

100 Years of Rising Corporate Concentration[†]

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We collect data on the size distribution of US businesses for 100 years, and use these data to estimate the concentration of production (e.g., asset share or sales share of top businesses). The data show that concentration has increased persistently over the past century. Rising concentration was stronger in manufacturing and mining before the 1970s, and stronger in services, retail, and wholesale after the 1970s. The results are robust to different measurement methods and consistent across different historical sources. Our findings suggest that large firms have become more important in the US economy for a long period of time. (JEL D22, E24, L11, L25, N12)

The role of large businesses in the economy is an important question for researchers, policymakers, and the public. The finding of rising concentration among US industries since the 1980s (as shown by Autor et al. 2020 and others using comprehensive census data covering this period) has attracted particular attention. Recent discussions often view this trend as a new development, and look for what might be special in today's world. However, for more than a century, a diverse group of observers have conjectured that the increasing dominance of larger firms could be an enduring phenomenon (Marx 1867; Marshall 1890; Lenin 1916; Berle and Means 1932; Lucas 1978; Chandler 1994). Indeed, one of the first publications by the National Bureau of Economic Research (NBER) also noted the spread of large enterprises at that time, and remarked that “each generation believes itself to be on

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[†]Go to <https://doi.org/10.1257/aer.20220621> to visit the article page for additional materials and author disclosure statements.

the verge of a new economic era” but what appears to be new sometimes represents recurring themes in history (Committee on Recent Economic Changes 1929).

In this paper, we provide comprehensive long-run evidence on the concentration of production among US businesses (i.e., the extent to which a small set of top businesses account for a large share of production assets or output). We compile data on the size distribution of the population of US corporations for 100 years, from 1918 to 2018. The data show that concentration (measured using the share of assets, sales, or net income of top businesses) has increased persistently over this period. Among different sectors, rising concentration was stronger in manufacturing and mining before the 1970s, and stronger in services, retail, and wholesale after the 1970s. For some years we also have data on the size distribution of noncorporations (partnerships and proprietorships), and the patterns of rising concentration are similar when noncorporations are included. Our findings reveal that increasing concentration of production activities has been a feature of the US economy for at least a century. Analyzing changes in concentration using only recent data might be misleading as it turns the focus to current events rather than longstanding economic processes.

We obtain long-run data on the business size distribution in the United States by digitizing historical publications of the Statistics of Income (SOI) from the Internal Revenue Service (IRS). Since 1918, the SOI has reported statistics for US businesses by size bins on an annual basis, including the number of businesses and their financial information (e.g., assets, sales, net income). We use these size bins to estimate top business shares in the aggregate and at the industry level. Our main estimation method is the generalized Pareto approach (Blanchet, Fournier, and Piketty 2022), which fits a Pareto coefficient to each size bin and interpolates these Pareto coefficients; results are over 0.99 correlated if we instead fit and interpolate lognormal distributions, or directly add up the top bins to a given number of businesses. The SOI data capture production activities in the United States (similar to the gross output convention in the national accounts), which align with our focus on the concentration of production.

For the aggregate economy, the data reveal a persistent rise in the shares accounted by top businesses. In earlier years (from 1918 to 1974), the SOI data provide size bins sorted by net income, and we use these data to compute the share of top corporations by net income in total corporate net income (restricting to businesses with positive net income). In later years (from 1959), the SOI data provide size bins by receipts (sales), and we use these data to compute the share of top corporations by receipts in total corporate receipts. The longest and most comprehensive size bin tabulations are sorted by assets (since 1931), and we use these data to compute the share of top corporations by assets in total corporate assets. The long-run increase in concentration is reflected by all three series. For instance, since the early 1930s, the asset shares of the top 1 percent and top 0.1 percent corporations have increased by 27 percentage points (from 70 percent to 97 percent) and 41 percentage points (from 47 percent to 88 percent), respectively. The patterns of rising concentration are similar if we examine the relative concentration within the largest businesses (e.g., the top 1 percent relative to the top 10 percent).¹

¹ A possible concern about the top 1 percent share is that when small firms enter the number of firms increases, which may mechanically increase the top 1 percent share. The relative concentration measure (the top 1 percent within

At the industry level, we also observe a general rise in concentration among the main sectors (where all three types of size bins are available) and the subsectors (where only size bins by assets are available). However, the timing differs across industries. For manufacturing and mining, rising concentration was stronger in earlier decades (before the 1970s); for services, retail, and wholesale, rising concentration was stronger in later decades (after the 1970s). The SOI assigns a single industry code to each business based on the industry that represents the largest percentage of its total receipts, whereas census concentration statistics only use establishments in a given industry (in which case a multi-industry firm can appear multiple times in different industries). Since we are interested in the firm size distribution and the role of large companies in production activities, we would like to keep a company as a whole, and the SOI industry classification aligns with this objective.²

Our baseline analyses use comprehensive size bins for corporations (both C- and S-corporations). For noncorporations (partnerships and nonfarm proprietorships), we can obtain size bins by receipts for some years. In these years, we construct the receipt share of top businesses by receipts among corporations plus noncorporations. We find similar results of rising concentration. For instance, the top 1 percent share among all businesses and the top 1 percent share among corporations are very similar.

We also study top shares using a fixed number of top N businesses. It is challenging to pin down the right N to maintain consistency across different levels of aggregation (e.g., the overall economy versus a particular industry) and across different industries that vary in size, so we use the top N share as an auxiliary measure. To check the robustness of our main results, we present the share of the top 500 businesses for manufacturing and the share of the top 5,000 businesses for services and retail/wholesale trade, which are comparable to the top 0.1 percent share among all businesses in these industries. We verify that these top N shares and the top 0.1 percent share show similar trends. In the aggregate, the top 5,000 share and the top 0.1 percent share among all businesses show similar trends as well. As before, the top share displays a stronger increase in earlier decades for manufacturing and in later decades for services and retail/wholesale trade. We can also fix the same N across industries and compare that with a corresponding top percentile, which provides consistent results. If we restrict to data on corporations, we find that top percentile shares among corporations align closely with top shares among all businesses, but top N shares among corporations can be more vulnerable to changes in the relative prevalence of corporations versus noncorporations.³

the top 10 percent) is robust to this concern if the right tail of the business size distribution is Pareto, and this measure is 98 percent correlated with the top 1 percent share.

²It is widely recognized that industry codes do not necessarily represent product markets, and product markets are challenging to define (Syverson 2019). Our industry-level analyses aim to group firms that share similar production activities (e.g., chemical manufacturing has different production processes from hotels), rather than to measure the concentration for a particular product market.

³The top N share among corporations can diverge from the other top shares if corporations become substantially more (less) common. These changes expand (shrink) its denominator, so this measure can decrease (increase) without actual changes in the concentration of production. This problem does not have a major impact on the top percentile shares among corporations since the numerator adjusts, which offsets the artificial change in the denominator. Like our baseline measures, the top N share among corporations increases in the aggregate, in manufacturing in earlier decades, and in services and retail/wholesale in later decades, since the relative prevalence of corporations is stable in these settings. It is unreliable for services and retail/wholesale in the early decades, where the relative prevalence of corporations increased substantially.

For manufacturing, we obtain further historical sources on the largest 100 firms by assets in the first half of the twentieth century (Collins and Preston 1961; Federal Trade Commission 1969; Chandler 1994). Early records are more abundant for manufacturing, and they are valuable given that rising concentration in the early decades was especially important in manufacturing. We show that top shares across different sources are consistent with those in our SOI data. Between 1909 and the 1970s, the top 100 asset share in manufacturing increased from around 20 percent to over 50 percent.

We perform several additional robustness checks. First, we cross-check with census data, which report sales shares of the top 4, 8, 20, and 50 firms by sales in census years, for manufacturing industries at the four-digit SIC level since 1947, and other industries later on. For the degree of concentration over time, we take the average concentration ratios in manufacturing in each census year, and observe an upward trend. For the degree of concentration in the cross section, we use recent data from 2012 (including both manufacturing and non-manufacturing industries) and compare top shares in census data with those interpolated from SOI data. These two sets of data match in level and are 0.86 correlated. Second, we also use Compustat data to check that our SOI data align with firms' financial statements. Compustat data miss large private companies (which have become more important over time) and have other caveats, but the level of aggregate top 500 shares (by assets or by sales) is comparable with estimates from SOI data. Third, in recent years some US firms may have shifted their production assets to foreign subsidiaries for various reasons. We show that the results are similar if we include the international assets of US companies, using data from the Bureau of Economic Analysis (BEA) on activities of US multinational enterprises (available since the 1980s).

In addition to the business size distribution, the SOI also provides information about other firm characteristics over the past century, such as profitability. Profitability (i.e., net income/sales) does not display secular trends, unlike concentration. It plunged during the Great Depression, rebounded during the 1940s, then declined gradually until the 1980s, and increased slightly afterwards.

In summary, our findings suggest that large firms have become more important in production activities in the US economy for at least a century. We provide long time series of estimated business concentration, which is not dependent on a specific distribution assumption (e.g., Pareto). The data offer multiple concentration measures (e.g., by assets and by sales). They also cover all major industries, and reveal differences in the timing of rising concentration across industries. The results are corroborated by additional historical sources and census publications when such information is available.

Our work contributes to knowledge about the long-run evolution of the US economy in three ways. First, the distribution of businesses by size has received considerable attention in economics research (Simon and Bonini 1958; Lucas 1978; Sutton 1997; Luttmer 2010). Recent influential studies highlight rising industry concentration in the United States since the 1980s using census data (Autor et al. 2020; Covarrubias, Gutiérrez, and Philippon 2020).⁴ Several early studies examine

⁴ Although economy-wide production concentration has been increasing, concentration in the market for a particular product or location may decrease as large firms expand into more markets (Rossi-Hansberg, Sarte, and Trachter 2021; Benkard, Yurukoglu, and Zhang 2023; Hoberg and Phillips forthcoming).

the shares of the top 100 or 200 firms in the United States for certain years in the initial decades of the twentieth century (Means et al. 1939; Blair, Houghton, and Rose 1946; Adelman 1951; Kaplan 1954; Collins and Preston 1961; Federal Trade Commission 1969; Prais 1976), which often point to an increasing pattern. We offer comprehensive evidence for all industries over the long run. Relatedly, several papers present long-run evidence on the “size distribution” of household income and wealth, such as Piketty and Saez (2003) and Saez and Zucman (2016); we show that similar historical administrative data for businesses contain extensive information that helps us better understand heterogeneity among firms.⁵

Second, a growing body of research investigates the economic mechanisms for rising concentration, such as technology and economies of scale (Brynjolfsson et al. 2008; Bessen 2020; Ganapati 2021; Aghion et al. 2023; Hsieh and Rossi-Hansberg 2023; Lashkari, Bauer, and Boussard forthcoming; Hubmer and Restrepo 2023; Firooz, Liu, and Wang 2023; Choi et al. 2024), antitrust and regulation (Philippon 2019; Affeldt et al. 2021; Akcigit and Ates 2023; Singla 2023), demographics (Hopenhayn, Neira, and Singhania 2022; Peters and Walsh 2022), low interest rates (Kroen et al. 2022; Zhao 2022), among others. Our findings suggest that a full account of rising concentration needs to explain not only the recent development, but also the long-run trends and the timing differences across industries. Our long-run analysis complements studies that scrutinize particular decades.

