

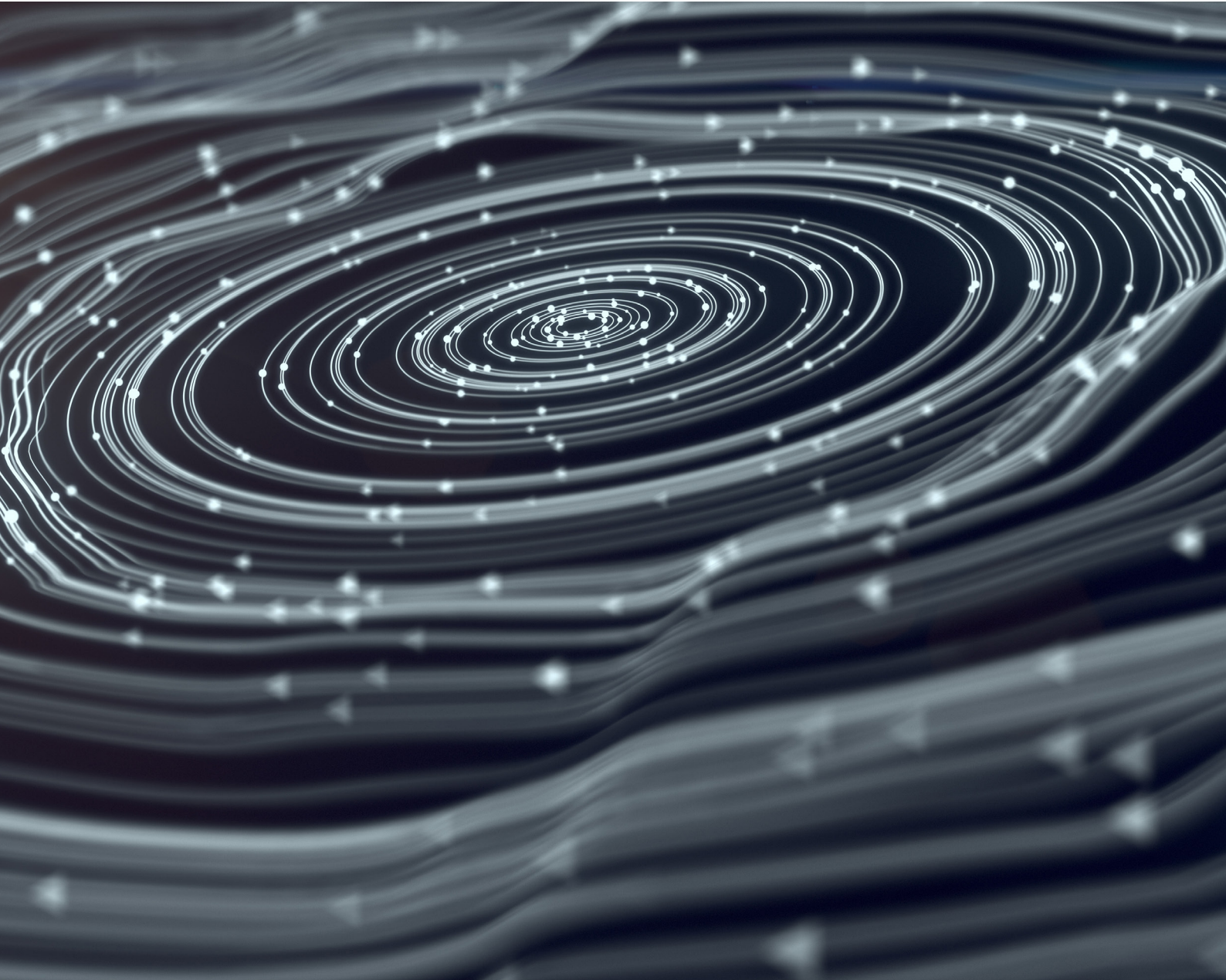
The
Economist

INTELLIGENCE
UNIT

Aftershock

The pervasive effects of tariff hikes

A report by The Economist Intelligence Unit



Commissioned by

 INTERNATIONAL
CHAMBER
OF COMMERCE
The world business organization

 WORLD TRADE
AGENDA
An initiative in partnership with Qatar Chamber

 غرفة قطر
QATAR CHAMBER

Contents

1. INTRODUCTION	6
2. THE FAR-REACHING CONSEQUENCES OF TARIFF INCREASES	11
3. UNINTENDED CONSEQUENCES: US TARIFFS ON TYRE IMPORTS FROM CHINA	25
4. ENVIRONMENTAL PAIN: THE EU-CHINA SOLAR PANEL DISPUTE	29
CONCLUSION: IMPLICATIONS FOR POLICYMAKERS	34

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The ICC World Trade Agenda is an initiative designed to enable global business leaders to define multilateral trade negotiation priorities and to help governments set a trade and investment policy agenda for the 21st century that contributes to sustainable economic growth and job creation. The initiative actively promotes a robust post-Nairobi trade and investment policy agenda in relevant forums, including the Business 20 and G20 discussions, and in particular at the WTO in the lead-up to and during its next Ministerial Conference.

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EXECUTIVE SUMMARY

After half a century of falling import tariffs, a profound shift is under way. Recent tit-for-tat actions by the US, China and others mean that a return to the destructive broad-based tariff increases of the 1930s is a genuine possibility. Critics of free trade are right to assert that trade liberalisation has had some negative consequences. But tariffs will not address these issues. Rather they will have diverse negative effects that will swamp any limited positive impact. This report examines ten areas where these negative effects could be felt:

- **Inflation:** Tariff increases will likely cause an uptick in inflation in the US, particularly if the dollar weakens. The UK appears even more vulnerable to an inflation spike.
- **Supply chains:** Tariffs are unlikely to lead to major new “reshoring” of production back to the US. Some companies will shift production from China to neighbouring countries, but this is a more costly and complex process than many imagine.
- **Export growth:** Retaliation from other countries means that import tariffs will act as a “tax on exports”. Export-focused sectors like the UK automotive industry are at risk.
- **Productivity and rent-seeking:** Tariff hikes will channel resources towards import-competing firms and shield them from competition, weakening productivity growth.
- **Economic growth:** Tariff increases hurt economic growth, although the timing and scale of these negative effects will depend on a variety of factors.
- **Poverty:** Tariff increases are likely to disproportionately hurt poorer households through their effects on inflation and/or employment.
- **Inequality:** Tariff increases may have a certain equalising effect if they disproportionately affect output in high-value-added sectors and facilitate the expansion of low-value-added sectors, as is expected with Brexit. However, any boost in inequality would come as a result of a decrease in overall output and growth.
- **Health:** While not the focus of recent tariff increases, tariffs levied on health products can cost lives, particularly if developing countries implement them (for instance, as several already do on mosquito nets).
- **Environment:** The EU’s experience of levying tariffs on Chinese solar panels demonstrates that such moves can hurt environmental goals—an effect that the US is now likely to experience.
- **Politics:** Recent tariff increases are a response to the political polarisation caused by trade liberalisation. However, they are more likely to exacerbate this polarisation, rather than address it. Better solutions are available.

AFTERSHOCK

THE PERVASIVE EFFECTS OF TARIFF HIKES

To demonstrate the diverse and often unexpected effects of tariff increases, we examine two case studies. The first considers how US tariff increases on Chinese tyres in 2009 led to a small increase in employment in the domestic tyre sector, but how this effect was dwarfed by the additional costs borne by US consumers. For example, there were far higher job losses in the retail sector and retaliatory tariffs were placed on US poultry exports. The second case study examines how the EU–China solar panel dispute, which began in 2012 and was recently unwound, hurt the EU’s environmental goals. We conclude the report with recommendations for policymakers to consider before levying tariffs, and the alternative tools that are available.

1. INTRODUCTION

Turning back the clock

After half a century of falling import tariffs, a profound shift is under way. A spate of high-profile tariff increases is causing corporate, civil society and government decision-makers to re-evaluate deep-rooted assumptions about the future of trade policy. In the first three months of 2018 the US government's loudly trumpeted decision to impose higher tariffs on solar panels, steel and aluminium was met with swift retaliation from the EU, Canada, Mexico and China. Undaunted, the US levied additional tariffs on Chinese goods worth close to US\$50bn, with China again responding in kind. A threat by the US to raise tariffs increases on China from 10% to 25% was temporarily postponed in December, but remains a real risk. These tit-for-tat tariff increases threaten to reverse decades of trade liberalisation, which has nudged average tariffs between the US, Europe and Japan down from 22% in 1947 to around 3% today (although many G20 members still set a significant share of their tariffs above 15%—see graphic, below).

Many policymakers are aware that widespread tariff increases are bad policy, yet appear unable to resist the pressure to retaliate. As the president of the European Commission, Jean-Claude Juncker, bluntly stated in response to the US tariffs: "We can also do stupid." More worryingly, retaliation against the US is not the only source of tariff increases in the offing. The torturous nature of the UK's negotiations to leave the EU mean that failure to secure a deal and the subsequent imposition of most favoured nation (MFN) tariffs on UK-EU trade are a distinct possibility. Furthermore, if tariff increases in the US, the UK, the EU and China continue, they may also legitimise a broader return to the use of tariffs as a policy tool around the world. Fears that Chinese steel that would otherwise be destined for the US market will now be shipped elsewhere have already led other countries to impose tariffs. Both the EU and Canada have imposed safeguard measures on imported steel. In August, Indonesia announced increased tariffs on 900 consumer items to try to halt a precipitous fall in its currency.

What is a tariff?

According to the World Trade Organisation (WTO), tariffs are customs duties on merchandise imports. Tariffs give a price advantage to locally produced goods over similar goods that are imported. Tariffs

are sometimes called import duties, import taxes or cess. Tariffs can be imposed on: subsidised imports, on exports that are sold at prices that are lower than in the exporter's domestic market ("dumping"), or on goods where imports have surged. In each case only if harm can be shown to an import-competing domestic industry.¹

More common than you think

There is no iron law of history stating that import tariffs must keep falling. According to Global Trade Alert, which monitors policies that affect global commerce, governments have already implemented more than 235 distinct tariff increases in 2018.² Even before the recent wave of tariff increases, governments have raised import tariffs more frequently than most observers appreciate—more than

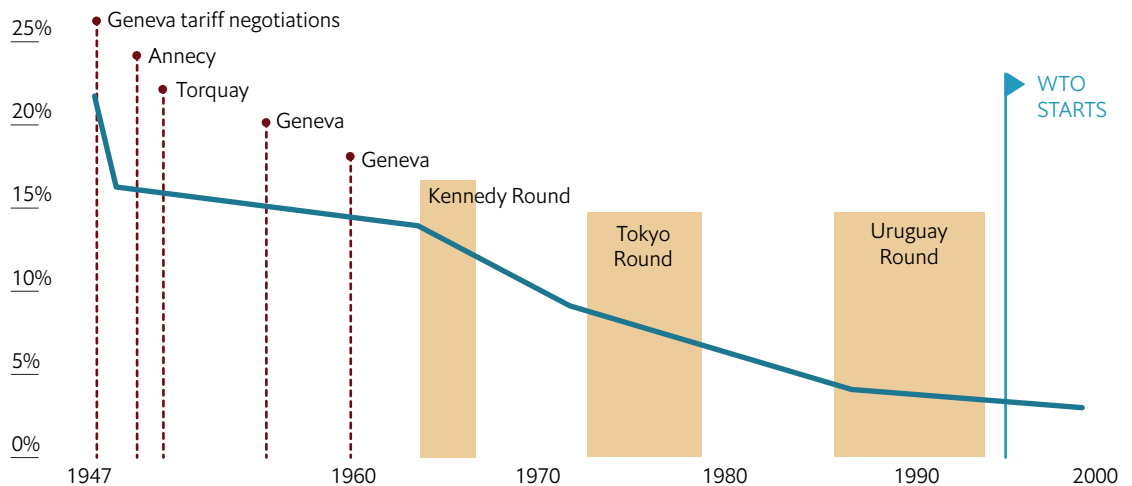
3,465 times over the past decade.³ This figure appears high, given the presence of a rules-based world trading system underpinned by the WTO. But while the WTO has successfully cut average tariff rates, countries retain considerable leeway to raise tariffs on imported products.

According to WTO rules, if governments conduct proper investigations, they are permitted to raise tariffs or impose trade barriers on: dumped imports, subsidised imports and import surges—if domestic import-competing industries are being harmed. Countries can also raise tariffs in exceptional circumstances, such as the outbreak of war or threats to national security (the US administration led by Donald Trump claims, improbably, that Chinese imports constitute the latter). Even if the WTO believes that governments are raising tariffs improperly, it can take up to two years before its judges rule them illegal. In the meantime, a lot of damage can be done.

While the number of tariff increases in 2018 was not dramatically higher than in previous years, the scale of the increases was unprecedented. According to Global Trade Alert, countries introduced a total of 199 initiatives to raise tariffs in the first 9 months of 2018. Six of these initiatives raised tariffs on over 100 products. At the time of writing the US has imposed tariffs on Chinese imports worth over one-quarter of a trillion dollars. The latest round of tariff increases, which came into effect on September 23rd 2018, saw a tariff rate of 10% imposed on Chinese exports worth US\$200bn. The US had previously threatened to boost that rate to 25% on January 1st 2019 but the two countries agreed in December 2018 to press the pause button on any new trade tariffs for 90 days to accommodate talks. Had China retaliated, the US administration indicated that it was willing to impose import tariffs on all remaining Chinese imports, taking the total value of Chinese exports facing US tariffs up to an estimated US\$505bn. Rarely in the post-war era have tariff increases on this scale been observed.

