Omnia Juncta in Uno: Foreign Powers and Trademark Protection in Shanghai's Concession Era*

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Abstract

Intellectual property (IP) institutions have been a salient topic of economic research and a prime cause of political disputes, including the latest U.S.-China trade war. In this paper, we investigate the effects of trademark protection, an under-examined form of IP protection, by exploring a historical precedent: China's trademark law of 1923—a law enacted not to protect the domestic economy; but an unanticipated, disapproved response to end conflicts between foreign powers. Exploiting a unique, newly digitized firm-level dataset from Shanghai in 1870-1941 and bilateral product-level data on Chinese imports in 1920-1928, we show that the trademark law spurred employment growth, organizational change, and rising imports for Western firms with greater dependence on trademark protection. In contrast, Japanese businesses, who had frequently been accused of counterfeiting, experienced employment contractions. Finally, we show that previous attempts by foreign powers to strengthen trademark protection — such as extraterritoriality rights, bilateral commercial treaties, and an unenforced legal trademark code — were ultimately unsuccessful.

JEL: F2, D2, O1, O3, N4

Keywords: trademark, firm growth, institution, treaty, concession

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"Omnia Juncta in Uno."

"All Joined in One" - Shanghai Municipal Seal
International Settlement, established in 1843

1 Introduction

Disagreements over the protection of intellectual property (IP) have been a prime cause of political and economic disputes, including the recent trade war between the United States and China. Firms from developed countries have been urging their governments to negotiate stronger IP protection with the Chinese authorities; for example, the *U.S.-China Phase One Agreement* signed in January 2020 prominently features IP provisions.

Within the IP-intensive sectors of the economy, trademark-intensive industries contribute most to employment (90% in US and 78% in Europe).[1] This economic importance stands in stark contrast to the academic literature, which has focused almost exclusively on patent and copyright protection. In this paper, we aim to close the gap in the literature by investigating the effects of trademark protection on firm and trade growth by exploiting a historical precedent — the introduction of China's first trademark law of 1923 and a series of newly digitized micro-level datasets in Shanghai that provide rare, first-hand insights into how firms from around the world operated and evolved in arguably one of the most volatile and complex markets before and after the birth of trademark institutions.

Different from patents or copyrights, the economic rationale for trademarks is to solve an asymmetric information problem that arises in settings when buyers are unable to observe intrinsic product characteristics at the point of purchase, e.g., product materials or ingredients that affect the quality, safety or durability of the products (e.g., Shapiro, 1982, Shapiro, 1983).[2] One way to overcome this information asymmetry problem is for sellers to use trademarks to signal the identity of the producer to the consumer (Grossman and Shapiro, 1988a).[3]

[1] See USPTO (2016) and EPO and EUIPO (2019).

[2] As defined by the USPTO, a patent is a "limited duration property right relating to an invention in exchange for public disclosure of the invention" and protects "the right to exclude others from making, using, offering for sale, or selling an invention." A copyright protects "original works of authorship" in literature, music, art, architecture as well as software. Patents and copyrights address market failures associated with the public good nature of knowledge and aim to provide incentives for innovation and knowledge creation.

[3] According to the 1875 *Trade Marks Registration Act* of Great Britain, one of the world's first trademark laws, a trademark is "a device, or mark, or name of an individual or firm printed in some particular and

Trademarks enable firms to build and benefit from reputation over time, but counterfeiting undermines the value and growth of this firm-specific asset. As the jurisdiction of laws is national by nature, this poses an especially difficult problem in the context of international trade and commerce.

At the beginning of the 20th century, China emerged as one of the world's most important markets for trademark protection due to its market size and absent formal trademark institutions. As noted in the *Manchester Guardian* on June 2, 1904, "perhaps for no market in the world is it more necessary that the trademarks upon our productions should be jealously safeguarded" (quoted in Heuser, 1975). However, unlike most other trademark laws throughout history, the urgent need for trademark protection described above did not stem from disputes between foreign and domestic businesses or demand from domestic businesses, but rather fierce conflicts between foreign powers (Motono, 2011).

After the Opium Wars, gunboats from Western nations forced Qing China to conclude numerous 'Unequal Treaties' that granted extraterritorial (ET) rights to foreign powers, and to open new treaty ports such as Shanghai and Tianjin to foreign trade and businesses. Entering one of the oldest societies that had been largely closed to the rest of the world for centuries, foreign businesses faced a series of formidable obstacles. In addition to language and cultural barriers, businesses first and foremost faced the challenge that economic activity had been conducted in the absence of formal economic rules. Among the foreign powers, British businesses attained early access and dominance in the Chinese market, but this status was soon challenged by Japan after the Treaty of Shimonoseki in 1895. Counterfeits of Western trademarks, especially by Japanese manufacturers, rose rapidly after the 1890s, leading to a fast-growing number of trademark disputes between Western nations and Japan, spanning across products from tobacco and textile to food and cosmetics (Motono, 2011). Despite strong protests from European countries, the Japanese government did not address counterfeiting activities of its businesses.

At the turn of the 20th century, China's leading economic partners—Great Britain, the United States, and Japan— signed bilateral commercial treaties with China promising to give up ET if China were to regulate foreign commerce along Western lines, including formal protection of trademarks. Great Britain and Japan both tried to implant their respective

distinctive manner; or a written signature or copy of a written signature of an individual or firm; or a distinctive label or ticket."

trademark laws involving different filing principles into China. This competition, however, resulted in an indefinite postponement of the trademark law. Britain and Japan spent the following two decades trying to negotiate the details of the Chinese trademark law, without success in reaching agreements. Neither government anticipated the Chinese government to prepare its own trademark law. In May 1923, China surprised foreign governments by passing its first trademark law. The law, completely unanticipated by the foreign community and failing to satisfy the demands of either Western or Japanese government, was broadly rejected and only later unwillingly accepted by foreign powers (Motono, 2011). These historical characteristics of the law offer us a unique context and an arguably exogenous institution shock for studying the economic impacts of trademark protection and comparing the effects of alternative institution approaches.

In this paper, we analyze the effects of the trademark law on the growth of foreign and Chinese firms and China's trade. We begin by providing a simple conceptual framework to help guide the empirical analysis. In the framework, trademark protection allows a brand producer to have a monopoly over her brand. Without trademark protection, a counterfeiter producing a lower quality version of the product at lower cost enters the market. Consumers are aware of the presence of counterfeits in the market, but cannot distinguish them upon purchase; this leads to a reduction in aggregate demand for the product. Our framework predicts that better trademark protection leads to growth of the brand producer while the counterfeiter contracts. Prices are predicted to increase, but — surprisingly to advocates of IP protection — the effect on total production and consumer surplus is ambiguous and depends on how much consumers dislike the counterfeit versus how much the counterfeiter reduces the market power of the brand producer.

We test the growth predictions of trademark protection by implementing a difference-in-difference (DD) analysis that compares the growth of firms trading more or less trademark-intensive products. We construct a firm-specific measure of trademark intensity based on each firm's initial product composition and the share of trademarks registered in each product category in a number of foreign countries before 1922. Given that foreign powers did not anticipate the introduction of the trademark law, we expect the timing of the law to be exogenous to the growth of trademark-intensive foreign firms, an assumption that we can test in a pre-trend analysis. We conduct the DD analysis exploiting two novel, complementary annual datasets: a firm-employee level dataset from Shanghai covering 1872 to 1942, the city

that accounted for 67% of China's inward FDI in manufacturing and 73% of China's total factory output by 1930s and a bilateral, product-level dataset of Chinese imports covering 1920 to 1928. In both exercises, we analyze the effects of the trademark law separately for Western and Japanese firms (or countries, respectively).

Our analysis suggests that the trademark law led to employment growth and organizational changes in trademark-intensive Western firms. The employment of Western firms grew, on average, by 5%. Japanese businesses, in contrast, witnessed an average reduction of employment by 15%. Similar patterns are observed in China's imports: the trademark law led to increasing imports in trademark-intensive products from Western countries, while imports from Japan fell (insignificantly) after 1923. We also compare the effect of the 1923 trademark law to the preceding three institutional arrangements that foreign powers sought to protect their trademarks: 1) ET, which can be interpreted as a direct import of foreign legal institutions in China; 2) bilateral commercial treaties between China and foreign countries; and 3) the legal trademark code in 1904 that had never been put into force. We find that none of the alternative institutional arrangements exerted a positive and significant effect on firm growth.

An extensive literature on IP institutions assesses the effects of patent laws and, to a lesser extent, copyright protection, on economic growth.[4] In contrast, there has been limited research on the economic effects of trademark protection. The main theoretical work on this topic is Grossman and Shapiro (1988a,b) who analyze the positive and normative effects of counterfeit trade on consumers, firms and total welfare and the implications of policies designed to combat counterfeiting based on earlier work by Shapiro (1982, 1983). Recent work by Heath and Mace (2019) offers empirical evidence on the effects of trademark protection on the profits of US firms exploring the 1996 Federal Trademark Dilution Act, which granted additional legal protection to selected trademarks. The paper finds that the Act raised treated firms' operating profits, lowered entry and exit, and reduced innovation and product quality. Qian (2008), examining counterfeiting among Chinese shoe companies, finds that a loosening of counterfeit enforcement led to alternative differentiation strategies by authentic producers. Low-quality counterfeit entrants are found to induce authentic producers to

[4]See, for example, Moser (2013) and Sampat (2018) for a comprehensive review on patent institutions and Biasi and Moser (2018), Giorcelli and Moser (2020), Oberholzer-Gee and Strumpf (2007), and Li, MacGarvie, and Moser (2018) for recent studies of copyrights.

upgrade product quality and invest in signaling and self-enforcement against counterfeits.

In contrast to previous studies, our paper focuses on a fundamental rather than incremental change in trademark protection: the implementation of an entire trademark law. Furthermore, the historical setting provides arguably exogenous variation in the timing of the trademark law that allows us to establish a causal effect of China's first trademark law on foreign, rather than domestic firms. By examining the foreign firm and trade responses to the trademark law, our study also offers one of the first pieces of evidence for the role of trademark institutions in international commerce.

Our paper is also related to an emerging literature assessing the historical patterns of Chinese trade during the treaty-port era, including Jia (2014), Keller, Li, and Shiue (2013), and Keller and Shiue (2020). Studying the long-run development of China's treaty ports, Jia (2014) examines the development paths of treaty ports and their neighbors and the roles of migration and sector-wise growth. Keller et al. (2013) and Keller and Shiue (2020) document the historical patterns in China's trade and FDI, and assess how these patterns compare to those of modern trade and investment.

The rest of the paper is organized as follows. Section 2 describes the historical background and timeline for the birth of China's first trademark law. Section 3 outlines a framework that predicts the effects of trademark protection. Section 4 explains the construction of the business-employee panel data and bilateral product-level trade data and presents some stylized facts. Section 5 implements the empirical analysis on the role of the trademark law in firm growth, entry and exit, organization and trade. Section 6 concludes.

2 History of China's First Trademark Law

China's historical use of trademarks can be traced back to the Northern Zhou Dynasty (556-580 A.D.), when merchants began to use different marks to distinguish their products and craftsmanship from others (Chang, 2014). Porcelain and ceramics are one of the oldest industries in which such marks had been used for centuries (Heuser, 1975). In contrast to the long history of trademark uses, China's formal institutions to protect trademarks has had a much shorter and complex timeline. Before the late 1800s, written Chinese law (e.g., the Great Qing Code) referred very little to the regulation of private economic activity (Kirby, 1995), with the main exceptions being the rules preventing monopolies and unfair trading. Instead, protection of trademarks had been governed by the by-laws of commercial organi-

zations (guilds or shanghui).

Trademark protection in pre-1949 China underwent several phases, from the imposition of foreign legal institutions (ET) to bilateral commercial treaties with major trading partners, and from the Qing 1904 code that had not been put into force to finally the 1923 birth of China's first comprehensive trademark law. In the initial phases, competition by Japanese and Western firms over their grasps of the Chinese market spurred growing Anglo-Japanese conflicts over trademark protection. These conflicts began at the end of the 19th century and remained unresolved after several rounds of failed negotiations among the British, Japanese and Chinese governments. In the midst of continuing Anglo-Japanese negotiations, the Republican-era government surprised foreign nations by introducing its first trademark law in 1923 to end the continuous disagreements between foreign powers, and as a first step towards removing ET altogether. Even though foreign governments rejected the new trademark law as it conflicted with their interests, it entered into force and remained in place even after the turnover of the government in 1927. Below we describe the three phases leading up to the 1923 trademark law.[5]

2.1 The Clashes of Foreign Legal Institutions

After the Opium War, gunboats from Western nations forced Qing China to conclude a series of 'Unequal Treaties' which allowed foreign merchants to trade in Chinese ports, established regulations for the conduct of trade, and granted foreign citizens and businesses extraterritorial rights, sometimes known as consular jurisdiction. Cases in which foreign companies with ET were defendants would be tried at their respective Consular Courts in Shanghai following the laws of their home country, while other cases would be tried in the "Mixed Court" following Chinese jurisdiction.