Third, a number of studies point out that the size distribution of businesses is important for the determinants of macroeconomic outcomes. The features and actions of large companies matter more with higher production concentration. For example, many papers analyze financial frictions among large versus small businesses; as Crouzet and Mehrotra (2020) show, high and rising concentration implies that the frictions that apply to the bottom 99 percent of firms have a modest impact on aggregate fluctuations. Gabaix (2011) highlights that shocks to large firms can drive aggregate fluctuations; such effects are likely stronger when production concentration is higher. Early work by Berle and Means (1932) examines production concentration to emphasize the significance of businesses practices among the largest firms (e.g., the separation between ownership and control) for the broader economy.

As reviewed by Syverson (2019), higher concentration can be associated with either less or more competition, and markups are better barometers for market power. Correspondingly, we do not speak to the strength of market power or the effectiveness of competition policies; a number of other studies analyze these issues in detail (De Loecker, Eeckhout, and Unger 2020; Gutiérrez and Philippon 2022; De Loecker, Eeckhout, and Mongey 2022; Eeckhout and Veldkamp 2023).

The rest of the paper is organized as follows. Section I describes the data. Section II presents the main facts about top business shares in the past 100 years. Section III

⁵For analyses of recent decades using data on public companies, see also DeAngelo, DeAngelo, and Skinner (2004); Grullon, Larkin and Michaely (2019); and Gutiérrez and Philippon (2020). Some analyses examine a small number of “giant” or “dominant” firms, such as top 20 in the aggregate, which tend to find weaker trends in the shares of these firms. We capture a broader set of top businesses, and the rise of concentration seems not limited to a few giant companies. As White (2002) observes, there appear to be benefits of being relatively large, although the advantages of giant size may be overblown.

performs additional checks, such as comparisons with census and Compustat data. Section IV concludes.

I. Data

Our main data source is the Statistics of Income report (SOI) and the associated *Corporation Source Book* published annually by the IRS. The SOI originated from the Revenue Act of 1916, and statistics on the size of businesses were included for the first time in 1918. We digitize historical SOI publications before 2000 (IRS 2024e), and use data from the SOI website afterwards (IRS 2024a); between 1965 and 1990, we are able to obtain some data from the Electronic Records Archives of the National Archives (National Archives and Records Administration 2024). The SOI is a key source for the national income and product accounts (NIPA), and our data capture production activities in the United States like the national accounts. We explain data construction in this section and provide more details in online Appendix IA2. We provide the transcribed data and cleaned data series in our replication package (Kwon, Ma, and Zimmermann 2024).

The SOI tabulates a variety of statistics for the population of corporations, including the number and financial information of corporations by size bins. Table 1 shows examples for the aggregate economy (panel A) and for one industry (panel B) in 1945. Size bins by assets are reported continuously for the longest period of time and have the most detailed breakdowns by industry. Size bins are also available based on receipts (sales) after 1959, net income from 1918 to 1974, and equity capital for 1921 and 1922. These data cover both C-corporations and S-corporations, and the information comes from corporate tax returns. For noncorporations (partnerships and nonfarm proprietorships), size bins by receipts are presented in some years, which we transcribe whenever available.⁶ Information at the individual firm level is confidential and not available in our data.

We have processed tabulations of corporations by size bins for the aggregate economy, main sectors (roughly at the single-digit SIC code level), and subsectors (roughly at the two-digit SIC code level). The industry classification system switched from SIC to NAICS in 1997, and we harmonize industries to maintain consistency as explained in online Appendix IA2. The list of main sectors and subsectors (together with the mappings to SIC and NAICS codes) is shown in online Appendix Table IA1. The IRS stopped publishing the sector-level tabulations after 2013 due to an update in its privacy guidelines (IRS Publication 1075), but the aggregate tabulations continue to be available. Table 2 shows the number of corporations in the aggregate and in the main sectors, and *SOI Bulletin* publications provide extensive descriptions of the business population (Harris and Szefflinski 2007).

The SOI data cover all industries, unlike the census concentration statistics which exclude some sectors like agriculture. The SOI assigns a single industry code to each business based on the industry that represents the largest percentage of its total receipts. This approach is different from census concentration statistics at the industry

⁶It is challenging to construct reliable economy-wide measures of business concentration before our SOI data started in 1918, since limited information exists to our knowledge about the denominator (total assets or sales), the numerator (the largest businesses and their assets or sales), as well as the number of businesses.

TABLE 1—RAW DATA FROM STATISTICS OF INCOME, 1945

Panel A. Example of aggregate tabulation

[Total assets classes and money figures in thousands of dollars]					
Total assets classes ³⁸	Number of returns ³²	Total assets—Total liabilities ³⁸	Total compiled receipts ⁸	Compiled net profit or net loss	Net income or deficit ²
AGGREGATE					
Under 50	177,788	3,647,660	9,030,941	267,783	267,621
50 under 100	61,431	4,378,846	8,650,707	376,597	376,379
100 under 250	60,308	9,526,342	16,659,649	837,872	837,120
250 under 500	27,583	9,666,507	15,828,823	914,465	913,563
500 under 1,000	17,669	12,436,856	17,397,634	1,196,416	1,193,741
1,000 under 5,000	22,057	47,907,402	42,250,752	3,450,003	3,427,380
5,000 under 10,000	3,948	27,591,380	17,749,140	1,719,313	1,704,217
10,000 under 50,000	3,197	65,334,850	39,917,400	3,900,112	3,868,073
50,000 under 100,000	427	29,834,282	15,626,460	1,521,776	1,508,085
100,000 and over	542	231,137,144	69,524,822	7,035,344	6,917,796
Total	374,950	441,461,263	252,636,330	21,219,681	21,013,975

Panel B. Example of industry-level tabulation

Total assets classes ⁴⁸	Number of returns with balance sheets ⁴²	Cash ⁴³	Notes and accounts receivable less reserve	Inventories	Investments ⁴⁶	Capital assets ⁴⁵ less reserves	Total assets—Total liabilities ⁴⁸	Accounts and notes payable ⁴⁷
SERVICE: BUSINESS SERVICE—								
0	2,419	11,723	11,877	1,264	4,076	9,901	41,710	9,258
50	519	9,009	11,138	1,170	4,203	8,186	36,246	8,416
100	433	13,848	20,844	1,964	10,960	15,292	66,950	16,679
250	173	12,547	16,526	2,122	11,386	13,542	60,054	15,626
500	99	11,875	20,417	2,614	16,166	11,856	66,486	17,827
1,000	92	31,130	45,472	8,058	56,072	37,504	185,880	41,630
5,000	7	6,589	17,685	1,044	13,450	4,913	47,822	11,048
10,000	5	9,951	15,301	1,936	18,255	26,171	75,814	8,786
50,000								
100,000								
Total	3,747	106,672	159,260	20,171	134,570	127,365	580,964	128,271

Notes: These tables show examples of raw data from the SOI for the year 1945. Panel A is a screenshot of the tabulation of corporations by asset size bins for the aggregate economy. Panel B is a screenshot of the tabulation of corporations by asset size bins for one industry. The screenshots are taken from page 12 and page 288 of the 1945 SOI report, available at <https://www.irs.gov/pub/irs-soi/45soireppt2ar.pdf>. Tabulations by asset size before 1960 did not include estimates for the small fraction of corporations that did not report balance sheets; see online Appendix IA2.1 for detailed discussions and checks.

level which only use establishments in a given industry, so a multi-industry firm is broken up into different industries. We are interested in the firm size distribution (in the economy as a whole and in different domains of production), so we would like to keep a company as a whole, and the SOI industry classification aligns with this objective. Some studies use the census convention to proxy for product market concentration, but product markets are challenging to define (Syverson 2019) and they are not our focus.

For each level of aggregation, we estimate top business shares from size bins marked by dollar thresholds. We verify that different estimation methods produce

TABLE 2—NUMBER OF CORPORATIONS (THOUSANDS)

Sector	1930	1950	1970	1990	2010
All	463	629	1,665	3,717	5,814
Agriculture	10	8	37	126	137
Construction	19	28	139	407	718
Finance	137	172	406	609	892
Manufacturing	92	116	198	302	281
Mining	12	9	14	40	40
Services	38	55	281	1,029	2,273
Trade	131	209	518	1,023	1,226
Utilities	22	26	67	160	246

Notes: This table shows the number of corporations (in thousands) at the beginning of various decades, for the aggregate economy and the main sectors. The main sectors largely correspond to SIC codes 01–09 (agriculture), 10–14 (mining), 15–17 (construction), 20–39 (manufacturing), 40–49 (transportation, communications, and utilities), 50–59 (wholesale and retail trade), 60–67 (finance, insurance, and real estate), and 70–89 (services).

almost identical results. Before the 1980s, the top bins in the raw data contain a very small number of businesses (e.g., a few firms at the industry level and a few hundred in the aggregate as shown in Table 1). This helps us obtain fairly precise estimates of top shares, which rely little on distributional assumptions. After the 1980s, the top bins in the raw data sometimes contain more businesses; in which case, our estimates for top shares may be less precise if the numerator is restricted to a very small set of businesses. The top bins by receipts also tend to be less granular than the top bins by assets.

One approach to estimate top business shares is fitting certain distributions to the raw data. Our baseline method uses the generalized Pareto interpolation, which is the standard approach to estimate household top income shares from income bins with a similar format (Blanchet, Fournier, and Piketty 2022; Piketty and Saez 2003). The generalized Pareto interpolation starts by calculating the inverted Pareto coefficient $b(p_i)$ for each bin threshold y_i , where p_i is the fraction of firms with size above y_i , and $b(p_i)$ is the ratio between the average size above y_i and the threshold y_i . It then fits a continuous curve of inverted Pareto coefficients. Alternatively, we can also fit a lognormal curve for each bin and interpolate the lognormal curves, as explained in online Appendix IA2.4. Some studies investigate whether Pareto or lognormal provides a good fit of the business size distribution when a given parameter is used for the entire distribution (Rossi-Hansberg and Wright 2007; Kondo, Lewis, and Stella 2019). Our interpolation allows the Pareto or lognormal parameters to vary for different parts of the distribution, in which case the top share using either method is similar. Pareto has one parameter to fit whereas lognormal has two, so the former is easier to implement.

