

NBER WORKING PAPER SERIES

DE-GLOBALISATION? GLOBAL VALUE CHAINS IN THE POST-COVID-19 AGE

Pol Antràs

Working Paper 28115

<http://www.nber.org/papers/w28115>

NATIONAL BUREAU OF ECONOMIC RESEARCH

1050 Massachusetts Avenue

Cambridge, MA 02138

November 2020

This paper was written for the ECB Forum on Central Banking, “Central Banking in a Shifting World,” originally scheduled to take place in Sintra, Portugal, in June 2020. I am grateful to Jingyi Tao for outstanding research assistance, to Max Alekseev, Davin Chor, Evgenii Fadeev, Elhanan Helpman, and Steve Redding for detailed comments, to Gita Gopinath and ebnem Kalemli-Özcan for helpful discussions, and to Diego Cerdeiro, Michael Clemens, Lionel Fontagné, Michele Mancini, Sébastien Miroudot, and Josep Pijoan-Mas for sharing data with me. The author received an honorarium for carrying out and presenting the research in this paper.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2020 by Pol Antràs. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

De-Globalisation? Global Value Chains in the Post-COVID-19 Age
Pol Antràs
NBER Working Paper No. 28115
November 2020
JEL No. F1,F2,F4,F5,F6

ABSTRACT

This paper evaluates the extent to which the world economy has entered a phase of de-globalisation, and it offers some speculative thoughts on the future of global value chains in the post-COVID-19 age. Although the growth of international trade flows relative to that of GDP has slowed down since the Great Recession, this paper finds little systematic evidence indicating that the world economy has already entered an era of de-globalisation. Instead, the observed slowdown in globalisation is a natural sequel to the unsustainable increase in globalisation experienced in the late 1980s, 1990s and early 2000s. I offer a description of the mechanisms leading to that earlier expansionary phase, together with a discussion of why these forces might have run out of steam, and of the extent to which they may be reversible. I conclude that the main challenge for the future of globalisation is institutional and political in nature rather than technological, although new technologies might aggravate the trends in inequality that have created the current political backlash against globalisation. Zooming in on the COVID-19 global pandemic, I similarly conclude that the current health crisis may further darken the future of globalisation if it aggravates policy tensions across countries.

Pol Antràs
Department of Economics
Harvard University
1805 Cambridge Street
Littauer Center 207
Cambridge, MA 02138
and NBER
pantras@fas.harvard.edu

“De-Globalisation? Global Value Chains in the Post-COVID-19 Age”

Pol Antràs*

Harvard University

November 16, 2020

Abstract

This paper evaluates the extent to which the world economy has entered a phase of de-globalisation, and it offers some speculative thoughts on the future of global value chains in the post-COVID-19 age. Although the growth of international trade flows relative to that of GDP has slowed down since the Great Recession, this paper finds little systematic evidence indicating that the world economy has already entered an era of de-globalisation. Instead, the observed slowdown in globalisation is a natural sequel to the unsustainable increase in globalisation experienced in the late 1980s, 1990s and early 2000s. I offer a description of the mechanisms leading to that earlier expansionary phase, together with a discussion of why these forces might have run out of steam, and of the extent to which they may be reversible. I conclude that the main challenge for the future of globalisation is institutional and political in nature rather than technological, although new technologies might aggravate the trends in inequality that have created the current political backlash against globalisation. Zooming in on the COVID-19 global pandemic, I similarly conclude that the current health crisis may further darken the future of globalisation if it aggravates policy tensions across countries.

1. Introduction

At the time of writing, the world is witnessing extraordinary events. The COVID-19 global pandemic has brutally awakened the world from a Panglossian tranquillity caused by decades of relatively sporadic and largely isolated epidemic risks. The magnitude and nature of the COVID-19 shock has quickly spilled over to the global economy, triggering a dramatic decline in economic activity, due both to social distancing practices but also due to government-mandated lockdowns and other mobility restrictions.

* This paper was written for the ECB Forum on Central Banking, “Central Banking in a Shifting World,” originally scheduled to take place in Sintra, Portugal, in June 2020. I am grateful to Jingyi Tao for outstanding research assistance, to Max Alekseev, Davin Chor, Evgenii Fadeev, Elhanan Helpman, and Steve Redding for detailed comments, to Gita Gopinath and Şebnem Kalemli-Özcan for helpful discussions, and to Diego Cerdeiro, Michael Clemens, Lionel Fontagné, Michele Mancini, Sébastien Miroudot, and Josep Pijoan-Mas for sharing data with me. The author received an honorarium for carrying out and presenting the research in this paper.

In describing the unfolding and the consequences of the current COVID-19 health crisis, journalists and commentators have been using the word “unprecedented” with a frequency that is unprecedented. One example of such hyperbolic commentary is the notion that the world economy has now entered a phase of de-globalisation in which economic agents are increasingly severing their international economic links and are reshoring economic activity toward their domestic economies. Is the world economy really getting de-globalised?

Ironically, such an unravelling of globalisation would not be unprecedented. The last significant episode of de-globalisation occurred in the 20th century during the so-called Interwar Period, a period which coincidentally witnessed at its onset one of the most devastating global pandemics on record, the 1918 Influenza Pandemic.¹ Of course, there are a myriad of forces that contributed to the de-globalisation of the Interwar Period, none more important than (i) the belligerent and dysfunctional political world order that emanated from World War I, and (ii) a worldwide economic downturn – the Great Depression – that severely impacted many of the world’s largest economies and led these countries’ governments to institute beggar-thy-neighbour policies.

Luckily, the world has not witnessed a truly global military conflict since 1945. Yet, the Great Recession of the late 2000s brought to an abrupt halt the process of globalisation that had begun in the post-war period and that had remarkably accelerated in the mid-1980s. And, much as it happened during the Interwar Period, the recent Great Recession has rekindled nationalistic sentiments in many advanced countries, fuelling a political rhetoric that blames foreigners for the economic woes faced by the domestic residents of these advanced countries. Although the extent to which this rhetoric has materialized into *actual* policies has been somewhat limited, the recent trade disputes between the U.S. and China and the withdrawal of the United Kingdom from the European Union have shaken the firm ground over which the process of globalisation appeared to be cemented. To cap it off, since early 2020, the world economy has submerged itself into a global health crisis that, due to its severity and asynchronous nature, has dramatically impacted the functioning of global value chains.

In sum, in an era like the present one with significant health, economic, and policy uncertainty, it is natural that some commentators have spotted the beginnings of a new era of de-globalisation.² The goal of this paper is to try to elucidate whether the world economy might have indeed already entered such a phase of de-globalisation, and more speculatively, to offer some thoughts on the future of global value chains in the post-COVID-19 age.

The paper sets off, in section 2, by studying the process of globalisation in recent decades. Unlike the view pushed by some commentators, the paper argues that there is no conclusive evidence indicating that the world economy is significantly less global today than it was at the onset of the Great Recession. It is certainly the case that that pace of globalisation has slowed down relative to recent decades – a process that *The Economist* has referred to as Slowbalisation³ –, but the anecdotal

¹ Being a citizen of Spain, you will allow me to refrain from referring to the 1918 Pandemic as the Spanish Flu, a denomination that is neither fair nor accurate.

² See, for instance, the views voiced by economists, business leaders, and other experts interviewed in “Have We Reached Peak Globalization?”, Bloomberg News, January 24, 2020 ([link](#)).

³ Economist. “Slowbalisation: The steam has gone out of globalisation.” *The Economist* (2019): 34-43 ([link](#)).

evidence based on individual firms' decisions that is often mentioned to justify the premonition of de-globalisation is not salient enough to show up in aggregate statistics. The world trade-to-GDP ratio – a standard measure of globalisation – has recovered from its late 2008 low, while last year, the share of migrants in world population attained its highest level since 1990. The relative importance of capital flows and multinational activity in overall economic activity has certainly gone down since the Great Recession, but these series remain at high levels comparable to those in the early 2000s. The same is true for the relative importance of global value chain (GVC) trade in world trade.

Focusing on the evolution of the ratio of world trade to world GDP in the last fifty years, I find that 80% of the growth in this ratio occurred during the subperiod 1986-2008. Indeed, the ratio of world trade to world GDP almost doubled (increasing by a factor of 1.72) during that period of “hyperglobalisation”. Because many measures of globalisation are simple ratios or shares that have natural upper bounds, I argue that growth explosions in trade openness of the type experienced during the hyperglobalisation of 1986-2008 are simply not sustainable. In other words, a period of “slowbalisation” was inevitable.

In order to elucidate why the process of globalisation slowed down, it is thus crucial to study the forces that fuelled that earlier expansionary phase. I turn to this task in section 3 of the paper. I identify three main developments beginning in the late 1980s that led to a remarkable disintegration of production processes across borders. First, the information and communication technology (ICT) revolution allowed firms in industrialized countries to relocate certain parts of their production processes to distant locations, while still maintaining a fluid flow of communication between the different production units in GVCs, and also facilitated the design and implementation of efficient supply-chain management practices. Second, this period also witnessed a significant fall in effective trade costs, a reduction caused both by a significant acceleration in the rate of reduction of man-made trade barriers (e.g., tariffs and other non-tariff barriers), and by the increased reliance on faster methods of shipping goods, such as air freight shipping. Third, political developments in the world – most notably the fall of communism in Eastern Europe and the gradual increased adoption of market economy practices in East and Southeast Asia – brought about a remarkable increase in the share of world population actively participating in the process of globalisation.

In sum, at the same time that firms in industrialized countries found it easier and cheaper to set up global value chains sustained by large flows of goods and information across the globe, the world capitalist system witnessed a massive labour supply shock, as hundreds of millions of workers (many of which highly-qualified workers) suddenly became “employable” from the point of view of firms in these advanced economies. I close section 3 by developing a simple theoretical framework to illustrate how these forces may have acted in independent but also in complementary ways to generate a fast acceleration in the share of world trade accounted by global production networks. The framework also incorporates imperfect competition and scale economies, and demonstrates the relevance of scale for the decision of firms to slice their value chain across borders.

Having described some of the key forces that fuelled the hyper-globalisation of 1986-2008, in section 4, I turn my attention to studying the extent to which these forces might have run out of steam, and more importantly, to assess the extent to which they may be reversible. I first review some of the key

technologies associated with the ICT revolution and argue that, although the rate of technological change does not seem to be slowing down for certain key technologies (e.g., Moore's Law holds as well today as it did in the 1980s and 1990s), sustaining such pace of technological progress is requiring increasingly high R&D outlays. Similarly, there are some signs of diminishing returns in other technological developments that were crucial for hyper-specialisation to take off. For instance, the number of internet users as a share of world population is still growing but at a noticeably slower pace than in the 1990s.

Next, I reflect on the extent to which other new technologies that have only become widely available in recent years might reduce rather than increase the profitability of breaking up production processes. I first discuss the role of automation, which constitutes an alternative to offshoring for firms in developed countries seeking to lower their labour costs. Because automation and offshoring appear to be substitutes, one might expect that that future improvements in automation will naturally lead to an increasing amount of reshoring over time, thus fuelling de-globalisation. A similar case has been made regarding 3D printing. I argue, however, that both conceptually as well as in light of recent empirical evidence, the de-globalising effect of these technologies is much less clear-cut in practice. Furthermore, and as I review in section 4, there are an array of novel, cutting-edge digital technologies, that have the potential to give hyper-globalisation a second wind in coming decades.

I conclude section 4 by returning to the conceptual framework developed at the end of section 3. I argue that, even if the forces that led to hyperglobalisation might have slowed down, and others might foster de-globalisation, the large economies of scale associated with modern GVCs might make firms reluctant to dismantle them in the face of severe but temporary shocks. More specifically, because firms incur large sunk costs when putting in place their global sourcing strategies, their location decisions are relatively sticky. I argue that this stickiness explains the fact that the bulk of the trade collapse of 2008-09 occurred at the intensive (rather than extensive) margin, thus sowing the seeds for the observed V-shape recovery in trade flows in 2010. The lesson is that shocks to the world economy are likely to lead to important changes in the geography of worldwide production only if these shocks are large and perceived to be persistent.

Stepping away from technological factors, in section 5, I briefly study the potential role of other secular long-term forces in potentially leading to a period of de-globalisation. First, the labour supply shock associated with the transition of communist and socialist countries into market economies will not go away, but unit labour costs in less developed economies have grown considerably relative to those in advanced economies, thereby eroding some of the benefits of fragmenting production. I argue, however, that global value chains do not always seek low unit labour costs, as reflected by the fact that an important share of GVC trade takes place between advanced economies. Furthermore, given the sunk costs associated with the current geography of worldwide production, it will take persistent and significant shifts in competitiveness for firms to want to reshore activity to their own domestic economies. In section 6, I also discuss the role of various types of compositional factors. In particular, I show that investment rates appear to be going down at the world level, and I argue that this might put downward pressure on globalisation in the future, given the disproportionate importance of capital goods in international trade flows.

Although the case for a process of de-globalisation based purely on technological factors is somewhat weak, the risk of policy factors leading to an era of increased isolationism deserves much closer attention. Are we in the cusp of a new Interwar Period in terms of trade policy? Although the trade liberalization efforts of the post-war period are certainly reversible, as Brexit or U.S.–China have vividly illustrated, the effects of these novel policy distortions have been limited to date. Building on the conceptual framework with sunk costs, I argue in section 6 that this tamed response is largely explained by the fact that firms are uncertain about whether the restrictions that have been put in place will be persistent. This leads me to study the underlying forces that precipitated the globalisation backlash of the 2000s, with the hope of elucidating the extent to which these forces will themselves be persistent. More specifically, I discuss the role of trade-induced inequality and of the limited compensation received by those that might have been negatively affected by the hyperglobalisation of 1986-2008. I argue that technological progress in coming decades might not only give globalisation an extra push, but it might also aggravate inequality. As a result, the political rhetoric that has fuelled the backlash against globalisation will remain a challenge unless tax systems do a better job of providing a safety net or offering active labour-market policies to those individuals experiencing negative trade-related income shocks, such as job dislocations caused by import competition.

In section 7, I turn to the current COVID-19 health crisis. I first document the effect it has had on international trade flows. Government-mandated lockdowns in China led to a first significant decline in trade flows in late January and in February of 2020, with a disproportionate effect on international trade in vehicles (a canonical example of GVC trade). After a recovery in early March, trade flows collapsed again in March and April, with again a much larger response for “GVC” trade than for other types of trade. Growth in world trade since May has been steady, however, and had virtually reached early January levels by early September. Building on the conceptual framework developed in section 3 extended to include sunk costs, I hypothesize that the bulk of the response in the early phases of the pandemic was at the intensive rather than the extensive margin. To the extent that economic agents perceive the COVID-19 as a temporary shock, I conclude that the current health crisis is not likely to constitute a significant de-globalisation force in the near future. Nevertheless, I anticipate two potential turns of events that could lead to a more protracted negative effect of the COVID-19 crisis on globalisation. First, whether the shock is permanent or not is not yet entirely clear. At the time of writing a reliable vaccine is not yet available, and there is the widespread perception that international business travel (a key input in global production networks) will be disrupted for years to come. Second, the negative externalities inherent in the spread of the disease across countries, has somewhat intensified the practice of “finger pointing” between countries, which is not auspicious for a future easing of political tensions in coming years. Furthermore, every indication at this point is that the current health crisis is likely to significantly increase income inequality worldwide due to the differential ability of skilled and unskilled individuals to work from home, and this again does not bode well for the future of globalisation.

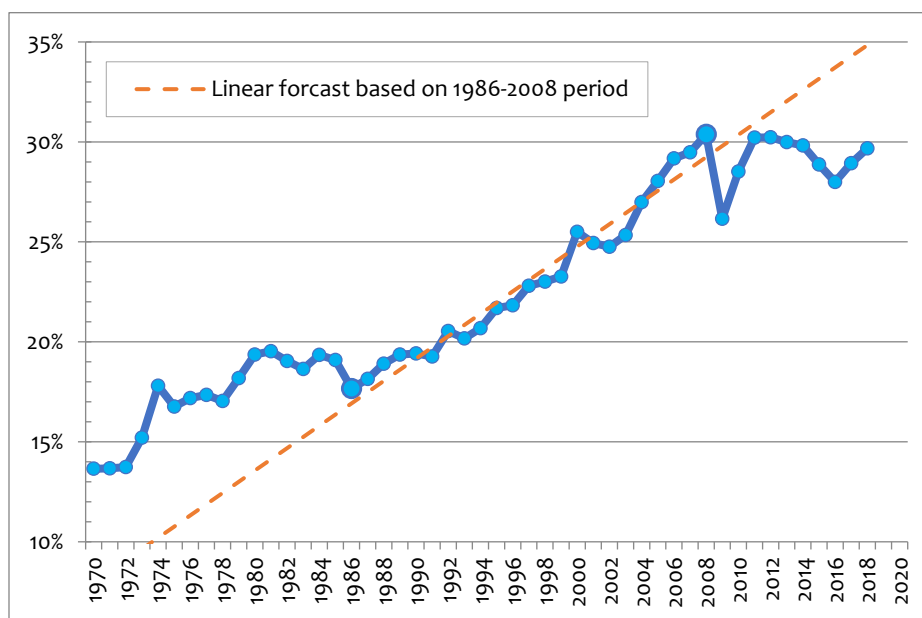
2. De-Globalisation? The Facts

In this section, I review the evolution of various measures of globalisation with the goal of assessing whether the world economy has indeed entered a new era of de-globalisation. Although the process

of globalisation encompasses the integration of goods, labour and capital markets, it is natural to begin our analysis with international trade flows.

Chart 1 plots the evolution of the share of world trade over world GDP during the period 1970-2018.⁴ Several aspects of the figure are noteworthy. First, the ratio of world trade to world GDP more than doubled, from an initial value of 13.7% in 1970 to 29.7% in 2018. Second, the bulk (close to 80%) of that increase occurred during the twenty-three-year period between 1986 and 2008. Third, world trade openness fell notably after the onset of the Great Recession, but it has since recovered and, in 2018, it reached essentially the same level it had achieved at its peak in 2008.

Chart 1. World Trade over World GDP (1970-2018)



Source: World Bank's World Development Indicators ([link](#))

Does the time series in Chart 1 warrant the concern that the world economy might have entered a phase of de-globalisation? The contrast between the hyperglobalisation period 1986-2008 and the more recent period 2009-18 is certainly noteworthy, but note that the period 1970-85 also saw a fairly restrained growth in this ratio. More significantly, it is natural to imagine that in a world economy converging to a balanced growth path, the ratio of world trade to world GDP will stabilize to a constant steady-state value. In other words, one cannot possibly expect the share of world gross output that is shipped across borders to grow without bounds over time: it cannot possibly be higher than 100 percent!⁵

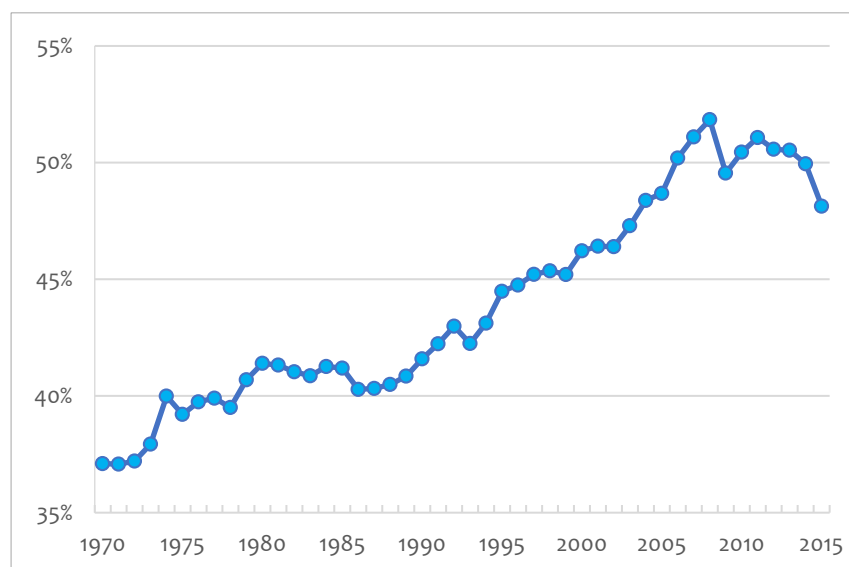
⁴ World trade is defined as half the sum of world exports and world imports.

