

Analysis of the Macroeconomic Environment in The United States and China for Tesla Model 3

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Abstract: China and the United States (US) are two of the biggest markets of which Tesla's products are being sold in. Through a comparative analysis of the macroeconomic environment, monetary policy, fiscal policy and trade policy of China and the United States, this report describes the potential of China's market over the US for the new Tesla Model 3. Although the trade war between the US and China increased the cost of Model 3 to a certain extent, these problems can be alleviated by expending the Giga factory in China in turn reducing taxes and fees. At the same time, there is also the urgency of speeding up Tesla's internationalization strategies to meet up with changing economies globally.

Keywords: Macroeconomic environment, Tesla, model 3, United States, China.

1. Introduction

Tesla Inc., founded in 2003, is the largest electric vehicle and solar panel company in the United States. In the automotive field, it is currently the world's best-selling electric vehicle brand. Model 3 which was released in 2017 is the iconic product that successfully opened up the market for Tesla after Model S. This model is cost effective starting from 35,000 USD and could drive up to 354 kilometres. In 2019, Model 3 sales in the United States exceeded 160,000, surpassing the same type of BMW 5 Series, Mercedes-Benz E-Class, Audi A6 and other traditional luxury fuel vehicles

(Ren et al, 2020), becoming the best-seller of the US mid-size luxury car market. As one of the important strategies of internationalization, Tesla targeted the new chinese electronic vehicle (EV) market of which Model 3 has caused a huge impact on China's mid-to-high-end traditional vehicles and EV market.

Figure 1 in the appendix shows the top 20 EV models sold globally in 2019. 9 of them are Chinese brands and 5 are from the EU. Tesla's Model 3, Model X, and Model S are all in it, and Model 3 is by far ahead of the other electric vehicles. Therefore, there is huge potential for this product within the global market in terms of its differentiation, positioning, competitiveness and pricing.

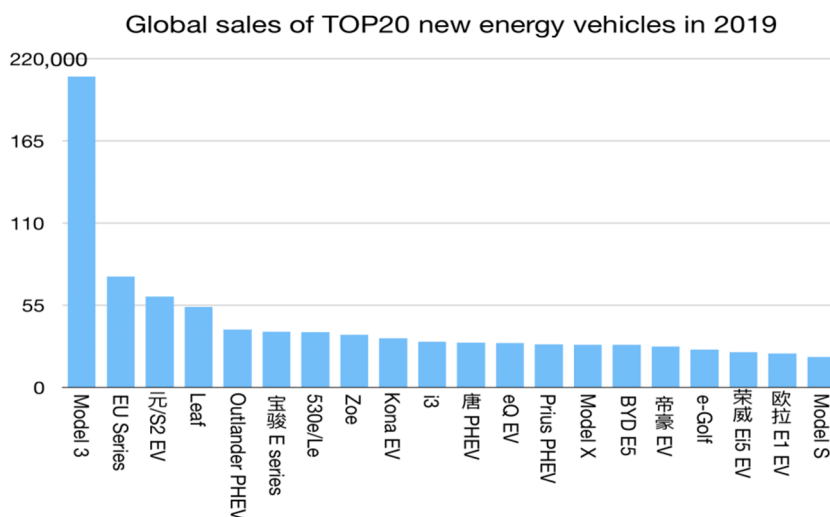


Figure 1. The top 20 new energy vehicle models sold globally in 2019. Tesla Model 3 sales far exceed other brand models. Source: EV sales

2. The Macroeconomic Environment of United State and China

Indicators can be used to understand the macroeconomic environment of two largest economies in the world, includes not limited to Gross Domestic Product (GDP) growth rate, GDP per Capita in constant Dollars (2010), Consumer Price

Index (CPI), unemployment rate, fiscal balance at the percentage of GDP, the balance of payment at the percentage of GDP, exchange rate and interest rate. Historic values of these two economic indicators are analysed for Tesla's business activities. Figure 2 to 9 displays the data of the respective indicators for the US and China in the last ten years. The data from Figure 2 to 9 are collected from the World Bank (the World Bank, 2020).

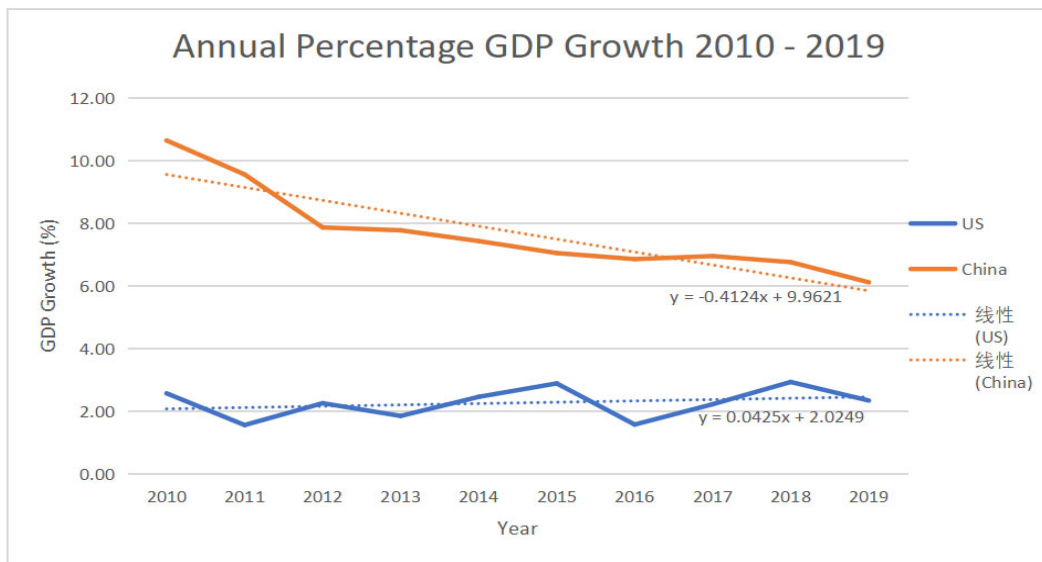


Figure 2. Annual percentage GDP growth comparison between the US and China (excluding Hong Kong and Macau) from 2010 to 2019. Logistic regression line (dotted line) shows the overall trend of the values for the past ten years. Source: (The World Bank)

GDP growth rates are the most common indicator of economic growth of which foreign investors look for in investing overseas (Frumkin, 2005). Based on Figure 2, the GDP growth rate of the US has shown an increase in trend overall compared to China’s significant decrease. However, the GDP per Capita in constant Dollars (2010) of China

showed a constant increase within the period, demonstrates individual prosperity which may tie in with income taxes, a factor of tax revenue percentage of GDP, affecting individual disposable income allowing more buying power for products such as Tesla electric vehicles (EV) (Figure 3).