Another approach to estimate top business shares is directly adding up the top bins such that the number of businesses in these bins approximates a certain amount (e.g., top 1 percent). For instance, if the total number of businesses is N and the number of businesses in the top k bins adds up to less than $0.01 N$ (whereas the top $k + 1$ bins add up to more than $0.01N$), then we take all the businesses in the top k bins and add $(0.01N - \sum_{i=1}^k n_i)/n_{k+1}$ fraction from the $k + 1$ th bin (where n_i denotes the number of businesses in the i th bin). In other words, we take all businesses in the top k bins and fill in the residual from the $k + 1$ th bin.

We verify that top shares estimated using all methods are similar, as shown in online Appendix Figure IA1. The raw correlation among the top 1 percent share based on generalized Pareto, generalized lognormal, and directly adding up bins is over 0.99. The benefit of interpolating distributions is that we do not have missing values for the small fraction of industry-years where the first bin has more than say 1 percent businesses; the benefit of adding up bins is that we can obtain other attributes of the top businesses (e.g., adding up their profits). We use generalized Pareto as the default, and use adding up bins when we need to measure other attributes of top businesses.

For the measure of concentration, we begin with the top 1 percent share as the baseline. The benchmark for evaluating the disparity of business size is the top x percent share in a number of models (Aghion et al. 2023; Hsieh and Rossi-Hansberg 2023). Analyzing top percentiles is also the standard approach in research on household income and wealth inequality. To make sure the results of top 1 percent shares are not affected by small and extraneous firms coming in or out of the sample (therefore changing the total number of firms), we also present the top 1 percent as a share of the top 10 percent, which should not be affected when the right tail is Pareto.⁷ Some models deliver the share of the top N businesses with a given N as a metric of concentration, but it can be challenging to determine the appropriate N across different levels of aggregation (e.g., the overall economy versus a particular industry) and across different industries that vary in size. We also present top shares using a fixed number of top businesses in Section IIC. The Herfindahl-Hirschman Index (HHI) is another measure of concentration, but it requires data on the size of every single firm and therefore is too data intensive to be feasible for us.

For corporations with subsidiary affiliates, the SOI reports consolidated affiliates as one entity.⁸ We follow IRS publications to refer to an entity in the SOI tabulations as a business or a corporation (see Petska and Wilson 1994; Harris and Szefflinski 2007, and other *SOI Bulletin* publications). We explain consolidation rules in detail in online Appendix IA2 and provide a summary here. First, the consolidation threshold was 95 percent ownership of an affiliate before 1954 and 80 percent afterwards. Second, consolidation was mandatory from 1918 to 1921 and voluntary after 1922, with the exception of 1934 to 1941 when consolidated filings were not allowed for most corporations. Before 1964, there was often a small surtax on consolidated returns. In recent decades, eligible firms generally elect to consolidate (Mills, Newberry, and Trautman 2002), given more favorable treatments when consolidated (e.g., when consolidated the sales among affiliates do not generate taxes, and gains and losses across affiliates can be netted). Overall, rising concentration is observed within each regime of consolidation filings. The top shares estimated from SOI data

⁷Specifically, if small and extraneous firms come in (out) of the data, the total number of firms in the top 1 percent will increase (decrease). Thus the top 1 percent share can increase (decrease), as the small firms have little impact on the total value of the denominator while the numerator will include more (fewer) firms. To make sure our results are not affected by this issue, we can calculate the top $x\%$ as a fraction of the top $y\%$ (e.g., the top 1 percent as a share of the top 10 percent). One can show that for Pareto distributions, this relative share only depends on x/y and the tail coefficient k . In other words, $\text{top } 1\% / \text{top } 10\% = \text{top } 0.01N / \text{top } 0.1N$ is invariant to the total number of firms N .

⁸For instance, the SOI in 2013 (as well as in other years) writes: "A consolidated return filed by the common parent company was treated as a unit and each statistical classification was determined on the basis of the combined data of the affiliated group." The 2013 SOI report is available at <https://www.irs.gov/pub/irs-soi/13coccr.pdf>.

are also consistent with those calculated from top firms' consolidated financial statements when such information is available (see Sections IIC and IIIB).⁹

For the reporting of financial information, firms provide their balance sheets (assets and liabilities) in Section L of Form 1120, and are instructed to use "the accounting method regularly used in keeping the corporation's books and records" (see Form 1120 instructions). In other words, balance sheet items in the SOI data largely follow what companies do for financial statements. Mills, Newberry, and Trautman (2002) provide detailed discussions about the relationship between financial information in SOI data and in firms' annual reports. For assets and sales, we show in Sections IIC and IIIB that the size of top firms estimated from SOI data is similar to that calculated using financial statements. For net income, the SOI uses tax depreciation, but the concentration series by net income is not our primary focus. Section IIID shows the consistency between aggregate corporate net income in SOI and in NIPA (where the BEA makes adjustments to use economic depreciation instead).

Like the national accounts, the SOI focuses on production activities in the United States (e.g., receipts in the SOI are similar to the convention of gross output in the national accounts). This is the natural realm for our analyses of concentration in production activities in the US economy. For assets, the SOI data cover businesses incorporated in the United States; affiliates of foreign companies incorporated in the United States are included as US corporations (they also do not count towards imports in the national accounts). For receipts, the SOI data cover US corporations and foreign corporations with US business activities (only income connected with conducting businesses in the United States is included); they cover exports and few imports. We discuss issues related to trade activities between United States and other countries in Section IIIC, and perform checks relating to foreign affiliates of US businesses.

II. Basic Results

We study the size distribution of US businesses over the past century. In Section IIA, we present results among corporations in the aggregate economy, the main sectors, and the subsectors. In Section IIB, we present results including non-corporations. In Section IIC, we present results for top N shares with a given N .

A. Aggregate and Industry-Level Trends

Figure 1 presents the aggregate concentration trends among the population of US corporations. The left panel shows the share of the top 1 percent corporations among all corporations, and the right panel shows the top 0.1 percent share. The green line

⁹In recent years, large asset managers (e.g., Vanguard, Blackrock) hold an increasing fraction of shares across multiple companies (see Schmalz 2018 and Backus, Conlon, and Sinkinson 2019 for reviews of the common ownership literature). Such common ownership driven by large index funds is unlikely to affect most of our sample period (before index funds became prominent) and sample firms (the vast majority are not publicly listed). Additionally, to our understanding the common ownership literature has not found strong evidence that different companies owned by the same investors directly coordinate their production activities. Since our focus is the organization of production activities, we treat a firm as a production enterprise in the usual way.

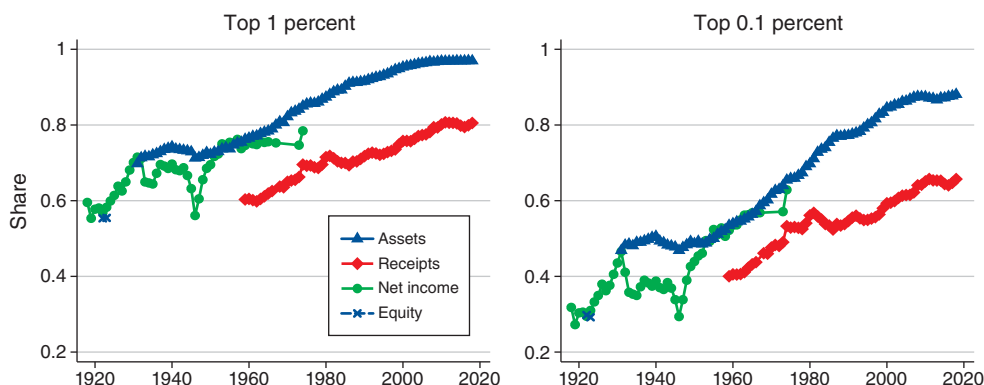


FIGURE 1. TOP 1 PERCENT AND 0.1 PERCENT SHARES: ALL CORPORATIONS

Notes: This figure shows the shares of the top 1 percent (left panel) and the top 0.1 percent (right panel) corporations among all corporations. The blue line with triangles shows the share of assets accounted for by top corporations sorted on assets. The red line with diamonds shows the share of receipts (sales) accounted for by top corporations sorted on receipts. The green line with circles shows the share of net income accounted for by top corporations sorted on net income (restricting to those with positive net income). The blue cross shows the share of equity capital accounted for by top corporations sorted on equity. See online Appendix IA2.3 for details about variable construction.

with circles shows the share of top corporations by net income in total corporate net income (restricting to those with positive net income). The red line with diamonds shows the share of top corporations by receipts in total corporate receipts. The blue line with triangles shows the share of top corporations by assets in total corporate assets. Finally, the blue cross shows the share of equity accounted for by top corporations sorted on equity, available for two years in the early 1920s; these data points align closely with the top share by net income that covers those early years.

The persistent upward trend in top shares is observable across series. For instance, the top 1 percent share by assets increased by 27 percentage points between 1931 and 2018 (from 70 percent to 97 percent), the top 1 percent share by receipts rose by 20 percentage points between 1959 and 2018 (from 60 percent to 80 percent), and top 1 percent share by net income grew by 19 percentage points between 1918 and 1974 (from 60 percent to 79 percent). Top shares by assets and by receipts have correlations over 0.9, and top shares by net income have correlations of around 0.7 with the other two series.

Figure 2 presents two more aggregate trends: the share of the top 1 percent among the top 10 percent (left panel), and the share of the top 0.1 percent among the top 1 percent (right panel). These series show the evolution of the far right tail of the size distribution. As discussed in Section I, they address the concern that some small firms at the bottom of the size distribution may not be active yet influence the number of firms and correspondingly the top 1 percent share. The relative top shares should not be affected by this concern.

