

# Diverging Trends in National and Local Concentration\*

Esteban Rossi-Hansberg  
*Princeton University*

Pierre-Daniel Sarte  
*Federal Reserve Bank of Richmond*

Nicholas Trachter  
*Federal Reserve Bank of Richmond*

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## Abstract

Using U.S. NETS data, we present evidence that the *positive* trend observed in *national* product-market concentration between 1990 and 2014 becomes a *negative* trend when we focus on measures of *local* concentration. We document diverging trends for several geographic definitions of local markets. SIC 8 industries with diverging trends are pervasive across sectors. In these industries, top firms have contributed to the amplification of both trends. When a top firm opens a plant, local concentration declines and remains lower for at least 7 years. Our findings, therefore, reconcile the increasing national role of large firms with falling local concentration, and a likely more competitive local environment.

## 1 Introduction

Most product markets are local. The reason is simply that the transportation of goods and people is costly so firms set up production plants, distribution centers, and stores close to customers. In turn, individuals locate in areas where they can obtain the goods they desire. A coffee shop or restaurant in Manhattan does not compete with similar establishments in Seattle, and probably not even in Brooklyn. The wedge in prices created by the inconvenience and monetary cost of buying a product far away from the desired consumption point shields companies in different locations from direct competition. Of course the size of these costs, and therefore the geographic extent of the market, varies by product. Markets are also product-specific. Producers of a particular product are shielded from competition by producers of distinct but related goods and services to the degree that their consumption requires households to move away from their ideal variety.

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\*Rossi-Hansberg: [erossi@princeton.edu](mailto:erossi@princeton.edu). Sarte: [pdgs4frbr@gmail.com](mailto:pdgs4frbr@gmail.com). Trachter: [trachter@gmail.com](mailto:trachter@gmail.com). The views expressed herein are those of the authors and do not necessarily represent the views of the Federal Reserve Bank of Richmond or the Federal Reserve System. We thank Eric LaRose and Sara Ho for outstanding research assistance.

Much has been written recently about the increase in national market concentration observed over the last two decades, and the role that large national firms have played in driving this trend. The evidence for the rise in concentration is uncontroversial; the share of the largest firms and the Herfindahl-Hirschman Index, among other measures of concentration, have increased consistently in most sectors since 1990.<sup>1</sup> A narrative has emerged whereby this increase in national concentration is perceived as the cause of lower product-market competition. This fall in competition is then viewed as the culprit of other apparent trends, such as rising markups and market power (De Loecker and Eeckhout, 2017), the increasing profits of large firms (Barkai, 2017), declining labor market dynamism and firm entry (Decker, Haltiwanger, Jarmin and Miranda, 2017), and a declining labor share (Autor, Dorn, Katz, Patterson, and Van Reenen, 2017). All of these trends, and in particular those related to concentration, markups, and profits, point to the notion that market power has been increasing. While the empirical robustness and validity of some of these trends has been contested in recent work, the rise in national market concentration remains as their main empirical foundation.<sup>2</sup>

In this short paper, we document four main facts regarding national and local product-market concentration in the U.S. economy between 1990 and 2014.<sup>3</sup> We make use of the National Establishment Time Series (NETS) dataset which covers the universe of U.S. firms and their plants.<sup>4</sup> The dataset includes sales and employment numbers for all plants at different levels of geographical and industrial disaggregation down to the SIC 8 product code.

Our first fact is that the observed positive trend in market concentration at the national level has been accompanied by a corresponding negative trend in average local market concentration. We measure concentration using the Herfindahl-Hirschman index (HHI), but our findings hold for a variety of statistics. We observe an increase in concentration at the national level overall across the vast majority of sectors and

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<sup>1</sup>A 2016 report by the Council of Economic Advisers, for instance, finds that the national revenue share of the top 50 firms has increased across most NAICS sectors between 1997 and 2012. The report can be found at [https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160414\\_cea\\_competition\\_issue\\_brief.pdf](https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160414_cea_competition_issue_brief.pdf). Gutiérrez and Philippon (2017) show that this increase in U.S.-wide market concentration is not uniform across all sectors and has been most pronounced in non-manufacturing sectors. Barkai (2017), and Autor, Dorn, Katz, Patterson, and Van Reenen (2017), find that the national sales share of top firms has also been rising since 1997 and, in fact, helps explain the decline in the labor share over the same period.

<sup>2</sup>While rising market concentration at the national level is relatively undisputed, the evidence regarding markups is more mixed. De Loecker and Eeckhout (2017) show evidence of rising markups since the 1980s among publicly traded firms. Hall (2018) finds similarly increasing markups at the sectoral level using KLEMS productivity data. However, Traina (2018) points out that the evidence on markups depends crucially on the measurement of variable costs. When variable costs include marketing and management costs, as well as other indirect costs of production, markups have been relatively flat since the mid-1980s. Similarly, Karabarbounis and Neiman (2018) find generally flat markups over time when also accounting for selling, general, and administrative expenses. Anderson, Rebelo, and Wong (2018) focus on the retail sector and find stable markups since 1979 using scanner data on the price of transactions and measuring marginal costs as replacement costs at the store level. Edmond, Midrigan and Xu (2018) show that when weighted by costs rather than sales, as implied by the microfoundations they lay out, aggregate markups have increased only modestly.

