US-China Bilateral Trade: Evolution & Imbalances

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Abstract

The US and China are biggest trade partners in the world. The rise of the Chinese economy and its dominance over world economics and politics has made the US to re-think its strategy. Moreover, growing trade deficit proves US dependence on Chinese imports. The paper elucidates the reasons for this shift, that may be attributed to a multitude of factors ranging from unfair business practices by the Chinese to the market seeking behaviour of US firms. The paper attempts to decipher the global value chain and position these economies at appropriate levels.

1. Introduction

In 2007, the US recorded an overall trade deficit of $809 Bn, an amount which reduced to $737 Bn in 2016 (USDC, 2017), depicting a negative 1.2% Compounded Annual Growth Rate (CAGR). While this indicates an improving trend towards a reduced trade deficit on an overall basis, the trade deficit figures of the US with China reveal an altogether different picture. The US had $259 Bn trade deficit with China in 2007, which grew at 3.75% CAGR to $347 Bn in 2016 (USDC, 2017). Increasing dependence of the US consumers upon Chinese imports, especially in areas like electronics, semiconductors, industrial machines and automobiles pose a threat for US-based organizations, which find difficult to compete with the Chinese. Political commentators in the US cite the above trend as a reason for the loss of US manufacturing jobs. However, economists see this trend as a natural and inevitable shift in global value chain, wherein low value adding activities like manufacturing moving to emerging economies like BRICS and high-end research work being concentrated in developed countries such as US, Germany and France among others. Although the information presented above does suggest a shift in the global value chain, the reasons for this change are still contentious. It may be argued that the shift occurred due to higher productivity and lesser manufacturing costs in emerging economies, while on the other hand, it may be argued that the market-seeking behaviour of organizations lead to this shift. Through this paper, we intend to uncover these arguments and identify the real causes of trade shift, specifically in the US-China context.

2. Methodology

The paper is a review of US-China bilateral trade's evolution and imbalance. The scope was to understand scenarios and situations that led to the trade imbalance. Statistics related to the trade were collected from secondary sources. For US export and import statistics, data from US Census website was used, whereas global indices were sourced from World Bank website. A special focus was laid to understand certain US corporations that moved to China for manufacturing/operations. Company's annual reports were gathered from their respective websites. Research articles related to the given topic were searched and retrieved. This paper is not meant to be an exhaustive review of the literature on the topic mentioned above, but an attempt was made to perform a thorough search of published material and

identify most relevant articles. Due to limited availability of data from the Chinese side, information was extracted from published articles on the web. The analysis for both exports and imports data was carried out in MS-Excel.

3. Discussion

3.1 Trade Imbalance

The US-China trade imbalance has been existing since more than a decade. In 2016, the US-China trade deficit accounted for 47% of overall US trade deficit, an increase from 32% in 2007. While the Non-Chinese trade deficit with the US reduced at a CAGR of -4.2% over the same period, US-China trade deficit grew at a CAGR of 3.75%.

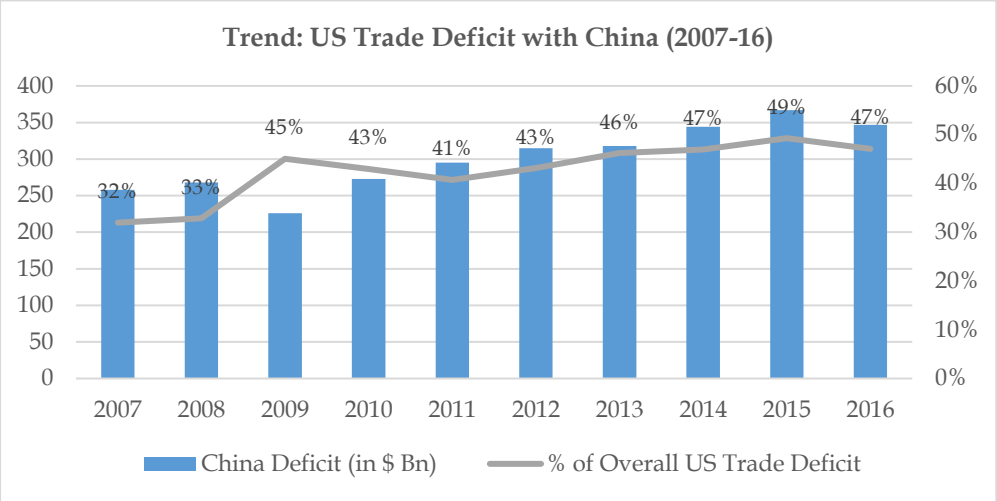

Figure 1: Trend indicating US Trade Deficit with China for the period 2007-16 (Source: https://www.census.gov, Accessed: 15 July 2017)

It may be intuitive to ascertain that the rise in the trade deficit was due to higher imports. However, US exports to China also saw an increase during the same period. While US imports from China grew at a CAGR of 4.66% during 2007-16, its exports to China grew at a CAGR of 7.90%. Refer Table 1 for more information.