⁵ The upper bound is in fact lower than 100%. For instance, in a world with no intermediate inputs, if bilateral trade flows are well approximated by a gravity equation then $WorldTrade/WorldGDP \leq 1 - \sum_i (GDP_i/WorldGDP)^2$. Using 2018 GDP figures for all countries in the world, this delivers an upper bound for world openness of 90.1%.

An important caveat to this argument is in order. World GDP and world gross output are two very different objects, and the ratio of world trade to world GDP could in principle well exceed 100%, as it does for certain individual economies such as Hong Kong or Singapore. Still, one would not expect the ratio of world GDP to world gross output to grow at a constant rate in a balanced-growth path. This ratio has in fact been quite stable at a value of one-half in recent decades (see Antràs and Chor, 2018).

In Chart 2, I explore the extent to which the observed growth in world trade in Chart 1 is associated with the emergence and consolidation of global value chains (GVCs). There are many possible ways to measure the extent to which production processes have become globalized in recent years. Borin and Mancini (2019) develop a natural measure of the importance of GVC trade in total international trade. Building on global Input-Output tables, they identify the share of a country's exports that flow through at least two borders.⁶ These exports encompass two broad types of GVC trade. On the one hand, GVC trade includes transactions in which a country's exports embody value added that it has previously imported from abroad. This type of GVC participation is often referred to as backward GVC participation. On the other hand, GVC trade also comprises transactions in which a country's exports are not fully absorbed in the importing country, and instead are embodied in the importing country's exports to third countries. The latter form of GVC participation is often dubbed forward GVC participation.

Chart 2. GVC Trade as Percentage of World Trade



Source: Borin and Mancini (2019), as reported in World Development Report (2020)

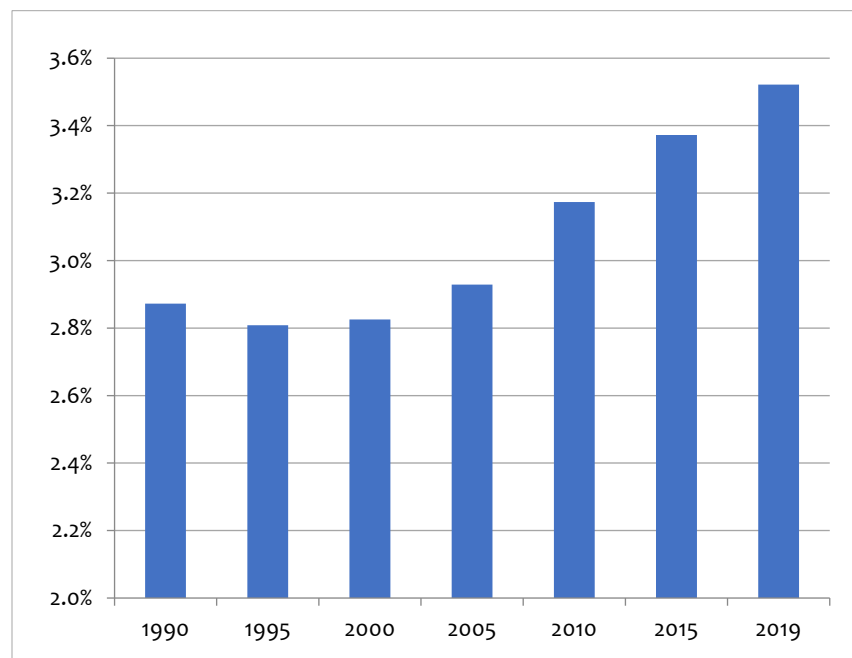
As Chart 2 indicates, according to the Borin-Mancini measure of GVC trade, the overall share of GVC trade in total world trade grew very significantly during the hyperglobalisation period 1986-2008, but it appears to have stagnated or even declined since the Great Recession. A natural conclusion from

⁶ See also Wang et al. (2013). Other important papers on the measurement of GVC participation include the pioneering work of Hummels et al. (2001), Johnson and Noguera (2012), and Koopman et al. (2014).

Charts 1 and 2 is that the hyperglobalisation of 1986-2008 was tightly related to the growth of global value chains, while the slowdown since the Great Recession might also be related to a slowdown in GVC activity.⁷

As mentioned above, globalisation is a multi-faceted process that involves much more than the flow of goods and services across countries. In Charts 3, 4 and 5, I explore the evolution of three variables that are often associated with this process. In Chart 3, I rely on data from the United Nations Population Division to report the stock of international migrants in the world as a percentage of world population. Although illegal immigration and the rise of refugees fleeing conflict might complicate the interpretation of this figure, it is apparent that the stock of migrants as a share of world population is at its highest level since 1990. When looking at individual regions or countries, increases in the stock of migrants are observed across the board. For instance, the share of migrants in total population grew from 6.9% to 10.9% in Europe, and from 9.2% to 15.7% in the United States. In sum, despite a backlash against immigration in several parts of the globe, there is little evidence that migration flows have significantly slowed down or decreased in recent years. The current COVID-19 pandemic and its associated travel restrictions have brought migration flows to an abrupt stop, but the long-term consequences of this shock are yet to be discerned, as I will discuss more extensively in section 7.

Chart 3. International Migrant Stock as Percentage of World Population

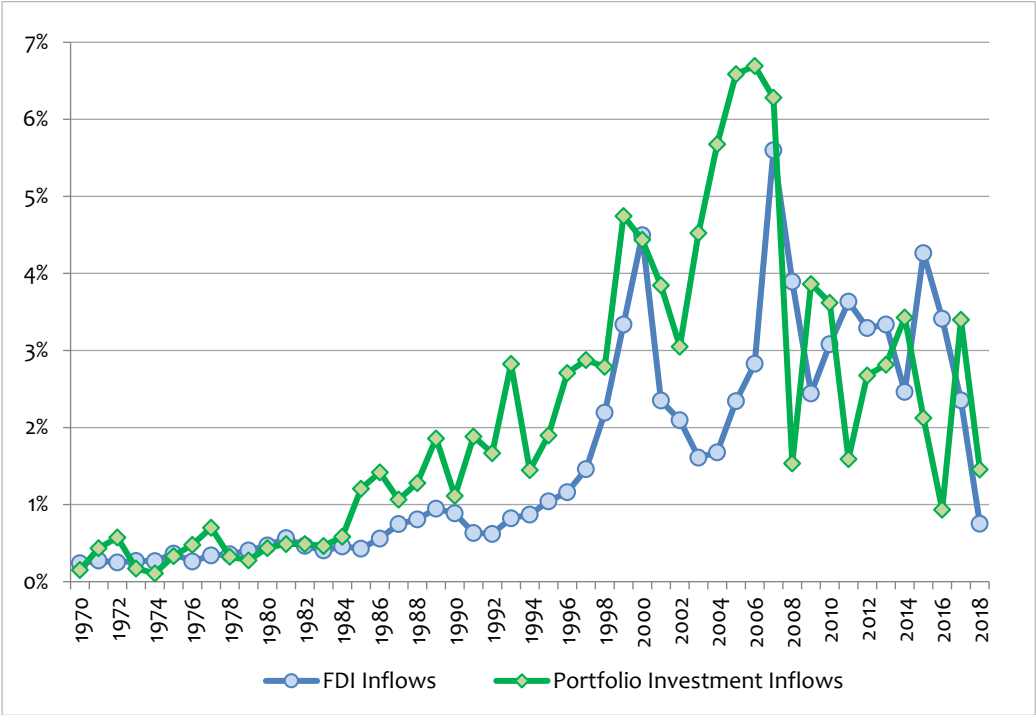


Source: United Nations ([link](#)).

⁷ Due to the complexities in constructing global Input-Output tables, this data only becomes available with a significant lag, so Chart 2 measures GVC trade only up to 2015. Despite their widespread use in economic research, it is also important to emphasize two key limitations of global Input-Output tables. First, because they rely on fairly aggregated Input-Output data, the resulting sectoral disaggregation of GVC flows is pretty coarse. Second, in constructing them, researchers are forced to impose strong assumptions to back out certain bilateral intermediate input trade flows that cannot be readily read from either Customs data or national Input-Output tables (see de Gortari, 2019).

Chart 4 turns attention to capital flows across countries as a measure of globalisation. For both foreign direct investment and portfolio investment flows, it is evident that the importance of these flows relative to world GDP peaked right before the Great Recession and, by 2018, they were nowhere near to recovering from those peak levels. Still, it is important to remember that the Great Recession was triggered by the Global Financial Crisis of 2007-08, so it is perhaps less surprising that one still observes some lingering effects of this crisis. This is for at least three reasons (see Beck et al, 2020): (i) the Global Financial Crisis naturally resulted in persistently high levels of risk aversion; (ii) the crisis led many governments to adopt macroprudential policies that naturally restrained the inflow of capital into their economies, and (iii) government bailouts provided an incentive for economic agents to lend in their domestic economies, where the perceived (or conveyed) probability of being bailed out was higher. Although the persistence of these factors might lead to a protracted period of financial de-globalisation, this paper will not dwell too much into these set of issues, since they fall well outside my expertise.

Chart 4. FDI Inflows and Portfolio Investment Inflows as Share of GDP (1970-2018)

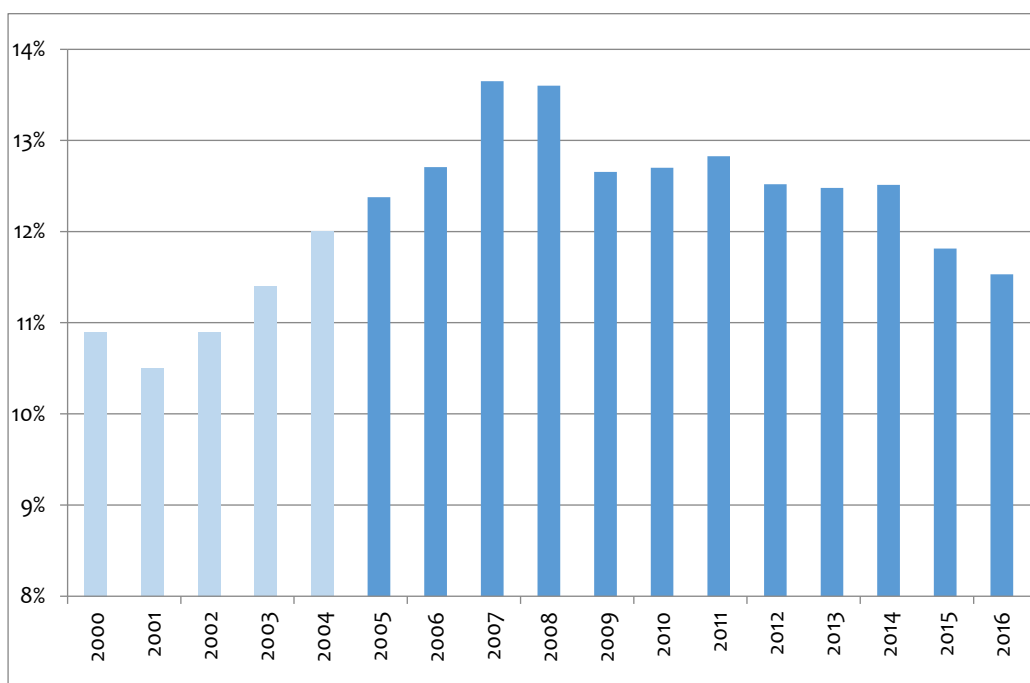


Source: Broner et al.'s (2013) World Bank Gross Capital Flows Data Files ([link](#)) and World Bank WDI database for GDP ([link](#)).

Partly to alleviate concerns about the fickle nature of capital flows, in Chart 5 I study the evolution of foreign direct investment from the operational (or real) side of multinational companies. Building on data from the OED (see also Cadestin et al., 2018), I plot an estimate of the share of global output accounted for by foreign affiliates of multinational corporations. Although the time frame for this chart is more limited than the one in the other charts in this section, the figure again suggests a

sizeable increase in the globalized nature of world production, followed by a marked decline in the last ten years or so. Still, the relative contribution of foreign affiliates to world output was larger in 2016 than in 2003. As in the case of the ratio of world trade to world output, the remarkable increase in the early 2000s was clearly unsustainable, and the decline in recent years points to a retrenchment in the relative importance of GVCs comparable in nature to the evolution FDI inflows in Chart 4 and of the share of GVC trade in world trade in Chart 2.⁸

Chart 5. Foreign Affiliates' Gross Output as Share in Global Output (2005-2016)



Source: OECD, Analytical AMNE database ([link](#)) for 2005-2016, and Cadestin et al. (2018) for 2000-04.

In sum, Charts 1 through 5 demonstrate that, although one could selectively pick certain measures of globalisation to argue that the world economy has become de-globalised since the Great Recession, world trade flows (as a percentage of world GDP) are close to their all-time highest levels, and GVC and multinational firm activity appear to have only retreated to their values in the mid-2000s. I conclude that the evidence at this point is more consistent with the notion of “slowbalisation” than with that of de-globalisation. Furthermore, in order to elucidate why the process of globalisation might have slowed down and could potentially reverse, these five charts suggest that it is paramount to study the forces that fuelled the expansionary phase of 1986-2008. I turn to this task in the next section.

⁸ Chart 2 plots the observations for the years 2000-04 in lighter blue because they are based on a methodology that Cadestin et al. have improved upon since their 2018 working paper. I appreciate Sébastien Miroudot for guidance with this.

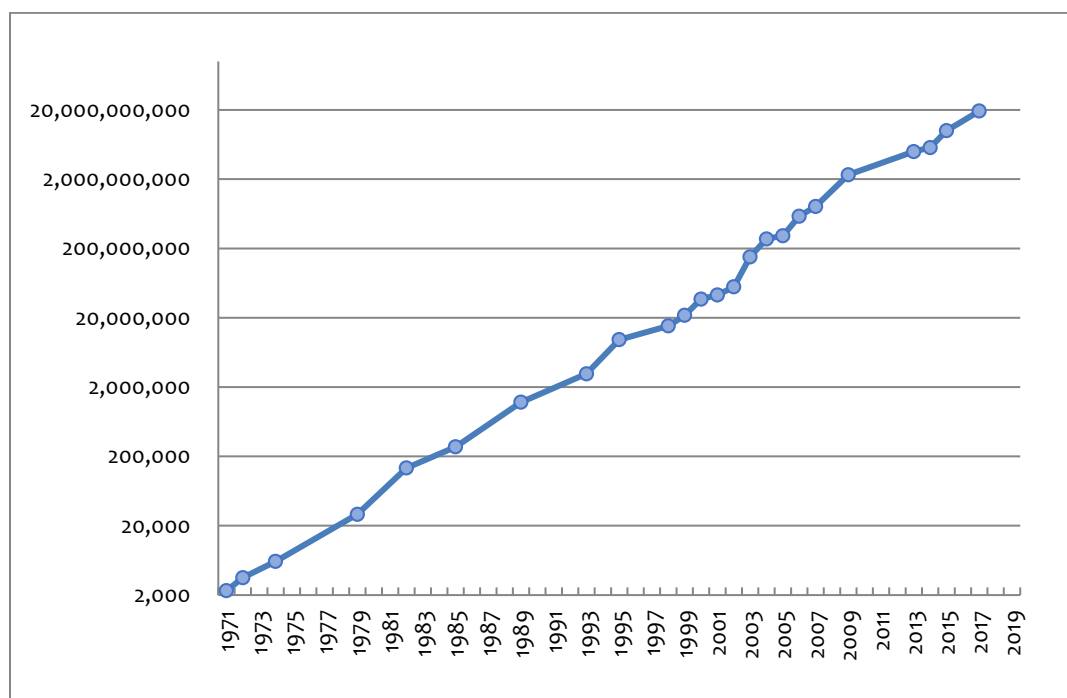
3. The Period of Hyperglobalisation

This section discusses some potential explanations for the extraordinary growth in global value chain activity and international trade flows observed during the late 1980s, 1990s and early 2000s. Although many factors contributed to this growth, I will highlight three particularly relevant developments: (i) the information and communication technology (ICT) revolution, (ii) an acceleration in the rate of reduction of trade costs, and especially trade costs associated with man-made trade barriers, and (iii) political developments that brought about a remarkable increase in the share of world population participating in the capitalist system.

3.1 The ICT Revolution

The 1980s and 1990s witnessed a genuine information and communication technology (ICT) revolution that led to a profound socioeconomic transformation of the world economy. Intel's 386 microprocessor, released in 1985, had 275,000 transistors, achieved clock speeds ranging from 16 to 33 MHz, and was viewed as a great feat of engineering. It sold for about \$300 apiece. Only twenty-three years later, in 2008, Intel introduced the iCore-7 microprocessor, with featured 731 million transistors, a clock speed in excess of 3GHz, and sold at \$284 apiece. This not an isolated example. The processing power and memory capacity of computers doubled approximately every two years, as implied by Moore's law, and confirmed in Chart 6. The almost perfectly linear fit in the graph features a slope equal to 0.384, which is extremely close to $\ln\sqrt{2} = 0.347$. Contemporaneously, the cost of transmitting a bit of information over an optical network decreased by half roughly every nine months (a phenomenon often referred to as Butter's law).

