The Impact of the Chinese Exclusion Act on the Economic Development of the Western U.S. [*]

Joe Long[†], Carlo Medici[‡], Nancy Qian[§] and Marco Tabellini[¶]

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Abstract

This paper investigates the economic consequences of the 1882 Chinese Exclusion Act, which banned immigration from China to the United States. The Act reduced the number of Chinese workers of all skill levels residing in the U.S. It also reduced the labor supply and the quality of jobs held by white and U.S.-born workers, the intended beneficiaries of the Act, and reduced manufacturing output. The results suggest that the Chinese Exclusion Act slowed economic growth in western states until at least 1940.

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[†]Research Improving People's Lives (RIPL).

[‡]University of California, Los Angeles. carlomedici@ucla.edu.

[§]Northwestern University, Fudan University FISF, NBER, CEPR, and BREAD. nancy.qian@kellogg.northwestern.edu.

[¶]Harvard Business School, NBER, CEPR, CReAM, and IZA. mtabellini@hbs.edu.

1 Introduction

In 1882, the U.S. government introduced the Chinese Exclusion Act, which banned "laborers" born in China from entering the United States and China-born individuals already residing in the U.S. from obtaining citizenship or re-entering the country. The Act was widely popular across political parties. A central motivation was economic. Proponents argued that Chinese workers, who constituted 12% of the male working-age population and 21% of all immigrants in the western United States, reduced economic opportunities for white workers. Many business owners opposed Chinese Exclusion. They worried that highly productive Chinese labor could not be easily replaced and that a wide-sweeping ban would lead to significant economic losses. There is little empirical evidence on whether these concerns were valid. Recent studies have documented that the Chinese Exclusion Act, which was broadly applied to almost all individuals born in China, triggered an exodus of Chinese immigrants from the United States and those that remained were adversely affected.[1] Much less attention has been paid to the consequences on white and U.S.-born workers, the intended beneficiaries of the policy, or on aggregate economic activity in the affected areas.

Our paper aims to fill this gap and provide novel and rigorous empirical evidence on the economic effects of the Chinese Exclusion Act on non-Chinese workers and aggregate economic production in the western United States. These effects are ambiguous *ex ante*. On the one hand, reducing the number of Chinese workers can reduce competition for jobs and resources, which can increase wages and employment for other workers (Borjas, 2003). On the other hand, the loss of Chinese labor can reduce the demand for other workers or lower their wages. This can happen if there are economies of scale or if Chinese workers complement other workers in production, such that their departure reduces average productivity (Ottaviano and Peri, 2012). Over time, both the positive and the negative effects can be moderated by the inflow of new labor and the adoption of new technologies (Lewis, 2011; Abramitzky et al., 2022). The net effects of the Chinese Exclusion Act and their evolution over time are empirical questions.

Our analysis examines a county-level panel for the period 1850-1940 for eight western states (Arizona, California, Idaho, Montana, Nevada, Oregon, Washington, and Wyoming), where almost all Chinese immigrants resided. We employ a *difference-in-differences* (DD)

[1] See the Background for a discussion of the policy and the references later in the Introduction.

strategy that exploits two sources of variation: time variation from the introduction of the Act, and cross-sectional variation in treatment intensity across counties. The Chinese Exclusion Act should have had little direct effect on counties with few Chinese residents and larger effects on those with many Chinese residents at the time of its enactment. Thus, treatment intensity increases in the 1880 county Chinese population share. Normalizing by total county population accounts for differences in county size. Since the distribution of the Chinese share was highly skewed and the Chinese population share may be measured with error by Census enumerators, our main measure of treatment intensity is a binary variable for whether a county had above or below sample median Chinese share in 1880. We will show in the paper that our results are not an artifact of this choice of measure.

The baseline specification controls for county fixed effects to account for time-invariant differences across counties, such as geography, and state-year fixed effects to account for state-specific changes over time, such as differential rates of population and economic growth. The location of Chinese workers in 1880 was not random. The first waves of Chinese immigrants worked in mining and railway construction, and subsequent immigrants often moved to locations where earlier immigrants concentrated. To account for this, the baseline estimates control for the interaction of year fixed effects with the number of years that a county had been connected to a railroad as of 1882 and with whether the county ever had a mine between 1840 and 1882. Only the interaction between the high Chinese share dummy variable and the post-Exclusion Act dummy variable is interpreted as plausibly exogenous. Causal interpretation assumes that conditional on the baseline controls, there were no other differences between high and low Chinese share counties that would influence the evolution of the outcomes of interest.

Our analysis begins by examining the labor supply. We focus on men, who constitute 96% of Chinese in our sample.[2] We find that the Act reduced the Chinese labor supply by 64%. The reduction occurred for skilled and unskilled workers. For white workers, who were the intended beneficiaries of the Act and accounted for 92% of the 1880 population in our sample, we also find negative effects. The Chinese Exclusion Act reduced the

[2]Focusing on male labor is standard in economic history studies because the workers in the formal market recorded in the historical data were mostly male. We will show that the results are similar if we include women. It is interesting to note that the highly skewed male sex ratio was a general feature of early U.S. immigrants and the western frontier, though perhaps not at the same level as the Chinese workers. Amongst all U.S. immigrants, 80% were male in 1920, 40% in 1880 and 70% in 1900 (Gabaccia and Zanoni, 2012). Bazzi et al. (2023) examine the moving frontier of American population and show that during 1850-1880, approximately 70% of the population of "frontier" counties was male. See Section 2 for a discussion of the reasons for the high share of Chinese males in the U.S.

white male labor supply by 28% and lowered white occupational income scores. Since the western U.S. grew rapidly during the late 19th and early 20th centuries, these and other negative estimates in the paper should be interpreted as a slowdown in growth and not as a decline in levels.

Next, we investigate the impact of the Chinese Exclusion Act on output. Systematic output data for our context are only available for manufacturing. The western U.S. was in the early stages of industrialization, when establishments were small and mostly relied on labor-intensive production. In this economic environment, we find that Chinese Exclusion reduced total manufacturing output by 62%. The Act also reduced the number of manufacturing establishments by 54-69%. The estimated effect on labor productivity is negative in sign, but statistically noisy. This is most likely due to the fact that our measure is very crude.

There are two main concerns for interpreting the results. This first is omitted variables. To address this, we repeat the natural experiment using the eastern U.S. as a "placebo" sample.[3] We compare counties that would have had many Chinese immigrants to those that would have had few in the hypothetical scenario that Chinese arrived from the Atlantic and chose residential locations in the eastern U.S. with the same characteristics as the western locations chosen by actual Chinese immigrants. Since the eastern U.S. was not affected by Chinese Exclusion, finding that counties with higher hypothetical 1880 Chinese share were worse off after the Act would imply that our main results are confounded by omitted variables. Reassuringly, we find that in the placebo states, counties with high hypothetical Chinese shares grew *more* than those with low hypothetical Chinese shares after 1880. We also address omitted variables by including additional controls. In addition, we check the robustness of our results to alternative measures of treatment intensity, alternative sample restrictions, and other sensitivity tests.

The second concern is the possibility that the Chinese Exclusion Act caused labor and economic activities to move from treatment to control counties. In this case, the negative estimates will reflect reallocation rather than an aggregate slowdown of economic growth in the West. We show that there are no spillovers to nearby areas. Under the assumption that moving costs increase with distance, this implies that reallocation does not drive our results.

It is beyond the scope of this study to be conclusive about the mechanisms underlying the main results. The last section of the paper attempts to shed some light on this question

[3] Very few Chinese moved from the West to eastern states. The number of Chinese immigrants outside of the west is negligible after the Act.

with the available data. We provide two pieces of suggestive evidence that migration (i.e., information and travel) costs mattered. First, we find that the magnitude of the negative effect of the Chinese Exclusion Act increases with the difference in climate between each western county and the average eastern county. This is consistent with the presence of migration costs and the existing evidence that migrants often chose to locate in places with similar climate as their places of origin (e.g., Kupperman, 2022; Obolensky et al., 2024). Second, we find that the negative effects on labor are driven by white men born outside of the western states, while the Act had no effect on men who were born in the West. In fact, the only group of white men to benefit from the Chinese Exclusion Act were "local" white miners. These results are consistent with the importance of information and travel costs. They also suggest that the Act discouraged prospective white migrants from moving to the West, causing them to remain in the eastern United States. This supports the interpretation that the Chinese Exclusion Act reduced aggregate economic development of the West. We also find some suggestive evidence consistent with the presence of complementarities between skilled Chinese and white workers.

A complementary explanation to the production-focused interpretation is that the departure of the Chinese reduced Chinese consumption, which, in turn, lowered demand for local products and labor. However, this is unlikely to be the main driver of our findings because the estimates are similar if we examine only sectors that produce widely traded goods, such as minerals and manufactured goods.

This study provides novel evidence that the Chinese Exclusion Act led to negative economic effects for most non-Chinese workers and likely slowed the economic development of the western United States for many decades. The long distances and geographic dissimilarity between the West and the eastern parts of the U.S. made it difficult to fully replace the lost Chinese workers with others.

The insights that productive immigrant labor may be hard to replace and its loss can have negative economic effects on the remaining workers are generalizable. However, the magnitudes of our estimates are specific to our context. The distance of the American West from eastern U.S. population centers at the time, the early stage of industrialization and the exclusion of other immigrants in subsequent years made it harder to fully replace Chinese workers with other labor or technologies. The limited number of Chinese women in the U.S. and the hostility towards inter-racial marriages made it difficult for Chinese men to marry after 1882. These features may have contributed to the large magnitude of the negative estimates. At the same time, we note that many states imposed restrictions on the Chinese prior to the 1882 Exclusion Act. For example, had policies such as barring the Chinese from owning farmland not been enacted, the negative estimates of this paper may be even larger in magnitude.[4]

Our paper contributes to studies of the economic effect of large population flows on the receiving location, which can be broadly grouped into two categories. The first one holds the view that an increase in labor supply will reduce wages and employment opportunities for native workers. This is supported by studies on immigration such as Borjas (2003, 2005) and Dustmann et al. (2017). The second one holds the view that an increase in (immigrant) labor will increase productivity and wages because of complementarities and economies of scale in production. This view is supported by evidence that immigration increases innovation and growth in the historical and modern U.S. (Burchardi et al., 2019, 2020; Sequeira et al., 2020; Ottaviano and Peri, 2012), Denmark (Foged and Peri, 2016), and post-World War II Germany (Peters, 2023). The latter view is also consistent with recent work on the economic effects of immigration restrictions that U.S.-born workers did not benefit from the Immigration Acts of the 1920s (Abramitzky et al., 2022) and the end of the Bracero program in 1964 (Clemens et al., 2018), and that the immigration quotas of the 1920s lowered American innovation (Moser and San, 2019). Since the Chinese Exclusion Act reduced the number of Chinese living in the U.S., our results also complement studies which find that the expulsion of Jews from 17th-century Spain (Chaney and Hornbeck, 2016) and from World War II Russia (Acemoglu et al., 2011) had long-lasting negative economic effects.[5]

A recent strand of the migration literature focuses on the economic development of America's western frontier. Studies find that the geographic isolation of the frontier contributed to long-lasting individualistic preferences (Bazzi et al., 2020) and the highly male-skewed sex ratios led to persistent gender norms (Bazzi et al., 2023). Our findings suggest that the geography and male-biased sex ratio of the western frontier also influenced its long-run development by interacting with the Chinese Exclusion Act.

Our work complements studies of the Chinese Exclusion Act. Existing papers have analyzed the economic and social assimilation of Chinese who remained in the U.S. and their descendants (Chen and Xie, 2020; Chen, 2015), but have not considered the effect on non-Chinese workers or aggregate production. Since the first version of our paper (January 2022), a working paper by Hoi (2023) uses a linked sample of U.S.-born men and finds that wages of low-skilled workers increased following the departure of the Chinese. This is consistent with our finding that U.S.-born miners from the same state benefited from

[4]See Section 2 for a more detailed discussion.

[5]See Card (2009) and Dustmann et al. (2016) for reviews of the literature on immigration and Becker and Ferrara (2019) for a survey of studies on forced migration.

the Act if such workers were more likely to enter the linked sample.[6] The results of the two studies together imply that the Act benefited specific segments of the U.S.-born workforce, but had negative consequences for most workers and the overall economy.

The paper is organized as follows. Section 2 discusses the historical background. Section 3 presents the conceptual framework. Section 4 describes the data. Section 5 presents the empirical strategy and the results. Section 6 explores the mechanisms. Section 7 offers concluding remarks.

2 Historical Background

2.1 Chinese Immigration

In 1880, the Chinese were the largest immigrant group in the American West. Unlike Europeans, who cross the Atlantic to enter the U.S. from its east coast, Chinese crossed the Pacific to San Francisco before gradually spreading out to other parts of U.S. By 1880, the Chinese were around a quarter of the western workforce (Lee, 2003, p.25). However, they were a negligible part of total U.S. population because most Americans lived in the eastern parts of the country. According to the 1880 Census, approximately 85% of the U.S. population lived east of Illinois. Chicago, one of the largest cities close to the western frontier, was over 2,000 miles from San Francisco and 1,000 miles to Denver.

Chinese immigration was facilitated by The Six Companies, which helped with the legal process and matched workers to employers in the United States. The workers were organized into "gangs", where one contractor, often a Chinese merchant, hired out a team of men. The gang provided their own housing, food and other services. These features made Chinese workers appealing to employers, who could deal with the contractor in English and did not need to provide amenities or support services for work that often took place in unpopulated areas (Chang, 2003, p. 30). They also meant that the loss of Chinese workers after the Chinese Exclusion Act resulted in the loss of entire production networks and local supply chains.

The first wave of immigrants arrived in the 1850s during California's gold rush. A second large wave came to build the Transcontinental Railroad. Chinese workers usually worked on short-term contracts. After the completion of work, they were left by their

[6] Hoi (2023) uses the linked sample provided by IPUMS Census Linking Project. 35% of men (that satisfy certain pre-specified criteria) in the censuses are linked. Individuals are more likely to enter the linked sample if, for example, their identifying information (e.g., name, birth data, birth place) are more accurately recorded and more unique (Abramitzky et al., 2021).

employers in what were often sparsely populated areas. Chinese workers often found new occupations in these places. In places where they had earlier logged to provide wood for railways and mines, they later logged to provide wood for the construction of new towns. Similarly, many who had worked as cooks or launders for the Chinese work gangs would later provide similar services for their new communities and local economies (Shih, 2022). By 1880, Chinese immigrants worked in many sectors. For example, the manufacturing of shoes, hats and cigars in the Western United States was dominated by the Chinese during this period (Chang 2003, p. 60). The Chinese worked in establishments owned and managed by other Chinese immigrants as well as by white or U.S.-born Americans.

Most Chinese immigrants were working-age men. At first, this was caused by economic necessity. They would make money and then either return home or bring wives and other family members to the U.S. This was exacerbated by the 1875 Page Act, which we discuss in the next section.

2.2 The Chinese Exclusion Act

Economic concerns about competition between Chinese and white workers were a key motivation for the Chinese Exclusion Act. Hostility towards the Chinese was shared by white U.S.-born workers and European immigrants (Chang 2003, pp. 116-7), who perceived the Chinese as unskilled and as taking employment opportunities away from white workers. For instance, during the 1870s in California, Chinese workers were producing 50-75% of the boots and shoes in the state at a time when there were four applicants for each job (Mink, 1986, pp. 74-5). Many were also concerned about the (cultural) threat of the "Yellow Peril" on western civilization. The Chinese were typically not Christian, spoke little English, dressed differently from others.[7] The cultural concerns were particularly salient in discussions around the 1875 Page Act. The Page Act was meant to prevent people from entering the U.S. for "immoral" reasons (e.g., enslavement, prostitution). In practice, it was mostly used to prevent the entry of Chinese women. The Page Act reduced, but did not completely stop, Chinese female immigration. Between 1875 and 1882, the number of Chinese female immigrants declined by approximately 30% (Peffer, 1986).

