

# Explaining Sino-US Trade Disputes: A Dollar Auction Game

GAO Jie<sup>1</sup>, SHENG Li<sup>2</sup>

(1 Chinese University of Hong Kong;

2 University of Macau)

**Abstract:** This study examines the causes of Sino-US trade disputes by using a dollar auction game to analyze global imbalances. The authors argue that the trade disputes between China and the U.S. should be deemed as a non-zero-sum game as well as a dollar auction in the abstract. In this game, the interests of both parties involved in the bidding will finally be damaged, and the only winner is the “auctioneer”. In this case, the auctioneer refers to all the issues that have concerned both sides ever since the process of globalization began. Through tracking the trajectory of economic development and social-political changes in both China and the U.S., it is found that the effects of the growing US-China tensions extend into individual society concerning unemployment, income inequality, and many other social factors. The authors indicate that the trade disputes will not have effectively ameliorated either country’s problems but will have created new troubles. And if the trade war continues, it will soon usher in a lose-lose situation. However, as the game operates with the condition that there are no collusions or threats, this analogy makes clear the necessity of an open dialogue. The authors suggested that to solve the domestic problems in the U.S., adjusting domestic taxes, such as consumption tax, is more reasonable and effective than imposing tariffs and establishing other trade barriers.

**Keywords:** Sino-US trade disputes, a dollar auction game, trade imbalance, globalization, decision making

## 解釋中美貿易戰：一個美元拍賣遊戲

高 婕 盛 力

**摘 要：**本文通過運用經濟學中的“一美元拍賣陷阱”理論，分析和研究當前中美貿易爭端的成因及未來走向。中美貿易爭端可被理解為抽象形式的“一美元拍賣”，其本質是一場非零和博弈——最終參與競標的雙方利益均會受損，而惟一的贏家是“拍賣師”。中美貿易爭端這場“拍賣”中的“拍賣師”是“兩國自全球化進程開始以來與雙方有關的所有經濟、社會和政治問題”。通過追蹤並分析中美兩國經濟、社會和政治的發展進程，貿易爭端將無法有效緩解兩國現存的問題，並會帶來新的問題，若貿易爭端繼續，或將很快迎來雙輸的局面。此外，由於“一美元拍賣陷阱”模型運行的前提條件是雙方不存在共謀，因此談判和磋商對於中美雙方擺脫“陷阱”具有必要性。為解決美國的國內問題，相較於加徵關稅和設立其他貿易壁壘，調整消費稅等相關國內稅制會更為合理和有效。

**關鍵詞：**中美貿易爭端 一美元拍賣陷阱 貿易失衡 全球化 策略選擇

收稿日期：2019年9月7日

作者簡介：高婕，香港中文大學碩士研究生；盛力，澳門大學社會科學學院副院長

## I. Introduction

In July 2018, the largest trading war in human history broke out between the U.S. and China when the Trump administration imposed 25% tariffs on \$34 billion worth of imported Chinese goods, which China matched, dollar for dollar, with its tariff in retaliation against the U.S.. The subsequent two rounds of tariffs, targeting first \$16 billion and then a further \$200 billion worth of Chinese imports, escalated this trade war between the world's two largest economies to a whole new level. This indicates that more than half of the products imported from China into the U.S. have been subjected to tariffs, while in retaliation, 85% to 95% of the American exports to China have had tariffs levied upon them.

Given the deep connections and interdependence between the U.S. and China and their status as superpowers in the world economy, many scholars have expressed their worries about the future of the US-China trade war. Some economists fear that an escalating trade war could lead to a recession because it causes financial strain on American companies and consumers and reduces access to the world's largest market.<sup>1</sup> The International Monetary Fund (IMF) has even warned that a trade war could undermine the most robust global upswing in seven years. Contrary to these views, one argument in favor of the US-led trade war is that it will only bring temporary pain and it is necessary for America to finish its reindustrialization process and to reduce the trade deficit. However, regardless of what is agreed to, there is no denying that the prevailing trade war is damaging both the U.S. economy and the Chinese economy. According to the latest statistics from the U.S. Department of Commerce, the U.S. trade deficit continued to deteriorate in September, and the goods deficit alone stood at \$76.3 billion, the highest on record on a seasonally adjusted basis. Even worse, the U.S. government reported that the trade deficit caused the loss of 1.78 percentage points in GDP in the third quarter, which was the most since the second quarter of 1985. As China is affected by the trade barrier, its official GDP growth rate slowed from 6.7% to 6.5% in the third quarter.

