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ABSTRACT

This paper estimates returns to scale for manufacturing industries around the turn of the twentieth century in the United States by exploiting an industry-city panel data for the years 1880-1930. We estimate decreasing returns to scale on average over the period, contrary to most of the existing literature, because our empirical methodology allows us to separate returns to scale from "agglomeration" effects. We also find that returns to scale grew substantially after 1910, mostly because the return to labor grew. We find that this was more marked in industries that were more intensive in human capital and energy at the beginning of the period and in cells that were less competitive. Overall, results suggest that technological change and lack of initial competition played relevant roles in the rise of larger establishments in manufacturing.

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1 Introduction

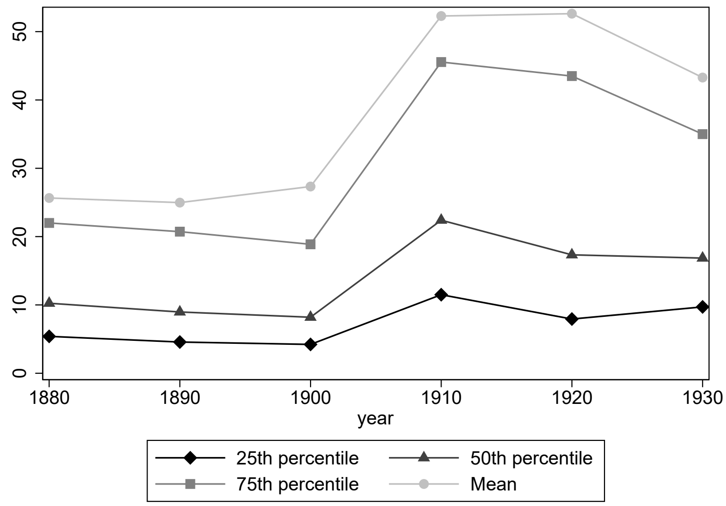
The late nineteenth century was a time of rapid change in the U.S. economy, with big firms becoming dominant in several sectors for the first time (Lamoreaux, 2019). Nutter and Einhorn (1969) estimates that between 1895 and 1904, 32% of profits came from manufacturing industries where the four biggest companies captured 50% of sales. The 1900 Census of Manufactures describes a trend in some industries towards concentration in larger-sized establishments. Not only do companies of larger sizes appear in this period, but the Census notes that the production and accumulation of inputs are strongly concentrated in the most important cities such as Boston, Chicago, and New York. Historians' widespread view is that this change had its origins in technological changes that increased capital intensity and the returns to being large (Chandler Jr, 1977). However, distinguishing this from broader – and potentially growing – agglomeration forces is challenging and has not previously been attempted.

This paper estimates the returns to scale in manufacturing industries in the United States over the five decades between 1880 and 1930. Using rich data that has recently become available, we estimate at the city-industry level, instead of at the more aggregated industry- or state-industry level of previous papers. The data come from Censuses of Manufacturers tabulations at 10-year intervals, recently digitized and harmonized by industry and geography by Lafortune et al. (2019). For each city-industry-time cell, we observe gross product, cost of materials, capital, and labor. We estimate a translog production function where capital and labor are the only inputs, and control for unobserved characteristics at the city, industry, and year level with fixed effects. We then compute the distribution of returns to scale with the parameters of the production function we estimate.

We ask three questions. First, what is the level of returns to scale? Is it increasing, as some previous research has found, or decreasing? Second, in light of the major technological and other forces reshaping the U.S. economy at this time – including better communication and transportation technology, increasing capital-skill complementarity, growing market concentration, and changing sources of power (see below) – how did returns to scale evolve over time? Third, which forces account for any changes we observe?

The first question is partly motivated by stylized facts indicating manufacturing was concentrated, and the second by its growth over time. Figures 1 and A.2 show how manufacturing labor and capital changed over time by percentile. A visible element in these figures is that the average level of labor and capital is higher than the 75 percentile of their respective distributions. This result indicates that there are a few industries or areas where firms are substantially larger. We also see from the figures that capital and labor concentration increased over this period, as the increase in both inputs was generally faster in higher percentiles. However, neither the cross-sectional concentration nor its changes alone imply increasing or growing returns to scale. These establishments might locate in cities sharing characteristics that could account for either result. As mentioned, our strategy allows us to separate the benefits from being big to those of being in a location where most other establishments are also big (agglomeration effects).

Figure 1: Average workers per establishment by city-industry, 1880-1930



On the first question, we find that returns to scale were centered around 0.92 at the industry-city level, well below the threshold for constant returns to scale. This contrasts with increasing returns previously found in James (1983) and Cain and Paterson (1986).[1] We show that failing to include city fixed effects, which previous research lacked the data to do, biases upward estimates of the returns to scale: it falsely attributes larger agglomeration effects to scale economies.[2] Other differences between our analysis and this previous work cannot account for their higher estimates. Put differently, previous analyses missed the fact that there are strong advantages of being located in a large city, and big firms disproportionately locate in them. On top of this, we go further than the previous literature and attempt to correct for aggregation bias, that is, the bias from estimating in cell- rather than establishment-level data. Basu and Fernald (1997) argued estimates of scale economies in aggregate data might be biased upward. To address this, we re-estimate the production functions normalized by the number of plants, thus obtaining an alternative estimate at the level of the "average plant." When we do this – in contrast with Basu and Fernald (1997)'s conjecture – we obtain larger estimates, with a median of 0.99. So returns to scale are still mostly below one even after correcting for this. These returns are larger in smaller cities, human capital intensive

[1] Our estimates are, however, more aligned with Atack (1977) who found constant returns to scale in the 1850-60 period, and Margo (2015) who found few cases of increasing returns in the 1850-80 period. We also did not find increasing returns in earlier years but ultimately exclude pre-1890 data from our analysis due to the differences in the geographic unit presented in the census tabulations.

[2] In contrast, Margo (2015) finds that changes in urbanicity account for little of the increase in the average size of manufacturing plants in the nineteenth century.

industries, and more competitive cells. This last result reinforces that the larger establishments in the nineteenth century did not arise out of a "natural" advantage of being large.

Our second question asks whether there is any evidence that the returns to scale grew over this period. In this question, we are the first of existing studies to be able to estimate the returns to scale into the XXth century and compare them to those in the XIXth. Studies by Atack (1977) relied on micro data that was only digitized until 1880 while those of Atack et al. (2017) use the "Hands and Machine Labor Study" which was published in 1899. We find that between the periods 1880-1900 and 1910-1930, the median return to scale for an average firm rose from 0.96 to 1.02. We show that this stems entirely from changes in returns to factors and not to changes in the use of factors. Broken out by the contribution of individual inputs, we find that this increase is driven mostly by an increase in the return to labor over this period. The coefficient on log employment rises by 20 percentage points (though a fall in the quadratic term partially offsets this change).

Finally, what forces are associated with the growth in returns? To answer this question, we conduct a multivariate analysis of the characteristics related to larger growth in returns. We find that this growth was particularly large for more skill- and energy-intensive industries and in cells that were less competitive, as measured by greater initial concentration. This result points to a mix of factors – rising capital-skill complementarity, the arrival of new and cheaper sources of energy, and growing market concentration – accounting for the increase. The historical context also suggests a plausible role for all of these factors.

Our work contributes to a better understanding of the period known as the "Second Industrial Revolution," which began about 1860 and ended in 1914 with World War I. This period saw the rise of factories, which had different production processes (Sokoloff, 1984) than the handicraft production they replaced. In handcraft production, skilled artisans created a good from start to finish, while in factories, unskilled workers tend to specialize in one stage of production (Atack et al., 2005). This process led to a standardization of production and facilitated work distribution. Previous work has found specialization may account for higher productivity at larger plants (Atack et al., 2017). The rise of factories, along with other technological changes such as new sources of power, may have allowed production to occur efficiently on a larger scale.[3]

Production processes in this period show a substantial increase in the use of energy sources. Starting in 1870, energy use in manufacturing (measured in horsepower) grew by 45% to 1880, by 74% in the next decade, and by 89% in the following 10 years (Vol. VII, 1900 Census). Different energy sources generate this growth: the use of steam, which grew by 93% per decade from 1870 to 1900; the use of gas, first tabulated in 1890, grew 1,509% over the 1890s; and later, electricity production

[3]But power is only part of the story. Atack et al. (2020) show that power use can only account for a fraction of the productivity gap between hand and machine production, suggesting that something else, like increased division of labor *per se*, accounts for the rest. Our findings are consistent with this interpretation.

emerges, which, while serving a trivial share of power needs in 1890, was a majority of horsepower used by 1930 (Jovanovic and Rousseau, 2005). In contrast, the share of other energy sources such as water declined. These new power sources, while much cheaper, may have only been efficient at larger scales. Large establishments were more likely to use steam, and the impact of that usage on labor productivity also increased with firm size and over time Atack et al. (2008a). Du Boff (1967) did argue that purchased electricity enabled smaller scale production, but, in contrast, Fiszbein et al. (2020) find that access to electricity was associated with increasing concentration in sectors that were already dominated by large firms. Our results suggest that energy innovations may have increased the return to being large.

Chandler (1990) argues that the arrival of railroads is also crucial in reducing transport costs allowing firms to sell to a large market. Fogel (1964) contends that the influence of the railroad on growth in the United States is relatively small, around 2.7% of GDP. In contrast, the work of Atack et al. (2008b) suggests that the arrival of the railroad did have a positive effect on firms since it facilitated their growth. The more recent work of Donaldson and Hornbeck (2016) demonstrates large gains from market access due to the expansion of the railroad network. Their result is relevant because this could have generated benefits from being in well-connected locations that would account for the agglomeration benefits that we capture with our fixed effects.

At the same time, the United States was going through a very intensive urbanization process. While a quarter of the US population lived in urban areas in 1880, that number rose to almost 60 percent by 1930. These growing cities were also, in many cases, new hubs of manufacturing activity. The geographical concentration of manufacturing production is visible if we observe that few states (the top five being New York, Pennsylvania, Illinois, Massachusetts, and Ohio) concentrate a large fraction of total production. Furthermore, Kim (1995) shows that between 1860 and the beginning of the twentieth-century, regional specialization in production increases and that industries become more localized once specialized areas emerge in specific industrial sectors. Michaels et al. (2018) argues that better transportation and communication technology drove this increased specialization and allowed cities to become more concentrated in interactive tasks, their comparative advantage (even within manufacturing). Therefore, the increased scale of manufacturing firms coincided with increased geographical concentration, potentially confounding the role of both factors. Our approach allows us to separate the role of agglomeration per se from the advantages of being large, and we find that agglomeration benefits biased earlier estimates of returns to scale. However, we also find no evidence that the benefits of being a large establishment increased differentially depending on the city size over this period. Thus, while cities may have been growing, they played little role in the making of bigger firms, according to our estimates.

This work, in addition to adding to the historical literature on returns to scale, also relates to the current debate on the falling labor share observed in most world economies in the last 50 years (see for example Acemoglu and Restrepo, 2018; Karabarbounis and Neiman, 2013). Our results suggest, in contrast, that the labor share rose around the turn of the twentieth century. This is consistent with the decrease in inequality visible during the middle of the twentieth century, with evidence from Sweden (Bengtsson, 2014), and with Atack et al. (2019)'s argument that mechanization increased the number of jobs for workers.[4] This evidence also suggests that new technologies do not *necessarily* lead to lower labor shares.

The rest of the work is structured as follows: section 2 describes the theoretical framework and the methodology used in the estimations, section 3 depicts the data used and their adjustment for the purpose of the investigation, section 4 shows the results for the full period while the following estimate the change over time and, finally, section 6 concludes.

2 Methodology

The objective of this paper is to estimate returns to scale for this period. We want to do so in a way that can reduce the confounding influence of larger firms being differentially located in high productivity locations. We estimate a production function, an approximation of the relation between different inputs and the product level, which is represented in its most general form by the following equation:

$$\ln(Y_{ict}) = \ln(A_{ict}) + \ln(F(Z_{ict})) \tag{1}$$

where Y_{ict} is the output level, A_{ict} represents factors that affect the productivity of the industries that are not related to the level of inputs and $F(Z_{ict})$ is a function that transforms inputs, represented by the vector Z of size n, into output. The function $F(\cdot)$ should fulfill standard suppositions: (a) continuity, (b) strictly increasing and (c) quasi-concavity.[5] The goal is to transform equation (1) in an expression that may be estimated econometrically.

A form widely used in literature is a transcendental logarithm function (translog). Christensen et al. (1973) proposed this function as it does not impose additivity and homogeneity but satisfies the other assumptions of production theory. This is a flexible generalization of a Cobb-Douglas function.[6] The incorporation of non-linearities in the relation between inputs and output enables

[4] As they summarize on page 66, "the share of time taken up by new tasks in machine labor was larger than the share of time associated with hand tasks that were abandoned—indeed, five times larger. Among other activities, these new tasks included maintenance of steam engines, a foreman supervising large numbers of workers ... and workers packaging products for distant markets."

[5] The reason for these assumptions are as follows: (i) continuity assures that small changes in inputs generate small changes in output level, (ii) strictly increasing generates that a more intensive use of some of the inputs increases the output level and (iii) quasi-concavity ensures isoquants curves to be convex.

[6] It also is a second order approximation of the widely-used constant elasticity of substitution (CES) production function.

the substitution elasticity not to be non-constant. For J inputs, the function $F(\cdot)$ is represented in equation (2), where X_j is the input number "j" in the production process (j=1,2,...J) and β indicates the parameters to be estimated. Sub-indexes i, c and t indicate industry, geographical area and time, respectively.

$$F(Z_{ict}) = \sum_j \beta_j \ln X_{j,ict} + \frac{1}{2} \sum_m \sum_k \beta_{mk} \ln X_{m,ict} \ln X_{k,ict} \tag{2}$$

While a flexible functional form is relevant, our main objective is to try to use our rich data to distinguish returns to scale from other confounding factors, particularly related to location. In our specification, these are contained in the A_{ict} term in equation (1). For example, there may be changes in technology affecting productivity of all cells. There may also be certain fixed unobservable determinants of productivity at geographical level derived from, for example governability and quality of certain institutions, or geographical comparative advantage related to proximity to energy sources or natural resources or agglomeration economies. At the industry level, as well, there may be factors leading to some to be permanently more productive than others. Respectively, these can be added to the estimation equation as fixed effects for time, area and indsutry. Adding this to the production function we obtain equation (3) where μ_t, λ_c, and δ_i are time, area, and industry fixed effects, respectively, and ε_{ict} is the error term:

$$\ln(Y_{ict}) = \sum_j \beta_j \ln(X_{jict}) + \frac{1}{2} \sum_m \sum_n \beta_{mn} \ln(X_{mict}) \ln(X_{nict}) + \delta_i + \mu_t + \lambda_c + \varepsilon_{ict} \tag{3}$$

If product and factor markets are competitive, then through the maximization of profits of the company, the elasticity of the output with respect to factor j, η_j is represented by equation (4) and returns to scale, defined in the traditional way as the relative change in output resulting from a proportional change in all inputs, is presented in equation (5).

$$\eta_j = \frac{\partial Y_{ict}}{\partial X_{jic}} \frac{X_{jic}}{Y_{ict}} = \beta_j + \sum_m \beta_{mj} \ln(X_{mict}) \tag{4}$$

$$\text{Return to scale} = \sum_j \eta_j \tag{5}$$

We use value-added (value of products minus the cost of materials) as the dependent variable in the function production. Although Basu and Fernald (1997) argues that in the presence of growing returns, estimates using gross output as a dependent variable are more consistent, we focus on value added for a few reasons. First, what is observed in the data as to materials is the total cost, which does not permit us to differentiate between input cost changes driven by price or quantity. It is possible that larger companies, when producing larger quantities, obtain lower prices, which has an ambiguous effect on the relation between the quantity produced and the total cost. The second problem arises from duplication: one company's gross output can be used by a second company, which considers it an input cost. Focusing on value added avoids this duplication. Furthermore, it is common within this literature to employ value-added instead of value of output. Nevertheless, we also check the robustness of our results to the use of gross output as the dependent variable.