<sup>3</sup>See Neumark, Zhang and Wall (2006), or Barnatchez, Crane and Decker (2017) for a thorough discussion of the advantages and disadvantages of this data source relative to U.S. Census data.

<sup>4</sup>Throughout the paper we interchangeably use the terms plant and establishment. We also treat firm and enterprise as synonymous.

industries, but a fall in concentration when it is measured at the CBSA, County, or Zip code levels.<sup>5</sup> The narrower the geographic definition, the faster the decline in local concentration. This is meaningful because the relevant definition of concentration from which to infer changes in competition is, in most sectors, local and not national.

The second fact shows that local concentration is falling across SIC 8 industries that together account for 77% of employment and 70% of sales. Furthermore, conditioning on industries where national concentration is rising, industries where local concentration has declined account for the majority of employment overall (70% of employment and 65% of sales) across all major sectors. The presence of these diverging trends is always large but more pronounced in services, retail trade, and FIRE relative to wholesale trade and manufacturing. This ordering is natural given that transport costs are less relevant in the latter two sectors. Together, these first two facts underscore an unmistakable decline in local concentration on average that is pervasive across all sectors.

How does one reconcile a positive trend in national concentration with a negative trend in local concentration? Our third fact shows that among SIC 8 industries that exhibit this pattern, top firms have accelerated these trends. That is, excluding the top firm in each industry (in terms of national sales in their SIC 8 industry in 2014), the national increase in concentration becomes naturally less pronounced. Perhaps more surprisingly, the decline in local concentration also becomes less pronounced. Put another way, large firms have materially contributed to the observed decline in local concentration.<sup>6</sup> Among industries with diverging trends, large firms have become bigger but the associated geographic expansion of these firms, through the opening of more plants in new local markets, has lowered local concentration thus suggesting increased local competition. In the considerably smaller set of industries where we observe increases in both national and local concentration, top firms have also been responsible for both forms of concentration.

Our fourth fact establishes that among industries with falling local concentration, the opening of a plant by a top firm is associated with a decline in local concentration at the time of the opening, and that this lower level of concentration persists for at least the next 7 years. This observation provides further evidence that in those industries, large enterprises do not enter and dominate the local market but instead lower its concentration, either by competing with the previous local monopolist or by simply adding one more establishment that grabs a proportional market share from other local establishments. In any case, the notion that entry by large firms eliminates local producers to the point of increasing concentration is certainly not supported in the vast majority of industries where most of U.S. employment resides.

Consider the much-publicized case of Walmart. Most of Walmart's establishments are in the discount department stores industry, an industry with declining local concentration. Consistent with fact four, when Walmart opens a store, the HHI falls by 0.15 in the associated ZIP code. In contrast, computing the HHI without taking into account the opening Walmart establishment, concentration remains constant. One can also consider the effect of Walmart on the number of firms in a market. When Walmart enters, the total

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<sup>5</sup>In the main text, we focus mostly on ZIP codes as our geographic definition of a local market. An online-only appendix presents results with other geographic units.

<sup>6</sup>This finding also holds when we exclude the top three firms in each industry instead of just the top firm.

number of establishments in the ZIP code increases, though by less than one-to-one (about 3/4). In other words, Walmart generates some exit but the net result of opening a Walmart store is a greater number of competitors in the market for at least 7 years after entry.<sup>7</sup> This case is paradigmatic, but there are many others across all major sectors. For example, the expansion of Cemex, the top firm by sales in 2014 in the ready-mixed concrete industry, led to a similar decline in local concentration and an expansion in the local number of establishments in the industry.<sup>8</sup>

Our findings challenge the view that product-market concentration is increasing in the U.S. They do so not by challenging the evidence that national concentration has increased – we actually provide additional evidence to that effect across many industries – but by observing that this national trend does not imply a positive local trend in concentration. In fact, we show that it implies the opposite in most industries, a declining trend in concentration. Ultimately, concentration matters because it can lead to less competition. Hence, measures of concentration have to be aligned with product markets as well as their geographic and industrial scope. In particular, for the majority industries, concentration is likely more relevant to firm pricing and other strategic behavior at a more local level. Our findings are also consistent with the mixed evidence found in recent literature regarding secular changes in markups across individual industries. If local competition matters, we should not see increases in markups or profits in the markets where local competition is increasing. The measurement of markups in local markets associated with particular industries depends on important assumptions and requires very detailed data. The NETS data does not allow us to calculate these local statistics, but there exists evidence of flat markups over time in specific industries with declining concentration (Anderson, Rebelo, and Wong, 2018), and in the aggregate (Traina, 2018).