This led to the coexistence of up to 22 different legal systems in Shanghai, depending on which treaties got signed, expired, or were renewed. The laws that specific firms had to adhere to changed over time and depended not only on the nationality of the specific firm, but also on the nationality of all involved parties. The coexisting legal systems and consular courts led to a complex "legally pluralistic environment," and often competed for jurisdiction and failed to cooperate with each other. By the early 1900s, the web of treaties attained such

[5] We refer interested readers to Motono (2011, 2013) for a comprehensive account of the history behind the trademark system.

a level of complexity that "even accomplished international lawyers found extremely difficult to assess with certainty the relevant jurisdictions and obligations" (Cassel, 2012).

Around the same time, China had emerged as one of the most important markets for trade and a major source of economic hope for Western merchants and manufacturers (in particular, Great Britain) which attained early entry and dominance in Chinese imports. This dominance was then challenged by Japan which gained extraterritorial rights after the end of the first Sino-Japanese War in 1894–95 and the Treaty of Shimonoseki in 1895. As Japanese firms lagged technologically behind their Western rivals, they often manufactured counterfeits of Western goods, thereby infringing on Western trademarks. Western-Japanese conflicts surrounding trademark started when Great Britain discovered a series of Japanese counterfeits in 1906.[6]

Great Britain immediately attempted to protect their trademarks by asking British firms to register trademarks in their Chinese and Japanese consulates. The marks were then transmitted to be recorded at the Customs. However, this form of protection proved inadequate because neither the consulate nor the record office had a legal basis to enforce compliance with its rules — the enforcement depended on the specific legal institution that was involved, nationalities of the opposing parties, and whether their home countries had ET or not, as illustrated earlier.

In practice, this resulted in different trademark protection of Western firms against Chinese versus Japanese firms (Motono, 2011). If a trademark lawsuit was made against a Chinese business, it went to the Mixed Court in Shanghai, which had tended to enforce the protection of trademarks registered at the Customs. However, if the case was against a firm who enjoyed ET, such as Japanese firms, the case was dealt with at the consular court, which tended to enforce trademark protection less. As noted in the *Daily Consular and Trade Reports* on October 30, 1923, "the difficulty in the matter of infringements does not generally arise among the Chinese, with whom the authorities are usually prompt to deal in cases of infringement, but with certain European and Oriental manufacturers who put on the China market merchandise which it is claimed by representatives of American manufacturers violates American trade-mark and patent rights." This intensified Anglo-Japanese tensions.

[6]See Motono (2011) for a detailed description of notable cases including, for example, Sir Elkanah Armitage Sons Ltd. v.s. Konishi Hanbei and the Peacock brand by British American Tobacco and the Peafowl brand by Sanlin Gongsi.

2.2 Bilateral Commercial Treaties and Failed Negotiations

In 1902 Great Britain signed a commercial treaty with China, promising to abolish their extraterritorial rights if China were to establish its legal systems along Western lines. A year later, the U.S. and Japan signed similar treaties with China. In particular, the treaties required the Chinese government to provide protection for foreign trademarks and establish offices to register trademarks.[7]

The Qing central government responded by asking the Japanese government for help in designing a trademark law as a first step towards satisfying the conditions outlined in the treaties for abolishing ET. Japanese suggested to use its first-to-file principle, which would continue to allow Japanese companies to counterfeit Western products as long as they filed the (counterfeit) trademark first, and at the same time prohibit Chinese merchants from copying Japanese products.

Western officials and firms, led by the British, strongly opposed the plan. Due to their protests, the Qing government postponed putting the Provisional Code of Trademark Registration into force. As noted in the Patent and Trade Mark Review (1904), "local merchants being dissatisfied with the measure, the British and German Ministers protested and the enforcement of the regulations was indefinitely postponed." In the meantime, British diplomats in China and Japan continued to discover counterfeits of Western products manufactured in Japan and exported to China via Chinese merchants. In response to the British complaints, Japanese diplomats argued that Chinese merchants initiated the counterfeit trade without Japanese firms being aware of counterfeiting, and took little actions to address the situation.

The British government then attempted to sign a mutual treaty with the Japanese government, which would enable British consuls and consular courts in China and Korea to punish any Japanese firms that infringed on the intellectual property of British businesses. However, disagreements between the two governments on issues including the protection of British unregistered trademarks that had been in use in Chinese markets before 1894 ended the negotiations.

After the Xinhai Revolution in 1911, the new government decided to introduce its own rules and regulations. The Draft of Rules and Regulations of Trademark Registration by the new government in April 1914, however, failed again to satisfy foreign diplomats. The

[7] See Article VII of the 1902 Treaty between the United Kingdom and China and Article IX of the 1903 Treaty between the United States and China.

British government was particularly disappointed to find no provisions for protecting old trademarks of British firms that had been used in China since 1842 as the draft did not adopt the first-to-use principle as requested by the British government. The objections were shared by the U.S., French and Russian governments. Even the Japanese government was unsatisfied with the draft. Negotiations for revising the draft were, however, postponed due to the outbreak of the First World War.

The British's continuing frustrations and concerns can be seen in the *North China Herald* from April 22, 1922, which highlighted an earlier article by Lord Northcliffe appearing in the *Daily Mail* warning the potential military threat Japan posed to China and comparing Japan's lack of adherence to treaties to the willingness of many of its traders to infringe others' trademarks. The third attempt to establish the trademark protection system in China with cooperation between British and Japanese governments ended again in failure.

2.3 China's First Trademark Law of 1923

While the British and Japanese governments were negotiating over the draft of the Chinese trademark regulations, neither government anticipated the Chinese government to implement a system for trademark protection on its own. However, after decades of failed negotiations, China saw the only way to progress with the trademark issue (and ultimately abolish ET) in confronting the conflicting parties with a fait accompli. The Chinese Congress passed the law and put it into force on May 9, 1923, and only then informed the foreign diplomats. Chinese opted to implement a compromise between the first-to-file (favored by the Japanese) and the first-to use principle (favored by the British), in which the first-to-file principle would be adopted (after a certain notice period to the public) unless two firms applied for the same trademark, in which case the first-to-use principle would apply.

At first, the foreign governments and chambers of commerce did not want to accept the law because of skepticism over the law's effectiveness and concerns of losing extraterritorial rights. Even in March 1924, a telegraph was published on the front page of the *North China Herald* arguing that the trademark law threatened the interests of British trademark owners by "placing the responsibility for trademark adjudication in the hands of inexperienced Chinese courts." However, the diplomats and businesses were soon overtaken by reality, as some groups such as German businesses who had previously lost ET status started to register their trademarks, fearing that their counterfeiters would register the trademarks first and they

would lose the legal rights to protect their own trademarks. It became evident then the implementation of the law had become irreversible. Between 1923 and 1926, 13,647 trademarks were registered with the Chinese trademark bureau (see Table 3 in Motono, 2011). British firms accounted for the largest share of trademarks (32%) followed by Japan (20%), China (16%), Germany (15%), and the United States (12%).

The impact of the trademark law can be seen in the advertisements of brand manufacturers. Before the trademark law, brand producers often included warnings against imitations in their newspaper advertisements. We collected all advertisements printed in the *North China Herald* and classified advertisements against imitation if they included the word "imitation" in the advertisement.[8] For example, the company "Lea & Perrins" warned their consumers: "To distinguish the original and genuine Worcestershire Sauce from the many imitations, see that the signature of LEA & PERRINS appears in *White* across the *Red* label on every bottle" – next to a picture of their product.[9]

Figure 2 shows that the share of advertisements that include a warning against trademark infringements in all advertisements declined sharply after 1923, from 6% before 1923 to virtually zero by 1925. This suggests that firms saw less need after 1923 to warn their consumers about counterfeits, presumably because the trademark law was effective in deterring counterfeiting.

The Nationalist government that came into power in 1927 kept the 1923 trademark law, but reduced the effective protection of foreign businesses against Chinese counterfeiters. By 1934, 7,932 Chinese companies registered their trademarks in Shanghai, accounting for 86% of the registered trademarks in the country (Motono, 2013).

3 Framework

To guide our empirical analysis, we provide a simple, intuitive framework in this section that examines the effects of trademark protection. We interpret trademark protection as a regime allowing a differentiated goods (brand) producer to have a monopoly over her brand. In contrast, without trademark protection, the brand producer has to compete with a counterfeiter who sells a product that consumers cannot distinguish from the brand product and

[8] We also checked for several synonyms of the word imitation, but they were not used in advertisements. We spot checked a number of advertisements to make sure these advertisements did in fact warn against imitations.

[9] In an advertisement published in the *North China Herald* on July 31, 1920.

incurs a lower production cost. We first consider a case when trademarks are protected and then compare it to an alternative scenario in which a counterfeiting firm may enter the market. Through the comparison, we assess the effects of trademark protection on firm outputs, prices and consumer surplus and derive testable hypotheses.[10]

3.1 Trademark Protection: Monopolist Brand Producer

Consider a firm that produces a differentiated product, labelled as *brand producer*. Some intrinsic product attributes are observed by the brand producer, but not by consumers at the time of purchase. Nonetheless, the consumers value these product attributes (Grossman and Shapiro, 1988a; Shapiro, 1982, 1983). The brand producer uses a trademark to inform the consumer about the specific product characteristics, thereby overcoming the asymmetric information problem.

Demand for the differentiated product is linear: $p(q) = a - bq$. The brand producer chooses production quantity q_1 in order to maximize profits π,

$$\max_{q_1} \pi(q_1) = p(q_1)q_1 - c_1 q_1$$

where c_1 is the cost of producing one unit of the differentiated product. As this is a simple monopolist problem with linear demand, the brand producer chooses $q_1^M = \frac{a-c_1}{2b}$, which results in a price of $p_1^M = \frac{a+c_1}{2}$. Consumer surplus is given by $CS^M = \frac{(a-c_1)^2}{8b}$.

3.2 No Trademark Protection: Duopolistic Competition between Brand Producer and Counterfeiting Firm

Now assume that the trademark of the brand producer is not protected, and a counterfeiting firm may enter the product market. The counterfeiter produces a product that is less desirable to the consumers, but the consumers cannot distinguish between the counterfeit and the brand product at the time of purchase. The counterfeiter uses the same trademark as the brand producer to make sure the brand producer cannot use its trademark to signal the identity of the producer to the consumer. However, as consumers are aware of the presence of counterfeits in the market, the aggregate demand for the product shifts downward by ϕ with $0 < \phi < a$: $p^C(q) = a - \phi - bq$.

[10]The current analysis is conducted in partial equilibrium in a specific product market. For simplicity, we start with a case in which the counterfeiter production cost is independent of the ability of consumers to distinguish the product and consider duopoly/monopoly scenarios.

The counterfeiter has a lower production cost $c_2 \leq c_1$. Counterfeiter and brand producer compete under Cournot competition, i.e., the counterfeiter chooses its production quantity q_2 conditional on the production decision of the brand producer, q_2:

$$\max_{q_2} \pi(q_2|q_1) = p^C(q)q_2 - c_2 q_2$$

where $q = q_1 + q_2$ is the total production of the product. Analogously, the brand producer chooses its production quantity q_1:

$$\max_{q_1} \pi(q_1|q_2) = p^C(q)q_1 - c_1 q_1$$

In equilibrium, the brand producer produces $q_1^C = \frac{a-\phi-c_1+(c_2-c_1)}{3b}$ units of the product, while the counterfeiter produces $q_2^C = \frac{a-\phi-c_2+(c_1-c_2)}{3b}$ of the products. Total production is $q^C = \frac{2a-2\phi-c_1-c_2}{3b}$ and the equilibrium price is $p^C = \frac{a-\phi+c_1+c_2}{3}$. Finally, the consumer surplus is given by $CS^C = \frac{(a-\phi-c_1+\frac{1}{2}(c_1-c_2))^2}{\frac{9}{2}b}$.

3.3 Predictions: The Effects of the Trademark Law

When there is a trademark law, the entry of a counterfeiter is prevented. We assess the effect of a trademark law by comparing the equilibrium described in section 3.2 with the one described in section 3.1. This results in the following intuitive hypotheses:[11]

Lemma 1. *Compared to the case without trademark protection, having trademark protection leads to:*

(i) larger output of the brand producer;

(ii) smaller output of the counterfeiter;

(iii) higher consumer prices;

(iv) an ambiguous effect on overall production;

(v) an ambiguous effect on consumer surplus.

To understand the mechanisms underlying the predictions, notice that the equilibrium with trademark protection differs from the equilibrium without trademark protection in three

[11] Formal proofs are provided in appendix section C.

ways. First, aggregate demand for the differentiated product increases under trademark protection because consumers prefer a market without counterfeits. Second, average production cost increases under trademark protection because the brand producer has a larger production cost. Finally, with trademark protection the brand producer has a larger market power, as she acts as a monopolist instead of a duopolist.

The intuition for the first two parts of Lemma 1 is simple: With trademark protection, the counterfeiter has to exit, and the brand producer, despite setting a higher price under monopoly, captures part of the counterfeiter's market share and enjoys an increase in aggregate demand due to the removal of counterfeits from the market.