Fall of duty

GATT average tariff rates for US, EU and Japan, %



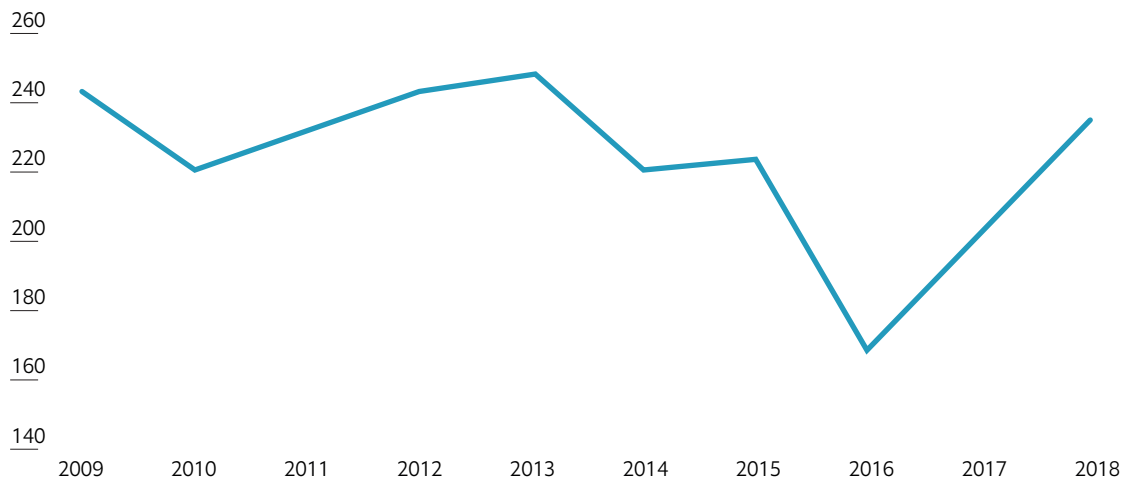
Source: The Economist

Scope to grow

Outside of the US and China, most governments can legally raise their tariffs, to a certain degree, without giving any notice to the WTO. This is because WTO members commit to *maximum* tariff levels rather than *actual* levels. Owing to substantial tariff cutting over the past quarter of a century,

Tariff increases happen often. 2018 isn't exceptional

Number of tariff increases



Note. These numbers include tariff increases associated with anti-dumping, anti-subsidy and safeguard actions; As of October 2018

Source: Global Trade Alert.

particularly in emerging markets, current tariffs typically fall well short of these legal maximums. In more sedate times, this differential rarely proved significant. In a period of rising trade tensions, governments could increase their tariffs substantially, overnight.

More than half of G20 members—the largest economies in the world—could raise their average tariffs by 5% or more (see graphic, below). Dozens of smaller trading nations could also raise their tariffs sharply without breaking WTO rules. The 5% threshold is relevant because it corresponds to the average tariff increase that the US imposed in 1930 through the ill-fated Smoot-Hawley Tariff Act.^{4,5} The US president at that time, Herbert Hoover, signed this act despite a petition by 1,028 of the most notable US economists. The tariff increases that followed were not the main driver of the Great Depression, but they exacerbated its effects and triggered retaliation from trading partners, leading to a collapse in world trade. The subsequent increase in global protectionism took decades to dismantle—a fact that increasingly seems to foreshadow the current situation.

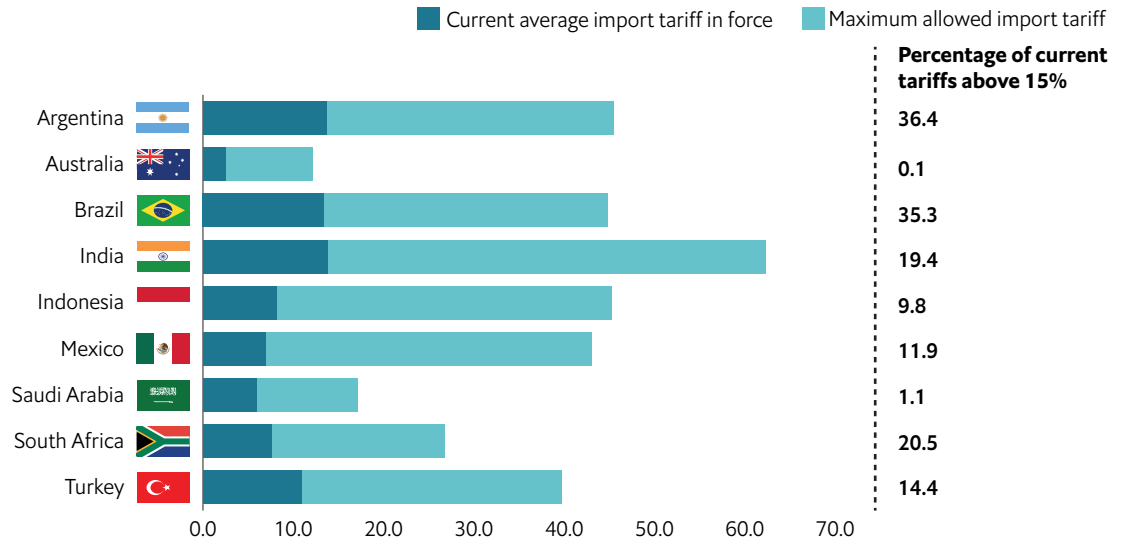
Is it time for tariffs?

The recent tariff increases did not arrive unannounced. They follow a populist-fuelled backlash against free trade and globalisation, exacerbated by the outbreak of the global financial crisis in 2008. While this report focuses on tariffs, other policies that distort trade and investment flows, such as subsidies, quotas, national security reviews and state-ownership, are also back in vogue. As of October 15th 2018 Global Trade Alert has recorded 781 “trade-restricting” policies in 2018, of which just 14% are tariff increases. Over 40% relate to subsidies.⁶

Populists have plenty of ammunition in their arsenal. Even the most ardent of free-trade advocates now acknowledge that the effects of liberalisation have not been uniformly positive, particularly for people working in export-competing industries, and in infant industries in developing countries. Protectionists may overplay the impact of China’s joining the WTO on US manufacturing jobs, but it did have a sizeable effect. Studies suggest that approximately one-fifth of the 6 million US manufacturing jobs lost between 1999 and 2011 were due to Chinese imports, and that those who lost jobs generally

Scope to grow

Current and maximum tariffs among a selection of G20 members, %



Source: WTO (2018).

did not find new ones in nearby locations.⁷ Policymakers and business executives across the world also share the Trump administration’s desire to punish China for unfair trade practices, including forced technology transfers and intellectual property theft.

Tariff increases themselves can have some merits, at least temporarily. In poor countries tariffs can be easier to collect than sales taxes, requiring only infrastructure at ports. Provisions allowing countries to impose new tariffs may help to garner political support for free-trade deals. Tariffs may also help a domestic industry to catch up with foreign competitors by offering temporary relief from more developed rivals. Environmentalists in particular long for tariff increases on fossil fuel imports, to stave off the increasingly ominous threat of climate change and ecological destruction.

Costs Trump benefits

Tariff increases may appear justified, but they almost never address the problem that they are trying to solve. Even if new US tariffs lead to some “reshoring” of manufacturing jobs, they will not result in the restoration of anything like the number of jobs that existed previously. This is because far more jobs were lost to automation than to Chinese imports, and this automation continues to accelerate. More importantly, tariff increases have diverse negative effects that counteract and exceed any limited positive impact. Most obviously, tariffs hurt consumers by inflating prices and preventing exchanges that would otherwise be beneficial to both parties. When tariffs increase the prices of necessities, they have a disproportionately large effect on lower-income households and can risk tipping them into poverty.

Furthermore, as this report will make clear, the negative effects of tariff increases extend far beyond inflation. When tariff increases break earlier promises, political trust between nations is eroded, making co-ordinated action on other global challenges difficult. When countries retaliate, export industries and their employees suffer. Tariffs also distort implementor economies, by channelling resources to protected industries and drawing workers and investment away from others.

The goal of this report

Given governments' latitude to increase tariffs, the case against doing so must be made and won in each nation. This report aims to support that endeavour. The tariff increases under consideration currently range from surgical rises (targeting specific products from selected exporters) to across-the-board hikes. It is the latter that pose the biggest threat to living standards. This report provides policymakers and decision-makers with an evidence-based overview of the gamut of potential economic and social consequences that may result from their imposition.

In the first half of the report, we examine ten areas where negative effects may be felt—from supply chains to poverty and health outcomes. One implication that quickly becomes clear is that it is very misleading to frame discussions on tariff increases narrowly in terms of dynamics within a sector or between two trading partners. In the second half of the report, we examine two case studies of tariff increases that have had adverse, and unintended, social consequences. First, we examine tariff increases on low-end tyre imports by the US in 2009. Second, we look at a five-year saga of EU tariff increases and changes on imported solar panels from China. In each case, what was framed by proponents as a limited, technocratic action affecting a single sector had far broader economic and social consequences. We conclude the report with recommendations for policymakers.

2. THE FAR-REACHING CONSEQUENCES OF TARIFF INCREASES

The practice of charging taxes on imported goods is centuries old. Governments of all stripes have long justified tariffs as a means to raise revenue for the state, to sanction foreign governments for “dumping” subsidised products or other objectionable policies, and to offer temporary relief to domestic firms facing a surge in competition from abroad.

Today, the arguments in favour of tariff increases are increasingly diverse and complex. Coalitions of non-governmental organisations and international bodies claim that tariffs should be imposed on countries with lower environmental standards to counter the “carbon leakage” of their heavily polluting firms. Activists call for tariffs to tackle the “social dumping” that allows companies to enjoy lower production costs, not on account of higher productivity, but because the local government does not impose minimum labour standards and employee benefits and/or does not collect sufficient taxes to support a welfare state.

Method of most harm

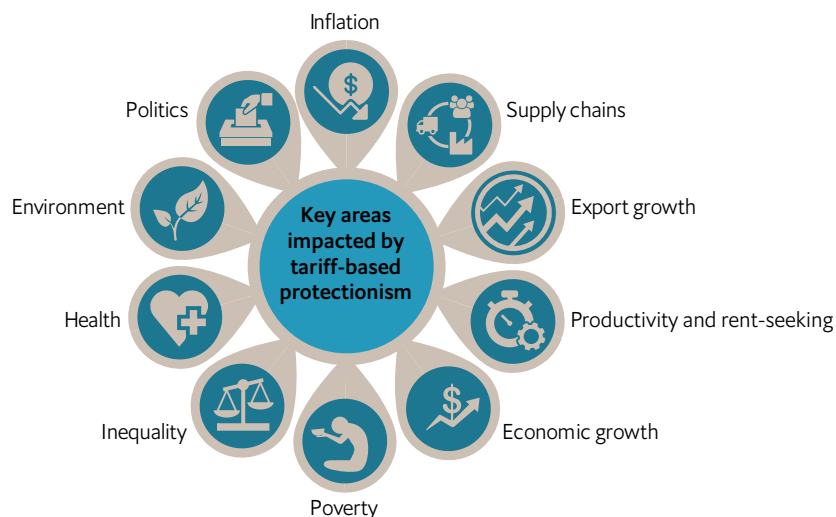
This report does not examine each of these rationales. However, good policymaking involves choosing the best available tool to attain a social goal. It is not enough for tariff increases to result in an increase in fiscal revenue or to reduce imports of carbon-heavy products. What matters is whether tariffs are the most effective and least harmful means to achieve these ends. Proponents of tariff increases can rarely, if ever, show evidence that this is likely to be the case. Economists have analysed tariffs for decades and rarely found them to be the best tool to use.⁸ Unfortunately, a lack of evidence does not mean that the arguments against using tariffs win the day. As economics professor Mark J. Perry noted, paraphrasing the economist and social theorist Thomas Sowell: “The first lesson of international economics is that free trade makes us better off and protectionism makes us worse off. The first lesson of politics when it comes to trade issues is to ignore the first lesson of international economics.”⁹

The main reason for the inadequacy of tariffs as a policy tool is that they have a variety of negative effects that swamp any positive impact. Moreover, as noted by interviewees, it is typically much easier to introduce tariff increases than to remove them, meaning that these negative effects can be long-lasting. In this section, we examine ten areas where a global increase in broad-based tariffs may have negative effects. The goal is not to predict the specific impacts of the recent tariff increases but rather to paint a picture of the wider effects that a return to tariff-based protectionism around the world could have, based on the evidence available.⁹

Inflation: Impossible to avoid

Tariffs are a tax on imports. Levied as either an absolute amount or a percentage of the price declared at the border,¹⁰ tariffs raise the price paid by importers above that which foreign sellers receive. Buyers, who vary from: individual consumers, supermarkets or firms that buy parts, commodities and raw materials abroad, will likely face higher prices. In response, they will aim to find alternative suppliers with cheaper prices or, failing that, cut back on the total volume of goods that they purchase.¹¹

