M&A and the Rise of Concentration*

Simcha Barkai
Boston College

Ezra Karger
Federal Reserve Bank of Chicago

Scott Loring
Cornerstone Research

November 2024

Abstract

This paper provides the first quantification of the contribution of mergers and acquisitions (M&A) to rising concentration. Using comprehensive firm-level microdata from the U.S. Economic Census, we show that M&A accounts for 44% of the increase in aggregate concentration. An empirical decomposition of changes in concentration that further accounts for firm entry and exit shows similar results. Classifying M&A using the numerical criteria in the merger guidelines, we show that presumed anticompetitive M&A accounts for 12% of the increase in aggregate concentration.

*Any views expressed are those of the authors and not those of the U.S. Census Bureau. The Census Bureau has reviewed this data product to ensure appropriate access, use, and disclosure avoidance protection of the confidential source data used to produce this product. This research was performed at a Federal Statistical Research Data Center under FSRDC Project Number 2090. (CBDRB-FY24-P2090-R10985). Any views expressed in this paper do not necessarily reflect those of the Federal Reserve Bank of Chicago or the Federal Reserve System.

1 Introduction

Over the past 40 years, industry concentration in the U.S. has risen in all major industrial sectors. A growing literature studies the extent of rising concentration and its consequences for the labor share, employment, investment, profits, and market valuations. An actively debated question is whether the observed increase in industry concentration is a sign of lessening or intensifying competition. Both points have been argued, and both are theoretically possible. Improvements in productivity and the elimination of regulation or frictions might have allowed the largest and most productive firms to grow rapidly and increase their market share. However, stagnating large firms may have instead increased their market share by acquiring competitors.

In this paper, we provide the first empirical framework and quantification of the contribution of M&A to rising concentration. We decompose changes in concentration into the separate contributions of M&A and internal Growth. The contribution of M&A measures the impact of changing ownership on concentration, while holding sales fixed, whereas the contribution of Growth measures the impact of changing sales, holding ownership fixed. Using data from the U.S. Economic Census from 1982 to 2012, we show that M&A accounts for 44% of the increase in aggregate concentration.

Extending our analysis to further account for the effects of entry and exit on concentration, we present an empirical decomposition of changes in concentration into (1) M&A, (2) Growth of continuing firms, and (3) Net Entry. We rewrite the concentration ratio as a sales-weighted average, across all establishments, of an indicator function equal to one if the establishment is owned by one of the largest four firms in the industry. Once presented in this form, we implement an empirical decomposition of changes in concentration in the style of Foster, Haltiwanger and Krizan (2001). In line with our previous results, the decomposition shows that M&A accounts for 42% of the increase in concentration, the Growth of continuing firms and Net Entry respectively accounting for 50% and the remaining 8% of the increase in concentration.

Last, we present analyses designed to document the extent to which the relaxation of merger guidelines or lax government enforcement of existing guidelines contributed to the rise in concentration. The merger guidelines, published by the Department of Justice Antitrust Division and the Federal Trade Commission, lay out the principles and standards used to determine whether the effect of a merger "may be substantially to lessen competition" and in those cases, the merger

is Presumed Anticompetitive and should be prevented. We classify all M&A using the numerical criteria set forth in the merger guidelines and show that Presumed Anticompetitive mergers and acquisitions are numerous and accounted for 12% of the increase in aggregate concentration. In addition, we show that the set of mergers and acquisitions that were previously presumed anticompetitive under the earlier and stricter 1968 guidelines, but which were later reclassified in 1982 as permissible, accounted for an additional 10% of the increase in aggregate concentration.

1.1 Literature Review

This paper contributes to a recent and growing literature on rising concentration in U.S. industries. Our work bridges several strands of research that examine the extent, consequences, and causes of increasing market concentration, while providing the first systematic quantification of M&A's contribution to this phenomenon.

A recent and substantial body of research documents rising concentration and studies its extent. Grullon, Larkin and Michaely (2019), Autor et al. (2020), and Barkai (2020) document an increase in industry concentration that is widespread and observed in a large majority of U.S. industries. More recent work by Kwon, Ma and Zimmermann (2024) examines concentration trends over a century-long horizon, finding that current levels of concentration rival the high levels of the early 20th century. Several studies focus on possible distinctions between industries and product markets. Amiti and Heise (2024) argue that imports of foreign-produced manufactured goods mitigated the rise in these product markets, and at the same time Benkard, Yurukoglu and Zhang (2021) and Neiman and Vavra (2023) show increases in concentration in consumer-good product markets. Rossi-Hansberg, Sarte and Trachter (2021) show that very geographically-local measures of concentration, measured within each zip code, are trending downward at the same time that concentration nationally is increasing, though the paper leaves unresolved the proper geographic unit for measuring concentration. Affeldt et al. (2021) study concentration in antitrust markets, as defined by the Directorate-General for Competition of the EU Commission, and show that concentration in these markets is trending upward.

Another strand of the literature studies the implications of rising concentration. This literature shows that rising concentration is associated with reduced labor shares (Autor et al., 2020; Barkai, 2020), depressed employment and wages (Benmelech, Bergman and Kim, 2022; Azar, Marinescu

and Steinbaum, 2022; Dodini et al., 2024), reduced investment (Gutiérrez and Philippon, 2017), and higher profit margins and market valuations (Bessen, 2020; Covarrubias, Gutiérrez and Philippon, 2020; Smith and Ocampo, Forthcoming).

A central debate in this literature concerns whether rising concentration reflects declining competition or is instead a sign of increasing competition that rewards the most efficient firms. This echoes earlier theoretical and empirical debates, notably Peltzman (1977) and Scherer (1979), about the relationship between concentration and competition. Peltzman (2014) argues that increased concentration may reflect efficient firms gaining market share, while Syverson (2019) provides a balanced assessment of both possibilities. Recent contributions advance this debate. Valletti and Zenger (2019) argue that lax antitrust enforcement allowed anti-competitive consolidation, while Gutierrez and Philippon (2023) compare U.S. and European trends to show that differences in antitrust policy may explain divergent concentration patterns. Koltay, Lorincz and Valletti (2023) use cross-country evidence to examine how regulatory environments affect the concentration-competition relationship; and Shapiro and Yurukoglu (2024) provides a comprehensive review arguing that the weight of evidence points toward declining competition in many concentrated industries.

While many studies document rising concentration, fewer systematically decompose its sources. Autor, Patterson and Van Reenen (2023) provide a statistical decomposition showing that rising national concentration is primarily driven by the reallocation of economic activity toward large firms rather than increasing local concentration. Our paper complements this work by providing the first decomposition that explicitly separates the contributions of M&A and organic growth. Several papers propose explanations for rising concentration: Bessen (2020) argue that software and IT systems give large firms scalable advantages; Akcigit and Ates (2023) develop a model where reduced knowledge diffusion leads to increasing concentration; and Brynjolfsson, Jin and Wang (2023) emphasize how information technology creates winner-take-most dynamics in many industries. Studies examining specific sectors provide additional insights. Argente et al. (2021) study the retail sector, documenting how large chains gain market share through both expansion and acquisitions; Einav et al. (2021) examine how customer data advantages contribute to concentration in digital markets; and Smith and Ocampo (Forthcoming) provide evidence that economies of scale in logistics and inventory management drive concentration in retail.

Our finding that M&A contributed significantly to rising concentration relates closely to the

literature on antitrust enforcement. Shapiro (2019) argues that merger enforcement has been too lenient, particularly regarding mergers that eliminate potential competition; Valletti and Zenger (2019) documents a decline in merger challenges despite rising concentration; Wollmann (2019) shows that mergers just below notification thresholds have anti-competitive effects, suggesting that many problematic mergers escape scrutiny; and Aggarwal and Baxamusa (2024) analyze mergers below reporting thresholds and finding substantial aggregate effects on concentration. Complementary to our aggregate findings, Brot et al. (2024) study 1000 mergers of U.S. hospitals, and find that 20% are presumed anticompetitive (based on the numerical criteria stated in the merger guidelines) and that these presumed anticompetitive mergers resulted in significant price increases.

