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Abstract

This study provides evidence on tax distortion to organizational choices of firm using historical data. We utilize the 1887 introduction of a personal income tax (PIT) in Japan as a quasi-experiment to examine tax-motivated incorporation. We circumvent the data limitation in the 19$^{\text{th}}$ century by drawing on a firm-level dataset constructed from genealogies of Japanese corporations. The sample is 3,203 firm-year observations spanning 1880-1892. We find that the introduction of PIT affected the adoption of simpler types of corporations and increased the corporate share of establishments by about 3 percentage points. The evidence indicates the role of a corporate income tax as a backstop to maintain revenue performance of PIT.

JEL Classification: G34, H25, K34
Keywords: *Tax Avoidance, Organizational Form, Business Incorporation*

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Introduction

Firms' choices over their organizational forms have tax consequences: whether a firm chooses to incorporate is such an ubiquitous issue for businesses that it is a staple topic in finance textbooks (Hanlon and Heitzman, 2010). To policymakers and academics, the extent to which taxes affect incorporation decisions is an important consideration: tax-motivated incorporations can reduce government revenue by compromising the revenue performance of a personal income tax (PIT).[1] In understanding a tax system as a set of interacting tax laws, the organizational choice is a knot that ties PIT and a corporate income tax (CIT), and is essential in evaluating and predicting impacts of tax policies (Cullen and Gordon, 2007).[2] Earlier empirical studies (Gordon and MacKie-Mason, 1994; Mackie-Mason and Gordon, 1997; Goolsbee, 1998) find small influences of taxes on organizational forms, indicating the possible dominance of non-tax factors: the limited liability status and external finance considerations can dominate the decision to incorporate, while administrative simplicity and fewer disclosure requirements may lead others to choose the sole proprietorship structure. However, later studies (Goolsbee, 2004; de Mooij and Nicodme, 2008; Liu, 2014) raise concerns over the identification strategy in earlier studies based on time series analysis of aggregate corporate share, and instead employ panel data to take advantage of cross-section variation in tax rates across states or countries. These later studies show that the influence of taxes may in fact be larger than previously thought, re-opening the debate on the magnitude of tax effects.

One alternative strategy, which provides clearer identification, is to utilize the introduction of PIT as a quasi-experiment. Absent PIT or CIT, the choice of organizational form should be determined by non-tax factors only. The introduction of PIT changes incentives, offering a sharp quasi-experimental setting to examine behavioral responses. The tax incentive is salient, which Chetty (2012) stresses to be a characteristic important in decision making. Although a simple idea, this strategy is difficult to implement: industrialized nations started to introduce PIT during the 19$^{\text{th}}$ century when official statistics on corporations, let alone sole proprietors, are limited or non-existent.[3] Our paper circumvents this data limitation by drawing on a new approach in economic history that allows analysis of business activities during a period when official data do not exist. Using firm-level data from genealogies of major corporations compiled by Yagura and Ikushima (1986), Tang (2011, 2013) examines the Japanese economy during the Meiji period (1868-1912). These data allow us to distinguish joint-stock corporations from sole proprietors as well as other corporate forms, and to look at the response of taxpayers to the introduction of PIT in 1887. The sample of firms drawn from genealogies is a non-random subset of the population of businesses that existed at the time, and larger firms are over-represented. As such, the sample based on genealogies likely leads to an underestimation, since the findings in the literature show smaller businesses tend to respond more strongly.

[1] de Mooij and Nicodme (2008) show that a shift from the personal to corporate tax base contributed to the stability of revenue from corporate income taxes despite the tax competition that drove average tax rates down in Europe.

[2] Cullen and Gordon (2007) demonstrate that the progressivity of PIT may discourage entrepreneurship but in fact can encourage startups by sharing risk with the government.

[3] Grossfeld and Bryce (1983) provide a historical account on the origins of income taxes in the U.K., Germany, and U.S. The earliest attempt was by the U.K. under the Pitt administration in 1799, introduced as a war tax. After an abolishment in 1816 upon the conclusion of the Napoleonic War, the Peel administration re-introduced an income tax in 1842. The U.S. first introduced in 1862 also as a war tax and repealed it in 1872. The 1894 Income Tax Act was found unconstitutional and did not went into effect.

Nonetheless, the sample represents an important subset of firms, including those belonging to Japanese-equivalent of Rockefeller and Carnegie conglomerates, and the behavior of large companies is of independent interests.

This study employs a quasi-experimental framework in examining 3,203 firm-year observations spanning 1880-1892. We utilize the time variation in tax incentives created by the introduction of PIT and control for the macroeconomic environment and industry-specific trends. The baseline analysis treats the data as a cross-section and tests whether the probability of a firm taking a corporate form changes discretely following the PIT introduction. We implement a battery of robustness checks to assess the sensitivity of estimates. First, to control for unobserved heterogeneity, we reformulate the data into a panel dataset by aggregating firm-year observations by firm genealogy and industry. Second, we consider the dynamic dependence using the panel dataset on industries to provide estimates of dynamic panel regressions. Third, the identification of tax effects relies on the before-after change, which could be confounded by unobservable time shocks. We chiefly address this issue by including a set of macroeconomic variables to control for changes in business conditions, but also consider alternative explanations.

The results suggest that the introduction of the PIT had significant influence on the incorporation decision. An estimate from the baseline specification implies that PIT increased the incorporation rate in the sample by around 3.2 percentage points with a 95-percent confidence interval of [1.2, 5.3]. In terms of marginal effects, with the top PIT rate of 3 percent, our estimate suggests that a 1-percentage-point increase in a PIT rate increases corporate share of firms by around 1 percentage point.[4]

Previous studies recognized large tax variations in the early 20$^{\text{th}}$ century U.S. and utilized them in analysis (Goolsbee, 1998; Liu, 2014; Romer and Romer, 2014). Our study extends the historical studies on the tax distortion to organizational forms in several ways. We examine a period not covered in the previous studies, enabled by the new genealogy-based data collection pioneered by Tang (2011, 2013).[5] We also provide additional estimates on the taxpayer response from a setting outside the U.S. For example, Goolsbee (1998) examines aggregate U.S. data over 1900-1939, which span the federal CIT introduction in 1909 and the re-introduction of PIT in 1913 after a constitutional amendment, so the order of tax changes is opposite to ours. He finds statistically significant but negligible impacts. Liu (2014) examines a state panel dataset drawn from U.S. census data in the years 1909, 1914 and 1919, and finds a 1-percentage-point increase in PIT leads to a 5.5-percentage-point increase in corporate share. As emphasized in previous studies, modern day tax administration is much more sophisticated. That said, historical evidence provides an important complement to scholarship that utilizes contemporary tax laws. Moreover, the introduction of an income tax, whether personal or corporate, is an epochal event in any country's history of public finance and therefore warrants careful statistical documentation.[6]

[4]To be sure, this estimate is not of a structural parameter but is a reduced-form estimate, so that factors such as economic institutions in the 1880s Japan, sample characteristics, and a possible non-linearity of responses in tax rates should be kept in mind in extrapolation and in comparison with existing estimates.

