Capitalists in the Twenty-First Century*

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Abstract

Have passive rentiers replaced the working rich at the top of the U.S. income distribution? Using income tax data linking 11 million firms to their owners, this paper finds that private business owners who actively manage their firms are key for top income inequality. Private business income accounts for most of the rise of top incomes since 2000 and the majority of top earners receive private business income—most of which accrues to active owner-managers of mid-market firms in relatively skill-intensive and unconcentrated industries. Profit falls substantially after premature owner deaths. Top-owned firms are twice as profitable per worker as other firms despite similar risk, and rising profitability without rising scale explains most of their profit growth. Together, these facts indicate that the working rich remain central to rising top incomes in the twenty-first century.

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> [The human capital hypothesis] is far less consequential than one might imagine. There is little evidence that labor's share in national income has increased significantly in a very long time: "non-human" capital seems almost as indispensable in the twenty-first century as it was in the eighteenth or nineteenth, and there is no reason why it may not become even more so. —Thomas Piketty (2014)

> For a rich client whose reputation or fortune, or both, are at stake will scarcely count any price too high to secure the services of the best man he can get: and it is this again that enables jockeys and painters and musicians of exceptional ability to get very high prices. —Alfred Marshall (1890)

In the last few decades of the twentieth century, the primary driver of rising top incomes was labor income growth of the "working rich" (Piketty and Saez, 2003). Since then, rising capital income has shifted focus to the possible renaissance of passive rentiers.[1] Understanding the nature of top incomes is essential for explaining their evolution and assessing policy implications. Have passive rentiers replaced the working rich at the top of the income distribution?

This paper uses de-identified administrative tax data to characterize top incomes and their rise in the twenty-first century. We begin with a little-known fact: nearly all of the recent rise in directly observed top incomes has come in the form of *business income*.[2] As a share of top 0.1% income, business income now exceeds both non-business capital income and wage income. Most of this top business income growth comes from private "pass-through" businesses that are not taxed at the entity level; instead, income passes through to the owners who pay taxes on their share of the firm's income.[3] This feature allows us to build a new dataset linking firms to their owners for 11 million firms between 2001 and 2014, enabling us to provide a novel perspective on the nature of top business income.

We use these data to test two key implications of the hypothesis that top earners are passive rentiers: (1) firm performance does not depend on the owner's active participation; and (2) differences in business income across people and over time depend on differences in the scale of business holdings rather than their profitability. Under the rentier hypoth-

[1] Piketty (2014) provides a comprehensive account of how passive wealth accumulation can lead to increasing inequality. Karabarbounis and Neiman (2014) document rising capital shares in the U.S. and internationally. Kopczuk and Saez (2004) use estate tax returns and Saez and Zucman (2016) use capitalized income flows to show wealth concentration in the U.S. has been increasing. Piketty and Zucman (2014) document rising capital-output ratios in the U.S. and Europe. Rognlie (2016) argues that capital accumulation cannot explain rising capital shares. See also Caballero, Farhi and Gourinchas (2017).

[2] We focus throughout on market income from tax filings, i.e., fiscal income excluding realized capital gains as in Piketty and Saez (2003), not imputed national income as in Piketty, Saez and Zucman (2018).

[3] Cooper, McClelland, Pearce, Prisinzano, Sullivan, Yagan, Zidar and Zwick (2016) document the increasing role of pass-throughs in generating business income. Guvenen and Kaplan (2017) note that administrative wage data do not show a recent rise in top income shares.

esis, growing business income solely reflects differences in non-human factor accumulation including capital, patents, and brands.[4]

The first part of the paper describes who earns business income and the salient features of their firms. Most top earners are private business owners. In 2014, more than half of the top 1% and nearly eighty percent of the top 0.1% earn some pass-through business income. In absolute terms, that amounts to 947,000 business owners with total income over $386K and 130,000 business owners with total income over $1.5M. Typical firms owned by the top 1-0.1% are single-establishment firms in professional services (e.g., consultants, lawyers, specialty tradespeople) or health services (e.g., physicians, dentists). A typical firm owned by the top 0.1% might be a regional business with $20M in sales and 100 employees, such as an auto dealer, beverage distributor, or a large law firm.

Four additional facts emerge. First, pass-through income is undiversified: it typically derives from one firm with one to three owners and amounts to a large share of their total income. Second, these owners appear to participate actively in firm operations. Their age distribution closely mirrors that of prime age workers, and less than ten percent of top owners report earning only passive income (i.e., income earned without hours engaged) from their businesses. Third, most private business income derives from mid-market firms—those with $5M to $500M in sales—and the distribution within industries is not especially concentrated among a few large firms. These firms operate across diverse geographies and sectors. Fourth, despite this diversity, most profits are earned in relatively labor-intensive industries, especially in those that demand high-skilled labor. Together, these facts support the notion that most top earners better resemble the working rich, not passive owners of large stocks of accumulated capital.

The second part of the paper sheds light on the role top owners play in their firms' performance. We develop a model of how business owners can affect firm performance and use the model to frame empirical tests of the rentier hypothesis. In this part, we focus our analysis to the population of S-corporations, the largest and most transparent form of pass-through business.[5] We present three findings that underscore the importance of human factors of production embodied in top owners. The first finding is that premature owner deaths cause a substantial decline in firm performance, which rejects a story in which top

[4] Views differ on the importance of heterogeneous returns to capital. Saez and Zucman (2016), for example, consider uniform within asset class returns when capitalizing income flows, but others such as Bricker, Henriques, Krimmel and Sabelhaus (2016) and Fagereng, Guiso, Malacrino and Pistaferri (2016) emphasize the importance of return heterogeneity, especially at the top.

[5] We focus on S-corporations because pyramidal and circular partnership structures make it difficult to allocate partnership profits to owners (Cooper, McClelland, Pearce, Prisinzano, Sullivan, Yagan, Zidar and Zwick, 2016) and because different accounting practices make it difficult to analyze partnership and S-corporation performance using the same measure.

owners are passive beneficiaries of firm profitability. In a sample of 2,509 deaths of non-elderly top 1% owners, owner death causes a 61% decline in firm profits. Thus, top-owned firms are not merely a collection of assets that generate profit independent of their ownership, rather performance depends critically on the owner's contribution of effort and human factors of production.

The second finding is that top-owned firms generate superior profitability, which rejects a story in which business income differences simply reflect differences in the size of business holdings. The mean profitability of firms owned by the top 0.1% is over twice that of firms owned by those in the 90-95th percentiles. The profitability advantage of top-owned firms is a persistent characteristic of top earners: startups founded by individuals with high incomes before founding the startup go on to enjoy superior profitability over the next five years. Differences in risk do not account for heterogeneous profitability between top-owned and non-top-owned firms.

The third finding is that rising profitability rather than rising scale explains rising top business income, which rejects a story in which growing business income solely reflects non-human capital accumulation. Between 2001 and 2014, both the profitability of top-owned firms and the profitability advantage relative to non-top-owned firms grew dramatically. While top-owned firm profitability rose over time, scale largely did not: approximately 80% of the increase in top S-corporation income is due to rising profitability per unit of scale. This rise in profitability was broad-based across sectors. Thus, in contrast to patterns observed among public companies or in aggregate Census data, this rise did not coincide with a dominant role of large "superstar" S-corporations.[6]

Our results inform four literatures. First, we find in our income tax data that most capitalists in the twenty-first century are not passive rentiers but active owner-managers of closely held firms who play a key role in their firms' success. This finding differs from recent work on top incomes, which has raised the possibility that the story of rising income inequality in the twenty-first century is solely a story of rising passive capital income (Piketty, 2014; Piketty and Zucman, 2014; Piketty, Saez and Zucman, 2018). Two considerations account for this difference. First, recent work assumes that all S-corporation income is passive capital income, whereas we find that it is largely active labor income. Second, we focus on standard income concepts that do not impute aggregate corporate retained earnings and taxes to individuals (see Section 6.5). Rather than focusing only on the allocation of top dollars, which can be skewed by the very top earners, our work also highlights how the

[6]Furman and Orszag (2015), Gutiérrez and Philippon (2016), Autor, Dorn, Katz, Patterson and Reenen (2017), and De Loecker and Eeckhout (2017) document increasing dispersion in profitability among public companies and within the manufacturing sector, which are not well represented in our S-corporation sample.

typical top earner earns her income.

Our findings are consistent with the earlier conclusion in Piketty and Saez (2003) that, in the 1990s, the working rich were more prevalent than rentiers at the top of the income distribution. More broadly, our findings are consistent with the view that the demand for top skill has outpaced its supply, with the returns to top skill increasingly taking the form of business income.[7] However, we stress that returns to owner-manager skill need *not* be socially optimal and can include returns to rent-seeking (Krueger, 1974; Murphy, Shleifer and Vishny, 1991) or elite connections (Fisman, 2001; Khwaja and Mian, 2005; Zimmerman, 2017).

Second, this paper is among the first to document an explicit empirical link between firm profitability and top income inequality. Separate literatures have documented firm- and industry-level variation in profitability (Hall, 1988; Foster, Haltiwanger and Syverson, 2008; Hsieh and Klenow, 2009; Syverson, 2011) and shown that firm-level variation in wage premia contributes to wage inequality (Card, Heining and Kline, 2013; Song, Price, Guvenen, Bloom and Von Wachter, 2015). We connect these ideas by showing that firm-level variation in profitability amplifies top income inequality among firm owners, and that firm ownership is a key channel through which firms matter for top income inequality.

Third, we find firm profitability is higher for top-owned firms in the U.S. Fagereng, Guiso, Malacrino and Pistaferri (2016) document heterogeneous and persistent returns in Norway, finding a key role for closely held firms at the top of the income distribution. Persistently high returns to private business may be explained statistically by higher firm profitability, with scale-limiting scarcity of skilled owner-manager effort being the underlying driver.[8] Top wealth estimates based on capitalized income flows and a constant returns assumption can be improved by accounting for the higher profitability of top-owned firms.

Fourth, we contribute to a literature on the impact of taxes on economic measurement, the composition of top incomes, and corporate organization.[9] The Tax Reform Act of 1986 initiated a steady tax-motivated migration of corporate activity out of traditional C-corporations and into S-corporations, which together compose the U.S. corporate sector. Tax considerations incentivize owner-managers of S-corporations to label their income as profits rather

[7] See Katz and Murphy (1992), Autor, Katz and Kearney (2008), Goldin and Katz (2009), and Murphy and Topel (2016) for some prominent articulations of this view. Kaplan and Rauh (2013*b*) argue that the broad-based rise in top incomes reflects market-driven forces, such as an increased return to skill.

[8] A recent literature has emphasized the importance of management practices for firm performance (Bloom and Van Reenen, 2007; Bertrand and Schoar, 2003; Bloom, Eifert, Mahajan, McKenzie and Roberts, 2012; Bender, Bloom, Card, Reenen and Wolter, 2016).

[9] See, e.g., Gordon and MacKie-Mason (1994), Slemrod (1996), Mackie-Mason and Gordon (1997), Gordon and Slemrod (2000), Alstadster, Jacob, Kopczuk and Telle (2016), Auten and Splinter (2016), DeBacker and Prisinzano (2015), Cooper, McClelland, Pearce, Prisinzano, Sullivan, Yagan, Zidar and Zwick (2016), Clarke and Kopczuk (2017), Prisinzano and Pearce (2017), and Dyrda and Pugsley (2017).

than wages. Two empirical approaches suggest that the decline in labor's share of U.S. corporate value-added (Karabarbounis and Neiman, 2014) is overstated by 16% as labor payments have increasingly taken the form of S-corporate profits.[10] For tax policy, our estimates imply that the ability of top earners to label their labor income as S-corporation income and thereby avoid payroll taxes undermines the net progressivity of the U.S. tax system and creates horizontal inequities between top earners. Moreover, behavioral responses to "capital" income taxation will reflect a mix of capital and labor elasticities.

The paper is organized as follows. Section 1 documents the importance of business income for top income inequality. Section 2 describes the institutional background and data. Section 3 presents descriptive statistics on the prevalence of top business ownership and the sizes and industries of those businesses. Section 4 presents a model of business income. Section 5 studies the effect of owner deaths on firm performance. Section 6 analyzes the profitability of top-owned businesses in the cross section and the contribution of rising profitability to rising top business income. Section 7 explores implications of disguised labor income for the corporate labor share and tax policy. Section 8 concludes.

1 Business Income and Top Income Inequality

To motivate our investigation of top business income, we highlight a little-known fact: around 2000, the nature of rising top income changed from rising wage and salary income to rising private business income.

Figure 1A uses the updated distributional statistics of Piketty and Saez (2003) to plot the time series of directly observed top incomes.[11] Figure 1A reprints the well-known U-shape of U.S. top income shares from 1913 through 2015. The top 1% of households earned nearly 20% of total income in the early twentieth century, less than 10% in the middle of the century, and now nearly 20% once again. Top incomes in the early twentieth century comprised mostly passive capital income like interest income, while rising top incomes of the final two decades of the twentieth century comprised mostly wage income. Piketty and Saez (2003) conclude that, at the top of the income distribution, the working rich had replaced

[10] Work on the decline in the labor share (e.g., Karabarbounis and Neiman (2014)) often restricts attention to the corporate sector to mitigate measurement problems associated with classifying self-employment income as labor or capital income (Gollin, 2002; Elsby, Hobijn and Şahin, 2013). We show these issues also matter for measuring factor income shares in the corporate sector.

[11] This data series measures households as personal income tax filing units, imputes non-filing units with incomes too low to require a tax filing, and measures market income as total personal tax return income ("fiscal income") minus unemployment compensation, taxable Social Security benefits, and realized capital gains. Piketty, Saez and Zucman (2018), Auten and Splinter (2016), and Larrimore, Mortenson and Splinter (2017) study how top income shares vary when the unit of observation is a household or an individual instead of a tax filing unit.

the "coupon-clipping" rentiers prevalent in Marx's era.

Figure 1B reveals that rising top wage income ceded to rising top capital income after 2000. This figure uses the underlying source of Figure 1A to decompose the top 1% series of Figure 1A into two income types: wage income and capital income, which includes business income, interest, rents, royalties, estates, trusts, and other capital income. Top 1% wage income as a share of total income rose through 2000 but has since flattened. In contrast, top 1% capital income as a share of total income doubled since 1990, with most of that growth coming after 2000. Thus, rising capital income accounts for roughly all of the observed growth in the top 1% income share since 2000.

Figure 1C shows that the vast majority of rising top capital income came in the form of private business income. As we detail in Section 2, there are three major business organizational forms in the United States: C-corporations, S-corporations, and partnerships. The vast majority of publicly traded businesses are C-corporations while nearly all C-corporations, all S-corporations, and nearly all partnerships are private. Figure 1C decomposes the top 1% capital income series of Figure 1B into business income from C-corporations (in the form of dividends), business income from private "pass-through" firms (S-corporations and partnerships), and other capital income (e.g., interest, rents, royalties, estates, trusts, etc.). While top business income rose as a share of total income since 2000, most of this growth took the form of S-corporation and partnership income, rather than C-corporation dividend income, with S-corporation income being the largest category. Top 1% other capital income declined slightly since 1990 and has been flat since 2000. Appendix Figures A.1 and A.2 show similar patterns for the top 0.1%, for whom business income now exceeds both non-business capital income and wage income.