Key areas impacted by tariff-based protectionism



Source: The Economist Intelligence Unit

While duties are directly paid by importers, the question of who ultimately “pays for tariffs” is more complicated. Mr Trump claims that ‘foreigners’ (i.e. the exporter) will pay the cost of the US\$200bn in tariffs that he plans to impose on Chinese goods. These foreign firms could end up shouldering some of the burden if they reduce their prices in response- to keep the overall buyer’s price stable. For example, Douglas Irwin of Dartmouth College found that in 1897 foreign exporters absorbed at least 60% of an increase in US sugar tariffs as they dropped their prices to maintain access to the mighty American market.¹² However, this option is available only to producers with high profit margins and a lack of alternative markets. To date, Chinese exporters’ prices do not appear to have fallen in response to US tariffs, with export indices suggesting that prices in July 2018 were broadly in line with those of six months earlier.¹³

US consumers could also avoid footing the bill for tariff increases if other currencies depreciate (making imports cheaper). However, Gita Gopinath of Harvard University, who was recently appointed Chief Economist at the International Monetary Fund, has argued in the past that around only 30% of exchange-rate movements typically get passed through to prices. Crucially, Chinese exporters often use inputs priced in US dollars that in fact become more expensive when the renminbi depreciates.¹⁴

As such, it is likely that US tariff increases will lead to an uptick in domestic inflation, although this may be limited in the short term. A July 2018 Wells Fargo study estimated that the tariffs already imposed will increase consumer price inflation by just 0.1 percentage points, but that this will rise to 0.5 percentage points if or when proposed additional tariffs are introduced.¹⁵ The study noted that the effects on inflation were initially constrained because the tariffs focused on intermediate goods. Tariff increases on intermediate goods do not typically result in like-for-like increases in consumer goods prices, as they only account for a share of a company’s production costs, alongside other inputs, such as labour. The strength of the US dollar has also limited inflationary effects to date. However, if the scope of tariff increases continues to widen, for example if trade talks between the US and China fail to provide some form of agreement, or the US dollar weakens, inflation will likely increase.

Other countries look more vulnerable to short-term increases in inflation. In the UK, inflation has already accelerated by more than two percentage points since the Brexit referendum, mainly due to a sharp currency depreciation. A further increase is likely. A recent study evaluated the impact of a no-deal “MFN Brexit”, where the EU would impose the same tariffs on UK trade as they impose on countries with which they have no free trade agreements. The study found that an MFN Brexit will increase the cost of living for a typical household by around 1%. For the 8% of households that are most vulnerable to imports costs, including single parents, the unemployed and pensioners, the cost of living would rise by 2% or more.¹⁶ One reason for this is that food products—including dairy products, meats, and oil and fats—would be among those hardest hit by EU tariffs.

Supply chains: Twist and dodge

Over the past two decades the costs of doing business across borders has tumbled, thanks to rapid advances in technology, transport and communications. This has led companies to create complex global supply chains. Products that were previously manufactured domestically are now assembled from modules made in other locations, with these modules assembled from sub modules originating elsewhere—depending on where cost-efficiency trade-offs are most advantageous. Tiers of suppliers have emerged, and manufactured goods may criss-cross national borders many times before reaching the final customer.

Even before firms developed intricate global supply chains, their competitiveness partly depended on their ability to source high-quality components from abroad. As tariffs fell, the range of suppliers available to exporters increased and greater competition resulted in better value for money.¹⁷ Against this backdrop, tariffs on imported components and capital equipment effectively act as a tax on exports because the competitiveness of downstream buyers is adversely affected.

The Trump administration hopes that tariff increases will lead manufacturing firms to “reshore” some of their production to the US. However, before the recent spate of tariff increases, some reshoring was already beginning. As wages in China surged, the US and other developed countries sought to grow their high-end, domestic manufacturing sectors that were more reliant on advanced technology than cheap components from abroad.

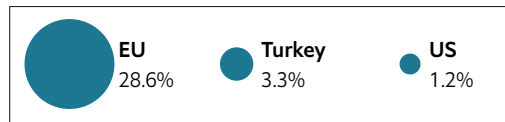
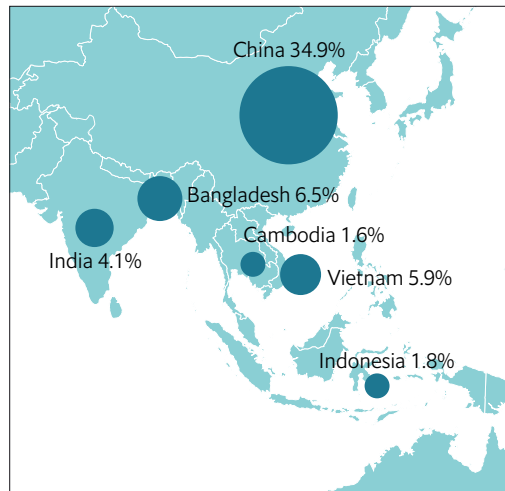
Tariff increases are unlikely to lead to a major increase in this reshoring to the US, and will almost certainly not in more traditional manufacturing. Global supply chains are complex, but also flexible. Even before the recent tariff increases, many international firms were looking to supplement their Chinese operations with lower-cost production in other markets, such as Vietnam and Cambodia, as part of a so-called China Plus 1 strategy. In response to tariffs, the pace of this reorientation is likely to increase. In September 2018 executives at Steve Madden, a fashion retailer, told investors that the company was working on a plan to double its Cambodian production next year to about 30% of its total, in addition to considering price rises in US stores.¹⁸ Hoover-maker Techtronic Industries and Google’s hardware maker Flex are planning moves to Vietnam and Malaysia, respectively.¹⁹

Moving production from China to other countries is not easy. China-based supply chains benefit from advanced infrastructure and deep relationships between suppliers. Shifting production to other markets, where investment laws are often unclear and labour and environmental standards lax, will come at a cost. Given that so many sectors—such as vehicle manufacturing, electronics,

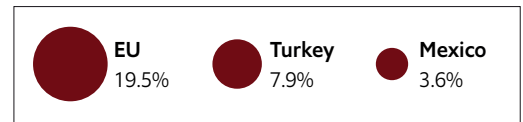
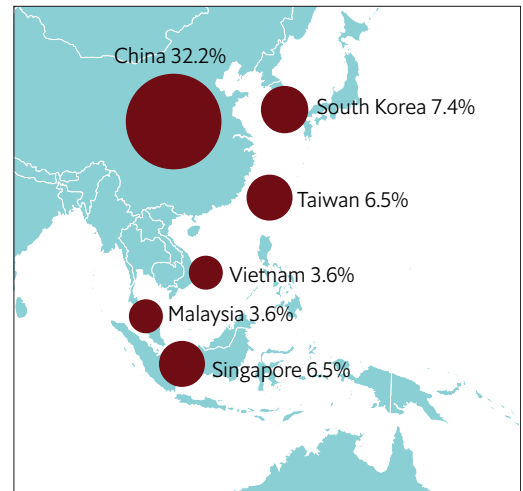
Top exporters in global supply chain

Share in world exports in:

Clothing, 2017



Office and telecom equipment, 2017



Source: World Trade Organisation; The Financial Times

retail, clothing, and information technology—depend on cross-border supply chains, it is difficult to understate the extensive corporate reorganisation that a return to higher tariff levels would require. Some investments would have to be written off. Innovation strategies, which can now involve multiple partners, would have to be rethought. Consequently, even in the event of persistent tariff increases, a substantial amount of manufacturing production is likely to remain in China, and firms will have to stomach lower profits or pass on the increased costs to consumers. It is no wonder then, that the US car industry has opposed current proposals to impose heavy tariffs on imported cars and car parts.

Export growth: Shrinking targets

Tariff increases do not only affect companies’ supply chains. If other countries respond in kind, then tariffs will also affect firms’ ability to export to new and existing markets, hurting corporate profitability and growth. The case of UK-based car manufacturers highlights what is at stake. At present, these firms can export cars and car parts across the English Channel to EU markets tariff-free. If no trade deal is struck as part of the Brexit negotiations, cars will be subject to a 10% tariff and components to a 4.5% tariff.²⁰ These costs will reduce the profitability of UK-based automotive producers and will strongly discourage new foreign direct investment in the sector.²¹ A February 2018 report by the Business, Energy and Industrial Strategy Committee of the UK House of Commons (the lower house of parliament) summarised the concerns:²²

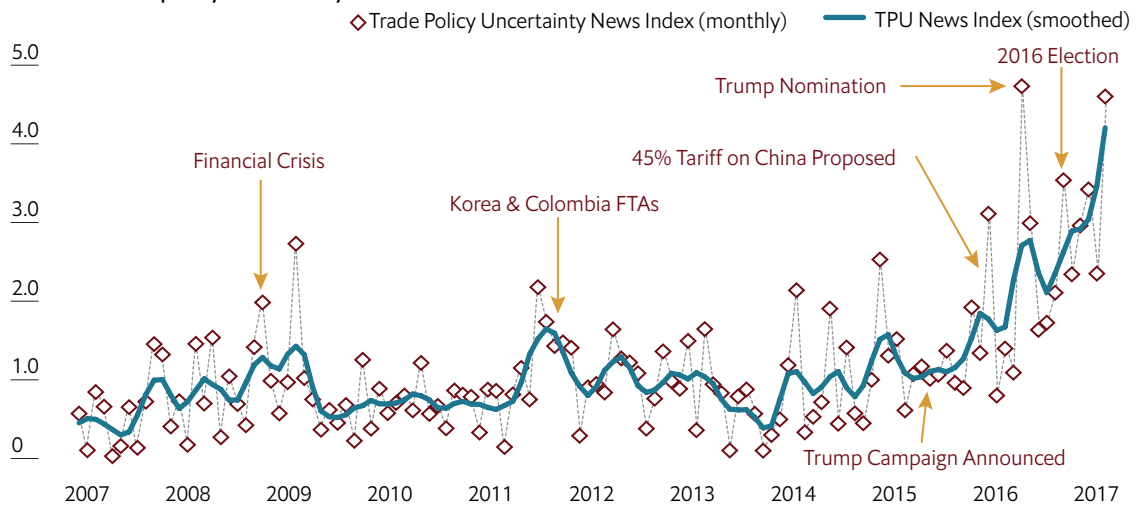
“Unless these additional [tariff-related] costs were to be passed on to consumers, the current profit margin of around £450 on a £15,000 car would be comfortably wiped out. Such an increase would inevitably have an impact on sales. One study by Her Majesty’s Revenue and Customs (HMRC) has

estimated that a 15 per cent price impact would result in 550,000 fewer sales in EU countries per year, a fall of around 19 per cent. Another study²³ estimated the introduction of trade barriers to result in a £7.9bn decline in exports to the EU. The SMMT [Society of Motor Manufacturers and Traders] has put the figure at £4.5bn. Professor David Bailey, of the Aston Business School has noted that there is no guarantee of future (automotive) production in the UK.²⁴

Fluctuating tariffs also create uncertainty about future trade policy, which in turn makes traders more reluctant to sell to new markets.²⁵ In short, the mere risk of a tariff increase—and not just its reality—can have a chilling effect on international trade. In the US, indices show elevated levels of uncertainty on the part of industry regarding the direction of trade policy well before the recent spate of high-profile tariff increases (see graphic, below). A July 2018 study²⁶ by academics at Cambridge University estimated that, because of Brexit-related uncertainty, almost 4,000 British firms stopped exporting to the EU in 2016, and over 5,200 firms that would ordinarily have begun exporting did not do so. As the authors noted, one of the acknowledged benefits of signing trade agreements, and sticking to them, is that they reduce the uncertainty and downside risks that can otherwise make international trade unpalatable.

Uncertain times

Index of trade policy uncertainty



Source: Carballo, Handley, and Limao (2018).

Productivity and rent-seeking: Bad incentives

Anemic productivity growth is one of the main constraints on global economic growth today. Between 2008 and 2014, productivity growth in the OECD averaged just 1% a year. In 2016, productivity growth in the US actually slipped into negative territory. Even in emerging markets there has been a sharp deceleration in improvements to productivity over the past decade, including China. Tariff increases now threaten to weaken productivity growth further.

Tariff increases hurt exporting firms by disrupting their supply chains, hurting their competitiveness and reducing the size of their export markets. Conversely, they provide a boost to domestic firms who compete with imports, as they are given a cost advantage of foreign producers. This can distort a country's economy, as though domestic exporting and import-competing companies do not compete

directly for market share, they do vie against each other for the best staff, to secure finance, and to obtain the raw materials, energy and facilities. Tariff increases can therefore reorient the structure of the economy towards import-competing firms and away from exporting firms²⁷. This reorientation of a nation's resources toward protected sectors, including inefficient firms, rather than towards the most efficient or innovative sectors, hurts overall productivity growth²⁸. Moreover, raising tariffs sharply reduces the pressure from foreign rivals on domestic firms to upgrade their products, leading to further adverse effects on innovation and productivity.