[5]Takahashi (1956) provides an early descriptive study on this topic, utilizing aggregate data from the Meiji period.

[6]Our study also adds to evidence provided by specific policy changes. Scholes and Wolfson (1991) document an explosion of tax-favored S-corporations following the Tax Reform Act of 1986. Freedman and Crawford (2010) document a rise in incorporation when the U.K. set the starting rate of CIT at 0 percent over 2002-2006, particularly for businesses with fewer than 10 employees.

The remainder of this paper is organized as follows. Section 1 provides the institutional background. Since this paper is the first application of genealogical data in examining a topic in public economics, in Section 2, we elaborate on how drawing a sample from genealogies of present-day major firms affects the sample's characteristics and consider precautions needed to identify the tax effects. Section 3 presents an empirical analysis including robustness check, and Section 4 concludes.

1 Institutional background

1.1 Early income tax

The Meiji Japanese government replaced the feudal administration in 1867 and pushed for industrialization to catch up with advanced nations. Initially, the new government relied on a land tax to finance the modernization of the military and industries.[7] Against the backdrop of rising political demand to fund the navy and to raise taxes from industrialists, the introduction of a PIT was considered, at least since 1884 (Hayashi, 1965, p. 299). The Ministry of Finance drafted and sent an income tax proposal to the Prime Minister's Cabinet in January 1887. On February 1887, the proposal was sent to the Senate (*Genrōin*) with some modifications, and the following month, the Income Tax Law (*Shotoku Zeihō*) was passed with implementation starting July 1887. Table 1 provides a summary of the main features of the early PIT, along with a reform in 1899. Initially, tax rates ranged from 1 to 3 percent with a large exemption of 300 yen. The rate was simple progressive, unlike the current PIT, so that taxpayers faced a notch of 3 yen at 300 yen in income.[8] In the initial year, the total number of income tax filers amounted to 0.3 percent of total Japanese population. As a comparison, the rates for U.S. personal tax in 1913 ranged from 1 to 7 percent and the personal exemption of 3,000 dollars. The total number of tax filers amounted to 0.5 percent of the total U.S. population.

Dividend income was taxable but otherwise corporate income escaped taxation. We consider local tax consequences later in this section. The main argument for excluding corporate income was the protection of the nascent industrial sector. At senate meetings, policymakers showed clear awareness of tax avoidance opportunities through incorporation, but opinions differed as to whether loopholes would be exploited.[9] Businessmen at the time would have understood the tax advantages to incorporation.[10] The 1899 reform added corporate income as an additional category (Type 1) in the Income Tax Law and levied 2.5 percent tax on accounting incomes, which were far from standardized at the time. Dividend income became exempt to avoid double taxation.

[7]The tax base for the land tax was assessed land values that remained constant regardless of crop yield. The land tax was therefore penalizing during the severe deflationary period in the early 1880s, particularly for peasants. The tax policy debate at the time raised inequality as a motivation for a tax reform. Tariffs, which governments of developing economies usually rely on to raise revenue, were negligible since Japan had signed treaties with advanced nations that restricted tariff rates.

[8]This amount was three times as much as a starting salary of a police officer and was US$228 based on the average exchange rate in 1887 (Tōyō Keizai Shinpōsha, 1975, Table 156).

[9]At a senate meeting held on February 22, 1887, a member of a council argued that noblemen were typically owners of businesses and as such noblemen would not conduct petty tax avoidance. Another councilman forcefully pointed that it is unfair to treat businesses run by one person versus multiple people differentially (Orii and Yamamoto, 1990, pp. 77-78).

[10]Letters written by a manager in Mitui *zaibatsu* from the early 20$^{\text{th}}$ century clearly show tax considerations were of first order importance in incorporating Zaibatsu companies. See, for example, Nakamura (2010).

The enforcement and administration of the early PIT was different from modern income taxes administered by tax specialists; the central government delegated the responsibility of assessment and collection to the county-level administration. A county-level tax commission, in charge of assessment, consisted of personnel elected in a local election, and served in part as a moderator between the administration and taxpayers. Since the suffrage at the local election depended on the amount of tax payments, committee members were local personages and often overlapped with elected officers in local assemblies.[11] The tax committee checked tax returns submitted by taxpayers and also conducted investigation, assisted by the county administration. The early assessment appears idiosyncratic; it is not until around 1893 that the administration started to 'predict' income on the basis of observable features and compared them with declared figures.[12] The National Tax Agency gradually took over responsibilities: The government established regional tax offices which took charge of tax collection in 1896, and the local offices assessed corporate income (but not personal income) from 1899. The enforcement regime would have varied considerably given the new administrative apparatus: The number of personal tax payers increased by 75 percent in one year over 1898-99 despite the same personal exemption amount.[13] Given those weaknesses in administration, firms might have found it easier to substituted tax avoidance with tax evasion. Whether firms respond to tax incentives by incorporating businesses is, however, an empirical question.

1.2 "Corporation" in the Meiji era

What did it mean to be a corporation in Japan during the Meiji period?[14] The previous Edo period (1603-1867) had a flourishing commercial economy. By the beginning of the Meiji era, a well developed customary law enabled merchants to issue promissory notes. The archetype of modern corporations existed but most joint ventures were family-oriented (Miyamoto, 1990). To promote industrialization, the Meiji government published textbooks on incorporation, coordinated merchants to form trading companies in 1869, and organized national banks as joint-stock corporations. Absent formal regulation in most sectors, the various prefectural governments based administrative orders about incorporation on the incorporation textbooks published by the central government. However, most sectors were not regulated, so many aspects, such as investor liability and voting rights of shareholders, were not well understood. For firms not in banking and key industries, incorporation often amounted to notifying a local authority.[15]

While regulation at the national level was absent, prefectural governments stepped up regulation since the mid-1880s. Osaka prefecture, for example, required new as well as existing corporations to submit corporate charters, starting from February 1886. Fraud, in which a swindler collected funds from investors and fled, was common. The urgent

[11] The Rules and Regulations for Prefectural Assemblies (*Fukenkai Kisoku*) of 1878 restricted the voting right on local election to male who pays at or more than 5 yen in land tax. The first national election was in 1890.

[12] A record from a county in a sericulture district shows a committee based assessment on observables such as land price, local business tax, wage, amount of loan extended (Orii and Yamamoto, 1990, pp. 334–335).

[13] (Tōyō Keizai Shinpōsha, 1975, Table 730)

[14] Miyamoto (1990) and Nakamura (2010).

[15] For example, in Tokyo Prefecture, firms notified a county office after incorporation, excluding those in bridge and embarkment constructors, land/water transportation, insurance and banking (Nakamura, 2010).

need for order led to a drafting of the Commercial Code (*Shōhō*), but complaints delayed implementation until 1899, except for sections including corporate laws that were promulgated in January 1893.