In short, private business income has played a central role in rising top income inequality in the twenty-first century. We therefore focus our empirical investigation into the nature of top business income and why it is rising.

2 Data on Firms Linked to Owners and Workers

This section describes the relevant institutional background and our primary data, which links S-corporations and partnerships to their owners and workers from 2001 to 2014.

2.1 How U.S. Businesses Are Organized and Taxed

Historically, U.S. business activity was largely organized in one of two forms: sole proprietorships (accounting for 25% of 1985 taxable business income) or C-corporations (accounting

for 75%) (Cooper, McClelland, Pearce, Prisinzano, Sullivan, Yagan, Zidar and Zwick, 2016; Clarke and Kopczuk, 2017).[12] C-corporations (named "C" after their subchapter of the Internal Revenue Code) are incorporated and officially registered business entities. C-corporations may be owned by individuals, businesses, non-profits, and foreigners. C-corporations are distinct legal entities whose owners enjoy limited liability. C-corporations pay the corporate income tax on annual taxable income, and taxable shareholders pay dividend taxes on dividends and capital gains taxes on gains realized from selling shares.

The Tax Reform Act of 1986 reduced the top ordinary personal income tax rate below the top corporate income tax rate for the first time in the post-war era, unleashing a dramatic rise in business activity conducted in "pass-through" business form. By 2011, 54.2% of U.S. taxable business income was earned by pass-throughs and sole proprietorships and only 45.8% by C-corporations (Cooper, McClelland, Pearce, Prisinzano, Sullivan, Yagan, Zidar and Zwick, 2016). Pass-through businesses typically enjoy limited liability but, unlike C-corporations, pay no entity-level tax. Instead, taxable business income "passes through" to shareholders' tax returns and is taxed as personal ordinary income on Form 1040, Schedule E, in the year it is earned by the firm. This tax burden applies regardless of whether the firm actually distributes the income to shareholders. When distributed, pass-through dividends are untaxed.

As of 2014, the dominant pass-through type is the S-corporation (named after its subchapter of the Internal Revenue Code). S-corporations have the same legal structure as C-corporations but are taxed differently. Since 1986, S status has been tax-superior, but legal restrictions prevent corporations with more than 100 owners, with owners who are not U.S. individuals, and with more than one class of stock from enjoying S status. These restrictions bar public corporations, corporations with institutional equity financing, and corporations with sophisticated divisions between ownership and control such as multiple stock classes from being S-corporations. There are now more S-corporations than C-corporations, even among firms with over $500M in revenue. Publicly-known examples of S-corporations with billions in revenue include Fidelity Investments and home improvement retailer Menards.[13]

Partnerships are the other major pass-through type. Partnerships are taxed similarly to S-corporations but are subject to partnership law rather than corporate law and can be owned by any type of individual or business entity. Publicly-known examples of partnerships with billions in revenue include Goldman Sachs before its 1999 initial public offering and the

[12] Sole proprietorships are unincorporated business entities owned by individual taxpayers. Their annual income is taxed at ordinary personal income tax rates at the owner level on Form 1040, Schedule C. Sole proprietors lack limited liability and sole proprietorship dividends are not taxed.

[13] Nelson (2016) provides a detailed account of how rules governing S-corporations have evolved over time and have generally made adopting this form more favorable.

U.S. arm of PricewaterhouseCoopers. Many financial and real estate investors structure their firms as partnerships as well.

Under current law, taxes encourage firms meeting the above ownership limitations to file taxes as an S-corporation, rather than as a C-corporation or a partnership.[14] Considering only current federal taxes for simplicity, C-corporations pay the corporate income tax, which is a nearly flat 35% rate on their annual taxable income, and their owners are liable for the dividend income tax or capital gains tax (23.8% in the top personal bracket, which includes the 2013 Affordable Care Act (ACA) surtax of 3.8% on investment income) on the remaining 65% of income when it is distributed to owners. These taxes amount to an estimated all-in top tax rate on C-corporations of 44.7%.[15] Partnerships typically enjoy lower taxes than identical C-corporations: annual partnership income is taxed at the owner level at ordinary income tax rates, payroll tax rates, and ACA Additional Medicare Tax rates (totaling 43.4% at the top), with no other income taxes or taxes on distributions.

S-corporations usually face the weakly lowest taxes. S-corporation income is taxed identically to partnership income, except that if the owner "materially participates" in the firm's operation, the income is classified as actively earned income and faces only the ordinary income tax (39.6% at the top). Owners determine their material participation status, which typically requires the owner to supply at least 500 hours of labor to the firm in the year the income was earned. Owners face tax incentives to classify themselves as material participants in order for their income to be deemed active and face lower taxes.[16] Note that whereas a partnership owner typically faces identical taxes when receiving her income as W-2 wage income and business income, an S-corporation owner faces lower taxes when receiving her income as business income.[17]

[14] In order to file as an S-corporation, a firm must be organized at the state level as either a corporation or a limited liability company (LLC). An LLC is treated as a partnership by the court system but can choose to be treated as an S-corporation by the tax system and thus file an S-corporation income tax return if the LLC satisfies the S-corporation ownership requirements.

[15] Economists typically assume that half of distributions face the statutory dividend tax rate while the other half is taxed at one quarter of the capital gains tax rate due to tax deferral from retained earnings and other avoidance. The estimate 44.7% equals $35\% + 65\% \times (.5 \times 23.8\% + .5 \times \frac{1}{4} \times 23.8\%)$.

[16] An S-corporation owner-manager's W-2 compensation is required to be "reasonable" and to reflect the market-value of labor services. The IRS rarely adjusts tax liabilities by deeming W-2 compensation to be unreasonable. Before the Net Investment Income Tax of 2013 that assessed a surtax on passive but not active S-corporation income, the incentive to declare one's S-corporation income as active rather than passive was limited to deducting active losses from one's other active income like wage and salary income. Auten, Splinter and Nelson (2016) document shifting of passive to active S-corporation income in response to the 2013 change.

[17] Litigation considerations also tend to favor corporate form over partnership form. Legal certainty is often higher in corporate form than in partnership (or LLC) form: corporate form is older than partnership form, so corporate law is more settled. Corporate form also provides more assurance that relatively well-known federal law will be used to adjudicate civil complaints, rather than lesser-known state law. For example, if a New Jersey citizen sues a partnership and the partnership has at least one partner who is also a New Jersey

2.2 Samples

Due to the legal requirements mentioned above, S-corporations are owned directly by U.S. individuals rather than through complicated ownership tiers and are taxed at the owner level. The U.S. government receives annual information linking all S-corporations to their owners in order to administer owner-level taxation of S-corporation income. We use this information to build our *main sample*.

Our main sample comprises the universe of S-corporations linked to owners and workers using de-identified data from income tax records spanning 2001-2014. Universal data are available only from 2001-2014. We construct the sample as follows.

We first merge the population of S-corporation business income tax returns (Form 1120S) to the population of S-corporation information returns (Form 1120S, Schedule K-1) that link the firms to their owners. These information returns detail each owner's share of the corporation's income. S-corporations are required to submit to the Internal Revenue Service a K-1 on behalf of each owner of the S-corporation when the corporation submits its Form 1120S business income tax return. Each owner receives a copy of her K-1, which she uses to report S-corporation income on her Form 1040, Schedule E, and compute her tax liability. Each 1120S includes the firm's masked Employer Identification Number (EIN), and each K-1 includes the firm's masked EIN as well as the owner's masked Social Security Number (SSN). We merge the 1120S records onto the K-1 records by masked EIN in order to yield linked firm-owner data.

We further merge on information from two additional sources: Form 1040 individual income tax returns and Form W-2 wage information returns. In order to rank owners by their percentile in the annual personal income distribution, we merge the firm-owner data by masked SSN to annual 1040 records. In order to measure firm scale, we merge on the annual number of W-2s with the firm's masked EIN listed as the W-2's payer. All data sources are in principle universal. We remove observations in which the firm has non-positive sales.

For the analysis of Section 3, we append linked partnership returns to our main sample in order to construct our *full sample*. The partnership rows comprise the population merge of partnership business income tax returns (Form 1065) to the population of partnership information returns (Form 1065, Schedule K-1). Unlike S-corporations, partnerships can be owned by individuals and entities other than U.S. individuals. We focus on direct partnership-owner links in which the partner is a U.S. individual. Thus, many partnerships are omitted from the Section 3 analysis. Sections 5 and 6 use the main sample, where links are nearly universal.

citizen, a New Jersey state court will hear the case. But if the firm had been a corporation that was neither headquartered nor incorporated in New Jersey, a U.S. district court would hear the case.

The full sample comprises 158.0M firm-owner-year observations—71.8M S-corporation-owner-year observations and 86.2M partnership-owner-year observations—on 11.0M unique firms (7.3M S-corporations and 3.9M partnerships with minimal overlap from corporate form switching) with 20.1M unique owners (9.8M S-corporation owners and 12.8M partnership owners with some overlap). In 2014, the main sample comprises 5.7M S-corporation-owner observations on 3.7M S-corporations and 4.9M owners. In 2014, the partnership observations in the full sample comprise 9.4M partnership-owner observations on 1.4M partnerships and 5.2M owners. Section 3 presents detailed descriptive statistics.

2.3 Variables

We now define variables in our full sample. All variables are annual and are available in all years. Year refers to calendar year, which by law is also each S-corporation's and partnership's fiscal year. All dollar values are inflated to 2014 dollars using the CPI-U.

1. Firm-level. A *firm* is an S-corporation or partnership. *Sales* is the firm's operating revenue (gross sales minus returns) as listed on the 1120S or 1065. Passively earned income (e.g., interest on bank deposits) is excluded. *Profits* is the firm's ordinary business income, equal to operating revenue minus costs as listed on the 1120S or 1065. *Costs* equals the sum of inputs (cost of goods sold), employee and owner wage compensation, rent, interest, capital asset tax depreciation, and other deductions related to ordinary business. Profits are divided among owners pro rata according to ownership stakes on Forms K-1, which owners then include on their Form 1040, Schedule E. Hence, except for Form 1040 loss limitations, profits are exactly the S-corporation and partnership income concept that Figure 1C shows had more than doubled among the top 1% of U.S. households since 1990.[18]

Profits per worker equals profits divided by the number of workers. *Number of workers* and *number of employees* equals the number of individuals who received a W-2 from the firm that year. *Industry* is the four-digit North American Industry Classification System (NAICS) code reported by the firm on its 1120S or 1065 as corresponding to its principal business activity. A firm is a *top-owned firm* if it has an owner in the top 1% or top 0.1% of the income distribution as defined below.

[18]Partnership profits are not always divided according to ownership stakes. Furthermore, as partnerships do not face a reasonable compensation requirement, in general all active owner labor compensation will be reported as profits for partnerships. In contrast, for S-corporations, some active owner labor compensation will be reported as wages, which will tend to understate the magnitude of income derived from active business participation when considering profits alone (Nelson, 2016).

2. Owner-level. *Personal income* is the main income concept used in Piketty and Saez (2003) and equals Form 1040 total income minus Form 1040 capital gains minus Form 1040 unemployment compensation minus Form 1040 taxable social security benefits. A firm owner is a *top 1% owner*, a *top 1-0.1% owner*, or a *top 0.1% owner* if her personal income lies in a year's top 1%, the top 1% but not the top 0.1%, or the top 0.1% of all tax units in the year, respectively. *Wage income* equals W-2 income. *S-corporation income* equals the owner's share of the profits from all S-corporations she owns. *Total owner payments* equals S-corporation income plus wage income from the S-corporations she owns, as reflected in merged W-2 records. *Partnership income* and owner payments in the Appendix Table A.1 are defined analogously. *Business income* is total pass-through business income and equals total Form 1040, Schedule E income. An owner's S-corporation income is *active* if the owner reports she materially participates in the operations of any of her pass-through businesses (see the previous subsection) and is *passive* otherwise.

Our personal income definition excludes both realized and unrealized capital gains from the definition of income, following a long tradition in national income accounting and the inequality literature.[19] The structure of certain forms of income introduces two additional considerations. First, if employees are paid in stock options, the value of those options should be included in national income, as it reflects compensation for labor supply. Fortunately, the accounting rules for stock options require that capital gains for realized in-the-money stock options be included in taxable wage and salary income, so they are reflected in fiscal income. Second, a similar argument applies to the "carried interest" capital gains earned by partners in financial partnerships (such as venture capital, buyout, and hedge fund investors), which usually reflects compensation for labor supply. Since we cannot distinguish this compensation from other capital gains, carried interest is not included in our fiscal income measure.[20]

[19] Kuznets (1941) offers three reasons why capital gains should be excluded from income. First, asset price changes, whether realized or unrealized, do not directly add to the flow of goods and services produced by the economy. Second, asset price changes may reflect changes driven by previous activity (such as reinvested earnings) that is already included in national income. Section 6.5 discusses how the allocation of retained earnings may affect the relative importance of top pass-through income. Third, changes in asset prices due to random fluctuations may distort the measurement of economic activity. The cyclical volatility of capital gains and lumpiness of capital gains realizations is likely a key reason why the composition of top earners when sorted by total cash income exhibits substantial turnover (Auten and Gee, 2009; Auten, Gee and Turner, 2013). In our data, realized capital gains exhibit strong cyclical sensitivity with no obvious trend since the late 1990s.

[20] Data from Metrick and Yasuda (2010) indicate that carried interest accounts for only one third of total income for these investors, with the rest appearing as ordinary income. Furthermore, the size of the industry estimated by Kaplan and Rauh (2009) implies that carried interest accounts for a small share of total realized capital gains. For these reasons, carried interest, while very relevant for certain top earners, likely does not substantially alter the composition of top earners.

2.4 Auxiliary Data

The main sample begins in 2001. In order to analyze a longer time series and also to compare S-corporation activity to C-corporation activity, we supplement our main sample with the Statistics of Income (SOI) sample of corporate income tax returns from 1993-2014.[21] We use data from W-2 forms to measure wage payments to individual owners and to calculate firm-level aggregates of the total number of employees at the firm.

3 Business Ownership in the Top 1%

This section describes who earns business income and the salient features of their firms. We ask whether owners actively participate in their firms' operations and whether their firms are more prevalent in skill-intensive industries where talent is likely an important factor.

3.1 The Prevalence of Business Ownership in the Top 1%

Figures 2A and 2B demonstrate the prevalence of pass-through business income among the top 1% and top 0.1% of earners in 2014 using the full sample of firm-owner-linked S-corporations and partnerships. Top 1% households had personal income over $386,000 while top 0.1% households had personal income over $1.5M. The graph shows that pass-through ownership is widespread among top earners. Among the top 1%, 57% earn pass-through income. That is nearly 1 million taxpayers, with aggregate pass-through business income of $474B. Among the top 0.1%, 79% earn pass-through income. That is 130,000 taxpayers, with aggregate pass-through business income of $264B. For comparison, in Execucomp, the top 9,900 executives working at the S&P 1500 earned a combined $32B. Figures 2C and 2D present analogous statistics on these owners' pass-through share of personal income and show that these owners derive substantial income from their businesses. The average pass-through owner in both the top 1% and the top 0.1% earns nearly half of their income from their pass-through businesses.