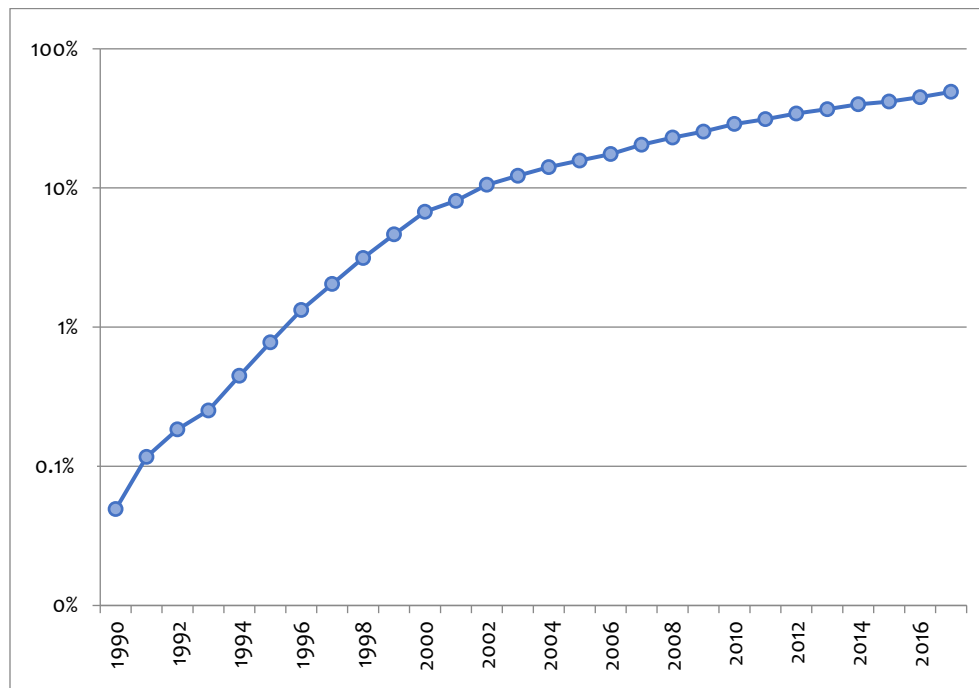
Chart 6. Moore's Law: Number of Transistors (log scale) per Microprocessor (1971-2019)



Source: Karl Rupp. 40 Years of Microprocessor Trend Data. Retrieved from Our World in Data ([link](#)).

Up to the mid-1980s, most internet networks were purpose-built, i.e., they were intended for, and largely restricted to, closed communities of scholars. There was hence little pressure for the individual networks to be compatible and, indeed, they largely were not. International connections were relatively rare. Over the following thirty years, the number of internet users increased by a factor of 600, from around 2.5 million users in 1990 to more than 1.5 billion users in 2008 (see Chart 7), which amounts to a doubling of internet users roughly every two years.

Chart 7. Number of Internet Users as Share of World Population (log scale)



Source: World Bank's World Development Indicators ([link](#))

As a result of these and other technological developments, the cost of processing and transmitting information at long distances fell dramatically during the hyperglobalisation period. The ICT revolution was thus instrumental for firms in developed countries to contemplate the possibility of organizing and managing production processes remotely. A salient example of this phenomenon is the proliferation Computer-Aided Design And Manufacturing (or CAD/CAM), which permitted the spatial separation of design and manufacturing, and has been shown to have led U.S. companies to increase their use of contract manufacturing, especially within the U.S., but also in distant foreign countries with a high enough availability of skilled workers (see Fort, 2017).

The following thought experiment provides a final illustration of the transformative nature of the ICT revolution. Try to envision how the world would have coped with the current COVID-19 global pandemic without widespread access to powerful computers and fast broadband internet connections. In case you need some help, think about how, despite all their imperfections, video communications technology companies such as Zoom have been instrumental in making it feasible for

workers in various types of occupations to work from home. Similarly, note how digital retailers such as Amazon have facilitated social distancing practices by allowing individuals to purchase many consumption goods from the comfort of their home.

3.2 The Golden Age of Trade Liberalization

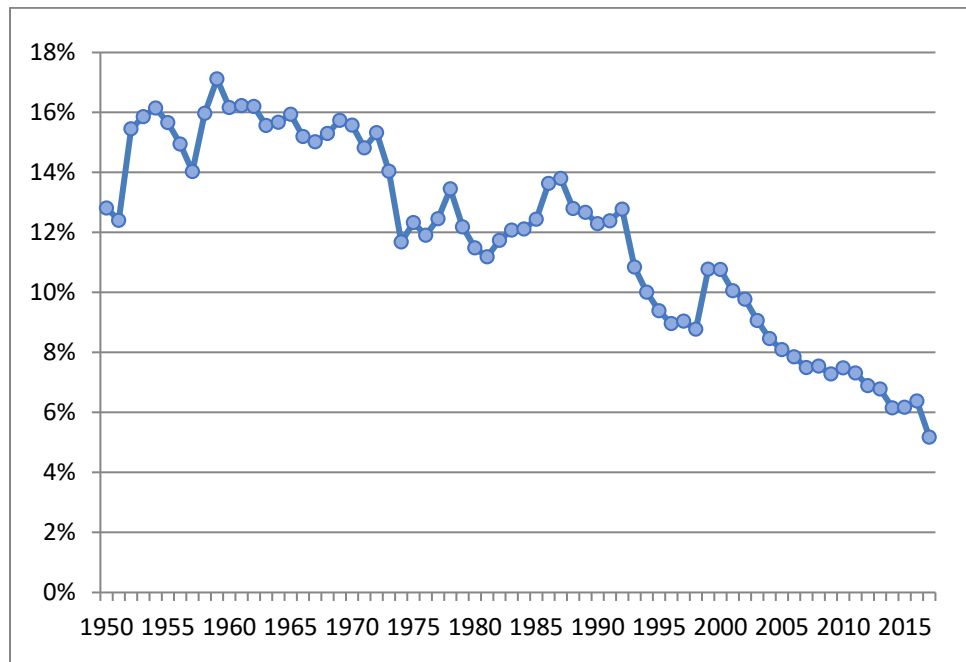
During the same period 1986-2008, governments intensified their efforts to gradually dismantle the man-made trade barriers that were erected in the 20th-century's Interwar Period. This process dates back to the initial signing of the General Agreement on Tariffs and Trade (GATT) in 1947, but it experienced a revitalization in the 1990s and 2000s with the signing of several notable regional trade agreements. The European Community granted accession to Spain, Portugal and Greece in 1986, and its offspring, the European Union, was later enlarged to include several East European countries in the 2000s. In the Americas, the early and mid-1990s saw the formation of the North American Free Trade Area (NAFTA) between the U.S., Canada and Mexico, and the Mercosur trade bloc in the Southern hemisphere. In Asia, the ASEAN free trade agreement of 1992 and its later expansions created a trade bloc of 10 East Asian nations. In parallel to this process of regional trade integration, the WTO continued its program of multilateral trade liberalization by lowering MFN tariffs (with the Uruguay Round concluding in 1994 with the creation of the World Trade Organization) and by granting access to new members. In the latter sense, China's accession to the WTO in 2001 was a particularly historic event.

Chart 8 demonstrates that, as a consequence of this wave of trade agreements, the world's weighted average tariff applied on traded manufactured goods fell precipitously from 13.6% in 1986 to 7.5% in 2008. Interestingly, this trend does not appear to have reversed since the Great Recession, as the unweighted world average tariff had fallen additionally to 5.2% by 2017.

A noteworthy aspect of the process of trade liberalization is that it not only reduced the average level of tariffs, but it also reduced trade-policy uncertainty due to the binding commitments that countries made when entering the GATT/WTO or signing regional trade agreements. In other words, not only were tariffs reduced on impact, but there was also the general sense that the institutions being put in place would be effective in precluding the reinstatement of protective trade measures (see Pierce and Schott, 2016, Handley and Limao, 2017).

Beyond the gradual removal of man-made trade barriers, the 1980s and 1990s also witnessed technological developments that significantly reduced the quality- and time-adjusted costs of transporting goods across countries, in large part due to the increased reliance on air freight shipping (see Hummels, 2007). For certain industries (such as the hard disk drive industry), whose value chains rely on continuous shipments of parts and components featuring high value-to-weight ratios, the time-saving associated with air shipping effectively constituted a large decline in the cost of organizing their value chains at the global level.

Chart 8. Unweighted World Average Tariff (1950-2017)



Source: Clemens and Williamson (2004) for the period 1950-1998 and World Bank’s World Development Indicators ([link](#)) for 1999-2017

3.3 The Spread of Capitalism

The third main lever of GVC growth during the hyper-specialisation era was institutional in nature. Political developments in the world brought about a remarkable increase in the share of world population that could feasibly participate in the process of globalisation. In Europe, prior to 1989, millions of workers in the Eastern part of the continent, many of them highly skilled, waited for better economic opportunities behind an “iron curtain” instituted by communism (and enforced by the Soviet Union). In China, the transition to a socialist market economy only began in 1978, when Deng Xiaoping introduced his program of “socialism with Chinese characteristics,” and foreign investment started pouring in soon after, exploding in the 1990s. Similarly, in 1991, India initiated a process of economic liberalization that eventually turned the country into a free-market economy.

Table 1. Share of World Population of Selected Socialist Countries in 1990

China	21.5%	East Germany	0.3%
India	16.5%	Hungary	0.2%
Bangladesh	2.0%	Czech Republic	0.2%
Vietnam	1.3%	Bulgaria	0.2%
Poland	0.7%	Serbia	0.1%
Romania	0.4%	Slovak Republic	0.1%

Source: World Bank’s World Development Indicators ([link](#)) and Statistisches Bundesamt for East German data ([link](#)).

Table 1 provides information on the share of world population in 1990 accounted for by ten selected countries that were socialist at that point in time and that have become deeply ingrained in global value chains in recent decades. Together, they accounted for to 43.5% of world population in 1990. The sheer size of this labour force implies that, at the same time that firms in advanced economies recognized the increased possibility of fragmenting production across borders and thus increased their demand of “foreign” labour, the capitalist system witnessed a massive labour supply shock that permitted Western firms to fulfil their demand without quickly bidding up the price of foreign labour.

It should also be pointed that, even in capitalist countries, during this period there was a noticeable ideological shift to the right in policy making, as exemplified by Ronald Reagan’s presidency in the U.S. and Margaret Thatcher three terms as Prime Minister of the United Kingdom. Thus, not only did former communist and socialist countries embrace mainstream capitalist policies, but these policies themselves became more friendly towards globalisation, as exemplified by the deepening of trade liberalization described in section 3.2, but also by a notable relaxation of currency convertibility and balance of payments restrictions in several low and middle-income countries.

3.4 Why These Forces Mattered: A Simple Conceptual Framework

Having loosely described the potential relevance of the ICT revolution, trade liberalization, and the expansion of the “capitalist labour force”, I next develop a simple theoretical framework (building on Antràs, 2003, and Antràs and Helpman, 2004) to more formally study the role of these three phenomena in explaining the spectacular increase in the growth of GVCs.

Imagine a simple world with just two countries, an advanced West and a developing East. We will largely be concerned with how a firm headquartered in the West organizes the production of a certain good, which is only consumed in the West. For now, it is assumed that production requires only two stages of production: (i) headquarter services denoted by h ; and (ii) manufacturing production, denoted by m . We will assume that these stages are used in fixed proportions, with a unit of output requiring a_h units of headquarter services and a_m units of manufacturing production.

Headquarter services can in principle be produced in either country, but we shall assume that the West has a strong enough comparative advantage in the provision of these services to ensure that they are always produced in the West. We denote the marginal cost of headquarter services by p_h , though this variable will not play an important role in the analysis below.

Manufacturing production is carried out by workers and can be done in either the West or the East. When done in the West, the firm needs to hire one worker per unit of manufacturing output at a cost w . It is assumed that because the other stage of production, headquarter services, is always performed in the West, the firm need not incur any additional marginal costs, such as shipping or trade taxes when manufacturing is also carried out in the West. When producing in the West, the firm thus faces an overall marginal cost of production equal to $a_h p_h + a_m w$.

When instead the firm chooses to internationally fragment production by moving the manufacturing stage to the East, the Western firm is assumed to require hiring $z^* \geq 1$ workers per unit of manufacturing output at a cost z^*w^* , where $w^* < w$. In words, we assume that workers in the less-developed East command a lower wage, but they are also (weakly) less productive than their Western counterparts. In addition, the firm's marginal cost when manufacturing in the East is inflated by ad-valorem communication costs $c^* > 1$, shipping costs $\tau^* > 1$, and tariffs $t^* > 1$. When fragmenting production by manufacturing in the East, the firm thus faces an overall marginal cost of production equal to $a_h p_h + a_m z^* w^* c^* \tau^* t^*$.⁹ This marginal cost will be lower than the one associated with the whole production process staying in the West whenever

$$z^* w^* c^* \tau^* t^* < w. \quad (1)$$

As equation (1) makes clear, the firm will only be able to reduce its marginal cost by offshoring whenever Eastern productivity-adjusted wages are low, whenever communication costs are low, and whenever transportation costs (i.e., shipping costs and tariffs) are low. This equation thus illustrates very simply the relevance of the ICT revolution described in section 3.1 (a reduction of c^*) and of the reductions in trade costs documented in section 3.2 (indicating lower values for t^* and τ^*).¹⁰ Furthermore, it is also natural to interpret the spread of capitalism to Eastern Europe and to Southeast Asia as the emergence of a new “Eastern” labour force offering lower unit labour costs (lower z^*w^*) to Western firms contemplating offshoring manufacturing production to the East.

I have so far focused on a discussion of the marginal costs associated with different locations of manufacturing. Yet, distinct global value chain strategies naturally also entail different levels of fixed (or overhead costs) associated with the corresponding location choices of production.¹¹ Let us then incorporate fixed costs associated with setting up manufacturing production units, with the natural assumption that the fixed cost is larger when setting the plant up at a distance (i.e., in the East) than in the West, or $f_o > f_D$, where D is associated with domestic manufacturing and O with offshore manufacturing. Antràs, Fort and Tintelnot (2017) indeed estimate fixed costs of global sourcing that increase in distance with an elasticity of around 0.2 for U.S. manufacturing firms in 2007. I also assume that the firm has some degree of market power, both because this is a realistic assumption and because it will allow firms to cover the fixed costs of production by charging a mark-up over marginal cost. Adopting the monopolistic competition cum love-for-variety-CES preferences that is standard in the international trade field, we can express operating profits as a simple function of the marginal cost to a negative power $-(\sigma - 1)$, where σ is the price elasticity of demand faced by the firm.¹² The condition for the firm to want to offshore manufacturing is now hence given by:

⁹ We are implicitly assuming that the good manufactured in the East is shipped back to the West, where it is combined with headquarter services into final assembly and distribution. It would be straightforward to study the case in which the good is instead assembled in the East, so transport costs are instead associated with shipping headquarter services from the West to the East, and with shipping the final good back to the West.

¹⁰ Note that the ICT revolution also potentially reduced trade costs τ^* due to the role of technology in enhancing the efficiency of supply-chain management.

¹¹ As I have emphasized in my own work, marginal and fixed costs of production associated with different configurations of global value chains may also be shaped by the organizational decisions of firms, most notably, by whether they internalize or not foreign production processes (see Antràs, 2015, for a review).

¹² This formulation originates in the work of Dixit and Stiglitz (1980) and became mainstream in the trade field with the work

$$B(a_h p_h + a_m z^* w^* c^* \tau^* t^*)^{-(\sigma-1)} - f_O > B(a_h p_h + a_m w)^{-(\sigma-1)} - f_D, \quad (2)$$

where B is a term associated with the level of demand faced by the firm, which is in turn positively affected by how much consumers value the firm's output and negatively affected by competition from other firms in the industry.

Equation (2) confirms the role of foreign marginal labour costs, communication costs, and trade costs in shaping the profitability of offshoring vis à vis domestic manufacturing. The main novel insight from equation (2) is that even when the condition in equation (1) is satisfied, a firm may not find it profitable to offshore if the difference $f_O - f_D$ is large and if the scale of the firm is not sufficiently large. In words, because offshoring entails higher scale economies than domestic production, it will typically be a strategy that only sufficiently large firms can profitably sustain.¹³

It is also interesting to study a variant of the model in which the production process entails several production stages rather than just two. In particular, imagine that manufacturing production encompasses N distinct production stages, each leading to a distinct component, with the N components then combined with headquarter services to assemble the final good in the West. The firm now faces the choice of whether to offshore or produce domestically each of these N components. Assuming that final good production entails a_h units of headquarter services and a_{mi} units of each of the manufacturing components $i = 1, \dots, N$, we can express profits of a given global value chain strategy as:

$$\pi = B \left(a_h p_h + \sum_{i=1}^N a_{mi} w + \sum_{i=1}^N \mathbf{1}_i^* \times a_{mi} (z^* w^* t_i^* c_i^* \tau_i^* - w) \right)^{1-\sigma} - N f_D - \sum_{i=1}^N \mathbf{1}_i^* \times (f_O - f_D) \quad (3)$$

In this expression, $\mathbf{1}_i^*$ is an indicator function taking a value of 1 when component i is offshored, and a value of 0 when it is sourced domestically. Note also that we allow cross-input heterogeneity in the extent to which transport costs and communication technologies affect the productivity of foreign labour versus domestic labour.

As Antràs, Fort and Tintelnot (2017) stress, this multi-input variant of the model illustrates the presence of interesting complementarities in the global sourcing strategies of firms. Technically, whenever $z^* w^* t_i^* c_i^* \tau_i^* < w$, the profit function in (3) features increasing differences in $(\mathbf{1}_i^*, \mathbf{1}_j^*)$ for all $i, j \in \{1, \dots, J\}$ and $i \neq j$. This result in turn implies that the marginal benefit (in terms of firm profits) of offshoring any component j can only be increased by the decision of the firm to offshore some other component i .¹⁴ Intuitively, whenever offshoring reduces marginal costs, firms will increase their optimal scale of operation, and this will put them in a better position to amortize the fixed costs associated with further investments in offshoring. This result provides an amplification mechanism

of Krugman (1980) and Melitz (2003), among many others.

¹³ Although the residual demand level B is endogenous to the industry equilibrium associated with the model, its determination would not undo the comparative statics described above. For instance, when all firms are identical, it is easy to invoke a free-entry condition to show that all firms will offshore when $z^* w^* c^* \tau^* t^*$ is sufficiently low, and they will all manufacture domestically when this composite foreign cost term is high.

¹⁴ Clearly, if $z^* w^* t_i^* c_i^* \tau_i^* > w$ no firm would find it profitable to offshore that component i , so the result is irrelevant for that set of inputs.

that helps explain, for instance, the magnified response of gross trade flows to observed changes in trade costs (see also, Yi, 2003). It is also consistent with the notion that the combination of improvements in communication technologies, trade liberalization and the adoption of market economy practices in socialist countries produced a combined effect on the geography of worldwide production that was larger than the sum of the individual effects that these forces would have had in isolation.¹⁵

Another implication of introducing fixed costs of offshoring is that they naturally lead to rationalisation in the global sourcing strategies of firms. Although firms would prefer to rely on several suppliers to obtain a given component – both for diversification purposes as well as to extract a more favourable price –, in practice multi-sourcing involves fixed costs that are too large for most firms to bear (see Antràs, Fort and Tintelnot, 2017).