The facts we document are directly relevant to the design of antitrust policy and other policies that can prevent successful firms from growing at the national level. We document heterogeneous trends across industries and, in some industries, concentration is clearly rising both at the national and local level. However, our results should provide pause for policy-makers that worry about increases in market power. On the whole, and in most industries, large firms are lowering local concentration and, therefore, most likely increasing product market competition. Carl Shapiro, a former Deputy Assistant Attorney General at the Antitrust Division of the Department of Justice, and member of the President’s Council of Economic Advisers under Barack Obama, makes a similar argument. Discussing evidence on the positive trend in national market concentration, he observes: “So, while these data do reflect the fact that large, national firms have captured an increasing share of overall revenue during the past 20 years in many of these 893 ‘industries,’ they do not, in and of themselves, indicate that the relevant local markets have become more

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<sup>7</sup>Jia (2008) studies competition by Walmart and other discount retail stores. She proposes a structural model of this competition and argues that the profits of previously available retailers decrease when ‘Walmart comes to town’. This is consistent with our view that Walmart lowers concentration by taking market share away from local competitors. Moreover, the exit of firms we observe is also consistent with those of Jia (2008) when measured at the county level. Holmes (2011) studies the expansion strategy of Walmart and, in particular, its geographic expansion strategy. Our findings are exactly consistent with this view of geographic expansion and provide related facts concerning its impact on local concentration. In contrast to these studies, our empirical findings extend to most U.S. industries in addition to the discount retail sector.

<sup>8</sup>This industry was singled out in Syverson (2008) as an example of an industry with a local market. We present the results of this case in the online-only appendix.

concentrated.” In this paper, we provide the empirical evidence supporting the notion that, in the face of rising national concentration, local markets have indeed become on average significantly less concentrated.<sup>9</sup>

The rest of the paper is organized as follows. Section 2 describes our data, the way we use it, as well as our benchmark measure of national and local concentration. Section 3 presents our main four facts and describes their implications. Section 4 concludes. An online-only appendix presents a large variety of additional calculations using other concentration statistics, and provides additional detail regarding the data and the results in the main text.<sup>10</sup>

## 2 Data and Concentration Statistics

Our analysis uses data from the National Establishment Time Series (NETS), which is provided by Walls & Associates, and comprises annual observations on specific lines of business at unique locations over the period 1990–2014. In particular, NETS data allow us to observe sales and employment of between 7 and 15 million lines of business each year in our sample. Each line of business is assigned a data universal numbering system (DUNS) identifier that makes it possible to track its sales and employment over time at the SIC 8 level of Standard Industrial Classification (SIC) and at specific latitudes and longitudes. Industries can be mapped into broader SIC 2 classifications or divisions, and locations can be mapped into ZIP codes, counties, or Core-Based Statistical Areas (CBSAs). In addition, each line of business is also assigned a headquarters (HQ) number that gives the particular enterprise to which it reports. Thus, the NETS data encompass the universe of establishments operating in the U.S., and the enterprise to which each belongs, between 1990 and 2014.

To better illustrate the nature of the NETS data, consider the case of Walmart as an example of an enterprise. It is headquartered in Bentonville, AR, and in 2014, it is associated with approximately 4700 establishments across all 50 states. Each of these 4700 establishment is assigned its own 8–digit primary SIC code, with 3718 establishments operating mainly as discount department stores (SIC 53119901), 603 establishments operating mainly as warehouse club stores (SIC 53999906), 241 establishments operating primarily as grocery stores (SIC 54110000), and the remaining establishments scattered mostly across various retail classifications.

Because each establishment in the NETS data is assigned a unique DUNS identifier, it is possible to track when an establishment enters our sample (for those that enter after 1990) and, if applicable, when it exits. In addition, the DUNS identifier follows each establishment over time even if it is sold from one enterprise to another, or becomes included in a merger of enterprises, so that sales and employment of particular establishments may be tracked irrespective of corporate-level changes.

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<sup>9</sup>De Loecker and Eeckhout (2018) also argue that in order to measure concentration in a way that is meaningful as an indicator of market power, this measurement has to be carried out for specific goods and local markets using the universe of firms. This is exactly what we do in this paper using the NETS data.

<sup>10</sup>The online-only supplementary appendix to this paper is available at [http://www.princeton.edu/~erossi/DTNLC\\_Appendix.pdf](http://www.princeton.edu/~erossi/DTNLC_Appendix.pdf).

Approximately a quarter of enterprises in the NETS data have only one employee. This feature of the data is typically not accounted for by alternative government sources of local employment as estimated by the County Business Patterns (CBP) or the Quarterly Census of Employment and Wages (QCEW).<sup>11</sup> Since these establishments nevertheless report positive sales, we include them in our benchmark analysis. In an online-only supplement to this paper, we show that our results are robust to excluding enterprises with only one employee.

At the 2–digit SIC code, the data is classified in terms of 11 divisions, including Manufacturing, Services, Retail Trade, Wholesale Trade, and Finance, Insurance and Real Estate (FIRE), that together account for approximately 85 percent of sales and 80 percent of employment respectively in 2014. Because our analysis centers on the relationship between market concentration and the geographic expansion of enterprises, we exclude from our benchmark exercises industries that are intrinsically tied to specific locations because of weather or endowments of natural resources. These industries include Mining, Agriculture, Forestry, and Fishing, Construction, and Transportation and Public Utilities. We also exclude from our benchmark analysis any government establishment, including establishments belonging to enterprises whose headquarters are associated with a public administration SIC code, and establishments associated with education, non-profit endeavors, health care, and central banking.<sup>12</sup>

## 2.1 Measuring Concentration

Establishments in our dataset are indexed by industry,  $i$ , location,  $\ell$ , and year,  $t$ . Industries are defined by an SIC 8 code. Locations are defined by a latitude-longitude pair. We denote collections of industries into broader classifications (SIC 2 or divisions) by  $d$ . We denote collections of locations into broader geographies (ZIP codes, Counties, CBSAs, or the whole U.S.) by  $g$ . When defining locations at the CBSA level, counties that are not within CBSAs are not represented, which amounts to between 5 and 10 percent of establishments in any given year.