The panels of Figure 2 break down pass-through ownership and income into firm size ranges. Approximately half of top 1% and three-quarters of top 0.1% owners own a business with more than $5M in sales, and over half of the pass-through income of both groups derives from firms with between $5M and $500M in sales. Figure 3A focuses on our main sample of linked S-corporations in 2014 to document that most S-corporation owners are middle-age and pre-retirement. The population of S-corporation owners does not include very many old people or children, whom we might associate with estates and inherited wealth. Figures 3B

[21] See Yagan (2015) and Zwick and Mahon (2017) for detail on these weighted, stratified random samples.

and 3C show that S-corporations have a similar size distribution as C-corporations except at the very top of the size distribution, and that S-corporation income is earned across states approximately proportionately to population, respectively.[22]

3.2 Statistics on Top Owners and Top-Owned Firms

Table 1 provide summary statistics of annual averages from the main sample for S-corporations and their owners, elaborating on the total counts reported in Section 2.2. Panel A presents statistics on distinct firm-year observations, while Panel B presents statistics on distinct owner-year observations. In the pooled main sample of all S-corporations 2001-2014, the average S-corporation earned $93K in profits on sales of $1.8M in 2014 dollars, employed 14 workers, and had 1.6 owners. S-corporations that have at least one owner whose income is in the top 0.1% are much larger and more profitable—these firms earned $1.6M in profits on $22.4M in sales with 103 employees and 3.4 owners on average. On a per worker and per owner basis, top-0.1%-owned firms have superior performance. The average top-0.1%-owned S-corporation generates $139K in profits per worker, $818K in profits per owner, and $950K in profits plus owner wage payments per owner. Top-0.1%-owned S-corporations are over five times more profitable per worker and per owner than the average S-corporation.

Owner income varies widely. The average S-corporation owner's income is $212K and the P10-90 range is $15K-422K. The average age of owners is 50 with a P10-90 range of 35-66. The average owner earns the same amount in business income ($72K) as in wage income ($71K). 11.4% of owners are in the top 1% of personal income and 1.8% are in the top 0.1% of personal income. Owners in the top 0.1% are five years older than the average owner across all S-corporations. Top 0.1% owners earn $4.5M in personal income on average, and earn $1.8M in total wage and business income from the S-corporations that they own. The average top-0.1% owner earns a majority of her income in the form of pass-through business income (53%). Just 5% of top-0.1% owners report earning only passive income from their pass-throughs.

Most S-corporations owned by top earners have few owners and most top S-corporation owners own just one firm, indicating that this activity is closely held and undiversified. S-corporation ownership is not held via big portfolios of diversified holdings, which we might expect if owners were only contributing capital. This fact is consistent with the share of S-corporation activity along the firm size distribution. In order to make substantial income

[22] Appendix Figures A.3 and A.4 show how the distributions of firm sales and profits have evolved among C-corporations, S-corporations, and top-owned S-corporations. The distribution of C-corporations has substantially more concentration in the right tail, with more than 90% of 2014 profits accounted for by firms with more than $500M in sales; in contrast, approximately 10% of total S-corporation profits and 20% of top 0.1% S-corporation profits in 2014 are accounted for by firms in this size bin.

as a minority passive owner, one would need to be a minority owner of a very large company, yet most top-0.1%-owned companies in our data are mid-market in size with average sales of $22M. To reach the top 1% or top 0.1% with this kind of firm requires concentrated ownership. Consistent with this claim, 93% of top 1-0.1% owners and 95% of top 0.1% owners report their income as actively earned.[23] See Appendix Table A.1 for qualitatively similar summary statistics on partnerships and their owners from the partnerships subset of our full sample.

3.3 The Industry Composition of Top Firms

Figure 3D compares the distribution of total profits across 1-digit NAICS sectors of top-owned S-corporations to the distributions for all S-corporations and C-corporations for the year 2014. S-corporation profits are earned broadly across sectors and are similarly distributed as overall corporate profits. The exception is that S-corporation profits are under-represented in manufacturing and overrepresented in information, professional services, and health care.

Table 2 presents a more disaggregated analysis of S-corporation profits for 30 industries, sorted by the 2014 level of profits among firms with a top 0.1% owner.[24] For these industries, we also present the level of profits and within-group rank for firms with a top 1-0.1% owner and for all S-corporations. Our focus on the industries of top-owned firms complements Bakija, Cole and Heim (2012), who study the occupations of top earners using personal income tax returns and find a large role for professional services, finance, and closely held business.

The top 30 industries compose 56.4% and 61.5%, respectively, of top 1-0.1% and top 0.1% income. Among the top 0.1%, the five largest industries are management of companies and enterprises ($12.9B), other financial investment activity ($7.8B), automobile dealers ($6.5B), other professional and technical services ($5.2B), and oil and gas extraction ($4.4B). Among the top 1-0.1%, the five largest industries are offices of physicians ($9.0B), other professional and technical services ($4.9B), offices of dentists ($4.4B), other specialty trade contractors ($4.3B), and legal services ($3.5B). Typical firms owned by the top 1-0.1%

[23] As further evidence consistent with active participation among working age owners, Appendix Figure A.5 shows how passive versus active reporting and aggregate business income earned vary over time by owner age. Owners above 80 are much more likely to report earning only passive income than younger owners, while owners aged between 40 and 70 account for the majority of business income earned overall.

[24] Some firms may have both top and non-top owners. The approach in Table 2 allocates profits based on whether any owners are in the top group. Appendix Table A.2 presents analogous statistics that apportion S-corporation profits pro rata to owners in either the top 0.1% or the top 1-0.1% and then aggregate those apportioned profits by industry. Because S-corporations are closely held, this alternative approach does not materially alter the aggregates.

are single-establishment firms in professional services (e.g., consultants, lawyers, specialty tradespeople) or health services (e.g., physicians, dentists). A typical firm owned by the top 0.1% might be a regional business with $20M in sales and 100 employees, such as an auto dealer, beverage distributor, or a large law firm. For both groups, 17 of the top 20 industries are outside finance, and management of companies and enterprises often represents non-financial activity as well.[25] Thus, most top S-corporation businesses do not operate in finance and instead actively produce goods or services across diverse industries.

Table 3 presents statistics comparing the level of S-corporation profits to partnership profits among top-owned firms in 2014 for the top thirty industries in Table 2. In terms of industry composition, there is substantial overlap between top S-corporations and top partnerships. However, partnership profits skew more toward high skilled services, especially other financial investment activity ($40.9B)—which includes private equity, venture capital, and hedge funds—and legal services ($38.6B). These two industries account for 65.7% of the $121B of total partnership profits among firms with a top 0.1% owner in 2014.[26]

The facts that top S-corporation profits predominate outside of manufacturing and that the list of top-1-0.1% industries are high-skilled service industries suggests that top-owned S-corporations are relatively skill intensive. Figures 4A and 4B systematize this observation by presenting a set of pairwise correlations at the NAICS 4-digit level comparing top 1% and top 0.1% profit levels to industry-level measures of skill intensity and other characteristics.

The first four rows of each graph present correlations of profits with measures of industry skill intensity. Row 1 shows correlations with the skill share of employment, defined as the average share of workers in an industry with some college education from the March supplement of the Current Population Survey from the years 2000 through 2014. Row 2 shows correlations with the average annual wage compensation per worker among firms with a top owner, based on our main sample. Row 3 shows correlations with the officer share of labor compensation, defined as follows. For each S-corporation in the SOI corporate sample, we divide officer compensation by the sum of officer compensation, salaries and wages, labor contribution to cost of goods solds, and pension and benefit contributions. The officer share of labor compensation is the sales-weighted average of this variable for all S-corporations between 2000 and 2014. Row 4 shows correlations with the average share of workers using

[25] Holding companies often own related but formally distinct non-financial firms, such as a dairy producer and a dairy distributor.

[26] Appendix Table A.3 presents analogous statistics that apportion S-corporation and partnership profits pro rata to owners in either the top 0.1% or the top 1-0.1% and then aggregates those apportioned profits by industry. Top partnerships (e.g., large law firms with both junior and senior partners) include many more owners than do top S-corporations, so this exercise reallocates roughly 40% of the top 0.1% profits to the top 1-0.1% category. Appendix Table A.4 presents statistics on the number of firms and owners for both S-corporations and partnerships in each industry in Table 3.

a computer at work between 2000 and 2014, measured in the October Current Population Survey. All four skill correlations with both top 1% profits and top 0.1% profits are strongly positive and statistically significant.

The strongly positive correlations between top S-corporation profits and industry-level skill measures contrast with insignificant or negative correlations with other industry-level characteristics. We use the SOI sample to construct sales Herfindahls in each 4-digit industry, including both C- and S-corporations. This proxy for market concentration is negatively correlated with both top 1% and top 0.1% S-corporation profits, implying that market power at the national product-market level is unlikely to explain the rise in top incomes. Workers per firm is the number of aggregate S-corporation W-2 payees employed by the average top firms. This measure of firm scale also is negatively correlated with profits. Capital per worker is the total book value of depreciable assets less accumulated depreciation divided by aggregate W-2 payees. Capital is measured as the average for all S-corporations in the SOI corporate sample betweeen 2000 and 2014, weighted to represent the population. Aggregate W-2 payees is measured directly for the population of S-corporations. We rely on data from Compustat to measure the intensity with which firms in different industries rely on intellectual property (proxied by R&D expenditures) or brand capital (proxied by advertising expenditures). For these variables, we compute the share of total public company expenditures in that category accounted for by public companies in that industry. We then compute the mean of this share over the years between 2000 and 2014. We measure international market presence as the 2000-2014 average of total foreign net income reported by S-corporations on Schedule M3 of their tax return divided by the 2000-2014 average of total S-corporation profits. These correlations are mostly negative or statistically insignificant.

Together, this section's descriptive statistics confirm the prediction that a large share of top earners are active owner-managers of mid-market firms in relatively skill-intensive and unconcentrated industries. Pass-through participation is pervasive among top earners who are working age and own undiversifed positions in closely held firms. The correlates analysis and statistics for top S-corporation industries suggest that many of these firms are in industries that are neither capital-intensive nor reliant on intellectual property and patents. For these firms, it is difficult to think of what other factors a passive owner would provide. That this activity is in many sectors, all states roughly proportional to population, and in firms that are not especially large is further at odds with passive capital stories that imply the most profitable activity would also be concentrated among a few firms.

4 Model of Business Income

This section introduces a model of how owners generate business income. We use the model to (1) clarify the channels through which business owners can affect firm performance, (2) explain profitability differences and constraints to expansion, and (3) discuss assumptions under which the effects of owner deaths can help identify parameters of economic interest.

Supply. Each firm j with owner i has a technology for producing a differentiated good or service,

$$y_{j(i)} = f(L_{j(i)}, K_{j(i)}, E_{j(i)}) = A_j L_{j(i)}^{\alpha_L} K_{j(i)}^{\alpha_K} E_{j(i)}^{\alpha_E}, \tag{1}$$

where A_j is productivity, $L_{j(i)}$ is the number of workers, $K_{j(i)}$ is units of physical capital, $E_{j(i)}$ is entrepreneurial effort of owner i, and $\alpha_L + \alpha_K + \alpha_E \leq 1$ are output elasticities.[27] A_j should be interpreted broadly as including all forms of non-physical capital that remain transferable, such as intangible assets, patents, and brands. The entrepreneur i maximizes her utility $U(L_{j(i)}, K_{j(i)}, E_{j(i)})$ by choosing the optimal amount of workers, capital, and effort:

$$\max_{L_{j(i)}, K_{j(i)}, E_{j(i)}} p_{j(i)} A_j L_{j(i)}^{\alpha_L} K_{j(i)}^{\alpha_K} E_{j(i)}^{\alpha_E} - w L_{j(i)} - r K_{j(i)} - \psi(E_{j(i)}/\theta_{j(i)}), \tag{2}$$

where $p_{j(i)}$ is the price of the good produced by firm j, w and r are factor prices that are common across all firms, and effort disutility is $\psi(E/\theta) = (E/\theta)^{1+\frac{1}{\varepsilon}}$, where $\theta_{j(i)}$ parameterizes owner i's talent. Talented owners can provide more effort at a given utility cost. Note that equation 2 defines the firm's economic profits, not the firm's accounting profits as measured in tax data.[28] In practice, owners often do not fully compensate themselves with wage payments for their effort costs, yielding high accounting profits that partially reflect owner effort compensation.

Demand. Demand $y_{j(i)} = D_{j(i)} p_{j(i)}^{\eta_{j(i)}}$ is a function of a demand shifter $D_{j(i)}$, which depends on market size and product appeal, price $p_{j(i)}$, and a demand elasticity $\eta_{j(i)} < -1$.

[27] Each component of the model (e.g., output elasticities) could depend on the owner i, but to declutter notation, we do not explicitly add subscripts unless highlighting a channel through which owners matter.

[28] If owners own the capital rather than renting it at cost $rK_{j(i)}$, then accounting profits will include the normal return to capital.

Profitability. After paying factors based on their importance in the production process, firm owners obtain economic profits $\pi_{j(i)}$, which are a residual share of sales.[29] Thus, forces that increase sales such as appealing products $D_{j(i)}$, technology A_j, and owner talent $\theta_{j(i)}$ will increase profits. Profitability, which we measure as profits per worker, is given by:

$$\frac{\pi_{j(i)}}{L_{j(i)}} = \left[\underbrace{\frac{1}{1+\frac{1}{\eta_{j(i)}}}}_{\text{Markup}} - \underbrace{\left(\alpha_L + \alpha_K + \frac{\alpha_E}{1+\frac{1}{\varepsilon_{j(i)}}} \right)}_{\text{Effective returns to scale}} \right] \frac{w}{\alpha_L} \tag{3}$$

Equation 3 highlights two channels through which profitability can rise with owner talent. On the demand side, if firm owners can make demand for their firm's services less elastic, then they can enjoy higher profitability. One mechanism for this possibility is through larger firm scale—firms of talented owners are bigger and have higher market share, which makes product demand $\eta_{j(i)}$ less elastic and yields higher profitability (see Appendix B.2).[30] Profitability can also vary for technological reasons. Talent-intensive firms with relatively low returns to non-owner labor and capital will enjoy high profitability. For example, in NAICS 7115, independent artists, writers, and performers generated \$1.9 billion in top 1% profits with 3.3 workers per firm and 14,668 workers overall in 2014. The effective returns to scale also depend on the elasticity of owner effort $\varepsilon_{j(i)}$. If owner effort is not infinitely elastic, then increasingly costly owner effort constrains firm scale. Similar to $\eta_{j(i)}$, $\varepsilon_{j(i)}$ can also become less elastic at higher scale if, for example, high effort levels are especially costly. Additionally, private businesses may be regionally focused businesses with diminishing returns to scale outside the regional market. These scale-based forces may enable talented entrepreneurs to generate higher profitability. Finally, observed accounting profitability will exceed economic profitability if some compensation for owner effort is paid as profits rather than owner wages.

Empirical Predictions. We use the model to derive empirical tests and discuss assumptions under which these tests help identify economic parameters of interest.