I close this section with a final extension of the model, inspired by the work of Antràs and de Gortari (2020), that illustrates the relevance of the sequential nature of production in many GVCs. I again consider the case of multiple manufacturing components, but I now assume that they need to be produced in a deterministic order dictated by engineering constraints. At each stage, the producer of that stage's component combines labour and the good produced up to the prior stage in fixed proportions. For simplicity, I assume that there are only two components $i = 1$ and $i = 2$, that there are no frictions to communication nor any shipping costs across countries (so $c_i^* \tau_i^* = 1$), and that the inputs are fully symmetric except for their position in the GVC. In terms of its location decisions, the firm thus only decides whether to offshore component 1, component 2, both, or neither. The profit function associated with each of these potential global sourcing strategies can be compactly expressed as:

$$\pi = B \left(a_h p_h + a_m \left(\mathbf{1}_1^* w^* t^* + (1 - \mathbf{1}_1^*) w ((1 - \mathbf{1}_2^*) + \mathbf{1}_2^* t^* t^*) \right) + a_m (\mathbf{1}_2^* w^* t^* + (1 - \mathbf{1}_2^*) w) \right)^{1-\sigma} - 2f_D - (\mathbf{1}_1^* + \mathbf{1}_2^*) (f_0 - f_D)$$

Note that the third marginal cost term associated with the second stage is unchanged relative to the case of multiple (but non-sequential) components, but the one associated with the first stage is more involved. The reason for this is that profits not only depend on production costs, but also on the total transport costs associated with each particular path of the global value chain. To demonstrate the implications of this feature, notice that if stage 2 is produced in the West ($\mathbf{1}_2^* = 0$), then the first stage will be offshored to the East only if $w^* < w/t^*$, while if stage 2 is produced in the East ($\mathbf{1}_2^* = 1$), the first stage will be offshored to the East only if $w^* < wt^*$. The latter is obviously a weaker condition than the former. In sum, trade costs and sequentiality of production give rise to complementarities in the co-location of inputs that may again lead to interesting interdependencies across the offshoring

¹⁵ The above complementarity relies on the degree of substitution of inputs being low relative to the elasticity of demand faced by the firm. This condition is naturally met when inputs are perfect complements, as in the simple model above, but the result generalizes to higher degrees of input substitutability and is consistent with empirical evidence (see Antràs, Fort and Tintelnot, 2017).

decisions of firms, with the potential to explain the remarkable growth in offshoring during the period of hyper-specialisation (see also Baldwin and Venables, 2013).

As mentioned in section 3.3, the hyperglobalisation of the 1980s, 1990s and early 2000s brought about not only an accelerated process of trade liberalization but also a relaxation of constraints to the free mobility of capital across countries. It is natural to imagine that this mechanism also contributed to the growth of offshoring by reducing the cost of capital in countries that were eager to host GVC activity. Although it would be straightforward to add physical capital into the model to capture this force, the static framework developed above is admittedly too crude to capture the role of financial capital flows on GVC activity.

4. De-Globalisation and Technological Factors

Having developed a better understanding of some of the key forces that led to the process of hyper-globalisation of the late 1980s, 1990s and early 2000s, I next turn to assessing why these factors might have run out of steam in the last ten years, and more importantly, to speculating on the extent to which they might be reversible. This section will focus on technological factors, while sections 5 and 6 will cover other long-term factors and political/institutional factors, respectively.

4.1 Is the ICT Revolution Over?

As discussed in section 3.1, the hyper-globalisation period witnessed the advent of a series of technological developments that revolutionized manufacturing and facilitated the fragmentation of production across countries. Is the slowdown in world trade associated with a slowdown in the pace of technological progress? I do not intend to provide a thoroughly researched answer to this question, but the almost perfect fit in Chart 6 up to 2018 is highly suggestive that the pace of technological progress in semiconductors has not slowed down. Furthermore, we continue to witness ever increasing speeds of information transmission over fiber optic cables. Nevertheless, it also seems intuitive that the marginal benefit of these innovations for the international organization of production might have reached diminishing returns. Being able to transmit information at long distances was crucial at the onset of the phenomenon, but once the internet achieved high enough speeds to sustain smooth communication of international production teams (e.g., via videoconferences), the return to further improvements in these technologies is likely to have gone down. Similarly, it is also important to point out that the amount of R&D spending required to sustain Moore's Law is much higher today than it was in the 1970s and 1980s (see Bloom et al., 2020).

Chart 7 is also revealing in this respect. Although the diffusion of the internet has still a long way to go (the World Development Indicators estimates that only 49% of the world population used the internet in 2017), this Chart shows that the rate of increase of internet adoption has significantly slowed down in recent years, as one would have expected from the fact that this share cannot possibly be higher than 100%.

4.2 A New Technological Revolution?

Perhaps the key drivers of the ICT Revolution might have slowed down over time, but a more intriguing possibility relates to the extent to which new technologies that have become widespread in recent years might prove to be more conducive to de-globalisation than the technologies that fuelled the ICT Revolution.

The example of industrial automation and robotics is a case in point. At first glance, automation constitutes an alternative to offshoring for firms in advanced economies seeking to lower their labour costs. Because automation and offshoring appear to be substitutes, one would then expect improvements in automation to lead to an increasing amount of reshoring over time. Furthermore, large multinational companies typically design their production processes with their domestic market factor prices in mind, so even when they engage in offshoring, they might set up manufacturing processes involving large amounts of automation in their host countries (see Rodrik, 2018). This phenomenon is particularly concerning for less developed economies, which might view automation as a threat to their ability to leverage their cheap labour to get a foot in the door of GVCs.

Nevertheless, the substitutability between automation and offshoring is much less clear-cut in practice. Automation by firms in advanced economies tends to decrease their costs, enhance their productivity and increase their optimal scale, thereby increasing their demand for intermediate inputs, many of which continue to be sourced from less developed economies. Whether automation increases or reduces the extent to which firms in less developed economies participate in GVCs is thus an empirical matter. Artuc et al. (2018) and the World Development Report (2020, Chapter 6) present industry-level evidence suggesting that automation in industrial countries appears to have, in fact, boosted imports from developing countries. In more recent work, Stapleton and Webb (2020) have confirmed these findings with much richer firm-level data from Spain, while Wang (2020) is currently exploring the same mechanism using detailed U.S. Census data.

Conveniently, it is relatively straightforward to illustrate the potential complementarity between automation and offshoring with the conceptual framework developed in section 3.4 (see also Wang, 2020). In particular, consider the version of the model with multiple inputs and non-sequential production, but now expand the range of strategies available to firms by giving them access to the possibility of automating stage i at a fixed cost $f_A > f_D$, which allows manufacturing of stage i in the West at cost $\alpha_i < w$. With this assumption, the profit function of Western firms becomes

$$B \left(a_h p_h + \sum_{i=1}^N a_{mi} w + \sum_{i=1}^N a_{mi} \times \mathbf{1}_{mi}^* \times (z^* w^* t_i^* c_i^* \tau_i^* - w) + \sum_{i=1}^N a_{mi} \times \mathbf{1}_{ai}^* \times (\alpha_i - w) \right)^{1-\sigma} - N f_D \\ - \sum_{i=1}^N \mathbf{1}_i^* \times (f_O - f_D) - \sum_{i=1}^N \mathbf{1}_i^* \times (f_A - f_D) .$$

In this expression, $\mathbf{1}_{ai}^*$ is an indicator function taking a value of 1 when component i is automated and 0 otherwise. Focusing on a particular component i , it is clear that the new possibility of automation reduces the range of parameter values for which offshoring will be optimal. But because automating

component i reduces marginal costs and thus increases the optimal scale of the firm, it is also the case that the probability that offshore-manufacturing dominates non-automated domestic manufacturing is increased for components satisfying $z^*w^*t_i^*c_i^*\tau_i^* < w$. In sum, automation of certain stages of production may well increase the demand for offshore components that are harder to automate, and may well increase the propensity to offshore manufacturing at the firm level, in line with the findings of Artuc et al. (2018) and Stapleton and Webb (2020).

Automation is often associated with industrial robots, but there has recently been a more focused debate on the role of 3D printing in fuelling de-globalisation. The mechanisms at play here are very much similar to those applying to automation more broadly. The direct trade-reducing effects of 3D printing are obvious, but one should also take into account the positive effect of this innovation on productivity and thus input demand, and the fact that 3D printers do not print goods out of thin air. Indeed, the relevance of this scale mechanism is consistent with the findings of Freund et al. (2018), who show that the dramatic shift of production of hearing aids from standard manufacturing to 3D printing increased international trade in hearing aids by roughly 60 percent.

Having discussed the role of automation, I next speculate on the consequences for global value chains of the advent of an array of new technologies, that though being the natural offspring of the set of innovations that triggered the ICT revolution, have some distinctive features that might make them particularly prone to fostering a new wave of hyper-globalisation in coming years.

Consider first the case of digital technologies. It is clear that global value chains are rapidly changing under the pressure of digital innovation. First and foremost, digital technologies encourage GVC participation by reducing many of the barriers that firms face when attempting to join GVCs. For instance, digital platforms (such as Amazon, Alibaba or Mercado Libre) facilitate the matching of buyers and sellers, thus reducing the initial fixed costs associated with GVC participation.¹⁶ Extending access to high-speed internet and expanding e-commerce thus has the potential to greatly facilitate increased GVC participation by relatively small firms, and also for firms in countries with bad infrastructure (which now gain the ability to specialize in segments of global value chains related to the provision of services via digital technologies rather than the provision of physical goods via transport infrastructure). These same technologies also enhance the management of inventories, and of logistics more broadly, thereby improving participation even in manufacturing segments of GVCs.

Furthermore, rating systems in digital platforms and open distributed ledgers (such as blockchain) enhance verification and monitoring in firm-to-firm relationships, thus reducing informational frictions and opening the door for countries with weak institutions to bypass a key factor limiting their participation in GVCs. Similarly, in situations in which language barriers remain significant (e.g., in the provision of certain services), the application of artificial intelligence, big data and machine learning techniques has the potential to provide much more efficient translation services (see Brynjolfsson et al., 2019). In sum, it does not seem particularly improbable that the unstoppable advance of digital technologies might provide a new tailwind to ensure the continuing growth in GVC activity worldwide.

¹⁶ Remember that many digital platform companies offer parallel business-to-consumers and business-to-business platforms.

Despite my somewhat optimistic take on the role of technology in continuing to promote globalisation, I should point out that many of the technologies I have described above are “General Purpose Technologies”, and these type of technologies throw a long shadow on economic activity, with their full impact taking many years to materialize (see Helpman, 1998). We should thus treat the available empirical evidence as tentative at best.

4.3 Sunk Costs and the Stickiness of Global Value Chains

I conclude this section with a more conceptual and focused discussion of the role of scale economies in shaping the short- to medium-term response of global value chains to shocks to the world economy. This framework will be of particular relevance for the discussion of the consequences of the COVID-19 health crisis in section 7, but since it centres on the role of technological aspects of GVCs, it seems natural to develop the arguments here.

The main conceptual point I will make is that many of the fixed costs associated with organizing global value chains are sunk in nature, and that this has very significant implications for how GVCs should be expected to react to shocks to the world economy. To better understand this, consider the type of investments that a firm needs to carry out before being able to source parts, components and services from a producer in a foreign country. First of all, it needs to gather information on a set of potential suitable suppliers in that country, or in the case of greenfield investment, it needs to figure out a suitable location for a new plant. Next, the firm and its supplier need to invest in physical assets (a factory, specialized equipment capital, etc.) that are often customized to the needs of both parties. Finally, in an environment with imperfect contracting, the firm and its supplier will need to invest in “relational” capital, to ensure that the perceived contractual security of all agents in the transaction is sufficiently high. These costs are nontrivial, they are largely fixed in nature, and they are likely to be larger for more distant buyer-seller relationships. Furthermore, and crucially for the purposes of this section, these costs are likely to be sunk in nature: relationship-specific physical assets are not easily sold or redeployed, while relational capital and search costs are naturally forfeited when abandoning a relationship or a host country altogether.

The key implication of the sunk nature of many fixed costs of production in GVCs is that the *ex-ante* decision to offshore parts of the production process is not equivalent to the *ex-post* decision to reshore these same stages. More precisely, in terms of the simple conceptual framework developed in section 3.4, *ex-ante*, when first deciding on how to organize production, offshoring is a relatively high fixed cost of option ($f_o > f_D$), so it will only be chosen if it is sufficiently more profitable than domestic sourcing. This is *a fortiori* true if, at the point at which the firm is contemplating the possibility to offshore, it is already manufacturing in the West, and would thus forfeit the sunk cost f_D if it chose to offshore. Nevertheless, *ex-post*, when the firm has already set up a global network of suppliers, the fixed cost f_o is sunk, while reshoring is likely to require significant additional fixed costs, at the very least to set up new factories that can carry out the production processes that had been offshored up to that point in time.

We can easily illustrate this result in the simplest version of our model in section 3.4, when manufacturing only entails a single process or component. Assume further that there are only two

periods, $t = 0$ (ex-ante) and $t = 1$ (ex-post), and that fixed costs are fully sunk. As in section 3.4, the condition for the firm to find offshoring profitable in the first period is given in equation (2), but in the second period, this condition becomes

$$B(a_h p_h + a_m z^* w^* c^* \tau^* t^*)^{-(\sigma-1)} - (\mathbf{1} - \mathbf{1}_m^*) f_O > B(a_h p_h + a_m w)^{-(\sigma-1)} - \mathbf{1}_m^* f_D, \quad (4)$$

where $\mathbf{1}_m^*$ takes a value of 1 if the firm chose to offshore in the first period, and a value of 0 otherwise. Clearly domestic manufacturing (reshoring) will require a much higher erosion of foreign competitiveness ex-post than ex-ante.

Equation (4) was derived under the simplifying assumption that there are only two periods. It is, however, straightforward (and illuminating!) to consider an extension of the framework in which the firm anticipates that the operating profits associated with domestic sourcing and offshoring will remain unaltered during T periods after period 1. In such a case, we can rewrite the second-period condition for offshoring to be profitable as

$$B(a_h p_h + a_m z^* w^* c^* \tau^* t^*)^{-(\sigma-1)} - (\mathbf{1} - \mathbf{1}_m^*) \left(\frac{1 - \delta^T}{1 - \delta} \right) f_O > B(a_h p_h + a_m w)^{-(\sigma-1)} - \mathbf{1}_m^* \left(\frac{1 - \delta^T}{1 - \delta} \right) f_D$$

where δ is the rate at which the firm discounts future cash flows, and where $\mathbf{1}_m^*$ again takes a value of 1 if the firm is currently offshoring to the East, and 0 if it is manufacturing domestically in the West. The obvious implication of this condition is that the larger is T , the lower the weight the firm will put on sunk costs. Or in other words, the less persistent shocks to profitability are expected to be, the less likely will be the probability that the geography of value chains will be affected by shocks.

Equation (4) also imposed the restriction that there is only one manufacturing process to be offshored or not. As described in section 3.4, with multiple production stages, there are natural interdependencies in the sourcing decisions associated with distinct components, with those interdependencies being particularly rich when global value chains are sequential in nature. How do these features shape the incentives to reshore manufacturing process to the West in the presence of a negative shock to competitiveness in the East? The complementarities identified in section 3.4 would appear to suggest that, in the same manner that there could be “waves of offshoring” during the hyper-globalisation era, a decrease in the relative competitiveness associated with offshoring might lead to a “wave of reshoring” and an accelerated de-globalisation.

Matters are, however, not so straightforward when fixed costs are sunk in nature. In that case, remember that reshoring a particular stage will necessarily entail higher fixed costs than when the firm sticks to offshoring. Thus, for reshoring of one component to foster reshoring of other components, it needs to be the case that the change in relative competitiveness that made that original reshoring decision profitable in turn reduces the firm’s marginal cost of production, and thus increases optimal scale. This is likely to apply to situations in which the firm automates a particular stage (therefore decreasing the marginal cost associated with manufacturing in the West), but it will typically not apply to situations in which reshoring is the response to wage increases in the East or to increased trade barriers (which I will discuss in sections 5 and 6, respectively). In the latter cases, reshoring may be

profitable even when it increases the marginal cost of production, but such a decision will make it less likely that the firm will reshore other parts of production that are currently offshored and that do not face the same type of losses in competitiveness.

With sequential production, reshoring decisions are interdependent in additionally complex manners. As I demonstrated in section 3.4, firms have an incentive to co-locate contiguous production stages to minimize trade costs, but in an environment in which the firm is offshoring various stages of production, it may make it particularly costly for the firm to reshore some stages of production but not others (due to increase cross-hauling of parts and components between the East and the West), particularly when the fixed costs of reshoring are too large for the firm to be able to reshore the entire production process.

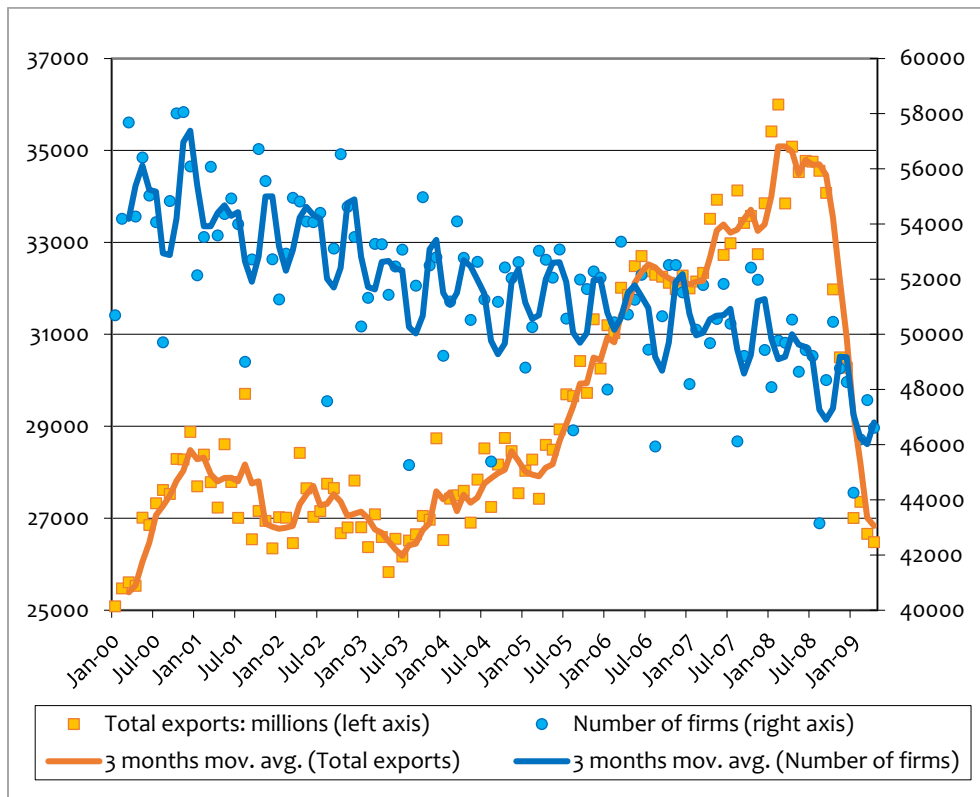
The above arguments are somewhat abstract, but they connect with a body of empirical work that has documented the sticky nature of global value chains. This literature has further associated this stickiness with the sunk nature of many of the investments made by firms organizing their value chains globally, especially in circumstances in which the imperfect enforceability of international contracting leads firms to invest in non-tangible forms of capital, such as reputational capital. For instance, building on ideas related to those explicated above, Martin et al. (2019), construct a measure of what they call “relationship stickiness” using detailed firm-to-firm export data from France. More specifically, they measure the duration of individual buyer-seller relationships in French trade statistics and estimate the average duration for more than 4,000 HS6 products. Their measure is positively correlated with widely used measures of relationship-specificity and contract complexity, such as the Rauch (1999) and Nunn (2007) measures. In related work, Monarch (2020) and Monarch and Schmidt-Eisenlohr (2020) have documented a remarkable degree of persistence in buyer-seller links in U.S. trade: 80 percent of U.S. imports occur in pre-existing firm-to-firm relationships, and Monarch and Schmidt-Eisenlohr (2020) structurally estimate that the value of long-term relationships is substantially higher than that of new relationships. Relatedly, Fillat and Garetto (2015) argue that the stickiness associated with the large sunk costs inherent in multinational activity and GVCs explains the fact that multinational corporations exhibit significantly higher stock market returns and earning yields than non-multinational firms.

