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TRADEMARKS AS INTELLECTUAL PROPERTY: INFORMATION FRICTIONS, FIRM GROWTH, AND COMPETITION

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ABSTRACT

We investigate how firms and markets adapt to trademark protection, an extensively utilized but under-examined form of intellectual property (IP) protection that addresses asymmetric information, by exploring a quasi-natural historical experiment: China's 1923 trademark law. Exploiting unique, newly digitized firm-employee, price, and advertising data from Shanghai, we show that the unexpected introduction of the trademark law significantly reduced information frictions and shaped firm growth and organization on opposite sides of trademark conflicts. Western firms that suffered from counterfeits reduced dependence on alternative communication channels and gained market share from Japanese counterparts who were most frequently accused of counterfeiting. The trademark law also fostered relationships between Western firms and domestic intermediaries, both within and beyond firm boundaries. The increased protection led to heterogeneous price responses and new varieties, demonstrating a coexistence of trademark protection and competitive markets. In contrast, previous institutional attempts to protect trademarks were broadly unsuccessful.

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1 Introduction

Trademarks, a form of intellectual property (IP) available to essentially any firm, serve to identify the source of goods and services.[1] Trademark applications constitute the majority of global IP filings, accounting for 65% of the 23 million filings in 2023. Within IP-intensive sectors, trademark-intensive industries generate the largest share of employment, representing 90% of jobs in the United States and 78% in Europe.[2] Despite their economic importance, trademark protection varies widely across countries, with many less-developed economies providing only limited legal safeguards even under pressure from multinational firms and high-income governments.[3]

The prevalence of trademarks contrasts sharply with the academic literature on intellectual property, which has primarily examined patents and copyrights Moser (2013); Giorcelli and Moser (2020). While patents and copyrights address market failures stemming from the public-good nature of knowledge, trademarks serve a distinct economic function by mitigating asymmetric information problems in markets where consumers cannot directly observe intrinsic product attributes—such as quality, safety, or durability—at the time of purchase (e.g., Akerlof, 1970; Shapiro, 1982; Shapiro, 1983). By allowing firms to signal their identities through repeated interactions with consumers, trademarks facilitate the establishment of brand reputation, reducing information frictions and strengthening market efficiency.

This paper addresses the gap by examining how trademark institutions influence firm growth, organizational structure, and market competition. We exploit a unique quasi-natural experiment—the introduction of China's first trademark law in 1923—in one of the world's most contested markets for trademark protection. Leveraging newly digitized micro-datasets from Shanghai, a major commercial hub historically plagued by counterfeiting, we investigate how key market participants—authentic firms, counterfeiters, and intermediaries—responded to the abrupt transition from minimal to strong trademark protection. This setting provides a rare opportunity to study the adaptations of firms in response to the establishment of trademark institutions.

We begin by presenting a conceptual framework that outlines four key predictions informed by

[1] Great Britain's 1875 *Trade Marks Registration Act* defines a trademark as "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"; and the United States Patent and Trademark Office (USPTO) defines it 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."

[2] See WIPO (2024), USPTO (2020), EUIPO (2022a), and EUIPO (2022b).

[3] See the *2023 International IP Index* (Category 3) (https://www.uschamber.com/intellectual-property/2023-international-ip-index) and OECD and EUIPO (2019).

existing theoretical studies. First, trademark protection reduces information frictions between consumers and producers, diminishing the need for producers to rely on alternative signaling mechanisms, such as advertising, to help consumers identify their products. Second, trademark protection reallocates market share from counterfeiters to authentic producers, enhancing allocative efficiency and resource distribution. At the same time, because trademark rights protect the exclusive use of a brand rather than the right to produce or sell similar goods under different branding, stronger protection may encourage the entry of new authentic varieties. Third, trademark protection can influence the organizational decisions of authentic firms. In environments with weak protection, producers have incentives to exert greater control over distribution channels to prevent intermediaries from diluting brand value by, for example, mixing counterfeits with authentic products. Stronger protection alleviates these concerns, facilitating new linkages with intermediaries. Fourth, by increasing consumer confidence in the authenticity of products, trademark protection can stimulate both demand and supply for authentic goods, leading to a heterogeneous price response that depends on consumer preferences and barriers to entry. Consequently, unlike patent and copyright protection, whose welfare effects depend on the tradeoff between innovation incentives and market competition, trademark protection offers a different source of welfare gains—reduced information frictions—that may coexist with market competition.

A central challenge in empirically assessing the economic effects of trademark protection is the scarcity of large, exogenous variations in the degree of trademark protection, especially after a trademark law has been enacted. Even when laws undergo revisions, incremental changes are often shaped by domestic interest groups, potentially biasing the analysis as policy adjustments may reflect pre-existing economic conditions rather than exogenous shifts. We address this challenge by leveraging the introduction of China's first trademark law in 1923, which provides a unique empirical setting with several key advantages.

First, the reform represented a substantial quasi-natural shift in trademark protection, transforming a system with minimal protection into one with strong legal safeguards. Crucially, the law's enactment was not driven by the economic interests of affected firms but rather by the Chinese government's broader political objective of persuading foreign powers to relinquish longstanding extraterritorial rights in China. While some firms advocated trademark protection, the final provisions proved unsatisfactory to both authentic producers and counterfeiters, leading to strong opposition from both groups for different reasons. Nevertheless, competitive pressures (and low registration costs) spurred firms to rapidly secure trademarks to preempt rivals, making the

law's implementation effectively irreversible. This interplay between an exogenous institutional shock and firm responses provides an ideal setting for studying the effects of trademark protection.

Second, our empirical setting leverages Shanghai's unique role as one of the most contested markets for trademark protection at the time. As China's largest treaty-port city and commercial hub, Shanghai attracted a large influx of foreign firms, which comprised both victims and perpetrators of counterfeiting. The absence of a formal trademark institution before 1923 led to an overwhelming volume of trademark disputes. The enactment of the trademark law introduced a substantial shift in the legal system, and Shanghai's existing law enforcement framework—including well-functioning courts and a municipal police force—provided the necessary infrastructure to implement the new law effectively, as confirmed in our collected data on trademark disputes and court cases. This enables us to assess the economic impacts of enforced trademark protection in a contested market environment.

Another key advantage of our setting is the availability of novel micro-level datasets spanning both the pre- and post-introduction periods of the trademark law in an emerging economy. Similar to many developing economies today, early 20th-century Shanghai was undergoing rapid industrialization and transforming into China's economic center, accounting for over half of the country's trade and two-thirds of its inward foreign direct investment in manufacturing by 1930 (Ma, 2008). We manually digitized and compiled a comprehensive annual firm panel dataset covering the universe of firms operating in Shanghai's concession areas from 1872 to 1941. This dataset includes detailed information on firm characteristics such as product offerings, workforce composition (including employee names, job titles, and nationalities), ownership nationality, and, for intermediary firms, a list of their foreign clients. To directly assess the role of trademark protection in reducing information frictions, we also collected firms' advertisements from Shen Bao ("Shanghai News", 申报), the leading Chinese daily newspaper at the time, focusing on ads specifically designed to help consumers distinguish authentic products from counterfeits. Lastly, we compiled a monthly trademark-level price panel dataset from the Shanghai Market Prices Report to examine price responses to the introduction of trademark protection. The richness of these newly digitized data sources allows us to provide rare empirical insights into how firms and markets adapted to the emergence of modern trademark institutions in a rapidly developing economy.

To test the theoretical predictions, we first implement a difference-in-differences (DiD) intent-to-treat framework that compares trademark-intensive products to non-trademark-intensive products before and after the introduction of the trademark law in May 1923. To measure the trademark

intensity of products, we use the pre-1922 distribution of trademark registrations across product categories in foreign countries that had already established trademark laws. At the firm level, we construct a firm-specific measure of trademark intensity based on each firm's initial product composition and introduce a third dimension to the DiD design by comparing three distinct groups: Western firms, which historical sources identify as having suffered most from trademark infringements, Japanese firms, which were most frequently accused of counterfeiting, and Chinese firms, most of which served as intermediaries. This approach allows us to analyze the differential responses of firms to the trademark law depending on their roles in trademark disputes and how these responses vary with product-level trademark intensity. To validate our identification strategy, we extend the analysis to an event-study specification, testing for parallel pre-trends and assessing the exogeneity of the law's timing.

Our findings show that the trademark law significantly reduced information frictions regarding producer identities and reshaped firm and market dynamics on opposite sides of trademark conflicts. First, consistent with the theoretical hypothesis, the trademark law effectively reduced information frictions, as authentic firms became less reliant on alternative communication channels, such as advertising, to signal product authenticity. Before the law, firms invested heavily in costly marketing efforts to help consumers differentiate their products from counterfeits. After the enactment of the trademark law, this need diminished, as protected trademarks provided a more direct and credible mechanism for distinguishing authentic goods from imitations.

Second, we document substantial market reallocation between opposing sides of trademark conflicts: the employment of trademark-dependent Western firms increased, on average, by 4.6% while the employment of Japanese firms shrank by 19.7%.[4] These differential impacts remain robust across a range of alternative specifications, including varying measures of trademark intensity, accounting for industry-specific characteristics, controlling for macroeconomic shocks such as domestic demand shifts (e.g., consumer boycotts against foreign goods) and foreign supply shocks, and ruling out the influence of specific countries or industries. Western firms also became more likely to establish manufacturing operations after the trademark law, signaling a transition from a wholesale trade mode to one exploiting domestic production. Importantly, unlike other forms of IP, trademark protection did not reduce market competition; instead, it spurred a net increase in the number of authentic product varieties introduced by Western firms.

[4]In addition to the intent-to-treat specification, we further verify these patterns by directly identifying authentic firms and counterfeiters through newly digitized data on trademark applications and approvals, yielding similar results (Online Appendix Section A.11).

Third, the law reshaped relationships between Western firms and Chinese intermediaries, fostering greater domestic integration both within and outside firm boundaries. Trademark-intensive Western firms became more likely to promote and recruit Chinese employees for sales and managerial positions while simultaneously expanding their engagements with independent Chinese intermediaries. This dual effect suggests that stronger trademark protection enhances firms' trust in local market participants, facilitating deeper linkages with domestic distribution networks. These new linkages subsequently fostered the growth of Chinese intermediaries.

Finally, we disentangle the demand- and supply-side mechanisms underlying the law's impact on prices. Specifically, trademark protection led to price increases in more vertically differentiated product categories where consumers exhibited greater willingness to pay for branded goods. In contrast, prices decreased in product markets characterized by greater competition and higher prior expenditures on anti-imitation advertisements, suggesting that stronger trademark enforcement lowered firms' costs of brand protection and reduced the need for costly signaling, ultimately passing benefits on to consumers.

Given that the trademark law was preceded by various institutional attempts by foreign powers in the early 1900s, we also compare the effects of the 1923 law to prior arrangements, including: (1) extraterritoriality, which allowed for the direct application of foreign laws and the establishment of foreign courts in China; (2) bilateral commercial treaties in which China pledged to provide trademark protection; and (3) a proposed trademark law influenced by the Japanese government that was never enacted. Our analysis finds that none of these alternative arrangements had a significant impact, further highlighting the critical role of domestic institutional reform in establishing effective trademark protection.

Our findings underscore the distinct role of trademark institutions in fostering industrial growth. Most of the controversy surrounding IP protection has focused on its implications for market competition and, in the context of less-developed countries, the potential rent transfer to IP owners in industrialized economies (Javorcik and Fink 2002; Maskus 2000). However, unlike innovation-targeted IP protections, which explicitly confer monopoly power to incentivize innovation, trademark protection, as we show in the paper, enhances market efficiency by reducing information frictions without necessarily restricting competition. These results suggest that strengthening trademark protection can serve as a viable pathway for low- and middle-income countries to enhance IP institutions, fostering both efficiency and competitiveness without the trade-offs associated with other forms of IP protection.

Related Literature. An extensive literature on IP institutions assesses the patterns and economic effects of patent laws and, to a lesser extent, copyright protection. For example, Ginarte and Park (1997), Javorcik (2004), Branstetter, Fisman, and Foley (2006), and Branstetter, Fisman, Foley, and Saggi (2011) provide important evidence on the determinants of patent protection and its impacts on technology transfer and industrial development, while Moser (2013) offers a comprehensive review of patent institutions. More recent studies, including Biasi and Moser (2021), Giorcelli and Moser (2020), Oberholzer-Gee and Strumpf (2007), and Li, MacGarvie, and Moser (2018), examine the effects of copyright protection on innovation, creativity, and pricing.

In contrast, relatively few studies have examined the economic effects of trademark protection. The main theoretical work on the topic is Grossman and Shapiro (1988a,b), who analyze the positive and normative effects of counterfeit trade on consumers, firms, and welfare and the implications of anti-counterfeiting policies. Baroncelli, Fink, and Javorik (2005) provide the first empirical analysis documenting the cross-country distribution patterns of trademarks, and Dinlersoz, Goldschlag, Myers, and Zolas (2021) describe the distribution of trademarks across US firms. Heath and Mace (2019) study the profit effects of increased trademark protection via the 1996 Federal Trademark Dilution Act, which enhanced legal protection to selected trademarks. Qian (2008), examining counterfeiting by Chinese shoe companies, finds that a loosening of trademark protection enforcement led authentic producers to pursue alternative strategies to differentiate products from counterfeits. Exploring Chinese tire exports to Africa, Kuroishi (2020) finds export quality increased after African countries joined the Madrid Protocol which simplified the international trademark registration process. Bo, Chen, and Liu (2024) show that firms use trademarks as a strategy to reveal product information.

Our paper contributes to the literature by examining the economic impact of a fundamental shift in trademark protection—the introduction of a trademark law—rather than an incremental policy change. The plausibly exogenous origins of China's 1923 trademark law, a policy experiment met with opposition from both authentic and counterfeiting firms, allow us to establish its causal effect on firm and market dynamics. Moreover, instead of focusing solely on authentic firms' responses in a particular industry as in previous studies, we leverage rich firm-employee and price data across industries and nationalities to investigate how different sides of trademark conflicts—authentic firms, counterfeiters, and intermediaries— respond to trademark protection. Finally, our analysis provides novel evidence on how trademark laws influence international firm organizations and foster domestic linkages by utilizing unique data on agent-client relationships.

Finally, our paper builds on an emerging literature that assesses the historical patterns of the Chinese economy and the roles of institutions during the treaty-port era. Jia (2014) examines the long-term development paths of treaty ports and their neighbors and the roles of migration and sector-wise growth. Keller and Shiue (2023) examine the influence of treaty ports and consulates on the number of firms and interest rates in the 19th century. Levine, Lin, Ma, and Xu (2023) examine the role of legal origins in financial development by exploring the formation and rendition of the Mixed Court in colonial Shanghai's concession zones. In a related study, Li (2022) assesses the effect of legal systems on land values by comparing the International Settlement and French Concession areas in colonial Shanghai.[5]

The rest of the paper is organized as follows. Section 2 describes the historical background of China's first trademark law and how the law changed the legal situation. Section 3 develops predictions about the effects of the trademark law on firms and markets. Section 4 describes the micro datasets, including (i) firm-employee and agent-client data, (ii) monthly brand price series, (iii) advertising data, and (iv) cross-country trademark registrations. Section 5 presents the empirical evidence. Section 6 compares the effects of alternative institutional arrangements, and Section 7 concludes.

2 Historical Background

China's use of trademarks can be traced to the Northern Zhou Dynasty (556-580 A.D.) when merchants began to use distinctive marks to differentiate their products and craftsmanship (Chang, 2014). In contrast to the long history of trademark use, formal institutions to protect trademarks have a much shorter and more complex timeline in China. This section describes the circumstances under which the 1923 trademark law was introduced.[6]

2.1 The Appearance of Japanese Counterfeits

Early in the 20th century, China emerged as one of the world's most coveted markets (Heuser, 1975). With a quarter of the world's population, China offered an alluring "promise of a market of four hundred million customers" (Alford, 1995, p.35) to manufacturers and merchants worldwide. Foreign firms gained access to the Chinese market via 'treaty ports' after the Qing government was forced to sign a series of 'Unequal Treaties' as a result of the Opium Wars in the mid-19th

[5] An earlier study by Zeitz (2013) exploits how employment institutions may have explained the divergent performance of British, Chinese, and Japanese textile firms. Also exploring the Chinese textile industry in the same era, Liu (2020) studies the effect of trade disruptions due to World War I on the entry of industrial firms.

[6] See Motono (2011, 2013) for a comprehensive account of the history behind the trademark system.

century.[7] These treaties granted foreigners significant privileges, including low tariffs, extraterritorial rights—which allowed foreign nationals and businesses to be governed by their own laws and consular courts established in China rather than by Chinese jurisdiction—and political control over designated concession areas.

British firms were among the first to enter the Chinese market, followed by counterparts from the US and other Western European countries. Japan entered after the first Sino-Japanese War (1894–95), but its firms lagged technologically behind their Western competitors and therefore often resorted to counterfeiting Western goods (Motono, 2011). Most Chinese firms played the role of intermediaries for foreign manufacturers, with some either knowingly or unknowingly partnering with Japanese counterfeiters (Bryan, 1919). The Patent and Trade Mark Review (1907) asserted in 1907 that "Japanese trade in China consists largely of Japanese imitations," spanning products from tobacco and textile to food and cosmetics. Bryan (1919) called Japanese firms "the worst trademark pirates in the Orient" and quantified "at least fifty percent of the infringements in China are of Japanese origin." As the *Manchester Guardian* warned in 1904,

> "Perhaps for no market in the world is it more necessary that the trademarks upon our productions should be jealously safeguarded." (cited in Heuser, 1975)

2.2 Bilateral Commercial Treaties and Failed Negotiations

While Western trademarks had been registered in their home countries, their national trademark laws could not extend the protection of their trademarks to other countries unless countries signed bilateral treaties to recognize each other's trademarks or signed the *International Convention for the Protection of Industrial Property* in Paris in 1883. Neither was the case in China (Higgins, 2012). Extraterritoriality further complicated the legal situation, as defendants from nations with extraterritorial rights were subject to their home country's legal systems and consular courts in China. For example, counterfeit cases involving Western plaintiffs and Japanese defendants were adjudicated in Japan's Consular Courts in Shanghai, where Japanese law applied—often resulting in outcomes biased in favor of the defendants.

Between 1902 and 1903, Great Britain, the United States, and Japan each signed a commercial treaty with China in which the Chinese government pledged to protect foreign trademarks. In return, the foreign powers would abolish extraterritorial rights once China 'modernized' its legal

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

systems (Heuser, 1975).[8] As noted by Alford (1995), "trademark protection was the centerpiece of the intellectual property issues addressed" in these commercial agreements. In response, the Chinese government sought assistance from Japan in drafting a trademark law in 1905 (Motono, 2011, p.11). Japan proposed adopting its first-to-file principle, which would have allowed Japanese counterfeiters to register Western trademarks if they acted before the original firms. Predictably, Western governments strongly opposed this proposal, leading the Qing government to abandon its implementation.

Following the 1911 Xinhai Revolution, China's new government attempted to implement its own trademark regulations in April 1914, but these again failed to satisfy foreign powers. The *North China Herald* expressed the continuing frustrations in 1919:

> "[Reforms], it must be confessed, after many years' weary agitation seem as far off as ever." (The North China Herald, 1919)

2.3 China's First Trademark Law of 1923

After decades of failed negotiations, neither Great Britain nor Japan expected the Chinese government to introduce a trademark law independently. However, on May 9, 1923, the Chinese Congress surprised the international community by passing the law, enacting it immediately, and only then informing foreign diplomats of the *fait accompli*. The law represented a compromise between the first-to-file principle, favored by Japan, and the first-to-use principle, favored by Britain: the first-to-file rule would apply after a public notice period unless a dispute arose, in which case the first-to-use principle—which grants rights to the party that can demonstrate prior commercial use of the mark—would prevail.

Neither Great Britain nor Japan was satisfied with this compromise. Furthermore, treaty nations, including Britain and Japan, feared the trademark law would set a precedent for the gradual erosion of their extraterritorial rights. Consequently, all treaty nations strongly opposed the law (Motono, 2011; Patent and Trade Mark Review, 1923). However, their resistance was quickly overtaken by reality as firms rushed to secure trademarks. Counterfeiters sought to register the authentic trademarks they had been imitating, while authentic firms scrambled to protect their brands before losing them to counterfeiters. Meanwhile, the cost of trademark registration was minimal:

[8] 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. For example, the 1903 treaty between the US and China stated that 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" (cited in Alford 1995, p. 36).

the registration fee, as published in the Trademark Gazette, was 40 silver dollars (银元), equivalent to the cost of 20 cases of a dozen beers.[9]

The accessibility of the new trademark law was reflected in the volume of trademark registrations: between 1923 and 1927, a total of 13,736 trademarks were registered with the Chinese Trademark Bureau.[10] Trademark registrations were widespread across both firm nationality and industry, as illustrated in Figure 1. British firms held the largest share of registered trademarks, followed by firms from Japan, Germany, China, and the United States. This distribution reflects the dominant presence of these countries in China's commercial landscape at the time. Industry-wise, trademarks were most frequently registered in textiles, chemicals, tobacco, and cosmetics—products that were highly vulnerable to imitation and reliant on brand recognition for product distinction. With trademark registrations rapidly spanning diverse industries and nationalities, it became evident that the law's implementation had become effectively irreversible.