We estimate the production function with two production factors: Capital (K) and Labor (L). The level of observation is that of an industry i in a city c in year t. This implies that our estimation equation will be

$$\begin{aligned}\ln(Y_{ict}) =& \beta_K \ln(K_{ict}) + \beta_L \ln(L_{ict}) + 0.5\beta_{KK} \ln(K_{ict})^2 + 0.5\beta_{LL} \ln(L_{ict})^2 \\ &+ \beta_{KL} \ln(K_{ict}) \ln(L_{ict}) + \delta_i + \mu_t + \lambda_c + \varepsilon_{ict}\end{aligned} \tag{6}$$

We will allow ε_{ict} to be correlated within a city across time by clustering by c.[7]

The data we will use, as detailed in the next section, consist of aggregates at the industry level in a city in a period of time. This means that the output and inputs of all establishments are added at the level of estimation in order to then estimate the production function. This will will allow us to compare our estimates of returns to scale to others that have been performed at aggregate level (see Cain and Paterson, 1986; James, 1983). However, we also wish to estimate returns at a level that would be closer to an individual plant (establishment), like Margo (2015). While we cannot actually obtain data at the level of an individual establishment for this period, we consider the existence of an "average establishment" and estimating as output and inputs the value for each "average establishment" in an industry-city-year cell, by dividing the aggregates by the number of plants in each cell. In that case, we carry out the estimations for the average establishment by estimating equation (7),

$$\begin{aligned}\ln\left(\frac{Y_{ict}}{n_{ict}}\right) =& \beta_K \ln\left(\frac{K_{ict}}{n_{ict}}\right) + \beta_L \ln\left(\frac{L_{ict}}{n_{ict}}\right) + 0.5\beta_{KK} \ln\left(\frac{K_{ict}}{n_{ict}}\right)^2 + 0.5\beta_{LL} \ln\left(\frac{L_{ict}}{n_{ict}}\right)^2 \\ &+ \beta_{KL} \ln\left(\frac{K_{ict}}{n_{ict}}\right) \ln\left(\frac{L_{ict}}{n_{ict}}\right) + \delta_i + \mu_t + \lambda_c + \varepsilon_{ict}\end{aligned} \tag{7}$$

In that equation, n_{ict} represents the number of establishments in each industry-city observation and helps to measure average value added and inputs per plant. At the same level of inputs, the productivity of an industry may be different if capital and labor are divided between a different number of companies. If the results of equation (6) are similar to those found when estimating equation (7), then the number of establishments is irrelevant for the productivity of an industry.

[7] Combined with the previous equation, we have, therefore, that our estimate of returns to scale is given by $\beta_K + \beta_L + \beta_{KK} \ln(K_{ict}) + \beta_{LL} \ln(L_{ict}) + \beta_{KL}[\ln(K_{ict}) + \ln(L_{ict})]$.

In case they are different, this signals to us that productivity is correlated with an industry's concentration. If the level of return to scale drops when obtaining the results of the average company then there is a positive correlation between the number of companies and productivity, while if the level of return to scale goes up the correlation between these variables is negative. The two equations will also be the same if there are constant returns to scale.

Another question we deal with is whether returns to scale change over time. Access to different technologies may have affected the level of returns to scale of the industries and capital accumulation post 1900, if accompanied by an increase in productivity. For this purpose we estimate equation (7) separating the sample in two different periods. The first considers the years 1880-1900 and the second considers 1910-1930, when we saw larger firms arising in terms of workers per establishment. This separation may show a change in the returns to scale, and we will investigate which areas and industries are the ones that generate this result. In this analysis, we allow the fixed effects to vary across the two periods.

3 Data

This paper uses panel data for manufacturing industries in different geographical areas for the United States, coming from 6 waves of different surveys of the Census of Manufactures (CM). We use tabulated data from CMs in ten-year intervals covering the years 1880-1930. For these years there is information for industry-city cells on the value of capital employed, separated into different categories (land, machines, buildings, etc) in later years. We estimate the production function using the aggregate value of stock of capital as our measure of K, which is feasible in all years.[8] As for labor, the number of workers is reported by categories such as gender and broad occupation. The measure used for the production function estimation is the sum of workers in all categories, combining skilled and unskilled jobs together. For all samples, the output level and costs of materials is available. We compute the value added of manufacturing as the Census computes it, that is by subtracting the costs of materials from the value of output.

The data correspond to the aggregation of inputs and product of the establishments of an industry in a city over a period of time. According to the definition of the census, an establishment is the representation of one or more factories belonging to or controlled by an individual, company or corporation, whether located in the same city, village or county and that belongs to the same industry. Factories situated in a different city, village or county are considered as separate establishments, even if they belong to the same controller.

From 1880 to 1930, the CM reports the information at the level of a city and industry. The

[8] Capital was not tabulated in 1930, so we impute it from horsepower using the relationship between horsepower and capital in the two previous decades, following Lafortune et al. (2019).

geographic coverage of the CM differs by year. The population threshold above which cities were included in each year changed over time. In 1890, the 165 largest cities were included. In 1900, there were 209 cities included and only cities with more than 20,000 inhabitants were detailed in the reports. In 1910 and 1920, only cities with more than 50,000 inhabitants were included. In 1930, the process was more complex and involved restricting cities to those that had a significant amount of manufacturing workers (10,000 was a typical cutoff, but it depended on other factors). Due to this change of geography, and because, with rare exception, cities are within county boundaries, we make "county" the unit of analysis, matching each city to the county they corresponded to.[9] We merged counties over time to ensure that borders were very similar between years, as described in Lafortune et al. (2019).

The map in Figure A.1 shows the counties that enter into our sample (using 1920 county boundaries). The areas in our analysis are the largest metropolitan areas of the period (including counties whose population was 5 to 6 times that of an average US county).

We guarantee consistency of the industries throughout the panel by joining industries that were merged by the Census in any of the periods of interest. We do this in the same way as in Fiszbein et al. (2020). Appendix Table B.1 shows the industry groups we formed in this spirit.

For our regressions, we restrict the sample to those areas for which information is available for at least 3 periods of time. We also exclude industry-year cells where we have information for only one or two areas. This leaves us with a sample of 182 areas and 138 industries categories. There are a total of 16,844 industries-area-year observations.

The database in itself is an important part of the contribution that this research provides. The work described above with respect to the geographical areas and industry categories makes it possible to have a complete panel with consistent industry and urban area definitions over time. This dataset allows us to estimate returns at a lower aggregation level than was previously possible in our period of study, and control for sources of bias fixed at the city level.

It is important to understand how our data differs from those used previously. Our data includes only large cities. If the returns to scale in large cities differs greatly from that of less urban areas, we would obtain different results compared to the previous literature. For example, if one sums up all cities in the state of Massachusetts, the value of inputs and product that is obtained is not equal to what is reported in the census at state level. This is due to the fact that the census, when collapsing the data at the state level, includes both large cities in which detailed information is found (and used in this paper) and other, smaller cities for which no detailed information is shown, and that, therefore, do not appear in the sample we use. On the other hand, for cities that do

[9] The only significant exception to this is New York City, which spans multiple counties and whose county composition changes over time. We therefore construct New York City to cover the five "boroughs" (counties) that make it up at the end of the period. This aggregates together Brooklyn and New York City, which reported as separate cities in earlier years.

show detailed information, not necessarily all industries are shown, but only detailed information of an industry-city if there are at least 3 establishments and if they fulfill a minimum level of sales. For those industries that do not meet the requirement for the census to show detailed data, the information is not presented in our sample, but they would be considered at state level if there are more than 3 establishments within the entire state. The aggregation level may also influence the results found, as different works document that higher levels of return to scale appear at higher aggregation levels (Basu and Fernald, 1997). We will thus be careful in our analysis to explore these sample differences as sources of differences in results.

4 Returns to scale over the full period

With the data presented in Section 3, we can now estimate production functions and returns to scale as was described in Section 2. Table 1 shows the results of the estimation of the Cobb Douglas specification for equation (3). It is estimated at the industry-city level with value added as a dependent variable. The results show that when increasing capital and labor by 1%, output increases by 0.24 and 0.70% respectively, which says that when augmenting all inputs by 1%, output increases by 0.94%, implying slightly decreasing returns to scale. In comparison, James (1983) finds for the flour industry that the levels of return to scale vary between 0.85 and 1.1 over time. On the other hand, Atack (1977) finds for the different industries that the average company has returns to scale between 0.7 and 1.5, with the majority of establishments in the ranges of constant returns to scale. By means of estimation tests, Cain and Paterson (1986) argue the presence of increasing returns to scale but do not present the level of return to scale of the industries, making it impossible to compare the magnitude between our estimates and theirs.

Table 1: Estimates at the city-industry-year level

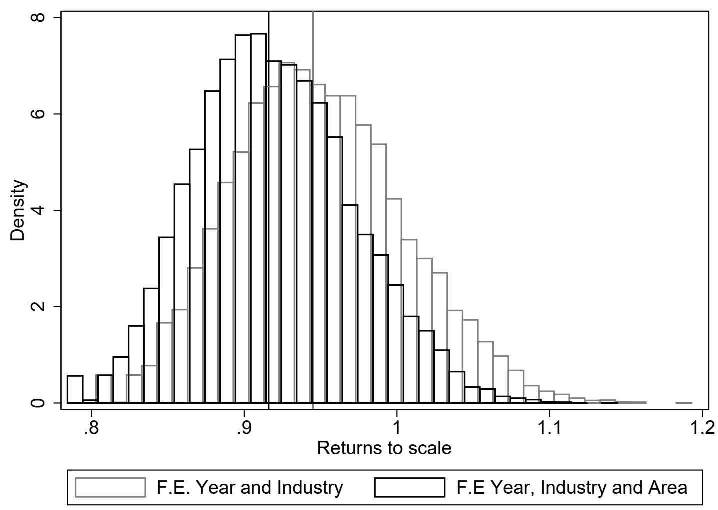
	Cobb Douglas		Translog	
	(1)	(2)	(3)	(4)
β_k	0.242***	-0.500***	-0.269***	-0.276***
	(0.009)	(0.033)	(0.032)	(0.031)
β_l	0.693***	1.239***	1.067***	1.048***
	(0.014)	(0.028)	(0.024)	(0.022)
β_{kk}		0.106***	0.065***	0.064***
		(0.004)	(0.004)	(0.004)
β_{ll}		0.119***	0.093***	0.087***
		(0.005)	(0.005)	(0.004)
β_{kl}		-0.099***	-0.064***	-0.062***
		(0.003)	(0.003)	(0.003)
Median return to scale	0.937	0.923	0.945	0.916
Fixed effects Industry	No	No	Yes	Yes
Fixed effects Area	No	No	No	Yes
R^2	0.957	0.962	0.971	0.974

N=16,844. All regressions include year fixed effects. Standard errors are clustered by areas. The dependent variable is the log of value added by manufactures in the cell. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Columns (2), (3) and (4) show the results of the translog specification. Column (2) considers only the inclusion of time fixed effects while industry fixed effects are added in Column (3) and area fixed effects in Column (4). These specifications do not impose homotheticity. We reject that the coefficients associated with the non-linearities are zero at the 1% level in each of columns (2)-(4) (not shown in table) and therefore reject homotheticity; the level of returns to scale does depend on the input level. We will only present the translog specification for the rest of the paper.

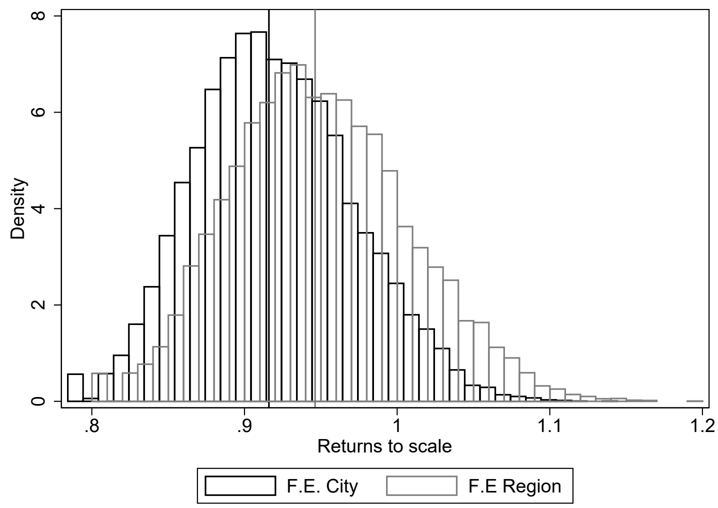
Rejecting homotheticity means there is thus no longer one value for the returns to scale but a full distribution. We thus calculate the level of returns to scale of each observation for the specifications of Columns (2), (3) and (4) according to equation (5). We find that the large majority of our observations display decreasing returns to scale, that is the returns summed to less than 1. The medians for each specification range between 0.92 to 0.95 depending on the introduction of fixed effects. Figure 2 plots the distributions of returns to scale for Columns (3) and (4), and shows the effect of incorporating fixed effects at area level in the returns to scale. The difference between the results with and without fixed effects for areas allow us to measure how much of the measured returns to scale may be biased because of factors constant within a city that increases firms productivity. We find that the returns to scale when including area fixed effects are substantially lower than those excluding them. The median falls from 0.95 to 0.92 once they are included. This suggests that part of the higher returns to scale observed in cities appear to be linked to agglomeration economies rather than returns to being big. The fact that industries are larger in larger cities confounds the analysis. The previous literature also attempted to capture geographical advantages but did not have the level of geographical details we are able to employ. In Figure 3, we show that introducing fixed effects for larger geographical units, like regions, would not lead to the same result.[10] This suggests that the productivity benefits appear to be much more local than at the region or state level. This explains part of the differences with the existing literature that finds higher levels of return to scale and also indicates that the inclusion of these fixed effects reduces endogeneity in the estimations of returns to scale that were present in other papers.

Figure 2: Effect on returns to scale of adding the city as fixed effect



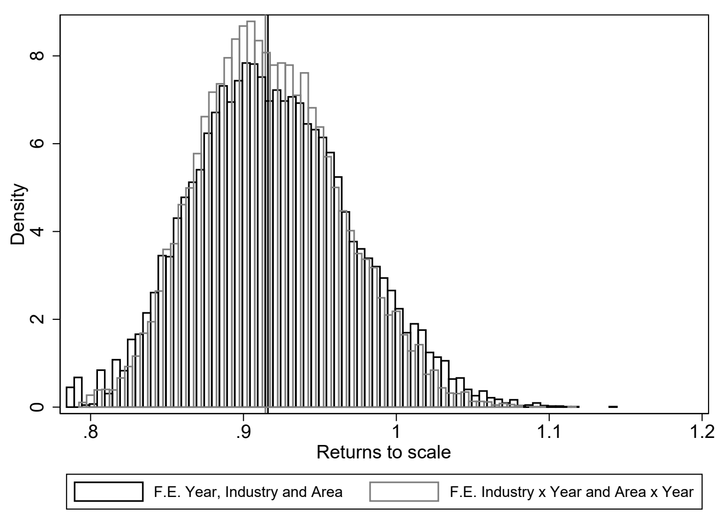
[10] James (1983) considers 4 geographical regions: Central East, North East, South and East.

Figure 3: Comparison geographical fixed effects



Despite the larger set of controls used than the previous literature, our preferred specification could still be more exhaustive. We are actually able not only to control for fixed effects by time, industry and geographical area but also for the double interactions of these since our inputs and outputs are measured at the cell-level. However, doing so reduces the degrees of freedom of our estimation without much impact. Returns to scale are practically the same when the interaction among fixed effects is included in the regression, as shown in figure 4. The medians are almost superimposed.

Figure 4: Interactions between F.E.



4.1 Differences with literature

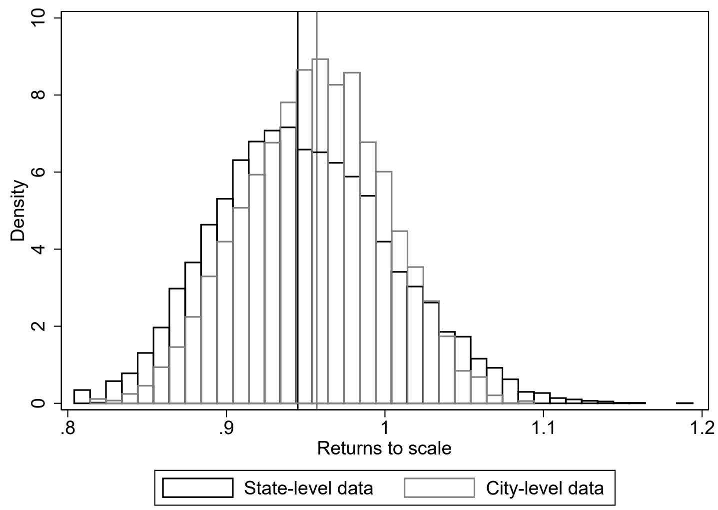
In the previous sections the returns to scale estimated are lower than those found in the existing literature. We find a very small number of cells appear to display increasing returns to scale. When comparing with James (1983), who uses a methodology similar to the one used in this work, some differences arise with regard to how estimations are carried out, of which the most important are the following: (i) the panel incorporates years 1850-1890, (ii) James uses a higher level of geographical aggregation, using information of inputs and outputs of industries at state level, and (iii) he considers only the 16 industries with the highest output level.

We have already argued above that the introduction of area-level fixed effects appears to substantially lower our estimates of returns to scale, suggesting a certain source of endogeneity in geographical advantages. We now wish to explore whether any of the other differences in our strategy may also be responsible for the differences in results.

