Increasing Differences Between Firms: Market Power and the Macroeconomy

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I. Introduction

- The aim of this paper is to document some of the emerging facts on firm heterogeneity especially in terms of recent changes.

- The fall in the labor share of gross domestic product (GDP) and the rise in estimated aggregate price-cost markups are consistent with a rise in market power.

- A theme of this paper is whether the increasing gap between large and small firms reflects an increase in market power due to a reduction in competition arising from (for example) weakened antitrust enforcement.

- There are other explanations of the increasing differences that do not rest on a generalized fall in product market competition. Indeed, an equally strong case could be made that the forces of globalization and new technologies have changed the nature of competition without necessarily diminishing it across the board.

- We will discuss several pieces of evidence that are suggestive of some role for the superstar firm hypothesis:

    1. using firm-level data to decompose the changes in aggregate markups and labor shares, the vast majority of the changes are due to reallocation between firms toward larger, more productive and profitable firms.

    2. the industries growing most concentrated appear to have rising productivity and innovation which is consistent with reallocation to more efficient and innovative firms.

    3. the qualitative trends of concentration and markups seem similar across countries, which suggests global changes, rather than country specific institutional changes such as the relative weakening of U.S. competition policy compared to Europe.

- Focus on long-run secular changes rather than how price-cost markups change over the business cycle.

II. Productivity Variation

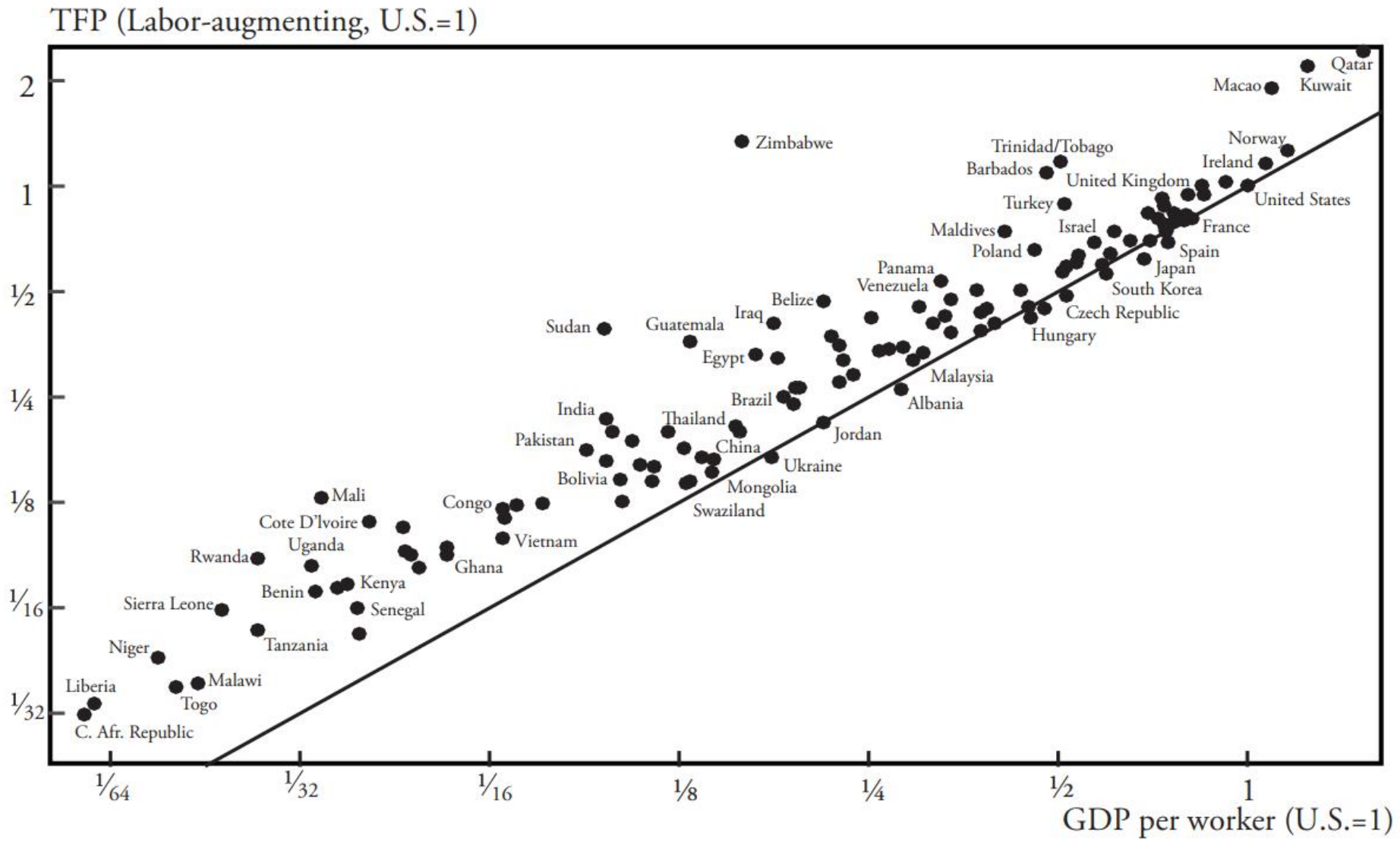
II.1. TFP Differences at a Point of Time

- Figure 1 shows GDP per worker and total factor productivity (TFP) for a large number of countries where the values are normalized to be 1 in the United States (so a number like ½ on the vertical axis implies that a country has 50 percent of the TFP of the United States).

- Two things stand out:

    1. Those countries with high TFP are also the countries with high GDP per worker, implying that capital accumulation cannot explain all of the differential wealth of nations
    2. It is striking that there is such a wide dispersion in TFP

Figure 1: Big Spread of Productivity Between Countries



Notes: 2010 data; Total Factor Productivity (Labor augmenting with common share $\alpha = 1/3$).
Sources: Penn World Tables 8.0; Jones (2015).

II.2. Aggregate Changes in Productivity Over Time

II.3. Where Do Firm Productivity Differences Come From?

III. Increasing Differences Between Firms Over Time

III.1. Concentration Trends

- Chart 2 shows this firm-level dispersion for the different countries in the WMS, which broadly mimics the variation observed in productivity.

- As with the average productivity levels in Chart 1, the United States has a very high management score, but there is large variation within the United States and indeed every country.

- The American advantage over India is not because every U.S. firm has managerial superiority over every Indian firm.