For prices, the above mechanisms have similar implications: Increased consumer demand (combined with market power), higher production cost, and larger monopolistic power all contribute to an increase in price. However, these mechanisms affect total production and consumer surplus in different directions. While a higher production cost and a larger monopolistic power reduce output, increased consumer demand increases output. The net effect on output depends on the relative strengths of the opposing forces, in particular, the difference in production cost between the brand producer and the counterfeiter and the dislike of consumers for the counterfeit product. Similarly, a higher production cost and more market power for the brand producer reduce consumer surplus, while increased consumer satisfaction with the brand product raises consumer surplus.

In the rest of the paper, we focus on testing predictions (i) and (ii) of Lemma 1, i.e., whether the trademark law increases the production of presumable brand producers and reduces the production of presumable counterfeiters.

4 Data

To quantify the economic impact of China's first trademark law, we digitize and construct a rich array of micro-level datasets, including a business-employee panel dataset covering the universe of firms operating in Shanghai's concession areas spanning across 1870-1940, product-level Chinese Customs trade statistics in 1920-1930, and a cross-country trademark database.

4.1 Business-Employee Data in Shanghai's Concession Era

Often labeled as the "Paris of the East," Shanghai had emerged by 1930 as one of the largest cities in the world and the commercial center of East Asia with over 3 million inhabitants, vibrant manufacturing and service sectors, and remarkable openness to trade, investment, and immigrants (Osterhammel, 1989). The decades before the 1930s marked one of the most transformative as well as turbulent periods in Shanghai's history when Shanghai grew from an unknown fishing village to one of the most prominent industrial and financial centers around the world (Brandt, Ma, and Rawski, 2014). Between 1865 and 1930, trade passing through the port of Shanghai increased fourteen-fold and accounted for more than half of China's foreign trade, which itself reached more than 2% of global trade flows, a level not regained until the 1990s (Lardy, 1994). By the 1930s, Shanghai also accounted for 67% of China's inward FDI in manufacturing, while China's total inbound FDI stock amounted to U.S. $2.6 billion and 8.4% of the world's total FDI–more than nearly any other underdeveloped region (Hou, 1965). Foreign businesses dominated the early stages of China's modern industrialization, but Chinese entrepreneurs eventually grew to produce 73% of China's factory output by 1933 (Rawski, 1989). During the rapid industrial growth, the population grew from 77,000 to 3.7 million, making Shanghai the world's 7th largest city (Ma, 2008). Shanghai consisted of three areas: the International Settlement (or Public Concession), the French Concession, as well as the Chinese part of the city. The two concession areas were governed by city councils independent of the Chinese government, and most foreign businesses were established there.

We digitized and assembled an annual business-employee-level panel dataset covering the universe of firms operating in Shanghai's concession areas spanning across 1872-1941 based on the *North-China Hong List*, a business and residential directory featuring comprehensive information about firms operating in the leading port cities of northern China.[12] This annual series was published by the *North-China Daily News*, an English-language newspaper based on Shanghai that was widely regarded as the "most influential foreign newspaper of its time." The Hong Lists contain detailed information about all the firms operating in both the Public and the French concessions of Shanghai.[13] For each company listed in the

[12]The Hong Lists from 1873, 1885, 1898, and 1900 are missing and not included in the dataset.

[13]To cross check the coverage of the data, we compared the aggregate non-production employment of foreign firms, the majority of which consisted of foreign nationals, with the size of the foreign population (including

Hong List in a given year, we recorded, among other things, its name, address, products, and importer and exporter status. In addition, we digizited each firm's non-production employees including their names and positions within the firm. Figure 1 below shows an example page from the 1934 Hong list.

For each firm, we also identify its nationality using a number of different sources, including "The Universal Dictionary of Foreign Business in Modern China", a source that contains a detailed description of a firm's ownership, history, and products; the "History of Foreign Firms", published by the Shanghai Academy of Social Science in 1932; the "Shanghai Dollar Dictionary 1943", published by the Dollar Dictionary Co.; and several documents from the Japanese Chamber of Commerce. For the remaining unmatched businesses, we manually searched them in Google to identify sources with nationality information or assigned nationality based on the language of the firm name or the countries mentioned in the firm name (if unambiguous). Our measure of the nationality of a firm is time-invariant, as we do not have information about changes in the nationality of firms over time.

Based on the data from each edition of the Hong List, we then constructed a firm-level panel dataset as well as a firm-employee-level panel dataset covering nearly the entire 1872-1941 period by matching firms over time. The richness of information from the Hong Lists and the corresponding panel that we generated offer us a unique tool to analyze firm dynamics in one of the most volatile historical periods. The key firm-level variables in the dataset include:

- firm name: name of the firm in English, traditional Chinese, and Wade-Giles romanization;
- year and address: the year of operation and address;
- firm activity: text description of firm activity matched to 8 broad industry categories (denoted by j in the empirical analysis below; these include: agriculture/mining, construction, manufacturing, transportation, wholesale, retail, finance/insurance/real estate, other services);

both adults and children) in Shanghai reported in the Census. The comparison suggests that the employees in our data accounted for 26% to 41% of foreign population in Shanghai, which appears like a sensible ratio.

- products: description of specific products produced or sold by the firm, merged from the Appendix of the publications and subsequently matched to the NCL categories used in the trademark data as described below;

- nationality: the nationality of the firm assigned based on different separate sources as described above;

- list of non-production employees including names, titles and hierarchies; we are using a count of the firm's non-production employees as a measure of employment in the empirical analysis below

- export and import status: an indicator of whether the firm was listed as an exporter, importer or both;

4.2 Bilateral Product Trade Data

In addition to the firm panel data, we also compile bilateral product-level import data between China and the world for the period of 1920 to 1928.[14] The source for the import data is the annual series "Foreign Trade of China" published by the *Statistical Department of the Inspectorate General of Customs*. For each source country and year, the data report the quantity and value of Chinese imports in a given product.

We harmonize countries and products over time, resulting in data for 40 countries and 246 harmonized product categories and covering all years between 1920 and 1928. Harmonizing products over time is challenging, as the product classification system changed significantly in 1925. We harmonize products based on the description of product categories, and verify our matches using the publication in 1925 that also provided import data for the previous years 1924 and 1923 under the new classification. Overall, we are able to match 35% (in terms of import value in 1924) of trade data exactly over time, and an additional 56% closely (i.e., the product categories had deviations of less than 1% of trade value in either product classification in both 1923 and 1924).[15] In our analysis we focus on the products that we

[14] We are grateful to Robert Bickers, Hans van den Ven, and their team for sharing with us their digitized data covering a large share of the final trade dataset.

[15] As sometimes errors in the trade data from previous years are updated in later publications, it is not entirely clear whether mismatches are due to mistakes in product assignment, or correction of previous mistakes in the official trade data.

can exactly match over time, and show robustness checks that include the remaining product categories.

4.3 Trademark Data

To measure firms' heterogeneous dependence on trademark protection, we obtain historical trademark data from the IP Portal of the World Intellectual Property Organization (WIPO). While WIPO in principle holds trademark data for 141 countries, after dropping countries with no or very sparse trademarks in the late 19th and early 20th century, we end up with trademark data for eight countries: Britain, Germany, US, Japan, Australia, Canada, Denmark and Spain.[16] The data set lists the name of the trademark, the name of the trademark holder, the number of the trademark, the application date, and the product group(s) that the trademark is registered for (among other things that may vary by country). Product groups are defined according to the international *Nice classification (NCL)* scheme that was established by the Nice Agreement in 1957.[17]

For each country, we calculate the cumulative sum of all trademarks registered between 1872 and 1922, the year before the enactment of the trademark law.[18] We then aggregate the trademarks across the eight countries, yielding a total of 50,050 registered trademarks by 1922. For each NCL product category p, we then calculate its share in total trademarks, labelling this $trademarkintensity_p$.[19]

Table 1 displays the NCL categories with the highest trademark intensity, such as pharmaceuticals, cosmetics, food, chemical products, alcoholic beverages, paper and cardboard, and tobacco. Table 2 shows the NCL categories with the lowest trademark intensity, e.g., furniture, yarns and threads, dressmakers' articles, leather, musical instruments, firearms, and canvas.

To compute a firm-specific measure of trademark intensity, We match the product-level trademark intensity to products sold by each firm prior to 1923 and use the maximum trademark intensity across the firm's products: $trademarkintensity_i := \max(trademarkintensity_p)$

[16] We also dropped New Zealand, as its product classification scheme is inconsistent with the NCL classification.

[17] For details, see https://www.wipo.int/classifications/nice/en/ (accessed 1/20/2021).

[18] Before 1872, only a handful of trademarks were reported on Jan 1, 1801, and hence excluded in our data.

[19] Registration of trademarks for services was not possible in this time period. Nevertheless, some service trademarks appeared in the data. We drop these trademarks and use a measure of 0 trademarks for all services that appear in the Hong List data.

for each $p \in P_i$ where P_i denotes the set of products that the firm sold in the period 1920 to 1922, i.e., before the trademark law. The firm-specific trademark intensity enables us to explore cross-firm variations in demand for trademark protection and examine the heterogeneous effect of the trademark law at the firm level.

4.4 The Trends and Compositions of Shanghai Firms

In this subsection, we describe the time trends and distributions of the firms in Shanghai documented in our data, starting with the growth in the number and size of businesses. After the forced opening of the Shanghai port, the city witnessed a tremendous growth in the number of foreign businesses. Consistent with the aggregate accounts of that period, Figure 4 shows that the number of business grew rapidly starting in the 1920s and rose from 771 to 1,624 in 1920-1930 alone. The total employment recorded in our data also grew over time as shown in Figure 4, rising from about 5,000 in 1920 to 13,000 in 1930. Some particularly notable examples of foreign corporations include British American Tobacco (BAT), Standard Oil and Mistui Trading Company. As shown in Figure 5, BAT, formerly named British Cigarettes, consisted of about 25 main employees and a relatively simple organization structure as of 1906; two decades later, BAT's operations in Shanghai expanded to over 100 main employees and 9 departments (such as accounting, advertising, legal and traffic).

During this period, Shanghai's economy also experienced a significant industrial transformation, transitioning from an economy primarily dominated by wholesale and merchants to a more diverse economic landscape with a mix of manufacturing and services. As shown in Figure 6, the manufacturing sector grew from only 6.2% of the economy (measured in non-production employment) to 20% by 1930 as both foreign and Chinese businesses set up factories in Shanghai.

The nationality composition of the businesses also varied significantly over time. Across country origins, Great Britain initially accounted for 50.5% of the businesses in the data as Figure 7 shows, but the share fell significantly over time reaching 20% by 1930 while the shares of Japanese and Chinese companies grew from 2.1% to 10.4% and from 3.3% to over 20%, respectively, by 1930. Other important firm nationalities in Shanghai were the United States, France, Russia, and Germany, which accounted for 18.3%, 5.7%, 2.1% and 4.7% of the businesses, respectively, by 1930. When grouping industries based on their pre-1922 trademark intensity levels in Figure 8, we notice that British dominance was particularly

pronounced in industries with relatively high trademark dependence. Prior to 1922, British businesses claimed about 50% of the employment in industries with above 75th percentile trademark intensity; that share rose to an average of 60% after 1923.

5 Empirical Evidence

In this section, we aim to test predictions (i) and (ii) of Lemma 1, i.e., whether the trademark law led to an expansion of brand producers and a contraction of counterfeiters. We test these predictions in both of our data sets, namely, the firm-level dataset in Shanghai and the product-level import data for China. Given that trademark conflicts had centered on disputes between Western firms on the one hand and Japanese and Chinese businesses on the other, we distinguish the effect of the trademark law on Western firms (imports) (i.e., businesses and imports from all countries other than Japan or China) from the effect on Japanese and Chinese businesses. We also compare the effect of the 1923 trademark law to that of alternative attempts foreign powers made to protect their trademarks and investigate their relative effectiveness in fostering firm growth.

5.1 Trademark Protection and Firm Growth

To examine the effect of the trademark law on firm-level outcomes, we estimate the following baseline specification:

$$firmoutcome_{ict} = \beta_0 + \beta_1 * TrademarkInt_i * PostLaw_t + FE_i + FE_{ct} + FE_{jt} + \epsilon_{ict} \quad (1)$$

where $firmoutcome_{ict}$ is a vector of firm-level measures for a given firm i from country c at year t, including firm employment size, entry, exit, and organization decisions, $TrademarkInt_i$ is a firm-specific measure of trademark intensity based on the firm's product composition in 1920-1922 and each product's trademark intensity (calculated based on a group of countries outside China as discussed in Section 4), $PostLaw_t$ is a dummy that equals 1 if the year is equal to or after 1923, FE_i denotes firm fixed effect, FE_{ct} denotes country-year specific fixed effect, and FE_{jt} is broad industry-year specific fixed effect. We two-way cluster standard errors by product category and country-year.

In the analysis below, we start by assessing the responses of Western firms to the law and then move on to the effects on Japanese and Chinese businesses. In our baseline regressions, we center on the period of 1920-1926 to compare firm outcomes in a focused time

window and mitigate the effects of other historical shocks. Our main analysis is restricted to the sample of firms that exist in either of the years 1920-1922, i.e., we examine the intensive margin of growth. Further below, we examine the the extensive margin of growth, i.e., the effects on firm entry and exit. When comparing the effects of alternative institutional attempts, the analysis will then explore a longer time horizon that encompasses various institutional periods.

