Stable profit rates in a time of rising market power: The role of financial and intangible assets in the U.S. corporate sector

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Abstract

In this paper, we analyze the intersection between profit margins, profit rates, and the asset composition of U.S. nonfinancial corporations after 1980. First, we document trends in the profit margin and profit rates. In line with the literature on market power, we show an almost 50% rise in the aggregate profit margin, defined by profits relative to sales, in the U.S. nonfinancial corporate sector after 1980. At the same time, however, the aggregate profit *rate*, defined by profits relative to total assets, is steady. To reconcile these two patterns, we show that the sales-to-asset ratio (or firms' 'asset utilization') falls after 1980, putting downward pressure on the profit rate that offsets rising margins. We also unpack two aspects of this decline. First, we show that the decline in the sales-to-asset ratio reflects a growing share of financial and intangible assets in total assets. In fact, the sales-to-(fixed) capital ratio is largely steady over time. Second, we show that the year-to-year decline in the sales-to-asset ratio reflects decline within continuing firms. These patterns link profitability dynamics to the widespread increase in financial and intangible assets and help clarify a picture of rising profit margins together with stagnant investment.

JEL Codes: B5, L1
Keywords: Profit rates, market power, financial and intangible assets.

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1 Introduction

In this paper, we analyze the intersection between profit margins, profit rates, and the asset composition of U.S. nonfinancial corporations after 1980. Recent years have seen growing attention in both the popular press and academic research to rising market power in the U.S. nonfinancial corporate sector, evidenced both by rising firm markups (Hall, 2018; De Loecker, Eeckhout & Unger, 2020) and increasing industrial concentration (Grullon, Larkin & Michaely, 2019; Davis & Orhangazi, 2021). Not only do rising markups imply a worsening distribution of income between capital and labor, but rising market power has also been linked to slowing investment (Gutiérrez & Philippon, 2017) as well a decline in low-skilled wages and falling labor market participation (De Loecker et al., 2020).

While this rise in profit margins is often heralded as capturing an overall rise in profitability (see, for example De Loecker et al., 2020), we show that the aggregate profit *rate* in the U.S. nonfinancial corporate sector is in fact remarkably stable over the same post-1980 years. In this paper, we focus on the intersection between these two trends: We highlight the importance of falling asset utilization for the widening divergence between the aggregate profit *margin* and the aggregate profit *rate* in the post-1980 U.S. nonfinancial corporate sector. In particular, we show that the divergence between the profit margin and the profit rate is reconciled by a secular decline in the sales-to-asset ratio that reflects rising portfolio shares of financial and intangible assets. These results direct attention to the intersection between profitability, market power, and the post-1980 shift in asset composition away from fixed capital and towards financial and intangible assets.

In (this draft of) this paper, we do two things. First, we document trends in profit margins and profit rates. In line with the literature on market power, we show that the aggregate (weighted-average) profit margin in the U.S. nonfinancial corporate sector has risen almost 50% over the post-1980 period, from an average of 9.6% in the 1970s to 13.3% after 2010. Consistent with the previous literature, we also show that top firms make an outsize contribution to this rise: Not only do the profit margins of top firms tend to rise more quickly than profit margins overall, but there has also been a reallocation of market share (i.e. sales) towards these same firms (see also De Loecker et al., 2020). This trend in the profit margin is consistent with previous evidence of

rising market power and market concentration in the U.S. nonfinancial corporate sector, and a shift in the distribution of income towards capital and away from labor that is driven, most notably, by top firms. We also show, however, that this rise in profit margins has occurred despite stagnant profitability. In particular, the aggregate profit *rate*, defined as the weighted average of firms' total profits relative to their total assets, is steady. The intersection of these two trends is important: on their own, rising profit margins have important distributional implications, but the picture that they paint of rising profits is difficult to reconcile with other important macroeconomic trends, including slow investment.

To reconcile these two patterns, we turn, second, to the sales-to-asset ratio, or firms' 'asset utilization'. We show that firms have, on average, come to derive lower sales from each unit of assets after 1980 or, put differently, that asset growth has outstripped sales growth. This decline puts downward pressure on the profit *rate* that has offset rising profit margins. We, furthermore, show that this decline in the sales-to-asset ratio reflects a growing share of financial and intangible assets in total assets. In contrast, the sales-to-capital ratio (i.e. a traditional measure of fixed capital capacity utilization) is largely stable over time. These patterns link profitability dynamics to a well-documented increase in financial and intangible assets (Davis, 2016; Crouzet & Eberly, 2018; Orhangazi, 2019), and show that firms systematically accrue lower sales off their these non-fixed capital asset stocks (relative to off their stocks of fixed capital), putting downward pressure on profit rates over time.

We also consider whether the decline in the sales-to-asset ratio reflects changes in average firm characteristics induced by entry and exit. For example, a falling aggregate sales-to-asset ratio – particularly insofar as it is driven by financial and intangible assets – could reflect entry by so-called 'new economy' and high-tech firms (Lazonick, 2005). Insofar as 'new economy' firms have above-average portfolio shares of financial and intangible assets (reflecting, for example, capitalized R&D incurred before going public), but do not make substantive sales upon entry, then these patterns could reflect structural change. This process could be reinforced by exit if 'old economy' firms have small stocks of financial and intangible assets, and are outcompeted by new entrants and leave the sector. We show, however that the year-to-year decline in the aggregate sales-to-asset ratio

reflects declines within continuing firms. Thus, while entry and exit are important for disrupting the distribution of financial asset holdings and profitability (Davis, de Souza & Hernandez, 2021; Davis & de Souza, 2022b), they do not change asset composition enough on a year-to-year basis to drive *average* changes in the profit rate. The central role of continuing firms in driving the falling sales-to-asset ratio, in turn, suggests that the declining sales-to-asset ratio (and, in turn, the growth reliance on financial and intangible assets) reflects an increasingly central part of firms' growth strategy.

