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by

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Understanding China-US Trade War: Causes, Economic Impact, and the Worst-Case Scenario[§]

Terence Tai-leung Chong* and Xiaoyang Li**

February 2019

Abstract: This paper studies the current trade war between China and the US from a historical standpoint. By comparing the ongoing trade war with similar trade conflicts in history, we reveal three major causes, with varying degrees of importance, from both economic and political perspectives. The trade war can principally be attributed to trade imbalances, the US midterm elections and rivalry for global economic dominance. As the fundamental conflicts between China and the US cannot be easily resolved, we hold a pessimistic view on the complete settlement of the trade war. In this paper, we perform a scenario analysis, which shows that in the worst-case scenario, China will suffer a 1.1% decrease in employment and a 1% GDP loss, which are not negligible but manageable for China.

Keywords: Trade war; trade imbalance; scenario analysis

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Introduction

The global economy has witnessed a series of trade disputes between China and the US since January 2018, when the US government imposed safeguard tariffs on large residential washing machines, as well as solar cells and modules.¹ These conflicts have engendered a full-fledged trade war.

Against the backdrop of threats of further tariffs and retaliation, the tension between China and the US, the top two trading countries in the world, inevitably intensifies. The International Monetary Fund (IMF) (2018) simulates the economic consequences of mounting China-US trade tensions and warns that should these trade threats materialise, the GDP of the US and China will be reduced by 0.9% and 0.6%, respectively, leading to a 0.4% fall in long-term world GDP. A report from the European Commission in July 2018 also downgraded its economic growth forecast for the European Union (EU), suggesting that the effect of the trade disputes is not restricted to China and the US (European Commission, 2018). Some journalists and commentators also suggest that the China-US trade war might eventually evolve into a new Cold War, which will severely imperil the stability of the global political and economic environment.²

The prospect of an all-out trade war sparks debates on whether China's clash with the US on the trade front will derail its rapid growth path. By dint of the successful export-oriented strategy, China has enjoyed impressive economic growth over the past few decades. Figure 1 presents China's growth of exports and GDP in the past ten years. The height of the bars represents the contribution of net exports to total output (shown on the left axis), while the line traces the GDP growth rate (shown on the right axis). Although the contribution of exports has been declining as China undergoes a transition to a consumption-based economy, net exports are still a major engine of growth. As

¹The official announcement is available at <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/january/president-trump-approves-relief-us>

² For media reports on this topic, see, inter alia, Hankla, Charles. 2018. "The Next Cold War? US-China Trade War Risks Something Worse." 24 September. <http://theconversation.com/the-next-cold-war-us-china-trade-war-risks-something-worse-103733>

Karabell, Zachary. 2018. "A Cold War Is Coming, and It Isn't China's Fault: Why Washington Should Stop Treating Beijing Like an Adversary." 31 October. <https://foreignpolicy.com/2018/10/31/a-cold-war-is-coming-and-it-isnt-chinas-fault/>

shown in Figure 1, the ratio of net exports to total GDP rebounded in 2014, when China experienced a deceleration in growth. In 2017, net exports made up 3.47% of China's total GDP.

[INSERT FIGURE 1 ABOUT HERE]

A closer look at China's net exports reveals that a significant portion of them comes from the trade surplus with the US. Figure 2 plots China's total trade surplus measured in million US dollars (solid line), together with that owed to the US (dotted line), and the ratio of trade surplus with the US to the total trade surplus (bar). Since China joined the World Trade Organization (WTO) in 2001, the trade surplus with the US has been increasing steadily. In some years (notably 2003, 2004, and 2011), the surplus China gained from trade with the US alone even exceeded China's surplus in the aggregate. However, due to China's rapid expansion of export markets, the contribution of US trade has been decreasing since 2013. Still, net exports to the US alone constitute more than 49% of the total surplus in 2016.

[INSERT FIGURE 2 ABOUT HERE]

The reliance on US trade leads to concerns that China might suffer substantial losses from the trade war. This uncertainty weighs on market sentiments and results in capital flowing out of China, which in turn suppresses its asset prices.

For instance, over the past ten months, the Shanghai Securities Composite Index has decreased by 22% and reached 2,606.24, which is even lower than the trough seen during the Chinese stock market turbulence in 2015–2016. Rapid capital outflows put strong depreciation pressure on the Renminbi (RMB). By the end of October 2018, the RMB has depreciated over 7% against the US dollar since the start of the year. Meanwhile, China's total reserve assets also decreased by US\$ 938.61 billion.

Simple statistics shown above go a long way towards revealing how the trade war undermines confidence in China's economic outlook. However, are these concerns and market reactions well grounded? The answer to this question requires an in-depth investigation into the ongoing trade war. Luckily, trade wars are hardly a new

phenomenon and are in fact commonplace in history, allowing us to draw on key lessons learnt from past trade clashes to gain a better understanding of the current one.

Our paper aims to study the ongoing trade war between China and the US from a historical point of view. By drawing on parallels and, as importantly, distinctions from previous trade conflicts, we can identify the sources of the current China-US trade war and derive a framework to evaluate its economic impacts. We conclude that the causes of the trade war are threefold; while they appear to be related to economics, they are in fact politically driven.

On top of that, we estimate the worst of the trade war fallout for China based on the experience of previous trade wars between Japan and the US. We find that in the worst-case scenario, China will lose 1.1% of job positions and about 1% of total output. Due to capital control policies and the massive reserves in China, shocks to foreign reserve assets should be manageable. Results from the scenario analysis indicate that while the adverse impact of trade war will be felt by China, it is far from devastating. While shocks brought about by the trade war should not be overlooked, the magnitude of the decline in confidence in recent months seems unwarranted.

The rest of the paper is organised as follows. The paper starts by reviewing various trade conflicts in history and summarises key facts. Next, it reviews the background information of the ongoing China-US trade war. Then, the paper compares it with the trade conflicts between the US and Japan, with a focus on the lessons we can draw on. The following two sections relate the current trade war to the previous ones and investigate its causes and economic impact. Finally, the last section concludes.