An interesting case study – and a particularly relevant one when assessing the potential consequences of the COVID-19 pandemic for the future of GVCs – is the reaction of world trade flows to the Great Recession of 2008-09. As is visible to the naked eye in Chart 1, right at the onset of the Great Recession, world trade experienced a collapse that far exceeded in magnitude the observed drop in world GDP, with a subsequent very rapid, V-shaped recovery. What explains that quick recovery?

The answer is found in a series of studies that have documented that the bulk of the “Trade Collapse” was at the intensive rather than the extensive margin. This is illustrated in Chart 9, borrowed from Bricogne et al. (2012), which indicates that the Trade Collapse did not significantly impact the evolution of the number of exporters in France (which was already on a mild downward trend), while the total volume exports fell quite dramatically during this period, following more than four years of steady growth. Overall, Bricogne et al. (2012) conclude that the extensive margin accounted for slightly over 20% of the trade collapse, a result that they ascribe to the fact that export entry costs “had already been incurred”. Behrens et al. (2014) found even starker results for Belgium, where more than 97% of

the adjustment for both exports and imports was at the intensive margin, while Hadad et al. (2010) also document very muted responses of the extensive margin when using product-level (not firm-level) information on imports by Brazil, the European Union, Indonesia, and the United States.¹⁷ One might worry that these patterns were driven by the special nature of the Global Financial Crisis, but the findings of Bernard et al. (2009) suggest the external validity of these findings, as they document similar patterns in U.S. exports to and U.S. imports from several Asian countries during the 1997 Asian Financial Crisis.

Chart 9. The Extensive Margin of Trade during the Great Recession



Source: Bricongne et al. (2012, Figure 1)

In sum, the stickiness of the extensive margin of trade was instrumental in permitting a swift recovery from the Trade Collapse. Once the crisis subsided, exporters and importers did not need to incur the large investments that would have been required to reinstate any broken links, so activity could quickly pick up.

Although these findings suggest that global value chains are remarkably resilient to shocks, an important caveat with these studies is that they do not focus on the resiliency of firm-to-firm transactions. In that respect, a more relevant contribution is the work of Huneus (2018), who studies

¹⁷ De Lucio et al. (2011), Muraközy (2012) and Jing (2013) provide analogous firm-level evidence for Spain, Hungary and China, respectively.

firm-to-firm links in Chile and finds a very small response of these links to small shocks, but a larger response to larger shocks. Despite the fact that large shocks have the potential to lead to significant reorganizations of production, the evidence from the Asian Financial Crisis and the Trade Collapse indicates that even very sizeable global shocks have been associated with very fast recoveries. The preliminary evidence I will present in section 7 related to the COVID-19 crisis is consistent with this conclusion.

5. De-Globalisation, Cost Convergence and Other Long-Term Factors

Having discussed technological factors in the last section, I now turn to studying other long-term factors that may contribute to a future stagnation of globalisation. I will begin by reviewing the often-mentioned convergence hypothesis, indicating that higher wage growth in less developed economies relative to advanced economies has eroded the competitiveness of the former set of countries as hosts of GVC activity. Competitiveness, however, is a function of productivity as much as of factor costs, so in section 5.2, I will turn to discussing technology diffusion and how it may impact globalisation. Finally, in section 5.3, I will analyse other long-run factors related to structural transformation.

5.1. Wage Convergence

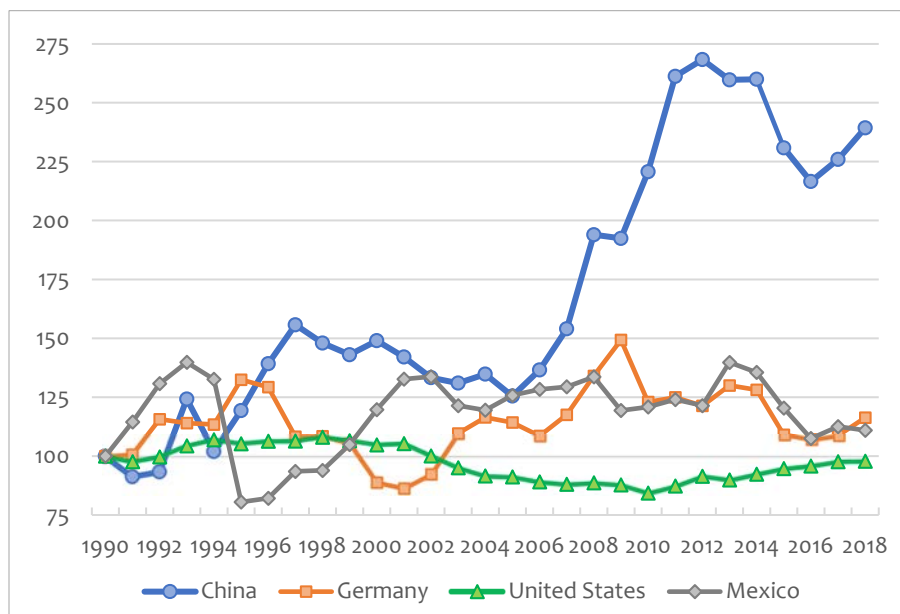
As explained in section 3.3, the transition of many countries from inward-looking socialism or outright communism to market capitalism constituted a massive labour supply shock from the point of view of firms in advanced countries, as a large pool of low-paid, skilled-labour force became available for these firms to hire. At some level, it is evident that this shock was unique and will not be repeated any time soon. Although there are certainly many countries in the world that are still not fully integrated into GVCs, they do not account for as large a share of world population as the countries listed in Table 1, and more importantly, they are not as skilled-labour-abundant as the countries in that list are.

At the same time, the increased labour demand sustained over a period of thirty years has gradually put upward pressure on the wages of countries that are recipients of GVC activity, thus naturally eroding the competitiveness of many of these economies. This is visible in Chart 10, where we see that unit labour costs in manufacturing have grown much faster in China than in other countries, despite the marked increase in labour productivity experienced by that country since 1990. More specifically, the figure plots an index of unit labour costs expressed in U.S. dollars for China, Germany, Mexico and the United States. The index demonstrates that, since 1990, Chinese unit labour costs have grown about 2.5 times as fast as those in Germany and the United States. Conversely, the figure shows that despite being host to a significant amount of GVC activity, Mexican unit labour costs have not grown significantly faster than in the United States or Germany. As a result, many manufacturing processes continue to be much cheaper to undertake in Mexico than in the U.S.

Mexico is, however, largely an exception. Many developing countries have experienced wage pressures similar to those in China, and thus there is now a lower incentive to move simple manufacturing production processes offshore than there was in the late 1980s and 1990s. Likewise, there is now a higher incentive to reshore processes that are no longer performed at significantly

lower cost abroad. Will cost convergence then lead to de-globalisation? It is evident that it will be a contributing force, but as highlighted in section 4.3, there is a natural asymmetric response of firms to relative costs shocks depending on whether they are already engaged in GVC activity or whether they have never offshored before. More specifically, in the presence of sunk cost of offshoring, the latter type of firms will need to perceive large *and* persistent losses of competitiveness to decide to reshore. In other words, even if relative costs shocks (perhaps due to exchange rate movements) appear to make production in a particular location unprofitable, it is not obvious that firms in advanced economies will want to relocate production right away. Instead, only when relative cost trends are viewed to be secular trends will firms give serious thought to abandoning locations that have become prohibitively expensive.

Chart 10. Unit Labour Cost Index in U.S. Dollars (1990=100)



Source: The Conference Board International Labour Comparisons Program ([link](#))

Importantly, even when firms decide to abandon production in certain countries that have lost comparative advantage in the processes firms used to undertake there, this does not necessarily imply that these processes will be reshored to these firms' domestic economies. This is exemplified by the fact that a significant amount of GVC activity that used to be carried out in China has already migrated to lower-wage countries in South East Asia.

Finally, it is also worth remembering that the bulk of multinational firm activity takes place between countries with similar relative factor endowments and factor prices. The common consensus a few years ago was that this reflected the dominance of market-seeking (or horizontal) FDI in overall multinational activity (see Carr et al., 2001, Blonigen et al., 2003). Nevertheless, work by Alfaro and Charlton (2009) challenged this view and demonstrated that most FDI flows between advanced economies have a vertical (input-output) dimension to them. At some level, this should not be too

surprising. The gains from specialization do not rely solely on factor price differences across countries, but can also stem from idiosyncratic cross-country differences in productivity in different goods, as the classical Ricardian model of trade beautifully illustrates. In that sense, the possibility of fragmenting production across borders gives rise to a finer international division of labour and greater gains from specialization: GVCs allow resources to flow to their most productive use, not only across countries and sectors, but also within sectors across stages of production. A suitable example of the prevalence of fragmentation of production between relatively similar countries is Boeing's global production of the 787, which entails 70 percent of its parts being sourced from 50 suppliers located in 8 developed economies other than the United States (Japan, Italy, South Korea, France, Sweden, Canada, United Kingdom, and Australia). To sum up, there are good reasons to believe that convergence in factor prices and in production costs across countries may not necessarily translate into a de-globalisation of the world economy.

5.2 Technology Transfer

Despite the growth in manufacturing unit labour costs in China, Chinese labour productivity has increased dramatically since 1990.¹⁸ This has allowed firms in the West to continue to find that country a suitable location of production for many industrial processes. Yet, Chinese technological absorption has also generated a fair amount of anxiety in advanced economies, as is exemplified by President's Trump's frontal opposition to China's *quid pro quo* policy – a policy that makes technology transfer a precondition for foreign firms to be able to operate in China. I will offer some brief thoughts below on the specifics of the U.S.–China technology war, but I will first consider more broadly the effects that technology transfer may have on the future of globalisation.

Should advanced economies fear the technological advance of less developed economies? Will it undermine the future of globalisation? Although focused on somewhat distinct aspects, these two questions are at least partly intertwined. To see this, and relying on the classical analysis of technology transfer in neoclassical trade theory (see Johnson, 1955), it is well known that technological improvements in foreign countries are typically beneficial for a specific country. The only exception is whenever foreign countries improve upon technologies related to goods for which that specific country had comparative advantage before the technological catch-up. The reason for this is that in those situations, productivity growth abroad worsens the specific country's terms of trade. The flip side of this effect is that such a form of technology transfer erodes the gains from specialisation and reduces gross trade flows across countries. In sum, technological change abroad is detrimental to advanced countries precisely when it leads to de-globalisation.

The mid 2000s witnessed a heated debate – involving the almost nonagenarian Paul Samuelson and Jagdish Bhagwati and co-authors – concerning the extent to which offshoring by U.S. companies had fuelled export-biased technological change by less-developed economies. Samuelson (2004) argued that this was a theoretical possibility and offered a carefully chosen numerical example in which offshoring-induced productivity growth in China completed kills off trade between the U.S. and China!

¹⁸ The same Conference Board International Labour Comparisons Program data used in Chart 10 indicates that real value added per employed person was almost 14 times larger in 2018 than in 1990 ([link](#)).

Bhagwati et al. (2004) admitted the theoretical argument, but argued that the phenomenon of offshoring should be better thought of as one in which processes that in the past had not been able to be sliced across countries, suddenly became tradable, thereby improving welfare worldwide. As stimulating as this debate was, and as pointed out by Dixit and Grossman (2005), there was no evidence that the U.S. terms of trade had deteriorated significantly, so the debate faded as quickly as it had flared up.

Anxiety over technological advancement in China has erupted again in recent years, with many governments in advanced economies demanding that China take a tougher stance on intellectual property rights (IPR) protection. President Trump has been particularly forceful about this, criticizing the Chinese quid pro quo policy and specifically targeting certain Chinese companies (such as Huawei, WeChat or TikTok) with specific restrictions or bans. What is the likely effect of these demands for stronger IPR protection? Will they lead to more reshoring and contribute to a de-globalized world?

In order to answer this question, it is worth pausing to carefully delineate the precise role for government intervention in this particular situation.¹⁹ When an American firm willingly forms a joint venture with a Chinese firm, what externality is the U.S. company not internalizing? Presumably, the company understands that because IPR protection in China is not as strong as in the United States, that joint venture increases their risk of the technologies they share with their Chinese counterpart being leaked to other producers in China. If the firm correctly anticipates the probability of leakage, and I see no reason to believe why it would not, then it would internalize the loss in the net present discounted value of its future profits associated with the higher probability of technological theft. Still, the cost advantage or market-access benefits associated with joint ventures in China lead some U.S. firms to find it optimal to operate there, though they might do so without sharing their state-of-the-art technologies.

Against this backdrop, if the ongoing spat between China and other advanced economies results in China putting in place stronger IPR protection laws, it is very far from obvious that this will trigger a process of reshoring. On the contrary, such stronger IPR protection might provide incentives for new firms to slice their value chains and operate in China, especially for firms that are unwilling to share their technologies in a joint venture in the current environment. Indeed, this is in line with the findings of the literature on the effects of tightening of IPR protection on U.S. multinationals operations. In particular, Branstetter et al. (2006) and Bilir (2014) found that patent law reforms that improved IPR protection abroad are associated with U.S. multinational transferring more technology to their foreign affiliates, with the effects being disproportionate in sectors with long product life cycles. In sum, although the current tension between the U.S. and China have fuelled concerns about de-globalisation, it is far less obvious that the “U.S.–China technology war” will be hugely detrimental to U.S. multinational activity in China.²⁰

¹⁹ I focus here on the role of technological spillovers, but governments may still play a useful role in the absence of such externalities. For instance, if the “quid pro quo” policy is viewed as a “tax” on U.S. multinationals operating in China, and if the U.S. government is in a better position than U.S. firms to convince the Chinese government to reduce or eliminate that tax, then such government pressures might be beneficial.

²⁰ A telling illustration of this claim is the decision by Tesla to begin assembling their electric cars in China once the company was assured that it could maintain whole ownership of their factories in that country.

Let me conclude this section by stressing that my thoughts above on the technological wars have focused on positive rather than normative aspects. Even if one concedes that investments by U.S. firms in China are privately optimal, it is far less obvious that they will be socially optimal. In particular, firms may not internalize the effects that their technological leakage might have on other U.S. firms, or on the U.S. more broadly, as has been highlighted by commentators that have warned about the cybersecurity issues associated with global value chains.

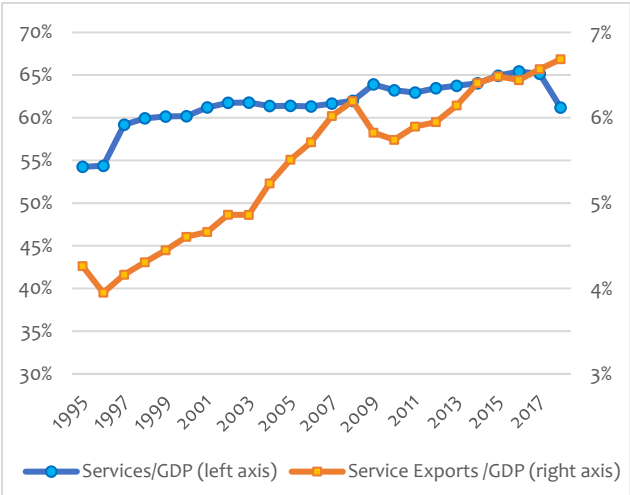
5.3 Structural Transformation, Investment, and Capital Goods

In this section, I briefly touch upon additional long-term forces that may potentially contribute to a process of de-globalisation.

First, consider the role of structural transformation, which involves a secular shift of economic activity from manufacturing to services, much like the structural transformation that turned agrarian economies into industrialized ones. Because manufacturing goods are more easily tradable than many services, it would appear that as a higher percentage of world GDP is accounted for by services, the ratio of world trade to world GDP will necessarily face downward pressure, thus confirming fears of de-globalisation. This argument, however, holds the relative tradability of manufacturing and services being constant over time, while I have argued in section 4.2 that new technologies have and will continue to enhance the ability of economic agents to trade services at long distances. Indeed, consistent with the counterbalancing effects of these two forces, panel A of Chart 11 demonstrates that the ratio of service exports to GDP has grown much faster (from 4% in 1995 to almost 7% in 2018) than the ratio of overall services in GDP (which grew from 55% to 65% in the same period).

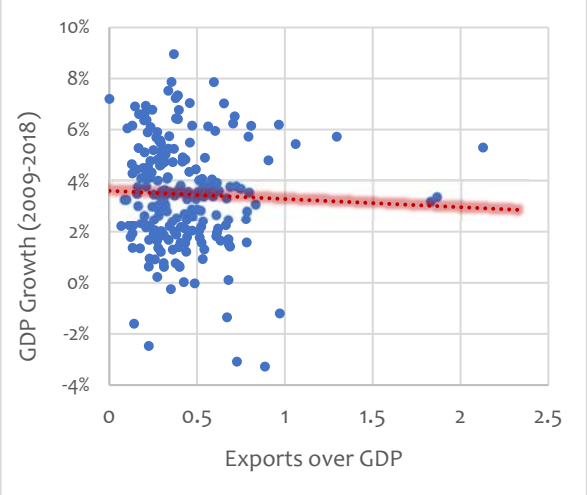
Chart 11. Structural Transformation and Composition Effects

Panel A. Exports over GDP vs. Service Exports over GDP



Source: World Development Indicators

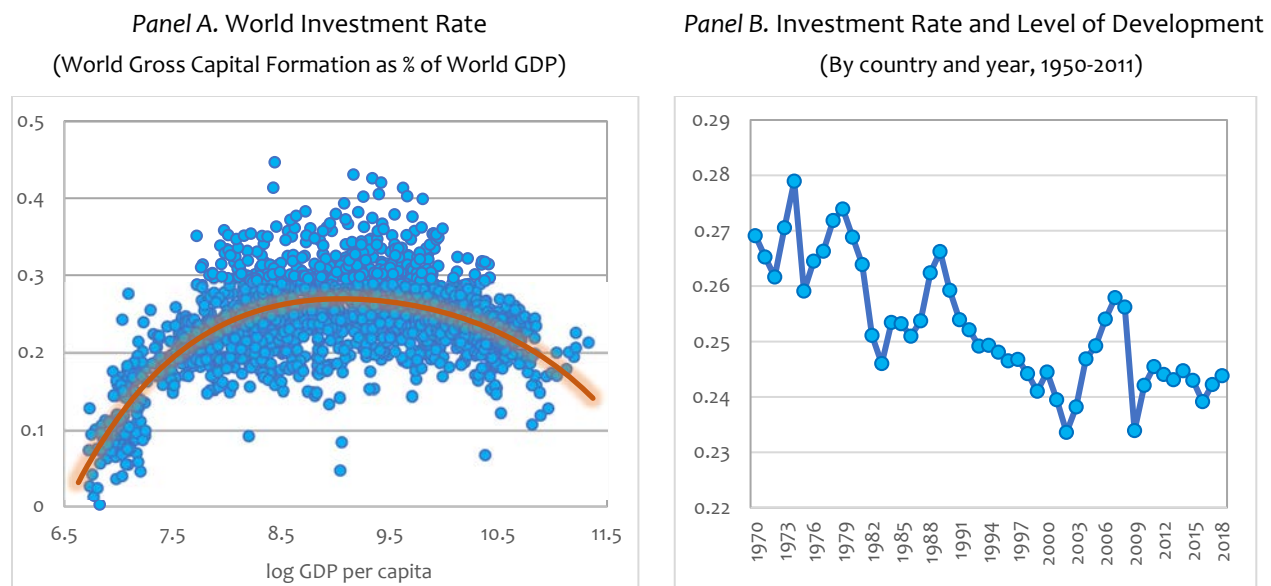
Panel B. Openness and GDP Growth (2009-18)



Source: World Development Indicators

A second secular trend is associated with the notion that the pattern of economic growth across countries has changed since the Great Recession, and relatively open economies now grow slower than relatively more closed economies. If this were a fact, world openness would be expected to be on a downward trend, as relatively more closed economies capture a larger and larger share of world trade. Nevertheless, as panel B of Chart 11 indicates, there is virtually no correlation between the cross-section of GDP growth rates in the period 2009-2018 and the cross-section of exports to GDP ratios in 2007.²¹ In words, it does not seem that the premise for this mechanism holds in the data.