These figures convince us of the fact that a trade war is not a zero-sum game - at least not for the present. Even if it appears that a country could outlive its opponent in the future, it would potentially do so at the expense of production capacities and a reduction in final demand. It should be realized that the imposition of new tariffs will not help to change the U.S. trade deficit in any significant way.<sup>2</sup> To address the problem of trade deficit, domestic policies, such as consumption tax-oriented at confining consumption and increasing federal income to cut budget deficits, are typically far more beneficial than tariffs imposed on foreign goods, which has the potential to destroy globalization.<sup>3</sup>

The authors believe that the situation of the trade war between China and the U.S. is a non-zero-sum game:

---

<sup>1</sup> Rajan, R., *Fault Lines: How Hidden Fractures Still Threaten the World Economy*, Princeton, NJ: Princeton University Press, 2010.

<sup>2</sup> Sheng, L., "Theorizing Global Imbalances: A Perspective of Savings and Inequality," *Cambridge Review of International Affairs*, vol. 28, Iss.2, 2015, pp. 191-204.

<sup>3</sup> Sheng, L., "Explaining US-China Economic Imbalances: A Social Perspective," *Cambridge Review of International Affairs*, vol. 29, Iss. 3, 2016, pp. 1097-1111.

it is a dollar auction in an abstract form. It is necessary to define who the auctioneer is, why the player makes his first bid, and how the bidding escalates. Through tracking the trajectory of economic development and social-political changes in both China and the U.S., the authors identify the “auctioneer”, who is assumed to be the only winner in a dollar auction. Moreover, the authors argue that the start of the trade war is unavoidable, which implies that it does not matter who starts the trade war. What truly matters is that the escalation of the attrition is prevented, because ending the trade war through collaboration is the only right way for the U.S. and China to break the deadlock.

## II. The Dollar Auction

The first discussion of the dollar auction in print was Shubik’s “The Dollar Auction game: a paradox in noncooperative behavior and escalation”.<sup>4</sup> To summarize, in a dollar auction, there is an auctioneer who is auctioning a dollar. There are two players bidding for the dollar, and the bids must be made in multiples of 5 cents (units of nickels). The dollar bill will go to the highest bidder, while both of the bidders (the highest and the second-highest bidder) have to pay the price that they offered in the last round. The game only operates with the condition/assumption that there are no collusions or threats.<sup>5</sup> For example, after a certain round of auction, player 2 bids 55 cents in order to win player 1 who just bid 50 cents. The game ends when player 1 stops trying, which results in player 2 gaining 45 cents. The other player, auctioneer gains 105 cents while player 1 gains nothing but has to pay 50 cents. Shubik argues that the auctioneer is one of the people who shape the game; thus, an auction with one auctioneer and two bidders is a three-person constant-sum game, though Shubik uses the characteristic function<sup>6</sup> in his formal analysis:<sup>7</sup>

$$\begin{aligned}V(1) &= -95\text{cents}, V(2) = V(3) = 0; \\V(1,2) &= 0, V(1,3) = 0, V(2,3) = 95\text{cents}; \\V(1,2,3) &= 0.\end{aligned}$$

\* 1 represents player 1, the auctioneer; 2 represents player 2, the bidder; 3 represents player 3, the other bidder.

The trade war between China and the U.S. is a dollar auction in the abstract. It is difficult to use the characteristic function or other ways to quantify the trade war based on three facts. Unlike the dollar auction above, for either China or the U.S., their bids in a new round are not a fixed multiple concerning the previous bids. Moreover, any decision that either side makes has the risk of creating “externality” in political and social

---

<sup>4</sup> Shubik, M., “The Dollar Auction Game: A Paradox in Noncooperative Behavior and Escalation,” *The Journal of Conflict Resolution (Pre-1986)*, vol. 15, iss. 1, 1971, pp. 109-111.

<sup>5</sup> O’Neill, B., “International Escalation and the Dollar Auction,” *The Journal of Conflict Resolution (1986-1998)*, vol. 30, no. 1, 1986, pp. 33-50.