What motivated China to introduce a trademark law in 1923? As discussed earlier, foreign countries including Great Britain, the United States, and Japan had signed treaties pledging to abolish extraterritorial rights once China had 'modernized' its legal systems. Although the trademark law was only one component of China's legal system, its enactment marked China's first step toward meeting this condition and bringing the country closer to its long-term goal of abolishing the Unequal Treaties and regaining sovereignty.

2.4 How the Trademark Law Altered the Legal Trademark Situation

The enactment of the 1923 trademark law significantly transformed the legal landscape for trademark protection by establishing a formal law for adjudicating disputes and imposing strict penalties for violations.

Prior to 1923, the primary obstacle to resolving trademark disputes—particularly those involving businesses from different countries—was the absence of a domestic law governing the use of trademarks on Chinese territory. As discussed earlier, due to extraterritoriality, defendants of treaty nationalities were tried under their respective countries' laws in their respective consular

[9]This cost was negligible even for small firms, as we will show later that the effect of trademark protection was similar across firms of different sizes, with only slightly smaller magnitudes for firms with fewer than four employees (Online Appendix Figure C.8).

[10]After the Chinese Civil War broke out in 1927, the Nationalist government retained the 1923 trademark law. See Motono (2013): 'The Nationalist government failed to replace the Chinese trademark law of 1923. [...] The primary reason was, needless to say, the complex situation in which the Nationalist government found itself. In addition to the fragile balance of power within their own government and the relationship with opposing local warlords, they had to fight against the Chinese Communist Party.' Nonetheless, our analysis focuses primarily on the period from 1920 to 1926, before the Nationalist government took over, with robustness checks extending the period to 1930.

courts within Shanghai. This meant that disputes, such as those involving Western firms accusing Japanese firms of counterfeiting, were heard in the Japanese Consular Court in Shanghai, which followed Japanese law.

The issue was not a lack of courts or enforcement mechanisms in Shanghai but rather the absence of a domestic law to provide consistent adjudication across cases on Chinese territory. As the The North China Herald (1919) noted, 'the only means at present open to merchants whose trademarks are being infringed of asserting their rights are hopelessly inadequate'. The introduction of the 1923 trademark law brought a fundamental shift in the legal institution for trademark protection: trademark disputes were now adjudicated under Chinese trademark law rather than the defendant's home country law. In addition, for the first time, the law granted authentic producers the right to seek damages as compensation for reputational harm and imposed strict penalties on convicted counterfeiters, including fines of up to $500 and potential imprisonment.

To assess the legal impact of the 1923 trademark law, we digitized two datasets on trademark disputes. This analysis provides two key insights into the law's effectiveness. First, our digitization of trademark disputes published in China's *Trademark Gazette* between 1924 and 1927 shows that while some Japanese counterfeiters attempted to register trademarks belonging to other businesses, these attempts were swiftly disputed and ultimately unsuccessful. The records indicate that the majority of disputed trademarks were originally filed by Japanese firms (63.4%, as shown in Figure 2(a)), and the majority of complainants were from Western countries (Figure 2(b)). Our analysis of dispute outcomes shows that Japanese firms lost 72% of the disputes filed against them by Western plaintiffs.[11] Second, we digitized verdicts of trademark cases reported in the *North China Herald*. As illustrated in Figure 3 and detailed in the Online Appendix (Section A.1), the legal provisions introduced by the trademark law significantly increased both the share of cases won by plaintiffs and the severity of financial penalties and jail sentences imposed on counterfeiters.

Further, court rulings were enforced by Shanghai's established law enforcement agencies, including the Shanghai Municipal Police in the international concession and the French concession police force, both of which were authorized to execute judgments, seize counterfeit goods, and detain offenders. The integration of trademark law with Shanghai's well-functioning judicial and law enforcement infrastructure provided a strong foundation for implementing legal provisions, ensuring penalties were enforced, and enhancing deterrence against counterfeiting.

[11] Examples of trademark disputes recorded in the *Trademark Gazette* are shown in Online Appendix Section A.1.

3 Hypotheses: Trademark Institution, Firms, and Markets

Unlike patents and copyrights, the economic rationale for trademarks is to solve an asymmetric-information problem that arises in settings where buyers are unable to observe intrinsic product characteristics at the point of purchase, e.g., product materials and ingredients that affect the quality, safety, or durability (e.g., Akerlof, 1970; Shapiro, 1982; Shapiro, 1983).[12] In the presence of such information frictions, markets may fail to allocate resources efficiently across producers (Akerlof, 1970). This problem is especially salient in international markets when sellers and buyers from different nations face greater information asymmetries and when intermediaries are involved. One way to overcome the information friction is for sellers to use trademarks to disseminate information and signal producer identity to the consumer, enabling firms to build reputation and benefit from reputation over time. However, trademark infringements by counterfeiters undermine the function and value of this firm-specific asset.[13] Trademark protection—protection of a firm's exclusive right to use a trademark—is therefore needed to ensure trademarks' effectiveness at resolving the information-asymmetry problem. Because of the distinct rationale and the specific rights protected, the impacts of trademark protection on firm performance, firm organization, and market competition may differ significantly from those of patent and copyright protection.

In this section, we build on existing theoretical work, including Shapiro (1982), Shapiro (1983), and Grossman and Shapiro (1988a), and examine how trademark protection is expected to shape firm and market outcomes by mitigating information frictions between firms and consumers. We develop testable hypotheses on the distinct effects of the trademark law on information frictions, market reallocation, firm organization, and the different mechanisms through which trademark protection may affect prices.

[12]The USPTO defines a patent as a limited property right for an invention in exchange for public disclosure, protecting the right to exclude others from its use or sale, while copyrights protect original works in literature, music, art, architecture, and software. Both address market failures in knowledge as a public good, incentivizing innovation. As Besen and Raskind (1991) note, "patents require novelty; copyright requires originality; the counterpart of these terms for trademarks is distinctiveness."

[13]The literature distinguishes between two types of counterfeiting. In *deceptive* counterfeiting, the authentic and counterfeited products are similar in design and packaging; unaware consumers inadvertently purchase (potentially lower-quality) counterfeited goods (such as cigarettes, drugs, and cosmetics) (Grossman and Shapiro, 1988a). In *non-deceptive* counterfeiting, consumers can distinguish between authentic and counterfeit products but knowingly purchase the latter (such as counterfeits of luxury goods) (Grossman and Shapiro, 1988b). In this paper's historical setting, deceptive counterfeiting is the main relevant form as reflected in the counterfeiting lawsuits and trademark disputes. In the words of 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 indictment for obtaining money by false pretenses." The North China Herald, 'A Cotton Fraud: Need of Criminal Law,' May 8, 1920.

Consider a setting where authentic producers (denoted as type a) sell differentiated varieties of a given product. Consumers derive utility from certain characteristics of the product but are unable to observe these characteristics at the time of purchase. Consumers may only be able to evaluate them after they experience the product; examples are product materials and ingredients that affect quality, safety, or durability (e.g., Shapiro, 1982; Shapiro, 1983). Nelson (1970) termed these types of products *experience* goods—that is, products that must be consumed for consumers to learn about their characteristics.[14]

Authentic producers attempt to resolve the information asymmetry by labeling the product with a 'trademark' and consumers learn over time to associate the trademark with the unobserved product characteristics.[15] If trademarks are not protected, however, a second type of firm, counterfeiters (denoted as type c), arises, who offer a version of the authentic product with likely inferior unobservable characteristics under the same trademark. The true source of a product is known to the producer, but consumers are unable to verify the source and distinguish counterfeits from authentic products upon purchase. In this case, the information conveyed by the trademark becomes unreliable, and the trademark's function in signaling the source of the product is undermined.

Following Grossman and Shapiro (1988a), consumers are assumed to have a probability of s of receiving authentic goods upon purchase (and a probability of $1-s$ of encountering counterfeits) in the absence of trademark protection. When consumers mistake counterfeits for authentic goods, they obtain less or no utility, i.e., $u_a > u_c$ where u_a and u_c denote the utility from consuming authentic versus counterfeit products, respectively. The expected utility of the consumer is hence given by $E(u) = su_a(q) + (1-s)u_c(q)$. The authentic firms receive a fraction s of the demand, i.e., $q_a = sq$, and set price p_a. Counterfeiters receive $1-s$ of the demand, i.e., $q_c = (1-s)q$, and follow $p_c = p_a$ to avoid being distinguished from authentic firms. If search frictions are present, the counterfeiter may also charge a slightly lower price without being revealed (Qian, 2008).

Information Friction. To help consumers identify the true source of goods, authentic firms may choose to adopt (imperfect) alternative mechanisms such as advertising to disseminate recognizable product information and warn consumers against imitations. Such alternative mechanisms lead to a cost that rises with the number of consumers they try to reach (Nelson, 1974, Grossman and Shapiro, 1984, and Bagwell, 2007).[16] By strengthening the role of trademarks in representing

[14]Nelson (1970) distinguishes experience goods from search goods, whose characteristics information can be obtained by consumers at a cost. We are grateful to Kyle Bagwell for pointing us to this literature.

[15]This role of trademarks differs from that of patents and copyrights, as trademarks aim to disseminate information while patents and copyrights aim to incentivize innovation.

[16]In Grossman and Shapiro (1988a), authentic firms may help customs agents detect counterfeits by supplying

the true origin of products and services, the trademark law reduces information friction between consumers and authentic firms. The reduced information friction, in turn, lowers authentic firms' need to communicate their brand identities with consumers through alternative information channels that educate the consumers on how to distinguish authentic products from counterfeits. This leads to our first testable hypothesis, which provides direct evidence on the information friction mechanism of trademarks:

Hypothesis 1. *Trademark protection reduces information friction and the need for alternative communication channels.*

Market Reallocation. Next, the introduction of the trademark law gives authentic firms the exclusive right to use their trademarks and precludes counterfeiters from free-riding on the reputation of authentic firms. By raising the probability of the consumer receiving authentic products (s), trademark protection leads to a direct market reallocation within brand-specific market segments from counterfeiters to authentic producers. The market share of authentic firms relative to that of counterfeiters (i.e., $s/(1-s)$) grows.

When there is free entry, the expanded market share of authentic firms enables more authentic firms to pay the fixed cost of entry and introduce new brands and products, while counterfeiters exit the market or rebrand themselves. The increase in the number of authentic brands and products expands the level of competition and the number of authentic varieties available to consumers. This yields the following hypothesis:

Hypothesis 2. *Trademark protection reallocates market share from counterfeiters to authentic firms and spurs the entry of new authentic varieties.*

The above point has also been highlighted in Fink and Javorcik (2002) who note that "a closely related difference between the two forms of IPRs is that patents and copyright expressly grant monopolies—-albeit limited in scope—-whereas trademarks can, in theory, coexist with perfectly competitive markets."[17] As a result, consumers may benefit not only directly from reduced information friction and market reallocation but also from the increased number of authentic varieties.

information about the recognizable differences between counterfeit and authentic goods as well as investing in product characteristics to increase such differences.

[17]Maskus (2000) similarly points out that, in general, the market power associated with a particular trademark tends to be small because "the potential supply of competing trademarks is virtually unlimited" and trademark protection can induce new firms and varieties to enter the market. It is worth noting that this effect can be weakened in some cases when consumers treat trademarks as status goods and/or a highly successful brand in an industry with high fixed investment costs serves to augment entry barriers.

Firm Organization. When producers and consumers come from different countries, intermediaries are often involved, further raising the level of information asymmetry surrounding the producer's identity. When authentic producers rely on domestic intermediaries to reach more final consumers, they face the additional risk that intermediaries may engage in counterfeiting by, for example, mixing authentic products with counterfeits and hence "diluting the brand" or selling exclusively counterfeit products.[18] In this case, authentic producers may opt to shun domestic intermediaries and sell directly to consumers (even if doing so entails more limited market access and higher distribution costs).

By mitigating the risk that intermediaries dilute the trademark, trademark protection can increase authentic firms' willingness to collaborate with domestic intermediaries within and outside firm boundaries. The new linkages between authentic firms and domestic intermediaries can both expand authentic firms' market access and lower their distribution costs. This leads to:

Hypothesis 3. *Trademark protection leads to greater integration of authentic firms with domestic intermediaries, both within firm boundaries (by hiring domestic sales staff) and across firm boundaries (by using domestic intermediaries at arm's length).*

Price. Increased trademark protection can also shape prices p_a by affecting both the demand for and supply of authentic products. Reduced information friction increases consumers' confidence in receiving authentic products and thereby expands both aggregate demand and the set of varieties, as discussed in Hypothesis 2. Increased aggregate demand raises consumers' willingness to pay, while larger choice sets have the opposite effect on prices. Further, as discussed in Hypothesis 1, firms with protected trademarks have a reduced need for alternative communication and differentiation strategies, resulting in cost savings that are partially passed onto consumers. Grossman and Shapiro (1988a) incorporate the above channels and show that trademark protection exerts an ambiguous effect on brand prices. They conclude that "the possibility of counterfeiting may raise or lower equilibrium price" (Grossman and Shapiro, 1988a, p.73). Trademark protection may raise prices when consumers exhibit a strong willingness to pay for brands and quality and lower prices when there are low entry barriers and cost savings from alternative communication channels.[19]

[18] During the period of study, foreign firms often turned to domestic intermediaries for expanded market access to overcome language barriers and inland market restrictions. As Section 4.1 shows, the intermediary sector accounted for more than half of the firms.

[19] Trademark protection may also change product quality choices by authentic firms. On the one hand, Schumpeterian forces would imply that the expectation of greater revenue by authentic firms would lead to more incentives to innovate and upgrade product quality as they expect stronger returns from investment. On the other hand, increased

Hypothesis 4. *Trademark protection leads to heterogeneous price responses depending on consumer preferences, entry barriers, and dependence on alternative communication channels.*

4 Data: Firms and Brands During Shanghai's Concession Era

To examine the hypotheses outlined in the above section and assess responses to the trademark law, we digitized and constructed a rich array of micro-level datasets in Shanghai. Often called "Paris of the East," Shanghai, by the end of the 1920s, became China's economic center and one of the world's largest cities and commercial hubs, boasting over 3 million inhabitants, vibrant manufacturing and service sectors, and remarkable openness to trade and investment (Osterhammel, 1989). The preceding decades marked one of the most transforming and turbulent periods in Shanghai's history (Brandt, Ma, and Rawski, 2014). Between 1900 and 1930, trade passing through Shanghai increased fourteen-fold, eventually accounting for more than half of China's foreign trade, which in turn exceeded 2% of global trade flows, a level not regained until the 1990s (Lardy, 1994). By 1930, Shanghai also accounted for 67% of China's inbound FDI in manufacturing, while China's total inbound FDI amounted to 8.4% of the world's total (Hou, 1965). Shanghai consisted of three areas: the International Settlement (or Public Concession), the French Concession, and the domestic portion of the city; almost all foreign firms were located in one of the two concessions (and were not allowed to locate outside treaty port cities). Not surprisingly, as the top destination for Western and Japanese firms, Shanghai experienced the largest volume of trademark disputes.

Our micro-level datasets, digitized based on a wide range of rare historical archives, include: (i) a firm-employee panel dataset covering the universe of firms that operated in Shanghai's concession areas from 1872 to 1941; (ii) an agent-client panel for Shanghai's intermediary sector; (iii) a monthly price panel at the brand-variety level; (iv) newspaper advertisements, including advertisements warning against trademark infringements; and (v) a database of cross-country trademarks.

4.1 Firm-Employee and Client Panel Data

We digitized and assembled an annual firm-employee-level panel dataset covering the universe of firms that operated in Shanghai's concession areas from 1872 to 1941 based on the *North-China*

trademark protection may also lower the need for quality upgrading to escape the threat of counterfeiters, as shown in Grossman and Shapiro (1988a), leading to an ambiguous net effect. It is also worth noting that since trademarks alone do not prevent imitations of products or technologies as long as the imitations are sold under different brand names, the Schumpeterian effect of trademark protection on innovation is likely to be weaker than that of patent and copyright protection. While our historical data do not have direct measures of R&D or product quality, we provide some suggestive evidence by exploring the textual composition of advertisements in Section 5.1 and find no significant increase in advertisements stressing the quality of their products after the law.

Hong List, a business directory that provided comprehensive information on firms operating in the leading port cities of northern China. This 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 provided detailed information on all firms operating in the Public and French concessions.[20] For each company listed in a given year, the Hong Lists reported, among other things, its name (in English, traditional Chinese, and Wade-Giles), address, activities (a textual description that corresponds to industries), the names and job titles of each firm's main employees, the products produced and/or sold by the firm (reported in the Hong List Appendices). Figure C.1 in the Online Appendix shows a representative page from the 1927 Hong list. We distinguished Chinese employees from foreign employees based on the employee names. We used the fact that lower-level employees were separated from their superiors with an indentation in the Hong List to identify the positions of Chinese employees in the organizational hierarchy.

We also collected comprehensive client information on each firm operating as an intermediary (labeled agent) in Shanghai, including its product composition, address, and the name and nationality of each client. This agent-client information enables us to identify firm linkages and measure how they evolved before and after the trademark law.

We identified each firm's nationality using several separate sources, such as directories of China's importers and exporters, directories of foreign businesses, and documents from the Japanese Chamber of Commerce. For the remaining unmatched businesses, we manually collected nationality information or assigned a nationality based on the country reference in the firm's name (if unambiguous). Firms were matched over time based on their names (in both English and traditional Chinese) and industries to produce a firm panel. We also investigated the business history of many companies to track them over time despite their potential name changes. See Online Appendix A.2 for additional details on the construction of the firm-employee and client dataset.

The resulting panel data provides us with a unique historical firm-employee dataset in one of the world's most competitive markets and enables us to examine firm dynamics in response to the introduction of a modern trademark institution.

[20]The Hong List also documented all foreign firms in the city's domestic areas, though its coverage of Chinese firms was incomplete in those areas. Since nearly all foreign firms—those most affected by trademark disputes—were located in the concessions, we focus our analysis on the universe of firms within these areas. In the International Settlement, the aggregate foreign employment based on the Hong List is equivalent to about 80% of the foreign adult-male population counted by the census, which offers a useful cross-check on the coverage of the data. See Section A.3 for more details on the validation of the dataset.

4.2 Brand Price Data

To examine the effect of trademark protection on prices, we obtained detailed, monthly brand-product-level price panel data from the issues of the *Shanghai Market Prices Report*, published by the Chinese Ministry of Finance, Bureau of Markets.

The *Shanghai Market Prices Report* was the official source of information on market prices for goods and commodities. The report was released quarterly and contained detailed monthly data on wholesale prices across a wide range of industries, including cereals, food products, textiles, metals, fuels, building materials, industrial materials, and sundries. Each issue of the report featured tables and listings that presented the prices of commodities and products in a systematic and organized manner. The data included specific product categories, relevant information about the products such as trademarks, brands, company names, and packaging sizes, and price levels.

We digitized all the issues between January 1923 (the first available issue) and December 1926 and matched brands over time to create a panel price dataset. Since the *Shanghai Market Prices Report* sometimes dropped or added brands, we restricted the dataset to brands that we observed for at least 12 months to avoid bias due to changing sample composition. This unusually rich historical price report enables us to construct the most comprehensive and disaggregated price panel data at the time and undertake a granular analysis of how the introduction of trademark institutions shaped price dynamics.[21]

4.3 Newspaper Advertisements

To provide direct evidence on the role of the trademark law in addressing information friction, we collected all the business advertisements published in the leading Chinese daily newspaper *Shen Bao* (申报) from 1920 to 1930. We then identified the subset of advertisements used to warn consumers about counterfeits by focusing on advertisements containing phrases related to the terms "infringement," "fake," "imitation," and similar terms. We manually reviewed these advertisements to validate their content and whether they were indeed used to educate consumers about how to distinguish between authentic and counterfeit goods. We also extracted information on titles, publishing dates, and products from the advertisements and classified ads if they mentioned quality or product innovation.

[21] We also merged the price data to trademark registrations by manually searching all the brands listed in the price reports in China's Trademark Gazette based on the texts or images of the trademarks. This enabled us to obtain the dates on which each trademark was registered and examine potential changes in pricing patterns after trademark registrations in a robustness analysis (see Table B.15 of the Online Appendix).

4.4 Measuring Dependence on Trademarks

To measure products' pre-existing dependence on trademark protection, we compute $TrademarkInt_p$ as the product-specific share of trademarks registered before 1923 in countries outside China where trademark laws existed, based on historical trademark data between 1872 and 1922 from the IP Portal of the World Intellectual Property Organization (WIPO). Product groups are defined according to the international Nice Classification (NCL) scheme. For additional details on the construction of this measure, see Section A.4 in the Online Appendix.