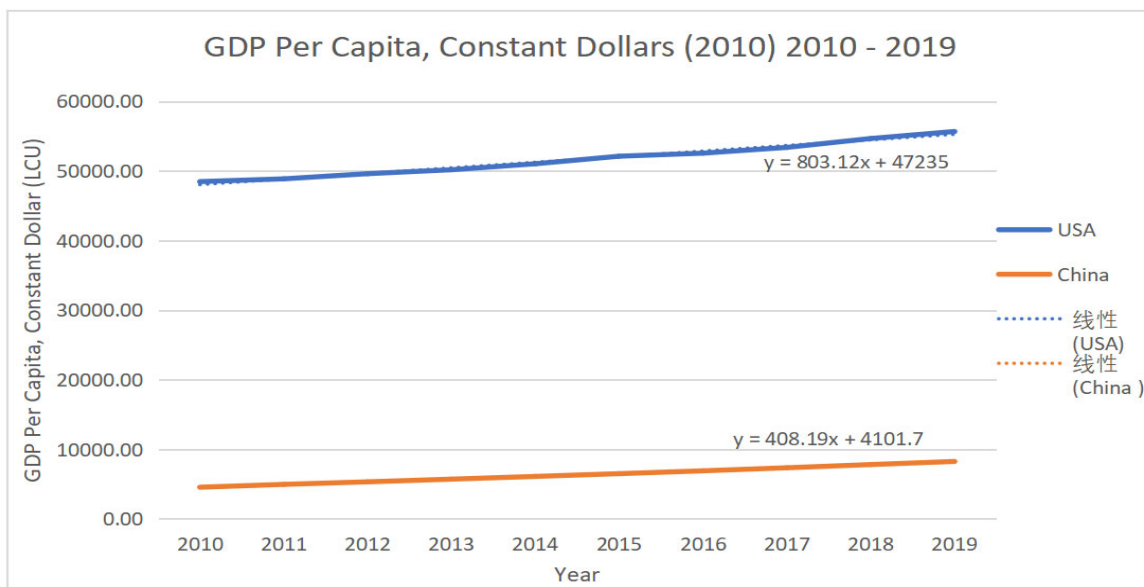


Figure 3. GDP per Capita in constant Dollars (2010) comparison between the US and China (excluding Hong Kong and Macau) from 2010 to 2019. Logistic regression line (dotted line) shows the overall trend of the values for the past ten years. Source: (The World Bank)

The overall CPI for China in Figure 4 has shown to be higher than the US for most of the ten years but with a sharper decline in trend. In the recent three years in which Tesla Model 3 are in the market, China’s CPI has shown an increasing trend compared to a more stagnant trend of the US. “Trends in CPI are a major guide in determining whether economic growth should be stimulated or restrained” (Frumkin, 2005), therefore can be an indicator for change in monetary and fiscal policies affecting buying power. The unemployment rate, another indicator alongside CPI is to evaluate economic policies and theoretically is normally

inversely with GDP and CPI (Frumkin, 2005). US CPI has significantly decreased, while the unemployment rate of China has been maintained at the same level in the past decade (Figure 5). This further supports that the economy of the US is growing while the unemployment rate is stable compared to the decrease in GDP over this period. Nonetheless, low unemployment rates in both countries suggest that businesses are performing well in raising their labour force. Hence more people might have more money to spend which might be the potential customers for Tesla, especially the Model 3 being the entry-level.