The Commercial Code of 1893 defined three types of corporation, and outlined requirements for organizing a corporation (Yoshida, 1998). First, investors in joint-stock corporations (*kabushiki gaisha*) enjoyed limited liabilities, but needed to obtain approval on articles of incorporation and also a licence to establish. Debtors to joint-stock corporations could request disclosure of balance sheets. Limited partnerships (*gōshi gaisha*) consisted of investors with partners with limited and unlimited liabilities while partnerships (*gōmei gaisha*) consisted of partners with unlimited liability. Requirements for founding the latter two types were fewer; a company needed to register but not a licence to establish. Responsibilities however became more stringent with the 1893 reform: an unlimited partnership was liable to cover losses within 2 years a partner's departure, for example. In sum, except for the regulated sectors, 'corporation' was loosely defined until 1893, when the partial implementation of the Commercial Code in 1893 finally established a proper guideline.

1.3 Local tax

Were there other taxes that might have discouraged, or encouraged, incorporation? At the beginning of Meiji, the local administrations inherited taxes and levies from the Edo period and local taxes varied considerably. Concerns about uneven tax practices, and the sheer number of various levies, led the central government to coordinate prefecture-level taxes by standardizing regulation. One of the main rules, set in 1878, concerned those on the Business Operations Tax (*Eigyō zei*), which was a tax based on external characteristics, such as sales, and levied mainly on merchants at its initial application. This 1878 rule on the Business Operations Tax set an upper limit on the annual levy by business category. For example, the maximum annual levy for a company (*kaisha*) and wholesalers was 15 yen while that for retailers was 5 yen (Hayashi, 1965). In an application in Saitama prefecture, the amount of tax was a step function of sales revenue. A company in that prefecture was defined as a business with a shopfront financed by two or more people that operated in commerce, manufacturing, transport, printing, contract work, and money lending (Mizumoto, 1998, p. 42). Thus, except for wholesalers and retailers who were taxed regardless, incorporation triggered a tax liability and therefore was disadvantageous. An amendment in 1880, however, abolished this categorization and set a uniform maximum tax at 15 yen, and made manufacturing plants liable for taxation regardless of organizational form. Further, the 1882 amendment abolished the distinction between commerce and manufacturing and sole proprietorship and corporation, respectively. By 1887, the tax disincentives for incorporation under the Business Operations Tax had been removed.[16]

[16]As a part of local government reforms, the central government permitted municipal and township/village administrations to levy surcharges on national taxes up to 50 percent of income tax liability since April 1889. This reform on local government finance was a part of a broader administrative restructuring law passed in 1888. Corporations escaped this surcharge as they were exempt from income taxation (Maruyama, 1985). For a locality that adopted a 50 percent surcharge, the national-local combined statutory top tax rates was 4.5 percent, providing an additional incentives for businesses residing in the locality to incorporate.

2 Data

2.1 Source

The main data source is the collection of corporate genealogies edited by Yagura and Ikushima (1986), who traced lineages of 1,089 corporations that were traded at the first tier of the Tokyo Stock Exchange in 1984. In constructing genealogies, these business historians drew from "autobiographical" accounts of corporate histories published by the corporations themselves. These corporate "family trees" provide information such as a date of establishment, ownership type, industry classification, and geographical location, but do not contain financial information. Like a genealogy of an individual family, a corporate genealogy traces corporate combinations and separations in form of mergers and division sales. As Tang (2011) emphasizes, the entries are not just those whose ultimate descendent survived and prospered. The autobiographical accounts of each corporation's history provide a record of asset transfers from bankrupt firms in addition to firms that were taken over in mergers. Transfers of assets, such as factories or new equipment, were notable events given their worth. The genealogies therefore include defunct firms whose ancestries are also tracked. Since most reorganizations took place within an industry, firms listed on a given genealogy typically are in the same industry.[17] The genealogies record name changes, including those due to changes in organizational forms. Types of organizational form include sole proprietorship (*kojin kigyō*), joint-stock corporation (*kabushiki gaisha*), limited partnership (*gōshi gaisha*), partnership (*gōmei gaisha*), limited liability company (*yūgen gaisha*), mutual company (*sougo gaisha*), anonymous partnership (*tokumei kumiai*), and government corporation (*seifu kigyō*).

The key advantage of the genealogical data is in providing firm-level observations, gathered under a systematic scheme, on organizational form for a period when aggregate data by organizational forms do not exist; aggregated data on types of corporation are available only from 1894, after the partial implementation of the Commercial Code. The genealogical data provide a good indicator of the overall movements in the economy: the Pearson's correlation coefficient for the number of non-bank corporations in the genealogies and the estimated number of non-bank corporations for the economy over 1899-1912 is 0.97 and is statistically significant at the 1 percent level.[18] Moreover, the correlation coefficient for the number of all firms with real GDP over 1875-1912 is 0.93 and is statistically significant at the 1 percent level.[19]

It should be noted that the sample of firms from genealogies is a non-random subset of the population of businesses that existed at the time. As such, the data have unique

[17] We computed the Herfindahl-Hirschman Index (HHI) from the count of industry classification within genealogies using unbalanced panel of firms. HHI is a common measure of concentration, and takes values between 0 and 1. HHI of 1 implies that all firms in a genealogy belongs to a same industry. The average HHI is above 0.9 whether we use all available sample (1870-1912), restrict to the sample period (1880-1892), or drop genealogies with fewer than the median number of firms (11) during the sample period. The average HHI is 0.67 among the top 10 percentile of genealogies in terms of firm count during the sample period, so larger genealogies tend to be more diverse but are still concentrated.

[18] We obtained the number of Type 1 income taxpayers for 1899-1912 to approximate the number of corporations in the population. We then subtracted banks to obtain the number of non-bank corporations (Japanese Bankers Association, 2012). For the genealogies, we dropped banks, sole proprietors and anonymous partnerships from the original sample to obtain the number of corporations used for this comparison.

[19] The data for GDP is the 'Yamada series' (Japan Statistical Association, 1987, Table 13-03). We used price index from Nakazawa (2001) to deflate GDP. The number of firms in the genealogies is computed from the whole original dataset.

characteristics that become important when drawing inference. As t approaches 1984, the number of firms approaches 1,089 by construction. The share of corporations becomes 100 percent mechanically. We would be reluctant to draw inference from a sample close to the time when the historians constructed the genealogies, out of concern for this mechanical selection. The current sample is however from a century before the construction of the genealogies and mechanical selection should not be an issue; mechanical selection should lead to a decline in the number of firms, but we see an increase in firm numbers over the Meiji period.

Another important characteristics is that genealogies are observed only for firms successful enough not only to become public corporations but also be listed at the first tier, which has tighter listing requirements and receive more investor attention. Reflecting this selection, the data include major *zaibatsu* from the Meiji period such as Mitsui, Sumitomo, and Mitsubishi. Genealogical data do not contain financial information, but qualitative information suggests that the sample contains large companies from the period.[20] Indeed, the incorporation rate gauged from tax statistics from 1899 is 1.3 percent, while that from the sample excluding banks is over 60 percent in that year, suggesting that the sample predominantly draws from the formal sector.[21] If initial capital affects survival probabilities, joint-stock corporations, which are typically larger in size, would dominate the sample over time. If so, the corporate share would increase over time even without any tax incentives, though the inclusion of discontinued firms mitigate over-sampling of successful firms to some extent. The effects of this sample selection through survivorship, if any, would however be gradual, while the identification relies on an abrupt change at a point in time. In the empirical analysis, we control for this possible influence by including a trend term in the regression.