The Growth of Western Firms

As reported in Table 3, we find the employment of Western firms grew significantly after the trademark law in 1923, especially for Western firms with greater trademark intensities. Column (1) shows the specification without, and column (2) with broad industry times year fixed effects. Across Western firms, employment grew, on average, 5% after the enactment of the law. For firms selling the ten most trademark-intensive products listed in Table 1 such as pharmaceuticals, cosmetics, foodstuffs, beverages, and tobacco, the employment growth ranged from 8% to 20%. In contrast, firms selling the ten least trademark-intensive products listed in Table 2 such as toys, metals, furniture and leather saw only 1-3% in employment growth.

In order for our identification strategy to work, it is important to check whether trademark-intensive firms would have grown even in the absence of the trademark law, i.e., if there had been pre-trends prior to the enactment of the law. In Table 4 we report that trademark intensity is not significantly correlated with employment growth in either 1920-1922, 1921-1922, or 1920-1921. In Figure 9 we test this more formally by estimating an event study version of equation (1):

$$firmoutcome_{ict} = \beta_0 + \sum_{t=1920}^{1926} \beta_t * TrademarkInt_i + FE_i + FE_{ct} + FE_{jt} + \epsilon_{ict} \quad (2)$$

Figure 9 shows the estimation results. Reassuringly, there are no pre-trends: the estimated employment elasticities of trademark intensity before 1923 are not significantly different from zero, while the estimated elasticities after 1923 are positive, large in magnitude, and mostly significantly different from zero.

Next we examine whether the heterogeneous effect of the trademark law indeed reflects firms' varying dependence on trademark protection rather than other firm or product at-

tributes. While we are not aware of any other shock that happened in 1923, we want to be sure that we are measuring the effect of the trademark law on firms that we would expect to be most affected ex ante, i.e., the trademark intensive firms. To check this, we interact the post-law dummy with other firm or product specific characteristics. For example, firms in trademark intensive products may also be innovation intensive. For this reason we control for an interaction of the post-law dummy with a firm-specific measure of patent intensity in column (2). We calculate patent intensity for each product as the share of patents in each product category based on data on the stock of US patents from the historical USPTO database.[20] Similar to trademark intensity, we use the maximum patent intensity across products for each firm. Trademark and patent intensity are only weakly correlated, and we find that our employment effect is not explained by patent intensity.

In columns (3) and (4) we check whether trademark intensive industries are also large industries, because it could be that the trademark law was particularly relevant for large (or small) industries. To test this, we interact the post law dummy with the number of firms per NCL product category in column (2).[21] Similarly, in column (3) we use the total employment of firms offering a specific product as interaction term. Neither of these size measures explain away the employment effect of trademark intensity.

In column (5) we use an alternative approach to control for the size of different industries by dividing the US trademarks by the size of industries in the US from the 1921 US census of manufactures.[22] The results are qualitatively similar to the baseline results and show again that firms with a relatively higher trademark intensity experienced a greater employment growth after the trademark law.

In Table 6 we check whether specific countries, industries or firms that were particularly affected by the trademark law explain our results. For example, in column (2) we drop German firms. German firms lost extraterritoriality at the end of World War I, and some of

[20] See https://www.uspto.gov/learning-and-resources/electronic-data-products/historical-patent-data-files

[21] We use the number of unique firms that offer the product in at least one of the years between 1920 and 1922. In order to create a firm-specific measure, we again use the maximum size across all products a firm produces.

[22] We are grateful to Dave Donaldson, James Lee, and Rick Hornbeck for sharing the digitized census data with us. The US was the only country for which we were able to get employment data for very detailed industries that enabled us to match them to NCL product categories. Notice, however, that the US manufacturing census does not include the service sector. The normalized trademark intensity is therefore not defined for the service sector, which explains the reduced sample size in column (5).

their inventory was seized by the Allied Forces and then resold around the world, including in China. In column (2) we drop German firms, but our results remain unaffected.

Cigarettes were a product that was particularly affected by trademark infringements.[23] At the same time, the cigarette industry was heavily concentrated, with *British American Tobacco (BAT)* being one of the big players. Big business groups could in principle have been lobbying for the introduction of the trademark law, thereby violating the exogeneity assumption. While this seems unlikely given the historical context described in e.g., Motono (2011), we drop BAT in column (3) and the entire tobacco industry in column (4). The analysis shows that this does not affect our estimated effect of the trademark law.

The effect of the trademark law was, however, not uniform across the distribution of firms. As depicted in Figure 10, the associated employment growth was documented in large and medium-sized businesses but not present among small businesses. The above findings suggest that the 1923 trademark law spurred employment growth especially among larger Western firms. Now while most Western firms benefited from the law, how did the law affect Japanese firms given their records of trademark imitations and conflicts with Western firms? Further, how did Chinese firms, at a primitive stage of industrial development compared to their Western and Japanese counterparts, respond to the law? We turn to these questions next.

Japanese and Chinese Firms

In Table 7, we report the estimated effects of the trademark law on the employment of Japanese and Chinese businesses. The results show that once we control for industry-year fixed effects, trademark intensive Japanese firms experienced a significant contraction in their employment after 1923. The decrease in employment averaged 15% while the top-tertile firms by trademark intensity witnessed a 23% decline. The effect on Chinese businesses, in contrast, is negative but statistically insignificant.

The event study in Figures 11 and 12 echo the above findings. The estimated employment elasticity of trademark intensity, either noisily estimated or flat before 1923, decreased significantly during the post-law period for both Japanese and Chinese businesses. The decline is again displayed mainly among larger Japanese and Chinese businesses, as shown

[23]This is highlighted in Motono (2011), and also reflected in the the data on advertisements that we describe in section 2.3

in Figures 13 and 14. These results suggest that after years of Anglo-Japanese trademark conflicts, the enactment of China's first trademark law enabled Western firms to grow their trademark-intensive operations in China while disadvantaging Japanese and Chinese businesses.

Entry and Exit

In order to examine the extensive margin of growth next, we extend the sample from firms that exist in 1920-1922 to all firms that appear between 1920 and 1926. We fully balance the sample between 1920-1926 and define an entry dummy as 1 in and after the year a firm enters, and an exit dummy variable as 1 in and after the year a firm exits. This allows us to examine how the law affected the entry and exit rates of Western, Japanese and Chinese firms. In Table 8 we see that the trademark law reduced the entry of Western firms insignificantly, but it has a negative and significant effect on the exit of Western firms. This suggests that the trademark law protected incumbent firms, while not leading to additional entry. Interestingly, Chinese firms experienced similar dynamics: Entry fell insignificantly, but exit probabilities dropped significantly.

Japanese companies experienced the reverse: Their entry probability fell by much more than those of Western firms, while their exit probability even increased slightly. Summing the coefficients across the entry and exit analysis reveals that the trademark law on net increased the existence of Western and Chinese firms, and reduced that of Japanese firms.

The trademark law could also affect firms' product composition, especially the likelihood of adding and dropping trademark-intensive products. To examine this hypothesis, in Table 9, we return to the sample of firms that exist in 1920-1922 and create a dummy variable if they offer a new or drop an existing trademark-intensive product in a a given year.[24] Since the reported product categories in the Hong List change significantly in 1926, we show two versions of this analysis, one including and one excluding 1926. The results are consistent, however: We find that Western firms were significantly less likely to drop products with above-median trademark intensity after 1923.

Firm Organization

In addition to firm growth, case studies of specific companies (Cochran, 2000) suggest

[24]Trademark intensive products are defined as the products with above median trademark intensity.

that foreign businesses in Shanghai also adapted their organization to the changes in the economic and institutional context of Shanghai. Confronted with extensive obstacles such as language barriers and inland market access restrictions, many Western businesses, such as Standard Oil and BAT, had to rely heavily on Chinese nationals as sales agents or commercial managers or worked directly with Chinese merchants to explore their social networks. At the same time, however, Western businesses could not establish a strong trust-based relationship with their domestic employees or merchants in the absence of formal legal institutions such as the trademark law. How did the establishment of the trademark law alter the organization of Western corporations, specifically their integration with domestic employees?

To answer this question, we explore the employee-level information and construct several additional variables to capture a firm's organization and domestic integration. First, we compute the number of layers in a firm's management hierarchy exploring the indents in the employee directory as reported in the Hong List where lower-level employees were separated from their superiors by an indent. Second, we separately identify Chinese employees versus foreign employees based on the names of the employees given in the Hong List and calculate the average position of Chinese employees in a Western company's employment hierarchy. In this variable $CHNlayernum$, a lower value represents a higher level in the hierarchy.

Table 10 reports the estimation results. We find that the number of layers in Western businesses did not significantly expand after the trademark law, but the average position of Chinese employees moved up in ranks after 1923. The result suggests that Western businesses became more inclined to promote Chinese employees after the enactment of the trademark law.

5.2 Trade Responses to the Law

In this subsection, we explore how Chinese imports responded to the establishment of the trademark law. Specifically, we estimate the following equation:

$$\ln(imports_{pct}) = \beta_0 + \beta_1 * TrademarkInt_p * PostLaw_t + FE_{pc} + FE_{ct} + \epsilon_{pct} \quad (3)$$

where $imports_{pct}$ are China's imports in product category p from country c in year t, $TrademarkInt_p$ is the trademark share of product p as defined in the previous section, $PostLaw_t$ is a dummy that equals 1 if the year is equal to or after 1923, FE_{pc} are product-country specific fixed

effect, and FE_{ct} are country-year specific fixed effects. As the different product categories can be of different size, we use the average import value between 1920-1922 of the product category in each country as weights in the regression. We cluster standard errors by product category p, in line with Bertrand, Duflo, and Mullainathan (2004). We run the regression on the sample of all countries except Japan, as we will study Japan separately further below. Also, we drop rice from the products, as rice imports were unusually low in 1919 and 1920 due to poor harvests leading to rice shortages in all of Southeast Asia (Kratoska, 1990).[25]

Table 11 presents the results. Column (1) shows that the imports of trademark-intensive products increased significantly after the establishment of the trademark law. The magnitude of the effect is sizeable: imports in the most trademark intensive products (trademark intensity = 0.067) increase by 1.13% compared to imports in the least trademark intensive products (trademark intensity = 0.005) after 1923. Column (2) shows that the result is very similar when using year fixed effects instead of country-year specific fixed effects.

Columns (1) and (2) of Table 11 explore the effect of the trademark law on the intensive margin of imports by using log of imports as the dependent variable, which by definition excludes observations with zero trade (70% of observations). In columns (3) to (5) we explore the inclusion of the extensive margin in a variety of ways. Column (3) uses log (imports + 1) as dependent variable, and column (4) uses the inverse hyperbolic sine transformation of imports. The effect of the trademark law remains positive and significant when including the extensive margin. Column (6) uses the simple import dummy as regressor, and confirms that the trademark law also led to the establishment of new trade relationships in trademark-intensive products.

To check whether imports of trademark-intensive products would have grown even in the absence of the trademark law, i.e., if there had been pre-trends, we estimate a full event study version of equation (3) by estimating:

$$\ln(imports_{pct}) = \beta_0 + \sum_{t=1920}^{1928} \beta_t * TrademarkInt_p + FE_{pc} + FE_{ct} + \epsilon_{pct} \qquad (4)$$

Figure 15 shows the estimation results. Again, there was no presence of pre-trends: the coefficients before 1923 are by an order of magnitude smaller and insignificantly different from

[25]The recovery of rice imports from the rice crisis appears like a pre-trend in our data, which would overestimate our effect.

zero, while coefficients after 1923 are consistently large, and mostly significantly different from zero. There seems to be a slight decline in the effect of the trademark law over time, however.

Next we consider the effect of the trademark law on Chinese imports from Japan. If a large share of China's imports from Japan were counterfeits, we should expect the trademark law to have a smaller effect on imports from Japan. In Table 12, we explore heterogeneous effects across regions, focusing on Japan versus all other countries in columns (1) and (2). Indeed, we do not find a significant effect of the trademark law on imports from Japan; if anything, the effect is slightly negative, both at the intensive and extensive margin. In columns (3) and (4) we split the main effect further into continents, keeping a separate estimate for Japan. With respect to imports, the trademark law had the largest effects on imports from North America, followed by Australia (though imprecisely estimated due to a smaller number of non-zero observations) and Europe. In contrast, the effect on imports from other Asian countries is insignificantly different from zero. We observe a similar pattern for the extensive margin, except there the effect for Europe is small and insignificant. The pattern across continents is in line with the historical evidence: Western countries, especially the United States and European countries, which had been most concerned about trademark infringements by Japanese manufacturers, experienced the greatest increase in imports.

5.3 Comparing Alternative Institutional Attempts

As discussed in Section 2, the 1923 trademark law was preceded by a series of alternative institutional models exploited by foreign powers to address trademark issues. These include extraterritoriality leading to the direct imports of foreign legal institutions in China, bilateral commercial treaties with specific trademark provisions, and a subsequent legal trademark code in 1904 that had never been put into force. Our long time horizon in the data enables us to compare the effect of the 1923 trademark law to the effects of these alternative approaches and attempts.