Trade wars from a historical perspective

Throughout history, trade wars have been hardly uncommon, with numerous precedents between the US and China. To date, the US has launched five ‘Section 301 investigations’³ against China since 1991, probing into areas of intellectual property rights, unfair trade barriers, and clean energy. In these past investigations, both sides threatened to use tariffs as a means of retaliation. However, the aforementioned conflicts were all eventually resolved by diplomatic means, be it through the signing of trade agreements after negotiation or reaching a compromise under the dispute settlement mechanism of the WTO.

Before the current round of investigation, the most recent one was conducted in September 2010. The Obama administration initiated a ‘Section 301 investigation’ on China’s subsidy policies and investment in green technologies in response to the petition filed by United Steelworkers.⁴ The target of the investigation was subsidies given to 154 Chinese firms in wind energy, solar energy, high-performance batteries, and alternative fuel vehicles, which allegedly violated WTO policies. Before the investigation developed into a full-fledged trade war, the US applied for consultations within the WTO’s dispute settlement framework in December 2010, and China agreed to revise the subsidy policies in Tentative Measures for the Administration of Special Fund Used for Industrialisation of Wind-power-generate-electricity Equipment.

Apart from China, the US has also engaged in trade wars with Japan and the EU over a spectrum of domains such as textiles, vehicles, color televisions, currencies, and steel. In the 1980s alone, the US initiated 24 ‘Section 301 investigations’ against Japan. Although most trade disputes were peacefully resolved by bilateral negotiations, there were no lack of all-out trade wars, such as that between the US and the EU over steel, which was only settled through WTO’s arbitration.

³ The president of the US is authorised by the Section 301 of the US Trade Act of 1974 to take appropriate actions against international trade agreements that are believed to be unjust to the US.

⁴ The official announcement is available at <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2010/october/united-states-launches-section-301-investigation-c>

In most cases, no one emerges as a winner in a trade war. A case in point is the US-Japan automobile trade war in the 1980s. At that time, the US achieved a tactical victory by forcing Japan to ‘voluntarily’ restrict its automobile exports and open up its domestic market to US firms. However, both Japanese car producers and American consumers suffered substantially from the trade conflict. On the one hand, car producers from Japan experienced a sharp decrease in revenue, and on the other, consumers in the US faced a sharp jump in automobile prices. Specifically, in the US, the average prices of imported and domestic cars increased by US\$ 900 and US\$ 400, respectively, resulting in a remarkable decline in car sales. More importantly, more than 60,000 jobs in the automobile industry were lost, and the unemployment rate peaked at the height of the trade war under the Reagan presidency.

We can establish a typical framework from the examples above to assess the economic impacts of a trade war, that is, the exporting country suffers a decrease in sales, which in turn puts pressure on total output and employment. And the influence on importers is twofold; while certain industries benefit from the protection of trade wars, other industries and households bear costs due to increase in price. And the aggregate effect is usually negative.

A great majority of trade wars in the past were resolved by peace talks and negotiations, suggesting that threats of tariffs were mostly rhetorical ‘tough talks’ and served as bargaining chips to force the other party to return to the negotiation table. Therefore, to evaluate a trade war, one should see through aggressive rhetoric and focus on the underlying motivations of the trade war. More often than not, the real motives behind a trade war are beyond economic reasoning.

Before investigating the causes of the China-US trade war and applying the above framework to assess its economic impact, we summarise the evolution and the status quo of the trade war and compare it with the US-Japan trade conflict in the past in the following two sections.

Background of the China-US trade war

After Donald Trump took office, a tough stance on trade policies was taken by the White House, even before the outbreak of the China-US trade war. In June 2017, Trump initiated a 'Section 232 investigation', for reasons of national security, on the import of steel and aluminium. Considering the huge production capacity of steel and aluminium in China, the investigation and the following additional tariff are believed to be targeting China.

Entering 2018, trade disagreements between the US and China have increased in scale and frequency. Since the start of the year, the US has repeatedly imposed anti-dumping duties or tariffs on Chinese imports. Trade tensions escalated in March 2018, when US President Donald Trump signed an executive memorandum launching a 'Section 301 investigation' into China's intellectual property practices and threatened extra tariffs on Chinese imports.

In retaliation, China promptly issued a similar statement the next day, reciprocating the threats with warnings of additional tariffs on American imports. On 4 April 2018, the US detailed a list of 1,333 Chinese goods, valued at US\$ 50 billion, that would be subject to an additional 25% tariff. China hit back immediately with reciprocal tariffs on a list of American goods of equal value, matching US threats on a dollar-for-dollar basis.

Led by Liu He, the vice premier of the People's Republic of China, a Chinese delegation went to the US on 17 May. After meeting with the US president, Donald Trump, and having rounds of negotiations with trade officials on the US side, including Steven Mnuchin, Wilbur Ross, and Robert Lighthizer, a joint declaration was announced, reflecting a cooperative attitude from both sides and a temporary easing of trade tensions. However, on 16 June, the Office of the United States Trade Representative (USTR) announced a US\$ 50 billion tariff list, covering over 1,000 Chinese goods. China's Customs Tariff Commission of the State Council immediately issued a notice, announcing tariffs on 659 locally-manufactured American goods valued at US\$ 50 billion. At the same time, the Ministry of Commerce declared that

previous negotiation attempts with the US had failed, marking the official start of the China-US Trade War.

In the following months, neither of the two countries were willing to make a concession. By 23 August 2018, the US has already followed through with its threat of 25% additional tariff on US\$ 50 billion worth of Chinese commodities. China also retaliated against US measures by levying an additional 25% tariff on American goods, also valued at US\$ 50 billion.

After rounds of ministerial-level negotiations, Xi Jinping, the general secretary of the Communist Party of China, meet with Donald Trump at the 2018 G20 Summit in Buenos Aires. Both parties agree on suspending new trade tariffs for 90 days to allow talks. The ceasefire is believed to be a temporary truce, as further actions may be taken by both sides should no substantive agreements be reached during the negotiation window. At the time of writing, no remarkable progress has been reported, and the future of the trade conflict is still unclear.