Figure 2: Management Varies Heavily Within Countries

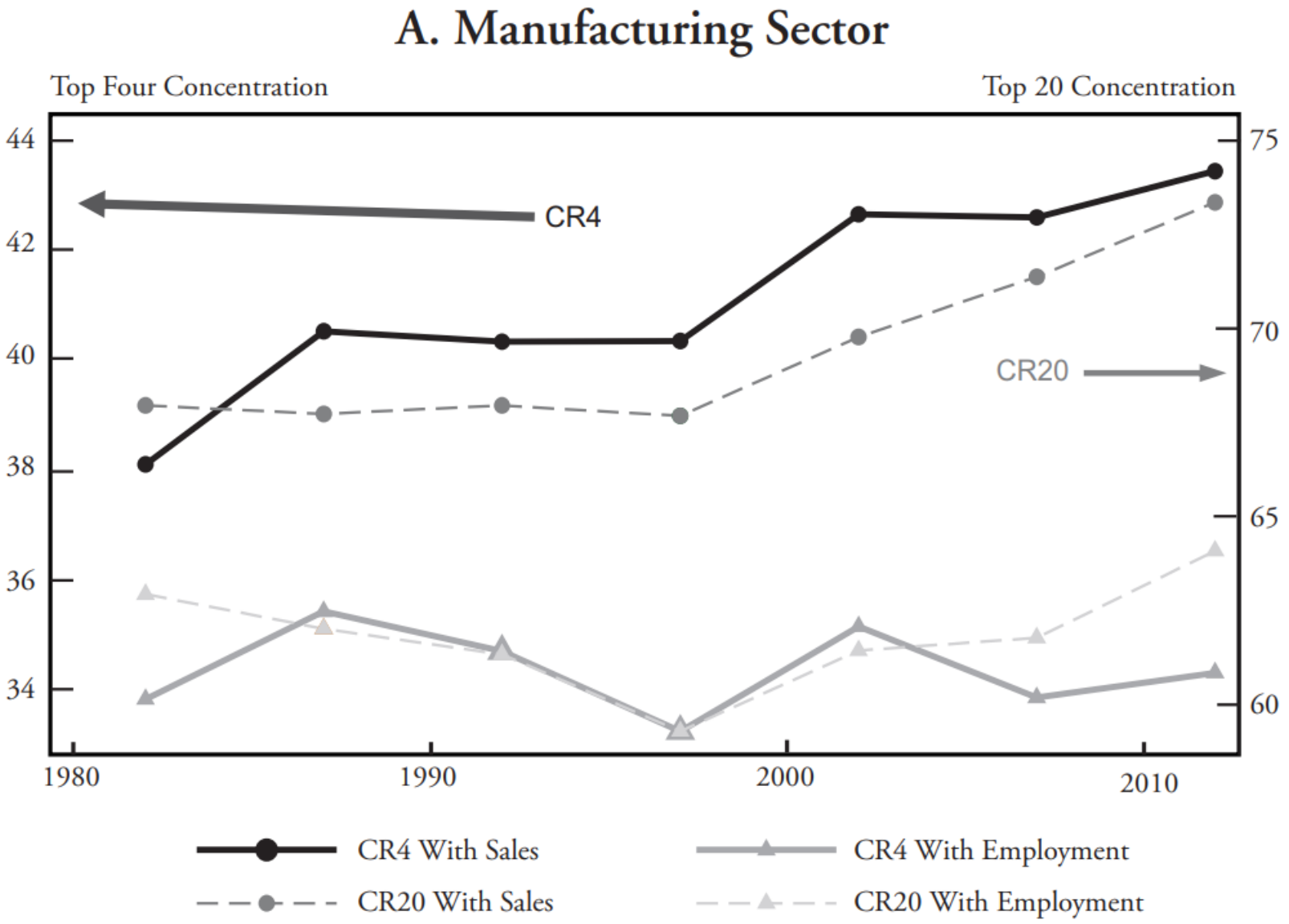
Note: Firm level average management scores, 1 (worst practice) to 5 (best practice).
Source: World Management Survey data from Bloom, Sadun and Van Reenen (2017).

- Chart 3 presents the data for each sector showing weighted average changes in four-firm (CR4) and 20-firm (CR20) concentration measures.

- The data show sharp increases in concentration across the whole U.S. economy in the last 30 years, with the growth generally stronger in the second half of the sample.

- A similar picture of generally rising concentration emerges from alternative measures such as the Herfindahl Index or CR1.