<sup>6</sup> Von Neumann, J., In Morgenstern O. (ed.), *Theory of Games and Economic Behavior* (3<sup>rd</sup> ed), Princeton: Princeton University Press, 1963.

<sup>7</sup> Shubik, M., “On the Scope of Gaming,” *Management Science*, vol. 18, no. 5 Part-2, 1972, pp. 20-36.

dimensions, which implies that the cost of every “bid” is higher than it appears to be. Each country is working on policies that can stimulate its own domestic market to tackle the economic bottleneck and create a buffer for the blows from the other side. For instance, the Opportunity Zones in places such as the South Side of Chicago and the Mississippi Delta have been designated to catalyze economic growth in overlooked communities nationwide. As the strategies that both sides take are multi-targeting, it is impossible to quantify how much of any one decision contributes to a “bid”. Nevertheless, pondering the forces behind the war of attrition matters most. In the following sections, the authors will elaborate on how the trade war between China and the U.S. escalated in the first place and who the winner will be - or perhaps, there will be no winner at all.

### **III. Who is the “Auctioneer” and What is “a Dollar”?**

In a conventional dollar auction, the auctioneer, who profits the most from the game, is also the participant who promotes the game. As stated above, the trade war is an abstract form of dollar auction. Obviously, the two bidders in this case are specific entities: China and the U.S.. The auctioneer, however, is obscure. The authors consider that, in this case, the auctioneer refers to all the issues (either economic or social-political) that have concerned both sides ever since the process of globalization began. The intention of the players to start bidding or continue bidding comes from their belief that the gain from the auction outweighs the cost of the bid that they have to pay in the end. The trade war is not different because it is based on the intention of each side to try to turn the order of international trade to their advantage and solve their domestic issues through a trade war. As such, the auctioneer is also the literal “dollar” that the players want. Although it sounds exaggerated, the intentions of each country should be deemed as the auctioneer, while all the issues that the players (China and the U.S.) want to solve through the trade war can be considered as the “dollar”. Some might notice one thing that differs from a conventional dollar auction is that the auctioneer in a trade war might not be the “person” who sees the highest profit. In other words, there is no guarantee that the trade war will alleviate the countries’ domestic problems. Rather, a trade war could make the problems even worse. However, this is exactly what makes “auctioneer” the “winner”. Again, the auctioneer is also abstract. For instance, considering all the issues that the players (China and the U.S.) want to solve through the trade war as value, the auctioneer will win once the sum of any consequence of the trade war (the bid that the players have to pay to the auctioneer) is greater than due to the choices that lead to the escalation of the trade war. In other words, the trade war will not have effectively ameliorated either country’s problems (e.g., the trade deficit in the U.S.) but will have created new troubles.

#### **1. Historical review**

A historical review of the trade between China and the U.S. will demonstrate where the auctioneer comes from. The origins of globalization, which is defined as a process of interaction and integration between people, companies, and governments throughout the world, can be traced back to the European Age of Discovery. The prevalence of neoliberalism, however, has markedly accelerated the process of globalization. Neoliberalism originated in the 1930s and arose from a desire to avoid the repetition of the economic failures that led to

the Great Depression, which neoliberals mostly blamed on the economic policy of classical liberalism.<sup>8</sup> As a modification of classical liberalism, neoliberalism recognizes that the free market must be supported by the state on an ongoing basis. Specifically, neoliberalism refers to the new political, economic and social arrangements within society that emphasize market relations, the re-tasking of the role of the state, and individual responsibility.<sup>9</sup> Neoliberalism is essentially the extension of competitive markets into the economy, politics, and society. Ever since British Prime Minister Margaret Thatcher and the U.S. President Ronald Reagan were elected to office in the late 1970s, neoliberalism has been strongly pushed. Nationalized industries were privatized to serve market efficiency, and tariffs and regulations were removed to unshackle the power of the market. As a consequence, these policies greatly facilitated international trade, driving global interaction.

More importantly, the combination of globalization and neoliberalism has produced some complicated changes. On the one hand, neoliberalism has become the main driver of globalization, particularly in the economic globalization realm.<sup>10</sup> On the other hand, the content of globalization is deliberately misinterpreted by the adherents of the neoliberal philosophy, who misconstrue globalization as global neoliberalism to benefit their arguments. Meanwhile, a collection of free trade agreements and supranational governing bodies, such as the North American Free Trade Agreement (NAFTA) and World Trade Organization (WTO), were gradually established to defend this existing neoliberal order.