Our findings are relevant for a number of strands of the existing literature. First, they speak to the widening literature on market power and markups, which has documented rising markups in the U.S. economy and linked these markups to a wide set of concurrent macroeconomic trends, including a decline in the labor share, falling low-skilled wages, and falling labor market participation (e.g. De Loecker et al., 2020; Gutiérrez & Philippon, 2017). In this paper, we reiterate this trend and highlight that it takes place on top of rising overhead costs (Traina, 2018). We also show that it has occurred despite stagnant profitability. As noted above, the intersection of these two trends, and this picture of rising 'rents' together with stagnant profitability, provides important insight into trends such as slow investment in a time of rising profits (i.e. profit margins).

Second, our focus on intangible and financial assets provides new insight into the dynamics and determinants of market power. For example, Kalecki (1943) argues that a main determinant of changes in the markup is the spread of sales promotion activities (e.g. advertising) that increase the markup by reducing price competition. These advertising activities create intangibles that play an important role in understanding the evolution of profitability. Rising overhead costs also lead firms to create agreements with other firms to raise markups and preserve profits. The role of changes in firm asset composition, furthermore, speak to the literature emphasizing large-scale portfolio shifts towards financial assets (Orhangazi, 2008; Davis, 2016) and intangible assets (Crouzet & Eberly, 2018; Orhangazi, 2019). Within this literature on financialization, our results speak to an emerging debate over whether the financialization of nonfinancial firms reflects opportunity (i.e. firms move into financial assets because of new opportunities that rise, thereby crowding out investment) or reflects constraints (i.e. firms acquire financial assets because there are insufficient opportunities for

capital investment). Third, our results speak to the literature on firm growth and declining business dynamism (Decker, Haltiwanger, Jarmin & Miranda, 2016; Akcigit & Ates, 2019), by suggesting an intersection between slow-(sales)-growth firms and changes in market power.

This paper is organized as follows: In Section 2 we introduce our data and describe the profit margin and the profit rate after 1980. We also show how changes in profit margins differ across its distribution, with top firms making an outsize contribution to its aggregate rise. In Section 3, we turn to the sales-to-asset ratio and, in turn, the shift in asset composition towards financial and intangible assets, and the roles of entry and exit. Section 4 (will) conclude.

2 Stable profit rates and rising profit margins

2.1 Data and variable definitions

We begin by documenting post-1970 trends in profit margins and profitability across U.S. nonfinancial corporations using income and balance sheet data from the CRSP-Compustat Merged (CCM) database. First, we measure the profit margin as firms' total profits relative to sales. We define profits as the sum of operating income before depreciation and non-operating income after taxes and net of interest expense (*oibdp + nopi - xint -txt*). This measure captures firms' total sources of income, whether from traditional operations and fixed capital or non-operating (e.g. financial) sources, net of costs. These costs include both the variable cost of goods sold (e.g. materials and labor) and the indirect overhead costs (e.g. advertising and marketing expense, and directors fees) that account for a rising share of firm costs after 1980 (Traina, 2018).

The main component of these profit flows is operating income (*oibdp*), which equals total sales net of both the cost of goods sold and general and administrative expense. In turn, non-operating income (*nopi*) includes all other income flows including, for example, (gross) interest and dividend income. We deduct interest expense (*xint*) from total profits (such that nonoperating profits includes net interest income). We also deduct income taxes (*txt*) from total profits. This choice is important for gleaning distributional implications from the profit margin: Average nonfinancial corporate income taxes relative to sales fall after 1970 and, in particular, in the 2000s. This decline

implies that average firm retains a relatively larger pool of after-tax income and thereby raises effective profit margins. Finally, we normalize by sales (*sale*). A rise in this profit margin implies that firms command higher prices relative to costs for each unit of sales.

Second, we define the profit rate as the ratio of total profits (defined above) to the book value of total assets (*at*). Thus, following Davis & de Souza (2022a,b), we define profitability as a return on assets, where we measure profits accruing to the firm for each unit of assets advanced in its business activities, independently of how that capital is financed. We also consider the composition of total assets, which consist (exhaustively) of tangible, intangible, and financial assets. Tangible assets include property, plant, and equipment, and inventories, *ppent* and *invt*). Financial assets include cash and short-term investments, investments and advances, receivables, and other miscellaneous assets (*che, ivaeq, ivao, aco, ao*) (Davis, 2016). Finally, intangibles (*intan*) fall into two categories: identifiable intangibles (e.g. brandnames, trademarks, patents, copyrights, and operating rights) and goodwill (which arises from mergers and acquisitions) (Crouzet & Eberly, 2019). Compustat measures of intangibles tend to be created through merger and acquisition (M&A) activity, rather than internal accumulation: while intangibles created by M&A transactions are priced by the M&A market and reported as assets, R&D is recorded on the income statement as an expense (see, for example, Hulten & Hao, 2008; Rizova & Saito, 2020).[1]

Our final sample includes all nonfinancial firms incorporated in the U.S. with non-missing profits and non-negative sales or total assets. We use SIC codes 6000-6799 to exclude financial firms, including those that switch into or out of finance, and use *fic* to identify country of incorporation.[2] We also use CCM to identify cases of firm entry, and merge CCM with delisting codes from the Center for Research in Security Prices (CRSP) database on fiscal year and firm (*permco*) to identify cases of exit.[3] Firms enter in the fiscal year they join the CCM database, and exit in the fiscal year they report a delisting code for their final security to delist, conditional on also reporting profits in these years. Following Davis & de Souza (2022a), we also classify firms as entering if their

[1] Compustat reports independent data on goodwill since 1988. An average of 64.% of intangibles in our CCM sample are goodwill between 1988 and 2020.

[2] We also limit the sample to primary issues (*linkprim* of P or C). Primary issues describe over 99% of CCM observations.

[3] Firms can delist for cause (*dlstcd* greater than 400, excluding 570 and 573; because they are acquired in a merger (*dlstcd* between 200 and 399); or voluntarily (*dlstcd* 500 or 573) (Fama & French, 2004).

profitability reporting lags entry by one year and as exiting if their last year of reporting leads their exit by one year. In doing so, we avoid dropping firms that – for example – delist too early in their fiscal year to report income and balance sheet information for their final year of operations.[4]

Finally, we trim both the profit margin and the profit rate to account for outliers that reflect small denominators. To do so, we follow Davis & de Souza (2022a) and identify the top and bottom one percent of the profit margin and the profit rate across all years, and trim observations that are also in the bottom 10% of that year's distribution of total sales (for the profit margin) or total assets (for the profit rate). In doing so, we trim extreme values that are driven by small denominators (e.g. exclude noise from very small asset bases), while retaining observations with legitimate information (e.g. very high profits among so-called 'superstar' firms (Autor, Dorn, Katz, Patterson & Van Reenen, 2020)).