Let  $S_{e,i,\ell,t}$  denote the nominal sales of enterprise  $e$  in industry  $i$  at location  $\ell$  in year  $t$ , and  $S_{e,i,g,t} = \sum_{\ell \in g} S_{e,i,\ell,t}$  its sales in the broader geography  $g$  (i.e. the sum of all its establishments’ sales across all latitude-longitude pairs in geography  $g$ ). We then denote by  $s_{e,i,g,t}$  this enterprise’s share of all sales in industry  $i$  located in geography  $g$  at date  $t$ . We adopt as our benchmark measure of market concentration the Herfindahl-Hirschman Index,

$$\mathcal{C}_{i,g,t} = \sum_e s_{e,i,g,t}^2,$$

where  $\mathcal{C}_{i,g,t} \in [1/N, 1]$  is the sales concentration, and  $N$  the number of enterprises in  $(i, g, t)$ . In the online-

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<sup>11</sup>Many enterprises with one employee are non-employer enterprises, or in other words, have no paid employees. While employment at those enterprises is then at times the result of imputations, Barnatchez, Crane, and Decker (2017) show that taking out those imputations leaves measures of local employment that are generally highly correlated with those in the CBP across industries.

<sup>12</sup>We eliminate health-care from our analysis since changes in the organization of the sector driven by changes in its institutional framework (in particular Obamacare) have generated a number of changes that are specific to this context. The online-only appendix shows that including the sector does not change our country-wide average implications.

only supplement to this paper, we also consider alternative measures of concentration, such as the sales share of the top firm, top 3 firms, and the adjusted Herfindahl, and show that all of our findings are robust to these other measures.

### 3 National and Local Market Concentration: The Facts

We organize the discussion of our findings into four main facts. The first two facts document the diverging trends in national and local concentration and their importance across sectors and geographic definitions of a ‘local’ market. The third and fourth facts document the role that large firms have played in these trends. As a form of corollary to the last fact, we also present evidence specific to Walmart, a firm that has featured prominently in the debate on the evolution of market concentration.

#### 3.1 Fact 1: Diverging Trends on Average

Fact 1 is summarized in Figures (1). Figure (1a) shows a weighted average of the change in concentration,  $\Delta\mathcal{C}_t$ , across all industry-geography pairs  $(i, g)$  for different definitions of geography, namely ZIP code, County, CBSA, and the whole U.S.,

$$\Delta\mathcal{C}_t = \sum_{i,g} w_{i,g,t} \Delta\mathcal{C}_{i,g,t},$$

where the weights  $w_{i,g,t}$  are given by the employment shares of industry-geography  $(i, g)$  in aggregate employment in year  $t$ , and  $\Delta\mathcal{C}_{i,g,t}$  denotes the change in market concentration between year  $t$  and the first year for which we observe sales in the location-industry pair  $(i, g)$ .<sup>13</sup>

As indicated in the 2016 CEA report, Barkai (2017), Gutiérrez and Philippon (2017), and others, market concentration at the national level has been steadily increasing since 1990. However, the exact opposite is true for less aggregated measures of concentration. Figure (1a) shows that the more geographically disaggregated the measure of concentration, the more pronounced its downward trend over the last two and a half decades.

Figure (1b) shows a weighted average of the change in concentration across all industry-geography pairs  $(i, g)$  within a particular division,  $d$ , namely Manufacturing, Services, Retail Trade, Wholesale Trade, and FIRE, for geographies defined by ZIP code and the whole U.S.,

$$\Delta\mathcal{C}_t^d = \sum_{i \in d, g} w_{i,g,t} \Delta\mathcal{C}_{i,g,t}.$$

Figure (1b) shows that while increasing market concentration at the national level holds broadly across all divisions, it is equally the case that concentration has steadily fallen at the ZIP code level in these

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<sup>13</sup>Given differences in the number of firms and other industry characteristics, the HHI cannot be compared directly across sector. This is why we aggregate changes in the HHI. Using sales shares instead of employment shares as weights yields similar results, as shown in the online-only appendix.

divisions. Observe, in particular, that market concentration in the Retail Trade division has been increasing nationally more than in any other division. However, Retail Trade is also among the divisions that show the steepest decline in concentration at the ZIP code level. This fact is especially striking given that physical retail establishments in our dataset are likely to have very local markets.