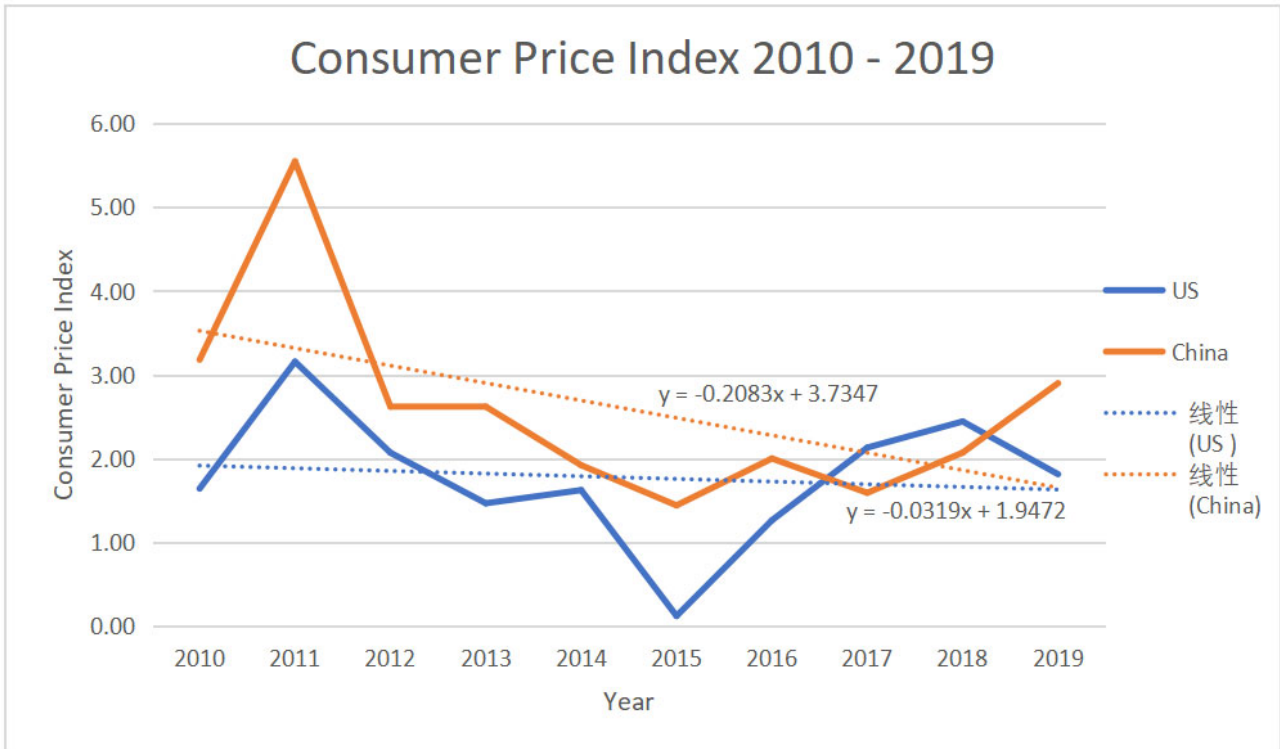


Figure 4. Consumer Price Index comparison between the US and China (excluding Hong Kong and Macau) from 2010 to 2019. Logistic regression line (dotted line) shows the overall trend of the values for the past ten years.

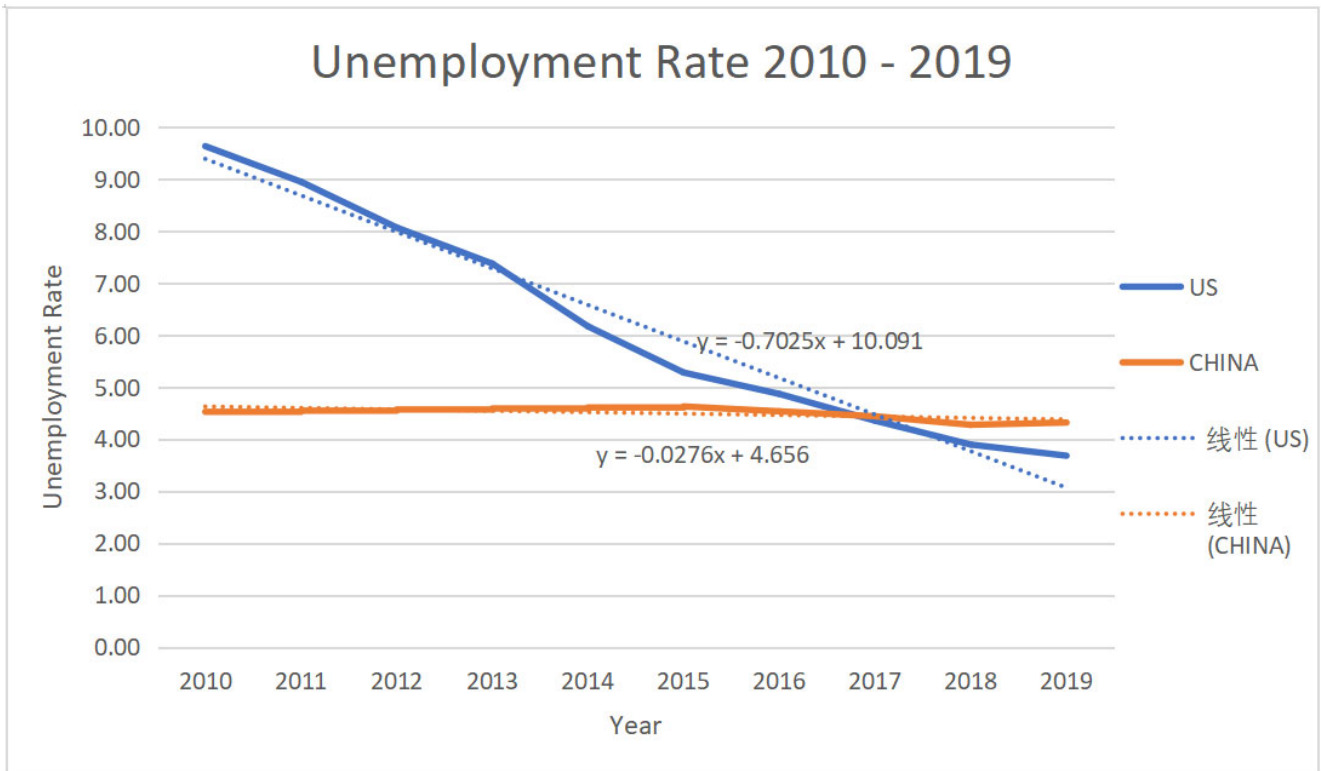


Figure 5. Unemployment Rate comparison between the US and China (excluding Hong Kong and Macau) from 2010 to 2019. Logistic regression line (dotted line) shows the overall trend of the values for the past ten years.

Fiscal balance refers to the difference in revenue and expenditure by the government, which is an important component of GDP. Figure 6 shows that both countries are in a deficit where the government expenditures are greater than the revenue (Frumkin, 2005). However, the trend line tells that the gap of deficit for China has increased over the decade

by more than four folds while the US has minimised such gap significantly from -11.81% in 2010 to -3.79% in 2017. China's decreasing trend in fiscal balance might be due to lower taxes and increased internal government expenditure which may lead to a better market for Tesla compared to the US which may have taken the opposite approach.