Learning from trade wars in history

Despite the fact that the US initiated five ‘Section 301 investigations’ against China, all of them were resolved via negotiation. However, it is worth noting that in the past, China’s responses to ‘Section 301 investigations’ were in part determined by its economic strength. In 1991, when China was accused of having insufficient intellectual property protection and pursuing unfair trade barriers, China responded by promoting intellectual property protection and eliminating trade barriers unilaterally. In 1994 and 1996, China was once again the target of two more ‘Section 301 investigations’, which were launched against its policies on intellectual property protection. In contrast to the previous two instances, however, this time compromises were made by both sides. In particular, China promised to enhance intellectual property protection, and the US also agreed to provide more technical assistance to China. As for the last investigation initiated by the US in 2010, the trade dispute was resolved in yet a different way, that is, via WTO dispute settlement.

As China's responses to trade disputes are contingent on its economic strength, previous China-US trade conflicts may not be a reference for the current trade war as useful as the US-Japan trade tensions in the 80s and 90s. It is because the US-Japan trade conflict did turn into a trade war, and that contemporary China is at a similar developmental stage as Japan in the 90s.

Economic reasons for the US-Japan trade war

Trade disputes between the US and Japan are one of the longest and most extensive trade conflicts in modern trade history. They have continued to this day since World War II.

From an economic perspective, the main reasons for the US-Japan trade war are trade imbalances between the two countries and the overlap of their industrial structures. According to Economic Nobel Prize laureate Joseph Stiglitz, intense trade frictions will result in the current account deficit of a country with its trading partner exceeding 1.5% of the GNP. If this grows to more than 2%, it will lead to retaliatory actions from the deficit country. If a country's trade surplus with another exceeds 25–30% of its trade volume, however, the problem is a political one instead. Though simplistic, this can help explain most trade disputes in modern history.

Amid the economic recovery after World War II, Japan's light industry underwent rapid development. As a consequence, exports to the US skyrocketed, such that the US had trade deficit with Japan for the first time in 1965. In 1987, the US-Japan trade deficit peaked at US\$ 56.7 billion, which was about 1.2% of the US GDP (at US\$ 4.8 trillion) that year. From 1985 to 1995, the trade deficit with Japan accounted for 30–50% of the overall US trade deficit.

In terms of the industrial structure, Japan has long been upgrading it and seeking opportunities to compete with the US. From light industry at the beginning of the post-war recovery to the steel industry in the 1970s, then to the automotive industry in the 1980s, and later to electronic products, Japan managed to capitalise on its edge in R&D investment and product quality to rapidly expand its presence in the US market and outcompete American companies. Domestic industries that bore the brunt of Japan's

expansion resorted to interest groups formed by large US domestic companies and utilised their political power to lobby the government into waging trade wars against Japan.

Political reasons for the US-Japan trade war

As we have mentioned in previous sections, a recurrent theme of trade disputes in history is that they are driven not only by economic motives, but also, more importantly, by political ones. This can also be seen in the US-Japan trade war. Specifically, Japan has been in a subordinate position economically, militarily, and politically since World War II. As Japan recovers its national power, it seeks a more equal relationship with the US, which results in counter-attacks from the US.

The safeguard treaty signed in 1951 became the basis of the military alliance between the US and Japan as well as an endorsement of the political dependency between the two countries. Under the treaty, the US had strict military control over Japan and was able to use political and diplomatic means to create economic advantages. This put Japan in a very passive position in the trade war. For example, Japan was forced to sign a series of autonomous restrictions on exports, covering a variety of popular products such as textiles, steel, color televisions, automobiles, and semiconductors. The 1985 Plaza Accord further interfered with Japan's exchange rate policy and affected the progress of its economic development in the next few decades.

Yet the increase in Japan's comprehensive strength has divided the US and Japan on defense costs, which further undermined their bilateral trust. Such distrust peaked after Mitsubishi Real Estate from Japan purchased the historic American landmark Rockefeller Centre. Statements like 'Japan bought the soul of the United States!' were widespread among American media. In the same year, the then president of Japan's Sony Corporation, Akio Morita, published the book *Japan Can Say No*, reflecting the public sentiment in Japan towards the need to improve its international status.

Japan's attempt to gain an equal footing with the US triggered a full-scale counter-attack from the US government. In the National Security Strategy Reports in

1987 and 1988,⁵ the US government stated that the success of its post-war strategy had enabled the economy and societies of allies to prosper, and that the US needed them to shoulder a larger share of common security responsibilities. At that time, the US government tended to lump trade and security issues together to put pressure on Japan, including political talks, trade wars, and exchange rate regulations, eventually achieving results in its favour. The US-Japan Structural Impediments Initiative signed in 1989 was known as ‘the third opening of Japan’ by the academic community in the US.

Today, US-Japan relations remain a delicate concoction of dependency and partnership; this special feature continues to affect the political and economic decisions of both countries. And, as we will show in the section ‘Causes of the China-US trade war’, political concerns are as important as economic factors in motivating the China-US trade war.

Lessons from Japan

Japan’s voluntary export restrictions on textiles, steel, color televisions, automobiles, and semiconductors brought substantial adverse shocks to local industries. But at the same time, these restrictions acted as a catalyst for Japan’s development of global production and industrial upgrade.

The first trade conflict between US and Japanese automobile industries broke out at the end of 1979, when the American Auto Workers Union lobbied the US government into negotiations with Japanese auto companies to restrict their imports or to move their production to the US. From then on, the trade friction between the two lasted for more than 20 years. The Japanese auto industry was caught in the cross hairs of trade tensions; it acquiesced to the demand of the US and implemented voluntary export restraints in 1981, but it once again became the target of the US Special 301 Review in 1985 and subsequently faced anti-dumping lawsuits filed by US companies

⁵ The official NSS reports are available at <https://history.defense.gov/Historical-Sources/National-Security-Strategy/>

in 1993. To overcome these obstacles, Japanese auto companies at that time embarked on a journey of transformation and upgrade.

