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# A Lost Opportunity? Trade between the United States and China, 1865-1914

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# A Lost Opportunity? Trade between the United States and China, 1865-1914

AN HONORS THESIS

College of Saint Benedict and Saint John's University

In Partial Fulfillment of the Requirements for All College Honors

and Distinction in the Department of Economics

By:

Kathryn Gaydos

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**Abstract:** American trade with Asia rose from 10% of total imports in 1870 to 15% in 1913. U.S. exports to China relative to the population quadrupled over this period as well. Scholars have studied U.S.-Japan trade for this period but have done little work on U.S.-China interactions. I therefore developed bilateral trade data for the United States and China from 1865 to 1914 and analyzed these data to reveal trade patterns and terms of trade between these two countries. The terms of trade improved for the U.S. between 1895 and 1913. Cotton manufactures and mineral oil were the United States' key exports to China; exports of these goods increased by factors of 651 and twenty-three, respectively, between 1865 and 1914. Tea imports to the U.S. peaked and then declined drastically during this time period while imports of silk grew in importance, increasing by a factor of eighty-four.

## Introduction

China has grown to become a world superpower in exports. For example, the level of exports from China to the United States over the last twenty-three has increased exponentially, from \$293 million in January of 1985 to over \$39 billion in August 2013.<sup>1</sup>

China and the United States have not always had such a close trading relationship. In my work, I focus on the time period from the end of the Civil War to the beginning of World War I. I chose to examine this time period for two reasons. First, this was the era in which the United States became an important player in the international economy.

Second, this period was when James J. Hill rose to power. Hill was a self-made businessman and a railroad magnate of the late 19<sup>th</sup> century. He is known as the “Empire Builder” because of the magnitude—both physically and economically—of his railroad, the Great Northern Railway. This railroad stretched from St. Paul to the West Coast; his actions directly affected settlement in the Northwest region of the United States, and his end goal was to establish U.S.-Chinese trade connections and to open up the Chinese market. Hill saw Asia as an enticing potential market, but it led to great personal and professional disappointment in the end. Hill’s lifelong dream was to interact, and travel to, Asia, but this dream barely became a reality (Martin, 1991, 62). He never traveled to Asia,<sup>2</sup> and his attempts at foreign trade were unprofitable.

The Asian market was underdeveloped by Western standards, especially during the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, and the United States experienced a period of extreme growth and industrialization during this same time period, so why is it that Hill didn’t succeed in establishing trade with China? Was his experience representative of the United States as a whole or was Hill’s

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<sup>1</sup> U.S. Department of Commerce: Bureau of Economic Analysis

<sup>2</sup> The closest Hill would ever come would be to send his son, Walter Jerome Hill, on the first voyage of his ship, the *Minnesota*, to Asia in 1905.

lack of success unique to him? Historians claim that Hill was inhibited by governmental regulations and not granted government subsidies which made competition against Western international companies unprofitable (Malone, 1996, 276-277). More generally, scholars claim the Robber Barons ignored Asia because the Interstate Commerce Commission (ICC) issued regulations did not allow the US to develop Asian markets.<sup>3</sup> As a result, the US was bested by foreign competitors in Europe and Canada and prevented from exploiting this rich market. Furthermore, scholars such as H.W. Brands (2010) argue that Asian trade wasn't important to American business because they preferred to focus on internal trade rather than international trade (20).<sup>4</sup>

Do these reasons accurately explain Hill's failure to establish strong trade relations with China? In this paper, I address this question by analyzing East Asian trade data from 1865 to 1914. Then, I will compare my findings with the traditional stories told by historians in order to see if the usual explanations for Hill's lack of success in Asia are supported by the overall picture for American trade during this time period.

Very little quantitative literature exists on this topic. Thus, in this thesis, I develop bilateral trade data between the United States and China from 1865 to 1914. This is the first time these annual data have been assembled and analyzed. The information was collected from the *Annual Report and Statements of the Chief of the Bureau of Statistics on the Commerce and Navigation of the United States* and from a dissertation by Shu-Lun Pan, the only other scholar to have studied this topic quantitatively. However, though Pan presented quantitative results, he only examined

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<sup>3</sup> The Robber Barons were businessmen and entrepreneurs who were suspected of engaging—and sometimes proved to have engaged—in allegedly unethical business practices and stock market exchanges in order to amass great personal fortunes. Some well-known 19<sup>th</sup> century Robber Barons are Andrew Carnegie, Cornelius Vanderbilt, and John D. Rockefeller.

<sup>4</sup> Other explanations that Malone (1996) and Martin (1991) propose are that the Chinese markets were not developed enough to receive American goods and Hill's inexperience in the shipping field led him to build the wrong type of ships.

five-year intervals did not perform any analysis on them. He simply listed the quantities and values of specific goods for selective years. I will follow up the collection of my bilateral trade data by analyzing trade patterns and the terms of trade between the United States and China between 1865 and 1914 as well.

After analyzing my data, I conclude that both total U.S. exports to China and U.S. imports from China increased substantially between 1865 and 1914. The terms of trade became more favorable for the United States at the end of this time period as well; however, for a majority of the time period, the U.S. terms of trade with China were less favorable than the overall terms of trade. Only during the time period following the turn of the century was it more favorable to trade with China than it was to trade with the rest of the world. Exports to China as a percentage of total exports declined between 1865 and 1871, and then remained relatively constant, fluctuating between 0.5% and 1.5% of total U.S. exports. The percentage of imports from China as a share of total U.S. imports ends around 2%, relatively close to its initial level in 1865; however, for the majority of the time period, this percentage ranged anywhere between 2% and 3.5%. The most popular exports were cotton manufactures and mineral oil, increasing by factors of 651 and twenty-three, respectively. The most notable imports were silk and tea: imports of silk increased by a factor of eighty-four, and by 1914, tea declined to a sixth of its peak level in 1873.

The next section of this paper addresses the historical context by presenting the background of Hill's desire to trade with Asia. The section that follows places Hill's efforts in the broader context of the literature on late 19<sup>th</sup> century American trade. Next, I explain the economic theory behind my research, followed by my descriptive model. After, I discuss the sources from which I collected my data. Finally, I present and explain my results and wrap up with a concluding section.

## Historical Context

America in the 19<sup>th</sup> and early 20<sup>th</sup> centuries experienced major growth. The population grew from half a percent of the world population in 1800 to about five percent by the turn of the 20<sup>th</sup> century. U.S. participation in world trade correspondingly grew over this time period, from about three percent of world exports in 1800 to fifteen percent in 1900 (Lipsey, 2000, 688). Due to the differences in population between the United States and Europe, with these levels of exports “the United States was twice as trade-oriented as Europe, and more than five times as export-oriented as the world as a whole” (Lipsey, 2000, 685). This statement reveals the importance of foreign trade in the United States during the 19<sup>th</sup> and early 20<sup>th</sup> centuries.

Prior to the 1870s, the United States imported more than it exported, much like today, but this trend reversed in the 1870s when the U.S. started exporting more goods. The United States’ reliance on exploiting and selling its natural resources to the world both preceded and directly followed this trend reversal. It was not until the beginning of the 20<sup>th</sup> century that the United States began to export manufactured goods (Lipsey, 2000, 692, 703). Foreign investment in the United States was another common element at this time. Lipsey (2000) states that this investment was used to fuel “the large spurts in the demand for capital that characterized the rapidly growing economy” and was often channeled toward infrastructure projects, such as canals, railroads, utilities, and communication networks, supervised by either the government or private companies (697).

This is the context in which James J. Hill was raised and worked. Hill lived in an age where the United States had recently become a net exporter to the world, where plentiful natural resources allowed for low production costs and therefore higher profits, and where foreign capital was readily available to fund infrastructure projects, such as his railroad which eventually

stretched across the Pacific Northwest. Hill's dreams reached beyond connecting the Northwestern United States to St. Paul and, eventually, Chicago with the most efficient railroad in the business. He wanted to dominate the transportation sector by pressing his advantage, the ability to ship large loads at low rates, and extend his reach across the Pacific Ocean and into East Asia. Hill had a vision of opening China up to the world. He thought that East Asia was the ultimate outlet for American goods, especially agricultural products, because it was an untapped market with a large population; he also believed that China was developed enough to reciprocate trade and send valuables such as silk to the United States.

James J. Hill's interest in the Orient<sup>5</sup> was a passion long before he became the Empire Builder. He always saw Asia as a land of opportunity. Among the richest men in the US in the 1850s were those who sought their fortunes in the Orient. Some traded furs to the Chinese for other goods. Others built faster ships to speed up trade. Some actually moved to Asia to develop lucrative trades. "A willingness to exile oneself to mysterious, dangerous corners of the earth was commonly conceived to be the best and quickest way to achieve one's fortune" (Martin, 1991, 21-22). Hill, who was born in 1838, was an impressionable young man in the 1850s; he was just starting to go out in search of his fortune, and the pull of the Orient was nearly irresistible. However, in spite of the fact that Hill was emotionally drawn to Asia, he realized that the most likely way for him to travel to Asia was to ship out as a sailor. He was not keen on this idea and decided that if he could do no better than taking a job as "a common sailor before the mast, then his destiny clearly must lie elsewhere" (Martin, 1991, 28-29). Instead, Hill chose to head toward Minnesota. This path provided him with a few alternatives. He could pursue an opportunity on

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<sup>5</sup> The use of the term "Orient" in this paper is derived from Hill's conception of East Asia at this time. Although today, the use of the word "Orient" sometimes is seen as outdated and imposing Western dominance onto Asia, this term is used because Hill used it in many of his writings, and it speaks to his thought process about the region he was trying to open up to trade.

the levee in a place where he had a few connections from home. Should this job not pan out, he could take the overland route to the Pacific and the Orient. Finally, if homesickness didn't abate, his journey home would be much shorter from Minnesota than it would from the East Coast (Martin, 1991, 28-29).