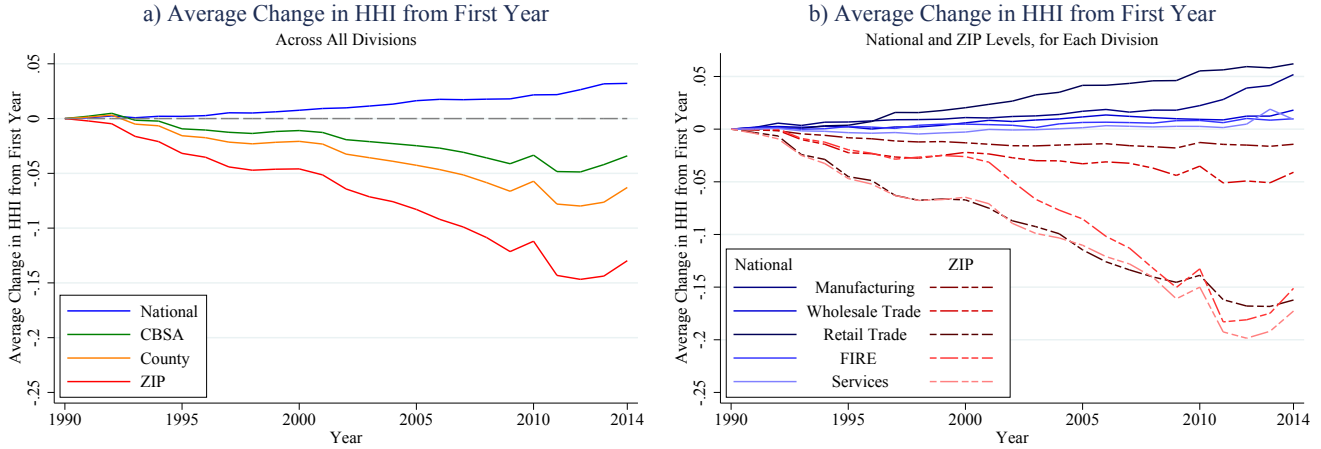


Figure 1: Diverging national and local concentration trends

### 3.2 Fact 2: Pervasive Diverging Trends

Fact 2 is presented in Figure (2). Within each SIC 2 classification, the figure gives a breakdown of employment in industries with different market concentration trends. In particular, for a given SIC 2 classification, the height of each bar gives the percentage of employment in all industries within that classification that have rising market concentration at the national level between 1990 and 2014. For each SIC 8 industry  $i$  within an SIC 2 classification, we compute in each year  $\Delta C_{i,t} = \sum_g w_{i,g,t} \Delta C_{i,g,t}$ , where  $g$  denotes the whole U.S., and regress  $\Delta C_{i,t}$  on  $t$ . The height of the bar then represents the percent of labor, within that SIC 2 and across all years, employed in all SIC 8 industries with positive national concentration time trends. Thus, the major part of U.S. employment resides in industries with rising national concentration across all SIC 2 classifications. Within a bar associated with a given SIC 2 classification in Figure (2), the colors red, blue, and black represent, respectively, the percent of employment that resides in industries with declining, rising, and flat market concentration at the ZIP code level.<sup>14</sup>

Figure 2 shows the pervasiveness of SIC 8 industries with diverging trends.<sup>15</sup> That is, a substantive share of employment resides in industries with rising market concentration at the national level and declining market concentration at the ZIP code level. It also shows the heterogeneity in this share across SIC 2

<sup>14</sup>Specifically, in the calculation of  $\Delta C_{i,t} = \sum_g w_{i,g,t} \Delta C_{i,g,t}$ ,  $g$  now represents a ZIP code.

<sup>15</sup>We reserve the term of ‘diverging trends’ for a case of positive national trend and a negative local trend. The case of a negative national trend and a positive local trend is also possible, though much less common in virtually all industries.



divisions. For example, in division 52, which includes General Merchandise Stores, virtually all employment resides in SIC 8 industries with diverging trends (96.38%). In contrast, in division 21, which includes Tobacco Products, none of the SIC 8 industries exhibit a positive national trend and a negative local trend. Diverging trends are more pronounced in Retail, FIRE and Services, than in Wholesale Trade and Manufacturing, though still very much present in the latter two divisions.

The proportion of aggregate U.S. employment located in all SIC 8 industries with increasing national market concentration and decreasing ZIP code level market concentration is 43 percent. Thus, given that some industries have also had declining concentration at both the national and ZIP code level, 77 percent (or over 3/4) of U.S. employment resides in industries with declining local market concentration.<sup>16</sup>