At that time, Japanese auto companies started the construction of their global production networks by investing in and building factories abroad or through starting joint ventures with overseas companies. For instance, since 1982, Japanese auto companies have set up a number of factories in the US, including the Toyota Kentucky plant, the Honda Ohio plant, and the Nissan Tennessee plant. In 1984, Toyota and GM established a joint venture, New United Motor Manufacturing, Inc. (NUMMI), in California, which was the largest joint venture in the Japanese automotive industry at the time. Localisation reduced the export value of Japanese auto companies in the US and, to a certain extent, cushioned the damage of the trade disputes to the Japanese economy.

Another key adjustment deployed by Japanese auto companies was to move up the value chain to manufacture high-end luxury cars. It was first implemented by three major auto companies: Toyota, Nissan, and Honda, which launched luxury brands: Lexus, Infiniti, and Acura, respectively. After six to seven years of research and development, these products were listed in the late 1980s and were well-received by US consumers. Acura sold a million units in the US in 1994, and Lexus became the bestselling luxury car brand in the US for the first time in 1999. These three Japanese automakers successfully entered the premium vehicle segments of the US market, with a combined annual sales volume of 600,000 units in North America.

It is worth noting that global production and industrial upgrade were no panacea for Japanese industries that were mired in the trade conflict. In fact, while the automobile industry achieved some success in adopting this strategy, it did not help electronics firms. Companies such as Sony and Toshiba used to dominate the global electronics market, but after the 1980s, as Japanese companies moved their production bases overseas, they left their design and R&D centres in Japan, disconnecting their technology development and their market expansion and gradually removing Japanese electronics manufacturing from the global standard. Yunogami Takashi, a professor at Kyoto University in Japan, rethinks the reasons for the failure of the transformation of Japanese electronics manufacturing industry in the book *The Defeat of Japanese*

Manufacturing Industry, concluding that they include the lack of sensitivity to market openings and the missed opportunities under the new technology wave. In addition, improper management has increased the operating cost of Japanese electronics manufacturing companies and accelerated the decline of the industry.

The two examples above show that while global production and industrial upgrade are viable strategies in the face of trade wars, they are not without risks. Without clear understanding of the challenges and practical long-term arrangements in advance, ad hoc industrial transformations can be useless or even harmful. Another lesson that we can draw on from the failure of Japan's electronics companies is that the reform has to be implemented in a market-oriented manner. Despite the threat of a full-blown China-US trade war looming large, long-term planning remains essential in the strategy of industrial transformation and upgrade, especially in cutting-edge industries such as high-end manufacturing, where a suitable development path must be found. Only after preparing for the corresponding risks and making full use of market-based mechanisms to survive can we enjoy the fruits of industrial upgrade.

When using Japan's experiences in guiding the current trade, two distinctions between China and Japan deserve our attention. Economically, the industrial structures are not the same for China and Japan in 1980s. While Japan took the lead in some technology intensive industries, a very large proportion of China's exports still comes from business with low added value. Politically, despite continuous and intense trade conflicts with the US, Japan is still a key ally of the US in East Asia. China, on the contrary, is more like a foe to the US with different ideologies. Before applying Japan's strategy in China, the influence of the above-mentioned differences needs to be considered.

Causes of the China-US trade war

The causes of the current China-US trade war are threefold: Ostensibly, it is caused by the widening trade gap between the two countries. Figure 3 shows an overview of US trade deficit from 2001 to 2017. The solid and dotted lines represent its total deficit and its deficit with China, respectively (left axis, in million US dollars).⁶ And the bars reflect the trade deficit with China as a percentage of the total.

[INSERT FIGURE 3 ABOUT HERE]

The US trade deficit with China has been growing in both absolute and relative terms. By 2017, the trade deficit with China has become a major source of net imports of the US, accounting for about 46% of the total deficit. Trade imbalances have long been the root of US national debt crises as well as public discontent in the US, motivating the US government to wage a trade war against China.

Given that the China-US trade gap is a long-standing issue, not to mention the questionable effectiveness of a trade war in alleviating US trade deficit, the China-US trade imbalance alone does not provide a convincing case for the outburst of trade conflicts between the US and China in 2018.

Another driving force of the ongoing trade war can be traced back to the American political system. In the US, midterm elections are held every four years in November, when voters elect members of the Congress. As they take place in the middle of the four-year presidential term of office, midterm election results are often viewed as voters' verdict on the president they elected two years ago. Over the course of US election history, the party out of power has almost always been able to make a comeback in midterm elections. This observation is often referred to as the 'midterm election curse'. Remarkably, only Theodore Roosevelt, Bill Clinton, and George Walker Bush were able to break free from the curse. Against this backdrop, midterm elections held on 6 November 2018 gave the incumbent president Donald Trump

⁶ The US trade deficit with China shown in Figure 2 is reported by Chinese authorities, while that shown in Figure 3 is data from US authorities.

incentives to adopt radical policies that appeal to his supporter base. Given that one of Trump's main promises during his election campaign was to solve the trade deficit problem, the China-US trade war appears to be a timely and logical move to secure votes for his political party in the midterm elections.

While there are economic factors and political motives at play, at the crux of the China-US trade war lies, in fact, a battle for global economic dominance. In recent years, China has experienced rapid growth and become a major economic power. For instance, China's production volume now ranks second worldwide, and China's GDP has already surpassed the US in purchasing power parity terms. The importance of RMB has also been consistently rising in world trade and transactions, posing a challenge to the dominant position of the US dollar. The wide array of strategic plans China announced lately, from the Belt and Road Initiative, Asian Infrastructure Investment Bank to 'Made in China 2025', may also have reinforced the image of China as a threat to US dominance.

The incumbent US President Donald Trump once explicitly stated that 'Made in China 2025' undermined the interests of America and other countries. To put it even more bluntly, Peter Navarro, one of Trump's top trade advisors, admitted that the Section 301 tariffs in fact target 'Made in China 2025' industries. Hence, it is clear that the China-US trade war is underpinned by rivalry for economic dominance between the two nations.