Notably, the US-China trade war shows that the neoliberal world order of free-trade globalization is in crisis. If one side gains more and the other side gains less, it will be difficult for globalization to win. In Sino-US relations, the primary difficulty is concentrated in the substantial and still-growing U.S. trade deficit with China, which will first erode the base of the Sino-US economic relationship and then endanger globalization.<sup>11</sup> Trump's protective tariffs, which indicate a significant shift away from global "free trade", were designed to boost the U.S. production of goods for the purpose to cut the trade deficit. However, the history has suggested that this will not happen.

Looking back at the Great Depression, a severe worldwide economic depression took place as the stock market crashed in the U.S., lasting from 1929 to 1939. This was the worst economic downturn in the history of the industrialized world, and worldwide GDP fell by an estimated 15%. To protect U.S. industries, Hoover's administration passed the *Smoot-Hawley Tariffs Act* to sharply raise tariffs on thousands of agricultural and industrial goods in 1930. This initiative immediately resulted in vigorous protestation and tariff retaliation

---

<sup>8</sup> Piketty, T., *Capitalism in the 21st Century*, Cambridge, MA: Harvard University Press, 2014.

<sup>9</sup> Sheng, L., "Income Inequality, Financial Systems, and Global Imbalances: A Theoretical Consideration," *Global Policy*, vol. 5, iss. 3, 2014, pp. 311-320.

<sup>10</sup> Sheng, L., "Theorizing Free Capital Mobility: A Perspective on Developing Economies," *Review of International Studies*, vol. 37 iss. 5, 2011, pp. 2519-2534.

<sup>11</sup> Sheng, L., "Dealing with Financial Risks of International Capital Flows: A Theoretical Framework," *Cambridge Review of International Affairs*, vol. 25, iss. 3, 2012, pp. 463-474.

from 35 other nations, which made it harder for the U.S. to pull itself out of the depression.<sup>12</sup> The new tariffs raised prices on consumers and damaged industries that relied on trade directly or indirectly. Despite only being implemented for 4 years, this act and the subsequent retaliatory measures not only destroyed the U.S. domestic economy but also deepened the depression around the world. Between 1929 and 1933, U.S. imports decreased by 66%, and exports dropped by 61%. U.S. gross national product fell by almost half, from \$103.1 billion to \$55.6 billion.<sup>13</sup> The unemployment rate jumped from 8% to 25%. Overall, world trade was reduced by over 65%.

Today's world is profoundly interconnected by previously unprecedented globalization, which makes the economy of today different from that of the 1930s. Thanks to the complementarity and comparative strengths of U.S. and Chinese industries, Sino-US economic interaction has increasingly grown over the past few decades. In 2017, the bilateral trade volume amounted to \$710 billion.<sup>14</sup> China has become the third-largest purchaser of US-made products and services, following Mexico and Canada. As a vital part of the global supply chain, China's manufacturing improves the competitiveness and profitability of U.S. businesses.

Moreover, China has invested \$1.2 trillion in the U.S. government's debt, which helps keep borrowing costs down for the U.S. government and its private sector.<sup>15</sup> In return, U.S. multinational companies and entrepreneurs have been a major contributing factor in the development of China's economy by introducing advanced technologies, promoting market competition and improving industry efficiency. Furthermore, a large number of agricultural products and highly sophisticated products imported from the U.S. make up for supply deficiencies in the Chinese market and satisfy Chinese consumers' demands.<sup>16</sup> In summary, Sino-US economic interaction has effectively promoted the economic growth of both countries as well as improved their economic wellbeing. The economic interests of the U.S. and China have become so closely intertwined that neither can walk away from the other.

## 2. The economy shapes the societies of both countries

In the context of globalization, the effects of the growing US-China economy interaction are not confined to the economic sphere. They also extend into individual society with respect to unemployment, income inequality, and many other social factors. One notable change resulting from the active economy interactions

<sup>12</sup> Acemoglu, D., Autor, D., Dorn, D., Hanson, G. & Price, B., "Return of the Solow Paradox? IT, Productivity, and Employment in the US Manufacturing," *American Economic Review*, vol. 104, no. 5, 2014, pp. 394-399; Batra, R. & Beladi, H., "The US Trade Deficit and the Rate of Interest," *Review of International Economics*, vol. 21, iss. 4, 2013, pp. 614-626.