In China, state owned enterprises (SOEs) generally lag behind private firms in innovation and productivity, and deliver much lower returns on investment. Since Xi Jinping became leader in 2012, despite reformers' initial hopes, the role of SOEs in the economy has grown. In 2018, 22 listed non-state firms have sold large stakes to SOE investors. Some observers now worry that tariff hikes will exacerbate the flow of funds and political support to SOEs, at the expense of private firms, as China's leadership seeks politically reliable self-sufficient institutions that promise security of supply, even if it is not commercially astute.^{29, 30}

Higher sales and prices also flatter the financial performance of import-competing firms, and this helps to explain why some firms lobby for tariffs in the first place.³¹ According to congressional reports, spurred on by the prospect of Mr Trump's tariff increases, the US steel industry spent US\$3.4m on lobbying in the first three months of 2018 alone. This was their highest rate of spending since Congress (the US legislature) began tracking quarterly reports in 2008.³² Once tariffs are in place, there is a natural incentive for companies to expend resources on lobbying to keep them in place.

These dynamics highlight one of the key lessons to be learnt about tariffs: whatever their rationale and whatever the rhetoric used by proponents, they inevitably redistribute income within the implementing country. Although the US administration's steel and aluminium tariffs have boosted domestic producers, they have at the same time hurt the various manufacturers that use steel and aluminium as an input, such as manufacturers of farm equipment (and their customers). There is no such thing as a "free lunch": when politicians choose to change a tariff, they are choosing to harm at least one domestic interest group in order to benefit another.

Economic growth: Prepare for a downturn

On July 27th President Donald Trump was "thrilled" to announce that America's economy grew by the "amazing" rate of 4.1% in the second quarter of 2018—enough to put it on track for average annual growth of over 3%.³³ The impressive growth rate likely owed more to the recent tax cuts and high oil price (which boosted investment), than the effects of tariffs.³⁴ However, tariff increases probably did provide a short-term growth boost, albeit an unexpected one. After China announced retaliatory tariffs on US soybeans, Chinese customers accelerated their purchases before the tariff increase came into effect, leading to a temporary boost to US exports.

As the American economist Barry Eichengreen recently noted, the future effects of tariff increases on short-term growth in the US, China and elsewhere will depend considerably on four factors. First the fiscal context (how tariff revenues are used), the monetary context (how central banks respond, for example, to rising prices), the political context (how policy making is affected) and finally the financial context (how currency changes translate into capital gains and losses). However, past evidence

suggests that they are likely to hurt short-term growth. A 2018 study for the US National Bureau of Economic Research (NBER) examined the effect of temporary tariffs imposed on dumped products.³⁵ They examined the impact on quarterly GDP growth, inflation and net exports, covering 21 economies including Canada and Turkey between 1999-2015. Commenting on their findings for Canada, which were representative of what they observed in other countries, the authors found that protectionism has similar effects to an unfavourable supply shock. Inflation rises and real economic growth falls. Explaining their findings, the authors note that tariffs drive up import prices. Consumers therefore switch towards domestic alternatives, reallocating market share towards less efficient domestic producers. In turn, this lowers aggregate productivity. Meanwhile, higher domestic prices reduce real incomes and expenditure, and firms cut back on investment spending and are less keen to enter new product markets. These effects together cause aggregate spending to fall. The trade balance improves, but only because imports fall more than exports.

In summarising the effects of tariffs on *long-term* economic growth, Eichengreen recently stated: “Nothing one can say in this area is uncontroversial, but probably the least controversial statement I can make is that there exists a broad consensus that that trade openness is positively associated with growth.”³⁶ In support, Eichengreen points to classic studies of economic growth and development in Columbia, South Korea, Taiwan and Turkey,³⁷ as well as studies that compare regional growth in East Asia and Latin America.³⁸

Some analysts have argued that higher import tariffs were historically associated with higher economic growth rates, as they helped to foster infant industries, for example in the US in the late 19th century.³⁹ However, in his recent study, Eichengreen carefully considers the historical evidence and finds the arguments wanting. Much turns on the mechanism by which protected local firms learn to innovate and improve their competitiveness and often that learning comes from sources abroad. The implication is that a return to broad-based tariff increases will act as a drag on long-term economic growth in the US and elsewhere, at a time when shrinking labour markets and low productivity growth are already constraining growth prospects.

Poverty: Getting squeezed

There is no clear pattern for how tariff increases affect poverty rates. The same tariff hike may affect the poorest communities in two different countries in different ways, depending on those countries’ economic structure, labour and capital mobility, geographic location, and income distribution, among other factors. Much depends on how tariff hikes affect three variables: inflation, government expenditure and the labour market.

In the US, tariff hikes are likely to result in higher domestic prices and poor households will feel the effects of this most keenly. A 2017 study, conducted before the recent spate of tariff increases, conservatively estimated that the poorest 10-20% of American households pay about US\$95 a year due to tariffs, while middle-income households pay roughly US\$190 and the richest 10% about US\$500.⁴⁰ However, the *burden* of tariffs is substantially higher for poor households relative to their income (see graphic, below).⁴¹ It is thus conceivable that broad-based tariff increases may push some US households into poverty, particularly if employment also falls in industries where poorer individuals disproportionately work, such as retail. This was the case with past US tariff increases on Chinese

Squeezing the poorest

Tariff burden in the US, by income decile, as a proportion of household income, %



Source: Vox

tyres (see case study 1, below). The government could mitigate the negative effects of tariff hikes by channelling tariff revenue into welfare and active labour market policies. However, this does not appear to be a policy priority for the Trump administration.

The effects of broad-based tariff increases on *global* poverty rates will hinge on how they affect developing countries. The vast majority of people in extreme poverty⁴² live in Africa and South-east Asia, and are not central targets in current debates about tariffs, which focus on large developed and emerging markets. However, tariffs may spill over into poor, developing countries - for instance, if China responds to US tariffs by dumping cheap exports in their domestic markets. At the very least, the recent spate of tariff hikes may weaken support for pro-trade advocates in developing countries, who will need to make the case that trade liberalisation has boosted development and cut poverty rates in their country.

To understand how households in developing countries may be affected by tariff increases, we can first examine how they were impacted by trade liberalisation. During the past quarter of a century some of the largest falls in import tariffs have occurred in developing countries. Before India began its market reforms in 1991, it charged an average tariff of 51%, with a 151% tariff on imported manufactured good. Today, it charges less than 10%.

A 2011 review of more than 200 studies concluded that trade liberalisation often has negative effects on employment in the short term, as employees in import-competing industries lose out.⁴³ The adjustment process is not easy, as weak social safety nets mean that the costs of adjusting from one job to another fall principally on the household. In the short-term, these negative effects on employment can override any beneficial price decreases that households feel, with the level of employment disruption also partly dependent on whether “rigidities”, such as labour regulations and trade unions, inhibit mobility between roles.

In the medium- and long-term the overall effect on trade liberalisation on poverty rests, in part, on whether productivity growth picks up, as firms access better parts and equipment from abroad. If it

does, this should lead to an uptick in GDP growth, with positive knock-on effects for state revenue and thus for the government’s ability to finance education, healthcare and social security.

A return to tariff increases is likely to reverse these effects, in that it may lead to an increase in employment in import-competing sectors in the short term but will prevent much-needed job creation in other sectors in the medium term. In the long term, renewed tariff increases will weaken developing countries’ ability to develop indigenous manufacturing sectors and to secure a productivity boost in the agricultural sector.

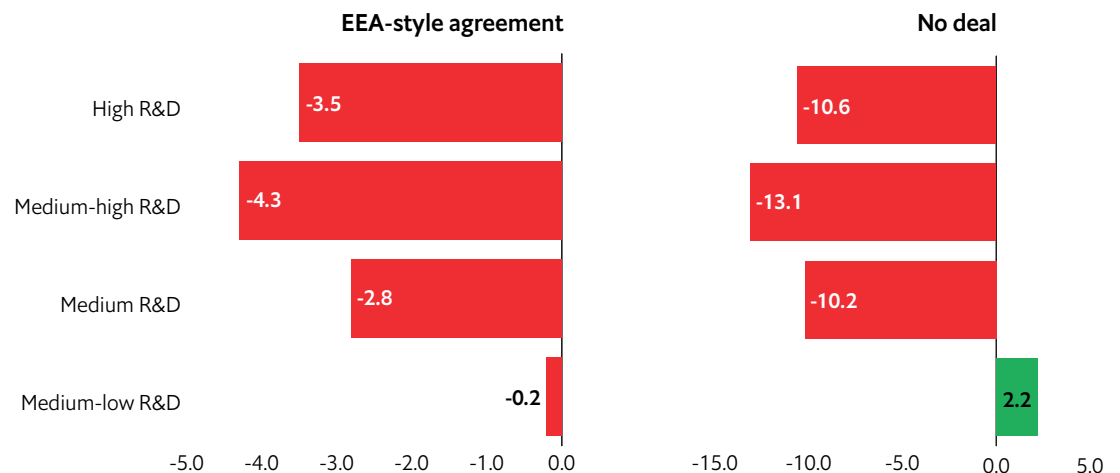
Inequality: Mixed signals

The effects of tariff increases on inequality are more complex than their impact on poverty. Much will depend on how tariffs affect the prices of different goods in individual countries, but also how they affect output and employment across different industries—for example the degree to which lower-paid (or higher-paid) jobs will be disproportionately affected.

A 2018 study by academics at the UK Trade Policy Observatory found that the impact of Brexit will differ markedly by industry, depending on the skills and technology levels involved.⁴⁴ The study assessed five potential Brexit scenarios, ranging from the UK exiting the EU with no deal to the country retaining full membership of the single market. In each scenario, output declines in most sectors. A rare exception is in agriculture, where output in the food-processing sector is forecast to rise in all scenarios and to jump by close to 20% in the no-deal scenario, as high EU tariffs on food will mean the UK to produce more food at home. By contrast, high- and medium-technology sectors—and particularly research and development (R&D)-intensive ones—are more vulnerable to output declines. In the English districts of Stratford-upon-Avon, Fylde and Ribble Valley more than 1,500 high-tech jobs may be lost for every 100,000 economically active residents. Stratford is an area where the automotive industry accounts for a high proportion of employment. Fylde and Ribble Valley, meanwhile, concentrate on the manufacture of aircraft and spacecraft. It is thus likely that Brexit will weaken economic growth in the UK by hurting the most productive sectors of the economy. However, it may

Hit the hardest

Forecast change in quantity of output in UK R&D-intensive sectors, post-Brexit



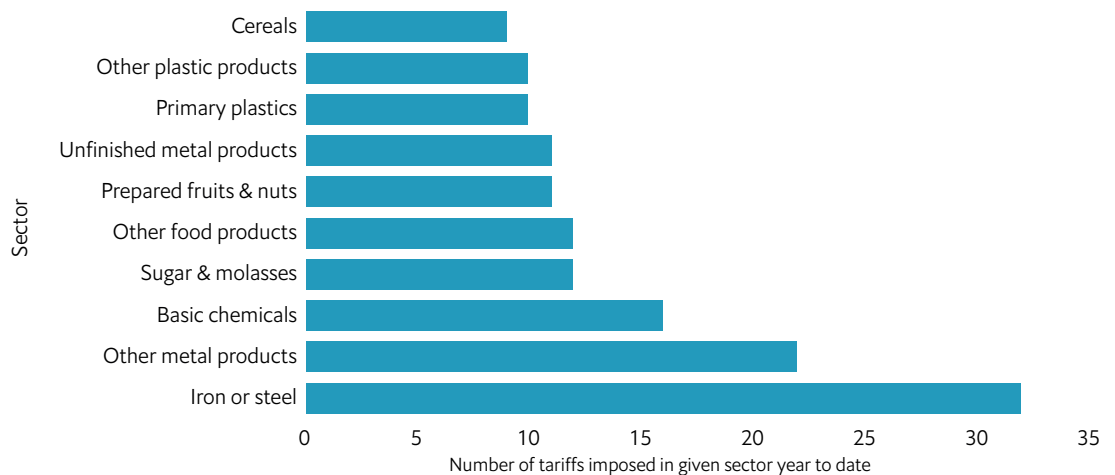
Source: Michael Gasiorek, Ilona Serwicka, Alasdair Smith (2018)

have a certain “equalising” effect on income inequality as lower-value-added industries (and the lower-paid jobs associated with them) expand and higher-value-added industries contract.

Globally, the effects on inequality are less clear. According to data from Global Trade Alert, the recent spate of tariffs are relatively concentrated in certain, often politically sensitive manufacturing and food sectors. For instance, shipments of iron and steel products were hit 32 times in 2018. Other metal products were hit 22 times. Teasing out how such tariffs will affect inequality is challenging. Mr Trump thinks his steel and aluminium tariffs will mean less unemployment. This is highly unlikely. A lot more jobs hinge on using these metals than on providing them; higher prices hurt those jobs. And better technology has seen employment in steel and aluminium industries fall much faster than production. As with the Brexit scenarios noted above, if the effects on employment are concentrated on higher-earning jobs, these tariffs could possibly result in a net loss to employment, economic growth and average incomes but only a slight decrease in inequality. Such reductions in inequality would therefore come at a high cost.

Sectors hit the hardest

Key food and manufacturing sectors are among the top 10 most frequently hit sectors by tariff increases in 2018



Note: Sectors classified according to United Nations three-digit sector codes

Source: Global Trade Alert.