2.2 Post-1980 trends in profit margins and profit rates

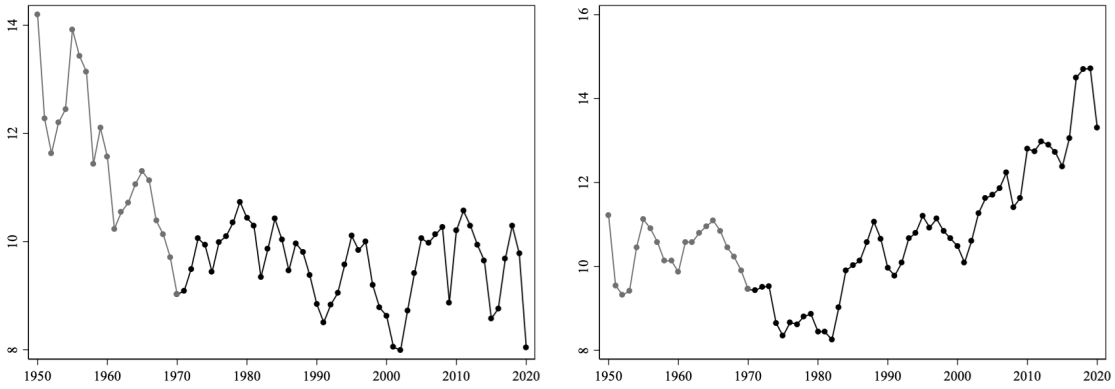
We show weighted-averages of the profit rate and profit margins between 1950 and 2019 in Figure 1. Figure 1a, which begins with the profit rate, shows that – despite cyclical fluctuations – average profitability is remarkably stable since 1970, with a post-1970 average of 9.6%. While small sample size prevents us from making strong claims about the pre-1970 years, Figure 1a also shows that this post-1970 stability follows a sharp decline in the profit rate during the 1950s and 1960s, suggesting a marked break between the pre- and post-1970 behavior of average profitability.[5] In contrast, average profit *margins* rise sharply, indicating that firms today derive higher prices relative to costs for their average unit of sales as compared to in the 1970s. We plot the sales-weighted average profit margin across U.S. nonfinancial corporations from 1950 through 2019 in Figure 1b. This figure shows that the average profit margin rises almost 50% after the mid-1970s, from an average of 9.0% during the 1970s to an average of 13.3% since 2010. The pre-1970 data, furthermore,

[4]We drop observations for which the length of this lag or lead exceeds one year, and firms with gaps in profitability. We also drop the 39 firms with multiple securities that delist in the same month and year but for different reasons, as we cannot identify these firms' reason for delisting.

[5]This trend closely tracks that in Grullon et al. (2019, p.709), which shows that operating income after depreciation and relative to sales is reasonably stable after 1970. In contrast, De Loecker et al. (2020) show a sharp post-1980 increase in profits on assets that closely tracks their profit-to-sales ratio (also from 1% in 1980 to approximately 8% in 2016). The difference between the patterns in De Loecker et al. (2020) and those in Figure 1b again reflects the definition of profits and, in particular, De Loecker et al. (2020)'s measure of expenditure on capital.

suggests that profit margins in recent decades – and, in particular, after 2000 – are high relative to their pre-1970 average of 10.4%.

Figure 1: The evolution of profit margins and profit rates (1950-2017)



(a) The average profit rate (b) The average profit margin

Notes: This figure shows the weighted average profit margin and profit rate between 1950 and 2019. Each variable is weighted by its denominator, and expressed as a percentage. The profit rate is profits relative to assets. The profit margin is profits (the sum of operating income before depreciation and nonoperating income less income taxes and interest payments) relative to sales. We trim separately for 1950-1969 and 1970-2019. For details describing the data, sample, and trimming method, see Section 2.1.

This rise in profit margins is in line with the previous literature on market power and industrial concentration. Gutiérrez & Philippon (2017), for example, document a rise in a narrower measure of operating profit margins (which exclude nonoperating income), defined as operating income after depreciation and relative to sales (see also Grullon et al., 2019). This operating margin rises from an average of 9.7% in the 1980s to 11.5% since 2010 and, like in Figure 1a, rises particularly rapidly during the 2000s.[6] De Loecker et al. (2020) also document a rise in profits relative to sales, from approximately 1% in the early 1980s to 8% since the mid-2000s.[7] The different order of magnitude of growth in this profit margin (which rises eight times, while the profit margin in Figure 1a rises approximately 50%) reflects the definition of profits: De Loecker et al. (2020) measure profits as

[6]There are three differences between the operating margin in Gutiérrez & Philippon (2017) and profit margin we show in Figure 1a: (1) Gutiérrez & Philippon (2017) deduct depreciation; (2) we include net nonoperating income; and (3) we emphasize after-tax profits. Put differently, Gutiérrez & Philippon (2017) consider an operating profit margin, whereas Figure 1 shows a total after-tax profit margin. Because operating income is the driving component of profits in both cases, the trends in these two measures are similar. However, the total after-tax profit margin that we show in Figure 1a rises more rapidly from the mid-2000s due primarily to income taxes, which fall from 4.2% of sales in the 1970s to 2.4% of sales since 2010.

[7]De Loecker et al. (2020) refer to this ratio as the profit 'rate', but – as it is normalized by sales – it is homologous to a profit margin earned above sales.

operating income before depreciation and after expenditure on capital, which is defined as the sum of the real federal funds rate and an exogenous risk premium multiplied by the gross capital stock. This definition implies that swings in the federal funds rate can generate sharp changes in the profit margin (and, for example, this measure of the profit margin declines sharply in 1979-1980). Despite these differences, the broad patterns are similar and point to a substantive rise in profit margins across the U.S. nonfinancial corporate sector.