Our paper makes several contributions to this literature. We provide the first empirical framework that quantifies the separate contributions of M&A and organic growth to rising concentration. While previous work documents that both mergers and organic growth occur in concentrating industries, we develop a decomposition that precisely measures their relative importance. Our finding that M&A accounts for 44% of rising aggregate concentration provides crucial evidence for the debate about whether concentration reflects competitive or anti-competitive forces. Second, we extend the decomposition literature by incorporating entry and exit, building on the framework of Foster, Haltiwanger and Krizan (2001). This allows us to separate the effects of M&A, growth of continuing firms, and net entry, providing a more complete picture of concentration dynamics. Last, our analysis of presumed anticompetitive mergers and their contribution to rising concentration provides novel evidence on the role of antitrust policy. The evidence directly addresses calls in the literature for evidence on the possible contribution of lax enforcement to concentration trends.

2 Data and Concentration

2.1 Data

Our main data source is the U.S. Census Bureau's Economic Census. The Economic Census provides us with establishment-level information on sales, geographic location, and firm identifiers that link together all establishments owned by each firm. The firm identifiers further allow us to track all changes in ownership, we show up in the data as a change in the firm identifier of an establishment. Our sample from the Economic Census covers six major sectors of the economy: Manufacturing,

Wholesale Trade, Retail Trade, Transportation and Warehousing, FIRE (finance, insurance, and real estate), and Services. We observe each establishment in these sectors in Economic Census years, which are those years ending in 2 and 7. In the sectors Manufacturing, Wholesale Trade, Retail Trade, and Services our data cover the years 1982 to 2012 and in the sectors FIRE and Transportation and Warehousing our data cover the years 1992 to 2012.

We supplement the Economic Census with two variables constructed from the Longitudinal Business Database (LBD). First, we use the time-consistent six-digit North American Industry Classification System (NAICS) industry codes provided in the LBD, which build on the work of Fort and Klimek (2018).[1] Second, we use the LBD to determine the birth year of a firm. Following the standard construction in the literature, the birth year of a firm is the birth year of the oldest establishment of the firm in the first year that it appears in the LBD data. This construction of firm birth year requires that we observe the firm (and its establishments) in the year in which it first appears in the data, something that is not possible in the Economic Census since most firms are not born in years ending in 2 or 7. For these purposes, we use the most recent version of the LBD, as constructed by and described in Chow et al. (2021), which has placed great emphasis on time-consistent measures of industry and on identifying new business formation.

2.2 Industry Concentration and Aggregation

At the level of a six-digit NAICS industry we measure concentration as the sales share of the largest four firms (C4):

$$\text{C4}_{j,t} = \frac{\text{Sales of the Largest Four Firms}_{j,t}}{\text{Total Industry Sales}_{j,t}} \tag{1}$$

where j indexes industries and t indexes time. We aggregate industry-level concentration to the level of a sector using industry sales weights:

$$\text{C4}_{S,t} = \sum_{j \in S} \frac{\text{sales}_{j,t}}{\text{sales}_{S,t}} C4_{j,t} \tag{2}$$

[1] For any establishment in the Economic Census without a longitudinal link to the LBD, we fill in this time-consistent industry classification using the most common time-consistent industry in the same year for other establishments in the same time-inconsistent industry variable reported by the Economic Census.

where S indexes sectors and $\frac{\text{sales}_{j,t}}{\text{sales}_{S,t}}$ is the sales weight on industry j in sector S in year t. This is equivalent to adding up the sales of the largest four firms of each industry in the sector and dividing this sum by total sales in the sector.

We construct changes in concentration at the level of a sector as:

$$\text{dC4}_{S,t\to t+5} = \text{C4}_{S,t+5} - \text{C4}_{S,t}. \tag{3}$$

This is distinct from the sales-weighted aggregation of industry-level changes in concentration, which would measure the sectoral with-industry change in concentration. The difference is due to the changes in industry sales weights from year t to $t+5$: an increase in the weight of industries with low levels of concentration will reduce concentration, whereas an increase in the weight of industries with high levels of concentration will increase concentration.

When reporting cumulative sector-level changes in concentration over time, we sum the five-year changes in concentration. In the four sectors with complete time series coverage (Manufacturing, Wholesale Trade, Retail Trade, and Services) this corresponds to changes in concentration from 1982 to 2012 and in the other two sectors (FIRE and Transportation and Warehousing) this corresponds to changes in concentration from 1992 to 2012.

Due to the unbalanced nature of our data, we measure the change in aggregate concentration from year t to $t+5$ using the sectors that report in both economic census years. This means that the changes in aggregate concentration from 1982 to 1987 and from 1987 to 1992 are only for the sectors Manufacturing, Wholesale Trade, Retail Trade, and Services and changes in aggregate concentration for later years include all six sectors. When reporting cumulative changes in aggregate concentration over time, we sum the five-year changes in aggregate concentration.

3 Contributions of M&A and Growth to Rising Concentration

3.1 Empirical Framework

We decompose changes in concentration into the separate contributions of M&A and Growth. For this purpose we introduce a new variation on the standard C4 concentration ratio:

$$\text{C4}_{j,t}^{\text{Ownership(t+5)}} = \frac{\text{Sales of the Largest Four Firms}_{j,t}^{\text{Ownership(t+5)}}}{\text{Total Industry Sales}_{j,t}}. \tag{4}$$

where Ownership(t+5) groups establishments into firms using the firm identifiers in year $t+5$ (instead of year t) and Sales of the Largest Four Firms$_{j,t}^{\text{Ownership(t+5)}}$ is the combined sales of the largest four firms in industry j in year t when using the Ownership(t+5) firm boundaries. We then measure the contributions of M&A and Growth to changes in concentration as: We then measure the increase in concentration attributed to M&A as

$$\text{Contribution of M\&A}_{j,t\to t+5} = \text{C4}_{j,t}^{\text{Ownership(t+5)}} - \text{C4}_{j,t} \tag{5}$$

$$\text{Contribution of Growth}_{j,t\to t+5} = \text{C4}_{j,t+5} - \text{C4}_{j,t}^{\text{Ownership(t+5)}}. \tag{6}$$

Contribution of M&A presented in Equation 5 measures the change in concentration due to all ownership changes that occur between years t and $t+5$, while holding fixed sales of all establishments at their values in year t. When the largest firms purchase other firms in the same industry, Contribution of M&A is positive. Contribution of Growth presented in Equation 6 measures the change in concentration due to the growth in sales at all establishments and firms between years t and $t+5$, while holding fixed the firm identifiers of all establishments at their values in year $t+5$. When the largest firms grow faster than the industry, Contribution of Growth is positive. As the equations make clear, the sum of the two terms Contribution of M&A and Contribution of Growth is equal to the change in concentration.

In order to construct the equivalent sector and aggregate measures, we construct sales-weights equivalents for each of the three terms on the right-hand side of equations 5 and 6. This aggregation of C4$_{j,t}$ exactly matches Equation 2 and the aggregation of C4$_{j,t}^{\text{Ownership(t+5)}}$ uses year-t sales weights.

3.2 Empirical Results

Figure 1 presents, for each of our six major sectors, the 5-year changes in concentration and the 5-year contributions of M&A to changes in concentration. Several features stand out in the data. First, concentration is increasing in nearly every 5-year period in every sector. The only 5-year periods that display a decline in concentration are Services from 1982 to 1987 (-0.3pp), Services from 2007 to 2012 (-0.01pp), Wholesale Trade from 1987 to 1992 (-0.1pp), and Wholesale Trade from 2002 to 2007 (-2.3pp) and only one of these exceeds in absolute value even half a percentage point. Second, the contribution of M&A to rising concentration is positive in nearly every 5-year period in every sector. The contribution of M&A can turn negative when large firms spin off some of their establishments or sell these establishments to smaller competitors. While this does occur in the data, the increases in concentration that result from M&A activity far outweigh the reductions in concentration that result from large firms spinning off or selling some of their business to smaller competitors. Third, those 5-year periods with large increases in concentration coincide with large contributions of M&A to concentration, but at the same time, in nearly all 5-year periods and sectors the increase in concentration exceeds the contribution of M&A.

Figure 2 presents the cumulative changes in concentration across all census years. In most major sectors, these changes are measured from 1982–2012, but in two sectors (FIRE and Transportation & Warehousing) the data only cover 1992-2012. We want to highlight three results shown in this figure. First, all sectors exhibit a significant increase in concentration. Concentration rises the least in Manufacturing (7.6pp increase) and the most in Retail Trade (23.7pp). This result is not new to the literature. Second, all sectors exhibit a positive contribution of M&A to concentration, ranging from 1.6pp in Wholesale Trade to 6pp in Manufacturing. Third, measured as a percentage of each sectors cumulative increase in concentration, M&A has contributed most in Manufacturing (78.6% of the change) and has contributed least in Wholesale Trade (18.3%). Manufacturing is the only sector in which M&A accounts for more than half of the increase in concentration, and the next largest contribution is in the Services sector (37.4%).

