services Trade, chapter 8 in *Trans-Pacific Partnership: An Assessment*, ed. Cathleen Cimino-Isaacs and Jeffrey J. Schott (Washington: Peterson Institute for International Economics, July 2016), table 8.3.

12 US services trade data come from the US Census Bureau, US Trade in Goods and Services--Balance of Payments (BOP) Basis (accessed November 23, 2023). US services trade barriers are reported in figure 2 in Hufbauer and Lu, *The Payoff to America from Globalization*.

13 See US Department of Commerce, Bureau of Economic Analysis, US International Trade in Goods and Services Annual Revision, June 7, 2023.

14 Ibid.

15 The integration of China, India, and the Soviet bloc added 1.5 billion mostly unskilled workers to the world economy by 2000, putting pressure on unskilled wages in advanced economies, according to Maurice Obstfeld, Get on Track with Trade, *Finance & Development* 53, no. 4 (International Monetary Fund, December 2016).

16 See Mohamed Younis, Sharply Fewer in US View Foreign Trade as Opportunity, Gallup.com, March 31, 2021. Also see a collection of polls reported by PollingReport.com, International Trade/Global Economy (accessed July 26, 2023). Poll responses are quite sensitive to the way the question is framed. In the cited Gallup polls, the questions were framed as follows: "What do you think foreign trade means for America? Do you see foreign trade more as an opportunity for economic growth through increased U.S. exports or a threat to the economy from foreign imports?"

17 See, for example, views expressed by the US Chamber of Commerce, US Chamber Letter on Trade Priorities, December 1, 2021.

18 US population in 2022 was 333 million. The average household size in 2022 was 2.5 persons.

19 Kimberly Clausing, *Open: The Progressive Case for Free Trade, Immigration, and Global Capital* (Cambridge, MA: Harvard University Press, 2019).

20 Alan Wm. Wolff, Robert Z. Lawrence, and Gary Clyde Hufbauer, *Have Trade Agreements Been Bad for America?*, PIIE Policy Brief 22-17 (Peterson Institute for International Economics, December 2022).

21 Bradford, Grieco, and Hufbauer, The Payoff to America from Global Integration, 2005.

22 Hufbauer and Lu, *The Payoff to America from Globalization*, 2017.

23 The gains from "sifting and sorting" between firms were first documented in the empirical analysis by Andrew B. Bernard and J. Bradford Jensen, Exceptional Exporter Performance: Cause, Effect, or Both?, *Journal of International Economics* 47, no. 1 (February 1, 1999): 1–25, and later buttressed through the theoretical framework designed by Marc J. Melitz, The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity, *Econometrica* 71, no. 6 (November 2003): 1695–1725.

24 See Gary Clyde Hufbauer, Jeffrey J. Schott, and Woan Foong Wong, *Figuring out the Doha Round*, Policy Analyses in International Economics 91 (Washington: Peterson Institute for International Economics, 2010). The survey was published as appendix A in that book.

25 See table 2 in Hufbauer and Lu, *The Payoff to America from Globalization*, 2017. In response to skepticism over the high dollar ratios reported in some empirical studies listed in table 2, Hufbauer and Lu excluded five dollar ratios that exceeded 0.5 (shown by an asterisk in table 2) from their calculation.

26 Total US two-way trade increased by 49.5 percent, or $1,644 billion (measured in 2016 dollars), from 2003 to 2016. Over this same period, US real GDP (in 2016 dollars) increased by 25.5 percent. Assuming economic expansion by itself causes "all boats to rise" by the same percentage, GDP growth between 2003 and 2016 could explain a rise of 25.5 percent in two-way trade, or $847 billion. The remaining growth of $797 billion reflected a combination of trade liberalization (the tail end of the North American Free Trade Agreement and Uruguay Round reforms) and important technological advances (especially the internet). For details and data sources, see Hufbauer and Lu, *The Payoff to America from Globalization*, 2017, page 5 and footnotes 20 and 21.

27 James Feyrer, Trade and Income—Exploiting Time Series in Geography, *American Economic Journal: Applied Economics* 11, no. 4 (October 2019): 1–35.

28 1.28 times $1.5 trillion equals $1.9 trillion rounded.

29 The US GDP deflator index rose from 83 in 2003 to 105 in 2016 (2012 = 100), indicating inflation of 28 percent between the two years. See Federal Reserve Economic Data (FRED), Gross Domestic Product: Implicit Price Deflator (GDPDEF).

30 US population in 2016 was 324 million. US average household size in 2016 was 2.53 persons. Population and household size figures reported here differ slightly from those reported in Hufbauer and Lu, *The Payoff to America from Globalization*, 2017.

31 Ibid.

32 See US Census Bureau, US Trade in Goods and Services--Balance of Payments (BOP) Basis. Inflation between 2016 and 2022 was 20.1 percent, so the 2016 value of trade, $4,961 billion, is multiplied by 1.201 to estimate the value in 2022 dollars.