Chart 12. The Decline in Investment Rates



Source: García-Santana et al. (2020). Data have been all been filtered out from country fixed effects. Projections (in red) based on a cubic polynomial of log GDP per capita.

Source: World Investment Indicators ([link](#))

The last secular force I will elaborate on is more intriguing and relates to the marked decline in investment rates in many countries in recent years. It has been a matter of debate whether this decline will be a permanent one or transitory, but panel A of Chart 12, borrowed from García-Santana et al. (2020), indicates that the relationship between country-level investment rates and the level of development (measured by log GDP per capita) exhibits a clear inverted-U shape in the data for the period 1950-2011. Furthermore, aggregate world GDP per capita currently features a value well in excess of \$7,125, which corresponds to the value of GDP at which investment rates peak according to the cubic fit in the figure. Indeed, as panel B of Chart 12 shows the aggregate world investment rate has been on a clear downward trend in the last 50 years. This phenomenon is particularly relevant for world trade because investment goods (capital goods, machinery, transport equipment, etc.)

²¹ The relationship is mildly negative and turns a bit more negative when dropping countries with export shares higher than 1. But as soon as one weights the observations by GDP or population in 2007, the relationship turns mildly positive (though insignificant).

constitute about forty percent of merchandise trade. A secular slump in investment is thus likely to reduce the share of world trade flows in the overall level of economic activity in the world.²²

6. De-Globalisation and Policy Factors

In section 4, I have fleshed out a series of arguments questioning the view that technological factors (such as automation) are likely to constitute a secular force fostering a retreat in globalisation in coming decades, while in section 5 I have studied the plausibility of additional secular non-policy drivers of de-globalisation. In this section, I will instead focus on the role of policy factors in potentially leading to an era of increased isolationism, much as it occurred in the 20th-century Interwar Period.

It is intuitively clear that the policy and institutional factors that fuelled the era of hyperglobalisation are much more reversible than the technological ones. Although it is hard to imagine that Eastern Europe will again fall behind an iron curtain or that China will abandon market economy practices, trade policies (and economic policies more broadly) can easily turn much more protectionist than they have been in the recent past. In principle, multilateral and regional trade agreements were designed in ways that they cannot easily be reversed, but recent events have undoubtedly eroded the notion that freer trade is necessarily here to stay. How likely is it that the next few years will bring a policy- or institutionally-driven process of de-globalisation? The rest of this section will provide tentative answers to this question.

6.1 Stalling Liberalization and Burgeoning Protectionism

Scepticism about the sustainability of the liberalized environment that was so conducive to the growth of global value chains is justified by at least three types of recent developments.

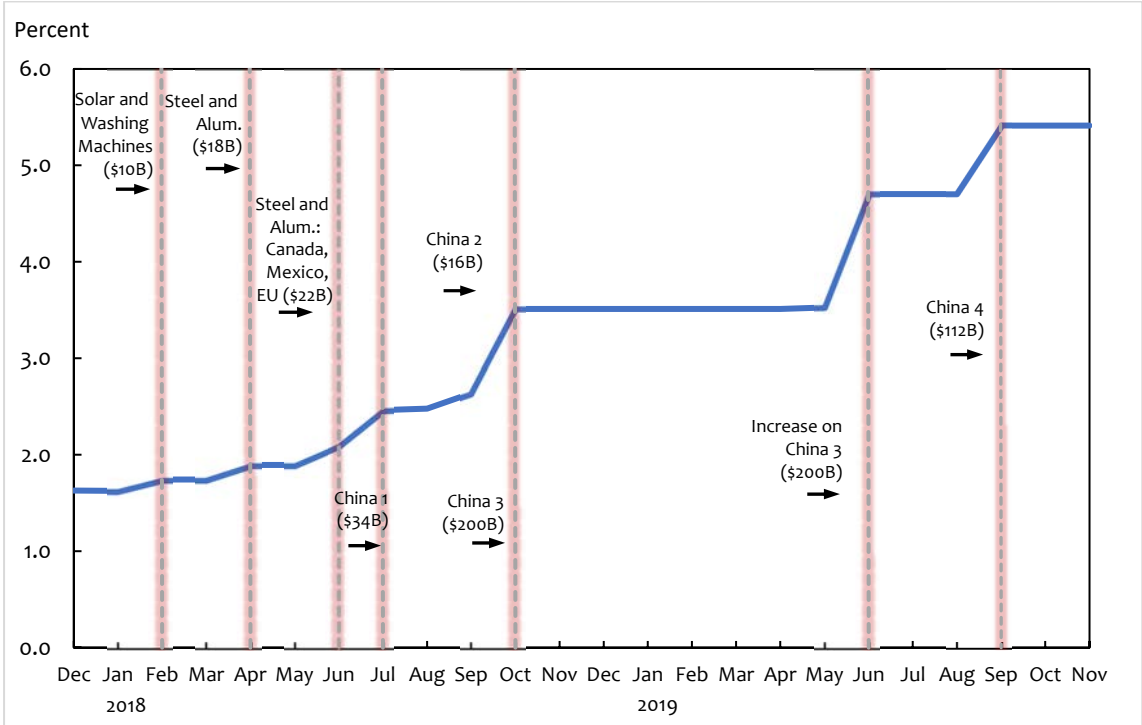
First, it is evident that the multilateral liberalization agenda under the umbrella of the WTO is at an impasse. The current round of negotiations, the Doha round, began in November 2001, and has yet to reach a conclusive agreement. Admittedly, the round began with an already very low average level of protection (see Chart 8), and it attempted to tackle very sensitive issues, such as the removal of agricultural subsidies in the U.S. and the European Union. Yet, the lack of substantial progress in close to twenty years has led many countries to lose faith in the ability of the WTO to further push the liberalization agenda.

Second, the process of regional liberalization has also largely stalled, and more worryingly, it shows signs of being in retreat. The decision of the United Kingdom to leave the EU, voted in referendum in June of 2016 and ratified in January of 2020, is an evident example of this trend. At the time of writing, it is not entirely clear what the implications of Brexit will be for the ease of flow of goods and services between the UK and the other members of the EU, but it is undoubtedly clear that Brexit will reduce their economic interdependence. Another example is President Trump's insistence on renegotiating

²² A lingering question is: will investment rates continue to permanently fall in the future? Given available estimates of the elasticity of substitution between capital and labour, the transitional dynamics of the "good old" neoclassical growth model indeed predict that investment rates will feature the inverted-U pattern in panel C of Chart 11 (see Antràs, 2001, 2004). The recent revival of the admittedly much sexier secular stagnation hypothesis (see Summers, 2011) also predicts a secular decline in investment for years to come.

NAFTA, culminating in the signing of the United States-Mexico-Canada Agreement (or USMCA, for readers inclined to pronounce institutions by their acronyms – good luck with this one!). Much has been written about the provisions in the new agreement regarding rules of origin in the automobile industry and labour standards in Mexico, but a particularly worrisome aspect of this agreement is the so-called “sunset clause,” which stipulates that the agreement must be reviewed by the three nations every six years, and that it will expire after sixteen years unless it is unanimously decided to extend it. Naturally, this makes future trade integration between the U.S., Canada and Mexico much more uncertain than it was under NAFTA. Even before the election of President Trump in 2016, appetite for the signing of the Transatlantic Trade and Investment Partnership (TTIP) and the Trans-Pacific Partnership (TPP) had largely waned in the United States, as exemplified by the fact that the Democratic candidate, Hillary Clinton, did not support the signing of these agreements either. Relatedly, free trade agreements have become more difficult to negotiate due to the many additional provisions that have become part and parcel of such agreements: in the lingo of trade economists, we live in the age of “deep” rather than “shallow” trade agreements.

Chart 13. Average U.S. Tariffs in the Trump Age



Source: Amiti, Redding and Weinstein (2019, Figure 3)

A third, much more worrisome development is the recent U.S.–China trade war. Starting in early 2018, President Trump enacted a series of tariff increases on specific products and countries, with China as an explicit target. Import tariffs increased from 2.6% to 16.6% on 12,043 products covering \$303 billion (12.7%) of annual U.S. imports (see Fajgelbaum et al., 2020). As a result, and as Chart 13 shows, average (weighted) U.S. tariffs more than doubled in 2018. In response to these unilateral measures, U.S. trade partners (and China, in particular) imposed retaliatory tariffs on U.S. exports. Beyond the increases in

average tariffs associated with these developments, there is a growing sense that the WTO is too weak an institution to restore order to the current situation.

6.2 Underlying Forces

What triggered the recent political backlash against globalisation? Answering this question is particularly important if one wants to understand the extent to which the forces that led to this escalating protectionism are only temporary or are instead secular.

A first obvious but important point is that recent protectionist spats have not been triggered by idiosyncratic decisions of particular individuals or political parties. Nigel Farage might have played a singular role in Brexit, and President Trump's blunt approach to policy making might have precipitated the U.S.–China trade war. But these individuals, as well as many other champions of protectionism around the globe (such as Bolsonaro in Brazil or Orban in Hungary) are elected officials who reached powerful positions because their electoral platforms appealed to a broad share of their electorates.

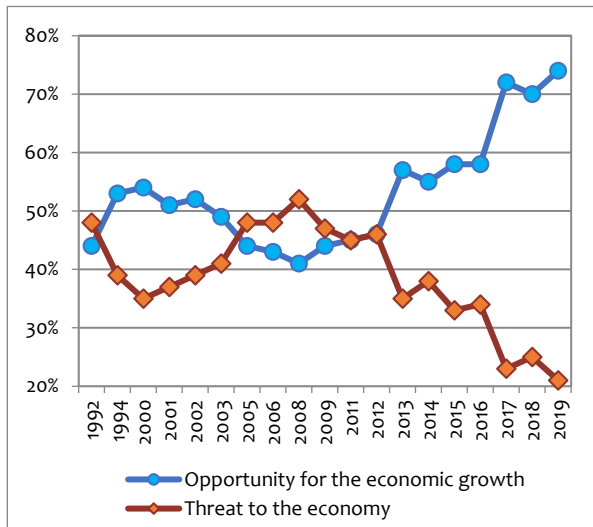
Consistent with this, data from surveys of people's perception of the consequences of trade for their economies suggests that the last few years of the hyper-globalisation period witnessed a significant share of people voicing concerns about the consequences of trade integration. Chart 14 provides an illustration based on the perceived effects of foreign trade in the United States. More specifically, Gallup has been asking Americans for close to thirty years the question: "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?" As the left panel of Chart 14 shows, in the early 2000s, the share of people responding that trade was good for the economy declined from 56% in 2000 to 41% in 2008, with the flip side of this being an increase in the share of people viewing trade as an economic threat increasing from 35% in 2000 to 52% in 2008. The increasing discontent with globalisation was widespread along the political spectrum. As the right panel of Chart 11 shows, support for globalisation fell dramatically in 2000-08 for both Republican as well as Democratic voters.

Given the patterns in Chart 14, it is not entirely surprising that the 2010s witnessed a proliferation of politicians and political parties catering to these increased demands for protectionism. Ironically, Chart 14 also demonstrates that perceptions of the consequences of trade for the U.S. economy have dramatically changed since 2008, and last year, prior to the COVID-19 crisis, 74% of respondents revealed seeing trade in a positive light, and only 21% characterized it as a threat. The recent trend might reflect improving economic conditions up to the COVID-19 shock, but Gallup also found that many more respondents (45%) indicated that the U.S.–China trade war was harmful to the economy rather than beneficial (31%), despite the fact that 62% described China as engaging in unfair trade practices.

Although support for protectionism might be much lower today than it was in the aftermath of the Great Recession, it is worth analysing the underlying causes of the growing discontent in the early 2000s, so as to better understand whether this discontent is likely to continue to wane in coming years or whether it may instead rekindle.

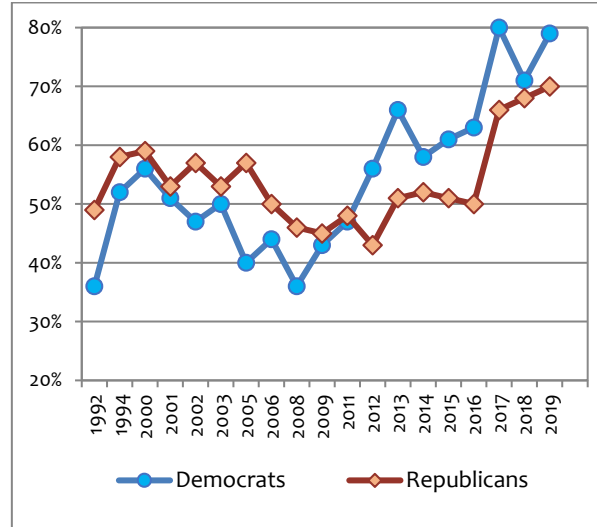
Chart 14. Perceived Effects of Foreign Trade in the United States

Panel A. Overall Population



Source: Gallup (2019, Figure 1, [link](#)).

Panel B. Trade is Good by Political Affiliation



Source: Gallup (2019, Figure 1, [link](#)).

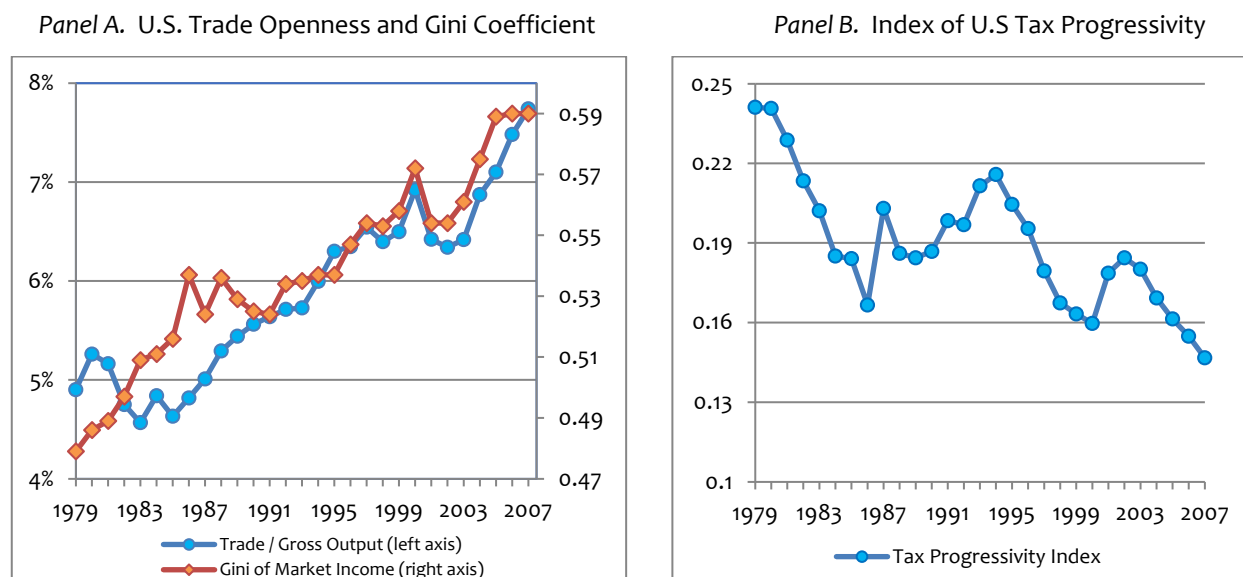
As many commentators have pointed out (see Pavcnik, 2017, Rodrik, 2020), a key source of resentment is related to the distributional effects of international trade. During the hyperglobalisation period, not only did economies become much more interconnected, but many of these economies contemporaneously experienced a significant rise in income inequality. For instance, during 1979-2007, the Gini coefficient associated with the distribution of U.S. market income grew dramatically from a level of 0.48 all the way to 0.59. Furthermore, as is clear from the left panel of Chart 15, trade integration and inequality grew very much in parallel even at fairly high frequencies. The extent to which these two phenomena are causally related has been the subject of intense academic debates, but it is by now a widely accepted view that trade integration has been a nonnegligible contributor to increased income inequality in the U.S., in many other industrialized, and even in developing countries (see Krugman, 2008, Goldberg and Pavcnik, 2007). A couple of landmark academic papers in the 2010s – Autor, Dorn and Hanson (2013) and Pierce and Schott (2016) – further singled out trade integration with China as a particularly salient contributor to the decline in U.S. manufacturing employment in the 1990s and 2000s.

Trade-induced increases in inequality need not generate discontent as long as those that may be harmed by trade integration are properly compensated. Have the losers from globalisation been compensated? In Antràs, de Gortari and Itshkoki (2017), we estimate the average degree of tax progressivity in the United States tax-transfer system and found a very significant decline in the degree of tax progressivity over the same period 1979-2007 in which the U.S. economy became much more integrated in world markets and was experiencing a marked increase in inequality in the distribution of market (pre-tax) income (see panel B of Chart 15).²³ In sum, in a period during which import

²³ To compute this index of tax progressivity, we used information on the distribution of adjusted gross income in public samples of U.S. IRS tax returns, as well as CBO information on the tax liabilities and transfers received by households at

competition was putting significant pressure on real wages and employment, the U.S. safety net was being pulled out from under U.S. workers' feet. Because median real weekly earnings grew very meagrely in the 1980s, 1990s and 2000s (see Acemoglu and Autor, 2011), it is natural that a growing share of U.S. workers felt alienated by the process of globalisation, despite the fact that aggregate real income in the U.S. grew significantly during this period.²⁴

Chart 15. Inequality and Redistribution in the United States



Source: Antràs, de Gortari and Itskhoki (2017).

Source: Antràs, de Gortari and Itskhoki (2017).