Health: Unintended consequences

The relationship between trade and health is complex.⁴⁵ In some instances, international trade may pose a risk to health outcomes. For instance, new cross-border flows in goods, services and people may increase the risk of infectious disease⁴⁶. Furthermore, some studies have found that trade agreements are associated with increased consumption of processed foods and sugar-sweetened beverages, which can be linked to an increased risk of developing non-communicable diseases.⁴⁷

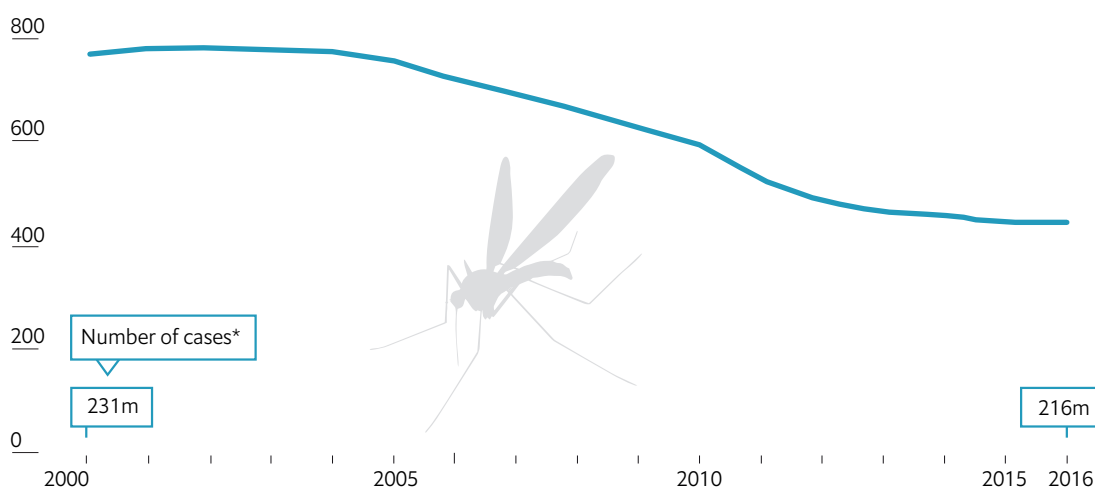
However, international trade also facilitates access to critical pharmaceuticals, medical devices and healthcare services. The recent tariffs imposed by the US, China and the EU do not focus on health products. However, if there are additional tariff increases in the coming period that widen the types of products and geographical areas covered, the potential health effects should not be ignored. Developing countries import many medicines, medical equipment and everyday products (such as

soap) that do much to prevent or reduce exposure to disease. Tariff increases on these products, or a weakening of the momentum to liberalise existing tariffs, could have particularly pernicious effects. In past studies, the World Health Organisation (WHO) has noted that “tariffs are a regressive form of taxation that target the sick.”⁴⁸

Tariffs on mosquito nets illuminate this danger. According to the WHO, there were 216m cases of malaria globally in 2016, resulting in more than 400,000 deaths. More than 90% of malaria deaths occur in Sub-Saharan Africa. With a proven vaccine still lacking, insecticide-treated bed nets (mosquito nets) remain among the most effective means for preventing the spread of the malaria scourge. A 2017 study by Arne Klau at the WTO noted that demand for mosquito nets is very price-sensitive. Despite this reality, at least 16 African countries studied by Dr Klau levied tariffs on mosquito nets.⁴⁹

Net effect

Global malaria deaths*, '000



*Estimated.

Source: WHO.

Dr Klau estimates that tariffs reduced total demand for mosquito nets in 2011-15 by 3.1m units. Given what is known about the link between net use and the prevention of deaths from malaria, this translates into the loss of around 5,200 lives during 2011-15. Today, many developing countries still levy tariffs on mosquito nets, discouraging their use and contributing to the spread of malaria and dengue fever.

Tariffs on mosquito nets are not an isolated case. A 2017 study by researchers at the Asian Development Bank (ADB) noted that although trade in health products has flourished in recent years, tariffs and non-tariff barriers increase prices and limit the availability of pharmaceuticals, vaccines and medical equipment.⁵⁰ Among the case studies included in the ADB study is insulin. Diabetes is no longer a rich-world condition. According to the International Diabetes Federation, diabetes affects at least 285m people worldwide, with the number expected to reach 438m 2030. At that point two-thirds of all diabetes cases will occur in low- to middle-income countries.⁵¹ In response, trade in insulin has risen sharply. However, there is a major differential in import costs across countries. A separate 2017 ADB study analysed the trade and prices of insulin in 186 importing countries between 1995 and 2013. It found that lower tariffs (along with price discrimination by pharmaceutical firms) had a significant effect on prices.

The potential effects of tariffs on health outcomes are not limited to developing countries. As we show in our first case study, below, US tariffs on Chinese tyres likely led some Americans to postpone replacing their tyres, which may have contributed to a rise in the number of accidents, injuries and fatalities.

Environment: Doing damage

As with healthcare, the relationship between trade and the environment is complex. In some instances, trade liberalisation may exacerbate environmental impacts, for example if tariff reductions lead to an increase in fossil fuel consumption, or if investors use investor-state dispute-settlement options in free-trade agreements to evade environmental commitments. However, trade can also promote environmental objectives. For example, an assessment of the trade agreement between South Korea and Japan found that it reduced air pollution by both supporting growth in non-polluting sectors and the sharing of technology that helps to address pollution. There was also a decline of those sectors or technology that exacerbate it.⁵²

The EU's ill-fated attempt to levy tariffs on Chinese solar panels (see case study, below) should act as a warning to the US. According to media reports, tariffs levied by the Trump administration on imported solar panels have incentivised domestic manufacturers to invest approximately US\$1bn in new solar panel factories. But the tariffs have also led American renewable-energy companies to cancel or freeze large installation projects worth more than US\$2.5bn as they are no longer economically viable.⁵³ Scaling up the supply of sustainable energy requires generation costs to be as low as possible. But owing to high capital costs, changes in solar panel prices can have a major effect on the economic viability of major projects. If these reports are accurate, the renewable energy sector can thus expect to see significant job losses, while the displacement of fossil fuels in the country's energy system will slow. By the end of 2017 solar accounted for 3.7% of power capacity in the US, with the EIU expecting this share to grow to 6.9% by 2022. This forecast is now under threat.⁵⁴

Politics: A bad remedy for polarisation

As a policy instrument that redistributes resources, incomes and profits within societies, tariff increases are as much a political tool as an economic one. Whether it is the advocacy of nationalistic trade policies by extreme political parties in the 1930s, or the association between contemporary populism and anti-globalisation, large-scale tariff increases are a strong indication that something is awry in a nation's politics.

Trade liberalisation over the past three decades has clearly exacerbated domestic political polarisation in the US and elsewhere. A 2017 NBER study found strong evidence that congressional districts exposed to larger increases in import penetration from China in effect "imported" political polarisation, as voters subsequently removed moderate representatives from office in the 2000s and elected more extreme politicians.⁵⁵ Similarly, in Germany and France, polling data from the past three decades suggest that support for political parties on the extreme right tend to rise in areas with higher levels of exposure to import competition and fall in areas with more exposure to export opportunities.^{56, 57} Italo Colantone and Piero Stanig at Bocconi University found that support for the Leave option in the Brexit referendum was systematically higher in regions hit by the shock of surging imports from China over the past three decades.⁵⁸ Interestingly, Colantone and Stanig found that

voters' attitudes about immigration (a predictor of a Leave vote) were more closely related to the import shock than to the actual incidence of immigration in their region.

At first glance, these results appear to support the idea of raising tariffs as a way to “take back control” and mend the fractured political landscape. However, tariff increases appear unlikely to reduce polarisation, and may actually exacerbate it. A small number of protected industries and individuals related to those industries will benefit from tariff increases. To the extent that trust in social institutions depends on perceptions of equal treatment and equal opportunity, societies in which some sectors successfully garner state favours—such as tariff increases—while others do not may find that there are low levels of trust among the disfavoured segment of the population.

A more effective response would be to develop societal institutions and policies that redistribute income and facilitate labour market transitions. For example active labour market policies and training programmes can help transition workers who are “trapped” in declining industries to “expanding” industries. Jerry Frieden and Chase Foster at Harvard University have argued that some smaller industrialised economies (for example, in parts of Scandinavia) tend to have more extensive and effective policies in place to compensate those individuals that lose from global economic integration, muting (although not removing) the trend towards political polarisation.⁵⁹ Indeed, some measures of political polarisation suggest that it is declining in the small open economies of Denmark, Malta, Iceland, and Belgium.⁶⁰

When it comes to international relations, US tariffs are already increasing tensions. Long-established trading partners are unsure whether previous commitments and free-trade agreements will be honoured and no longer view the US as a reliable partner. The frequent justification of tariff increases in “us versus them” rhetoric can poison a country's image. For example, the latest Pew Survey of American adults found that the percentage with a positive impression of China had fallen from 44% in 2017 to 38% in 2018.⁶¹ Chinese analysts in turn refer to an American strategy to contain their country, while members of the public are threatening to boycott US goods. These tensions will make it more difficult to find common ground, although trade negotiations between the US and China provide a glimmer of hope.

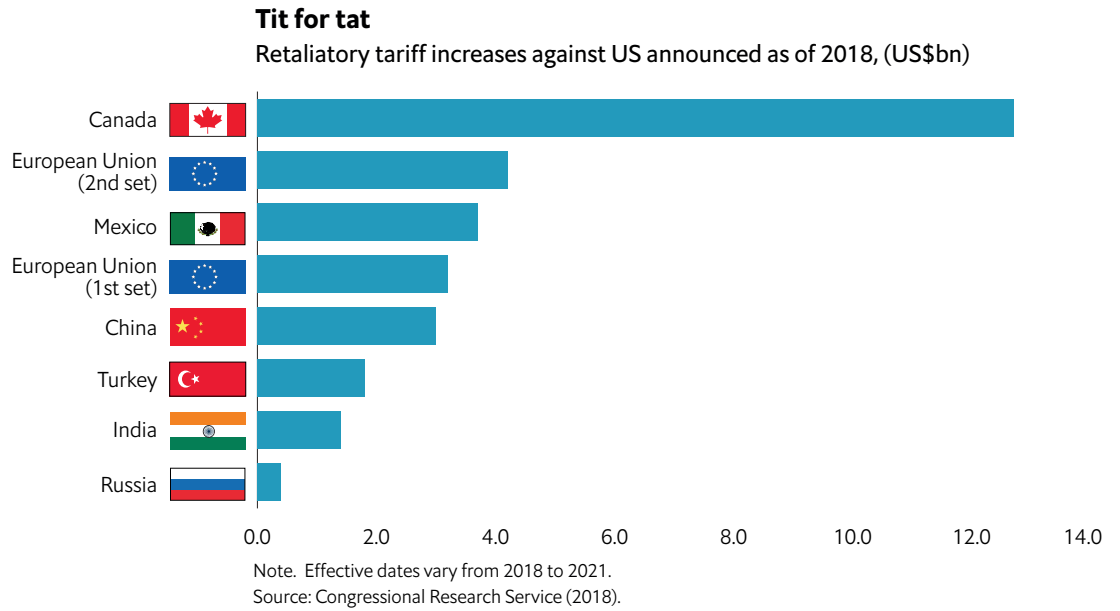
The Trump administration has threatened China, the EU and Canada (among others) with further tariffs if they do not open their markets more to American exports. Some observers argue that using tariffs this way creates leverage, by motivating these countries' exporters to lobby their governments in favour of the reforms America wants. However, the strategy is a hazardous one that risks straining trade relations and creating uncertainty. It is also unlikely to work, as recent experience demonstrates. Exporters typically lack the clout to enforce such changes and are more likely to lobby for bailouts from their governments to dampen the effects of US tariffs (just as US soybean farmers were given loans after China raised tariffs on the import of their produce). Moreover, rather than capitulating to US pressure, other governments have retaliated with tariffs of their own (see graphic, below). As an instrument of diplomacy, raising tariffs have an unimpressive record. Instead, if the goal is to get rid of foreign trade barriers, the US and other countries should reconsider bilateral negotiations or bringing complaints to existing dispute resolution forums, such as the WTO.

In this section we have described how tariff increases—in particular those of a far-reaching nature in terms of the imported products covered—have numerous, significant effects on national

AFTERSHOCK

THE PERVASIVE EFFECTS OF TARIFF HIKES

economies, their politics and their key social indicators (such as poverty). Decision-makers must therefore be sceptical of those who frame the case for significant tariff increases in narrow terms, perhaps emphasising job losses in a single sector of an economy or the unfairness or alleged illegality of the trade policies adopted by a single trading partner's government. Only with an appreciation of the broader socioeconomic consequences can policymakers grasp the full impact of substantial tariff increases. In the next section we examine two specific case studies of tariff hikes to highlight how such increases rarely achieve their desired goals, and can often have unintended consequences.