We present results for the main sectors (around the single-digit SIC level) in Figure 3. In this case, we have size bins of corporations by assets, receipts, and net income. Concentration (as represented by the top 1 percent share) has been rising over the past century in most of the main sectors. The series by assets, receipts, and net income display consistent patterns. Online Appendix Figure IA2 shows that the

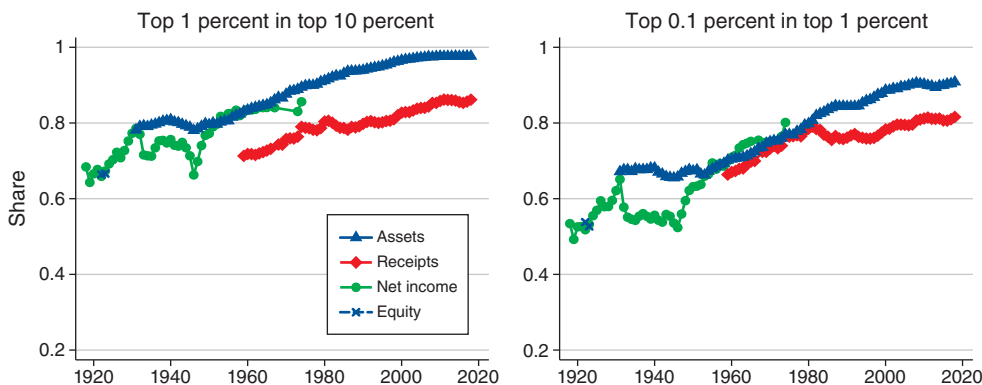


FIGURE 2. RELATIVE SHARES AMONG TOP CORPORATIONS

Notes: This figure shows the shares of the top 1 percent corporations among the top 10 percent corporations (left panel) and the top 0.1 percent corporations among the top 1 percent corporations (right panel). The blue line with triangles shows the share of assets accounted for by top corporations sorted on assets. The red line with diamonds shows the share of receipts accounted for by top corporations sorted on receipts. The green line with circles shows the share of net income accounted for by top corporations sorted on net income (restricting to those with positive net income). The blue cross shows the share of equity capital accounted for by top corporations sorted on equity. See online Appendix IA2.3 or details about variable construction.

results are similar for the share of the top 1 percent in the top 10 percent. Indeed, the share of the top 1 percent in the top 10 percent is over 0.98 correlated with the top 1 percent share. Table 3 provides a tabulation of the average top 1 percent asset share in various decades for the aggregate and the main sectors.¹⁰

The evidence also indicates that the timing for rising concentration varies across industries. The rise was stronger in earlier years for manufacturing and mining, and stronger in later years for services and retail/wholesale trade. Panel A of online Appendix Figure IA3 further visualizes the differences in timing. For each main sector, the solid blue circles show the change in the top 1 percent asset share between the 1930s and the 1970s, and the hollow red diamonds show the change between the 1970s and the 2010s.

In Figure 4, we plot asset shares (panel A) and receipt shares (panel B) across the full distribution by size (top 0.1 percent, top 0.1 percent to 1 percent, top 1 percent to 10 percent, top 10 percent to 50 percent, and bottom 50 percent). This figure shows that most of the expansion of the top share is driven by the very top (e.g., the top 0.1 percent). We also see that the expansion of the top businesses primarily reduces the shares of businesses in the middle of the distribution, and the bottom 50 percent is too small in value terms in any case.

Finally, we present results for subsectors (around the two-digit SIC level) in Figure 5. In this case, tabulations are most comprehensive for size bins by assets, which also have the longest time series. Figure 5 shows the asset share of the top

¹⁰The level of top business shares can be higher in the aggregate than in most industries because some industries have more large firms and more concentrated industries may also have more large firms. For the *change* in aggregate top business shares, rising concentration in different industries in general, higher growth of industries with larger firms, and higher growth of industries with more concentration can all play a role.

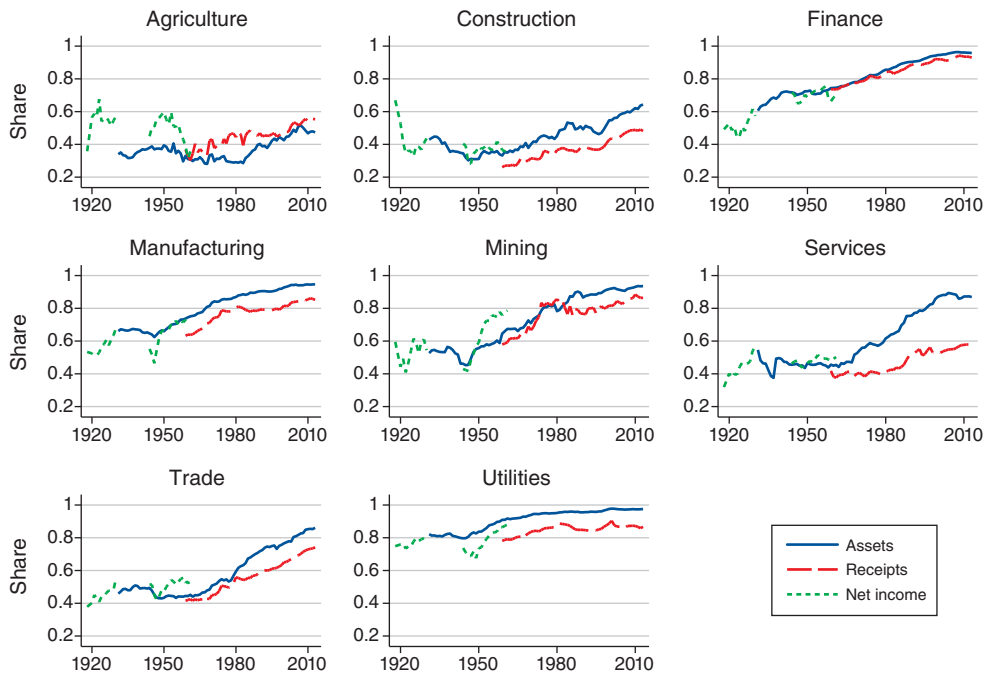


FIGURE 3. TOP 1 PERCENT SHARES: MAIN SECTORS

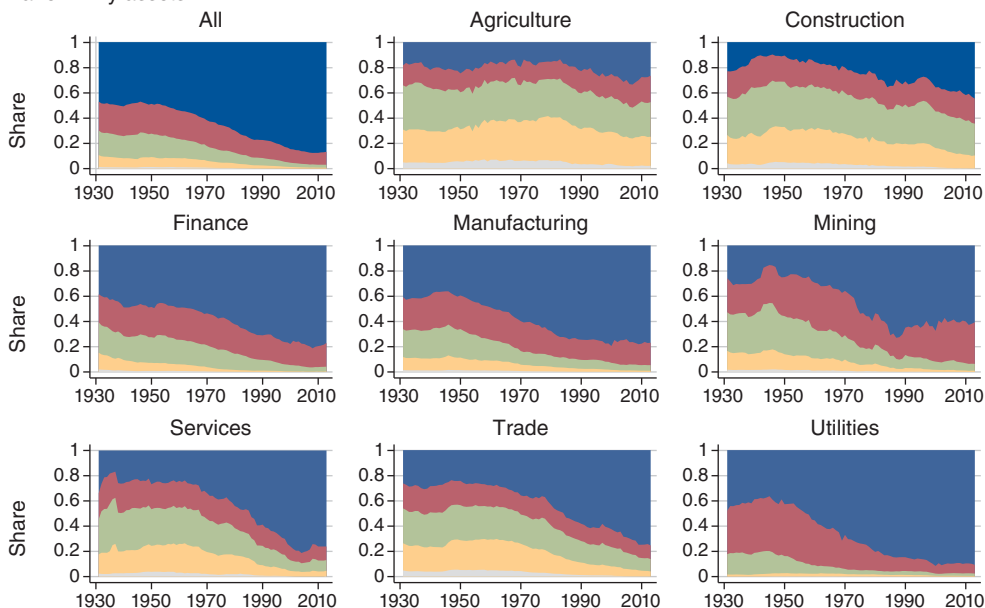
Notes: This figure shows the share of the top 1 percent corporations among the main sectors. The solid blue line shows the share of corporate assets accounted for by top corporations sorted on assets. The dashed red line shows the share of corporate receipts accounted for by top corporations sorted on receipts. The dotted green line shows the share of corporate net income accounted for by top corporations sorted on net income (restricting to those with positive net income). The main sectors largely correspond to SIC codes 01–09 (agriculture), 10–14 (mining), 15–17 (construction), 20–39 (manufacturing), 40–49 (transportation, communications, and utilities), 50–59 (wholesale and retail trade), 60–67 (finance, insurance, and real estate), and 70–89 (services).

TABLE 3—TOP 1 PERCENT ASSET SHARES: AVERAGE BY DECADE

	1930s	1950s	1970s	1990s	2010s
All	0.72	0.74	0.85	0.93	0.97
Agriculture	0.33	0.36	0.31	0.41	0.47
Construction	0.42	0.34	0.43	0.49	0.63
Finance	0.66	0.72	0.82	0.92	0.96
Manufacturing	0.67	0.70	0.85	0.91	0.95
Mining	0.54	0.59	0.78	0.89	0.93
Services	0.46	0.46	0.57	0.80	0.87
Trade	0.49	0.44	0.54	0.74	0.86
Utilities	0.82	0.87	0.95	0.96	0.97

Notes: This table shows the average share of the top 1 percent corporations by assets in total corporate assets in various decades, for the aggregate economy and the main sectors. The main sectors largely correspond to SIC codes 01–09 (agriculture), 10–14 (mining), 15–17 (construction), 20–39 (manufacturing), 40–49 (transportation, communications, and utilities), 50–59 (wholesale and retail trade), 60–67 (finance, insurance, and real estate), and 70–89 (services).