Figure 3: Rising Concentration in the United States



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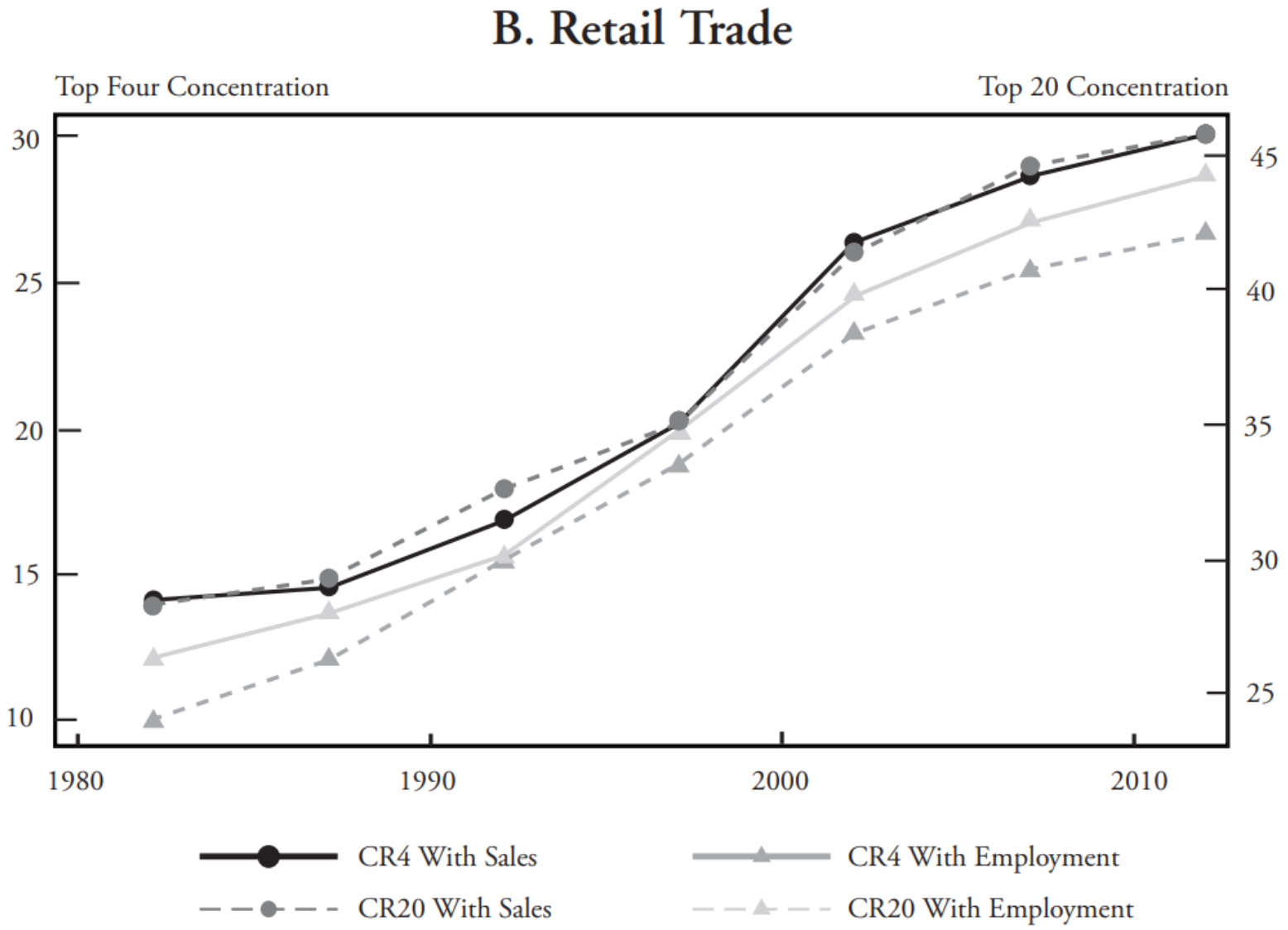
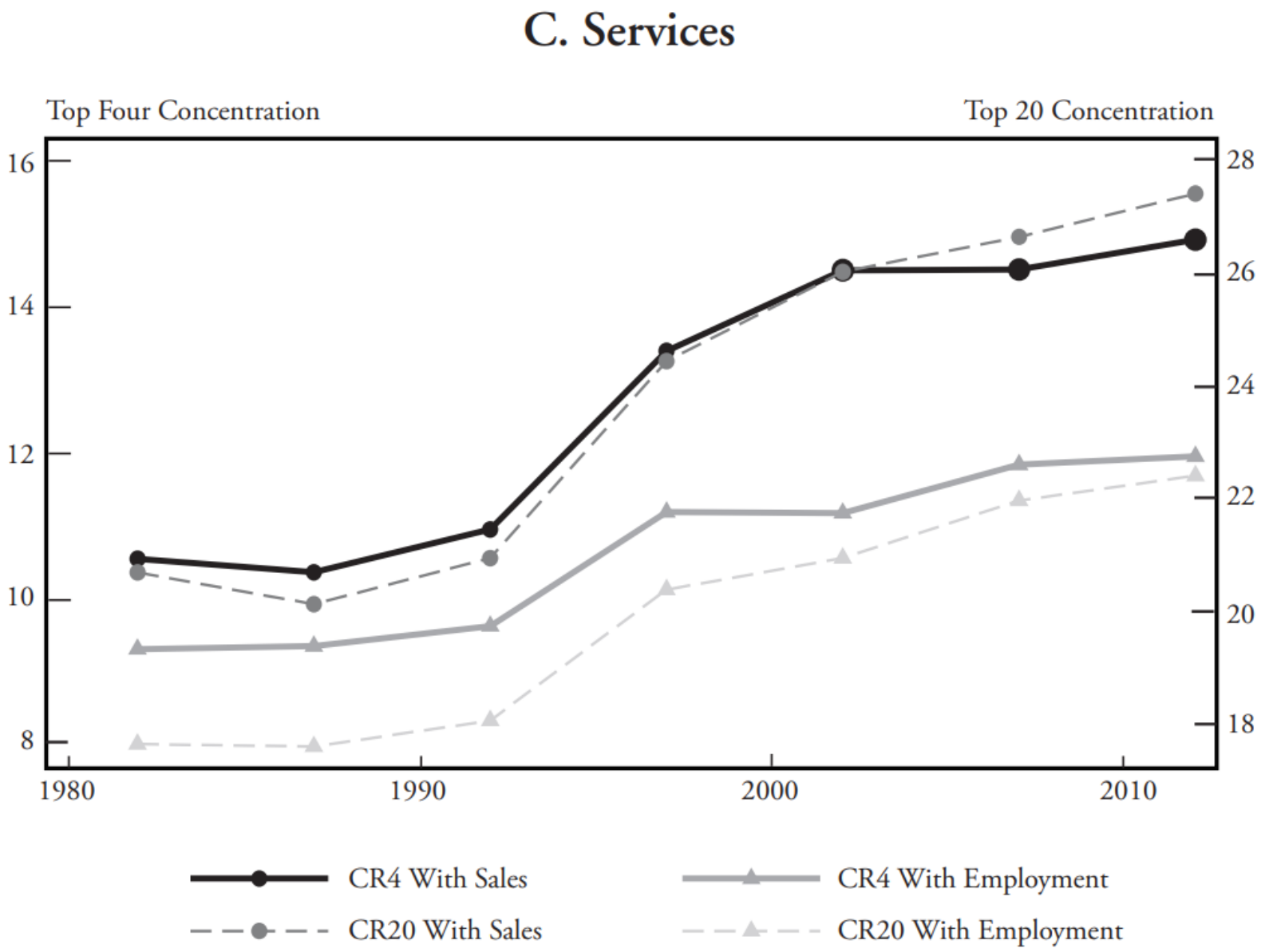


Notes: Weighted average of four-digit industries within each large sector. Manufacturing: 388 inds; Retail: 58.
Source: Autor, Dorn, Katz, Patterson and Van Reenen (2017).