Discussions of the economic and cultural problems of Chinese immigration intensified

[7] One early proponent of excluding the Chinese, Senator John F. Miller, in a speech to his fellow senators in 1881, called upon them to: "...[preserve] American Anglo-Saxon civilization without contamination or adulteration ... [from] the gangrene of oriental civilization... Why not discriminate? Why aid in the increase and distribution over ... our domain of a degraded and inferior race, and the progenitors of an inferior sort of men?" (Chang 2003, p. 130).

throughout the 1870s, particularly amongst nativist groups such as the Know-Nothings (Higham, 2002). Congress passed the Chinese Exclusion Act in 1882. There was broad support from all political parties, especially in the House. Amongst the 291 congressmen in the House, 202 voted in support of the Bill, 52 abstained and 37 voted against the bill. Of the 76 members of the U.S. Senate, 39 voted "yes", 29 abstained and 15 voted "no". In the western states that we will analyze in this paper, *all* Representatives and Senators voted in support of the bill. The main dissent came from business owners, who expressed concerns about the loss of Chinese laborers and believed that they would not be easily replaceable (Pfaelzer, 2008).

The 1882 Chinese Exclusion Act barred all China-born "laborers" from entering the United States and all individuals of Chinese ethnicity from naturalization for ten years. In practice, the Act applied to all Chinese except for a very few and select individuals, such as Qing government officials or Boxer Indemnity Scholars. An 1884 amendment expanded the scope of the Act to include all people of Chinese descent regardless of the country of origin. A further 1888 amendment prevented immigrants who had arrived prior to the Act from re-entering the United States. These legislations led to confusion over the rights of the Chinese who arrived in the U.S. prior to 1882. In 1898, the children of Chinese immigrants born in the U.S. were given citizenship in the landmark decision in *United States v. Wong Kim Ark*, which defined the birthright to citizenship that has been applied to all those born in the U.S. since that time.

The Exclusion Act was renewed for ten more years in 1892 with the Geary Act, and then made indefinite in 1902. Congress repealed the Exclusion Act in 1943, when China became a U.S. ally in World War II. Chinese immigrants were limited to 105 people a year, but were allowed to naturalize. It was not until the Immigration and Nationality Act of 1965 that Chinese immigrants were allowed to move to the United States in large numbers again (Lee, 2003, Ch. 3).

The Act led many Chinese in the U.S. to leave for other countries in the Americas or to return home, as workers wished to reunite with their families or to get married since miscegenation (mixed-race marriages) was discouraged or illegal in most states at the time. The Chinese exodus was also encouraged by many other discriminatory policies and the general anti-Chinese hostility. In addition to the federal 1875 Page Act discussed in the previous section, many states imposed laws that restricted Chinese economic activities. Starting in 1859, to prevent Chinese from becoming independent farmers, western states passed laws to prohibit the Chinese from buying or leasing land (Kanazawa, 2005). Similarly, Chinese fishermen and miners faced increasing local and regional regulations that limited their access to mines or the most lucrative fishing grounds, such as salmon in the Columbia River (Chan, 1986). Many local governments passed legislation that confiscated the property of the Chinese. There were also instances of mob violence against the Chinese. It was during this period, in 1900, that the first "China Town" appeared in San Francisco.

2.3 Other Immigrants and Restrictions

The second largest immigrant group in the West in the 1880s were the Irish, who accounted for 20% of the immigrant population and 6% of the total population. There were very few other non-white immigrants at the time. In 1880, only 158 Japanese lived in the western U.S. states that we study.[8] As the Japanese population grew (e.g., to 24,326 by 1900), they faced the same resistance and hostility as the Chinese. In 1907, the U.S. introduced the Gentleman's Agreement, which *de facto* banned Japanese migration. In 1917, Congress introduced a literacy requirement and barred Southeast Asians, South Asians, and Middle Eastern people (those from the so-called "Asiatic Barred Zone") from immigrating to the United States (Goldin, 1994).

In 1921 and then, more permanently, in 1924, a quota on immigration set to each group's 1890 population effectively banned immigrants from Asia, and Southern and Eastern Europe. Filipinos, as U.S. citizens, were exempt until 1934, when the Tydings–McDuffie Act restricted them to a quota of fifty people each year. Hawaii, which was not a state or subject to these laws until 1959, and Puerto Rico, which has been a territory since 1898, were exempt from these laws and are not included in our sample. Our reduced form estimates will capture the cumulative effects of all of the restrictions and the informal discrimination against the Chinese after the Exclusion Act.

3 Conceptual Framework

The Chinese Exclusion Act reduced both the flow and the stock of Chinese immigrants in the United States. The effects on the regional economy can be positive or negative. On the one hand, reducing the number of Chinese workers can reduce competition for jobs, which can increase the price of labor and employment for other workers (Borjas, 2003).

[8] 64,800 individuals were born in Mexico (96% report "white" for race), but these self-reported countries of birth may include those born in the former Californian territories before 1850. Filipinos migrated to the U.S. mostly in the early 1900s. After the Spanish-American War (1898), the Philippines became a U.S. colony and Filipinos were U.S. citizens.

This can happen if Chinese and non-Chinese workers are competing over natural resources such as minerals, fish, wood or land, and/or if labor demand is downward sloping.

On the other hand, the loss of labor can reduce demand for other workers and lower their wages. This can happen for two reasons. The first one is the direct effect from lowered Chinese consumption. The decline in Chinese consumption reduces labor demand for the workers who produced these goods, many of whom were not Chinese. The second one is from a decline in productivity. This can happen if there are economies of scale or if Chinese workers complement other workers in production, such that their departure reduces average productivity (Ottaviano and Peri, 2012).[9]

Ultimately, the magnitude of the positive and negative effects on the non-Chinese workers and the regional economy depends on the elasticity of wages with respect to labor, the elasticity of substitution between Chinese and non-Chinese workers and the economies of scale in production.

The effects of Chinese Exclusion can change over time. Long-run effects can differ from the short and medium-run effects, since the factors of production can adjust over time. The American West of the late 19th and early 20th centuries was characterized by a large westward movement of the population (Bazzi et al., 2020; Zimran, 2022), the introduction of new technologies (Abramitzky et al., 2022) and structural transformation (Eckert and Peters, 2022). The inflow of new labor and the adoption of labor-saving technologies can moderate both the positive and negative shorter-run effects. The sooner other workers and labor saving technologies can replace the departed Chinese workers, the sooner the effects of the departing Chinese will dissipate. The longer it takes to replace Chinese workers, the more persistent will be the effect of the Act. The main empirical analysis will capture the net of the positive and negative forces.

4 Data

Sources and Sample The main data used in our analysis are the individual-level U.S. decennial censuses between 1850 and 1940 (Ruggles et al., 2021), and the county-aggregates from the Census of Manufacturing (Haines, 2010; Haines and Rhode, 2018). Although the 1890 full-count U.S. Census was destroyed in a fire, some outcomes (e.g., population) are available at the county level for this year (Haines, 2010). We also use

[9]Sectors such as infrastructure (e.g., railroads), mining, services like food and hospitality, and manufacturing may produce large positive spillovers. Many of these sectors are also likely to have large economies of scale in production.

data from the Census of Manufacturing every ten years from 1860 to 1940. We discuss other data sources when they are relevant.

Our sample includes western states where the Chinese population is above 1% of the total population in 1880: Arizona, California, Idaho, Montana, Nevada, Oregon, Washington, and Wyoming. All data are aggregated to the county-decade level. To address the fact that county boundaries changed over time, we follow standard approaches in the literature (e.g., Hornbeck, 2010) and fix them to 1930 boundaries.

Definition of "Chinese" We define someone to be Chinese if either their "country of birth" is "China" or their "race" is "Chinese". Since Chinese immigration began in the 1850s and our sample only include working-age adults, these two variables are nearly synonymous for most Chinese adults in the U.S. in 1880. In later censuses, it is possible that U.S.-born children from a parent who is Chinese and a parent who is of another race choose to report her race as the other race. However, this is unlikely to be quantitatively important since only 1.7% of married Chinese men had a non-Chinese spouse in the sample.

Cross-Sectional Variation in 1880 Chinese Population Share Figure 1 maps the 1880 Chinese population share for each county. Darker counties reflect a higher share of Chinese. There is variation across counties within states, as well as across the states in our sample.

Evolution of Immigration The total number of Chinese individuals living in the western U.S. and the U.S. as a whole declined after the Act. Figure 2 plots the total number of Chinese and of all other immigrants in our western sample over time. We observe a rapid increase in the total number of Chinese residing in the U.S. from 1850 until 1880, followed by a decline in the post-1882 decades. The decline is driven by Chinese leaving the United States. This is consistent with the fact that the change in the total number of Chinese for the entire U.S. (Appendix Figure A.1) is similar to that of the western states.

This was a period of rapid growth for the western states, when large waves of Americans born in the eastern states and European immigrants moved west. Figure 2 also shows that the non-Chinese immigrant population rises throughout this period. This is important to keep in mind when interpreting our estimates.

Summary Statistics Table 1 presents detailed descriptive statistics for the Chinese population in 1880. Panel I includes all counties. Section A presents select demographic characteristics of all Chinese individuals. On average, 6.6% of the population is Chinese – and the values are similar irrespective of the definition (race vs. country of origin) we use. The Chinese are 21% of all foreign-born individuals in the West and are, on average, 32 years old. 96% of Chinese were male. 94% were working-age (age 15–64) males.

Section B examines the sample used in the regression analysis: working-age (15–64 years old) Chinese men who are in the labor force. The Chinese account for 12% and 10% of the total and the literate male labor force (82% of working-age Chinese men in a county in our sample are literate. This is not shown in the tables).[10]

Section C shows that the Chinese worked in many different sectors in 1880. The industries with the highest share of Chinese workers were personal services (e.g., private households, hotels and lodging places, or laundering and cleaning services) (50%), entertainment and recreational services (e.g., theaters) (22%), mining (25%), transportation (e.g., railroads) (8%) and manufacturing (6%).

Section D shows that amongst skilled and unskilled workers, 3% and 23% were Chinese. Less than 5% of those in managerial positions were Chinese. Skill groups are defined based on individuals' reported occupation following Katz and Margo (2014). In particular, skilled workers include: professionals, managers, craftsmen, clerical and sales occupations. Unskilled occupations include: operatives, laborers, and service workers (both private household and non-household). Farmers and workers employed in agriculture are not included in these categories.

In Panels II and III of Table 1, we divide the sample into counties with above and below 1880 median (4%) Chinese population share. Panel II shows that 35% of all immigrants and 21% of the labor force were Chinese in the former, while only 8% and 3% were Chinese in the latter. The large standard deviations reflect the spatial variation within each group of counties.

Appendix Section A discusses other baseline characteristics of control and treatment counties. For example, the data show that counties with more Chinese in 1880 have higher values of manufacturing output and more manufacturing establishments, while the income score is similar in the two types of counties.[11] After we present the main results,

[10]The U.S. Census did not record years of schooling prior to 1940. Literacy, which in the historical census mostly means an individual's ability to read or write his name, is often used as a crude proxy for education in the U.S. economic history literature.

[11]The U.S. Census of Population did not collect information on wages prior to 1940. We thus use occupational income scores, which are standard in the U.S. economic history literature and often interpreted as a proxy for life-time income. This score assigns to an individual the median income of his job category

we will conduct numerous robustness exercises to check that they are not confounded by these differences between treatment and control counties.

5 Main Results

5.1 Baseline Specification

To understand how the effect of the Chinese Exclusion Act, we exploit two sources of variation: time variation in the introduction of the Act and cross-sectional variation in a county's Chinese population share on the eve of the Act. The latter influences the intensity of treatment: counties with a higher Chinese population share will be more affected by the Act than counties with fewer Chinese immigrants. The intuition is that absent the Act, the Chinese population share would have increased more in places with higher 1880 Chinese population shares.[12]

Our baseline *difference-in-differences* (DD) estimate compares outcomes in counties with high and low 1880 Chinese population shares. High Chinese share is a dummy variable that equals 1 if the 1880 Chinese population share in the county is above the sample median and equals 0 otherwise. The median county has 4% Chinese population share in 1880. The baseline uses 1880 instead of earlier years because there were very few Chinese in earlier periods. We use a binary measure of Chinese population share because the 1880 Chinese population share is highly skewed (see Appendix Figure A.2) and may be measured with error. The U.S. historical censuses are filled out by census enumerators rather than the respondents. Since many Chinese spoke English poorly, they may have been misclassified as other races or nationalities if they were not living near many other Chinese. Individuals living in isolated places may be excluded from the census. We will later show that the results are not an artifact of how we measure pre-Exclusion Act Chinese population share.

The baseline specification is:

$$Y_{ijt} = \alpha + \beta(HighChineseShare_{i,1880} \times 1\{t > 1882\}) + \Gamma X_{ijt} + \varphi_i + \xi_{jt} + \nu_{ijt}, \qquad (1)$$

where the outcome of interest in county i state j and year t, Y_{ijt}, is a function of: the

in 1950 and are often interpreted as a proxy for life-time income.

[12] Appendix Table A.2 shows that there is a positive association between lagged Chinese population and current Chinese population.

interaction of a dummy variable that takes the value of one if the 1880 Chinese population share is above the sample median, $HighChineseShare_{i,1880}$, and an indicator variable equal to one if the time period is after 1882; a vector of controls, X_{ijt}; county fixed effects, φ_i; and state-year fixed effects, ξ_{jt}. Standard errors are clustered at the county level. We will also present Conley standard errors with 100km cutoffs to account for spatial correlation.

County fixed effects control for time invariant differences across counties, such as distance to the San Francisco port. State-year fixed effects control for changes over time that affect all counties within a state similarly, such as the macro economic growth of the western states.

Since Chinese immigrants did not locate randomly and the first waves of immigrants were concentrated in mining and railroad construction, the baseline controls for the number of years that a county has been connected to the railroad before 1882 and whether there was ever a mine in the county between 1840 and 1880.[13] We include the interactions of each time invariant variable with year fixed effects.

β is the coefficient of interest. If the Act improved outcomes, then $\beta > 0$. If the Act worsened outcomes, then $\beta < 0$. β reflects the effect of the 1882 Chinese Exclusion Act and all subsequent legislations that reinforced the effect of the initial Act that we discussed in Section 2.

The causal interpretation of β assumes that, absent the Act, the outcomes of interest would have evolved along parallel trends in counties with high and low 1880 Chinese population shares. In other words, we assume that conditional on the controls, the interaction of 1880 Chinese population share in the county and the post-1882 dummy variables is uncorrelated with the error term. We will provide evidence for this assumption after we present the main results.

5.2 Labor Supply

We begin by examining the effect of the Exclusion Act on the Chinese population and labor force. The outcomes are measured in logs throughout the paper unless otherwise noted. Columns (1) and (2) of Table 2 examine total Chinese population and labor supply in each county-decade. The estimates are negative and statistically significant at the 1% level for both outcomes. In columns (3)-(14), we examine the effects of the Act on Chinese labor supply across 1-digit sectors, ordered by the 1880 Chinese worker

[13]The data for the railroad network are from Atack (2016). The data on the location of mines are from Mason and Arndt (1996).

share: the number of Chinese workers as a share of all workers in the sector in 1880. The 1880 Chinese worker share reflects the importance of Chinese workers to the sector. The Act reduced the number of workers in sectors where the Chinese were a large fraction of the labor force (columns 3 to 8): personal services (e.g., laundry, hotels), entertainment and recreational services (e.g., theaters), mining, manufacturing, wholesale and retail trade (e.g., apparels, eating and drinking places), and transportation (i.e., railways). The estimates are statistically significant at the 1% level, except for manufacturing, which is statistically significant at the 10% level. In columns (9) to (14), where we examine sectors with smaller shares of Chinese workers (agriculture, professional services, construction, business and repair services, finance et al., and public administration), we find statistically zero effects, except for professional and related services.