Panel A. By assets



Panel B. By receipts

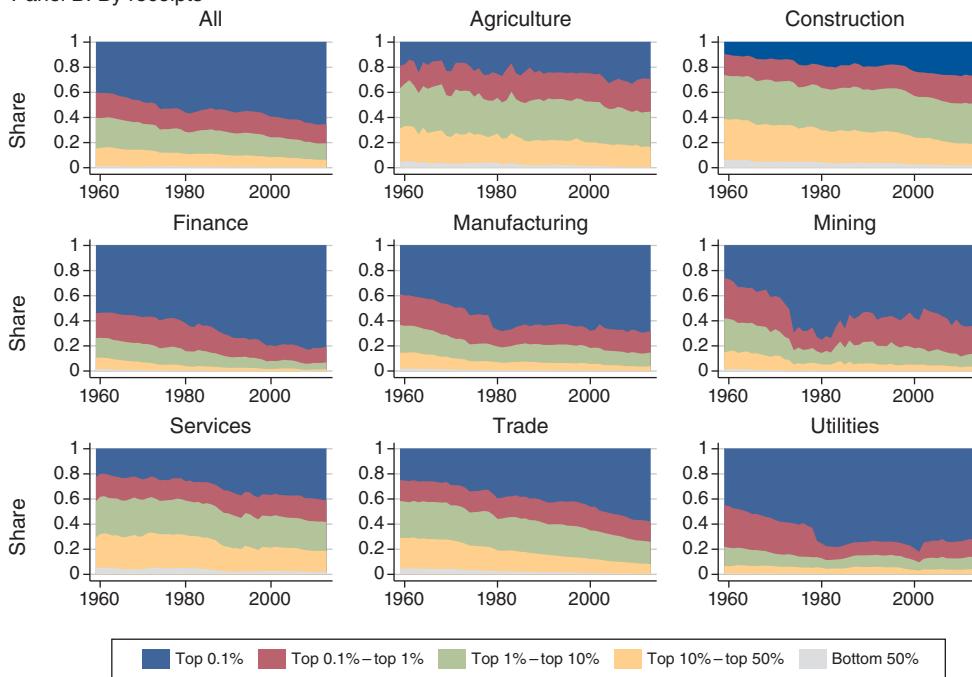


FIGURE 4. FULL DISTRIBUTION

Notes: Panel A shows the asset shares across the entire distribution of corporations by asset size: top 0.1 percent by assets (dark blue), top 0.1 percent to top 1 percent by assets (red), top 1 percent to top 10 percent by assets (green), top 10 percent to top 50 percent by assets (yellow), and bottom 50 percent by assets (gray). Panel B shows the receipt shares across the entire distribution of corporations by receipt size: top 0.1 percent by receipts (dark blue), top 0.1 percent to top 1 percent by receipts (red), top 1 percent to top 10 percent by receipts (green), top 10 percent to top 50 percent by receipts (yellow), and bottom 50 percent by receipts (gray).

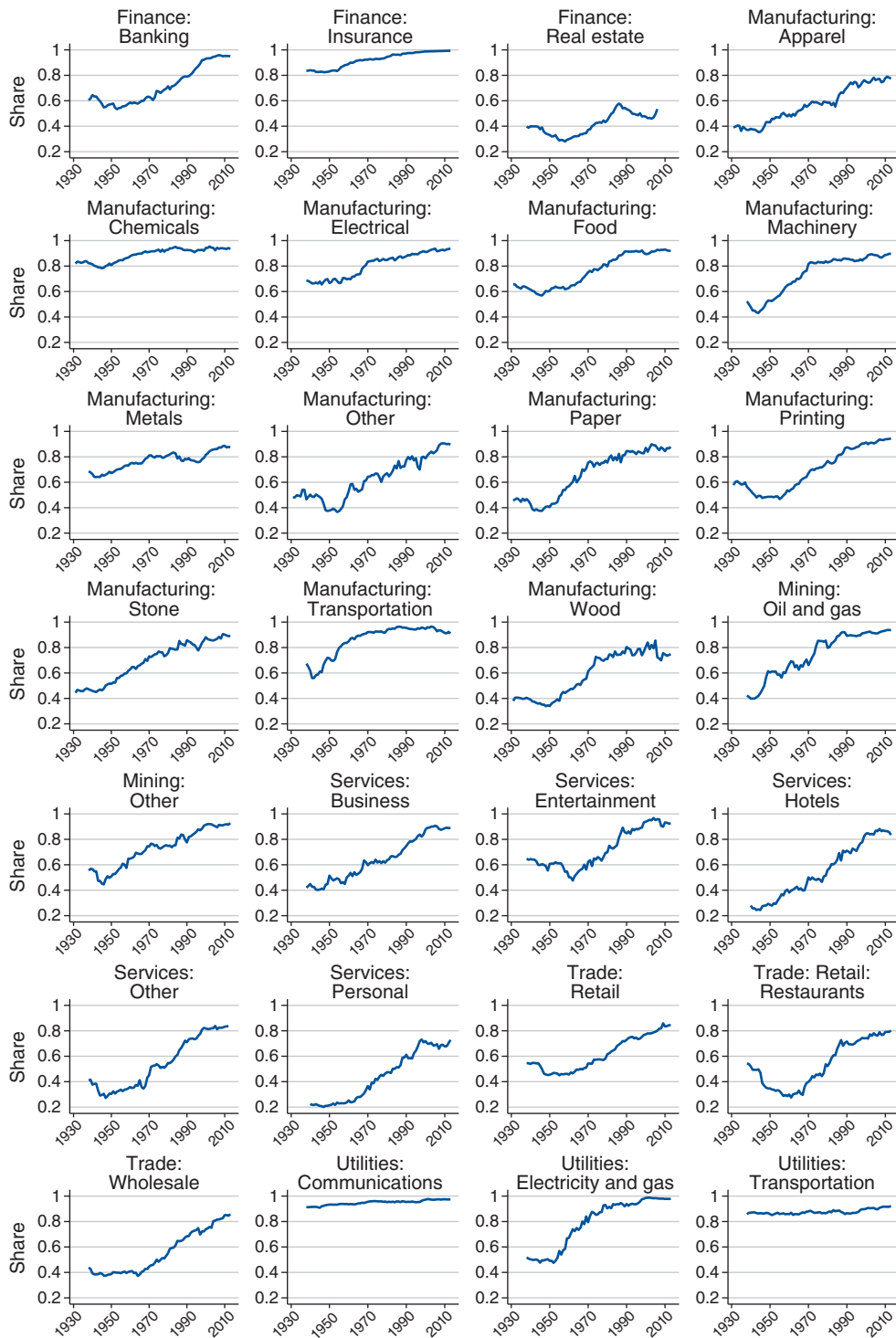


FIGURE 5. TOP 1 PERCENT ASSET SHARES: SUBSECTORS

Note: This figure shows the share of the top 1 percent corporations by assets in total corporate assets among the subsectors.

1 percent corporations.¹¹ The persistent rise in concentration is common in many industries, but the timing can differ. Panel B of online Appendix Figure IA3 shows the change in the top 1 percent asset share between the 1930s and the 1970s and the change between the 1970s and the 2010s for each subsector. While most industries experienced noticeable increases in concentration over time, the ranking in the cross section remains stable. For instance, the rank correlation between top 1 percent asset shares in the 1930s and those in the 2010s is over 0.9 among main sectors and around 0.7 among subsectors. This pattern suggests that industries differ persistently in the organization of production.

For further breakdowns within our subsectors, online Appendix Figure IA4 shows several examples. Here we decompose mining into coal, metal, nonmetallic, and oil and gas in panel A, and decompose retail into different types of retail in panel B. The long-run trends of rising concentration also hold at this level of disaggregation. Further breakdowns of other subsectors is challenging due to redefinitions of granular industries over time. For concentration in even narrower industries, the manufacturing census provides some historical information at the four-digit SIC level, which we examine in Section IIIA. Overall, the long-run trends of rising concentration are present at various levels of aggregation.

B. Including Noncorporations

Our objective is to study the concentration of production (i.e., the extent to which a small set of top businesses account for a large share of production activities). The SOI tabulations of businesses by size bins have comprehensive coverage of corporations. In the following, we check that the concentration trends among corporations plus noncorporations (partnerships and proprietorships) are similar, using additional data on the size distribution of noncorporations when these data are available.

As an overview of the economic activities of corporations and noncorporations, online Appendix Figure IA5 plots corporations' share in overall business receipts (by corporations, partnerships, and nonfarm proprietorships), using SOI data on corporate and noncorporate receipts.¹² In the aggregate, the corporate share rose from 70 percent in the early decades to 90 percent in the 1980s, and decreased gradually to 80 percent since then; these trends are consistent with several studies showing that noncorporations have become more important since the 1980s (Clarke and Kopczuk 2017; Kopczuk and Zwick 2020). Among the main sectors, the corporate share is high for industries such as finance and manufacturing, as well as mining and utilities prior to the 1990s; it was lower in the early decades for construction, services, and trade. In our baseline results in Section IIA, rising concentration was stronger in manufacturing and mining before the 1980s, and the share of corporations was high and stable in these sectors during that period; rising concentration

¹¹ We exclude "finance: holding companies," which includes RICs and REITs as these companies are the exceptions where consolidated filings are not allowed. We also exclude observations that cannot be integrated into consistent long-run series due to sector reclassifications (new SIC/NAICS vintages). This includes "manufacturing: plastics," "finance: real estate" (post-2007), and some early observations for metal manufacturing industries, personal services, and hotels.

¹² The noncorporate receipt data are available from Lamoreaux (2006), and we extend the series to recent years (IRS 2024c). See online Appendix IA2.1 for details.

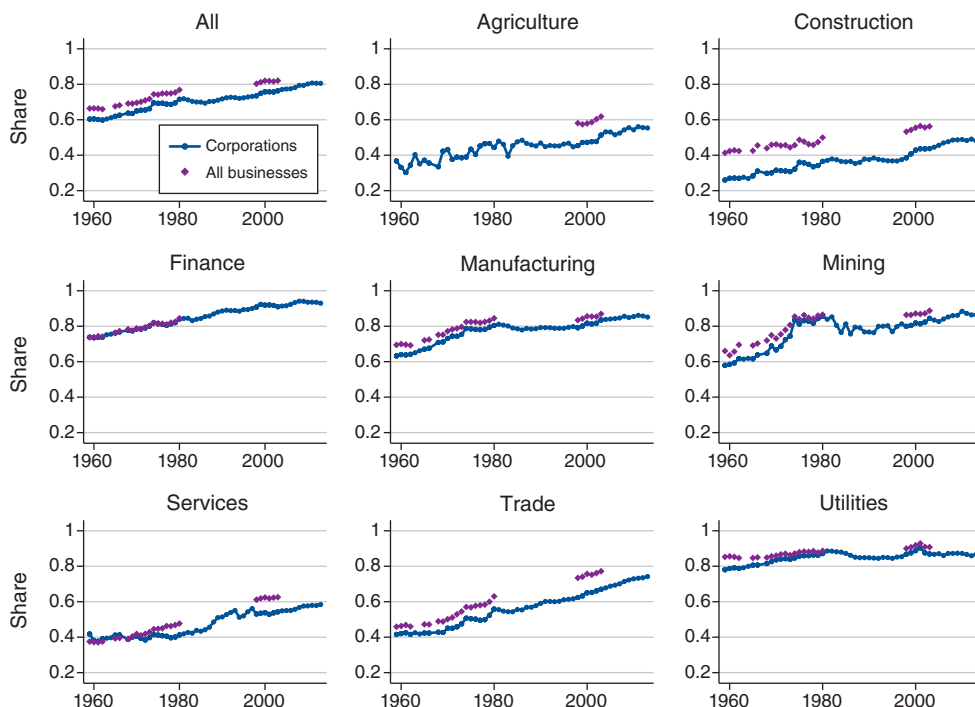


FIGURE 6. TOP 1 PERCENT RECEIPT SHARES INCLUDING NONCORPORATIONS

Notes: This figure shows robustness checks for top businesses' shares including noncorporations. The blue circles show the receipt share of the top 1 percent corporations by receipts among all corporations. The purple diamonds show the receipt share of the top 1 percent businesses by receipts among all businesses (corporations plus noncorporations), for years when size bins of noncorporations are available. The top receipt share among all businesses is not available for finance in recent decades due to data errors in SOI publications. See online Appendix IA2.3 for details about variable construction.

was stronger in services and retail/wholesale after the 1980s, and the share of corporations was also high and stable in these sectors during that period.