2.3 Profit margins and rising market power

Top firms have made an outsized contribution to this rise in profit margins, both because these top firms' margins have risen *and* because there has been a reallocation of sales towards these same firms that has allowed them to drive up the (weighted) average profit margin as they pull away from the rest of the sector.

To see this pattern, consider a shift-share analysis that distinguishes the role of 'top' firms (defined by the top 80%, 10%, 5% or 1% of the profit margin distribution in each year) from firms in the 'rest' of the sector in driving the weighted-average profit margin ($\frac{p}{s}$) between t and $t-k$:

$$\left(\frac{p}{s}\right)_t - \left(\frac{p}{s}\right)_{t-k} = \underbrace{\overline{\Theta}^{\text{Rest}}\left[\left(\frac{p}{s}\right)_t^{\text{Rest}} - \left(\frac{p}{s}\right)_{t-k}^{\text{Rest}}\right] + \overline{\Theta}^{\text{Top}}\left[\left(\frac{p}{s}\right)_t^{\text{Top}} - \left(\frac{p}{s}\right)_{t-k}^{\text{Top}}\right]}_{\text{Within-group component}} + \tag{1}$$

$$+ \underbrace{\left(\Theta_t^{\text{Top}} - \Theta_{t-k}^{\text{Top}}\right)\left[\overline{\left(\frac{p}{s}\right)}^{\text{Top}} - \overline{\left(\frac{p}{s}\right)}^{\text{Rest}}\right]}_{\text{Reallocation component}}$$

where Θ_t^{Top} and Θ_t^{Rest} denote the shares of the top firms and remaining firms; p_t and s_t are the sum of profits and sales across all firms in year t (such that $\frac{p}{s}$ is the sales-weighted average profit margin); and a bar denotes a simple arithmetic average in years $t-k$ and t.

In the shift share equation, the first term measures the contribution of changes in the average profit margin among top firms and non-top firms. The second term is a reallocation component that captures changes in the sales share of top firms, weighted by the difference between their

average profit margin and that of the remaining firms. Because top firms are distinguished by their relatively high profit margins, this weight is always positive. Thus, the reallocation component is positive when the share of top firms in total sales increases between $t-k$ and t, and negative if it declines. In turn, the total contribution of top firms to the aggregate profit margin is the sum of the second and third terms in Equation 1 (i.e. the joint contribution of their within-group changes and the reallocation term).

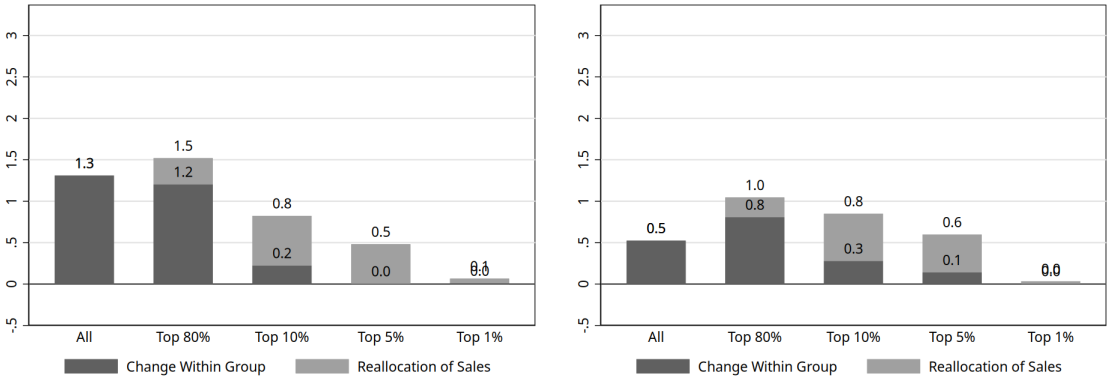
Figure 2 shows these decompositions for four post-1980 peak-to-peak periods: 1981-1990, 1990-2000, 2000-2007, and 2007-2019.[8] The first bar in each panel reiterates the pattern in Figure 1, showing the aggregate profit margin rises in each post-1980 business cycle. The remaining bars show the contributions of the top 10%, 5%, and 1% of firms to this overall change, and also splits these contributions between within-group changes and reallocation terms. These decompositions highlight that the top 10% and 5% of firms play outsize roles in the aggregate rise in profit margins, due both to both rising profit margins within these groups of top firms and a rise in their shares of total sales. More specifically, Figure 2 first shows that shows that both groups make total contributions to rising profit margins that far exceed their shares in the total number of firms. In 2007-2019, for example, the top 5% and 10% of firms account for 30% and 46% of the rise in the aggregate profit margin, respectively.

Second, these large rises reflect both within-group growth in the profit margin and a growing weight in the sample (with the exception of 2000-2007, when the reallocation effects are negligible). Not only is the average profit margin across the top 10% of firms more than three times larger than that of the rest of firms over the full post-1980 period, but this margin also rises within each period (for example, from 24.7% to 34.7% between 2007 and 2019).[9] The top 10% of firms' weight in total sales also rises: For example, this group of firms accounts for 7.3% of total sales and 12.5% of sales between 2007 and 2019. This relative growth in sales typically accounts for the majority of these firms' contribution to aggregate trends. In 1981-1990, for example, the reallocation component

[8] By using peak-to-peak periods, we avoid using periods (e.g. decades) that are not comparable in terms of when they start and end relative to business cycle peaks. This choice is important in light of the strongly cyclical behavior of profits. We select the year-end closest to the quarter of each cyclical peak in GDP based on NBER classifications.

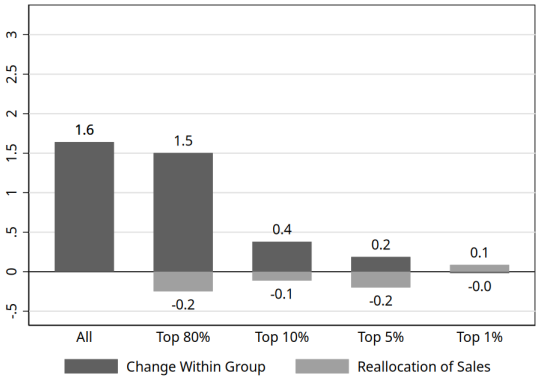
[9] For consistency with Equations 1, we report average sale shares and profit margins as arithmetic averages of their values in the initial and final year of each period.