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	CAGR
US Imports from China (in $ Bn)	21	338	296	365	399	426	440	468	483	463	**4.66%**
US Exports to China (in $ Bn)	63	70	69	92	104	111	122	124	116	116	**7.90%**
Deficit	259	268	227	273	295	315	319	345	367	347	**3.75%**

Table 1: US Exports and Imports to/from China for the period 2007-16 (Source: https://www.census.gov, Accessed: 15 July 2017)

3.1.1 US Imports from China

Imports into the US were categorized into 142 Harmonized System (HS) codes. For the sake of simplicity, these HS codes were re-grouped into the following 13 categories: Automobiles, Pharmaceutical & Medical, Chemicals, Electronics, Fuel, Consumer Goods, Industrial Machines & Materials, Metals, Agriculture & Horticulture Produce, Aircrafts, Merchandise, Gems & Jewelry and Others.

In 2016, 21% of overall US imports were from China. Upon grouping the imports, and comparing Chinese share among total imports, the extent of Chinese dominance in different

sectors of production could be assessed. For example, Chinese imports accounted for 47% of total electronics imports into the US. This share was 38% in 2007. Similarly, Chinese dominance was visible in Consumer Goods and Merchandise as well. China also improved its position in areas such as Industrial Machines & Material (share increased from 15% in 2007 to 19% in 2016) and Chemicals (share increased from 9% in 2007 to 14% in 2016). Refer Table 2 for more details.

Classification	Import Amount in 2007 (in $ Bn)	% Share in 2007	Import Amount in 2016 (in $ Bn)	% Share in 2016
Electronics	120.51	38.35%	193.90	46.92%
Consumer Goods	57.15	46.87%	69.87	44.36%
Merchandise	53.49	41.23%	61.41	41.66%
Industrial Machines & Material	40.34	14.83%	60.60	18.62%
Automobiles	9.30	3.77%	18.64	5.66%
Chemicals	4.01	9.23%	7.72	14.34%
Pharmaceuticals & Medical	3.01	3.11%	6.63	4.45%
Metals	5.71	9.08%	5.98	11.58%
Agriculture & Horticulture Produce	4.30	6.91%	5.61	5.63%
Gems & Jewelry	3.14	7.62%	3.53	5.88%
Aircrafts	0.38	1.06%	0.95	1.79%
Fuel	0.67	0.18%	0.63	0.41%
Others	19.45	11.85%	27.13	14.17%

Table 2: Classification of Chinese imports and its share among total imports (Source: https://www.census.gov, Accessed: 15 July 2017)

The Chinese were able to improve its share in overall imports, causing a reduction in that of others. In the electronics space, the Chinese won market share from Japan and Taiwan. While Chinese electronics imports to the US clocked a CAGR of 6% during 2007-16, Japan and Taiwan reported CAGRs of -4.3% and -0.88% respectively. Analysis of top HS code items within the electronics grouping uncovered the shift in trade in greater detail. In the 'Cell phones and other household goods' item, China clocked a CAGR of 11% whereas Mexico, Taiwan, Malaysia and Japan clocked negative CAGR of -0.58%, -2.6%, -3.9% and -6% respectively. Moreover, China held 63% of total import's share for this item.

Similarly, for the item 'Computer', Chinese imports reported a CAGR of 7%, whereas Japan, Malaysia and South Korea reported negative CAGR of -17%, -37% and -5% respectively. Following table consists of CAGRs for top 5 HS code items in electronics grouping, over the period 2007-16, for top 6 countries, which constitute 80% of US electronics imports.

HS code items	China	Japan	Korea, South	Malaysia	Mexico	Taiwan
Cell phones and other household goods, n.e.c.	10.57%	-5.99%	0.32%	-3.92%	-0.58%	-2.57%
Computers	7.16%	-16.71%	-4.84%	-37.11%	16.89%	12.60%
Telecommunications equipment	11.00%	-5.43%	-3.78%	4.93%	8.72%	1.95%
Computer accessories	0.05%	-5.90%	-5.53%	-7.93%	4.50%	-3.87%
Semiconductors	17.53%	-2.38%	6.79%	23.16%	8.15%	1.74%

Table 3: CAGRs over the period 2007-16 for top 5 HS code items in electronics grouping (Source: https://www.census.gov, Accessed: 15 July 2017)

Industrial Machines & Material is one grouping wherein share of Chinese imports increased from 14.82% to 18.62% during 2007-16. The same period saw a decline in the share of imports in the given category for countries like Canada, Japan, Italy, the UK, Germany and France.

