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

Laura Alfaro Cathy Bao Maggie X. Chen Junjie Hong

Claudia Steinwender

November 2021

Abstract

We investigate how firms adapt to trademark protection, an under-examined form of IP protection, by exploring a historical precedent: China's trademark law of 1923—an unanticipated, disapproved response to end conflicts between foreign powers. Exploiting a unique, newly digitized firm-employee-level dataset from Shanghai in 1870-1941, we show that the trademark law impacted firm dynamics on all sides of trademark conflicts. The law spurred growth and brand investment for Western firms with greater dependence on trademark protection. In contrast, Japanese businesses, who had frequently been accused of counterfeiting, experienced contractions while attempting to build their own brands after the law. Further, the trademark law led to new linkages with domestic agents both within and outside the boundary of Western firms and the growth of Chinese intermediaries. At the aggregate level, trademark-intensive industries witnessed a net growth in employment and product categories. A comparison with previous attempts by foreign powers to strengthen trademark protection–such as extraterritorial rights, bilateral treaties, and an unenforced trademark code–shows the alternative institutions were ultimately unsuccessful.

JEL: F2, D2, O1, O3, N4

Keywords: trademark, firm dynamics, intermediaries, intellectual property institutions

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*Harvard Business School, lalfaro@hbs.edu; UIBE, baoge@uibe.edu.cn; George Washington University, xchen@gwu.edu; UIBE, hongjunjie@uibe.edu.cn; Ludwig Maximilian University of Munich and NBER, claudia.steinwender@econ.lmu.de. We thank Dave Donaldson, Ruixue Jia, Wolfgang Keller, Rocco Macchiavello, Petra Moser, Nancy Qian, Marco Tabellini and seminar and conference participants at Yale, Northwestern, MIT Sloan, NYU, Duke Fuqua, HEC, GWU, Brandeis, University of Vienna, NBER China Group Meeting, NBER SI Productivity Meeting, Barcelona GSE Summer Forum, and SIOE for very helpful comments and suggestions. We also thank our research assistants, Mengru Wang, Sara Ji, Chelsea Carter, Xueyun Luo, Julia Reinhold, Alison Zhao, Zineb El Mellouki, Emanuela Migliaccio, Gerard Domenech Arumi, Erxiao Mo, Tianyu Zhao, Mona Dong, Alexander Shusko, Chris Kaiser, Bennett Adamson, Feifei Mi, and Zhihua Guan for outstanding assistance. We thank Harvard's China Fund Faculty Grant for financial support.

"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 international political and economic disputes. Firms from developed countries have often urged their governments to negotiate stronger IP protection overseas especially in less advanced economies, while developing nations have longstanding concerns over the implications of IP protection for firm growth and market competition. Within IP-intensive sectors, trademark-intensive industries contribute most to employment (90% in U.S. 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 and investigate the effects of trademark protection on firm and industry dynamics. We address the question by exploiting an exogenous institution shock provided by a historical precedent—the unanticipated, disapproved introduction of China's first trademark law in 1923—and a series of newly digitized micro datasets in Shanghai's Concession Era that enable us to examine on how domestic and international firms, operating on different sides of the trademark conflict, adapt to the introduction 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

Trademarks enable firms to build and benefit from reputation over time, but counterfeiting undermines the function and value of this firm-specific asset.[4] Trademark protection, by protecting one firm's exclusive right to use a specific mark, is therefore needed to ensure the effectiveness of trademarks in resolving the underlying information asymmetry problem.

In this paper, we investigate how the introduction of the trademark law shapes the growth dynamics of firms on all sides of trademark conflicts. The establishment of the trademark law could affect firm and industry dynamics in complex ways. First, trademark protection can lead to a direct market reallocation within brand-specific segments from counterfeiters to authentic producers. Second, trademark protection, by raising consumer confidence of receiving authentic products upon purchase, may increase overall demand for a brand. Third, unlike patents and copyrights, trademarks protect the rights to use a mark rather than the rights to make or sell (sometimes similar) products with different marks, and hence may not necessarily reduce the extent of market competition. Finally, the trademark law could affect the distribution mode of authentic firms. If trademark protection is weak, authentic producers may want to 'control' the distribution to final consumers and not involve intermediaries, as there is a risk that they could dilute the brand by mixing authentic products with counterfeits. The trademark law could mitigate these concerns and foster new linkages with, and the resulting growth, of the intermediary sector.

We empirically examine these mechanisms by exploiting the introduction of China's first trademark law in 1923. The historical circumstances surrounding this institutional change are attractive, as they suggest that the exact timing of the law was exogenous to economic conditions. First, discussions between foreign countries and China about introducing trademark protection in China had started at least two decades earlier. However, because Great Britain and Japan both tried to influence China with opposing interests and contradicting

laws, a trademark is "a device, or mark, or name of an individual or firm printed in some particular and distinctive manner; or a written signature or copy of a written signature of an individual or firm; or a distinctive label or ticket." Similarly, the USPTO defines a trademark as "a word, phrase, symbol, or design, or a combination thereof, that identifies and distinguishes the source of the goods and services of one party from those of others".

[4]The literature distinguishes two types of counterfeiting: (i) *deceptive* counterfeiting, where the authentic and counterfeited products are similar in design and packaging and unaware consumers have difficulties distinguishing the two and are deceived to unknowingly purchase (potentially lower-quality) counterfeited goods (such as cigarettes, drugs, and cosmetics) (Grossman and Shapiro, 1988a); and (ii) *non-deceptive* counterfeiting, where consumers are able to distinguish between authentic and counterfeited products and knowingly purchase the latter (such as counterfeits of luxury goods) (Grossman and Shapiro, 1988b). In this paper, deceptive counterfeiting is the more relevant case given our historical setting, as described in Section 2.

filing principles, this resulted in an indefinite postponement of the trademark law. Second, the timing of the law was unexpected. When China passed its first trademark law in May 1923, this was completely unanticipated by the foreign community, as they were only informed *after* the law was passed and put into force–a move highly unusual in a time period characterized by a strong foreign influence in China as a result of the so called "Unequal Treaties" signed in the mid 19th century. Third, all foreign countries expressed discontent with the details of the law, which was revealed by their refusal to recognize the law. Fourth, China's motivation for introducing the law was unrelated to the economic effects of trademark protection. Instead, it was motivated by China's overarching, long-run goal of ending foreign influences and privileges in China (such as extraterritoriality). The introduction of the trademark law was a first, relatively easy step toward this long-term goal.

The second advantage of our historical setting is the availability of a series of novel micro-level datasets from Shanghai, the most economically important city of China, accounting for over half of China's trade and two thirds of China's inward FDI in manufacturing (Ma, 2008). Specifically, we manually 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. For each company, we recorded its name, address, products, importer and exporter status, nationality, and non-production employees including their names, job positions, and levels in the firm hierarchy. We also merged this data with firms' advertisements in the leading daily Chinese newspaper *Shen Bao* (申报) during 1920-1926 to measure firms' brand investments. For firms that were representing foreign manufacturers in Shanghai, we were also able to collect comprehensive client lists that include the name and nationality of each client. The coverage and richness of information enable us to provide rare insights on firm operations in one of the most contested markets for trademark protection and investigate how firms adapt to the birth of a trademark institution.

In order to estimate how the trademark law affected firms on all sides of the conflict, we implement separate difference-in-differences (DD) specifications for three sets of firms: Western firms, who according to court cases and historical archives suffered most from trademark infringements, and Chinese and Japanese firms, who had been most frequently accused of counterfeiting. In each DD analysis, we compare firms that were selling trademark-intensive products with those less trademark dependent, before and after 1923. We construct a firm-specific measure of trademark intensity based on each firm's initial product compo-

sition and historical trademark registration data in each product category from a number of foreign countries before 1922. Given that foreign powers neither anticipated nor approved the introduction of the trademark law, we expect the timing of the law to be exogenous to the growth dynamics of trademark-intensive firms, an assumption that we can test and confirm in a pre-trend analysis.

Our analysis suggests that the trademark law significantly reshaped firm dynamics on all three sides of trademark conflicts. The employment of trademark-intensive Western firms grew, on average, by 5%, while Japanese businesses, in contrast, witnessed an average reduction of employment by 15%. During their adjustments, Western firms became more likely to recruit engineers and manufacturing staff signaling a transition from wholesale to domestic manufacturing, while Japanese firms cut sales staff. Western firms were also less likely to exit the market or drop trademark-intensive products and more likely to invest in brand advertising after the enactment of the trademark law. Interestingly, Japanese firms also became more likely to post advertisements and add trademark-intensive products to their portfolio, suggesting an attempt to build up their own brands after the law.

The trademark law also transformed the relationships between Western businesses and Chinese intermediaries. The trademark law led to greater domestic integration by Western firms both within and outside the boundary of the firm. After the trademark law, trademark-intensive Western firms became more inclined to promote Chinese employees within their organizations as well as recruit Chinese employees in sales positions. Western manufacturers also started forming more linkages with Chinese intermediaries and utilizing Chinese agents for market access. These new linkages subsequently fostered significant growth of Chinese intermediaries.

One of the long-standing concerns of IP institutional reforms is the implications for market competition. Aggregating the data to the product-year level, we show that the trademark law led to a net growth of both total employment and products in trademark-intensive industries, implying that the impact went beyond a simple reallocation between authentic and counterfeiting firms and entailed positive changes in consumer demand and market variety.[5]

As the 1923 trademark law was preceded by a series of alternative institutional models

[5]This result is echoed by a case study of brand prices in the Online Appendix which estimates price responses to trademark registrations using detailed monthly brand-level price series and trademark registration dates. The evidence shows that Western brands did not increase prices after the trademark law; instead, brand prices exhibited a slight, albeit insignificant, decline after trademark registrations.

established by foreign powers, we compare the effect of the 1923 trademark law to these preceding institutional arrangements including: 1) extraterritoriality, i.e., the application of foreign laws and the establishment of foreign courts in China; 2) bilateral commercial treaties in which China promised to improve trademark protection; and 3) a draft for a trademark law influenced by the Japanese government, but not put into force. Using equivalent difference-in-difference specifications, we find that none of the alternative institutional arrangements exerted a significant effect on firm growth, highlighting the importance of the domestic institutional reform.

An extensive literature on IP institutions assesses the effects of patent laws and, to a lesser extent, copyright protection, on economic growth.[6] In contrast, there are only few studies 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 increased trademark protection on the profits of U.S. firms exploring the 1996 Federal Trademark Dilution Act, which granted additional legal protection to selected trademarks. Qian (2008), examining counterfeiting among Chinese shoe companies, finds that a loosening of counterfeit enforcement led to alternative differentiation strategies by authentic producers, including upgrading product quality and investing in signaling and self-enforcement against counterfeits. Conversely, Kuroishi (2020) finds that the quality of Chinese tyre exports to Africa increased once the African countries joined the Madrid Protocol, which simplified the international trademark registration process.

In contrast to previous studies, our paper focuses on a fundamental, rather than incremental, change in trademark protection: the introduction of a trademark law. Further, the historical setting explored in the paper provides an arguably exogenous variation in the timing of the trademark law that allows us to establish the causal effect of the law on firm and industry dynamics. In addition, instead of focusing on authentic firms' responses to trademark protection, we investigate how firms on different sides of trademark conflicts, including

[6] 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.

not only authentic businesses but also counterfeiters and domestic intermediaries, adapt to trademark protection through either competition or cooperation. Our analysis also offers novel evidence on the effect of the trademark law on firm organization and the formation of domestic linkages taking advantage of rich firm-employee and firm-client panel data.

Our paper is also related to an emerging literature assessing the historical patterns and roles 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 foreign investment, and assess how these patterns compare to the modern counterparts.

The rest of the paper is organized as follows. Section 2 describes the historical background for the birth of China's first trademark law and the mechanisms through which the law could affect firms and industries. Section 3 discusses the construction of the business-employee panel data and trademark registration dataset. Section 4 presents empirical evidence on firm adaptations to the trademark law. In Section 5, we compare the effects of alternative institutional arrangements. Section 6 concludes.

2 Historical Background: The Birth of China's First Trademark Law

China's 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).[7] In contrast to the long history of trademark uses, China's formal institutions to protect trademarks have a much shorter and complex timeline. Before the late 1800s, protection of trademarks had been governed by the by-laws of commercial organizations (guilds or shanghui) (Alford, 1995).[8] The development of formal trademark institutions in pre-1949 China underwent several phases, from the imposition of foreign legal institutions to bilateral commercial treaties with major trading partners, and from the Qing 1905 code that had not been put into force to finally the birth of China's first trademark law.

[7]Porcelain and ceramics are one of the oldest industries in which such marks had been used for centuries (Heuser, 1975).

[8]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.

In this section, we describe the setting in which the 1923 trademark law was introduced.[9]

2.1 The Appearance of Counterfeits

In the early 20th century, China had emerged as one of the world's most important markets. Accounting for a quarter of the world population, China provided the alluring *"promise of a market of four hundred million customers"* (Alford, 1995, p. 35) to manufacturers and merchants around the world.

Foreign firms were able to access the Chinese customers through a number of 'treaty ports', after Qing China was forced to sign a series of 'Unequal Treaties' as a result of the Opium Wars in the mid 19th century.[10] These treaties granted foreigners important privileges to access the Chinese market, including low tariffs, extraterritorial rights (ET; i.e., the use of foreign laws and establishments of foreign courts in China), and even political governance in some designated areas called 'concessions'.

British firms were among the first to enter the market and gained early dominance, but this status was challenged by Japan after the end of the first Sino-Japanese War in 1894–95. As Japanese firms lagged technologically behind their Western rivals, more and more of them were found to sell counterfeits of Western goods.[11] By the early 1900s, a growing number of trademark disputes involved Western authentic firms, Japanese counterfeiters, and Chinese merchants, spanning across products from tobacco and textile to food and cosmetics. As illustrated by 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).

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

[10] The first treaty ports were established by the British at the end of the First Opium War in the Treaty of Nanking in 1842, and included Shanghai, Canton, Ningpo, Fuchow, and Amoy.

[11] The Patent and Trade Mark Review (1907) argued that "Japanese trade in China consists largely of Japanese imitations, both undisguised and colorable, of foreign goods. The trade is assuming the dimensions of a great national industry." Motono (2011) provides a detailed description of some notable cases including, for example, Sir Elkanah Armitage Sons Ltd. vs. Konishi Hanbei and the "Peacock" brand by British American Tobacco vs. the "Peafowl" brand by Sanlin Gongsi. The *North China Herald* also reported additional prominent cases such as British Whiskey brand "Black and White" producer J. Buchanan Co. vs. an Osaka spirit merchant.