1. **The passive owner hypothesis:** $\alpha_E = 0$. Under this hypothesis, firm performance

[29] When profits exceed fixed costs, optimizing firms make scale decisions such that factor prices equal the value of the marginal products, implying that factor payments are $wL_{j(i)} = \alpha_L \left(\frac{1}{\eta}+1\right) p_{j(i)} y_{j(i)}$ and $rK_{j(i)} = \alpha_K \left(\frac{1}{\eta}+1\right) p_{j(i)} y_{j(i)}$, and compensation for owner effort amounts to $\frac{\alpha_E}{1+\frac{1}{\varepsilon}} \left(\frac{1}{\eta}+1\right) p_{j(i)} y_{j(i)}$. Thus, $\pi_{j(i)} = \left[1 - \left(\alpha_L + \alpha_K + \frac{\alpha_E}{1+\frac{1}{\varepsilon}}\right)\left(\frac{1}{\eta}+1\right)\right] p_{j(i)} y_{j(i)}$. Appendix B.1 provides expressions for profits, firm scale, economic factor payments, and factor shares in terms of primitives.

[30] Another scale-based mechanism for higher profitability, for example, is that talented owners can spread their higher sales and profits over fixed costs. Profitability can vary across firms for additional reasons: non-linear production technologies, input quality heterogeneity, risk, factor market frictions, etc.

is independent of owner effort. For example, tenants of an apartment building may continue to pay rent checks regardless of the owner. We can test this null empirically by estimating the effect of premature owner deaths on firm profits. Furthermore, and similar to the logic of Hall (1988), the marginal effect of effort on sales is: $\frac{\partial \text{Sales}}{\partial E} = \alpha_E \left(1 + \frac{1}{\eta}\right) \frac{Sales}{E}$. Thus, under our modeling assumptions, the sales elasticity with respect to owner effort equals $\alpha_E \left(1 + \frac{1}{\eta}\right)$, enabling us to test the null hypothesis by testing whether the sales elasticity is zero. Moreover, dividing the sales elasticity by $\left(1 + \frac{1}{\eta}\right)$ provides a quantitative estimate of the importance of entrepreneurial effort α_E.[31]

2. **The accumulation hypothesis:** Under this hypothesis, firms enjoy constant returns to scale with constant unit costs, enabling them to accumulate as much capital as their product demand merits. This view contrasts with the scarcity view, in which unit costs increase with scale due to the imperfectly elastic supply of inputs such as owner effort. Consider, for example, a physician's office (or law firm, computer systems design firm, or economic consultancy). If the demand for firm output doubles (i.e., $D_j \Uparrow$), it can hire twice as many nurses and administrators, purchase twice as much office space and equipment, but will struggle to double the lead doctor's effort, especially if she is already working 70 hours per week. Consequently, the firm will respond largely by raising prices rather than by increasing output.[32] We imagine the same constraint binding for talented managers of firms across diverse industries. Thus, similar to the argument of Katz and Murphy (1992), the evolution of output prices and quantities can provide evidence that points to an important role for a scale-limiting factor like the effort of skilled owner-managers.

5 The Impact of Owner Deaths

This section tests the rentier hypothesis—that firm performance is independent of owner effort—by testing whether the death of a non-elderly owner affects firm performance. We find that the average premature owner death causes a 61% decline in firm profits.

[31] Under the rentier null, all components affecting firm sales — appeal D_j, productivity A_j, labor L_j, and capital K_j — are independent of the owner's effort E_j. However, a more reliable estimate of α_E requires adjusting for changes in other inputs when the firm scales down. In Appendix B.3, we show that this factor adjustment term can be identified by multiplying the non-owner factor share by the employment elasticity.

[32] Price increases $\hat{p}_j = \frac{\hat{D}_j - \hat{S}_j}{\epsilon^S - \eta}$ are the net shock to demand scaled by the sum of supply and demand elasticities and the quantity increases $\hat{y}_j = \frac{-\eta \hat{S}_j + \epsilon^S \hat{D}_j}{\epsilon^S - \eta}$ are an elasticity-weighted average of the shocks. Appendix B.4 shows how ϵ^S relates to α_E and ε, and how S_j relates to TFP, talent, and factor prices. Appendix B.5 discusses potential forces limiting the responsiveness of firm entry to profit increases.

5.1 Owner Deaths Analysis Sample and Variable Definitions

We construct an owner deaths analysis sample—comprising firms with owner deaths matched to firms without owner deaths—as follows. We obtain owner year of death from Social Security Administration files housed alongside tax records, linked to our main sample. We refer to a firm-owner-year observation in the main sample as experiencing a year-t owner death when: (a) the owner was aged 64 or younger at the end of year t and had $t-1$ personal income in the top 1%; (b) the owner died in year $t \in [2005, 2010]$; (c) the firm had no other owners 2001-2014 who died in the year of or immediately after being an owner; and (d) the firm had at least \$100,000 in sales in at least one year in $[t-4, t-1]$, the firm had positive sales in all years $[t-4, t-1]$, and the firm had positive employment in some year $[t-4, t-1]$.[33]

We then match each such owner-death firm-owner-t observation to all "counterfactual" firm-owner-t observations that satisfy the following criteria: (a) the firm never had an owner die in the year of or immediately after being an owner; (b) the firm had at least \$100,000 in sales in 2014 dollars during at least one year in $[t-4, t-1]$, the firm had positive sales in all years $[t-4, t-1]$, and the firm had positive employment in some year $[t-4, t-1]$; and (c) the observation matches the owner-death observation along four dimensions. Those four dimensions are: the owners were in the same five-year age bin in year t, the owners were in the same income fractile (99th to 99.5^{th} percentile, 99.5^{th} to 99.9^{th} percentile, or top 0.1%) in $t-1$, the firm had the same three-digit NAICS industry code, and the firm had the same sales decile (defined after applying all other sample restrictions) in $t-1$.

The sample restrictions and matching procedure serve the following purposes. Restricting to ages below 65 ensures that we examine owner deaths representative of typical owners (who are working-age) rather than typical dying owners (who skew older). Restricting attention to deaths in years 2005-2010 allows us to construct a balanced panel of firm observations between four years before and four years after the death using our 2001-2014 data. Restricting to firms with substantial pre-period sales and positive employment focuses our analysis on economically active firms. Matching on the various dimensions assists in identifying counterfactual firms that would plausibly exhibit common trends to owner-death firms in the absence of the owner death. The matching procedure is similar to other death-based event studies (Jaravel, Petkova and Bell, 2015; Jäger, 2016) except that it uses all matched counterfactual observations rather than selecting one at random.[34]

[33] Most dying owners have a firm-owner observation in the year of death. We also include owner deaths that occur one year after the last year the owner is in the main sample. Each firm-owner death is included only once: a firm-owner's year-t death observation is omitted when the owner died in $t+1$ and the firm-owner has an observation in $t+1$.

[34] Using all matched counterfactual observations is akin to the reweighting procedure of DiNardo, Fortin and Lemieux (1996) and increases precision when analyzing outcomes conditional on survival by both the

After conducting the matches, we construct a balanced panel of firm outcomes for each owner-death firm j and each counterfactual firm j' for every year between four years before and four years after the death. If the firm exits the sample (i.e., no longer files a Form 1120S income tax return), the firm is coded as having zero sales and zero profits in exited years. We discuss the interpretation of firm exits below. Our owner deaths analysis sample comprises 2,717,748 matched pair-year observations: nine years of observations on each of 2,509 owner-death firms and 301,972 counterfactual firms. Our owner deaths analysis subsample of top 0.1% owner deaths comprises 221,004 matched pair-year observations: nine years of observations on each of 455 owner-death firms and 24,556 counterfactual firms. Appendix Table A.5 provides a waterfall showing how sample restrictions produce our analysis sample.

We analyze two main outcomes: firm survival and profits per pre-period worker. Firm survival in a year s equals an indicator for whether the firm has positive sales in s. Profits per pre-period worker in a year s equals firm profits in s divided by the firm's mean annual workers across years $[t-4, t-1]$ where t denotes the owner death year.

5.2 Event Study Estimates

We use our owner deaths analysis sample of matched owner-death and counterfactual firms to estimate difference-in-differences impacts of owner deaths, as follows. Let j denote an owner-death firm and j' denote one of the counterfactual firms. For each matched pair-year observation, we compute the difference in the outcome of interest between the owner-death firm and the counterfactual firm in the given year, i.e., $\Delta Y_{jj's} \equiv Y_{js} - Y_{j's}$. We then regress that difference on event-time indicators in an event study specification:

$$\Delta Y_{jj's} = \sum_{k \in \{-4,-3,-2,0,1,2,3,4\}} \beta_k D^k_{js} + \varepsilon_{js} \tag{4}$$

where D^k_{js} is an indicator for owner-death firm j having experienced an owner death k years in the past. The coefficients of interest β_k provide the time path of mean owner-death firm outcomes relative to the period before the owner death which is normalized to zero. Note that because there are no controls, the coefficients β_k are raw differences-in-differences of the outcome means between owner-death firms and counterfactual firms between year $t-1$ and other years. We ensure that each owner-death firm carries equal weight in the regression by weighting each $jj's$ observation by one over the number of counterfactual (j') firms matched to the owner-death firm (j). We cluster standard errors by owner-death firm j.

Figure 5A plots point estimates and 95% confidence intervals from equation 4 estimated in

owner-death firm and the counterfactual firm (Table 4 columns 3 and 9 below).

our top-1% owner deaths analysis sample for the outcome of firm survival. Plotted estimates are mechanically zero prior to owner death because all firms survived until the death by construction. The negative estimates after owner death imply that survival rates of owner death firms relative to counterfactual firms decline immediately and persistently after the owner death. The right-most data point is our focal estimate, also reported in Table 4A column 1; the average top-1% owner death caused her firm to be 0.210 percentage points less likely to have survived four years after the owner death, relative to counterfactual firms. The effect size is precisely estimated, with a t-statistic of 21. Hence, we reject the rentier hypothesis: firm owners are instrumental to firm performance.

We scale our regression estimates to compute a preferred percentage effect interpretation. Table 4 column 1 reports that counterfactual firms had a four-year survival rate of 85.2% and that the average dying owner owned 60.2% of the owner-death firm. We also estimate that 28.6% of firm exits represent firm reorganizations rather than firm shutdowns.[35] We therefore interpret our 0.210-percentage-point point estimate as implying that the death of a 100% owner causes firm survival to fall by 29.3% ($= .210 \times (1 - .286)/.852/.602$).

Figure 5B presents results for profits per pre-period worker. Unlike Figure 5A, the pre-period estimates are not mechanically zero. The flat pre-period trend corroborates the common trends assumption underlying our difference-in-differences analysis—that in the absence of the owner death, profits per pre-period worker among owner-death firms and among counterfactual firms would have trended similarly. Profits per pre-period worker decline immediately and persistently at owner-death firms relative to counterfactual firms upon owner death. The rightmost data point, also reported in Table 4A column 2, indicates that the mean top-1% owner death caused a $12,307 decline in profits per pre-period worker four years after the owner death. The effect is precisely estimated, with a t-statistic of 6. Given the counterfactual firms' $t+4$ mean of $24,015 and the preceding paragraph's logic, we interpret our estimate as implying that the death of a 100% owner caused firm profits to decline by 60.7%.

The larger percentage impact of owner deaths on profits than on survival suggests that the profit impact occurs on both the extensive (firm survival) and intensive (firm performance)

[35]Some firm exits are not shutdowns: the firm reorganizes under a different employer identification number either through bankruptcy or sale. We do not directly observe firm reorganizations, so we infer reorganizations by whether most of the exiting firm's workers subsequently appear as coworkers at another firm. Specifically, for every owner-death firm that had zero sales in year $t+4$ and denoting its first year of zero sales (i.e., its first fully exited year) by s, we identify the largest single employer other than the owner-death firm across years s and $s+1$ of the firm's $s-1$ workers excluding the dying owner. 28.6% of exiting firms with at least two $s-1$ workers were reorganizations, in which the largest single employer following the owner death employed over half of the owner-death firm's $s-1$ workers. We do not adjust for counterfactual firms' reorganizations, making our estimates conservative.

margins. Table 4A column 3 tests for intensive margin effects by restricting the analysis to pairs of owner-death firms and counterfactual firms that survived four years after the owner death. We find in this subsample that the average owner death caused firm profits to decline by \$5,090 four years after the owner death. After scaling this estimate by the outcome mean and ownership share, our preferred percentage impact of -39.6% suggests that approximately two-thirds of the profit impact of owner deaths is along the intensive margin.

Columns 4-6 report heterogeneity and placebo estimates that corroborate our rejection of the rentier hypothesis. First, one might expect majority owners to be more likely to actively manage their firms than minority owners and therefore that a majority owner death causes a larger decline in firm profits than a minority owner death. Columns 4-5 test this prediction by repeating column 2 on the subset of owner-death firms with dying minority owners (those with less than or exactly 50% ownership) and firms with dying majority owners (all others), respectively. We find that a majority owner death causes over three times the profit decline than a minority owner death. When scaled by ownership shares, the implied percentage impacts are statistically indistinguishable. Second, the non-elderly owners analyzed in columns 1-5 are more likely to be active managers than elderly owners. Column 6 implements a placebo test by repeating column 2 in an identically constructed sample of matched owner-death firms that is based on owners who died at age 75 or greater. We find no statistically significant impact of an elderly owner death on firm profits.

We can use additional owner death estimates on sales and employment to estimate α_E, the parameter that governs the importance of owner effort for firm performance. Appendix B.3 shows that, under our modeling assumptions, $\hat{\alpha_E} = \frac{\hat{\beta}^{Sales,E} - (1-s_{owner})\hat{\beta}^{L,E}}{\left(1+\frac{1}{\eta}\right)}$ where $\hat{\beta}^{Sales,E}$ and $\hat{\beta}^{Sales,E}$ are the elasticity of sales and employment with respect to owner effort, s_{owner} is the owner share of payments, and η is the product demand elasticity.[36] Thus, we estimate $\hat{\alpha}_E = \frac{.30-(1-.45).24}{1-\frac{1}{4.5}} \approx .22$.

The preceding analyses considered firms with dying top 1% owners, including top 0.1% owners. Figures 5C-D and Table 4B repeat the analysis on the 461 owner-death firms with a dying top-0.1% owner. Regression results are qualitatively similar, and preferred percentage estimates are quantitatively similar as well.

These findings contribute to a literature on the effect of managers and CEOs on firm performance using research designs based on retirements, family succession, and CEO deaths. Johnson, Magee, Nagarajan and Newman (1985), Pérez-González (2006), and Bennedsen,

[36] The values and sources for each parameter estimates are described in Appendix B.3. These values result in an average estimate for α_E that can vary substantially across firms due to heterogeneity in the impacts on firm performance, owner shares, and product demand elasticities.

Nielsen, Pérez-González and Wolfenzon (2007) find that, when replacing an outgoing CEO, choosing an external CEO increases firm value and performance relative to choosing a within-family CEO. In Danish administrative data, Bennedsen, Perez-Gonzalez and Wolfenzon (2010) and Bennedsen, Perez-Gonzalez and Wolfenzon (2011) use CEO deaths and hospitalizations, respectively, to show that these events cause significant declines in profitability, with larger effects for CEOs who are younger and more likely to be actively involved in the firm's operations. The estimates from our owner death design are considerably larger than estimates from these studies, which find average effects of professional CEOs between 10 and 25 percent in terms of operating profitability. This fact underscores the central importance of active owner-managers in our setting.[37]

6 High and Rising Firm Profitability

We now explore whether capital accumulation or superior profitability is driving top incomes and their rise. Under the rentier view, top owners earn high business income purely because of scale: all firms are equally profitable, and high earners have accumulated large business holdings. However, if owner talent is an important input to production, then owners may earn high business income because their firms generate superior profitability, possibly in addition to being larger. Moreover, if the supply of effort from skilled owner-managers becomes increasingly costly, we should find that rising profitability contributes to rising profits at top-owned firms.