Figure 3: Rising Concentration in the United States



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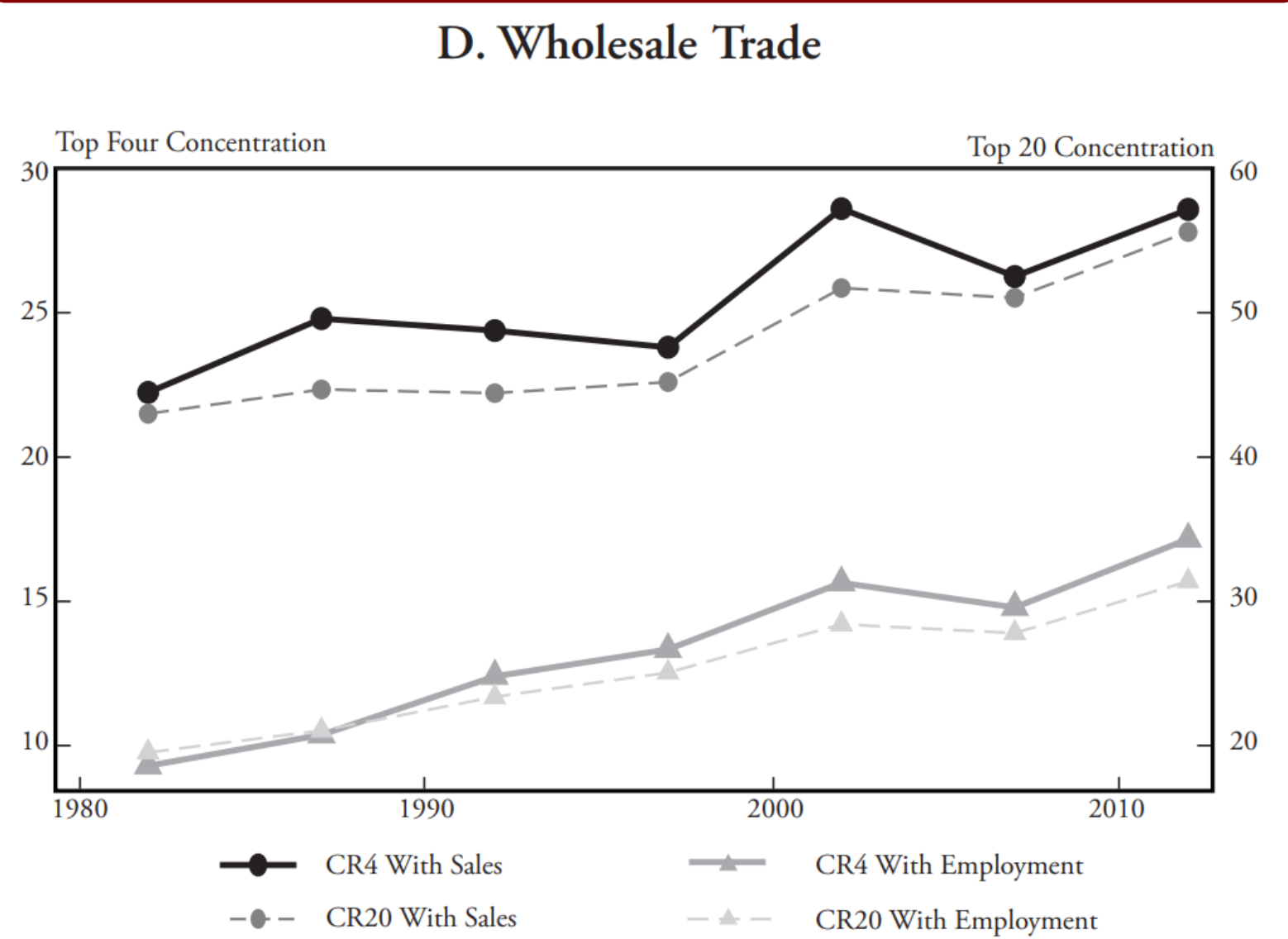

Notes: Weighted average of four-digit industries within each large sector. Wholesale: 56. Services: 95.
Source: Autor, Dorn, Katz, Patterson and Van Reenen (2017).

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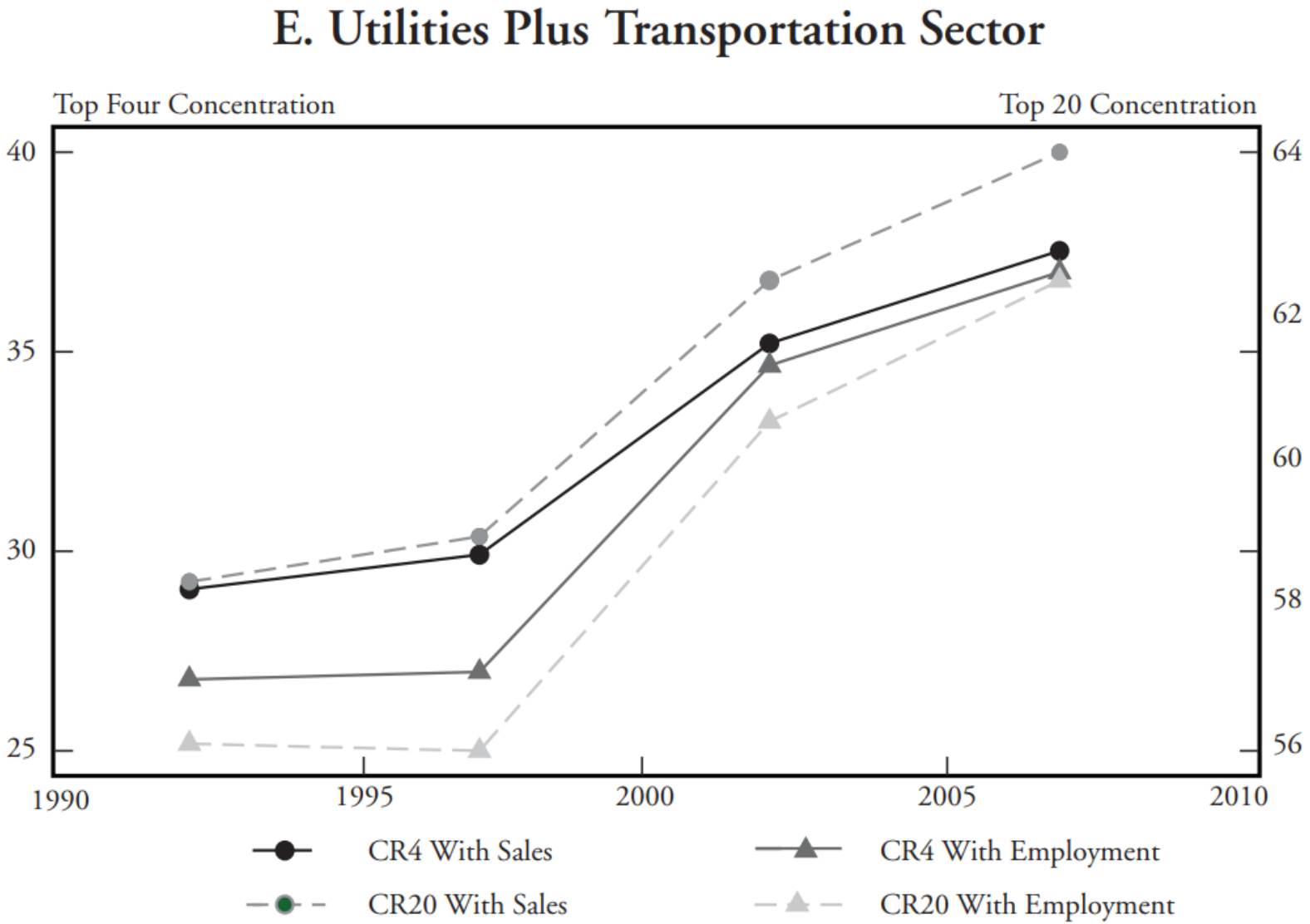