We construct three additional variables to represent each of these approaches and attempts. First, we construct a firm-year specific measure of extraterritorial rights based on the firm's nationality and the nation's extraterritorial status in a given year. Due to geopolitical reasons such as the start and end of World War I that were arguably orthogonal to Chinese economy, certain countries were added and deleted from the list of nations that enjoyed ex-

traterritorial status. These changes in extraterritorial power caused firm-specific changes in their legal institutional settings. In legal disputes, when the defendants' home countries had extraterritorial status, the home-country law of the defendants would apply and the cases would be tried at their consular courts. However, differences in countries' legal systems such as the filing principles of the trademark law and the lack of strong domestic enforcement could lead to unresolved disputes and jurisdiction evasion.

Second, we use a dummy variable to denote the commercial treaties China signed with Great Britain, United States, and Japan in 1902 and 1903, respectively. The bilateral commercial treaties, requiring China to establish its own legal trademark system among other demands, again exhibited conflicting interests with both Western nations such as Great Britain and Japan attempting to export their respective trademark laws.

Finally, we include a dummy variable to denote China's first attempt after the bilateral treaties to establish a domestic trademark code in 1904. The code, largely influenced by Japan's trademark system, was eventually not enforced due to protests from Western governments.

The estimation results that evaluate and compare the effects of all three alternative institutions with the 1923 trademark law are reported in Table 13 where each institutional measure is interacted with firm-specific trademark intensity.[26] The results in column (6) show that when taking into account all measures and controlling for country-year dummies, neither extraterritoriality nor bilateral treaty exerted significant, positive effects on firm employment. The unenforced 1904 trademark code, as anticipated, was also found to have no effects. Across all the alternatives, the 1923 trademark law was the only measure shown to have played a positive role in the growth of trademark-intensive firms. These findings suggest that earlier attempts involving direct imports of foreign institutions had been largely unsuccessful as means of trademark protection.

6 Conclusion

[TO BE ADDED]

[26]The appendix to the Hong List that lists which firms offer which type of product or service is only available during 1920-1930. In order to understand which products and services firms offer across the entire period of 1872-1936, we manually assign products to firms based on the textual description of the activity of the firm in the Hong List.

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A Figures



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For a full list of Agencies carried by the following Firms, see the Agents' Directory at the end of this Section.

A

司公蘇茂
Mow-law-kung-sze
A. A. Products Co.
Importers and Exporters
10 Kiukiang-rd Tel 14848
PO Box 1570
Hong, P. H., dir.
Law, Jackson, ,,
Butt, J. P., mgr.
Sole Distributors throughout China for—
Walter G. Critchlow, Inventor and Manufacturer of Internal Combustion Engine Humidifier and Gas Saving Apparatus, Wheaton, Illinois

ABC Bakery
Bakers and Confectioners
1076-7 North Szechuen-rd
Tel 46775
Hanahara, T.

行潔浩麗愛
A-li-chin-chi-hong
ABC Clean'g Contractor
House and Window Cleaning, Carpet Cleaning, Disinfecting, Fumigating, Renovating, Waxing, and Polishing of Floors, Painting and Whitewashing
Ezra-rd TA Cleaningco
Power, T. Y., B.S., M.S., gen. mgr.
Sung, C. N., M.A., sec.
Powell, Miss A., typist
Yang, G. Y., B.A., clerk
Tsong, C., acct.
Nyi, S. M., book-keeper
Liu, L. Y., compr.
Ozorio, T. J., insp.

館宇印業商
Sang-yih-in-sz-fang
ABC Press
Printers
45 Kiukiang-rd
Tel 93028, 93968
TA Abcepress
Hanggi, Ed., mng. dir.
Hanggi, A.
Hanggi, Miss M.
Ossipoff, M.
Ennock, A.
Burak, S. A.
Guzman, Mrs C.
Niedernhoefer, K. A.
Moh Kee Kong

號金五安福
Fook-on-wu-ching-hou
A Sing, Ld.
Stevedores and Shipchandlers, and General Provision Merchants
1111 Broadway
Tel 41711 TA Asing
Sing, C. W. A., mgr.

記祥 *Zang-kee*
Abdoolally, Ebrahim & Co.
Merchants and Commission Agents
671 Szechuen-rd
Tel 11829 TA Abdoolally
PO Box 241
Ebrahim, D. E. (ab.)
Ebrahim, S. C.
Ebrahim, T. C. (ab.)

市部阿
Ah-bu-su
Abeichi Yoko, Ld.
Importers and Exporters of Cotton Piece Goods
223 Szechuen-rd
Tel 12095, 12357, 13296
PO Box 645
Koga, T., dir.
Noda, T., mgr.

德培安
Abend, Hallett
Representative of "The New York Times"
901 Embankment Bldg,
N. Soochow-rd
Tel 43043 TA Abend

豐益 *Yik-foong*
Abraham, D. E. J.
Merchant
83 Peking-rd
Tel 10269 TA Pigeon
Abraham, D. E. J.
Abraham, R. D.
Abraham, E.
Cohen, M. M.

時凱 *Ka-sze*
Abraham, Katz & Co.
Manufacturers' Representatives and Commission Agents
57 Peking-rd Tel 13361
TA Abkatz PO Box 207
Katz, Martin

司公告廣美克愛
Acme-kwang-koa-kung-sze
Acme Advertising Agency
Advertising Agents
20 Museum-rd (Room 320)
Tel 17518
Crawshaw, V. B., gen. mgr.

碼電美愛
Ae-mei-dee-ma
Acme Code Co.
Cable Codes, Condensers, Bank Publications, and Special Code Compilers
25 Central-rd Tel 10083
TA Busequicer PO Box 1
Business Equipment Corporation, agents

司公限有廠鐵造利商英
Ying-shang-ta-li-tieh-chang-yu-hsien-kung-sze
Acme Foundry, Ld.
Town Off.: 22 Museum-rd
Tel 15404-6
Factory: 120 Robison-rd
Tel 22746
Directors—
Thomas, J. A. T., chrmn.
Bailey, Robert
Bassett, A.
Cousins, L. G.
Dickson, A. L.
Harber, C. E.
Stranack, M. W.
Secretariat—
Newson, C. C., F.C.I.S., sec.
McKelvie, K., asst. sec.
Staff—
Mitin, K.
Guleff, V.

司公易貿美克愛
Acme Trading Co., Ld.
Selling Agency
570 Szechuen-rd Tel 11834
Lynch, Geo., mgr.
Moshevich, L. D., asst. mgr.

Adaline
Dressmaker and Milliner
Indanthren House,
1255 Bubbling Well-rd
Tel 30659
Rayden, Mrs. Ada., propr.

和龍 *Loong-ho*
Adams & Co., W. A.
Importers and Insurance Agents
70 Szechuen-rd
Tel 18210
TA Happy PO Box 1716
Adams, W. A.
Breen, C. J.
Cheng, T. L.
Sole Agents for—
Axton Fisher Tobacco Co.: "Spud" Mentholated Cigarettes
Agents for—
Great American Insurance Co. (Fire)
Home Insurance Co.(Marine)
General Accident Fire & Life Assurance Corp.(Casualty)

Adina Apartments
25 Rue Adina (Passage 40 Rte Kaufmann)
Agents—
Crédit Foncier d'Extreme-Orient, Chartered Bank Bldg, 18 The Bund (Tel 16366)

吉森謀 *AEG*
AEG China Electric Co.
Electrical Manufacturers and Contractors
267 Kiangse-rd
Tel 17472 TA Aechinaco
Branch at Tientsin
Halas, St., tech. mgr.
Woldt, Dr. H., com'l. mgr.

Figure 1: Example of Hong List Page

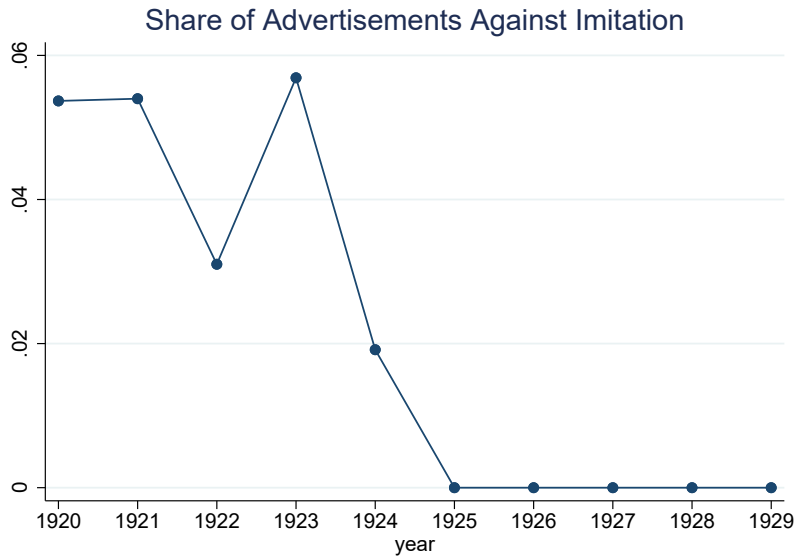


Figure 2: Share of Advertisements against Trademark Infringements in North China Herald

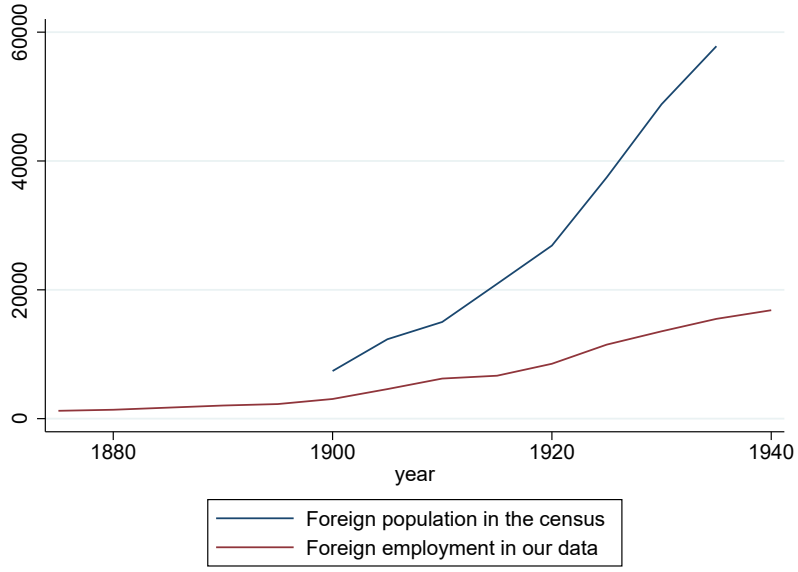
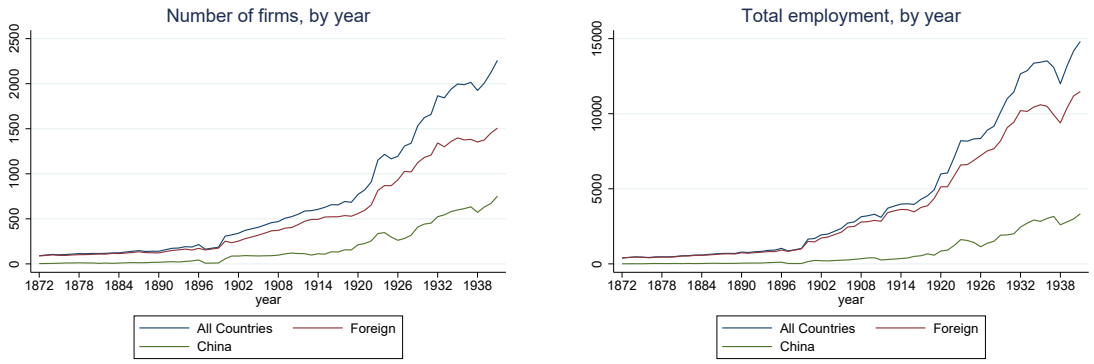