Figures 3 and 4 present our aggregate results. Panel A of Figure 3 presents the 5-year changes in aggregate concentration and the 5-year aggregate contribution of M&A. The panel clearly shows that (i) aggregate concentration is increasing in every 5-year period, (ii) the contribution of M&A

to rising aggregate concentration is positive in every 5-year period, and (iii) those 5-year periods with large increases in aggregate concentration coincide with large aggregate contributions of M&A. Panel A of Figure 4 presents the cumulative changes in aggregate concentration and the cumulative aggregate contribution of M&A. In the unbalanced panel of sectors over the full time-period 1982 to 2012, aggregate concentration increases 9.1pp and the cumulative aggregate contribution of M&A is 4.0pp, which is equal to 43.8% of the increase in aggregate concentration. In the balanced panel of sectors over the shorter time-period 1992 to 2012, aggregate concentration increases 7.5pp and the cumulative aggregate contribution of M&A is 2.9pp, which is equal to 38.5% of the increase in aggregate concentration.

Even though concentration is increasing in all sectors, the gradual increase in the weight of the Services sector (the sector with lowest level of concentration) and the decline in the weight of the Manufacturing sector (the sector with highest level of concentration) help to moderate the increase in aggregate concentration over time. As a consequence, if (as a relevant example) M&A contributes 33% to the rise in concentration in each and every sector, we would find that contribution of M&A is equal to 45% of the increase in aggregate concentration. This moderation is greater in the first two periods 1982–1987 and 1987–1992, during which time (due to limited coverage of sectors) Services and Manufacturing have larger sales weights and therefore also larger changes in sales weights.

We report an additional set of aggregate results in which we compare the contribution of M&A to the aggregate within-sector change in concentration. The aggregate within-sector change in concentration from year t to year $t+5$ is defined as the weighted average of the sectoral changes in concentration using sales weights in year t. By fixing the weights in one year, rather than using different sectoral weights for concentration in years t and $t+5$, the within-sector estimates exclude the 5-year reductions in concentration that are the result of rising Services and declining Manufacturing. There is no need to adjust the contribution of M&A because it was already constructed using sales weights in a single year t.

Panel B of Figure 3 presents the 5-year aggregate within-sector change in concentration and the 5-year aggregate contribution of M&A. In each and every 5-year period, the aggregate within-sector change in concentration exceed the change in aggregate concentration. This difference is primarily due to the moderating effect of rising Services and declining Manufacturing on aggregate concentration. Panel B of Figure 4 presents the cumulative aggregate within-sector change in

concentration and the cumulative aggregate contribution of M&A. In the unbalanced panel of sectors over the full time-period 1982 to 2012, the cumulative aggregate within-sector change in concentration is 12.4pp and the cumulative aggregate contribution of M&A is 4.0pp, which is equal to 32.1% of the aggregate within-sector increase in concentration. In the balanced panel of sectors over the shorter time-period 1992 to 2012, the cumulative aggregate within-sector change in concentration is 8.8pp and the cumulative aggregate contribution of M&A is 2.9pp, which is equal to 32.8% of the aggregate within-sector increase in concentration.

In summary, this section presents three main findings. First, M&A has contributed to rising concentration in each sector. Measured as a percentage of each sector's cumulative increase in concentration, M&A has contributed most in Manufacturing (78.6%) and contributed least in Wholesale Trade (18.3%). Second, in the unbalanced panel of sectors over the full time-period 1982 to 2012, M&A contributes 43.8% of the increase in aggregate concentration. In the balanced panel of sectors over the shorter time-period 1992 to 2012, M&A contributes 38.5% of the increase in aggregate concentration. Third, the increase in aggregate concentration is moderated by the the gradual rise of Services and the decline of Manufacturing. When we strip out this moderating effect by measuring aggregate within-sector changes in concentration, we find that M&A contributes 32%-33% to the aggregate within-sector increase in concentration.

4 Standard Decomposition - Further Accounting for Net Entry

This section presents our empirical decomposition of changes in concentration into (1) M&A, (2) Growth of continuing firms, and (3) Net Entry.

4.1 Decomposition Framework

We can express the concentration ratio $C4_{j,t}$ as a sales-weighted average (across all establishments) of an indicator function equal to one if the establishment is owned by one of the four largest firms in the industry:[2]

$$\mathrm{C4}_{j,t} = \sum_{i \in j} \omega_{i,j,t} \mathbb{1} \left\{ \text{Largest Four}_{j,\text{Ownership(t)},t} \right\} \tag{7}$$

[2]The measurement of concentration only depends on firm sales in each industry, rather than on the underlying sales of all establishments of the firm in the industry. We choose to present the decomposition equations in terms of establishments to highlight and make fully transparent the measurement of M&A and its impact on concentration.

where i indexes establishments, j indexes industry, t indexes years, $\omega_{i,j,t}$ is the sales weight of establishment i in industry j in year t, and $\mathbb{1}\left\{\text{Largest Four}_{j,\text{Ownership(t)},t}\right\}$ is an indicator function equal to one if the establishment is owned by one of the largest four firms in industry j in year t, where the determination of which firms are the largest four uses the year-t ownership structure.

This non-standard presentation of the concentration ratio allows us to implement a standard empirical decomposition of changes in concentration in the style of Foster, Haltiwanger and Krizan (2001). To keep the equations clearly readable, we omit from within the summation the indices i and j and use the abbreviation "L4" instead of "Largest Four":

$$\begin{aligned}
\text{dC4}_{j,t\to t+5} = & \sum_{Cnt_{t\to t+5}} \omega_t \mathbb{1}\left\{\text{L4}_{\text{Ownership(t+5)},t}\right\} - \sum_{Cnt_{t\to t+5}} \omega_t \mathbb{1}\left\{\text{L4}_{\text{Ownership(t)},t}\right\} && \text{(M\&A)} \\
& + \sum_{Cnt_{t\to t+5}} \omega_{t+5} \mathbb{1}\left\{\text{L4}_{\text{Ownership(t+5)},t+5}\right\} - \sum_{Cnt_{t\to t+5}} \omega_t \mathbb{1}\left\{\text{L4}_{\text{Ownership(t+5)},t}\right\} && \text{(Growth)} \\
& + \sum_{N_{t+5}} \omega_{t+5} \mathbb{1}\left\{\text{L4}_{\text{Ownership(t+5)},t+5}\right\} - \sum_{X_t} \omega_t \mathbb{1}\left\{\text{L4}_{\text{Ownership(t)},t}\right\} && \text{(Net Entry)}
\end{aligned}$$

where $Cnt_{t\to t+5}$ is the set of all establishments in industry j that belong to continuing firms (those firms that operate in years t and $t+5$), N_{t+5} is the set of all establishments in industry j operating in year $t+5$ that belong to firms born after year t, and X_t is the set of all establishments in industry j that belong to firms that exit before year $t+5$.[3] We aggregate industry values using industry sales weight, for all industries in sectors that report in both economic census years t and $t+5$.[4] This procedure is fully equivalent to implementing the decomposition using a single aggregate equation, after replacing industry weights with aggregate sales weights, but the presentation of a single aggregate equation is more cumbersome as it requires an additional summation over industries.

The M&A term measures the change in concentration that is due to the redrawing of the ownership boundaries of the continuing firms to account for all changes in ownership over the subsequent five years, while holding fixed the sales of all establishments. When the largest firms purchase other firms in the same industry, concentration increases, and when the largest firms spin off some of their establishments, concentration decreases. The Growth (of continuing firms) term measures

[3] In line with the literature, a firms that operates in year t is said to exit before year $t+5$ if all of its establishments exit before year $t+5$.

[4] The two terms $\sum_{N_{t+5}} \omega_{t+5} \mathbb{1}\left\{\text{L4}_{\text{Ownership(t+5)},t+5}\right\}$ and $\sum_{C_{t\to t+5}} \omega_{t+5} \mathbb{1}\left\{\text{L4}_{\text{Ownership(t+5)},t+5}\right\}$ are aggregated using sales weights in year $t+5$ and the other terms are aggregated using sales weights in year t.

the change in concentration that is due to the growth and decline in sales of continuing firms while holding fixed firm boundaries. When the largest firms grow faster than the industry concentration increases, and when the largest firms grow slower than the industry concentration decreases. The Net Entry term measures the contribution of entry and exit to changes in concentration. The entrance of a large firm increases concentration, and the exit of a large firm reduces concentration.