<sup>13</sup> McKinnon, R., "The U.S. Saving Deficiency, Current-Account Deficits, and Deindustrialization: Implication for China," *Journal of Policy Modeling*, vol. 35, iss. 3, 2013, pp. 449-458; Sheng, L. & Gao, J., "Foreign Investors versus Host Communities: An Urban Political Economy Model for Tourist Cities," *Argumenta Oeconomica*, vol. 41, no.2, 2018, pp. 257-275.

<sup>14</sup> Watanabe, A., "Greater East Asia Geopolitics and Its Geopolitical Imagination of a Borderless World: A Neglected Tradition?" *Political Geography*, vol. 67, 2018, pp. 23-31.

<sup>15</sup> Lau, L. J., "Chinese Economy in the New Era," *Pacific Economic Review*, vol. 24, iss. 2, 2019, pp. 187-207.

<sup>16</sup> Hosain, M. D., & Hossain, M. S., "US-China Trade War: Was It Really Necessary?" *International Journal of Business and Economics*, vol. 4, no. 1, 2019, pp. 21-32.

between the U.S. and China is that the benefits of globalization have become dubious and are debated in contemporary U.S. society. Globalization makes many manufacturing industries shift out of the U.S. into developing countries, including China, causing the U.S. to lose approximately a fifth of its share in the global manufacturing output. In addition to the stagnation of the manufacturing industry, U.S. society is concerned about the large trade deficit with other countries, among which, the deficit with China is the biggest.<sup>17</sup> The disadvantaged position has transformed U.S. society. Blue-collar workers face greater competition from the Chinese labor market, aided by a drive for productivity gains. Despite that, the pay for blue-collar workers has remained at the same level as before, if not an even lower one. Laid-off workers attribute their misfortunes to globalization. Some politicians magnify the adverse effects of globalization to serve their political interests, which further misleads common people into changing their views of globalization.<sup>18</sup> Finally, these sentiments have converged to become a powerful anti-globalization sentiment spreading in today's society in the U.S.. By contrast, those groups that have benefited most from the globalization process, including consumers who pay lower prices, managers who earn higher salaries and shareholders enriched by dividends and equity growth, are more firmly supportive of globalization.<sup>19</sup>

In contrast, Chinese society has been transformed in another direction. Thanks to extremely low manufacturing costs, China has attracted relocated global manufacturers, including many from the U.S., to the country since the 1980s. From this shifting, China has become the world factory, which has helped lift hundreds of millions of Chinese out of poverty. Subsequently, China's accession to the WTO is regarded as a strong stimulus for China's externally-oriented economic growth. Such accession would bail out the inefficient state-owned enterprises, making them more competitive in the U.S. market. With the development of globalization, a rich and prosperous society has been growing in contemporary China. The standard of living in China has consistently improved, while personal income has substantially increased, creating the world's largest middle-class. According to incomplete statistics, of China's nearly 1.4 billion citizens, over 400 million people have become middle-income earners.<sup>20</sup> The poverty of China's past has become history because globalization has benefitted almost every class in China. Considering the great success that China has had in the process of globalization, pro-globalization has evolved into a common social sentiment in contemporary China.

### **3. How decision makers respond to social change**

It is important to note that this transformation in Sino-US economic interaction that has impacted society is by no means a one-way process. Changes in each society can, in return, impact the way in which the two countries interact with each other economically. In this process, the policies that individual governments make

---

<sup>17</sup> Prasad, E. S., "Rebalancing Growth in Asia," *International Finance*, vol. 14, iss. 1, 2011, pp. 27-66.

<sup>18</sup> O' Rourke, K. H., "Economic History and Contemporary Challenges to Globalization," *The Journal of Economic History*, vol. 79, iss. 2, 2019, pp. 356-382.

<sup>19</sup> Burrige, P., Iacone, F., & Lazarová, Š., "Spatial Effects in a Common Trend Model of US City-level CPI," *Regional Science and Urban Economics*, vol. 54, 2015, pp. 87-98.