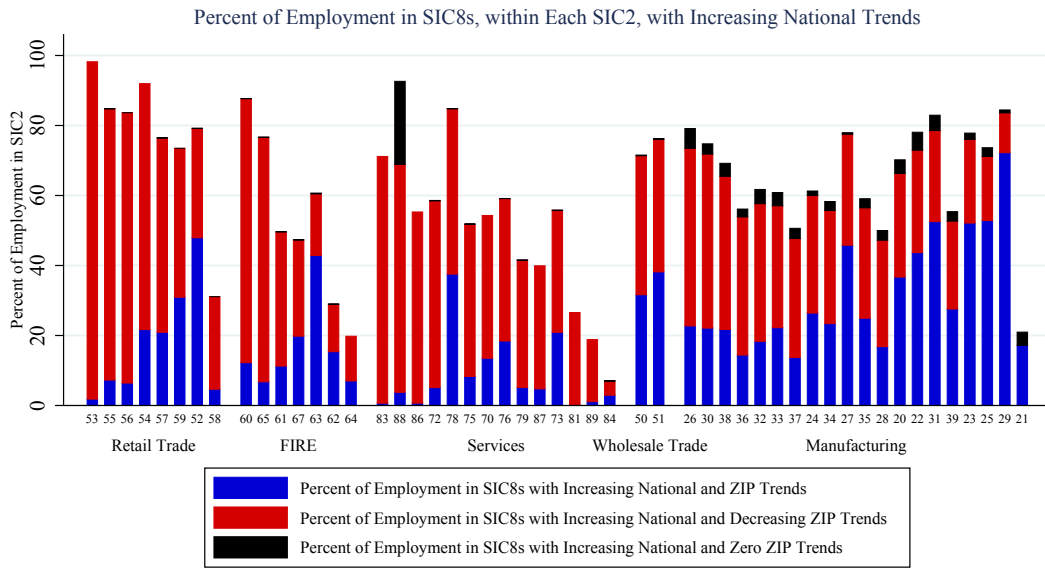


Figure 2: Pervasive diverging trends across 2-digit sectors

### 3.3 Fact 3: The Role of Top Firms

Fact 3 explores the contribution that top firms –in terms of sales share– have made to the diverging trends in each SIC 8 industry. Figures (3a) and (3b) focus on just those industries whose market concentration has increased at the national level since 1990, represented by the height of the bars in Figure (2). Those industries account for roughly half of all industries in our sample, 61% of aggregate U.S. employment, and 67% of aggregate sales.

Within that set of SIC 8 industries, Figure (3a) focuses on those that exhibit negative local concentration trends. These industries account for 70% of total employment in industries with positive national trend (65% of sales). The figure presents in solid orange and solid red, respectively, the national HHI and the local ZIP

<sup>16</sup>The share of national sales in sectors with decreasing local market concentration is 70%.

code level HHI among these industries. Given our industry selection, the national concentration (orange) line is increasing by construction and the local concentration (red) line is decreasing by construction. The dashed orange and dashed red lines in that figure depict the same objects but excluding the top enterprise in each SIC 8 industry as measured by sales in 2014.<sup>17</sup> We consider only industry-geography pairs  $(i, g)$  for which  $i$ 's top enterprise has at least one establishment present in  $g$  in at least one year. Furthermore, because we are interested in isolating the effect of the top enterprise on market concentration, among those remaining industry-geography pairs, we then only include observations  $(i, g, t)$  where at least one establishment remains after dropping the top enterprise in  $i$  and its associated establishments.<sup>18</sup>

Figure (3a) shows that among SIC 8 industries with diverging trends, excluding the top firm results in a national concentration trend that is less pronounced. The fact that large firms have contributed to the national increase in concentration is as expected. More surprising is the observation that the top firms have also contributed to the decline in local concentration. Figure (3a) shows that when we exclude the top firm, the negative trend in ZIP-code-level concentration is less pronounced. Hence, the top firm (and more generally the largest firms) in an industry are responsible (though not entirely) for the diverging trends.

Figure (3b) is constructed exactly as Figure (3a) but uses the SIC 8 industries with increasing national and local trends which are not depicted in Figure (3a). In other words, it uses the SIC 8 industries with positive national and local trends. The figure shows that for this set of industries, excluding the top firm lowers both the national and the local trend in concentration. Over the last ten years or so, it also shows that excluding the top firm reduces the trend in national concentration significantly more than that in local concentration.

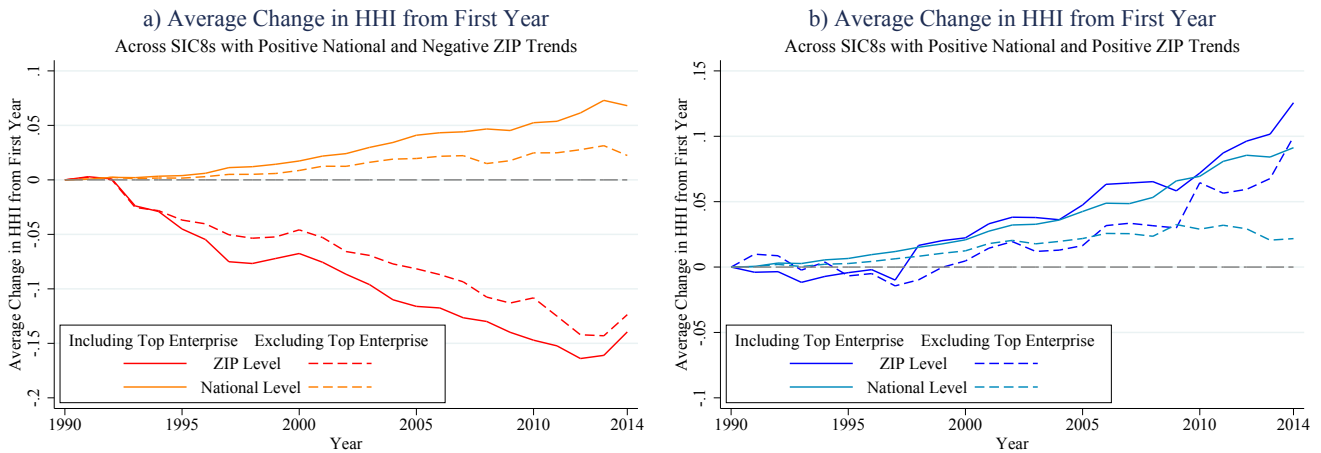


Figure 3: The role of top firms in national and local concentration trends

How can the growth of large firms contribute to the divergence in these trends? To a large extent, top

<sup>17</sup>We show in the online-only appendix that we obtain similar results when we exclude the top 3 firms rather than only the top firm.