4.2 Decomposition Results

Figure 5 presents the empirical decomposition of changes in concentration into M&A, Growth (of continuing firms), and Net Entry. In Panel A, we separately report the values of the three decomposition terms for each five-year period. From 1997 to 2002, for example, M&A contributed 1.6pp, Growth contributed 2.8pp, and Net Entry contributed less than 0.1pp to the 4.4pp increase in aggregate concentration. There are time periods, like 1997 to 2002, where Growth is the dominant driver of increases in concentration. There are other periods, such as 1982 to 1987, where M&A is responsible for most of the increase in concentration. The contribution of Net Entry to concentration is small in most years. The only exception is 1992 to 1997 when Net Entry contributed 0.6pp to the 1.4pp increase in concentration.

Adding up the decomposition across years, we present the cumulative decomposition for the full sample (1982 to 2012) and for the balanced sample (1992 to 2012, those years when the data cover all sectors). These results are reported in panel B of Figure 5 and in Table 1. The decomposition shows that, over the full sample (1982 to 2012), M&A contributed 42%, Growth contributed 50%, and Net Entry contributed 8% to the increase in concentration. These results are very much in line with the results reported earlier in Section 3.

5 Merger Guidelines and Preventable

In this section, we present an analysis designed to document how the relaxation of merger guidelines and lax government enforcement of existing guidelines may have contributed to the rise in concentration.

Section 7 of the Clayton Act is the principal federal law that regulates mergers, acquisitions, and joint ventures. The law prohibits mergers and acquisitions "in any line of commerce or in any

activity affecting commerce in any section of the country, [where] the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly" and grants enforcement powers to the DOJ Antitrust Division and the FTC. In merger guidelines, the regulators codify the rules and standards used to determine whether a merger or acquisition is presumed to be anticompetitive, and therefore should be challenged in court under Section 7 of the Clayton Act.

The first merger guidelines were published in 1968. These guidelines set forth numerical criteria used by the regulators to determine which mergers and acquisitions are presumed to be anticompetitive. We present these criteria in Panel A of Table 2.[5] As an example (third row of Panel A), if the acquiring firm has a market share that exceeds 15% then any acquisition that exceeds 3% market share is presumed to be anticompetitive. In addition to numerical criteria, the guidelines further describe special cases that can influence regulators, such as mergers in markets with a significant trend toward increased concentration, acquisitions of competitors that are particularly "disruptive," even if their market share is small, and acquisitions of failing companies. The guidelines explicitly reject compensating economic considerations such as economies of scale "unless there are exceptional circumstances."

The merger guidelines underwent significant changes in 1982. The numerical criteria used to evaluate mergers and acquisitions were significantly relaxed and reformulated in terms of HHI instead of market shares. We present these criteria in Panel A of Table 2. As an example (first row of Panel B), any acquisition that increases HHI by more than 100 and results in an HHI between 1000 and 1800 is presumed to be anticompetitive. Similar to the 1968 guidelines, the revised 1982 guidelines further describe special cases and considerations that may influence the regulator. The merger guidelines have been updated several times since 1982 (in 1984, 1992, 1997, 2010, and 2023), but the numerical criteria were left unchanged until 2010, at which time the criteria were further relaxed, and later in 2023 the 1982 criteria were again reinstated.

5.1 Empirically Classifying Mergers

Based on the numerical criteria set forth in the merger guidelines, in every five-year period (from t to $t+5$) we classify each observed merger and acquisition in the Economic Census microdata as

[5] The guidelines set stricter criteria in the extreme cases when the market share of the largest four firms exceed 75%.

either (1) permitted or (2) presumed anticompetitive.

Market Definition. In the case of tradable industries (such as automobile manufacturing), we define the market as the national six-digit NAICS industry, and in the case of nontradable industries (such as supermarkets), we define the market as a six-digit NAICS industry within each U.S. state. Our classification of industries into tradable and nontradable is taken from Barkai and Karger (2020). We measure firm size and market shares based on sales.[6]

Base Year and Bundles. The data do not provide us with the precise date of mergers and acquisitions or even reliable annual information. Instead, the best available information on firm ownership for all firms in the U.S. is systematically updated once every five years to align with the sampling frame of the Economic Census. For this reason, we measure size and market shares in the base year t for each interval. We review and evaluate all mergers and acquisitions as bundles. This means that when one firm acquires several different firms in the same five-year period, we review the acquisition as if the firm had acquired all of these firms at once and as one. Therefore, when the merger guidelines set criteria that depend on the size of the acquired firm, we use the combined size of the different acquired firms.

Aggregation. After classifying each individual merger and acquisition, we decompose the contribution of M&A to concentration into the separate contributions of presumed anticompetitive mergers and permitted mergers. As before, we aggregate from industries to sectors and from sectors to a national aggregate using sales weights, and when reporting cumulative changes in concentration over time we sum the five-year values.

5.2 Contribution of Presumed Anticompetitive M&A to Concentration

Figure 6 graphically presents the contribution of Presumed Anticompetitive M&A to changes in aggregate concentration. The results are presented numerically in Table 3.

[6]Sales is the most common measure of firm size used by enforcement agencies to evaluate mergers. There are unique cases in which other metrics are used instead. As described in the 1968 merger guidelines: "The market is ordinarily measured primarily by the dollar value of the sales or other transactions (e.g., shipments, leases) for the most recent twelve month period for which the necessary figures for the merging firms and their competitors are generally available. Where such figures are clearly unrepresentative, a different period will be used. In some markets, such as commercial banking, it is more appropriate to measure the market by other indicia, such as total deposits."

Panels A and B of Figure 6 report the results of the classification of mergers and acquisitions using the 1982 merger guidelines. These show that in all 5-year periods, Presumed Anticompetitive M&A contributed to aggregate concentration. In the first 20 years of the sample (from 1982 to 2002), the contribution of Presumed Anticompetitive M&A to concentration is a modest fraction of the overall contribution of M&A. However, in the more recent period of 2002 to 2012, Presumed Anticompetitive M&A account for a large majority of the total contribution of M&A to concentration. As reported in the first row of Table 3, over the full sample period of 1982–2012, Presumed Anticompetitive M&A contribute 12% of the increase in aggregate concentration.

Panels C and D of Figure 6 report the results of the classification of mergers and acquisitions using the 1968 merger guidelines. Because the 1968 guidelines are stricter than the 1982 guidelines, following the 1968 guidelines leads one to classify many more mergers and acquisitions as Presumed Anticompetitive. As reported in the first row of Table 3, Presumed Anticompetitive M&A under the stricter 1968 guidelines contribute 22% of the increase in aggregate concentration.

Combining the two sets of results, we see that the set of mergers and acquisitions that were previously presumed anticompetitive under the earlier and stricter 1968 guidelines, but which were later reclassified in 1982 as permissible, accounted for an additional 10% of the increase in aggregate concentration. Although these mergers individually contribute very modestly to concentration in their own industries (which is why they are permitted under the 1982 guidelines), they are so numerous that together they have a large measurable effect on aggregate concentration.

6 Conclusion

This paper presents the first empirical framework and quantification of the contribution of M&A to rising concentration. We separate contributions of M&A and Growth and find that from 1982 to 2012, M&A accounts for 44% of the increase in aggregate concentration. We know of no benchmark to help us evaluate the magnitude of this main result, although in our eyes 44% appears large.

We hope that documenting these trends will stimulate new research and help researchers form a better understanding of the nature of rising concentration, its competitive consequences, and the potential role competition regulators can play in shaping industry and aggregate outcomes.

References

Affeldt, Pauline, Tomaso Duso, Klaus Peter Gugler, and Joanna Piechucka. 2021. "Market concentration in Europe: Evidence from antitrust markets." CEPR Discussion Paper No. DP15699.

Aggarwal, Rajesh K., and Mufaddal Baxamusa. 2024. "Stealth mergers and investment outcomes." Northeastern University Mimeo.

Akcigit, Ufuk, and Sina T Ates. 2023. "What happened to US business dynamism?" *Journal of Political Economy*, 131(8): 2059–2124.

Amiti, Mary, and Sebastian Heise. 2024. "US market concentration and import competition." *Review of Economic Studies*, rdae045.

Argente, David, Doireann Fitzgerald, Sara Moreira, and Anthony Priolo. 2021. "How do firms build market share?" Available at SSRN 3831706.