<sup>20</sup> Georgiadis, G., "Determinants of Global Spillovers from US Monetary Policy", *Journal of International Money Finance*, vol. 67, 2016, pp. 41-61.

to respond to the transformation act as catalysts for intensifying this impact. Generally, the U.S. government has exacerbated the trade deficit problem it faces today. Faced with an increase in offshore operation investments and shrinking domestic production during the Cold War, the government chose to ignore or even to facilitate the trade deficit to temporarily serve its alliance strategies. Additionally, offshoring was also deemed by the government to be merely the pursuance of U.S. liberal market philosophy, which was characterized by free trade. These reactions from the U.S. government accidentally speed up the course of the U.S.'s deindustrialization, which solidified the country's dependence on imports. Apart from deindustrialization, high consumption propensity is responsible for the U.S.'s large trade deficit. A collection of initiatives undertaken by the U.S. government, including prioritizing the development of financial sectors, offering easy consumer credit, and implementing affordable housing programs, stimulated domestic consumption unlimitedly and further aggravated the preexisting social inequity in American society, which eventually triggered the financial crisis of 2008.<sup>21</sup> As a result, to protect Americans' savings, the U.S. administration had to enact a bailout plan financed by U.S. treasury bonds to prevent major banks from bankruptcy. At this point, as a country with a surplus, China became a creditor to the U.S. Like the U.S. policies, the income distribution policies made by the Chinese government had far-reaching impacts, these ones on China's trade surplus. With U.S. companies profiting from low labor costs in China, the Chinese state sector also benefited. To maintain absolute power over the economy, the government further activated state-owned enterprises while regulating private firms, which enabled great wealth to flow into the state sector and a few privileged classes but leaving ordinary wage earners with low incomes. This unequal income distribution directly caused low consumption and a high propensity for saving in the country, which is the fundamental cause of the country's export-driven economy.<sup>22</sup> In addition, the administration's overemphasis on GDP and manufacturing expansion also led to China's overproduction, further expanding the trade surplus. The continuing trade surplus inevitably accumulated considerable foreign exchange reserves. Therefore, U.S. assets, especially treasury bonds, served as desirable and reasonable investment targets for China.

#### **4. The impact of the policies**

As an extreme trade policy, the implementation of new tariffs exerts some predictable and some unexpected influences over the economic and social spheres in both countries. From the perspective of the U.S., as mentioned above, the new levies have already caused the U.S.'s large trade deficit with China to surge in September. Although the struggle between pro-globalization and anti-globalization sentiments is making progress in China, since Donald Trump, who appears to act in the interest of anti-globalization powers, assumed the U.S. presidency in 2017, the anti-globalization sentiments in U.S. society have reached an unprecedented high. Trump has adopted the policy of imposing high tariffs on goods made in China. However, if this US-China trade war is provoked only to fulfill an election promise that was made to help Trump win the presidency,

---

<sup>21</sup> Sheng, L., "Explaining US-China Economic Imbalances: A Social Perspective," pp. 1097-1111; Stiglitz, J. E., "The Global Crisis, Social Protection and Jobs," *International Labour Review*, vol. 148, iss. 1-2, 2009, pp. 1-13.

<sup>22</sup> Sheng, L., "Theorizing Global Imbalances: A Perspective of Savings and Inequality," pp. 191-204.

the situation cannot become much worse because the whole nation will pay a heavy price for a decision that does not take the country's best interest into account.

The trade war is undesirable to China as well, as China benefits from globalization, especially its economic interaction with the U.S.. However, China has shown its determination to accept challenges and imposed retaliatory tariffs on goods made in the U.S.. This is currently the most effective policy that China can use to prevent the trade war from becoming even worse because it reduces Chinese losses and pulls the Trump administration back to the negotiation table. Another response to this trade friction has been watching the U.S. closely and making relevant adjustments. For instance, the tax imposed on domestic companies has been reduced recently to alleviate the negative impact of tariffs.

If we were to make an improper metaphor here, the economic interaction between U.S. and China takes place, more or less, at a macro-level, while the societal changes in their countries take place at a micro-level. However, whether these effects take place on the macro-level or the micro-level, the power of each country to shape the other is neither strengthened nor weakened. By referring to a policy as a catalyst, it is meant that the calculated policy can either exacerbate the conflict that it is supposed to alleviate if it is poorly designed or it can encourage a win-win outcome if it effectively resolves the problem.