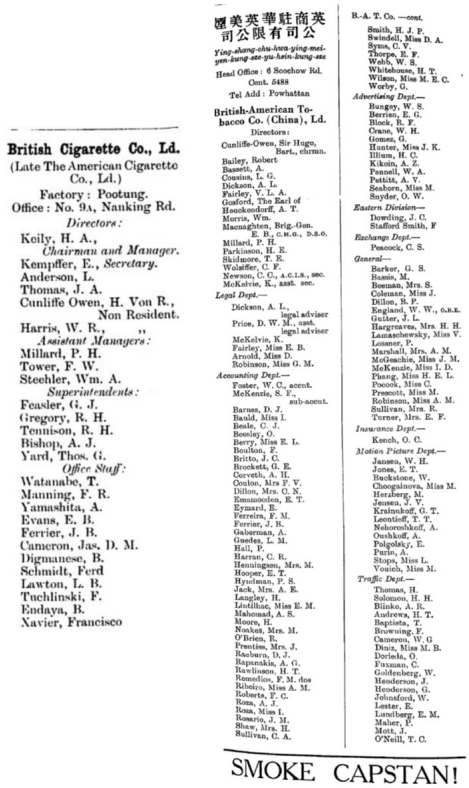
Figure 3: Data Validation



(a) Number of firms

(b) Total employment

Figure 4: Time Trends of Firms and Employment in Shanghai Concessions

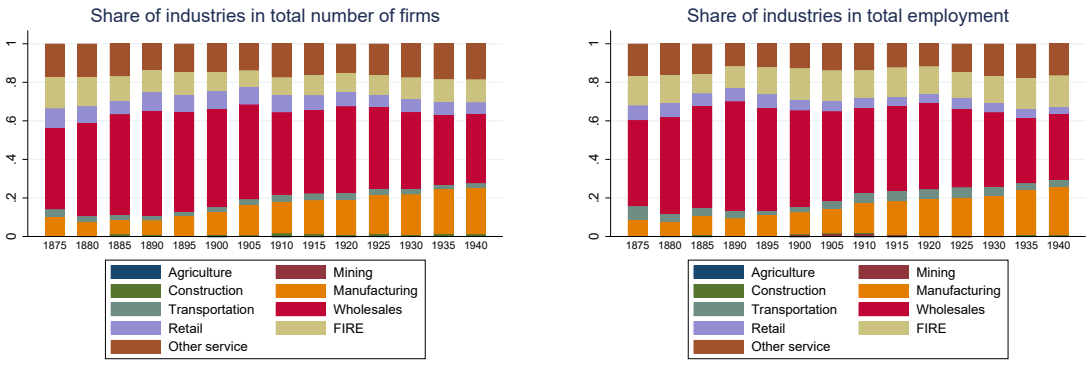


British Cigarette Co., Ld.
(Late The American Cigarette Co., Ld.)
Factory: Pootung.
Office: No. 9A, Nanking Rd.
Directors:
Keily, H. A.,
Chairman and Manager.
Kempffer, E., *Secretary.*
Anderson, L.
Thomas, J. A.
Cunliffe Owen, H. Von R., Non Resident.
Harris, W. R., ,,
Assistant Managers:
Millard, P. H.
Tower, F. W.
Steehler, Wm. A.
Superintendents:
Feasler, G. J.
Gregory, R. H.
Tennison, R. H.
Bishop, A. J.
Yard, Thos. G.
Office Staff:
Watanabe, T.
Manning, F. R.
Yamashita, A.
Evans, E. B.
Ferrier, J. B.
Cameron, Jas. D. M.
Digmanese, B.
Schmidt, Ferd
Lawton, L. B.
Tuchlinski, F.
Endaya, B.
Xavier, Francisco

SMOKE CAPSTAN!

Left: BAT-Shanghai in 1906; Right: BAT-Shanghai in 1926

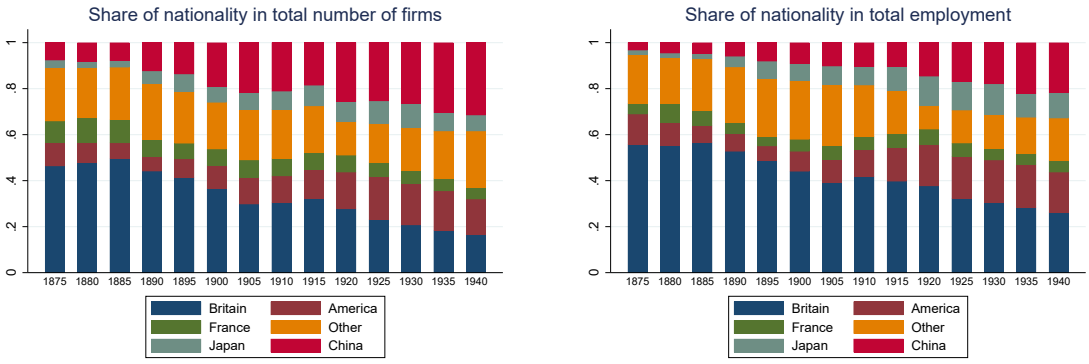
Figure 5: Employment of British American Tobacco in 1906 versus 1926



(a) Share of firm numbers

(b) Share of total employment

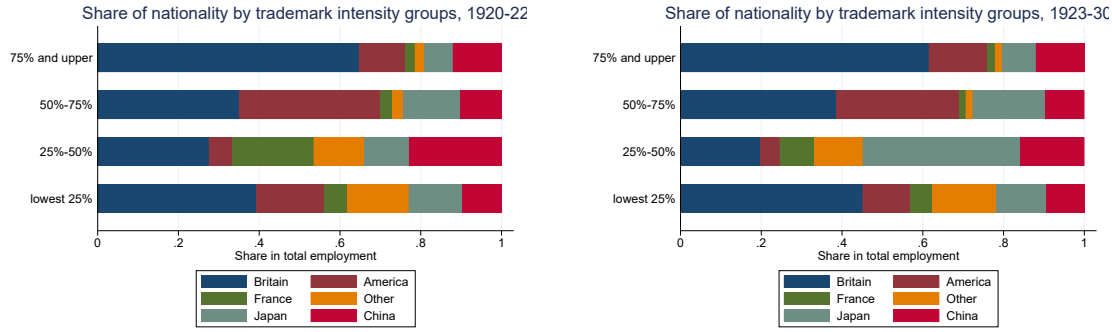
Figure 6: Industry Composition of Businesses in Shanghai's Concessions



(a) Share of firm numbers

(b) Share of total employment

Figure 7: Nationality Composition of Businesses in Shanghai's Concessions



(a) Share of total employment, 1920-1922

(b) Share of total employment, 1923-1930

Figure 8: Nationality Composition of Shanghai Concession Businesses by Trademark Intensity

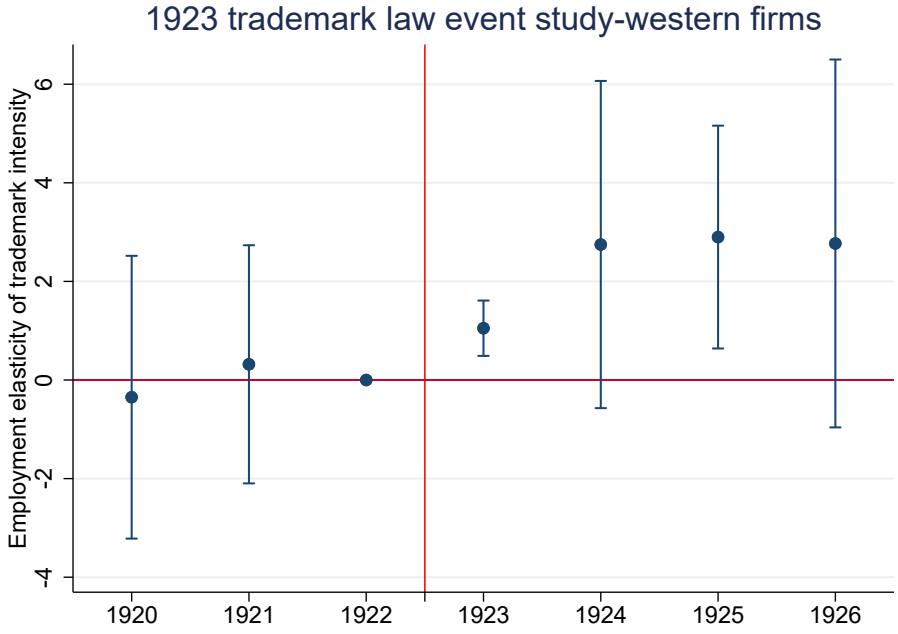


Figure 9: The Effect of Trademark Law on Western Firm Employment: Event Study

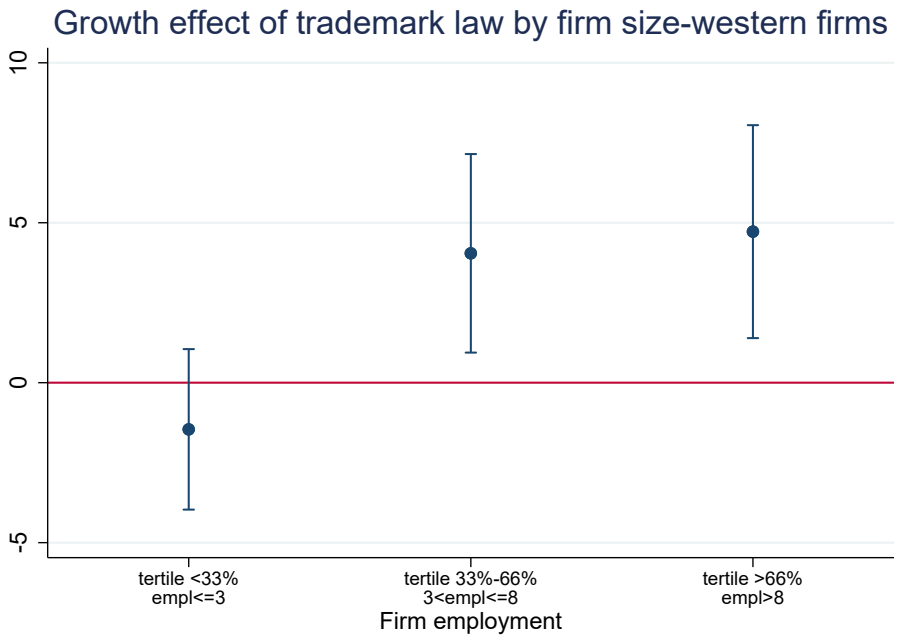


Figure 10: The Heterogeneous Effect of the Trademark Law across Western Firms

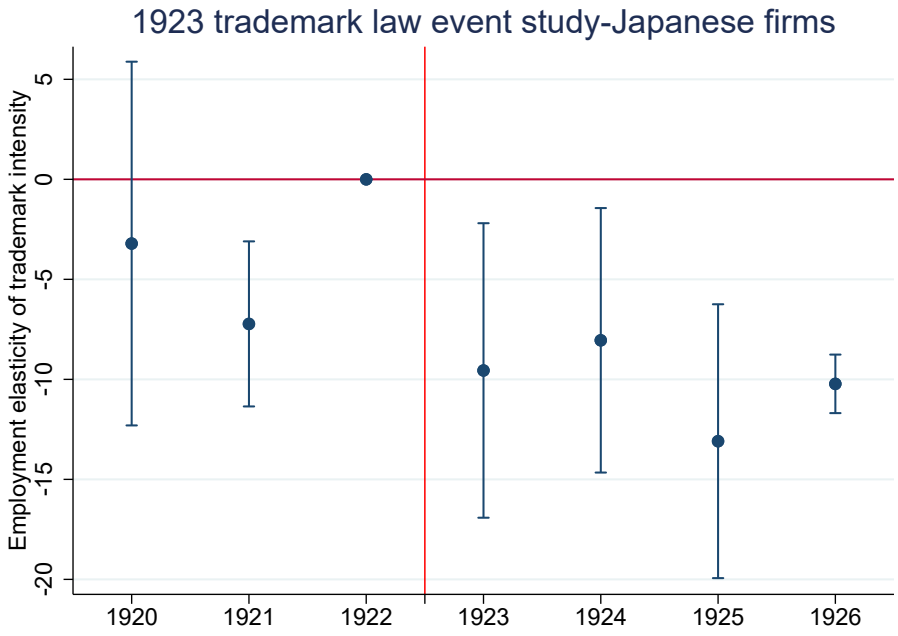


Figure 11: The Effect of the Trademark Law on Japanese Firm Employment: Event Study

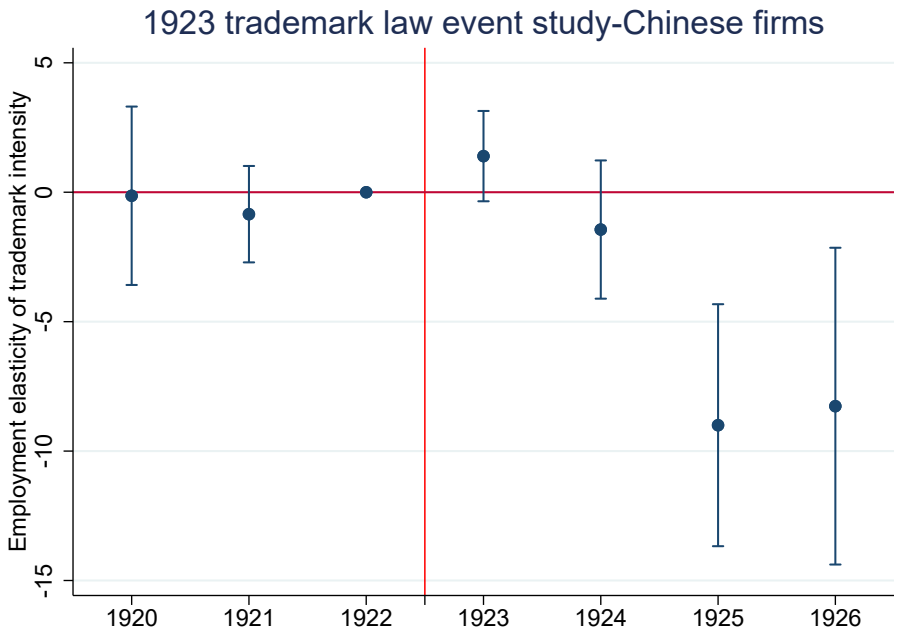


Figure 12: The Effect of the Trademark Law on Chinese Firm Employment: Event Study