After living in Minnesota for about four years, Hill met Mary Mehegan and started to court her. However, even though he was now considering marriage, his passion for Asia had not left him during this time; the pull towards the Orient was constantly with him. Hill would often talk with Mary about the possibility of going to India to run steamboats up the Ganges River (Martin, 1991, 62; Malone, 1996, 18).

Hill was motivated by the potential he saw in Asian markets. Hill saw the large population in China and wanted to take advantage of it by creating more demand for agricultural goods produced in the Midwest. Hill wanted to convert the Chinese from rice to wheat to channel American agricultural surpluses abroad and keeping the prices high for domestic farmers. In a speech at a reception for Senator Davis in September 1898, Hill said:

Lying to the west of us is one-third of the population of the globe. That one-third is not an ignorant, barbarous people but a learned people...Go back and read the history of the world. The nation that has controlled the trade of the Orient has held the purse strings of the world...Our country cannot stand still. She must go ahead or backwards...Shall we take part in [the development of the Orient trade] or shall we...build a Chinese wall and go behind it? (Quoted in Martin, 1991, 471).

In a letter written from Hill to his shipbuilding associate and longtime friend, Senator Mark Hanna, during this same year, Hill expressed a similar sentiment, stating that all that was required to make the Chinese suitable consumers was proper government and education. He attested:

I believe there will be a commercial development on the Pacific Ocean in the next twenty years which will surpass any commercial growth the world has seen in the last thousand years. China and Japan alone contain nearly one-third of the population of the globe; and the Chinaman, while his education and civilization is [*s/c*] different from ours, is commercially speaking capable of the greatest



development. When they have a good government, which will not systematically rob them, they will develop very rapidly...Our commercial relations with China can be easily developed to an extent that would take one-third of our agricultural product, including cotton, and a very large amount of iron and steel (Quoted in Malone, 1996, 164-165).

This quote again reveals that Hill was a visionary. He foresaw that Asia was a rising market, and he predicted that China and Japan would grow to be major players in international trade, the Pacific Century as he called it, by 1920. He miscalculated his time period a bit—he “saw a ‘Pacific Century’ for the 20<sup>th</sup> Century, which actually has come in the 21<sup>st</sup> Century,”<sup>6</sup>—but this prediction reveals that he was forward-thinking and anticipated Asia’s path to the future.

In addition to the potential consumers in Asian markets, Hill also thought that American exports could help bring civilization to the Asian continent. This civilization, which Westerners believed began in the Middle East and Europe, could be brought full circle around the globe. This civilization sent across the Pacific Ocean would be an amalgam of Christianity, individualism, and commercialism, based on “the cornucopia of American agricultural munificence” (Malone, 1996, 164). Hill dreamed big, and usually his plans were well-thought-out; however, “the sharp-eyed realist, in this case, ignored some very hard facts” (Malone, 1996, 165). The Chinese and Japanese most likely didn’t want American help to make them more ‘civilized’, and Hill’s assumption that they weren’t civilized simply because their culture was different was a very conceited and jingoistic perspective. The economic development that would have to take place to turn the impoverished Chinese into Western-style consumers of surplus crops and manufactures would take decades rather than a few years, as Hill hoped. In addition, his plan to convert Asians from rice to wheat was also a bit far-fetched and idealistic (Malone, 1996, 165). It would be interesting

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<sup>6</sup> This is a quote from Professor Richard Bohr, an Asian Studies scholar and professor at College of Saint Benedict and Saint John’s University in Lee Egerstrom’s article.

to see how long it would have taken for the cultural changes that this plan required to have caught on in Asia if Hill's attempts at trade with Asia had not been frustrated by government regulation.

The idea of international trade with Asia was still in the back of Hill's mind as Hill worked on the Great Northern line from St. Paul, MN to Seattle, WA. In 1892, Hill sent Herman Rosenthal to survey prospects in East Asia. Upon his return, Rosenthal reported that China "did not afford much trade opportunity, but rapidly modernizing and industrializing Japan did" (Malone, 1996, 166). Hill sent another man, Captain James Griffiths, to Asia in 1896 when east-bound shipments of Northwest lumber caused surplus capacity on west-bound trains. He charged him "to look closer, this time at the actual manifests of ships unloading their cargoes at East Asian ports—no easy task, since shippers guarded such information jealously" (Malone, 1996, 166-167). Since Hill could not build his own fleet at this time, he contracted with the largest Japanese steamship line, forging the first formal maritime link between Japan and the U.S.

In the summer of 1899 Hill started designing the ships and in fall of 1900, he borrowed \$5 million and commissioned his two ships in anticipation of increased trade with Asia (Martin, 1991, 473-474). He tried to apply what had been successful in railroads—high tonnages and low rates—to the shipping industry. The *Minnesota* and the *Dakota* were built to carry over twenty thousand tons of freight (in five acres of tonnage space) and two hundred first class passengers. These ships were the largest of their day. The *Minnesota* was launched in 1902,<sup>7</sup> but did not go into service until 1905. On its maiden voyage, it carried twenty-six thousand tons of lumber, copper, and cotton; the return trip brought back silk. Unfortunately for Hill, the ships traveled very slowly and

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<sup>7</sup> There is a discrepancy in the research here. Martin (1991) states that the *Minnesota* was launched on April 16, 1902 and "some 300 invited guests...cheered as Clara [one of Hill's daughters] swung the bottle of champagne against the bow" (545), while Malone writes that Clara "christened [the *Minnesota*] with the customary champagne bottle while forty thousand people looked on in April 1903" (247). Either way, a few years passed between the initial launching of the ships and the *Minnesota*'s maiden voyage.

could only make four round-trips per year. The slow speed of the ships made finding passengers difficult, and the ships were soon obsolete as technological advances came swiftly (Malone, 1996, 247-248, 276-277; Martin, 1991, 544-546). Hill's dabbling with shipping caused almost constant frustration. The government wouldn't provide any subsidies and they regulated that railroads must publish both domestic and export rates, which would inform international competitors and allow them to underbid Hill (Malone, 1996, 247-248). Martin and Malone claim that Hill failed in his shipping attempts to Asia because he was inexperienced in the field, government regulation made trade economically and politically unfeasible, and the Asian markets were not developed enough to be receptive. However, his idea of using massive tonnages to reduce rates and the belief that Asian markets would one day demand America's crops, metals, and other products were admirable and forward-thinking (Malone, 1996, 276-277).

According to the traditional story, the government posed the most problems for Hill's ambitions in Asia. In order to successfully compete in Asian trade, Hill needed a government-supported merchant fleet and market subsidies, similar to those provided by European governments (Malone, 1996, 165). However, the government was not so obliging. The ICC refused to allow lower through-rates on cargo bound for the Orient, which would make it difficult for the U.S. exports to be competitive with European exports. Hill despaired, saying "America is not a commercial nation, and until she has to make greater efforts to support her population than has been necessary in the past, I do not see how she will become important among the leading exporting nations of the world" (Malone, 1996, 202). Hill was emotionally drawn to Asia and always regretted unrealized ambitions involving the Far East, both for himself and his country.

Hill's obsession in the Orient is worth pondering because some scholars today think that Hill's contemporaries were not very interested in expanding their businesses abroad. Instead, they

were more concerned with developing their businesses domestically. H.W. Brands argues that this was common for the majority of capitalists in the mid- to late 19<sup>th</sup> century. While the capitalists of many European nations sought new ventures abroad, “American capitalists concentrated on their home market.” (Brands, 2010, 20). This argument is not supported by the example of Hill. Hill’s constant consideration of Asian markets, as displayed in his speeches, writings, and biographies, reveals that foreign trade was definitely seen by some as the way of the future. Though Hill’s plans to never came to fruition, the mere fact that he thought about Asia and attempted to make his dreams a reality runs counter to what modern scholars attest.

### Literature Review

There is very little literature currently on this subject aside from general statements on the fact that there was foreign trade between the United States and East Asia going on between 1865 and 1914. Some of these general statements can be found in Martin (1991) and Brands (2010).<sup>8</sup> These pages talk about the small amount of trade that was already taking place as well as people who called for more trade with the Orient in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. Howard Schonberger (1968) wrote an article that captures most of the details of Hill’s life goal of reaching the Orient and how this dream was shattered due to government regulation. This paper is a wonderful testament to Hill’s desire to trade with Asia, but again, it only provided qualitative evidence. Articles that do offer quantitative analysis, such as Chao’s (1986) and Reynolds’ (1986) studies on the Chinese cotton trade with the United States, Britain, and Japan, are limited to a single industry and cannot offer an overarching picture of U.S.-Chinese trade patterns.

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<sup>8</sup> The page numbers within these references are on pages 21-22, 28-29, and 471-474 in Martin (1991) and on pages 499, 522, 525, and 527 in Brands (2010).

After reading the two biographies of Hill's life written by Martin and Malone and the article by Schonberger, I noticed that references to Asia were few and far between, even though this idea was a lifelong passion for him. Hill even dedicates two full chapters to his dreams of foreign trade in his autobiography, *Highways of Progress* (1910). The overall silence on this topic, as well as the lack of quantitative analysis of foreign trade between the United States and China during this time period inspired this research.