3. UNINTENDED CONSEQUENCES: US TARIFFS ON TYRE IMPORTS FROM CHINA

In the US, car ownership rates are high by international standards (see graphic, below). Owing to decentralised homes and jobs, suburb-to-suburb commuting is common. The patchy nature of public transport means that many Americans drive to work, to shop and to take their children to school. Car ownership is also ingrained in US culture - it is not an exaggeration to suggest that many Americans' quality of life depends, at least in part, on their cars. Maintaining cars can be expensive. One associated cost is that of new or replacement tyres, a problem that first arose in the US in 2009, when the administration of Barack Obama imposed tariffs on tyres imported from China (see case study, below).

An industry evolved

The US tyre industry used to produce tyres at varied levels of quality. To boost utilisation rates, medium- and high-end producers used to rent space at their facilities to low-end producers. This arrangement spared lower-margin producers the cost of investing in their own facilities and ensured a diverse supply of locally produced tyres. However, approximately 15 years ago the business model began to change and medium- and high-end producers stopped renting out their spare capacity. The production of low-end tyres was outsourced abroad, and by 2009 less than one-fifth (18.6%) of US tyre production was of the cheaper, lower-quality type.⁶²

During this period the US tyre industry also became largely foreign-owned through a combination of mergers, acquisitions and greenfield investments.⁶³ When the Obama government imposed tariffs on tyres from China in 2009, there were only two major US-owned tyre producers left.⁶⁴ Moreover, seven of the top ten tyre producers in the country, including the two US-owned producers, had acquired production facilities in China.⁶⁵ Alongside Chinese imports the US market was supplied by Canada, Japan, Korea, Mexico and Thailand, among others. In sum, tyre production in the US had become a quintessentially global industry, in terms of both ownership and sourcing.

Unions vs producers

On April 20th 2009 the trade union representing US tyre workers asked the US government to investigate tyre imports from China. The union pointed to a US trade law provision that allowed tariff increases against a single country if import growth from that country had caused "material injury" to local industry. Given their international footprint, no US-based tyre producer supported the investigation, but the investigating body recommended that large tariffs be imposed.⁶⁶ On September 11th the president, Mr Obama, imposed a 35% tariff on tyres from China, with the rate falling to 30% in year two and to 25% in year three.⁶⁷ Before the increase tariffs on imported tyres had been 4% or less, meaning that overnight they rose approximately ten-fold. In addition to passenger-car tyres, lorry tyres were also hit.

After failing to convince Mr Obama to back down, China (unsuccessfully) raised the issue at the WTO's dispute-settlement panel. China's commerce minister, Chen Deming, condemned the

tariff increase, claiming: “this is a grave act of protectionism ... Not only does it violate WTO rules, it contravenes commitments the United States government made at the G20 financial summit.”⁶⁸ For its part, the Obama administration claimed that the goal of the tariff increase was to get China “to play by the rules”.

1,000 new jobs?

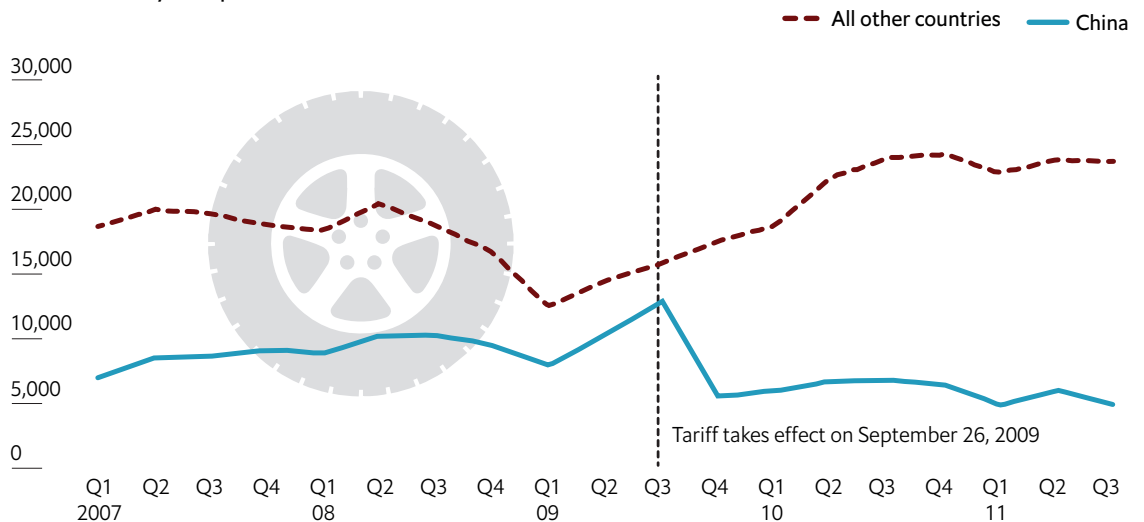
Three years later, in his State of the Union Address to Congress in 2012, Mr Obama claimed that the 2009 tyre tariffs had led to over 1,000 new jobs and stopped a surge in Chinese imports.⁶⁹ In a simple sense, Mr Obama may have been correct. According to the US Bureau of Labour Statistics, employment in the tyre sector rose from 50,800 in September 2008 to 52,000 in September 2011. It is likely that the expanding US economy, which grew by 4.4% in real terms over the same timeframe, accounted for much of the increase. Nevertheless, even if the entire employment increase is credited to the imposition of the tariff, a detailed analysis by Gary Clyde Hufbauer and Sean Lowry at the Peterson Institute for International Economics revealed the vast cost to the US of retaining and creating these jobs.⁷⁰

Surging prices and switching suppliers

Following the tariff increase, the average price of car tyres imported from China rose by 26%, while those of lorries rose by 17%. As the tyres imported from China were of lower quality and cheaper, they tended to be bought by lower-income Americans, who felt the greatest burden from the resulting price increases. Other tyre makers—both non-Chinese and American—raised their prices as well. Following the sharp price increases, imports from China fell. However, US consumers did not switch all of their purchases to domestically made tyres. Instead they bought more tyres from other foreign suppliers, an outcome the trade union is unlikely to have appreciated. Indeed, according to Hufbauer and Lowry, of the extra US\$1.1bn spent by US consumers on tyres following the tariff imposition, US\$800m went to producers based outside the US and China—a powerful example of the so-called *trade diversion effect*.

Squeezing China

US radial car tyre imports, ('000)

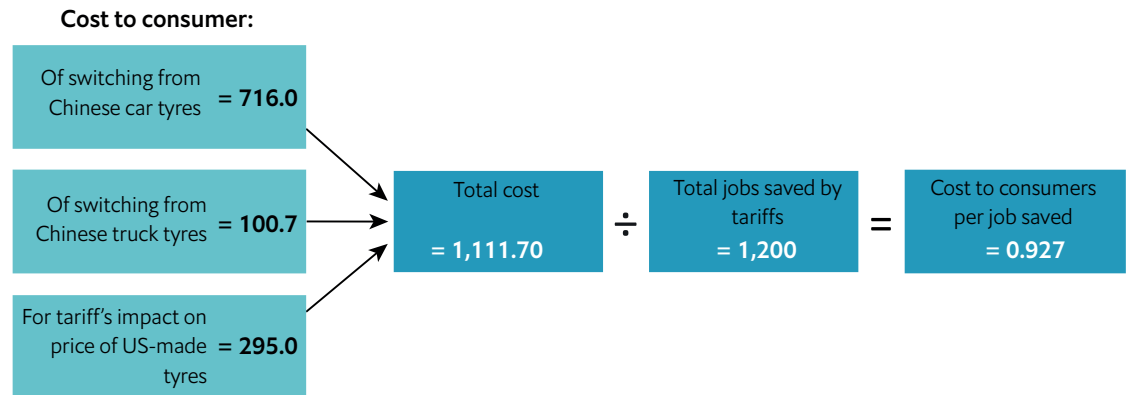


Source: Hufbauer and Lowry (2012).

With additional spending of US\$1.1bn and 1,200 new jobs created (under the most optimistic scenario), the average cost per job created was over US\$926,000. Given that the average salary in the tyre manufacturing industry in 2011 was US\$40,070, this was a decidedly inefficient job creation scheme.^{71,72}

Consumer burden

The cost to US consumers of protection against Chinese tyre imports (US\$m, 2011)



Source: Hufbauer and Lowry (2012)

A blow to retail

The effects of the tariff increase were not restricted to the tyre sector. Given how dependent Americans are on their cars, many were unable to postpone the replacement of their tyres and had to reduce their spending elsewhere. This, in turn, depressed retail sales. Using US Bureau of Labour Statistics, Hufbauer and Lowry estimated that US consumer spending fell by US\$1.064bn following the tariff increase, leading to job losses in the retail sector of approximately 3,731 employees (even accounting for increases in retail sales caused by the 1,200 new employees in the tyre sector).⁷³ As such, for every job the tariff increase created in the US tyre sector, three were lost in the US retail sector. A disproportionate percentage of employees in the US retail sector are from low-income backgrounds, and so, as with prices, these individuals again bore the brunt of the tariff hike.

More accidents?

Rather than absorbing higher tyre costs and reducing consumption elsewhere, some US car owners may have delayed replacing their worn tyres.⁷⁴ It is possible that this led to more accidents however drawing a clear line of causation is impossible. There are no hard data on the number of US car owners who chose to postpone replacing their tyres, and road accidents are caused by myriad factors, from speeding to drunk-driving to texting. However, it is certainly likely that some US car owners chose to postpone replacing their tyres, and past studies have made it clear that such delays cause accidents. A 2004 study by the AA Foundation for Road Safety Research and the County Surveyors' Society found that 9% of traffic accidents are typically caused by worn tyres.⁷⁵ A 2012 study of over 5,000 US road accidents by the National Highway Traffic Safety Administration clearly highlighted the risk posed by tyres with "lower tread depths".⁷⁶

Beijing hits back

Supporters of the tariff increase claimed that China was “not playing fair” - a claim that had some merit. However, the tariff increases did not lead to reform. Rather, in 2010, after losing an appeal at the WTO, China chose to retaliate by levying tariffs of between 4% and 31% on US exports of chicken, based on the claim that US agricultural subsidies lowered the cost of rearing chickens. Beijing later imposed additional duties of between 50% and 104%.⁷⁷ Before this the US had accounted for around 90% of Chinese chicken imports.⁷⁸ In 2016 a senior official in the US Department of Agriculture estimated the cost of the new measures to US chicken exports at more than US\$1bn.⁷⁹ The US ultimately contested the duties at the WTO and won, but China did not withdraw them until 2018, by which time the US had incurred considerable costs.

In summary, US tariff increases may have boosted employment in the domestic tyre sector. However, this effect was dwarfed by the additional costs borne by US consumers, far higher job losses in the retail sector, and the effects of retaliatory tariffs on US poultry exports. The majority of the extra expenditure incurred by US consumers was redirected to suppliers located abroad, and so any positive effects for the US economy were limited. The costs of the tariff increases fell mainly on the lower-income Americans, whom Mr Obama had sought to protect, through increased tyre costs and job losses in the retail sector. And apart from their negative economic effects, the tariff increases may also have contributed to more tyre tread related road accidents.

This case demonstrates the perils of narrowly framing deliberations over tariff increases, especially in sectors where the goods in question are essential purchases for customers. Coupled with the potential for retaliation, imposing high tariffs is tantamount to sacrificing the interests of a number of groups in society to benefit a narrow range of commercial and employee interests. In these circumstances, the total costs inflicted on society far exceed the benefits received.

4. ENVIRONMENTAL PAIN: THE EU-CHINA SOLAR PANEL DISPUTE

Governments should align their trade policies, to the best of their ability, with headline societal goals such as improving living standards, boosting health and education outcomes and protecting the environment. In reality, such coherent policy making is rare.

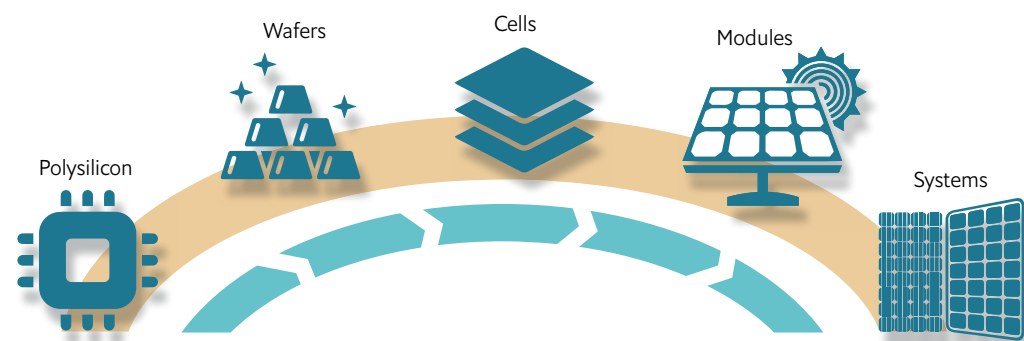
Taking the lead

By global standards, the EU has set ambitious renewable energy targets. In 2007 the European Council mandated that EU member states must obtain 20% of their energy from renewable sources by 2020. In 2014 the European Commission raised the target to 27% by 2030.⁸⁰ Public opinion surveys suggest broad support for the targets. According to the 2017 Eurobarometer poll, 89% of EU citizens believe it is important for their national governments to set targets to increase renewable energy use, while 79% would like to see more public financial support for the transition.^{81,82}

EU policymakers view renewable energy as a way to meet the bloc's challenging climate-change goals, curb worsening pollution and create high-value new jobs. According to the International Renewable Energy Association, the renewable energy sector created half a million jobs worldwide in 2017, taking the global total to 10.3m.⁸³ In the Netherlands, a recent study estimated that renewable energy adoption could result in 50,000 more jobs by 2030.⁸⁴ In the US, the solar power sector alone employs 347,000 people—more than coal, gas- and oil-power generation combined.⁸⁵

Despite the EU's ambitious targets, the use of solar power remains minimal. In 2016 approximately 17% of the energy consumed by members states came from renewable sources, but almost 50% of this came from wood and solid biofuels. Just 6.3% of electricity generated came from solar power.⁸⁶ One of the main constraints on scaling up solar power is the cost to consumers. To lower costs, companies that install solar power need access to low-cost inputs, such as photovoltaic cells. Over the past 15 years China has emerged as a major supplier of these cells, boosting the EU's installation of solar power but leading to a backlash from domestic incumbents.