<sup>18</sup>We also exclude industry-geography pairs whose first year of observed sales results from only one establishment belonging to the top enterprise, since the change in market concentration cannot be computed in that case.

enterprises expand by adding new establishments in new locations. The new establishments tend to decrease local concentration as they compete with existing establishments in the area, even as the top firm acquires a larger national market share, increasing national concentration. Next, we explore the impact of local entry by a top firm.

### 3.4 Fact 4: When a Top Firm Comes to Town

To further illustrate the impact of an industry’s top enterprise on market concentration at the local level, Figure (4) presents an event study describing the effect of local entry by an establishment associated with a top firm (defined by 2014 sales in an SIC 8 industry as in Fact 3) in a ZIP code. Specifically, Figure (4) examines the effect of a top firm opening a new establishment in a ZIP code on local market concentration. The calculations here mimic those in Figure (3). In Figure (4), the  $x$ -axis plots a 10-year window surrounding a top firm establishment opening in a given ZIP code, with 0 denoting the opening year. To better highlight the net effect of entry on concentration, we normalize the change in concentration to zero in the year prior to the establishment opening.

Figure (4a) depicts the event study for all SIC 8 industries with increasing market concentration at the national level and decreasing local market concentration, that is, SIC 8 industries with diverging trends. Figure (4b) illustrates findings for the remaining SIC 8 industries with increasing national concentration: those where both national and local trends are positive over our sample period. The solid lines in both figures present the evolution of the HHI index when the entering establishment is included; the dashed lines illustrate the same object when excluding the opening establishment owned by the top enterprise within each industry.

Among industries with diverging trends, the opening of an establishment in a ZIP code is associated with a fall in market concentration. Moreover, this fall persists at about the same size for at least 7 years after the event. In contrast, among industries with increasing local market concentration, the opening of an establishment leads to a temporary decrease in market concentration but one that reverses quickly. After 4 to 5 years, concentration is higher than it would have been absent the opening. Hence, in the former case, the establishment owned by the top enterprise does not become dominant, while in the latter case it eventually dwarfs the establishments of other firms. The data suggest that on the whole, the case where the top firm does not become dominant at the local level is markedly more relevant.<sup>19</sup>

The dashed lines in both panels of Figure (4) suggest that when all shares are re-calculated excluding sales of the opening establishment belonging to the top enterprise in each industry, market concentration does not exhibit a significant trend over the entire 10-year window. Thus, the dashed-lines lend credibility

<sup>19</sup>Neumark, Zhang and Wall (2006) and Barnatchez, Crane and Decker (2017) argue that NETS dataset might at times be slow in reporting the entry and exit of small firms. Given their findings, one might question the extent to which our results are driven by the exit of small firms not being reported accurately. However, the fact that the fall in the HHI persists for up to 7 years diminishes this potential concern. Another potential concern is that ZIP codes are too narrow a geographic definition of a market. In the online-only appendix, we show that the fall in the local HHI as a result of local entry by a top enterprise in industries with diverging trends holds and persists when we use counties rather than ZIP codes.

to a central assumption underlying the event study, namely that entry by a top enterprise in a local market is the main event affecting concentration in each market.