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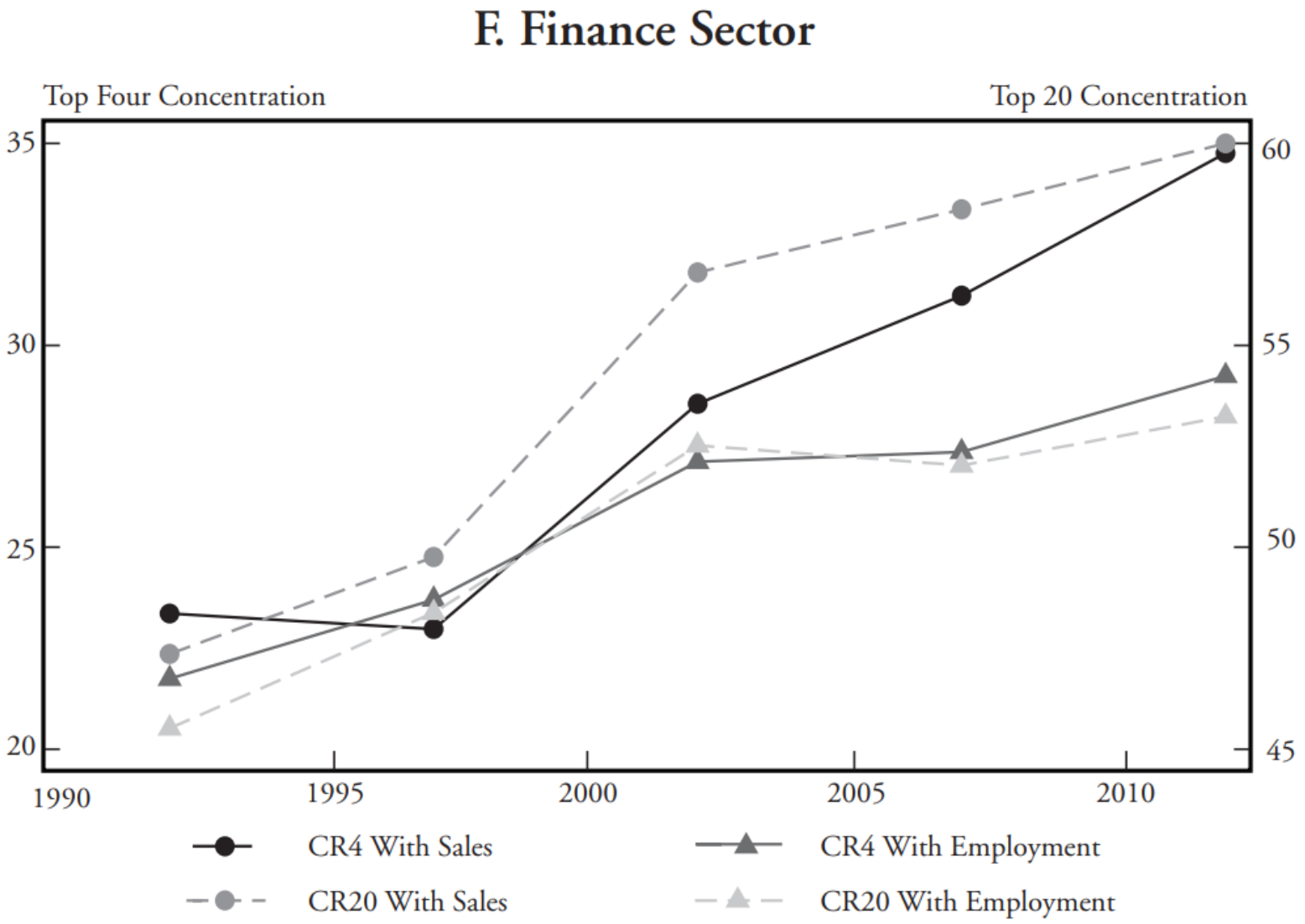


Notes: Weighted average of four-digit industries within each large sector. Utilities & Transport: 48; Finance 31
Source: Autor, Dorn, Katz, Patterson and Van Reenen (2017).

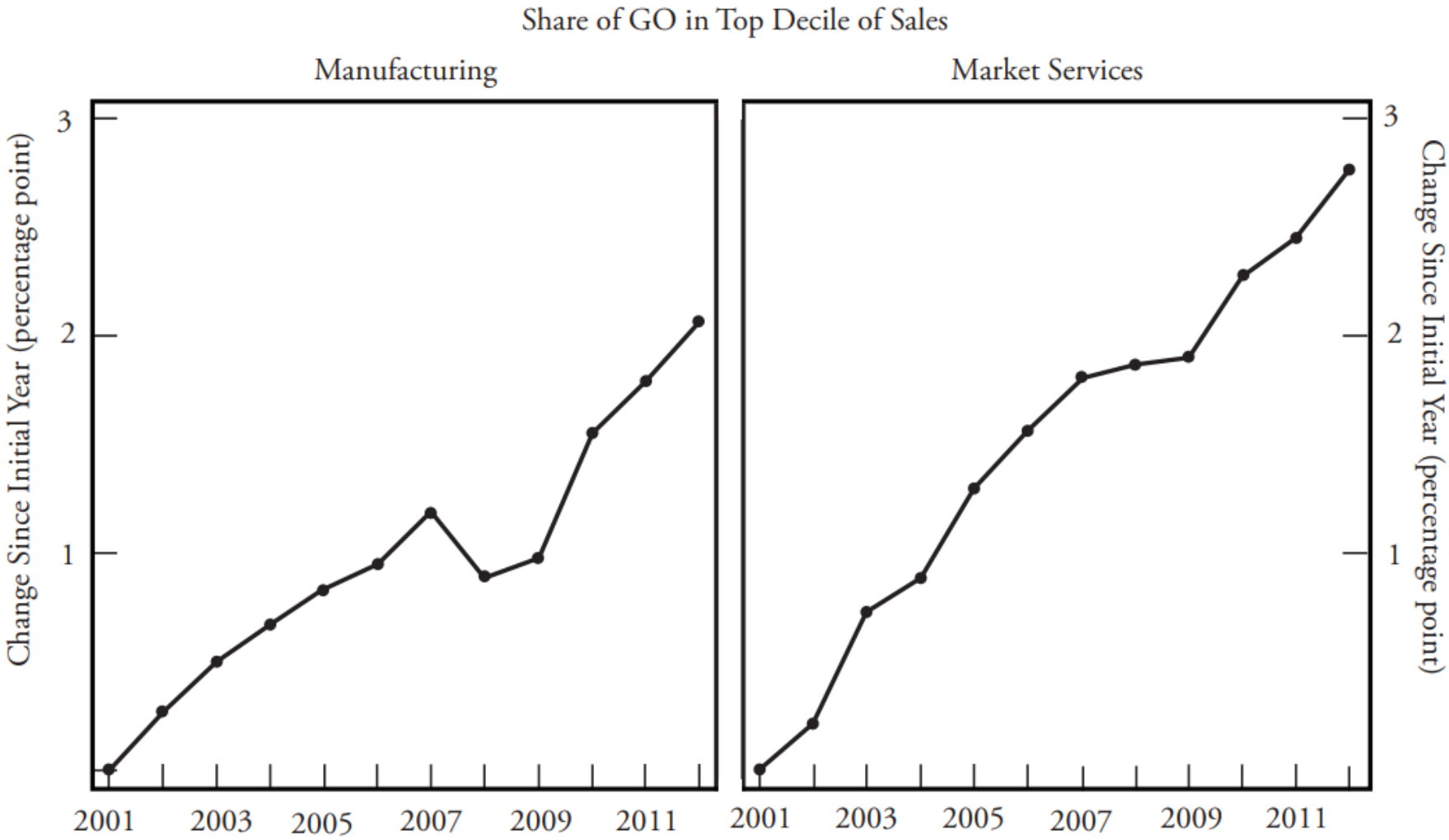
III.2. Productivity Dispersion Trends

- Chart 4 is taken from Criscuolo (2018) who uses these data to show that, on average, within the nine EU countries where comprehensive data are available, sales concentration has risen since 2000.