#### **IV. Who Will Be the Winner?**

The winner in a game refers to the player who gains the best scores. However, a dollar auction is tricky because it gradually exploits the irrationality of the bidders' behaviors. The dollar auction appears to be a zero-sum game at first: the highest bidder will get a dollar, while the second-highest bidder will get nothing but will still have to pay his/her bid. However, as the attrition increases, even the highest bidder will end up paying more than one dollar to get “a dollar”. The auctioneer will finally be the winner. The auctioneer, in this case, is all the problems that China or the U.S. want to resolve through a trade war. However, the “winner” in the trade war might be a disaster for both sides because there is no guarantee that a trade war is a right way to fix such issues as the wealth gap and the financial bubble. Even worse, both the Chinese and the American people have begun to suffer from the costs of the trade war. Every move that China or the U.S. makes is an attempt to escalate the country's commitment to winning by deterring the other side with the threat of a potentially costly consequence. However, as the commitment to winning escalates and the sunk cost created by both countries rises higher, the whole game is changing from “who is going to win most” to “who is going to lose less”. If we use backward induction to check at exactly which point rational behavior becomes irrational, we find that even at the beginning of the dollar auction, the idea of “do not play” is internally inconsistent. What is the best response in a dollar auction if it is clear that no one else will play? The practical answer should be starting the game as the first/single player. Not only should one play, but one should also start with a large enough bid to make it sufficiently clear that one is committed to winning. This can explain why, in July 2018, the Trump administration imposed an additional 25% tariffs on \$34 billion worth of imported Chinese goods. The conclusion is that any misestimate of the size of the bid necessary to make the others remain silent could

consequentially escalate the attrition.

There is one critical condition that ensures the paradox inside the dollar auction: the prohibition of collusion/communication. One bright side of the trade war is that the interaction between China and the U.S. has been relatively congenial for a long period of time. More open discussion between the two countries is needed to stop the creation of a “black hole” that sucks away every accomplishment of and effort made by citizens in both countries in the past.

## V. Conclusion

To simplify the complexity of the US-China trade war into a dollar auction game is not a naive analogy. Instead, this analogy makes clear the necessity of an open dialogue. If domestic problems arise in a country, self-reflection and policy adjustments are more important than blaming the others. Correspondingly, the consequence of a country changing itself is less severe than forcing others to change. Adjusting domestic taxes, such as consumption tax, should be more reasonable and effective than imposing tariffs and establishing trade barriers. Though it seemingly acts as protection, the “welfare” is actually an anesthetic that slowly fills the wound so that the country will not feel the injury. Once exposed to a competition, those elements that were previously protected will be knocked out. Unfortunately, a trade war is not the best remedy.

Moreover, along with the complexities of globalization, the fast-changing world has a high demand for decision making. Under some circumstances, previous decisions can be a stumbling block for the formation of new decisions. As Great Britain Prime Minister Palmerston said, “Our interests are eternal and perpetual, and those interests it is our duty to follow.” As such interests are necessary for the existence and development of a country, the actors in globalization fear to fall into less privileged positions, which would preclude their ability to fulfill their duty of following national interests. However, since the future is full of unpredictability, human rationality is always limited. Because of such unpredictability, the trade war between the U.S. and China is the consequence of more than the countries’ short-term and imbalanced trading relations that we can see now. To be sure, if the trade war continues into the foreseeable future, an iterative nightmare will haunt the comprehensive development of bilateral relations between the U.S. and China. A serious lose-lose result would not be very far behind.

## References:

- Acemoglu, D., Autor, D., Dorn, D., Hanson, G. & Price, B., “Return of the Solow Paradox? IT, Productivity, and Employment in the US Manufacturing,” *American Economic Review*, vol. 104, no. 5, 2014, pp. 394-399.
- Autor, D., Dorn, D., Hanson, G. & Song, J., “Trade Adjustment: Worker-level Evidence,” *The Quarterly Journal of Economics*, vol. 129, iss. 4, 2014, pp. 1799-1860.
- Batra, R. & Beladi, H., “The US Trade Deficit and the Rate of Interest,” *Review of International Economics*,

vol. 21, iss. 4, 2013, pp. 614-626.