The solar value chain



Source: The Economist Intelligence Unit

The solar value chain

The solar industry can be divided into “upstream” and “downstream” segments. In the upstream segment manufacturers produce raw silicon, which is then purified and transformed into wafers, cells, modules, panels and systems. “Downstream” providers then take over, distributing and installing the systems, providing the necessary finance and providing legal and consulting services.

In the 1990s Germany emerged as a global leader in solar power after it began offering subsidised loans for installing solar panels through its “1,000 Solar Roofs” and “100,000 Solar Roofs” initiative, and generous minimum payments, or subsidies, for selling solar energy to the national electric grid.⁸⁷ To meet demand, upstream German providers turned to China in search of cheap solar panels. At the time, the Chinese government was actively supporting the fledgling sector with subsidised land and loans. These shifting market dynamics led some European suppliers to lobby the European Commission to impose tariffs on imported solar panels⁸⁸ to shut out their Chinese rivals.^{89,90}

Competing loyalties

European countries were conflicted over the potential tariffs, as their companies were represented at different stages of the value chain. Although Germany was home to producers of cells and panels, it was also a leading exporter to China of polysilicon and equipment. Its firms also installed solar systems and needed access to cheap panels. Britain was also well-represented in the manufacture of equipment for panels and in upstream installation. By contrast, both France and Italy had a large number of firms that competed with China in the manufacture of photovoltaic cells. The proposed tariffs threatened to hurt British and German exporters of equipment and lead to a spike in their installation firms’ import costs. By contrast, the tariffs would provide a direct boost to rival French and Italian cell producers.⁹¹

Against this fragmented industry backdrop, different industry groups emerged. A coalition of six solar wafer, cell and module producers formed EU-Prosun. Meanwhile, a group of upstream producers of polysilicon and equipment, as well as downstream installers of photovoltaic projects and installers, formed the Alliance for Affordable Solar Energy (AFASE).⁹² Unsurprisingly, EU-Prosun expressed a clear interest in reducing or eliminating import competition, while AFASE wanted to avoid any cost increase in the supply of imported cells and panels and to sustain demand from China for European-made equipment.

A six-year saga begins

In 2012 EU-Prosun filed complaints with the European Commission, alleging that China was illegally subsidising Chinese producers and dumping imports of solar panels. With EU-Prosun claiming that 25,000 European jobs were in danger, the Commission opened an investigation.⁹³ In 2013 AFASE countered with a study which claimed that tariffs would threaten 213,000 jobs across the broader renewable energy sector owing to their knock-on effects on the downstream segment.⁹⁴ Member states remained conflicted. France, Italy, Portugal and Spain supported the introduction of tariffs, while Germany, Sweden and the UK made their opposition clear. Meanwhile, the Commission’s decision to investigate saw it come under attack from environmental groups, which warned the tariffs would hurt the EU’s climate-change goals.⁹⁵ So on the backfoot was the Commission that on September 12th 2012 it was forced to issue a fact sheet entitled: “Why the EU’s investigation into solar panel imports from China does not harm Europe’s climate goals”.

Commission under fire

In its public commentary, the Commission acknowledged the size of the broader renewable energy sector, noting that it had received €100bn in investment and created 300,000 jobs over the previous five years.⁹⁶ However, the Commission's statements also suggested that the investigation had a narrow focus on the impact of import competition on domestic firms, rather than the effects of lower costs on downstream buyers. As it noted in one statement:⁹⁷

“Potentially unfair trade in solar panels does not help the environment: a market that faces dumped imports will drive local producers out of business and could discourage EU producers from developing cutting edge technologies in the renewable energy sector. As well as the very significant loss of jobs, dumping and other unfair trade practices can ultimately lead to less competition and eventually price increases. We do not know yet if that is the case here, but that's what the investigation is designed to find out.”

The Commission's statements also neglected to mention the scale of Chinese imports to Europe, which was staggering, at least by the standards of a typical anti-subsidy or anti-dumping investigation. In 2011 EU member states imported €21bn worth of Chinese solar panels. The Commission was thus considering one of the most far-reaching attempts to increase tariffs since the onset of the global financial crisis. This point was not lost on certain member states, or on China, which soon took steps to limit the damage to its commercial and environmental objectives.⁹⁸

Panels for wine

Notwithstanding the resistance, on June 4th 2013 the Commission imposed initial duties of 11.8% for up to six months, claiming that Chinese imports were 88% below their appropriate value. It is also stated that to reduce the “harm caused by the dumping to the European industry” a duty of 47.6% would be needed.⁹⁹ It is unclear how the Commission defined “industry”, and whether it included downstream firms in its estimate (given that downstream firms would have to pay much of the duty). Strikingly, only four out of the then 27 EU member states supported the tariff hike in a non-binding indicative vote.¹⁰⁰

The size of the exports at stake ensured a swift reaction from China. Less than 24 hours after the preliminary duties were announced, China declared a investigation into whether European wine exports were subsidised and dumped. Compared with Chinese solar panel exports to the EU, the bloc's wine exports to China were a relatively small drop in the bucket, at €763m in 2012. But unsurprisingly, the chairman of the French Federation of Wine and Spirits Exporters complained that the wine industry had been “taken hostage” in a wider trade dispute over solar panels.¹⁰¹

An unsatisfactory settlement

On 26 July 2013 the Commission reached an agreement with its Chinese counterparts, whereby Chinese exporters who agreed not to sell below a certain minimum price would not have to pay the anti-dumping duty (tariff increase) of 47.6%.¹⁰² Exporters who refused to meet the minimum price would have to pay the duty. In explaining his decision to accept the accord, the EU trade commissioner, Karel De Gucht, acknowledged the importance of downstream buyers and the EU's climate-change goals.¹⁰³ According to Mr De Gucht, demand for solar panels in Europe had outpaced supply, and imports could help to address that gap.

This explanation was unconvincing. Replacing a tariff with a minimum price equal to the original price plus the tariff meant that downstream buyers still had to pay higher prices. This did prevent the knock on effect of slowing solar power adoption. Moreover, replacing a tariff with a minimum price benefitted Chinese exporters, who do not have to pay the import duty and whose profit margin expanded on their remaining sales to European customers.

The retreats begins

After the formal adoption of the minimum price, the Commission and EU member states remained torn between competing policy objectives and commercial interests. In September 2017 the Commission announced changes to the minimum import prices, to come into effect on a quarterly basis from September 1st 2017 until July 1st 2018. The goal was to allow the prices of photovoltaic cells to converge towards world prices by the latter date. In explaining the change, the Commission acknowledged that “the sharp decline of the minimum import price for multi-crystalline cells and modules is in the interest of EU installers and large utility companies.”¹⁰⁴

On August 31st 2018 the Commission completed its retreat when it decided to end its measures, arguing: “It was in the best interests of the EU as a whole to let the measures lapse. This decision also takes into account the EU’s new renewable energy targets.”¹⁰⁵ Ultimately, EU trade policy was brought into line with its climate-change objectives, but only after six years of disruption to the EU solar panel industry.

A sharp fall in imports ...

What was the effect of the Commission’s actions? According to Louis Curran, at the University of Toulouse, although other factors were at play, “the [anti-dumping] case and the uncertainty that it created are likely to explain much of the fall” in imports of solar panels from China. These imports fell by 58% between the second quarter of 2012 and the second quarter of 2013, and by 79% between the second and fourth quarter of 2013.¹⁰⁶ Unlike the tyre case study above, trade deflection does not appear to have happened. As a result, the total amount of solar panels imported into the EU fell sharply. A stinging criticism by a Swedish government agency summarised the effects:

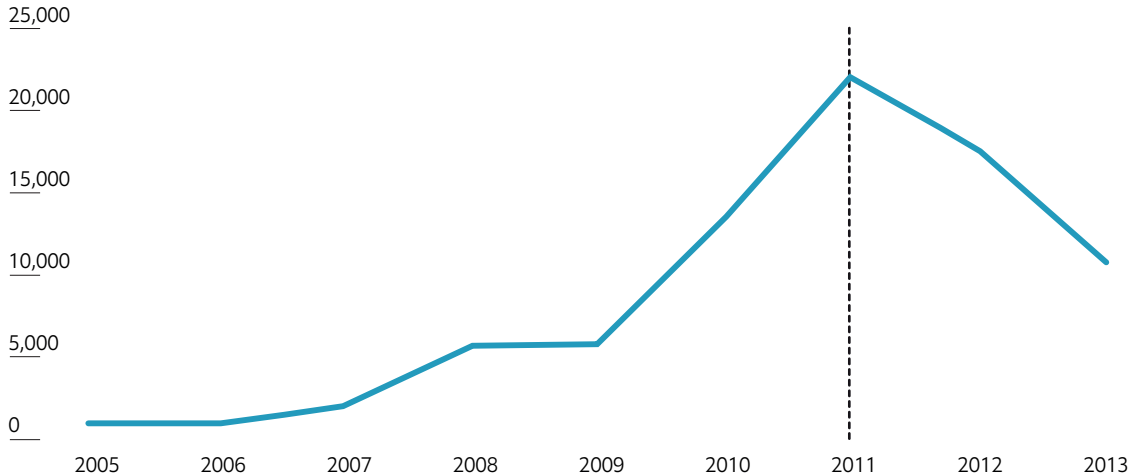
“Increasing the price of imported renewable energy sources and increasing the level of unpredictability for importers, user industries and consumers will, most likely, affect the availability of affordable renewable energy in the EU market in the near future. As a consequence, the EU’s [trade defence instrument] policy will have negative consequences for the shift towards renewable energy and energy efficiency and, in the long-run, for the environment. It is vital that the EU has policies that are coherent in all fields...”¹⁰⁷

And installations ...

After the start of the Commission’s intervention the total amount of new photovoltaic capacity installed fell in both 2012 and 2013. In 2011 Europe accounted for 74% of all photovoltaic installations worldwide. By 2013 its share had fallen to 29%.¹⁰⁸ The many factors at play in this market make drawing a clear link between the EU’s duties and minimum prices and subsequent solar installations challenging. Notably a simultaneous sharp reduction in subsidies and feed-in tariffs provided by European governments also contributed to the down turn.¹⁰⁹ However, although technological

Dawn to dusk

New photovoltaic capacity installed in Europe fell after 2011



Source: European Photovoltaic Industry Association (EPVA) (2014).

advances have cut the cost of solar equipment further, the EU's duties and minimum prices appear to have had a clear impact on the rate of installations, which will hurt the EU's attempts to scale up renewable power.

The perils of narrow framing

This case highlights again the perils of framing decisions on tariff increases in narrow terms. Clearly, the interests that are likely to benefit from tariff increases have an incentive to highlight the adverse effects of competitive imports. Impartial policymakers and analysts must take a broader view of the potential effects of raising import prices, especially in sectors with elaborate value chains that criss-cross national borders. One of the significant benefits of international trade is that it allows product, process and cost improvements in one country to spread to users in other countries. In the case of energy-related technologies, this can have significant implications not only for the cost and availability of energy supplies but also for environmental policy objectives, including climate change, which many contend is the greatest challenge of our time.

CONCLUSION: IMPLICATIONS FOR POLICYMAKERS

The scale of recent tariff hikes is unprecedented. Not since the 1930s has the trend towards universal global tariff reduction faced such a challenge. The world would do well to recall the negative effects of these, seemingly moderate, 5% rises as most countries retain considerable latitude to raise tariffs to this level without breaking WTO rules.

This report has outlined ten possible effects of a return to broad-based tariff increases that go far beyond the narrow “welfare losses” depicted in economics textbooks. These effects, which range from an increase in poverty to deteriorating health outcomes, will differ across geographies and over time. However, almost all tariffs benefit a narrow group at the expense of a broad one, have unanticipated effects beyond their original focus areas, and are take more time to repeal than to implement (perpetuating their negative effects).

After the US raised tariffs on Chinese-made tyres in 2009, employment in the US tyre sector grew. However, this effect was dwarfed by far higher job losses in the retail sector and the effects of retaliatory tariffs on US poultry exports. The burden of higher tyre prices was borne mainly by lower-income Americans, whose additional expenditure went primarily to other international suppliers. After the European Commission imposed import duties and minimum prices on solar panel imports from China, solar power installations in the region fell, leading the Commission to end minimum prices in 2018.