Lipsey (2000) is another valuable background source. His article covers the general topic of U.S. foreign trade. He addresses the time period from 1800 to 1914, which is a wider range of time than I am analyzing. His results are mostly aggregate totals of trade, and they focus mainly on Europe because that is where the United States traded heavily during this period, but his work will still be helpful in understanding the big picture of American trade during the 19<sup>th</sup> and early 20<sup>th</sup> centuries. Fishlow (2000) also provided me with a contextual background on railroads, Hill's life work, during the 19<sup>th</sup> and early 20<sup>th</sup> centuries. While this essay will not directly contribute to my paper, it did help me to frame Hill's life.

Brands (2010) makes an important point on foreign trade because he makes an interesting proposition early in his book. He attests that while the capitalists of many European nations sought new ventures abroad, "American capitalists concentrated on their home market." (Brands, 2010, 20). Many modern scholars support this view; however, Hill's story reveals that Americans didn't concentrate on the home market simply because they were uninterested in markets abroad. Hill's interest in and passion to trade with Asia bordered on obsessive, and scholars attribute his failure to external sources rather than a lack of interest in foreign trade.

## Theoretical Model

In order to understand why countries ever choose to trade with each other, it is necessary to look at economic theory. The motivation behind international trade is the comparative advantage theory.<sup>9</sup> In 1800, David Ricardo derived the principle of comparative advantage from Adam Smith's principle of absolute advantage. Before explaining the differences between these two theories, it is important to understand the foundational labor theory of value. This theory assumes that there is only one factor of production, labor, and it is of the same quality across the nation. The price of a good singularly reflects the amount of labor that went into its production. For example, if China can produce a yard of silk with less labor than the United States, the production cost and, in turn, the price of silk in China will be lower than in the United States.

Smith built off the labor theory of value and proposed that the United States and China should each produce the goods in which they have an absolute cost advantage—meaning a lower production cost—for export and then import those goods in which it does not have an absolute advantage. The problem with this theory is that each country must be able to produce at least one good in which it has an absolute advantage; otherwise, Smith contends, trade will not benefit the country which is able to produce all goods less expensively than the other country.

Ricardo modified this theory and presented his modifications as the principle of comparative advantage. This theory determines trading patterns based on a country's relative, rather than absolute, advantage. According to the theory of comparative advantage, the United States and China should specialize in and export the goods in which each has the lowest opportunity cost of production. Opportunity cost is a measure of what a producer must give up in order to get something. For example, the fertile tracts of land in the southern United States can

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<sup>9</sup> I found the specific information for comparative advantage and the terms of trade in Carbaugh, 2013, Chapter 2. However, background information on comparative advantage could be found in any introductory economics textbook, and information on the terms of trade is included in many international economics textbooks.

grow many crops. The opportunity cost of growing cotton on that land is the amount of money a farmer would make if he chose to grow an agricultural product other than cotton, such as tobacco or indigo. If both China and the United States produce and export those goods in which their labor productivity is high—meaning it is relatively less inefficient to produce—both nations will receive output gains from this specialization because they do not need to dedicate resources to industries where labor productivity is low and goods are relatively more expensive to produce. They can simply trade for those goods which would take a relatively large amount of labor to produce domestically.

It would be insightful to examine the sources of comparative advantage based on the factors of production in both the United States and China during this time period to see how each country benefitted from trade. The Heckscher-Ohlin model focuses on capital intensity and labor intensity as the sources of comparative advantage. The Specific Factors model divides the factors of production into capital, labor, and land; capital and land are assumed to be fixed while labor mobility is possible.<sup>10</sup> Both of these models offer deeper insights into U.S.-China trade, but the sources of comparative advantage go beyond the scope of this project and therefore will not be addressed in this paper. This thesis will only examine revealed comparative advantage, which will be determined by looking at the data in order to see which goods were most commonly traded between 1865 and 1914.

Through revealed comparative advantage, it appears that the United States had a comparative advantage in capital-intensive goods, with capital in the form of factories, refineries, and other industrial processes. China had a comparative advantage in labor-intensive goods. Since

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<sup>10</sup> I found the specific information on the Heckscher-Ohlin and Specific Factors models in Krugman, Obstfeld, and Melitz, 2012, Chapters 4 and 5. However, background information on these models could be found in any intermediate economics textbook.

both countries specialized in a different factor of production, they could each produce goods that were inexpensive for them to produce and trade for those goods that would be relatively more expensive to produce themselves. It was advantageous for the United States to produce goods that required intensive capital inputs—such as cotton manufactures and refined mineral oil—because they had an established foundation in industry. Conversely, it was advantageous for China to produce goods that were labor intensive—such as silk and tea—because they had a large labor force and lacked factories to speed up manufacturing goods. Each country specialized by producing the goods that it could efficiently produce, and then the two countries traded with one another. This theory is foundational for all trading relationships.

However, sometimes trade is limited by external factors. One possible limitation to the China-United States trade relationship was that both countries were well-endowed with natural resources. Keller et al. (2011) make an interesting contention that “large countries tend to be less open to trade than smaller countries, not least because many goods are available domestically” (888). It is possible that the United States did not see much profit in focusing on international markets when it could develop internal markets instead. Indeed, this is one of the arguments for Hill’s lack of success in the Asian market: the United States focused so much on internal development that it did not notice the profits that could be made in the Asian market.

Another potential limitation of trade in the United States is the involvement of the Interstate Commerce Commission (ICC). Interference by the commission is another oft-cited reason for Hill’s failure in the Asian market. This commission, which was established in 1887 through the Interstate Commerce Act, passed regulations which limited the ability of transportation companies in the United States that were interested in developing international trade to compete with foreign companies in Europe and Canada that received subsidies from their respective governments. The



commission targeted railroads by regulating shipping rates, which would ensure fair rates and eliminate rate discrimination.

### Descriptive Model

In order to make the theory operational, I developed data on bilateral trade between the United States and China. Once I collected my data, I chose to analyze it by looking at the terms of trade for the United States.

#### *Terms of Trade Equation*

$$\text{Terms of Trade} = \frac{\text{Export Price Index}}{\text{Import Price Index}} \times 100$$

The terms of trade measure the relationship between the prices a nation receives for its exports and the prices it pays for its imports over a specific time period (Carbaugh, 2013, 43). This equation only measures the terms of trade for one country, and it is made into an index because the change over time, rather than the absolute value of each number, is the component that is analyzed. For example, in a given year, the United States sends a certain dollar value of goods to China as exports and receives a certain dollar value of goods in imports. Over time, the terms of trade can become more favorable or less favorable for the United States. Assuming that the prices of goods remain constant throughout the years, if terms of trade improve for the United States, they receive more imports for the same level of exports sent to China. Since their goods are becoming more valuable, they receive a greater value of goods in return. The reverse is also true: if the terms of trade become less favorable over time, the United States would receive fewer imports for that same level of exports sent to China.

## Data Sources

I compiled my data from two sources. The primary data source comes from the Department of the Treasury. The Treasury keeps records called the *Annual Report and Statements of the Chief of the Bureau of Statistics on the Commerce and Navigation of the United States*. These reports contain detailed records of imports and exports in order to collect duties on the proper goods. Since this report is published annually, I am using several different reports, one report for each year I am observing. I have access to forty-four years of these reports, which gives me a fairly accurate picture of trade over this fifty-year period.

The second source that offers a quantitative analysis on the topic of aggregate foreign trade between China and the United States during the time period between the Civil War and World War I is a book titled *The Trade of the United States with China*. It is a dissertation written in 1924 by Shu-Lun Pan. I used some of Pan's tables as a starting point for my research. His research gives me access to the breakdown of goods into a few broad categories and the aggregate totals of imports and exports for the years 1870, 1875, 1880, 1885, 1890, 1895, 1898, 1901, 1903, 1905, 1907, 1909, 1911, 1912, and 1913. The categories Pan chose to use were usually those which revealed the most trade between countries. I chose a selection from his categories to analyze in my own charts. Of the six years for which I could not get data from the *Commerce and Navigation* reports, only one of them was included in Pan's dissertation, so I used his data for the year 1905.<sup>11</sup>

One benefit to using the annual Commerce and Navigation reports over Pan's data is that the annual reports are broken down into the component parts of imports and exports. One can see

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<sup>11</sup> One important note about Pan's data is the fact that he that Pan includes "Opium and extract of" in his "Chemicals, drugs, dyes, and medicines" category, so the data for "Chemicals" for 1905 is slightly inflated and the data for "Opium" is omitted for this year.

exactly how much of each good was being traded and the price at which it was traded in each year. Pan's data is broken down a little bit, but the Commerce and Navigation reports are much more detailed, while Pan focuses more on the aggregate amounts of goods imported and exported in each year he observed. Though I did end up using many of the categories Pan did because those goods were the most heavily traded, it was insightful to see the quantity of goods traded, the values for each of those goods, and the consistency or the rarity with which they were traded year after year.

### Quantitative Results

First, I will present my results for the trading patterns revealed in the data. As illustrated in Figure 1, total trade between the United States and China increased between 1865 and 1914. Total imports increased by a factor of 7.7 while total exports increased by a factor of 3.8. The other notable element in Figure 1 is the spike in exports in 1905. Exports drastically start increasing in 1903 and drop off sharply in 1907. I will discuss some potential causes of this spike later in my results.