The differences in the years used are exploited in the next section to understand the dynamics of returns to scale, but it does not seem to be a plausible explanation for the gap. In results not reported here, we found little evidence that the returns for the 1860-1870 period were closer to the increasing returns range. We chose to focus on the 1880-1930 period as this allows us to work with the part of the sample where the information is consistently provided at the level of a city. In years previous to that, the most fine level of geographical disaggregation provided was at the county level.

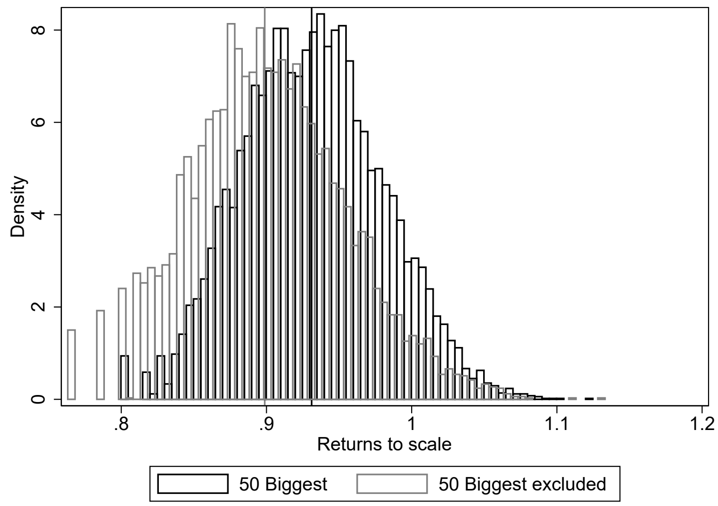
Another factor that might make a difference is the adding of information in a larger geographical unit. As set out before, literature has documented that higher returns to scale appear at higher aggregation (Basu and Fernald, 1997). To find out whether this factor explains the lower level of return to scale, we compare the distributions of returns to scale at industry-city level with industry-state estimations (computed by aggregating our city-industry data at the state level) in which both estimations incorporate fixed effects of time, industry and state. The results presented in Figure 5 show that the distribution of returns is quite similar in both estimates, and that results at city level seem to be slightly higher, rather than lower, than the estimations at state level. This indicates that the aggregation level is unlikely to be the source of difference between our results and those from literature.

Figure 5: Impact of aggregation



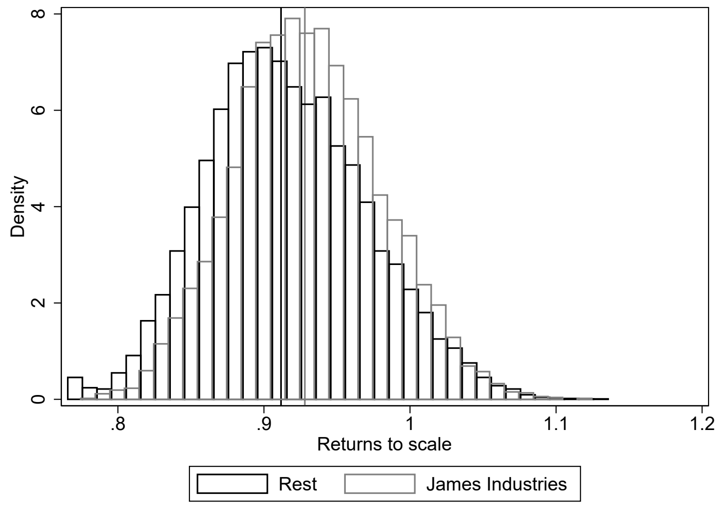
Which geographical areas are in the sample may also affect our estimates of returns to scale. The data presented are at city level and therefore smaller cities, towns and rural areas are excluded; industries in some cities that do not meet minimum requirements for the census to present the detailed information will also be excluded. We cannot know exactly what the level of return to scale is in those places since we have no information, but we can see whether places with a different magnitude of capital accumulation – a measure of size – have different levels of return to scale. In order to check whether this is a likely source of differences in our results, we estimate the production function for the 50 areas with highest capital level and the rest of the cities including fixed effects of area, time and industry. We then plot the distribution of returns to scale in Figure 6. This figure reveals that the larger cities show a higher level of return to scale. Thus, this does not seem a plausible explanation for our difference with the existing literature since our estimates include geographical areas with higher returns to scale than those that appear to have been excluded from our analysis.

Figure 6: Returns to scale: size of cities



Finally, the work of James (1983) analyzes only 16 important industries, considering the 10 industries with highest added value in 1860 together with 6 other industries. Because our analysis includes all industries, our differences in results could stem from the difference in coverage by industry if the industries with higher added value selected by James are also those with the highest levels of return to scale. In order to understand whether this creates differences in the returns to scale we estimate the production function at the area-industry-time level for all industries and for the 16 chosen by James (1983). We then plot the returns to scale of both estimations to compare them. The 16 industries identified by James translate into only 13 of our 122 industry groups. This is because some of the selected industries are combined in our own data. The estimated returns to scale, presented in Figure 7, are very similar for both sets of industries, and the medians are very close to one another. We thus argue that the selection of industries in the previous literature does not explain the difference in returns to scale.

Figure 7: Difference in industries included does not explain the difference



We argue that the combination of all these results suggests that the main difference between our estimates and that of the previous literature stems from the fact that we are able to better capture agglomeration economies that were previously attributed to returns to scale.

4.2 Estimations for Average Establishment

Having reconciled our results with that of the literature, we now estimate the returns for the average establishment, by normalizing inputs and outputs by the number of plants. Table 2 shows the estimates. In the Cobb Douglas specification, in column (1), the capital and labor elasticities are 0.26 and 0.69 respectively, placing the return to scale at 0.95. This would be similar to the 0.94 found in the Cobb Douglas estimation above, indicating that the returns to scale are slightly less decreasing at the average establishment than at the industry-area level.

Table 2: Estimates at the average establishment level

	Cobb-Douglas		Translog	
	(1)	(2)	(3)	(4)
β_k	0.262***	-0.479***	-0.303***	-0.283***
	(0.003)	(0.023)	(0.021)	(0.022)
β_l	0.692***	1.494***	1.338***	1.272***
	(0.005)	(0.025)	(0.024)	(0.023)
β_{kk}		0.109***	0.068***	0.064***
		(0.003)	(0.003)	(0.003)
β_{ll}		0.043***	0.008	0.023**
		(0.010)	(0.010)	(0.009)
β_{kl}		-0.100***	-0.059***	-0.056***
		(0.005)	(0.004)	(0.004)
Median return to scale	0.954	0.968	1.002	0.987
Fixed effects Industry	No	No	Yes	Yes
Fixed effects Area	No	No	No	Yes
R^2	0.928	0.937	0.952	0.957

N=16,844. All regressions include year fixed effects. Standard errors are clustered by areas. The dependent variable is the log of value added by manufactures per establishment in the cell. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

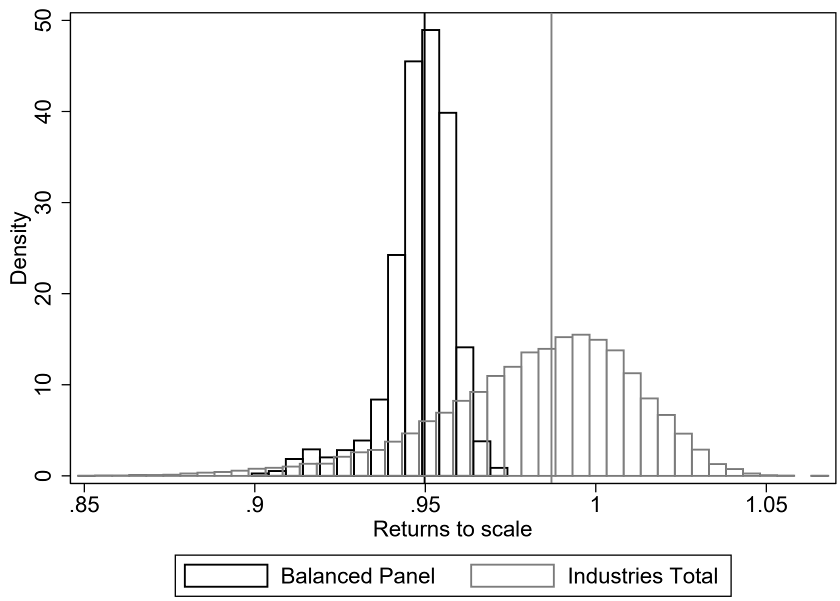
Like in the previous specification, we again reject that the production function is homothetic. We also see that, once more, the inclusion of area fixed effects reduces the estimates of the returns to scale. Appendix Table A.1 shows that including fixed effects by city also reduces dramatically the returns to scale compared to region or state fixed effects. Appendix Figure A.3 displays the difference graphically. Thus, the importance of controlling for local advantages continues to be relevant when looking at returns to scale for an average establishment.

We also show that the fixed effects explain a fraction of the variation present in our data. In Appendix Table A.2, we show city fixed effects on their own explain around 9 percent of the variation in returns to scale. Industry level fixed effects on their own explain around 29 percent of the variation in returns to scale. Finally, combining both fixed effects can explain around 36 percent of the variation in returns to scale. This suggests that while the introduction of these controls is very important, it does not explain all the variation, leaving a crucial role for the inputs. In column (4) of the table, we see that the explanatory power of our regressions is around 96 percent once we add our full sets of input measures.

We also observe slightly larger returns to scale at the level of the average establishment than at the level of the aggregate. This suggests a negative correlation between the number of plants and productivity. This also suggests that the increased concentration of production documented over this period would not have been justified by economies of scale, but rather by an absence of competition. The lighter bars in Figure 8 present the returns to scale estimates obtained from Column (4). We find again limited evidence that the returns to scale are generally above 1 over the period. Most of the returns are concentrated between 0.9 and 1.

Finally, since the rest of our analysis will look at evolution over time, we also show, in this figure, the returns to scale estimated for cells that are continuously present in our panel data set (darker bars in Figure 8). We show that the returns to scale estimated in cells that are continuously present in our panel are even lower than the ones estimated in all cells. Given that the cells that are continuously present are larger than those who are entering and exiting our panel, this reinforces our result of decreasing returns to scale.

Figure 8: Returns to scale for the average establishment, total and cells in balanced panel



We also correlate the returns to scale with different city, industry and cell characteristics to establish what may explain the patterns we have presented so far. Results are available in Table 3 where we measure characteristics in 1890. The first column suggests, as shown in Figure 6, that large cities have lower returns to scale. Agglomeration benefits would thus stem from having many firms together in one geographical location but not of being a larger establishment within these larger cities. The second column indicates that industries with larger capital stocks and or skill ratios also have higher returns to scale.[11] The opposite is true for those with larger energy demands. Finally, we use two proxies of market concentration in column (3) which includes whether the cell has above median average establishment in terms of value-added and employment, respectively. We find that

[11] Note the finding for capital can also be derived from the coefficients themselves: the effect of a one-unit increase in ln capital on returns to scale is given by $\beta_{KK} + \beta_{KL} > 0$; a one-unit increase in the ln capital/labor ratio on returns to scale is given by $\beta_{KK} - \beta_{LL} > 0$. Thus, sensibly, capital intensity is associated with higher returns to scale.

in both cases, more concentrated cells have lower returns to scale, indicating that monopolies of the era were not necessarily big because that made them more productive, but more probably because of market frictions that allowed them to gain market share. This conclusion is unaffected by adding simultaneously all correlates in column (4). We observe that the coefficients on the industry-level correlates shrink in size once combined, and the horsepower coefficient is no longer significant.

Table 3: Correlates of returns to scale for average establishment

	(1)	(2)	(3)	(4)
Above median number of establishments (areas)	-0.004**			-0.002
	(0.001)			(0.001)
Above median total capital stock (areas)	-0.007***			-0.005***
	(0.001)			(0.001)
Above median capital stock (industries)		0.010***		0.005***
		(0.002)		(0.001)
Above median skill ratio (industries)		0.018***		0.010***
		(0.001)		(0.001)
Above median HP (industries)		-0.002*		0.000
		(0.001)		(0.001)
Above median average plant size (by VA)			-0.007***	-0.007***
			(0.001)	(0.001)
Above median average plant size (by Employment)			-0.022***	-0.019***
			(0.001)	(0.001)

N=7,607. This table presents the results of a regression of estimated returns to scale from column (4) in Table 2 on area level characteristics (column (1)), industry-level characteristics (column (2)), cell characteristics (3) and the combination of all in the last column. Standard errors clustered by area. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5 Evolution of returns to scale over time

Having shown that returns to scale appear to have been in general below 1 over the full period, whether we use the full cell or the average establishment, we now turn to exploring how this return may have evolved over time. Concerns over "bigness" appear around the turn of the twentieth century, potentially implying that the returns to scale may have been growing over time. Lafortune et al. (2019) suggests that the complementarity between capital and skill arose over this period as well. Finally, Fiszbein et al. (2020) emphasizes how the arrival of electricity substantially increased labor productivity suggesting another channel through which returns to scale could have changed over this period. This section will thus first estimate returns to scale by period and then evaluate critically the role of different explanatory factors.

5.1 Estimation of returns to scale by period

In order to tackle the question about a change in returns to scale around the turn of the century, we re-estimate equation (7) separately for two different periods, 1880-1900 and 1910-1930. Figure 9 and Table 4 show that returns to scale grew substantially between the two. While returns in the first period are almost entirely in the range of decreasing returns (below 1), in the second period, a substantial share of cells display increasing returns to scale with some even rising above 1.1. The median return increases from 0.96 to 1.02. The results show that the years considered in this work and in the work of James (1983) does not explain the gap in returns to scale; on the contrary, the higher returns are in the years after 1890, which James (1983) does not cover.

In the previous section, we argued that the introduction of city-level fixed effect was very important in explaining our difference with the literature. This is also the case for the change over time. While not shown, the introduction of fixed effects by cities reduces the returns to scale for the early period much more significantly than it does for the second, implying that we would have underestimated the rise in returns to scale had we not properly controlled for agglomeration effects at the city level.

Turning to Table 4, we see that it is the return to labor that increased substantially over this period. In the early period, the linear component of the return to labor was 1.0055 but increased to 1.2081 in the later period. While the quadratic component of labor also became more negative, the overall result is one where each unit of labor produces more output in the later period than previously.[12] Returns to capital fall significantly over this period. The non-linearity in returns is particularly marked in the second period. Furthermore, the interaction between our two inputs increases, suggesting increased complementarity between labor and capital in the later period. This is consistent with Lafortune et al. (2019) who shows that capital became complementary with skilled labor around the turn of the twentieth century. While one may think that this simply reflects an increase in workers' skills, we find that percent of manufacturing workers in the Census of Population that were literate increased only from 93.8 to 94.4 between 1880-1900 and 1910-1930. Thus, it is not clear that the "skill" of workers over this period changed radically enough to fully account for the increase.

[12]This is even more visible if we impose a Cobb-Douglas form, not shown in table, where we estimate the return to labor rose from around 0.55 to around 0.85.