Autor, David, Christina Patterson, and John Van Reenen. 2023. "Local and national concentration trends in jobs and sales: The role of structural transformation." NBER Working Paper No. w31130.

Autor, David, David Dorn, Lawrence F. Katz, Christina Patterson, and John Van Reenen. 2020. "The fall of the labor share and the rise of superstar firms." *Quarterly Journal of Economics*, 135(2): 645–709.

Azar, José, Ioana Marinescu, and Marshall Steinbaum. 2022. "Labor market concentration." *Journal of Human Resources*, 57(S): S167–S199.

Barkai, Simcha. 2020. "Declining labor and capital shares." *Journal of Finance*, 75(5): 2421–2463.

Barkai, Simcha, and Ezra Karger. 2020. "Classifying industries into tradable/nontradable via geographic radius served." Available at SSRN 4306269.

Benkard, C. Lanier, Ali Yurukoglu, and Anthony Lee Zhang. 2021. "Concentration in product markets." NBER Working Paper No. w28745.

Benmelech, Efraim, Nittai K. Bergman, and Hyunseob Kim. 2022. "Strong employers and weak employees: How does employer concentration affect wages?" *Journal of Human Resources*, 57(S): S200–S250.

Bessen, James. 2020. "Information technology and industry concentration." *Journal of Law & Economics*, 63(3): 531.

Brot, Zarek, Zack Cooper, Stuart V Craig, and Lev Klarnet. 2024. "Is there too little antitrust enforcement in the US Hospital sector?" *American Economic Review: Insights*, 6(4): 526–542.

Brynjolfsson, Erik, Wang Jin, and Xiupeng Wang. 2023. "Information technology, firm size, and industrial concentration." NBER Working Paper No. 31065.

Chow, Melissa C., Teresa C. Fort, Christopher Goetz, Nathan Goldschlag, James Lawrence, Elisabeth Ruth Perlman, Martha Stinson, and T. Kirk White. 2021. "Redesigning the longitudinal business database." NBER Working Paper No. w28839.

Covarrubias, Matias, Germán Gutiérrez, and Thomas Philippon. 2020. "From good to bad concentration? US industries over the past 30 years." *NBER Macroeconomics Annual*, 34(1): 1–46.

Dodini, Samuel, Michael Lovenheim, Kjell Salvanes, and Alexander Willén. 2024. "Monopsony, job tasks and labour market concentration." *The Economic Journal*, 134(661): 1914–1949.

Einav, Liran, Peter J Klenow, Jonathan D Levin, and Raviv Murciano-Goroff. 2021. "Customers and retail growth." NBER Working Paper No. w29561.

Fort, Teresa C., and Shawn D. Klimek. 2018. "The effects of industry classification changes on US employment composition." Center for Economic Studies Working Paper 18-28.

Foster, Lucia, John C. Haltiwanger, and Cornell John Krizan. 2001. "Aggregate productivity growth: Lessons from microeconomic evidence." In *New developments in productivity analysis*. 303–372. University of Chicago Press.

Grullon, Gustavo, Yelena Larkin, and Roni Michaely. 2019. "Are U.S. Industries Becoming More Concentrated?" *Review of Finance*, 23(4): 697–743.

Gutiérrez, Germán, and Thomas Philippon. 2017. "Declining competition and investment in the U.S." NBER Working Paper No. w23583.

Gutierrez, German, and Thomas Philippon. 2023. "How European markets became free: A study of institutional drift." *Journal of the European Economic Association*, 21(1): 251–292.

Koltay, Gábor, Szabolcs Lorincz, and Tommaso Valletti. 2023. "Concentration and competition: evidence from Europe and implications for policy." *Journal of Competition Law & Economics*, 19(3): 466–501.

Kwon, Spencer Y., Yueran Ma, and Kaspar Zimmermann. 2024. "100 years of rising corporate concentration." *American Economic Review*, 114(7): 2111–2140.

Neiman, Brent, and Joseph Vavra. 2023. "The rise of niche consumption." *American Economic Journal: Macroeconomics*, 15(3): 224–264.

Peltzman, Sam. 1977. "The gains and losses from industrial concentration." *The Journal of Law and Economics*, 20(2): 229–263.

Peltzman, Sam. 2014. "Industrial Concentration under the Rule of Reason." *Journal of Law and Economics*, 57(S3): S101–S120.

Rossi-Hansberg, Esteban, Pierre-Daniel Sarte, and Nicholas Trachter. 2021. "Diverging trends in national and local concentration." *NBER Macroeconomics Annual*, 35(1): 115–150.

Scherer, Frederic M. 1979. "The causes and consequences of rising industrial concentration." *The Journal of Law and Economics*, 22(1): 191–208.

Shapiro, Carl. 2019. "Protecting competition in the American economy: Merger control, tech titans, labor markets." *Journal of Economic Perspectives*, 33(3): 69–93.

Shapiro, Carl, and Ali Yurukoglu. 2024. "Trends in Competition in the United States: What Does the Evidence Show?" NBER Working Paper No. w32762.

Smith, Dominic A, and Sergio Ocampo. Forthcoming. "The evolution of US retail concentration." *American Economic Journal: Macroeconomics*.

Syverson, Chad. 2019. "Macroeconomics and market power: Context, implications, and open questions." *Journal of Economic Perspectives*, 33(3): 23–43.

Valletti, Tommaso, and Hans Zenger. 2019. "Increasing market power and merger control." *CLPD*, 5: 40.

Wollmann, Thomas G. 2019. "Stealth consolidation: Evidence from an amendment to the Hart-Scott-Rodino Act." *American Economic Review: Insights*, 1(1): 77–94.

Figure 1: **Concentration of M&A to Rising Concentration: By Sector and Year**
This figure presents the change in concentration and the contribution of M&A to the change in concentration by sector and year. See Section 2 and Equation 3 for the measurement of changes in concentration and Section 3 and Equation 5 for the measurement of the contribution of M&A. See Section 3 for further details.

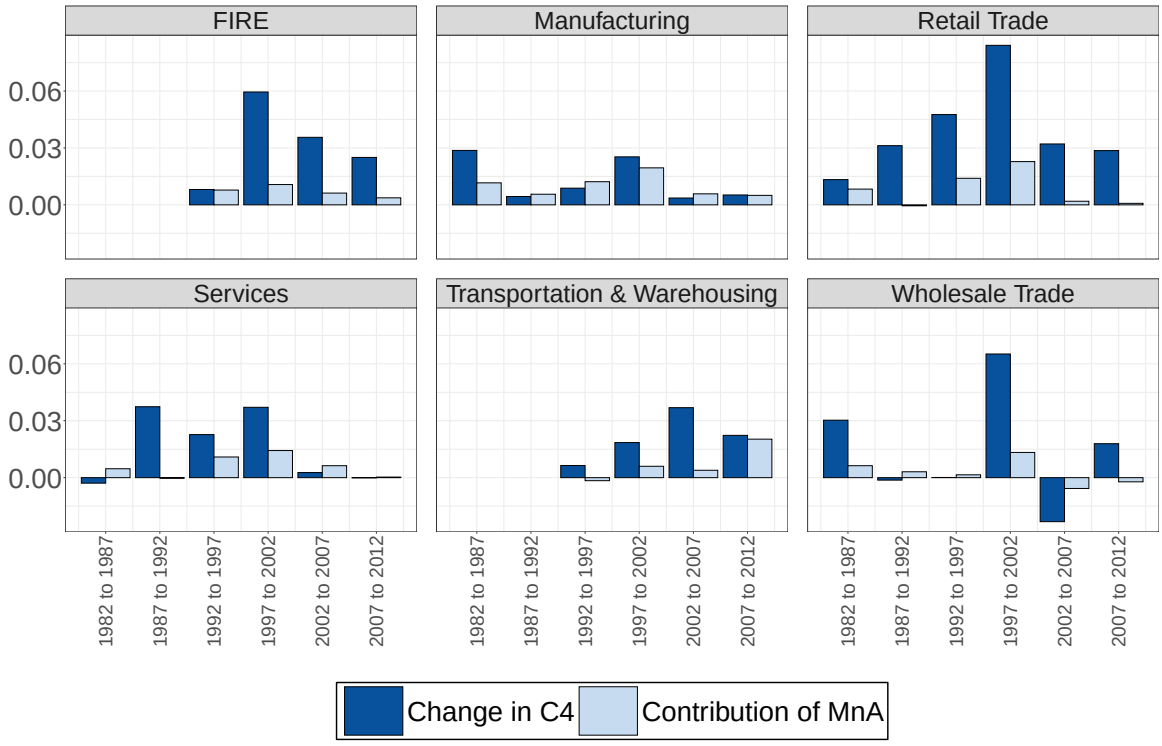


Figure 2: **Concentration of M&A to Rising Concentration: Cumulative by Sector**
This figure presents the cumulative change in concentration and the cumulative contribution of M&A to the change in concentration by sector. See Section 2 and Equation 3 for the measurement of changes in concentration and Section 3 and Equation 5 for the measurement of the contribution of M&A. See Section 3 for further details.