Figure 2 is the breakdown of total exports by commodities. The main commodities driving the increase in exports were cotton—both manufactured and unmanufactured—and mineral oil. Cotton manufactures start increasing sharply around the turn of the 20<sup>th</sup> century, and mineral oil follows closely by starting to increase in 1903. Raw cotton and cotton manufactures increase by a factor of 651 between 1865 and 1914; over a slightly abbreviated time period, 1873-1914, mineral oil increases by a factor of 22.8. One commodity that you will notice did not contribute greatly to U.S. exports to China was wheat and wheat flour. In only two years, 1907 and 1912, did wheat exports exceed \$2 million. Hill's plans relied heavily on the Chinese purchasing a great

deal of agricultural products from the United States; in reality, this was a small contribution to foreign trade. Iron and steel, both unmanufactured and goods made of these metals, was another sector that Hill thought he could exploit. The data reveals that during this time period, the Chinese were not interested in iron and steel goods, as the value of these exports never exceeded 3 million dollars.

Another good that Hill strongly depended on was unmanufactured cotton. He planned to export raw cotton to China, have the Chinese manufacture it, and then import the completed cotton manufactures to sell to Americans. Figure 3 reveals that the reality of trade did not support this plan. Throughout the majority of the time period, the United States exported no unmanufactured cotton to China. Even in the peak year, 1912,<sup>12</sup> the United States exported less than 2.6 million dollars' worth of raw cotton to China.<sup>13</sup> As Figure 3 shows, exports of cotton manufactures were much more common than raw cotton, revealing Hill again misjudged the current trading trends when it came to the commodity of cotton.

The most important commodity imported from China between 1865 and 1914 was silk. Looking at Figure 4, silk increased from a negligible amount of value in 1865 to nearly \$17 million worth in 1914.<sup>14</sup> This is an increase by a factor of 84. The other notable U.S. import from China is tea. Tea declines from its peak of more than \$16.5 million in 1873 to less than \$3 million in 1914, a decline in over 80% of the value. However, this does not mean that tea was not an important commodity. In fact, until 1907, it was still the second costliest commodity imported from China, behind silk. Figure 5 shows some other important imports, even though they were

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<sup>12</sup> This year, it is also important to note, is later than Hill anticipated. His ship, the *Minnesota*, sailed in 1905, and he hoped to see immediate profits from these ships. His plan did not include waiting seven years to see results in China's cotton market.

<sup>13</sup> Table 1 in the Appendix lists the values of raw cotton and cotton manufactures that were exported to China in selective years.

<sup>14</sup> Table 2 in the Appendix lists the values of silk and tea imported from China in selective years.

not as important as tea and silk. Some of these imports are hides and skins, wool, and vegetable oil.

When evaluating the terms of trade, I set the base year for the index in 1914, so both the indices—for total U.S. terms of trade and U.S.-China terms of trade—are aligned to the same point in 1914 so they can be compared. Figure 6 reveals that the terms of trade became more favorable for the United States from 1865 to 1914, increasing from about 74 to 100 over these fifty years. The U.S. terms of trade with China, however, were not favorable over the course of the time period and were less favorable than the overall terms of trade during a majority of these fifty years; from 1865 to 1914, the terms of trade decreased from 202 to 100. The terms of trade with China generally declined until it reached a value of 11.6 in 1873, then remained low for more than twenty years, when it started increasing again in 1895. Terms of trade with China surpassed general terms of trade in 1902 and then remained relatively close to the total terms of trade until 1914, excluding the anomalous spike in 1905.

This result differs from the results that would be obtained from Pan's data. When looking at Pan's terms of trade, as shown in Figure 7, the terms of trade appear favorable for the United States both for the country as a whole and for the U.S.-China trade. The total terms of trade for the United States as a whole increased from 72 to 100 over the forty-four year period. The terms of trade did rise to over 100 between 1898 and 1905, then dipped before finally ending at 100 in 1913. The U.S. terms of trade with China was even more drastic. Between 1870 and 1913, it increased from 38 to 100. The terms of trade dropped off drastically, all the way down below 9 in 1880 before it experienced the conspicuous spike that peaked at 350 in 1905, just like total exports. This anomalous spike also drops off in 1907 and tapers down until it reaches 100 in 1913. Even if we ignore the spike between 1903 and 1907, terms of trade greatly increased over the period,

and were at a higher level than total U.S. terms of trade after 1901, revealing that it was very favorable for the United States to trade with China, even more so than the rest of the world. Since data from 1865-1869 is not included, the steep decline of U.S.-Chinese terms of trade during those five years is not observed, completely changing the results and suggesting dramatically favorable U.S. terms of trade with China over the time period.

Finally, Figure 8 shows the Chinese share of the United States' foreign trade. This graph illustrates the percentage of imports from China as a percentage of total U.S. imports and the percentage of exports to China as a percentage of total U.S. exports. The Chinese share of U.S. exports decreased over the fifty-year time period from 2.78% of U.S. exports to 0.97% of U.S. exports. This decline occurred early in the time period, dropping below 1% in 1871 and only rising above 1% in nine out of the next forty-three years. Imports from China as a percentage of total U.S. imports also declines slightly from 1865 to 1914. It starts at 2.06% and rises to a peak in of 4.18% in 1872, but then it generally declines to 1.98% in 1914. These declines do not stem from a decline in total imports—as we saw earlier in Figure 1, both total imports and total exports are increasing over these forty-four years—but rather from the fact U.S. trade with China is not growing as rapidly as U.S. trade with the rest of the world. Therefore, relative to total U.S. trade rather than in absolute terms, imports to and exports from China are declining.

Again, Pan's data reveals different results. When looking at China's share of U.S. foreign trade derived from Pan's data in Figure 9, the Chinese share of U.S. exports increased over this time period. Even though the increase was small in magnitude—only an increase from 0.68 percent to 0.83 percent—it was a large increase proportionally, growing by over 20 percent. The Chinese share of imports, on the other hand, decreased from 3.16 percent to 2.07 percent over this same time period.

When comparing the two data sets' results of the Chinese share of U.S. foreign trade, Pan's shortened time period is the cause of the discrepancies more so than his five-year intervals. His smoothed data does not miss any vital trends, but, by starting in 1870 rather than 1865, his measure of the Chinese share of imports decreases significantly rather than barely decreasing and his measure of the Chinese share of exports increases slightly rather than decreasing substantially.

To more carefully analyze the data in Figures 6 and 8 and to show the connection between the two, I will break down my fifty-year time period into three sub-periods. The first sub-period is from 1865-1871. This, as seen in Figures 6 and 8, was a period of decline in the U.S. terms of trade with China—even though U.S. total terms of trade were stable during this time period—and a decline in U.S. exports to China as a percentage of total U.S. exports. Imports from China were increasing during this time, but the exports to China remained relatively constant and low, contributing to this decline in the terms of trade with China.

One explanation for this is that both countries were recovering from their respective civil wars and were trying to determine what the other country would like to buy. China's exports to the United States were almost solely driven by tea, which increased by nearly eight million dollars in the seven years after the end of the civil wars. No other commodity from China exceeds \$2.2 million worth of trade during this time period. This could be because the United States had a high tariff during this time in order to protect home industries, so it was expensive to import goods from China that could be produced in the United States.

No single commodity exported from the United States in these seven years exceeded \$2.5 million worth of trade. Agriculture and manufacturing industries suffered during the U.S. Civil War and could not produce as much capacity as they used to. It is also possible that the United

States did not know what the Chinese wanted to buy and had to figure out what they could sell to China.

The second sub-period covers the years 1872-1895. This is a period of relative stability both in the terms of trade and in China's share of U.S. trade. There is only one spike during this time period in 1878, preceded by falling imports from China four years before this spike. This can be partially explained by a drought in China from 1876-1878, which has been "identified as the most severe and extreme one in North China over the past 300 years" (ZhiXin et al., 2010, 3001). U.S. imports of both silk and tea show this same downward trend, revealing that these crops could have been affected by the drought, which in turn affected China's ability to export.

The years 1896 to 1914 comprise the third sub-period. This is a period of erratic movements in the U.S. terms of trade with China as well as U.S. exports to China as a share of total U.S. exports. The changing political situation in China probably contributed greatly to the fitful trading patterns. In 1865, the Chinese government quelled the Taiping Rebellion and declared its intention to recover from civil war through "Self-Strengthening" reforms. Through these reforms, China intended to modernize and become self-sufficient rather than reliant on foreign countries for trade. This did not really come to pass, however, and the Self-Strengthening Movement was declared a failure by the government in 1895, following Japan's defeat of China in the Sino-Japanese War. This defeat led to a loss of Chinese power and influence as well as a decline in internal stability. Japan started to become a colonizer, annexing Korea and Taiwan after this victory. Japan was prevented from inflicting harsher punishment on China through its acquisition of the Liaodong peninsula by European nations who felt their claims on China were being threatened (DuBois, 2013, 14). Scholars have tried to discern why the Chinese Self-Strengthening reforms were unsuccessful and why they were so easily defeated by the Japanese;



they have concluded that the Qing army was defeated because of “poor armaments, insufficient training, lack of leadership, vested interests, lack of funding, and low morale” (Elman, 2004, 283), but the explanation as to why the Chinese were unable to modernize and attain these features during the Self-Strengthening Movement is still a topic of debate.

After 1895, China’s internal weakness persisted and stability could not be regained. “In rapid succession China suffered two more wars: the eight nation suppression of the Boxer Rebellion in 1900 and a showdown between Russia and Japan in 1904-05, which was fought largely on Chinese soil” (DuBois, 2013, 14). In addition to China’s internal weakness, Japan’s victory over Russia solidified it as the preeminent power in the region. Japan’s newest imperial acquisition, Manchuria, was accepted by the major Western powers. In return for supporting Japan, Western governments—especially Britain, France, and the United States—requested that China, even in its instability, be kept intact politically and territorially because they didn’t want to lose their trading opportunities with China (DuBois, 2013, 14-15). China had little input, compared to the major Western powers and the regional power of Japan, into the politics of the region. During the Russo-Japanese War from 1904-1905, China watched Japan win victories over Russia. The Chinese might have been frightened that Japan would attack them again. They could have responded to this threat by starting to import more goods to build up their reserves. Imports of cotton cloth could have been intended to make uniforms and mineral oil could have been imported to be a fuel source for the Chinese army if it should be called to fight.