Table 1 shows how $TrademarkInt_p$ is distributed across product groups. The products with the highest trademark intensity were pharmaceuticals, cosmetics, food, alcoholic beverages, chemical products, paper and cardboard, and tobacco. Among the goods with the lowest trademark intensities were firearms, canvas products, musical instruments, leather products, and dressmakers' articles. Services were not covered by trademark laws in this period.[22] Our measure of trademark intensity corroborates the distinction of experience versus search goods described in Nelson (1970) while providing more variation in the degree of dependence on the trademark. Our measure of trademark intensity is also highly correlated with the frequency of trademark infringements documented in court cases and newspapers, which were concentrated in products such as medicines, cosmetics, and tobacco.[23]

For our data on prices and advertising, we match this product-specific trademark intensity directly to the data based on products. For our firm-level analysis, we construct a firm-specific measure of trademark intensity based on each firm's product composition before the trademark law. Specifically, we calculate the maximum trademark intensity across a firm i's products offered before 1923:

$$TrademarkInt_i := \max_{p \in P_i} (TrademarkInt_p)$$

where P_i denotes the set of products the firm offered in 1920-1922. This firm-specific trademark intensity enables us to explore cross-firm variation in pre-existing dependence on trademark protection within an industry and country group and how firms selling more trademark-intensive products adjusted to the trademark law relative to firms with less trademark-intensive products.[24]

[22] We provide robustness checks excluding services in the Online Appendix (Section A.8).

[23] We also examined the correlations between trademark intensity and other industry attributes such as patent intensity, constructed in Section A.6 of the Online Appendix using the share of patents in each product category based on U.S. patent data in 1922, and industry or firm size. Trademark intensity was found to be only weakly correlated with the latter measures.

[24] We consider various alternative ways to measure trademark intensity in Section A.5 of the Online Appendix, including country-specific trademark intensity.

5 Empirical Evidence

In this section, we empirically examine the predictions established in Section 3 and assess the effects of the trademark law on information friction and firm and market outcomes.

5.1 Information Frictions

As discussed in Hypothesis 1 of Section 3, a direct, first test of the role of the trademark law in addressing information asymmetry is to examine whether the trademark law reduced authentic firms' dependence on alternative information channels to communicate with consumers.

To address the problem of counterfeits in the absence of formal trademark protection, many brand producers in Shanghai turned to advertising to warn consumers against brand imitations. For example, British American Tobacco frequently placed advertisements in **Shen Bao** (申报), the leading Chinese daily newspaper, featuring images of counterfeit versions of their products to educate consumers on how to distinguish authentic goods from imitations.[25] This type of anti-imitation advertising served as an imperfect alternative means to communicate the identity of the producer and reduce information frictions. Our hypothesis posits that when the role of trademarks is strengthened, the demand for this alternative communication channel diminishes.

We formally examine this hypothesis by collecting firms' anti-imitation advertisements from **Shen Bao** and estimating the following equation:

$$AntiImitationAds_{pt} = \beta \times TrademarkInt_p \times PostMay1923_t + FE_p + FE_t + \epsilon_{pt} \qquad (1)$$

where p denotes a product group and t a month, outcomes $AntiImitationAds_{pt}$ denote different measures for the prevalence of anti-imitation advertising in a product group, $TrademarkInt_p$ is the trademark intensity of product p as defined in Section 4.4, and $PostMay1923$ is a dummy that equals 1 for periods after the enactment of the trademark law in May 1923. For our empirical strategy to be valid, the trademark law must be the only change in relevant legislation occurring in 1923. We conducted a detailed review of national and Shanghai-specific legislation from the period just before and after 1923. Archival materials and historical newspapers did not reveal any other comparable policy changes that might have altered commercial or legal structures.

The estimates in Table 2 show that after the trademark law, trademark-intensive products became significantly less likely to utilize anti-imitation advertisements to protect brands. According

[25] See, for example, advertisements titled "Notice of Counterfeiting" published in *Shen Bao* from May 19 to May 25, 1922.

to column (1), the probability of posting such ads fell by 40% percent from the pre-law level for products with mean trademark intensity. Columns (2) and (3) show that the share of anti-imitation ads and the number of anti-imitation ads in a product category also decreased significantly. In Figure 4, we show in the event study that there were no pre-trends in anti-imitation ads. The intensity of having anti-imitation ads in trademark-intensive products started to decline visibly in 1923 and stayed low afterward.[26]

While our analysis here focuses on the role of legal trademark protection in reducing authentic firms' dependence on alternative information channels for protecting their brands, trademark protection may also influence other forms of advertising. For instance, with higher expected revenue returns, authentic firms may be incentivized to upgrade quality, introduce new varieties, and promote their brands accordingly. To explore these potential effects, we examine whether trademark protection impacts firms' references to quality or new product varieties in their advertising content.[27] We find that while the propensity of quality ads did not change significantly, advertisements highlighting new products increased following the introduction of trademark law. This pattern aligns with Hypothesis 2 and Section 5.2.2, suggesting an expansion in the number of authentic product varieties after the implementation of legal trademark protection.

These findings provide direct evidence of the role of trademark law in reducing information frictions between consumers and authentic producers. By reinforcing the function of trademarks in conveying producer identity to consumers, trademark law diminishes both the need for and the cost of alternative information channels for authentic firms.

5.2 Market Reallocation

We next examine how the trademark law reshaped the reallocation of market shares across authentic firms and counterfeiters, as posited in Hypothesis 2 of Section 3. We begin by analyzing growth dynamics within existing firms (the intensive margin) before turning to firm entry and exit (the extensive margin).

5.2.1 Within-Firm Growth

As outlined in Hypothesis 2, the implementation of trademark law is expected to drive growth among incumbent Western firms—the primary complainants about trademark infringements—

[26] In Online Appendix Table B.2, we also estimated the effect of the trademark law for a longer period (1920-1930). The results are largely consistent, with a small expected decline in magnitude.

[27] We classify advertisements as "quality ads" if they emphasize product quality, using terms such as 质 (quality), 特效 (effective), 功效 (efficacy), or 功用 (effect). Advertisements are classified as "new product ads" if they include keywords related to 发明 (invention) or 新品 (new product).

through the reallocation of market share from counterfeiters. In contrast, Japanese firms, which were the main group accused of counterfeiting, are expected to contract in size and eventually exit the market. To test this, we compare the reallocation of employment shares using a triple-difference (DDD) specification, which examines the differential responses of Western firms to the trademark law relative to Japanese firms within the same product categories, and how these responses vary with trademark intensity.

$$\begin{aligned} y_{it} &= \beta \times Western_r \times TMInt_i \times Post1923_t + \gamma \times TMInt_i \times Post1923_t \\ &\quad + FE_i + FE_{ct} + FE_{rjt} + \epsilon_{it} \end{aligned} \tag{2}$$

with firm i in year t from home country c operating in broad industry j. $TMInt_i$ is the firm-specific trademark intensity based on products that the firm offered in 1920-1922.[28] $Western_r$ is a dummy variable indicating that a firm's owner is from a Western country. $Post1923_t$ is a dummy variable that equals 1 for periods after the enactment of the trademark law in 1923. We use firm fixed effects FE_i to control for time-invariant firm characteristics; country-year specific fixed effects FE_{ct} to absorb potential macroeconomic shocks from the firms' home countries or domestic shocks specific to firms of particular nationalities; and broad industry-year specific fixed effects FE_{rjt} to account for industry-specific shocks within different country groups.[29] Standard errors are two-way clustered by product category and country-year.[30]

We use either the log employment or the employment share of a firm in a specific product group p as the dependent variable in specification (2) based on the sample of firms that existed between 1920 and 1922 and were tracked through 1926. Column (1) in Table 3 shows that the trademark law indeed differentially increased the employment of Western firms at the expense of Japanese firms in trademark-intensive products, compared to non-trademark-intensive products. Specifically, at the mean trademark intensity, the employment of Western firms rose, on average,

[28] Section A.5 of the Online Appendix uses alternative measures of trademark intensity, and Section A.6 controls for interactions with other firm or product attributes–such as innovation intensity, industry size, average firm size, or competitiveness.

[29] We have eight broad industries: agriculture/mining, construction, manufacturing, transportation, wholesale, retail, finance/insurance/real estate, and services. Firms may belong to multiple broad industries. Region r denotes whether a firm is a Western or a Japanese firm.

[30] Clustering by product category allows for both the autocorrelation of errors at the firm level (as we fix firms' products before 1922 when constructing firm trademark intensity) as well as the correlation of errors across firms that offer the same products and may be affected by product-specific shocks. Country-year clustering allows for the correlation of errors across firms that offer different products but are affected by the same macroeconomic shocks in their home countries. We also considered firm-level clustering and found the results to be robust.

by 4.6% while the employment of Japanese firms shrank by 19.7%. For Western firms that sold the ten most trademark-intensive products listed in Table 1, their employment increased, on average, by 7.5% while their counterparts experienced a 31.9% employment cut.

In column (2), we show that the employment share of Western firms expanded significantly at the expense of Japanese firms after the trademark law for trademark-intensive firms. According to column (2), the employment share of individual Western firms with mean trademark intensity grew, on average, by 0.8 percentage points while the market share of individual Japanese businesses shrank by 5.5 percentage points. For Western firms that sold the ten most trademark-intensive products listed in Table 1, the growth in individual firms' employment share exceeded 1.3 percentage points. In columns (3)-(4) we replace the main interaction term with NICE product category-year fixed effects which absorb all product-specific shocks and find similar reallocation effects.[31]

In Figure 5, we estimate the event study equivalent of equation (2) as implemented in column (4) of Table 3, our preferred specification, by allowing the effect to vary every year. The event study shows no evidence of pre-trends in the reallocation from Japanese to Western firms: the estimated employment elasticities of trademark intensity before 1923 are not significantly different from zero and the reallocation effect emerged in 1923 and persisted thereafter.

Our current empirical specification has assumed that no other shocks in 1923 affected firms differentially based on the trademark intensity of their products *and* their nationality. Shocks impacting all firms of a specific nationality—regardless of the products they sold in Shanghai—are accounted for by country-year fixed effects, which absorb macroeconomic shocks affecting firms from certain countries. Examples of such country-specific shocks include Japan's Great Kantō Earthquake of 1923 and consumer boycotts targeting products from specific countries. In Section A.7 of the Online Appendix, we extend the analysis by allowing a range of country-specific shocks—measured by foreign country GDP, country-year-specific consumer boycott dummies, and country-specific export ratios—to differentially affect trademark intensive products. We also account for potential spillover effects from consumer boycotts against other countries onto Western products. Our estimates are stable across all these robustness checks.

Thus far, we have excluded Chinese firms from the sample, as historical evidence suggests that most identified counterfeiters during the study period were Japanese. While some Chinese merchants were accused of counterfeiting, they were often either willing partners of Japanese man-

[31] As shown in Figure C.8 of the Online Appendix, the reallocation effect of the trademark law affected firms of all sizes, albeit slightly larger for large and medium-sized businesses, confirming our earlier finding that the trademark registration costs were relatively low and even small firms were able to access trademark protection.

ufacturers or unwitting distribution channels deceived by Japanese counterfeiters (Bryan, 1919). Consequently, the impact of trademark law on Chinese firms is ambiguous. On the one hand, trademark protection may crowd out Chinese merchants collaborating with Japanese counterfeiters. On the other hand, as discussed in Hypothesis 3 of Section 3, trademark protection—by alleviating authentic firms' concerns about intermediaries mixing genuine and counterfeit goods—may encourage authentic firms to engage more with domestic intermediaries, thereby fostering the growth of Chinese firms. To examine this empirically, we add Chinese firms to the sample in columns (5) and (6) of Table 3 and find that Chinese firms also experienced a positive employment effect after the trademark law, though the effect on the employment level is smaller than that for Western firms and not always statistically significant. In section 5.3.2 we show that one driver of Chinese firm growth is the intermediary sector and its increased collaboration with Western firms.[32]

To further corroborate the mechanism that trademark protection leads to market reallocation by reducing information frictions, we conduct an additional test: the ability of trademarks to convey the true identity of the producer should be particularly crucial for final goods compared to intermediate inputs. Consumers of final goods are more susceptible to deception due to their lack of expertise and direct interactions with producers, whereas business-to-business transactions for intermediate inputs typically involve direct and repeated interactions, making deception more difficult. Figure 6 estimates the effects of the trademark law by categorizing NCL product categories into intermediate and final goods. Consistent with our hypothesis, reallocation from Japanese to Western firms is only evident for final goods, while the effects on intermediate inputs are close to zero and insignificant.[33]

We next examine how firms adjusted their employment composition in response to the trademark law. This allows us to understand whether the growth of Western firms was primarily driven by a general business expansion or merely by an increase in legal hires in anticipation of lawsuits.

[32]Table B.3 of the Online Appendix extends the analysis to a longer period until 1930 and shows that the employment effects persisted after 1926. In 1927, when the civil war broke out and the Nationalist government came into power, the 1923 trademark law remained in place, but some observers feared that trademark protection would be weakened. Our analysis suggests that this was not the case. In Section 6, we further extend the period to 1936—the year before Japan's occupation of Shanghai in 1937—and again find similar results.

[33]In the Online Appendix, we demonstrate that the results remain robust when excluding firms that sell services, specific product groups, specific countries, or distributors (A.8). Further, the findings hold when accounting for the extraterritorial status of Western firms (A.9) and restricting the sample to comparable Western and Japanese firms using propensity score matching (A.10). In Section A.11, we employ an alternative research design by identifying a list of authentic firms and likely counterfeiters based on trademark application approvals, denials, and involvements in trademark disputes. Consistent with our baseline results, we find that authentic firms—those granted trademarks based on either market tenure or application/dispute reviews—experienced significant growth, whereas likely counterfeiters—firms whose trademark applications were denied or registrations revoked—witnessed a contraction.

By leveraging employees' job title data, we assess how firms restructured their workforce after the introduction of the trademark law. Columns (1)–(2) of Table 4 confirm that the baseline findings hold within the sub-sample of firms with available job title information. Columns (3)–(5) further investigate firms' hiring decisions for lawyers, sales staff, and manufacturing workers, respectively. The results indicate that following the trademark law, Western firms were more likely than their Japanese counterparts to expand their sales and manufacturing workforce, while the increase in legal hires is positive but not statistically significant.

The finding on the hiring of manufacturing workers suggests that Western firms that had previously entered the Chinese market by importing goods from their home countries became more inclined to establish and expand local production in Shanghai after the trademark law, transitioning from the importing mode toward manufacturing—a shift also reflected in the aggregate trends shown in Figure C.5 of the Online Appendix.

5.2.2 Entry and Exit

As outlined in Hypothesis 2, strengthened trademark protection can drive an increase in the number of authentic product varieties while prompting the exit of counterfeiters. To analyze the impact of the trademark law on firm entry and exit, we estimate the following DDD specification:

$$\begin{aligned} NumFirms_{prt} &= \beta \times Western_r \times TMInt_p \times Post1923_t \\ &\quad + \gamma \times TMInt_p \times Post1923_t + FE_{pr} + FE_t + \epsilon_{prt} \end{aligned} \tag{3}$$

where we aggregate the data to the product p-country region r (Western vs. Japanese)-year t level and compute two new dependent variables. The first is the stock of firms that entered the market before the end of the sample period (starting with the stock of firms in 1920 and then adding newly entered firms every year while ignoring exits); the change in this stock variable captures the number of new entries in a given product and year. The second dependent variable is the stock of surviving firms in a given year (ignoring entries); the change in this stock variable measures the number of exits in a given product and year. The coefficients on the interaction terms in this DDD specification can be interpreted as the effects of the trademark law on the entry and exit of firms. $TMInt_p$ is the product-specific trademark intensity, and $Western_r$ is a dummy variable indicating the stock of Western firms. We use region-product fixed effects FE_{pr} to control for region-specific differences across products and year fixed effects FE_t to account for time shocks.

In column (1) of Table 5, we examine how the trademark law influenced the entry decisions

of Western and Japanese firms across products with varying trademark intensities. The results indicate that the law had a significant positive effect on Western firm entries, increasing the number of Western varieties by an average of 2.9 at the mean level of trademark intensity. In contrast, Japanese firm entries were not significantly affected.[34] Column (2) examines the impact of the trademark law on firm exits. The estimates suggest that the law led to an increase in Japanese firm exits by approximately 0.13 at the mean level of trademark intensity, while it had no significant effect on Western firm exits.[35] In columns (3) and (4), we expand the sample to include Chinese firms and find that their entry also increased, though to a lesser extent than that of Western firms, while exits were not significantly affected. In the next section, we show how this result aligns with increased collaboration between Western firms and Chinese intermediaries.

These findings highlight the distinctive role of trademark protection: contrary to concerns that innovation-related IP protection might reduce competition, trademark protection is shown to enhance market variety by protecting the integrity of brands and their role in signaling producer identity. As discussed in Section 3, this suggests that trademark protection provides a unique source of welfare gains—reduced information frictions—while preserving market competition.[36]

5.3 Integration with Domestic Intermediaries

Hypothesis 3 in Section 3 predicts that trademark protection, by mitigating the risks associated with working with intermediaries, can also influence the organization decisions of authentic firms. Specifically, it may lead to greater integration between foreign authentic firms and domestic intermediaries, both within and outside firm boundaries. In this subsection, we test this hypothesis by examining how the trademark law affected Western firms' decisions to hire Chinese compradors (sales staff) and partner with Chinese intermediaries.

5.3.1 Domestic integration within firm boundaries

We begin by looking *within* the boundary of Western firms and measure domestic integration by examining the employment of Chinese employees and their positions. In column (1) of Table 6,

[34]The increase in firm entry is also reflected in a rise in advertisements introducing new products, as shown in Section 5.1.

[35]Both the positive effect on Western firm entry and the negative effect on Japanese firm survival are slightly larger when extending the time period to 1930; results are available upon request. Table B.14 in the Online Appendix confirms that these findings are robust to alternative measures of trademark intensity, as well as controls for product characteristics and consumer boycotts.

[36]The effects of the trademark law on prices, market reallocation, and product variety documented in this section also extend to Chinese imports (see Section A.12 of the Online Appendix). The law led to increased imports from Western countries in trademark intensive products and facilitated new trade relationships, without significantly affecting unit prices. In contrast, imports from Japan declined, though the effect is not statistically significant.

we find that Western firms exhibited an increased likelihood of employing Chinese. This is mainly driven by the extensive margin, i.e., moving from zero to one Chinese employee, as the effect on the number of Chinese employees is also positive but more noisily estimated. Given that Hypothesis 3 predicts increased employment of Chinese as intermediaries (rather than manufacturing workers), we test in columns (3)-(5) whether this increase in Chinese employment is driven by sales (including compradors) or managerial positions. Column (3) supports the prediction and shows that the increase in Chinese employees is particularly driven by Chinese hired into sales and comprador positions. 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 signifies a higher layer, as the layers are numbered from 1 (highest) to 3 (lowest)). These results suggest that Western firms became more inclined to promote Chinese employees after the enactment of the trademark law, especially in managerial and sales positions.

5.3.2 Domestic integration outside firm boundaries

To examine whether integration between Western firms and domestic intermediaries increased beyond firm boundaries, we leverage the client directory of intermediary firms from the Hong List. Specifically, we analyze whether Chinese intermediary firms selling trademark-intensive products expanded their foreign client base. To capture this effect, we adapt equation (2) to include all intermediary firms and introduce interaction terms indicating Western vs. Chinese intermediary firms engaged in trademark-intensive product sales.

Table 7 shows that, following the implementation of trademark law, Chinese firms selling trademark-intensive products were more likely to act as agents for foreign firms, with their client rosters expanding significantly compared to their Japanese counterparts. In contrast, there was no observable change in the client lists of Western firms. This increase in integration was entirely driven by Western clients, as shown in columns (3)–(4); while Chinese intermediary firms also had Japanese clients, their number remained unchanged.[37]

5.4 Brand Prices

How did reduced information friction affect prices? As noted in Hypothesis 4 of Section 3, trademark protection does not guarantee market power and can exert an ambiguous effect on brand prices by influencing both the demand and supply sides of authentic products.

We first examine the net effect of the trademark law on brand prices by estimating the following

[37] As discussed in Section A.13, we find that the increased integration between Western firms and Chinese intermediaries was also associated with higher growth and new market entry among Chinese intermediaries.

equation using the monthly brand-product-level price panel data:

$$\ln(price)_{bt} = \beta \times TrademarkInt_b \times PostMay1923_t + FE_b + FE_t + FE_{jq} + \epsilon_{bt} \quad (4)$$

where b denotes the branded product, t a month, j a broad industry,[38] q a quarter, and the outcome is the log price of the branded product in a given month. We include brand, month, and broad industry times quarter fixed effects (i.e., FE_b, FE_t, and FE_{jq}) in the regression to control for brand and monthly factors and industry-specific-quarterly shocks that may affect prices.

The results of the above regression are reported in column (1) of Table 8 and show that the establishment of the trademark did not, on average, significantly affect the level of brand prices. In Figure C.12 of the Online Appendix, we show the corresponding event study and find there were no pre-trends, and price responses of trademark-intensive brands to the trademark law were insignificant across periods.[39]

To disentangle the potential offsetting effects of the demand and supply mechanisms, we next explore heterogeneity in price responses across products as the importance of each mechanism can vary with product attributes. First, trademark protection is expected to exert a greater positive effect on aggregate demand in industries with a stronger preference for quality and a larger scope of vertical product differentiation. Producers in these industries are more likely to raise prices after trademark protection as their ability to signal quality via trademarks rises.