3.1.2 US Goods Exports to China

As discussed in the previous section, US exports to China grew at a CAGR of 7.9% during the period 2007-16. In 2016, US exports to China accounted for 7.9% of its total exports. China was third, after Canada (18.38%) and Mexico (15.83%). The top items exported from the US to the world included Industrial Machines & Material, Electronics, Automobiles, Agriculture and Horticulture Produce and Aircrafts. When it comes to China, US exports saw a positive CAGR in all categories except Metals. Refer table below for details:

Classification	Export Amount in 2007 (in $ Bn)	Export Amount in 2016 (in $ Bn)	CAGR
Agriculture and Horticulture Produce	7.96	21.36	13.12%
Industrial Machines & Material	13.84	20.72	5.18%
Aircrafts	5.20	14.58	13.74%
Electronics	12.12	14.10	1.91%
Automobiles	1.85	11.43	25.59%
Pharmaceuticals & Medical	1.23	5.40	20.32%
Chemicals	3.47	5.34	5.55%
Metals	6.87	5.22	-3.38%
Fuel	0.54	3.26	25.09%
Consumer Goods	0.69	0.98	4.59%
Merchandise	0.29	0.69	11.58%
Gems & Jewelry	0.09	0.49	24.52%
Others	8.79	12.02	3.99%
Grand Total	62.94	115.60	7.90%

Table 4: US exports to China across groupings and respective CAGRs over the period 2007-16 (Source: https://www.census.gov, Accessed: 15 July 2017)

Export numbers within the 'Electronics' grouping were disparate. While items such as cell phones and other household goods grew by a CAGR of 22%, computer accessories witnessed a negative CAGR of 3.9%. Computer exports rose by 6.95% whereas semiconductors exports increased by -1.1%.

Within the grouping 'Industrial Machines & Material', following were growth rates for top 10 items:

Classification	CAGR
Industrial machines, other	6.87%
Plastic materials	2.34%
Measuring, testing, control instruments	8.23%
Other industrial supplies	10.83%
Laboratory testing instruments	16.14%
Industrial engines	8.21%
Generators, accessories	4.25%
Finished metal shapes	2.92%

Classification	CAGR
Metalworking machine tools	0.19%
Engines and engine parts (carburettors, pistons, rings, and valves)	9.77%

Table 5: CAGRs for top 10 items within the 'Industrial Machines & Material' grouping over the period 2007-16 (Source: https://www.census.gov, Accessed: 15 July 2017)

3.1.3 US Services Trade with China

The US possesses a trade surplus with China when it comes to services trade.

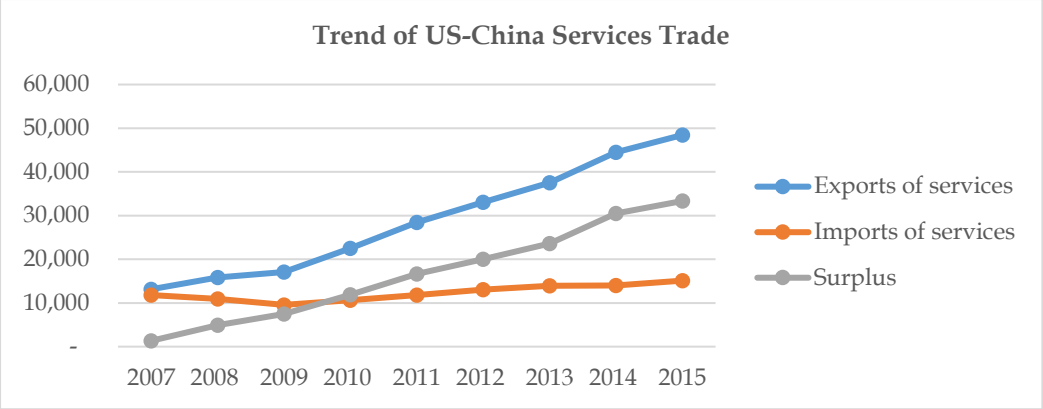

Figure 2: US-China services trade trend over the period 2007-2015 (Source: https://www.bea.gov/, Accessed: 1 Aug 2017)

US exports to China rose from $13.13 Bn in 2007 to $48.44 Bn in 2015, indicating a CAGR of 20.49% (BEA, 2017). Moreover, the services trade surplus grew by a CAGR of 58.3%. Travel services accounted for 57.23% of the services export, whereas charges for the use of intellectual property accounted for 12.31% ($5.97 Bn). The composition of US exports to China for the year 2015, excluding the travel services is depicted below in the chart:

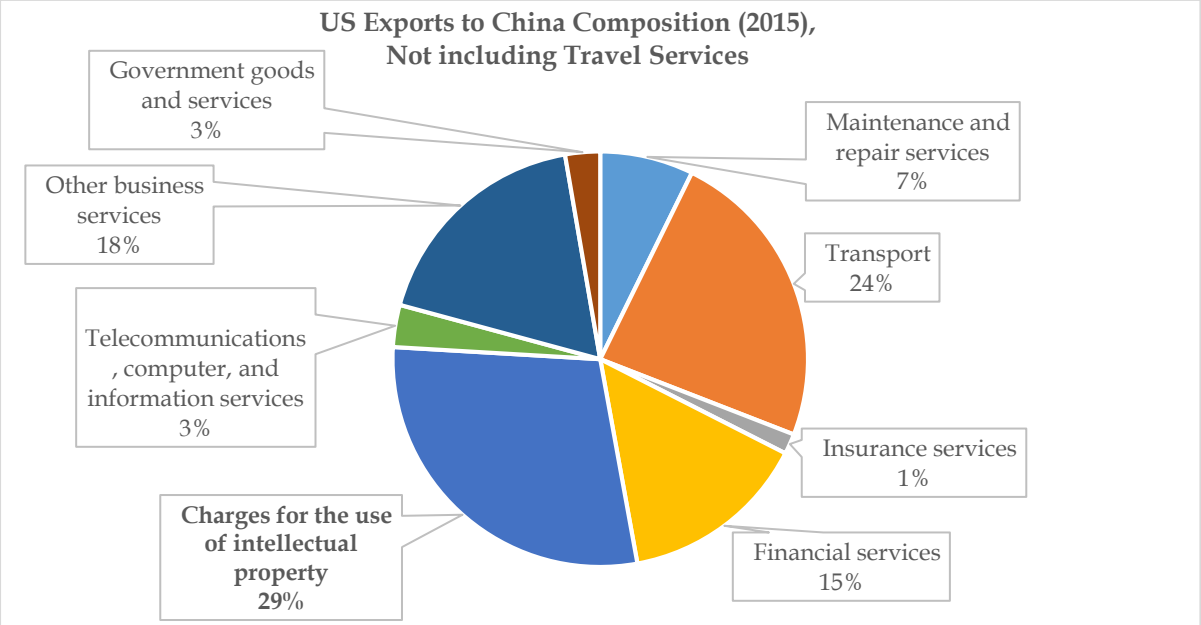

Figure 3: Composition of US Exports to China, the year 2015, not including travel services (Source: https://www.bea.gov/, Accessed: 1 Aug 2017)

3.1.3.1 US Exports of Intellectual Property (IP)

US spent 2.75% of its GDP on Research & Development (R&D) during the period 2010-15. Moreover, during the same period, numerous US based Multi-National Enterprises (MNEs)

setup businesses in China and other Asian economies. Of the total $5.97 Bn exports of intellectual property to China in 2015, 59% were made to US parents' foreign affiliates (such as Ford Motor's affiliates discussed later in the text). The remaining 41% were made to unaffiliated businesses. Further, if we segregate the IP exports to China by its end use, it is understood that more than 45% of IP exports ended up in industrial processes during 2010-15 (BEA, 2017). Details below:

Classification	2010	2011	2012	2013	2014	2015	% of Total
Industrial processes	1,335	1,580	1,903	2,756	3,424	2,545	**45.21%**
Computer software	752	974	912	857	814	928	17.48%
Trademarks	846	1,096	1,133	1,312	1,598	1,480	**24.92%**
Franchise fees	-	337	450	458	435	453	7.12%
Audio-visual and related products	110	-	185	307	396	559	5.20%
Other intellectual property	-	-	15	3	2	2	0.07%
Total IP Exports	**3,043**	**3,987**	**4,598**	**5,693**	**6,669**	**5,967**	

Table 6: Composition of US IP Exports to China over the period 2010-15, in $ Mn (Source: https://www.bea.gov/, Accessed: 1 Aug 2017)

The data presented may be correlated to the number of US corporations setting up facilities in China during the same period and their areas of investments. Export of trademarks and franchises also indicate the interest of US firms to not only manufacture in China and export goods back to the US but to create a market for the products in China and sell those in the Chinese domestic market. This market seeking behaviour of US firms and related data is cited in the latter sections of the text.

3.2 Global Value Chain

A country's role in the Global Value Chain (GVC) may be defined by the criticality of its role in the production of goods and services. In the era of globalization, wherein, components of a product are manufactured across the world and then brought together for assembly in a different country, the value added by each country in this process determines its position in the value chain. Intuitively, it may appear that the US, with its large IP assets and cutting-edge technological research, may be situated on the top of the value chain with highest value addition and China, the manufacturing hub may be at the bottom/middle with lesser value addition. However, data speaks volume about the truth.