Barton, J., & Rehner, J., “Neostructuralism through Strategic Transaction: The Geopolinomics of China’s Dragon Doctrine for Latin America,” *Political Geography*, vol. 65, 2018, pp. 77-87.

Burridge, P., Iacone, F., & Lazarová, Š., “Spatial Effects in a Common Trend Model of US City-level CPI,” *Regional Science and Urban Economics*, vol. 54, 2015, pp. 87-98.

Georgiadis, G., “Determinants of Global Spillovers from US Monetary Policy,” *Journal of International Money Finance*, vol. 67, 2016, pp. 41-61.

Hosain, M. D., & Hossain, M. S., “US-China trade War: Was It Really Necessary?” *International Journal of Business and Economics*, vol. 4, no. 1, 2019, pp. 21-32.

Lau, L. J., “Chinese economy in the New Era,” *Pacific Economic Review*, vol. 24, iss. 2, 2019, pp. 187-207.

McKinnon, R., “The U.S. Saving Deficiency, Current-Account Deficits, and Deindustrialization: Implications for China,” *Journal of Policy Modeling*, vol. 35, iss. 3, 2013, pp. 449-458.

Nisan, N., Roughgarden, T., Tardos, E., & Vazirani, V. V., *Algorithmic Game Theory*. Cambridge: Cambridge University Press, 2007.

O’ Neill, B., “International Escalation and the Dollar Auction,” *The Journal of Conflict Resolution (1986-1998)*, vol. 30, no. 1, 1986, pp. 33-50.

O’ Rourke, K. H., “Economic History and Contemporary Challenges to Globalization,” *The Journal of Economic History*, vol. 79, iss. 2, 2019, pp. 356-382.

Piketty, T., *Capitalism in the 21st Century*, Cambridge, MA: Harvard University Press, 2014.

Prasad, E. S., “Rebalancing Growth in Asia,” *International Finance*, vol. 14, iss. 1, 2011, pp. 27-66.

Rajan, R., *Fault Lines: How Hidden Fractures Still Threaten the World Economy*, Princeton: Princeton University Press, 2010.

Sheng, L., “Theorizing Free Capital Mobility: A Perspective on Developing Economies,” *Review of International Studies*, vol. 37 iss. 5, 2011, pp. 2519-2534.

Sheng, L., “Dealing with Financial Risks of International Capital Flows: A Theoretical Framework,” *Cambridge Review of International Affairs*, vol. 25, iss.3, 2012, pp. 463-474.

Sheng, L., “Income Inequality, Financial Systems, and Global Imbalances: A Theoretical Consideration,” *Global Policy*, vol. 5, iss. 3, 2014, pp. 311-320.

Sheng, L., “Theorizing Global Imbalances: A Perspective of Savings and Inequality,” *Cambridge Review of International Affairs*, vol. 28, Iss.2, 2015, pp. 191-204.

Sheng, L., “Explaining US-China Economic Imbalances: A Social Perspective,” *Cambridge Review of International Affairs*, vol. 29, iss. 3, 2016, pp. 1097-1111.

Sheng, L. & Gao, J., “Foreign Investors versus Host Communities: An Urban Political Economy Model for

Tourist Cities,” *Argumenta Oeconomica*, vol. 41, no. 2, 2018, pp. 257-275.

Shubik, M., “The Dollar Auction Game: A Paradox in Noncooperative Behavior and Escalation,” *The Journal of Conflict Resolution (Pre-1986)*, vol. 15, iss. 1, 1971, pp. 109-111.

Shubik, M., “On the Scope of Gaming,” *Management Science*, vol. 18, no. 5 Part-2, 1972, pp. 20-36.

Stiglitz, J. E., “The Global Crisis, Social Protection and Jobs,” *International Labour Review*, vol. 148, iss. 1-2, 2009, pp. 1-13.

Von Neumann, J., In Morgenstern O. (ed.), *Theory of Games and Economic Behavior* (3<sup>rd</sup> ed.), Princeton: Princeton University Press, 1963.

Watanabe, A., “Greater East Asia Geopolitics and Its Geopolitical Imagination of a Borderless World: A Neglected Tradition?” *Political Geography*, vol. 67, 2018, pp. 23-31.