Figure 2: Contributions of top-ranked firms to changes in the aggregate profit margin

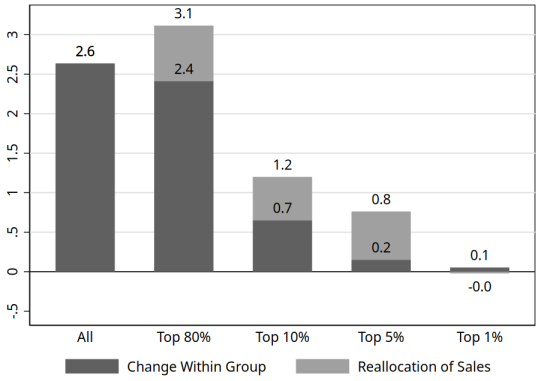


(a) 1981-1990

(b) 1990-2000



(c) 2000-2007



(d) 2007-2019

Notes: This figure decomposes the change in aggregate profit margin between the initial and the final year of each period into the within-group changes and the reallocation of sales to firms in the top 80%, 10%, 5%, and 1% of firms. The profit margin is profits (the sum of operating income before depreciation and nonoperating income less income taxes and interest payments) relative to sales. The labels show the cumulative percentage point total of these contributions. For details describing the data and sample, see Section 2.1.

accounts for 75% of the total contribution made by the top 10% of firms to the aggregate profit margin. When narrowing to the top 5% of firms, the reallocation component accounts for *all* of these firms' contribution to the aggregate profit-to-sales ratio between 1981 and 1990. As discussed above, this role of sales concentration towards high-margin firms is consistent with the previous literature on markups (De Loecker et al., 2020) and on concentration (Grullon et al., 2019; Davis & Orhangazi, 2021). While these trends do not hold for the top 1% of firms, it is important to recognize that – in contrast with the top 10% or top 5% of firms – the firms sitting at the very top percentile are, on average, too small to influence aggregate trends in profit margins.[10]

Finally, in contrast to firms at the top, low-margin firms have contributed negatively to the aggregate trend. If we instead consider the top 80% of firms (such that the 'rest' of firms are the bottom 20%), we see that these firms contribute negatively to the aggregate trend. This pattern is most significant in the 1990-2000 period, which spans the dotcom bubble and is characterized by rapid entry of firms with negative profits (Fama & French, 2004; Davis & de Souza, 2022a,b). While the average profit margin among the bottom 20% of firms was -1.5% during 1981-1990, it falls to -10.39% in 1990-2000 and reaches -15% in 2007-2019.

In sum, the overall rise in the sales-weighted profit margin reflects a concentration of sales in high-margin firms. These patterns are consistent both with rising market power and also with rising industrial concentration. Nonetheless, profit rates over the same period are steady.

3 Reconciling profit rates and margins: The sales-to-asset ratio

Long-term stability in the average profit rate after 1980 despite rising market power and rising profit margins reflects falling 'asset utilization', or a decline in the extent to which the average unit of assets generates sales. Put differently, asset growth has outpaced sales growth on average in the U.S. nonfinancial corporate sector. In this section, we document the implication of falling asset utilization for profit rates, thereby reconciling the rise in profits captured by the profit margin with the constant profit rate.

[10]For example, these firms' share in total assets averages 0.1% in 1981-1990 – an order of magnitude below their share in the total number of firms. While this share more than triples by 2007-2019, it is still low (0.38%).

We then unpack two aspects of this decline: We show, first, that the decline in the sales-to-asset ratio reflects a growing share of financial and intangible assets in total assets, rather than falling fixed capital capacity utilization. Second, we show that these changes in the sales-to-asset ratio have taken place within continuing firms and, as such, do not reflect changes in average sector characteristics due to entry, exit and structural change after 1980.

3.1 Falling asset utilization

To highlight the role of asset utilization, we begin with the identity showing that the profit rate is the product of the profit-to-sales ratio (the profit margin) and the sales-to-asset ratio (asset utilization):

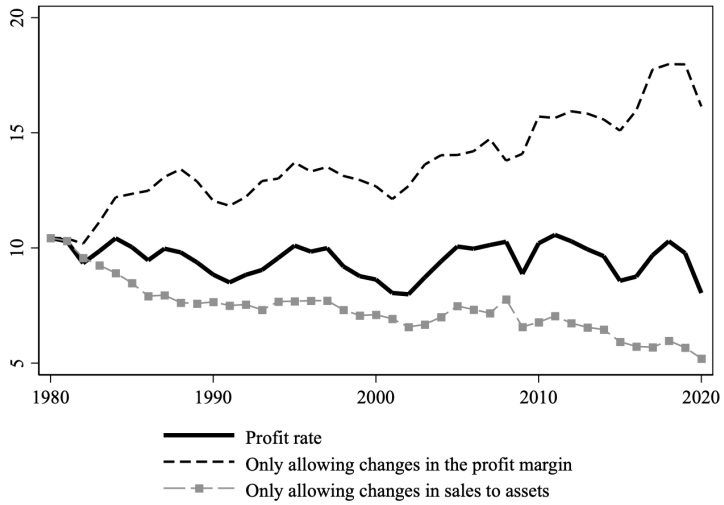
$$\left(\frac{\text{profits}}{\text{assets}}\right)_t = \left(\frac{\text{profits}}{\text{sales}}\right)_t \left(\frac{\text{sales}}{\text{assets}}\right)_t \tag{2}$$

Based on this identity, we decompose the growth rate of the weighted-average profit rate between two years into the sum of three terms: the growth rate of the profit margin, the growth rate of the sales-to-asset ratio, and an interaction term given by the product of these two rates. We, first, aggregate profits, assets, and sales across all firms and then take the ratios (such that each term is an average weighted by its denominator).[11] We then use these growth rates to construct counterfactual trends describing how the profit rate *would have* evolved if only the sales-to-asset ratio or profit margin had exerted pressure on profitability after 1980.