A detailed review of valued added by China in its exports to the US reveal that the Chinese have slowly and steadily been capturing the value chain. Among all goods manufactured in China and shipped to the US, the value added domestically in China stood at 51% in 2001, a figure that reached 58% in 2011 (OECD, 2017). Latest data remain unavailable. However, the essence the information put forth is that China is trying to catch up with developed nations and improve its competency in upstream areas.

Another measure that indicates a similar trend is R&D spending. China's spend on R&D as of percentage of its GDP rose from 0.94% in 2001 to 2.07% in 2015. Although, it may still not match the US, for which the figures stood at 2.64% and 2.79% in 2001 and 2015 respectively, however, it depicts a step the Chinese have taken to move upstream (OECD, 2017).

Further, the tangible benefits of this may also be viewed if we analyze the IP filings by the Chinese, a number which increased from a feeble 64,644 in 2001 to 1.1 Mn in 2015 (WIPO,

2017). The Chinese stood at the top position in global rankings in various disciplines of Intellectual Property.

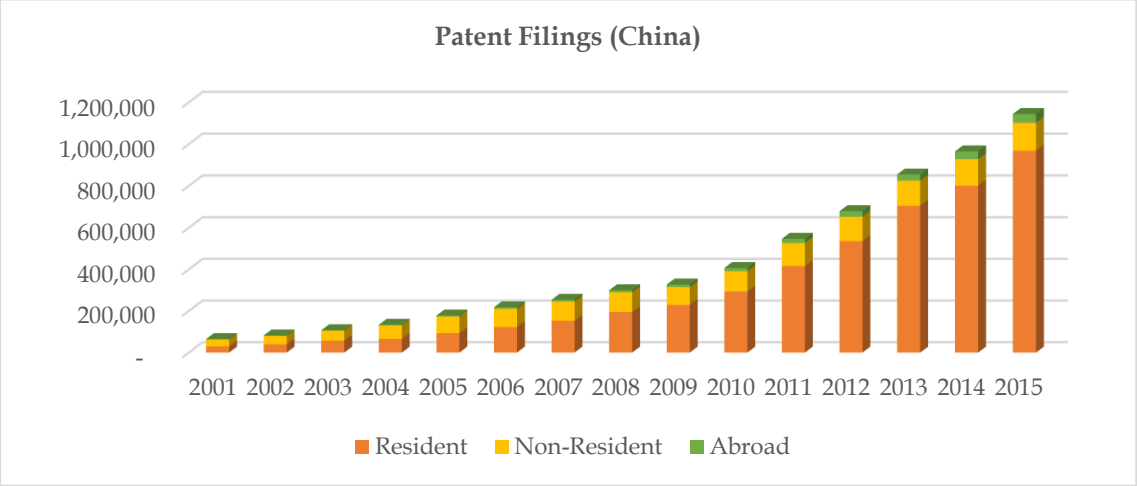

Figure 4: Trend in number of Patents filled by Chinese during the period 2001-15 (Source: http://www.wipo.int/ipstats/en/, Accessed: 8 Aug 2017)

Following are the rankings of the Chinese in various disciplines of Intellectual Property (WIPO, 2017):

S.No.	Title	Global Rank in 2015 (Chinese)
1	Patent Applications (Residents)	1
2	Patent Grants (Residents)	1
3	Patents in Force	3
4	Utility Model Applications (Residents)	1
5	Trademark Applications	1 (2014)
6	Trademark Registrations	1 (2014)
7	Industrial Design Applications	1
8	Industrial Design Registrations	1

Table 7: Global rankings of the Chinese in various IP disciplines (Source: http://www.wipo.int/ipstats/en/, Accessed: 8 Aug 2017)

3.3 Reasons for Trade Shift

3.3.1 Humungous Chinese market

China is world's most populous country with more than 1.3 Bn citizens. By 2022, 76% of Chinese population would be considered Middle Class, with an income between $9,000 and $34,000 (McKinsey, 2013). Only 4% of the Chinese population was considered Middle Class in the year 2000. The Chinese market has always been on the radar of multinational corporations that looked to expand their business. To make a dent in the Chinese market, many US organizations entered into Joint Ventures with Chinese companies, giving them access to the market and support to setup manufacturing facilities.