33 See Federal Reserve Economic Data (FRED), Gross Domestic Product (GDP). 2016 GDP in current dollars of $18.8 trillion is multiplied by 1.201 to estimate the value in 2022 dollars.

34 Calculated as 0.03 times $5,958 billion.

35 The GDP deflator index was 98.2 for Q2 2016 and 117.7 for Q2 2022 (Q3 2017 = 100). See Federal Reserve Economic Data (FRED), Gross Domestic Product: Implicit Price Deflator [GDPDEF] (accessed November 29, 2023).

36 US GDP in 2022 was $25.7 trillion. See Federal Reserve Economic Data (FRED), Gross Domestic Product (GDP).

37 US population in 2022 was 333 million. The average household size in 2022 was 2.5 persons.

38 Bela A. Balassa, *Trade Prospects for Developing Countries* (Chicago, IL: University of Chicago Press, 1966).

39 Gary Clyde Hufbauer and Kimberly Ann Elliott, *Measuring the Costs of Protection in the United States* (Washington: Institute for International Economics, 1994).

40 OECD, *The Sources of Economic Growth in OECD Countries* (Paris: OECD Publishing, 2003).

41 For methodological detail, see Bradford, Grieco, and Hufbauer, The Payoff to America from Global Integration, 2005.

42 Jeffrey Frankel and Andrew Rose, An Estimate of the Effect of Common Currencies on Trade and Income, *Quarterly Journal of Economics* 117, no. 2 (May 2002): 437–66.

43 Arnaud Costinot and Andrés Rodríguez-Clare, Chapter 4: Trade Theory with Numbers: Quantifying the Consequences of Globalization, *Handbook of International Economics*, volume 4 (Elsevier, 2014).

44 Feyrer, Trade and Income—Exploiting Time Series in Geography.

45 Peter Dizikes, Q&A: David Autor on the long afterlife of the "China shock," MIT News, December 6, 2021. The term "China shock" was coined by David H. Autor, David Dorn, and Gordon H. Hanson. See David H. Autor, David Dorn, and Gordon H. Hanson, *The China Shock: Learning from Labor Market Adjustment to Large Changes in Trade*, NBER Working Paper 21906 (January 2016), National Bureau of Economic Research. Even if the United States had not welcomed China into the WTO in 2001, other countries very likely would have, and the "China shock" would have indirectly reached the US economy through imports from Southeast Asia and other regions.

46 US Bureau of Labor Statistics, Table 1. Job Openings Levels and Rates by Industry and Region, Seasonally Adjusted, August 29, 2023.

47 See Hufbauer and Lu, *The Payoff to America from Globalization*, 2017.

48 Manufactured imports are calculated as total merchandise imports minus two categories: (1) Foods, Feeds, and Beverages and (2) Industrial Supplies. Total manufactured imports in 2019 were $1,827 billion and in 2022, $2,226 billion. Adjusting for inflation between 2019 and 2022 (using the GDP deflator, which increased 13 percent between these years), expressed in 2019 dollars the change was $143 billion, about $48 billion annually between 2019 and 2022. The coefficient of imports (from Hufbauer and Lu, *The Payoff to America from Globalization*) was 5,033 manufacturing jobs per billion dollars of imports in 2014, of which 3,160 were direct manufacturing jobs and 1,873 were indirect manufacturing jobs. Applying this coefficient of 5,033 manufacturing jobs per billion dollars of imports (though the coefficient was almost certainly lower between 2016 and 2019), jobs affected by import growth over the three years between 2019 and 2022 were at most 242,000 jobs annually (48*5,033 = 242,000, rounded). For import data, see US Department of Commerce, Bureau of Economic Analysis, US International Trade in Goods and Services Annual Revision, June 7, 2023; and Table 2.1 US International Trade in Goods, March 23, 2021.

49 See Statista, Monthly Unemployment Rate in the United States from July 2021 to July 2023, August 7, 2023; and Monthly Number of Unemployed Persons in the United States from July 2021 to July 2023, August 7, 2023; US Bureau of Labor Statistics, Table 1 Job Openings Levels and Rates by Industry and Region, Seasonally Adjusted, August 29, 2023.

50 For job vacancies and job separations, see US Bureau of Labor Statistics, JOLTS Databases.

51 Kate Heinz, 38 Employee Turnover Statistics to Know, Built In, April 17, 2023.

52 See Ariel Gelrud Shiro and Kristin Butcher, *Job Displacement in the United States by Race, Education, and Parental Income*, Brookings Institution report, July 2022. Appendix figure 3 on page 21 in that report depicts the share of workers displaced annually. For employment data, see Statista, Total employment and the unemployment rate in the United States from 1980 to 2022, with projections until 2028.