We find that firms owned by individuals in the top 1% and top 0.1% generate very high profitability that has grown over time. In contrast, the scale of top-owned firms has not risen. A decomposition shows that rising profitability rather than rising scale explains most of the rise in top S-corporation income. Neither risk nor assortative matching of high-earners to highly profitable firms explains the results. We also show that rising pass-through income is a largely real rather than reporting phenomenon.

6.1 High Profitability

To test whether top-owned firms generate especially high profitability, we begin by binning year-2014 owners in the main sample by their personal income rank in the overall U.S. income distribution. We confine attention to the top personal income decile, where the vast majority of S-corporation income accrues. The bins are one-percentile wide, except in the

[37] Consistent with our findings, Jäger (2016) uses German data to show that manager deaths cause a decline of average yearly wages among incumbent workers of approximately 1%. However, his paper does not estimate effects on firm performance.

top 1% where we consider bins between the 99th percentile and 99.5th percentile, the 99.5th percentile and 99.9th percentile, and the top 0.1%.

We then compute mean profitability—measured as profits per worker—across firms owned by individuals within each personal income bin, with and without controls, as follows. When not using controls, we compute the mean profitability across owner-firm observations within each bin weighting by firm scale (the number of workers).[38] Our main specification controls for industry (four-digit NAICS) by removing profitability variation across owner income bins that is correlated with industry fixed effects.[39] We similarly execute a specification in which we control for interactions of industry fixed effects and firm size ventiles (five-percentile-point bins of firm sales).

Figure 6A plots the results. The series in red squares is our preferred specification, which plots mean profitability net of industry fixed effects. If profitability did not vary systematically by owner income, the series would be flat. Instead, the series is highly convex. Firms owned by top 0.1% earners enjoy profitability ($16K per worker) that is over twice as large as the profitability ($7.5K per worker) of firms owned by individuals in the bottom half of the top decile. The graph displays similar patterns without controls and when controlling additionally for firm size.

Panel A's convex profitability-income gradient implies that top owners do not earn high business income solely because their firms operate at larger scale. Instead, their firms generate superior profits per unit of scale. Figure 6B demonstrates that high firm profitability is a persistent and systematic characteristic of high earners. It replicates Panel A in the subsample of startups, plotting the profitability-income gradient using owner income ranks from the year *before* the owner founded the startup. A firm qualifies as a startup in year t if it filed an S-corporation income tax return in year t and did not file a business income tax return of any kind before year t. We find all such owner-startup observations in the main sample in years 2001-2010 and define the owner's income rank using her personal income in the year before she founded the startup. Then for each startup year, we produce a profitability-income gradient net of industry fixed effects, using profitability from the startup's fifth year of existence and conditioning on startups that survive for at least five years. We then average

[38] We focus on firms with positive workers. We winsorize profitability at the 1st and 99th percentiles across the year's top-decile owner-firm observations. We do not apportion profits and workers to owners according to ownership shares. Results are similar when apportioning (Appendix Figure A.6).

[39] Specifically, we compute profitability at the owner-firm level for all owners in the top personal income decile, regress profitability on industry fixed effects weighted by the number of workers, compute residuals, add a constant to the residuals such that the sum of the product of the residuals and the number of workers equals total profits, and then compute the employment-weighted mean of each bin's residuals. The addition of the constant ensures that the overall employment-weighted mean profitability is constant across specifications.

those gradients evenly across years and plot the mean gradient in circles in Panel B.

Startups founded by top earners go on to be much more profitable in their fifth year than those started by other lower earners.[40] The panel also shows that we find similar results when including all startups regardless of how long they survive, computing each startup's profitability as total profits in the startup's first five years divided by total annual workers in the startup's first five years. Hence, superior firm profitability is a persistent and systematic characteristic of high earners. Not only does this reject the accumulation view, but it also has important implications for wealth estimates—uniform return assumptions may overstate wealth estimates at the top of the income distribution.

6.2 Rising Profitability, Not Rising Scale

We now turn to investigating the relative importance of rising profitability versus rising scale for explaining the rise in top business income. We first separately analyze the time series of profitability and scale. Then, we quantify their relative contributions to rising top business income.

Figure 6C analyzes the profitability of top-owned firms in the time series. We construct annual versions of the profitability-income gradient of Figure 6A and plot two quantities: mean profitability among top-0.1%-owned firms and the profitability of firms owned by the individuals in the 90th-95th percentiles over time 2001-2014. The figure shows that top-owned firms have doubled in profitability, from $8K per worker in 2001 to $16K in 2014. Moreover, the graph shows that the profitability of P90-P95-owned firms rose much less. Thus, top owners generate superior profitability that has risen dramatically over time.

To investigate how much top-owned firm scale has also risen over time, Figure 7 plots two measures of the distribution of S-corporation activity across firms of different scale. We measure scale as the firm's number of workers and plot distributions in three years: 2001, 2007, and 2014. Panel A plots the share of workers across four scale bins: firms with fewer than 10 workers, firms with 10-50 workers, firms with 51-100 workers, and firms with over 100 workers. The share of workers at firms with over 100 workers has *fallen* slightly over time from 57% in 2001 to 50% in 2014. Panel B shows a similar pattern for the distribution of firm profits across the four scale bins. Thus, firm profitability has risen over time, while scale has not.

Panels A and B of Figure 8 summarize the lessons of this subsection and the previous subsection by plotting how S-corporation profitability and scale has evolved since 2001, by owner income groups. Panel A plots aggregate profits per worker for three different types of

[40] Note that these firms have existed for only five years, so the magnitude of performance advantages may differ relative to the full sample of top-owned firms for firm life-cycle reasons.

S-corporations: those with a top 0.1% owner, those with an owner in the top 1-0.1%, and those without a top owner. Top-owned firms exhibited high and rising profitability. Panel B shows firm scale (the number of workers) rather than profits per worker. Similar to Panel A's profitability patterns, top-owned firms are larger than other firms in the cross-section: they employed roughly 125 more workers than non-top-owned firms on average in 2001. But unlike Panel A's profitability patterns, top-owned firms shrunk on average between 2001-2014. The scale difference between top-owned firms and non-top-owned firms also fell between 2001-2014. Together, these facts indicate that rising profitability rather than rising scale explains the rise in top S-corporation income.

To quantify the degree to which rising profitability rather than rising scale explains rising top S-corporation income, Figures 8C and 8D decompose the growth of S-corporation profits for top-1-0.1%- and top-0.1%-owned firms, respectively. The graphs show how profitability and components of scale evolved relative to their 2001 levels. Specifically, we plot the following components:

$$\underbrace{\frac{\pi_t}{\pi_{01}}}_{\text{Profit Growth}} = \underbrace{\frac{\pi_t/L_t}{\pi_{01/L_{01}}}}_{\text{Profitability Growth}} \times \underbrace{\frac{L_t/Owner_t}{L_{01}/Owner_{01}} \times \frac{Owner_t/Firm_t}{Owner_{01}/Firm_{01}} \times \frac{Firms_t}{Firms_{01}}}_{\text{Scale Growth}} \tag{5}$$

where growth is defined as the ratio of the current value (denoted by t) to the value in 2001 (denoted by 01), profit π is aggregate S-corporation profits for a given set of firms, profitability is the ratio of profits to scale (the number of workers), and scale can be decomposed further as the product of three terms: the number of workers per owner, the number of owners per firm, and the number of firms. Panels C and D show that for top-owned firms, aggregate profits doubled since 2001. Profitability also nearly doubled for top-owned firms, while scale and each of its subcomponents did not increase since 2001, except a modest increase in the number of firms. This decomposition illustrates that rising profitability explains nearly all of the growth in top S-corporation profits.

Table 5 reports the precise results of our decomposition for 2001-2014, both overall and across sector. The table has three panels: all owners in A, top-1-0.1%-owned firms in B, and top-0.1%-owned firms in C. Profit growth was broad-based across industries and the largest growth overall was in healthcare and information and professional services. Profitability growth was also broad-based, with profitability increases of over 40% in every sector, and the largest increase in manufacturing. Profitability increases coincided in many cases with reductions in workers per firm and owners per firm. The number of firms increased generally and especially in healthcare. Overall, profitability growth accounts for 73.4% (= 84.48/115.10) and 87.7% (= 81.69/93.16) of the growth in top-1-0.1% and top 0.1% S-corporation profits,

respectively.

6.3 Not Risk or Rising Assortativeness

This subsection tests two alternative explanations for high and rising profitability at top-owned firms. The first potential explanation is undiversifiable risk, which is a common explanation for high profitability. For example, if top-owned firms have a higher probability of failure, owners could be compensated for that risk by higher profitability in years of survival. The blue circles (left axis) in Figure 9A plot the share of year-2001 firms in the main sample that had exited the sample by 2014 (which typically indicates failure) versus 2001 owner personal income rank, weighting by the firm's 2001 number of workers. Rather than experiencing higher exit rates than average, top-owned firms experienced lower exit rates than average. This finding suggests that top-owned firms exhibit higher profitability and lower risk.

Whereas the exit rate measure proxies for risk along the extensive margin of firm exit, we employ a second measure that proxies for risk: a version of the Sharpe ratio, computed within each personal income bin. The Sharpe ratio—typically defined as an asset's mean return divided by the standard deviation of its returns—is commonly used in finance to assess whether an asset's return compensates for its risk. A high Sharpe ratio indicates returns in excess of what one would expect given the risk. In our context, higher Sharpe ratios among top-owned firms would indicate that top-owned firms' high profitability more than sufficiently compensates their owners for their risk. For each year 2011-2014 in the main sample, we compute each personal income bin's Sharpe ratio as the ratio of employment-weighted mean profitability to the employment-weighted standard deviation of profitability across owner-firm observations. We then average those within-bin Sharpe ratios evenly across years and plot the means in the green triangles (right axis) of Figure 9A. Top income bins have higher standard deviations of profitability, indicating somewhat higher risk. However, profitability is so much higher in top income bins that we find higher Sharpe ratios among top-owned firms. This finding suggests that higher risk does not explain higher profitability among top-owned firms.

Turning to the time series, we further use the Sharpe ratio to test whether rising risk among top-owned firms explains rising top-owned firms' profitability. In Figure 9A, we plot a 2001-2004 version of the 2011-2014 Sharpe ratio curve defined above. If rising risk explained rising top-owned-firms' profitability, we would expect the top bins' 2011-2014 Sharpe ratio values to lie below their 2001-2014 values. Instead, the 2011-2014 values lie above the 2001-2014 values: top-owned firms in 2011-2014 appear to have enjoyed higher

profitability without commensurately higher risk. Hence, we do not find evidence that higher risk explains higher profitability among top-owned firms—neither in the cross section nor in the time series.

Finally, we consider a second explanation for rising profitability at top-owned firms: ownership reallocation such that top owners are increasingly assortatively matched with highly profitable firms. Under this explanation, the distribution of firm profitability has not changed; all that has changed is the mean income rank of the owners at the most profitable firms. We test this possibility by ranking firms in the main sample according to their profitability in each year. We then plot in Figure 9B the mean firm profitability rank for different top-owner groups: the top 0.1%, top 0.1-top 0.5%, top 1%-top 0.5%, and top 2%. The graph shows that top owners tend to own higher ranked firms. However, the average rank is quite stable over time.

The stability in the allocation of top firm ownership found in Panel B implies that diverging firm performance explains rising profitability among top-owned firms. Panel C illustrates this fact directly. It plots percentiles of the S-corporation profitability distribution for each year 2001-2014. The graph shows that the firm-level profitability distribution widened at the top. While the 25th percentile and median profitability across each year's S-corporations has been relatively stable, the 75th percentile and especially the 95th percentile have increased. Thus, diverging firm profitability rather than a rising assortative matching of the most-profitable firms to high-income individuals accounts for the rising profitability enjoyed by top owners.

To sum up, this section has shown that high and rising profitability among top-owned firms explains the vast majority of rising top S-corporation income in the twenty-first century. The high and rising profitability enjoyed by top owners is not explained by high or rising risk but reflects high and rising profitability of the most profitable firms.

6.4 Not a Reporting Phenomenon

When business income is earned in C-corporation form, corporate income taxes never appear on personal income tax returns and retained earnings do not appear in the year the income is earned and may never appear. The rising top S-corporation income documented in Section 1 could therefore reflect relabeling of business income, as businesses reorganized from C-corporation form to S-corporation form and entrants increasingly chose S-corporation form. We now demonstrate that most of the rise in top S-corporation income is in fact a real economic phenomenon.

Figure 10A uses SOI aggregate statistics to highlight the possibility that the rising top

S-corporation income documented in Figure 1C does not represent a real rise in business income. We plot the S-corporation share of three measures of total (C+S+P) corporate and partnership activity: the total number of firms, total profits, and total sales. After the Tax Reform Act of 1986 changed the incentives to organize business activity as an S-corporation, the S-corporation share of the number of total corporate firms and partnerships rose from 16% to 47% in 2012. Similarly, the S-corporation share of total corporate and partnership profits rose from 4% to 20%, and the S-corporation share of total corporate and partnership sales rose from 5% to 19%. The rising S-corporation share of total corporate and partnership profits indicates that some share of rising top S-corporation income is an artifact of changes in the organizational form through which business income is reported. However, Figure 10B shows this rapid increase in the number of S-corporations is due to S-corporations that are not owned by top earners. For instance, the number of S-corporations that have top 0.1% owners was actually slightly lower in 2010-2014 (roughly 135 thousand S-corporations) than it was in the early-to-mid 2000s (roughly 140 thousand S-corporations).

To assess the reporting concern more directly, we collect data from the population of businesses that switch corporate forms between 2001 and 2014. On average, approximately sixty-seven thousand C-corporations switch each year, corresponding to between 3 and 5 percent of total potential C-corporations. To evaluate the importance of these switchers for the aggregate growth of S-corporation profits, consider the decomposition

$$\Delta Y_1 \equiv \Delta Y_0 + [\Delta Y_1 - \Delta Y_0] = \Delta Y_0 + \Delta Z, \tag{6}$$

where Y_1 is total S-corporation profits, Y_0 is counterfactual S-corporation profits without any switchers, and Z refers to S-corporation profits not driven by organic factors. We measure ΔZ by cumulating profits earned by all switchers between 2001 and 2014. This figure amounts to \$70.5B, or 30% of the total growth in S-corporation profits of \$235.2B. Thus, 70% of the growth in S-corporation profits is due to firms that did not switch from C-corporation form during this time. However, this calculation neglects the role of organic entry and exit. If changes in the propensity to enter or exit as an S-corporation have led to a differential increase in the share of total activity in S-corporation form, this could account for some share of ΔZ not captured by our switchers analysis.

To explore this concern, Figure 10C decomposes the level of S-corporation profits between 2001 and 2014 into actual S-corporation profits and the share attributed to organizational form changes. To correct for the effect of differential net entry into the S-corporation sector, the decomposition assumes the level of S-corporation sales remains a constant share of total business sales (including S-corporations, C-corporations, and partnerships) for each

4-digit NAICS industry throughout the time period. The top bars represent the share of S-corporation profits that are due to S-corporations having a higher share of total business sales relative to 2001. Figure 10D applies the same transformation to decompose the growth in S-corporation profits among those with top 0.1% owners.