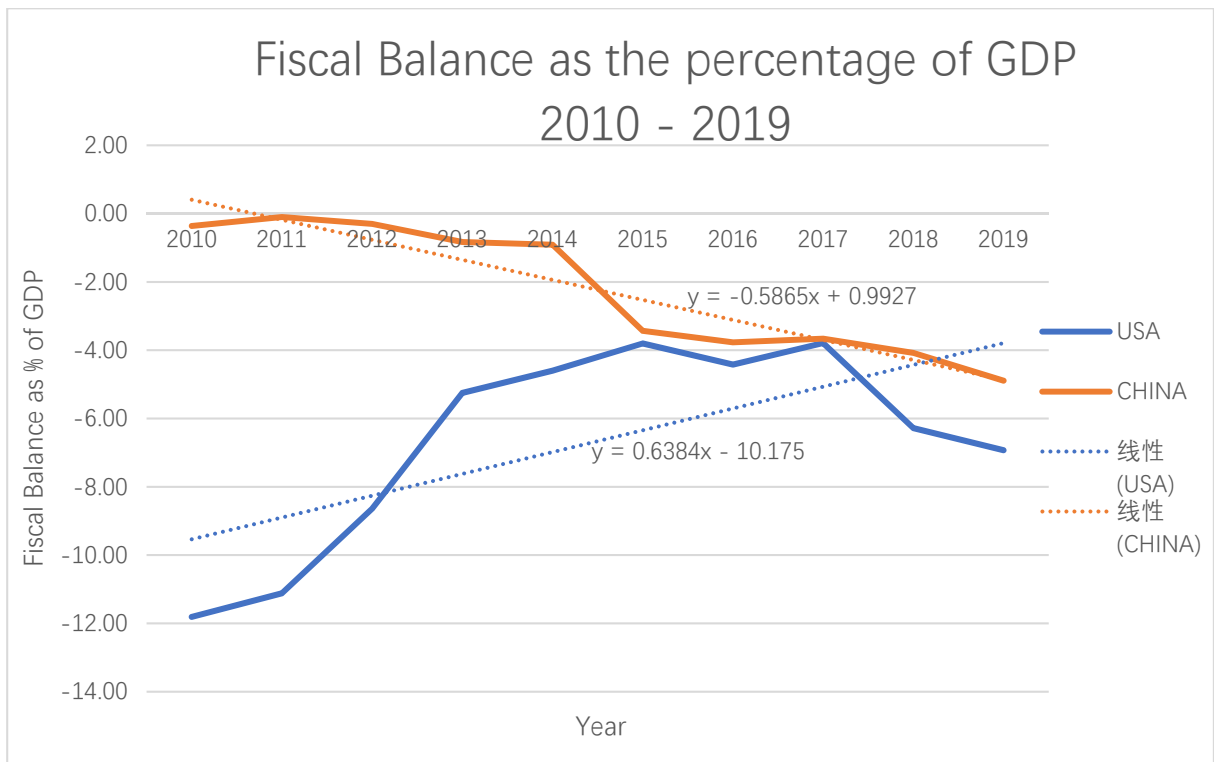


Figure 6. Fiscal Balance as % of GDP in the comparison between the US and China (excluding Hong Kong and Macau) from 2010 to 2019. Logistic regression line (dotted line) shows the overall trend of the values for the past ten years.

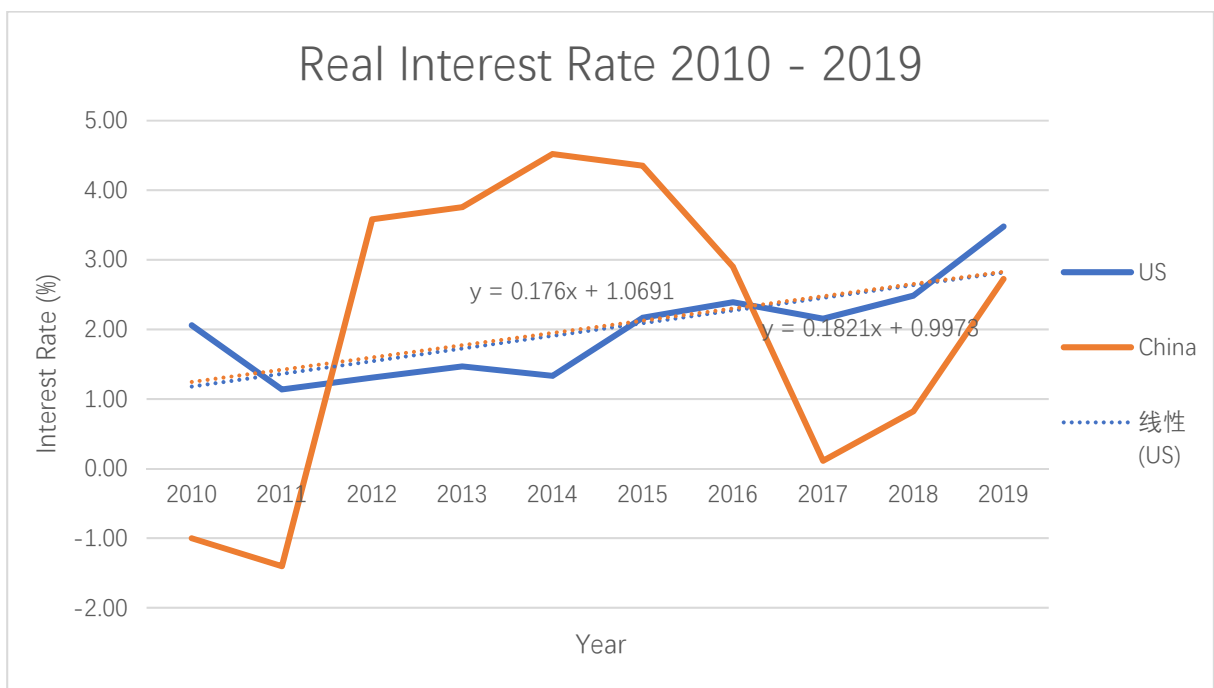


Figure 7. The interest rate in the comparison between the US and China (excluding Hong Kong and Macau) from 2010 to 2019. Logistic regression line (dotted line) shows the overall trend of the values for the past ten years.

Real interest rate, the cost of borrowing and lending of money, is determined by the central bank based on an economic event or market movement in the past. This has a significant influence on banks, consumers and business all around the world (Cattlin, 2019). Figure 7 illustrates the comparison of the movement of the interest rate for the US and China. China has a much more fluctuated line between -1.4% and 4.52% than the US, but both showed an upward trend leading to a possible choice of investment leading to less purchasing power.

Balance of payment (Figure 8) measures the trade balance,

net factor income and net cash transfers in domestic currency. This measure based on its performance indicates the international competitiveness of a country (Alawattage, 2009). The statistic demonstrated that China has always been a net lender with a decreasing trend, while the US has been a net borrower from the rest of the world. Hence, China has higher international competitiveness than the US. The exchange rate is one of the elements affecting the balance of payment. Figure 9 shows that the Chinese Yuan has been very stable compared to the Dollar. China's Central Bank manages, intervenes and determines its direction (Euromonitor, 2019)

leading to limited influence on the transactions between the US and China is limited. Overall, macroeconomic indicators state both the US and China have a stable economy. However,

China has a more suitable macroeconomic environment for Tesla's new EV.