To explore this channel, we construct a measure of consumer preference for quality and vertical product differentiation by following the methodology by Khandelwal (2010) which utilizes both unit value and quantity information in detailed trade data to infer quality and quality dispersion. Conditional on price, imports from countries with higher market shares are assigned higher quality. We implement this approach and estimate the quality of each country variety in Chinese import data by compiling bilateral product-level import data covering China's imports from over 40 countries in 246 harmonized product categories from 1920-1922 and combining this with information on

[38] We group the brands into 5 broad industries according to their NCL product classification p: chemicals, food/beverages/tobacco, metals/machinery/vehicles, non-metallic materials, and textiles.

[39] In a robustness check, we implemented an alternative identification strategy by testing how the prices of individual brands changed after the respective month in which each brand got registered at the trademark office, by implementing a staggered diff-in-diff estimation. Since the trademark registration month may be an endogenous choice for the firm, we prefer the above intent-to-treat specification but find it nonetheless reassuring that the alternative specification yields similar results: no significant effects of the trademark law on prices. To implement this alternative research design, we matched the price data manually to the trademark registrations in China based on the brand and product variety names. Results are reported in Table B.15 of the Online Appendix.

tariffs.[40] We then construct a measure of *quality dispersion* within a product category based on the quality distance between the top 90th and bottom 10th percentiles to reflect the scope of quality differentiation. This metric, as measured in equation (18) of Khandelwal (2010), has been termed the length of the quality ladder which reflects consumer preferences for quality. As an alternative proxy, we also use our brand price data to construct a measure of *price dispersion*, which is shown in Khandelwal (2010) to be positively correlated with quality dispersion.

Columns (2)-(4) of Table 8 use these two measures and show a positive relationship between price responses to the trademark law and the degree of vertical differentiation.[41] Firms from industries with larger vertical differentiation and stronger consumer preference for quality increased prices after the trademark law relative to the less differentiated industries. In the last row of Table 8, we compute marginal effects for the products with the largest measure of quality and price dispersion, respectively: the positive marginal effects indicate that the trademark law led to price increases in those industries, and significantly so in columns (3) and (4).

Second, another factor in shaping price responses to trademark protection is the degree of free entry. Grossman and Shapiro (1988a) highlight that in industries with low entry barriers, trademark protection results in new entries and new varieties and subsequently limits firms' ability to raise prices. To examine the role of entry conditions in price responses, we construct several proxies of fixed cost, including average factory size and capital per factory.[42] Columns (5)-(6) of Table 8 reveal that–consistent with the hypothesis–the trademark law tended to lower prices in industries with lower entry barriers relative to industries with higher entry barriers.

Third, we explore how the price effect of trademark protection varies with the product's prior dependence on alternative communication and differentiation channels. For industries that use anti-imitation advertising to communicate and protect their identities (or other mechanisms to increase product differentiation), stronger trademark protection lowers the dependence and cost spent on such mechanisms, as shown in Section 5.1. As modeled in Grossman and Shapiro (1984), ad-

[40] To estimate the quality of each variety, we follow equation (15) in Khandelwal (2010) and regress, separately for each NCL product category, the import share of a variety on the unit price of the variety, its market share within the product, the population of the origin country (which we merge in from the Maddison project, see Bolt, Inklaar, de Jong, and van Zanden, 2018), and variety and year fixed effects, using the lagged ad valorem equivalent tariff, the number of varieties China imported per product, and the number of products a country exported to China as instruments. We then compute quality based on the estimated fixed effects as in equation (16) in Khandelwal (2010).

[41] Note that in column (3) we control for the number of varieties on which the quality dispersion measure is based, as products with more varieties tend to mechanically have larger quality dispersion.

[42] We obtained this data by digitizing detailed product-level input and output data from Lieu (1936) who conducted industrial surveys in 1931 and 1933 to collect Shanghai's economic statistics at the detailed industry level. Apart from average factory size and capital per factory, which we use in this analysis, we also used capital intensity and capital per blue-collar worker as additional proxies for entry cost and found similar results.

vertising cost—or generally the cost to disseminate information—increases with the fraction of consumers that the producer seeks to reach. When the importance of such information channels diminishes, the reduced costs lower prices.[43] To test this channel, we interact our main treatment variable with the product's anti-imitation advertising intensity before the law in column (7) of Table 8 and find that, consistent with the hypothesis, products that utilized anti-imitation advertising more frequently were more likely to see a decline in prices after the trademark law.

6 Comparing Alternative Institutional Attempts

As Section 2 recounted, the 1923 trademark law was preceded by a series of alternative institutional approaches exploited by foreign powers to address ongoing trademark disputes: extraterritoriality, leading to direct importation of foreign legal institutions into China; bilateral commercial treaties with pledges to provide specific trademark provisions; and a legal trademark code in 1905 that was never put into effect. The long time horizon of our data enables us to compare the effect of the 1923 trademark law to the effects of these prior attempts.

In this section, we construct three variables to represent each of these earlier undertakings. First, we construct a firm-year-specific measure of extraterritorial rights based on a firm's nationality and that nation's extraterritorial status in a given year. For geopolitical reasons, such as the outbreak and end of World War I, that were arguably orthogonal to the Chinese economy, countries were added to or deleted from the list of nations that enjoyed extraterritorial status.[44] These shifts in extraterritorial power caused changes to firms' legal status. In legal disputes, when the defendants' home countries had extraterritorial status, their home laws would apply, and the cases would be tried at their consular courts. Differences in countries' legal systems and the application of the defendant's home-country law could lead to unresolved disputes, jurisdiction evasion, and biased rulings, ultimately failing to provide effective trademark protection.

Second, we use dummy variables to denote China's commercial treaties with Great Britain (1902) and the United States (1903). However, these bilateral treaties, which required China to establish its own legal trademark system, among other demands, embodied conflicting interests; both Western nations and Japan attempted to export their respective trademark laws to China, leading to an indefinite postponement in the establishment of a domestic trademark law.

[43] See Sections 2.3 and 5.2 of Bagwell (2007) for a comprehensive overview on the information role of advertising and the implications for prices among differentiated products.

[44] The nations that lost extraterritorial status were Australia (1901), Austria (1917), Czechoslovakia (1917), Germany (1917), Finland (1924), Hungary (1917), Latvia (1924), the Philippines (1898), and Russia (1917). Those that gained extraterritorial status were Switzerland (1918) and Japan (1896).

Finally, we include a dummy variable to denote China's first attempt to establish a domestic trademark code after the 1902-1903 bilateral treaties. The 1905 code, largely modeled on Japan's trademark system and first-to-file principle, eventually went unenforced due to fierce protests from Western governments.

The estimation results that compare the effects of the three alternative institutions to the 1923 trademark law on Western firms are reported in Table 9, where each institutional measure interacted with firm-specific trademark intensity.[45] 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 Western firm employment of trademark-intensive firms. As anticipated, the unenforced 1905 trademark code also appears to have had no effects. The 1923 trademark law is the only measure shown to have played a positive role in the growth of trademark-intensive Western firms. Earlier attempts involving direct imports of foreign institutions and bilateral treaties were unsuccessful as means of trademark protection; a positive effect was not achieved until a domestic trademark law was established.

7 Conclusion

In this paper, we investigate how firms and markets respond to the introduction of modern trademark institutions by exploiting a quasi-natural policy experiment—the establishment of China's first trademark law of 1923–in one of the world's most contested markets for trademark protection. Using a series of digitized micro-level datasets, we provide empirical evidence that the trademark law significantly reduced information frictions related to producer identity and diminished authentic firms' reliance on alternative communication channels. Moreover, trademark protection reshaped firm dynamics on the opposite sides of trademark conflicts by reallocating market shares from Japanese firms, which were most frequently accused of counterfeiting, to Western firms. In addition, the law led to new relationships with domestic intermediaries, both within and outside the boundary of Western firms, as the latter became more inclined to recruit and promote Chinese employees and to collaborate with Chinese intermediaries. The Chinese intermediaries, in turn, experienced growth in both the volume of Western clients and market share.

Despite widespread concerns that IP reforms could reduce market competition, we find no evidence that the trademark law led to a decline in competition. On the contrary, it facilitated the

[45] For this analysis, the sample period is extended to 1872-1936 to incorporate the earlier institutions. The appendix to the Hong List, which enumerates which firms offered which types of products or services, is only available for 1920-1930. To identify firms' offerings across the entire period of 1872-1936 for measuring firm-specific trademark intensity, we used the textual description of firms' activities in the Hong List to assign products to firms manually.

entry of authentic firms and the introduction of new product varieties. The reduction in information frictions also did not necessarily result in higher brand prices, especially in industries with a lower scope of quality differentiation and lower entry barriers. These findings highlight the unique role of trademark institutions compared to other forms of intellectual property. They suggest that strengthening trademark protection to reduce consumer information frictions can align with sustained market competition, foster domestic industrial growth, and generate consumer gains.

Our examination of historical archives, including trademark disputes and court cases, sheds light on the mechanisms driving the documented impact of the 1923 trademark law and the role of legal infrastructure. The effects of the law could be attributed to the diminished ability of counterfeiters to register infringed trademarks and resolve trademark disputes with minimal legal consequences. The trademark law provided effective trademark protection by establishing a legal basis for trademark protection and significantly increasing penalties for counterfeiting which were then enforced by the existing legal infrastructure. The paper underscores the particular importance of domestic institutional reforms in addressing international trademark disputes, a challenge that remains highly relevant in today's global markets and policy debates.

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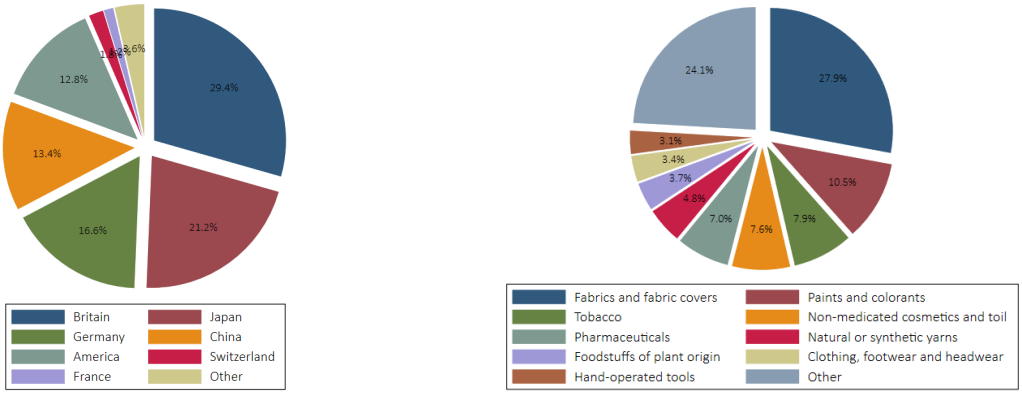


(a) By nationality of registering firm (b) By product categories

Figure 1: Chinese Trademark Registrations, 1924-1927

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

(a) By disputed region (b) By filing region

Figure 2: Disputed Trademark Applications and Registrations, 1924-1927

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

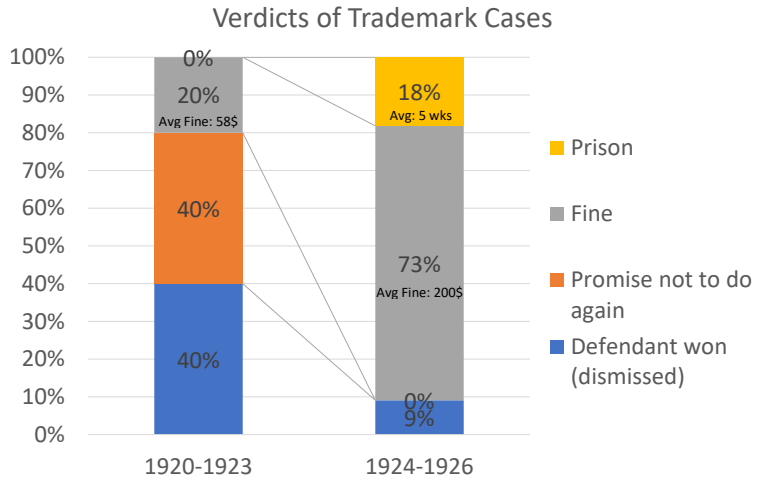


Figure 3: Verdicts of Trademark Cases, Before and After 1923

Source: Own calculations based on 16 Mixed Court case reports, as published in the *North China Herald*, 1920-1927.

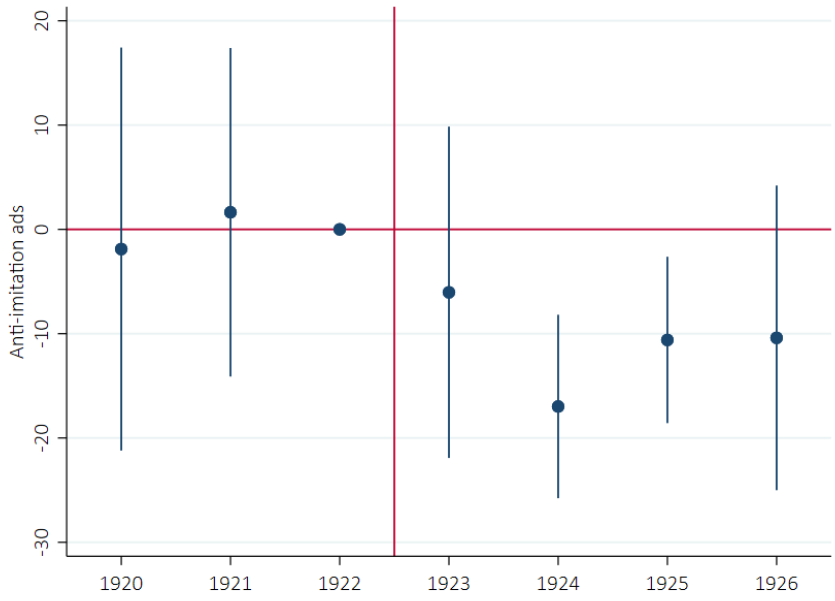


Figure 4: Effect of the Trademark Law on Anti-imitation Advertisements: Event Study

Notes: The figure estimates the event study version of column (3) in Table 2 where we aggregate the data to the annual level and allow the effect on trademark intensity to vary every year.

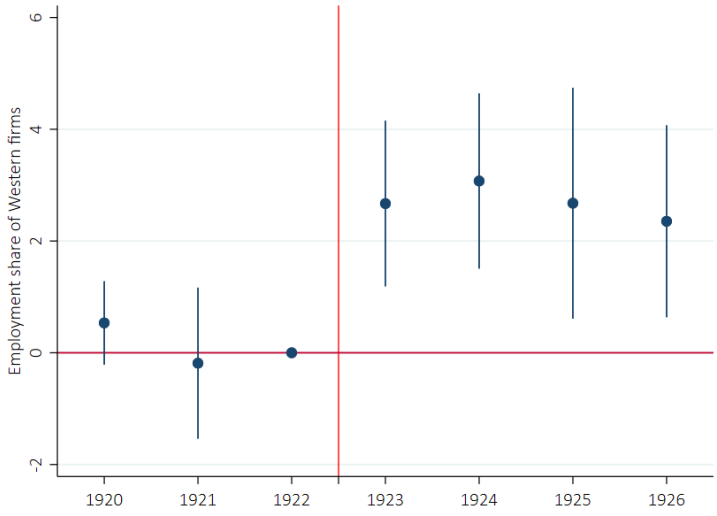


Figure 5: Effect of the Trademark Law on Reallocation from Japanese to Western Firms

Notes: The figure estimates the event study version of column (4) in Table 3 by allowing the effect on the differential trademark intensity of Western firms to vary every year.

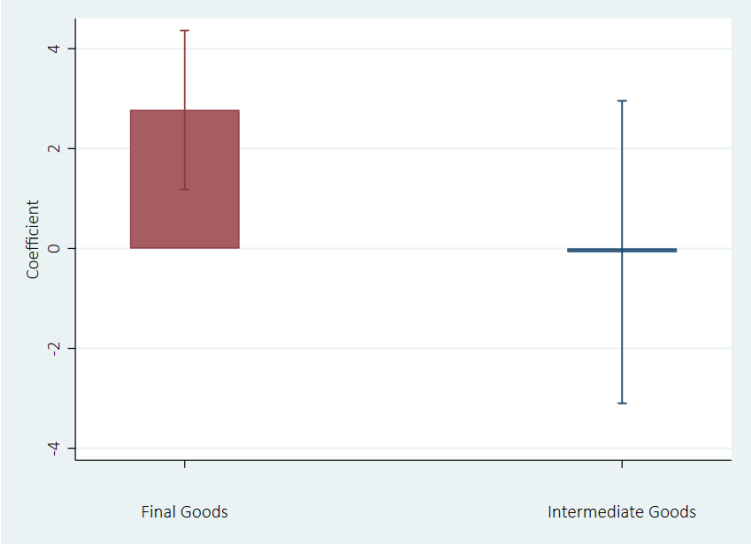


Figure 6: Effect of the Trademark Law on Intermediate and Final Goods

Notes: This figure reports the estimated employment effects of the trademark law on final goods versus intermediate goods. The effects are estimated based on an extended version of the equation estimated in column (4) in Table 3: we add interaction terms for intermediate and final goods, depending on the NCL product classification of the most trademark intensive product that a given firm sells.

Table 1: Trademark Intensity across Product Categories

NCL product category	Trademark intensity	NCL product category	Trademark intensity
Pharmaceuticals	.088	Toys, games, sports equipment	.016
Non-medicated cosmetics and toiletry	.076	Precious metals, jewellery, clocks, watches	.013
Foodstuffs of plant origin	.073	Medical equipment	.013
Foodstuffs of animal origin	.048	Furniture	.013
Alcoholic beverages	.047	Natural or synthetic yarns	.012
Chemical products	.046	Dressmakers' articles	.012
Paper, cardboard and office goods	.045	Leather and leather goods	.01
Tobacco	.041	Musical instruments	.008
Non-alcoholic beverages; beer	.04	Canvas and other materials	.008
Machines, motors and engines	.036	Firearms	.006
Hand-operated tools	.035	Carpets, rugs, mats	.005
Paints and colorants	.034	Construction services; mining and drilling	0
Scient. instruments and audio equip.	.034	Education, entertainment, sports	0
Metals	.031	Telecommunications services	0
Clothing, footwear and headwear	.03	Transport; packaging and storage of goods	0
Industrial oils and fuels	.029	Business services	0
Household utensils	.026	Food and drink services	0
Live animals and plants	.024	Scientific and technological services	0
Environmental apparatus	.024	Medical and veterinary services	0
Vehicles	.021	Legal, security, and personal services	0
Electrical, thermal, acoustic insulating material	.021	Treatment and recycling	0
Materials, not of metal	.018	Insurance, financial and real estate services	0
Fabrics and fabric covers	.016		

Notes: Trademark intensity is measured using each product category's share of total pre-1923 trademarks in eight countries (Britain, Germany, the United States, Japan, Australia, Canada, Denmark, and Spain), recorded at the historical trademark database of the World Intellectual Property Organization (WIPO).