We perform checks for top business shares including noncorporations in Figure 6. In some years, we have tabulations of noncorporations by size bins based on receipts (IRS 2024b, c), and the data sources are listed in online Appendix Table IA2. In these years, we can estimate top businesses' receipt shares among all businesses (corporations plus noncorporations): we rank all businesses by size of receipts, and obtain the share accounted for by the top businesses among all businesses. Figure 6 shows that the top 1 percent receipt share among all businesses (purple diamonds) is similar to the top 1 percent receipt share among corporations (blue circles). Overall, the patterns of rising concentration are similar when noncorporations are included.

C. Top N Businesses with a Given N

Another metric for concentration is the share of the top N businesses with a given N . We present top N shares and compare them with top percent shares in the following.

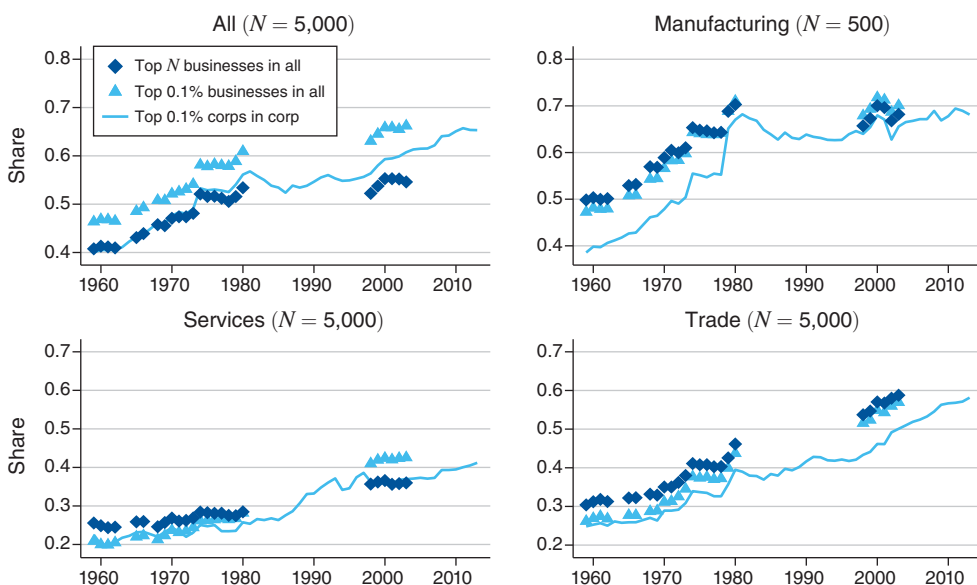
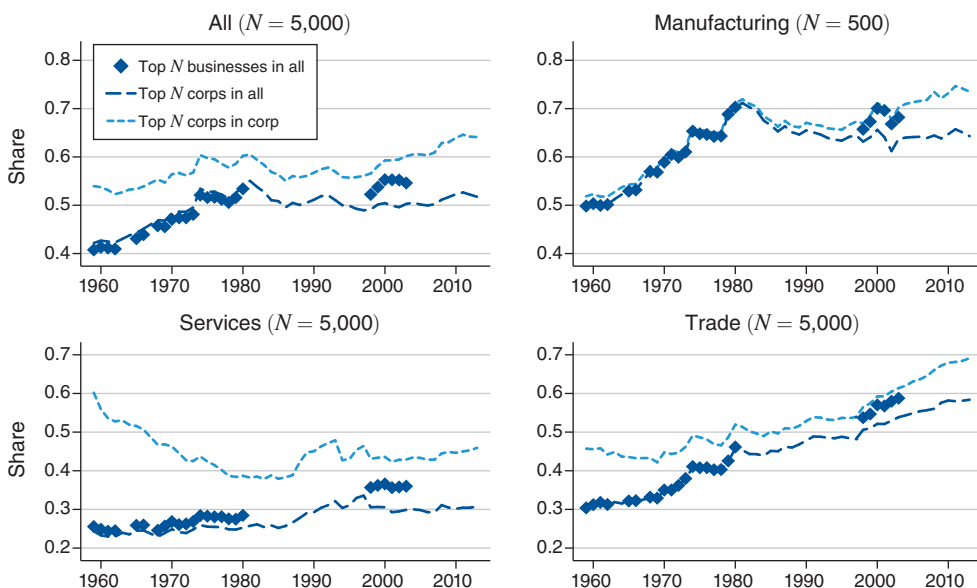
Top Receipt Shares.—For receipts, we can construct the best measure of the top N share, namely the receipt share of the largest N businesses (corporations and non-corporations) by receipts among the receipts of all businesses. This is possible for the years where we have data on the receipt size distribution of both corporations and noncorporations (also used in Figure 6).

Panel A of Figure 7 shows the consistency between concentration trends using top N businesses and our previous results using top percentiles. It presents the top N share (dark blue diamonds) and the top 0.1 percent share (light blue triangles) among all businesses as an example. In manufacturing where the number of total businesses is smaller, the top 500 is comparable to the top 0.1 percent. In services and retail/wholesale trade where the number of total businesses is larger, the top 5,000 is comparable to the top 0.1 percent. In the aggregate, the top 5,000 share can also roughly match the top 0.1 percent share. In these cases, we see that the top N share among all businesses and the top 0.1 percent share among all businesses have similar trends. In addition, the top 0.1 percent share among all businesses is similar to the top 0.1 percent share among corporations (light blue line) used in Section IIA, so the concentration trend here resembles our baseline results in Section IIA (where we have data for all years and more granular industries).¹³

We use manufacturing, services, and retail/wholesale trade as the primary examples here because they are the most important sectors in terms of output, and they exemplify the patterns of rising concentration among different sectors: the increase was stronger in manufacturing in earlier decades, and stronger in services and retail/wholesale trade in later decades. The top 0.1 percent also matches with a convenient round number of N in these cases. In online Appendix Figure IA8, we extend the comparison of top N shares and top $x\%$ shares to all main sectors. Here we use top 5,000 businesses in all cases, and automatically select the percentile $x\%$ such that the top $x\%$ among all businesses has 5,000 businesses in 1980. The corresponding percentile $x\%$ is around 0.1 percent for services and retail/wholesale trade, close to 1 percent for manufacturing (hence the round N and top 0.1 percent comparison in panel A of Figure 7 works well), and other fractions in other sectors. Overall, Figure IA8 shows similar patterns to Figure 7, panel A. The evolution of the top 5,000 share among all businesses is similar to that of the corresponding top percentile share, especially among the large and important sectors.

In panel B of Figure 7, we show the caveats of computing top N shares in years where we do not have the size distribution of noncorporations. The dark blue diamonds are the same as those in panel A, which represent the best measure of the top N share. First, for the dashed line, we show the approximation of the top N share where we use only the largest (500 or 5,000) *corporations* in the numerator, and divide by the combined receipts of corporations and noncorporations in the denominator. In other words, *we assume that the largest N businesses are all corporations*. This approximation is close to the dark blue diamonds before the 1980s. However, it can underestimate the top share in recent decades as large noncorporations have

¹³One might also think that the number of potential entrepreneurs or the demand for goods and services may increase with the population, so we can also scale the number of businesses in the numerator with population (obtained from Jordà, Schularick, and Taylor 2024). Online Appendix Figure IA7 shows the series in Figure 7, panel A, where we have top N businesses in the numerator in 1980, and adjust the number of top businesses in the numerator using the cumulative population growth for other years.

Panel A. Top N shares in all businessesPanel B. Top N shares in corporations and in all businessesFIGURE 7. TOP N RECEIPT SHARES

Notes: In panel A, the dark blue diamonds show the receipt share of the largest N businesses (corporations plus noncorporations) by receipts among the receipts of all businesses. This is possible for years where we have data on the receipt size distribution of both corporations and noncorporations. For comparison, the light blue triangles show the receipt share of the top 0.1 percent businesses by receipts among all businesses. The light blue line shows the receipt share of the top 0.1 percent corporations by receipts among all corporations. In panel B, the dark blue diamonds are the same as those in panel A. The dashed line shows the receipt share of the largest N corporations by receipts among the receipts of corporations and noncorporations. The dotted line shows the receipt share of the largest N corporations by receipts among the receipts of corporations. The value N is equal to 500 for manufacturing, and 5,000 for the aggregate, services, and retail/wholesale trade. See online Appendix IA2.3 for details about variable construction.

become more common. Second, for the dotted line, we show the largest N corporations among the receipts of *corporations* only. Like our baseline measures, this line increases in the aggregate, in manufacturing in earlier decades, and in services and retail/wholesale in later decades. However, it can diverge from the dark blue diamonds for services and retail/wholesale in earlier decades. These are settings where corporations became substantially more common (as discussed in Section IIB), so the denominator of the top N share among corporations expands. Since the numerator does not adjust, the dotted line declines artificially. As a result, the share of the top N corporations among corporations is vulnerable to changes in the relative prevalence of corporations and noncorporations.