Although globalisation might have created some discontent, it is less clear the extent to which trade-induced inequality directly contributed to the emergence of the protectionist and isolationist policies we have seen put in place in the last few years. A recent literature, both theoretical as well as empirical, has studied such a link. On the theoretical side, Grossman and Helpman (forthcoming) borrow tools and insights from social psychology to argue that increased income inequality may generate endogenous changes in social identity that generate a protectionist bias in trade policy. On the empirical front, Autor et al. (2020) and Colantone and Stanig (2018a) establish a causal link between the China (import competition) shock and (i) a rise of political polarization in the U.S., and (ii) an increase in support for nationalist and isolationist parties in 15 Western European countries, respectively. A couple of spinoffs of these papers – Autor et al. (2017) and Colantone and Stanig (2018b) – have further directly linked the China shock to the outcomes of the 2016 U.S. Presidential election and the 2016 Brexit referendum vote, respectively.

different points of the U.S. income distribution.

²⁴ Even from a utilitarian social welfare perspective, the welfare gains associated with international trade would be about 20% lower than as implied by aggregate real income (see Antràs, de Gortari and Itskhoki, 2017).

6.3 Implications for the Future of Globalisation

With this background in mind, we are now ready to revisit the main theme of this paper, which concerns the future of globalisation. What would the consequences be of persistent trade wars across countries? Are the forces that fuelled the backlash against globalisation in the early 2000s likely to re-emerge in coming years and indeed make policy spats persistent? And might the ongoing COVID-19 health crisis spark an intensification of the resentment against globalisation? I will postpone tackling the last question until section 7, which will focus on the current global pandemic, but we can attempt to isolate an answer to the first two questions by (hypothetically) rolling back time to January of 2020.

Let me first discuss how the persistence of trade wars would impact the future of globalisation. The answer here is fairly clear, as the Interwar Period reminds us, but it is worth commenting on a few nuances.

First, it will not be immaterial whether trade wars continue to be bilateral in nature, as is largely the case with the current U.S.–China trade, or whether the situation escalates into an all-out world trade war. In the former case, and as some studies have already shown (see Flaaen et al., 2020), production might relocate to (third) countries unaffected by the bilateral trade war rather than being reshored to domestic economies. If tensions turn multilateral in nature, however, a scenario with significant de-globalisation would become much more likely.²⁵

Second, because of the relevance of sunk costs, the perceived persistence of trade disputes will be key for the extent to which production will relocate across countries. In this sense, the outcome of the November 3rd Presidential election in the U.S. is encouraging and suggests a decrease in policy isolationism in the U.S. (although, frankly the stance of the future Biden administration on U.S. trade relationships with China remains somewhat unclear). Nevertheless, to the extent that continuing pressures for nationalist trade policies lead to the weakening or potential disbandment of the WTO, we could well face a very serious threat to the architecture that underpinned the process of trade liberalization in the post-WWII era.

A third relevant factor is that recent developments have not only increased the average level of tariffs but have also generated a lot of trade policy uncertainty. Such uncertainty is likely to weigh on the decision of firms to make new investments in China, and might also lead some firms to diversify their sourcing strategies (possibly involving partial reshoring) in situations in which they are able to afford the fixed costs associated with more complex, multi-sourcing strategies.

Finally, it is worth mentioning an additional potential ramification of the current Sino-American trade tensions. As some commentators have pointed out, there is the real risk that geopolitical and strategic imperatives drive a decoupling and a fragmentation of the world economy into hostile political blocs,

²⁵ Empirical work on the economic impact of the U.S.-China trade war is still at its infancy, but a slowly emerging body of work seems to indicate that the increased trade barriers in Chart 13 and the retaliation they triggered from China, has harmed both U.S. consumers (see Amity et al., 2019, Fajgelbaum et al., 2020) and also the U.S. manufacturing sector (see Flaaen et al., 2020, Handley et al., 2020).

with a potential bifurcation of technology standards that would undermine much of the digital integration achieved in recent decades. A world partitioned into two “internets”, a Western one and a Chinese one, where the latter would only allow users and apps that sign on to China’s regulatory and compliance standards would pose a serious threat to the process of global integration.

Having outlined the consequences of persistent trade tensions, I next turn to the arguably more fundamental second question of whether the backlash-generating forces discussed in section 5.2 are likely to persist in the next few years. From the vantage point of January 2020, the key consideration for answering this question was: will we continue to see trade-induced inequality in the coming years, and will redistribution systems continue to insufficiently compensate the losers from globalisation? In this respect, it is honestly hard to be optimistic. I have argued in section 4.2 that recent technological developments (such as automation and the proliferation of digital platforms) might well give globalisation a second wind, but it also seems likely that these technological developments will aggravate income inequality in both advanced and less developed economies. Consider the case of automation. Although I have argued that industrial robots, 3D printing and other automated forms of production might well lead to the growth in trade in complementary inputs of production, it is also evident (and has been empirically established) that they tend to reduce the demand for workers (and particularly production workers) in advanced economies (see Acemoglu and Restrepo, 2020, Acemoglu et al., 2020). Furthermore, while automation might have a positive effect on offshoring in less developed economies (as documented by Artuc et al., 2018, or Stapleton and Webb, 2020), it is likely that the increased demand for foreign labour will be biased in favour of skilled workers in those less developed economies, in line with the vast literature documenting the skilled-labour intensity of GVC activity (e.g., Verhoogen, 2008). In sum, automation is likely to increase inequality both by reducing the labour share of income, but also by giving a higher share of that labour income to relatively skilled workers worldwide.

In the case of digital platforms, despite their enormous potential to enhance the efficiency of international trade in consumer goods and intermediate inputs, the same reputation mechanisms GVCs rely on to verify seller and buyer quality may foster concentration, thus making it harder for entrants to compete. Within existing firm-to-firm GVC links, novel technologies might also have implications for the relative bargaining power of the different participants in GVCs. For instance, digital platforms might allow large buyers in rich countries to gain information on a larger number of potential suppliers, thus enhancing their ability to have these suppliers compete with each other. This in turn may lead to better terms of trade for lead firms in rich countries, at the expense of a lower share of the gains from GVCs accruing to producers in less developed economies. Furthermore, digital platforms themselves have been accumulating vast amounts of information on the users of their platforms, and this certainly enhances their ability to use this information to their advantage, either by locking in buyers with particularly well-tailored recommendations, or by price discriminating in particularly effective ways. As a result, digital platform firms also pose new challenges for regulators seeking to ensure fair competition and prevent abuse of market power.

Concerns about growing market power of firms engaged in GVC activity are compounded by the widespread profit-shifting practices of these companies, which have found it relatively simple to

exploit loopholes in international taxation laws to increase the share of their profits that are accrued in locations with particularly low (or even zero) corporate tax rates.

The inability of regulators to adequately tackle the issue of profit-shifting also resonates with the inability (or unwillingness) of many governments to put in place sufficiently progressive tax systems to ensure that the gains from economic growth and international trade are widely spread in the population. Although discontent over globalisation and inequality has given rise to populist governments in many parts of the globe, in most cases, those governments have been right-wing rather than left-wing, so if anything they have been less inclined to increase the progressivity of their tax systems (see Rodrik, 2020).

Despite these pessimist views, remember that recent Gallup surveys show a marked increase in support for globalisation since 2008, at least in the U.S. This indicates that views on globalisation are strongly correlated with economic cycles, regardless of how widely spread the benefits of economic growth are. As puzzling as this may be, it suggests that as long as the world avoids long recessions, we may also avoid de-globalisation.

Now, in the last few paragraphs, I had hypothetically turned back time to January of 2020, but it is now time to tackle the big elephant in the room.

7. The COVID-19 Crisis and the Future of GVCs

I conclude the paper with a discussion of how the main themes of this paper interlace with the global pandemic the world is actively fighting at the time of writing. What has been the immediate impact of the COVID-19 pandemic on global integration and GVC activity more narrowly? What are the likely mid- to long-run implications of this crisis for the future of globalisation and of GVCs? Although answering these questions satisfactorily would require an essay of its own, and could also benefit from a few more months (or even years) of enhanced perspective, I will attempt to provide some tentative answers below appealing to the insights offered earlier in this paper.

7.1 The COVID-19 Health Crisis

The background of the COVID-19 (or Coronavirus) global pandemic is well known by now. The epidemic originated in Wuhan, China, where the first cases were identified in December of 2019. By January 2020 there was a widespread awareness that this was a serious epidemic with the potential to turn into a global pandemic. Indeed, on January 21, 2020, the first human-to-human infections of COVID-19 in Europe are presumed to have taken place in Starnberg, Germany, when a local car parts supplier (Webasto) organized a training session with a Chinese colleague from its operation in Wuhan. The epidemic grew quickly in Europe during February and March of this year, with a particularly heavy death toll in Italy and Spain. The first few cases in the United States were diagnosed in late January, but the disease only became an epidemic in March. A well-known focus of infection was a biotech conference in Boston, Massachusetts, on February 22-23, 2020, which is believed to have spread the disease to at least six states in the U.S. and three European countries, and caused close to 100 infections in Massachusetts alone. By March 11th, 2020, the epidemic had spread to essentially all

corners of the world, and the World Health Organisation declared COVID-19 a global pandemic. At that point in time, only around 4,300 people had died worldwide. At the time of writing, early November of 2020, the death toll of the COVID-19 pandemic had reached 1.3 million deaths, with no clear end to the epidemic in sight despite gargantuan efforts to develop an effective vaccine.

As we have emphasized in Antràs, Redding and Rossi-Hansberg (2020), globalisation and pandemics are closely intertwined. Not only was the rapid spread of the disease an obvious consequence of the globalized nature of economic activity and of GVC activity more narrowly – as the Starnberg and Boston examples above illustrate – but the global pandemic has had a severe impact on the workings of the global economy. Most notably, the flow of people across borders has essentially come to a halt both due to government restrictions but also due to purposeful social distancing practices by individuals. But beyond migration flows, the profound and asynchronous nature of the COVID-19 shock has also had an immediate impact on world trade flows, as the next section will overview.

7.2 Short-Term Effects

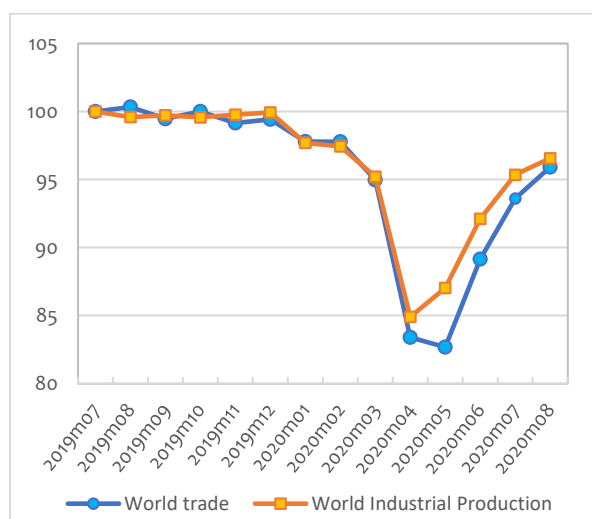
Although at this point in time the data we have at hand is somewhat tentative in nature, Chart 16 attempts to provide a preliminary diagnostic of the impact of the global pandemic on the flow of goods across countries. In Panel A, I use data from the CPB (Netherlands Bureau for Economic Policy Analysis) to illustrate the dramatic decline in world trade in recent months. Relative to its level in August of 2019, world trade reached a bottom in May of 2020, when it had reached a cumulative decline of 17.6%. In June, July, and August however, trade flows grew at a fast pace, and by the end of August, the year-on-year decline in trade had been reduced to a much more moderate 4.4%. The figure shows that although industrial production also markedly declined during the crisis, the response of world trade has been slightly larger. It is important to emphasize, however, that the current pandemic is affecting the service sector much more than the industrial sector, so it is quite likely that, by the end of 2020, the ratio of world trade to world GDP will be significantly higher than it was at the end of 2019.

Panel B of Chart 16 further decomposes the evolution of world trade during the current calendar year into different types of goods. The data originates in the creative work of Cerdeiro et al. (2020), who use data from radio signals emitted by global vessels for navigational safety purposes to construct estimates of world seaborne trade (in terms of metric tons) based on the dimensions and characteristics of the ships. The data is available at a very high-frequency (daily) and with a short lag, so despite its imperfect nature, it provides a valuable angle on the recent decline in trade. A few patterns in the figure are noteworthy. First, the chart illustrates clearly a “double-dip” in world trade, first in February and then again in April and early May, reflecting lockdowns (and social distancing) first in China, and then in Europe and North America. Second, although world trade was 11% lower in early June than in early January, by early October, world trade had fully recovered to its level at the beginning of the year, thus confirming that world trade is recovering much faster than world GDP. Third, information on the type of vessel used for transport allows one to decompose the evolution of world trade into various components associated with bulk carriers, oil/chemical tankers, general cargo/container ships and vehicle vessels. The chart then demonstrates that world trade in vehicles, a prototypical example of GVC trade experienced a much larger initial decline (at some point a cumulative decline of 50%) than other types of trade. Nevertheless, this type of trade also recovered

faster than other components of trade, and by early September, it had reached early January levels. Whether the disproportionate rise and fall of vehicles in panel B reflects the peculiarities of GVC trade or the durable nature of the goods being shipped is an open question, but in any case, the figure demonstrates that standard indices of globalisation based on trade statistics are not likely to provide ammunition for those commentators advocating for the advent of an era of de-globalisation in the near future.

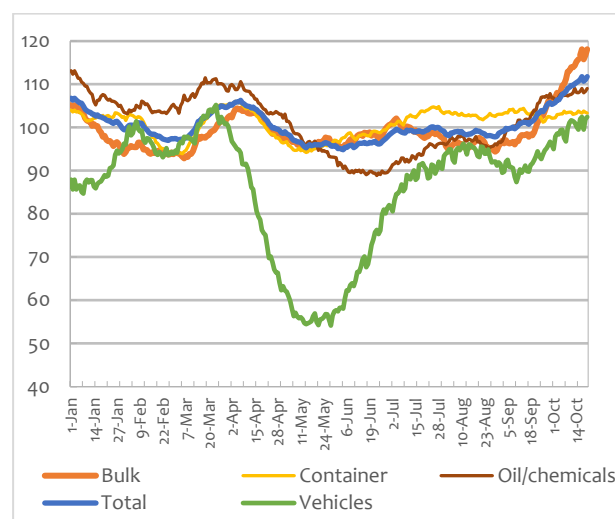
Chart 16. The Impact of COVID-19 On World Trade

Panel A. World Trade and World Industrial Production
(Index July 2019 = 100)



Source: CPB World Trade Monitor ([link](#))

Panel B. Estimated Metric Tons of World Exports
(30-day moving average in ratio to 2017-19 average)



Source: Cerdeiro, Komaromi, Liu and Saeed (2020); AIS data collected by MarineTraffic ([link](#))

Why has world merchandise trade recovered so quickly from the May lows? Unfortunately, the characteristics of the data we have at hand at this point in time is not conclusive, but the conceptual considerations developed in section 4.3 of this paper, as well as empirical evidence from the Great Recession and the 1997 Asian Financial Crisis reviewed in that same section, leads me to hypothesize that the trade collapse in Chart 16 has not operated, at least up to this point, at the extensive margin. This conjecture also explains the rapid recovery in world trade from May to September, and it also suggests that as long as the global pandemic is not perceived to be a highly persistent shock, the medium-run implications of the current health crisis for world trade will be muted.²⁶ On the latter matter, and even if we are still in the midst of much uncertainty about the timing and effectiveness of a COVID-19 vaccine, it seems reasonable that this shock is still widely perceived to be more transitory than the Great Recession. As a result, it is then natural that firms are at this point unwilling to sever international ties and reshore activity domestically.

²⁶ This is indeed consistent with the calibration results in Antràs, Redding and Rossi-Hansberg (2020). Furthermore, preliminary evidence from Spanish Customs data suggest indeed that less than 5% of the decrease in Spanish exports during March-August of 2020 relative to March-August of 2019 was explained by the intensive margin (see Minondo, 2020).

7.3 Medium-to-Long-Term Effects

Even if in the short-to-medium run merchandise trade recovers to pre-COVID-19 levels, it is worth pausing to elucidate whether the current global pandemic might sow the seeds for an intensified phase of de-globalisation. To answer this question, it is useful to again separate effects working largely through technology, and effects working through policy.

On the technological front, there are reasons to believe that the decline in face-to-face interactions experienced in recent months is likely to persist (though obviously in a less dramatic manner) for years to come. On the one hand, it is hard to gauge the state in which the airline industry will leave the crisis, but it seems inevitable that international travel will be less pleasant and more expensive for years to come. On the other hand, even with a vaccine in place, the willingness of people to share tight places, like airplanes, with other individuals is likely to remain depressed for some time. To the extent that face-to-face interactions and international business travel are important inputs into the well-functioning of GVCs, it seems reasonable to expect a reshoring of economic activity in ways that diminish the need for long-distance travel. Indeed, there is a small but fruitful empirical literature that has demonstrated the role of international business travel in facilitating international trade (see Cristea, 2011, Blonigen and Cristea, 2015, and Startz, 2018), and more generally, in fostering economic development (see Campante and Yanagizawa-Drott, 2018).

It is pertinent, however, to mention two caveats to this argument. First, the marginal return to face-to-face interactions is likely to be larger when initiating trade relationships than when maintaining them, so I would expect the effect of depressed international business travel on world trade to operate largely at the entry margin rather than at the exit margin. In plain words, business executives are unlikely to shut down existing offshore plants due to increased nuisances in international travel, but they are likely to take these matters into consideration when considering the location of new plants. As a result, the adjustment might only materialize gradually. Second, it may perhaps be naïve to ignore the possibility that future technological developments will enhance virtual interactions in ways that make them much more of a substitute for face-to-face interactions. Such developments would of course tilt the balance toward a more globalised world economy (albeit with less international travel).

These technological considerations are however second-order relative to the impact of the political landscape post COVID-19 on GVCs. Will the current pandemic add fuel to the fire in the current political tensions between the U.S. and China? Or will a global coordinated effort to eradicate the global pandemic produce some goodwill that can then be used to ease tensions in the future? The answer to these questions in part depends on the stance of the future Biden administration in the United States, but at this point in time I see two main reasons for pessimism.

First, the pandemic has brought about a number of diplomatic disputes related to the exact origin of the COVID-19 crisis, with President Trump making a concerted effort to publicly refer to it as the “Wuhan virus” or the “China virus.” Tensions have also flared up in Europe, where the passing of a massive aid package was delayed until late July and only after many heated rounds of negotiations

and mutual recriminations. These types of finger pointing and blame games are not likely to be conducive to healthy international relations in the future, and they do not bode well for the future of global organizations, such as the WTO (which incidentally has been without an interim Director-General for more than two months at the time of writing).

A second reason for concern relates to the highly regressive nature of the economic recession caused by the global pandemic. As highlighted by the results of Chetty et al. (2020) and others, every indication so far points to this recession having a much larger impact on the economic wellbeing of poor households than on that of rich households. This is in large part due to the fact that the types of jobs performed by low-wage earners are likely to demand much higher face-to-face interactions than the types of jobs associated with high-wage earners (see Dingel and Neiman, 2020). Furthermore, as of early November, the stock market has recovered much faster than the “real” economy, which again naturally benefits richer individuals much more than poorer ones. In sum, if income inequality brews isolationism, slowbalisation may well turn quickly into de-globalisation.