We show the results in Figure 3, focusing on the post-1980 period during which the profit margin rises. The solid black line reproduces the (asset-weighted) profit rate in Figure 1. The dashed line shows the counterfactual trend describing how the average profit rate would have evolved if only the profit margin drives subsequent changes in the profit rate and the sales-to-asset ratio were held constant at its 1980 level. Conversely, the grey line with square markers describes how the average profit rate would have evolved from this 1980 level if the sales-to-asset ratio drove all movements in profitability and the profit margin were held constant. We omit the interaction term, which is negligible in all years, from Figure 3.

[11] Specifically: let $\widehat{p_t/a_t} = \widehat{p_t/s_t} + \widehat{s_t/a_t} + \widehat{p_t/s_t} \times \widehat{s_t/a_t}$, where p_t/a_t denotes the profit rate; p_t/s_t denotes the profit margin; s_t/a_t denotes the sales-to-assets ratio; p_t, s_t, and a_t are the sum across all firms of profits, sales, and assets in year t; and carets denote rates of change between $t-1$ and t.

Figure 3: Decomposing the asset-weighted profit rate



Notes: This figure shows a decomposition of the profit rate into the product of the profit-to-sales ratio (the profit margin) and the sales-to-asset ratio. The profit rate is profits (the sum of operating income before depreciation and nonoperating income less income taxes and interest payments) relative to assets. The profit margin is profits relative to sales. For details describing the data and sample, see Section 2.1.

Figure 3 shows that, as expected, rising profit margins exert upward pressure on the profit rate after 1980. If the sales-to-asset ratio were to have stayed constant after 1980, then rising profit margins would have pushed the average profit rate to a post-2010 average of 16.3%, versus its actual level of 9.6%. The sales-to-asset ratio offsets these rising profit margins. The grey line with square markers shows that, if the average profit rate followed growth in the sales-to-asset ratio, the profit rate would have fallen to a post-2010 average of only 6.2%. In other words, the post-1980 decline in asset utilization was sufficiently large to counteract the rise in profit margins in Figure 3 and yield stable average profit rates. As a result, rising profit margins have resulted in a net acquisition of assets, with asset growth outpacing sales growth. In turn, firms make lower sales per unit of their asset base, but derive a higher margin from each unit.

3.2 The rise of financial and intangible assets

The implications of this decline in the sales-to-asset ratio differ depending on whether it is also indicative of a decline in capacity utilization versus if it is indicative of a shift in portfolio composition away from fixed capital. Doing so allows us to disambiguate two interpretations. On the one

hand, if the decline in the sales-to-asset ratio takes place on all types of assets, then it also indicates a sustained decline in capacity utilization. This type of sustained trend would be important in the context of post Keynesian growth models. On the other hand, if the decline in asset utilization occurs despite relatively stable rate of utilization of fixed capital, then it would indicate that a shift in asset composition towards financial and/or intangible assets has offset rising profit margins to yield stable average profitability. This second possibility is important to explore given evidence of a widespread shift in portfolio composition after 1980 towards financial and intangible assets. It would suggest that firms do not generate sales from their financial and intangible assets commensurate to those generated from fixed capital, and that – instead – these assets reflect a wider shift in firm strategy either towards financial assets (and financial profits), competitive strategies that rely on intangibles, or the use of mergers and acquisitions to expand.

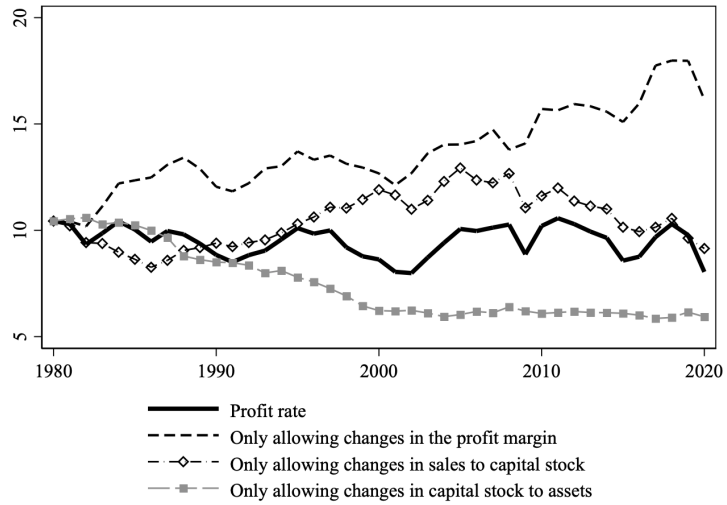
To distinguish these possibilities, we extend the decomposition in Equation 2 to disaggregate the sales-to-asset ratio into the ratio of sales to fixed capital (a traditional measure of capacity utilization) and the ratio of fixed capital to total assets:

$$\left(\frac{\text{profits}}{\text{assets}}\right)_t = \left(\frac{\text{profits}}{\text{sales}}\right)_t \left(\frac{\text{sales}}{\text{fixed capital}}\right)_t \left(\frac{\text{fixed capital}}{\text{assets}}\right)_t \tag{3}$$

Using the identity in Equation 3, we decompose growth in the weighted-average profit rate between two years into the sum of the growth rates of the weighted average profits-to-sales ratio, sales-to-capital ratio, and capital stock-to-assets ratio, and two interaction terms.[12] As in Section 3.1, we then use these growth rates to construct counterfactual series describing how the profit rate would have evolved if only the profit margin, fixed capital utilization, or the fixed capital share of total assets were allowed to grow. Note that, because total assets are the sum of fixed, financial, and intangible assets, a decline in the capital-to-asset ratio is equivalent to a rise in the share of financial and intangible assets in total assets. This decomposition, therefore, distinguishes whether the downward pressure exerted by the sales-to-asset ratio on the profit rate reflects trends in capacity utilization or a shift in asset composition towards financial and intangible assets.

[12] In particular, $\widehat{p_t/a_t} = \widehat{p_t/s_t} + \widehat{s_t/k_t} + \widehat{k_t/a_t} + \widehat{p_t/s_t} \times \widehat{s_t/k_t} + \widehat{s_t/k_t} \times \widehat{k_t/a_t} + \widehat{p_t/s_t} \times \widehat{s_t/k_t} \times \widehat{k_t/a_t}$, where k_t is the capital stock summed across all firms in year t and the remaining terms are defined as in Section 3.1.