2.2 The Clashes of Foreign Legal Institutions

While authentic Western trademarks were usually registered in their home countries, the absence of a Chinese trademark law meant that this protection did not extend to Chinese territory. Great Britain therefore reacted to the growing number of conflicts by asking British firms to register trademarks in their Chinese and Japanese consulates, which were then transmitted to the Imperial Maritime Customs Service. However, this form of protection proved inadequate because neither the consulate nor the record office had a common legal basis to enforce compliance. In the absence of a legal basis for trademark protection, plaintiffs sometimes tried to make a case of 'unfair competition'. But even this proved difficult, as *"the imitation of a trademark or trade wrapper is not forgery at common law or under the Provisional Criminal Code, even when the trademark consists of a signature."* (The North-China Herald, May 8, 1920).

Further complicating the issue was that defendants from different nationalities were tried under different laws in different courts because of extraterritoriality. For example, 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" under the informal Chinese law. Since the extraterritorial status of countries changed over time, the coexisting legal systems led to a "legally pluralistic environment" with up to 22 different legal systems that competed for jurisdiction.

In practice, Western firms were subject to different trademark protection against Chinese versus Japanese firms. 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.[12] However, if the case was against a firm who enjoyed ET, such as Japanese firms, the case was dealt with at Japan's consular court, which tended to enforce trademark protection to a lesser extent. 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."

[12]For example, Heuser (1975) noted that "In case of infringement by Chinese subjects it was possible to obtain injunctions by the Chinese authorities... The British minister mentioned in a dispatch to the Foreign Office that 'the Chinese Courts... as they have done in the past, afford substantial protection against imitation on the part of Chinese subjects'."

2.3 Bilateral Commercial Treaties and Failed Negotiations

In 1902-1903, Great Britain, the United States, and Japan each signed a commercial treaty with China, promising to abolish extraterritorial rights if China were to establish its legal systems.[13] In particular, the treaties required the Chinese government to provide protection for foreign trademarks and establish offices to register trademarks.[14] As noted by Alford (1995), "trademark protection was the centerpiece of the intellectual property issues addressed" in these commercial agreements.

The Qing government, specifically, its Ministry of Commerce, responded by asking the Japanese government for help in designing a trademark law as a first step toward satisfying the conditions outlined in the treaties for abolishing ET. Japan suggested the adoption of its first-to-file principle, which would continue to allow Japanese companies to counterfeit Western products as long as they filed the trademarks first. The resulting opposition by Western governments led the Qing government to indefinitely postpone the implementation of a trademark law.[15]

After the 1911 Xinhai Revolution, the new government attempted to introduce its own regulations in April 1914. The draft, however, again failed to satisfy foreign diplomats. Negotiations for revising the draft were also 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* on April 22, 1922, which compared the potential military threat Japan posed to China to its traders' willingness to infringe trademarks.

2.4 China's First Trademark Law of 1923

Neither Great Britain nor Japan anticipated the Chinese government to introduce a trademark law 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

[13] See, for example, the 1903 Treaty between the United States and China, cited in Alford (1995, p. 36): the foreign powers might be "prepared to relinquish extra-territoriality when satisfied that the state of the Chinese law, the arrangements for their administration and other considerations warrant."

[14] 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.

[15] 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."

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 fiercely opposed the law (Motono, 2011; Patent and Trade Mark Review, 1923). 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 Japanese businesses and German businesses who had previously lost ET status started to register their trademarks, fearing that their rivals would register the trademarks first. 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). While Japanese and German businesses accounted for the vast majority of the initial trademark applications as reported in the 1924 Trademark Gazette, by 1926 British firms owned the largest share of trademarks (32%) followed by Japan (20%), China (16%), Germany (15%), and the U.S. (12%). As can be seen in Figure 1, trademarks were most frequently registered in textiles (cotton textiles, clothing, woolen products, cotton yarns), chemicals (paints, medication, soap, cosmetics), and tobacco.[16]

2.5 A First Test: The Decline in Advertising against Infringements

The impact of the trademark law can be immediately seen on the advertisements of brand manufacturers. Note that in the context of our study, counterfeits were designed to deceive consumers into believing they were purchasing the authentic brand, as highlighted in the *North China Herald*: "Such an imitation when it has been intended to be and has been the means of inducing persons to part with their money, in the belief that they were buying one thing when in fact they were buying another, is sufficient to support a conviction on an

[16]The Nationalist government that came into power in 1927 kept the 1923 trademark law, but offered less effective protection for 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).

indictment for obtaining money by false pretences."[17]

To address the problem of counterfeits in the absence of formal trademark protection, many brand producers turned to marketing campaigns and used advertising to warn consumers against brand imitations. The need for such a differentiation strategy and advertising effort should decrease upon the introduction of the trademark law.

To test this, we collected all advertisements printed in the *North China Herald*, the leading English newspaper in China at the time, and classified an advertisement as one against imitation if they included strings related to "imitation" in the ad.[18] 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.[19]

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 significantly less need after 1923 to warn their consumers about counterfeits, presumably because the trademark law was effective in deterring counterfeiting.

2.6 From the Trademark Law to Firm Outcomes

The establishment of the trademark law, by granting and protecting a firm the exclusive rights to use a trademark, could affect firms and industries in complex ways. In this subsection, we discuss the various mechanisms through which the trademark law may have impacted firm and industry dynamics.

Reallocation. Before the trademark law, both authentic and counterfeiting firms may be selling their products (potentially with heterogeneous qualities) under the same brand while consumers are unable to identify the true identity of the seller. The introduction of trademark protection, by ensuring authentic firms' exclusive rights to use their brands, would lead to a direct market reallocation within brand-specific market segments from counterfeiters to authentic producers, enabling the latter to grow and become more likely to survive. Because trademarks protect the rights to use a mark, rather than the rights to make or sell (sometimes

[17] North China Herald, 'A Cotton Fraud: Need of Criminal Law', May 8, 1920.

[18] Keywords like "imitation" were used in the search in the *North China Herald*. We manually checked the advertisements to make sure these advertisements did in fact warn against imitations.

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

similar) products with different marks, counterfeiters may either decide to exit the market or choose to obtain new marks for their varieties.

Demand. Next, by lowering the risk of consumers receiving counterfeits at the point of purchase, the trademark law reduces the information frictions consumers face in relating trademarks to the true identity of sellers. As Grossman and Shapiro (1988a) note, the reduced information frictions can increase consumers' confidence in the quality of purchased goods and hence willingness to pay for high-quality goods, further expanding the aggregate market demand for authentic firms. Grossman and Shapiro (1988a) also point out that this channel raises the value of authentic brands and enables firms to appropriate returns from their brands and reputation, thereby potentially increasing brand investment incentives.

Distribution. Further, the trademark law can affect authentic firms' mode of distribution. A significant literature has underscored the importance of intermediaries in facilitating the matching of buyers and sellers in the presence of search and information frictions (e.g., Rubinstein and Wolinsky, 1987, Biglaiser 1993, and Spulber 1996) and trade barriers (Ahn, Khandelwal and Wei, 2011; Antras and Costinot, 2011).[20] However, working with intermediaries is associated with its own risks especially in the absence of strong legal institutions. The introduction of the trademark law could mitigate the risks and improve the confidence of authentic firms in collaborating with domestic intermediaries, fostering new linkages both within and outside the boundary of the firm.

The above channels would lead to a range of implications for firm dynamics. First, both the reallocation and demand channels would increase the growth of authentic firms while counterfeiting firms contract in size. Second, while trademark protection help authentic producers capture brand-specific markets, it would not necessarily reduce market competition as often in the case of patent protection, with authentic firms becoming more likely to survive and some counterfeiters re-branding their products. Third, trademark protection, by protecting the value of brands as a firm-specific asset, may raise firms' incentives to invest in their brands. Finally, trademark protection would foster authentic firms' use of intermediaries; this, in turn, can provide growth opportunities to both authentic firms and the domestic intermediary sector.

[20]This was particularly the case in historical Shanghai where foreign firms often turned to domestic intermediaries due to language barriers and inland market restrictions. As a result, the intermediary sector accounted for more than half of the businesses as shown in Section 3.2.

3 Data: Firms in Shanghai's Concession Era

To formally examine the hypotheses outlined above and quantify firm-level adjustments to the trademark law, we digitized and assembled a rich array of micro-level datasets, including a firm-employee panel dataset covering the universe of firms operating in Shanghai's concession areas spanning across 1870-1940 and a historical cross-country trademark database from 1870-1922.[21]

3.1 Firm-Employee and Agent-Client Data

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 8.4% of the world's total FDI(Hou, 1965). 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 concessions, where most foreign businesses were established, were governed by city councils independent of the Chinese government.

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.[22] This

[21] In section A.5 of the Online Appendix, we show additional analysis using product-level Chinese Customs import data from 1920-1928 to examine the trade effects of the law.

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

annual series was published by the *North-China Daily News*, an English-language newspaper based in 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.[23] For each company listed in the Hong List in a given year, we recorded, among other things, its name, address, products, and importer and exporter status. In addition, we digitized each firm's non-production employees including their names, positions, and hierarchy levels within the firm. Figure C.2 in the Online Appendix shows an example page from the 1927 Hong list.

For each firm, we also identified its nationality using a number of different sources, including the "China Importers and Exporters Directory" published 1936 by the Bureau of Foreign Trade, Ministry of Industry, Shanghai, "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 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.

In addition, we collected comprehensive client information for each agent firm operating in Shanghai including the agent's product composition, address, and nationality as well as the name and nationality of each client. The agent-client information allows us to measure firm linkages and how they evolved before and after the trademark law. We also downloaded all advertisements posted by firms in our sample in the leading daily Chinese newspaper Shen Bao (申报) during 1920-1926 to examine firms' brand investment decisions.

Based on the data from each edition of the Hong List, we constructed a firm-level panel 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 List and the corre-

[23] In the international concession, the aggregate foreign employment in the Hong List at firms covers about 80% of the foreign male adult population reported by the census, which seems a reasonable coverage; see section A.1 of the Online Appendix for more details.

sponding panel that we generated offer us a unique tool for analyzing firm dynamics in one of the most volatile historical periods. The key firm-level variables in the datasets include:

- firm name: name of the firm in English, traditional Chinese, and Wade-Giles;
- 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);
- 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 information from different 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, an importer, or both;
- hierarchical layers: a number that enumerates the indents in the list of employees that are used to denote hierarchical layers in Hong List;
- Chinese nationality of employees: a count of employees that have Chinese last names;
- job titles: we classify job titles into sales related positions (with job titles such as sales, salesman, marketing, representative, advertising, and publicity), engineering related positions (engineer, engineering, technical, machinery, draughtsman, mechanic, mechanician, and technician), and manufacturing related positions (job titles that include keywords like manufacturing, production, producing, and factory);
- clients: the list of clients for each agent business in Shanghai including the name and nationality of the client;
- advertising: whether the firm posted an advertisement in the leading daily Chinese newspaper *Shen Bao* (申报) and the frequency of advertising.

Several stylized facts on the time trends and distributions of firms emerge from the data. Consistent with aggregate accounts, the data display a significant transformation in both the number and composition of businesses in Shanghai during the decades after late 1800s.

Figure 3 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 3, 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 4, BAT, formerly named British Cigarettes and one of the Western companies involved in numerous trademark disputes, 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).

There are also notable patterns in the industrial composition of Shanghai's economy. Throughout the historical period, wholesale constituted the most important sector in Shanghai's economy, accounting for 40-50% of businesses and employment. The dominant role of the wholesale sector led by domestic merchants and agents was driven by the major port status of Shanghai and the market barriers facing foreign manufacturers and merchants. Interestingly, during this period, Shanghai's economy also experienced a gradual growth of industrial activities, transitioning to a more diverse economic landscape with a mix of wholesale and manufacturing. As shown in Figure 5, the manufacturing sector grew from only 6.2% of the economy (measured in non-production employment) to 20% by 1930 as more foreign 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 6 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, Germany, and Russia, which accounted for 18.3%, 5.7%, 4.7%, and 2.1% of the businesses, respectively, by 1930.

3.2 Cross-country 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, U.S., Japan, Australia, Canada, Denmark and Spain.[24] The dataset 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. Product groups are defined according to the international *Nice classification (NCL)* scheme that was established by the Nice Agreement in 1957.[25]

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.[26] 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 $trademarkintensity_p$.[27]

As can be seen in Table 1, the product categories with the highest trademark intensity are pharmaceuticals, cosmetics, food, alcoholic beverages, chemical products, paper and cardboard, and tobacco. Services have a trademark intensity of zero, as it was not possible to register trademarks for them. Among the goods with the lowest trademark intensities were firearms, canvas, musical instruments, leather products or dressmakers' articles.

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:

$$TrademarkIntensity_i := \max_{p \in P_i} (TrademarkIntensity_p)$$

where P_i denotes the set of products that the firm sold in the period 1920 to 1922, i.e., before

[24] We also dropped New Zealand whose product classification is inconsistent with the NCL system.

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

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

[27] 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.

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 Empirical Evidence

In this section, we examine how Western, Japanese, and Chinese firms, with their distinct roles in the trademark conflicts, had respectively adapted to the trademark law. We first examine how the trademark law had shaped the growth dynamics on the opposite sides of trademark conflicts through a combination of reallocation and demand mechanisms. Next we explore the effects of the trademark law on the linkages between foreign firms and domestic intermediaries and whether the linkages benefited the domestic sector.

4.1 Empirical Specification

To examine the firm effects of the trademark law, we estimate a difference-in-differences specification on the sample of pre-existing firms in Shanghai (i.e., firms that we observe in at least one of the years 1920-1922), comparing the outcome of firms that sell trademark-intensive products with firms that sell less trademark-intensive products before and after the trademark law of 1923:

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

where y_{ict} is a firm-specific outcome such as the log employment, exit decision, and product composition of a given firm i from country c in year t, $TrademarkInt_i$ 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 of China as discussed in Section 3), $PostLaw_t$ is a dummy that equals 1 if the year is equal to or after 1923, FE_i, FE_{ct}, and FE_{jt} denote, respectively, the firm fixed effect to control for time-invariant firm characteristics, country-year specific fixed effect to absorb potential macroeconomic shocks from the firms' home countries, and broad industry-year specific fixed effect to account for industry-specific shocks in Shanghai. Standard errors are two-way clustered by product category and country-year. 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, such as the establishment of the Nationalist government. Table

B.1 in the Online Appendix presents the summary statistics for this regression sample.

In order for our identification strategy to work, it is important to make sure that trademark-intensive firms would not have grown even in the absence of the trademark law, i.e., there were no pre-trends. To ensure that, we also implement an event study specification:

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

Examining the elasticity of trademark intensity before and after 1923 will help detect the presence of pre-trends in our data.

4.2 Authentic vs. Counterfeiting Firms

We start by examining how the trademark law had shaped firm dynamics depending on the firms' role in trademark conflicts. As discussed in Section 3.1, as the main complainants of trademark infringements, Western firms are expected to benefit, at both intensive and extensive margins, from reallocation within its own market segment and increased aggregate demand due to lower information frictions. They are also expected to raise brand investments as trademark protection raises the value of brands. Japanese and to a less extent Chinese firms, which had been accused of counterfeiting, are expected to contract in size, but may opt to re-brand their products and adapt their product composition to remain in the market. In this subsection, we present evidence on these hypotheses by looking at firm adaptions in employment, extensive margins, and brand investment.