### The 1905 Spike

The most notable element in several of the graphs is the spike in exports to China, which, as Figures 2 and 3 revealed, was driven largely by cotton manufactures. Chao (1986) describes

the type of cotton goods Americans would have exported and the Chinese market for those goods. American cloth was the prominent form of a manufactured cotton export. This cloth was rough, heavy, and coarse, and this type of cloth was preferred by the peasant classes; Britain was well-known for producing the lighter, finer cotton cloths, which catered to the wealthier urban residents (109-110). American cloth, since it was widely demanded, was a prominent export between 1890 and 1905, “almost doubling every five years” (Chao, 1986, 119). After 1905 though, exports dropped off dramatically. This analysis corresponds with the results revealed in Figure 3.

Chao (1986) proposes two reasons why exports of cotton manufactures dropped off so dramatically after 1905. The first is that China’s handweaving industry started to take off, and the cloth they could now make on their handlooms competed with the coarse cloth the United States produced. The second competing force was the large textile mills that were being built in East Asia. The first modern mill was built in Shanghai in 1890, and it didn’t take long for the industry to develop and force out the United States (119-120).

These reasons explain why, after ten strong years of increasing exports of cotton manufactures to China, U.S. exports drop off so dramatically. They do not explain, however, what lead to the anomalous spike from 1904-1905 in the first place. Chao (1986) does not provide a reason for the increase in exports of cotton manufactures from \$4.1 million to \$27.8 million in this one year, but he does leave a clue in one of his tables.<sup>15</sup> This table reveals that Chinese imports of cotton cloth from the United States increased by nearly 9% between 1902 and 1905. The majority of this increase was taken from the British, whose exports dropped by 6% during this time period. It is strange that the United States, which produced heavy, coarse cloth would take such a large percentage away from Britain, a country known for its light, fine cloth.

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<sup>15</sup> Table 21: Shares of Imported Cotton Cloths, by Origin, 1902-1930, on page 121.

One potential explanation for this sudden jump is that the peasant classes demanded more coarse cotton cloth in 1905; however, it is unlikely that such a large gap would be driven solely by peasant demand. An alternative is to look at why Britain's supply of cotton cloth decreased by 6% between 1902 and 1905. The majority of British cotton came from its Indian colony, and this cotton was grown in states such as Punjab, Rajasthan, and Haryana in Northern India (Chandrasekaran, Annadurai, & Somasundaram, 2010, 177). In April 1905, an earthquake erupted in Kangra Valley, right in the midst of these northern states. More than 20,000 people were killed, tens of thousands of homes and buildings were destroyed, and "farming was disrupted by the loss of 53,000 domestic animals and extensive damage to a network of hillside aqueducts that had been constructed over many generations" (Ambraseys and Bilham, 2000, 45). It seems likely that this natural disaster disrupted the supply of raw cotton that would have been shipped to Britain, formed into cotton cloth, and then exported to China. In order to meet demand in 1905, the Chinese had to adapt and accept more cotton cloth from America.

The rise in raw cotton exports to China that begins just a few years before the outbreak of World War I signifies a trend that is just beginning. The decreasing demand of U.S. cotton manufactures in China after 1905 was eventually set off by increasing demand of U.S. raw cotton, especially after World War I (Reynolds, 1986, 130). As East Asian countries built their own textile mills and imported textile machinery of their own, their demand for raw cotton increased accordingly. This is what the visionary Hill had originally expected. His plans were finally being realized; unfortunately for him, this trend came too late.

Qualitative Implications: Why did Hill really fail?

Let's return to the underlying question connecting Hill's life to the trade data analyzed above: why did Hill fail to establish large flows of trade into the relatively untapped market of China? The traditional stories claim that the United States was too busy developing internal markets to focus on foreign trade, the Asian markets were not developed enough to welcome American goods, governmental interference by the ICC and a lack of government subsidies made foreign trade uneconomical and the ships Hill built were outdated before they ever set sail, sinking his Great Northern Steamship Co. before it ever got off the ground.

I argue that the traditional story is incorrect. While some of these stories mentioned above have elements of merit, the trade data reveals some other conclusions that should be incorporated into any new explanation of Hill's apparent failure. The idea that America was an internally-focused country without any foreign trade interests has been disproved. Trade with Asia flourished between 1865 and 1914, as evidenced through this Chinese example, and this was only a small fraction of the United States' foreign trade.

The belief that Asian markets were not developed is a Western imposition on the East. It harkens to the supposed superiority of Americans over the Chinese and the arrogant notion that the Chinese would be foolish to refuse any goods that Americans desired to thrust upon them. The idea that the Chinese might not be interested in certain goods that Hill wanted to sell them, such as wheat as a replacement for rice, never occurred to him.

Governmental interference through the ICC did contribute to increased shipping costs, and the government's refusal to subsidize Hill's ships did put him at a disadvantage against other Western powers; however, there is no guarantee that if the U.S. government had subsidized Hill's venture—or at the very least hadn't interfered with his trade—that he would have been successful. His own failure in the midst of successful American trade, as revealed through increased U.S.

imports from and exports to China during this time, shows that his situation was not representative of the nation, for some American businessmen were able to profit in spite of government regulation. As discussed above, Hill's expectations varied drastically from China's desires. This discrepancy between what Hill thought the Chinese wanted to buy and what the Chinese actually wanted to buy would have had to be remedied before any successful trading relationship would have been possible.

Hill was not a naval man, and his ships may indeed have been outdated by the time the *Minnesota* finally made her maiden voyage; this technological disadvantage very likely contributed to Hill's lack of success, directly impacting the flow of goods and distinguishing him from his American competitors. Hill's ships, however, cannot be blamed entirely for his failure, for it must not be forgotten how badly Hill read the market. Hill's ships were built to carry specific goods that he supposed the Chinese would want to import. Recall that Hill's first voyage shipped lumber, copper, and cotton. He also dreamed of sending wheat and manufactures of iron and steel in the near future in exchange for silk and cotton manufactures. The Chinese, according to the data, were more interested in purchasing cotton manufactures from the United States. Demand for cotton manufactures would require more careful packing and storing than raw materials,<sup>16</sup> something for which Hill's ships were not designed.

Therefore, I propose a new perspective. I argue that Hill's failure in Asia stemmed more from his misreading the market than from any external excuse. Due to the fact that trade increased during the fifty years covered in this paper, it is evident that some Americans overcame the limitations created by the ICC and profited in Asian markets. Hill was not so fortunate. His vision

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<sup>16</sup> Chao (1986) comment on the process of shipping American cotton manufactures to China. Often, these manufactures were packaged poorly. He writes, "Bales of American cloth were fastened with narrow metal strips which cut into the bales and damaged the merchandise, and there was no waterproofing" (119). It is easy to imagine the frustrated Chinese suppliers who received such poorly-shipped merchandise to sell.

of China as a major trading partner was sound, but because he misread Chinese demand, Hill was unable to profit from trading ties with Asia.

### Conclusions and Continuing Research

From these results explained in the previous two sections, I conclude that the patterns of trade reveal an increasing trend. Both total U.S. exports to China and total U.S. imports from China increased between 1865 and 1914. The data reveals that the United States had a comparative advantage in cotton manufactures and mineral oil while China had a comparative advantage in silk and tea. I also conclude that the total terms of trade became more favorable for the United States over this same time period even though the terms of trade with China did not. The terms of trade with China were only occasionally more favorable than they were for trade with the rest of the world. The net Chinese share of U.S. foreign trade was also negative since the Chinese share of exports declines by nearly two percent and the Chinese share of imports remains nearly constant. These results reveal that Hill's failure stemmed more from his misjudgment of the market and his desire to impose certain goods on the Chinese that they did not demand than from government regulation or a lack of interest in foreign trade.

Hill's interactions with China are important to study because he lived during the First Era of Globalization, when China was first opened up to international trade. Today, we are living through the Second Era of Globalization. Hill's experience gives us a glimpse into the past to better understand our present-day trading relationship with China during this new era and learn from Hill's mistakes.

The main lesson to be learned from Hill's failure in China is to know the market. Hill tried to force goods on the Chinese. He wanted them to buy raw cotton and wheat, even though they

were not interested in these goods. He did not take the time to ask the Chinese what they wanted to buy and then cater to their desires. Hill tried to single-handedly change a country's preferences for certain goods. He could not, and therefore, he was not able to take advantage of the potential in the Chinese market. American businessmen today would be well-advised to know the market. They should talk to consumers in Asia, discover what these consumers want to buy, and then produce goods which meet that demand. This approach may result in more successful trading relationships between the United States and Asia.

Even though this project spanned the course of ten months, there is still research to be done on this topic. The main element that is missing from this paper is research and data analysis on Japan. The inclusion of Japan would allow for a more complete Asian analysis and would allow East Asian trade to be compared more thoroughly with U.S.-European trade, which was a much more prominent and established trading network between 1865 and 1914. Another element of analysis which should be further researched would be the inclusion of quantity data. This would eliminate fluctuations in the exchange rate and allow price levels to be adjusted for currency appreciation or depreciation over this time period. Finally, including a study on the sources of comparative advantage with either the Heckscher-Ohlin model or the Specific Factors model would provide more insight into how the United States and China successfully interacted in trade with one another by understanding the advantage of choosing to produce the goods they did.