Table 2: Effect of the Trademark Law on Advertisements

	(1) Dummy if > 1 anti-imitation ad	(2) anti-imitation ads/all ads	(3) $\sinh^{-1}$(anti-imitation ads)	(4) quality ad dummy	(5) new product ad dummy
Post May 1923 * trademark intensity	-1.446**	-0.160**	-2.939**	0.657	1.182**
	(0.548)	(0.072)	(1.115)	(1.048)	(0.516)
Observations	2,856	2,856	2,856	2,856	2,856
R-squared	0.038	0.035	0.038	0.047	0.030
Number of NICE	45	45	45	45	45
Product FE	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the estimated effects of the trademark law on advertisements warning against imitations (anti-imitation ads) that were published in *Shen Bao* between 1920-1926. The dependent variables are a dummy variable indicating that there was at least one anti-imitation ad in the product-month, the share of anti-imitation ads in all ads in the product-month, the inverse hyperbolic sine of the count of anti-imitation ads in the product-month, a dummy variable indicating whether the regular ad highlights the quality or innovativeness of a product, and a dummy variable indicating whether the regular ad is about a new product. *Post May 1923* is a dummy denoting the period after adoption of the trademark law in May 1923. *Trademark intensity* is a product group-specific measure of trademark dependence, calculated using each product's share in total pre-1923 trademarks. All regressions include product group fixed effects and month fixed effects. Standard errors are clustered by product group. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Effects of the Trademark Law on Employment Reallocation

	(1) ln(empl)	(2) emp share	(3) ln(empl)	(4) emp share	(5) ln(empl)	(6) emp share
Post 1923 * trademark intensity * Western firms	10.929***	2.839***	10.405***	2.607***	9.764**	2.477**
	(3.138)	(0.824)	(3.659)	(0.916)	(3.499)	(0.932)
Post 1923 * trademark intensity	-8.853**	-2.475***				
	(3.433)	(0.828)				
Post 1923 * trademark intensity * Chinese firms					5.624	2.564***
					(4.223)	(0.894)
Observations	2,131	2,131	2,088	2,088	2,955	2,955
R-squared	0.914	0.952	0.922	0.955	0.918	0.942
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Country*year FE	Yes	Yes	Yes	Yes	Yes	Yes
Region*broad ind*year FE	Yes	Yes	Yes	Yes	Yes	Yes
NICE*year FE			Yes	Yes	Yes	Yes

Notes: This table reports the differential effect of the trademark law on the employment shares of Western firms relative to Japanese firms. The sample includes Western and Japanese firms located in Shanghai's concessions with employment and activity information between 1920-1923 in columns (1) to (4), and adds Chinese firms in columns (5) and (6). The dependent variable is either the natural log of a firm's employment in a given year or the share of employment of a firm in total employment in the respective product category-year. *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. Regions denote either Western countries or Japan or China. Standard errors are clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Effect of the Trademark Law on the Probability of Hiring in Certain Positions

	(1)	(2)	(3)	(4)	(5)
			Dummy for:		
	ln(empl)	emp share	Lawyers	Sales	Manuf
Post 1923 * trademark intensity * Western firms	14.666***	3.451***	1.327	4.800**	1.593*
	(3.485)	(0.877)	(1.917)	(2.090)	(0.776)
Observations	1,627	1,627	1,627	1,627	1,627
R-squared	0.928	0.960	0.854	0.744	0.706
Firm FE	Yes	Yes	Yes	Yes	Yes
Country*year FE	Yes	Yes	Yes	Yes	Yes
Region*broad ind*year FE	Yes	Yes	Yes	Yes	Yes
NICE*year FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the estimated effect of the 1923 trademark law on Western firms' differential probability of hiring lawyers, sales staff, and manufacturing staff. Columns (1) and (2) show that our main results on employment and employment shares also hold on the subset of firms for which we have job title information. The dependent variables in columns (3)-(5) are dummies denoting whether a firm had lawyers, sales staff, and a manufacturing department. *Post 1923* is a dummy denoting the period after the adoption of the trademark law in 1923. *Trademark intensity* is a firm-specific measure of trademark dependence, based on each firm's pre-1923 product mix and product-level trademark intensity, calculated using each product's share in total pre-1923 trademarks. Standard errors are two-way clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Entry and Exit

	(1) Entry	(2) Exit	(3) Entry	(4) Exit
Post 1923 * trademark intensity * Western firms	125.615***	-10.610	155.6154***	-10.6098
	(28.783)	(8.556)	(28.7994)	(8.4380)
Post 1923 * trademark intensity * Chinese firms			40.4129***	-4.4741
			(10.1408)	(3.7702)
Post 1923 * trademark intensity	0.037	5.776*	0.4494	5.4092**
	(5.533)	(2.933)	(4.7221)	(2.4610)
Observations	4,186	4,186	6,279	6,279
R-squared	0.9482	0.9995	0.9530	0.9996
Prod-region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: This table reports the estimated effect of the 1923 trademark law on the on the entry and exit of Western relative to Japanese firms, using data collapsed to product-years. The dependent variables in columns (1) and (3) are the stock of firms that entered the market before the end of the sample period (ignoring exits), i.e., the increase in the stock equals entry. The dependent variables in columns (2) and (4) are the stock of firms that survived during the sample period, i.e., the change in this stock equals exits. Thus the coefficient on the interaction terms can be interpreted as the effect of the trademark law on the entry and exit of firms. *Post 1923* is a dummy denoting the period after the adoption of the trademark law in 1923. *Trademark intensity* is a product-specific measure of trademark dependence calculated using each product's share in total pre-1923 trademarks. Standard errors are two-way clustered by product category and region-year. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6: Domestic Integration within the Boundary of the Firm

	(1)	(2)	(3)	(4)	(5)
				Hierarchy	
	Chinese empl dummy	Num. Chinese employees	Num. Chinese sales staff	Dummy Chinese mgr	Avg layer of Chinese empl
Post 1923 * trademark intensity * Western firms	4.878*	4.319	5.469*	1.943**	-1.645**
	(2.591)	(9.395)	(3.054)	(0.835)	(0.631)
Observations	2,088	2,088	1,627	2,088	1,494
R-squared	0.781	0.671	0.716	0.633	0.643
Firm FE	Yes	Yes	Yes	Yes	Yes
Country*year FE	Yes	Yes	Yes	Yes	Yes
Region*broad ind*year FE	Yes	Yes	Yes	Yes	Yes
NICE*year FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the estimated effects of the trademark law on the hierarchical structure of firms and their decisions to recruit and promote Chinese employees. Column (4) uses the sample of firms for which we have job title information, and column (5) uses the sample of firms that have at least one Chinese employee. *Post 1923* is a dummy denoting the period after adoption of the trademark law in 1923. *Trademark intensity* is a firm-specific measure of trademark dependence, based on each firm's pre-1923 product mix and product-level trademark intensity, calculated using each product's share in total pre-1923 trademarks. Standard errors are two-way clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Foreign Client Growth at Chinese Firms

	(1)	(2)	(3)	(4)
	Dummy having foreign clients	Number of foreign clients	Dummy having Western clients	Number of Western clients
Post 1923 * trademark intensity * Western firms	0.097	-26.271	0.097	-26.293
	(0.558)	(29.974)	(0.558)	(29.934)
Post 1923 * trademark intensity * Chinese firms	1.598***	7.880***	1.598***	7.880***
	(0.462)	(2.516)	(0.462)	(2.516)
Observations	3,006	3,006	3,006	3,006
R-squared	0.767	0.726	0.758	0.722
Firm FE	Yes	Yes	Yes	Yes
Ctry*Year FE	Yes	Yes	Yes	Yes
Broad ind*Year FE	Yes	Yes	Yes	Yes
NICE*year FE	Yes	Yes	Yes	Yes

Notes: This table reports the estimated effects of the trademark law on the growth of firms' client rosters, for whom they act as intermediaries. The dependent variables are a dummy for whether a business served as an agent for business clients, and the number of such clients for which it served as an agent. *Post 1923* is a dummy denoting the period after adoption 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 sample consists of Western, Chinese, and Japanese firms (omitted category; absorbed by fixed effects). Standard errors are two-way clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Effect of the Trademark Law on Brand Prices

	(1) ln(price)	(2) ln(price)	(3) ln(price)	(4) ln(price)	(5) ln(price)	(6) ln(price)	(7) ln(price)
Post May 1923 * TM int.	-0.745	-4.520***	-3.317	-1.030**	-4.502***	-2.819**	-1.209
	(0.455)	(1.307)	(3.567)	(0.458)	(1.029)	(1.058)	(0.911)
Post May 1923 * TM int. *							
– quality dispersion		0.155*	0.147**				
		(0.078)	(0.069)				
– no. of varieties			-0.116				
			(0.264)				
– price dispersion				0.690**			
				(0.320)			
– avg firm size					0.016***		
					(0.004)		
– avg capital per firm						0.010**	
						(0.004)	
– anti-imitation ads							-0.088*
							(0.044)
Observations	33,245	16,955	16,955	15,618	32,344	32,344	33,245
R-squared	0.150	0.192	0.193	0.188	0.159	0.157	0.154
Number of panel_id	1,141	581	581	484	1,117	1,117	1,141
Brand FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Broad industry-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Marginal effect for		13.137	13.387**	10.702*	1.523	2.611**	-14.171**
the top industry		(7.812)	(6.038)	(5.568)	(0.990)	(1.221)	(6.017)

Notes: This table reports the estimated effects of the trademark law on log prices. *Post May 1923* is a dummy denoting the period after adoption of the trademark law in May 1923. *Trademark intensity* is a product-specific measure of trademark dependence, calculated using each product's share in total pre-1923 trademarks. All regressions include brand fixed effects, month fixed effects, and broad industry times quarter fixed effects. Marginal effects at the bottom of the table are computed at the maximum values of the respective interacted variables. The sample includes all brands for which we have at least 12 monthly observations. Standard errors are clustered by product group. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: 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	0.115*	0.190**	0.223***	0.222***	0.165*	
	(0.060)	(0.074)	(0.080)	(0.080)	(0.084)	
ET*trademark intensity		-2.607	-3.662*	-3.643*	-2.239	-4.160
		(1.875)	(1.863)	(1.864)	(2.264)	(3.362)
Part II: Bilateral Treaties						
Treaties			-0.153**	-0.153**	-0.142**	
			(0.064)	(0.064)	(0.064)	
Post 1902*trademark intensity			-5.394***	-5.430***	-5.290***	-7.440***
			(0.846)	(0.846)	(0.803)	(1.748)
Post 1903*trademark intensity			0.489	-0.674	-0.622	-0.440
			(1.212)	(0.908)	(0.797)	(0.512)
Treaties*trademark intensity			-0.152	-0.176	-0.494	1.508
			(1.835)	(1.842)	(1.877)	(2.699)
Part III: Provisional Trademark Code						
Post draft (1905)*trademark intensity				1.295	0.287	0.748
				(1.400)	(1.255)	(0.841)
Part IV: 1923 Trademark Law						
(Post 1923)*trademark intensity					3.114***	3.516***
					(1.027)	(1.106)
Observations	19,390	19,390	19,390	19,390	19,390	19,114
R-squared	0.769	0.769	0.770	0.770	0.770	0.780
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-year controls	Yes	Yes	Yes	Yes	Yes	
Ctry*Year FE						Yes
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table compares the effect of the trademark law to that of earlier initiatives, including extraterritoriality, bilateral treaties, and the 1905 trademark code. The sample consists of Western firms located in Shanghai's concessions for which we have data on employment and activity in the period 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 extraterritoriality status in a given year. *Treaty* is a country-year-specific dummy denoting China's treaties with Great Britain (1902) and the United States (1903), respectively. *Post draft (1905)* is a dummy denoting a trademark code proposed in 1905 but not enforced (Motono, 2011, p.11). *Post 1923* 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 annual Hong List; *trademark intensity* is calculated using each product's share in total pre-1923 trademarks. Column (7) includes an interaction with the number of mixed court assessors that a country employs at its consulates (taken from the Hong Lists). Controls are dummy variables indicating the treaties that China entered into 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 are two-way clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

ONLINE APPENDIX

Trademarks as Intellectual Property: Information Frictions, Firm Growth, and Competition

Laura Alfaro, Cathy Bao, Maggie X. Chen, Junjie Hong, Claudia Steinwender

A Additional Background and Analysis

A.1 How the Trademark Law Changed the Legal Situation for Trademark Protection

To examine the effectiveness of the trademark law in improving trademark protection, we digitized all the trademark disputes published in China's Trademark Gazette between 1924 and 1927. As discussed in Section 2.4 of the paper, the data show that while some Japanese counterfeiters attempted to register other businesses' trademarks, such registrations were soon disputed and revoked. The records show that 63.4% of the disputed trademarks were originally filed by Japanese firms and firms that filed complaints were mostly from Western countries. Further, Japanese firms lost 72% of the disputes filed against them by Western counterparts.

For example, as documented in the Trademark Gazette, the Japanese firm *Tokyo Ink Co., Ltd.,* applied to register a trademark that showed a lion with wings putting its paws on a globe (Figure C.3a). However, the German dye producer *Farbenfabriken vorm. Friedr. Bayer & Co.* was able to prove that they had been using a stylized version of the lion since 1912 in China (Figure C.3b). The Trademark Bureau forced *Tokyo Ink* to withdraw their application as it was deemed a counterfeit, arguing "the drawings are identical except for an unimportant small part [...] the confusion is more than accidentally similar".

Sometimes, Japanese firms even managed to register their counterfeit trademarks first but subsequently lost the registrations. For example, the Japanese firm *Takisada Co., Ltd.,* managed to register the trademark *"年年如意"* ("good luck every year") for its cotton products (Figure C.3c), but seven months later lost the trademark to the British firm *Probst, Hanbury & Co., Ltd.,* whose trademark had a slightly different name, *"万年如意"* ("good luck for ten thousand years"), but an almost identical image (Figure C.3d). *Probst, Hanbury & Co.* was able to prove that they had used the trademark since 1899. The Trademark Bureau subsequently revoked the Japanese trademark, indicating that "although the defendant argues that they accidentally used a similar trademark because, in Asian culture, it is customary and auspicious to use the characters *"如意"*, it is not convincing, since the color and the design of the picture are identical. Thus, the trademark is deemed counterfeit, and the defendant is not of good will."

We also examine whether the legal provisions affected the verdicts by collecting information on all the trademark cases reported in the *North China Herald*, the leading English-language newspaper in China at the time. While these case reports are not comprehensive, the 16 case verdicts, as summarized in Figure 3 of the main paper, illustrate that the punishments for counterfeiters became more severe. For example, before 1923, 40% of the cases were dismissed, compared to less than

10% after 1923. Plaintiffs won 40% of cases before 1923, but instead of a punishment, the counterfeiter just had to promise not to counterfeit again. In contrast, after 1923, the cases in which the plaintiff won were never settled without a fine or prison sentence. Before the law, the maximum possible fine under the Provisional Criminal Code was $100, but the reported case only charged 3 defendants with fines between $50 and $75 (with an average of $58). The new trademark law raised fines up to $500, and the average fine across reported cases was $200. Notably, the trademark law also included prison sentences, imposed in 20% of the reported cases, with an average prison sentence of 5 weeks. The law allowed for 1 year maximum prison time, even though in one case the verdict was $500 or 500 days of prison time; see Articles 39 and 40 of the Trademark Law, published in English in The China Weekly Review (1923a) and The China Weekly Review (1923b).

Prison time became a major punishment, especially when counterfeiters used intermediaries. Because counterfeiting was so profitable, Japanese producers had reimbursed their Chinese distributors for any court fines before the trademark law was introduced, which would not have worked with prison time. As the The North China Herald (1919) lamented: "But the very salutary effect of a few sentences of imprisonment would nullify all the guarantees that Japanese or any other manufacturer of goods under false trade marks might give."

A.2 The Construction of the Firm-Employee Panel Data

We digitized and assembled an annual business-employee-level panel dataset covering the universe of firms that operated in Shanghai's concession areas in 1872-1941 based on the *North-China Hong List*, an annual series 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.

For each company listed in a given year, our initial dataset recorded the following variables:

- *year:* the year of the issue of the *North-China Hong List*
- *firm name:* the name of the firm in English
- *Wade-Giles firm name:* the Wade-Giles romanization of the firm name
- *address:* the firm's street and street number
- *firm activity:* text description of the firm's activities
- *list of main employees:* For each employee, we recorded the employee name and their job title.

The original dataset consisted of 560,246 firm-employee-year observations covering 66 years (1872-1941, with 4 missing issues in 1873, 1885, 1898, and 1904). Note that we only collected data related to firms and did not digitize government organizations (e.g., municipal councils, embassies) or organizations (e.g., missions, churches, clubs), which were also listed in the Hong List.

Based on this data, we created several additional variables for each firm-year:

- *Broad industry.* We manually assigned each firm to eight industry categories (multiple assignments possible): agriculture/mining, construction, manufacturing, transportation, wholesale, retail, finance/ insurance/real estate, and other services. We then created 8 dummy variables indicating whether a firm belongs to one of these broad industries in a given year.

- *Employment.* We counted the list of the employees which we use as a proxy for employment. If a firm did not list any employee, we assigned them a count of 1, assuming that any firm needs to have at least one worker, who may be the owner. We dropped absent employees (indicated by "(abs.)" after their name) from the count.
- *Lawyers dummy.* Dummy variable that equals one if at least one of the listed employees has a job title related to legal activities (titles such as attorney, lawyer, etc.)
- *Sales staff dummy.* Dummy variable that equals one if at least one of the listed employees has a job title related to sales (e.g., titles such as sales, salesman, marketing, representative, advertising, and publicity)
- *Manufacturing staff dummy.* Dummy variable that equals one if at least one of the listed employees has a job title related to manufacturing (e.g., titles such as manufacturing, production, producing, factory)
- *Concession.* We assigned the addresses to either the International Settlement (also called the Public concession) or the French Concession. We dropped all firms that did not have an address, firms whose addresses we could not locate in a concession, and firms in areas outside the concessions (because the Hong Lists did not systematically cover those). We were able to assign the concession to 94.55% of our firm-employee-year observations.
- *Chinese employment.* We identified Chinese employees based on their names, and create a count as well as a dummy variable if a firm has any Chinese employees.
- *Chinese employees in sales positions.* We specified a Chinese employee as sales staff if the job title related to sales.
- *Chinese manager dummy.* Dummy indicator if a Chinese employee appears in the top organizational layer of employees according to indents.
- *Average organizational layer of Chinese employees.* We calculated the average organizational layer of Chinese employees (according to indents) relative to the average organizational layer of all employees.

We then used additional sources to create an indicator of the nationality for each firm:

- *nationality:* We assigned the nationality of the ownership nationality of the firm based on various sources. These sources used to identify firm nationality include: the "China Importers and Exporters Directory," published in 1936 by the Bureau of Foreign Trade, Ministry of Industry, Shanghai; "The Universal Dictionary of Foreign Business in Modern China," which includes a detailed description of each 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 Company; and several documents from the Japanese Chamber of Commerce. For the remaining unmatched businesses, we manually collected nationality information or assigned a nationality based on the country reference in the firm's name (if unambiguous). Our measure of a firm's nationality is time-invariant; we have no information about changes in the nationality of firms over time, but the nationality of ownership tended to be persistent in this period.

To construct the panel data, we matched the firms over time based on their names (in both English and traditional Chinese), industries, and employee names to produce a firm panel dataset.

This was an iterative process and included a combination of automated processing (such as harmonizing common company abbreviations by replacing the word 'limited' with the abbreviation 'ltd', etc.), semi-automated processing (e.g., fuzzy matching firm names and then manually verifying potential matches), and manual matching (such as correcting spelling errors that occurred during data entry, or taking out industry information that appeared in the name in some years, such as harmonizing "ying cheong and co" and "ying cheong and co photographers" or "watson a s and co" and "watson a s and co ld (the shanghai pharmacy)"). In case of imperfect matches, we also used the information on industry, address, or the list of firm employees to decide whether two observations belonged to the same firm. We iterated these steps until we exhausted all the spelling variants or common mistakes in the process of manually checking data. In the case of takeovers or for deceased owners, the Hong List typically kept listing the old firm name in parenthesis after the new firm name, which we also used for matching (e.g., matching "milles walter jennings" with "milles walter jennings (henderson macleod and milles)" and "henderson macleod and milles"; or "bury a j (late wilkinson and co)" to match with "bury a j" and "wilkinson and co"). We also investigated the business history of many companies to better track companies over time despite their potential name changes (an example is "British American Tobacco", which we traced to consist of the firms "british american tobacco co", "american cigarette co", "american tobacco co depot", "british cigarette co", and the wade romanized firm names of "yungtahzeangienhong", "yungtahzeangienhung", "yuentaiyuenienhong", "yee tsoong tobacco co" and "yee tsoong tobacco co"). If the same firm name appeared in both the Public and the French Concessions, we treated them as two separate firms, as they operated in slightly different legal environments.

We then restricted our dataset to the years 1920-1926 for our main analysis (and 1920-1930 for robustness checks) during which the *North-China Hong List* provided an appendix of products and services where firms selling a specific product or service were listed underneath the product or service. Using this appendix, we created an additional variable:

- *product list:* the list of products or services offered by the firm.
- *product Nice category:* We assigned each of the products or services mentioned to one of the Nice classification (NCL) categories used in the trademark data described in Section 4.4. We used this later to assign trademark intensities to each product the firm sells, as described in the main text.

Several stylized facts on the time trends and distributions of firms emerge from the data.[1] Consistent with historical accounts, the data reveal a significant transformation in both the volume and composition of businesses in Shanghai during the early decades of the 1900s. As Figure C.4 shows, the number of businesses grew rapidly beginning in the 1920s and rose from 771 to 1,624 in 1920-1930 alone, while employment increased from about 5,000 in 1920 to 13,000 in 1930.[2] Transformations were also evident in the industrial composition of Shanghai's economy. While

[1] Summary statistics for the regression sample are given in Table B.1.

[2] Some notable examples of foreign corporations operating in Shanghai at the time include British American Tobacco (BAT), Standard Oil, Andersen, Meyer & Co, and Mitsui Trading Company. As Figure C.2 of the Online Appendix shows, BAT (formerly British Cigarettes), a Western company involved in numerous trademark disputes, consisted in 1906 of about 25 main employees and a relatively simple organizational structure; two decades later, BAT's operations in Shanghai had expanded to over 100 main employees and 9 departments.

wholesale constituted the dominant sector in Shanghai, the manufacturing sector grew from only 6.2% of the employment to 20% by 1930 as more foreign businesses set up factories (Figure C.5). The array of nationalities represented by Shanghai businesses also varied significantly over time. As Figure C.6 shows, Great Britain, initially accounting for half of the businesses, saw a significant fall in its share over time while the shares of American, Japanese, and Chinese companies grew.

A.3 Data Validation of the Firm-level Dataset

The Hong List, published by the *North-China Daily News*, was a directory of businesses that operated in Shanghai's concessions (i.e., the international concession and the French concession). To cross-check the coverage of the Hong List, we compared the aggregate foreign employment of foreign firms with the size of the foreign population (including both adults and children) in Shanghai reported in the Census for the years in which there are overlapping data: 5-year intervals between 1900 and 1935. The comparison suggests that the employees in our data accounted for 26% to 41% of the foreign population in Shanghai (see Figure C.7 (a)) in the Online Appendix). The Census reported the population of the international concession separately for male adults, female adults, and children. Figure C.7 (b)) shows that aggregate (predominantly male) employment in the Hong List accounts for about 80% of the foreign adult male population in the Public Concession census; we believe this finding confirms the thoroughness of the Hong List's coverage.