4.2.1 Within-Firm Employment

In Table 2, we show that the trademark law exerted a net positive effect on the growth of trademark-intensive Western firms. Our main analysis in columns (1) to (3) focuses on the period until 1926. In 1928 when the Nationalist government came into power, the 1923 trademark law was kept in place, but it is possible that the law may have offered less effective protection for foreign businesses against Chinese counterfeiters. In column (4) we extend the sample to 1930 to check whether the effectiveness of the trademark law changed, but the results remain similar.[28]

Based on column (3), our preferred specification that includes the broad industry-year

[28] We do not extend the analysis beyond 1930, as in 1931 Japan invaded Manchuria which later led to the Japanese occupation.

fixed effect, the employment of Western firms with mean trademark intensity grew by 4.6% after the enactment of the law. This implies on average adding a 1/2 employee at the mean employment of 11.2. However, for firms selling the ten most trademark-intensive products listed in Table 1, the employment growth ranged from 7.8% to 19.2% (adding 1-2 employees to the mean firm size). In contrast, firms selling the ten least trademark-intensive products listed in Table 1 saw only a 1.3-3.5% employment growth.[29]

In contrast to the growth of Western firms, trademark-intensive Japanese firms experienced a significant contraction in their employment after 1923. In terms of magnitude, the employment of Japanese firms with mean trademark intensity decreased by 15% after the enactment of the law. The effect on Chinese firms is also negative, but has a smaller magnitude and mostly statistically insignificant.[30] In section A.6 of the Online Appendix we show that these effects are robust to different ways of measuring trademark intensity.

To ensure the results are not driven by pre-trends, we estimate equation (2) for the three types of firms. As shown in Figure 7, no pre-trends are present for Western firms: the estimated employment elasticities of trademark intensity before 1923 are not significantly different from zero, while the effect partially appears in 1923 and then fully in 1924 and after. Figure 8 shows the corresponding event study for Chinese and Japanese firms, confirming the absence of pre-trends and the negative effect of the trademark law.[31] Overall, 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.

Next we examine whether the positive effect of the trademark law on Western firm employment indeed reflects firms' varying dependence on trademark protection rather than other firm or product attributes. While we are not aware of other major shocks in China during 1923, we want to ensure that we are measuring the effect of the trademark law on firms that are ex ante most dependent on trademark protection, i.e., the trademark-intensive

[29] As we show in Figure C.3 of the Online Appendix, the effect of the trademark law was not uniform across the size distribution of firms with the effects concentrated on large and medium-sized businesses.

[30] In section A.5 of the Online Appendix, we show these effects were mirrored in Chinese imports. The trademark law led to increased Chinese imports and new trade relationships from Western countries in trademark-intensive products. In contrast, imports from Japan fell, though the effect is not statistically significant.

[31] We group Chinese and Japanese firms together in the event study, as the event study for Japanese firms is noisier as we do not have as many Japanese firms in the sample. We report the event study for Japanese firms in Figure C.6 of the Online Appendix; it still shows a decline in employment, but is noisy.

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) of Table 3. We calculate patent intensity for each product as the share of patents in each product category based on data on the stock of U.S. patents in 1922 from the historical U.S. PTO database.[32] Trademark and patent intensity are found to be only weakly correlated, and our employment effects are not explained by patent intensity.

In columns (3)-(5) of Table 3 we check whether the estimated effect on trademark-intensive industries may instead reflect an effect on large industries or firms, as the trademark law may be particularly relevant for large (or small) industries and firms. To test this, we interact the post-law dummy with the number of firms or the total employment of firms in each NCL product category and firm initial size, respectively.[33] Again, none of these size measures explain away the employment effects of trademark intensity. Finally, we show in column (6) the estimated effects are also not due to general macroeconomic shocks in home countries, measured by home-country GDP, that may affect trademark-intensive firms differentially.[34,35]

One would assume that trademark protection is more important for sellers of final goods than sellers of intermediate inputs, as the former sell to consumers that may be more easily

[32]See https://www.uspto.gov/learning-and-resources/electronic-data-products/historical-patent-data-files. Similar to trademark intensity, we use the maximum patent intensity across products for each firm.

[33]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.

[34]Note that we already control for general macro-economic shocks in the home countries by including a country-year specific fixed effect. For example, the fixed effect would control for the Great Kanto Earthquake of 1923 in Japan and its potential effect on Japanese importers in Shanghai. Here we are further allowing the shocks to affect firms differentially based on their trademark intensity. We thank David Weinstein for the suggestion.

[35]In the Online Appendix, we conduct a different set of robustness checks and test whether excluding potential interest groups, namely, specific countries, products, or firms that were expected to benefit particularly from the trademark law would affect our results. These groups include, for example, German firms, who lost extraterritoriality at the end of World War I and as a result would arguably have more interests in a domestic trademark law in China, and firms in the tobacco industry (or the largest tobacco manufacturer), who were particularly affected by trademark infringements. The analysis in section A.4 shows that excluding these potential interest groups does not affect our estimated effect of the trademark law on Western firm growth. Furthermore, we show in section A.3 of the Online Appendix that neither a specific country nor a specific product group is driving the results.

deceived than firms due to the lack of expertise or limited interactions with retailers. In Figure 9 we estimate heterogeneous effects by splitting the NCL product categories into predominantly intermediate versus final goods. In line with this hypothesis, we see that the reallocation from Japanese and Chinese firms to Western firms after the trademark law is only present for final goods. In contrast, the effects on intermediate inputs is insignificantly different from zero for firms from all country groups.

After establishing the effect on firm employment growth, we next explore in more detail how firms grew or shrank their organizations in response to the trademark law by taking advantage of information on the job titles of employees. As we do not have job titles for all firms in our sample, column (1) of Table 4 first repeats our baseline analysis on this sub sample to confirm that the trademark law has the same employment effect on this sample. In columns (2) to (4) we examine specific positions in firms and their decisions to employ a lawyer, sales staff, and engineer, respectively. We see that after the trademark law, Western firms were more likely to employ all of these positions, but the effect is only statistically significant for engineers. While only suggestive, this could indicate that Western firms that entered the Chinese market by importing goods produced in their home countries became more likely to start their own manufacturing activities after the trademark law — a trend that was also visible in the aggregate statistics of Shanghai in Figure 5. For Japanese and Chinese firms, the employment reduction is reflected in less hiring for most positions, but particularly pronounced for sales staff.

4.2.2 Entry, Exit, and Product Composition

Up to now we have studied the intensive margin, i.e., whether the trademark law affected the growth of existing firms. Next we examine the extensive margins by extending the sample from firms that had existed in 1920-1922 to all firms that appeared 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 entered, and an exit dummy variable as 1 in and after the year a firm exited. This allows us to examine how the law affected the entry and exit rates of firms. In columns (1) and (2) of Table 5 we see that while the trademark law had an insignificant effect on the entry of Western firms, it exerted a negative and significant effect on the exits of Western firms. Overall, in column (3) we see that the trademark law led to a positive but insignificant effect on firm existence, suggesting that the trademark law protected incumbent firms while

not necessarily leading to increased entry.

The trademark law could also affect firms' product composition, especially the likelihood of adding and dropping trademark-intensive products. To examine this hypothesis, in columns (4) and (5) of Table 5 we return to the sample of firms that existed in 1920-1922 and create a dummy variable to denote firms that added or dropped a trademark-intensive product in a a given year.[36] The results are similar to the firm entry and exit analysis, suggesting that Western firms were significantly less likely to drop products with above-median trademark intensity after 1923, but not more likely to add them.

Turning to the extensive margin for Japanese and Chinese firms, we see that Japanese were less likely to enter while Chinese firms were less likely to exit. In addition, Japanese firms were significantly more likely to add trademark-intensive products whereas there were no significant changes in the product portfolio of Chinese firms.

4.2.3 Brand Investment

If the trademark law helped incumbent Western firms to grow their trademark-intensive products, we may also see increased investment incentives in, for example, brand promotion, as Western firms experienced a larger return after the trademark law. Prior to the trademark law, the return from advertising faced a free-rider problem: any increase in market demand through brand promotion efforts would be shared by counterfeiters. This externality lowers brand producers' incentives to invest in advertising. The free-rider problem would be mitigated after the enactment of the trademark law; with reduced counterfeits in the market, brand producers would have greater motives to pay for brand promotion. At the same time, however, the need of advertising to educate consumers and ensure they are able to distinguish the authentic brand from counterfeits decreases with strengthened trademark protection as shown in Section 3.4.

To examine the effect of the trademark law on brand investment incentives, we downloaded all advertisements posted by firms in our sample in the leading daily Chinese newspaper *Shen Bao* (申报) during 1920-1926 excluding those warning consumers of counterfeits. Column (1) of Table 6 reports that while the increase in the likelihood of advertising was not statistically significant for Western firms, the number of advertising days in columns (2) and (3), alternatively measured as log(ads+1) or the inverse hyperbolic sine of ads, rose

[36]Trademark-intensive products here are defined as products with above median trademark intensity.

significantly after 1923 for Western businesses. Interestingly, we also find a higher probability of posting advertisements for Japanese firms. This result offers suggestive evidence that Japanese firms reacted to the trademark law by trying to build up their own brands and invest in brand promotion.[37]

4.3 Domestic Intermediaries

Next, we examine how the trademark law affected Western firms' incentives to work with intermediaries, both within and outside the boundary of the firm. As discussed in Section 3.1, the establishment of the trademark law, by reducing the risks of using domestic intermediaries as a mode of distribution, would provide foreign authentic firms greater incentives to collaborate with domestic middlemen and agents.

We start by considering the use of Chinese employees within Western firms by constructing several variables to capture Chinese employees' positions in Western firm hierarchy. First, we separately identify Chinese employees from foreign employees based on the names of the employees reported in the Hong List. Second, we explore the position of Chinese employees in the organizational hierarchy by exploiting the indents in the employee directory as reported in the Hong List, where lower-level employees were separated from their superiors by an indent. More specifically, we check whether Chinese employees appeared in the first organizational layer, which we label as the managerial layer, and also calculate the average position of Chinese employees in a Western company's employment hierarchy. Finally, we check whether Chinese employees appeared in positions related to sales (i.e., job titles related to comprador, sales, and marketing), engineering (i.e., job titles related to engineering positions), and manufacturing (i.e., job titles related to production).

Table 7 reports the results. We find Western firms with trademark-intensive products expanded their employment after the trademark law by hiring Chinese employees (columns 2 and 3). Chinese employees were also more likely to appear in the managerial layer (column 4), and in general move up in the organizational hierarchy (column 5; a negative sign means

[37] In addition to brand promotion, incentives to invest in product quality can also change with trademark protection. On the one hand, the trademark law, by reducing the free rider problem and raising the return from quality upgrading, can motivate authentic firms to invest in quality upgrading. On the other hand, however, stronger trademark protection can lower the need for authentic firms to upgrade quality as a means to signal identity and differentiate from counterfeits. Because of the opposing channels, the net effect of trademark protection on product quality can be ambiguous. In section A.7 of the Online Appendix, we provide suggestive evidence on whether trademark protection may have exerted an effect on product quality by studying whether there had been changes in advertisements focusing on product quality. We do not find a significant effect.

a higher layer, as the layers are numbered from 1 (highest) to 3 (lowest).). With respect to positions, Chinese employees were more likely to be hired in sales related positions, as opposed to engineering or production related positions (columns 6-8). These results suggest that Western businesses became more inclined to promote Chinese employees after the enactment of the trademark law, especially with respect to managerial and sales tasks. In contrast, Chinese firms were less likely to hire Chinese managers (column 4) and Chinese employees higher up in the organizational hierarchy (column 5). Japanese firms reduced their employment by both reducing foreign (column 2) and Chinese employees (column 3), and were also less likely to employ Chinese in more important positions (columns 4 and 5), though not statistically significantly so.

Apart from setting up a foreign-owned subsidiary in a treaty port like Shanghai, a common alternative strategy to enter the Chinese market was through agents located in China. However, before the trademark law Western firms may have found it risky to use Chinese agents with the concern that Chinese merchants might mix their branded products with counterfeits, thereby undermining the brand value (Motono, 2011). We test whether Western companies became more likely to enter the Chinese market via Chinese agents after the trademark law by exploiting the list of clients that agents provided in the Hong List. In Table 8 we find that Chinese firms selling trademark-intensive products were more likely to act as agents for foreign firms after the trademark law, and that their number of clients increased significantly. In contrast, Western and Japanese firms did not experience significant changes in their numbers of clients.

This suggests that there may be heterogeneity in the effect of the trademark law on Chinese firms: those that acted as intermediaries for foreign firms may have grown, while others might have shrunk. We check this in Table 9 by estimating whether Chinese firms that acted as agents for Western firms experienced differential growth. Indeed we see that while Chinese firms contracted on average, Chinese agents exhibited strong growth.

4.4 Aggregate Industry-level Effects

After exploring detailed firm-level responses to the trademark law across sides of trademark conflicts, we next examine one of the long-standing concerns of IP institutional reforms—the implications of greater IP protection for market competition.

To do so, we aggregate the data to the product-year level to explore the net effect of the

trademark law on industry employment and market competition in Table 10. Since many firms offer several products, in columns (1) and (2) of Table 10 we allocate total firm employment to the product with the maximum trademark intensity, while in columns (3) and (4) we distribute firm employment equally across products. Columns (1) and (3) show positive effects at the intensive margin: the total industry employment increased by 7 percent at the mean level of trademark intensity and more than doubled for relatively more trademark-intensive products. Columns (2) and (4) show even stronger effects at the extensive margin: firms start to enter new, especially trademark-intensive, product categories. This is also reflected in columns (5) and (6), which use the number of firms in a product category as outcomes, and column (7), which uses a dummy variable indicating whether any firm offers a specific product. The trademark law led to not only more employment in trademark-intensive product categories, but also more products with active firms.[38]

The above results suggest that the impact of the trademark law went beyond a simple reallocation between authentic and counterfeiting firms and did not reduce overall market competition. Instead, the law entailed an expansion in total employment and the number of products offered. This finding, in line with the earlier firm-level results in Section 4.2.2, highlights again the distinct role of trademark protection: in contrast to the common concerns that greater IP protection would increase market power and reduce competition, trademark protection may increase industry employment and the number of products without a decrease in the level of competition.

This distinct effect of the trademark law is also pronounced in prices as shown in the Online Appendix (Section A.8) which estimates the price responses to trademark registrations. Exploring a subset of digitized monthly brand-level price series and trademark registration dates, we find that Western brands did not increase prices after their trademarks became registered. Instead, brand prices exhibited a slight, statistically insignificant decline after trademark registrations, again suggesting the trademark law did not lead to falling market competition.[39]

[38] It is worth noting that an increase in the number or probability of active firms in a given product category does not reflect re-branding of counterfeiting firms, because the data account for both authentic and counterfeiting firms present in each product category before and after the trademark law. Instead, the result reflects a combination of reduced exits and new entry as shown in Section 4.2.2.