To interpret the magnitudes, consider, for example, the estimate of -1.03 for total Chinese labor supply in Table 2 column (2). Under the parallel trends assumption, this implies that the Act reduced Chinese labor supply by 64.3% ($(e^{-1.03} - 1) \times 100 = 0.643$) on average.

To assess the plausibility of this estimate, consider the counterfactual based on Figure 2. Had the Chinese population continued to grow at the same rate as between 1860 and 1880, it would have reached around 300,000 by 1940. In practice, there were only 100,000 Chinese in 1940. This crude comparison suggests that the Exclusion Act reduced the Chinese population by around 66%, which is comparable to our estimate. The similarity between our estimate and the crude counterfactual from the aggregate population is consistent with the decline of the Chinese population in treated counties mostly reflecting departures from the U.S. rather than migration to other parts of the country. We examine this more later in the paper.

We repeat the same estimates for white workers, who were the intended beneficiaries of the Act. Table 3 examines white county population (column 1), total labor supply (column 2) and labor supply in sectors sorted by the 1880 share of Chinese workers. If the departure of the Chinese opened up opportunities for white workers, we should find that there are more white men working in the counties from which the Chinese departed. Instead, the main interaction coefficient is negative for all dependent variables. The estimates are statistically significant at conventional levels except for manufacturing (column 6), agriculture, forestry and fishing (column 9) and public administration (column 14). The estimates for manufacturing and agriculture, forestry and fishing are significant at the 15% level.

The estimate for public administration is small in magnitude and statistically imprecise. This is reassuring since 70% of public administration jobs were federal government jobs, which were less responsive to local economic activity than market-driven sectors. For example, a large and statistically significant negative result would raise the concern that our results are confounded by treated counties receiving less federal funding in infrastructure such as the postal system.[14]

The estimates should be interpreted as a reduction in the *growth* rather than a decline in the levels of white population and labor supply because this was a period of rapid growth in the western states. Between 1880 and 1940, the average white county population in our sample increased from 4,126 to 39,141. The coefficients in columns (1) and (2) imply that the white population and labor supply in counties with a high 1880 Chinese population share grew 21.34% and 28.82% less than in counties with a low 1880 Chinese population share. Contrary to the intentions of the Chinese Exclusion Act, we find no evidence that the average white worker benefited from the departure of the Chinese.

The negative effect on white labor supply is present both in sectors with a high 1880 Chinese share and in sectors with relatively few Chinese workers. Thus, the Chinese Exclusion Act had negative spillover effects on white labor supply in the same sector, and also across sectors.

5.3 Skilled Labor

Table 4 presents the effect of the Act on the supply of skilled workers. Since educational attainment was not reported in the U.S. Census prior to 1940, we measure skills in two ways. First, with literacy, which was reported in the Census until 1930. This is crude and mainly reflects whether a man can read or write his name. In 1880, 82% of Chinese workers were literate. Column (1) shows that the Act reduced the number of literate Chinese workers by 65% ($e^{-1.06} - 1 = 0.65$). The magnitude is economically meaningful. Many skilled Chinese departed after the Act.

Second, we follow Katz and Margo (2014) and use occupation information to infer skill. This measure uses more information and is a more precise measure of skill, but it captures both a worker's skills and labor market conditions. We find that the Act reduced the number of skilled Chinese workers by 43% ($e^{-0.56} - 1 = 0.43$) (column 2) and the number of Chinese in managerial positions by 33% ($e^{-0.40} - 1 = 0.33$) (column 3).

In a similar spirit, we examine the occupational income score in column (4). The Act also had a negative effect on this measure. All of the estimates in columns (1)-(4) are

[14] See Aneja and Xu (2024) for a study on the 19th century postal service.

statistically significant at the 1% level.

Columns (6) to (9) examine the supply of skilled white workers. We find that the Act reduced the number of literate white workers by 24% ($e^{-0.28} - 1 = 0.24$) (column 6), the number of skilled white workers by 32% ($e^{-0.39} - 1 = 0.32$) (column 7) and the number of white workers in managerial positions by 32% ($e^{-0.39} - 1 = 0.32$) (column 8). We also find that the Act reduced white occupational income scores by 4% (column 9). The estimates are statistically significant at the 1% level.

The results for literacy and the occupation-based measures have slightly different meanings. Literacy can be interpreted as a (crude) proxy for the level of skills. The occupation-based measures reflect both labor market discrimination and skills, which can be pre-existing skills as well as skills that are acquired on the job. If anti-Chinese discrimination pushed Chinese workers into lower-skilled occupations after the Act, then the estimated effect of the Act on occupation-based measures *overstates* the negative effect on the average level of pre-existing skills of Chinese workers. If anti-Chinese discrimination allowed white workers to move into more skilled occupations, then the estimated effect *understates* the negative effect of the Act on the level of pre-existing skills of white workers.

Columns (5) and (10) examine the urban population share. We find that the Act reduced the share of Chinese and white workers living in urban areas. The estimates are statistically significant at the 1% and 10% levels.

Appendix Table A.3 shows that the estimates for labor supply and skill composition are similar for male workers of all races, and if we include female workers.

5.4 Manufacturing

The only production data that are systematically available from this period are for manufacturing. These data are reported by Haines (2010) as county-aggregates for every ten years and do not distinguish Chinese and non-Chinese workers. Our analysis will examine a county-decade panel of aggregate production measures for a balanced panel of counties from 1860 to 1940 where the outcomes of interest have non-missing values.[15]

Columns (1) and (2) of Table 5 examine the log value of total manufacturing output across establishments in the county and the log manufacturing output per worker, calculated as the total manufacturing output in the county divided by the number of manufacturing workers in the county. The latter is a very crude measure of productivity. Both values are measured in 2020 dollars. Column (3) examines the log number of estab-

[15]See Appendix Section B for a detailed description.

lishments. Column (4) replicates column (3) using a Poisson regression since the number of establishments is a count. In columns (1) to (3), we add one to the observed value to allow observations with no manufacturing to be in the sample.[16]

The coefficients are negative in all columns. They are statistically significant at conventional levels except for total output per worker. These results imply that the slowdown in labor growth caused by Chinese Exclusion was accompanied by a reduction in manufacturing output by 62% ($e^{-0.97} - 1 = 0.62$). The estimates in columns (3) and (4) show that the Act reduced the number of manufacturing establishments by 54% ($e^{-0.78} - 1 = 0.54$) to 69% ($e^{-1.16} - 1 = 0.69$). The negative coefficient in column (2) for manufacturing output per worker is consistent with a decline in productivity. But we cannot be conclusive because of the imprecise estimates, which is likely caused by the crudeness of the productivity measure.

These results imply that the Chinese Exclusion Act had a sizable negative effect on manufacturing output, which was accompanied by a reduction in the number of manufacturing establishments. The findings are consistent with the negative effects on labor supply. As with labor supply, these estimates reflect a reduction in growth and not a reduction in levels. During 1880 to 1940, average manufacturing output increased from approximately \$36,700,000 to \$716,000,000 (in 2020 dollars) for the sample. The average establishment employed approximately four workers in 1880 (not in tables) and the average number of establishments grew from 71 to 174 between 1880 and 1940.

5.5 Dynamic Estimates

To understand the evolution of the effects of the Chinese Exclusion Act, we estimate a dynamic specification, similar to the baseline except that we replace the post-1882 dummy variable with Census year (decade) dummy variables:

$$Y_{ijt} = \alpha + \Sigma_{t=1850}^{1940} \beta_t (HighChineseShare_{i,1880} \times 1\{t > 1882\}) + \Gamma X_{ijt} + \varphi_i + \xi_{jt} + \nu_{ijt} \quad (2)$$

Figure 3a presents the estimates for the labor supply of Chinese, white and all races. For brevity, we focus on the log total number of workers in each group. Unsurprisingly, the estimates show that places with high Chinese population share in 1880 experienced growth in the Chinese labor prior to the Act. This trend reverses in the 1880s, and

[16]Since the Census of Manufacturing does not report data separately by birth place or race, we do not examine the effects of the Chinese Exclusion Act on the wage bill or wage bill per worker. In unreported results, we verified that the estimates were noisy and not robust.

coefficients begin a precipitous decline immediately after the Act, remaining lower than the peak 1880 levels for the subsequent years in our sample.

For white and all labor, the coefficients are zero prior to the Act and become increasingly negative afterwards. These estimates exhibit no pre-trends and the timing of the trend break coincides with the Act. These patterns also mitigate concerns that our baseline estimates are driven by the Immigration Act of 1924, which restricted immigrants from Southern and Eastern Europe and reduced the flow of immigrants to the United States.

Figure 3b plots the coefficients for the occupational income score of Chinese, white and all workers. The estimates exhibit no pre-trends and the timing of the trend break coincides with the Act.

Figure 3c plots the estimates for total manufacturing output and the number of establishments. The negative effects on manufacturing trail the negative effects on labor. We find no evidence of pre-trends.

The coefficients and standard errors for all of the dynamic estimates are presented in Appendix Table A.4. Note that the statistical significance of the point estimates in the figures are not important for our study. Our focus is instead in the joint significance between the coefficients before and after 1880, which is provided by the baseline estimate.

The dynamic estimates show that the negative effects persisted to the end of our sample in 1940 and that the Chinese Exclusion Act had long-lasting consequences. This implies that the lost Chinese workers were not easily replaced by other workers or labor saving technologies.

5.6 Reallocation

Our findings imply that places that lost more Chinese workers because of the Exclusion Act grew less than other places in the western United States. This can reflect a negative effect on aggregate development for the western U.S., or a reallocation of labor and production from the treatment counties to the control counties. To investigate reallocation, we follow the approach used in Sequeira et al. (2020) and examine spatial spillovers. The logic is as follows. Since moving costs increase with distance, economic activity is more likely to relocate to nearby places. It follows that reallocation would increase labor supply and manufacturing in counties that neighbor those with high 1880 Chinese population share.

Table 6 presents estimates of the interaction of the post 1882 dummy variable and a dummy for whether adjacent counties have a high Chinese share in 1880. For the latter variable, we calculate the average of the Chinese share of all the neighboring counties in 1880, weighted by the length of shared borders, and then construct a dummy variable that takes a value of one if it is higher than the 1880 median Chinese share in our sample (0.04).

Panel A augments the baseline specification with the addition of the new interaction term. Conceptually, the new interaction coefficient reflects the effect of the Act on counties next to those with high 1880 Chinese population shares, holding own county 1880 Chinese population share constant. If there is reallocation, the interaction coefficient should be positive. Instead, the interaction coefficients are all negative or statistically indistinguishable from zero. This goes against reallocation. If anything, the negative and statistically significant coefficient on the interaction between the post dummy and the Chinese population share in the neighboring county suggests agglomeration effects. That is, Chinese workers in a county might be more likely to leave if there were many Chinese living nearby.

In Panel B, we examine the effect of the Act for counties next to those with a high 1880 Chinese share, focusing on counties that have 1880 Chinese shares below the median, and are thus in our control group in the baseline specification. By examining only counties in the control group, this exercise directly addresses the conceptual concern that the control group is contaminated by the treatment group in the main estimate. The coefficients are all negative or statistically zero, which goes against reallocation.

In a similar spirit, Panel C investigates whether labor and economic activity relocated to cities. This is motivated by the observation that "Chinatowns" emerged in cities such as San Francisco after Chinese Exclusion. We restrict the sample to counties with 1880 urban population share of 25% or higher, and estimate the same specification as in Panel B. The sample is much smaller, but we find statistically zero effects, and most estimates are negative in sign. We thus conclude that there is no evidence that Chinese relocated from counties with high Chinese shares in 1880 to nearby urban areas.

In Panel D, we examine a sample of counties with Chinese share above the 75th percentile of Chinese share in 1940 to focus our attention on the counties where remaining Chinese concentrated after the Act. We still find negative coefficients. While this result should be interpreted cautiously since we are selecting the sample based on an endogenous variable, the fact that we still find no evidence of reallocation is reassuring.

Table 6 examines the effect of the Act for counties with high Chinese population shares in adjacent counties. The results are similar if we replace the average Chinese share in adjacent counties with the average Chinese share of other counties in the same state.[17]

The results on spillover effects go against the interpretation that the main findings are driven by the reallocation of labor and production within the western states. They support the interpretation that our main findings mainly reflect an aggregate negative effect for the West. In other words, much of the labor and economic productivity that would have moved from other parts of America to the counties where Chinese workers resided prior to the Act chose to not migrate to the West.

5.7 "Placebo" Experiment

The main caveat to the causal interpretation of our estimate is omitted variables: there may be unobservable factors correlated with the location of the Chinese in 1880 and economic development after the Act. The fact that the dynamic estimates show no evidence of pre-trends goes against this concern. We also address this threat to identification with a placebo exercise. First, we select the "best" predictors of 1880 Chinese immigrant share in our main sample of Western counties using LASSO.[18] Then, we use these variables to predict the 1880 Chinese immigrant share in non-Western counties, where the actual Chinese population was near zero. Finally, we replicate our baseline specification with this placebo sample.

If the coefficient of interest is negative in the placebo sample as it is in the main sample, we would be concerned that the main results are confounded. A null effect would mean that Chinese Exclusion did not matter in the placebo sample because there were no Chinese. A positive effect is also possible since this was a period of high European immigration and immigrant-driven growth in the eastern parts of the U.S., and many of the predictors of Chinese migrations in the West (e.g., employment opportunities, presence of a mine) may also predict where European immigrants moved to in the Eastern U.S.

Table 7 Panel A reports the main western sample estimates. They are similar to the

[17] These results are not shown for brevity and available upon request.

[18] LASSO selects the following variables: state fixed effects, non-Chinese immigrant share, log distance from a major port (San Francisco for the West), share of rural population, share of labor force in agriculture, manufacturing, mining, construction, trade, transportation, personal services, professional services, business, finance, public administration, and entertainment, share of literate workers, and log total population. The variables not selected are: a dummy indicating whether the county ever had a mine during 1840-1882, log population density, log average occupational income score, the number of years the county has been connected to the railroad, and interactions of the number of years the county has been connected to the railroad with a dummy for whether the county ever had a mine and with the log distance from a major port. We also conducted a restricted LASSO where the railroad and mine controls in the baseline are necessarily selected. The results do not change and are not reported for brevity. They are available upon request.

main results. We then examine several placebo samples: all other states (Panel B), midwestern states (Panel C), northeastern states (panel D) and southern states (Panel E).[19] We find that almost all the estimates are positive in the placebo samples. At the time, northeastern states were the most economically developed and densely populated. The southern states were recovering from the Civil War (1862-65). The Midwest is arguably the most similar to the main western sample in its proximity to the frontier and economic structure. It is notable and reassuring that the estimates for the midwestern states are positive and statistically significant at the 1% level.[20]

To ensure that we use placebo counties with similar economic fundamentals to the main sample, we alternatively restrict the sample to those with values within the 25th and the 75th percentile of distribution in the West in terms of urban population share, manufacturing output per capita, non-Chinese immigrant population share, and the employment share in railroads and mining. The estimates are all positive. See Appendix Table A.6.

The placebo results go against the concern that our main results are driven by omitted variables. They imply that, had there been no Chinese Exclusion Act, the western counties that suffered the most from the Act would have actually grown more than other counties. This finding is consistent with the conventional wisdom that immigrants from different countries of origin decide on their locations in the U.S. based on economic opportunities, and large number of European immigrants arrived to the placebo states during this time.