Knowing the threefold cause gives us deeper understanding of the trade war. More importantly, it provides us with a framework for analysing its future evolution. The trade tension might remain high during the final push period. However, as the dust settles after the midterm elections, the trade war may also move towards a more peaceful direction. Indeed, if the trade imbalance between China and the US narrows, the chance of a de-escalation will be higher. Yet, the competition for global economic dominance is likely to be long-lasting, rendering it unlikely that the trade conflicts will be resolved in a short period of time.

Economic impacts on and the worst-case scenario for China

There have been a number of papers that estimate how China will be affected by the trade war. For example, Guo et al. (2018) simulate different situations in which the US wages a trade war by raising tariffs by 45% against China or the rest of the world, following the methodology of Eaton and Kortum (2002) and Caliendo and Parro (2015). Scenarios with and without retaliation by the counterparty are considered. Similarly, Li et al. (2018) construct their model within the framework of Nash bargaining and present the possible impacts in different situations.

In contrast to these papers, where researchers first develop a series of hypothetical scenarios and examine the economic impact of different tariff shocks in each case, we model the ongoing trade war directly. In particular, we restrict our focus to the current situation, where China and the US increase their tariffs on imported goods by 25%, with a total value of US\$ 150 billion (US\$ 50 billion already implemented and a threat of another US\$ 100 billion). Also, we construct the worst-case scenario, where all of the parameters are set at the least favourable levels for China, which reflects the maximum loss China could be facing.

Scenario development

To evaluate the impact of the trade war, we first estimate the impact on the trade volume between China and the US. In the ongoing trade war, the US attempts to attack China's exports by increasing tariffs on goods produced in China, which prompts China to adopt commensurate tariffs on US imports. The influence of tariffs on imported goods is very straightforward. Higher tariffs erode the attractiveness of Chinese goods by making them more expensive in the US market, which ultimately suppresses China's exports to the US.

In international trade, changes in relative prices between domestic and imported goods are very common, which can be caused by changes in tariff, exchange rates, technology, demands, and so on. By relating the current China-US trade war to similar conflicts in history, we can estimate how the 25% increase in tariff is likely to change the trade volume.

As we have discussed in the sections above, Japan has experienced many trade disputes with the US, among which the exchange rate war in the 80s has the most profound impact. Specifically, after Japan and the US signed the Plaza Accord in September 1985, the Japanese yen appreciated by more than 80% against the US dollar in the three years that followed.

[INSERT FIGURE 4 ABOUT HERE]

Figure 4 shows the value of Japanese exports to the US in million yen. Exports to the US showed an increasing trend until the signing of the Plaza Accord in 1985, when the trend was reversed. By 1988, the value of Japanese exports to the US reached 11.49 trillion yen, which was around 27% lower than the peak of 15.58 trillion yen in 1985.

Based on this fact, we argue that 27% is a plausible estimate of the maximum fall in trade volume in response to the 25% increase in tariffs on Chinese exports. It is worth pointing out that the rise in Japanese export prices as a consequence of the Plaza Accord should be severer than the increase in Chinese export prices caused by tariffs—as the former treaty is much larger in scale and has broader scope. To put it more concretely, the current increase in tariff is 25%, but back then the yen was forced to appreciate by 80%. In fact, if we factor in the recent depreciation of the RMB, the actual increase in Chinese commodity prices is likely to be lower than 25%. Furthermore, the appreciation of the yen triggered by the Plaza Accord resulted in a price increase in Japanese goods across the board, whereas the 25% additional tariff levied on Chinese goods affects only a subgroup of Chinese exports. Therefore, we conjecture that the actual decrease in bilateral trade amounts to less than 27%.

Impact on China

To gauge the impact of the trade war on Chinese output, we first calculate the importance of trade to total output. Data from the US Department of Commerce show that China has a trade surplus of US\$ 375.2 billion with the US in 2017. Under the worst-case scenario, where the trade volume shrinks by 27%, China will lose US\$ 101.3 billion trade surplus with the US.

To produce export commodities, both domestic and imported inputs are needed. As such, the total value of export goods can be divided into two parts. The first part is the imported value, which is the value of imported raw materials or intermediate goods that are used in the production of export commodities. And the second part is the value added, reflecting the incremental value created due to inputs of domestic goods or services. Notably, only the value-added part is fully converted into the trade surplus of exporters, while the rest is shared by other countries. Thus, it is the value-added part, and not the total value of surplus, that really affects total output.

In other words, the estimated decrease of US\$ 101.3 billion trade surplus is not equivalent to a worsening of China's balance of payments on the same scale. In fact, among the US\$ 101.3 billion, only the fraction of it that corresponds to the value added by Chinese firms will impact on China's GDP. The remaining portion of the loss will be spilled over to other trade partners of China, as China will respond to the decline in exports to the US by cutting its imports of raw materials and intermediate goods.

Lau et al. (2017) use China's trade data in 2015 to estimate that the value-added ratio of China's exports is about 55.72%. Considering that China has been actively upgrading its industrial structure since then, the number in recent years could be higher. To make sure that we are simulating the worst-case scenario, the value-added ratio used in the following analysis is raised to 60%. In other words, the US\$ 101.3 billion decrease in trade surplus is conjectured to reduce net exports by US\$ 60.8 billion.

Next, we need to estimate how the US\$ 60.8 billion decrease in net exports translates into the fall in total output, taking into account also the multiplier effect of consumption. Li and Zhong (2012) calculate the marginal propensity to consume in China on an annual basis. While this percentage varies across years, it is generally above 0.5. Again, considering that we are calibrating parameters for the worst-case scenario, we err on the side of caution and set the marginal propensity to consume to just 0.5. A marginal propensity to consume of 0.5 means that the multiplier is 2, which then indicates that a drop in net exports of US\$ 60.8 billion will cause the GDP to go down by US\$ 121.6 billion.

IMF data show that China's total GDP in 2017 was US\$ 12,014.6 billion. According to our calculations, this implies that the trade war will cause China's GDP to drop by 1.01%. Considering that the growth rate of China's economy was 6.9% in 2017, the trade war does have a non-negligible effect on the output.