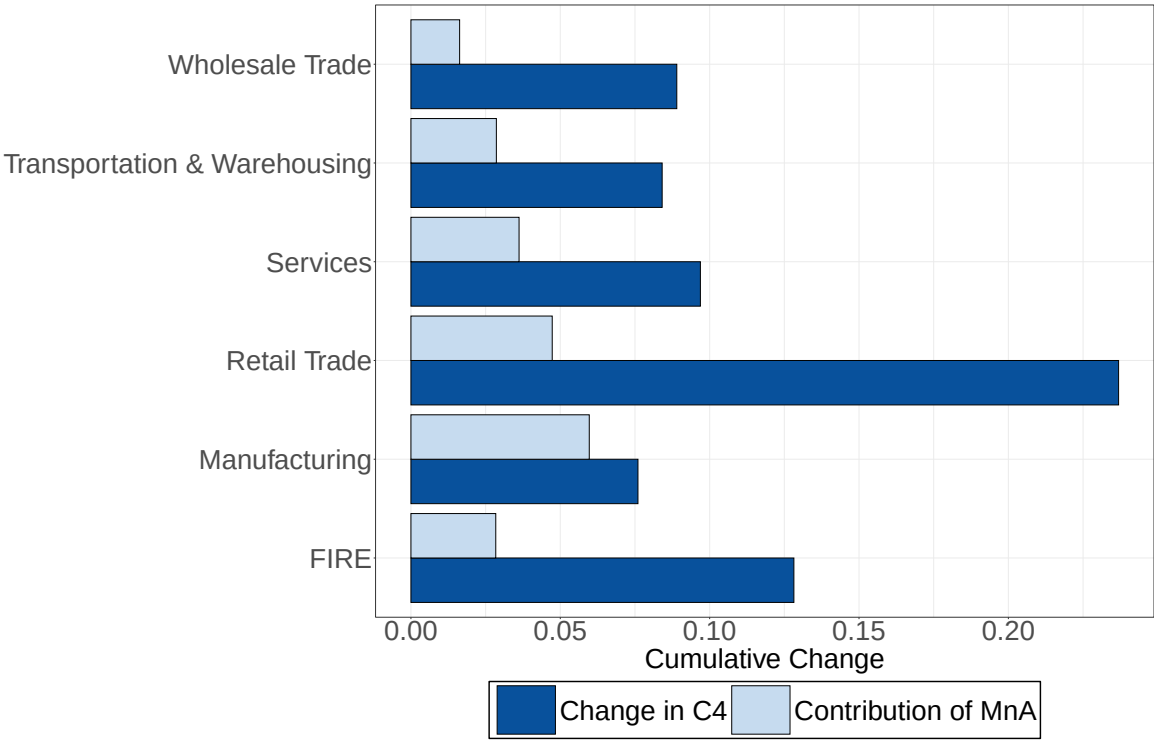
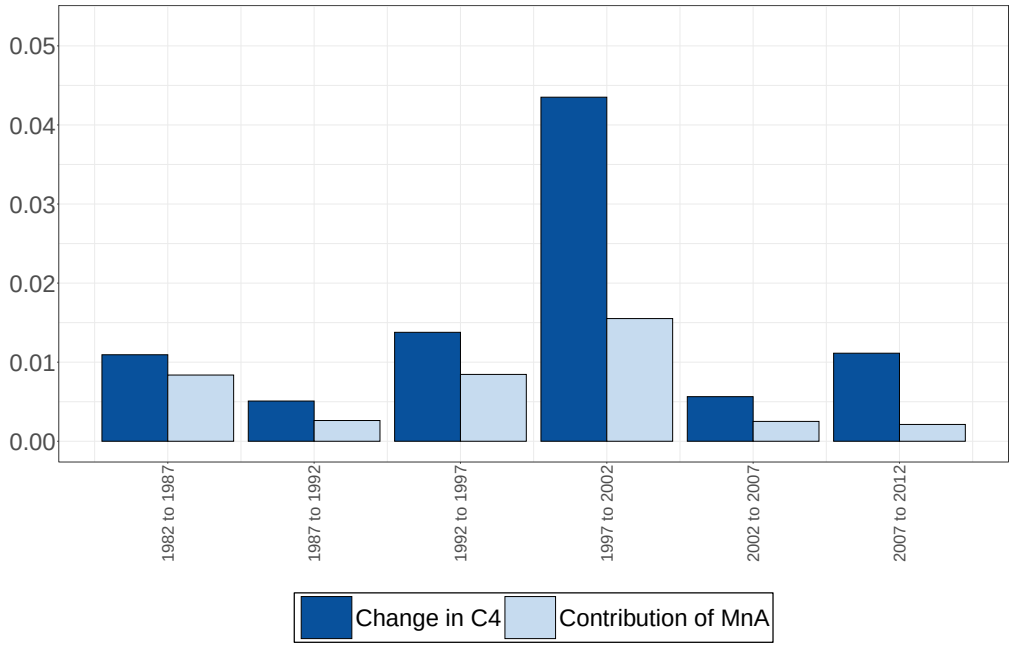


Figure 3: **Concentration of M&A to Rising Concentration: Aggregate by Year**
Panel A reports the statistics of the change in aggregate concentration. Panel B reports the statistics of the aggregate within-sector change in concentration. See Section 2 and Equation 3 for the measurement of changes in concentration and Section 3 and Equation 5 for the measurement of the contribution of M&A. See Section 3 for further details.

(a) Change in Aggregate Concentration



(b) Aggregate Within-Sector Change in Concentration

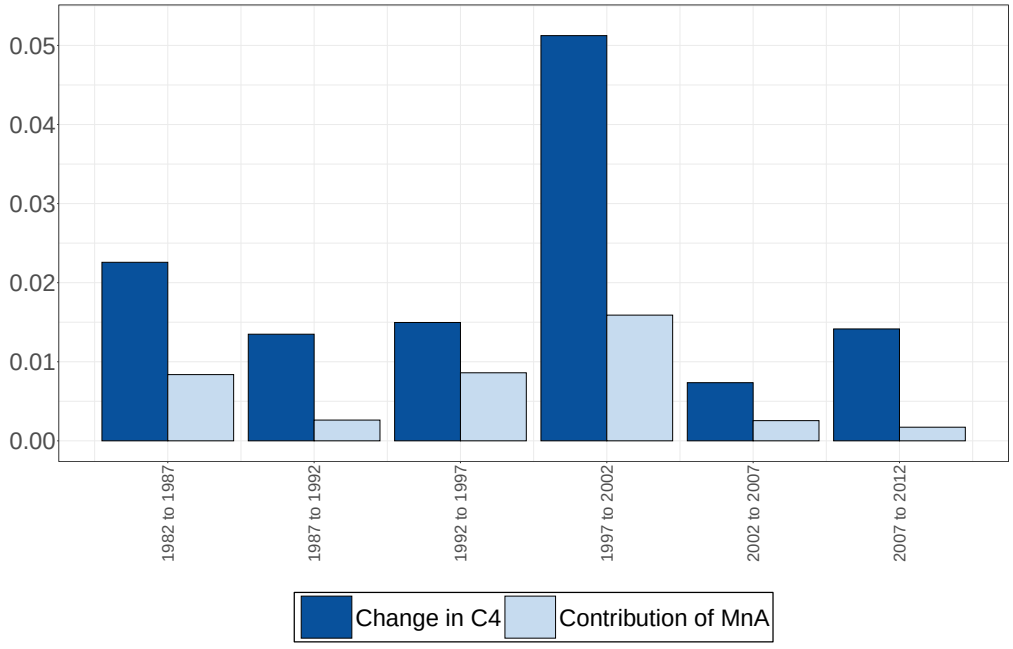
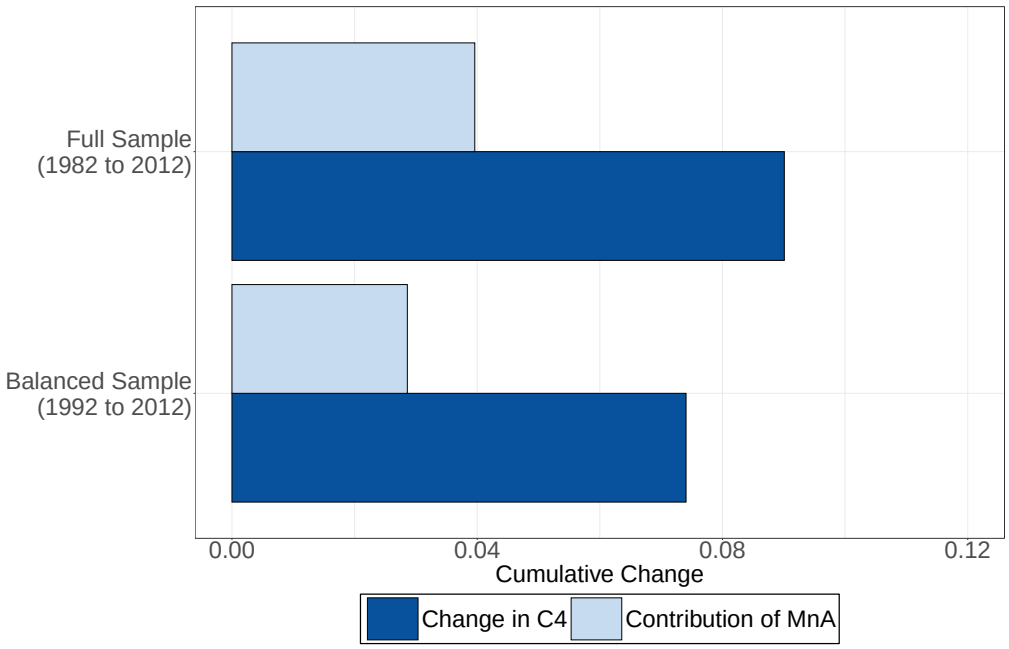