5.8 Additional Robustness Checks

5.8.1 Additional Controls

To further assuage concerns about omitted variables, we control for the observable county characteristics discussed in the historical literature. Motivated by the literature and our context, we consider several additional variables. To address the possibility that counties with higher Chinese population shares in 1880 had more immigrants from other countries, we control for population share of the largest immigrant groups in our sample: Irish

[19] Midwestern states include: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; northeastern states include: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; southern states include: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

[20] In Table 7, high Chinese share is defined using the same threshold as in the main results, the sample median of 1880 Chinese share in the western sample. We can alternatively use the sample median of the Chinese share in the placebo sample. The results are very similar. See Appendix Table A.5.

(6.11%), Germans (4.21%), English (2.92%) and Canadians (2.45%). Since anecdotal accounts indicate that employers started recruiting Mexican and Japanese workers after the Chinese Exclusion Act, we also account for the historical presence of these groups, even though they accounted for small shares of the U.S. West population (1.4% were born in Mexico and 0.012% were born in Japan).[21] The interaction coefficient of interest is always negative and statistically significant. For each group, we construct a dummy variable that equals one if the value is higher than the sample median, and control for the interaction with the post 1882 dummy variable. We find that the interaction of high Chinese share and post-1882 is robust to these additional controls. See Appendix Table A.7.

In Appendix Table A.8, we control for non-Chinese immigrants, total population, manufacturing labor supply, agricultural labor supply, as well as the decade-to-decade growth of each of these variables. In addition, we control for the interaction of year fixed effects with a measure of market integration from Hornbeck and Rotemberg (2021) and with a dummy variable that equals one if a county was ever part of a Homestead Act before 1880 to account for its effects on local population growth and occupational choice (Allen and Leonard, 2021; Smith, 2020). For each variable, we control for its base-year measure interacted with year fixed effects to allow the effects to be fully flexible over time. The controls address the concern that the main results are confounded by other immigration and macro development trends, as well as mean reversion. The base year varies depending on data availability. The results vary in precision with these rigorous controls, but the magnitudes of the estimates are similar to the baseline estimates.

5.8.2 Alternative Measures of Chinese Share

Our baseline divides counties into those with the 1880 Chinese population share above and below its median. The estimates are qualitatively similar if we use the 1860 Chinese share instead of 1880. When we use a higher threshold of Chinese share to define treatment counties (i.e., Chinese share is above the 75th percentile of the 1880 distribution, which is 8%), the treatment effect is larger in magnitude than when we define treatment using the sample median (i.e., above 4%). Consistent with these results, we find that the treatment effect is also negative and large in magnitude when we use a continuous measure of Chinese share. See Appendix Table A.9 columns (1)-(3).

[21] Since the place of birth is self-reported, individuals born in Mexico might include those born in the western U.S. before the territory became part of the United States in 1850.

5.8.3 Alternative Sample Restrictions

Since the distribution of the 1880 Chinese population share is very skewed, we omit counties with 1880 Chinese population shares in the top one percentile of the 1880 distribution. Since almost all Chinese immigrants arrived via San Francisco, we alternatively exclude San Francisco county. The results are similar to the baseline. See Appendix Table A.9 columns (4) and (5).

5.8.4 Random Inference

Another way to check that our result are not spurious is to randomly permute the independent variable, $HighChineseShare_{i,1880}$, across counties and re-estimate the baseline equation in each sample. Figure A.3 plots the distribution of the coefficients for the main outcome variables from 1,000 permutations. The vertical red line is the estimate from the baseline sample. The figures show that our main results are unlikely to be generated by chance.

6 Mechanisms

This section attempts to shed light on these mechanisms as far as the data will allow. We provide suggestive evidence for the presence of migration costs and worker complementarities, and against the importance of the local consumption channel. There are other possible explanations and it will be beyond the scope of our paper to be conclusive on this point.

6.1 Migration Costs

The Exclusion of the Chinese was meant to increase opportunities for white workers. Given that information and travel costs increase with distance, white workers who lived near the treatment counties stood to benefit more. Table 8 presents the estimated effect of the Exclusion Act on the labor supply of white men depending on where they were born.[22] The presence of migration costs implies a larger negative effect on men who are born further away from the treatment counties. We examine labor supply in all sectors in column (1) and then for each sector in columns (2)-(11). For brevity, we do not examine public administration because of the null effect shown earlier. Table 8 Panels A and B

[22]The U.S. Census only records the state, and not the county, of birth individuals born in the U.S.

show that the estimates for white men born in the same state and in other western states are mostly small and statistically insignificant at conventional levels. The one exception is mining (column 4): the Exclusion Act increased the number of white men born in the U.S. West working in this sector. White miners born in the west moved in when the Chinese moved out.

Panels C, D and E examine men born in states outside of the West, in Europe, and in countries other than Europe. The interaction coefficient of interest is negative, statistically more precise, and larger in magnitude. This is consistent with the costs of information and re-location being higher for those who live further away. The similarity in the magnitudes of the estimates for these three groups is likely due to the fact that they were all living in the eastern parts of the U.S. when deciding on whether to move to the West (Europeans mostly entered the U.S. via Ellis Island and the Canadian population was concentrated in its eastern provinces at this time).

The findings show that the only group of white workers who benefited from the departure of the Chinese were white men born in the West who worked in mining. That most of the negative effects are borne by white labor from outside of the West supports the presence of migration costs. Together, these results show that without the Chinese Exclusion Act, more white men would have moved to the counties where the Chinese lived. Because of the Act, they stayed in the eastern parts of the U.S.

Migration costs include the costs of information as well as transportation. In our context, information costs are particularly large because of the differences in climate and geography between the West and other parts of North America. During this period, workers often looked for similar climates when migrating (Steckel, 1983; Obolensky et al., 2024) because of the relevance of climate-specific human capital for production and because migrants may have valued climate similarity as an amenity.

We investigate the importance of "climate distance", our proxy for information costs, by estimating the heterogeneous effect of the Chinese Exclusion Act. Table 9 presents the baseline estimates with the addition of the triple interaction of post-1880, 1880 Chinese population share, and a measure of distance between a county's climate and the average climate in counties outside of the U.S. West.[23] The triple interaction coefficients are all negative and statistically significant at the 1% level for white, non-Chinese and European foreign-born, and native born out-of-state labor supply (columns 2, 3, 4, and 5). They are

[23] This analysis builds on Obolensky et al. (2024), who show that climate distance, measured as the absolute value of the origin-destination difference in yearly average temperature (computed over the 1895-1920 period), reduces both domestic and international migration to the U.S. See Appendix C for more details on the variable construction and the data sources.

statistically zero for Chinese workers (column 1) and white workers born in the same state as the current state of residence (column 6). The latter null results most likely reflect the fact that Chinese workers and white workers born in the West were less sensitive to climate distance from the eastern states.[24] These results suggests that the difference in climate between the West and the eastern parts of the U.S. made it harder to replace the lost Chinese with workers from eastern U.S..

Columns (7) and (8) examine total manufacturing output and the number of establishments. The triple interaction estimates are negative and statistically significant.

6.2 Worker Complementarity

The finding that the departure of Chinese workers is accompanied by the departure of white workers is consistent with the presence worker complementarities. We do not have individual data to examine complementarities within the firm. Instead, we conduct a cruder examination and ask whether the departure of skilled Chinese workers was accompanied by the departure of skilled white workers. This would be consistent with the complementarity of skilled Chinese and white workers.[25]

We estimate a specification similar to the baseline with the addition of the triple interaction of the post dummy, a dummy for counties with high Chinese population share in 1880, and the share of the county's Chinese workers who are skilled in 1880. The logic is similar to our baseline. If a county had no skilled Chinese workers to begin with, then it cannot lose any skilled Chinese workers.[26] We include the lower order interaction term of the share of skilled workers and a post 1880 dummy variable. The interaction of Chinese population share and Chinese skilled population is absorbed by the county fixed effects.

Table 10 presents the results. The outcome variable of interest is the log number of literate workers. On the left-hand side, we measure skill with literacy instead of the occupation-based skill measures because the latter are endogenous. On the right-hand side, the triple interaction uses the occupational based measure of "skill" measured in 1880 to have more variation. Endogeneity is not a problem since we use the pre-Act measure.

Columns (1) and (2) examine the log number of literate Chinese workers in all sectors

[24]Note that Chinese workers in treatment counties were mostly leaving the U.S.

[25]Complementarities can occur within and across firms, and across sectors. To see the latter, consider that many Chinese worked in sectors with positive spillovers sectors, such as transportation, energy, manufacturing and services. Our county-level analysis will capture all of these complementarities.

[26]Note that an alternative right-hand-side variable would be the number of skilled Chinese workers lost due to the Act (which we presented earlier). We do not use this because it is an outcome of the Act.

and in manufacturing. Both triple coefficients are negative. This is partly mechanical. Columns (3)-(5) examine white workers. The triple interaction estimates are negative for the total number of workers, the number of all literate workers and the number of literate workers in manufacturing. The estimates are statistically significant at the 1% level. The results imply that counties with more skilled Chinese workers in 1880 lost more skilled Chinese and skilled white workers after the Act.

To assess the magnitude, note that 3% of Chinese workers are skilled in 1880 on average. This implies that treated counties with the average share of skilled Chinese workers in 1880 lost 38% ($e^{(-15.76\times0.03)} - 1 = -0.38$) more white workers in total and 37% ($e^{(-15.36\times0.03)} - 1 = -0.37$) more literate white workers than treated counties with no skilled Chinese workers in 1880.[27]

Columns (6) and (7) examine manufacturing output and the number of establishments. The triple interaction coefficient is negative and statistically significant for both measures. This indicates that Chinese Exclusion reduced manufacturing more in counties that had a higher share of skilled Chinese before the Act.

The results show that places that lost more skilled Chinese workers also experienced a larger decline in skilled white workers and manufacturing output. The results are consistent with the presence of complementarities between skilled Chinese and skilled white workers. But as there are also other possible explanations, we cautiously interpret them as merely suggestive.

6.3 Local Consumption and Tradable Goods

In principle, the main results are driven by the decline in local consumption caused by the departure of the Chinese after the Exclusion Act. In practice, several pieces of narrative and empirical evidence go against the direct consumption channel playing an important role in our findings. First, historical accounts indicate that Chinese workers consumed much less than other workers because they sent a large share of their earnings as remittances back to China (Chang, 2019; Chang and Fishkin, 2019). Second, the main results show that the Act had large negative effects on labor supply in sectors that produce regionally, nationally, and even internationally traded goods, such as manufacturing and mining. In contrast, for agriculture, which is more likely to be consumed locally, we find a smaller and less precise effect of white labor supply. Finally, we find that the estimates

[27] Appendix Table A.10 examines white labor for each sector. The triple interaction is negative and statistically significant at the 1% level for all sectors for which the baseline estimate in Table 3 was statistically significant.

between the tradable sectors are similar to those from the full sample (see Appendix Table A.11 and Appendix Section D).

7 Conclusion

The findings of this paper show that the Chinese Exclusion Act of 1882 dampened economic development in the American West until at least 1940. The departure of the Chinese caused many prospective migrants to remain in the eastern states. Contrary to expectations, the Act did not benefit white and U.S.-born workers. The rationale behind the Act focused on economic competition between Chinese and U.S.-born workers. But the empirical results of our study show that such competition was less important than the positive economic spillovers generated by Chinese workers.

Our results open the door to several interesting questions for future research. The first one is about the mechanisms underlying the negative impact of Chinese exclusion. Our estimates shed some light, but more granular data are needed to make further progress. Detailed and disaggregated data on production would be particularly valuable for this pursuit. A second question regards the Chinese who left the U.S. after 1882. In post-WWII Europe, Becker et al. (2020) finds that Poles who were forced to leave Eastern Europe shifted their preferences from material possessions to mobile capital and invested more in education. The displacement of Chinese workers in the 19th century could have had similar effects on subsequent generations. Finally, it is interesting to investigate how the exclusion of the Chinese from the U.S. affected other countries in the Americas, to which many Chinese moved after 1882. The pattern of the Chinese arriving to work in relatively unpopulated areas and facing hostility from the non-Chinese population was repeated in varying degrees. For example, Canada banned Chinese immigrants with the 1923 Chinese Immigration Act. In Mexico, the government initially welcomed the Chinese to work in its northern border areas in the late 19th century. But attitudes became hostile as the Chinese population grew and mass deportations and expulsions in the 1930s significantly reduced the population size.[28] In other Latin American countries, many Chinese arriving from the U.S. after 1882 faced discrimination, but Chinese immigration was not banned.[29] More research is needed to understand the economic consequences of Chinese migration in the Americas.

[28] See Delgado (2013) and Romero (2010).

[29] See, for example, Hwang (2013) and Hu-DeHart and López (2008) for a discussion of the history of Asian immigration to Latin America.

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Table 1: Summary Statistics: Chinese Population and Labor Force

	I. All Counties			**II. 1880 Chinese Share ≥ Median**			**III. 1880 Chinese Share < Median**		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
A. All Individuals									
% Chinese (amongst county population)	289	6.63	8.03	144	11.87	8.55	145	1.42	1.23
using race definition only	289	6.61	8.02	144	11.85	8.54	145	1.41	1.22
using country of origin definition only	289	6.42	7.95	144	11.55	8.56	145	1.33	1.15
% Chinese (amongst all immigrants)	289	21.39	18.24	144	35.01	15.23	145	7.86	8.08
Avg. Age of Chinese population	264	31.68	4.56	144	32.80	3.86	120	30.33	4.96
% Male (amongst Chinese population)	264	95.99	5.99	144	95.94	5.44	120	96.06	6.61
% Male Age 15-64 (amongst Chinese population)	264	93.63	8.44	144	93.77	7.02	120	93.47	9.91
B. Chinese (Males 15-64) Labor Supply									
% Chinese (as a share of all workers)	289	12.05	12.14	144	20.91	11.42	145	3.25	2.96
% Chinese Literate Workers (as a share of all literate workers)	289	10.30	11.14	144	18.04	11.01	145	2.61	2.86
C. Industry Amongst (%Chinese as a share of all workers in sector)									
Personal services	279	50.09	25.63	141	63.01	16.20	138	36.88	26.78
Entertainment and Recreation Services	170	21.87	33.89	104	33.58	37.01	66	3.41	15.81
Mining	256	25.45	29.49	141	35.53	31.80	115	13.09	20.60
Transportation, Communication, and Other Utilities	281	8.21	19.22	144	12.29	24.35	137	3.93	10.07
Manufacturing	279	5.78	11.87	143	9.47	15.08	136	1.90	4.63
Wholesale and Retail Trade	284	5.15	8.65	143	9.04	10.47	141	1.21	2.98
Agriculture, Forestry, and Fishing	289	2.73	6.35	144	4.76	8.42	145	0.71	1.41
Professional and Related Services	275	1.90	6.86	141	3.41	9.32	134	0.31	0.85
Construction	278	0.74	4.01	143	1.40	5.51	135	0.05	0.33
Business and Repair Services	275	1.03	6.91	142	1.78	9.52	133	0.23	1.04
Finance, Insurance, and Real Estate	177	0.38	2.71	98	0.67	3.63	79	0.02	0.19
Public Administration	272	0.17	1.32	137	0.15	0.82	135	0.20	1.69
D. Occupation (% Chinese as a share of all workers)									
Skilled	289	2.78	5.37	144	5.06	6.81	145	0.53	1.16
Unskilled	289	23.20	19.15	144	37.40	16.15	145	9.11	8.56
Managers	287	4.60	7.92	143	8.26	9.77	144	0.97	1.98
Income Score for Chinese	264	19.42	3.51	143	20.53	2.66	120	18.09	3.93

Notes: Observations are at the county and year level. The data are from U.S. Census of 1880. Panel C row lables are occupation categories in the census. Panel D are defined based on individuals' reported occupation following Katz and Margo (2014). Skilled workers include: professionals, managers, craftsmen, clerical and sales occupations. Unskilled occupations include: operatives, laborers, and service workers (both private household and non-household). These groups omit workers employed in agriculture. The definition of managers follows the IPUMS classification of the occ1950 variable.