[39] Albeit a subset of prices, and thus to be taken as suggestive cases, we applied staggered diff-in-diff methodology developed by Callaway and Sant'Anna 2020.

5 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.

In this section, 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 extraterritorial status.[40] 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 1902-1903 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 in-

[40]The countries that lost extraterritorial status were: Australia (1901), Austria (1917), Czechoslovakia (1917), Germany (1917), Finland (1924), Hungary (1917), Latvia (1924), Philippines (1898), Russia (1917). The countries that gained extraterritorial status were: Switzerland (1918), Japan (1896).

stitutions with the 1923 trademark law are reported in Table 11 where each institutional measure is interacted with firm-specific trademark intensity.[41] 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 and a positive growth effect was not achieved until the establishment of a domestic trademark institution.

6 Conclusion

In this paper, we investigate how firms on different sides of trademark conflicts adapt to trademark protection 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, one of the world's most contested markets in trademark disputes.

Our empirical evidence shows that the trademark law exerted sharply different and complex effects on Western, Japanese and Chinese firms who had played distinct roles in the trademark conflicts. The trademark law spurred growth and brand investment for trademark-intensive Western firms. In contrast, Japanese businesses, who had frequently been accused of counterfeiting, experienced employment contractions while attempting to build their own brands after the law. Further, the trademark law led to new linkages with domestic intermediaries both within and outside the boundary of Western firms as they became more inclined to recruit and promote Chinese employees as well as work with Chinese agents. The Chinese intermediaries then experienced a significant growth in both the volume of foreign clients and employment.

At the aggregate level, in contrast to the widespread concern over reduced market competition after IP reforms, we show that the trademark law led to a net growth in both total employment and product categories in trademark-intensive industries. These findings high-

[41] 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.

light the prospect of enforcing trademark protection and addressing consumer information frictions while sustaining market competition and fostering domestic sectors, underlining potential important gains from domestic trademark institutions.

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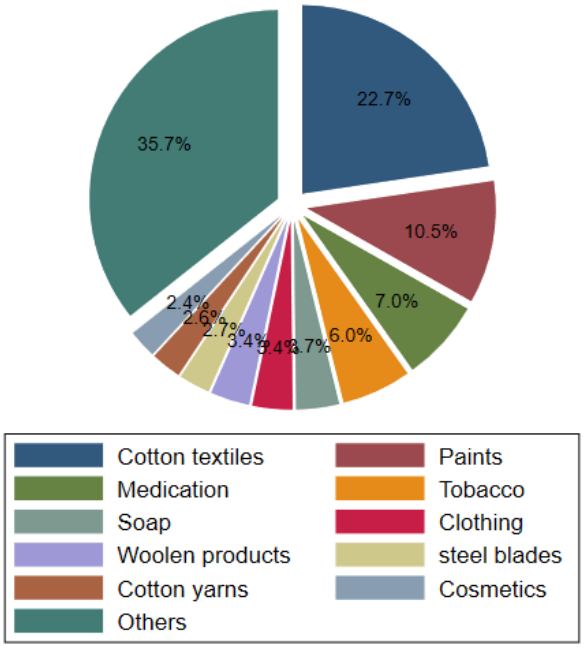


Figure 1: Most common product categories, Chinese trademark registries 1924-1927

Notes: The statistics are produced based on our own digitization of the Chinese trademark registries named *Shangbiao Gongbao* (商标公报) between 1924 and 1927.

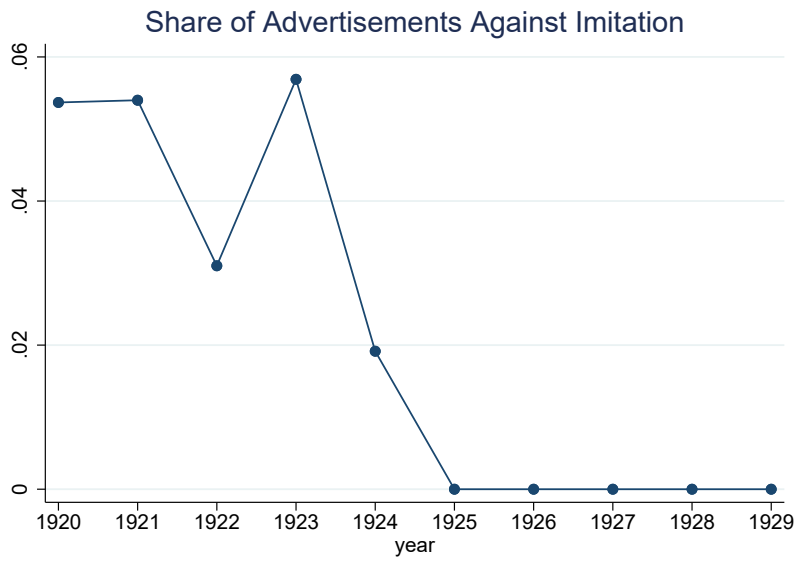
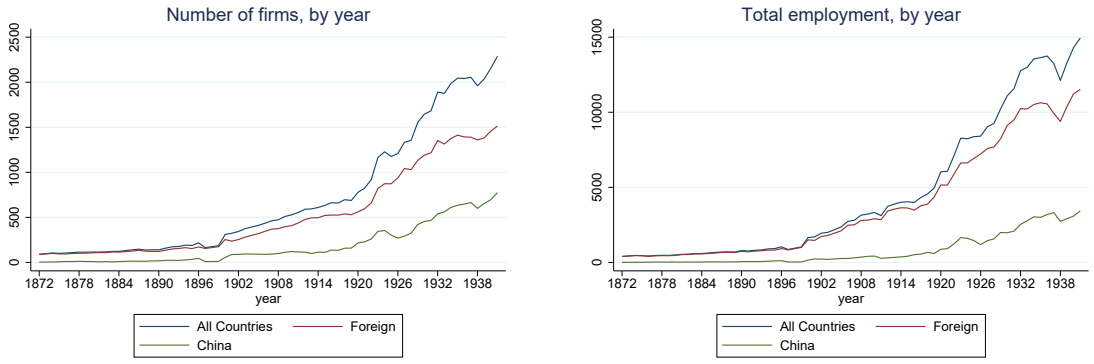


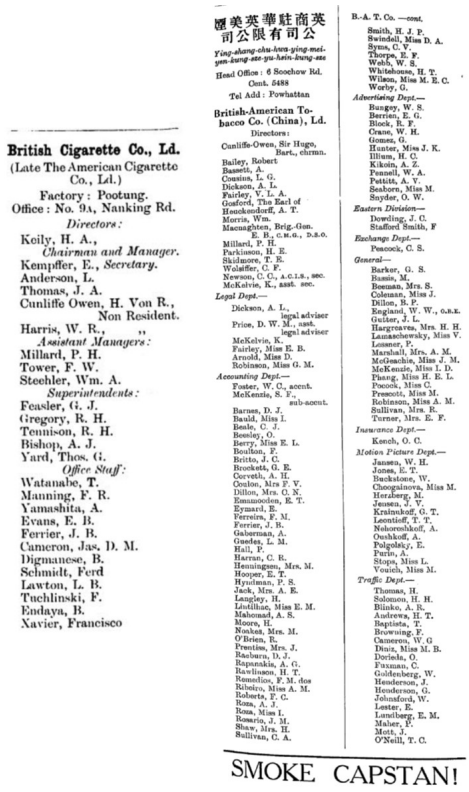
Figure 2: Share of Advertisements against Trademark Infringements in North China Herald



(a) Number of firms

(b) Total employment

Figure 3: 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.
Steebler, 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

英美烟草公司 British-American Tobacco Co. (China), Ltd.
Ying-kuang-chu-tsao-ying-mei-yen-kung-sze-yu-hsien-kung-sze
Head Office: 6 Soochow Rd. Cent. 5488
Tel Add: Powhattan

British-American Tobacco Co. (China), Ltd.
Directors:
Cunliffe-Owen, Sir Hugo, Bart., chrmn.
Bailey, Robert
Bassett, A.
Cousins, L. G.
Dickson, A. L.
Fairley, V. L. A.
Gosford, The Earl of
Houckendorff, A. T.
Morris, Wm.
Macnaghten, Brig.-Gen. E. B., C.M.G., D.S.O.
Millard, P. H.
Parkinson, H. E.
Skidmore, T. E.
Wolstiffer, C. F.
Newson, C. C., A.C.I.S., sec.
McKelvie, K., asst. sec.

Legal Dept.—
Dickson, A. L., legal adviser
Price, D. W. M., asst. legal adviser
McKelvie, K.
Fairley, Miss E. B.
Arnold, Miss D.
Robinson, Miss G. M.

Accounting Dept.—
Foster, W. C., acent.
McKenzie, S. F., sub-acent.
Barnes, D. J.
Bauld, Miss I.
Beale, C. J.
Beesley, O.
Berry, Miss E. L.
Boulton, F.
Britto, J. C.
Brockett, G. E.
Cerveth, A. H.
Coulon, Mrs F. V.
Dillon, Mrs. C. N.
Emmanoelen, E. T.
Eymard, E.
Ferreira, F. M.
Ferrier, J. B.
Gaberman, A.
Gaedes, L. M.
Hall, F.
Harran, C. E.
Henningsen, Mrs. M.
Hooper, E. T.
Hyndman, P. S.
Jack, Mrs. A. E.
Langley, H.
Listillhue, Miss E. M.
Mahmood, A. S.
Moore, H.
Noakes, Mrs. M.
O'Brien, E.
Prentiss, Mrs. J.
Raebara, D. J.
Rapanakis, A. G.
Rawlinson, H. T.
Remedios, F. M. dos
Ribeiro, Miss A. M.
Roberts, F. C.
Roza, A. J.
Roza, Miss I.
Rosario, J. M.
Shaw, Mrs. H.
Sullivan, C. A.

B.-A. T. Co. —*cont.*
Smith, H. J. P.
Swindell, Miss D. A.
Syms, C. V.
Thorpe, E. F.
Webb, W. S.
Whitehouse, H. T.
Wilson, Miss M. E. C.
Worby, G.

Advertising Dept.—
Bungey, W. S.
Berrien, E. G.
Block, R. F.
Crane, W. H.
Gomez, O.
Hunter, Miss J. K.
Illium, H. C.
Kikoin, A. Z.
Pennell, W. A.
Pettitt, A. Y.
Seaborn, Miss M.
Snyder, O. W.

Eastern Division—
Dowding, J. C.
Stafford Smith, F

Exchange Dept.—
Peacock, C. S.

General—
Barker, G. S.
Bunie, M.
Beeman, Mrs. S.
Coleman, Miss J.
Dillon, R. P.
England, W. W., O.B.E.
Gaiter, J. L.
Hargreaves, Mrs. H. H.
Lamaschewsky, Miss V.
Lessner, F.
Marshall, Mrs. A. M.
McGeachie, Miss J. M.
McKenzie, Miss L. D.
Pheng, Miss H. E. L.
Pocock, Miss C.
Prescott, Miss M.
Robinson, Miss A. M.
Sullivan, Mrs. R.
Turner, Mrs. E. F.

Insurance Dept.—
Kench, O. C.

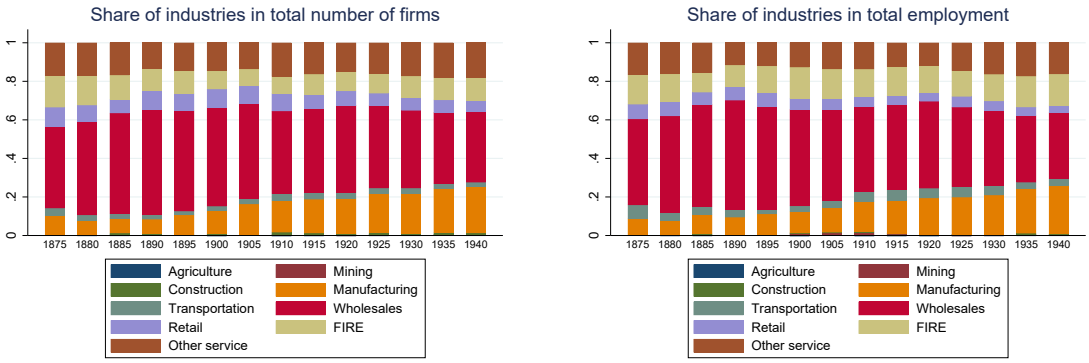
Motion Picture Dept.—
Jansen, W. H.
Jones, E. T.
Backstone, W.
Chogolnova, Miss M.
Herzberg, M.
Jensen, J. V.
Krainukoff, G. T.
Leontieff, T. T.
Nehorenkoff, A.
Onshkoff, A.
Polgolsky, E.
Purin, A.
Stops, Miss L.
Vosiels, Miss M.

Traffic Dept.—
Thomas, H.
Solomon, H. H.
Blinko, A. R.
Andrews, H. T.
Baptista, T.
Browning, F.
Cameron, W. G
Dinis, Miss M. B.
Dorlesk, O.
Fuxman, C.
Goldenberg, W.
Henderson, J.
Henderson, G.
Johnsford, W.
Lester, E.
Lundberg, E. M.
Maher, F.
Mott, J.
O'Neill, T. C.

SMOKE CAPSTAN!