A.4 The Construction of Product Trademark Intensity

To measure the pre-existing, product-specific demand for trademark protection, we compute the product-specific share of trademarks registered before 1923 in countries outside China. We obtained historical trademark data from the IP Portal of the World Intellectual Property Organization (WIPO).[3] After eliminating countries whose use of trademarks in the late 19th and early 20th centuries was very sparse or nonexistent, we ended up with trademark data for eight countries: Britain, Germany, the United States, Japan, Australia, Canada, Denmark, and Spain.[4] The dataset lists the trademark name, the trademark ID, its holder, the application date, and the product group(s). Product groups are defined according to the international NICE classification (NCL) scheme, established by the NICE Agreement in 1957.[5]

For each country, we calculated the cumulative sum of all trademarks registered between 1872 when the trademark data started, and 1922, the year before the enactment of China's trademark law.[6] We then aggregated the trademarks of the eight countries, yielding a total of 50,050 registered trademarks by 1922. For each NCL product category p, we calculated its share of the total, which we labeled $TrademarkInt_p$.[7]

As Table 1 shows, the product categories with the highest trademark intensity were pharmaceuticals, cosmetics, food, alcoholic beverages, chemical products, paper and cardboard, and tobacco. Among the goods with the lowest trademark intensities were firearms, canvas products,

[3] https://www3.wipo.int/branddb/en/

[4] We dropped New Zealand, whose product classification system is inconsistent with the NCL system used by other countries.

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

[6] Before 1872, only a handful of trademarks were reported on 01/01/1801. We excluded these from the data.

[7] Services were generally not covered in trademark laws in this time period. Nevertheless, some service trademarks appeared in the data; we dropped them and assigned a value of 0 for services listed in the Hong List data. We also performed robustness checks by excluding services from the analysis, see Section A.8.

musical instruments, leather products, and dressmakers' articles. Our measure of trademark intensity corroborates the distinction of experience versus search goods described in Nelson (1970) while providing more variation in the degree of dependence on the trademark. As anticipated, experience goods classified by Nelson (1970) exhibit significantly greater trademark intensity than search goods. Further, the trademark intensity is also highly correlated with the frequency of trademark infringements documented in court cases and newspapers which are concentrated in product categories such as medicines, cosmetics, food, and tobacco.

A.5 Robustness to Alternative Measures of Trademark Intensity

Table B.4 uses alternative measures of trademark intensity. Column (2) computes the mean trademark intensity across all the firm's products (instead of the maximum, as in our baseline specification). In column (3), we return to our baseline measure of trademark shares but exclude Japan's trademark intensity from the aggregate measure and assign it to Japan only. That is, Western countries and China are assigned the trademark intensity of all countries excluding Japan, and Japan is assigned the trademark intensity of Japan alone. Column (4) goes one step further, using 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. Though these measures may be susceptible to endogeneity concerns and are, therefore, not our preferred measure, the results are robust.

A.6 Robustness to Other Firm or Product Attributes

We examine whether the positive effect of the trademark law on Western firms indeed reflects ex-ante variation in firms' dependence on trademark protection rather than other firm or product attributes. For example, trademark-intensive firms may have also been innovation-intensive. We hence interact the post-law dummy with a firm-specific measure of patent intensity in column (2) of Table B.5, by calculating the patent intensity of 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. We find trademark and patent intensity to be weakly correlated, and the result is not explained by patent intensity. In columns (3)-(4), we examine whether the effect on trademark-intensive industries reflects an effect on large industries measured by the number of firms or total employment in the firm's most trademark-intensive product (measured in 1920-1922). In columns (5)-(6), we check whether the industry's competitiveness or average firm size may drive the result. Overall, none of these measures affect the estimated effect of the trademark law on trademark-intensive firms.

A.7 Controlling for Country-Specific Shocks including Consumer Boycotts

In column (1) of Table B.6, we allow for macro-economic shocks (measured by home country GDP) in foreign countries to affect trademark-intensive firms from that country. This allows, for example, Japan's Great Kantō earthquake in 1923 to affect trademark-intensive Japanese-owned firms in Shanghai, and more generally, economic depressions or booms in home countries to affect their trademark-intensive firms in Shanghai.

Another example of country-specific shocks is consumer boycotts that the Chinese organized to protest against foreign influence in China. The US experienced the first of these boycotts in 1905, and subsequent boycotts, which typically lasted several months, affected British and Japanese

products (League of Nations, 1932; Orchard, 1930; Zumoto, 1932). Could these boycotts, especially those targeting Japanese goods, have driven our empirical results? First, notice that for this to be the case, the boycotts would have to affect trademark-intensive products differentially, or our country-year fixed effects would absorb them. While the archives suggest that boycotts tended to cover all products (Orchard, 1930, p.254 and p.256), it is possible that consumers found it easier to figure out the origin of a trademarked product (unless, of course, the trademarks themselves were counterfeited). In columns (2) to (4) of Table B.6, we therefore control for interactions between a country-year specific dummy variable indicating whether a foreign country experienced consumer boycotts in a specific year and trademark intensity. As historical sources are inconsistent concerning the number of boycotts reported, we use three alternative sources to date the boycotts (League of Nations, 1932; Orchard, 1930; Zumoto, 1932). However, not even the most comprehensive source for boycotts in column (4) explains away the trademark law's effect; our estimated effects are also not sensitive to the specific boycotts we control for.

It is also possible that boycotts on specific countries, e.g., Japan, had spillover effects on the demand for Western products. To account for this, we allow all boycotts to differentially affect Western firms in columns (5) to (7), essentially only using the years without boycotts for identification.

Next, we refine our measure in two ways. First, it may be plausible that product categories dominated by a foreign country were more affected by the boycotts. In columns (8) to (10), we interact the country-year-specific boycott indicator with the ratio of that country's trademarks over world trademarks (excluding the country)—this measure is larger than 1 if a country dominates the product category.

Finally, in columns (11) to (13), we refine the boycott dummy to capture the intensity of a boycott or more generally, any demand shock reflected in Chinese imports. This is based on the idea that without a boycott or other country-specific demand shock, we may expect a country's exports to China to exhibit similar trends as its exports to the rest of the world. Therefore, if a country's exports to China fall relative to its exports to the world, this could reflect negative demand shocks in China, including the intensity of boycotts. Notice that this measure is conservative, as the trademark law itself may drive some of this change. In column (11), we begin by only allowing Japanese firms to be affected by boycotts as measured by the ratio of Japan's exports to China over Japan's exports to the world. In column (12), we expand this idea to all 21 countries in our data for which we have export data. Finally, in column (13), we allow the boycotts to affect the growth of Japanese vs. Western firms differentially.

A.8 Robustness for Different Subsamples

Our main analysis has included both goods and service industries. Here, we examine the robustness of our results for different subsamples, starting by restricting the analysis to goods alone. Because many of the firms in our sample sold both goods and services, this analysis includes only firms that sold goods exclusively during 1920-1922. The results are reported in Table B.7. We find the estimated effect of the trademark law to increase in magnitude and continue to be statistically significant when considering goods alone.

Next, we examine whether the estimated employment effects of the trademark law are attributable to a particular country or product. Figures C.10 and C.11 show that neither a specific country nor a specific product group drives the results. The results remain similar in magnitude

and are almost always significant when we drop a single country or product group at a time.

In Table B.8, we drop distributors to check whether the reallocation results are also significant between Western and Japanese producers who produced domestically (we expect reallocation effects both across producers and across distributors and import sources, the latter of which is confirmed when we examine the effects of the trademark law on Chinese imports in Section A.12). We find that results are robust to dropping distributors.

A.9 Testing for the Role of Extraterritoriality

In Table B.9 of the Online Appendix we also check whether estimated effects differ depending on whether the Western firms had extraterritorial status in 1923. Ex ante, we would not expect this to matter, as only the extraterritorial status of defendants (i.e., the Japanese firms) should matter for trademark protection and Japanese firms had extraterritoriality throughout the study period. In line with this expectation, we find very similar results for both types of Western firms.

A.10 Inverse Propensity Score Reweighing

In Table B.10, we perform two types of inverse propensity score reweighing to ensure Western and Japanese firms are comparable based on pre-law characteristics such as firm size, exporter status, importer status, and employment growth. Our results are robust.

A.11 Identifying Individual Authentic Firms vs. Counterfeiters

So far, our analysis has explored a feature of our historical experiment—as documented in the trademark dispute data (Figure 2): the probability of being an authentic producer or a counterfeiter differed systematically across firms of different nationalities: Western firms were more likely to be authentic producers; Japanese firms were more likely to be counterfeiters (e.g., Motono 2011). In this subsection, we adopt a complementary approach and seek to identify individual authentic firms and counterfeiters by exploring our digitized data on Chinese trademark applications, registrations, and disputes in detail.

In addition to the pre-1922 trademark data outside China, we collected data on Chinese trademark applications, registrations, and disputes after the 1923 Trademark Law by digitizing all issues of the Trademark Gazette published by the Chinese Bureau of Trademark from September 1923 to December 1927. For each trademark registration, we collected the trademark ID, name, issue date, trademark owner name, city and country, and trademark product code. Two types of trademarks were issued. Type I, labeled as "甲", consisted of trademarks that had been on the market for over 5 years and thus were granted directly based on Provision 4 of the 1923 Trademark Law without going through six months of public notice. Type II, labeled as "乙", included trademarks that had been on the market for less than 5 years and were granted after an application process and 6 months of public notice (and in case of a dispute, an investigation). The dataset recorded in total 5,491 type-I and 8,229 type-II trademark registrations by the end of 1927. As mentioned before, Figure 1 shows trademarks were most frequently registered in fabrics, paints, tobacco, cosmetics, pharmaceuticals, foodstuffs, and clothing, all of which also appeared in the top 15 most trademark-intensive products based on the pre-1922 foreign trademark data.

We then classify firms in the matched dataset into four different groups: (i) firms whose trademark applications were all approved; (ii) firms that were granted type-I trademarks based on their over 5 years of existence in the market; (iii) firms that received significantly fewer trademark

approvals than applications and/or lost trademark disputes and are hence considered likely counterfeiters; (iv) firms that did not apply for nor receive any trademarks. The first two groups of firms are viewed as authentic firms, while group (iii) is considered as likely counterfeiters. Note that since trademark protection does not prevent counterfeiters from re-branding their products, group (i) may also include former counterfeiters that decided to introduce their own trademarks.

Column (1) of Table B.11 shows that authentic firms (as measured by group (i)) increased employment while counterfeiters (as defined in group (iii)) reduced employment (both relative to the excluded group (iv)). Column (2) uses an alternative definition of authentic firms by adding group (ii) to group (i). Employment effects are slightly larger. Columns (3) and (4) repeat this exercise but use employment shares as the dependent variable. This result echoes our findings in Section 5 and offers supplementary evidence on how firms from different sides of trademark conflicts responded to the trademark law.

A.12 The Effect of the Trademark Law on Chinese Imports

While our main analysis has focused on firms located in Shanghai, we would also expect the trademark law to have affected China's imports of trademark-intensive products.

To investigate this hypothesis, we compile bilateral product-level data on imports to China from the rest of the world for the period 1920-1928.[8] The source of the 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 imports of a given product.

We harmonize countries and products over time, resulting in data for 40 countries and 246 harmonized product categories for the years 1920-1928. Harmonizing products over time is challenging; the product-classification system changed significantly in 1925. We verify our matches using a 1925 publication that applies the new classification system to data for the preceding two years. Overall, we match 91% of trade data (in terms of import value in 1924) either exactly (35%) or closely (56%), with deviations of less than 1% of trade value in either product classification in both 1923 and 1924).[9] Our analysis focuses on the products we can match exactly over time; robustness checks include the remaining product categories.

We use bilateral product-specific import data and estimate the following equation:

$$\begin{aligned} y_{pct} &= \beta \times Western_c \times TMInt_p * Post1923_t + \gamma \times TMInt_p \times Post1923_t \\ &\quad + FE_{pc} + FE_{ct} + FE_{jt} + \epsilon_{pct} \end{aligned} \tag{5}$$

where y_{pct} are different measures of China's imports in product category p from country c in year t, including logged imports, a country's import share in total imports of a product pt, an import dummy, and logged unit price. $TrademarkInt_p$ is the trademark share of product p as defined in Section 4.4, $Post1923_t$ is a dummy that equals 1 if the year is equal to or after 1923, FE_{pc} are product-country-specific fixed effects, FE_{ct} are country-year-specific fixed effects, and FE_{jt}

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

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

are broad industry-year fixed effects (broad industries are 5 categories based on the NICE trademark categories and include chemicals, textiles, metal and automotive, non-metal, as well as food, beverages and tobacco). Because different product categories can be of different sizes, we use the average import value in 1920-1922 of the product category in each country as a weight in the regression. We cluster standard errors by product category p, in line with Bertrand, Duflo, and Mullainathan (2004). We exclude rice from the list of products because rice imports were unusually low in 1919 and 1920 due to poor harvests (Kratoska, 1990).[10]

Table B.12 presents the results. Column (1) shows that Chinese imports of trademark-intensive products from Western countries increased significantly relative to imports from Japan after the adoption of the trademark law. The magnitude of the effect is sizeable: imports of the most trademark-intensive products in the trade data (tea and coffee, with a trademark intensity of 0.073) increased by 1.4%; imports of the product category with mean trademark intensity (chinaware, with a trademark intensity of 0.026) increased by 0.5%. Column (2) shows that the result is similar when using the share of imports. Column (3) explores the extensive margin of imports by using the simple import dummy and confirms that the trademark law also led to new trade relationships with Western countries in trademark-intensive products. Finally, column (4) uses the unit prices as the dependent variable. Consistent with our result on Shanghai prices, we do not find significant effects of the trademark law on import prices.

We also check whether there were pre-trends in the trade data indicating that imports of trademark-intensive goods would have grown even in the absence of the trademark law. Figure C.9 shows the estimation results. There is no evidence of pre-trends: coefficients before 1923 are smaller by order of magnitude and insignificantly different from zero; coefficients after 1923 are consistently large and mostly significantly different from zero. However, the effect of the trademark law appears to decline slightly over time.

A.13 The Growth of Chinese Intermediaries

In Table B.13, we examine whether the increase in integration between Western firms and Chinese intermediaries also resulted in growth for the Chinese intermediaries. Column (1) shows trademark-intensive Chinese firms that also acted as agents, experienced more employment growth after the trademark law, however, the coefficient is insignificant. Column (2) includes Chinese firms that become agents after the trademark law, and in this specification the employment effect turns significant. In columns (3) and (4) we fully balance the dataset to study entry and exit of Chinese firms. In column (3) we specify firms as agents when they are agents in their year of entry. The coefficient on the interaction terms demonstrates that there is an increased likelihood of entry for trademark-intensive Chinese firms that act as agents after the trademark law. This effect is not mimicked in exit. In column (4) we specify agent firms as those firms that are agents in the year before exit. Trademark-intensive agents after the trademark law are less likely to exit, but the effect is insignificant. Overall, the empirical patterns suggest that the trademark law enhanced growth and entry among Chinese distributors.

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

B Online Appendix — Tables

Table B.1: Summary Statistics

	(1) Observations	(2) Mean	(3) Std.dev.	(4) Min	(5) Max
Employee number	2088	11.95	23.195	1	387
Employment share	2088	0.203	0.272	0.002	1
Number of products	2088	1.746	1.391	1	11
Trademark intensity	2088	0.022	0.025	0	0.088
Western firm dummy	2088	0.892	0.311	0	1
Japanese firm dummy	2088	0.108	0.311	0	1

Notes: Summary statistics are provided for the sample used in Table 3's column (4), the baseline regression.

Table B.2: Effect of the Trademark Law on Advertisements, 1920-1930

	(1) Dummy if > 1 anti-imitation ad	(2) anti-imitation ads/all ads	(3) $\sinh^{-1}$(anti-imitation ads)	(4) quality ad dummy	(5) new product ad dummy
Post May 1923 * trademark intensity	-1.286***	-0.204***	-2.664***	0.979	0.661
	(0.407)	(0.074)	(0.908)	(1.069)	(0.437)
Observations	4,411	4,411	4,411	4,411	4,411
R-squared	0.043	0.034	0.040	0.058	0.042
Number of NICE	45	45	45	45	45
Product FE	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the estimated effects of the trademark law on advertisements warning against imitations (anti-imitation ads) that were published in *Shen Bao* between 1920-1930. The dependent variables are a dummy variable indicating that there was at least one anti-imitation ad in the product-month, the share of anti-imitation ads in all ads in the product-month, the inverse hyperbolic sine of the count of anti-imitation ads in the product-month, a dummy variable indicating whether the regular ad highlights the quality or innovativeness of a product, and a dummy variable indicating whether the regular ad is about a new product. *Post May 1923* is a dummy denoting the period after adoption of the trademark law in May 1923. *Trademark intensity* is a product group-specific measure of trademark dependence, calculated using each product's share in total pre-1923 trademarks. All regressions include product group fixed effects and month fixed effects. Standard errors are clustered by product group. *** p<0.01, ** p<0.05, * p<0.1.

Table B.3: Effects of the Trademark Law on Employment Reallocation, 1920-1930

	(1) ln(empl)	(2) emp share	(3) ln(empl)	(4) emp share	(5) ln(empl)	(6) emp share
Post 1923 * trademark intensity * Western firms	13.812***	3.262***	14.247***	3.187***	12.686***	2.861***
	(2.994)	(0.811)	(3.579)	(0.867)	(3.672)	(0.908)
Post 1923 * trademark intensity	-11.555***	-2.927***				
	(3.418)	(0.793)				
Post 1923 * trademark intensity * Chinese firms					8.827*	2.828***
					(4.753)	(0.893)
Observations	3,211	3,211	3,143	3,143	4,395	4,395
R-squared	0.895	0.950	0.904	0.950	0.895	0.939
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Country*year FE	Yes	Yes	Yes	Yes	Yes	Yes
Region*broad ind*year FE	Yes	Yes	Yes	Yes	Yes	Yes
NICE*year FE			Yes	Yes	Yes	Yes

Notes: This table reports the differential effect of the trademark law on the employment shares of Western firms relative to Japanese firms. The sample includes Western and Japanese firms located in Shanghai's concessions with employment and activity information between 1920-1923 in columns (1) to (4), and adds Chinese firms in columns (5) and (6). The dependent variable is either the natural log of a firm's employment in a given year or the share of employment of a firm in total employment in the respective product category-year. *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. Regions denote either Western countries or Japan or China. Standard errors are clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table B.4: Robustness to Alternative Measures of Trademark Intensity

Dependent variable: employment share	(1)	(2)	(3)	(4)
TM intensity measure:	baseline	mean	excl. Japan	country-specific
Post 1923 * trademark intensity * Western firms	2.607***	1.136*	2.559***	1.450**
	(0.916)	(0.599)	(0.903)	(0.635)
Observations	2,088	2,088	2,088	2,088
R-squared	0.955	0.954	0.955	0.954
Firm FE	Yes	Yes	Yes	Yes
Ctry*Year FE	Yes	Yes	Yes	Yes
Region*broad ind*year FE	Yes	Yes	Yes	Yes
Product group*year FE	Yes	Yes	Yes	Yes

Notes: This table reports the estimated effect of the 1923 trademark law on Western firms' employment share, using alternative measures of trademark intensity described in Section A.5, following the same specification as in column (4) of Table 3. Standard errors are clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table B.5: Controlling for Alternative Product Attributes

	(1) employment share	(2) employment share	(3) employment share	(4) employment share	(5) employment share	(6) employment share
Post 1923 * trademark intensity * Western firms	2.607***	2.513**	2.526**	2.499**	2.564***	2.572**
	(0.916)	(0.949)	(0.936)	(0.970)	(0.858)	(0.943)
Post 1923 * patent intensity * Western firms		0.328**				
		(0.138)				
Post 1923 * ln(number of firms) * Western firms			-0.015***			
			(0.004)			
Post 1923 * ln(total employment) * Western firms				-0.010*		
				(0.005)		
Post 1923 * Herfindahl index * Western firms					0.076**	
					(0.036)	
Post 1923 * ln(avg empl 20-22) * Western firms						-0.010
						(0.006)
Observations	2,088	2,088	2,081	2,081	2,088	2,088
R-squared	0.955	0.955	0.954	0.954	0.955	0.955
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Country*year FE	Yes	Yes	Yes	Yes	Yes	Yes
Region*broad ind*year FE	Yes	Yes	Yes	Yes	Yes	Yes
NICE*year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the differential effect of the trademark law on the employment shares of Western firms relative to Japanese firms, controlling for other product, industry, or country attributes. *Post 1923* is a dummy denoting the period after adoption 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 in a product category. *Herfindahl-Index* is calculated across all firms in a product category, using employment of firms. The sample includes the years 1920-1926 and Western and Japanese firms. Standard errors are two-way clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table B.6: Controlling for Country-Specific Shocks, including Consumer Boycotts

	(1) employment share	(2) employment share	(3) employment share	(4) employment share	(5) employment share	(6) employment share	(7) employment share	(8) employment share	(9) employment share	(10) employment share	(11) employment share	(12) employment share	(13) employment share
Post 1923 * trademark intensity * Western firms	2.635***	2.512**	2.515**	2.603***	2.653***	2.967***	2.637***	2.529**	2.523**	2.606***	2.583***	2.802***	2.842***
	(0.897)	(0.906)	(0.938)	(0.910)	(0.824)	(0.886)	(0.907)	(0.913)	(0.908)	(0.920)	(0.877)	(0.986)	(0.997)
ln(real GDP) * TM intensity	-0.611												
	(1.263)												
Country-year specific boycott dummy (League of Nations, 1932) * TM intensity		-0.244			-0.320								
		(0.308)			(0.350)								
Country-year specific boycott dummy (Zumoto, 1932) * TM intensity			-0.152			-0.297							
			(0.336)			(0.341)							
Country-year specific boycott dummy (Orchard, 1930) * TM intensity				0.029			-0.021						
				(0.263)			(0.332)						
Country-year specific boycott dummy (League of Nations, 1932) * Western * TM intensity					-0.322								
					(0.233)								
Country-year specific boycott dummy (Zumoto, 1932) * Western * TM intensity						-0.726***							
						(0.246)							
Country-year specific boycott dummy (Orchard, 1930) * Western * TM intensity							-0.234						
							(0.346)						
Country-year specific boycott dummy (League of Nations, 1932) * product dominanc								-0.023					
								(0.020)					
Country-year specific boycott dummy (Zumoto, 1932) * product dominance									-0.017				
									(0.023)				
Country-year specific boycott dummy (Orchard, 1930) * product dominance										-0.004			
										(0.014)			
Japan * export ratio * trademark intensity											-2.853		-10.273*
											(6.464)		(5.491)
Country-specific export ratio * trademark intensity												13.325	
												(16.220)	
Western * export ratio*trademark intensity													54.373
													(40.190)
Observations	2,088	2,088	2,088	2,088	2,088	2,088	2,088	2,088	2,088	2,088	2,088	2,023	2,023
R-squared	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region*broad ind*year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NICE*year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: ln(real GDP) is the real GDP of the firm's home country, from the *Maddison Project Database*, interpolating data for missing years. See Bolt et al. (2018) and Fouquin and Hugot (2016). Columns (2) and (5) control for a 1925 boycott against the UK and 1923 and 1925 boycotts against Japan, as in League of Nations (1932). Columns (3) and (6) add 1923 and 1926 boycotts to Japan, as in Zumoto (1932). Columns (4) and (7) add 1920 and 1921 boycotts to Japan, and extend the boycott against the UK to 1926, as in Orchard (1930). Columns (5) to (7) interact the boycott measure with the ratio of the trademarks of the boycotted country divided by world trademarks excluding the boycotted country (labeled 'product dominance'). Column (8) controls for Japanese exports to China divided by Japanese exports to the world, interacted with a Japan dummy. Column (9) controls for each country's exports to China divided by the country's exports to the world, using export data for 21 countries from Statistical Office of the United Nations (1962) and Òscar Jordà, Schularick, and Taylor (2016). Column (10) interacts this measure with separate dummy variables for Japanese as well as Western firms. *** p<0.01, ** p<0.05, * p<0.1.