Figure 9: Returns to scale over time

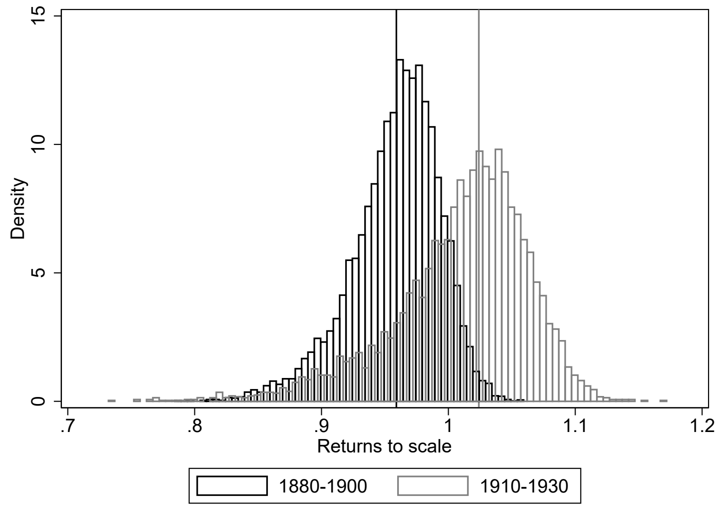


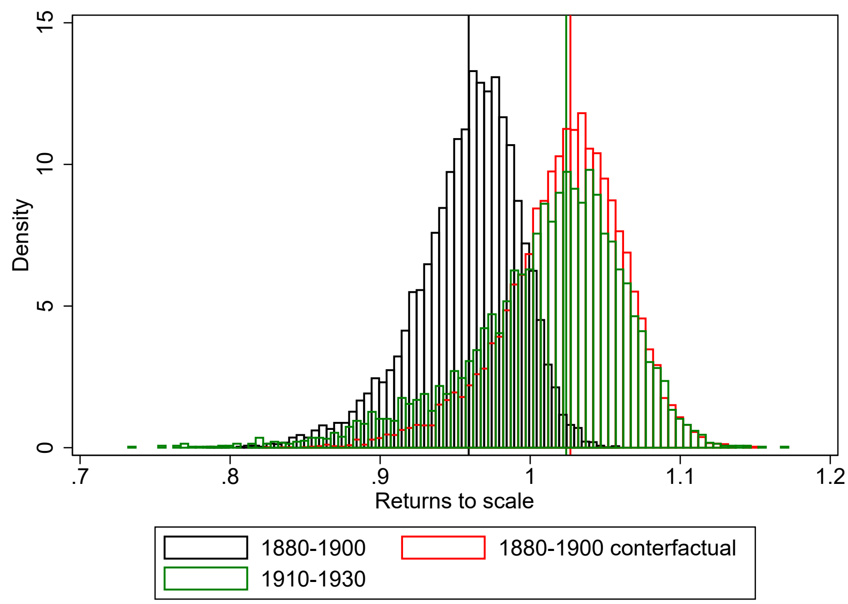
Table 4: Returns to scale over time (average)

	1880-1900 (1)	1910-1930 (2)
β_k	-0.104**	-0.294***
	(0.049)	(0.034)
β_l	1.006***	1.208***
	(0.067)	(0.036)
β_{kk}	0.046***	0.045***
	(0.008)	(0.004)
β_{ll}	-0.024	-0.046***
	(0.018)	(0.013)
β_{kl}	-0.027**	-0.017***
	(0.011)	(0.005)
Median return to scale	0.959	1.024
R^2	0.952	0.941
N	11,178	5,666

All regressions include area, industry and year fixed effects. Standard errors are clustered by areas. The dependent variable is the log of value added by manufactures per establishment in the cell. The first column includes only observations between 1880 and 1900 while the second, those between 1910 and 1930. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

We confirm that the change between periods is due to changes in returns to the factors and not to change in the distribution of inputs by constructing a counterfactual distribution of returns to scale, in the spirit of an the Oaxaca decomposition. Specifically, we take the distribution of capital and labor of cells in 1880-1900 and re-estimate the returns to scale by assuming that the coefficients of the production function were those of the 1910-1930 period. We present these results in Figure 10. We show that returns to scale in the early period would have been almost as large as those in the second period had only the coefficients of the production function changed. Little appears to depend on a changing distribution of inputs at the cell level.[13]

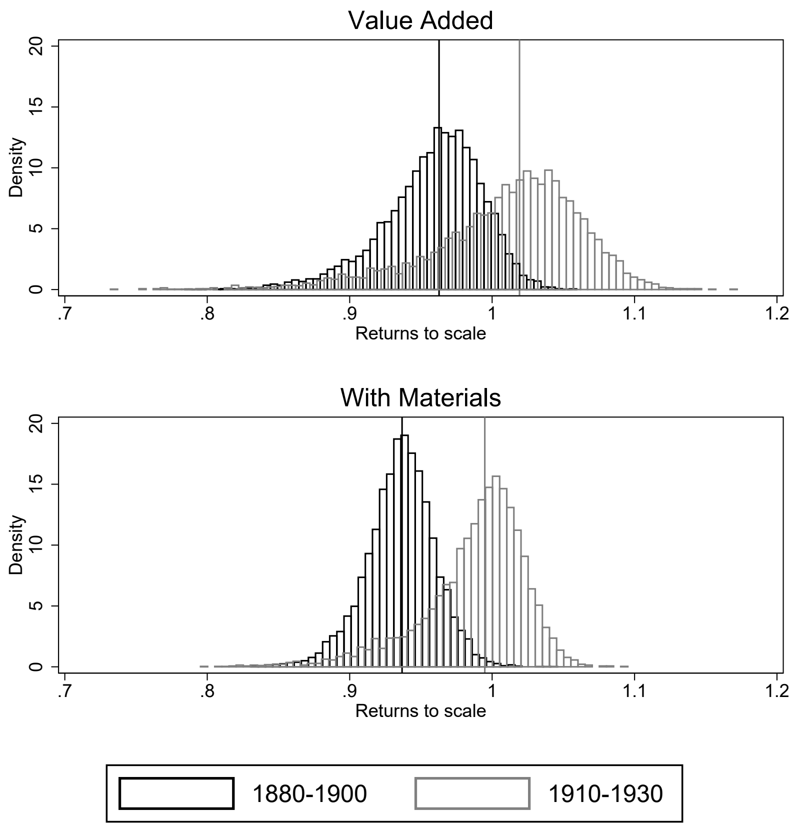
Figure 10: Counterfactual returns to scale



To confirm that this is not due to a change in materials costs, we re-estimated the production function but adding materials as another inputs in the translog production function. We then use as our left-hand side variable in our estimation equation the log of value of output instead of using value added. Figure 11 show that our conclusions are unchanged when using that alternative specification. Returns are slightly smaller in both periods using this alternative but the increase between the two periods is still very marked. The median rises from 0.94 to 1.

[13] As in any Oaxaca decomposition, we could have also computed an alternative counterfactual, this time asking what would the later period returns would have looked like if the coefficients of the production function had remained the ones of the early period. We reach a similar conclusion in that case, namely that most of the change occurred because of a change in the coefficients and not because of a change in the distribution of inputs. Results not presented but are available upon request.

Figure 11: Returns to scale over time, by whether using value added or including materials as an input



5.2 Explanations

Why did returns to scale increase at the turn of the twentieth century? Any explanation one can provide must also include why the return to labor increased. We focus on a few hypotheses and look at whether any heterogeneity analysis is consistent with that division.

To do this, we use the same regression strategy as before but expand it to measure the correlates of the change in returns to scale rather than the levels. For this, we regress the returns to scale for each cell against a fixed effect for each year, industry and city. We then interact city, industry and cell characteristics with an indicator for being of the "late" time period. Through that, we wish to test whether the impact of these characteristics on returns to scale has strengthened or weakened over time.

Since we previously found that there was a very important role for local synergies, we first explore whether the increase in returns to scale was more marked in big or small cities. Regression results in Table 5 do not show any indication that the growth in returns to scale was larger for bigger

Table 5: Correlates of the change in returns to scale for average establishment

	(1)	(2)	(3)	(4)
Above median number of establishments (counties)	-0.005			-0.006*
	(0.004)			(0.003)
Above median total capital stock (counties)	0.001			-0.000
	(0.004)			(0.003)
Above median capital stock (industries)		-0.010***		-0.010**
		(0.003)		(0.003)
Above median skill ratio (industries)		0.004**		0.010***
		(0.002)		(0.002)
Above median HP (industries)		0.019***		0.018***
		(0.002)		(0.002)
Above median average plant size (by VA)			0.003	0.001
			(0.003)	(0.003)
Above median average plant size (by Employment)			0.014***	0.018***
			(0.003)	(0.003)

N=7,607. This table presents the results of a regression of estimated returns to scale from column (4) in Table 4 on an interaction between an indicator for being in 1910-1930 and area level characteristics (column (1)), industry-level characteristics (column (2)), cell characteristics (3) and the combination of all in the last column. All regressions include area, industry and year fixed effects. Standard errors clustered by area.

or smaller cities. Appendix Figure A.4 shows, in the top panel the evolution of returns to scale for the geographical areas that had above median establishments in 1880. The bottom panel focuses on geographical areas that had below median number of establishments. It appears returns were already larger in small cities and increased between the two periods. In larger cities, we see a significant shift from a setting where most firms have decreasing returns to scale to one where the majority of cells display increasing returns but the overall change is relatively similar in magnitude.[14] This suggests that the hypothesis of Michaels et al. (2018), who found an increase in labor specialization which benefited occupations where human interactions are more important, may have occurred later in the XXth century in manufacturing.[15]

Our second hypothesis stems from the results of Lafortune et al. (2019) who show that around 1880, capital increased its complementarity with skills. We cannot consistently estimate the skills of the work force in our data set and use a translog with that level of detail for labor input. However, we can estimate our main equation separating industries in those that were initially more skill intensive in 1880 from those that were less. To do that, we classify wage workers as "low skill" and clerks as "high skill" and divide the industries by the ratio of these two factors in 1880. We

[14] While not presented here, we also exclude as a potential explanation for our pattern composition effects from the arrival or exit of some cities in our panel. The results look very similar if we only focus on the cells continuously present in our balanced panel.

[15] Indeed, the differential urban increase in the "interactiveness" of manufacturing jobs from 1880 is only statistically significant starting in 1940 (see Table 6 in Michaels et al., 2018).

observe, in Table 5 that higher skill ratios industries are correlated with a larger increase in returns to scale. Appendix Figure A.5 presents the distribution of estimated returns to scale for those with a high-to-low skill ratio above the median in the first panel and those with such a ratio below the median in the bottom figure. We observe a stronger movement of the distribution of returns to scale to the right in the top panel compared to the bottom one. While the median shifts from 0.98 to 1.03 in the top panel, it moves from 0.97 to 1.01 in the bottom one. This would suggest that returns to scale, and particularly returns to labor, increased more in sectors that were initially more intensive in human capital. This would be consistent with capital and skill becoming more complementarity over this period.

On the other hand, industries with higher capital stock were likely to observe a slower than average growth in their returns to scale. This is consistent with the fact that we observed that it was the return to labor, more than that of capital, that increased over this period.

Many have emphasized the potential role of technological change over this period. The Second Industrial Revolution is already well under way by 1910, our inflection point, but some of the most modern inventions of that revolution, namely electricity and the combustion engine, are making their massive entry into the manufacturing industries around that time. To explore whether this could be a reason explaining the increasing returns to scale we estimated, we divide our sample by the energy-intensity of industries in 1880. Fiszbein et al. (2020) show this variable to be a good predictor of how electric-intensive a sector is likely to become by 1910-1920. Table 5 indicates that this also is a very good predictor of sectors whose returns to scale grew more over the period. Appendix Figure A.6 shows the distribution of returns to scale for industries that had above median horsepower per output in 1880 in the top panel and those that had below the median horsepower per output in the bottom panel. This graph suggests similarly that electricity played an important role in the rising importance of labor and in increasing returns to scale. This is because, for industries that were high in energy demands before the introduction of electricity, we observe a large increase in their returns to scale over time. The median increases from 0.97 to 1.02. On the other hand, industries that had limited energy demands, displayed on the bottom panel, experienced a smaller increase in their returns to scale. The median goes from 0.97 to 1.01 within this time period. This suggests that the arrival of electricity to American manufacturing increased the benefits of being large.

Finally, there is, over this period, a concern about “bigness” being synonymous with non-competitive. The anti-trust measures in the United States are born over this period because of a clear sense that some large firms were behaving monopolistically. We unfortunately do not have information regarding the level of concentration of a given industry-city. However, we propose to use a measure of size of the average establishment as a proxy for less competitive cells. The idea would be that in an industry-city where the average establishment is substantially larger than another may have firms who can exert more market power. We thus measure the size of the average establishment (in terms of value-added or employment per establishment) in an industry-city cell in 1880 and classify those above the median size as being "large". Results presented in Table 5 suggests that cells that had larger firms in terms of employment (but not in terms of value-added), experienced a more substantial increase in their returns to scale over this period. The distribution of returns is presented graphically in Appendix Figures A.7 and A.8. In the top panel, we show the distribution of returns for cells with small average establishments while the bottom panel shows the distribution for cells with large average plants. Figure A.7 indicates that while cells with larger firms had lower returns to scale before 1910, these increased substantially after that date, almost equaling those in cells with smaller establishments. While the median increases from 0.99 to 1.02 in the top panel, it grows from 0.94 to 1.01 in the bottom one. We show, in Appendix Figure A.8, that the pattern is a bit weaker but still visible when separating cells by value-added rather than employment. When combining both definitions in Table 5, we see that only the one based on employment is statistically significantly linked to an increased in returns to scale. Thus, this would suggest that firms that had more market power used this to find new advantages of their size in the turn of the twentieth century.

6 Conclusion

This paper estimates production functions of capital and labor for industries in US cities in the period 1880-1930 using a translog functional form that includes fixed effects of time, industry characteristics and geographical location to estimate their level of return to scale. This is made possible by the digitalization of a rich panel of industry-city data on manufacturing establishments in the United States.

The results reject an hypothesis of returns to scale above one for a majority of the sample over the full period, contrary to many previous studies, because of our capacity to capture the important local synergies visible in the data. These results would indicate that Chandler's (Chandler Jr, 1977) hypothesis of returns to scale being larger than one in this period is not true, consistent with Margo (2015)'s argument that there were productive small firms at the end of the nineteenth century. It seems to be that the organization in an oligopolistic structure, predominant during these years in the US industry, was not generated by larger returns to being "big" but rather by non-competitive practices. Instead of finding widespread evidence of "natural monopolies", our results point instead to "agglomeration benefits" with substantial advantages to all firms located in large cities. Ignoring those previously led to a over-estimation of returns to scale.

Interestingly, we were able, thanks to our new data to estimate the evolution of returns to scale until the Great Depression, something that had not been done previously. We estimate that these returns grew substantially after 1900, particularly because of a large increase in the returns to labor. This appears to have occurred more importantly in industries that were more skill-intensive and energy-intensive and in cells that had larger average establishments initially. This suggests that the increased complementarity between skills and capital and the introduction of electricity may explain part of the evolution. Bigger establishments appear to have been able to exploit this increased productivity of workers and their increased complementarity with capital. New production functions, instead of leveling the playing field, appear to have instead increased the returns to being big for those who were already there.

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A Additional Figures and Tables