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

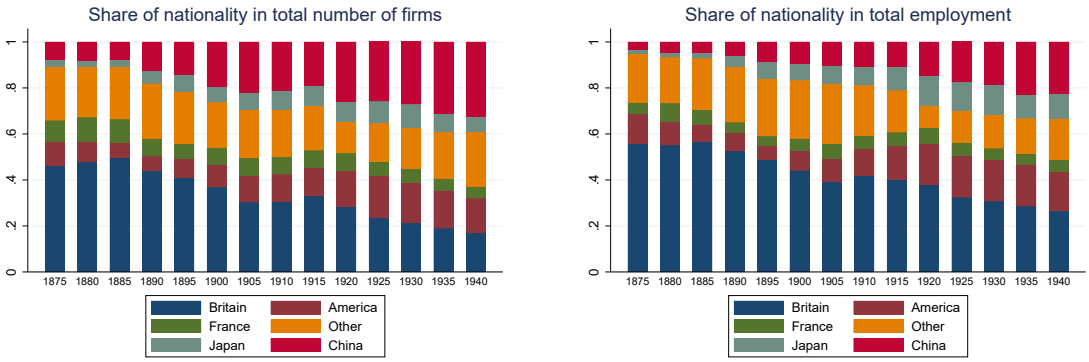
Figure 4: Employment of British American Tobacco in 1906 versus 1926



(a) Share of firm numbers

(b) Share of total employment

Figure 5: Industry Composition of Businesses in Shanghai's Concessions



(a) Share of firm numbers

(b) Share of total employment

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

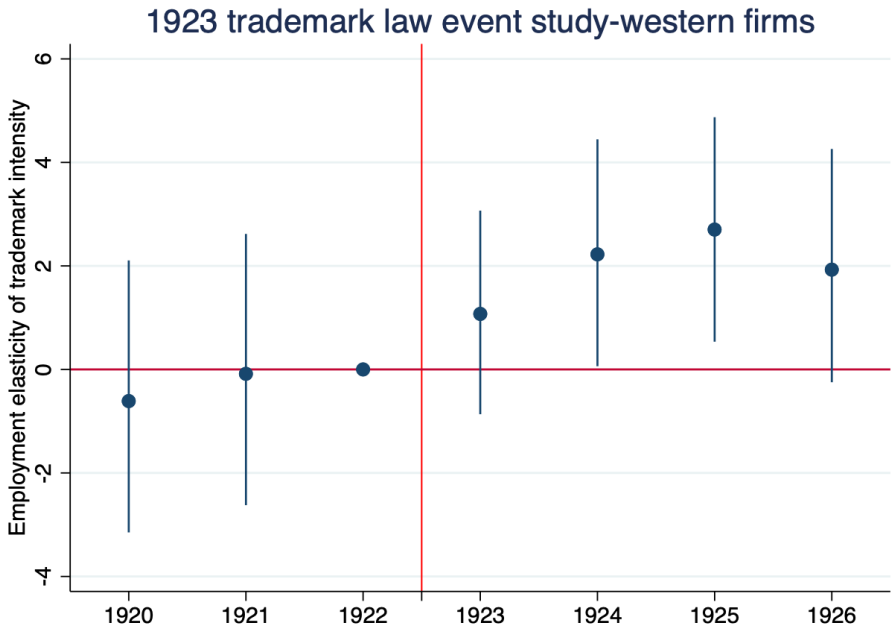


Figure 7: The Effect of Trademark Law on Western Firm Employment: Event Study

Notes: The graph is produced by estimating equation (2) for Western firms. Confidence intervals are computed using wild cluster bootstrap with clusters at the product category and country-year levels (Roodman, Ørregaard Nielsen, MacKinnon, and Webb, 2019).

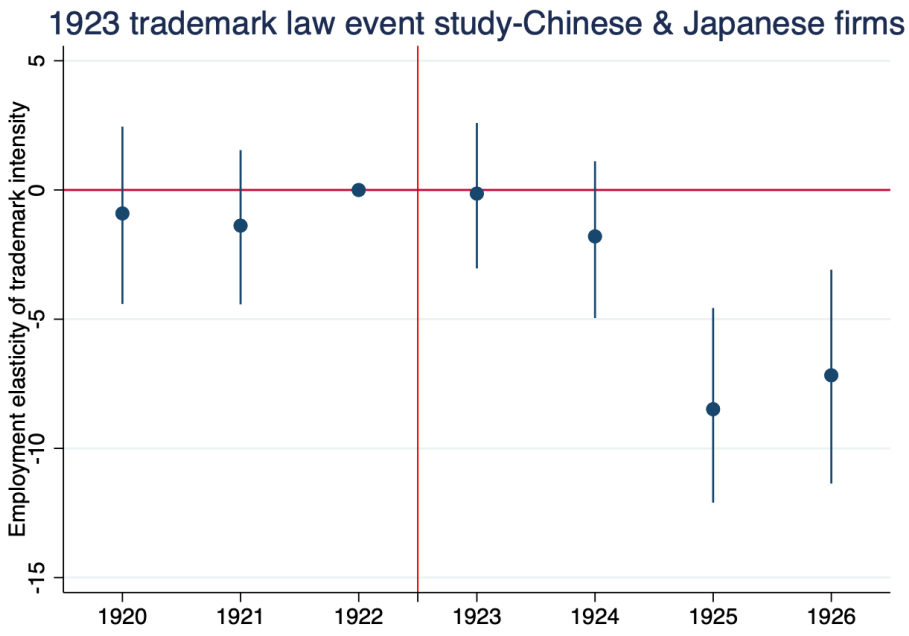


Figure 8: The Effect of the Trademark Law on Chinese and Japanese Firm Employment: Event Study

Notes: The graph is produced by estimating equation (2) for Chinese and Japanese firms. Confidence intervals are computed using wild cluster bootstrap with clusters at the product category and country-year levels (Roodman et al., 2019).

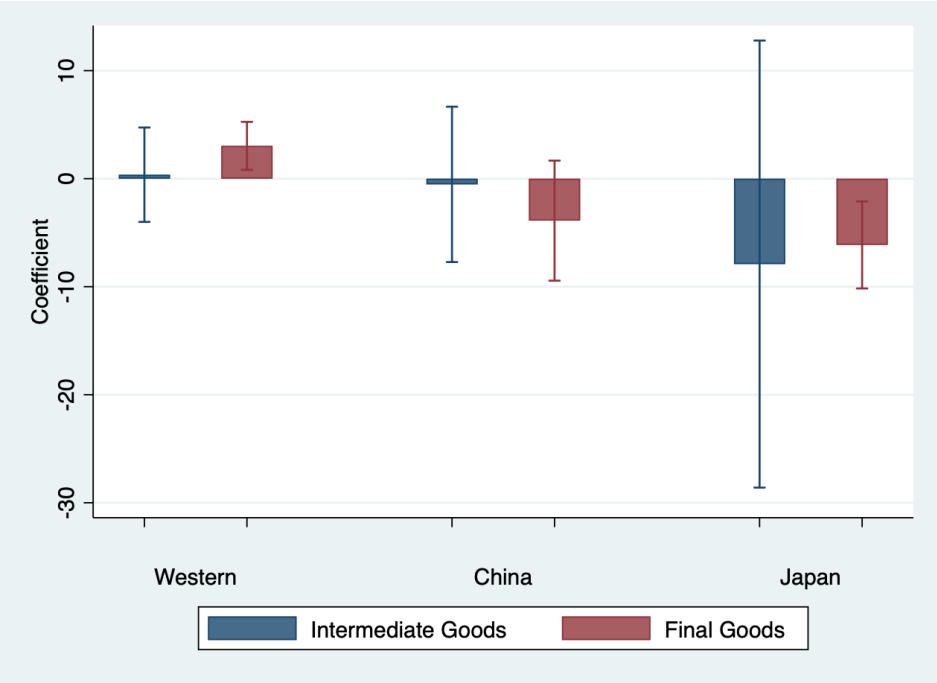


Figure 9: The Effect of the Trademark Law on Intermediate versus Final Goods

Notes: This figure reports the estimated effects of the trademark law on final goods vs. intermediate goods. The effects are estimated based on an extended version of equation (1), where we add interaction terms for intermediate and final goods depending on the NCL product classification of the product with the largest trademark intensity a firm sells.

Table 1: Trademark Intensity across Product Categories

NCL product category	Trademark int.	NCL product category	Trademark int.
Pharmaceuticals	0.088	Fabrics and fabric covers	0.016
Non-medicated cosmetics and toiletry	0.076	Toys, games, sports equipment	0.016
Foodstuffs of plant origin	0.073	Precious metals, jewellery, clocks, watches	0.013
Foodstuffs of animal origin	0.048	Medical equipment	0.013
Alcoholic beverages	0.047	Furniture	0.013
Chemical products	0.046	Natural or synthetic yarns	0.012
Paper, cardboard and office goods	0.045	Dressmakers' articles	0.012
Tobacco	0.041	Leather and leather goods	0.010
Non-alcoholic beverages; beer	0.040	Musical instruments	0.008
Machines, motors and engines	0.036	Canvas and other materials	0.008
Hand-operated tools	0.035	Firearms	0.006
Paints and colorants	0.034	Scientific and technological services	0
Scient. instruments and audio equip.	0.034	Food and drink services	0
Metals	0.031	Telecommunications services	0
Clothing, footwear and headwear	0.030	Transport; packaging and storage of goods	0
Industrial oils and fuels	0.029	Legal, security, and personal services	0
Small, hand-operated utensils	0.026	Medical and veterinary services	0
Live animals and plants	0.024	Construction services; mining and drilling	0
Environmental apparatus	0.024	Business services	0
Vehicles	0.021	Treatment and recycling	0
Electrical, thermal, acoustic insulating materials	0.021	Insurance, financial and real estate services	0
Materials, not of metal	0.018	Education, entertainment, sports	0

Notes: 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: The Effect of the Trademark Law on Firm Employment

	(1) ln(empl)	(2) ln(empl)	(3) ln(empl)	(4) ln(empl)
Post 1923 * trademark intensity				
– Western	1.408*	1.748**	2.177**	2.223**
	(0.821)	(0.774)	(1.058)	(1.063)
– Chinese Firms	-1.842	-1.814	-3.096	-3.960*
	(1.655)	(1.678)	(2.395)	(2.251)
– Japanese Firms	-0.401	-0.071	-6.849***	-8.897***
	(2.112)	(2.599)	(1.840)	(2.338)
Observations	3,180	3,144	3,006	4,472
R-squared	0.906	0.908	0.913	0.890
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes			
Ctry*Year FE		Yes	Yes	Yes
Ind*Year FE			Yes	Yes
Sample until	1926	1926	1926	1930

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 1923 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 interactions of the China dummy with a post-1923 dummy, as well as the interaction of the Japan dummy with the post-1923 dummy (coefficients not shown). Standard errors clustered by product category and country-year. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3: Controlling for Alternative Product and Country Attributes

	(1) ln(empl)	(2) ln(empl)	(3) ln(empl)	(4) ln(empl)	(5) ln(empl)	(6) ln(empl)
Post 1923 * trademark intensity						
– Western Firms	2.177**	2.068*	2.234**	2.254**	1.698*	2.953***
	(1.058)	(1.056)	(1.058)	(1.083)	(0.956)	(1.006)
– Chinese Firms	-3.096	-3.100	-3.037	-3.041	-2.556	-3.011
	(2.395)	(2.314)	(2.391)	(2.398)	(2.155)	(2.380)
– Japanese Firms	-6.849***	-7.201***	-6.254***	-6.282***	-7.310***	-6.311***
	(1.840)	(2.282)	(1.883)	(1.832)	(2.139)	(1.857)
Post 1923 * patent intensity						
– Western Firms		0.429				
		(0.564)				
– Chinese Firms		0.469				
		(0.426)				
– Japanese Firms		-0.957				
		(2.045)				
Post 1923 * ln(number of firms)						
– Western Firms			0.008			
			(0.015)			
– Chinese Firms			0.016			
			(0.034)			
– Japanese Firms			0.053			
			(0.065)			
Post 1923 * ln(total employment)						
– Western Firms				0.007		
				(0.010)		
– Chinese Firms				0.011		
				(0.031)		
– Japanese Firms				0.041		
				(0.050)		
Post 1923 * ln(average employment 20-22)						
– Western Firms					-0.089***	
					(0.023)	
– Chinese Firms					-0.075*	
					(0.040)	
– Japanese Firms					0.082	
					(0.112)	
Trademark intensity * ln(real GDP)						-5.552
						(5.206)
Observations	3,006	3,006	3,006	3,006	3,006	3,006
R-squared	0.913	0.913	0.913	0.913	0.914	0.913

Notes: This table reports the estimated effect of the 1923 trademark law on Western firms' employment when controlling for other product or industry attributes. The dependent variable is the natural log of a firm's employment in a given year. Post 1923 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. "ln(real GDP)" is the real GDP of the home country of the firm from the *Maddison Project Database*, interpolating data for missing years, see Bolt, Inklaar, de Jong, and van Zanden (2018) and Fouquin and Hugot (2016). All regressions include firm, industry-year, and country-year fixed effects. Standard errors two-way clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: How did Firms Grow or Shrink? The Effect of the Trademark Law on the Probability of Hiring in Certain Positions

	(1)	(2)	(3)	(4)
		Dummy if firm has:		
	ln(empl)	Lawyers	Sales staff	Engineers
Post 1923 * trademark intensity				
– Western Firms	3.566**	0.913	0.453	0.732*
	(1.326)	(0.573)	(1.179)	(0.394)
– Chinese Firms	-4.974	0.429	-1.495	-0.173
	(3.086)	(0.642)	(1.120)	(0.198)
– Japanese Firms	-12.439***	-0.065	-4.779**	-0.396
	(3.424)	(2.178)	(2.049)	(1.988)
Observations	2,344	2,344	2,344	2,344
R-squared	0.913	0.824	0.709	0.785

Notes: This table reports the estimated effect of the 1923 trademark law on firms' probability of hiring lawyers, sales, and engineers. The dependent variables in columns (2)-(4) are dummies denoting whether a firm has lawyers, sales staff, and engineers in their employees. Post 1923 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. All regressions include firm, country-times-year, and industry-times-year fixed effects. Standard errors two-way clustered by product category and country-year. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5: Entry, Exit and Product Composition

	(1)	(2)	(3)	(4)	(5)
	Extensive margin			Product scope	
	Firm entry	Firm exit	Firm exist	Adding tm-int product	Dropping tm-int product
Post 1923 * trademark intensity					
– Western Firms	-0.282	-0.797**	0.515	-0.621	-0.717**
	(0.648)	(0.321)	(0.771)	(0.715)	(0.268)
– Chinese Firms	-0.345	-1.423**	1.077	-0.585	-0.093
	(0.746)	(0.596)	(0.853)	(0.641)	(0.344)
– Japanese Firms	-1.594*	0.035	-1.629	2.334***	-3.193
	(0.893)	(0.728)	(1.345)	(0.189)	(2.538)
Observations	7,652	7,652	7,652	2,782	2,782
R-squared	0.667	0.572	0.556	0.318	0.342

Notes: This table reports the estimated effect of the 1923 trademark law on firms' probability of entry, exit, being active, and adding or dropping trademark-intensive products. The dependent variables are dummies denoting whether a firm enters, exits, is active, or add/drop a trademark-intensive product. Post 1923 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. The data in columns (1)-(3) consists of a balanced sample of firms that ever existed in 1920-1926. The data in columns (4)-(5) consist of firms that existed in 1920-1922. All regressions include firm, country-times-year, and industry-times-year fixed effects. Standard errors two-way clustered by product category and country-year. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6: Advertising Investments

	(1) Advertising dummy	(2) ln(advertising days+1)	(3) $\sinh^{-1}$(ad-)vertising)
Post 1923 * trademark intensity			
– Western Firms	0.542	3.316*	3.366*
	(0.877)	(1.887)	(1.950)
– Chinese Firms	-0.300	0.641	0.567
	(0.578)	(2.137)	(2.221)
– Japanese Firms	3.464**	3.060	3.680
	(1.457)	(2.013)	(2.260)
Observations	3,098	3,098	3,098
R-squared	0.695	0.809	0.805