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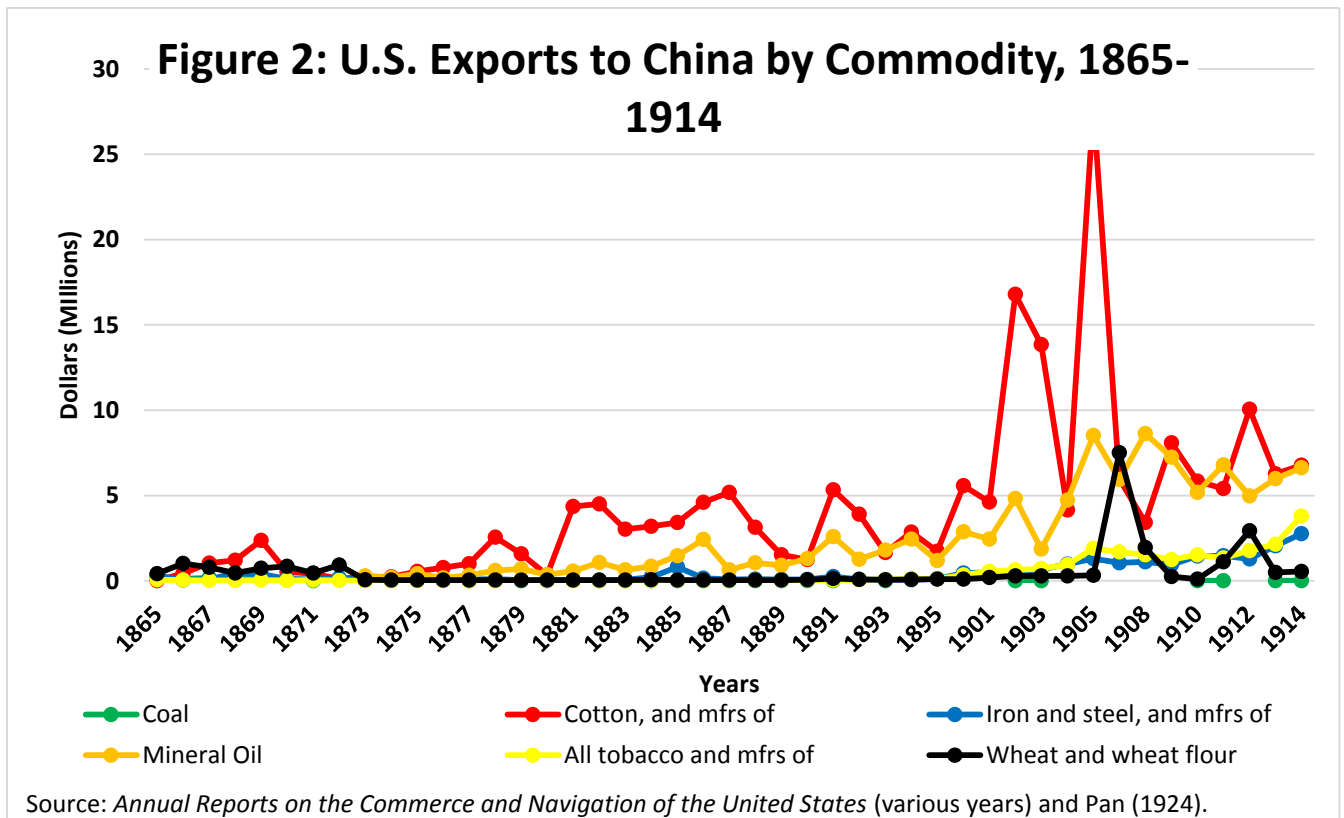
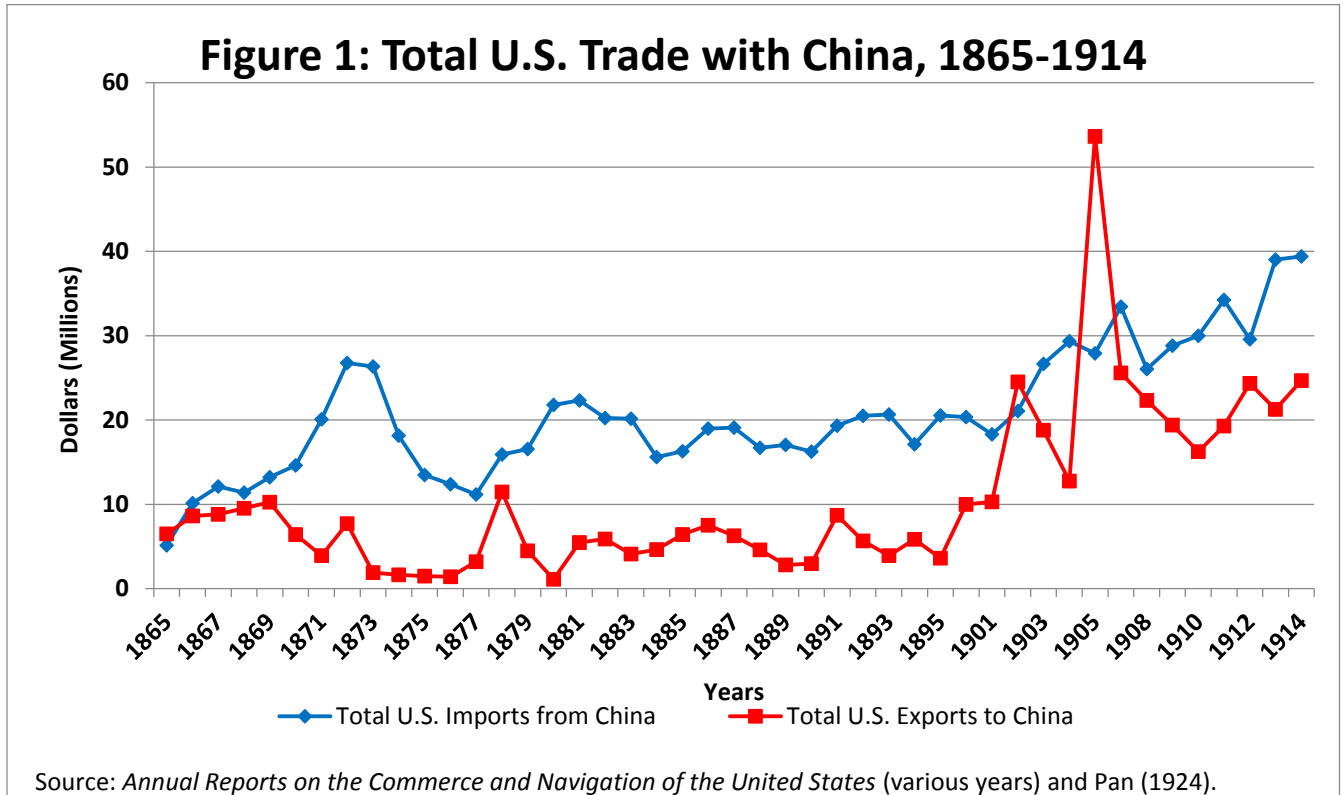
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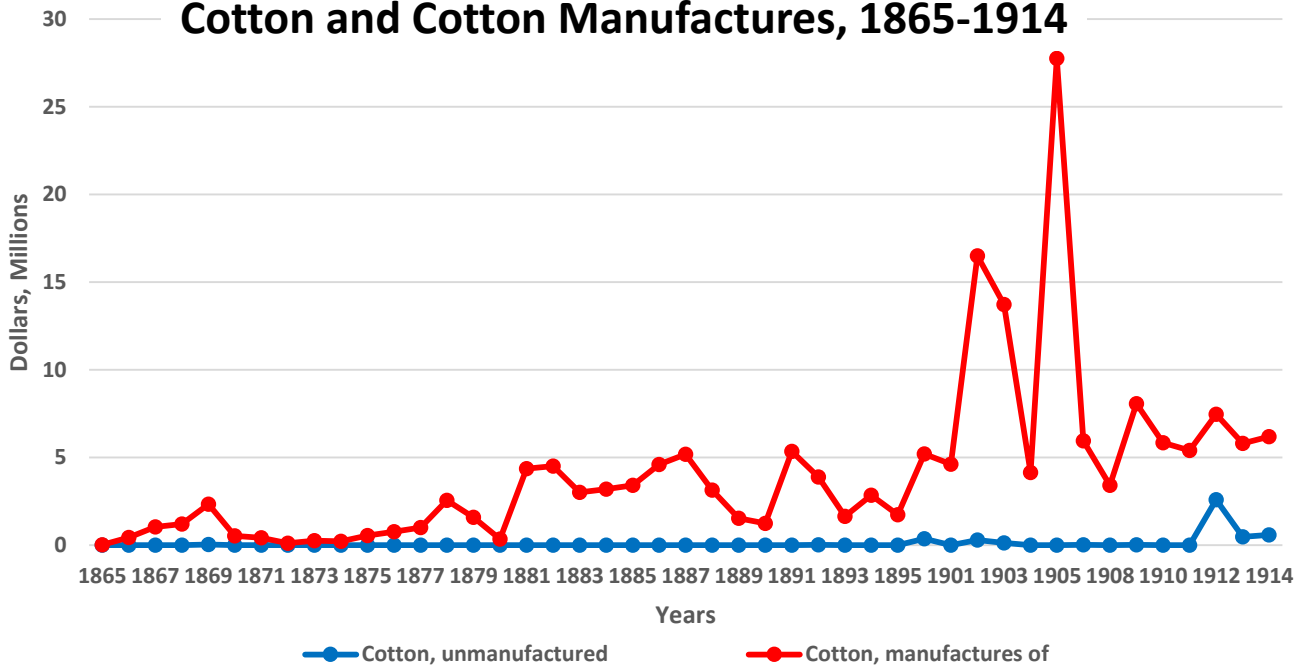
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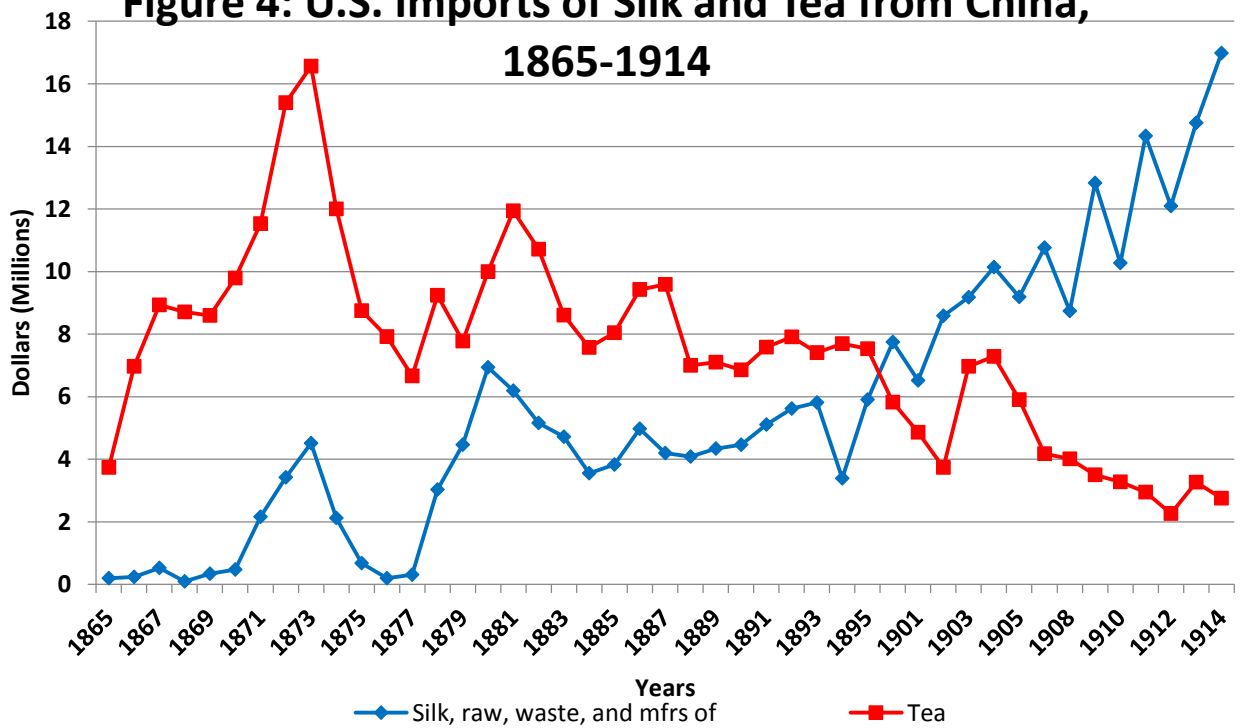