53 Hufbauer and Lu, *The Payoff to America from Globalization*, 2017.

54 Manufactured exports are calculated as total merchandise exports minus two categories: Foods, Feeds, and Beverages and Industrial Supplies. Total manufactured exports in 2019 were $975 billion, and in 2022, $1,054 billion. Adjusting for inflation using the GDP deflator, which increased 13 percent between 2019 and 2022, manufactured exports in 2022 were just $933 billion when measured in 2019 dollars, indicating a loss of manufacturing jobs. As a matter of interest, the 2015 coefficient for export jobs (from Hufbauer and Lu, *The Payoff to America from Globalization*) was 5,210 jobs per billion dollars of exports. For export data, see US Department of Commerce, Bureau of Economic Analysis, US International Trade in Goods and Services Annual Revision, June 7, 2023; and Table 2.1 US International Trade in Goods, March 23, 2021.

55 J. David Richardson, *Why Exports Matter: More!* (Washington: Institute for International Economics, 1996), 9–12.

56 Andrew B. Bernard, J. Bradford Jensen, Stephen J. Redding, and Peter K. Schott, Global Firms, *Journal of Economic Literature* 56, no. 2 (June 2018): 565–619.

57 White House, Executive Office of the President of the United States, *The Economic Benefits of U.S. Trade*, May 2015, figure 1. However, a more recent paper by Kirill Borusyak and Xavier Jaravel concludes that the consumption of imported goods as a share of expenditure is approximately flat across the income distribution of households and therefore trade has little impact on the extent of income inequality (*The Distributional Effects of Trade: Theory and Evidence from the United States*, June 16, 2021).

58 White House, *The Economic Benefits of U.S. Trade*.

59 Bruce Sacerdote, *Is the Decline of the Middle Class Greatly Exaggerated?*, Aspen Economic Strategy Group, December 10, 2020.

60 Michael R Strain, The Myth of Income Stagnation, Project Syndicate, December 15, 2022.

61 See Bureau of Labor Statistics, Quarterly labor productivity and related measures for major sectors.

62 Hufbauer and Lu, *The Payoff to America from Globalization*, 2017, provide relevant calculations.

63 Reuters Staff, "Trump Tweets: 'Trade Wars Are Good, and Easy to Win,'" Reuters, March 2, 2018.

64 See citations in footnote 6 above for remarks by Tai and Sullivan. Secretary of the Treasury Janet Yellen and Secretary of State Antony Blinken gave more supportive, but less noticed, statements on trade policy. See US Department of the Treasury, Remarks by Secretary of the Treasury Janet L. Yellen on the US-China Economic Relationship at Johns Hopkins School of Advanced International Studies, April 20, 2023; US Department of State, Secretary Antony J. Blinken and US-EU Trade and Technology Council Ministerial Co-Chairs at a Joint Press Availability, May 31, 2023.

65 MacroTrends, US Tariff Rates 1989-2023 (accessed August 29, 2023).

66 For example, China's weighted average tariff declined from 32.2 to 2.5 percent; Mexico from 11.9 to 1.2 percent; India from 56.4 to 6.6 percent. See MacroTrends, China Tariff Rates 1992-2023 (accessed August 29, 2023), and similar publications from the same source for other countries. Of course, by opening foreign markets to US exports, lower tariffs abroad increase US exports, which indirectly increase US imports. But it would take a brave (or foolhardy) US official to criticize the reduction of foreign tariffs.

67 Slices of Blue Sky, Container Shipping History in Charts, November 17, 2015.

68 Feyrer, Trade and Income—Exploiting Time Series in Geography.

69 For an early estimate, see Elon University, 1960s–1990s: Internet (accessed August 29, 2023). For a 2022 estimate of internet users, see International Telecommunication Union, *Measuring digital development: Facts and Figures 2022*.

70 See Gary Clyde Hufbauer, Theodore H. Moran, and Lindsay Oldenski, *Outward Foreign Direct Investment and US Exports, Jobs, and R&D: Implications for US Policy* (Washington: Peterson Institute for International Economics, 2013).

71 Megan Hogan and Gary Clyde Hufbauer, *Despite disruptions, US-China trade is likely to grow*, PIIE Policy Brief 23-14, Peterson Institute for International Economics, October 2023.

72 See Evdokia Moïsé and Silvia Sorescu, *Trade Facilitation Indicators: The Potential Impact of Trade Facilitation on Developing Countries' Trade*, OECD Trade Policy Paper no. 144 (Paris: OECD Publishing, 2013).

73 World Trade Organization, *World Trade Report 2015: Speeding up Trade: Benefits and Challenges of Implementing the WTO Trade Facilitation Agreement* (Geneva, 2015).