Figure A.1: Counties in our sample using 1920 boundaries

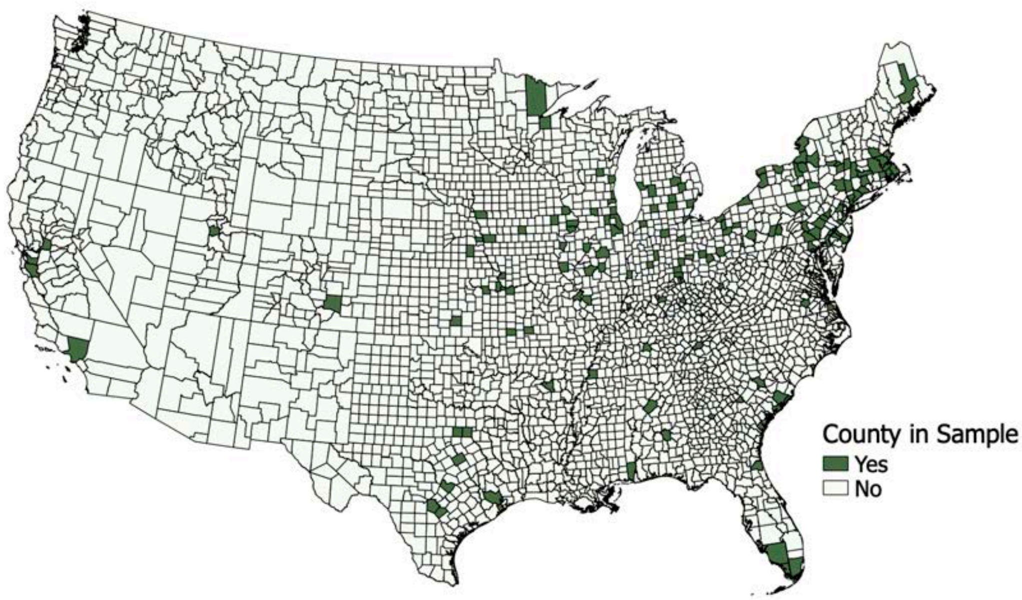

Figure A.2: Average capital per firm by city-industry, 1880-1930

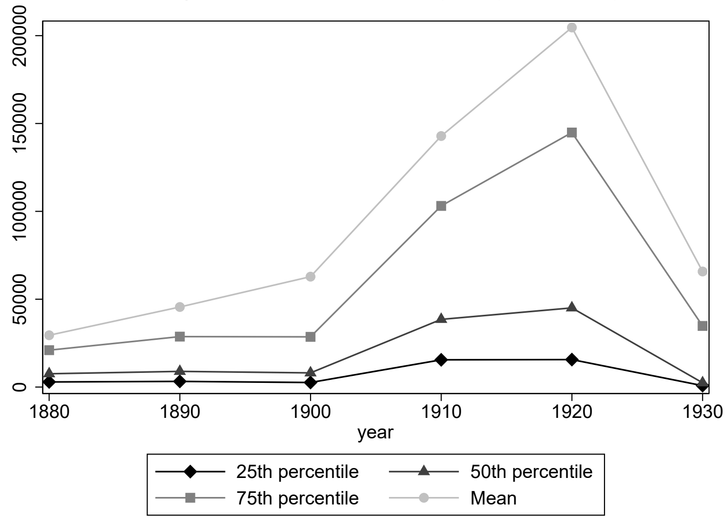

Figure A.3: Comparison geographical fixed effects

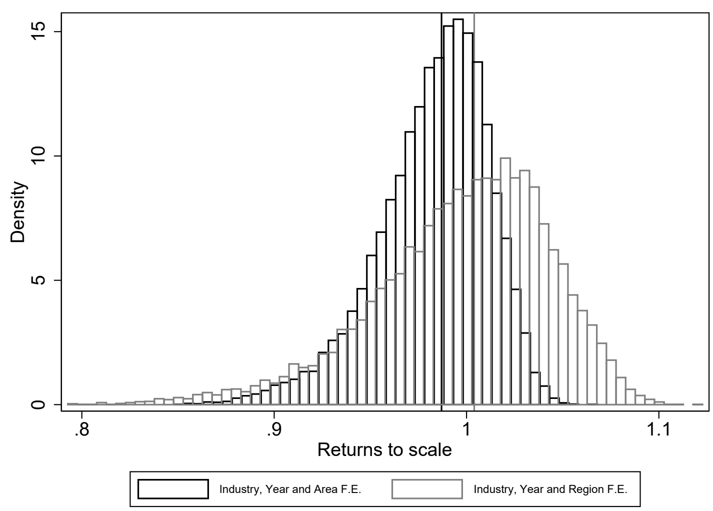

Figure A.4: Returns to scale over time, by size of the geographical areas

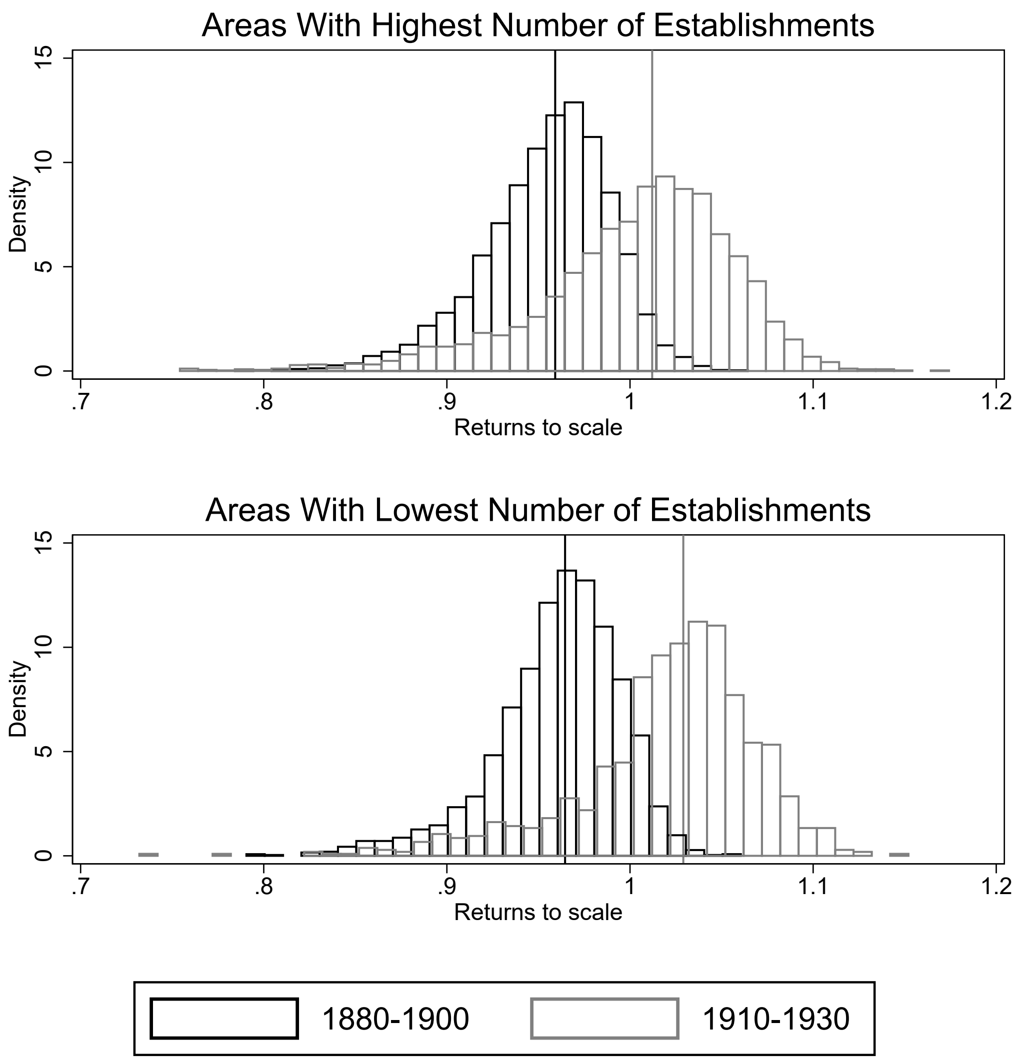

Figure A.5: Returns to scale over time, by initial skill intensity

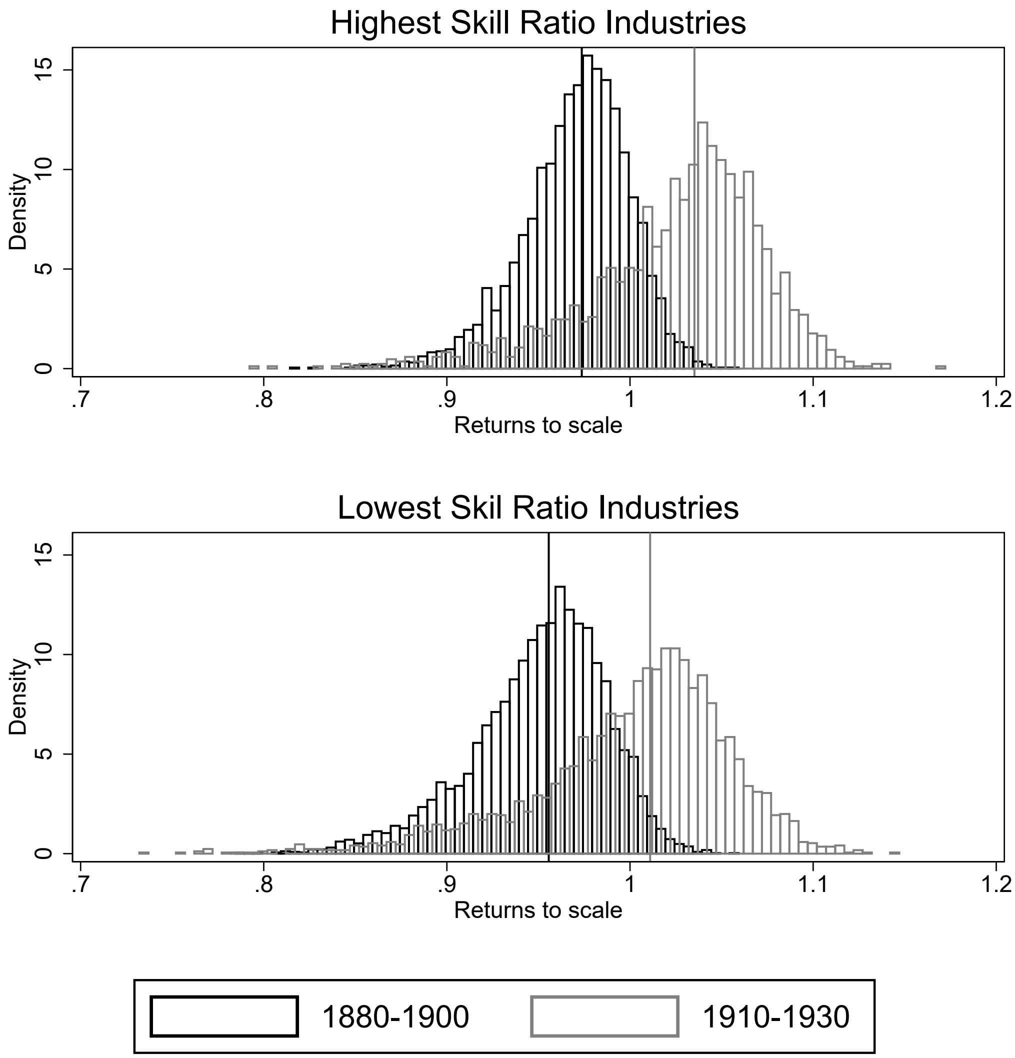

Figure A.6: Returns to scale over time, by initial horsepower intensity

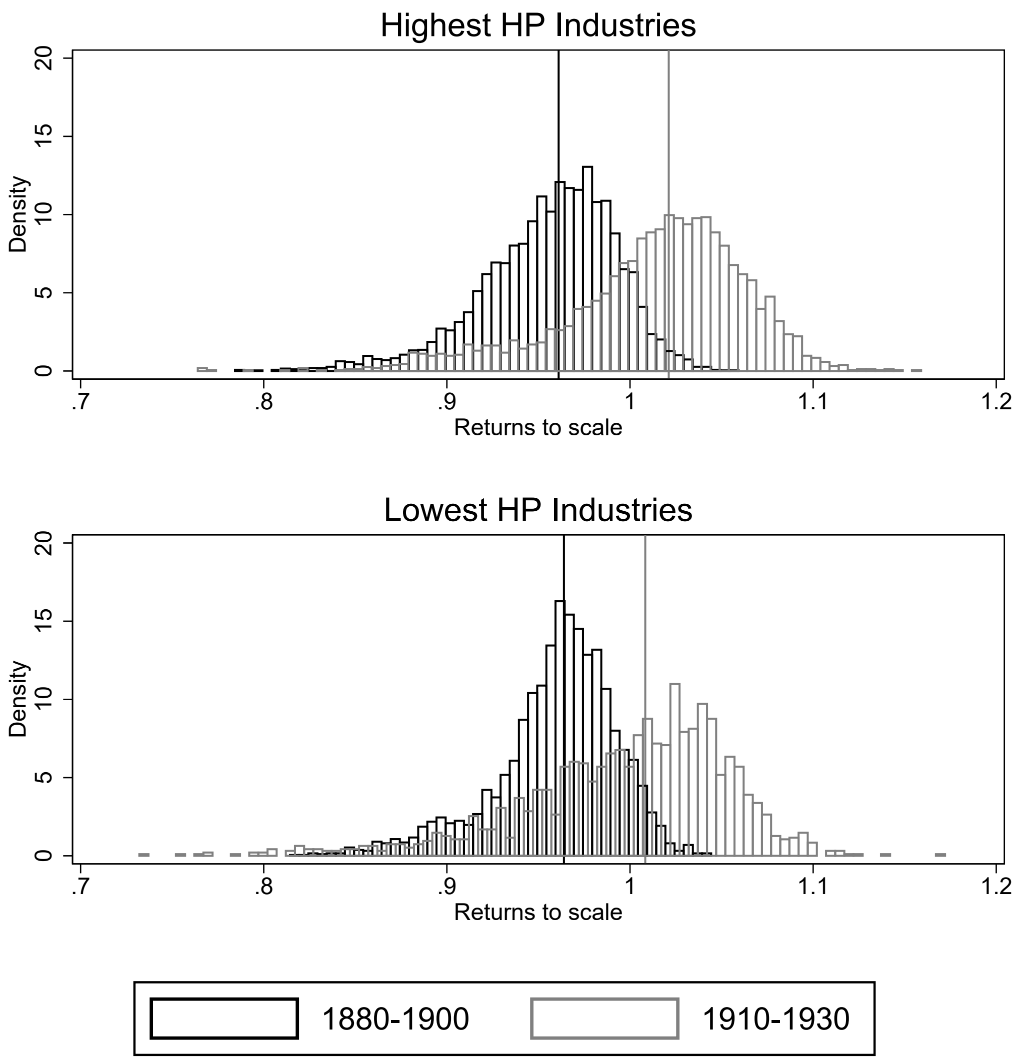

Figure A.7: Returns to scale over time, by size of average establishment in 1880, as measured by workers per establishment

Figure A.8: Returns to scale over time, by size of average establishment in 1880, as measured by value-added per establishment

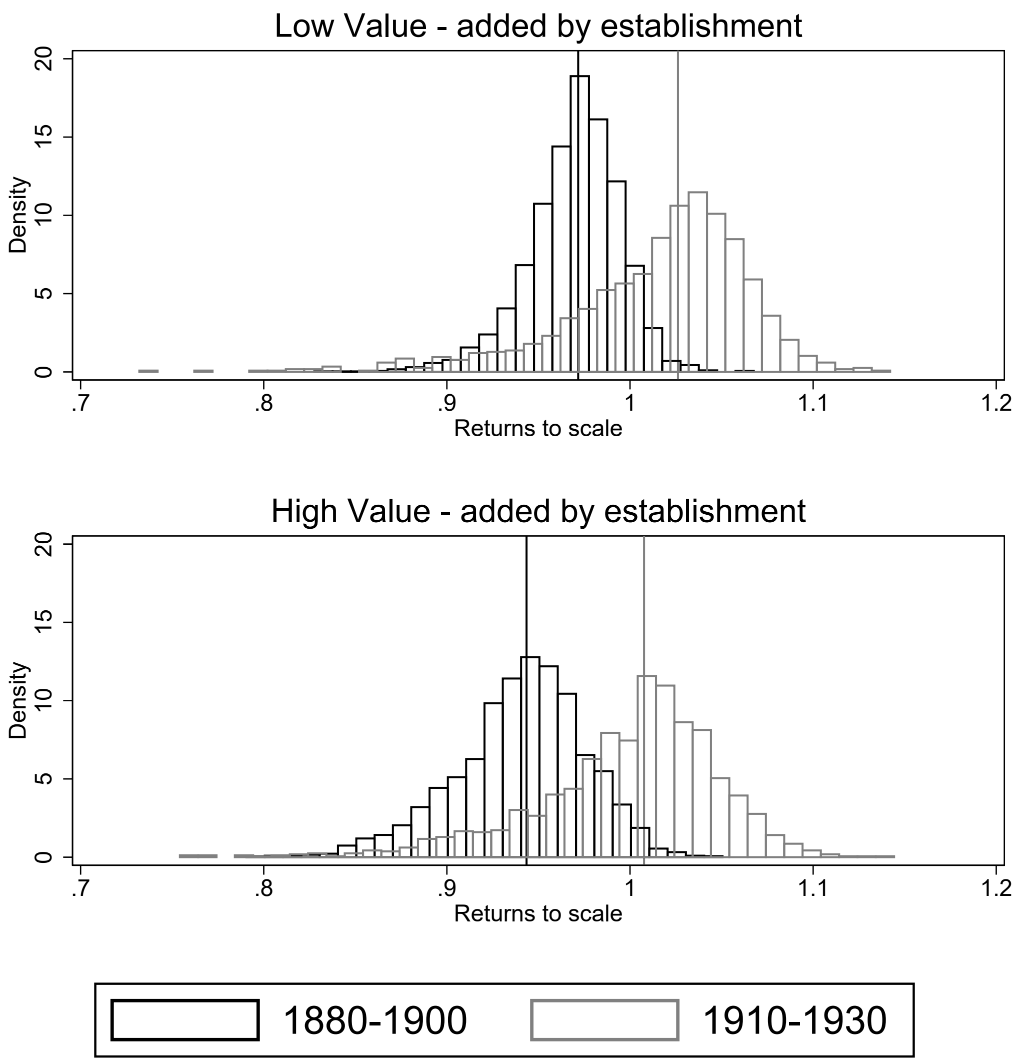

Table A.1: Fixed effects by city-state-region (average)

	City F.E. (1)	State F.E. (2)	Region F.E (3)
β_k	-0.283***	-0.298***	-0.298***
	(0.022)	(0.020)	(0.021)
β_l	1.272***	1.330***	1.334***
	(0.023)	(0.024)	(0.026)
β_{kk}	0.064***	0.067***	0.068***
	(0.003)	(0.003)	(0.003)
β_{ll}	0.023**	0.010	0.011
	(0.009)	(0.010)	(0.011)
β_{kl}	-0.056***	-0.058***	-0.059***
	(0.004)	(0.004)	(0.004)
Median return to scale	0.987	1.005	1.004
Fixed effects Industry	Yes	Yes	Yes
Fixed effects Area	Yes	Yes	Yes
R^2	0.957	0.954	0.953

N=16,844.