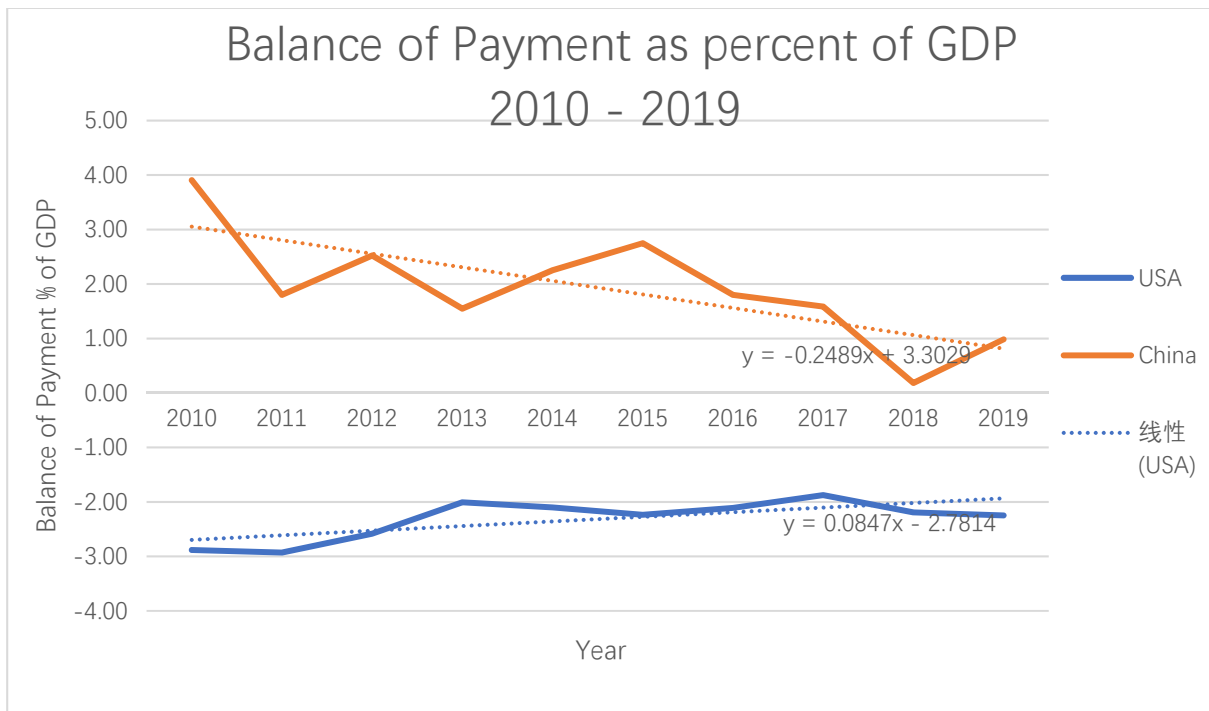


Figure 8. Balance of payment as a percentage of GDP in the comparison between the US and China (excluding Hong Kong and Macau) from 2010 to 2019. Logistic regression line (dotted line) shows the overall trend of the values for the past ten years.

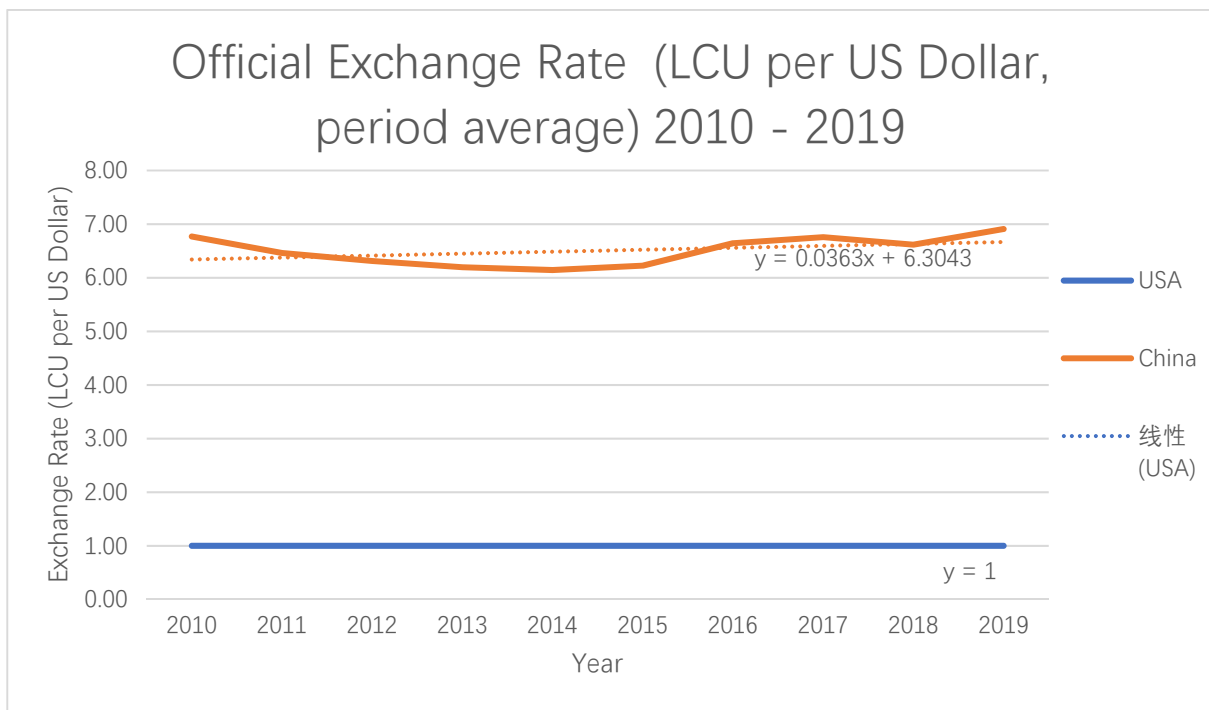


Figure 9. The average exchange rate in LCU per US Dollar in the comparison between een US and China (excluding Hong Kong and Macau) from 2010 to 2019. Logistic regression line (dotted line) shows the overall trend of the values for the past ten years.