For example, the Ford Motor Company operates the following companies in China (Ford Motor Company, 2016):

a. **Changan Ford Automobile Corporation, Ltd. ("CAF")**: It is a 50-50 JV between Ford Motor Company and Chongqing Changan Automobile Co., Ltd. ("Changan"). CAF

currently operates five assembly plants, an engine plant, and a transmission plant in China where it produces and distributes an expanding variety of Ford passenger vehicle models.

b. **Changan Ford Mazda Engine Company, Ltd. ("CFME"):** JV between Ford Motor Company (25% partner), Mazda (25% partner), and Changan (50% partner). Located in Nanjing, CFME produces engines for Ford and Mazda vehicles manufactured in China.

c. **JMC**: a publicly-traded company in China with Ford Motor Company (32% shareholder) and Jiangling Holdings, Ltd. (41% shareholder). The public investors in JMC own 27% of its total outstanding shares. JMC assembles Ford Transit, Ford Everest, Ford engines, and non-Ford vehicles and engines for distribution in China and **other export markets**. JMC operates two assembly plants and one engine plant in Nanchang. In 2015, JMC opened a new plant in Taiyuan to assemble heavy duty trucks and engines.

Although these firms cater to the Chinese market, these facilities also export goods to the rest of the world.

A similar scenario exists for organizations like Nike, which manufactures 29% of its total footwear and 26% of its total apparel in China (Nike, 2016). Moreover, China also generated a revenue of $3.785 Bn and an EBIT of $1.372 Bn in FY 2016 for Nike.

3.3.2 FDI into China

Due to its huge market and government's push to industries, Foreign Direct Investment into China saw a CAGR of 6.48% during 2007-15 (BEA, 2017). FDI from the US alone increased from $29.7 Bn in 2007 to $92.4 Bn in 2016. This figure may be an understatement as the US also invested $64 Bn in Hong Kong (2015), which is the platform for global investments for numerous Chinese companies.

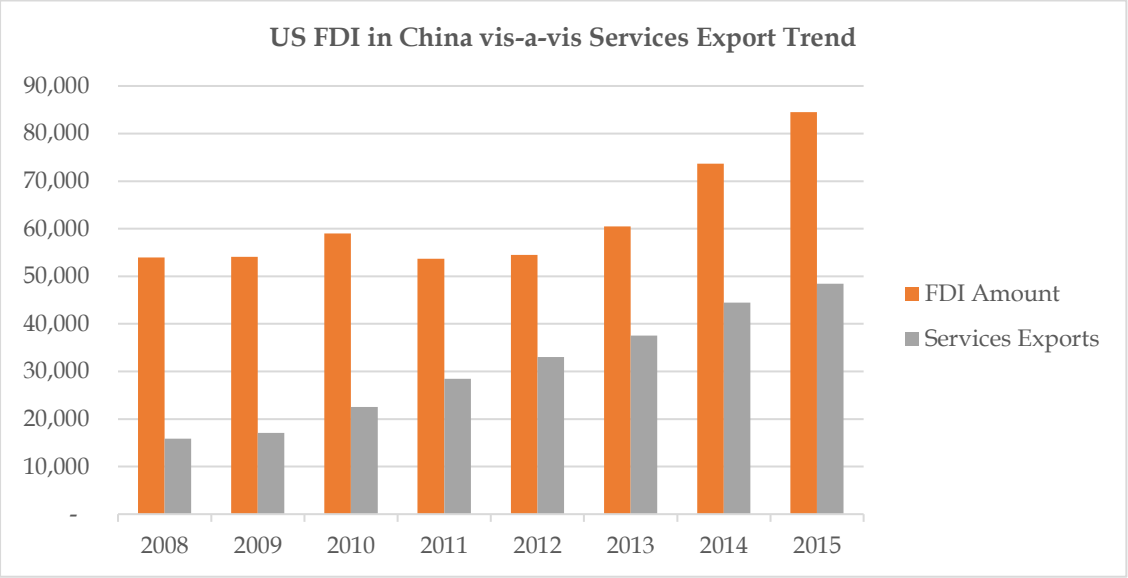

Table 8: US FDI in China v/s Services Exports, in $ Mn, over the period 2007-16 (Source: https://www.bea.gov/, Accessed: 1 Aug 2017)

FDI helped China develop infrastructure, manufacturing facilities and enabled it to harness the potential of its human capital and technological prowess. Also, FDI from companies in

the US and other developed nations brought with itself intangible benefits such as latest technology, best practices and Intellectual Property among others. This eventually led to a shift in global value chain wherein China emerged as the world's manufacturing hub.

Assessment of US FDI into China shows that 51% of the investments ended in the manufacturing sector, followed by 14% in wholesale trade and 9% in holding companies. Further within manufacturing, the following was the distribution: **Transportation equipment (27.10%), chemicals (21.70%), computers and electronic products (16.2%)**, food (8.45%), machinery (8%), and others (18.66%).