Notes: This table reports the estimated effects of the trademark law on the advertising of Western firms on Shen Bao. The sample includes Western firms located in Shanghai's concessions with employment and activity information between 1920-1926. The dependent variables are the dummy of having advertisements on Shen Bao in a specific year, logged numbers of advertising days of advertisements, and the inverse sine of advertising days of advertisements, respectively. Post 1923 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. All regressions include firm, country-times-year, and industry-times-year fixed effects. Standard errors two-way clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Domestic Integration within the Boundary of Firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Hierarchy		Job titles		
	ln(empl)	ln(foreign empl)	Dummy Chinese empl	Dummy Chinese mgr	Avg layer of Chinese empl	Dummy Chinese sales staff	Dummy Chinese engineers	Dummy Chinese manuf staff
Post 1923 * trademark int.								
– Western Firms	2.177**	1.646	1.995**	0.719***	-0.818***	0.130**	-0.690	-0.386
	(1.058)	(1.033)	(0.789)	(0.201)	(0.279)	(0.062)	(0.535)	(0.437)
– Chinese Firms	-3.096	-1.538	-0.024	-0.503***	0.206***	-1.075	-0.129	0.912***
	(2.395)	(1.416)	(0.195)	(0.034)	(0.062)	(1.039)	(0.221)	(0.256)
– Japanese Firms	-6.849***	-9.394***	-1.998	-1.468	2.853	0.043	0.000	0.000
	(1.840)	(3.031)	(2.323)	(0.871)	(2.022)	(0.052)	(0.000)	(0.000)
Observations	3,006	3,006	3,006	3,006	1,607	2,344	2,344	2,344
R-squared	0.913	0.948	0.809	0.656	0.593	0.741	0.751	0.387

Notes: This table reports the estimated effects of the trademark law on the organization of firms and their decisions to recruit and promote Chinese employees. The sample includes firms located in Shanghai's concessions with employment and activity information between 1920-1926. The dependent variables are whether to hire Chinese employees and managers, Chinese employees' average rank/layer in the management hierarchy, and whether to hire Chinese sales, engineers, and manufacturing staff, respectively. Post 1923 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. All regressions include firm, country-times-year, and industry-times-year fixed effects. Standard errors two-way clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: The Client Growth of Chinese Intermediary Firms

	(1)	(2)
	Dummy having clients	ln(num clients+1)
Post 1923 * trademark intensity		
– Western Firms	-0.247	-1.858
	(0.631)	(2.279)
– Chinese Firms	1.606***	2.672***
	(0.459)	(0.593)
– Japanese Firms	-0.036	-3.601
	(0.823)	(2.559)
Observations	3,006	3,006
R-squared	0.770	0.783

Notes: This table reports the estimated effects of the trademark law on the client growth of intermediary firms. The dependent variables are a dummy whether a business serves as an agent for business clients and the number of business clients for which the firm serves as an agent. Post 1923 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. All regressions include firm, country-times-year, and industry-times-year fixed effects. Standard errors two-way clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: The Employment Growth of Chinese Intermediaries

	(1) ln(empl)	(2) Firm entry	(3) Firm exit
Post 1923 * trademark intensity	-3.657	-0.701	-1.212*
	(2.415)	(0.881)	(0.614)
Post 1923 * trademark intensity * agent dummy	14.855*	7.319*	-3.367
	(7.196)	(3.163)	(2.237)
Post 1923 * agent dummy	-0.387**	-0.508***	0.121
	(0.115)	(0.117)	(0.103)
Observations	870	2,330	2,330
R-squared	0.881	0.665	0.555

Notes: This table reports the estimated effects of the trademark law on the employment, entry and exit of Chinese firms, in particular, Chinese intermediaries. The dependent variables are the number of employees and dummies denoting entry and exit of the firm. Column (1) uses the sample of firms that existed before 1923, and columns (2) and (3) use a fully balanced panel dataset to study entry and exit. The agent dummy denotes firms that acted as agents in 1920-1922. Post 1923 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. All regressions include firm, country-times-year, and industry-times-year fixed effects. Standard errors two-way clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 10: The Effects of the Trademark Law on Aggregate Employment and Competition

	(1) ln(empl)	(2) ln(empl + 1)	(3) ln(empl)	(4) ln(empl + 1)	(5) ln(# firms)	(6) ln(# firms + 1)	(7) Firm dummy
Post 1923*trademark intensity	3.564*	9.315***	1.589	8.642**	0.076	5.920*	2.279*
	(1.904)	(3.269)	(1.384)	(3.902)	(1.739)	(3.179)	(1.175)
Observations	548	1,274	575	1,274	582	1,274	1,274
R-squared	0.848	0.757	0.875	0.739	0.904	0.745	0.626

Notes: This table reports the estimated effects of the trademark law on product-level employment and competition. In columns (1) and (2), firm-level employment of multi-product firms is allocated to the product with highest trademark intensity. In columns (3) and (4), firm-level employment of multi-product firms is distributed across all products equally. Firm dummy is 1 if the product-year has at least one firm for which the product has the highest trademark intensity, and 0 otherwise. Post 1923 is a dummy denoting the period after the establishment of the trademark law in 1923. Trademark intensity is the product specific trademark intensity calculated using each product's share in total pre-1923 trademarks. All regressions include product and year fixed effects. Standard errors are clustered at the product level. *** p<0.01, ** p<0.05, * p<0.1.

Table 11: Comparing Alternative Institutions

	(1) ln(empl)	(2) ln(empl)	(3) ln(empl)	(4) ln(empl)	(5) ln(empl)	(6) ln(empl)
Part I: ET						
ET	0.063	0.137	0.185	0.185	0.130	
	(0.092)	(0.134)	(0.143)	(0.143)	(0.152)	
ET*trademark intensity		-2.383	-3.532	-3.533	-2.137	-4.475
		(2.651)	(2.719)	(2.714)	(3.110)	(3.825)
Part II: Bilateral Treaties						
Treaty			-0.295*	-0.295*	-0.286*	
			(0.147)	(0.147)	(0.149)	
Post 1904*trademark intensity			-7.271***	-7.134***	-6.988***	-9.373***
			(2.551)	(1.575)	(1.558)	(2.555)
Treaty*trademark intensity			3.549	3.548	3.209	5.636
			(3.043)	(3.041)	(3.076)	(4.446)
Part III: Provisional Trademark Code						
(Post 1906)*trademark intensity				-0.145	-1.421	-1.323
				(2.317)	(2.214)	(2.538)
Part IV: 1923 Trademark Law						
(Post 1923)*trademark intensity					3.581**	3.929***
					(1.336)	(1.451)
Observations	20,051	20,051	20,051	20,051	20,051	19,797
R-squared	0.765	0.765	0.766	0.766	0.767	0.777
Country-year controls	Yes	Yes	Yes	Yes	Yes	No

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. 1906 trademark code is a dummy denoting a trademark code proposed in 1906 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). All regressions include firm, country-times-year, and industry-times-year fixed effects. Standard errors two-way clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

ONLINE APPENDIX

A Additional Analysis

A.1 Data Validation: the Hong List

The Hong List, published by the *North-China Daily News*, was a business directory covering the universe of firms operating in Shanghai's concession. To cross check the coverage of the Hong List, we compare the aggregate non-production foreign employment of foreign firms with the size of the foreign population (including 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 (see Figure C.1a) in the Online Appendix. For the international concession, the census reports population separately for male adults, female adults, and children. Figure C.1b shows that the aggregate (predominantly male) employment in the Hong List covers about 80% of the foreign male adult population of the census in the international concession, which we believe provides support to the coverage of the Hong List.

A.2 Restricting the Analysis to Goods Only

In our main paper, firms in both goods and services sectors are included in the analysis. In this subsection, we examine the robustness of the results when restricting the analysis to goods only. Note that as many of the firms in our sample sell both goods and services, this analysis drops firms that sell only services.

The results are reported in Table B.2. We find that the estimated effect of the trademark law to increase in magnitude when considering goods only and are statistically significant in most specifications.

A.3 Dropping a Country or Product

Next, we examine whether the estimated growth effects of the trademark law are due to a particular country or product. In Figures C.4 and C.5 below, we show that neither a specific country nor a specific product group is driving the results. The results are very similar in magnitude and mostly significant when we drop a country or product group at a time.

A.4 Excluding Potential Interest Groups

We also conduct a different set of robustness checks and test whether excluding certain interest groups, namely, specific countries, products, or firms that were expected to benefit particularly from the trademark law, would affect our estimated effects of the trademark law on Western firm growth.

For example, German firms lost extraterritoriality at the end of World War I and as a result would arguably have more interests in a domestic trademark law in China. Relatedly, among the different products, cigarettes were a product that was particularly affected by trademark infringements.[1] At the same time, the cigarette industry was heavily concentrated, with

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

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. While this seems unlikely given the historical context described in Section 2.4, we can drop BAT and the entire tobacco industry.

The analysis in which we drop German firms, BAT, and the tobacco industry, respectively, shows that, similar to the previous sub-section where we drop one country or industry at a time, excluding the various groups does not affect our estimated effect of the trademark law, either.

A.5 The Effect of the Trademark Law on Chinese Imports

In addition to firm growth, we would expect the trademark law to similarly affect China's imports of trademark-intensive products.

To investigate this, we compile bilateral product-level import data between China and the world for the period of 1920 to 1928.[2] 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 91% of trade data in terms of imports value in 1924 either exactly over time (35%) or closely (56%) with deviations of less than 1% of trade value in either product classification in both 1923 and 1924).[3] In our analysis we focus on the products that we can exactly match over time, and show robustness checks that include the remaining product categories.

In order to examine this, we use bilateral product-specific import data and 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 import values 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 different product categories can be of different size, we use the average import value between 1920-

Section 2.4.

[2]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.

[3]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.

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. We also 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).[4]

Table B.3 presents the results. Column (1) shows that the imports of trademark-intensive products increased significantly after the establishment of the trademark law. Column (2) shows that the result is very similar when using country-year fixed effects instead of year specific fixed effects, our preferred specification. The magnitude of the effect is sizeable: imports in the most trademark-intensive products in the trade data (i.e., tea and coffee with a trademark intensity of 0.073) increased by 1.2%, while imports in the product category with mean trademark-intensity (i.e., chinaware with a trademark intensity of 0.026) increased by 0.4% after the trademark law.

Columns (1) and (2) of Table B.3 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 the 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 (5) uses the simple import dummy and confirms that the trademark law also led to the establishment of new trade relationships in trademark-intensive products.

As with the firm data, in order for our identification strategy to work, it is important to make sure that there are no pre-trends indicating imports of trademark-intensive goods might have grown even in the absence of the trademark law. To check for this, 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 C.7 shows the estimation results. Again, there is no evidence of pre-trends: the coefficients before 1923 are by an order of magnitude smaller and insignificantly different from zero, while coefficients after 1923 are consistently large, and mostly significantly different from zero. There, however, appears to be a slight decline in the effect of the trademark law over time.

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 B.3 the results confirm what we have seen in the analysis of employment growth; imports from Japan fell, though the effect

[4]The recovery of rice imports from the rice crisis appeared as a pre-trend in our data, which would overestimate our effect.

is not significant. The full event study for Japan is reported in Figure C.8; while the event study is noisier than the one for Western imports in general, it does not find imports to grow after the trademark law.

A.6 Robustness to Alternative Measures of Trademark Intensity

In Table B.4 we use alternative measures of trademark intensity. We begin by normalizing trademark intensity by the size of the industry in column (2). In Table 3 we have already shown that our results are robust to controlling for the size of the respective industry in Shanghai, but the size of the industry in Shanghai may not be the size of the industry in the foreign countries for which we have trademark data. We were able to obtain detailed employment data per industry that enabled us to match employment to NCL product categories for the U.S., so in column (2) we divide U.S. trademark intensity by the size of a product group as measured by total employment in this product group in the U.S..[5] While this rescales the trademark intensity variable using employment, our results are robust to this alternative measure. In column (3) we return to our baseline measure of trademark shares, but we take out Japan's trademark intensity from the aggregate measure, and assign it to Japan only. I.e., Western countries and China get assigned the trademark intensity of all countries excluding Japan, and Japan gets assigned the trademark intensity of Japan. In column (4) we go one step further and use the trademark intensity of each firm's home country (and the aggregate measure if we do not have trademark registration data for a given country) rather than the aggregate trademark share as in our baseline specification. While these measures may be susceptible to endogeneity concerns and are therefore not our preferred measure, the results are robust.

A.7 The Effect of the Trademark Law on Quality Ads

The previous literature has also suggested that trademark protection may exert mixed effects on product quality. On the one hand, firms may improve product quality as they capture a larger market share, charge potentially higher prices, and/or experience larger demand for their products as consumers become less concerned about receiving counterfeits. On the other hand, authentic producers may have more incentives to offer a higher quality without trademark protection, in order to make it harder for counterfeiters to copy their products.

We explore these hypotheses using information available in the advertisement data. Specifically, we classify a subset of advertisements as "quality ads", if the text of the advertisements stresses the quality of the product, using words such as 质 (quality), 特效 (effective), 功效 (efficacy), 功用 (effect). In columns (1) to (3) of Table B.5 we find an insignificant increase in firms' advertising highlighting product quality.

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[5]We are grateful to Dave Donaldson, James Lee, and Rick Hornbeck for sharing the digitized census data with us. The U.S. 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 U.S. 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.

A.8 The Effect of Trademark Registrations on Prices

In Section 4.4 of the paper, we have documented a net increase in employment and product categories after the trademark law. Here, we examine how the trademark law might have influenced prices, another important outcome for assessing the impact of trademark institutions on market competition and consumer welfare. Ex ante, trademark protection may exert an ambiguous net effect on prices. Prices might rise if authentic producers gain market power via market reallocation or increased consumer demand. However, the contrary may also occur if, for example, authentic producers improve economies of scale thanks to an expanded market share or lower product quality as they feel less need to distinguish themselves from counterfeiters.

To investigate the price effect of the trademark law, we obtain detailed brand-level price panel data by digitizing issues of *The Shanghai Market Prices Report*, published by the Ministry of Finance, Bureau of Markets, in Shanghai. Specifically, we digitized the *Wholesale Prices of Commodities at Shanghai* or *The Table of Wholesale Prices in Shanghai* (in later issues) which reported monthly price series starting in April 1923. Overall, we collected monthly price series for the period of April 1923 to December 1929.

The products reported are from eight product categories: cereals, other food products, textiles, metals, fuels, building materials, industrial materials, and sundries. Each product is "affixed with its trade mark, brand and, in some cases, the name of the company" (The Shanghai Market Prices Report, April-June 1924, p. 2). The products recorded expanded over time, but we only consider products consistently reported between June 1923 (as there were some missing prices before this date) and December 1929, yielding 117 products. Out of these, 39 listed at least one brand name (instead of a generic, though narrow, product description), and we use this subset for our analysis further below.[6] The market price reports also indicate the country origin of the manufacturer in most cases, which we classified into Western, Japanese and Chinese brands.

We then manually searched all the brands listed in the price reports in the trademark registries of China, i.e., *Shangbiao Gongbao* (商标公报) (we located all the volumes until December 1927 except for the first one). We were able to find trademark registrations for 28 products in this time period.

Since the price data is only available from April 1923, one month before the trademark law was announced, we undertake a different empirical strategy from the specifications used earlier. Specifically, we manually check the Chinese trademark registry to identify when (or if) a given brand became registered, and implement a staggered differences-in-differences estimation. Since gradual adjustment of prices can bias the coefficients in the standard OLS estimation, we estimate the average effect on the treated (ATT) using the method introduced in Callaway and Sant'Anna (2020) as our preferred method.