To prevent further tariff increases, policymakers must first be honest about the negative effects that trade liberalisation has had on certain groups, not least to shed light on the inadequacy of tariff hikes as a solution to these groups’ ills. Second, policymakers should insist on a deliberative process and data-driven societal impact assessments for all major proposed tariff increases. Such assessments would shift the burden of proof onto those advocating tariffs and provide insight into their wider effects. Finally, policymakers should address their grievances with more effective tools. To tackle China’s unfair treatment of foreign investment, policymakers should use multilateral forums and leverage China’s clear desire to retain a rules-based trading system. Governments can increase their remarkably low expenditure on training programmes for groups that lose out from free trade. Policymakers can also promote more flexible trade agreements that do not pursue free trade at all costs and instead allow countries some bandwidth to pursue other societal goals, such as environmental protections.

Endnotes

1. https://www.wto.org/english/tratop_e/tariffs_e/tariffs_e.htm
2. <https://www.globaltradealert.org/>
3. Source: Global Trade Alert. These numbers include tariff increases associated with anti-dumping, anti-subsidy and safeguard actions.
4. The bill was sponsored by Willis Hawley, a congressman from Oregon, and Reed Smoot, a senator from Utah.
5. Irwin (2011) reports that the Smoot-Hawley legislation raised the average applied US import tariff rate by 5.5 percentage points.
6. <https://www.globaltradealert.org/>
7. <https://www.economist.com/leaders/2016/04/02/open-argument>
8. See Bhagwati, 1969.
9. <http://www.aei.org/publication/2009-tire-tariffs-cost-us-consumers-926k-per-job-saved-and-led-to-the-loss-of-3-retail-jobs-per-factory-job-saved/>
10. The former are known as specific tariffs, the latter as *ad valorem* (percentage) tariffs. Today, specific tariffs are principally confined to imports of agricultural goods. Imports of manufactured goods are typically subject to *ad valorem* tariffs, if they are subject to tariffs at all.
11. In addition to pushing up inflation, tariffs may reduce the the range of choice available to consumers. In the past decade sophisticated techniques have been developed to estimate how much consumers value being able to buy greater varieties of products (Broda and Weinstein 2006). Using data from Q1 1999 to Q1 2008, Mohler and Seitz (2010) estimate that, with few exceptions, consumers in the member countries of the EU would have been prepared to pay more than 1% of GDP to gain access to the greater variety of products available in 2008 brought about by greater trade.
12. <https://www.dartmouth.edu/~dirwin/docs/w20635.pdf>
13. <https://tradingeconomics.com/china/export-prices>
14. <https://www.economist.com/united-states/2018/09/08/who-pays-for-tariffs>
15. <https://www08.wellsfargomedia.com/assets/pdf/commercial/insights/economics/special-reports/tariffs-inflation-20180719.pdf>
16. <https://core.ac.uk/download/pdf/153534444.pdf>
17. <https://www.aeaweb.org/articles?id=10.1257/aer.90.5.1239>
18. <https://www.ft.com/content/03e4f016-aa9a-11e8-94bd-cba20d67390c>
19. <https://www.ft.com/content/03e4f016-aa9a-11e8-94bd-cba20d67390c>
20. These are the tariff rates paid on imports into the EU for these products under the prevailing WTO agreements. UK House of Commons, Business, Energy and Industrial Strategy Committee, "The impact of BREXIT on the automotive sector," Chapter 2. 28 February 2018. Available at <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/379/37902.htm>
21. In response to recent rounds of tariff hikes, BMW has already raised prices on US-built vehicles exported to China.
22. <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/379/379.pdf>

23. <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/business-energy-and-industrial-strategy-committee/leaving-the-eu-implications-for-the-automotive-industry/written/71644.pdf>
24. UK House of Commons, Business, Energy and Industrial Strategy Committee, "The impact of BREXIT on the automotive sector," Chapter 2. 28 February 2018. Available at <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/379/37902.htm>
25. <https://voxeu.org/article/trade-cold-wars-and-value-agreements-during-crises>
26. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3211689
27. <http://www.nber.org/papers/w5170>
28. Some may object to this argument on the grounds that the tariff-protected sectors can hire unemployed labour or rent buildings that are currently unused. Unemployment rates certainly vary across countries and it is noteworthy that the 2018 tariff hikes have been led by a nation with historically low rates of joblessness. Another counterargument is that talent and desirable locations for commercial operations are scarce and the ability of unprotected sectors to retain them after tariff increases is what causes these disfavoured sectors to shrink, in absolute or relative terms
29. <https://www.ft.com/content/f1ca06b2-c837-11e8-ba8f-ee390057b8c9>
30. <https://www.economist.com/china/2018/10/06/a-chinese-writer-calls-for-private-companies-to-fade-away>
31. https://www.jstor.org/stable/1816698?seq=1#page_scan_tab_contents
32. <https://www.opensecrets.org/news/2018/04/quarter-1-lobbying-2018-report/>
33. <https://www.economist.com/united-states/2018/08/02/what-americas-latest-gdp-figures-reveal>
34. The numbers were an advance release and may yet be revised.
35. <http://www.nber.org/papers/w24353>
36. Eichengreen (2018), page 4.
37. Bhagwati (1978), Little, Scitovsky, and Scott (1970), and Krueger (1983,1984).
38. Sachs (1985).
39. See Dasgupta and Stiglitz (1988).
40. <https://voxeu.org/article/us-tariffs-are-arbitrary-and-regressive-tax>
41. The authors estimated that if tariffs were raised by 10 percentage points across the board, the cost of the lowest-income households' 2014 consumption bundles (all else remaining equal, including exchange rates) would rise by US\$301.1
42. The World Bank defines extreme poverty as living on less than US\$1.90 per day in purchasing power parity terms.
43. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.466.2827&rep=rep1&type=pdf>
44. <http://blogs.sussex.ac.uk/uktpo/publications/which-manufacturing-sectors-are-most-vulnerable-to-brexite/>
45. http://apps.who.int/iris/bitstream/handle/10665/183934/9789241565035_eng.pdf;jsessionid=E7CCD9E4B997F752C209E5377F344637?sequence=1
46. http://apps.who.int/iris/bitstream/handle/10665/183934/9789241565035_eng.pdf;jsessionid=E7CCD9E4B997F752C209E5377F344637?sequence=1
47. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5343316/>
48. Olcay and Laing (2005).
49. Klau (2017), https://www.wto.org/english/res_e/reser_e/ersd201714_e.pdf

50. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2955559
51. <http://care.diabetesjournals.org/content/34/6/1249#ref-1>
52. <https://www.gtap.agecon.purdue.edu/resources/download/1780.pdf>
53. <https://uk.reuters.com/article/uk-trump-effect-solar-insight/billions-in-u-s-solar-projects-shelved-after-trump-panel-tariff-idUKKCN1J3oDg>
54. <http://country.eiu.com/articleindustry.aspx?articleid=1327095516&Country=United%20States&topic=Industry&subtopic=Energy>
55. <http://www.nber.org/papers/w22637>
56. Dippel, Gold, and Hebllich (2016)
57. Malgouyres (2017).
58. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2870313
59. <http://journals.sagepub.com/doi/abs/10.1177/1465116517723499>
60. See Draca and Schwarz (2018), figure 8
61. http://assets.pewresearch.org/wp-content/uploads/sites/2/2018/08/28101349/Pew-Research-Center_U.S.-Views-of-China_Report_2018-08-28.pdf
62. <https://www.usitc.gov/publications/safeguards/pub4085.pdf>
63. <http://www.nber.org/chapters/c8649.pdf>
64. <https://www2.gwu.edu/~iiep/assets/docs/papers/CharnovitzIIEPWP201312.pdf>
65. <https://www.usitc.gov/publications/safeguards/pub4085.pdf>
66. <https://www2.gwu.edu/~iiep/assets/docs/papers/CharnovitzIIEPWP201312.pdf>
67. <https://www.ictsd.org/bridges-news/bridges/news/us-tyre-tariffs-spark-spat-with-china>
68. <https://www.ictsd.org/bridges-news/bridges/news/us-tyre-tariffs-spark-spat-with-china>
69. <https://obamawhitehouse.archives.gov/the-press-office/2012/01/24/remarks-president-state-union-address>
70. <https://piie.com/publications/pb/pb12-9.pdf>
71. <https://piie.com/publications/policy-briefs/us-tire-tariffs-saving-few-jobs-high-cost>
72. Since econometric analyses of the determinants of employment in the tyre sector showed that the imposition of tariffs against imported Chinese tyres had not benefitted US employment in the tire industry, some may be tempted to draw an even more negative policy conclusion (that of complete ineffectiveness). Such econometric evidence casts Mr Obama's comments in his State of the Union address in a poor light. See Joonhyung Lee (2011), "Who Benefited from the US Tariffs on the Chinese tires?", Southern Methodist University.
73. <https://piie.com/publications/pb/pb12-9.pdf>
74. As Ikenson puts it: "Consumer groups and other organizations have also expressed safety concerns about the impact of higher-priced tires on increasingly-pinched consumers. The likelihood that an increasing number of consumers will forego the replacement of old and worn-out tires presents a whole new category of risk and costs that are difficult to quantify economically." See Dan Ikenson, "Burning Rubber: Proposed Duties on Chinese Tires Whiff of Senseless Protectionism", *Free Trade Bulletin*, no. 39, Cato Institute, 11 September 2009.
75. https://roadsafetyfoundation.org/wp-content/uploads/2017/11/aa_foundation_fdn34.pdf
76. <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811617>

77. Wall Street Journal, "A Game of Trade Chicken; Poultry Protectionism shows where the U.S. and China are heading," 28 September 2010. Text not available online.
78. https://www.joc.com/regulation-policy/china-penalize-us-chicken-imports_20100205.html
79. <https://www.reuters.com/article/us-usa-china-trade/u-s-launches-second-wto-complaint-in-china-chicken-trade-dispute-idUSKCN0Y11E8>
80. <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52014DC0015>
81. https://ec.europa.eu/clima/sites/clima/files/support/docs/report_2017_en.pdf
82. In the UK, 85% of adults surveyed in the government-funded Public Attitudes Tracker supported greater use of renewable energy, up from 79% a year earlier. # Support is also relatively high in the US—a May 2018 poll found that 71% of US adults supported greater use of renewable energy.
83. <http://irena.org/publications/2018/May/Renewable-Energy-and-Jobs-Annual-Review-2018>
84. https://econpapers.repec.org/article/eeerenene/v_3a119_3ay_3a2018_3ai_3ac_3ap_3a528-538.htm
85. https://www.energy.gov/sites/prod/files/2017/01/f34/2017%20US%20Energy%20and%20Jobs%20Report_o.pdf
86. https://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics
87. <https://climatepolicyinitiative.org/wp-content/uploads/2011/12/PV-Industry-Germany-and-China.pdf>
88. The case is typically referred to as the "EU solar panel case, but covered imports of solar panels and their key components (i.e. solar cells and solar wafers) originating in China.
89. <https://www.tandfonline.com/doi/abs/10.1080/09692290.2015.1014927>
90. As Curran notes, it is the location of a firm in the value chain, rather than the nation where their principal production facilities are located, that have the greater influence on the firm's attitude towards import protection.
91. To the extent that technological innovations diffuse through the solar value chain, tariff increases on imports associated with one part of the value chain will limit diffusion of new products and processes downstream. See: <https://www.technologyreview.com/s/426392/a-solar-trade-war-could-put-us-all-in-the-dark/>
92. A third group, the European Photovoltaic Industry Association (EPIA), included firms from along the value chain.
93. http://europa.eu/rapid/press-release_MEMO-13-498_en.htm
94. https://unctad.org/meetings/en/Contribution/ditc_ted_03042014prognos.pdf
95. See <https://rd.springer.com/article/10.1007/s12689-018-0080-z>. This paper describes the environmental and other arguments used by the many societal groups that debated this matter.
96. Note that the 100 billion euro figure includes investments in renewable technologies other than solar.
97. http://trade.ec.europa.eu/doclib/docs/2012/september/tradoc_149903.pdf
98. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2310564
99. <http://trade.ec.europa.eu/doclib/press/index.cfm?id=909>
100. After the European Commission has proposed tariffs on dumped goods, a majority of EU member states must vote in favour of their imposition. Before the final vote, the European Commission tests the water by asking for indicative votes from the governments of the member states.
101. <https://www.ft.com/content/9229031a-cdb1-11e2-8313-00144feab7de>
102. <http://trade.ec.europa.eu/doclib/press/index.cfm?id=955>
103. http://europa.eu/rapid/press-release_MEMO-13-730_en.htm

104. <http://trade.ec.europa.eu/doclib/press/index.cfm?id=1717>
105. <http://trade.ec.europa.eu/doclib/press/index.cfm?id=1904>
106. <https://www.tandfonline.com/doi/abs/10.1080/09692290.2015.1014927>
107. <https://www.kommers.se/Documents/dokumentarkiv/publikationer/2013/rapporter/Targeting-the-environment.pdf>
108. <https://resources.solarbusinesshub.com/solar-industry-reports/item/global-market-outlook-for-photovoltaics-2014-2018>
109. https://www.lalive.law/data/publications/Recent_developments_in_solar_energy_sector_across_Europe.pdf

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