Figure 4: **Concentration of M&A to Rising Concentration: Aggregate**
Panel A reports the statistics of the change in aggregate concentration. Panel B reports the statistics of the aggregate within-sector change in concentration. Results are reported separately for the full sample of sectors covering the years 1982–2012 and for the balanced sample of sectors covering the years 1992–2012. See Section 2 and Equation 3 for the measurement of changes in concentration and Section 3 and Equation 5 for the measurement of the contribution of M&A. See Section 3 for further details.

(a) Change in Aggregate Concentration



(b) Aggregate Within-Sector Change in Concentration

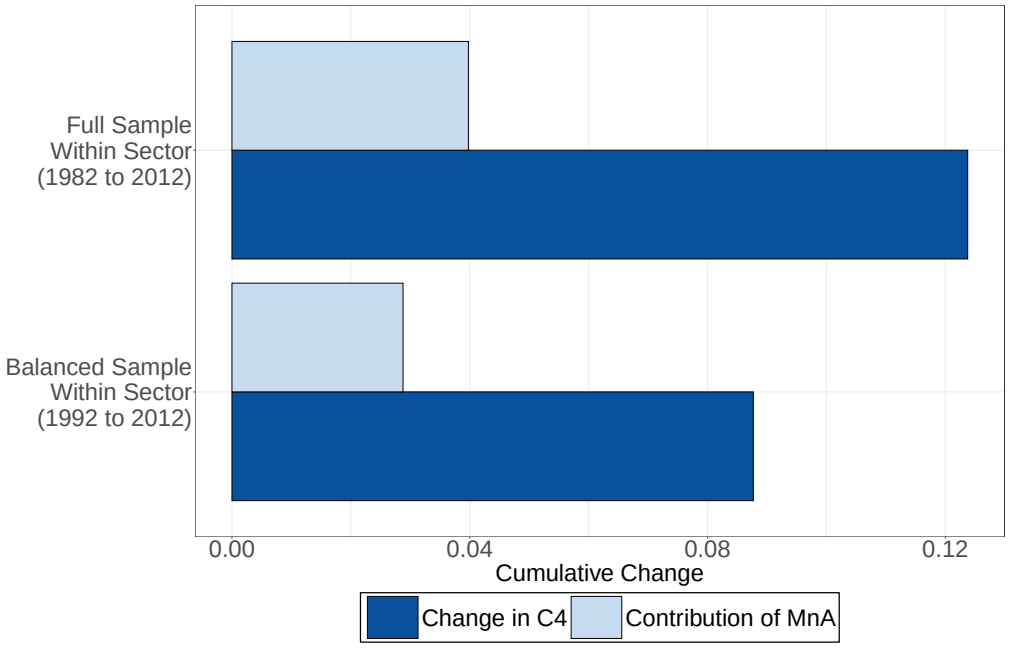
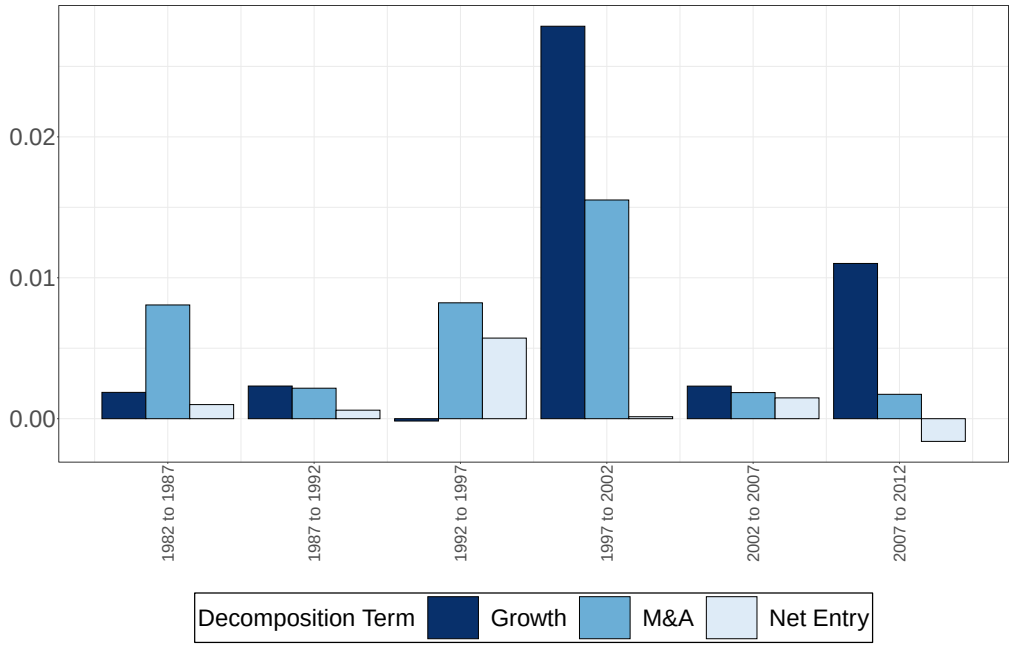


Figure 5: **Decomposing Changes in Concentration: Growth, M&A, and Net Entry**
This figure presents the decomposition of changes in aggregate concentration into the three terms Growth, M&A, and Net Entry. Panel A reports presents the value of the three decomposition terms for each five-year period. Panel B reports presents the cumulative decomposition, where results are reported separately for the full sample of sectors covering the years 1982–2012 and for the balanced sample of sectors covering the years 1992–2012. See Section 4 for further details.