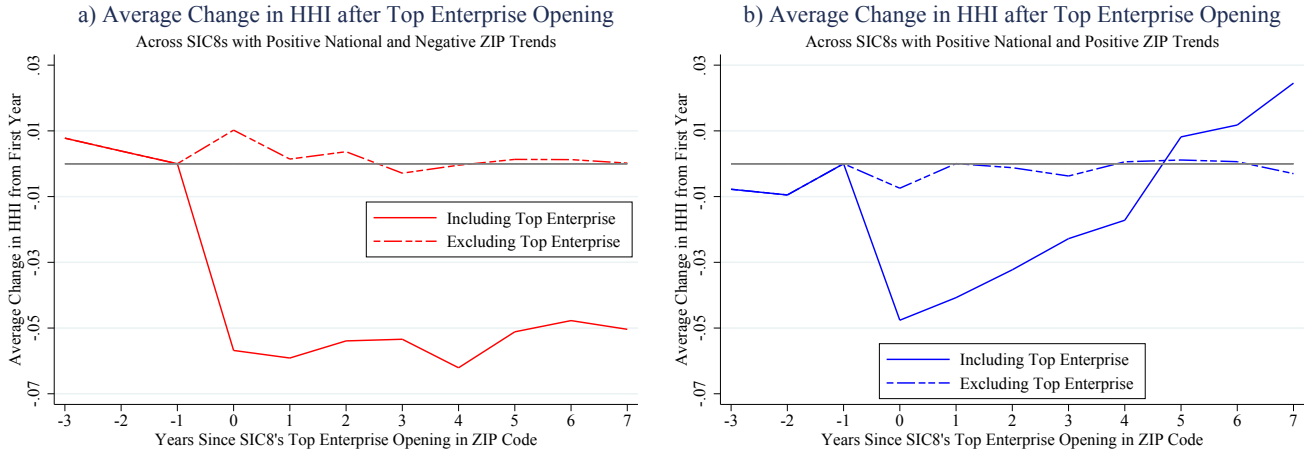


Figure 4: Effect on concentration when a top firm enters a local market

### 3.4.1 The Case of Walmart

The event study presented in Fact 4 averages the effect of entry by a top enterprise across many markets. It is informative, therefore, to further delve into the data within a particular sector. In the last couple of decades, one of the most widely studied cases of an expanding firm has been the case of Walmart.<sup>20</sup> Hence, here we repeat the calculations underlying Fact 4 but for the particular case of Walmart and the SIC 8 industries with which it is associated. The solid line depicted in Figure (5a) represents a weighted average of concentration within Walmart’s primary industry (discount department stores) across all ZIP codes. The dashed line represents the same object but excluding the opening establishment owned by Walmart (i.e. all shares are re-calculated excluding Walmart’s sales from the new establishment).

Our findings for Walmart are qualitatively similar to those in Fact 4 for industries with diverging trends (as is the case for Walmart’s industries). Absent a Walmart opening, there is no trend in concentration, but there is a significant fall in the HHI of a ZIP code in which Walmart opens a new establishment. This lower level of concentration remains about constant for at least 7 years.

One advantage of considering a particular firm and its industries is that we can also show, and easily interpret, the effect of entry on the number of establishments in the local market. To do so, Figure (5b) illustrates the effect of a Walmart establishment opening in a given ZIP code on the number of establishments in that ZIP code. The solid line in the figure indicates that, when averaged across all ZIP codes (weighted by geography-SIC 8 employment, as in all other figures), the opening of a Walmart establishment is associated

<sup>20</sup>See, for example: Basker (2007), Jia (2008), Ailawadi, Zhang, Krishna, Krueger (2010), Zhu, Singh, Manuszak (2009), Holmes (2011).

with an increase in the number of local establishments. This increase is somewhat less than one-for-one (roughly 0.75) which suggests that the entry of Walmart is associated with some establishment exits across ZIP codes. Consistent with this observation, the dashed line indicates that when the newly established Walmart is excluded from the calculation, the number of establishments falls somewhat across ZIP codes.<sup>21</sup>

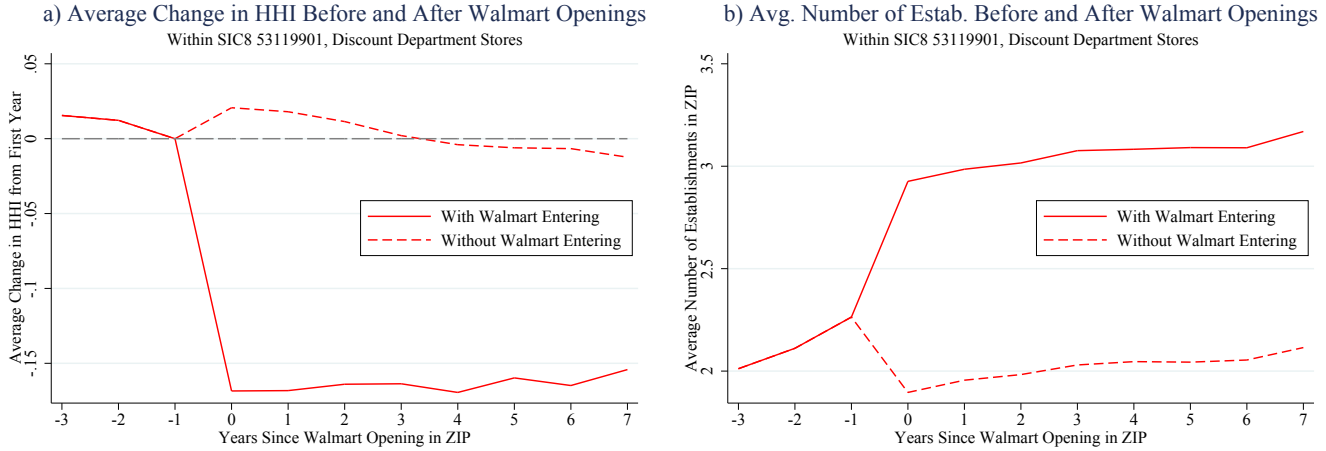


Figure 5: Effect on concentration and the number of firms when Walmart enters a local market

## 4 Conclusions

We have shown, by way of four main facts, that the increase in market concentration observed at the national level over the last 25 years is being shaped by enterprises expanding into new local markets. This expansion into local markets is accompanied by a fall in local concentration as firms open establishments in new locations. These observations are suggestive of more, rather than less, competitive markets.

The findings in this paper potentially help reconcile the observation of increasing concentration at the national level and the more mixed evidence on increasing markups and profits. Virtually no theory of product market competition associates decreasing concentration with either increasing markups or increasing profits. Our facts also indicate that the rising trend in national concentration is not, in and of itself, necessarily a concern for anti-trust policy. By decreasing local concentration, the growth of top firms has likely increased local competition and, therefore, helped improve the quality and reduce the prices of much of what we buy.

<sup>21</sup>Consistent with the findings in Jia (2008) and Basker (2007), carrying out these calculations at the county level reveals a more pronounced effect of Walmart’s entry on firm exit. Nevertheless, the decline in the HHI is still large on impact and still negative after 7 years.

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