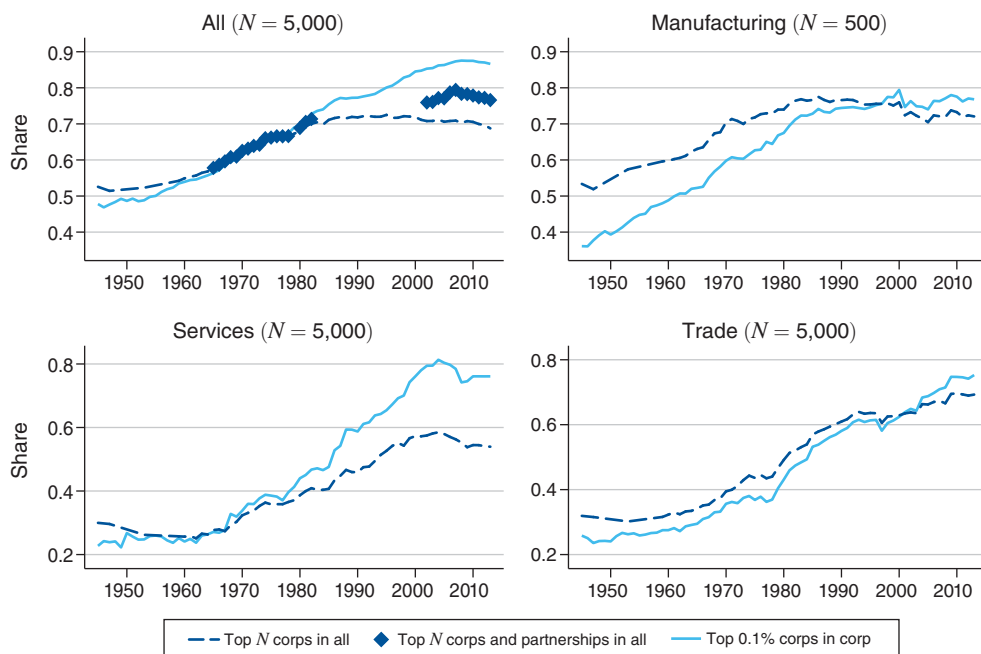
In sum, the top N shares among all businesses display similar patterns to the top percentile shares used in our baseline plots. Proper measurement of the top N share relies more on data about noncorporations; for example, the share of the top N corporations among corporations is not necessarily a good approximation. In comparison, the top percentile share is consistent whether it is measured among all businesses or among corporations. Since data on the size distribution of corporations are most comprehensive, our baseline measures use the top percentile shares among corporations. The evidence above shows that these measures are reliable reflections of top business shares.¹⁴

Top Asset Shares.—For assets, limited data exist for the total assets of noncorporations, which adds to the challenge of calculating the top N share as explained above. For total business assets in the denominator of top asset shares, we know the total assets of corporations and need to estimate the total assets of noncorporations. We follow other work (Federal Trade Commission 1969) and assume that the ratio of corporate to noncorporate assets is comparable with the ratio of corporate to noncorporate receipts (available after 1945 as shown in online Appendix Figure IA5). We check this assumption in panel A of Figure IA6 using information about corporate and noncorporate assets from the Flow of Funds (Board of Governors of the Federal Reserve System 2024), available for nonfinancial industries in the aggregate. The solid line shows the fraction of corporate receipts in corporate and noncorporate receipts for nonfinancial industries using our SOI data. The dashed line shows the fraction of corporate assets in corporate and noncorporate assets for nonfinancial industries based on Flow of Funds data.¹⁵ These two lines are very similar.

Figure 8 shows the asset share of the top N corporations by assets in the estimated total assets of corporations and noncorporations (dark blue line). This approximation to the top N share *assumes the largest N firms in the numerator are all corporations*, due to the lack of data on the asset size distribution of noncorporations. Accordingly, the top share is likely underestimated in recent decades given large

¹⁴Top N shares and top $x\%$ shares may differ when the number of entities in the numerator of top $x\%$ shares changes. Among all businesses, the marginal firms in the numerator have a limited impact, so top N shares and comparable top $x\%$ shares are similar. Among corporations only, top N shares and top $x\%$ shares can diverge in periods with a substantial shift between noncorporations and corporations. In these settings, top $x\%$ shares are more consistent with concentration among all businesses. As discussed above, when corporations become more common, the denominator expands and artificially lowers top N shares, whereas top $x\%$ shares are more robust due to an offsetting increase in the numerator.

¹⁵We exclude farm assets and residential real estate in Flow of Funds data to better match SOI data.

FIGURE 8. TOP N ASSET SHARES

Notes: The dashed dark blue line shows the asset share of the largest N corporations among the estimated total assets of corporations and noncorporations (i.e., total assets of corporations divided by the fraction of corporate receipts in total corporate and noncorporate receipts). The dark blue diamonds show the asset share of the largest N corporations and partnerships among the estimated total assets of corporations and noncorporations. The solid light blue line shows the asset share of the largest 0.1 percent corporations by assets among the assets of corporations. See online Appendix IA2.3 for details about variable construction.

noncorporations have become more common, as illustrated in panel B of Figure 7. We compare this top N asset share approximation with the top 0.1 percent asset share among corporations in our baseline series in Section IIA (light blue line). The patterns are similar. Rising concentration was stronger in manufacturing in earlier decades, and stronger in services and retail/wholesale trade in later decades.

In the aggregate, we have data on the asset size distribution of partnerships for 1965 to 1982 as well as 2002 onward (IRS 2024c, d), and the data sources are listed in online Appendix Table IA3. With these additional data, we can draw the largest businesses in the numerator of the top N asset share from both corporations and partnerships. Since most of the large noncorporations are partnerships, the asset size distribution of partnerships is helpful, especially for recent years when large noncorporations have become more common.¹⁶ The dark blue diamonds in the aggregate panel show that allowing for large partnerships in the numerator raises the top N asset share in recent years, whereas it does not make a difference in the past.

¹⁶For example, the SOI records 2,316 partnerships with sales exceeding \$50 million in 2000, making up 60 percent of partnership business receipts. In contrast, there are only 244 sole proprietorships with sales exceeding \$50 million, which account for 5 percent of sole proprietorship business receipts.

Additional Historical Data on the Top 100 Asset Share in Manufacturing.—For manufacturing, we can obtain additional historical data to estimate the top 100 asset share as far back as 1909. Early data are more abundant for manufacturing than for other sectors, and they are valuable as rising concentration in the first half of the twentieth century was especially important in manufacturing. We plot the share of the largest 100 manufacturers by assets in total manufacturing assets based on a number of historical sources in online Appendix Figure IA9, and explain the sources in detail in online Appendix IA2.2. Across all the sources, the top 100 asset share in manufacturing increased substantially in the early decades, from around 20 percent in 1909 to over 50 percent by the 1970s. Additional historical sources corroborate the patterns shown by our measures using SOI data.

III. Additional Results

We provide additional checks in this section, by comparing our SOI data with census data in Section IIIA and with Compustat data in Section IIIB. We then discuss international activities in Section IIIC and other features of production activities over our sample period in Section IIID.

A. Comparison with Census Data

We cross-check our data with census data, which report sales shares of the top 4, 8, 20, and 50 firms by sales, for manufacturing industries in census years since 1947 (US Census Bureau 1992) and other industries later on (US Census Bureau 2024b). First, for the degree of concentration over time, we rely on the longer time series of census concentration ratios in manufacturing industries at the four-digit SIC level (analyzed in Pryor 2001; Peltzman 2014; Lamoreaux 2019; and Keil 2017, among others). In this dataset, we can take the average of census concentration ratios across these detailed industries. Figure 9, panel A, displays the value-weighted average (solid line) and the equal-weighted average (dashed line). We observe a persistent increase in the sample period, especially for the value-weighted average.¹⁷

Second, for the degree of concentration across industries, we compare census concentration ratios in 2012 (including both manufacturing and non-manufacturing industries) with our estimates using SOI data. The census data in 2012 are available for two-digit to six-digit NAICS industries. The most granular SOI industries in 2012 map into roughly four-digit NAICS codes. Here we can estimate the sales shares of the top businesses by assets (by adding up the sales of top corporations by assets); we cannot rank businesses by sales in these granular industries where the SOI data only report size bins by assets.¹⁸ Accordingly, our measure is not

¹⁷Peltzman (2014) tabulates the equal-weighted average of the change in CR4 between 1963 and 1982, which is close to zero. This is consistent with the milder increase in the equal-weighted averages in Figure 9, panel A. In addition, the rise in concentration in this period is stronger among a broader set of firms (e.g., CR20 compared to CR4).

¹⁸For the top 20 share in SOI data, the numerator uses the top 20 corporations by assets. We have to assume that the largest 20 businesses are corporations since we do not have data on the asset size of noncorporations. The denominator estimates total business assets using total corporate assets in SOI data, adjusted with the corporate share. We derive the corporate share using census data on corporate and noncorporate receipts in the corresponding NAICS codes (we do not have noncorporate receipts for these granular industries directly from SOI data). The corporate share adjustment for the denominator makes little difference for the cross-sectional comparison with census data.

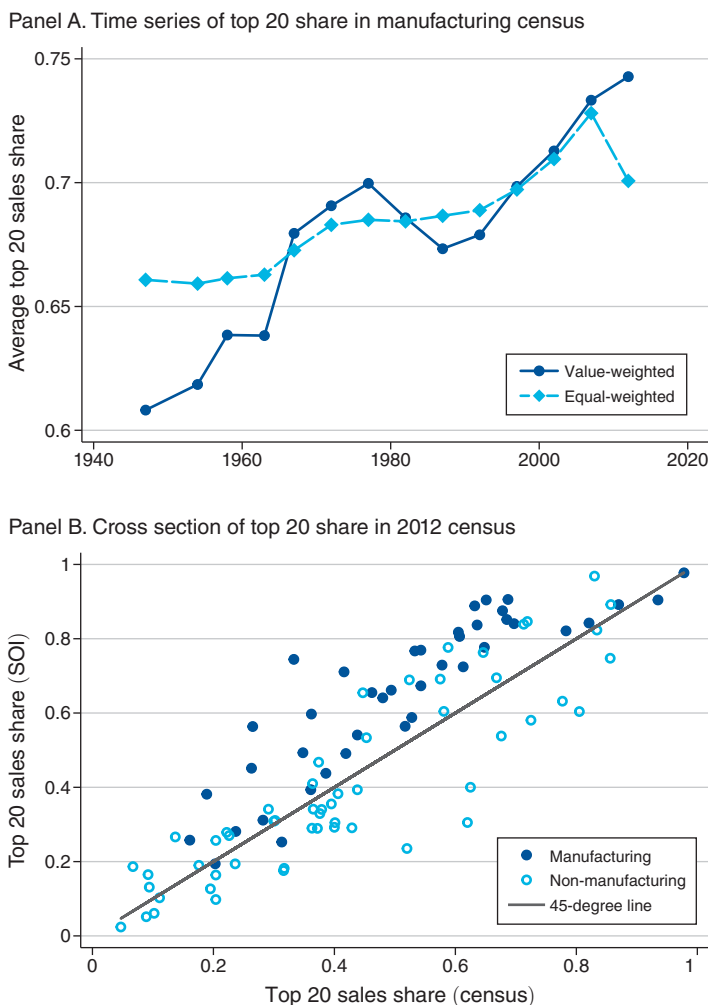


FIGURE 9. CONCENTRATION RATIOS IN CENSUS DATA

Notes: Panel A shows the time series of the value-weighted average (solid line with circles) and equal-weighted average (dashed line with diamonds) of sales concentration of the top 20 firms by sales from the manufacturing census. The data use four-digit SIC industries until 1992 and six-digit NAICS industries after 1997. Panel B shows the 2012 cross section of the sales share of the top 20 firms by sales in census data on the x -axis, and the sales share of the top 20 corporations by assets in SOI data on the y -axis. Each dot is a six-digit SOI industry, which largely map into four-digit NAICS. The solid dots indicate manufacturing industries and the hollow dots indicate non-manufacturing industries. See online Appendix IA2.3 for details about variable construction.

exactly the same as the census measure. Figure 9, panel B, shows the cross-sectional relationship between the sales shares of the top 20 businesses by sales in census data (x -axis) and the sales shares of the top 20 businesses by assets in SOI data (y -axis). We observe a high degree of consistency in the cross section, with a correlation of 0.86. The level is also similar, with a mean (median) difference of about 0.05.