**Figure 3: Exports to China of Unmanufactured Cotton and Cotton Manufactures, 1865-1914**



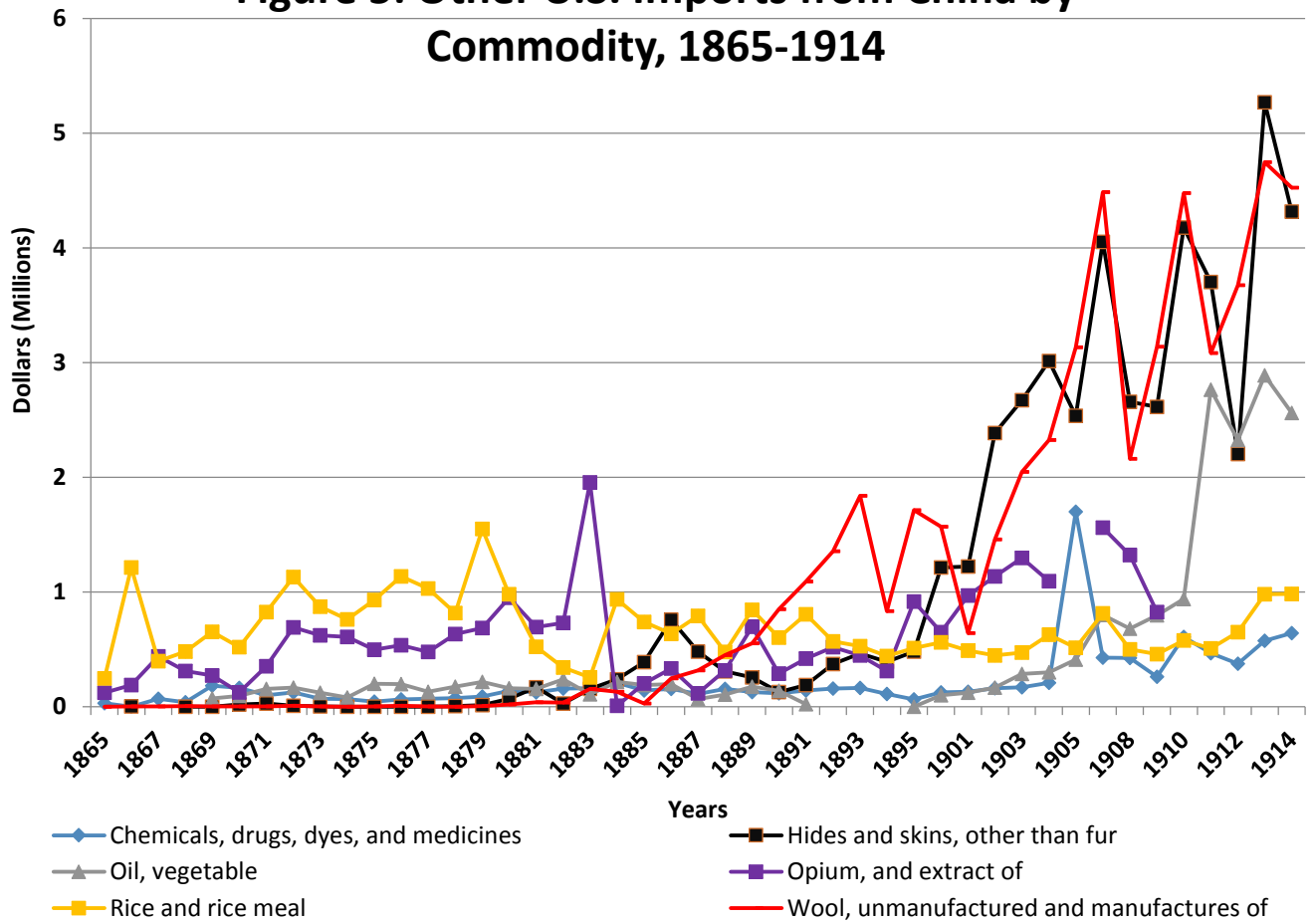
Source: *Annual Reports on the Commerce and Navigation of the United States* (various years) and Pan (1924).

**Figure 4: U.S. Imports of Silk and Tea from China, 1865-1914**



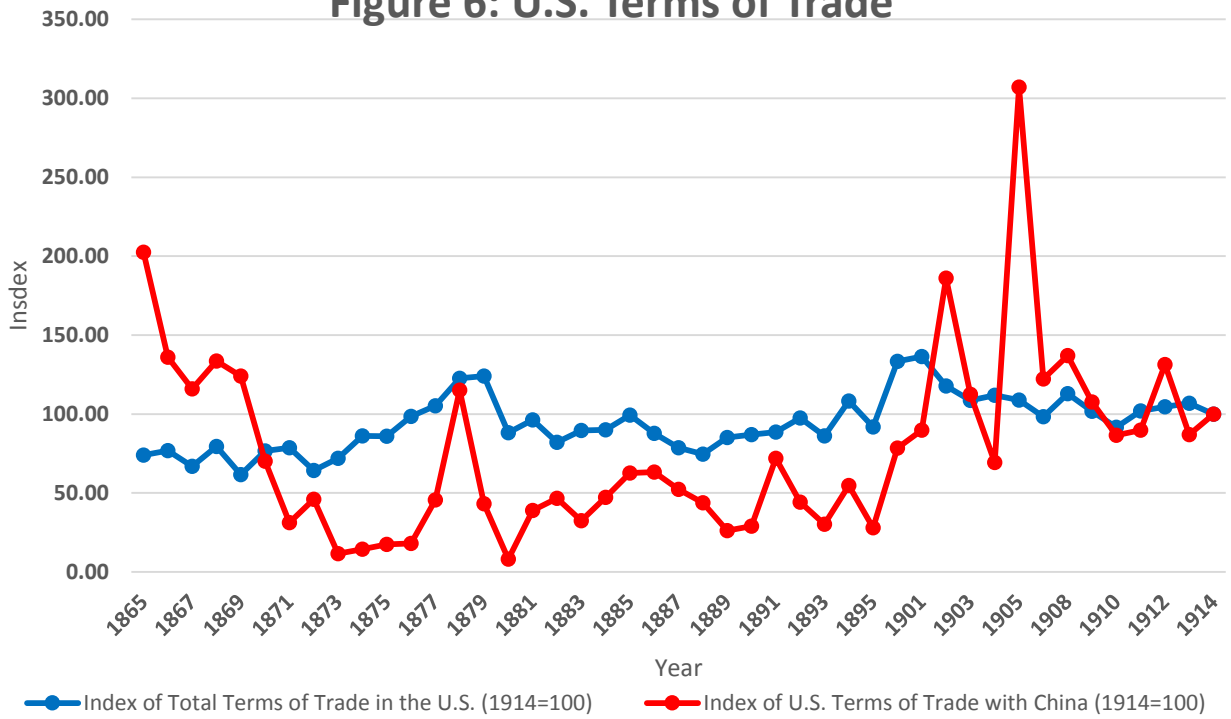
Source: *Annual Reports on the Commerce and Navigation of the United States* (various years) and Pan (1924).