Table B.7: Effect of the Trademark Law on Employment at Western Firms: Goods only

VARIABLES	(1) ln(empl)	(2) emp share	(3) ln(empl)	(4) emp share	(5) ln(empl)	(6) emp share
Post 1923 * trademark intensity * Western firms	26.621***	3.656**	30.784***	4.550**	31.432***	4.526**
	(8.547)	(1.738)	(7.146)	(1.768)	(9.714)	(1.903)
Post 1923*trademark intensity	-24.132**	-3.500**				
	(9.181)	(1.696)				
Observations	889	889	840	840	1,241	1,241
R-squared	0.909	0.944	0.930	0.947	0.922	0.938
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Country*year FE	Yes	Yes	Yes	Yes	Yes	Yes
Region*broad ind*year FE	Yes	Yes	Yes	Yes	Yes	Yes
NICE*year FE			Yes	Yes	Yes	Yes
Sample years	1920-1926	1920-1926	1920-1926	1920-1926	1920-1930	1920-1930

Notes: The sample consists of all firms that sold only goods in one of the years 1920-1922. The regressions implemented are the same as in Table 3. Standard errors are clustered by product category. *** p<0.01, ** p<0.05, * p<0.1.

Table B.8: Effect of the Trademark Law on Employment at Western Firms: Dropping Distributors

VARIABLES	(1) ln(empl)	(2) emp share	(3) ln(empl)	(4) emp share	(5) ln(empl)	(6) emp share
Post 1923 * trademark intensity * Western firms	8.723*	2.068***	9.015**	2.407**	11.162*	2.644**
	(4.548)	(0.653)	(4.248)	(0.987)	(6.435)	(0.931)
Post 1923 * trademark intensity	-5.093	-1.526***				
	(3.824)	(0.517)				
Observations	1,324	1,324	1,273	1,273	1,900	1,900
R-squared	0.923	0.944	0.930	0.949	0.918	0.948
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Country*year FE	Yes	Yes	Yes	Yes	Yes	Yes
Region*broad ind*year FE	Yes	Yes	Yes	Yes	Yes	Yes
NICE*year FE			Yes	Yes	Yes	Yes
Sample years	1920-1926	1920-1926	1920-1926	1920-1926	1920-1930	1920-1930

Notes: The sample drops all firms that are pure distributors, i.e., wholesellers or retailers. The regressions implemented are the same as in Table 3. Standard errors are clustered by product category. *** p<0.01, ** p<0.05, * p<0.1.

Table B.9: Effect of the Trademark Law on Employment: By Extraterritorial Status of Western firms

	(1) ln(empl)	(2) emp share	(3) ln(empl)	(4) emp share
Post 1923 * trademark intensity * Western firms * ET	10.361***	2.607***	14.215***	3.190***
	(3.651)	(0.912)	(3.575)	(0.866)
Post 1923 * trademark intensity * Western firms * non-ET	13.611***	2.671**	17.149***	2.893**
	(4.788)	(1.250)	(4.692)	(1.212)
Observations	2,088	2,088	3,143	3,143
R-squared	0.922	0.955	0.904	0.950
Firm FE	Yes	Yes	Yes	Yes
Country*year FE	Yes	Yes	Yes	Yes
Region*broad ind*year FE	Yes	Yes	Yes	Yes
NICE*year FE	Yes	Yes	Yes	Yes
Sample years	1920-1926	1920-1926	1920-1930	1920-1930

Notes: The regressions implemented are the same as in columns 3, 4, 7, and 8 of Table 3, but now we allow the effect on Western firms to vary depending on whether the specific Western country has extraterritorial rights in China ('ET') or not ('non-ET') in 1923. Standard errors are clustered by product category. *** p<0.01, ** p<0.05, * p<0.1.

Table B.10: Effect of the Trademark Law on Employment at Western Firms: Inverse Propensity Score Reweighing

VARIABLES	(1) ln(empl)	(2) emp share	(3) ln(empl)	(4) emp share	(5) ln(empl)	(6) emp share	(7) ln(empl)	(8) emp share
Post 1923 * trademark intensity * Western firms	10.660***	2.784***	9.650**	2.542***	10.267**	2.593**	10.537**	2.529**
	(3.376)	(0.861)	(3.744)	(0.839)	(4.177)	(0.962)	(4.850)	(1.047)
Post 1923*trademark intensity	-8.552**	-2.419***			-8.206*	-2.285**		
	(3.568)	(0.855)			(4.529)	(0.970)		
Observations	2,088	2,088	2,084	2,084	1,791	1,791	1,786	1,786
R-squared	0.917	0.947	0.930	0.960	0.923	0.948	0.938	0.962
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region*broad ind*year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NICE*year FE			Yes	Yes	Yes	Yes	Yes	Yes
Sample years	1920-1926	1920-1926	1920-1926	1920-1926	1920-1926	1920-1926	1920-1926	1920-1926
Weights	IPW1	IPW1	IPW1	IPW1	IPW2	IPW2	IPW2	IPW2

Notes: The regressions implemented are the same as columns 1-4 in Table 3, but now we reweigh observations based on their inverse propensity score. Columns (1) to (4) create inverse propensity weights (IPW1) from a logistic regression of the Western dummy on firm size (average employment 1920-1922), an importer and an exporter dummy. Columns (5) to (8) create inverse propensity weights (IPW2) by adding also the employment growth between 1920-1922 to the logistic regression. Standard errors are clustered by product category. *** p<0.01, ** p<0.05, * p<0.1.

Table B.11: Effect of the Trademark Law on Authentic vs. Counterfeiting Firms

	(1)	(2)	(3)	(4)
	ln(empl)	ln(empl)	empl share	empl share
Post 1923 *				
– Authentic (all TM applications approved)	0.090*		0.014*	
	(0.024)		(0.004)	
– Authentic (TM appl approved plus type I TM registrations)		0.091**		0.013**
		(0.020)		(0.003)
– Counterfeiter (denied applicants)	-0.058*	-0.054**	0.008***	0.008***
	(0.015)	(0.013)	(0.000)	(0.001)
Observations	9,557	9,683	9,557	9,683
R-squared	0.893	0.894	0.953	0.953
Firm FE	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes
Ctry*Year FE	Yes	Yes	Yes	Yes

Notes: This table reports the estimated effects of the trademark law on the employment and employment share of identified authentic firms and counterfeiters. The sample consists of firms located in Shanghai's concessions, for which we have information on employment and activity for the period 1920-1922. The dependent variable is the natural log of a firm's employment or the firm's employment share in a product in a given year. *Post 1923* is a dummy denoting the period after adoption of the trademark law in 1923. The first measure of authentic firms includes all firms whose TM applications were approved. The second measure of authentic firms includes these firms and adds all firms that show up with trademark registrations of type I, i.e., whose applications were granted after checking that they had been on the market for more than 5 years. All regressions include firm, country-times-year, and industry-times-year fixed effects. Standard errors are clustered by product category and country-year. *** p<0.01, ** p<0.05, * p<0.1.

Table B.12: Effect of the Trademark Law on Imports

	(1)	(2)	(3)	(4)
	ln(imports)	Country's import share in product	Import dummy	ln(unit price)
Trademark intensity * (Post $\geq$ 1923) * Western countries	19.270*	5.872**	1.381*	-0.782
	(11.294)	(2.257)	(0.705)	(1.905)
Trademark intensity * (Post $\geq$ 1923)	-13.311	-3.271*	-1.297*	1.345
	(14.295)	(1.796)	(0.727)	(3.002)
Observations	11,071	14,958	14,958	6,192
R-squared	0.911	0.893	0.586	0.994
Country-year FEs	Yes	Yes	Yes	Yes
Country-prod FEs	Yes	Yes	Yes	Yes
Broad industry-year FEs	Yes	Yes	Yes	Yes

Notes: This table reports the differential effects of the trademark law on China's imports from Western countries relative to Japan. The sample consists of products that can be matched exactly across different product-classification schemes over time; it excludes rice. The dependent variables are the natural log of the import value, a country's imports share in a product group, and a dummy for the existence of imports, respectively. Column (4) uses log of unit prices (import value divided by import quantity) for the subset of trade data for which units are reported. *Post 1923* is a dummy denoting the period after adoption of the trademark law in 1923. *Trademark intensity* represents a product-level trademark intensity, calculated using each product's share of total pre-1923 trademarks. All regressions are weighted by the import value of the product by country averaged over 1920-1922. Standard errors are clustered by product category. *** p<0.01, ** p<0.05, * p<0.1.

Table B.13: Employment Growth, Entry and Exit of Chinese Firms

	(1) ln(empl)	(2) ln(empl)	(3) Firm entry	(4) Firm exit
Post 1923 * trademark intensity	3.846*	3.625*	-0.464	-0.504
	(1.657)	(1.723)	(0.388)	(0.398)
Post 1923 * trademark intensity * agent dummy	12.149	9.539**	1.545***	-0.610
	(7.247)	(2.654)	(0.254)	(2.179)
Post 1923 * agent dummy	-0.310**	-0.160	-0.123**	-0.039
	(0.096)	(0.146)	(0.047)	(0.090)
Observations	875	875	1,175	1,175
R-squared	0.880	0.881	0.327	0.757
Firm FE	Yes	Yes	Yes	Yes
Broad ind*Year FE	Yes	Yes	Yes	Yes

Notes: This table reports the estimated effects of the trademark law on the employment, entry, and exit of Chinese firms, and in particular of Chinese intermediaries (as indicated by interactions with the agent dummy). The dependent variables are the number of employees and dummies denoting post-entry and post-exit of the firm. Columns (1) and (2) use the sample of firms that existed before 1923; columns (2) and (3) use a fully balanced panel dataset to study entry and exit. The agent dummy denotes: in column (1) firms that acted as agents between 1920 and 1922; in column (2) firms that acted as agents any time between 1920 and 1926; in column (3) *Post 1923* is a dummy denoting the period after adoption 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 of total pre-1923 trademarks. Standard errors are two-way clustered by product category and year. *** p<0.01, ** p<0.05, * p<0.1.

Table B.14: Entry and Exit - Robustness Checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Entry										
Post 1923 * trademark intensity * Western firms	125.6154***	144.2390***	169.2891***	117.8965***	85.8637***	85.4970***	97.1945***	128.8676***	133.8702***	137.3988***
	(28.7833)	(32.7992)	(38.6038)	(27.9035)	(27.9632)	(28.3312)	(28.0030)	(26.2167)	(20.9229)	(25.2960)
TM share * Post 1923	0.0371	-0.9703	-0.8372	3.9954	-0.7988	-1.8506	-12.9818	-7.4357	-10.9191	-57.2475
	(5.5332)	(6.1735)	(7.2133)	(4.9286)	(3.8915)	(4.0954)	(9.1465)	(9.9167)	(19.2732)	(36.2958)
Observations	4,186	4,186	4,186	4,186	4,186	4,186	1,876	4,186	4,186	4,186
R-squared	0.9482	0.9481	0.9483	0.9484	0.9534	0.9525	0.9471	0.9483	0.9482	0.9499
Panel B. Exit										
Post 1923 * trademark intensity * Western firms	-10.6098	-11.3642	-13.6112	-5.7469	10.6594	12.0760	-6.8099	-11.0767	-9.6466	-12.4181
	(8.5559)	(9.7491)	(11.3645)	(8.7016)	(7.2803)	(7.2779)	(9.6799)	(8.4826)	(10.5666)	(9.1910)
TM share * Post 1923	5.7760*	6.3781*	7.4105*	3.3503	4.3158**	4.9169**	10.8242**	6.8488**	4.4975	14.5671
	(2.9329)	(3.2396)	(3.7909)	(2.0657)	(1.6979)	(1.7210)	(4.6147)	(2.5429)	(3.5727)	(8.6548)
Observations	4,186	4,186	4,186	4,186	4,186	4,186	1,876	4,186	4,186	4,186
R-squared	0.9995	0.9995	0.9995	0.9995	0.9996	0.9996	0.9995	0.9995	0.9995	0.9995
TM measure	benchmark	excl. Japan	ctry-spec.							
Controls (incl. interactions)				patent intensity	ln(num firms)	ln(tot empl)	Herfindahl			
Region-year specific boycott dummies								League of Nations, 1932	Zumoto, 1932	Orchard, 1930
Prod-region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

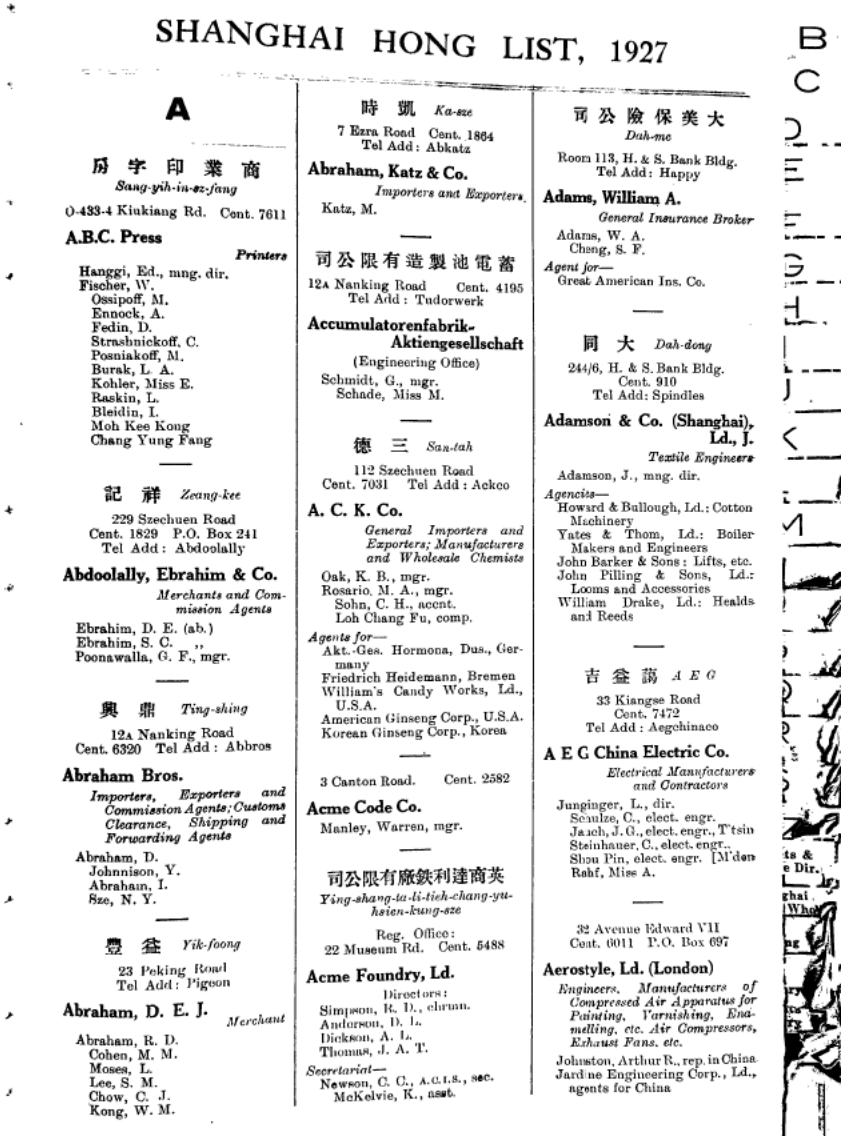
Notes: This table performs robustness checks to Table 5. Panel A uses the stock of entered firms as dependent variable, while panel B uses the stock of exited firms as dependent variable. *** p<0.01, ** p<0.05, * p<0.1.

Table B.15: Effect of Trademark Registrations on Prices

	(1) ln(price)	(2) ln(price)
Post trademark registration	-0.002	0.007
	(0.009)	(0.007)
Observations	14,263	35,862
# products in TG	594	594
# products in CG		1,101
Control group	not yet treated	never treated

Notes: This table reports the estimated effect of trademark registrations on prices. All columns compute the average treatment effect based on the method of Callaway and Sant'Anna (2020) and Sant'Anna and Zhao (2020) and were implemented using their Stata command `csdid` which is appropriate for staggered differences-in-differences settings and includes product and time-fixed effects. Column (1) drops never treated products from the analysis. *** p<0.01, ** p<0.05, * p<0.1.

C Online Appendix — Figures



SHANGHAI HONG LIST, 1927

A

商印業宇房
Sang-yih-in-ez-fang
O-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.

興鼎 *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.
Abraham, I.
Sze, N. Y.

豐益 *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.