3. Monetary and Fiscal Policies of United State and China

Monetary policies are actions taken by the US federal reserve and People's Bank of China (PBOC) by spurring or restraining the growth of overall demands for goods and

services in the Economy (Federal Reserve, 2018; Lee, 2018). Unlike the US federal reserve in which the decisions are made by the Federal Open Market Committee (FOMC) with a primary goal, China's case uses more complex tools in meeting similar goals to the US. The main goals discussed here include maximizing employment, stable pricing and

moderate long term interest rates.

The US has maintained a stable monetary policy by promoting overall demand relative to the economy in controlling the inflation rate at around 2% (Figure 4) and lower unemployment (Figure 5) over the last ten years (Federal Reserve, 2018). The interest rate has shown a steady increase due to inflation rate being kept low to keep sustainability through tighter monetary policy. This may implicate less purchasing power whereby the real interest rate is directly linked to increasing saving returns from bond-related items and an increase in loan costs. China's monetary

policy through its seven tools achieved similar success with a sharper decline in inflation rates with a very stable unemployment rate. This may result in the large fluctuation of the real interest rate as we have seen in Figure 7 leading to a more unpredictable market. The interest rate trend has been more stable in the last three years shown by both the US and China-based effect on the stability of the other two indicators but with the lower interest rates by China, it may affect the electric car sale differences between the two countries (Figure 12). This may be due to purchasing methods such as loans which are affected by interest rate.

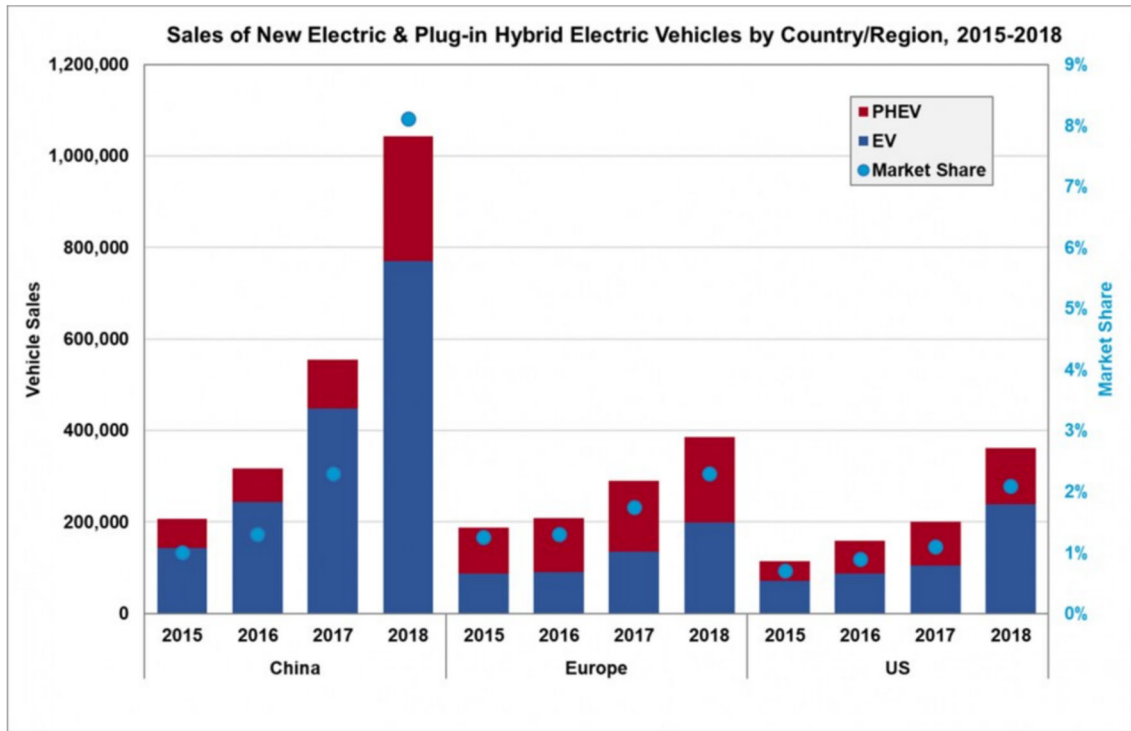


Figure 10. Sales of new electrical vehicles (EV) Plug-in in Hybrid Vehicles (PHEV) between China, Europe and the US between 2015 to 2018. (Source: Kane, 2019)