Table 2: Effect on Chinese Labor

	Dependent Variable: Log (# of individuals + 1)													
		Labor Supply (males age 15-64) by Sector												
	Tot. Pop.	All Workers	Personal services	Entertainment, Recreation	Mining	Manufacturing	Wholesale, Retail Trade	Transportation, Communica-tion	Agriculture, Forestry, Fishing	Professional Services	Construction	Business, Repair Services	Finance, Insurance, Real Estate	Public Admin.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Post x High Chinese Share	-0.92	-1.03	-0.36	-0.30	-0.90	-0.16	-0.45	-0.17	-0.04	-0.16	-0.07	-0.06	-0.00	0.02
	(0.18)	(0.17)	(0.11)	(0.06)	(0.13)	(0.09)	(0.15)	(0.07)	(0.12)	(0.07)	(0.05)	(0.04)	(0.04)	-0.03
Conley SE	[0.14]	[0.13]	[0.09]	[0.05]	[0.13]	[0.07]	[0.09]	[0.08]	[0.07]	[0.04]	[0.03]	[0.02]	[0.02]	[0.02]
Obs.	2,688	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401
Chinese Industry Share			0.615	0.363	0.338	0.186	0.117	0.112	0.0739	0.0295	0.0168	0.00887	0.00633	0.00295
Dep. Var. mean (sample)	204.2	131.7	30.37	1.185	24.59	11.47	20.99	3.539	18.45	1.356	0.890	0.260	0.354	0.351
– in 1880	357.9	318	72.55	3.024	75.71	35.02	20.67	13.94	38.76	1.464	1.332	0.339	0.0865	0.128

Notes: Observations are at the county and year level. The columns are organized by the share of Chinese workers in the industry in 1880, which is stated at the bottom of the table. Dependent variable means are also presented at the bottom of the table. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses. Conley (1999) standard errors with 100km cutoffs are shown in square brackets.

Table 3: Effect on White Labor

	Dependent Variable: Log (# of individuals + 1)													
		Labor Supply (males age 15-64) by Sector												
	Tot. Pop.	All Workers	Personal services	Entertainment, Recreation	Mining	Manufacturing	Wholesale, Retail Trade	Transportation, Communica-tion	Agriculture, Forestry, Fishing	Professional Services	Construction	Business, Repair Services	Finance, Insurance, Real Estate	Public Admin.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Post x High Chinese Share	-0.24	-0.34	-0.31	-0.46	-0.48	-0.27	-0.45	-0.43	-0.20	-0.26	-0.37	-0.37	-0.44	-0.10
	(0.13)	(0.14)	(0.13)	(0.13)	(0.19)	(0.16)	(0.15)	(0.15)	(0.13)	(0.13)	(0.13)	(0.13)	(0.15)	(0.13)
Conley SE	[0.11]	[0.10]	[0.08]	[0.08]	[0.12]	[0.10]	[0.09]	[0.10]	[0.11]	[0.08]	[0.09]	[0.08]	[0.08]	[0.10]
Obs.	2,689	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401
Chinese Industry Share			0.615	0.363	0.338	0.186	0.117	0.112	0.0739	0.0295	0.0168	0.00887	0.00633	0.00295
Dep. Var. Mean (Sample)	14,891	5,179	171.2	57.86	268.4	892.3	703.2	529.9	1,151	180.8	468	127.9	133.9	179.8
– in 1880	4,126	1,503	41.93	5.232	147.7	153.2	155	109.1	483.3	48.09	77.40	37.66	13.54	43.16

Notes: Observations are at the county and year level. The columns are organized by the share of Chinese workers in the industry in 1880, which is stated at the bottom of the table. Dependent variable means are also presented at the bottom of the table. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses. Conley (1999) standard errors with 100km cutoffs are shown in square brackets.

Table 4: Effects on Skill Composition

	Dependent Variables									
	Chinese					White				
	Log(# Literate+1) (1)	Log (# Skilled+1) (2)	Log (# Managers+1) (3)	Income Score (4)	% Urban (5)	Log(# Literate+1) (6)	Log (# Skilled+1) (7)	Log (# Managers+1) (8)	Income Score (9)	% Urban (10)
Post x High Chinese Share	-1.06	-0.56	-0.40	-0.17	-12.29	-0.28	-0.39	-0.39	-0.04	-4.32
	(0.15)	(0.14)	(0.13)	(0.03)	(3.77)	(0.12)	(0.14)	(0.14)	(0.01)	(2.44)
Conley SE, 100 km cutoff	[0.13]	[0.09]	[0.08]	[0.03]	[2.98]	[0.11]	[0.10]	[0.09]	[0.01]	[1.46]
Obs.	2,401	2,401	2,401	1,708	1,773	2,401	2,401	2,401	2,398	2,401
Dependent Variable Mean	76.95	20.94	9.881	20.09	24.42	95.10	2,169	471.7	20.78	13.06
– in 1880	72.48	28.28	10.08	19.36	4.20	93.91	443.3	111.9	19.89	4.17

Notes: Observations are at the county and year level. Dependent variable means are presented at the bottom of the table. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses. Conley (1999) standard errors with 100km cutoffs are shown in square brackets.

Table 5: Effect on Manufacturing

	Dependent Variable			
	Log (Output)	Log (Output per Worker)	Log (# Firms)	# Firms (Poisson)
	(1)	(2)	(3)	(4)
Post x High Chinese Share	-0.97	-0.10	-0.78	-1.16
	(0.38)	(0.12)	(0.25)	(0.62)
Conley SE	[0.22]	[0.09]	[0.15]	[0.66]
Obs.	744	672	768	768
Dep. Var. Mean (sample)	262,616	95	122.7	122.7
– in 1880	36,678	79.79	71.76	71.76

Notes: Observations are at the county and year level. Dependent variable data are from the Historical, Demographic, Economic, and Social Data (ICPSR 2896), values for columns (1) and (2) are in 2020 USD. The dependent variables are the log of the stated variable +1, except for column (4). Means are reported at the bottom of the table. Means of columns (1) and (2) are expressed in thousands of 2020 USD. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses. Conley (1999) standard errors with 100km cutoffs are shown in square brackets.

Table 6: Reallocation – Proximity defined as Adjacent Counties

	Dependent Variable: Log (X + 1)				
	Chinese Labor (1)	White Labor (2)	Total Labor (3)	Total Output (4)	# Firms (5)
	A. Full Sample				
Post x High Chinese Share	-0.70	-0.26	-0.36	-0.96	-0.77
	(0.23)	(0.16)	(0.16)	(0.41)	(0.25)
Post x HCS in Border Counties	-0.68	-0.11	-0.15	-0.03	-0.07
	(0.24)	(0.17)	(0.17)	(0.39)	(0.25)
Obs.	2,380	2,380	2,380	736	760
Dep. Var. Mean (sample)	105.6	4,804	5,106	224,545	98.30
– in 1880	256.5	1,274	1,542	14,392	41.24
	B. Counties with Chinese Share < Sample Median				
Post x HCS in Border Counties	-0.59	-0.20	-0.24	-0.03	0.01
	(0.24)	(0.20)	(0.20)	(0.41)	(0.32)
Obs.	1,154	1,154	1,154	368	368
Dep. Var. Mean (sample)	41.71	5,564	5,851	261,255	117.6
– in 1880	50.15	851.5	908.2	7,414	32.07
	C. Counties with Urban Share > 25%				
Post x HCS in Border Counties	0.18	-0.47	-0.47	-0.82	-0.61
	(0.60)	(0.59)	(0.59)	(0.89)	(0.77)
Obs.	195	195	195	136	136
Dep. Var. Mean (sample)	536.8	22,596	24,290	684,072	297.2
– in 1880	1125	4,799	5,983	46,259	100.5
	D. Counties with Chinese Share > 75th Percentile in 1940				
Post x HCS in Border Counties	-1.55	-0.83	-0.86	-1.05	-0.85
	(0.33)	(0.32)	(0.33)	(0.61)	(0.44)
Obs.	603	603	603	344	336
Dep. Var. Mean (sample)	309.4	11,354	12,222	354,057	146.8
– in 1880	730.4	3,029	3,789	23,550	61.76

Notes: Observations are at the county and year level. HCS Border Counties is a dummy variable taking value 1 if the average Chinese shares in neighboring counties is higher than the median share of Chinese in Western counties. Dependent variable means are presented at the bottom of the table. Means of column (4) are expressed in thousands of 2020 USD. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Table 7: Placebo Sample

	Dependent Variable: Log (X + 1)					
	Chinese Labor	White Labor	Total Labor	European Immigrant Labor	Output	# Firms
	(1)	(2)	(3)	(4)	(5)	(6)
	A. Western States (Main Sample)					
Post x High Predicted Chinese Share	-1.06	-0.59	-0.68	-0.6	-1.37	-0.85
	(0.17)	(0.13)	(0.13)	(0.14)	(0.34)	(0.23)
Obs.	2,394	2,394	2,394	2,394	744	768
Dependent Variable Mean	131.7	5,179	5,516	1,021	262,616	122.7
– in 1880	318	1,503	1,834	524.9	36,678	71.76
	B. All Other States (Placebo Sample)					
Post x High Predicted Chinese Share	0.23	0.06	0.12	0.18	0.23	0.24
	(0.04)	(0.04)	(0.04)	(0.07)	(0.10)	(0.05)
Obs.	23,335	23,335	23,335	23,335	12,224	13,584
Dependent Variable Mean	4.527	6,496	7,224	1,200	276,195	141.7
– in 1880	1.615	4,186	4,745	902.9	88,349	136.7
	C. Midwestern States (Placebo Sample)					
Post x High Predicted Chinese Share	0.48	0.44	0.44	0.58	0.58	0.47
	(0.10)	(0.09)	(0.09)	(0.13)	(0.17)	(0.08)
Obs.	8,702	8,702	8,702	8,702	4,560	5,032
Dependent Variable Mean	2.713	6,741	6,937	1,268	288,598	131.5
– in 1880	0.891	4,481	4,582	1,142	68,767	128.3
	D. Northeastern States (Placebo Sample)					
Post x High Predicted Chinese Share	0.78	0.07	0.08	0.34	-0.05	0.22
	(0.17)	(0.13)	(0.13)	(0.19)	(0.15)	(0.12)
Obs.	1,953	1,953	1,953	1,953	1,640	1,704
Dependent Variable Mean	32.57	27,435	28,214	7,695	1,018,644	546.1
– in 1880	7.143	17,995	18,302	4,749	414,652	528.7
	E. Southern States (Placebo Sample)					
Post x High Predicted Chinese Share	0.16	-0.07	0.03	0.04	0.11	0.14
	(0.04)	(0.05)	(0.05)	(0.09)	(0.15)	(0.06)
Obs.	11,682	11,682	11,682	11,682	5,888	6,688
Dependent Variable Mean	1.172	3,147	4,319	133.3	64,136	48.87
– in 1880	0.650	1,943	2,953	133.6	14,521	45.79

Notes: Observations are at the county and year level. The independent variable uses the predicted shares of Chinese population in each county based on controls selected by LASSO, please refer to text for the list of selected variables. The dummy variable "High Predicted Chinese Share" takes value 1 if the predicted share is higher than the median predicted share for the Western sample. Dependent variable means are presented at the bottom of the table. Means of column (5) are expressed in thousands of 2020 USD. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Table 8: Effect on White Labor – By Birth Place

	Dependent Variable: Log (of individuals + 1)										
	Labor Supply (males age 15-64) by Sector										
	Total	Personal services	Entertainment, Recreation	Mining	Manufacturing	Wholesale, Retail Trade	Transportation, Communica-tion	Professional Services	Construction	Business, Repair Services	Finance, Insurance, Real Estate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	A. Born in the Same State										
Post x High Chinese Share	0.09	0.03	-0.13	0.34	-0.08	-0.06	-0.12	-0.19	-0.12	-0.10	-0.23
	(0.11)	(0.11)	(0.10)	(0.15)	(0.14)	(0.12)	(0.13)	(0.11)	(0.11)	(0.11)	(0.12)
Obs.	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401
Dependent Variable Mean	1,030	25.11	11.17	31.07	188.3	148.7	99.28	36.18	83.22	28.63	29.64
– in 1880	156	3.149	0.540	6.125	15.30	15.78	8.709	3.426	4.287	3.907	1.076
	B. Born in other States in the West										
Post x High Chinese Share	-0.04	0.03	-0.08	0.37	-0.08	-0.09	-0.10	-0.04	-0.04	-0.06	-0.11
	(0.10)	(0.11)	(0.09)	(0.14)	(0.15)	(0.13)	(0.13)	(0.11)	(0.11)	(0.10)	(0.11)
Obs.	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401
Dependent Variable Mean	248.6	7.027	3.490	10.26	49.98	35.17	24.89	9.268	22.87	7.253	6.319
– in 1880	22.30	0.474	0.111	1.464	2.059	2.042	1.640	0.471	0.502	0.453	0.0588
	C. Born in other States outside of the West										
Post x High Chinese Share	-0.41	-0.43	-0.55	-0.44	-0.34	-0.57	-0.48	-0.32	-0.47	-0.48	-0.51
	(0.16)	(0.14)	(0.14)	(0.19)	(0.17)	(0.16)	(0.16)	(0.14)	(0.14)	(0.14)	(0.16)
Observations	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401
Dependent Variable Mean	2,588	83.31	32.58	125.3	423.6	349.6	257.2	106.6	252.3	69.72	77.41
– in 1880	698.2	14.28	2.256	58.06	61.11	59.48	51.57	31.83	43.12	18.04	7.696
	D. Born in Europe										
Post x High Chinese Share	-0.39	-0.34	-0.27	-0.46	-0.18	-0.45	-0.34	-0.31	-0.23	-0.38	-0.24
	(0.14)	(0.13)	(0.11)	(0.18)	(0.18)	(0.15)	(0.16)	(0.12)	(0.13)	(0.12)	(0.13)
Obs.	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401
Dependent Variable Mean	1,021	45.99	7.867	81.36	182	137.7	109.6	21.54	84.10	16.66	14.98
– in 1880	524.9	21.27	1.990	68.91	62.10	70.78	40.91	10.36	23.23	11.77	4.163
	E. Born outside of the U.S. and Europe (i.e., Canada)										
Post x High Chinese Share	-0.61	-0.35	-0.27	-0.23	-0.35	-0.51	-0.60	-0.20	-0.43	-0.25	-0.16
	(0.15)	(0.12)	(0.09)	(0.14)	(0.16)	(0.14)	(0.16)	(0.11)	(0.13)	(0.11)	(0.11)
Obs.	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401	2,401
Dependent Variable Mean	395	23.74	3.531	21.37	55.75	44.13	47.81	8.797	27	6.125	6.837
– in 1880	104.3	3.194	0.318	13.32	12.81	7.073	6.592	2.021	6.325	3.433	0.460

Notes: Observations are at the county and year level. The columns are organized by the share of Chinese workers in the industry in 1880. Dependent variable means are also presented at the bottom of the table. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Table 9: Heterogeneous Effects - Climate Distance