Figure 4: Decomposing the asset-weighted profit rate: the role of asset composition



Notes: This figure shows a decomposition of the profit rate into the product of the profit-to-sales ratio (the profit margin), the sales-to-fixed capital ratio, and the fixed capital-to-asset ratio. The profit rate is profits (the sum of operating income before depreciation and nonoperating income less income taxes and interest payments) relative to assets. The profit margin is profits relative to sales. Fixed capital is the sum of property, plant, and equipment, and inventories. For details describing the data and sample see Section 2.1.

We show the results in Figure 4. As in Figure 3, the solid black line shows the asset-weighted profit rate between 1980 and 2019, and the dashed line shows the counterfactual trend describing how average profitability would have evolved if driven only by changes in the profit margin after 1980. The remaining two lines show counterfactual trends in the profit rate when the sales-to-capital ratio or the capital-to-assets ratio were allowed to change, while leaving the other two terms in Equation 4 constant.

Consider, first, the counterfactual evolution of the profit rate when only allowing the sales-to-capital ratio to change (shown by the line with white diamonds). Figure 4 shows that, unlike the sales-to-asset ratio, this line is reasonably steady over time. When the profit rate follows growth in this sales-to-capital ratio, profitability rises moderately in the 1990s and 2000s, before returning to its 1980 levels during the 2010s. However, these changes are modest and, if the sales-to-capital ratio were its only driver, the average profit rate would have averaged 10.6% after 2010 (one percentage point above its actual post-2010 average of 9.6%).

Downward pressure on the profit rate from the sales-to-asset ratio, therefore, lies in the falling

share of fixed capital in total assets (shown by the grey line with square markers in Figure 4). In fact, if only the capital-to-asset ratio were allowed to vary, the profit rate would have fallen to a post-2010 average of 6.1%. The flip side of a decline in the share of fixed capital in total assets is a rise in financial and intangible assets.[13] Put differently, rising profit margins are offset by lower sales relative to firms' asset bases and, in particular, relative to firms' financial and intangible asset holdings. This pattern draws attention to the importance of changing asset composition in stabilizing profit rates despite rising margins. Put differently, firms are able to reap high margins despite earning low sales on their stocks of tangible and financial assets.

3.3 Compositional changes and the sales-to-asset ratio

We also show that the decline in average asset utilization takes place within continuing firms, rather than reflecting changes in average firm characteristics due to entry by firms with low sales-to-asset ratios and exit by firms with high sales-to-asset ratios. This distinction is important given the role of financial and intangible assets in this ratio's decline, and the fact that one may expect new firms entering the nonfinancial corporate sector after 1980 to be increasingly intangible intensive. For example, if high-tech or knowledge-intensive firms go public with relatively large shares of intangibles in total assets, but (at least initially) generate relatively little in sales, then entry may push down the sales-to-asset ratio. The period of rapid entry through the mid-1990s may, furthermore, have quickly disseminated these shifts. Similarly, if exiting firms have above-average sales-to-asset ratios, exit would also reinforce this decline. We show, however, that compositional effects due to entry and exit do not explain the falling sales-to-asset ratio and, instead, this decline is driven by continuing firms.

To show the predominance of within-firm changes in the declining sales-to-asset ratio, we use a shift-share decomposition to distinguish four components of the change in the weighted average sales-to-asset ratio between two years. First, the average sales-to-asset ratio may decline among firms that continue in the sample for both years (a *within-firm* component). Second, this ratio may change due to a reallocation of total assets among continuing firms towards those with lower sales-

[13] One can equivalently consider the alternative decomposition in which...

to-asset ratios (a *reallocation* component). When this reallocation component is negative, then expanding firms have lower average asset utilization than continuing firms overall, such that – as expanding firms' weight in the sample grows – the weighted average of the sales-to-asset ratio falls. Third, *entering* firms may have average sales-to-asset ratios lower than continuing firms. Fourth, *exiting* firms may have higher average sales-to-asset ratios than continuing firms.[14]

We show the decomposition of annual changes in the sales-to-asset ratio into these four components in Equation 4:

$$\left(\frac{s}{a}\right)_t - \left(\frac{s}{a}\right)_{t-1} = \underbrace{\overline{\Theta}^{\text{Cont}}\left\{\overline{\Theta}^{\text{Exp}}\left[\left(\frac{s}{a}\right)_t^{\text{Exp}} - \left(\frac{s}{a}\right)_{t-1}^{\text{Exp}}\right] + \overline{\Theta}^{\text{Shr}}\left[\left(\frac{s}{a}\right)_t^{\text{Shr}} - \left(\frac{s}{a}\right)_{t-1}^{\text{Shr}}\right]\right\}}_{\text{Within-firm component}} +$$

$$\underbrace{\overline{\Theta}^{\text{Cont}}\left(\Theta_t^{\text{Exp}} - \Theta_{t-1}^{\text{Exp}}\right)\left[\overline{\left(\frac{s}{a}\right)}^{\text{Exp}} - \overline{\left(\frac{s}{a}\right)}^{\text{Shr}}\right]}_{\text{Reallocation component}} + \tag{4}$$

$$+ \underbrace{\Theta_t^{\text{Ent}}\left[\left(\frac{s}{a}\right)_t^{\text{Ent}} - \overline{\left(\frac{s}{a}\right)}^{\text{Cont}}\right]}_{\text{Entry component}} - \underbrace{\Theta_{t-1}^{\text{Exit}}\left[\left(\frac{s}{a}\right)_{t-1}^{\text{Exit}} - \overline{\left(\frac{s}{a}\right)}^{\text{Cont}}\right]}_{\text{Exit component}}$$

where Θ_t^{Cont}, Θ_t^{Ent}, and Θ_t^{Exit} denote the shares of continuing, entering, and exiting firms in the total sum of assets among *all* firms in the sample, and Θ_t^{Exp} and Θ_t^{Shr} denote the shares of expanding and shrinking firms in the total sum of assets among *continuing* firms.[15] As above, we calculate the weighted-average sales-to-asset ratio using the sum of sales (s_t) and assets (a_t) across all firms in year t. Finally, a bar over a variable denotes its simple arithmetic average in $t-1$ and t.