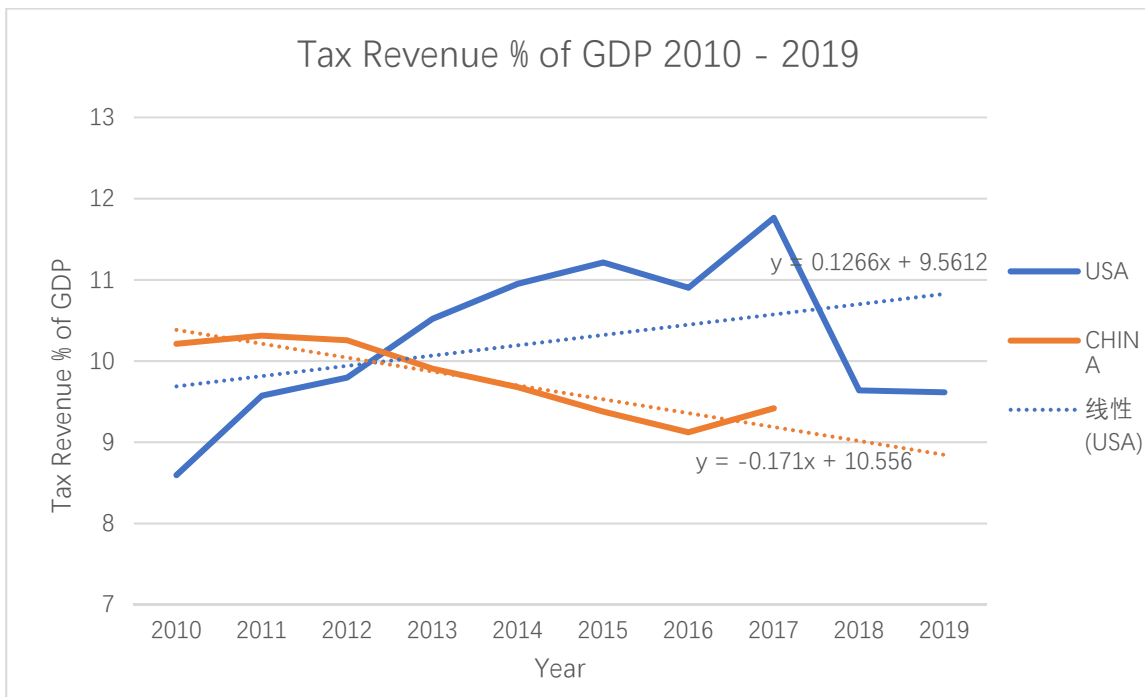


Figure 11. Tax Revenue % of GDP of US (2010 - 2019) and China (excluding Hong Kong and Macau) (2010 - 2017). Logistic regression line (dotted line) shows the trend of the values for the past ten years. (Source: World Bank, 2020)

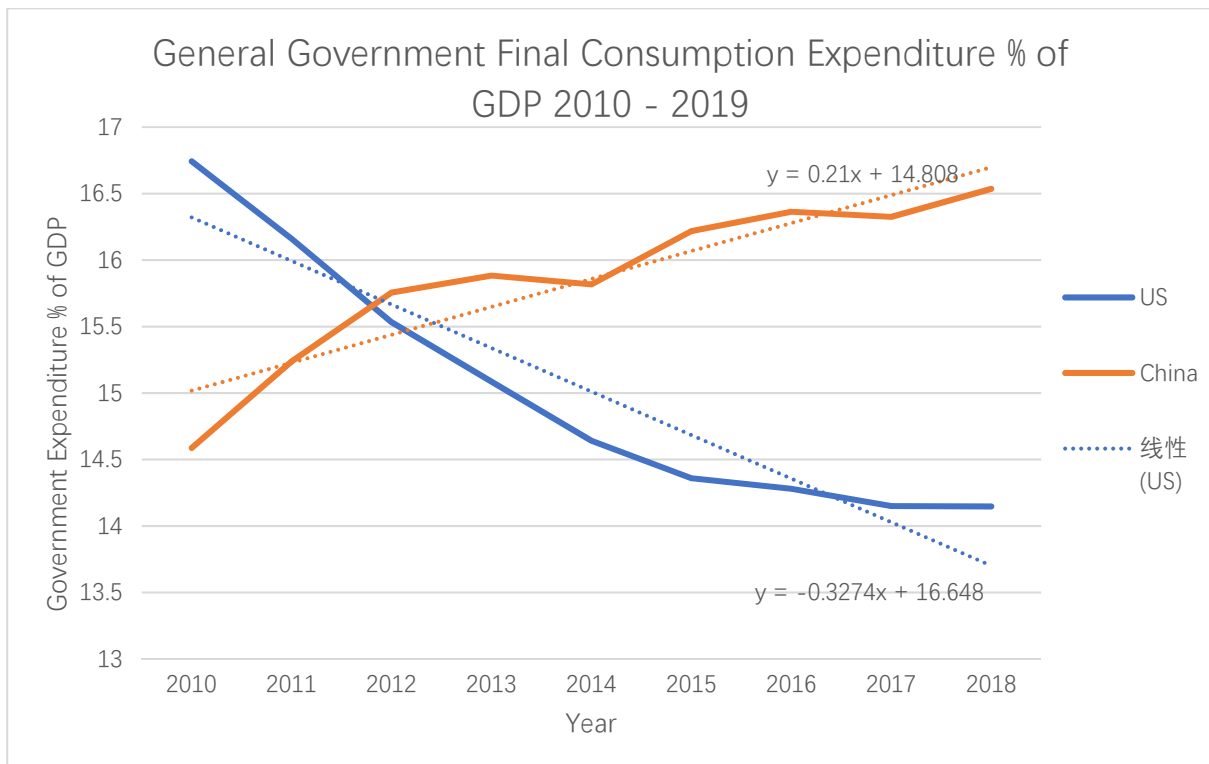


Figure 12. General government final consumption expenditure % of GDP of the US and China (excluding Hong Kong and Macau) from 2010 to 2018. Logistic regression line (dotted line) shows the trend of the values for the past ten years. (Source: World Bank, 2020)

Fiscal policy is a means by which the government adjusts its budget balance through spending and revenue changes to influence broader economic conditions (Stupak, 2019). Similar to the monetary policy, the use of fiscal policy by the government can affect the economy in the short term. Figures 11 and 12 displays the historic government spending on all goods and services as well as tax revenue in the US and China respectively. The US has taken a contractionary fiscal policy shown through its increased tax revenue and decrease in government spending. This will cause a slower economic activity as the government purchases fewer goods and services from the private sector and decreases individual disposable income by increasing tax collection. This will lead to fewer goods bought by individuals leading to a slower economy and leading to lower inflation (Figure 4) and trade deficits (Figure 8).

In contrast, China has taken an opposite approach of fiscal stimulus whereby government spending is increased alongside a reduction in tax revenue which spurs economic activity with inverse effects compared to the US. The lessened tax allows individuals to obtain more disposable income to consume more goods and services but result in reduced GDP growth as shown in Figure 1. The adverse effects of fiscal stimulus are shown by an increased interest rate (Figure 7), but inflation rates are kept relatively stable with a decreasing trend at a manageable level. This indicates that the fiscal stimulus policy can still be maintained in the short-term leading to expansion of Tesla into the growing Chinese market (Li, 2020).

4. Foreign Trade Policies of the United State and China

In April 2018, the United States Trade Representative (USTR) published China Section 301-Tariff Actions and

Exclusion Process on its website, suggesting additional tariffs on a series of products imported from China. Among those, List 3 came into effect in 2018, imposing a 25% tariff on 200 billion US dollars of imported goods imported from China. List 4 came into effect in 2019 and includes a 7.5% tariff on US\$120 billions of Chinese imports. These two lists include various raw materials and components related to EV such as cobalt, lithium, batteries and so on (USTR, 2018).