Table B.6 presents the results. Column (1) uses the potentially biased OLS, which shows a positive but insignificant effect on prices after trademark registration. In column (2) we

[6] In some instances, product prices were missing for specific months. In order to generate a fully balanced panel necessary for the method suggested by Callaway and Sant'Anna (2020), we replaced the missing data with the prices from the previous period.

report the ATT estimated using Callaway and Sant'Anna (2020)'s method, which is slightly negative but insignificant. In columns (3) and (4) we repeat the analysis on the sample of Western products, and the negative effect becomes stronger, but is still insignificant.

Before we can trust the estimates, we again need to check for pre-trends. Figure C.9 shows that log prices in the months before a trademark gets registered were stable, and declined upon registration, stabilizing after about 8 months. We also formally test for pre-trends using the method described in (Callaway and Sant'Anna, 2020), and find no evidence for them.

Overall, we find no evidence of authentic producers raising prices as a result of trademark registrations; if anything, they fell. This result, together with the earlier findings on rising aggregate employment and number of product categories, suggests that the trademark law did not lead to reduced market competition and higher prices for consumers.

B Online Appendix — Tables

Table B.1: Summary Statistics

	(1) Observations	(2) Mean	(3) Std.dev.	(4) Min	(5) Max
Employee number	3220	10.215	20.864	1	387
Share of Chinese employees	3220	0.298	0.382	0	1
Number of products	3220	1.635	1.222	1	11
Trademark intensity	3220	0.022	0.024	0	0.088
Western firm dummy	3220	0.64	0.48	0	1
Chinese firm dummy	3220	0.279	0.449	0	1
Japanese firm dummy	3220	0.081	0.272	0	1

Notes: Summary statistics are provided for the sample used in the baseline regression, column (1) of Table 2 (the regression drops some singletons).

Table B.2: The Effect of the 1923 Trademark Law on Employment of Western Firms: Goods only

	(1) ln(empl)	(2) ln(empl)	(3) ln(empl)	(4) ln(empl)
Post 1923*trademark intensity	2.531**	2.423*	2.489	2.550*
	(1.079)	(1.265)	(1.543)	(1.378)
Observations	855	842	808	1,209
R-squared	0.905	0.912	0.909	0.896
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes			
Ctry*Year FE		Yes	Yes	Yes
Ind*Year FE			Yes	Yes
Sample until	1926	1926	1926	1930

Notes: The trademark intensity measure used in this table only considers products but not services of firms. Firms that only sell services are therefore dropped. Standard errors are clustered by product category. *** p<0.01, ** p<0.05, * p<0.1.

Table B.3: Trademark Law and Import Growth — Western Countries versus Japan

VARIABLES	(1) ln(imports)	(2) ln(imports+1)	(3) $\sinh^{-1}$(imports)	(4) Import dummy
Trademark intensity * (Post $\geq$ 1923) * All countries excl. Japan	16.263**	22.591**	23.029**	0.637**
	(7.415)	(9.194)	(9.337)	(0.290)
Trademark intensity * (Post $\geq$ 1923) * Japan	-2.433	-7.967	-8.299	-0.476
	(11.321)	(12.705)	(12.896)	(0.517)
Observations	11,071	14,958	14,958	14,958
R-squared	0.906	0.863	0.858	0.583
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, separately from all countries excluding Japan and from Japan. 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 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 B.4: Robustness to Alternative Measures of Trademark Intensity

	(1) ln(empl)	(2) ln(empl)	(3) ln(empl)	(4) ln(empl)
Post 1923 * trademark intensity				
– Western	2.177**			
	(1.058)			
– Chinese Firms	-3.096			
	(2.395)			
– Japanese Firms	-6.849***			
	(1.840)			
Post 1923*normalized U.S. trademark share				
– Western		13.877**		
		(6.014)		
– Chinese Firms		-24.185**		
		(11.305)		
– Japanese Firms		15.779		
		(21.359)		
Post 1923 * trademark share excl. Japan				
– Western Firms			2.310**	
			(1.041)	
– Chinese Firms			-2.826	
			(2.365)	
– Japanese Firms			-3.432***	
			(0.148)	
Post 1923 * country specific trademark share				
– Western Firms				1.717*
				(0.944)
– Chinese Firms				-2.826
				(2.365)
– Japanese Firms				-3.432***
				(0.148)
Observations	3,006	2,037	3,006	3,006
R-squared	0.913	0.912	0.913	0.913

Notes: This table reports the estimated effect of the 1923 trademark law on Western firms' employment, using alternative measures of trademark intensity. 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. Country-groups are Western, China, and Japan. All regressions include firm, country-times-year, and industry-times-year fixed effects. Standard errors clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table B.5: Quality Advertisements

	(1) Quality adv. dummy	(2) ln(quality advertising days+1)	(3) $\sinh^{-1}$(quality) advertising)
Post 1923 * trademark intensity			
– Western Firms	0.119	0.979	0.996
	(0.425)	(0.689)	(0.750)
– Chinese Firms	-0.363	-0.001	-0.118
	(0.268)	(0.664)	(0.696)
– Japanese Firms	n/a	n/a	n/a
Observations	3,098	3,098	3,098
R-squared	0.585	0.671	0.669

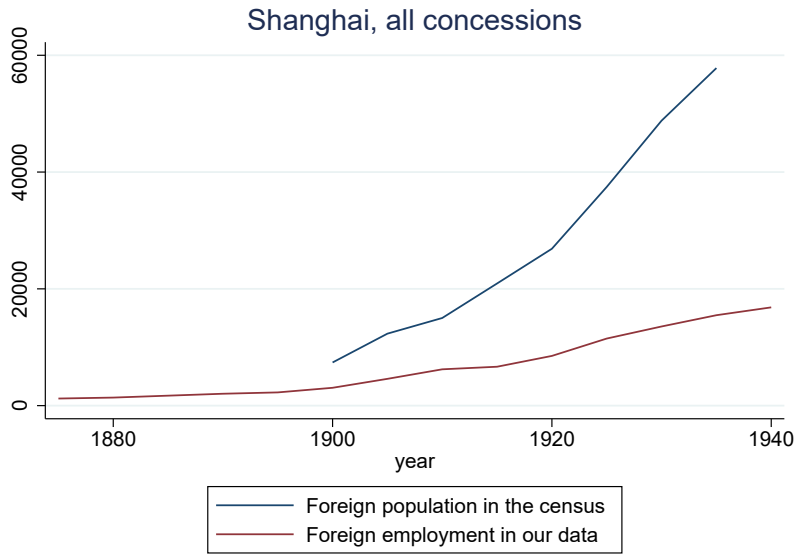
Notes: This table reports the estimated effects of the trademark law on quality advertising of Western firms on Shen Bao. The sample includes Western firms located in Shanghai's concessions with employment and activity information between 1920-1926. The dependent variables are the dummy of having quality advertisements on Shen Bao in a specific year, logged numbers of quality advertising days of quality advertisements, and the inverse sine of quality advertising days of advertisements, 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. There is no effect estimated for Japanese firms, because there are no Japanese advertisements highlighting quality in our sample. All regressions include firm, country-times-year, and industry-times-year fixed effects. Standard errors clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table B.6: The Effect of Trademark Registrations on Prices

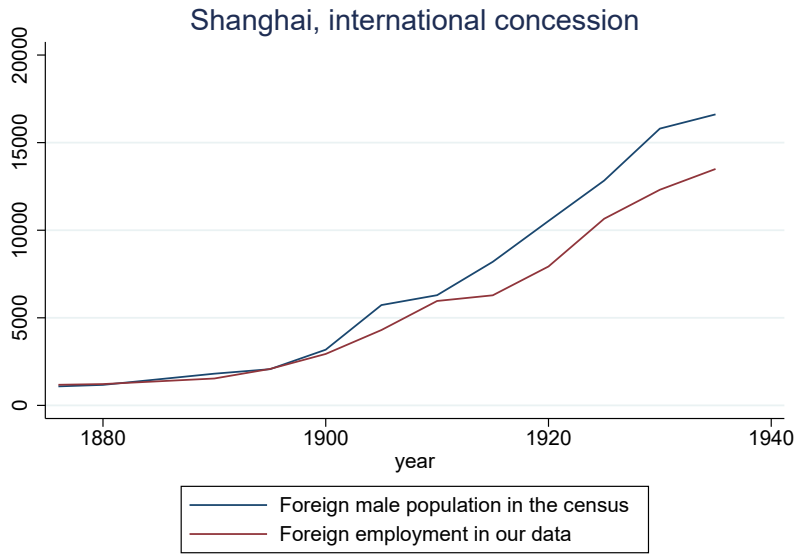
Sample:	(1) All products	(2) All products	(3) Western products	(4) Western products
	ln(price)	ln(price)	ln(price)	ln(price)
Post trademark registration	0.039	-0.010	0.041	-0.032
	(0.038)	(0.034)	(0.043)	(0.037)
Observations	3,042	3,042	2,418	2,418
R-squared	0.140	n/a	0.132	n/a
Method	OLS	CS	OLS	CS

Notes: This table reports the estimated effect of trademark registrations on prices. Columns (1) and (3) estimate OLS regressions of log monthly prices on an indicator variable that is 1 after the product's trademark was registered in China, including time and product fixed effects. Standard errors are clustered by product category. Columns (2) and (4) compute the average treatment effect based on the method of Callaway and Sant'Anna (2020) (labelled 'CS') which is appropriate for staggered differences-in-differences settings, and implicitly allows for product and time fixed effects. Columns (3) and (4) restrict the analysis to products manufactured by Western companies. *** p<0.01, ** p<0.05, * p<0.1.

C Online Appendix — Figures

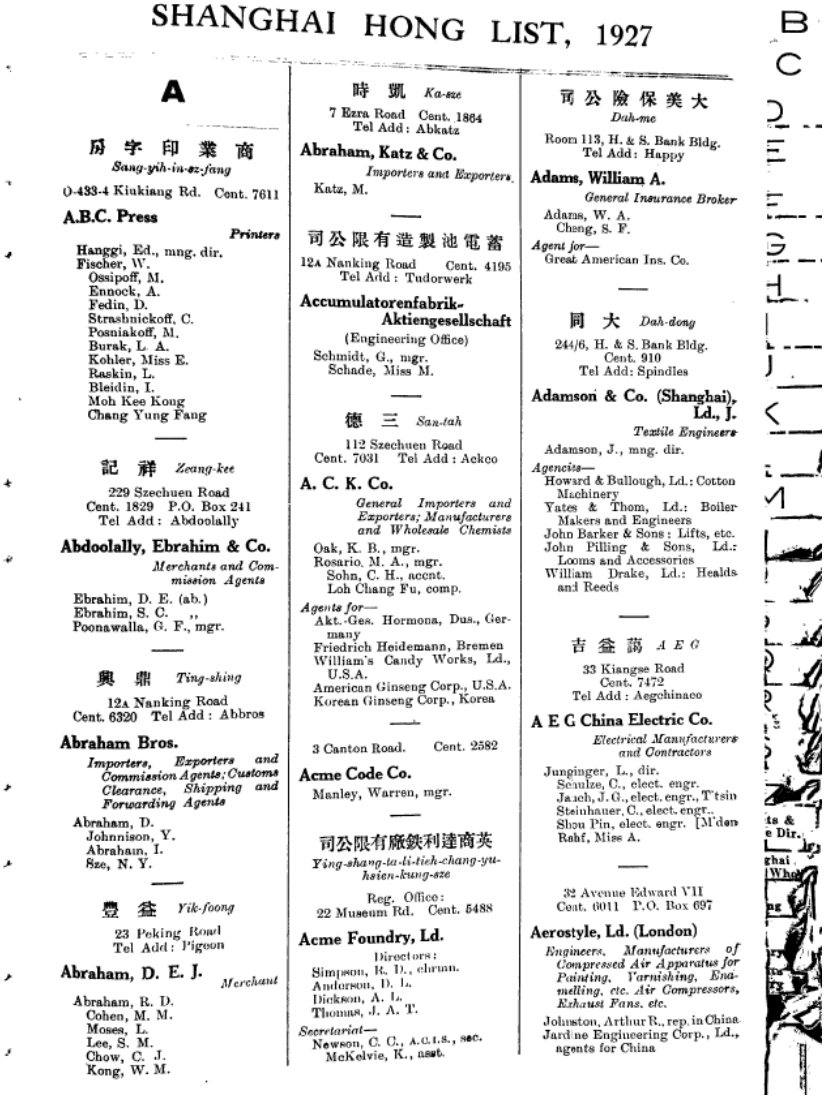


(a) All concessions



(b) Public concession

Figure C.1: Data Validation



SHANGHAI HONG LIST, 1927

A

昶 字 印 業 商
Sang-yih-in-ez-fang
0-433-4 Kiukiang Rd. Cent. 7611

A.B.C. Press
Printers
Hanggi, Ed., mng. dir.
Fischer, W.
Ossipoff, M.
Ennock, A.
Fedin, D.
Strashnickoff, C.
Posniakoff, M.
Burak, L. A.
Kohler, Miss E.
Raskin, L.
Bleidin, I.
Moh Kee Kong
Chang Yung Fang

記 祥 *Zeang-kee*
229 Szechuen Road
Cent. 1829 P.O. Box 241
Tel Add: Abdoolally

Abdoolally, Ebrahim & Co.
Merchants and Commission Agents
Ebrahim, D. E. (ab.)
Ebrahim, S. C. ,,
Poonawalla, G. F., mgr.

鼎 興 *Ting-shing*
12A Nanking Road
Cent. 6320 Tel Add: Abbros

Abraham Bros.
Importers, Exporters and Commission Agents; Customs Clearance, Shipping and Forwarding Agents
Abraham, D.
Johnnison, Y.
Abrahan, I.
Sze, N. Y.

益 豐 *Yik-foong*
23 Peking Road
Tel Add: Pigeon

Abraham, D. E. J.
Merchant
Abraham, R. D.
Cohen, M. M.
Moses, L.
Lee, S. M.
Chow, C. J.
Kong, W. M.

時 凱 *Ka-ze*
7 Ezra Road Cent. 1864
Tel Add: Abkatz

Abraham, Katz & Co.
Importers and Exporters
Katz, M.

司公限有造製池電蓄
12A Nanking Road Cent. 4195
Tel Add: Tudorwerk

Accumulatorenfabrik-Aktiengesellschaft
(Engineering Office)
Schmidt, G., mgr.
Schade, Miss M.

德 三 *San-tah*
112 Szechuen Road
Cent. 7031 Tel Add: Ackco

A. C. K. Co.
General Importers and Exporters; Manufacturers and Wholesale Chemists
Oak, K. B., mgr.
Rosario, M. A., mgr.
Sohn, C. H., accnt.
Loh Chang Fu, comp.
Agents for—
Akt.-Ges. Hormona, Dus., Germany
Friedrich Heidemann, Bremen
William's Candy Works, Ld., U.S.A.
American Ginseng Corp., U.S.A.
Korean Ginseng Corp., Korea

3 Canton Road. Cent. 2582

Acme Code Co.
Manley, Warren, mgr.