- This remains true when adding other non-EU OECD countries such as Australia, Japan and Switzerland.

- Some of the countries are small relative to the United States, so one might be concerned that the relevant market is geographically much wider.

Figure 4: Like U.S., Sales Concentration has Increased in the EU

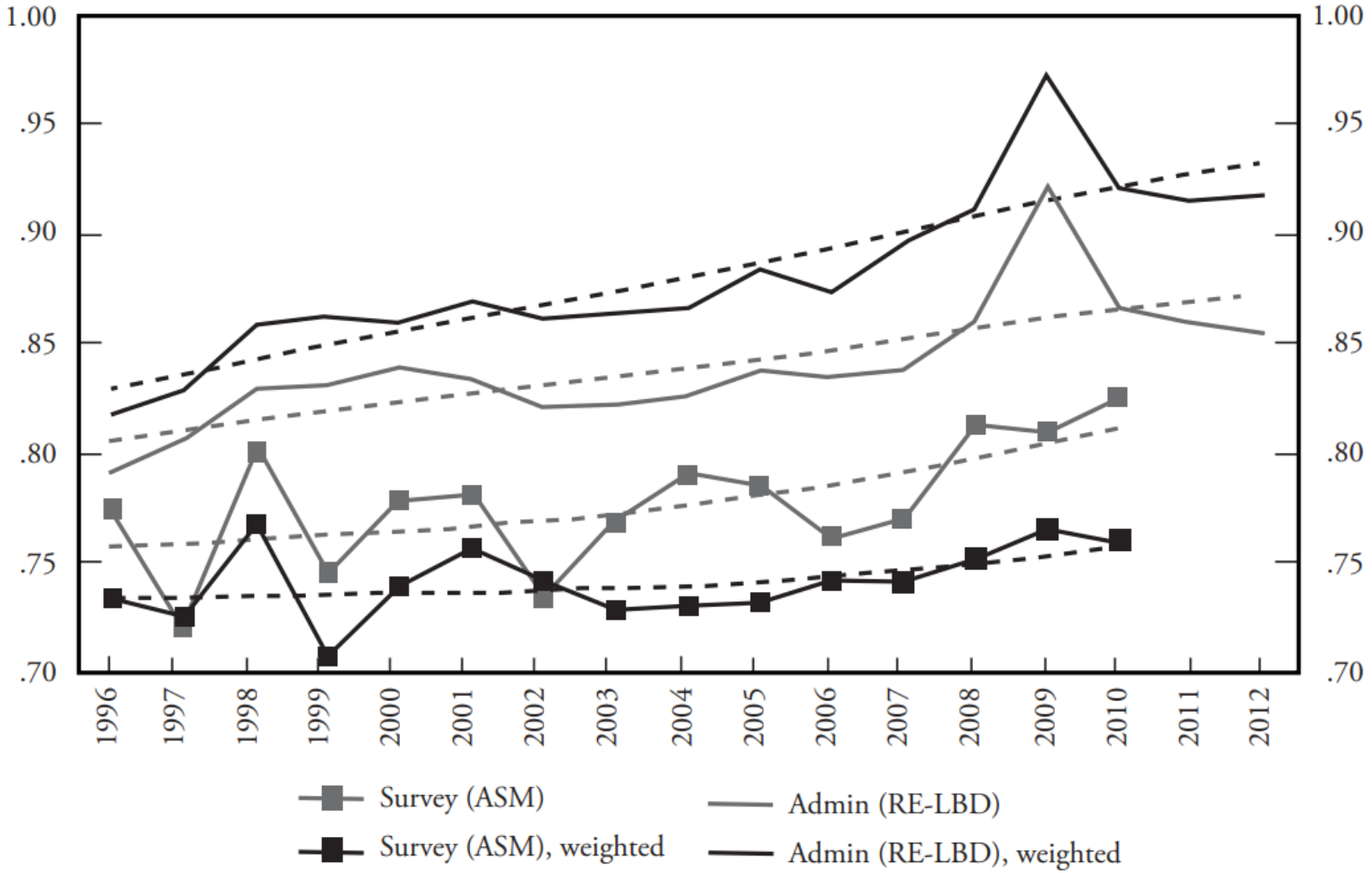


Note: Year effects from regressions with country-industry dummies and year dummies (BEL, DEU, DNK, FIN, FRA, HUN, NOR, PRT, SWE).
Sources: OECD Multiprod, *https://www.oecd.org/sti/ind/multiprod.htm*; Criscuolo (2018).

- This seems unlikely, however, as the LBD series in Chart 5 is based on administrative rather than survey data and there is little direct evidence that classical measurement error has increased over time.

- Furthermore, as White et al. (2018) show, although there are errors in the raw Census data, the extensive cleaning and imputations performed by the U.S. Census actually tend to underestimate the true level of productivity dispersion rather than overestimate it.