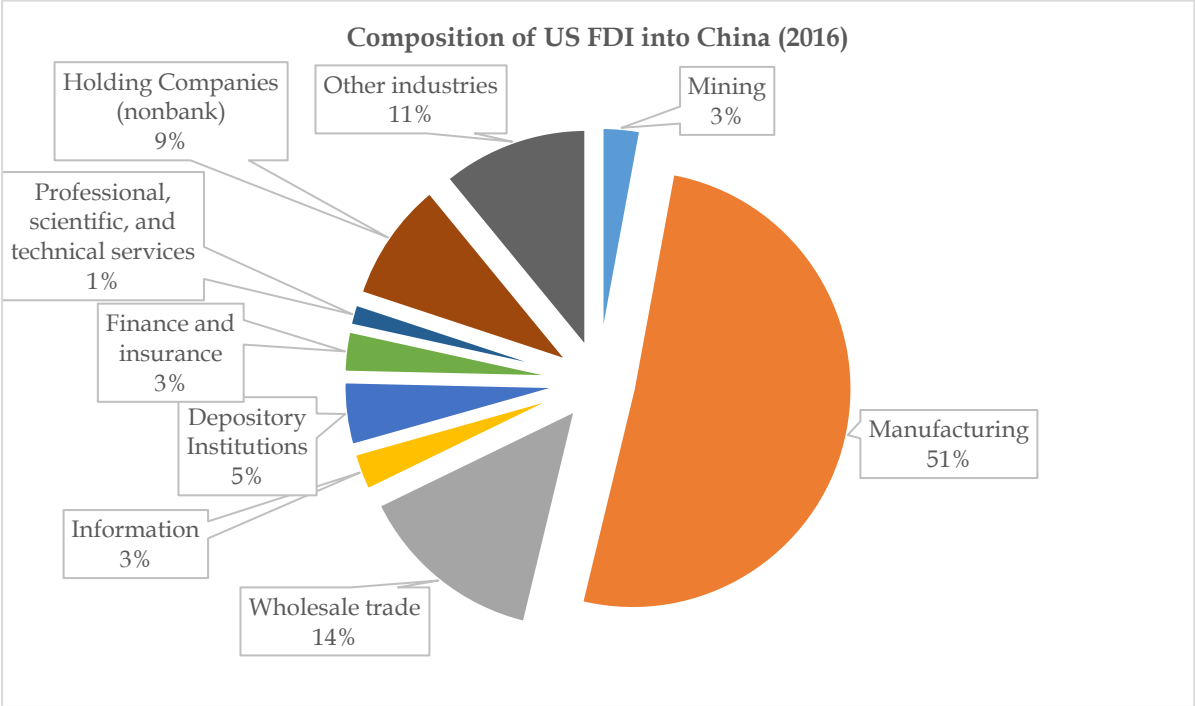

Figure 5: Composition of US FDI in China for the year 2016 (Source: https://www.bea.gov/, Accessed: 1 Aug 2017)

Upon analysis of activities of majority-owned foreign affiliates of US MNEs, it was noted that their total asset value in China surged 88% in 2014 from 2009 levels. These firms generated more than 1.6 Mn jobs in China in 2014 (BEA, 2017).

3.3.3 Government Incentives and Support

Chinese government extended various incentives in the form of tax subsidies, monetary funding and exemptions from custom duties for organizations investing in China. These incentives were even higher for priority industries such as information and consultation services, real estate development, design, and construction, distribution, foreign trade, logistics and transportation, iron and steel manufacturing, automobile, shipbuilding and equipment manufacturing, and chemical/petrochemical industries. The incentives were provided by central as well as provincial authorities. For example, Shanghai, Beijing and Shenzhen regions had separate incentive structures and schemes. Tax waivers were provided to companies' setup in Special Economic Zones (SEZs), Free Trade Zones (FTZs), Export Processing Zones (EPZs) and Bounded Zones/Logistics Parks.

Although, information could not be sourced from official websites, following instances where Chinese government provided subsidies to companies were found in a secondary search:

- Battery and electric car maker BYD, received subsidies from the government to the tune of $435 Mn, over the period 2011-15 (Clifford, 2016). Interestingly, the subsidies given in 2012 and 2014 were even greater than the profit declared by the firm. It is claimed that the government played a crucial role to turn BYD into one of the world's largest battery and electric car maker.
- The Chinese government provided energy subsidies of nearly $17 Bn between 2000 and 2007 to steel companies and helped China become world's biggest steel producer and exporter (Haley, 2013). Similarly, it also subsidized the Chinese paper industry by the amount of $33 Bn and turned it into world's largest paper producer. This also demonstrates the reason behind low cost of production in China, which is stemming not from competitive labour rates, productivity or economies of scale, rather it the artificially created unsustainable subsidies that have made China a top manufacturing destination.
- Reports have suggested that the Zhengzhou government subsidized Foxconn's manufacturing facility setup cost, which enabled China's largest private employer to make the iPhone. It was estimated that a subsidy of more than $1.5 Bn was provided to start the facility (David Barboza, 2016).