(a) Five-Year Changes



(b) Cumulative Changes

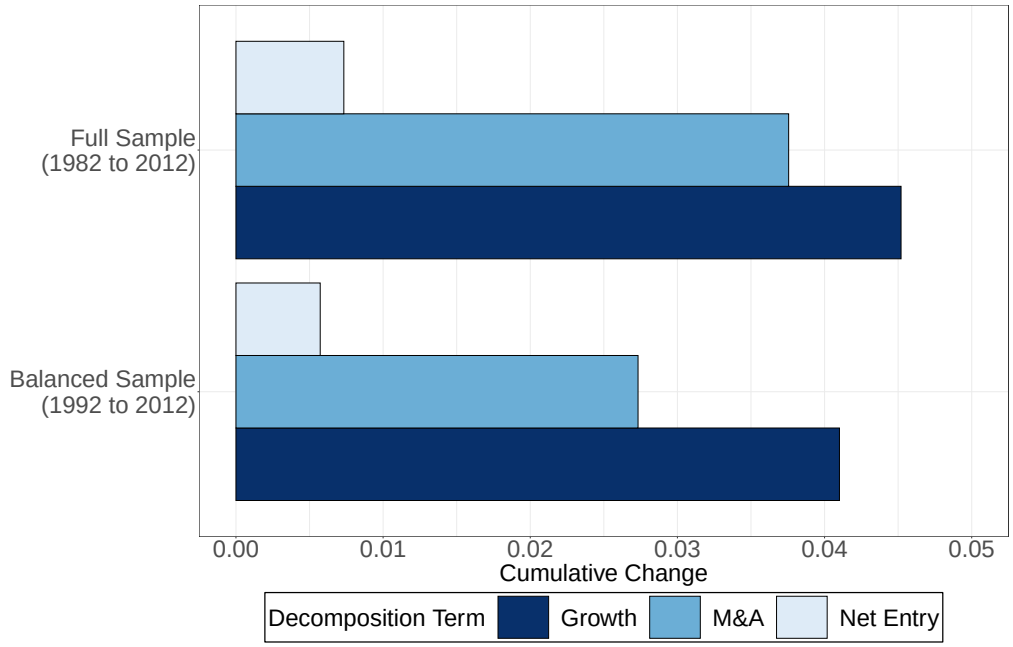
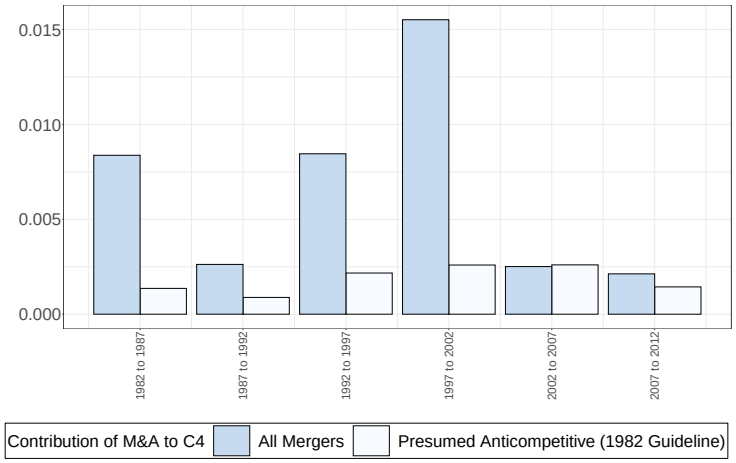
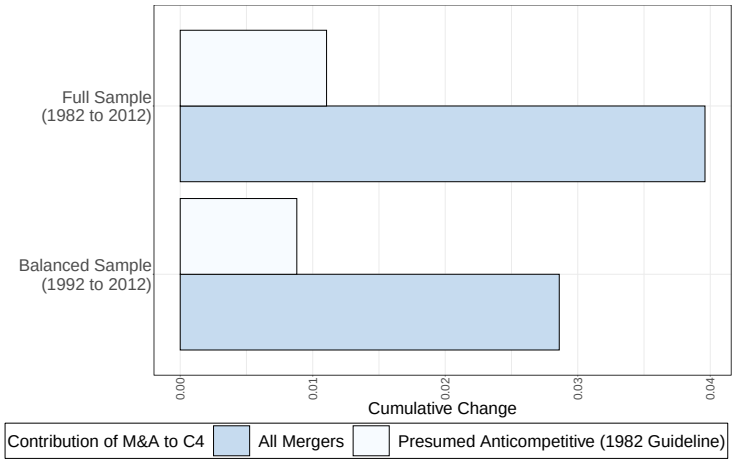


Figure 6: **Presumed Anticompetitive Mergers**
This figure presents the the contribution of M&A and the contribution of Presumed Anticompetitive M&A to changes in aggregate concentration. Panels A and B report results from classifying mergers and acquisitions using the 1982 merger guidelines. Panels C and D report results from classifying mergers and acquisitions using the 1968 merger guidelines. See Section 5 for further details.

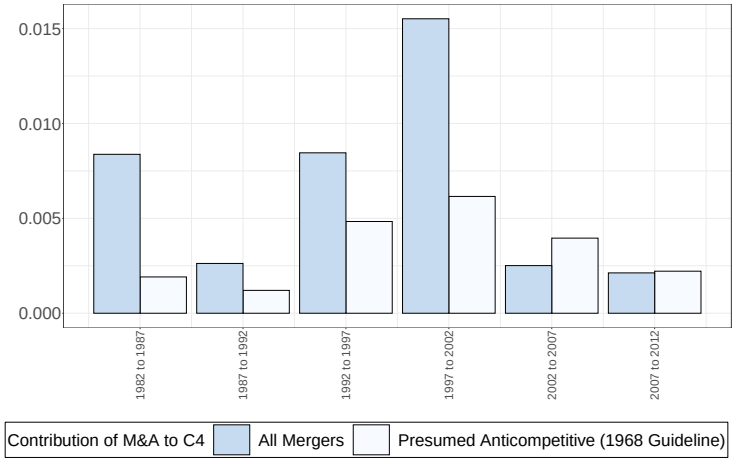
(a) 1982 Guidelines



(b) 1982 Guidelines, Cumulative



(c) 1968 Guidelines



(d) 1968 Guidelines, Cumulative

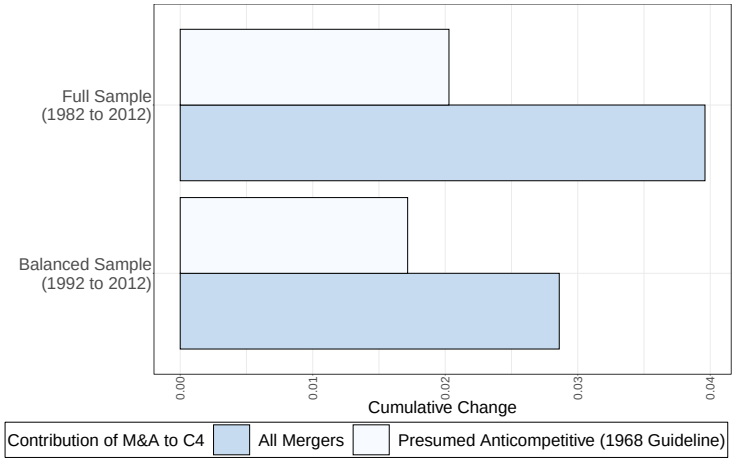


Table 1

Decomposing Changes in Concentration: Growth, M&A, and Net Entry (Percent of Total)

This table presents the decomposition of changes in aggregate concentration into the three terms M&A, Growth of continuing firms, and Net Entry. Each term is presented as a percentage of the increase in aggregate concentration. We separately report results for the full sample of sectors covering the years 1982–2012 and for the balanced sample of sectors covering the years 1992–2012. See Section 4 for further details.

	M&A	Growth	Net Entry
Full Sample (1982 to 2012)	42%	50%	8%
Balanced Sample (1992 to 2012)	37%	55%	8%

Table 2

Mergers and Acquisitions Challenged Under Merger Guidelines

Panel A presents the 1968 Merger Guideline. These guideline rules are presented in terms of market shares of the acquiring firm and acquired firm. As an example, the guideline states that a merger should be challenged when an acquirer has a market share between 15% and 20% and the acquired firm has a market share greater than 3%. Panel B presents the 1982 Merger Guideline. These guideline rules are presented in terms of post-merger competition-market HHI and the change in HHI that results from the merger. See Section 5 for further details.

(a) 1968 Merger Guideline

Acquiring Firm	Acquired Firm(s)
5%	5% or more
10%	4% or more
15%	3% or more
20%	2% or more
25% or more	1% or more

(b) 1982 Merger Guideline

Post-Merger HHI	Increase in HHI
1000–1800	100 or more
1800+	50 or more

Table 3

Contribution of Presumed Anticompetitive Mergers to Rising Concentration (Percent of Total)

This table presents the decomposition of changes in aggregate concentration into Growth, Permitted M&A, and Presumed Anticompetitive M&A. Each term is presented as a percentage of the increase in aggregate concentration for the full sample of sectors covering the years 1982–2012. We separately report results from classifying mergers and acquisitions using the 1982 merger guidelines and using 1968 guidelines. See Section 5 for further details.

		M&A (44%)	
		Presumed	
	Growth	Anticompetitive	Permitted
1982 Guideline	56%	12%	32%
1968 Guideline	56%	22%	22%