Table A.2: Explanatory power of fixed effects

	Area (1)	Industry (2)	Industry-Area (3)
R^2	0.0746	0.3466	0.4057
N	16,867	16,867	16,867

B Industry classification

Table B.1: Industries included in each industry group

Industry 1
Slaughtering and meat packing, not including retail butchering; Slaughtering, wholesale, not including meat packing; Sausage; Slaughtering and meat packing, wholesale; Meat packing, wholesale; Sausage, meat puddings, headcheese, etc., and sausage casings, not made in meat-packing establishments; Poultry, killing and dressing, not done in slaughtering and meatpacking establishments; Slaughtering and meat packing; Sausage casings—not made in meat-packing establishments; Sausages, prepared meats, and other meat products—not made in meat-packing establishments; Poultry killing, dressing, and packing, wholesale; Slaughtering and meat-packing, wholesale; Sausage, meat puddings, headcheese, etc, and sausage casings, not made in meat-packing establishments, sausage; Sausage, not made in slaughtering and meat-packing establishments; Sausage, meat puddings, headcheese, etc, and sausage casings, not made in meat-packing establishments, sausage casings; Poultry dressing and packing, wholesale; Custom slaughtering, wholesale
Industry 2
Cheese; Butter; Butter, reworking; Cheese and butter (factory); Condensed and evaporated milk; Butter, cheese, and condensed milk; Cheese, butter, and condensed milk; Cheese and butter, urban dairy product; Condensed milk; Creamery butter

Industry 3
Food preparations, not elsewhere classified, breadstuff preparations, cereals, and breakfast foods. Macaroni, vermicelli and noodles; Confectionery; Bread and other bakery products; Pickled fruits and vegetables and vegetable sauces and seasonings; Bread and other bakery products (except biscuit, crackers, and pretzels); Ice cream; Food preparations, not elsewhere classified, except breadstuff preparations, cereals, and breakfast foods-for animals and fowls; Pickles, preserves, and sauces, pickles and sauces; Food preparations, not elsewhere classified, except macaroni, vermicelli and noodles-for human consumption; Food preparations, not elsewhere classified, except breadstuff preparations, cereals, and breakfast foods; Feeds, prepared, for animals and fowls; Food preparations, not elsewhere classified; Canning and preserving, fruits and vegetables, canned vegetables; Food preparations; Fish, canning and preserving; Food preparations, not elsewhere specified; Canning and preserving, fruits and vegetables; Canning and preserving, fruits and vegetables, canned fruits; Fruits and vegetables, canning and preserving; Food preparations, not elsewhere classified, except macaroni, vermicelli and noodles and peanut butter and sweetening sirups-for human consumption; Coffee and spice, roasting and grinding, coffee; Food preparations, not elsewhere classified, except breadstuff preparations, cereals, and breakfast foods-for human consumption; Confectionery and ice cream; Oysters, canning and preserving; Cereal preparations; Confectionery and ice cream, confectionary; Lard, not made in slaughtering and meat-packing establishments; Coffee and spice, roasting and grinding; Chewing gum; Food preparations, not elsewhere classified, breadstuff preparations, cereals, and breakfast foods; Food preparations, not elsewhere classified, all other food preparations; Canning and preserving: Fruits and vegetables: pickles, jellies, preserves, and sauces; Canned and dried fruits and vegetables (including canned soups)
Industry 4
Flouring and grist mill products; Flour and other grain-mill products; Flour-mill and gristmill products
Industry 5
Rice, cleaning and polishing; Rice cleaning and polishing
Industry 6
Sugar, refining, not including beet sugar; Sugar refining, cane; Sugar and molasses, refining; Cane-sugar refining; Sugar, beet; Beet sugar; Sugar and molasses, beet; Cane sugar-except refineries; Sugar and molasses, not including beet sugar; Sugar, cane; Sugar, cane, not including products of refineries

Industry 7

Chocolate and cocoa products; Chocolate and cocoa products, not including confectionery

Industry 8

Mineral and soda water: except mineral and carbonated waters; Mineral and soda waters; Beverages; Nonalcoholic beverages; Mineral and soda water: mineral and carbonated waters

Industry 9

Alcohol, ethyl, and distilled liquors; Liquors, malt; Liquors, distilled; Liquors, vinous; Wines; Liquors, rectified or blended; Malt liquors

Industry 10

Malt

Industry 11

Baking powders and yeast; Baking and yeast powders; Baking powder, yeast, and other leavening compounds; Baking powders, yeast, and other leavening compounds

Industry 12

Oleomargarine; Oleomargarine and other butter substitutes; Oleomargarine—not made in meat-packing establishments; Oleomargarine, not made in meat-packing establishments

Industry 13

Corn sirup, corn sugar, corn oil, and starch; Glucose; Starch; Glucose and starch

Industry 14

Flavoring extracts; Flavoring extracts and flavoring syrups; Flavoring extracts and flavoring syrups, not elsewhere classified; Cordials and syrups; Cordials and flavoring syrups

Industry 15

Vinegar and cider

Industry 16

Ice, manufactured; Ice, artificial

Industry 17
Tobacco, chewing, smoking, and snuff; Tobacco, cigars, and cigarettes; Tobacco manufactures; Tobacco, chewing and smoking, and snuff; Cigars; Tobacco, cigars and cigarettes; Cigarettes; Cigars and cigarettes; Tobacco (chewing and smoking) and snuff; Tobacco: Chewing and smoking, and snuff

Industry 18
Cotton goods; Cotton thread; Cotton small wares; Cotton, compressing; Cotton, ginning; Cotton yarn; Cotton broad woven goods; Cotton goods, including cotton small wares; Cotton lace; Cotton, cleaning and rehandling; Cotton narrow fabrics; Lace goods

Industry 19
Silk and rayon manufactures; Rayon narrow fabrics; Silk throwing and spinning—contract factories; Rayon throwing and spinning—contract factories; Silk and silk goods, including throwsters; Rayon broad woven goods—regular factories or jobbers engaging contractors; Silk broad woven goods—regular factories or jobbers engaging contractors; Rayon yarn and thread, spun or thrown—regular factories or jobbers engaging contractors; Silk and silk goods; Silk broad woven goods—contract factories; Silk goods; Silk and silk goods, finished products; Silk narrow fabrics; Silk yarn and thread, spun or thrown—regular factories or jobbers engaging contractors; Rayon broad woven goods—contract factories; Silk and silk goods, throwsters and winders

Industry 20

Woolen, worsted, felt goods, and wool hats; Wool scouring; Men's and boys' hats and caps (except felt and straw); Finishing of men's and boys' hats of fur-felt, wool-felt, and straw; Clothing, women's, factory product; Clothing, women's, contract work, except suits, skirts, and cloaks, shirt waists and dresses, except house dresses; Women's, children's and infants' underwear and nightwear of cotton and flannelette woven fabrics; Hat and cap, except felt and straw men's; Millinery and lace goods, except trimmed hats and hat frames; Wool pulling; Fur hats; Clothing, women's, except suits, skirts, and cloaks, shirt waists and dresses, except house dresses, undergarments and petticoats and wrappers and housedresses; Collars and cuffs, paper; Furnishing goods, men's; Woolen and worsted goods; Embroideries; House dresses, uniforms, and aprons—made in inside factories or by jobbers engaging contractors; Clothing, women's, contract work, undergarments and petticoats; Clothing, women's, regular factory products, except suits, skirts, and cloaks and shirt waists and dresses, except house dresses; Embroideries, other than Schiffli-machine products—contract factories; Woolen goods; Men's and boys' underwear—made in contract factories; Hat and cap materials; Millinery and lace goods; Women's and misses' clothing, not elsewhere classified—made in contract factories; Trimmings (not made in textile mills), stamped art goods, and art needlework—contract factories; Coats, suits, and skirts (except fur coats)-made in contract factories; Clothing, women's; Men's neckwear—made in contract factories; Women's and misses' dresses (except house dresses)—made in contract factories; Wool hats; Children's and infants' wear not elsewhere classified-made in contract factories; Clothing, women's, except suits, skirts and cloaks, shirt waists and dresses, except house dresses; House dresses, uniforms, and aprons—made in contract factories; Robes, lounging garments, and dressing gowns; Straw goods, not elsewhere specified

Industry 21

Dyeing and finishing textiles; Dyeing and finishing textiles, exclusive of that done in textile mills; Dyeing and finishing cotton, rayon, silk, and linen textiles; Dyeing and cleaning; Dyestuff and extracts; Dyeing and finishing woolen and worsted

Industry 22

Hosiery and knit goods; Knitted underwear; Knitted outerwear (except knit gloves)—contract factories; Hosiery—seamless; Knitted outerwear (except knit gloves)—regular factories or jobbers engaging contractors; Knit goods; Knitted gloves; Knitted cloth; Hosiery—full-fashioned

Industry 23

Cloth, sponging and refinishing; Cloth sponging and miscellaneous special finishing; Cloth sponging and refinishing

Industry 24

Carpets and rugs, other than rag; Carpets, rag; Carpet yarn, woolen and worsted; Carpets, rugs, and mats made from such materials as paper fiber, glass, jute, flax, sisal, cotton, cocoa fiber, and rags; Mats and matting, from cocoa fiber, grass, and coir; Mats and matting, grass and coir; Mats and matting; Carpets and rugs, wool; Carpets and rugs, wool, other than rag; Carpets and rugs, rag

Industry 25

Oilcloth, enameled; Asphalted-felt-base floor covering; Oilcloth; Artificial leather and oilcloth; Oilcloth, floor; Oilcloth and linoleum, floor; Artificial leather; Oilcloth and linoleum; Linoleum; Linoleum, asphalted-felt-base and other hard-surface floor coverings, not elsewhere classified

Industry 26

Felt goods; Haircloth; Felt goods, wool, hair, or jute; Felt goods, wool, hair, and jute (except woven felts and hat bodies and hats)

Industry 27

Upholstering materials; Batting, padding, and wadding: upholstery filling; Excelsior; Upholstering materials, not elsewhere specified; Upholstering materials, not elsewhere classified

Industry 28

Processed waste and recovered wool fibers—contract factories; Waste; Cotton waste; Wool shoddy; Shoddy; Oakum; Processed waste and recovered wool fibers—regular factories or jobbers engaging contractors

Industry 29

Cordage and twine; Cordage and twine and jute and linen goods; Linen goods; Jute goods; Bags, other than paper; Jute and jute goods; Bags, other than paper, not made in textile mills; Jute goods (except felt); Bags, other than paper, not including bags made in textile mills; Textile bags—not made in textile mills; Thread, linen; Bagging, flax, hemp, and jute

Industry 30

Gloves and mittens; Clothing (except work clothing), men's, youths', and boys', not elsewhere classified; Clothing, men's, contract work, men's and youths' and boys'; Clothing, men's, buttonholes; Dress and semidress gloves and mittens: cloth, cloth and leather combined; Trousers (semidress), wash suits, and washable service apparel; Clothing, men's, factory product, buttonholes; Clothing, men's; Leather gloves and mittens; Clothing, men's, custom work and repairing; Work shirts; Men's and boys' suits, coats, and overcoats (except work clothing)—made in contract factories; Clothing, men's, contract work, boys'; Clothing, men's, regular factory products, men's, youths'; Clothing men's, factory products buttonholes; Collars, men's; Clothing, men's, regular factory products, boys'; Clothing, men's, contract work; Shirts; Men's and boys' shirts (except work shirts), collars, and night-wear made in inside factories or by jobbers engaging contractors; Clothing, men's, including shirts; Clothing, men's, contract work, except men's and youths'; Men's and boys' suits, coats, and overcoats (except work clothing)—made in inside factories or by jobbers engaging contractors; Clothing, men's, regular factory products; Clothing, men's, contract work, men's, youths'; Clothing, men's, regular factory products, except men's, youths' and boys'; Clothing men's, factory products; Gloves and mittens, cloth; Work clothing (except work shirts), sport garments (except leather), and other men's and boys' apparel, not elsewhere classified; Clothing, men's, contract work, men's and youths'; Clothing, men's, factory product; Men's and boys' shirts (except work shirts), collars, and night-wear—made in contract factories; Work gloves and mittens: cloth, cloth and leather combined; Gloves and mittens, leather; Clothing, men's, regular factory products, except men's, youths', and boys'; Clothing, men's, regular factory; Clothing, leather and sheep-lined; Raincoats and other waterproof garments (except oiled cotton)

Industry 31

Corsets; Corsets and allied garments

Industry 32

Saddlery and harness; Pocketbooks, purses, and card cases; Trunks and valises; Women's pocketbooks, handbags, and purses; Leather goods not elsewhere classified; Suitcases, brief cases, bags, trunks, and other luggage; Belts (apparel), regardless of material; Pocketbooks; Leather goods, not elsewhere classified; Trunks, suitcases, and bags; Leather goods; Belting other than leather and rubber, not made in textile mills; Whips; Leather board; Small leather goods; Bellows; Saddlery, harness, and whips; Belting and hose, woven, other than rubber; Leather goods, not elsewhere specified; Leather-boards

Industry 33

Fur goods; Fur coats and other fur garments, accessories, and trimmings

Industry 34

Tires and inner tubes; Suspenders, garters, and other elastic woven goods, made from purchased webbing; Belting and hose, rubber; Rubber goods other than tires, inner tubes, and boots and shoes; Rubber and elastic goods; Suspenders, garters, and elastic woven goods; Rubber tires, tubes, and rubber goods, not elsewhere specified; Rubber products not elsewhere classified; Belting and hose, linen; Rubber goods, not elsewhere specified; Belting and hose, woven and rubber; Reclaimed rubber; Suspenders, garters, and other goods made from purchased elastic material; Belting and hose, other than leather; Rubber tires and inner tubes

Industry 35

House-furnishing goods, not elsewhere specified, mops and dusters; House-furnishing goods, not elsewhere specified; Curtains, draperies, and bedspreads—made in regular factories or by jobbers engaging contractors; Curtains, draperies, and bedspreads—contract factories; House-furnishing goods, not elsewhere classified; Aluminum ware, kitchen, hospital, and household (except electrical appliances); Housefurnishings (except curtains, draperies, and bedspreads); Aluminum products (including rolling and drawing and extruding), not elsewhere classified; Aluminum manufactures; House-furnishing goods, not elsewhere specified, comforts, quilts, feather pillows, and beds; House furnishing goods, not elsewhere specified; House-furnishing goods, not elsewhere specified, except comforts, quilts, feather pillows, and beds and mops and dusters; House-furnishing goods, not elsewhere specified, except mops and dusters

Industry 36

Awnings, tents, and sails; Canvas products (except bags); Awnings, tents, sails, and canvas covers

Industry 37

Regalia, and society badges and emblems; Flags and banners; Regalia and society banners and emblems; Clothing, horse; Nets and seines; Miscellaneous fabricated textile products not elsewhere classified; Nets and selnes; Flags, banners, regalia, society badges, and emblems; Horse blankets, fly nets, and related products; Regalia, badges, and emblems

Industry 38

Charcoal; Lumber and timber products; Boxes, wooden packing; Wooden boxes except cigar boxes; Sawmills, veneer mills, and cooperage-stock mills, including those combined with logging camps and with planing mills; Boxes, wooden, except cigar boxes; Lumber and timber products, not elsewhere classified; Wood distillation; Charcoal, not including production in the lumber and wood distillation industries; Logging camps and logging contractors (not operating sawmills); Boxes, wooden packing, except cigar boxes; Plywood mills; Hardwood distillation and charcoal manufacture; Lumber and other mill products from logs or bolts; Wood distillation, not including turpentine and rosin; Wood distillation and charcoal manufacture

Industry 39

Window shades; Venetian blinds; Planing-mill products (including general millwork), not made in planing mills connected with sawmills; Lumber, planing mill products, including sash, doors, and blinds; Planing mills not operated in conjunction with sawmills; Lumber, planing-mill products, not including planing mills connected with sawmills; Window shades and fixtures; Window and door screens and weather strip; Window and door screens and weather strips

Industry 40

Mattresses and spring beds; Mattresses and spring beds, not elsewhere specified; Mattresses and bed springs, not elsewhere classified; Mattresses and bedsprings

Industry 41

Hammocks; Furniture, including store and office fixtures; Furniture, including cabinetmaking, repairing, and upholstering; Refrigerators; Office furniture; Laboratory, hospital, and other professional furniture; Public-building furniture; Show cases; Upholstered household furniture; Furniture, wood and rattan and willow; Furniture, except wood, other than rattan and willow; Partitions, shelving, cabinet work, and office and store fixtures; Furniture, rattan and willow and metal; Furniture, chairs; Refrigerators, domestic (mechanical and absorption), refrigeration machinery and equipment, and complete air-conditioning units; Household furniture, except upholstered; Furniture, metal furniture and store and office fixtures; Furniture, factory products; Furniture and refrigerators; Refrigerators, mechanical; Furniture, rattan and willow, store and office fixtures; Furniture, cabinet making, repairing and upholstering; Furniture, rattan and willow; Furniture, metal; Furniture; Furniture, wood, other than rattan and willow; Furniture, metal and store fixtures; Furniture, factory product; Refrigerators and refrigerator cabinets, exclusive of mechanical refrigerating equipment; Furniture, store and office fixtures