In terms of employment, the impact can be more profound. Two different methods are adopted to assess how the employment rate will be affected. The first estimation is an extension of the previous calculations of value-added losses. China's customs data show that China's exports to the US are mainly labour-intensive and concentrate on electronic devices, furniture, toys, miscellaneous products, and textiles. As for the production of capital/technology-intensive commodities, the main role of China in the global value chain is to provide labour services (for instance, assembling electronic devices). Therefore, China's value added in exports mainly comes from labour's contribution. We make an audacious assumption that all of the added value in exports is created by labour, as in such case the estimated impact of the trade war on employment will be the strongest.

Data from the National Bureau of Statistics of China reveal that the average wage for employees in urban private sectors was 45,761 yuan (US\$ 6,509) in 2017. Thus, it takes 9.34 million workers to generate value added of US\$ 60.8 billion. That is to say, we assume the shock will deprive China of 9.34 million job positions.

An alternative way to calculate the effect on employment utilises the number of trade practitioners. According to customs records, China's trade with the rest of the world and the US are US\$ 4,103.4 billion and US\$ 583.6 billion, respectively. In the scenario we study, the trade volume between China and the US goes down by US\$ 157.6 billion (that is, 27% of US\$ 583.6 billion). Also, given that the value-added ratio of China's exports is 60%, the US\$ 101.3 billion decrease in trade surplus will cause an indirect drop in China's imports by another US\$ 40.5 billion. The combination of the direct and indirect influences amounts to US\$ 198.1 billion, representing around 4.83% of China's total foreign trade volume.

On a simple but reasonable assumption that the number of job positions in international trade is in direct proportion to the trade volume, we are able to estimate

the employment shock of the trade war. The Minister of Commerce Zhong Shan announced in a media conference that international trade created 180 million jobs in China in 2017. Therefore, we can estimate the job losses due to trade war to be 4.83% of 180 million, that is, 8.69 million. This result is somewhat smaller than the prediction using the first method.

Data from the National Bureau of Statistics of China reveal that the total working population in China is 776.4 million, suggesting that the estimated decrease in job positions accounts for 1.11% to 1.2% of the total.

Finally, we investigate how the trade war affects China's reserve assets. The impacts via the current account and the capital account will be studied separately. Figure 5 presents the changes in China's reserve assets from January 2018 onwards. Entering 2018, China's total reserve assets have been falling, and the decline sharpened after March, when the trade war was intensified by the 'Section 301 investigation'. According to the latest data, the total value of reserve assets has gone below US\$ 3,200 billion in September 2018, the lowest point since July 2017.

[INSERT FIGURE 5 ABOUT HERE]

Changes in trade surplus affect current account balances, which in turn influence reserve assets. Apart from the current account, intervention in exchange rates and the withdrawal of foreign direct investment (FDI) due to the trade war also adversely affect reserve assets. Specifically, when being faced with depreciation pressure on the RMB, the government uses its reserve assets to finance purchases of the RMB in the foreign exchange market to stabilise the exchange rate. Also, depreciation expectation of the RMB also triggers capital outflows, leading to aggravation of China's capital account balance.

Due to the capital control policy in China, the monetary authority has relatively strong management power over the capital account. So we only focus on shocks in the current account. As calculated before, the trade war will lead to a decrease of US\$ 60.8 billion in China's net exports, which is directly reflected as a fall in current account

surplus. The fall in the current account surplus, compared to the balance of reserve assets, is moderate.

To sum up, in the worst-case scenario we construct, where the bilateral trade between China and the US goes down by 27%, China's GDP, employment, and reserve assets will face different degrees of negative shocks. The biggest impact is on employment, where around 1.1% of job positions will be lost. In terms of output, China's economy is expected to suffer a decrease of US\$ 121.6 billion, representing around 1% of the total GDP. Due to capital regulation policies and abundant reserves, the influence on China's reserve assets is relatively muted.

The simulation results of the worst-case scenario can be interpreted in two ways. On the one hand, a single shock that triggers a decrease of US\$ 121.6 billion in output and around 9 million job losses is indeed a serious issue. Aggressive policies that smooth fluctuations in the short run and facilitate industrial upgrade in the long run are necessary. On the other hand, the impact on China's economy is far from devastating. The sheer size of output, the rapid development of the economy, and the abundant reserve assets enable China to withstand the negative shocks brought about by the trade war, even in the worst-case scenario. Therefore, concerns that the trade war would deliver a fatal blow to China's economy are ungrounded.

Impact on China's trading partners

The simulation above has revealed that among the US\$ 101.3 billion decrease of trade surplus with the US, US\$ 60.8 billion will be borne by China, leaving the remaining US\$ 40.5 billion to be shared by China's other trading partners. So far, we have only studied how China is affected by the trade war. To supplement the above analysis, we briefly investigate how those countries will be (indirectly) affected. More formally, we present additional evidence reflecting the spillover effect of the trade war under the worst-case scenario.

According to the Ministry of Commerce, China's total import value is US\$ 1,841.0 billion. The EU, ASEAN countries, Korea, Japan, and Chinese Taiwan are China's top five trading partners, with values of imports amounting to US\$ 244.9

billion, US\$ 235.7 billion, US\$ 177.5 billion, US\$ 165.7 billion, and US\$ 155.4 billion, respectively.

We further assume that the US\$ 40.5 billion are proportionally shared by China's trading partners according to their importance to China's total imports. As such, we anticipate the decreases in exports from the EU, ASEAN countries, Korea, Japan, and Chinese Taiwan to be US\$ 5.4 billion, US\$ 5.2 billion, US\$ 3.9 billion, US\$ 3.6 billion, and US\$ 3.4 billion, respectively.

In terms of the size of economy, the EU, ASEAN countries, and Japan are relatively large, suggesting that they should be able to absorb the negative spillovers from the China-US trade war. On the other hand, smaller economies such as Taiwan of China and Korea could be less resilient to these negative shocks.