74 See Cosimo Beverelli et al., *Trade and Welfare Effects of the WTO Trade Facilitation Agreement*, World Trade Organization, Economic Research and Statistics Division, Staff Working Paper ERSD-2023-04, February 28, 2023. The WTO's general equilibrium model, expressing gains as percentages of 2016 trade and GDP, suggest a 1.2 percent increase in world exports because of the TFA and a 0.12 percent increase in real GDP. However, larger and statistically significant gains were found for least developed countries: an export increase of 2.4 percent and real GDP gains of 0.24 percent.

75 Peter A. Petri and Michael G. Plummer, Scenarios for a Global New Normal and ASEAN Value Chains, chapter 6 in *ASEAN and Global Value Chains: Locking in Resilience and Sustainability*, Asian Development Bank, April 26, 2023.

76 Table 6.8 in Petri and Plummer, Scenarios for a Global New Normal and ASEAN Value Chains, reports the change in US exports, comparing the Global Reach scenario with the Baseline scenario, as $335 billion in 2035. The source does not have a table reporting the change in US imports, but in email correspondence, Petri said the change would be $355 billion in 2035. Since this is not a published number, for purposes of appendix table A.1 and table 1 in this Policy Brief, we rely on the familiar assumption in most CGE models that the change in national imports equals the change in national exports.

77 Based on their model, Petri and Plummer project gains of $241 billion in 2035.

78 Population Reference Bureau, Population Mid-2035, August 16, 2022.

79 Statista Research Department, Average Number of People per Household in the United States from 1960 to 2022, June 2, 2023.

80 Richard Baldwin, *The Great Convergence: Information Technology and the New Globalization* (Cambridge, MA: Belknap Press of Harvard University Press, 2016).

81 Costinot and Rodríguez-Clare, Chapter 4: Trade Theory with Numbers: Quantifying the Consequences of Globalization, *Handbook of International Economics*, volume 4 (Elsevier, 2014).

82 Strictly speaking, the calculations are expressed as welfare gains, rather than GDP gains. The difference is minor.

83 Marc J. Melitz, The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity, *Econometrica* 71, no. 6 (November 2003): 1695–1725.

84 Feyrer, Trade and Income—Exploiting Time Series in Geography.

85 Jeffrey A. Frankel and David H. Romer, Does Trade Cause Growth?, *American Economic Review* 89, no. 3 (June 1999): 379–399.

86 Andrew B. Bernard, J. Bradford Jensen, Stephen J. Redding, and Peter K. Schott, Global Firms, *Journal of Economic Literature* 56, no. 2 (June 2018): 565–619.

87 Andrew B. Bernard, J. Bradford Jensen, and Peter K. Schott, *Falling Trade Costs, Heterogeneous Firms and Industry Dynamics*, Institute for Fiscal Studies Working Paper 03/10, April 2003.

88 Direct manufacturing value added was $1,939 billion in 2019 and the number of manufacturing employees was 11,540,000. See tables 3.2 and 4.1 in Douglas S. Thomas, *Annual Report on US Manufacturing Industry Statistics: 2022*, NIST Advanced Manufacturing Series NIST AMS 100-49, October 2022. The estimate for firms engaged in exporting is based on the 19 percent higher value added calculated by Bernard, Jensen, Redding, and Schott, Global Firms.

89 A. P. Lerner, The Symmetry Between Import and Export Taxes, *Economica* 3, no. 11 (August 1936): 306–13. In a 2019 paper, Arnaud Costinot and Iván Werning qualified the basic Lerner symmetry theorem by considering imperfect competition and the role of MNCs. See Lerner Symmetry: A Modern Treatment, *American Economic Review: Insights* 1, no. 1 (June 2019): 13–26.

90 Mary Amiti, Stephen J. Redding, and David E. Weinstein, The Impact of the 2018 Tariffs on Prices and Welfare, *Journal of Economic Perspectives* 33, no. 4 (Fall 2019): 187–210.

91 Pablo D. Fajgelbaum, Pinelopi K. Goldberg, Patrick J. Kennedy, and Amit K. Khandelwal, The Return to Protectionism, *Quarterly Journal of Economics* 135, no. 1 (published November 2019): 1–55.

92 Aaron Flaaen and Justin Pierce, Disentangling the Effects of the 2018-2019 Tariffs on a Globally Connected U.S. Manufacturing Sector, *Finance and Economics Discussion Series*, Federal Reserve Board, December 2019.

93 Ibid.

94 Kyle Handley, Fariha Kamal, and Ryan Monarch, *Rising Import Tariffs, Falling Export Growth: When Modern Supply Chains Meet Old-Style Protectionism*, NBER Working Paper 26611, National Bureau of Economic Research, January 2020.

95 Xavier Jaravel and Erick Sager, *What Are the Price Effects of Trade? Evidence from the U.S. and Implications for Quantitative Trade Models*, January 2023.

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