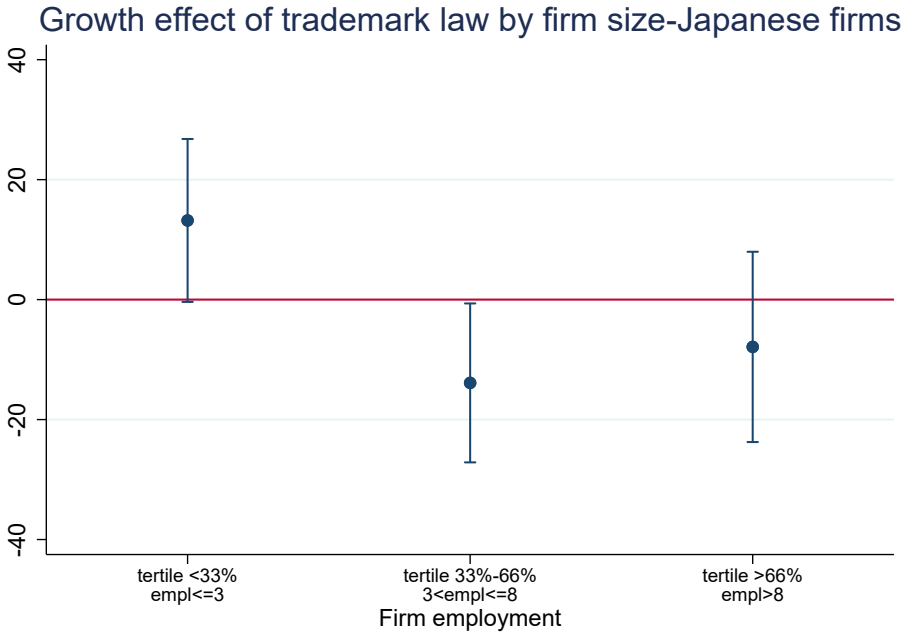


Figure 13: The Heterogeneous Effect of the Trademark Law across Japanese Firms

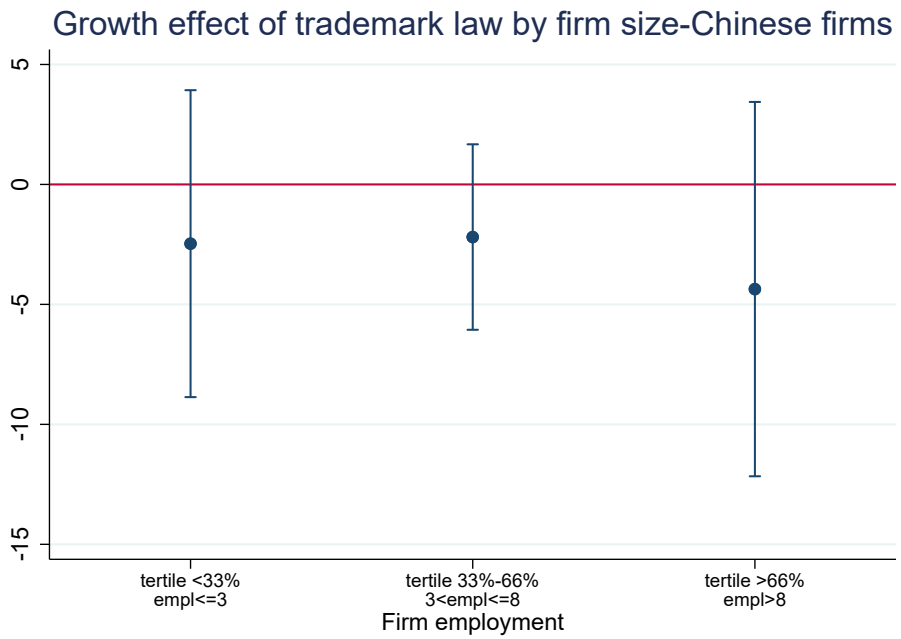


Figure 14: The Heterogeneous Effect of the Trademark Law across Chinese Firms

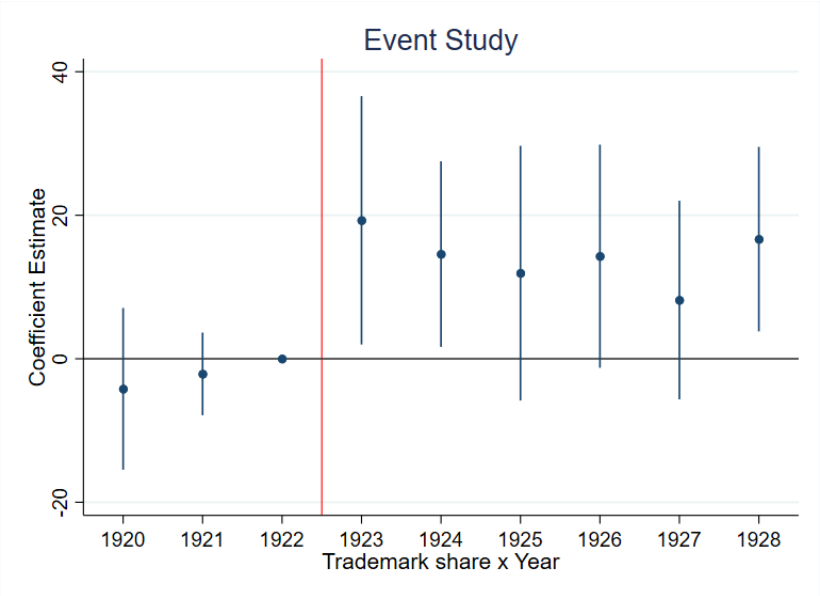


Figure 15: The Effect of the Trademark Law on Chinese Imports: Event Study (excluding imports from Japan)

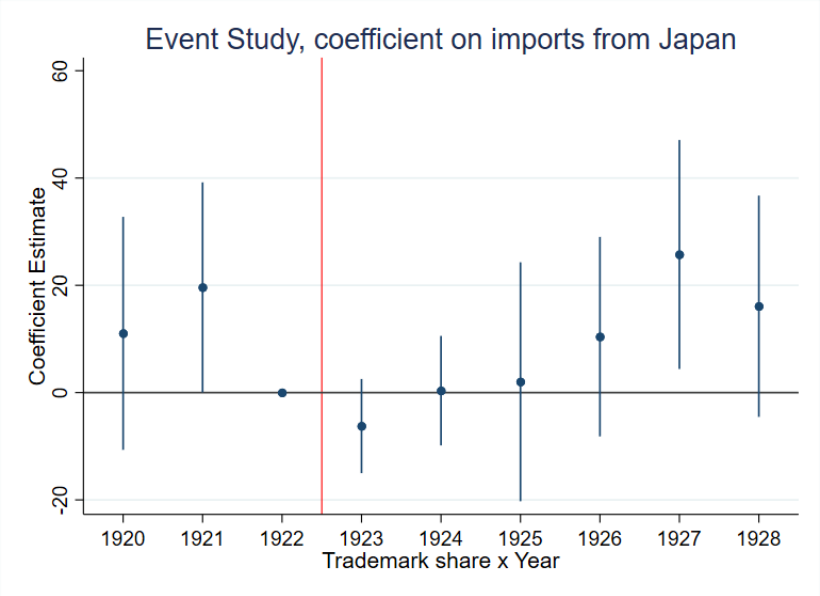


Figure 16: The Effect of the Trademark Law on Chinese Imports from Japan

Notes: Estimating equation (3) is appended by observations from Japan, and all coefficients are estimated separately for Japan and non-Japanese countries. The figure just plots the time varying coefficients for Japan, as the coefficients for non-Japanese countries are identical to Figure 15.

B Tables

Table 1: Top Trademark-intensive Products

NCL class	NCL	Trademark int.
Pharmaceuticals and other preparations for medical or veterinary purposes	5	0.0881
Non-medicated cosmetics and toiletry	3	0.0756
Foodstuffs of plant origin, except fruits and vegetables, prepared or preserved for consumption	30	0.0731
Foodstuffs of animal origin; prepared or preserved vegetables	29	0.0476
Alcoholic beverages, essences and extracts	33	0.0468
Chemical products for use in industry	1	0.0462
Paper, cardboard and office requisites	16	0.0454
Tobacco and articles used for smoking	34	0.0410
Non-alcoholic beverages; beer	32	0.0397
Machines and machine tools, motors and engines	7	0.0361

Notes: This table lists the 10 products with the highest trademark intensity. Trademark intensity is measured using each product's share in total pre-1923 trademarks recorded at the historical trademark database from the World Intellectual Property Organization (WIPO) IP Portal.

Table 2: Least Trademark-intensive Products

NCL class	NCL	Trademark int.
Toys, apparatus for playing games, sports equipment, amusement and novelty items	28	0.0160
Precious metals and metal goods, jewellery, clocks and watches, and component parts	14	0.0133
Medical, dental and veterinary apparatus	10	0.0132
Furniture and parts therefor	20	0.0125
Natural or synthetic yarns and threads	23	0.0120
Dressmakers' articles; small decorative items	26	0.0118
Leather, imitations of leather, and related goods	18	0.0097
Musical instruments, parts and accessories	15	0.0084
Canvas and other materials for making sails, rope, padding, cushioning and stuffing materials and raw fibrous textile materials	22	0.0079
Firearms and pyrotechnic products	13	0.0063

Notes: This table lists the 10 products with the lowest trademark intensity. Trademark intensity is measured using each product's share in total pre-1923 trademarks recorded at the historical trademark database from the World Intellectual Property Organization (WIPO) IP Portal.

Table 3: The Effect of the 1923 Trademark Law on Western Firm Employment

	(1)	(2)
VARIABLES	ln(empl)	ln(empl)
Post trademark law*trademark intensity	1.819**	2.330**
	(0.816)	(1.052)
Observations	2,013	1,915
R-squared	0.914	0.914
Firm FE	Yes	Yes
Ctry*Year FE	Yes	Yes
Ind*Year FE	No	Yes

Notes: This table reports the estimated effect of the 1923 trademark law on Western firms' employment. The sample includes Western firms located in Shanghai's concessions with employment and activity information between 1920-1926. The dependent variable is the natural log of a firm's employment in a given year. Post trademark law is a dummy denoting the period after the establishment of the trademark law in 1923. Trademark intensity is a firm-specific measure of trademark dependence based on each firm's pre-1923 product mix and product-level trademark intensity calculated using each product's share in total pre-1923 trademarks. Standard errors clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Pre-trend Checks

	(1)	(2)	(3)
VARIABLES	Δ ln(empl) 20-22	Δ ln(empl) 21-22	Δ ln(empl) 20-21
trademark intensity	0.809	0.272	0.698
	(1.525)	(1.265)	(0.978)
Observations	250	242	264
R-squared	0.118	0.097	0.066
Ctry-Ind FE	Yes	Yes	Yes

Notes: This table reports pre-trend check results for the period of 1920-1922. The sample includes Western firms located in Shanghai's concessions with employment and activity information between 1920-1926. The dependent variable in the three columns are the natural log of a firm's average employment in 1920-1922, 1921-1922, and 1920-1021, respectively. Trademark intensity is a firm-specific measure of trademark dependence based on each firm's pre-1923 product mix and product-level trademark intensity calculated using each product's share in total pre-1923 trademarks. Standard errors clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Controlling for Alternative Product Attributes

VARIABLES	(1) ln(empl)	(2) ln(empl)	(3) ln(empl)	(4) ln(empl)	(5) ln(empl)
Post trademark law*trademark intensity	2.330**	2.244**	2.329**	2.382**	
	(1.052)	(1.037)	(1.030)	(1.049)	
Post trademark law*patent intensity		0.349			
		(0.585)			
Post trademark law*ln(number of firms)			-0.000		
			(0.015)		
Post trademark law*ln(total employment)				0.005	
				(0.008)	
Post trademark law*normalized US trademark ratio					12.526*
					(6.650)
Observations	1,915	1,915	1,915	1,915	1,236
R-squared	0.914	0.914	0.914	0.914	0.918
Firm FE	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes	Yes
Ctry*Year FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the estimated effect of the 1923 trademark law on Western firms' employment when controlling for other product attributes and using an alternative measure of trademark intensity. The sample includes Western firms located in Shanghai's concessions with employment and activity information between 1920-1926. The dependent variable is the natural log of a firm's employment in a given year. Post trademark law is a dummy denoting the period after the establishment of the trademark law in 1923. Trademark intensity is a firm-specific measure of trademark dependence based on each firm's pre-1923 product mix and product-level trademark intensity calculated using each product's share in total pre-1923 trademarks. Patent intensity is a similar firm-specific measure based on each firm's pre-1923 product mix and product-level patent intensity calculated using each product's share in total pre-1923 patents. Number of firms and total employment are the number of firms and the total number of employees, respectively, in a product category. The normalized U.S. trademark ratio is computed using the ratio of U.S. pre-1923 trademarks in a given industry relative to the industry's level of employment. Standard errors clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Excluding Potential Interest Groups

VARIABLES	(1) ln(empl)	(2) ln(empl)	(3) ln(empl)	(4) ln(empl)
Post trademark law*trademark intensity	2.330**	2.364**	2.330**	2.489**
	(1.052)	(1.055)	(1.060)	(1.118)
Observations	1,915	1,901	1,908	1,845
R-squared	0.914	0.914	0.911	0.912
Firm FE	Yes	Yes	Yes	Yes
Ind*Year & Ctry*Year	Yes	Yes	Yes	Yes
Excluding	None	German	BAT	Tobacco