**Figure 5: Other U.S. Imports from China by Commodity, 1865-1914**



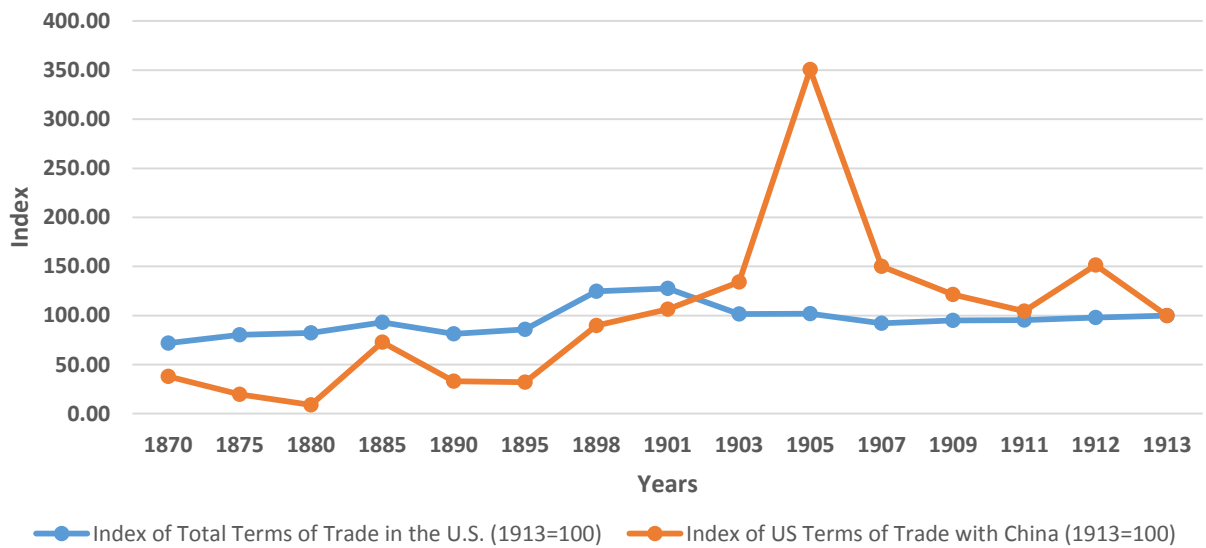
Source: *Annual Reports on the Commerce and Navigation of the United States* (various years) and Pan (1924).

**Figure 6: U.S. Terms of Trade**



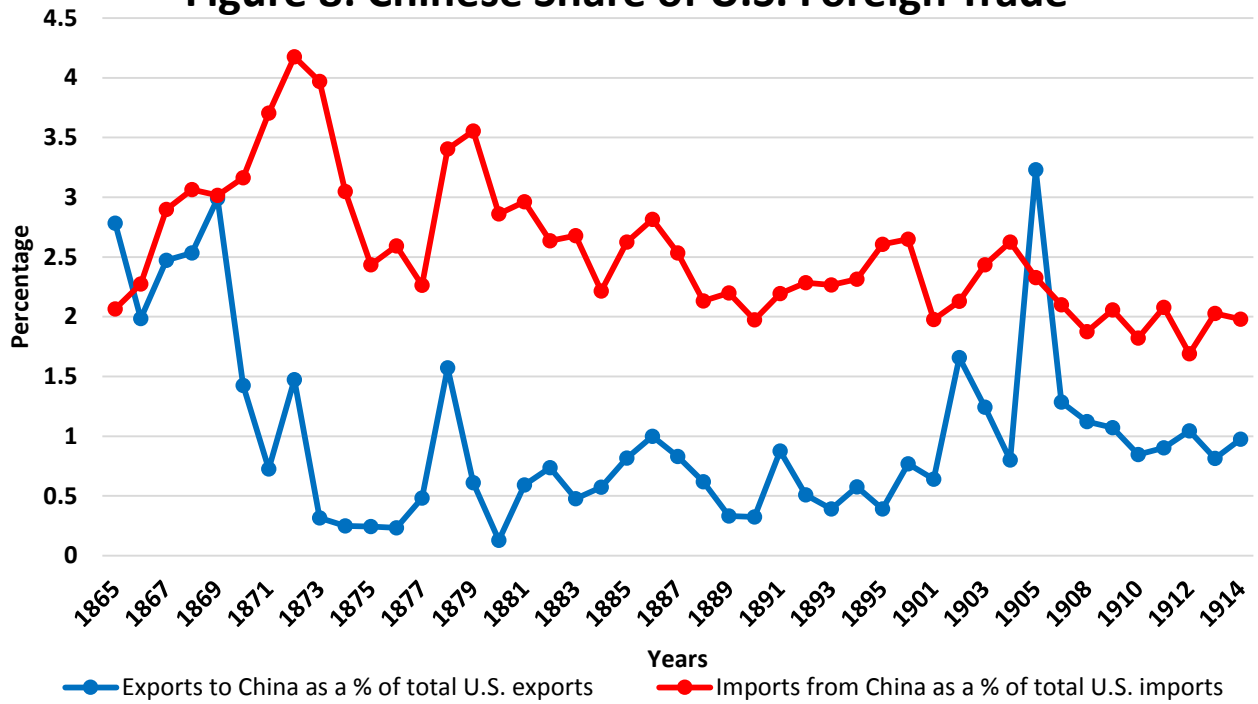
Source: *Annual Reports on the Commerce and Navigation of the United States* (various years), Pan (1924), and Bureau of the Census: *Historical Statistics of the United States*, p. 244.

**Figure 7: U.S. Terms of Trade with Pan's Data**



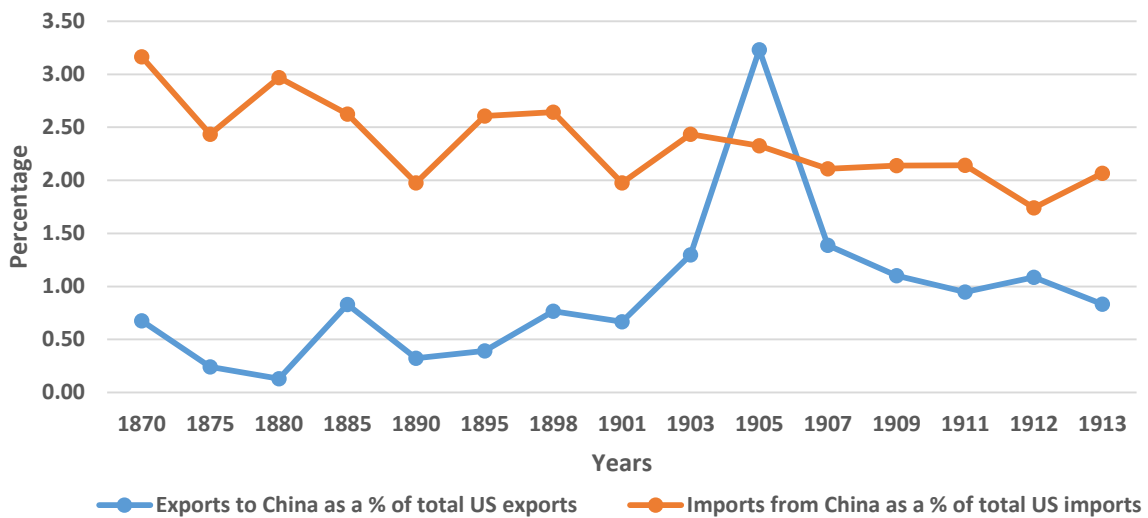
Source: Pan, pp. 42, 59-60, 55-56; Bureau of the Census: *Historical Statistics of the United States*, p. 244.

**Figure 8: Chinese Share of U.S. Foreign Trade**



Source: *Annual Reports on the Commerce and Navigation of the United States* (various years), Pan (1924), and Bureau of the Census: *Historical Statistics of the United States*, p. 244.

**Figure 9: Chinese Share of U.S. Foreign Trade from Pan Data**



Source: Pan, pp. 42, 59-60, 55-56; Bureau of the Census: *Historical Statistics of the United States*, p. 244.

## Appendix

Table 1: Unmanufactured Cotton and Cotton Manufactures, 1865-1914 (in dollars)		
Years	Cotton, unmanufactured	Cotton, manufactures of
1865	0	10402
1870	0	526172
1875	0	552444
1880	0	339134
1885	67	3414514
1890	0	1231033
1895	0	1723394
1901	0	4620998
1905	0	27761000
1910	0	5831653
1914	588240	6187639

Table 2: U.S. Imports of Silk and Tea from China, 1865-1914 (in dollars)		
Years	Silk, raw, waste, and mfrs. of	Tea
1865	201365	3732811
1870	476905	9795933
1875	682805	8745602
1880	6936610	9995499
1885	3830514	8038896
1890	4465527	6858195
1895	5902362	7534354
1901	6516314	4863844
1905	9191000	5903000
1910	10268525	3275343
1914	16984697	2757695