Figure 10C shows that in 2014, the share of profit levels due to organizational form changes was approximately 15%, while 85% of S-corporation profits remain under the constant share assumption. In terms of growth, Figure 10D shows that actual top profits doubled between 2001 and 2014 in real terms, while counterfactual profits rose roughly 75%. Thus, most of the growth in top profits remains after adjusting for corporate form reorganization.

6.5 Discussion of Retained Earnings

Our analysis considers all directly observed income reported on personal income tax returns, excluding realized capital gains and transfer payments. A substantial share of national capital income does not appear on personal income tax returns (Piketty, Saez and Zucman, 2018). The key omitted component of national capital income is the retained earnings of C-corporations (i.e., earnings not distributed as dividends). Imputations of retained earnings can affect the magnitude of top income growth and its composition (Clarke and Kopczuk, 2017; Auten and Splinter, 2016), including due to re-ranking of which individuals are in the top 1% (Piketty, Saez and Zucman, 2018). Given the fact that retained earnings are not directly observed, there is inherently more uncertainty about the distribution of retained earnings.

We conjecture that including the true distribution of retained earnings would not overturn the conclusion that the working-rich remain quantitatively important at the top of the income distribution. First, the vast majority of top earners in our data—in 2014, 88.0% of the top 1% and 89.0% of the top 0.1%—earn most of their income in the form of pass-through income or wage-and-salary income, strengthening our conclusions based on pass-through income alone.[41] Second, and like pass-through income, some retained earnings are likely disguised labor income, for example, from the active management of companies by private equity partners that realize some income in the form of "carried interest" capital gains.[42] Third, plausible distributions of retained earnings could have a limited impact on whether the typical top-earner earns most of her income through labor or the importance of pass-through income

[41] These shares are nearly equal because the pass-through share of income rises with income rank approximately as much as the wage-and-salary share of income falls with income rank. When including realized capital gains in defining the income and percentile thresholds, the shares are 77.7% and 66.0%, respectively.

[42] Startups are also reported to routinely issue stock and options to executives at below-market prices, allowing executives to accrue labor income in the form of lightly taxed retained earnings.

for aggregate top income growth.[43] Last, many top earners with majority-passive income are self-made individuals who accumulated their wealth by saving their entrepreneurial labor income and who continue to work—typified by founders of successful new ventures who still manage those or similar firms (Kaplan and Rauh, 2013*a*)—such that many majority-passive earners are not retired and are still working. Promising avenues for future research include investigating the life-cycle dynamics of entrepreneurship and collecting data that link C-corporations to their owners, building on what we have done here for S-corporations and partnerships.

7 Implications of Disguised Wages

Our evidence has suggested that top business income does not simply derive from passive returns to accumulated capital. Instead, a large share of top earners derive private business income as active owner-managers, which implies that some portion of top private business income is wage income in disguise. We close our analysis by quantifying two implications of this finding.

7.1 Disguised Wages and the Corporate Sector Labor Share

Our paper has found in the universe of S-corporations that a large share of business profits derive from the active participation of owner-managers. Owner-managers have leeway in whether they report their income for tax purposes as wages or as profits. C-corporation owner-managers face tax incentives to report their income as wages while S-corporation owner-managers face tax incentives to report it as profits. We show in this subsection that this fact substantially affects the measurement of changes in the U.S. corporate sector labor share. The U.S. corporate sector comprises C-corporations and S-corporations. The Tax Reform Act of 1986 made S form tax superior to C form for eligible firms. Ever since, the share of business activity in S form has risen while the share in C form has fallen.

[43] Estimates of U.S. public stock ownership suggest that public stock accounts for most of the rise in U.S. retained earnings, a substantial share of which is owned by pension funds, in retirement accounts, and by foreigners (Rosenthal and Austin, 2016). For the share held by individuals, the top 1% in terms of wealth own 38% of stocks, including stocks held indirectly through retirement accounts, according to the 2013 Survey of Consumer Finances (Wolff, 2016). Taxable dividends paid to top-1% earners amount to just 20% of total taxable dividends in recent years, and just 5% of retirement account distributions were paid to top 1% individuals—though these income shares would change if retained earnings were used to re-rank individuals (Piketty, Saez and Zucman, 2018). In addition, for any given level of retained earnings accruing to the top-1%, top-1% retained earnings may be quite concentrated among a small number of top earners such as Bill Gates and Mark Zuckerberg, which would indicate that the typical top earner is working-rich regardless of how much retained earnings accrue to the top few people.

This transformation of C-corporation activity into S-corporation mechanically reduces the measured labor share, given owner-managers' incentives to report their income as profits rather than wages under S form.

We use a sample of firms that switch from C-corporation to S-corporation form to study the role of corporate form changes for trends in the aggregate labor share in the U.S. Figure 11 presents evidence that a nontrivial share of S-corporation profits would have been reported as labor payments if the firms organized as C-corporations. To show this, we plot average labor payments (including officer compensation) and profits relative to contemporaneous firm sales, conditional on firm and calendar year fixed effects, for a sample of 259,957 S-corporations that switched from C-corporation form to S-corporation form between 2001 and 2014. The sample includes firms that are of non-trivial size and present for at least 4 years prior to the switch event.

Figure 11A plots the impacts on profits and labor payments for all firms. On average, labor payments fall sharply in the event year by 1.95% on average relative to sales, which are offset by a profit margin that increases by 1.76% on average. The substition of wages to profits around switching provides further evidence of active participation among S-corporation owners. This behavior is difficult to arrange for firms where owners and top managers are separate, because the firm would be underpaying and overpaying different people.

Figures 11B-D present subsample analyses. Panel B shows that offices of physicians and dentists, which are closely held with relatively few workers, display much larger responses than the full sample. For this group, profit margins increase 7.81% and labor payments fall 6.36% relative to sales following a switch. Panel C shows that when large firms (i.e., with mean sales > \$50M) switch, approximately zero relabeling occurs. Panel D shows that small firms that switch (i.e., with mean sales < \$5M) show similar patterns to the full sample. This result reflects, in part, the fact that these firms account for 85% of the sample.

How much would the corporate sector labor share have declined if all corporations were C-corporations? To answer this question, we combine labor share data from Karabarbounis and Neiman (2014), aggregate S-corporation sales going back to 1980 from SOI, and our estimate of the effect of organizing as an S-corporation on reported labor compensation relative to sales (1.95% of sales). Figure 12A displays our results. In 2012, the last year for which labor share data are provided by Karabarbounis and Neiman (2014), our estimate implies that roughly \$116B of aggregate S-corporation profits are disguised wages. Thus, we estimate that the aggregate labor share is understated by 1.4 percentage points. Since 1980 the labor share in the U.S. corporate sector fell 7.5 percentage points from 64.7% to 57.2%. Our counterfactual series shows a decline of 6.3 percentage points, 16% smaller than in the raw data. This finding shows that the fact that owners actively generate their business income

meaningfully affects economic measurement of different components of national income, in the real-world environment of changing tax policy.[44]

7.2 Disguised Wages and Tax Policy

A simple tax implication of our results is that, under current law, the federal marginal tax rate on labor income falls at the top of the income distribution. As explained in Section 2.1, wage income is subject to both the federal ordinary income tax (39.6% at the top) and additional federal labor income taxes (the 2.9% employee and employer Medicare taxes and the 0.9% Affordable Care Act Additional Medicare Tax on labor income), while active S-corporation income is subject only to the personal income tax.[45] Our analysis of the profit impact of an owner death yielded an estimate of 61% of the share of S-corporation profits. In this subsection's exercise, we will interpret that finding as showing that 61% of top S-corporation income is wage income in disguise. We apply these parameters to the 2014 SOI personal income tax sample in order to estimate the effective federal marginal tax rate on labor income at various points in the personal (i.e. labor plus other) income distribution. We define labor income as Form 1040 Wages, Salaries, and Tips (explicit wages) plus the disguised wages share of active S-corporation income.[46]

We find that the effective marginal tax rate on labor income rises as one's personal income breaches the top ordinary income tax bracket (above $457,601 for married-filing-jointly tax units and somewhat less for other units). However, disguised wages constitute a larger share of labor income among very-high-income tax units than among lower-income units. As a result, we find that the effective federal marginal tax rate on labor income falls at the very top of the income distribution.[47] From a positive perspective, the results suggest that high-

[44]The overstatement of corporate profits and understatement of wages is also important for government estimates of the projected shortfall for payroll-tax-funded programs, such as Social Security and Medicare. See Congressional testimony by the Congressional Budget Office (CBO, `http://www.cbo.gov/publication/51988`) and the Social Security Administration (SSA, `https://www.ssa.gov/legislation/testimony_092116.html`) for more detail.

[45]None of the Affordable Care Act's surtaxes applied to active S-corporation income.

[46]For tax units with both explicit wages and disguised wages, we compute the tax unit's marginal tax rate on labor income as the weighted average between its marginal tax rate on explicit wages and its tax rate on disguised wages, with weights equal to their respective shares of labor income. The marginal top tax rate on explicit wages equals 43.4%. The marginal top tax rate on disguised wages equals 39.6%. Tax units subject to the alternative minimum tax are assigned a marginal income tax rate equal to the maximum of their marginal ordinary income tax rate and their marginal alternative minimum tax rate.

[47]Appendix figure A.11 plots the effective marginal tax rate by broad income group within the top tax bracket. Tax units with personal income between $1 million and $50 million face a 42.8% tax rate on their marginal dollar of labor income. That marginal tax rate falls as personal income rises above $50 million, down to 42.0% among tax units with over $100 million in personal income. Though the decline in the marginal labor income tax rate is small in absolute magnitude, its negative direction contrasts with normative tax prescriptions for rising or flat top labor income tax rates (Diamond, 1998; Saez, 2001) and the apparent

earners' relative ability to earn wage income in the form of S-corporation income allows them to enjoy lower taxes than those less well off.

8 Conclusion

This paper uses administrative income tax data linking 11 million firms to their owners to find that private business owners who actively manage their firms are key for top income inequality. The majority of top earners receive some private business income—most of which accrues to active owner-managers of mid-market firms in relatively skill-intensive and unconcentrated industries. Top-owned firms' profits fall substantially after a premature owner death. Top-owned firms are twice as profitable as other firms despite similar risk, and rising profitability at top-owned firms explains most of the rise in top profits. Taken together, this evidence rejects the hypothesis that high and rising top business income reflects passive returns to high and rising capital accumulation. Instead, the working rich remain central to rising top incomes in the twenty-first century.

We highlight six implications:

First, much of rising top income inequality remains consistent with rising returns to top skill, though we stress that our findings are silent on the social value of those returns. In particular, the returns to owner-manager skill can include returns to rent-seeking, elite connections, and unequal access to the opportunity to enter certain professions, industries, or markets.

Second, firm-level variation in profitability amplifies top income inequality, with firm ownership being a key channel through which firms matter for inequality. The role of owners for firm profitability may also play a role in accounting for persistent dispersion in firm productivity.

Third, wage earnings data likely understate the returns to education and skill at the top of the income distribution, because wage data miss a significant share of income derived from operating a business.

Fourth, top wealth estimates based on capitalized income flows and a constant returns assumption can be improved by accounting for the higher profitability of top-owned firms.

Fifth, conventional measures overstate the decline in the U.S. labor share as well as marginal tax rates on top labor income. As a result of differences in the treatment of wages and active business income, the tax code currently features quantitatively meaningful horizontal inequities as well as regressivity at the top of the income distribution, which distort the reporting of taxable income. Nevertheless, our estimate that 25-30% of the growth of

desire for rising or flat top labor income tax rates embodied in the graduated personal income tax.

S-corporation profits reflects changes in the reporting of business income implies that most of the growth in top profits is real.

Sixth, estimates of the elasticity of business income and real activity with respect to "capital" taxes likely reflect a mix of capital and labor elasticities. Our results underscore the importance of the rise of private pass-through businesses, the mixed nature of pass-through income, and the potential value of a harmonized business tax system for the twenty-first century.

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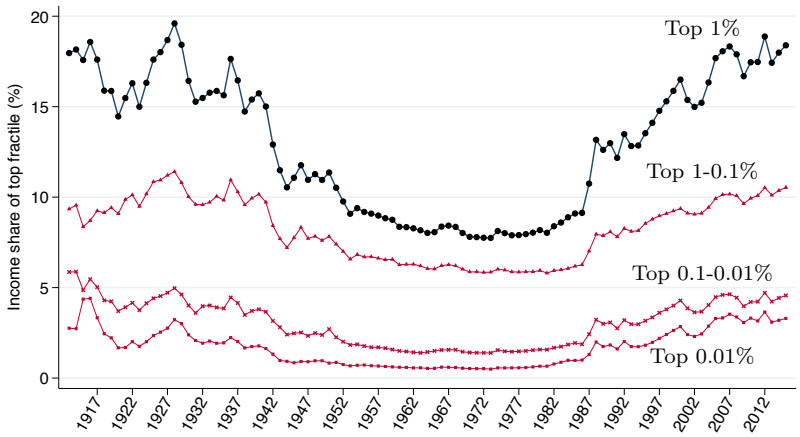
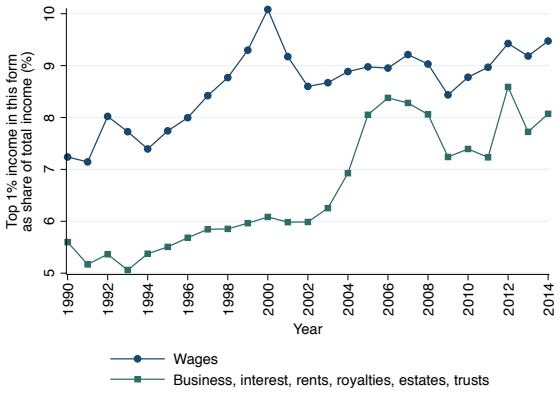
Figure 1: Rising U.S. Income Inequality and Business Income