	Dependent Variables: Log (X + 1)							
	Labor Supply						Manufacturing	
	Chinese Labor	White Labor	All Non-Chinese Immigrants Labor	European Immigrants Labor	White Born Out-of-State Labor	White Born in-State Labor	Output	# Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post x High Chinese Share	-1.04	-0.33	-0.48	-0.38	-0.38	-0.00	-1.01	-0.84
	(0.17)	(0.13)	(0.14)	(0.14)	(0.15)	(0.10)	(0.42)	(0.26)
Post x High Chinese Share x Climate Distance (std)	-0.22	-0.45	-0.36	-0.33	-0.45	-0.09	-0.39	-0.28
	(0.17)	(0.13)	(0.14)	(0.14)	(0.14)	(0.10)	(0.47)	(0.31)
Obs.	2,396	2,396	2,396	2,396	2,396	2,396	744	768
Dependent Variable Mean	132	5,190	1,419	1,023	2,901	1,087	262,616	122.7
– in 1880	319.1	1,508	631.3	526.7	732.7	160.7	36,678	71.76

Notes: Observations are at the county and year level. Climate Distance is an index, standardized to have zero mean and standard deviation equal to one, of average predicted climate distance induced migration between a county and all other counties outside of the U.S. West. Climate distance is defined as the distance between the average temperature in a county and the average temperature in counties outside of the U.S. West. See Section 6.1 and Appendix C for more details. Dependent variable means are presented at the bottom of the table. Means of column (7) are expressed in thousands of 2020 USD. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Table 10: Heterogeneous Effects - Skilled Chinese Labor

	Dependent Variables: Log (X + 1)						
	Chinese Labor		White Labor			Manufacturing	
	# Literate	# Literate in Manufacutring	# Total	# Literate	# Literate in Manufacutring	Total Output	# Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post x High Chinese Share	-0.69	0.00	0.16	0.23	0.19	0.02	-0.19
	(0.16)	(0.09)	(0.16)	(0.14)	(0.16)	(0.46)	(0.26)
Post x High Chinese Share x 1880 Share of Skilled Chinese	-13.36	-5.95	-15.76	-15.36	-15.26	-31.05	-18.07
	(4.88)	(3.30)	(4.47)	(3.79)	(3.73)	(9.09)	(5.69)
Observations	2,223	2,223	2,223	2,223	2,223	736	760
Dependent Variable Mean	107.6	10.11	5,459	3,818	645.4	262,107	123.1
– in 1880	270	33.04	1,636	1,528	159.6	37,072	72.46

Notes: Observations are at the county and year level. 1880 Share of Skilled Chinese is the number of skilled Chinese workers (professionals, managers, craftsmen, clerical and sales occupations) as a fraction of all Chinese workers in 1880. Dependent variable means are presented at the bottom of the table. Means of column (6) are expressed in thousands of 2020 USD. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Figure 1: Spatial Distribution of Chinese in 1880

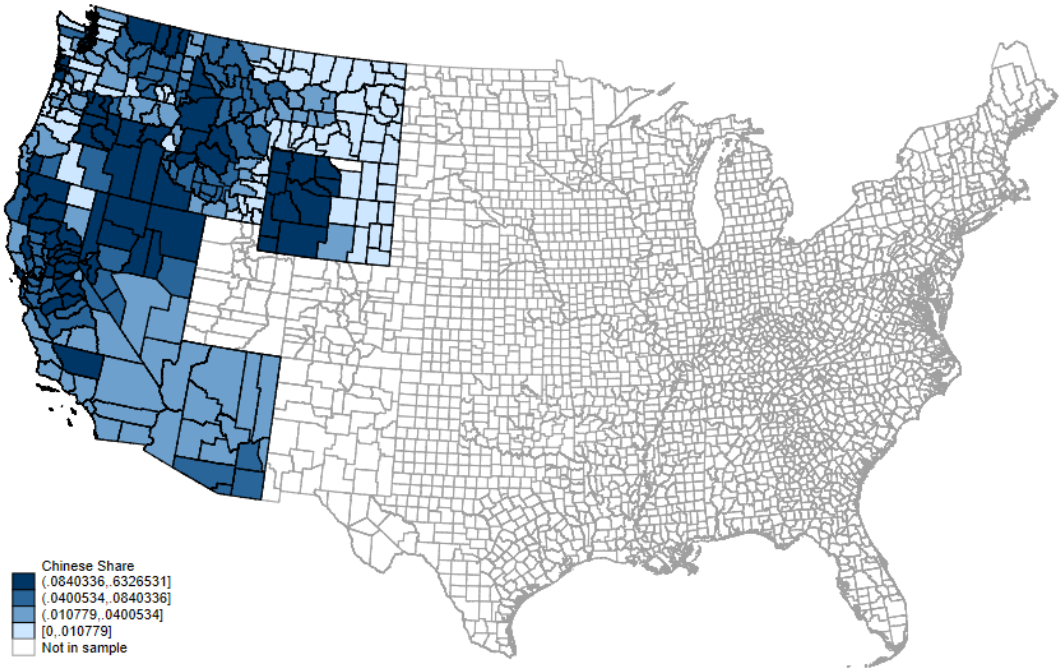
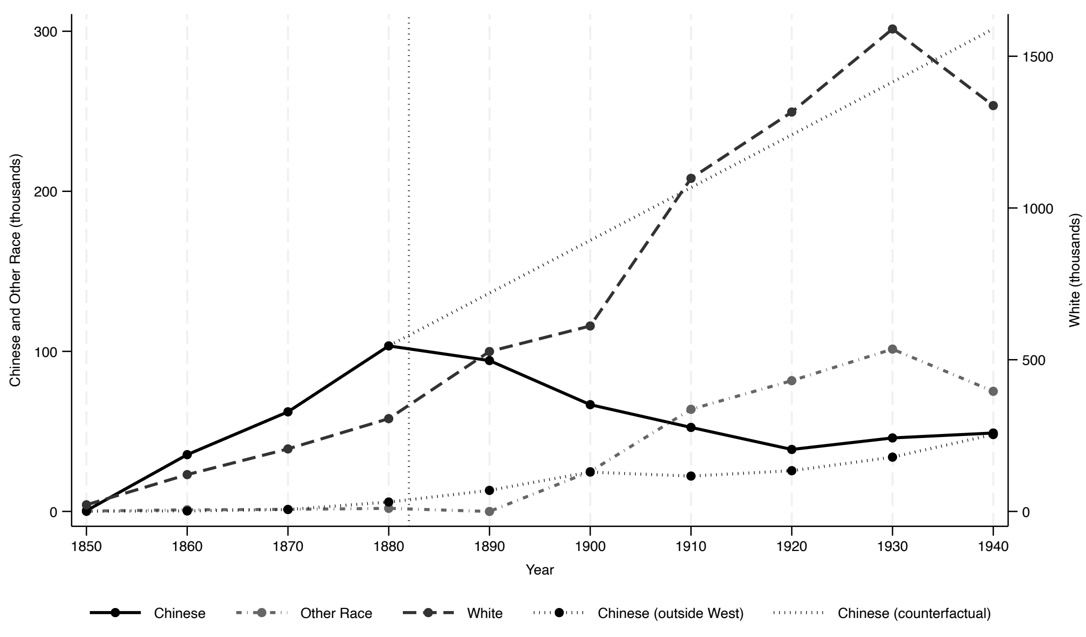


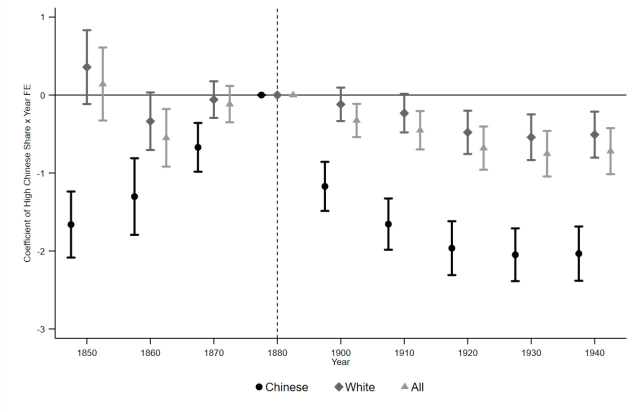
Figure 2: Immigrant Population over Time



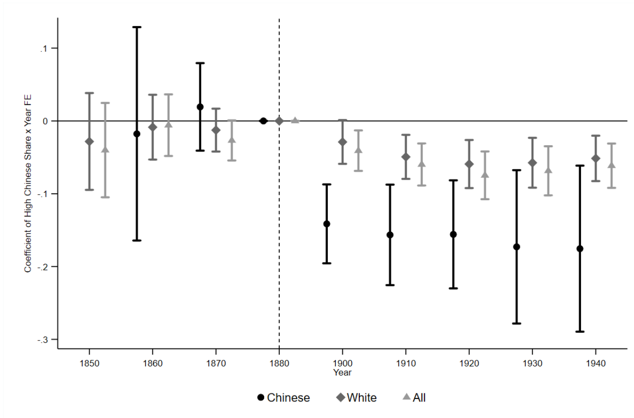
Notes: Main sample includes Arizona, California, Idaho, Montana, Nevada, Oregon, Washington, and Wyoming. See Appendix Figure 1 for a map. The data are from the U.S. Population Census.

Figure 3: Dynamic Estimates

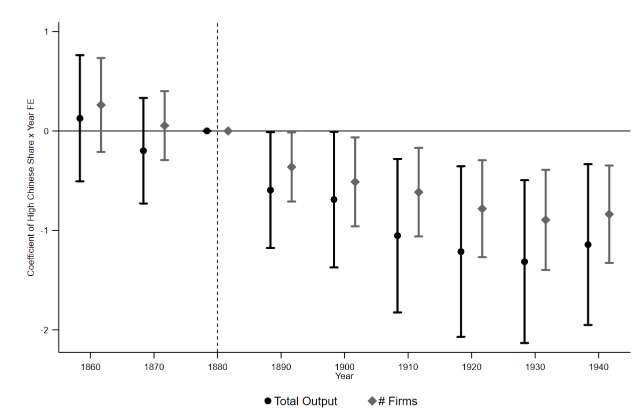
(a) Labor



(b) Occupational Income Score



(c) Manufacturing



Notes: The figure plots the interaction coefficients from equation (2). See Appendix Table A.4 for the coefficients and standard errors.

Appendix

A Summary Statistics

Appendix Table A.1 presents the descriptive statistics for the main variables of our analysis in 1880. Panel I includes all counties in the sample. Mean county population and urban population share are 4,528 and 4%. The West was relatively sparsely populated. (For comparison, note that in the eastern states that are not in our sample or the tables, average county population in 1880 is 18,186 and average urban population share is 7%.) 27% of the population in the average county in our sample are immigrants. The racial composition for the average county is: 92.1% white, 6.6% Chinese, and 1.3% others.

Section B shows that, on average, there are 1,834 working-age men in the labor force in a county, 92% of whom are literate.

Section C presents the share of working-age men in the labor force in each 1-digit sector, where the sectors are ordered by the share of Chinese workers shown in Table 1.

Section D shows that the average share of workers holding skilled, unskilled, and managerial occupations is 18%, 43% and 5%, respectively.

Section E indicates that, on average, a county has been connected to the railroad network for almost three years as of 1882. 98% of the counties had at least one mine in the period 1840–1882. The average manufacturing output is 12,751,000 (2020 USD) and the average number of establishments is 27.

In Panels II and III, we divide the sample into counties with 1880 Chinese population share above and below the median, respectively. On average, Chinese constitute 12% and 1.4% of the county population in what are the treatment and control counties in the analysis. Counties with a large Chinese share on average have larger populations, are more urbanized, have more immigrants, larger labor forces, a higher share of the labor force working in mining, a larger share of unskilled workers, have been connected to the railroad for longer, have higher manufacturing output, and have more establishments. The larger mining employment shares and the earlier connection to the railroad network in counties with a higher share of Chinese population is consistent with the fact that the first waves of Chinese immigrants came to work in mines and on the construction of railroads. These patterns motivate the controls in our regression analysis.

B Manufacturing Data

The manufacturing outcomes are not available for all counties in every decade. We first restrict our sample to counties with non-missing data for the number of manufacturing establishments. We then take several steps to address data inconsistencies. First, we exclude any observation where the number of establishments is zero but where output is positive, or where the labor force is zero but output or the number of establishments are not. Second, if a county has only one observation with manufacturing output equal to zero, but output is positive both ten years before and ten years after, we impute the output by linearly interpolating between the previous and following decades. Finally, we restrict the sample to a balanced panel of counties where the outcomes examined are non-missing in every decade from 1860 to 1940. There are no data on the number of manufacturing establishments for 1850. The results (not shown for brevity) are very similar when we do not impose the restrictions described above. They are available upon request.

C Climate Distance

Section 6.1 examines whether the effects of the Chinese Exclusion Act are larger in western counties that are climatically more distant from the relatively eastern areas of the U.S. To measure climate distance to the "non-West", we use data on (1) the distance (i.e, the absolute value of the difference) in temperature between a destination county in the West and counties outside of the West; and (2) the elasticity of migration with respect to the distance in temperature. These build on Obolensky et al. (2024).

We proceed in several steps. We focus on the distance in average temperature because Obolensky et al. (2024) show that this is the climate statistic that has the strongest and most robust impact on migration.

First, as in Obolensky et al. (2024), we define the temperature distance between a western county (county c) in our sample and a county outside our sample (county $-w$), $CD_{c,-w}$, as the absolute value of the difference in average yearly temperature (1895 to 1920) in the two counties.[30]

$$CD_{c,-w} = |\frac{1}{25}\left[\Sigma_{1895}^{1920} temp_c - \Sigma_{1895}^{1920} temp_{-w}\right]|. \tag{3}$$

[30]Data prior to 1895 are not available at a sufficiently fine resolution. Note that the turn of the 20th century was not characterized by large shifts in climate, and the climate between 1850 and 1900 was rather similar to that prevailing in the subsequent two decades.

Second, to obtain the implied number of migrants between each western county and each county in the "non-West", we interact the origin-destination pair in temperature distance with the elasticity of migration with respect to climate distance estimated in Obolensky et al. (2024) over the 1850-1940 period. This is -0.235. Third, we derive the weighed average climate-distance induced migration summing across all counties in the non-West, using 1880 population as weights:

$$\overline{CD_c} = \sum_{-w}(pop_{-w}^{1880} \times CD_{c,-w} \times -0.235). \tag{4}$$

Finally, we standardize $\overline{CD_c}$ to have mean equals to zero and standard deviation equals to one, and we multiply by -1 so that higher values reflect higher (climate) distance. In the analysis, we use this normalized measure.

Intuitively, the climate distance index is the weighed average of the climate-induced migration for each county in our sample, with weights equal to 1880 non-western county population. Similar in spirit to the market access measure from Donaldson and Hornbeck (2016), the index takes on higher values for western counties that are climatically more distant to (non-western) counties with a large population, which captures the size of the prospective migrant population who could have moved to the U.S. West to replace Chinese workers.

D Tradable Sectors

We systematically explore the differential effects on Chinese, white, and total labor supply, as well as on manufacturing output, productivity, and number of establishments, depending on the 1880 share of the labor force in tradable industries. In absence of a readily available classification of tradable and non-tradable industries in this historical period, we employed ChatGPT-4 to identify such sectors. We then review the output and manually enhanced the classification where necessary. Appendix Table A.11 Panel A presents the full sample estimates. Panel B presents estimates for counties with share in tradable industries above the sample median. The estimates are very similar in magnitude in the two panels and statistically indistinguishable. This suggests that the main results are driven by sectors that produce traded goods and goes against the direct consumption channel being an important driver of the results.