The total outputs of Chinese Taiwan and Korea are US\$ 572.8 billion and US\$ 1,538.0 billion, respectively, which indicates that as China reduces its imports, Taiwan of China and Korea will suffer decreases in exports amounting to 0.6% and 0.25% of GDP.

A word of caution is in order. To obtain an accurate estimation of the impact on Chinese Taiwan and Korea, we will also need to take into account their value-added ratios and marginal propensities to consume. In addition, as US exports to China are reduced, its imports will decrease as well. Consequently, trading partners of the US will suffer the spillover effect of the trade war. For the specific cases of Korea and Chinese Taiwan, the losses caused by the decreases in imports from the US need to be taken into consideration as well. Therefore, the aforementioned calculated changes in net exports as a percentage of GDP for Taiwan of China and Korea are directional, as opposed to being precise estimates.

Key assumptions revisited

The last part of the scenario analysis revisits the key assumptions of our model and discusses how the reality could turn out to be better than the hypothetical situation outlined in our paper.

First, the decrease in trade volume between China and the US may be overestimated. In the current trade war, the price changes of imported goods will be more moderate than those happened in Japan as a result of the Plaza Accord, suggesting that the 27% decrease in exports to the US in Japan's case may not repeat itself in the current trade war between China and the US.

Second, our scenario analysis ignores the fact that China can increase exports to other countries to offset the fall in the bilateral trade with the US, which results in mitigation of the impact of the increase in tariffs by the US. As a large open economy, the US has the power to influence the world price of a commodity. Specifically, incremental tariffs by the US will decrease the world price of commodities, thereby triggering a stronger demand from other countries. For example, the decrease in US import of Chinese products drags down the aggregate demand. And the price of commodities will drop to clear the market, making those goods more attractive in markets outside the US. Consequently, while China enjoys a smaller surplus from trading with the US, it may export more to other countries. However, this channel is not modelled in our scenario.

Third, the assumption that the entire portion of China's value added in trade is generated by labour exaggerates the importance of this factor of production, which leads to an overestimation of the shocks to employment. More realistically, some of the value added will be generated by capital, and therefore the shocks to employment should be less severe in reality.

Fourth, in reality, wage adjustments would also alleviate the rise in unemployment caused by the trade war, but this mechanism is excluded from our analysis. As labour demand goes down, wages will also fall to clear the market.

However, as this is removed from our scenario analysis, we may have exaggerated the magnitude of the fall in employment.

Before moving on to the conclusion, we make one final remark about the scenario analysis. The simulation results are based on the status quo of the trade war, and the assumptions above ensure that our estimation represents the worst possible outcome as long as there is no fundamental shift in the trade war. However, should there be substantial changes in the nature of trade war, for example, more countries get involved, a revision of the scenario analysis would be needed.

Conclusion

The China-US trade war has received widespread attention, not only because of its labyrinthine nature, but also because of the vastness of the economies involved. Academic researches and professional forecasts indicate that the trade war will have a remarkable impact on China, the US, and even the world economy.

Our paper conducts a thorough analysis of the current trade conflict between China and the US by reviewing similar episodes of trade tensions in history. Specifically, by comparing this trade war with a series of trade conflicts between the US and Japan, we conclude that the causes of the trade war are threefold, namely trade imbalances, the midterm elections in the US, and the competition for global economic dominance.

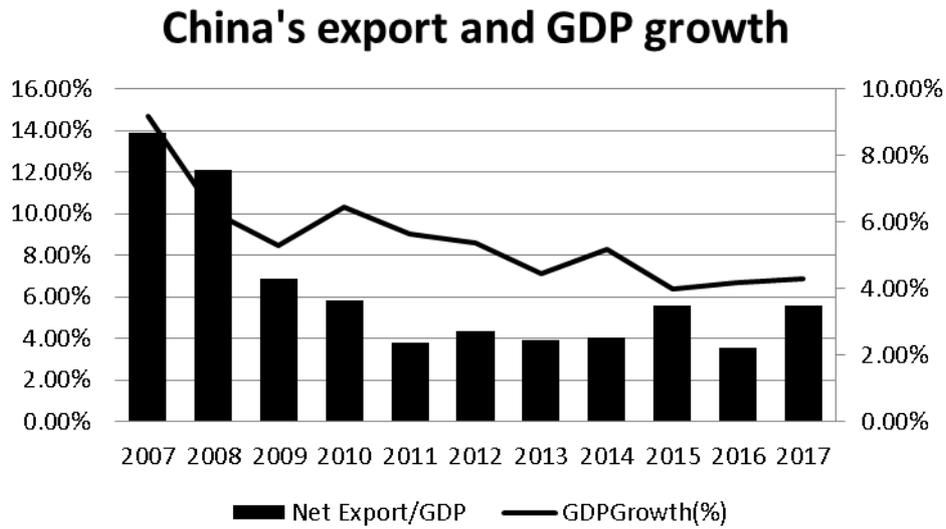
Understanding the underlying forces at play allows us to make predictions about how the trade war will evolve. While effects of temporary factors such as the midterm elections may cease, those of more fundamental factors like economic rivalry between the two countries will persist, implying the chances of a settlement in the short run are slim.

Our scenario analysis simulates that in the worst-case scenario, China will lose 1.1% of its job positions and 1% of GDP. While the findings confirm that the trade war will have some impact on China, it is far from catastrophic.