Industry 42

Chemicals; Perfumery and cosmetics; Druggists' preparations, not including prescriptions; Celluloid and celluloid goods; Drug grinding; Drugs and medicines (including drug grinding); Perfumes, cosmetics, and other toilet preparations; Druggists' preparations; Foundry supplies; Insecticides, fungicides, and related industrial and household chemical compounds; Patent medicines and compounds, patent and proprietary medicines; Patent medicines and compounds; Druggists' preparations; Plastic materials; Coal-tar products; Rayon and allied products; Perfumes, cosmetics, and other toilet preparations; Sulphuric, nitric, and mixed acids; Compressed and liquefied gases—not made in petroleum refineries or in natural-gasoline plants; Patent medicines and compounds and druggists' preparations; Compressed and liquefied gases; Patent medicines and compounds , patent and proprietary compounds, not elsewhere specified; Foundry supplies; Chemicals, not elsewhere classified; Chemicals not elsewhere classified; Patent or proprietary medicines and compounds; Patent medicines and compounds, except patent and proprietary medicines; Coal-tar products, crude and intermediate

Industry 43

Baskets, and rattan and willow ware; Baskets and rattan and willow ware, not including furniture; Baskets and rattan and willow ware; Whalebone and rattan; Baskets for fruits and vegetables; Rattan and willow ware (except furniture) and baskets other than vegetable and fruit baskets

Industry 44

Boxes, cigar; Boxes, cigar, wooden; Cigar boxes: wooden, part wooden

Industry 45

Rules, ivory and wood; Wood products not elsewhere classified; Woodenware, not elsewhere specified; Wood turned and shaped and other wooden goods, not elsewhere classified; Cooperage; Wood, turned and carved; Kindling wood; Cooperage and wooden goods, not elsewhere specified; Cooperage, except hogsheads and barrels; Wooden goods, not elsewhere specified; Wood work - Miscellaneous; Cooperage, hogsheads and barrels

Industry 46

Caskets, coffins, burial cases, and other morticians' goods; Coffins, burial cases, and undertakers' goods

Industry 47

Cork products; Cork, cutting

Industry 48
Matches

Industry 49
Wood preserving; Wood, preserving

Industry 50
Lasts; Lasts and related products

Industry 51
Looking-glass and picture frames; Mirror and picture frames; Mirror frames and picture frames

Industry 52
Pulp, from fiber other than wood; Paper; Paper and wood pulp; Pulp goods; Pulp mills; Pulp, wood; Pulp goods (pressed, molded); Wood pulp; Fabricated plastic products, not elsewhere classified; Paper and paperboard mills; Pulp (wood and other fiber)

Industry 53
Converted paper products not elsewhere classified; Die-cut paper and paperboard, and converted cardboard; Envelopes; Stationery goods, not elsewhere specified; Cardboard, not made in paper mills; Cardboard; Card cutting and designing; Paper goods, not elsewhere classified; Stationery goods, not elsewhere classified; Paper goods, not elsewhere specified; Coated and glazed paper; Pencil cases; Greeting cards (except hand-painted); Card board

Industry 54
Bags, paper; Bags, paper, exclusive of those made in paper mills; Paper bags, except those made in paper mills

Industry 55
Boxes, fancy and paper; Boxes paper, not elsewhere classified, shipping containers; Boxes, paper, not elsewhere classified; Boxes, paper and other, not elsewhere specified; Paperboard containers and boxes not elsewhere classified; Boxes paper, not elsewhere classified, cartons; Boxes paper, not elsewhere classified, set-up paper boxes; Fiber cans, tubes, and similar products; Boxes paper, not elsewhere classified, all others

Industry 56

Paper hangings; Wall paper; Wallpaper; Wall paper, not made in paper mills

Industry 57

Printing and publishing, newspapers and periodicals; Engraving and diesinking; Printing and publishing, music; Printing and publishing, newspaper and periodical; Bookbinding and blank book making; Printing, tip; Printing and publishing; Printing and publishing, book and job, job printing and book publishing and printing; Type founding; Labels and tags; Printing and publishing, book and job; Engraving on metal (except for printing purposes); Lithographing and engraving; Engraving, steel, including plate printing; Type founding and printing materials; Printing and publishing, newspaper and periodical, printing, publishing, and job printing; Machine and hand typesetting (including advertisement typesetting); Engravers' materials; Paper patterns; Engraving, wood; Printing and publishing, book and job, book publishing and printing, linotype work and typesetting; Engravers materials; Periodicals: publishing without printing; Bookbinding and blank-book making; Printing and publishing, book and job , book publishing and printing; Printing materials; Printing and publishing, book and job, job printing; Newspapers: publishing without printing; Printing and publishing, book and job ; Engraving (steel, copperplate, and wood); plate printing; Printing and publishing, book and job, except job printing; Printing-trades machinery and equipment; Books: publishing without printing; Periodicals: publishing and printing; Printing and publishing, music ; Printing and publishing, book and job, book publishing without printing and linotype work and typesetting; Printing materials, not including type or ink; Lithographing and photo-lithographing (including preparation of stones or plates and dry transfers); Books: printing without publishing; General commercial (job) printing; Lithographing; Newspapers: publishing and printing; Printing and publishing, book and job, book publishing and printing, linotype work and typesetting; Bookbinding and related industries; Books: publishing and printing; Engraving (other than steel, copperplate)

Industry 58

Photolithographing and photoengraving; Photo-engraving, not done in printing establishments; Photo-engraving; Photoengraving, not done in printing establishments (including preparation of plates); Gravure, rotogravure, and rotary photogravure (including preparation of plates); Photolithographing and engraving

Industry 59

Stereotyping and electrotyping; Stereotyping and electrotyping, not done in printing establishments; Electrotyping and stereotyping, not done in printing establishments

Industry 60

Paint and varnish; Varnishes; Paints and varnishes; Colors and pigments; Paints; Varnish; Dyestuffs and extracts; Paints, varnishes, and lacquers; Tanning materials, natural dyestuffs, mordants and assistants, and sizes; Tanning materials, natural dyestuffs, mordants, assistants, and sizes; Dyestuffs and extracts—natural

Industry 61

Oil, not elsewhere specified; Fish and other marine oils, cake, and meal; Oil, lubricating; Essential oils; Oil, essential; Oil, cake, and meal, linseed; Oil, cottonseed and cake; Oil and cake, cottonseed; Oil, resin; Oil, linseed; Oil, not elsewhere specified, composite; Linseed oil, cake, and meal; Oil, castor; Oil, lard; Oils, not elsewhere classified; Oil, not elsewhere specified, vegetable, animal, and mineral oils; Oil, cake, and meal, cottonseed; Lard, refined; Oils, essential; Soybean oil, cake, and meal; Oil, vegetable, essential; Oil, not elsewhere specified, vegetable; Oil, cottonseed, cake; Cottonseed oil, cake, meal, and linters; Oil, not elsewhere specified, except vegetable and composite; Oil, illuminating, not including petroleum refining; Oil, not elsewhere specified, composite oils; Vegetable and animal oils, not elsewhere classified

Industry 62

Soap and candles; Soap; Candles; Soap and glycerin

Industry 63

Turpentine and rosin; Wood naval stores; Tar and turpentine; Gum naval stores (processing but not gathering or warehousing)

Industry 64

Fertilizers

Industry 65

Explosives; Gunpowder; High explosives

Industry 66

Salt

Industry 67

Bone black, carbon black, and lampblack; Bone, ivory, and lamp black; Bone, carbon, and lamp black; Bone black, carbon black, and lamp black

Industry 68

Ink, printing; Ink, printing; Ink, writing; Printing ink; Ink, writing; Ink; Writing ink

Industry 69

Firearms; Firearms and ammunition; Ammunition and related products; Ammunition

Industry 70

Cleaning and polishing preparations, blackings, and dressings; Cleansing and polishing preparations; Blacking, stains, and dressings; Blacking; Cleansing and polishing preparations, except metal polish and cleansing preparations; Blacking and cleansing and polishing preparations; Cleaning and polishing preparations; Cleansing and polishing preparations, except metal polish; Cleansing and polishing preparations, metal polish; Cleansing and polishing preparations, cleansing preparations; Cleansing and polishing preparations, polishing preparations

Industry 71

Glue, not elsewhere specified; Glue and gelatin; Glue

Industry 72

Grease and tallow (except lubricating greases); Grease and tallow; Grease and tallow, not including lubricating greases

Industry 73

Petroleum, refining; Gas, illuminating and heating; Axle grease; Lubricating greases; Lubricating oils and greases—not made in petroleum refineries; Petroleum refining; Lubricating oils and greases, not made in petroleum refineries; Gas, manufactured, illuminating and heating

Industry 74

Fireworks; Fire-works

Industry 75

Bluing

Industry 76

Mucilage, paste, and other adhesives, except glue and rubber cement; Mucilage and paste; Mucilage, paste and other adhesives, not elsewhere specified

Industry 77

Coke; Coke, not including gas-house coke; Beehive coke; Oven coke and coke-oven byproducts

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Industry 78

Paving materials; Paving and paving materials; Paving materials: Asphalt, tar, crushed slag, and mixtures; Paying blocks and paying mixtures: asphalt, creosoted wood, and composition

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Industry 79

Roofing materials; Roofing and roofing materials; Roofing, built-up and roll; asphalt shingles; roof coating (except paint); Roofing, built-up and roll; asphalt shingles; roof coatings other than paint

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Industry 80

Fuel, artificial; Fuel Briquettes and boulets; Fuel briquets; Fuel, manufactured

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Industry 81

Rubber boots and shoes (including rubber-soled footwear with fabric uppers); Boots and shoes, rubber

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Industry 82

Leather, tanned, curried, and finished; Leather: tanned, curried, and finished-regular factories or jobbers engaging contractors; Leather: Tanned, curried, and finished; Leather: tanned, curried, and finished—contract factories; Leather, patent and enameled; Leather, morocco; Leather, dressed skins; Leather, tanned and curried

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Industry 83

Belting, leather; Belting and hose, leather; Industrial leather belting and packing leather; Packing hose

Industry 84

Boots and shoes, other than rubber; Boot and shoe cut stock; Boots and shoes; Boots and shoes, factory product; Boot and shoe cut stock, not made in boot and shoe factories; Boot and shoe findings; Boots and shoes, custom work and repairing; Boot and shoe findings, exclusive of those produced in boot and shoe factories; Boot and shoe uppers; Boot and shoe cut stock, exclusive of that produced in boot and shoe factories; Boots and shoes, not including rubber boots and shoes; Boots and shoes, including cut stock and findings; Boots and shoes, other than rubber, stitching and crimping; Boots and shoes, other than rubber, regular factory products; Boots and shoes, stitching and crimping; Boots and shoes, regular factory products; Boots and shoes, other than rubber, except regular factory products; Boot and shoe findings, not made in boot and shoe factories; ; Boots and shoes, other than rubber, contract work; Footwear (except rubber); Boot and shoe cut stock and findings; Boots and shoes, contract work

Industry 85

Glass; Tableware, pressed or blown glass, and glassware not elsewhere classified; Glass containers; Flat glass

Industry 86

Glass, cutting, staining, and ornamenting; Mirrors; Mirrors, framed and unframed, not elsewhere specified; Mirrors, framed and unframed; Glass products (except mirrors) made from purchased glass; Mirrors and other glass products made of purchased glass; Glass, cutting, staining, and ornamenting, decalcomania work on glass; Glass, cutting, staining, and ornamenting, except decalcomania work on glass

Industry 87

Lime and cement; Cement; Lime

Industry 88

Pottery, including porcelain ware; Pottery, terra-cotta and fire-clay products; Masonry, brick and stone; Pottery, terra cotta, and fire-clay products; Porcelain electrical supplies; Brick and tile, terra-cotta, and fire-clay products, except building bricks and terra-cotta products; Artificial stone; Brick and tile, terra-cotta, and fireclay products; Whiteware; Concrete products; Brick and tile, terra-cotta, and fire-clay products, building brick; Brick and tile; Clay products (other than pottery) and nonclay refractories; Brick and tile, terra-cotta, and fire-clay products, stove lining and terra-cotta products; Artificial stone products; Crucibles; Clay refractories, including refractory cement (clay); Roofing tile; Concrete products; Brick and hollow structural tile; Clay and pottery products; Terra cotta; Clay products (except pottery) not elsewhere classified; Sand-lime brick, block and tile; Nonclay refractories; Pottery products not elsewhere classified; Brick and tile, terra-cotta, and fire-clay products, fire brick; Floor and wall tile (except quarry tile); Vitreous-china plumbing fixtures; Pottery; Sand-lime brick; Sewer pipe and kindred products; Hotel china; Brick and tile, terra-cotta, and fire-clay products, terra-cotta products

Industry 89

China firing and decorating, not done in potteries; China decorating; China decorating, not including that done in potteries; China firing and decorating (for the trade)

Industry 90

Plastering and stuccowork; Wall plaster and composition flooring; Wallboard and wall plaster (except gypsum), building insulation (except mineral wool), and floor composition; Wall plaster, wall board, insulating board, and floor composition; Mineral wool; Statuary and art goods (except stone and concrete)—factory production; Wall plaster; Gypsum products; Statuary and art goods, factory product; Statuary and art goods

Industry 91

Monuments and tombstones; Mantels, slate, marble, and marbleized; Monuments, tombstones, cut-stone, and stone products not elsewhere classified; Marble and stone work; Marble and stone work, monuments and tombstones; Marble, granite, slate, and other stone products, other marble and stone work, except slated; Marble, granite, slate, and other stone products; Marble and stone work, except monuments and tombstones

Industry 92

Emery and other abrasive wheels; Emery wheels and other abrasive and polishing appliances; Emery wheels; Sand and emery paper and cloth; Abrasive wheels, stones, paper, cloth, and related products; Hones, whetstones, and similar products; Sand paper, emery paper, and other abrasive paper and cloth

Industry 93

Asbestos products (except steam packing and pipe and boiler covering); Asbestos products, not including steam packing; Steam packing; Steam and other packing, pipe and boiler covering, and gaskets, not elsewhere classified; Steam and other packing; pipe and boiler covering; Asbestos products, other than steam packing or pipe and boiler covering

Industry 94

Graphite, ground and refined; Graphite and graphite refining; Natural graphite, ground and refined; Graphite ground and refined

Industry 95

Minerals and earths, ground or otherwise treated; Kaolin and ground earths; Kaolin and other earth grinding

Industry 96

Iron and steel, steel works and rolling mills; Iron and steel: Steel works and rolling mills; Iron and steel; Iron and steel, blast furnaces; Steel castings; Blast-furnace products; Tin and terne plate; Iron and steel: Blast furnaces; Steel works and rolling mills; Iron and steel, tempering and welding; Ferroalloys; Tin plate and terneplate

Industry 97

Gas machines and gas and water meters, gas meters and water meters; Ironwork, architectural and ornamental; Gas machines and meters; Plumbers' supplies; Construction and similar machinery (except mining and oil-field machinery and tools); Hardware, except locks and builder's hardware; Vault lights and ventilators; Foundry and machine-shop products, machine shop and foundry combined; Steam engines, turbines, and water wheels; Signs and advertising novelties, signs, electric and others; Signs, advertising displays, and advertising novelties; Foundry and machine shop products; Foundry and machine-shop products, boiler shops; Hardware, locks; Bridges; Lightning rods; Steam fittings, regardless of material; Pumps, not including steam pumps; Steam fittings and heating apparatus; Foundry and machine-shop products, except machine shops; Steel barrels, kegs, and drums; Registers, car fare; Hardware; Locomotives, not made by railroad companies; Enameled-iron sanitary ware and other plumbers' supplies (not including pipe and vitreous and semivitreous china sanitary ware); Signs and advertising novelties; Mining machinery and equipment; Foundry and machine-shop products, except foundries; Vending, amusement, and other coin-operated machines; Hardware, saddlery; Oil-field machinery and tools; Mechanical power-transmission equipment; Plumbers supplies; Hardware not elsewhere classified; Pumps (hand and power) and pumping equipment; Locomotives, not made in railroad repair shops; Steel barrels, drums and tanks, portable; Engines, steam, gas, and water; Gray-iron and semisteel castings; Blowers; exhaust and ventilating fans; Foundry and machine-shop products, not elsewhere classified; Hardware, vehicle hardware; Cast-iron pipe; Steam fittings and steam and hot-water heating apparatus; Textile machinery and parts; Signs and advertising novelties, electric and other signs; Iron and steel, processed; Steam fittings and steam and hot-water heating apparatus, radiators and cast-iron heating boilers