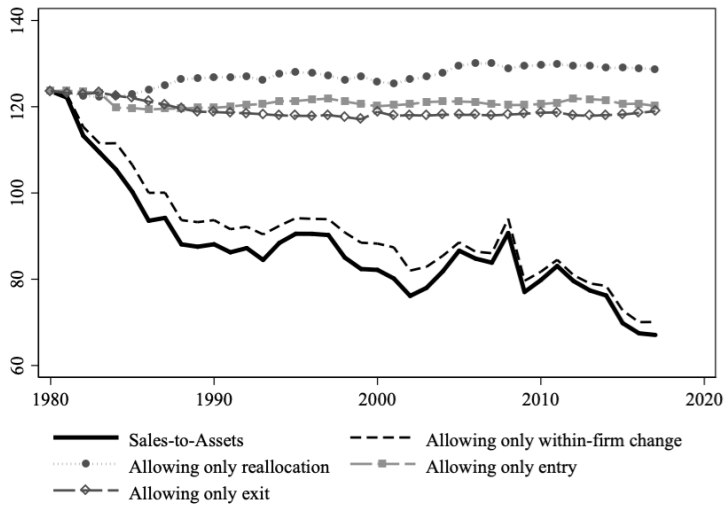
Thus, the within-firm component in Equation 4 is the contribution of changes in the average sales-to-asset ratio in both expanding and shrinking continuing firms, weighted by each group's average share in the total asset distribution. The reallocation component captures the role of the

[14] More specifically, consider two adjacent years t and $t-1$. In the first year, $t-1$, there are two groups of firms: (1) firms that continue into year t and (2) firms that later exit in year t (such that they are only observed in $t-1$). Analogously, there are two groups of firms in year t: (1) firms that continue from $t-1$ and (2) new firms (which are only observed in t). Among continuing firms, we also distinguish expanding firms, whose share in assets among continuing firms rises between $t-1$ and t, from shrinking firms, whose asset shares declines.

[15] As such, $\Theta_{t-1}^{\text{Cont}} + \Theta_{t-1}^{\text{Exit}} = 1$ and $\Theta_t^{\text{Cont}} + \Theta_t^{\text{Ent}} = 1$, and $\Theta_t^{\text{Exp}} + \Theta_t^{\text{Shr}} = 1$.

relative growth of expanding firms in the change in the sales-to-asset ratio. Equation 4 shows that this component is proportional to the difference between expanding firms' average sales-to-asset ratio and that of shrinking firms (this difference may be positive or negative); to the increase in the asset share of the expanding firms; and to the average share of all continuing firms in total assets. Finally, the entry and exit components are equal to the differences between the sales-to-asset ratios of these groups and the average sales-to-asset ratio of continuing firms, weighted by the asset shares of entering and exiting firms. The exit component enters with a negative sign, capturing that exiting firms lower the sales-to-asset ratio if they exit with a higher sales-to-asset ratio than continuing firms.

Figure 5: Decomposing the sales-to-asset ratio: continuing firms versus entry and exit



Notes: This figure shows a decomposition of the asset-weighted sales-to-asset ratio into the contributions of changes in the sales-to-asset ratio within firms, changes in the distribution of assets across firms, and the effects of entry and exit. Each line shows the counterfactual trajectory of the sales-to-asset ratio allowing for the contribution of only one of these components. For details describing the data and sample see Section 2.1.

Figure 5 shows results of this decomposition for the post-1980 period. The solid black line shows the actual trajectory of the sales-to-asset ratio, while the remaining lines represent how the sales-to-asset ratio would have evolved if only one of the four components in the decomposition had driven its changes from year to year. These results highlight that the declining sales-to-asset ratio is driven almost entirely by declining asset utilization within firms, rather than changes in the distribution of assets among continuing firms or changes in the composition of firms. In particular,

the dashed line shows that – if only within-firm changes in the sales-to-asset ratio are allowed – the aggregate sales-to-asset ratio evolves almost identically to its original trajectory. The average sales-to-asset ratio declined from an annual average of 103.7% in the 1980s to 75.1% since 2010. The counterfactual allowing only within-firm changes, similarly, declines from 107.8% to 77.2% in these decades. Thus, within-firm declines absorb the vast majority of the decline in asset utilization.

Entry and exit also make negative contributions to the sales-to-asset ratio, but these magnitudes are small. These small magnitudes are intuitive: in each year, the share of total assets accruing to entering and exiting firms (and, thus, their weight in the sample) is also small.[16] Similarly, while the reallocation component is positive, it is also small. Thus, while there is some evidence that firms with large asset stocks get bigger and that these firms have relatively low sales-to-asset ratios, the magnitude of this shift between two years is too small to explain the overall trend in average asset utilization. Thus, the stabilizing role of declining asset utilization on the average profit rate is not the result of large firms accruing larger shares of total assets.

4 Conclusion

This paper analyzes the intersection between rising profit margins and stagnant profit rates in the post-1980 U.S. economy and points to the role of changing asset composition in underlying the divergence between these two measures of firms' profits. In particular, we show that a sustained decline in the sales-to-asset ratio after 1980 puts downward pressure on the profit *rate* that offsets rising profit margins, and that this decline reflects growing portfolio shares of financial and intangible assets. At the same time, the sales-to-(fixed) capital ratio is largely steady. These patterns link profitability dynamics to the widespread increase in financial and intangible assets that has taken place after 1980, and help clarify the picture of rising profits that is painted by rising profit margins with stagnant capital investment.

[16] For example, consider 1980 and 1981. While the average sales-to-asset ratio among expanding firms (126.4%) exceeded that of shrinking firms by nearly ten percentage points, expanding firms increased their share of total assets among continuing firms by only four percentage points between these two years. This small reallocation of assets limits the impact of their expansion on the aggregate sales-to-asset ratio. Likewise, the sales-to-asset ratio among entering firms in 1981 exceeded that of continuing firms by over twenty percentage points, but entering firms only account for 0.8% of assets in 1981. These low asset weights of entering and exiting firms limit their impact on the average sales-to-asset ratio.

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