8. Concluding Remarks

This paper has attempted to contribute to the debate over whether the world economy entered a new phase of de-globalisation in the aftermath of the Great Recession of 2008-09. I have first scrutinized and rejected the claim that the data already indicate that the world is de-globalising. Many informative measures of globalisation indicate a decline in the growth rate of globalisation – a process that *The Economist* has cleverly labelled as “slowbalisation” – but this slowdown is not particularly surprising given the remarkable and unsustainable period of hyperglobalisation of the late 1980s, 1990s and early 2000s. I have then analysed the various factors that had led to that earlier expansionary phase, and I have speculated on the extent to which these forces have lost steam or might actually be operating in reversal. It is particularly hard to conclude that technological developments are likely to fuel an era of de-globalisation, but there are certainly more reasons for concern with regards to policy factors. In other words, the main challenge for the future of globalisation is institutional and political in nature rather than technological, although new technologies might aggravate the trends in inequality that have created the current political backlash against globalisation. I have concluded the paper with some even more speculative thoughts on the current global pandemic and the extent to which it may aggravate policy tensions across countries and further contribute to a new era of significant isolationism, much as the world witnessed in the 20th-century’s Interwar Period.

Throughout the paper, I have attempted to draw my conclusions based on what economic research has taught us in recent years on how the world economy – and international trade and GVCs in particular – responds to economic crises. When it comes to the COVID-19 shock, however, the data I have used is certainly incomplete and imperfect, and thus much will be learned from more detailed future studies of the event. The same is true, to some extent, about the recent U.S.–China trade war of 2018-19, the effects of which will be sorted out by trade economists for years to come. In any case, and as I have pointed out repeatedly above, the international political landscape in the post-COVID-19 age is likely to be crucially affected by the outcome of the very recent presidential election in the United States, so my views on the topic are likely to be shaped by it as well. As Keynes reminded us long ago, it is advisable to let one’s opinions change when the facts change.

References

- Acemoglu, Daron, and Pascual Restrepo (2020), “Robots and Jobs: Evidence from U.S. Labor Markets,” *Journal of Political Economy* 128, no. 6: 2188-2244.
- Acemoglu, Daron, Claire Lelarge, and Pascual Restrepo (2020), “Competing with Robots: Firm-Level Evidence from France,” *American Economic Review Papers and Proceedings*, vol. 110, pp. 383-88.
- Alfaro, Laura, and Andrew Charlton (2009), “Intra-Industry Foreign Direct Investment,” *American Economic Review*, 99 (5): 2096-2119.
- Amiti, Mary, Stephen J. Redding, and David E. Weinstein (2019), “The Impact of the 2018 Tariffs on Prices and Welfare,” *Journal of Economic Perspectives* 33, no. 4: pp. 187-210.
- Antràs, Pol (2001), “Transitional Dynamics of the Savings Rate in the Neoclassical Growth Model,” mimeo MIT, available at ([link](#)).
- Antràs, Pol (2003), “Firms, Contracts, and Trade Structure,” *Quarterly Journal of Economics*, 118:4, pp. 1375-1418.
- Antràs, Pol (2004), “Is the U.S. Aggregate Production Function Cobb-Douglas? New Estimates of the Elasticity of Substitution,” *Contributions in Macroeconomics* 4 (1).
- Antràs, Pol (2015). *Global Production: Firms, Contracts, and Trade Structure*. Princeton University Press.
- Antràs, Pol, Luis Garicano and Esteban Rossi-Hansberg (2006), “Offshoring in a Knowledge Economy,” *Quarterly Journal of Economics*, Vol. 121, No. 1, pp. 31-77.
- Antràs, Pol, and Davin Chor (2013), “Organizing the Global Value Chain,” *Econometrica* 81(6): 2127-2204.
- Antràs, Pol, and Davin Chor (2018), “On the Measurement of Upstreamness and Downstreamness in Global Value Chains,” in *World Trade Evolution: Growth, Productivity and Employment*, pp.126-194. Taylor & Francis Group.
- Antràs, Pol, Teresa Fort, and Felix Tintelnot (2017), “The Margin of Global Sourcing: Theory and Evidence from U.S. Firms,” *American Economic Review*, 107, no. 9 (2017): 2514-64.
- Antràs, Pol and Alonso de Gortari (2020), “On the Geography of Global Value Chains,” *Econometrica* 88, no. 4: 1553-1598.
- Antràs, Pol, Alonso De Gortari, and Oleg Itskhoki (2017), “Globalization, Inequality and Welfare,” *Journal of International Economics* 108 (2017): 387-412.
- Antràs, Pol and Elhanan Helpman (2004), “Global Sourcing,” *Journal of Political Economy*, 112, pp.552--580.
- Antràs, Pol, Stephen J. Redding and Esteban Rossi-Hansberg (2020), “Globalization and Pandemics,” NBER Working Paper No. 27840.
- Artuc, Erhan, Paulo S. R. Bastos, and Bob Rijkers (2018), “Robots, Tasks, and Trade,” Policy Research Working Paper 8674, World Bank, Washington, DC.
- Autor, David H., David Dorn, and Gordon H. Hanson (2013), “The China Syndrome: Local Labor Market Effects of Import Competition in the United States,” *American Economic Review*, 103 (6): 2121-68.
- Autor, David H., David Dorn, Gordon H. Hanson, and Kaveh Majlesi (2017), “A Note on the Effect of Rising Trade Exposure on the 2016 Presidential Election.” Appendix to “Importing Political Polarization”.

- Autor, David H., David Dorn, Gordon H. Hanson, and Kaveh Majlesi (2020), "Importing Political Polarization? The Electoral Consequences of Rising Trade Exposure," *American Economic Review*, 110 (10): 3139-83.
- Baldwin, Richard, and Anthony J. Venables (2013), "Spiders and Snakes: Offshoring and Agglomeration in the Global Economy," *Journal of International Economics* 90.2: pp. 245-254.
- Beck, Thorsten, Willem Buiter, Kathryn Dominguez, Daniel Gros, Christian Gross, Sebnem Kalemli-Ozcan, Tuomas Peltonen, Antonio Sánchez Serrano, and Richard Portes (2020), "The Global Dimensions of Macroprudential Policy," No. 10., European Systemic Risk Board.
- Behrens, Kristian, Gregory Corcos, and Giordano Mion (2013), "Trade Crisis? What Trade Crisis?" *Review of Economics and Statistics* 95, no. 2: pp. 702-709.
- Bernard, Andrew B., J. Bradford Jensen, Stephen J. Redding, and Peter K. Schott (2009), "The Margins of U.S. Trade," *American Economic Review* 99, no. 2: 487-93.
- Bhagwati, Jagdish, Arvind Panagariya, and Thirukodikaval N. Srinivasan (2004), "The Muddles Over Outsourcing," *Journal of Economic Perspectives* 18, no. 4: pp. 93-114.
- Bilir, L. Kamran (2014), "Patent Laws, Product Life-Cycle Lengths, and Multinational Activity," *American Economic Review* 104, no. 7: pp. 1979-2013.
- Blonigen, Bruce A. and Anca D. Cristea (2015), "Air Service and Urban Growth: Evidence from a Quasi-Natural Policy Experiment," *Journal of Urban Economics* 86, 128-146.
- Blonigen, Bruce A., Ronald B. Davies, and Keith Head (2003), "Estimating the Knowledge-Capital Model of the Multinational Enterprise: Comment," *American Economic Review* 93, no. 3 (2003): 980-994.
- Bloom, Nicholas, Charles I. Jones, John Van Reenen, and Michael Webb (2020), "Are Ideas Getting Harder To Find?" *American Economic Review* 110, no. 4: 1104-44.
- Borin, Alessandro and Michele Mancini (2019), "Measuring What Matters in Global Value Chains and Value-Added Trade," Policy Research Working Paper; no. WPS 8804. Washington, D.C. : World Bank Group.
- Branstetter, Lee G., Raymond Fisman, and C. Fritz Foley (2006), "Do Stronger Intellectual Property Rights Increase International Technology Transfer? Empirical Evidence from U. S. Firm-Level Panel Data," *Quarterly Journal of Economics*, Volume 121, Issue 1, pp. 321-349.
- Bricongne, Jean-Charles, Lionel Fontagné, Guillaume Gaulier, Daria Taglioni, and Vincent Vicard (2012), "Firms and the Global Crisis: French Exports in the Turmoil," *Journal of International Economics* 87, no. 1: pp. 134-146.
- Broner, Fernando, Tatiana Didier, Aitor Erce, and Sergio L. Schmukler (2013), "Gross Capital Flows: Dynamics and Crises," *Journal of Monetary Economics*, Volume 60, Issue 1, pp. 113-133.
- Brynjolfsson, Erik, Xiang Hui, and Meng Liu (2019), "Does Machine Translation Affect International Trade? Evidence from a Large Digital Platform," *Management Science*, 65:12, 5449-5460
- Cadestin, Charles, Koen De Backer, Isabelle Desnoyers-James, Sébastien Miroudot, Ming Ye, and Davide Rigo. (2018), "Multinational Enterprises and Global Value Chains: New Insights on the Trade-Investment Nexus," OECD Science, Technology and Industry Working Papers 2018/05.

Caliendo, Lorenzo, and Fernando Parro (2015), “Estimates of the Trade and Welfare Effects of NAFTA,” *The Review of Economic Studies*, (2015) 82 (1): 1-44.

Campante, Filipe, and David Yanagizawa-Drott (2018), “Long-Range Growth: Economic Development in the Global Network of Air Links,” *Quarterly Journal of Economics* 133, no. 3 (2018): 1395-1458.

Carr, David L., James R. Markusen, and Keith E. Maskus (2001), “Estimating the Knowledge-Capital Model of the Multinational Enterprise,” *American Economic Review* 91, no. 3: 693-708.

Cerdeiro, Komaromi, Liu and Saeed (2020), “World Seaborne Trade in Real Time: A Proof of Concept for Building AIS-based Nowcasts from Scratch,” IMF Working Paper 20/57.

Chetty, Raj, John N. Friedman, Nathaniel Hendren, and Michael Stepner (2020), “How Did COVID-19 and Stabilization Policies Affect Spending and Employment? A New Real-Time Economic Tracker Based on Private Sector Data,” NBER Working Paper No. 27431.

Clemens, Michael A., and Jeffrey G. Williamson (2004), “Why Did the Tariff–Growth Correlation Change After 1950?” *Journal of Economic Growth* 9, no. 1: pp. 5-46.

Colantone, Italo, and Piero Stanig (2018a), “The Trade Origins of Economic Nationalism: Import Competition and Voting Behavior in Western Europe,” *American Journal of Political Science* 62, no. 4: 936-953.

Colantone, Italo, and Piero Stanig (2018b), “Global Competition and Brexit,” *American Political Science Review*, 2018 - 112 (2): 201-218.

Cristea, Anca D. (2011), “Buyer-Seller Relationships in International Trade: Evidence from U.S. States' Exports and Business-Class Travel,” *Journal of International Economics* 84, no. 2: 207-220.

de Gortari, Alonso (2018), “Disentangling Global Value Chains,” mimeo Harvard University.

de Lucio Fernández, Juan José, Raúl Mínguez Fuentes, Asier Minondo, and Francisco Requena Silvente (2011), “Comercio Internacional y Crisis Económica: Un Análisis Microeconómico para España,” *Información Comercial Española, ICE: Revista de economía*, 858: 145-158.

Dingel, Jonathan I. and Brent Neiman (2020), “How Many Jobs Can Be Done at Home?” NBER Working Paper No. 26948.

Dixit, Avinash K., and Joseph E. Stiglitz (1977), “Monopolistic Competition and Optimum Product Diversity,” *The American Economic Review* 67, no. 3 (1977): pp. 297-308.

Dixit, Avinash and Gene M. Grossman (2005), “The Limits of Free Trade,” *Journal of Economic Perspectives* 19, no. 3: 241-244.

Fajgelbaum, Pablo D., Pinelopi K. Goldberg, Patrick J. Kennedy, and Amit K. Khandelwal (2020), “The Return to Protectionism,” *Quarterly Journal of Economics* 135, no. 1: pp. 1-55.

Fillat, José L. and Stefania Garetto (2015), “Risk, Returns, and Multinational Production,” *Quarterly Journal of Economics*, Volume 130, Issue 4, pp. 2027–2073.

Flaaen, Aaron, Ali Hortaçsu, and Felix Tintelnot (2020), “The Production Relocation and Price Effects of U.S. Trade Policy: The Case of Washing Machines,” *American Economic Review* 110, no. 7: pp. 2103-27.

Flaaen, Aaron, and Justin R. Pierce (2020), “Disentangling the Effects of the 2018-2019 Tariffs on a Globally Connected US Manufacturing Sector,” mimeo Federal Reserve Board.

Fort, Teresa C. (2017), "Technology and Production Fragmentation: Domestic versus Foreign Sourcing," *Review of Economic Studies* 84 (2): pp. 650-87.

Freund, Caroline L., Alen Mulabdic, and Michele Ruta (2018), "Is 3D Printing a Threat to Global Trade? The Trade Effects You Didn't Hear About," Working paper, World Bank, Washington, DC.

Gallup (2010), "Trade Under Trump," report available at ([link](#)).

Garcia-Santana, Manuel, Josep Pijoan-Mas, and Lucciano Villacorta (2020), "Investment Demand and Structural Change," mimeo CEMFI.

Goldberg, Pinelopi K. and Nina Pavcnik (2007), "Distributional Effects of Globalization in Developing Countries," *Journal of Economic Literature*, 45:1, 39-82.

Grossman, Gene M. and Esteban Rossi-Hansberg, "Trading Tasks: A Simple Theory of Offshoring," *American Economic Review*, 2008, 98 (5), 1978-97.

Grossman, Gene M., and Elhanan Helpman (forthcoming), "Identity Politics and Trade Policy," forthcoming *Review of Economic Studies*.

Haddad, Mona, Ann Harrison, and Catherine Hausman (2010), "Decomposing the Great Trade Collapse: Products, Prices, and Quantities in the 2008-2009 Crisis," NBER Working Paper No. 16253.

Handley, Kyle, Fariha Kamal, and Ryan Monarch (2020), "Rising Import Tariffs, Falling Export Growth: When Modern Supply Chains Meet Old-Style Protectionism," NBER Working Paper No. 26611.

Handley, Kyle, and Nuno Limao (2017), "Policy Uncertainty, Trade, and Welfare: Theory and Evidence for China and the United States," *American Economic Review* 107, no. 9: 2731-83.

Helpman, Elhanan, ed. (1998), *General Purpose Technologies and Economic Growth*. MIT press.

Hummels, David (2007), "Transportation Costs and International Trade in the Second Era of Globalization," *Journal of Economic Perspectives* 21(3), 131-154.

Hummels, D., Ishii, J. and Yi, K.-M. (2001), "The Nature and Growth of Vertical Specialization in World Trade," *Journal of International Economics* 54, p. 75-96.

Huneus, Federico (2018), "Production Network Dynamics and the Propagation of Shocks," mimeo Princeton University.

Jing, Ran (2013), "How Much Did China's Exports Drop During the 2008-2009 Financial Crisis?" in *China's Trade, Exchange Rate and Industrial Policy Structure*, pp. 193-214.

Johnson, Harry G. (1955), "Economic Expansion and International Trade," *The Manchester School* 23, no. 2 (1955): 95-112.

Johnson, Robert C., and Guillermo Noguera, (2012), "Accounting for Intermediates: Production Sharing and Trade in Value Added," *Journal of International Economics* 86(2): 224-236.

Koopman, Robert, Zhi Wang, and Shang-Jin Wei, (2014), "Tracing Value-Added and Double Counting in Gross Exports," *American Economic Review* 104(2): 459-494.

Krugman, Paul R. (1980), "Scale Economies, Product Differentiation, and the Pattern of Trade," *American Economic Review*, 70(5), 950-959.

Krugman, Paul R. (2008), "Trade and Wages, Reconsidered," *Brookings Papers on Economic Activity*, 1, pp.103-154.

Martin, Julien, Isabelle Méjean, and Mathieu Parenti (2019), “Relationship Stickiness and Economic Uncertainty,” unpublished working paper.

Melitz, Marc J. (2003), “The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity,” *Econometrica*, 71:6, pp. 1695-1725.

Minondo, Asier (2020), “Impact of COVID-19 on the Trade of Goods and Services in Spain,” mimeo Deusto Business School.

Monarch, Ryan (2020), “It's Not You, It's Me: Price, Quality, and Switching in U.S.–China Trade Relationships,” mimeo Federal Reserve Board.

Monarch, Ryan and Tim Schmidt-Eisenlohr (2020), “Longevity and the Value of Trade Relationships,” mimeo Federal Reserve Board.

Muraközy, Balázs (2012), “Margins of Hungarian Exports During Crisis,” EFIGE working.

Nunn, Nathan (2007), “Relationship Specificity, Incomplete Contracts and the Pattern of Trade,” *Quarterly Journal of Economics*, Vol. 122, No. 2, pp. 569-600.

Pavcnik, Nina (2017), “The Impact of Trade on Inequality in Developing Countries,” Proceedings of Jackson Hole Economic Symposium, Fostering a Dynamic Global Economy, pp. 61-114.

Pierce, Justin R., and Peter K. Schott (2016), “The Surprisingly Swift Decline of U.S. Manufacturing Employment,” *American Economic Review* 106, no. 7 1632-62.

Rauch, James E. (1999), “Networks versus Markets in International Trade,” *Journal of International Economics* 48, no. 1, pp. 7-35.

Rodrik, Dani (2018), “New Technologies, Global Value Chains, and Developing Economies,” National Bureau of Economic Research Working Paper No. 25164.

Rodrik, Dani (2020), “Why Does Globalization Fuel Populism? Economics, Culture, and the Rise of Right-Wing Populism,” National Bureau of Economic Research Paper 27526.

Samuelson, Paul A. (2004), “Where Ricardo and Mill Rebut and Confirm Arguments of Mainstream Economists Supporting Globalization,” *Journal of Economic Perspectives* 18, no. 3: pp. 135-146.

Stapleton, Katherine and Michael Webb (2020), “Automation, Trade and Multinational activity: Micro Evidence from Spain,” mimeo Oxford University.

Startz, Meredith (2018), “The Value of Face-To-Face: Search and Contracting Problems in Nigerian Trade,” mimeo Stanford University.

Summers, Lawrence (2013), “Secular Stagnation”, speech at 14th Annual IMF Research Conference, Washington DC, November.

Verhoogen, Eric A. (2008), “Trade, Quality Upgrading, and Wage Inequality in the Mexican Manufacturing Sector,” *Quarterly Journal of Economics* 123.2: 489-530.

Wang, Jeffrey (2020), “Robot Adoption, Trade, and Offshoring: A Firm-level Analysis,” mimeo Harvard University.

Wang, Z., S. Wei and K. Zhu (2013), “Quantifying International Production Sharing at the Bilateral and Sector Levels,” NBER Working Paper, No. 19677.

World Bank (2020), *World Development Report 2020: Trading for Development in the Age of Global Value Chains*, World Bank Publications.

Yi, Kei-Mu, (2003), "Can Vertical Specialization Explain the Growth of World Trade?" *Journal of Political Economy* 111(1): 52-102.