Lastly, and most relevant to the research question, the sample of large formal-sector firms is likely to lead to an underestimation of tax effects. Previous studies indicate that the tax motive affects smaller firms, whose decisions are at the margin of incorporation, more than larger firms. Liu (2014) finds corporate shares of employment respond less than those of firm count and Freedman and Crawford (2010) document that incorporation rates increased among smaller firms but not larger firms in the UK's experience with the 0 percent starting rate. Thus, results based on a sample of genealogies of large corporations would provide a lower bound on any tax effect and understate the impacts in the population. Appendix Table A1 lists sources for other data.

2.2 Sample

To prepare the dataset, we convert the genealogical information into firm-year observations. We also drop banks given the industry's specificity and exclude government corporations out of the same concern. We omit anonymous partners since they are pass-through entities. There are no mutual companies between 1880 and 1892, so the sample consists of sole proprietors, partnerships, limited partnerships, limited liability corporations, and joint-stock corporations.

[20] We also find via inspection that a list of 200 largest industrial firms in 1918 (Fruin, 1994, p.329) overlaps with firms covered in the genealogy.

[21] The number of taxpayers filing Type 1 income (6,133) divided by Business Operations Tax filers in 1899 (475,917) (Tōyō Keizai Shinpōsha, 1975, Table 728, 730). Small businesses, such as second-hand cloth shops, pawn shops and inns, as well as large businesses, such as banks, were liable for the Business Operations Tax. Tax records from Nagano Prefecture in 1891 show, for example, rich farmers conducted sericulture and money lending as sole proprietors (Orii and Yamamoto, 1990).

Of the remaining organizational types, joint-stock corporations are on average much larger than other types of corporations: The average size of paid-in capital for 1895 is 11 and 3 times as large as that of partnership and limited partnership respectively. The theory suggests that the tax incentives affect firms at the margin of incorporation (Gordon and MacKie-Mason, 1994). Non-tax factors, such as the benefit of limited liability for investors, would likely dominate the choice of organizational form of a modern textile factory, for example, while a medium-size family businesses may not find a clear advantage in incorporation. We therefore treat joint-stock corporations as one category, and combine partnership, limited partnership, and limited liability corporations into a separate category, referred to as "other corporations".

Figure 1 provides a preliminary examination, and shows the share of sole proprietors, joint-stock corporations and other corporations for the entire Meiji period (1868-1912). The solid vertical line indicates the introduction of PIT. The dotted vertical lines indicate the timing of other major reforms: the partial implementation of the Commercial Code in 1893, Tax Reform of 1899, and a permanent extension of war taxes in 1906. Also indicated are the timing of wars: the Civil War (February-September 1877), the First Sino-Japanese War (August 1894-April 1895), and the Russo-Japanese War (February 1904-May 1905). As the figure shows the sample consists predominantly of sole proprietors at the beginning of the Meiji period. The corporate share increased gradually throughout the period, and by the end of Meiji, the share of sole proprietors is about a third of the sample. This broad trend is consistent with the rapid industrialization that took place particularly since the 1890s. In 1887, the share of other corporations jumps by 4 percentage points while the share of sole proprietors falls by 4.8 percentage points. In contrast, we do not see visible changes for joint-stock corporations around the time. These patterns are consistent with the conjecture that the PIT induced sole proprietors to incorporate their business into a simpler corporate form.

Upon the partial implementation of the Commercial Code in 1893, the share of joint-stock corporations jumped while the share of other corporations fell abruptly. This shift suggests that the Commercial Code affected the choice of organizational forms within the corporate sector. The Tax Reform of 1899 did not appear to have had a large influence on the choice of organizational forms, despite the introduction of the 2.5 percent tax on corporate income. As Table 1 shows, the top marginal rate on personal income also increased from 3 to 5 percent, countering the disincentives to incorporate. The lack of a clear response at the aggregate level may be due to these countering tax incentives. Temporary war taxes, implemented during the Russo-Japanese War, increased the progressivity of the PIT and applied the progressive rate to income earned by partnerships, limited partnerships, and joint-stock corporations with 20 or fewer shareholders. Since its permanent extension in 1906, the share of joint-stock corporations increased while that of sole proprietorship fell, in line with the tax minimization motives.

In designing a quasi-experiment, we limit the sample period to 1880-1892 for the following reasons. First, this period keeps regulatory environment relatively homogenous across the pre- and post-PIT samples; the Commercial Code of 1893 had had a visible impact, but in addition, the enforcement regime became more sophisticated over time as discussed. Accounting for all relevant policy changes would render an empirical model unnecessarily complex. Second, the sample spans a period of relative political stability and falls between the Civil War and First Sino-Japanese War. The rise in corporate share after the latter war may reflect an economic boom that followed. We chose the end year given the partial implementation of the 1893 Commercial Code. The choice of

end year limits the number of post-reform years to six. We chose the beginning year to keep the length of the pre-reform period comparable (7 years). Table 2 provides summary statistics.

3 Analysis

3.1 Baseline model

To estimate the effects of tax incentives, we utilize the introduction of PIT in 1887 as a quasi-experiment. Since the data suggest that the PIT encouraged the formation of other corporations, we pool firm-year observations for sole proprietors and other corporations from 1880-1892 and examine the likelihood of incorporation with the following linear probability model:

$$oc_{it} = \alpha_0 + \alpha_1 PIT_t + \boldsymbol{x}'_{it}\boldsymbol{\beta} + \lambda_j t + \mu_k + u_{it}, \tag{1}$$

where oc_{it} is an indicator for firm i from time period t being other corporations (i.e., partners, limited partners, and limited liability corporations). PIT_t is an indicator for time period at and after 1887. The coefficient α_1 captures the difference in the probabilities of incorporation before and after the reform.

The identification of tax effects relies on the time variation in tax incentives since PIT was at the national level. Since business conditions can confound the influence of taxes, we consider several macroeconomic controls ($\boldsymbol{x}_{it}$). In the early 1880s, a contractionary fiscal policy induced a severe deflation, known as the Matsukata Deflation.[22] The economy was still recovering when the government introduced PIT. To account for possible business cycle effects, we control for the real GDP growth rate. The impact of the business cycle would have differed by industries, but we have information on industry-level output growth for some, but not all, industries. To account for this, we consider the growth rate of the number of firms in the original sample as a proxy for industry growth, since the overall changes in the number of firms in the original sample and the GDP growth are strongly correlated (Tang, 2013). We also include the growth rate of the Tokyo stock price index. Publicly-traded companies were small in number, particularly in the first years following the foundation of the Tokyo and Osaka stock exchanges in 1878, but accounted for 30-40 percent of the total capital of joint-stock corporations, so the stock index captures the broad trend in the formal sector.[23] We control for real interest rates to account for access to external finance.