The Chinese released the 'Made in China 2025' strategy and promised heavy subsidies to companies that undergo technological up gradation (The State Council, PROC, 2017). These stories also pose a question on the sustainability of Chinese manufacturing prowess. In the absence of government support, these firms would not be able to undercut the prices of European and American manufacturers. As per a report published in Harvard Business Review, it has been cited that numerous Chinese companies would be bankrupt had the government not intervened (Haley, 2013). Moreover, it states that Chinese exports to the world constituted 37% of labour-intensive goods in 2001, which reduced to 14% in 2010. This indicates that Chinese became better to produce more high-tech products. However, the articles state otherwise and claim that subsidies made the Chinese competitive in global arena. A fallout of Chinese subsidies has been a reduction in global prices of these goods, which has sharply affected companies in other nations.

3.3.4 Undervalued Yuan

China has ever ensured to keep the demand for US Dollar high and keeping its currency undervalued. The Chinese central bank keeps the exchange rate pegged against the USD, a move not endorsed by economists for a huge economy like China's. Although economists have a differing opinion regarding the quantum of undervaluation, many believe that Yuan is undervalued by 15-40%. Since the last decade, the Chinese have ensured that the currency rate hovers around 7 Yuan for a USD mark. This gives impetus to Chinese exporters, who can compete with the world through lower prices. It also increases the trade deficit with countries like the United States and ensures that Chinese produce is cheaper than produce from other emerging economies like India. Moreover, the undervalued Yuan hinders Chinese companies from importing material from other countries and further restricts balance of trade. This also indicates that the current trade deficit between US-China may be overstated. If China followed an open market valuation of its currency, the trade deficit would have been lower as the value of US imports would have decreased and exports increased.

3.3.5 Ease of Doing Business

China has continuously improved its ranking in the doing business ranking year after year. In 2017, the country stands at 78th place, up two positions from 2016. Within the parameters, its performance has improved in the 'Getting Credit' area, where its stands at 62nd position in 2917, up sixteen positions from 2016 (World Bank, 2017). Furthermore, in the Logistical Performance Index (LPI) too, China has consistently shown improvements. It's LPI ranking is 27th in the world (World Bank, 2017). It is contemplated that these rankings are expected to improve in the coming decade due to its significant infrastructure investments to connect Europe, the Middle East and South East Asia by road, sea and railways. Although it may be argued that all Doing Business parameters are in general better for the developed world, however, still the trade shift was witnessed. A possible answer to this would be the subtle reasons and under current not captured by these parameters. Environmental regulations, related litigations and waste management are such contentious issues. In the developed world, these areas have gained traction of the public, and citizens have become more sensitive towards these causes. However, in China, the focus has been on a different development path, which may compromise the environment. Although, data could not be sourced that could compare Chinese laws with those of the US, however, impetus can be gained from the mere fact that China is home to most polluted cities in the world: Xingtai, Baoding, Shijiazhuang and Beijing among others.

4. Conclusion

China has proved its mettle in the world by becoming world's factory. However, there have been many exogenous factors that have supported China in succeeding. Also, the Chinese government's intervention and support to its domestic ventures cannot be discounted. For the United States, it has been a win all throughout. Its companies, which faced saturation in the US market welcomed China's offer to set up Joint Ventures and factories, and produce for the Chinese consumer. Although, it may seem trivial by the arguments presented that the Chinese undercut the prices of global production and captured the market without hassle, however, the Chinese in doing so appear to have a long-term horizon. The knowledge spillover from western organizations enabled China to win more and more of the Global Value Chain. It is estimated that China increases its net value added in exports by 10% each year. This signifies that Chinese leadership is determined to take the next quantum leap from manufacturing to high-tech innovation and automation. The United States in the given situation can do little to reduce the trade deficit. Its companies have already invested heavily and tasted success in China and would be in no shape to revert to production in the US. The trade shift that occurred from countries such as Japan, South Korea, Malaysia and Mexico to China was inevitable and too difficult for American companies to resist. This was topped by the subsidies and tax breaks provided by the Chinese government to these firms.

While many economic commentators may believe that China's dream run is set to decline in the next decade, the data suggests otherwise. China's investments in R&D and its industrial policy that promotes technological up gradation would give it thrust. Also, factories are fixed assets and difficult to move from one place to another. There is an attached ecosystem it that comprises of factors such as labour, technology, finance and consumption among others. China has delved into these factors deeply and gained a competitive advantage. From the standpoint of location, China is well placed to supply to the entire world, an attribute which may not be imitable by other nations.

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