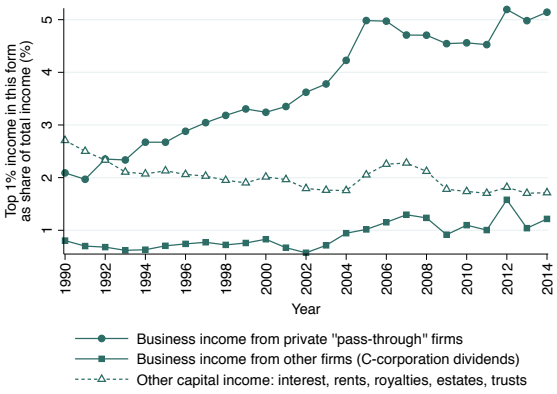
A. The Rise in Income Inequality



B. Wage Income vs. Capital Income

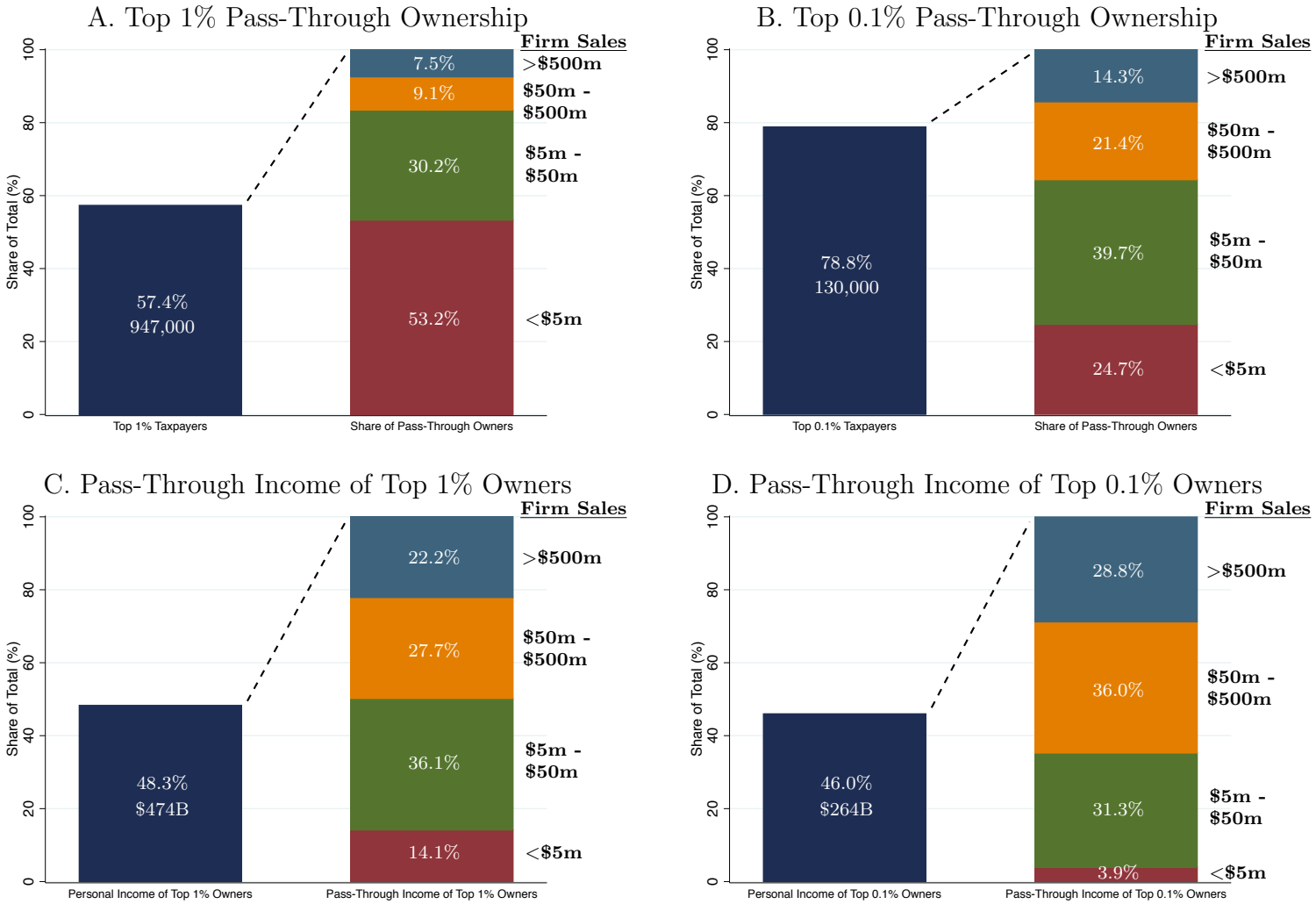


C. Types of Capital Income



Notes: Panel A uses data from Piketty and Saez (2003) to plot the share of personal income earned by the top 1%, top 1-0.1%, top 0.1-0.01%, and top 0.01%, respectively. Panel B uses the underlying source of Panel A (see Section 2.4) to decompose the top 1% income share into two components: labor income (i.e. wages, salaries, and tips and pensions and annuities, as done in Piketty and Saez) and capital income (i.e., business income, interest, rents, royalties, estates, and trusts) since 1990. Panel C decomposes capital income into income from different business entity types: pass-through firms, C-corporations (in the form of dividends) and other capital income. These series follow the baseline approach in Piketty and Saez (2003) of plotting pre-tax income excluding capital gains. See Appendix Figure A.1 for an analogous figure for the top 0.1% and Appendix Figure A.2 for a detailed breakdown by income component for the top 1-0.1% and the top 0.1%.

Figure 2: Most of Top 1% and 0.1% Earn Pass-Through Income



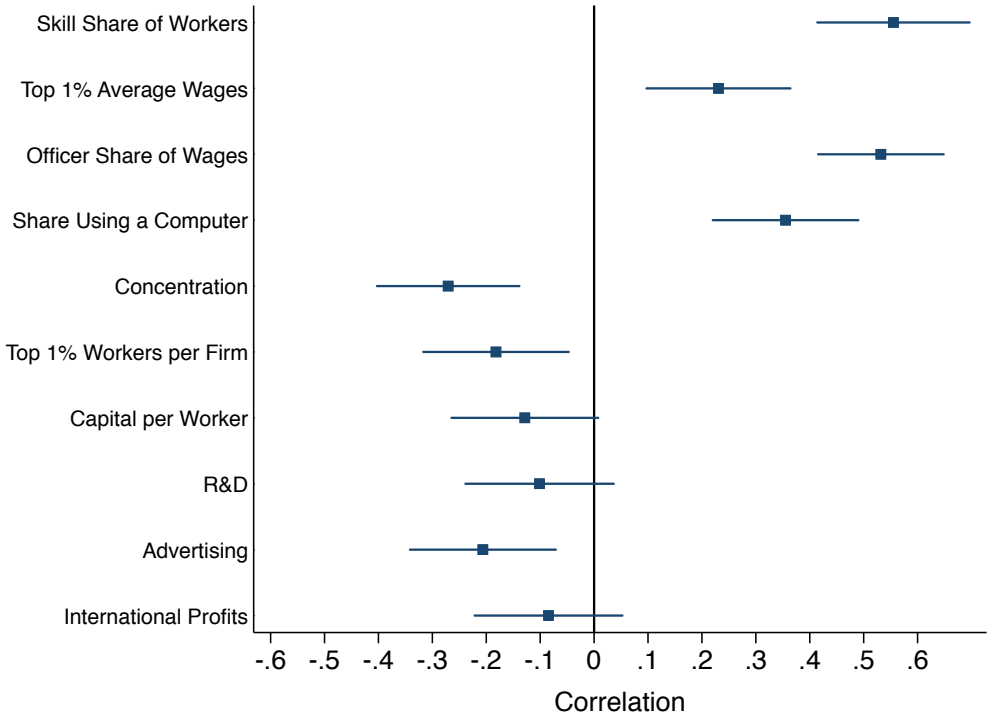
Notes: Panel A plots for 2014 the share of the top 1% with pass-through income, and breaks down pass-through owners' share of total sales by sales bin. Similar to Panel A, Panel B plots the share of top 0.1% with pass-through income and top 0.1% sales by sales bin. Panel C plots pass-through income share for top 1% pass-through owners, and graphs share of top 1%-owned pass-through income by total sales. Panel D replicates Panel C for top 0.1% owned pass-throughs. Overall, 947,000 and 130,000 taxpayers collectively earn $474B and $264B in the top 1% and top 0.1%, respectively.

Figure 3: S-Corporations Are Actively Held, Mid-Market, and Broad-Based Across Geography and Industry

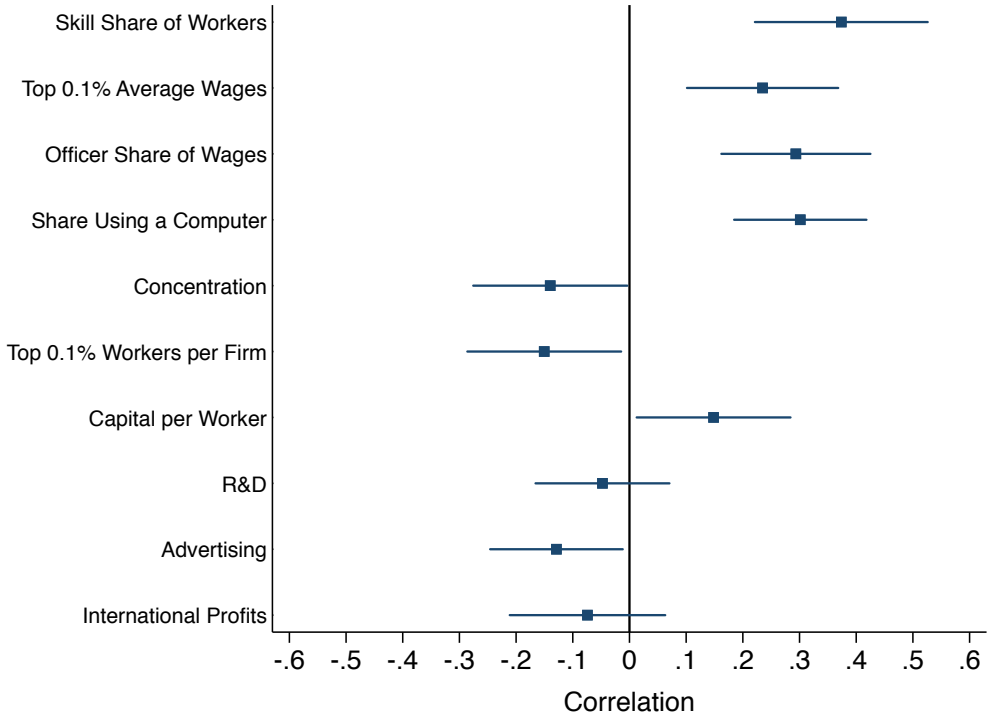
Notes: Panels A, B, C, and D use 2014 data to show that S-corporations are actively held, and are relatively dispersed across firm sizes, states, and sectors. Panel A shows the share of S-corporation owners by owner age group. Age is defined as of December 31 and is computed using year of birth from Social Security Administration records housed alongside tax records. Panel B plots the firm size distribution of total profits for different groups of firms, including C-corporations, S-corporations, and within S-corporations, firms having a top 1-0.1% or top 0.1% owner. Panel C decomposes total S-corporation profits by state where firms are located and compares states by share of total S-corporation profits and share of U.S. population. Population data for 2014 comes from the 2014 Census National Population Estimates. Panel D plots the distribution of total profits across 1-digit NAICS sectors for different groups of firms, including C-corporations, S-corporations, and within S-corporations by whether firms have a top 1-0.1% or top 0.1% owner.

Figure 4: Correlates of S-Corporation Profits across Industries

A. Top 1% Profits

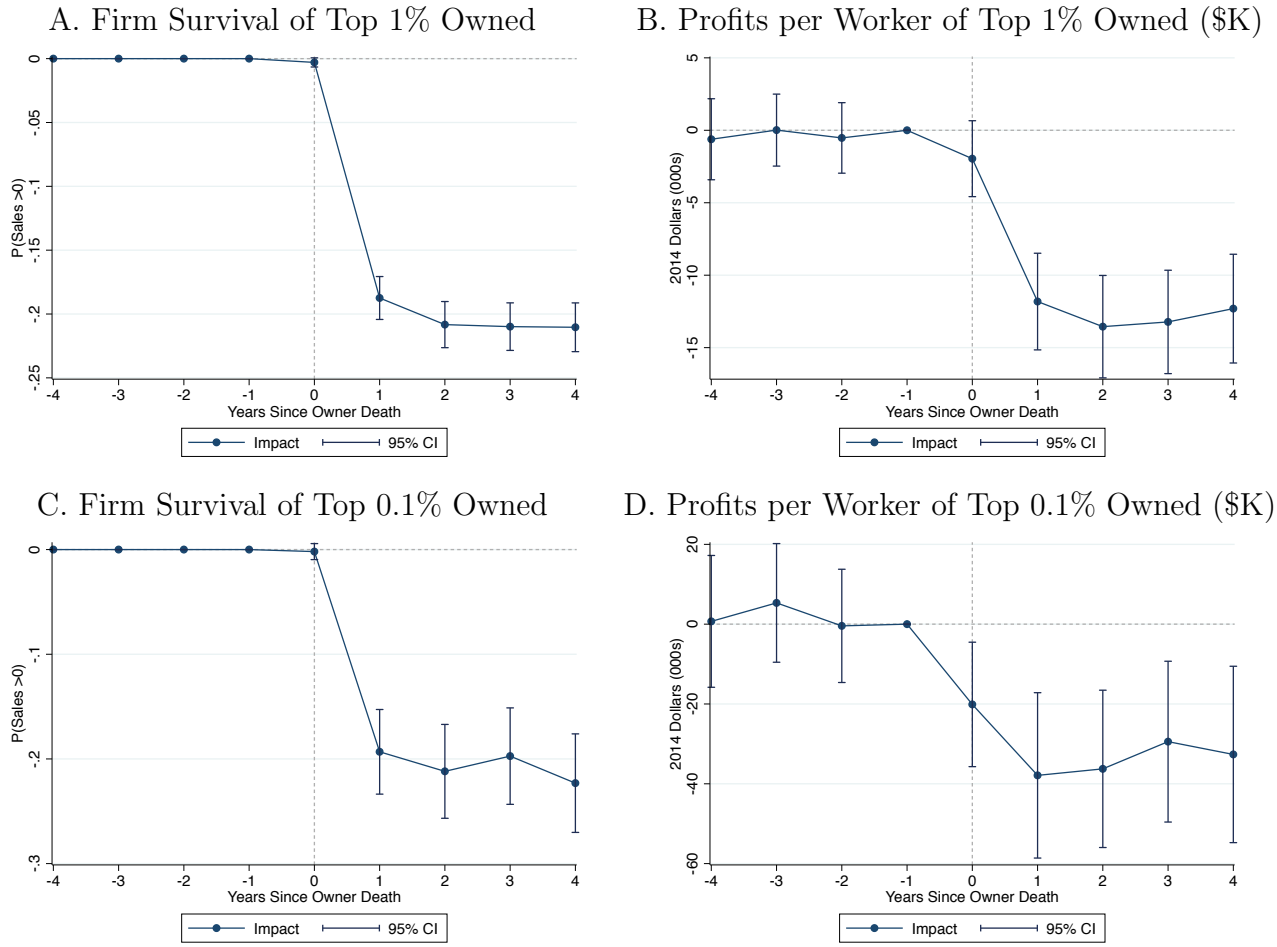


B. Top 0.1% Profits



Notes to Figure 4: This figure presents correlations and robust 95% confidence intervals among firms owned by the top 1% in Panel A and top 0.1% in Panel B for total profits and several industry-level characteristics, defined below. **Top profits** are the 2014 level of profits in 2014 dollars among firms with top 1% or top 0.1% owners. **Skill share of workers** is the 2000-2014 average share of workers in a 4-digit industry who have at least some college in the CPS. **Top average wages** is total 2014 wages among top-owned firms divided by top-owned firms' 2014 number of W-2 payees. **Officer share of wages** is the share of labor compensation (the sum of salaries and wages paid to employees, employee benefit programs such as health insurance, and contributions to pension and profit-sharing plans) that accrues to officers. Specifically, on Form 1120S it is line 7 divided by the sum of lines 7, 8, 17, and 18. **Share using a computer** is the share of 2000-2014 average share of workers who use a computer as part of their role, following Autor, Levy and Murnane (2003). **Concentration** is the sales Herfindahl in each 4-digit industry, including both C- and S-corporations, averaged over the years 2000-2014. **Top workers per firm** is the number of W-2 payees in top-owned firms in 2014 divided by the number of top-owned firms in 2014. **Capital per worker** is total book value of depreciable assets less accumulated depreciation divided by aggregate W-2 payees. Capital is measured as the average for all S-corporations in the IRS SOI corporate sample betweeen 2000 and 2014, weighted to represent the population. Aggregate W-2 payees is measured directly for the population of S-corporations. **R&D** and **advertising** are the industry's average share of total R&D expenditures and total advertising expenditure in Compustat between 2000 and 2014. **International profits** is the 2000-2014 average of total foreign net income reported by S-corporations on Schedule M3 of their tax return divided by the 2000-2014 average of total S-corporation profits. All variables are standardized.