Industry 98

Gold and silver, reducing and refining, not from the ore; Tinsmithing, coppersmithing, and sheet-iron working; Smelting and refining, not from the ore; Smelting and refining, lead; Secondary smelting and refining of nonferrous metals, not elsewhere classified; Sheet-metal work not specifically classified; Copper, tin, and sheet-iron products; Tinware, not elsewhere specified; Zinc, smelting and refining; Gold, silver, and platinum, reducing and refining, not from the ore; Smelting and refining, metals other than gold, silver, or platinum, not from the ore; Smelting and refining, copper; Lead, smelting and refining; Smelting and refining, zinc; Cooper, tin, and sheet-iron work; Primary smelting and refining of nonferrous metals; Silversmithing; Copper, smelting and refining; Smelting and refining; Secondary smelting and refining, gold, silver, and platinum; Tin cans and other tinware not elsewhere classified; Zinc; Tin cans and other tinware, not elsewhere classified; Copper, tin, and sheet-iron work, including galvanized iron work, not elsewhere classified

Industry 99

Wire; Wire, drawn from purchased bars or rods; Wire drawn from purchased rods

Industry 100

Iron and steel, nails and spikes, cut and wrought, including wire nails; Nails, spikes, etc. not made in wire mills or in plants operated in connection with rolling mills; Iron and steel, nails and spikes, cut and wrought, including wire nails, not made in steel works or rolling mills; Nails, spikes, etc., not made in wire mills or in plants operated in connection with rolling mills; Iron, steel, nails, spikes, cut and wrought, including wire nails, not made in steel works or rolling mills

Industry 101

Wirework, including wire rope and cable; Wirework, not elsewhere specified; Wirework not elsewhere classified; Wirework, not elsewhere classified

Industry 102

Cutlery (except aluminum, silver, and plated cutlery) and edge tools; Machine-tool and other metalworking-machinery accessories, metal cutting and shaping tools, and machinists' precision tools; Metal working machinery and equipment, not elsewhere classified; Tools, not elsewhere specified; Cutlery and edge tools; Machine tools; Tools, not elsewhere specified, except machinists'; Tools (except edge tools, machine tools, files, and saws); Cutlery and tools, not elsewhere specified; Cutlery and edge tools, except razors; Cutlery (not including silver and plated cutlery) and edge tools; Cutlery and edge tools, razors; Tools, not elsewhere specified, machinists'; Tools, not including edge tools, machine tools, files, or saws; Machine-tool accessories and small metal-working tools, not elsewhere classified; Tools, not elsewhere specified, shovels, spades, scoops, hoes, and carpenters' tools, not elsewhere classified

Industry 103

Files

Industry 104

Saws

Industry 105

Stoves, ranges, water heaters, and hot-air furnaces (except electric); Gas and oil stoves; Gas stoves; Heating and cooking apparatus, except electric, not elsewhere classified; Stoves, gas and oil; Stoves and hot-air furnaces; Stoves and furnaces, including gas and oil stoves; Stoves and hot air furnaces, stoves and ranges; Oil burners, domestic and industrial; Stoves and ranges (other than electric) and warm-air furnaces; Stoves and hot air furnaces, hot-air furnaces

Industry 106

Japanning; Enameling; Stamped ware; Enameling, japanning, and lacquering; Stamped and pressed metal products (except automobile stampings); Automobile stampings; Enameling and enameled goods; Enameling and japanning; Stamped and enameled ware, not elsewhere specified; Vitreous enameled products, including kitchen, household, and hospital utensils; Stamped ware, enameled ware, and metal stamping, enameling, japanning, and lacquering; Enameled goods

Industry 107

Galvanizing; Galvanizing and other coating processes; Galvanizing and other coating—carried on in plants not operated in connection with rolling mills; Galvanizing and other coating not done in plants operated in connection with rolling mills

Industry 108

Iron and steel, doors and shutters; Doors, shutters, and window sash and frames, metal; Doors, window sash, frames, molding, and trim (made of metal)

Industry 109

Bolts, nuts, washers, and rivets, not made in plants operated in connection with rolling mills; Iron and steel, bolts, nuts, washers, and rivets; Bolts, nuts, washers, and rivets made in plants not operated in connection with rolling mills; Iron and steel, bolts, nuts, washers, and rivets, not made in rolling mills; Iron and steel, bolts, nuts, washers, and rivets, not made in steel works or rolling mills

Industry 110

Iron and steel, forgings; Horseshoes, not made in steel works or rolling mills; Forgings, iron and steel—made in plants not operated in connection with rolling mills; Iron and steel forgings; Iron and steel forgings, not made in steel works or rolling mills; Forgings, iron and steel, not made in plants operated in connection with rolling mills; Horseshoes, factory product; Horse-shoes

Industry 111

Iron and steel, wrought pipe; Wrought pipe, welded and heavy riveted, not made in plants operated in connection with rolling mills; Iron and steel, pipe, wrought; Iron and steel pipe, wrought; Wrought pipes, welded and heavy riveted—made in plants not operated in connection with rolling mills

Industry 112

Springs, steel, except wire, not made in plants operated in connection with rolling mills; Springs, steel, car and carriage, not made in steel works or rolling mills; Springs, steel (except wire)—made in plants not operated in connection with rolling mills; Springs, steel, car and carriage

Industry 113

Screws; Screws, machine; Screw-machine products and wood screws; Screws, wood

Industry 114

Safes and vaults

Industry 115

Bronze castings; Nonferrous-metal products not elsewhere classified; Lead, bar, pipe, and sheet; Brass castings and brass finishing; Alloying; and rolling and drawing of nonferrous metals, except aluminum; Bells; Brass, bronze, and copper products; Lead, bar, pipe and sheet; Brass and bronze products; Brass; Babbitt metal and solder; Brass castings; Nonferrous-metal foundries (except aluminum); Brass and copper, rolled; Brassware; Brass, bronze and copper products, brass and bronze products; Brass, bronze and copper products, copper and all other products; Nonferrous-metal alloys and products, not including aluminum products

Industry 116

Watch and clock materials, except watchcases; Watches and watch movements; Clocks; Watch and clock materials; Clocks and watches, including cases and materials; Watch and clock materials and parts, except watchcases; Watches; Watchcases; Watch cases; Clocks, watches, and materials and parts (except watchcases); Clocks, clock movements, time-recording devices, and time stamps

Industry 117

Costume jewelry and costume novelties (jewelry other than fine jewelry); Jewelry; Jewelers' findings and materials; Jewelry (precious metals)

Industry 118
Lapidary work

Industry 119
Silverware and plated ware; Silverware; Plated and britannia ware; Silversmithing and silverware; Plated ware

Industry 120
Electroplating, plating, and polishing; Electroplating

Industry 121
Calcium lights; Lamps and reflectors; Gas and lamp fixtures; Gas and electric fixtures, lamps and reflectors; Gas and electric fixtures; lamps, lanterns, and reflectors; Gas and electric fixtures; Gas and electric fixtures, electric fixtures; Gas and electric fixtures, except electric fixtures; Lighting fixtures; Lamps and reflectors, all other lamps; Lamps and reflectors, reflectors; Lamps and reflectors, automobile lamps

Industry 122
Tin and other foils, not elsewhere specified; Collapsible tubes; tinfoil; Tin and other foils (except gold and silver foil); Tin foil; Tin and other foils, not including gold foil; Tinfoil

Industry 123
Gold and silver, leaf and foil; Gold leaf and foil; Gold and silver leaf and foil

Industry 124
Electrical machinery, apparatus, and supplies; Phonographs and graphophones; Electric light and power; Insulated wire and cable; Generating, distribution, and industrial apparatus, and apparatus for incorporation in manufactured products, not elsewhere classified; Electric lamps; Batteries, storage and primary (dry and wet); Electrical apparatus and supplies; Electrical measuring instruments; Electrical products not elsewhere classified; Automotive electrical equipment; Electrical appliances; Wiring devices and supplies; X-ray and therapeutic apparatus and electronic tubes; Radios, radio tubes, and phonographs; Communication equipment; Phonographs; Beauty-shop and barber-shop equipment; Carbon products for the electrical industry, and manufactures of carbon or artificial graphite

Industry 125

Agricultural implements; Agricultural machinery (except tractors); Windmills; Windmills and windmill towers; Tractors

Industry 126

Typewriters and supplies; Typewriters and supplies, carbon paper; Office and store machines, not elsewhere classified; Typewriters and supplies, typewriters and parts; Carbon paper and inked ribbons; Typewriters and supplies, except typewriters and parts and carbon paper; Typewriters and parts

Industry 127

Scales and balances

Industry 128

Washing machines and clothes wringers; Washing machines, clothes wringers; Washing machines, wringers, driers, and ironing machines, for household use; Laundry equipment, domestic

Industry 129

Sewing machines and attachments; Sewing machines, domestic and industrial; Sewing machines, cases, and attachments; Sewing-machine cases

Industry 130

Carriage and wagon materials; Carriages and wagons, including repairs; Wheelbarrows; Automobiles, including bodies and parts; Carriages, wagons, sleighs, and sleds; Carriages and wagons; Automobile bodies and parts; Motor vehicles, not including motorcycles; Motor-vehicle bodies and motor-vehicle parts; Carriages and wagons,including repairs, repair work only; Carriages and wagons,including repairs, cars and wagons; Carriage, wagon, sleigh, and sled materials; Automobiles; Carriages and wagons and materials; Automobile trailers (for attachment to passenger cars); Motor vehicles, motor-vehicle bodies, parts and accessories; Transportation equipment not elsewhere classified

Industry 131

Cars and general shop construction and repairs by steam-railroad companies; Car and general construction and repairs, steam-railroad repair shops; Cars, street-railroad, not including operations of railroad companies; Cars, electric-railroad, not including operations of railroad companies; Cars, railroad and street, and repairs, not including establishments operated by steam railroad companies; Cars and general shop construction and repairs by steam railroad companies; Cars, electric and steam railroad, not built in railroad repair shops; Cars and general shop construction and repairs by street railroad companies; Cars and general shop construction and repairs by street-railroad companies; Cars, street railroad, not including operations of railroad companies; Car and general construction and repairs, electric-railroad repair shops; Cars, steam-railroad, not including operations of railroad companies; Cars, steam railroad, not including operations of railroad companies; Cars and car equipments-railroad, street, and rapid-transit; Cars and general shop construction and repairs by electric-railroad companies

Industry 132

Bicycles and tricycles; Aeroplanes, seaplanes, and airships, and parts; Bicycles, motorcycles, and parts; Motorcycles, bicycles and parts; Aircraft and parts, including aircraft engines; Motorcycles, bicycles, and parts; Aircraft and parts

Industry 133

Shipbuilding, including boat building; Shipbuilding; Shipbuilding, wooden, including boat building, yards where work on new vessels was done; Shipbuilding, wooden, including boat building, yards engaged entirely on repair work; Shipbuilding, wooden, including boat building, boats under 5 tons; Boat building and boat repairing; Shipbuilding, iron and steel; Shipbuilding, steel, repair work only, small boats, and masts, spars, oars, and rigging; Shipbuilding, steel, new vessels; Shipbuilding, steel, new vessels, small boats, and masts, spars, oars, and rigging; Shipbuilding, steel; Ship and boat building, steel and wooden, including repair work; Shipbuilding and ship repairing; Ship and boat building, wooden; Shipbuilding, steel, repair work only; Shipbuilding, wooden, including boat building; Shipbuilding, wooden, including boat building, masts, spars, oars, and the rigging of vessels

Industry 134

Instruments, professional and scientific; Surgical appliances; Artificial limbs; Surgical and medical instruments; Surgical supplies and equipment not elsewhere classified; orthopedic appliances; Instruments, professional and scientific, medical and surgical; Surgical and orthopedic appliances, including artificial limbs; Surgical appliances and artificial limbs; Instruments, professional and scientific, except medical and surgical; Professional and scientific instruments (except surgical and dental)

Industry 135

Photographic materials, motion-picture films not exposed, and motion-picture projection films; Photographic apparatus, except cameras and motion-picture machines; Photographic apparatus and materials; Photographic materials; Photographic apparatus; Photographic apparatus and materials and projection equipment (except lenses); Photographic apparatus, cameras and motion-picture machines; Photographic materials, except motion-picture films; Photographic materials, motion-picture films; Photographic materials, except motion-picture films not exposed, and motion-picture projection films

Industry 136

Optical goods; Optical instruments and lenses; Ophthalmic goods: lenses and fittings

Industry 137

Dentists' materials; Dental goods; Dental equipment and supplies; Dental goods and equipment

Industry 138

Musical instruments, piano and organ materials; Musical instruments, organs and materials; Muscial instruments: Organs; Musical instruments: Pianos; Musical instruments and parts and materials, not elsewhere classified; Musical instruments and materials, not specified; Musical instruments, pianos; Musical instruments, pianos and organs and materials; Musical instruments, parts, and materials not elsewhere classified; Musical instruments, pianos and materials; Pianos; Organs; Musical instruments, organs; Musical instrument parts and materials: Piano and organ; Piano and organ parts and materials

Industry 139

Toys and games; Games and toys (except dolls and children's vehicles); Dolls (except rubber); Toys (not including children's wheel goods or sleds), games, and playground equipment

Industry 140

Carriages and sleds, children's; Children's vehicles

Industry 141

Sporting and athletic goods; Sporting goods; Sporting and athletic good not elsewhere classified; Sporting and athletic goods, not including firearms or ammunition; Billiard tables and materials; Billiard tables, bowling alleys, and accessories; Billiard and pool tables, bowling alleys, and accessories

Industry 142

Pens, steel; Pens, gold; Pencils (except mechanical) and crayons; Pens, fountain and stylographic; Pens, fountain, stylographic and gold; Artists' materials; Pencils, lead; Pens, fountain and stylographic; pen points, gold, steel, and brass; Pens, mechanical pencils, and pen points; Pencils, lead (including mechanical)

Industry 143

Stencils and brands; Hand stamps, stencils and brands; Hand stamps; Hand stamps, stencils, and brands; Hand stamps and stencils and brands

Industry 144

Buttons

Industry 145

Jewelry and instrument cases; Jewelry cases and instrument cases

Industry 146

Feathers and plumes; Artificial feathers and flowers; Artificial flowers; Feathers, plumes, and manufactures thereof; Feathers, plumes, and artificial flowers; Artificial and preserved flowers and plants; Artificial flowers, feathers and plumes

Industry 147

Brooms and brushes; Brooms; Brushes; Brooms, from broom corn; Brushes, other than rubber; Brushes, except toilet; Brushes, toilet; Brooms, except from broom corn; Brushes, other than toilet

Industry 148

Furs, dressed; Furs, dressed and dyed

Industry 149

Umbrellas and canes; Umbrellas, parasols, and canes

Industry 150

Pipes (tobacco); Pipes, tobacco; Tobacco pipes and cigarette holders

Industry 151

Soda water apparatus; Soda fountains, beer dispensing equipment, and related products; Soda-water apparatus

Industry 152

Models and patterns; Models and patterns (except paper patterns); Models and patterns, not including paper patterns

Industry 153

Hair work; Hairwork

Industry 154

Needles, pins, hooks and eyes, and snap fasteners; Needles and pins; Hooks and eyes; Needles, pins, hooks and eyes, and slide and snap fasteners; Needles, pins, hooks and eyes; Needles, pins, and hooks and eyes

Industry 155

Fire extinguishers, chemical

Industry 156

Ivory and bone work; Combs; Fancy and miscellaneous articles, not elsewhere classified, paper and wood novelties; Fancy articles, not elsewhere specified; Fancy and miscellaneous articles, not elsewhere classified; Theatrical scenery and stage equipment; Ivory, shell, and bone work, not including combs and hairpins; Fancy articles, not else where specified; Ivory, shell, and bone work, not including buttons, combs, or hairpins; Miscellaneous fabricated products not elsewhere classified; Fancy and miscellaneous articles, not elsewhere classified, except beadwork, celluloid and metal novelties; Fancy and miscellaneous articles, not elsewhere classified, metal novelties; Fancy and miscellaneous articles, not elsewhere classified, except metal and paper novelties; Theatrical scenery; Combs and hairpins, not made from metal or rubber; Fancy and miscellaneous articles, not elsewhere classified, except beadwork, celluloid, metal and paper novelties; Fancy and miscellaneous articles, not elsewhere classified, metal and wood novelties; Fancy and miscellaneous articles, not elsewhere classified, beadwork and celluloid novelties; Fancy and miscellaneous articles, not elsewhere classified, paper novelties; Fancy and miscellaneous articles, not elsewhere classified, metal and paper novelties; Fancy and miscellaneous articles, not elsewhere classified, wood novelties; Fancy and miscellaneous articles, not elsewhere classified, except paper and wood novelties; Fancy and miscellaneous articles, not elsewhere classified, except metal and wood novelties; Combs and hairpins, except those made from metal or rubber; Lamp shades