An increase in incorporation rates over the Meiji period, shown in Figure 1, likely reflects technological change. Table 3 presents changes in the shares of organizational types by industry before and after the 1887 reform. Notably, the textile industry, which underwent a large transformation by the introduction of Western-style factories, exhibits a large decline in the share of sole proprietors across the periods (-31.7 percentage points). Some of these increases in incorporation rates may be attributable to the survivorship bias or mechanical increase as discussed earlier. We therefore consider industry-specific linear time trends (λ_j) to control for technological change and possible influences from

[22]The economy in the late 1870s suffered from severe inflation after the Civil War of 1877. Finance Minister Matsukata implemented deflationary fiscal policy to counter deflation.

[23]In 1878, 1885, and 1915, 4, 24 and 151 firms were traded on the stock market respectively (Okazaki et al., 2005).

the dataset construction. In addition, $\boldsymbol{x}_{it}$ includes a vector of firm-level controls: reginal dummies, industry dummies (12 industries), and the number of years since the founding of the oldest firm in a genealogy to which firm i belongs ('genealogy age').[24] We consider a specification with and without μ_k, a genealogy fixed effect. Firms within a genealogy typically engage in similar operations, so a genealogy fixed effect should capture the characteristics of narrow industry not accounted for by the industry dummies. We allow for a heteroskedastic error term.

3.1.1 Results

Columns 1-3 in Table 4 show estimates from the linear probability model using the pooled firm-year sample. The specification in Column 1 includes a full set of macroeconomic controls, an industry-specific time trend, and firm-level controls. The model fit seems reasonable: industry-level trends, industry dummies, and regional dummies account for much of the explained variation. The coefficients on genealogy age and squared age are statistically significant. Their point estimates imply that a firm in an 'older' genealogy tends to be a corporation, in line with the theory that businesses incorporate as they mature and their organizational structures become more complex.

Column 2 includes the dummy for the PIT introduction, which is significant at the 1 percent level. Column 3 adds genealogy fixed effects, and shows that the coefficient on PIT_t is lower but is still highly significant. This point estimate implies that the share of incorporation increased by 5.5 percentage points in this sub-sample that excludes joint-stock corporations. This translates to a 3.2 percentage-point increase in the whole sample.[25] Interestingly, the coefficients on genealogy age and its square change signs, reflecting the influence of 'new comers.' That is, conditioning on a genealogy, observations with older genealogies ages are from the latter sample period, which likely include new business operations.

3.2 Robustness checks

3.2.1 Full sample

The baseline estimation dropped joint-stock corporations to focus on the choice between a sole proprietorship and a non-joint-stock corporation. To see if this estimation strategy affects the result, we estimate a multinomial logit model on a sample that includes joint-stock corporations, following Wooldridge (2010):

$$P(y_{it} = m|\boldsymbol{z_{it}}) = \exp(\boldsymbol{z'_{it}\beta_m})/[1 + \sum_{h=2}^{3} \exp(\boldsymbol{z'_{it}\beta}_h)], \tag{2}$$

where m indicates three outcome categories: (i) sole proprietorships, (ii) other corporations, (iii) and joint-stock corporations, with sole proprietorships as the base category in the estimation. The vector $\boldsymbol{z}$ includes PIT_t and a set of control variables, including $\boldsymbol{x}$ from (1) and industry-specific linear time trends. As before, we allow for heteroskedastic errors.

[24] We combine regions with small number of observations.

[25] 0.055 divided by the share of firms other than joint-stock corporations in the pre-tax-reform sample (0.585).

Columns 4-5 in Table 4 present the results. The coefficient on PIT_t is significant at the 1 percent level for other corporations but not for joint-stock corporations. To interpret the magnitude, we compute the difference in predicted probabilities. The result indicates that observations from the post-reform period are 6.5 percentage points more likely to become 'other corporation' than observations from the pre-reform period. This is slightly higher than the unconditional differences in probabilities between 1886 and 1887. Therefore, the result is robust to the exclusion of joint-stock corporations.

3.2.2 Genealogy panel

We consider a panel regression analysis to account for unobservable characteristics. We first take each genealogy as a panel unit, and use industry as an alternative panel unit in a separate analysis.[26] To construct a genealogy-level panel data, we aggregate observations over genealogies after dropping banks and government corporations. We retain genealogies with 5 or more observations spanning 1887 to ensure each panel unit has sufficient time length, and we keep observations with gaps.[27]

We consider counts of each type of organization per genealogy-year, rather than shares, since the number of firms within a genealogy is typically small, making data on shares lumpy. Table 5 shows the tabulation by organizational types. The range for sole proprietor and other corporation is [0, 4], but with heavy concentration in [0, 1]. Count is therefore an outcome more suitable in a regression analysis. Thus, following Wooldridge (2010), we employ the fixed-effect Poisson regression to fit model with count data. We assume that the number of firms that takes a certain organizational type in a given genealogy at any point in time, conditional on observables and an unobserved fixed-component, follows a Poisson distribution:

$$f(numtype_{kt}|\boldsymbol{z}_{kt}, c_k) = \exp[-c_k \exp(\boldsymbol{z}'_{kt}\boldsymbol{\beta})][c_k \exp(\boldsymbol{z}'_{kt}\boldsymbol{\beta})]^{numtype_{kt}}/numtype_{kt}!, \quad (3)$$

where $f(.)$ is a probability density function; k indexes genealogy. The outcome variable, $numtype_{kt}$, is the number of firms that take an organization type (sole proprietorship, other corporation, or joint-stock corporation) in genealogy k at time t. The vector $\boldsymbol{z}_{kt}$ includes PIT_t and a vector of control variables from (2), excluding regional and industry dummies. The term c_k accounts for time-invariant unobservable characteristics of genealogy k.

Since the genealogies differ in size, which naturally affects the count of organizational types, we therefore consider incorporation rates by including the number of firms as an exposure variable with a unit coefficient. In estimation, we drop genealogies with all zero outcomes for a given organizational type, so the sample size varies by outcome analyzed.[28] We cluster the standard errors within panel by genealogies.

Columns 6-8 show estimates from the fixed-effect Poisson regression on the count of firm type using the genealogy panel data. The coefficient on PIT_t is significant at

[26] We are unable to take firm as a panel unit since direct lineages are often difficult to derive from genealogies in case of mergers.

[27] To be clear, while we drop banks in computing the outcome variable, we keep genealogies which include banks as member.

[28] To control for industry output growth, each genealogy needs an industry classification. We counted the frequency of industry classifications within each genealogy over the sample period, and assigned the industry with the highest count. Given that industry counts are concentrated within genealogy, this approach should provide a reasonable approximation.

the 5 percent level for sole proprietorship. The magnitude indicates that the number of sole proprietors fell by 6.8 percent per genealogy, or by 0.053 firms per genealogy.[29] The coefficient on PIT_t is significant at the 1 percent level for other corporations. This magnitude implies that the number of other corporations increased by 84.9 percent, or by 0.048 firms per genealogy. The coefficient on PIT_t takes a negative sign for joint-stock corporations, but is not statistically significant. While the magnitudes of these estimates are harder to interpret, in qualitative terms, the results are robust to controlling for time-invariant unobservable effects.