Notes: This table reports the estimated effect of the 1923 trademark law on Western firms' employment when excluding certain potential interest groups. The sample includes Western firms located in Shanghai's concessions with employment and activity information between 1920-1926. The dependent variable is the natural log of a firm's employment in a given year. Post trademark law is a dummy denoting the period after the establishment of the trademark law in 1923. Trademark intensity is a firm-specific measure of trademark dependence based on each firm's pre-1923 product mix and product-level trademark intensity calculated using each product's share in total pre-1923 trademarks. Column (1) includes the baseline sample and columns (2)-(4) exclude German firms, British American Tobacco, and all firms that sell or produce tobacco products, respectively. Standard errors clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: The Effect of the Trademark Law on Chinese and Japanese firms

VARIABLES	(1) ln(empl)	(2) ln(empl)
Western*post trademark law*trademark intensity	1.819**	2.330**
	(0.812)	(1.061)
China*post trademark law*trademark intensity	-2.014	-3.286
	(1.613)	(2.406)
Japan*post trademark law*trademark intensity	0.043	-6.849***
	(2.724)	(1.840)
Observations	3,136	3,007
R-squared	0.910	0.915
Firm FE	Yes	Yes
Ctry*Year FE	Yes	Yes
Ind*Year FE	No	Yes

Notes: This table compares the effects of the trademark law on the employment of Western, Japanese and Chinese firms. The sample includes Western, Japanese and Chinese firms located in Shanghai's concessions with employment and activity information between 1920-1926. The dependent variable is the natural log of a firm's employment in a given year between 1920-1926. Post trademark law is a dummy denoting the period after the establishment of the trademark law in 1923. Trademark intensity is a firm-specific measure of trademark dependence based on each firm's pre-1923 product mix and product-level trademark intensity calculated using each product's share in total pre-1923 trademarks. Standard errors clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Entry and Exit Analysis

VARIABLES	(1) entry	(2) exit	(3) entry	(4) exit	(5) entry	(6) exit
Post trademark law*trademark intensity	-0.332	-0.813**	-0.134	-1.504*	-1.594	0.035
	(0.619)	(0.335)	(0.779)	(0.666)	(0.953)	(0.776)
Observations	4,606	4,606	2,288	2,288	703	703
R-squared	0.668	0.583	0.653	0.555	0.691	0.588
Sample	Western	Western	China	China	Japan	Japan
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year	Yes	Yes	Yes	Yes	Yes	Yes
Ctry*Year	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the estimated effects of the trademark law on the entry and exit decisions of Western, Japanese and Chinese firms. The sample includes Western, Japanese and Chinese firms located in Shanghai's concessions with employment and activity information appearing for at least one year between 1920-1926. The dependent variables are dummy variables denoting entry and exit. Post trademark law is a dummy denoting the period after the establishment of the trademark law in 1923. Trademark intensity is a firm-specific measure of trademark dependence based on each firm's pre-1923 product mix and product-level trademark intensity calculated using each product's share in total pre-1923 trademarks. Standard errors clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Entry and Exit in Trademark Intensive Products

VARIABLES	(1) product entry	(2) product entry	(3) product exit	(4) product exit
Post trademark law*trademark intensity	-1.229	-1.156	-0.734**	-0.664***
	(0.737)	(0.734)	(0.313)	(0.237)
Observations	1,584	1,354	1,584	1,354
R-squared	0.428	0.404	0.410	0.454
Firm FE	Yes	Yes	Yes	Yes
Ind*Year & Ctry*Year	Yes	Yes	Yes	Yes
End year	1926	1925	1926	1925

Notes: This table reports the estimated effects of the trademark law on the entry and exit decisions of Western firms in trademark-intensive product categories. The sample includes Western firms located in Shanghai's concessions with employment and activity information between 1920-1926. The dependent variables are dummy variables denoting entry and exit. Post trademark law is a dummy denoting the period after the establishment of the trademark law in 1923. Trademark intensity is a firm-specific measure of trademark dependence based on each firm's pre-1923 product mix and product-level trademark intensity calculated using each product's share in total pre-1923 trademarks. Standard errors clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Firm Organization

VARIABLES	(1) Layer num	(2) CHN layer num
Post trademark law*trademark intensity	1.044	-1.760*
	(1.267)	(0.889)
Observations	1,847	426
R-squared	0.663	0.695
Firm FE	Yes	Yes
Ind*Year	Yes	Yes
Ctry*Year	Yes	Yes

Notes: This table reports the estimated effects of the trademark law on the organization of Western firms. The sample includes Western firms located in Shanghai's concessions with employment and activity information between 1920-1926. The dependent variables are the number of layers in a firm's management hierarchy and Chinese employees' average rank/layer in the management hierarchy, respectively. Trademark law is a dummy denoting the trademark law established in 1923. Trademark intensity is a firm-specific measure of trademark dependence based on each firm's pre-1923 product mix and product-level trademark intensity calculated using each product's share in total pre-1923 trademarks. Standard errors clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 11: Trademark Law and Import Growth

VARIABLES	(1) ln(imports)	(2) ln(imports)	(3) ln(imports+1)	(4) $\sinh^{-1}$(imports)	(5) Import dummy
Trademark intensity * (Post trademark law)	16.263**	17.862**	22.591**	23.029**	0.637**
	(7.420)	(8.116)	(9.197)	(9.340)	(0.290)
Observations	10,081	10,099	13,932	13,932	13,932
R-squared	0.901	0.884	0.855	0.850	0.580
Year FEs		yes			
Country-year FEs	yes	no	yes	yes	yes
Country-prod FEs	yes	yes	yes	yes	yes

Notes: This table reports the estimated effects of the trademark law on China's imports. The sample includes products that can be matched exactly across different product classification schemes over time and excludes rice. The dependent variables are the natural log of the import value, the natural log of the import value plus 1, the inverse sine of the import value, and a dummy for the existence of imports, respectively. Post trademark law is a dummy denoting the period after the establishment of the trademark law in 1923. Trademark intensity is a product-level trademark intensity calculated using each product's share in total pre-1923 trademarks. All regressions are weighted by the import value of the respective product in the country averaged over 1920-1922. Standard errors are clustered by product category. *** p<0.01, ** p<0.05, * p<0.1.

Table 12: Trademark Law and Import Growth — Heterogeneity across Regions

VARIABLES	(1) ln(imports)	(2) Import dummy	(3) ln(imports)	(4) Import dummy
Trademark intensity * (Post law) * All countries excl. Japan	16.263**	0.637**		
	(7.415)	(0.290)		
Trademark intensity * (Post law) * North America			54.363*	2.068*
			(32.554)	(1.247)
Trademark intensity * (Post law) * Australia			22.789	12.645
			(56.022)	(15.968)
Trademark intensity * (Post law) * Europe			22.232**	0.188
			(10.650)	(0.291)
Trademark intensity * (Post law) * Asia excl. Japan			3.621	0.323
			(3.340)	(0.204)
Trademark intensity * (Post law) * Latin America				3.005
				(3.763)
Trademark intensity * (Post law) * Japan	-2.433	-0.476	-2.433	-0.476
	(11.321)	(0.517)	(11.322)	(0.517)
Observations	11,071	14,958	11,071	14,958
R-squared	0.906	0.583	0.908	0.584
Country-year FEs	yes	yes	yes	yes
Country-prod FEs	yes	yes	yes	yes

Notes: This table reports the estimated effects of the trademark law on China's imports from different regions. The sample includes products that can be matched exactly across different product classification schemes over time and excludes rice. The dependent variables are the natural log of the import value and a dummy for the existence of imports, respectively. Post law is a dummy denoting the period after the establishment of the trademark law in 1923. Trademark intensity is a product-level trademark intensity calculated using each product's share in total pre-1923 trademarks. All regressions are weighted by the import value of the respective product in the country averaged over 1920-1922. There are too few non-zero imports observed for Latin America to estimate an effect on the intensive margin in column (3). Standard errors are clustered by product category. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 13: Comparing Alternative Institutions

VARIABLES	(1) ln(empl)	(2) ln(empl)	(3) ln(empl)	(4) ln(empl)	(5) ln(empl)	(6) ln(empl)
Part I: ET						
ET	0.109*	0.172	0.217	0.218	0.169	
	(0.063)	(0.134)	(0.144)	(0.144)	(0.153)	
ET*trademark intensity		-1.844	-2.928	-2.940	-1.647	-4.057
		(2.867)	(2.993)	(2.981)	(3.338)	(3.617)
Part II: Bilateral Treaties						
Treaties			-0.298**	-0.298**	-0.288*	
			(0.143)	(0.143)	(0.144)	
Treaties*trademark intensity			3.276	3.272	2.943	5.477
			(3.076)	(3.074)	(3.115)	(4.371)
Post 1904*trademark intensity			-7.263***	-6.512***	-6.328***	-8.545***
			(2.602)	(1.783)	(1.782)	(2.678)
Part III: 1904 Trademark Code						
1904 trademark code*trademark intensity				-0.796	-2.102	-1.607
				(2.399)	(2.327)	(2.659)
Part IV: 1923 Trademark Law						
Post law*trademark intensity					3.514**	3.893**
					(1.358)	(1.459)
Observations	19,995	19,995	19,995	19,995	19,995	19,816
R-squared	0.765	0.765	0.766	0.766	0.767	0.780
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ctry*Year FE	No	No	No	No	No	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table compares the effect of the trademark law with earlier institutions including extraterritoriality, bilateral treaties, and the 1904 trademark code. The sample includes Western firms located in Shanghai's concessions with employment and activity information appearing between 1872-1936. The dependent variable is the natural log of a firm's employment in a given year. ET is a firm specific dummy denoting a firm's status of extraterritoriality in a given year. Treaties is a country-year specific dummy denoting the treaties between China and Great Britain, the U.S. and Japan, respectively. 1904 trademark code is a dummy denoting a trademark code proposed in 1904 but not enforced. Trademark law is a dummy denoting the trademark law established in 1923. Trademark intensity is a firm-specific measure of trademark dependence based on each firm's product mix as described in the activity text of the Hong List of each year and product-level trademark intensity calculated using each product's share in total pre-1923 trademarks. Controls are: dummy variables indicating the 'equal treaties' that China entered with Germany and Austria in the 1920s, ln(GDP/capita), ln(population). Standard errors clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

C Proofs

Proof of Lemma 1. (i) Compare $q_1^M = \frac{a-c_1}{2b}$ to $q_1^C = \frac{a-\phi-c_1+(c_2-c_1)}{3b}$. Calculate $q_1^M - q_1^C = \frac{a+2\phi+c_1-2c_2}{6b}$. Since $0 < \phi < a$ and $a > c_1 > c_2$ we can see that $a + 2\phi + c_1 - 2c_2 > a + c_1 - 2c_2 = (a - c_2) + (c_1 - c_2) > 0$. It follows that $q_1^M - q_1^C > 0$, $q_1^M > q_1^C$.

(ii) With trademark protection, the counterfeiter produces zero units of the product, which is smaller than the positive production without trademark protection.

(iii) Compare $p_1^M = \frac{a+c_1}{2}$ to $p^C = \frac{a-\phi+c_1+c_2}{3}$. Since $\frac{a+c_1}{2} = \frac{3a+3c_1}{6} > \frac{2a+4c_1}{6} = \frac{a+2c_1}{3}$. The inequality follows because $c_1 < a$. Furthermore, $\frac{a+2c_1}{3} > \frac{a-\phi+2c_1}{3}$ because $\phi > 0$. Finally, $\frac{a-\phi+2c_1}{3} > \frac{a-\phi+c_1+c_2}{3}$ because $c_2 < c_1$. It follows that $p_1^M > p^C$.

(iv) Compare $q_1^M = \frac{a-c_1}{2b}$, which equals total production with trademark protection because there are no other producers, to $q^C = \frac{2a-2\phi-c_1-c_2}{3b}$. While $\frac{a-c_1}{2b} = \frac{3a-3c_1}{6b} = \frac{2a-2c_1+(a-c_1)}{6b} < \frac{2a-2c_1+2(a-c_1)}{6b} = \frac{4a-4c_1}{6b} = \frac{2a-2c_1}{3b}$ (where the inequality follows from $a - c_1 > 0$), the latter expression being total production in a duopoly; it is not clear whether this is then larger or smaller than q^C because the downward shift in demand reduces the production quantity, while the lower cost $c_2 < c_1$ increases it.

(v) Compare $CS^M = \frac{(a-c_1)^2}{8b}$ to $CS^C = \frac{(a-\phi-c_1+\frac{1}{2}(c_1-c_2))^2}{\frac{9}{2}b}$. There are three differences in the expressions. Replacing the denominator 8 with 9/2 increases consumer surplus and is due to the shift from monopolistic to duopolistic competition. Subtracting ϕ from a reduces consumer surplus, as it reflects the reduced desirability of the counterfeit. However, adding $c_1 - c_2 > 0$ to the denominator increases consumer surplus, reflecting the reduction in price due to the lower production cost of the counterfeiter.

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