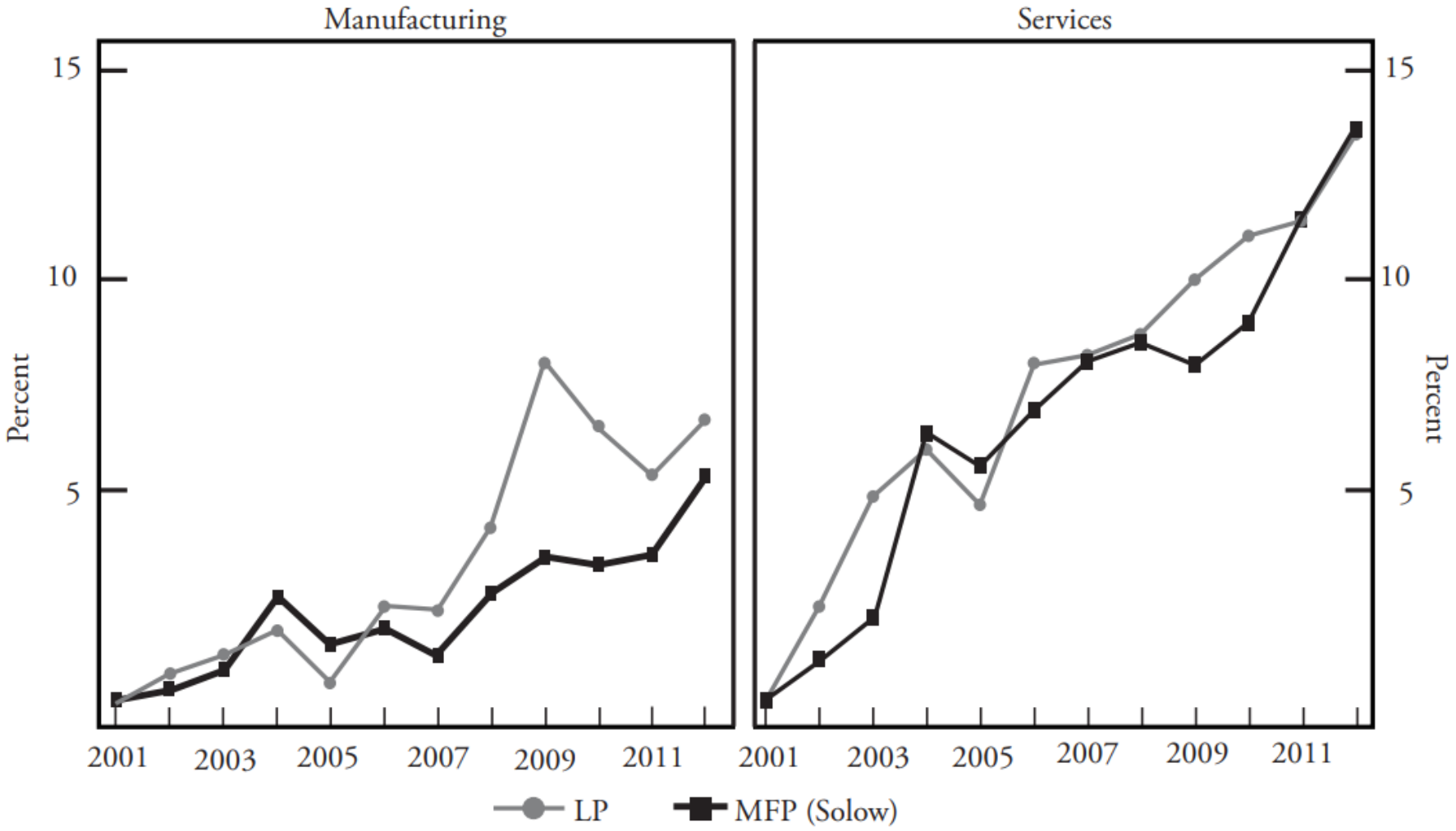
Figure 5: Rising U.S. Productivity Dispersion (manufacturing)



Notes: Standard Deviation of log(real sales/employment) normalized in a NAICS six digit industry-year. HP filtered series in dashed lines. LBD is population whereas ASM is corrected for sample selection. Weights are employment weights.
Source: Decker, Haltiwanger, Jarmin and Miranda (2018, figure A6).

- Chart 6 (Andrews et al. 2017) is also taken from MULTIPROD administrative data and documents an increase in both labor productivity and TFP dispersion, qualitatively similar to the U.S. trends in the previous graphs (they also find these patterns in BVD Orbis company accounts).

Figure 6: Change in Firm-Level Productivity Dispersion, 2001-12



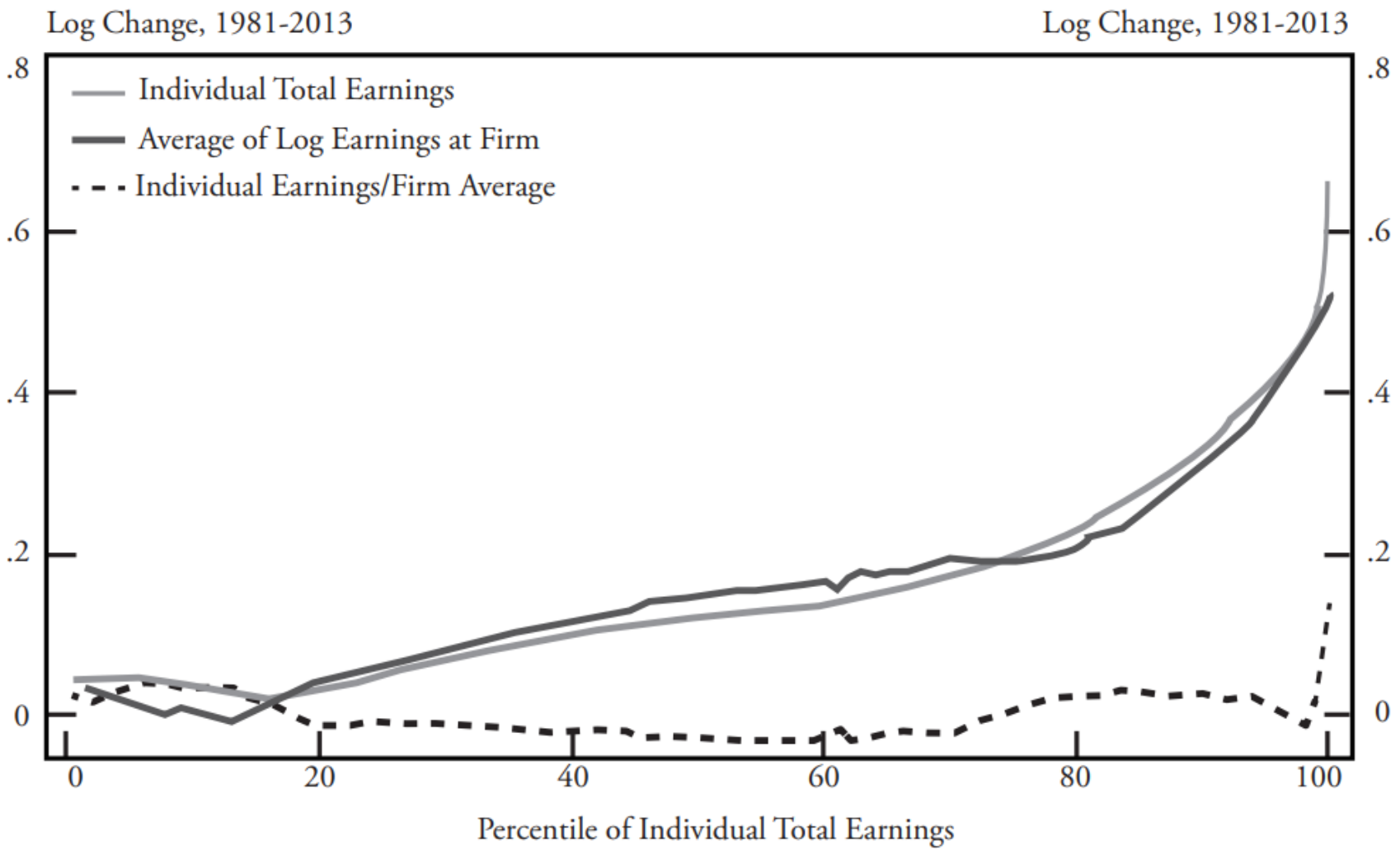
Notes: Coefficients on year dummies from regression of 90-10 log(productivity) within an industry-year cell in 16 OECD countries (AUS, AUT, BEL, CHL, DEU, DNK, FIN, FRA, HUN, ITA, JPN, NLD, NOR, NZL, PRT SWE).
Source: Berlingieri, Blanchenay and Criscuolo (2017) *https://www.oecd.org/sti/ind/multiprod.htm.*

III.3. Trends in Firm-Level Pay Dispersion

- Chart 7 shows that just about all of the increase in earnings inequality has happened between firms rather than within firms (except maybe for the top percentile, dominated by the CEO).