3.2.3 Industry panel

The standard approach in previous studies is to use a panel regression on corporate shares over aggregate unit, such as states. To see if a common framework changes the result, we aggregate the sample over 12 industries and examine corporate shares by industry-year in a fixed-effects regression model. The present study differs in using a subset of population.[30] While industry aggregation reduces the sample size substantially, these estimates provide a basis for comparison with results from the literature. We cluster standard errors within the panel and weight observations by the number of firms in industries.

Columns 9-11 show the result. In Column 10, the coefficient on PIT_t in the model for other corporations is positive and significant at the 1 percent level. The result indicates that the share of other corporations increased by 5.8 percentage points in the post-reform period. The coefficients on PIT_t are not significant for sole proprietorships and joint-stock corporations. Since the number of observations is much smaller (N=156), the results likely reflect a lack of statistical power.

3.2.4 Dynamic consideration

So far, the empirical framework implicitly assumed that the choice of organizational forms does not depend on firms' choices in the past. However, the decision likely exhibits time dependence for obvious reasons: firms would retain their current forms unless faced with a compelling reason to do so.[31] To obtain a sub-sample of firms with a continuous identity, we restrict the sample to observations with a single unit in a genealogy at a given time, and compute a transition matrix from each type (*sp*, *oc*, and *kk*) across adjacent years. The probabilities of remaining in the same type across years typically exceeded 98 percent in this sub-sample, indicating a strong dependence.[32]

The industry panel readily extends to a dynamic analysis. In addition to including a lagged dependent variable in the fixed-effects estimation, we use difference and system GMM estimation to incorporate a dynamic dependence while allowing for fixed effects and dynamic panel bias. For both difference and system GMM, we treat the macroeconomic control variables as predetermined but not strictly endogenous; collapse the instruments

[29] The sample average for 1880-1886 (0.782) multiplied by 0.068.

[30] Unfortunately, we do not have information to construct other measures of corporate activity, such as employment or output.

[31] Examining time dependence is not as easy as it might first appear, since, once again, the identity of a firm is not easily tractable due to mergers.

[32] The transition matrix also indicated that firms tend to "move up" from simpler organizational forms. A duration model may be more appropriate in modeling such behavior given this "irreversible" tendency, but the limited longitudinal information at firm level precludes us from implementing such model. However, since the off-diagonal elements were much smaller compared to the diagonal elements, the dynamic dependency seems the first-order importance in modeling.

to avoid overfitting with numerous instruments (Roodman, 2009); use the one-step estimation procedure. We once again weight observations by the number of firms in the industries, and cluster standard errors by industries.

Table 6 presents the main estimates, and all three models produce nearly identical coefficients on PIT_t. As is well documented, the dynamic panel bias affects the lagged dependent variable more severely compared to covariates (Judson and Owen, 1999; Flannery and Hankins, 2013). The coefficients on the lagged dependent variable are significant at the 1 percent level across specifications, and are larger under the GMM estimates, suggesting a high dynamic dependence with a possible dynamic panel bias under the fixed effects estimator. The similarity of the PIT coefficients across the three estimators, however, suggests that the fixed-effects model is sufficient in assessing robustness. Although the specification tests for the GMM estimators indicate that the instruments are valid with no second-order autocorrelation, the p-value for the Hansen test is 1, which is symptomatic of over-proliferation of instruments despite adopting a recommendation to collapse instruments. Our preferred estimates are therefore those in Columns 1-3. The coefficient on PIT_t for the share of other corporations is 0.044 and is significant at the 1 percent level. Compared to the static model, this estimate is about 25 percent lower, but is higher than that suggestted by the baseline estimation employing the firm-level data. Overall, the dynamic issue does not seem to warrant further probing.

3.3 Alternative explanation

While we have explicitly controlled for economic factors in the analysis, absent cross-section variation, the identification could be confounded by other changes in the economy. Particularly, we have noted that local governments started issuing decrees on incorporation around the time of the PIT introduction. If the creation of local rules increased the benefits of incorporation, perhaps through a better status of corporations, then an improved legal environment, rather than the tax motives, may better explain a rise in incorporation in 1887.

To address this concern, we focus on Osaka prefecture which issued a local guideline for establishing a corporation in February 1886. Osaka was a commercial center during the Edo period and was the second largest local economy in the country at the time. If the local rule was responsible for the surge in incorporation, we should observe the incorporation rate in Osaka increase from 1886. Panel B in Figure 2 shows shares of firms in Osaka Prefecture by organizational types. The dashed and solid vertical line indicates 1886 and 1887 respectively. The overall pattern is similar to that from the country aggregate (Panel A), and no trend break is evident in 1886. The local guideline would have somewhat contributed to clarifying legal requirements for incorporation (Nakamura, 2010), but is unlikely to explain the jump in incorporation rate in 1887.

4 Discussion

Economic historians named the period spanning the PIT introduction the 'First Surge of the Corporate Sector' (1886-1889) in Japan. Our study draws on a new data source and utilize the discrete change in tax law as a quasi-experiment to examine tax-motivated incorporation in 19$^{\text{th}}$ century Japan. The evidence shows that the introduction of PIT was an important factor behind the surge. Our estimates, while lower than these from the most recent study by Liu (2014), would likely underestimate the true impact at

the population level given the sample of prominent firms. In addition, our data are taken from an economy less developed than the U.S. in the early 20$^{\text{th}}$ century, so the tax administration in the late 19$^{\text{th}}$ century Japan would have been much weaker, possibly enabling firms to substitute avoidance with evasion.[33] That said, our results confirm findings in the existing literature that tax incentives affect small firms disproportionately. Specifically, the estimates show that the tax incentives affected the margin between sole proprietorship and 'simpler' corporations but not joint-stock corporations.

More generally, our study demonstrats the role of the CIT as a backstop to the PIT, also emphasized in recent studies (de Mooij and Nicodme, 2008; Liu, 2014). The early PIT collected 70 percent of projected revenue in the first year (Hayashi, 1965), but the portion of this shortfall attributable to tax-motivated incorporation is hard to gauge from data available from the period under investigation. Rather, it would be relevant to examine further how PIT and CIT affect each other's revenue performance, as considered in de Mooij and Nicodme (2008). We left several opportunities for quasi-experiments with later tax changes unexamined in the paper, primarily because the advantage of genealogical data becomes less clear with the availability of aggregate statistics since the mid-1890s. However, qualitative evidence from the latter period suggests the importance of tax motives: well-documented correspondences by managers of Mitsui *zaibatsu* reveal tax planning efforts that included a survey trip to Europe (Nakamura, 2010) and records of discussions from the National Assembly show a conscious development of anti-avoidance policies in the latter period (Takagi, 2007). We leave these questions for further study.