These tariffs will become a heavy burden for Tesla, as many of its parts are imported from China. According to data from the International Trade Administration of the U.S. Department of Commerce (2018), the value of China's exports of parts and components to the U.S. in 2018 was about 20 billion U.S. dollars. Although some of these parts flowed to auto parts retail stores, a large part still flowed to the assembly line to be used to make cars.

This has negative impacts on Tesla Model 3, for example the Media Control Unit (MCU) which linked to and communicates with the vehicle's ADAS and connectivity board modules. MCU is a combination of three printed circuit board assemblies (PCBAs) enclosed in a mechanical chassis. Imposing tariffs on these parts will undoubtedly increase the production cost of Model 3 and reduce the competitiveness of enterprises, which may affect Tesla's global industrial chain layout.

Besides, the customized chips made in China are part of Tesla's advanced hardware Autopilot 3.0, which is used for fully autonomous driving operations and is a standard configuration for all Tesla models, including Model 3. If a 25% tariff is imposed on this core hardware, Tesla will have to consider looking for alternative manufacturers in their own country. However, the fact is that Tesla cannot find a manufacturer in the United States that has the expertise to produce Autopilot ECU 3.0 and whose production capacity can keep up with Tesla's growth (Kirsten, 2020). Tesla stated

that this part is the brain of the vehicle, Therefore the sourcing decision for this was not taken lightly nor simply on a cost basis. Autopilot is a complicated, safety-critical feature of the Tesla experience where even the slightest imperfection can have major ramifications, so all of our decisions aim to decrease risk (USTR, 2018).

In response to the additional tariffs imposed by the United States on Chinese goods, in August 2019, the State Council of China (2019) stated that it would impose a 25% tariff on

American cars and a 5% tariff on auto parts from December 15. Figure 13 in the appendix shows the approximate sales of global EV in 2019. From the figure, we can see that the Chinese market occupies nearly half of the global new EV industry, and like the most typical representative of EV, the Chinese market is also of great significance to Tesla Model 3. China's imposing tariffs on American cars will directly increase the price of Model 3 in the Chinese market and reduce the competitiveness of Model 3 in the Chinese market, which may cause Tesla to lose market share in China.

Global New Energy Vehicle Market Share in 2019

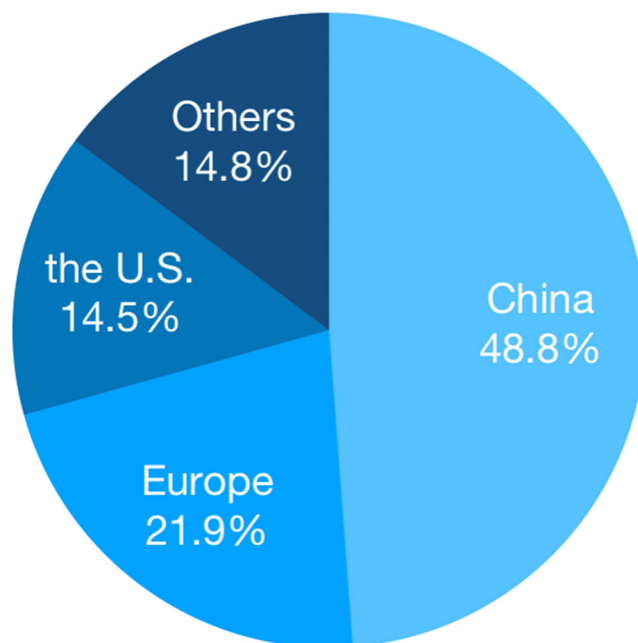


Figure 13. Global New Energy Vehicle Market Share Distribution in 2019. Source: IEA, AECA, CPCA, Markline

Moreover, the Regional Competitive Economic Partnership (RCEP), was signed with 15 countries in Asia and the Pacific on 15 November 2020, this will help reduce the cost of auto parts circulation in RCEP member states, promote further assembly of the Asian vehicle industry chain, and accelerate the export of Chinese vehicle brands. This may threaten Tesla's market share in RCEP regions.

However, starting from January 1, 2021, China will exempt the purchase tax on electric vehicles including Tesla Model 3, which will help Model 3 offset part of the increased costs due to tariffs (State Administration of Taxation, 2020). Besides, Tesla built a wholly owned factory that produces Model Y and Model 3 in Shanghai China in 2019, which further weakened the impact of tariffs on it and undertook the main production capacity of Tesla during the COVID-19 pandemic in 2020.

5. Conclusion

Based on the data from 2010 to 2019, both the US and China have a stable and healthy macroeconomic environment for investors like Tesla. The US's large consumer market remains attractive and China's contribution to global output remains substantial. Low interest in both countries stimulates business investment and large government expenditure on infrastructures anticipated to upgrade transport networks and energy infrastructure; low unemployment rate mean that more percentage of population have disposable income to afford for

products such as Tesla Model 3.

However, the trade war between the US and China has added more burden to the economy of both countries and impacted further to the rest of the world. Changing of the administration from January 2021 is likely to cloud the bilateral relation. Not to mention the COVID-19 pandemic hard hitting the global economy and bringing more uncertainty to global investors.

In summary, China has more competitive advantage in terms of higher GDP growth rate, a well-maintained interest rate and loosening monetary policy which encourages business activities and expects a boost in economic growth. Entire comprehensive automobile value chain in China will benefit from such policies and indirectly help Tesla reduce production cost. Tax cuts also lead to more disposable income and higher spending power. Therefore, the market in China contains huge potential.

6. Recommendation

Based on the above analysis and conclusions, we suggest that Tesla should try to construct vehicle component suppliers in the US or other regions with trade agreements. Lay out its own local industrial supply chain and avoid shortcomings being restricted by others. Expansion of production in Tesla's Shanghai plant to further meet the demand of an increasing Chinese market and avoid the impact of tariffs by sustaining more cost-effective productivity. This will also keep

production costs in check to maintain competitiveness with other Chinese EV brands. There are many emerging EV brands in China, and the establishment of the RCEP may be more conducive to Chinese electric vehicle brands entering the international market. Meanwhile Tesla can accelerate their internationalization strategy and seize other important markets besides China, such as the European Union.

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