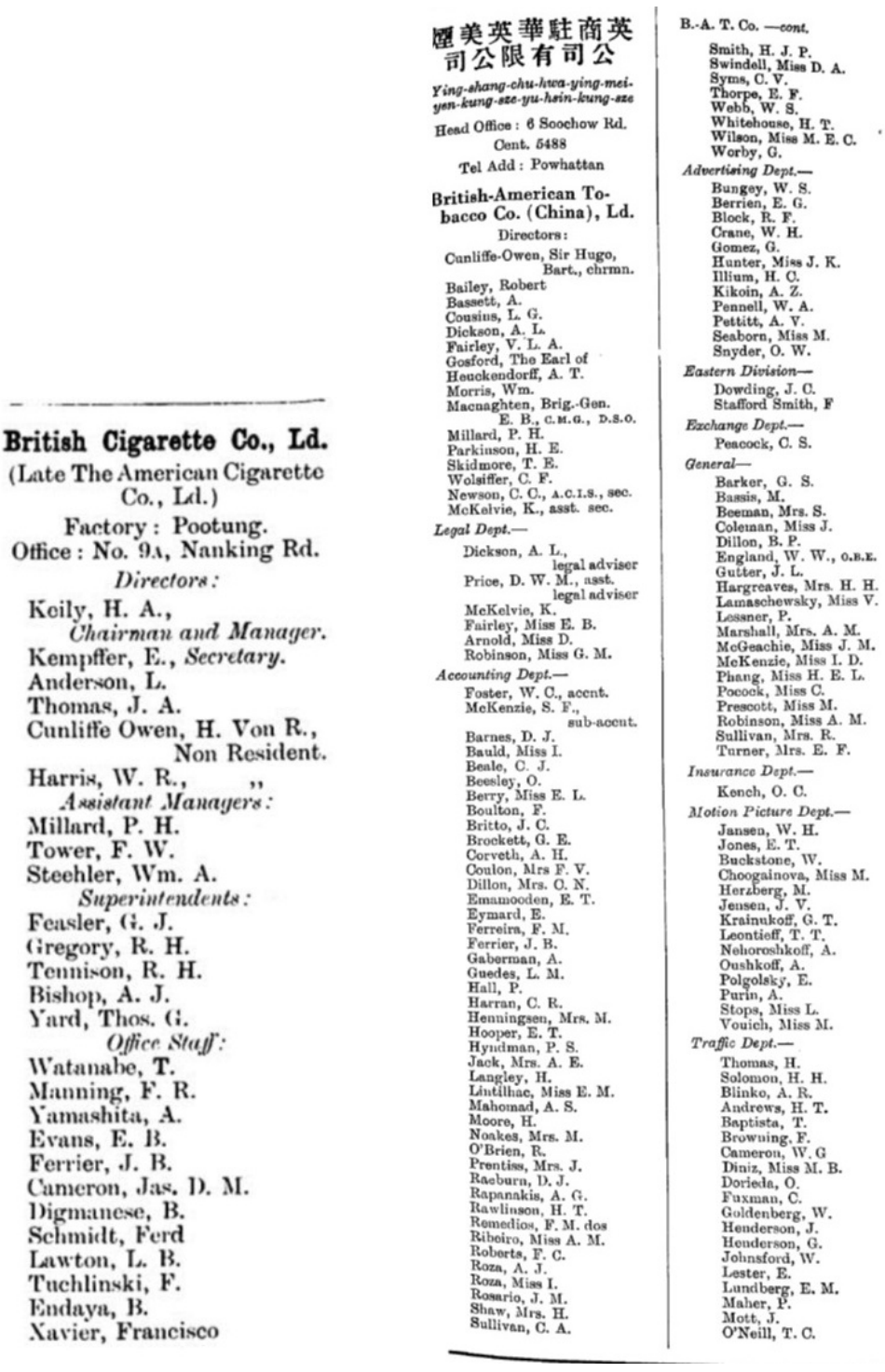
司公險保美大
Dah-me
Room 113, H. & S. Bank Bldg.
Tel Add: Happy
Adams, William A.
General Insurance Broker
Adams, W. A.
Cheng, S. F.
Agent for—
Great American Ins. Co.

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

吉益蔼 *A E G*
33 Kiangse Road
Cent. 7472
Tel Add: Aegchinaco
A E G China Electric Co.
Electrical Manufacturers and Contractors
Junginger, L., dir.
Schulze, C., elect. engr.
Jauch, J. G., elect. engr., Tsin
Steinhauer, C., elect. engr.
Shou Pin, elect. engr. [M'dan
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.1: Representative page from the Hong List, 1927



British Cigarette Co., Ld.
(Late The American Cigarette Co., Ld.)
Factory: Pootung.
Office: No. 9A, Nanking Rd.

Directors:
Keily, H. A.,
Chairman and Manager.
Kempffer, E., *Secretary.*
Anderson, L.
Thomas, J. A.
Cunliffe Owen, H. Von R., Non Resident.
Harris, W. R., ,,

Assistant Managers:
Millard, P. H.
Tower, F. W.
Steehler, Wm. A.

Superintendents:
Feasler, G. J.
Gregory, R. H.
Tennison, R. H.
Bishop, A. J.
Yard, Thos. G.

Office Staff:
Watanabe, T.
Manning, F. R.
Yamashita, A.
Evans, E. B.
Ferrier, J. B.
Cameron, Jas. D. M.
Digmanese, B.
Schmidt, Ferd
Lawton, L. B.
Tuchlinski, F.
Endaya, B.
Xavier, Francisco

英商駐華美英煙草公司
公司有限有限公司

Ying-shang-chu-hwa-ying-mei-yen-kung-sze-yu-hsin-kung-sze

Head Office: 6 Soochow Rd.
Cent. 5488
Tel Add: Powhattan

British-American Tobacco Co. (China), Ld.

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
Heuckendorff, A. T.
Morris, Wm.
Macnaghten, Brig.-Gen. E. B., C.M.G., D.S.O.
Millard, P. H.
Parkinson, H. E.
Skidmore, T. E.
Wolsiffer, 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., accnt.
McKenzie, S. F., sub-accnt.
Barnes, D. J.
Bauld, Miss I.
Beale, C. J.
Beesley, O.
Berry, Miss E. L.
Boulton, F.
Britto, J. C.
Brockett, G. E.
Corveth, A. H.
Coulon, Mrs F. V.
Dillon, Mrs. C. N.
Emamooden, E. T.
Eymard, E.
Ferreira, F. M.
Ferrier, J. B.
Gaberman, A.
Guedes, L. M.
Hall, P.
Harran, C. R.
Henningsen, Mrs. M.
Hooper, E. T.
Hyndman, P. S.
Jack, Mrs. A. E.
Langley, H.
Lintilhac, Miss E. M.
Mahomad, A. S.
Moore, H.
Noakes, Mrs. M.
O'Brien, R.
Prentiss, Mrs. J.
Raeburn, 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, G.
Hunter, Miss J. K.
Illium, H. C.
Kikoin, A. Z.
Pennell, W. A.
Pettitt, A. V.
Seaborn, Miss M.
Snyder, O. W.

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

Exchange Dept.—
Peacock, C. S.

General—
Barker, G. S.
Bassis, M.
Beeman, Mrs. S.
Coleman, Miss J.
Dillon, B. P.
England, W. W., O.B.E.
Gutter, J. L.
Hargreaves, Mrs. H. H.
Lamaschewsky, Miss V.
Lessner, P.
Marshall, Mrs. A. M.
McGeachie, Miss J. M.
McKenzie, Miss I. D.
Phang, 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.
Buckstone, W.
Choogainova, Miss M.
Herzberg, M.
Jensen, J. V.
Krainukoff, G. T.
Leontieff, T. T.
Nehoroshkoff, A.
Oushkoff, A.
Polgolsky, E.
Purin, A.
Stops, Miss L.
Vouich, Miss M.

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

(a) BAT's predecessor in 1906 (b) BAT in 1926

Figure C.2: Employment at British American Tobacco (BAT) and its predecessor in Shanghai, 1906 and 1926

Source: The 1906 and 1926 issues of the Hong List.

(a) Lion: Japanese counterfeit

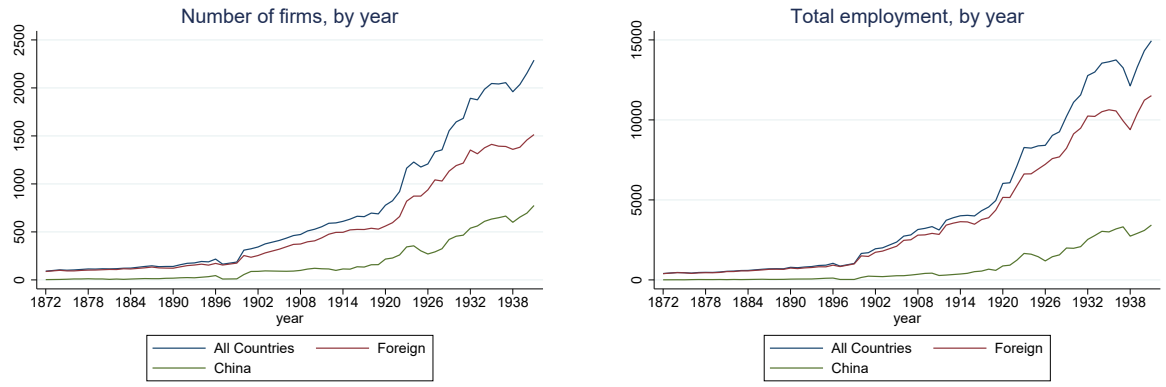
(b) Lion: German authentic producer

(c) Good luck: Japanese counterfeit

(d) Good luck: British authentic producer

Figure C.3: Examples of Authentic and Counterfeit Trademarks

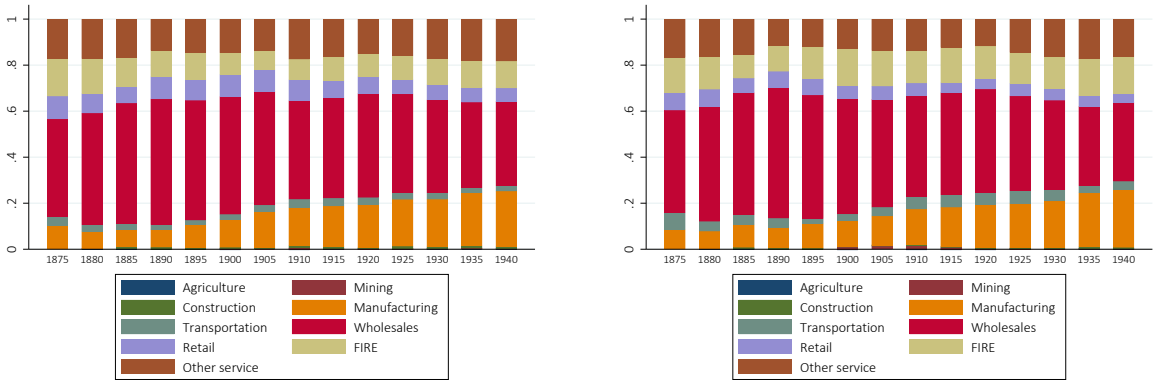
Sources: Images are taken from the Chinese Trademark Gazette *(Shangbiao Gongbao* (商标公报)) (volumes 9 and 29 of applications and volumes 15 and 29 of registrations).



(a) Number of firms

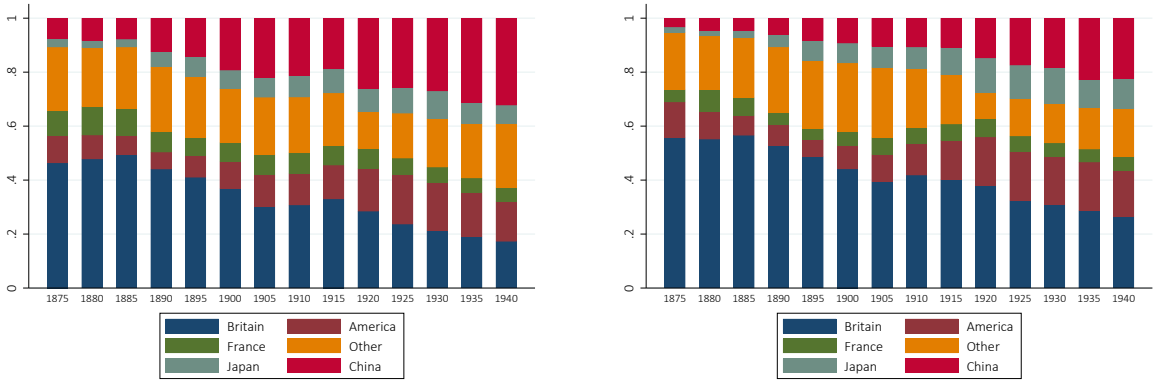
(b) Total employment

Figure C.4: Trends in Firms and Employment in the Shanghai Concessions, 1872-1938



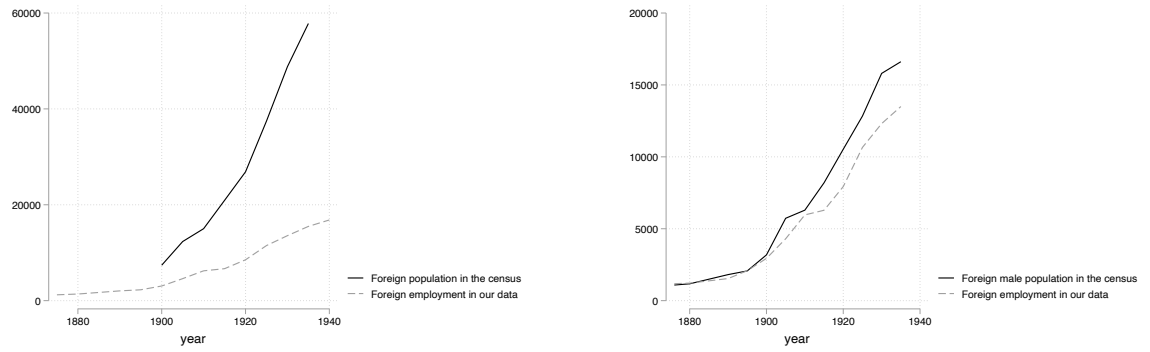
(a) By number of firms (b) By employment

Figure C.5: Composition of Firms in Shanghai's Concessions by Industry, 1875-1941



(a) By number of firms (b) By employment

Figure C.6: Composition of Firms in Shanghai's Concessions by Nationality, 1875-1941



(a) All concessions (b) International concession

Figure C.7: Data Validation

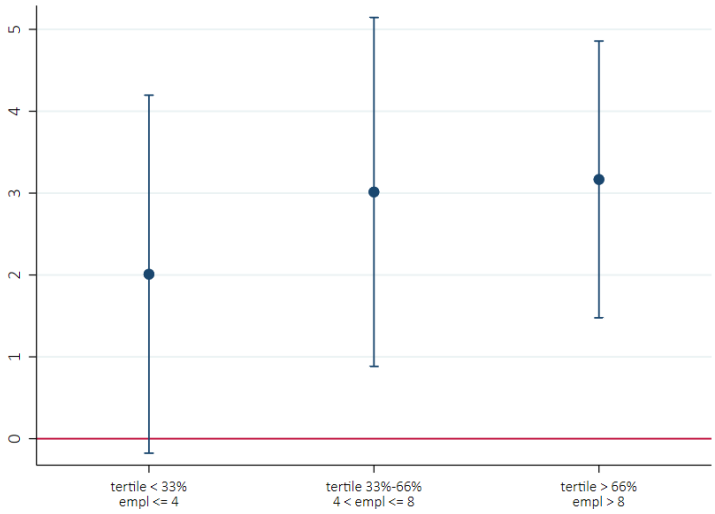


Figure C.8: Heterogeneous Effect of the Trademark Law on the Employment Share of Western Firms

Notes: For this graph we run the baseline estimation used in column (4) of Table 3 and allow the effect to vary by initial employment size tertile.

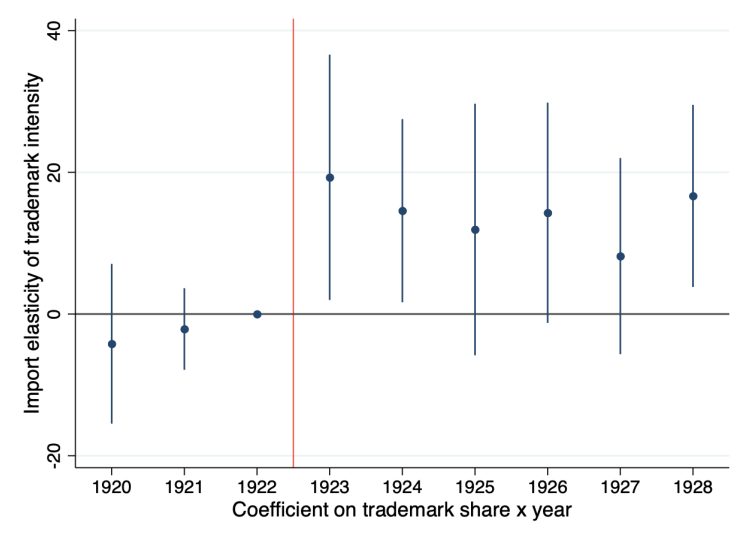


Figure C.9: Effect of the Trademark Law on Chinese Imports from Western countries: Event Study

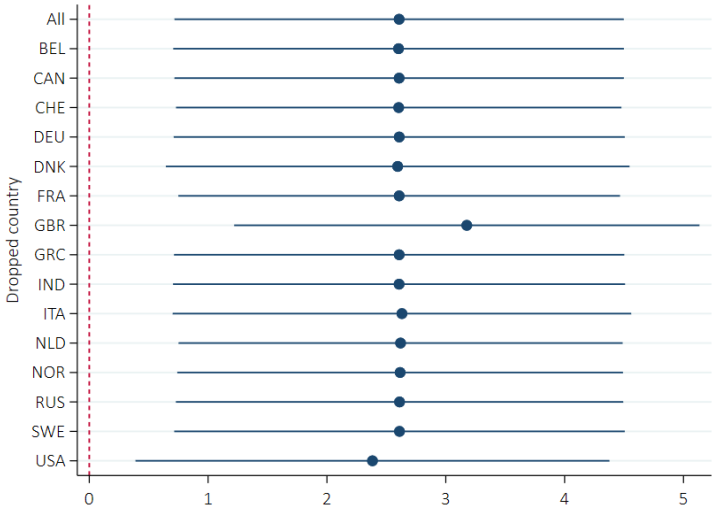


Figure C.10: Effect of the Trademark Law on Employment at Western Firms, dropping one home country at a time

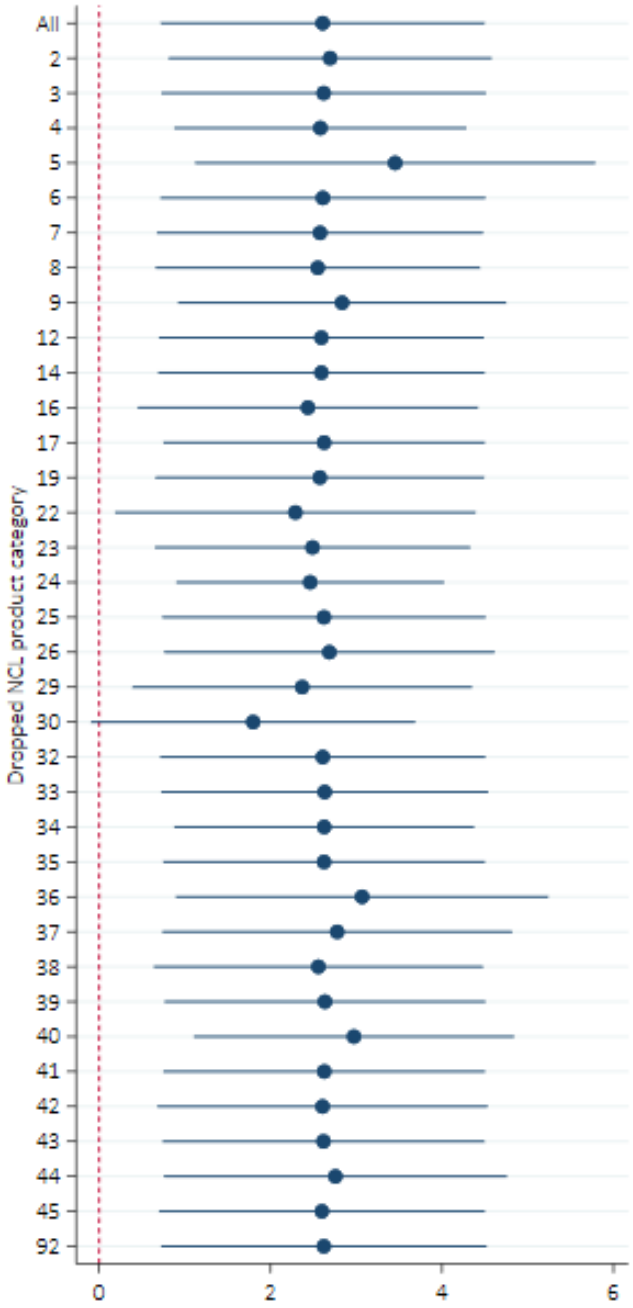


Figure C.11: Effect of the Trademark Law on Employment at Western Firms, dropping one NCL product category at a time

Notes: Only product categories that remain in the sample in the main specification (i.e., after singletons are dropped) are used here, which explains why product category 1 cannot be dropped, for example.

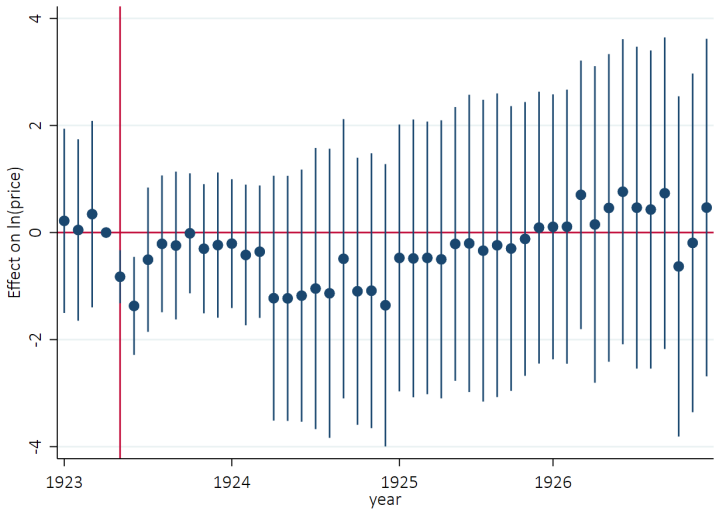


Figure C.12: Effect of the Trademark Law on Prices: Event Study

Notes: The figure estimates the event study version of column (1) in Table 8 by allowing the effect on trademark intensity to vary every month.