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[33] The discrepancy may in addition arose from nonlinear effects of PIT. The top federal-state-combined PIT rate in Liu (2014) was 22 percent (Table 1), while the top rate of the initial Japanese PIT was 3 percent.

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Table 1: Early income tax in Japan

	1887		1899			
			Type 1 Corporate income	Type 2 Bonds	Type 3 Other income	
Schedule	bracket (yen)	rate (%)			bracket (yen)	rate (%)
	300	1	2.50%	2%	300	1
	1,000	1.5			.	
	10,000	2			.	
	20,000	2.5			.	
	30,000	3			100,000	5.5
Number of brackets	5		1	1	12	
Exemption	300				300	
Excluded income	Corporate income Real estate income		Dividend income			
Taxpayers	Japanese		Resident of Japan			
Family income	Aggregation		Aggregation			

Source: Takagi (2007)

Table 2: Summary statistics

Variables	mean	sd	min	max	N
Joint-stock corporation = 1	0.42	0.49	0	1	3,203
Sole proprietor = 1	0.50	0.50	0	1	3,203
Other corporation = 1	0.08	0.27	0	1	3,203
Stock index growth	-0.02	0.17	-0.40	0.46	3,203
Real IR index	0.36	0.14	0.26	0.75	3,203
GDP growth	0.04	0.08	-0.06	0.17	3,203
Industry growth	0.09	0.16	-0.13	3.00	3,203
Age (/100)	0.34	0.59	0.01	3.07	3,203

Note: Firm-year observations covering 1880-1892 constructed from the genealogies. Banks are excluded from the sample. See text for further details.

Table 3: Changes in the share of organizational type by industries and tax regimes

	Sole proprietor				Other corporations				Joint-stock corporations			
Industry	Before	After	Total	Change	Before	After	Total	Change	Before	After	Total	Change
primary	0.900	0.861	0.878	-0.039	0.000	0.040	0.022	0.040	0.100	0.099	0.100	-0.001
retail	0.872	0.850	0.860	-0.022	0.000	0.049	0.026	0.049	0.128	0.101	0.114	-0.027
metal	0.811	0.619	0.690	-0.192	0.000	0.000	0.000	0.000	0.189	0.381	0.310	0.192
machinery	0.651	0.657	0.654	0.006	0.048	0.157	0.110	0.109	0.301	0.185	0.236	-0.116
chem_etc	0.734	0.588	0.640	-0.146	0.109	0.096	0.101	-0.013	0.156	0.316	0.258	0.160
ceramic	0.692	0.525	0.590	-0.167	0.031	0.129	0.090	0.098	0.277	0.347	0.319	0.070
foodbev	0.500	0.422	0.455	-0.078	0.045	0.100	0.077	0.055	0.455	0.478	0.468	0.023
textile	0.530	0.213	0.308	-0.317	0.052	0.194	0.151	0.142	0.417	0.593	0.540	0.176
wood_etc	0.302	0.232	0.257	-0.070	0.151	0.343	0.276	0.192	0.547	0.424	0.467	-0.123
transport	0.272	0.178	0.216	-0.094	0.029	0.118	0.082	0.089	0.699	0.704	0.702	0.005
other	0.174	0.191	0.184	0.017	0.000	0.059	0.032	0.059	0.826	0.750	0.784	-0.076
finance	0.135	0.174	0.155	0.039	0.108	0.104	0.106	-0.004	0.757	0.721	0.738	-0.036
Total	0.545	0.458	0.495	-0.087	0.039	0.112	0.081	0.073	0.415	0.43	0.424	0.015

Table 4: Regression analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Sample	pooled (sp, oc)			pooled (all)		genealogy panel			industry panel		
Estimator	LP			MNL		FE Poisson			FE		
Dependent variable	oc	oc	oc	oc[a]	kk[a]	numsp	numoc	numkk	sharesp	shareoc	sharekk
PIT Introduction		0.104**	0.055**	1.200**	0.108	-0.068*	0.849**	-0.027	-0.025	0.058**	-0.033
		(0.032)	(0.018)	(0.381)	(0.214)	(0.030)	(0.306)	(0.039)	(0.035)	(0.015)	(0.027)
GDP growth	0.020	0.011	-0.011	0.294	-0.012	0.024	0.492*	0.034	-0.029	0.012	0.017
	(0.134)	(0.134)	(0.074)	(1.145)	(0.787)	(0.051)	(0.242)	(0.075)	(0.041)	(0.012)	(0.037)
Industry growth	0.028	-0.000	-0.013	-0.091	0.288	0.011	-0.052	0.021	-0.063**	-0.002	0.065**
	(0.047)	(0.046)	(0.031)	(0.609)	(0.339)	(0.028)	(0.229)	(0.063)	(0.015)	(0.010)	(0.015)
Stock index growth	-0.036	0.028	-0.001	0.532	-0.066	0.002	0.345+	-0.042	0.031	0.010	-0.041
	(0.051)	(0.053)	(0.030)	(0.734)	(0.380)	(0.022)	(0.206)	(0.035)	(0.021)	(0.011)	(0.025)
IR index	-0.019	-0.031	0.030	-1.471	-0.810	-0.001	-0.010	-0.002	0.001+	0.000	-0.001
	(0.087)	(0.088)	(0.054)	(1.166)	(0.666)	(0.001)	(0.007)	(0.001)	(0.001)	(0.000)	(0.001)
Age/100	-0.057*	-0.058*	0.029	-3.153**	-1.533**						
	(0.025)	(0.025)	(0.107)	(0.552)	(0.311)						
Age/100^2	0.024*	0.024*	-0.143**	1.273**	0.664**						
	(0.009)	(0.009)	(0.052)	(0.197)	(0.129)						
Time	0.020*	0.006	-0.002	0.086	0.074	-0.038+	0.060	0.055	-0.026**	0.008*	0.018**
	(0.008)	(0.010)	(0.004)	(0.103)	(0.061)	(0.022)	(0.111)	(0.065)	(0.005)	(0.003)	(0.003)
Constant	-0.385*	-0.163	-0.357**	-6.461**	-3.058*				0.564**	0.015	0.421**
	(0.169)	(0.191)	(0.133)	(2.378)	(1.328)				(0.094)	(0.057)	(0.073)
Fixed effects	NO	NO	YES[b]	NO		YES	YES	YES	YES	YES	YES
PIT marginal effects		10.4	5.5	6.5	2.0	-6.8	84.9	-2.7	-2.5	5.8	-3.3
(Unit)		(%pt)	(%pt)	(%pt)	(%pt)	(%)	(%)	(%)	(%pt)	(%pt)	(%pt)
Observations	1,846	1,846	1,846	3,203		1,324	325	860	156	156	156
R-squared[c]	0.228	0.232	0.753	0.280		.	.	.	0.690	0.774	0.575
Number of panel						108	27	72	12	12	12
LL				-2113		-1126	-188.4	-750.5			
LL_0				-2935							