B. Comparison with Compustat

We also present a comparison with aggregate top shares using Compustat data (Standard & Poor's 2024). In general, it is difficult to perform comprehensive

analyses of business concentration using stock market data alone. First, stock market data miss large private firms (while at the same time include some smaller growth firms). In recent years, large private firms have become increasingly common and the coverage of top firms using Compustat appears less reliable (e.g., as of 2018, there are around 60 private companies with sales larger than the 500th company by sales in Compustat according to the *Forbes* America's Largest Private Companies list). Second, the coverage of stock market data is very limited at the industry level. For example, in 1960, one-quarter of our subsectors had less than 10 public companies and nearly one-half had less than 20 companies. This makes it challenging to properly calculate top shares at the industry level using public firms (and the result can be sensitive to the listing decision of one particular firm). Several studies also show that industry-level concentration measures using Compustat data versus census data differ substantially (Ali, Klasa, and Yeung 2008; Keil 2017; Decker and Williams 2023).

We perform an aggregate comparison of the top 500 in SOI and Compustat data. Our objective is to check that the level of aggregate top shares is comparable. This analysis verifies that businesses in the SOI data are similar to those in financial statements (e.g., consolidation is performed properly in the SOI). We do not emphasize the time trends in this comparison given the caveats associated with Compustat coverage discussed above. In addition, the top bins in the SOI data have become less granular after the 1980s (the top bins for the aggregate often contain a few thousand companies), so the estimated aggregate top 500 share can be less precise in recent decades.

In panel A of online Appendix Figure IA10, we calculate the total assets of the top 500 firms by assets in Compustat, normalized by total corporate assets from SOI data. We compare this series with the estimated share of the top 500 corporations by assets in total corporate assets using SOI data (the imputation shows some jumps in recent decades when the top bins are not very granular). In panel B, we calculate total sales of the top 500 firms by sales in Compustat, normalized by total corporate sales from SOI data. We compare this series with the estimated share of the top 500 corporations by receipts in total corporate receipts using SOI data. Total assets and sales in Compustat generally include global activities; after around 1998, activities of foreign subsidiaries can be separated using Compustat data on geographical segments, but the segment data are less reliable (e.g., a segment can include North America as a whole) and unavailable for many companies. The selection issue of public firms will lead to a downward bias in top shares using Compustat data, while reporting global activities may lead to an upward bias.

Overall, Figure IA10 shows that the level of aggregate top 500 shares is similar using SOI data (solid line) and Compustat data (dashed line). The results further confirm that our SOI data are reliable and a business in the SOI data is similar to a firm in Compustat.

C. International Activities

We also make sure that our findings are robust to changes in cross-border activities.

First, while we focus on production activities of businesses in the United States, in recent years some US firms may have shifted production assets to foreign subsidiaries (Auerbach 2021). We perform checks that include the assets of US businesses' foreign affiliates, using activities of US multinational enterprises compiled

by the BEA (Bureau of Economic Analysis 2024a). This dataset records the assets of foreign affiliates and information about their US parents, with information available since the early 1980s. In online Appendix Figure IA11, we use the top 1 percent asset share among corporations as an example for this robustness check; most multinational companies should be corporations. One assumption is that all international assets belong to the top 1 percent, and the dashed red line shows the adjusted top 1 percent asset share under this assumption. Another assumption is that the top 1 percent businesses' share of international assets is the same as their share of domestic assets, and the dash-dotted purple line shows the adjusted top 1 percent share under this assumption. The concentration trends including international assets are similar to our baseline results in the solid line (international assets are less than 20 percent of domestic corporate assets in most industries except manufacturing and services after the 2000s, and the ratio of international assets to the top 1 percent corporations' domestic assets has remained stable).

Second, a common question is whether international trade and globalization drive the key facts we observe. International trade for the United States (relative to GDP) did not expand in the first half of the twentieth century, and globalization only started to accelerate around the 1970s (Wen and Reinbold 2020). For manufacturing, where international trade is particularly important, rising concentration was stronger before the globalization era. For services, where trade volume is smaller, rising concentration has been stronger in recent decades. The timing suggests that international trade does not account for the entire long-run evidence.¹⁹ Some research also suggests that globalization (e.g., Chinese imports) presented a negative shock to large US manufacturers but less so to small ones who produce niche or boutique products (Holmes and Stevens 2014; Ding et al. 2022), in which case globalization may even reduce production concentration.²⁰

D. Other Outcomes

We discuss several additional outcomes that are often mentioned in connection with production concentration.

Employment Concentration.—The SOI provides information on business size by financial metrics such as assets, receipts, and net income; it does not provide information on employment. Does employment concentration among US firms increase over time? The census database on Business Dynamics Statistics (BDS) provides annual data with size bins of firms by employment, which date back to 1978. We can therefore estimate the employment shares of top firms by employment using BDS data (US Census Bureau 2024a). We are not aware of earlier data on firm size distribution by employment (earlier census data only cover the employment size distribution of establishments). Figure IA12 plots the aggregate share of the top

¹⁹For trade within the United States, prior work finds that domestic markets had become well-integrated by the late 19th century (Kim 1995).

²⁰For analyses of product market concentration (rather than production concentration), the concentration measure needs to remove exports and take imports into account. See Amiti and Heise (forthcoming) for a study of manufacturing products between 1992 and 2012. As explained earlier, our focus is concentration in the production activities in the United States.

1 percent firms by employment in total employment using BDS data. First, the level of employment concentration is lower relative to the level of concentration measured by financial outcomes. Second, employment concentration displays a slight increase in the sample period (e.g., the top 1 percent share rose from 55 percent in 1979 to around 60 percent in the 2010s); the magnitude is modest and can be less visible as shown in Luttmer (2010). Autor et al. (2020) perform detailed analyses of employment concentration using census micro data since the 1980s for a wide range of industries. They observe a similar pattern that top firms produce more with fewer workers and exhibit “scale without mass.”

Profitability.—The SOI data provide a variety of financial information for corporations in each size bin, as shown by the examples in Table 1. Using this information, online Appendix Figure IA13 plots the profitability ratio (net income before tax over sales) for the top 1 percent corporations by assets (solid line) and the rest (dashed line). We observe that the profitability ratio has fluctuated substantially over time, in line with analyses of corporate profits since 1945 by Barkai and Benzell (2018). Profitability in most sectors was low during the Great Depression; it then rebounded sharply in the 1940s, declined until the 1980s, and increased slightly afterwards. We also observe that profitability is higher among the top 1 percent corporations than among the rest, but the difference between these two groups does not display noticeable changes over time. We cross-check profitability in the SOI with that in the national accounts (Bureau of Economic Analysis 2024b), since net income is affected by depreciation and tax rules for depreciation have changed over time. The BEA begins with data from the SOI and then makes capital consumption adjustments so that corporate profits use economic depreciation (estimated by the BEA). Figure IA14 shows that aggregate corporate profits from SOI and BEA are similar. Overall, corporate profitability has not followed the same persistent trend as concentration.

Asset Ownership.—We also examine whether changes in the balance sheet characteristics of larger and smaller companies affect the rising concentration trends we observe (we focus on nonfinancial industries here since the balance sheet structure of financial services is substantially influenced by regulations). One possible concern is that maybe smaller firms lease more assets over time, so their book assets (which do not include most leases) will shrink relative to those of larger firms; this concern, however, should not affect concentration by sales. In online Appendix Figure IA15, we plot the ratio of fixed assets on firms’ balance sheets relative to their total assets, since leasing mainly applies to fixed assets. We do not observe different long-run trends for the ownership of fixed assets among the top 1 percent corporations by assets and the rest.

IV. Conclusion

We collect long-run data on the size distribution of US businesses, and document that production concentration has been rising over the past century. The rise was stronger in manufacturing and mining in earlier decades, and stronger in services, retail, and wholesale in later decades. The data are most comprehensive for the

population of corporations, but the results are similar when we include noncorporations in settings where data on the size distribution of noncorporations are available. The results are also robust to different ways to measure top business shares. Using a fixed percentile is more straightforward to implement across different levels of aggregation and across industries that vary in size, but using a fixed number of top businesses shows similar patterns of increasing concentration.

Our findings on the evolution of production concentration suggest that a full account of rising concentration needs to explain the development over the long run (not only the recent decades), and the differences in the timing of rising concentration in different industries (e.g., manufacturing versus services). Our findings also have implications for the determinants of macroeconomic outcomes, such as the effects of shocks to larger versus smaller firms (Gabaix 2011) and the effects of financial frictions across the firm size distribution (Crouzet and Mehrotra 2020). Since at least the beginning of the twentieth century, large firms have become more important in the production activities of the US economy.

Will rising concentration be an enduring trend in the future? The answer is not obvious. Indeed, discussions about production concentration have shaped a number of prominent intellectual traditions: some maintain that large enterprises would become all powerful and change the way the society should be organized, whereas others caution that large organizations face certain limitations (Berle and Means 1932; Lange 1937; Schumpeter 1942; Hayek 1945). These issues have also inspired the inquiry about the nature of the firm (Coase 1937, 1988). More analyses about the foundations for the organization of production may provide knowledge that can guide our outlook for the future.

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