Table A.1: Summary Statistics: Population, Labor Force, and Economic Outcomes

	I. All Counties			II. 1880 Chinese Share ≥ Median			III. 1880 Chinese Share < Median		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
A. Population in 1880									
Total Population	289	4,528.27	14,901.23	144	6,505.12	20,559.90	145	2,565.05	4,065.78
% Urban Share	289	4.12	13.94	144	6.47	18.14	145	1.79	7.14
% Immigrant Share	289	27.38	11.60	144	33.27	11.41	145	21.54	8.41
% Non-Chinese Immigrant Share	289	20.92	8.55	144	21.65	8.64	145	20.19	8.42
Avg. Age	289	25.79	2.50	144	26.80	2.52	145	24.79	2.05
% Male Share	289	67.34	8.20	144	68.72	7.20	145	65.97	8.90
% Chinese Share	289	6.63	8.03	144	11.87	8.55	145	1.42	1.23
% White Share	289	92.07	8.50	144	86.88	8.89	145	97.22	3.50
% Black	289	0.69	1.22	144	0.62	1.23	145	0.77	1.20
% Other Races	289	0.61	2.51	144	0.63	1.99	145	0.59	2.94
B. Males 15-64 Labor Supply									
Total Labor Force	289	1,834.04	5,659.39	144	2,770.54	7,812.82	145	904.00	1,301.25
% Share Literate	289	0.92	0.07	144	0.91	0.07	145	0.92	0.07
C. Industry Amongst (% of LF in Industry)									
Personal services	289	3.82	2.30	144	4.65	2.41	145	3.00	1.86
Entertainment and Recreation Services	289	0.28	0.45	144	0.38	0.51	145	0.17	0.34
Mining	289	14.39	16.84	144	21.94	19.18	145	6.90	9.39
Transportation, Communication, and Other Utilities	289	6.48	5.89	144	6.71	6.02	145	6.24	5.77
Manufacturing	289	6.71	6.85	144	7.18	7.81	145	6.24	5.73
Wholesale and Retail Trade	289	5.88	4.62	144	5.56	2.72	145	6.19	5.93
Agriculture, Forestry, and Fishing	289	34.03	18.55	144	27.79	16.42	145	40.22	18.53
Professional and Related Services	289	2.06	0.91	144	2.07	0.81	145	2.06	1.00
Construction	289	3.32	1.40	144	3.45	1.42	145	3.19	1.36
Business and Repair Services	289	1.66	0.67	144	1.86	0.63	145	1.46	0.65
Finance, Insurance, and Real Estate	289	0.21	0.29	144	0.22	0.34	145	0.19	0.22
Public Administration	289	7.25	13.02	144	3.61	6.85	145	10.86	16.31
D. Occupation									
% Share Skilled	289	18.10	6.87	144	18.26	6.72	145	17.95	7.04
% Share Unskilled	289	43.24	17.67	144	52.81	16.08	145	33.74	13.62
% Share Managers	289	4.88	3.81	144	4.50	1.71	145	5.25	5.08
Income Score	289	19.91	2.49	144	20.87	2.15	145	18.96	2.45
E. Economy in 1880									
# Years Connected to Railway (in 1882)	289	2.28	4.64	144	3.50	5.79	145	1.06	2.59
Mines (At least one in 1840–1882)	289	0.98	0.14	144	0.99	0.12	145	0.97	0.16
Mfg. Total Output (thousands of 2020 USD	93	36,678.36	216,330.62	47	65,320.53	302,981.70	46	7,413.53	10,376.26
# Mfg. Firms	96	71.76	303.34	50	108.28	417.12	46	32.07	41.28

Notes: Observations are at the county and year level. The data are from U.S. Census of 1880. Panel C row lables are occupation categories in the Census. Panel D are defined based on individuals' reported occupation following Katz and Margo (2014). Skilled workers include: professionals, managers, craftsmen, clerical and sales occupations. Unskilled occupations include: operatives, laborers, and service workers (both private household and non-household). These groups omit workers employed in agriculture. The definition of managers follows the IPUMS classification of the occ1950 variable.

Table A.2: Chinese Population – Persistence Over Time

	Dependent Var: Log(1 + Chinese Population in Year t)		
	x=10 (1)	x=20 (2)	x=30 (3)
		A. 1850-1940	
Log Chinese Pop. in year t-x	0.76 (0.02)	0.51 (0.03)	0.37 (0.03)
Observations	2,398	2,112	1,823
		B. 1850-1880	
Log Chinese Pop. in year t-x	0.73 (0.02)	0.52 (0.05)	0.62 (0.12)
Observations	673	387	161
		C. 1890-1940	
Log Chinese Pop. in year t-x	0.90 (0.01)	0.77 (0.02)	0.50 (0.03)
Observations	1,725	1,725	1,662

Notes: Observations are at the county and year level. The independent variable is the log of Chinese population in year t-x, with the value of x stated in the column headings. Robust standard errors are presented in parentheses.

Table A.3: Effect on Labor - All races, female workers

	Dependent Variable: Log (X +1)				
	Total Labor	# Literate	# Skilled	# Managers	Income Score
	(1)	(2)	(3)	(4)	(5)
	A. All - Male Workers				
Post x High Chinese Share	-0.451	0.004	0.010	0.004	-0.917
	(0.137)	(0.010)	(0.010)	(0.003)	(0.283)
Conley SE, 100 km cutoff	[0.105]	[0.009]	[0.009]	[0.003]	[0.246]
Obs.	2,401	2,113	2,399	2,399	2,399
Dependent Variable Mean	5,516	0.932	0.238	0.0602	20.63
– in 1880	1,834	0.919	0.181	0.0488	19.91
	B. Chinese - Male and Female Workers				
Post x High Chinese Share	-1.036	-0.058	-0.043	-0.03	-2.817
	(0.175)	(0.028)	(0.017)	(0.015)	(0.542)
Conley SE, 100 km cutoff	[0.132]	[0.030]	[0.016]	[0.013]	[0.512]
Obs.	2,401	1,538	1,722	1,722	1,717
Dependent Variable Mean	136.4	0.768	0.158	0.109	20.01
– in 1880	324.7	0.719	0.0304	0.0156	19.31
	C. White - Male and Female Workers				
Post x High Chinese Share	-0.346	-0.013	-0.008	-0.001	-0.91
	(0.139)	(0.007)	(0.010)	(0.003)	(0.260)
Conley SE, 100 km cutoff	[0.104]	[0.007]	[0.009]	[0.004]	[0.242]
Obs.	2,401	2,112	2,398	2,398	2,398
Dependent Variable Mean	6,390	0.951	0.264	0.0646	20.60
– in 1880	1,723	0.938	0.224	0.0791	20.30
	D. All - Male and Female Workers				
Post x High Chinese Share	-0.461	0.006	0.008	0.004	-0.946
	(0.139)	(0.010)	(0.010)	(0.003)	(0.258)
Conley SE, 100 km cutoff	[0.105]	[0.009]	[0.009]	[0.003]	[0.232]
Obs.	2,401	2,113	2,399	2,399	2,399
Dependent Variable Mean	6,780	0.931	0.252	0.0618	20.44
– in 1880	2,066	0.917	0.202	0.0730	20.27

Notes: Observations are at the county and year level. Dependent variable means are presented at the bottom of the table. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses. Conley (1999) standard errors with 100km cutoffs are shown in brackets.

Table A.4: Dynamic Effects

	Dependent Variable: Log (X + 1)							
	Chinese Labor	White Labor	Total Labor	Chinese Income Score	White Income Score	All Income Score	Total Output	# Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High Chinese Share x 1850	-1.66	0.36	0.14	0.74	-0.03	-0.04		
	(0.22)	(0.24)	(0.24)	(0.63)	(0.03)	(0.03)		
High Chinese Share x 1860	-1.30	-0.34	-0.55	-0.02	-0.01	-0.01	0.13	0.26
	(0.25)	(0.19)	(0.19)	(0.07)	(0.02)	(0.02)	(0.32)	(0.24)
High Chinese Share x 1870	-0.67	-0.06	-0.12	0.02	-0.01	-0.03	-0.20	0.05
	(0.16)	(0.12)	(0.12)	(0.03)	(0.01)	(0.01)	(0.27)	(0.17)
High Chinese Share x 1890							-0.59	-0.36
							(0.29)	(0.17)
High Chinese Share x 1900	-1.17	-0.12	-0.33	-0.14	-0.03	-0.04	-0.69	-0.51
	(0.16)	(0.11)	(0.11)	(0.03)	(0.02)	(0.01)	(0.34)	(0.23)
High Chinese Share x 1910	-1.66	-0.23	-0.45	-0.16	-0.05	-0.06	-1.05	-0.62
	(0.17)	(0.13)	(0.12)	(0.04)	(0.02)	(0.01)	(0.39)	(0.22)
High Chinese Share x 1920	-1.96	-0.48	-0.68	-0.16	-0.06	-0.07	-1.21	-0.78
	(0.18)	(0.14)	(0.14)	(0.04)	(0.02)	(0.02)	(0.43)	(0.25)
High Chinese Share x 1930	-2.05	-0.54	-0.75	-0.17	-0.06	-0.07	-1.31	-0.89
	(0.17)	(0.15)	(0.15)	(0.05)	(0.02)	(0.02)	(0.41)	(0.25)
High Chinese Share x 1940	-2.03	-0.51	-0.72	-0.18	-0.05	-0.06	-1.14	-0.84
	(0.18)	(0.15)	(0.15)	(0.06)	(0.02)	(0.02)	(0.41)	(0.25)
Obs.	2,401	2,401	2,401	1,708	2,398	2,399	837	864

Notes: Observations are at the county and year level. 1880 is the reference year for all columns. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Table A.5: Placebo Sample – High Chinese Share if Above Median Chinese Share of Placebo Sample

	Dependent Variable: Log (X + 1)					
	Chinese Labor	White Labor	Total Labor	European Immigrant Labor	Output	# Firms
	(1)	(2)	(3)	(4)	(5)	(6)
	A. Western States (Main Sample)					
Post x High Predicted Chinese Share	-1.06	-0.59	-0.68	-0.6	-1.37	-0.85
	(0.17)	(0.13)	(0.13)	(0.14)	(0.34)	(0.23)
Obs.	2,394	2,394	2,394	2,394	744	768
Dependent Variable Mean	131.4	5,192	5,529	1,024	262,616	122.7
– in 1880	316.2	1,502	1,832	525.3	36,678	71.76
	B. All Other States (Placebo Sample)					
Post x High Predicted Chinese Share	0.29	0.10	0.15	0.28	0.41	0.25
	(0.04)	(0.04)	(0.04)	(0.07)	(0.11)	(0.05)
Obs.	23,335	23,335	23,335	23,335	12,224	13,584
Dependent Variable Mean	4.527	6,496	7,224	1,200	276,195	141.7
– in 1880	1.615	4,186	4,745	902.9	88,349	136.7
	C. Midwestern States (Placebo Sample)					
Post x High Predicted Chinese Share	0.23	0.14	0.15	0.29	0.20	0.21
	(0.05)	(0.06)	(0.06)	(0.10)	(0.16)	(0.07)
Obs.	8,702	8,702	8,702	8,702	4,560	5,032
Dependent Variable Mean	2.713	6,741	6,937	1,268	288,598	131.5
– in 1880	0.891	4,481	4,582	1,142	68,767	128.3
	D. Northeastern States (Placebo Sample)					
Post x High Predicted Chinese Share	0.49	0.27	0.28	0.30	0.02	0.25
	(0.16)	(0.12)	(0.12)	(0.16)	(0.13)	(0.10)
Obs.	1,953	1,953	1,953	1,953	1,640	1,704
Dependent Variable Mean	32.57	27,435	28,214	7,695	1,018,644	546.1
– in 1880	7.143	17,995	18,302	4,749	414,652	528.7
	E. Southern States (Placebo Sample)					
Post x High Predicted Chinese Share	0.17	-0.07	0.03	0.04	0.09	0.14
	(0.04)	(0.05)	(0.05)	(0.09)	(0.15)	(0.06)
Obs.	11,682	11,682	11,682	11,682	5,888	6,688
Dependent Variable Mean	1.172	3,147	4,319	133.3	64,136	48.87
– in 1880	0.650	1,943	2,953	133.6	14,521	45.79

Notes: Observations are at the county and year level. The independent variable uses the predicted shares of Chinese population in each county based on controls selected by LASSO, please refer to text for the list of selected variables. The dummy variable "High Predicted Chinese Share" takes value 1 if the predicted share is higher than the median predicted share for the placebo sample. Dependent variable means are presented at the bottom of the table. Means of column (5) are expressed in thousands of 2020 USD. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Table A.6: Placebo Exercise - Restrictions

	Dependent Variable: Log (X + 1)					
	Chinese Labor	White Labor	Total Labor	European Immigrant Labor	Total Output	# Firms
	(1)	(2)	(3)	(4)	(5)	(6)
Sample: non-West	A. Share of Urban Population (West) between 0 (p25) and 0 (p75)					
Post x High Predicted Chinese Share	0.02	-0.05	0.02	0.07	0.08	0.09
	(0.03)	(0.05)	(0.05)	(0.08)	(0.16)	(0.06)
Obs.	17,428	17,428	17,428	17,428	7,608	8,768
Dependent Variable Mean	0.711	2,918	3,462	254.3	42,552	46.17
– in 1880	0.717	2,060	2,535	254.3	12,663	50.62
	B. Manufacturing Output per Capita (West) between 588.5 (p25) and 1599 (p75)					
Post x High Predicted Chinese Share	0.25	0.19	0.2	0.36	0.11	0.26
	(0.09)	(0.09)	(0.09)	(0.17)	(0.23)	(0.10)
Obs.	3,760	3,760	3,760	3,760	3,360	3,360
Dependent Variable Mean	1.662	6,238	6,780	755.9	84,192	91.71
– in 1880	0.714	5,100	5,524	849.5	21,656	108.3
	C. Share of Non-Chinese Immigrants (West) between 0.14 (p25) and 0.26 (p75)					
Post x High Predicted Chinese Share	0.49	0.25	0.21	0.36	-0.17	0.19
	(0.14)	(0.16)	(0.15)	(0.19)	(0.25)	(0.14)
Obs.	3,462	3,462	3,462	3,462	1,648	1,752
Dependent Variable Mean	6.794	10,903	11,307	2,462	640,651	291.4
– in 1880	2.100	6,555	6,739	1,848	223,496	295.1
	D. Share of LF in Railroad and Mining (West) between 0.02 (p25) and 0.27 (p75)					
Post x High Predicted Chinese Share	0.35	0.07	0.07	0.01	0.23	0.29
	(0.09)	(0.08)	(0.08)	(0.12)	(0.16)	(0.08)
Obs.	6,695	6,695	6,695	6,695	3,984	4,256
Dependent Variable Mean	7.888	11,763	12,545	2,473	583,793	248.7
– in 1880	2.417	7,053	7,501	1,792	171,321	235.9

Notes: Observations are at the county and year level. The sample is limited to states that are not in the West. See Section 5.7 for more details. The independent variable uses the predicted shares of Chinese population in each county based on controls selected by LASSO, please refer to text for the list of selected variables. The dummy variable "High Predicted Chinese Share" takes value 1 if the predicted share is higher than the median predicted share for the Western sample. Dependent variable means are presented at the bottom of the table. Means of column (6) are expressed in thousands of 2020 USD. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Table A.7: Control for Shares of Other Immigrant Groups

	Dependent Variables: Log (X + 1)				
	Labor Supply			Manufacturing	
	Chinese Labor (1)	White Labor (2)	Total Labor (3)	Total Output (4)	# Firms (5)
Post x High Chinese Share	-1.05	-0.34	-0.46	-0.71	-0.55
	(0.19)	(0.14)	(0.14)	(0.37)	(0.24)
Post x High Irish Share	-0.08	0.01	0.00	-0.09	-0.18
	(0.26)	(0.19)	(0.20)	(0.50)	(0.33)
Post x High German Share	0.08	-0.21	-0.22	0.14	-0.07
	(0.23)	(0.18)	(0.18)	(0.35)	(0.25)
Post x High English Share	-0.29	-0.47	-0.45	-0.38	-0.43
	(0.23)	(0.17)	(0.18)	(0.38)	(0.28)
Post x High Canadian Share	0.04	-0.04	-0.04	-0.46	-0.15
	(0.26)	(0.20)	(0.20)	(0.42)	(0.29)
Post x High Mexican Share	0.11	-0.04	-0.03	0.16	0.51
	(0.22)	(0.16)	(0.17)	(0.58)	(0.37)
Post x High Oth. Asian Share	0.57	0.26	0.26	0.72	0.76
	(0.26)	(0.19)	(0.19)	(0.43)	(0.29)
Obs.	2,401	2,401	2,401	744	768
Dependent Variable Mean	131.7	5,179	5,516	262,616	122.7
– in 1880	318	1,503	1,834	36,678	71.76