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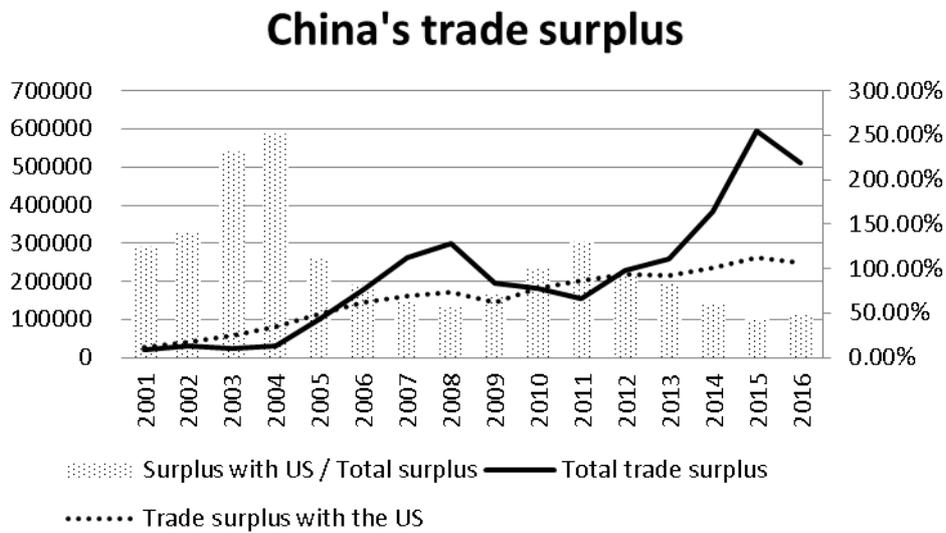
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Figure 1: China's export and GDP growth



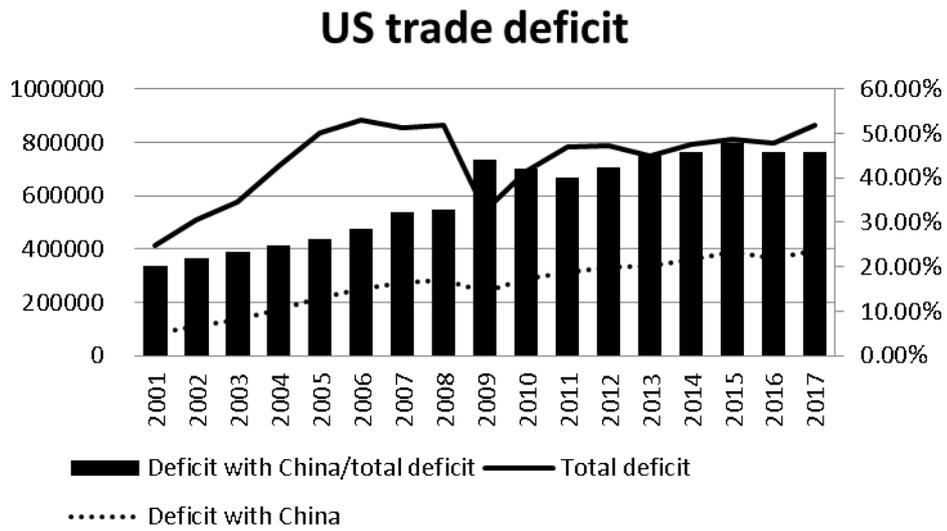
Data source: National Bureau of Statistics of China

Figure 2: China's trade surplus



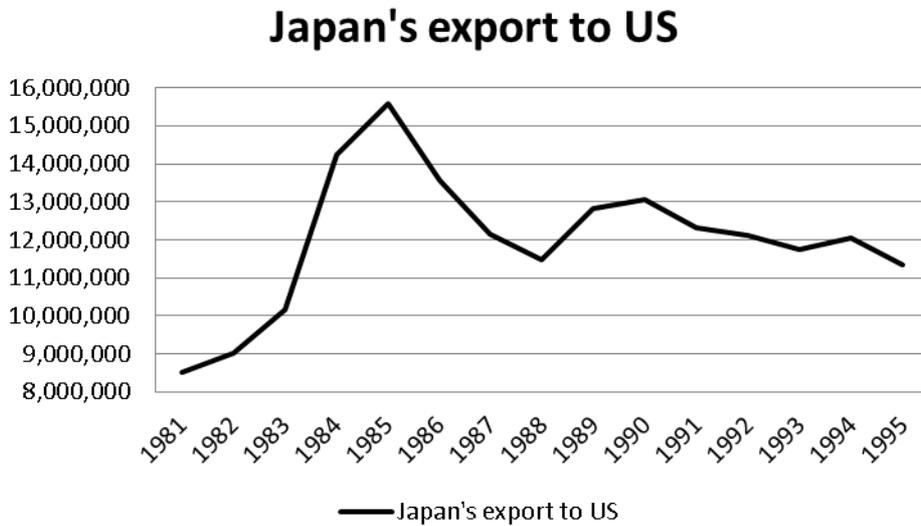
Data source: UN Comtrade Database

Figure 3: US trade deficit



Data source: UN Comtrade Database

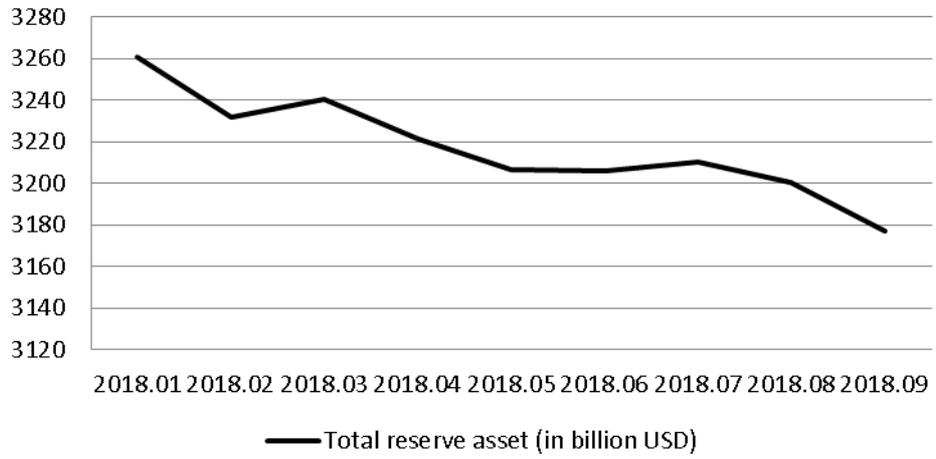
Figure 4: Japan's exports to the US around the time of the signing of the Plaza Accord



Data source: Japan Tariff Association

Figure 5: China's reserve assets

China's reserve asset



Data source: State Administration of Foreign Exchange