- In other words the oft-cited differences within companies between high- and low-paid workers explain very little of the increase in overall U.S. earnings inequality.

Figure 7: Change in U.S. Earnings Inequality Almost All Between Firm (rather than within firm), 1981-2013



Sources: Song et al. (2017), SSA data.

III.4. Summary on Increasing Differences

IV. The Weakening Competition Explanation

IV.1. Evidence—Markups and the Labor Share

- The well-documented decline in the labor share of GDP—see Figure 8—is broadly consistent with a rise in markups.

- To see this, note that in a wide class of imperfect competition models, one can write the markup μ_i of firm i 's ratio of its price (ρ_i) to its marginal cost (c_i) as:

$$\mu_i = \alpha_i^v / s_i^v$$

α_i^v - the output elasticity with respect to a variable factor v
s_i^v - the factor share, the cost of factor v in total revenue

$$s_i^v = w_i^v x_i^v / \rho_i q_i$$

w - the factor price
x - the factor quantity
q - the firm's output

- This implies that the markup can be estimated from just a production function parameter and a variable factor share. For example, in a representative firm model with a time invariant Cobb-Douglas production function we can write the markup as a function of the labor share at time t as:

$$\mu_t = \alpha^L / s_t^L \qquad (2)$$

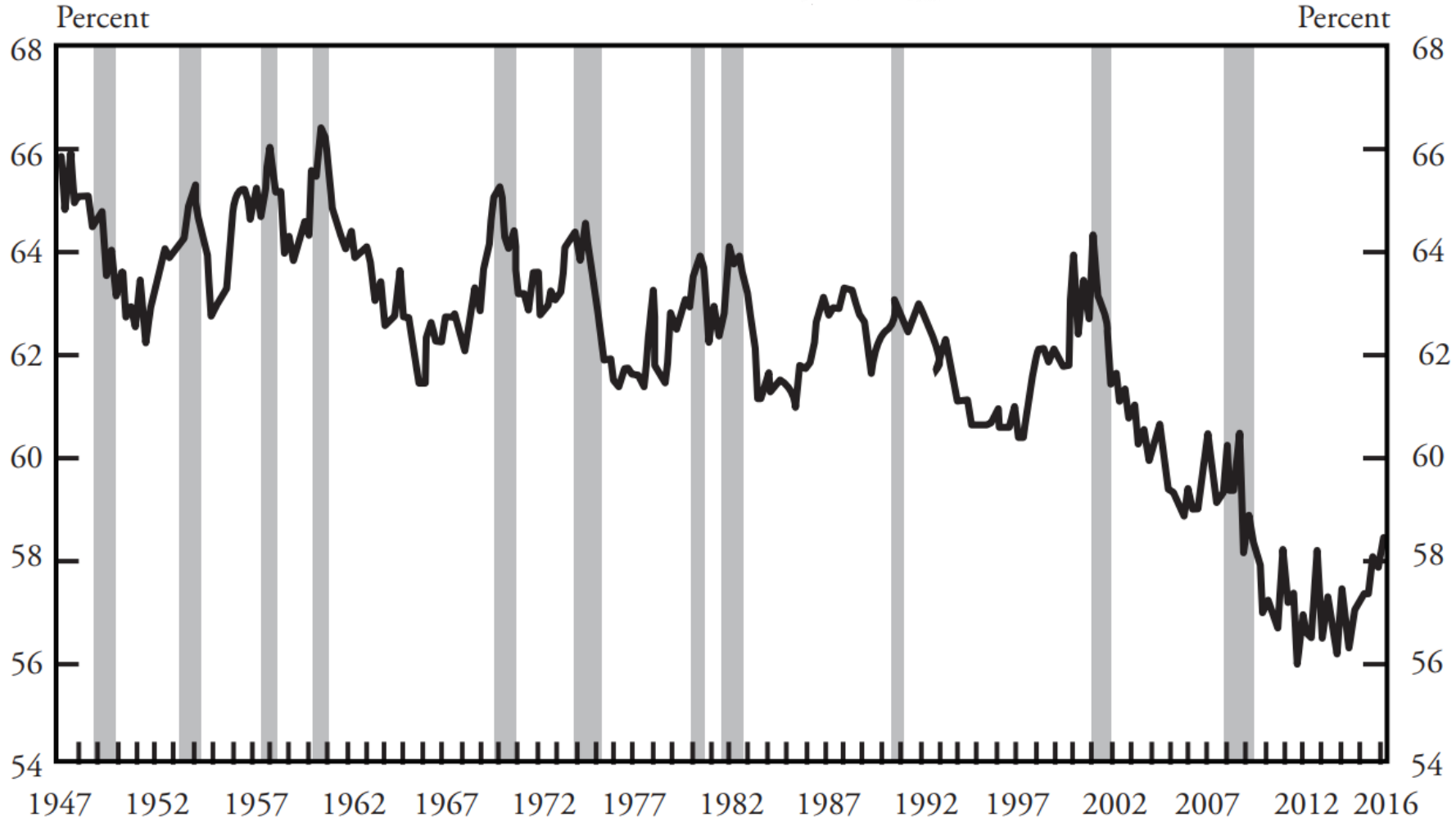
- Using Figure 8 we see the labor share fell from about 64 percent in 1982 to 58 percent in 2016. If $\alpha^L = 2/3$, for example, this implies that the markup rose from 4 percent in 1982 to 15 percent by 2016 (1.04 to 1.15).

- An alternative to relying on equation (2) is to take a more direct approach of measuring capital.

$$\left(\frac{\Pi}{PY}\right)_t = 1 - \left(\frac{w^L L}{PY}\right)_t - \left(\frac{rK}{PY}\right)_t \qquad (3)$$

- Using Chart 8 we see the labor share fell from about 64 percent in 1982 to 58 percent in 2016.

Figure 8: U.S. Labor Share, 1947-2016



Notes: Labor's share of output in the nonfarm business sector, first quarter 1947 through third quarter 2016. Shaded areas indicate recessions, as determined by the National Bureau of Economic Research.
Source: BLS *https://www.bls.gov/opub/mlr/2017/article/estimating-the-us-labor-share.htm.*

IV.2. Implications of Weakening Competition

IV.3. Possible Causes of Rising Market Power

IV.4. An Alternative Perspective on Market Power: Superstar Firms

IV.5. The Role of Information and Communications Technology (ICT)

IV.6. Distinguishing Between Declining Competition vs. Superstar Firms Explanations

IV.7. Other Explanations

V. Some Policy Implications

V.1. Antitrust Policy

V.2. Monetary Policy in the Long Run and the Short Run

V.3. Monetary Policy Effectiveness

VI. Conclusion