Notes: Observations are at the county and year level. High Share for each immigrant group is a dummy variable taking value 1 if the share of immigrants for the group is above the median share of immigrants for such group in Western counties. Dependent variable means are presented at the bottom of the table. Means of column (4) are expressed in thousands of 2020 USD. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Table A.8: Robustness - Alternative Controls

	Control for Year FE x Other Immigrant Share 1880	Control for Year FE x: Population 1860	Control for Year FE x Mfg Labor Supply 1860	Control for Year FE x: Agric. Labor Supply 1860	Control for Year FE x Other Immigrant Growth 1850-80	Control for Year FE x: Population Growth 1850-80	Control for Year FE x Mfg Labor Supply Growth 1850-80	Control for Year FE x: Agric. Labor Supply Growth 1850-80	Control for Year FE x Market Integration	Control for Year FE x Homestead Act
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	A. Chinese Labor Supply									
Post x High Chinese Share	-1.05	-0.96	-0.93	-0.92	-1.04	-0.99	-1.04	-1.02	-1.21	-1.03
	(0.18)	(0.22)	(0.21)	(0.22)	(0.33)	(0.34)	(0.34)	(0.34)	(0.23)	(0.17)
Obs.	2,401	1,962	1,962	1,962	1,041	1,041	1,041	1,041	1,809	2,401
R-square	0.79	0.79	0.79	0.79	0.79	0.80	0.80	0.80	0.80	0.79
	B. White Labor Supply									
Post x High Chinese Share	-0.32	-0.45	-0.31	-0.43	-0.32	-0.32	-0.33	-0.32	-0.36	-0.34
	(0.14)	(0.15)	(0.14)	(0.15)	(0.28)	(0.28)	(0.28)	(0.28)	(0.18)	(0.14)
Obs.	2,401	1,962	1,962	1,962	1,041	1,041	1,041	1,041	1,809	2,401
R-square	0.89	0.91	0.91	0.91	0.88	0.89	0.89	0.88	0.86	0.89
	C. Manufacturing Output									
Post x High Chinese Share	-1.23	-1.16	-0.90	-1.09	-1.08	-1.10	-1.08	-1.13	-0.92	-0.95
	(0.39)	(0.38)	(0.34)	(0.38)	(0.49)	(0.49)	(0.49)	(0.48)	(0.37)	(0.40)
Obs.	744	744	744	744	496	496	496	496	736	744
R-square	0.80	0.82	0.82	0.81	0.78	0.79	0.79	0.79	0.80	0.80

Notes: Observations are at the county and year level. Columns titles indicate the set of controls added to the baseline specification. Columns (5)-(8) use a restricted sample in which the same observations are available for all columns. The dependent variable is the log of the variable stated in the panel title + 1. Values for Panel C are in 2020 USD. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Table A.9: Robustness – Sample Restrictions

	High Chinese Share = 1 if Chinese Share ≥ 1860 Median	High Chinese Share = 1 if Chinese Share ≥ 1880 75 pct	Continuous Measure of 1880 Chinese Share	Omit Top 1% Chinese Share	Omit San Francisco County
	(1)	(2)	(3)	(4)	(5)
			A. Chinese Labor Supply		
Post x High Chinese Share	-0.90	-1.30	-6.12	-1.02	-1.04
	(0.34)	(0.20)	(1.08)	(0.18)	(0.17)
Obs.	1,962	2,401	2,401	2,383	2,393
R-square	0.79	0.79	0.79	0.79	0.78
			B. White Labor Supply		
Post x High Chinese Share	-0.88	-0.56	-2.25	-0.35	-0.34
	(0.22)	(0.15)	(0.99)	(0.14)	(0.14)
Obs.	1,962	2,401	2,401	2,383	2,393
R-square	0.90	0.89	0.89	0.89	0.89
			C. Manufacturing Output		
Post x High Chinese Share	-1.31	-1.48	-6.79	-0.97	-0.97
	(0.39)	(0.39)	(2.93)	(0.38)	(0.38)
Obs.	744	744	744	744	736
R-square	0.80	0.81	0.80	0.80	0.79

Notes: Observations are at the county and year level. Column titles indicate the variation to the baseline specification. The dependent variable is the log of the variable stated in the panel title + 1. Values for Panel C are in 2020 USD. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Table A.10: Heterogeneous Effects on White Labor – Skilled Chinese Labor

	Dependent Variable: Log (# of individuals + 1)										
	Labor Supply (males age 15-64) by Sector										
	Total	Personal services	Entertainment, Recreation	Mining	Manufacturing	Wholesale, Retail Trade	Transportation, Communica-tion	Professional Services	Construction	Business, Repair Services	Finance, Insurance, Real Estate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Post x High Chinese Share	0.07	-0.02	-0.12	0.12	0.02	0.01	0.20	0.15	0.04	0.00	0.02
	(0.16)	(0.15)	(0.22)	(0.20)	(0.17)	(0.18)	(0.15)	(0.15)	(0.15)	(0.15)	(0.17)
Post x High Chinese Share x 1880 Share of Skilled Chinese	-16.82	-21.62	-16.37	-16.2	-18.66	-15.97	-10.28	-16.61	-15.63	-15.85	-23.13
	(4.51)	(5.16)	(7.50)	(4.81)	(4.97)	(5.11)	(3.63)	(4.40)	(4.31)	(4.44)	(5.66)
Observations	2,223	2,223	2,223	2,223	2,223	2,223	2,223	2,223	2,223	2,223	2,223
Dependent Variable Mean	182.3	61.76	286.2	942.6	748.2	559.9	1186	192.2	496.6	135.8	143.1
– in 1880	45.73	5.670	161.7	167.4	169.3	119.3	525.9	52.49	84.40	41.09	14.83

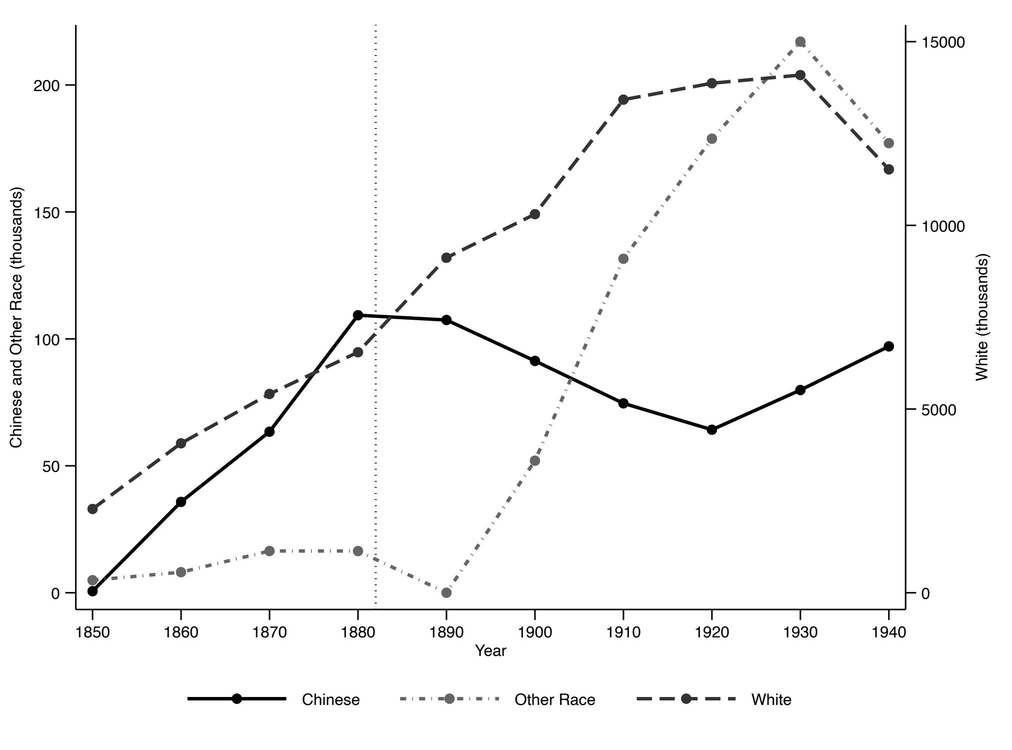
Notes: Observations are at the county and year level. The columns are organized by the share of Chinese workers in the industry in 1880. 1880 Share of Skilled Chinese is the number of skilled Chinese workers (professionals, managers, craftsmen, clerical and sales occupations) as a fraction of all Chinese workers in 1880. Dependent variable means are presented at the bottom of the table. All regressions control for county FE, state by year FE, and year FE interacted with: the # of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Table A.11: Heterogeneous Effects - Share Employed in Tradable Industries

	Dependent Variable: Log(X + 1)				
	Chinese Labor	White Labor	Total Labor	Total Output	# Firms
	(1)	(2)	(3)	(4)	(5)
	A. Full Sample				
Post x High Chinese Share	-1.03	-0.34	-0.45	-0.97	-0.78
	(0.17)	(0.14)	(0.14)	(0.38)	(0.25)
Observations	2,401	2,401	2,401	744	768
Dependent Variable Mean	131.7	5,179	5,516	262,616	122.7
– in 1880	318	1,503	1,834	36,678	71.76
	B. Tradable sectors				
Post x High Chinese Share	-1.07	-0.39	-0.51	-0.95	-0.8
	(0.29)	(0.21)	(0.21)	(0.52)	(0.33)
Observations	1,235	1,235	1,235	512	528
Dependent Variable Mean	96.97	3,709	3,934	100,626	49.81
– in 1880	271.8	1,274	1,554	7,297	30.83

Notes: Observations are at the county and year level. Panel A reports the baseline results. Panel B reports the results on the sample of counties with a share of labor force in tradable industries in 1880 above the sample median, as described in Section 6.3 and Appendix Section D. Dependent variable means are presented at the bottom of the table. Means of column (4) are expressed in thousands of 2020 USD. All regressions control for county FE, state by year FE, and year FE interacted with: the of years connected to railroad as of 1882 and a dummy variable that equals 1 if the county ever had a mine during 1840-1882. Standard errors clustered at the county-level are shown in parentheses.

Figure A.1: Immigrant Population over Time – All States



Notes: Sample includes all states.

Figure A.2: Histogram of Chinese Share in 1880 Across Counties

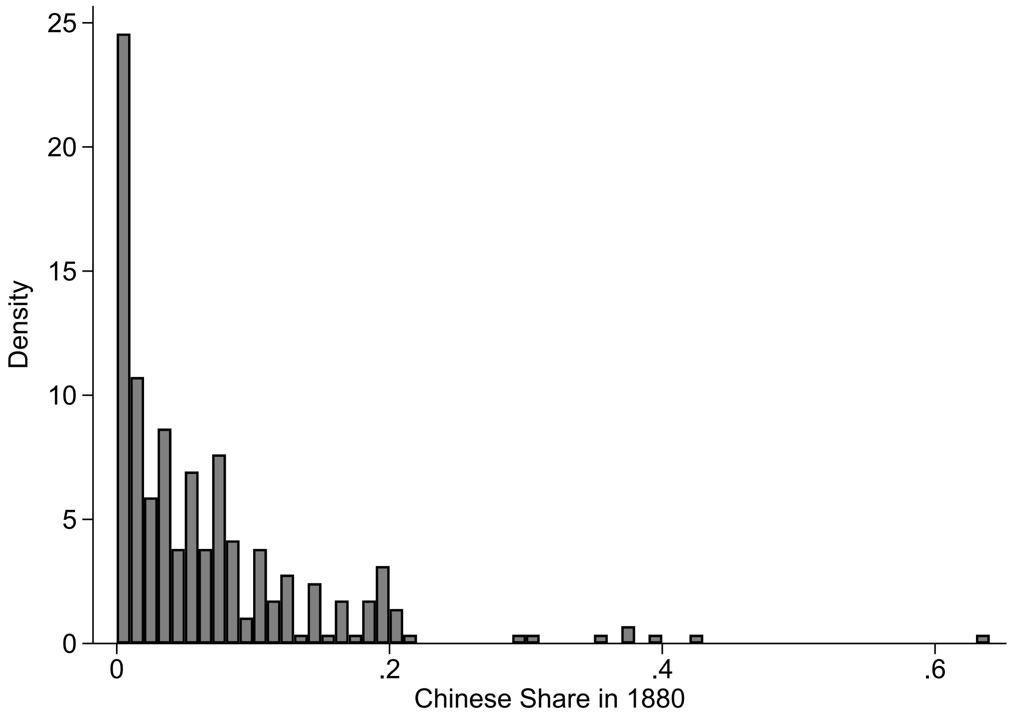
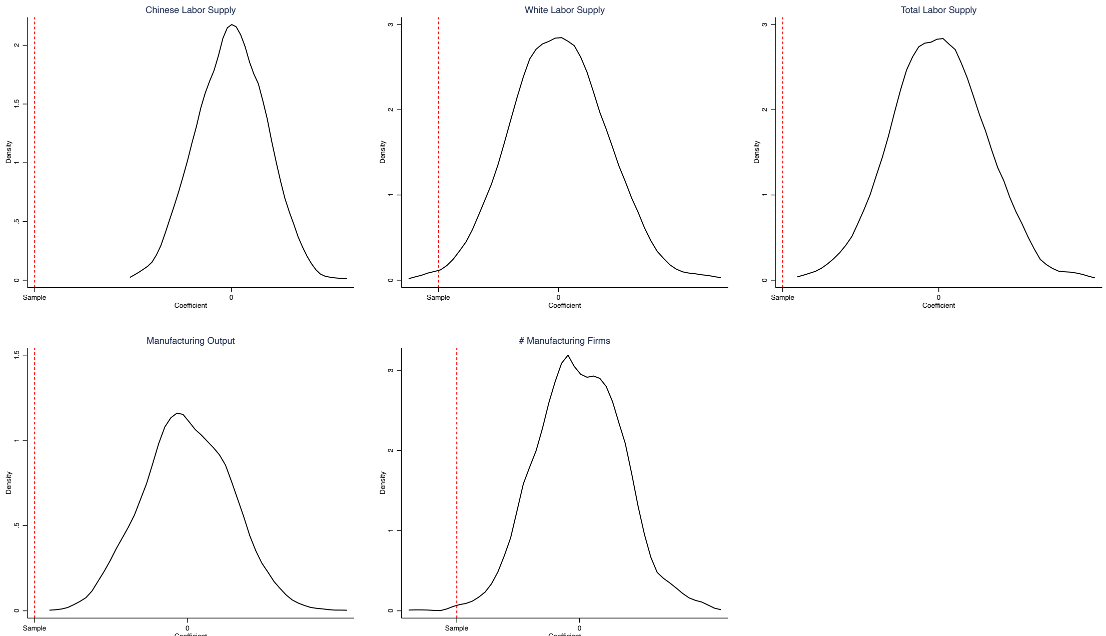


Figure A.3: Permutation Test



Notes: The figure plots the distributions of $\hat{\beta}$ from equation (1) from randomly permuting the $HighChineseShare_{i,1880}$ across counties 1,000 times. The vertical dashed lines correspond to the baseline estimates from Tables 2–5.