Note: This table presents regression analysis on the base sample (Column 1-5) and panel data constructed from the sample (Column 6-11). Column (1)-(3) presents OLS estimates on the indicator for other corporations in a sample that excludes joint-stock corporations. Column (4)-(5) presents a Multinomial Logit estimates (the base category is sp). Column (6)-(8) presents fixed-effects poisson estimates on the count of organizational types in a genealogy. Column (9)-(11) presents fixed-effects regression estimates on the share of organizational types in an

Table 5: Frequency of type counts within genealogy-year

Count	Sole proprietor		Other corp.		Joint-stock corp.		Combined
0	600	(32.4)	1,671	(90.2)	1,154	(62.3)	0
1	1,087	(58.7)	149	(8.0)	401	(21.6)	1,360
2	140	(7.6)	20	(1.1)	145	(7.8)	212
3	25	(1.4)	12	(0.7)	82	(4.4)	125
4	1	(0.1)	1	(0.1)	35	(1.9)	71
5	0	(0.0)	0	(0.0)	29	(1.6)	54
6	0	(0.0)	0	(0.0)	1	(0.1)	12
7+	0	(0.0)	0	(0.0)	6	(0.4)	19

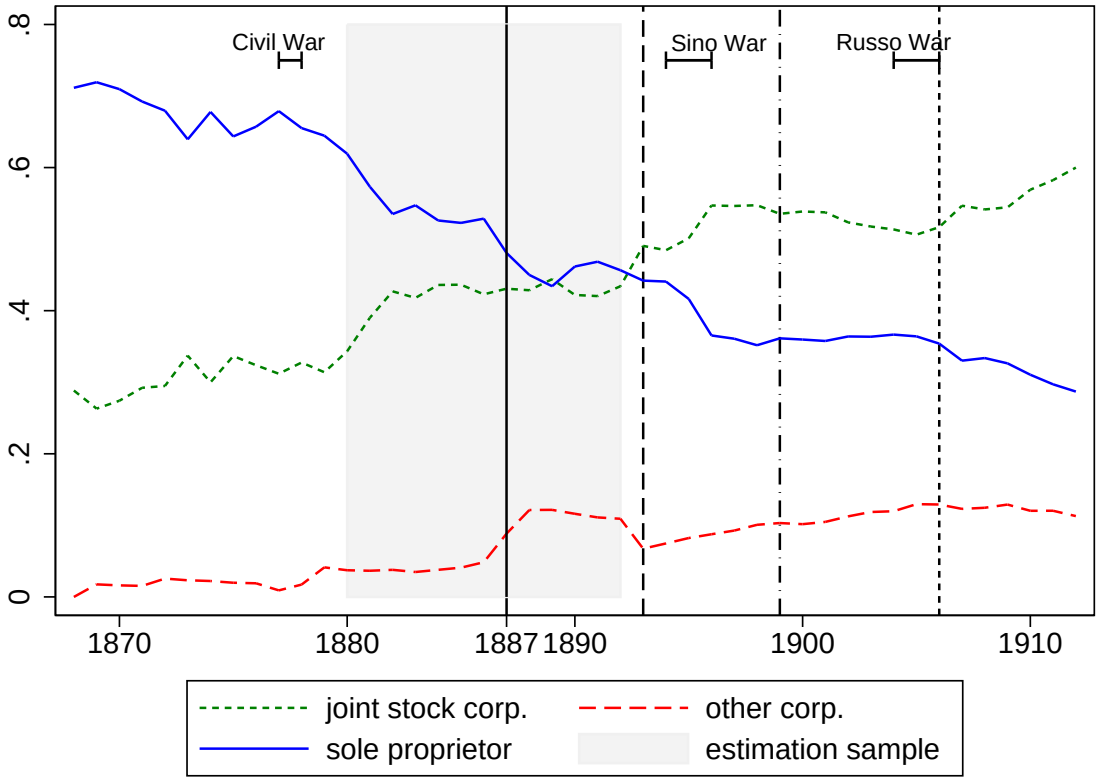
Note: The sample is based on the panel of genealogies. Percent of column in parentheses.

Table 6: Dynamic panel regression using the industry panel

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Estimator	FE	FE	FE	DGMM	DGMM	DGMM	SGMM	SGMM	SGMM
Dep. var.	sharesp	shareoc	sharekk	sharesp	shareoc	sharekk	sharesp	shareoc	sharekk
PIT Introduction	-0.022	0.044**	-0.024	-0.023	0.043**	-0.023	-0.022	0.043**	-0.023
	(0.025)	(0.010)	(0.022)	(0.025)	(0.009)	(0.021)	(0.026)	(0.010)	(0.022)
Lagged dep. var.	0.412*	0.462**	0.378**	0.455**	0.547**	0.452**	0.455**	0.518**	0.465**
	(0.141)	(0.054)	(0.121)	(0.108)	(0.063)	(0.108)	(0.123)	(0.053)	(0.092)
Observations	144	144	144	132	132	132	144	144	144
Number of panels	12	12	12	12	12	12	12	12	12
Sargan test (p-val.)	.	.	.	0.225	0.383	0.789	0.0767	0.315	0.751
Hansen test (p-val.)	.	.	.	1.000	1.000	1.000	1.000	1.000	1.000
AR(2) test (p-val.)	.	.	.	0.215	0.201	0.686	0.230	0.200	0.703
No. of instruments	.	.	.	45	45	45	59	59	59

Note: This table examines the robustness of results by including a lagged dependent variable in the industry panel regression on the share of organizational type. Three estimators include fixed effects (FE), difference GMM (DGMM), and system GMM (SGMM). For the GMM estimators, we treated the macroeconomic control variables as predetermined but not strictly endogenous, collapsed the instruments, and used the one-step estimation procedure. Observations are weighted by the number of firms in the industries, and standard errors, clustered at industry, are in parentheses. ** $p < 0.01, *p < 0.05$.

Figure 1: Shares of firms by organizational types: All regions



Note: The sample of genealogical firms excluding banks. See text for more details. The Civil War, First Sino-Japanese War, and Russo-Japanese War is for 1877.2-9, 1894.8-1895.4, and 1904.2-1905.9 respectively.

Table A1: Variable list

Variable	Code	Description	Source
Sole proprietor	sp	Indicator for observation i being a sole proprietor	Authors' computation based on the genealogies
Joint-stock corporations	kk	Indicator for observation i being a joint-stock corporation	as above
Other corporations	oc	Indicator for observation i being a partnership, limited partnership, or limited liability corporation	as above
PIT Introduction	pit	Indicator for observations with t at or greater than 1887	as above
Industry growth	numgr	The growth rate of the number of firms in industry j.	as above
Age	age	The number of years since the foundation of the first firm in a genealogy until t.	as above
GDP growth	gdpgr	GDP growth rate, deflated by the price level	Japan Statistical Association (1987), Table 13–03)
Price level	priceindex	Price level	Nakazawa (2001)
Stock index growth	stockgr	The growth rate of stock index.	as above
IR index	ririndex	Daily interest in 1/100 yen, deflated by the price level and indexed to 1868	as above

Figure 2: Shares of firms by organizational types during the sample period