司公限有廠鉄利達商英
Ying-shang-ta-li-tieh-chang-yu-hsien-kung-sze
Reg. Office:
22 Museum Rd. Cent. 5488

Acme Foundry, Ld.
Directors:
Simpson, R. D., chrmn.
Anderson, D. L.
Dickson, A. L.
Thomas, J. A. T.
Secretariat—
Newson, C. C., A.C.I.S., sec.
McKelvie, K., asst.

司公險保美大
Dah-me
Room 113, H. & S. Bank Bldg.
Tel Add: Happy

Adams, William A.
General Insurance Broker
Adams, W. A.
Chang, S. F.
Agent for—
Great American Ins. Co.

同 大 *Dah-dong*
244/6, H. & S. Bank Bldg.
Cent. 910
Tel Add: Spindles

Adamson & Co. (Shanghai), Ld., J.
Textile Engineers
Adamson, J., mng. dir.
Agencies—
Howard & Bullough, Ld.: Cotton Machinery
Yates & Thom, Ld.: Boiler Makers and Engineers
John Barker & Sons: Lifts, etc.
John Pilling & Sons, Ld.: Looms and Accessories
William Drake, Ld.: Healds and Reeds

吉 益 滿 *A E G*
33 Kiangse Road
Cent. 7472
Tel Add: Aegchinaco

A E G China Electric Co.
Electrical Manufacturers and Contractors
Junginger, L., dir.
Scaulze, C., elect. engr.
Jaach, J. G., elect. engr., Tsin
Steinhauer, C., elect. engr.
Shou Pin, elect. engr. [M'den
Rahf, Miss A.

32 Avenue Edward VII
Cent. 6011 P.O. Box 697

Aerostyle, Ld. (London)
Engineers. Manufacturers of Compressed Air Apparatus for Painting, Varnishing, Enamelling, etc. Air Compressors, Exhaust Fans, etc.
Johnston, Arthur R., rep. in China
Jardine Engineering Corp., Ld., agents for China

Figure C.2: Example of a page from the Hong List, 1927

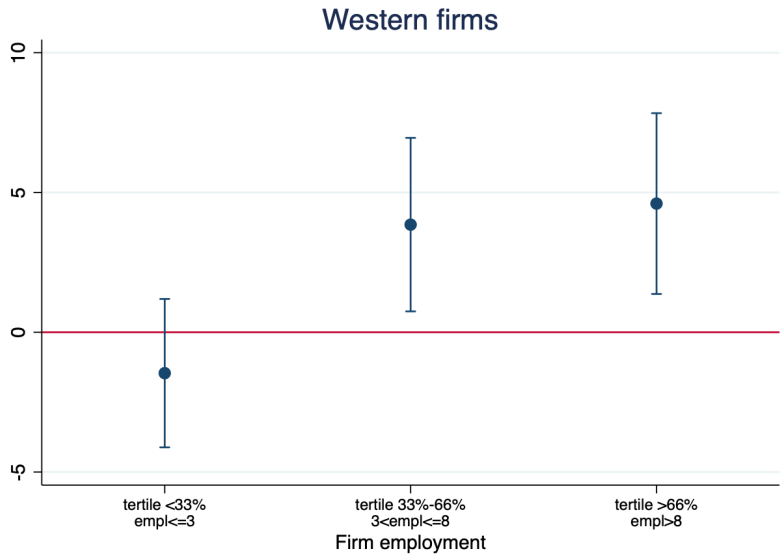


Figure C.3: The Heterogeneous Effect of the Trademark Law across Western Firms

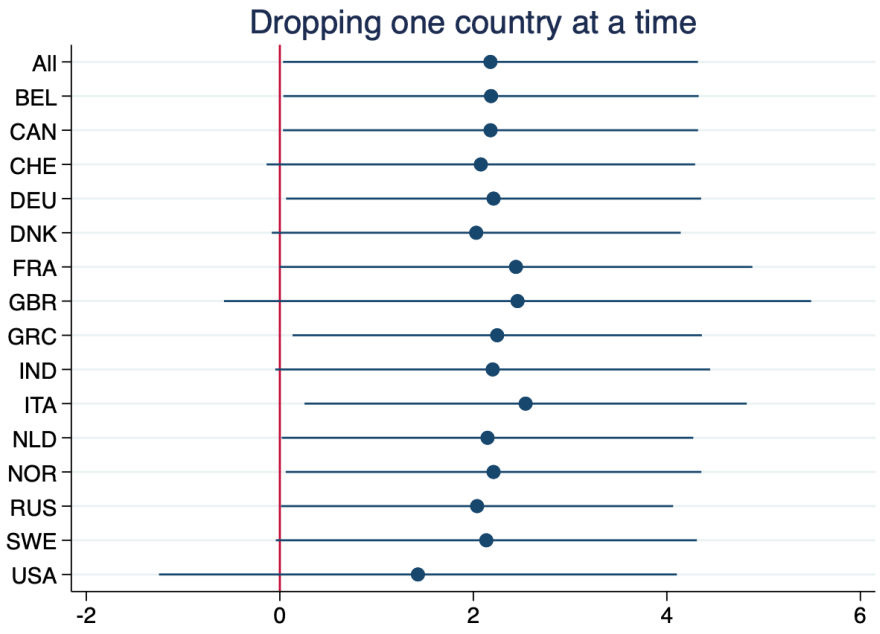


Figure C.4: The Effect of the Trademark Law on Employment of Western Firms, dropping one home country at a time

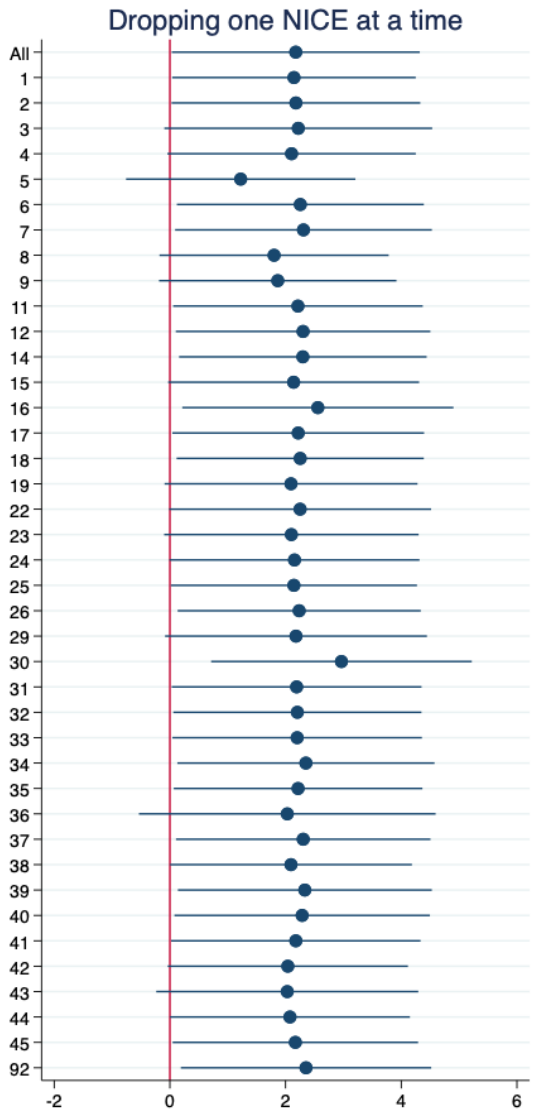


Figure C.5: The Effect of the Trademark Law on Employment of Western Firms, dropping one NCL product category at a time

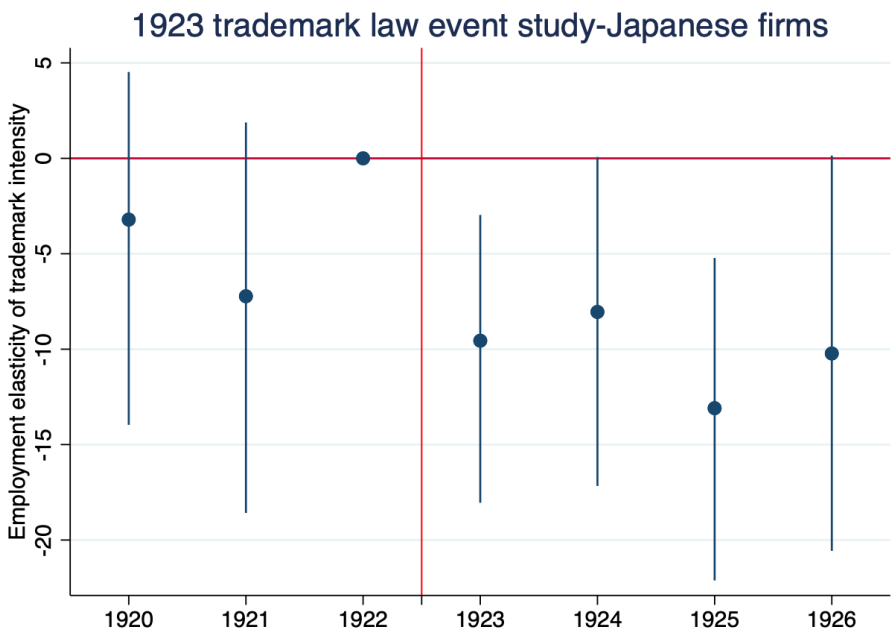


Figure C.6: The Effect of the Trademark Law on Japanese Firm Employment: Event Study

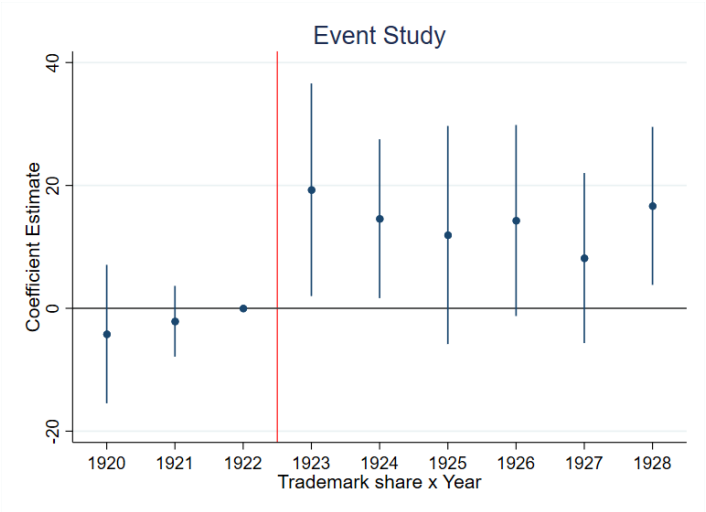


Figure C.7: The Effect of the Trademark Law on Chinese Imports from Western countries: Event Study

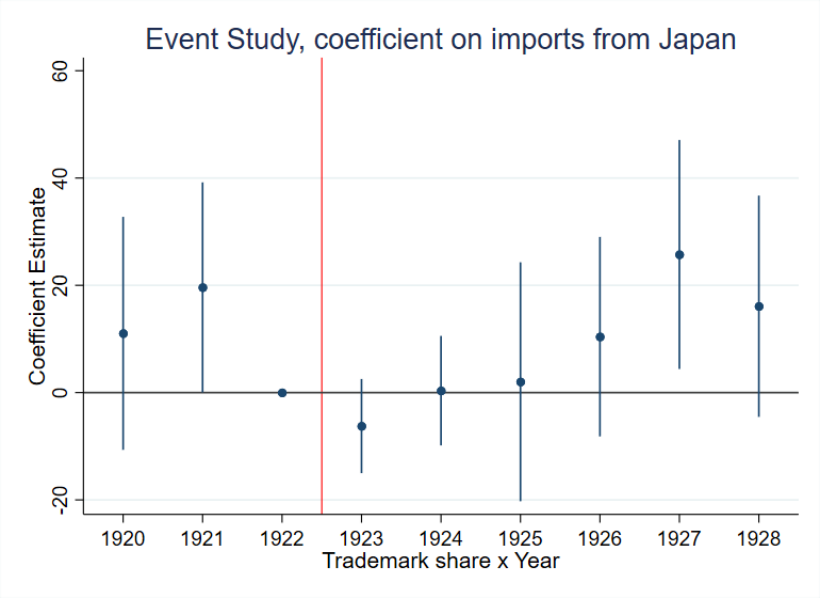


Figure C.8: The Effect of the Trademark Law on Chinese Imports from Japan

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 C.7.

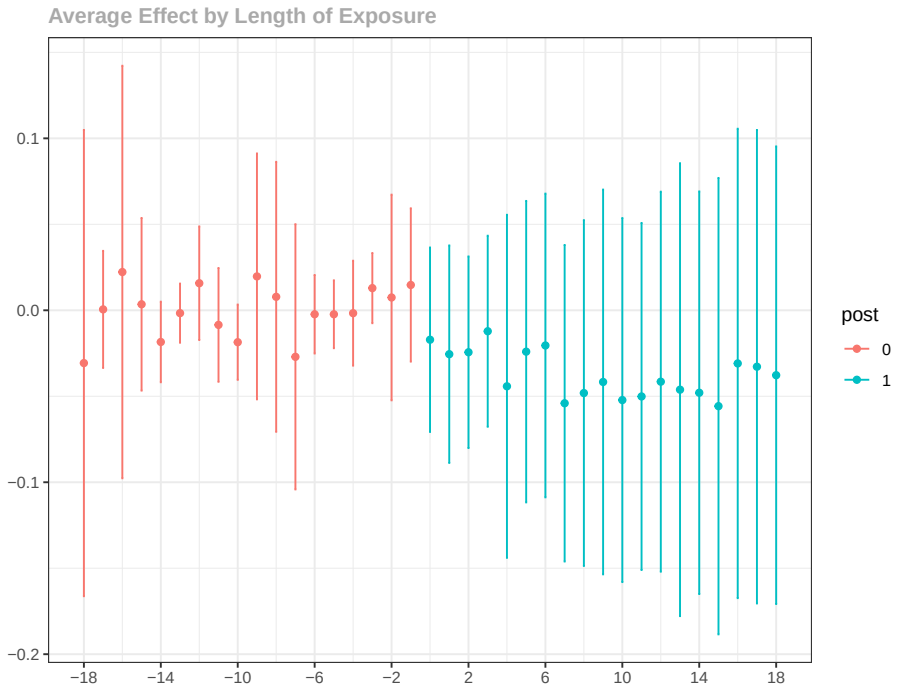


Figure C.9: The Effect of the Trademark Law on Price: Event Study

Notes: The graph plots the effect of trademark registrations on prices and is produced based on the method and program described in Callaway and Sant'Anna (2020). Red bars represent the months before trademarks were registered and blue bars represent log prices after trademark registrations. Time on the x-axis is in months.