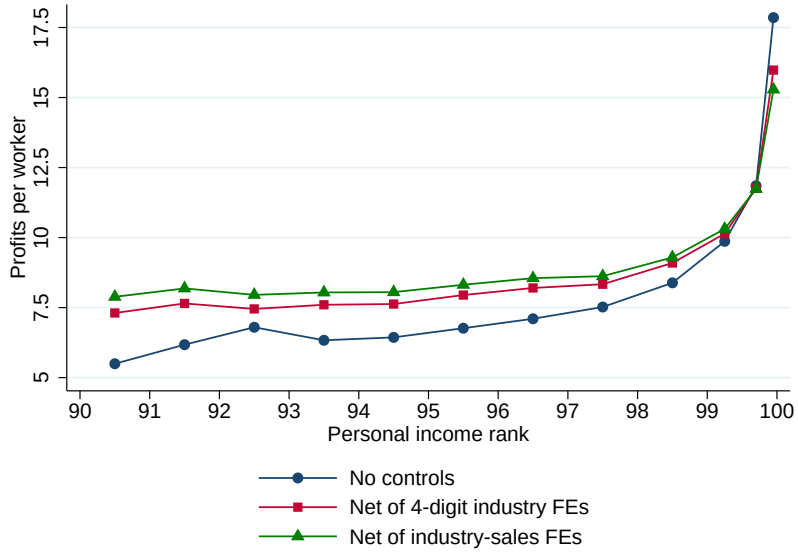
Figure 5: Impact of Top 1% and Top 0.1% Owner Death on Firm Performance



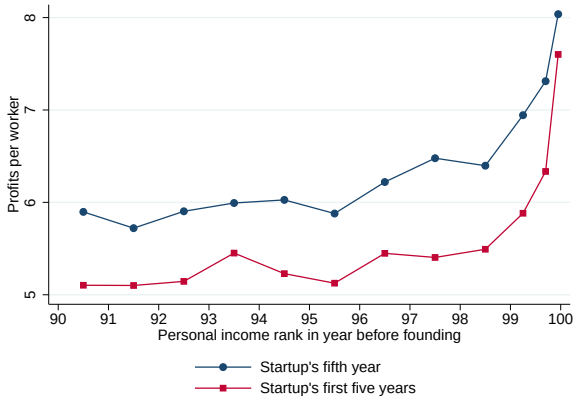
Notes: This figure analyzes the impact of owner deaths on firm performance. We identify all 2,509 "owner-death" firms that: (i) have an owner in a year $t \in [2005, 2010]$ who was under age 65, died in year t, and was a top-1% earner in $t-1$; (ii) had no other owner deaths 2001-2014, at least $100,000 in sales in 2014 dollars in at least one year in $[t-4, t-1]$, positive sales in all years $[t-4, t-1]$, and the firm had positive employment in some year $[t-4, t-1]$; and (iii) has at least one "counterfactual" firm that met the same $[t-4, t-1]$ firm requirements, match the owner-death firm on three-digit industry and $t-1$ sales decile, and have a year-t owner who matches the dying owner on $t-1$ income fractile and five-year age bin. We also include owner deaths that occur one year after the last year the owner is in the main sample, when that last year is in $[2005, 2010]$ and all other criteria are satisfied. Panel A presents simple difference-in-differences estimates of the impact of a year-t owner death on the owner death firm's survival (having positive sales) $[t-4, t+4]$, relative to $t-1$ and to all matched counterfactual firms. Each owner-death firm carries equal weight. See Section 5.2 for more details. Panel B repeats Panel A for the outcome of profits per pre-period worker, equal to annual profits divided by the firm's mean annual number of workers $[t-4, t-1]$. Firm profits are set to zero for exited firms. Panels C and D repeat Panels A and B for the subset of owner-death and counterfactual firms with a top-0.1% owner.

Figure 6: Profitability Rises with Owner Income Rank

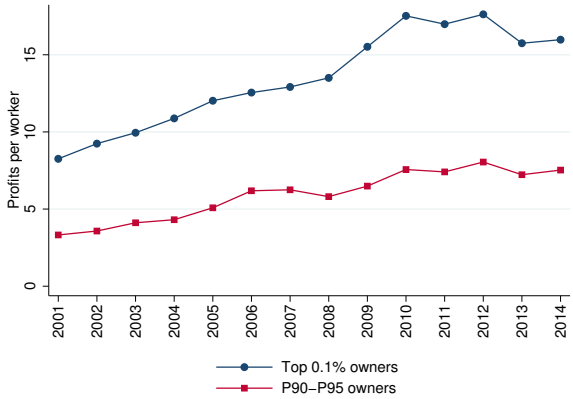
A. Profitability Increases with Owner Income Rank (All Firms)



B. Profits per worker in startups first five years

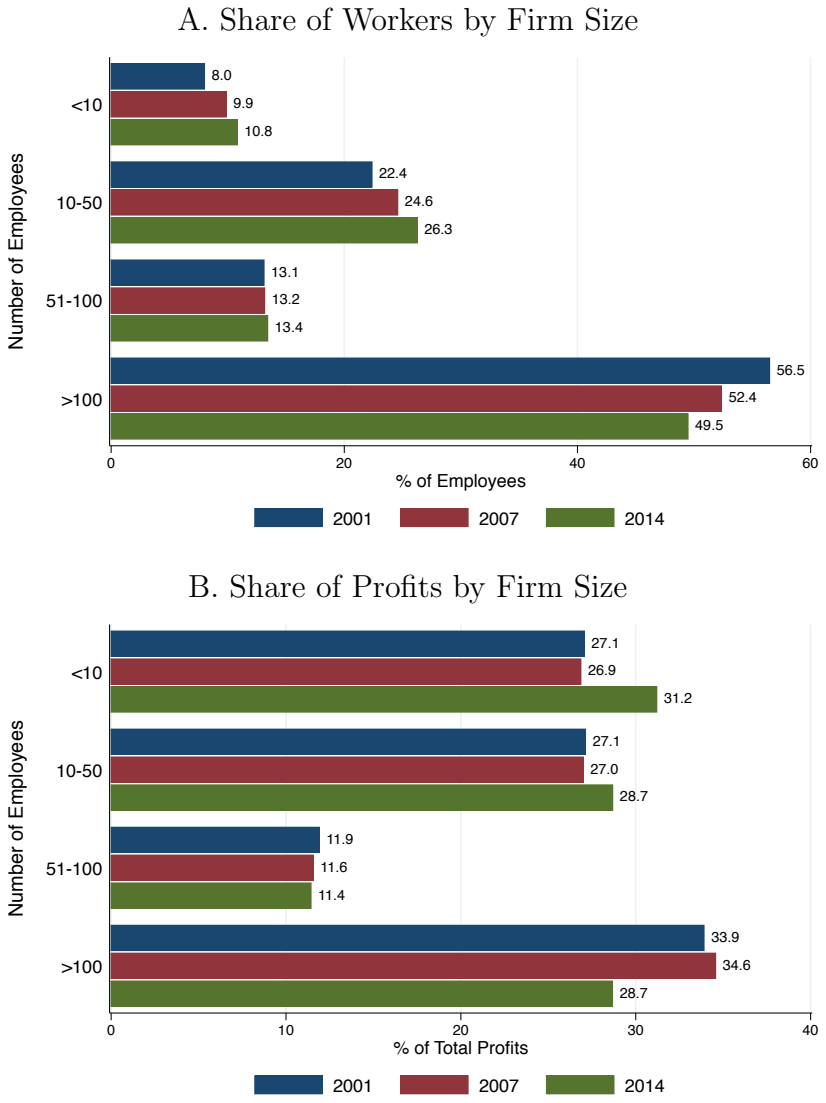


C. Rising Top 0.1% Profitability over Time



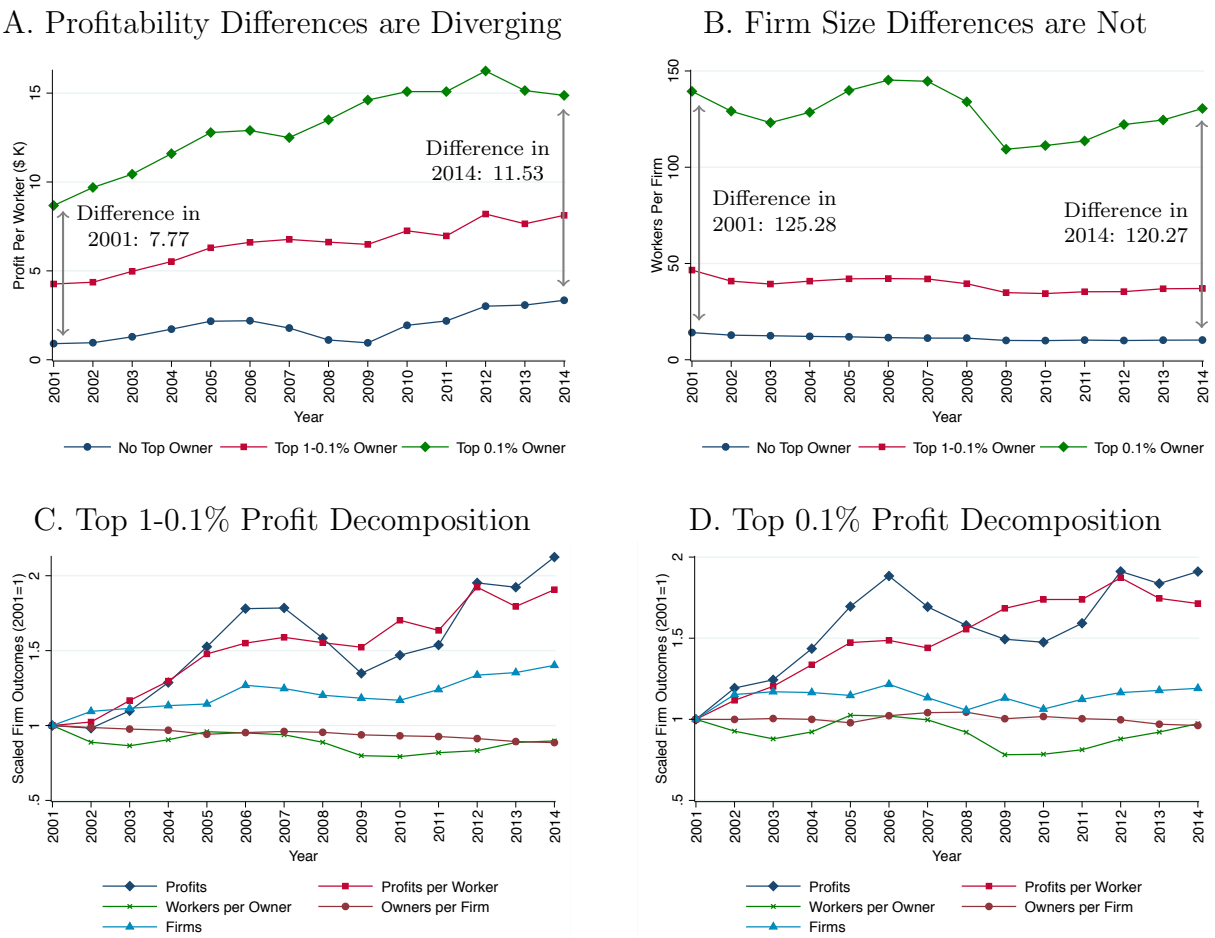
Notes: Panel A plots our main measure of profitability—profits ($K) per worker—by owner personal income rank across owner-firm observations in the 2014 main sample. Owners are ranked by their positions in the overall U.S. income distribution using the personal income concept of Piketty and Saez (2003). The bins are one-percentile-point wide in personal income ranks, except in the top 1% where we consider bins of ranks between the 99th percentile and 99.5th percentile, the 99.5th percentile and 99.9th percentile, and the top 0.1%. Means are weighted by scale (the firm's number of workers). Sales fixed effects denote ventiles (five-percentile-point bins). See Appendix Figure A.6 for an alternative version that apportions profits and workers to owners according to their ownership shares. Panel B plots the equivalent of Panel A's within-industry series using the population of S-corporation start-ups 2001-2010. It ranks owners by their personal income in the year *before* founding their startups. It plots in blue circles profits per worker in the firm's fifth year of existence, conditional on the firm surviving five years. It plots in red squares the startup's sum of its first five years of annual profits divided by the startup's sum of its first five years of annual number of workers, imputing zeros for profits and workers in years after a startup exits. Panel C plots the time series of Panel A's within-industry top-0.1% data point and the analogous time series of the evenly weighted mean of Panel A's 90th-95th data points. Appendix Figure A.7 shows high and rising profitability is not driven by differences in capital intensity across firms. See Section 6.1 for additional detail.

Figure 7: Share of Economic Activity Has Not Been Increasing at Large Employers



Notes: This figure plots two measures of the distribution of S-corporation activity across firms of different scale, using the main analysis sample. We measure scale as the firm's number of workers (defined in this graph as the firm's number of W-2 recipients plus the firm's number of 1099-MISC recipients with positive independent contractor income) and plot distributions in three years: 2001, 2007, and 2014. Panel A plots the share of workers across four scale bins: firms with fewer than 10 workers, firms with 10-50 workers, firms with 51-100 workers, and firms with over 100 workers. Panel B plots the analogous distributions of firm profits across the four scale bins in each of the three years.

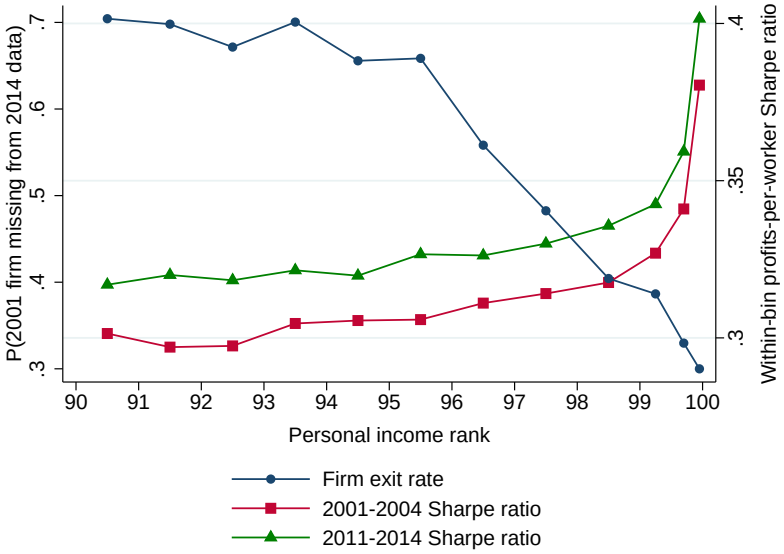
Figure 8: Rising Profitability Explains Most Top S-Corporation Income Growth



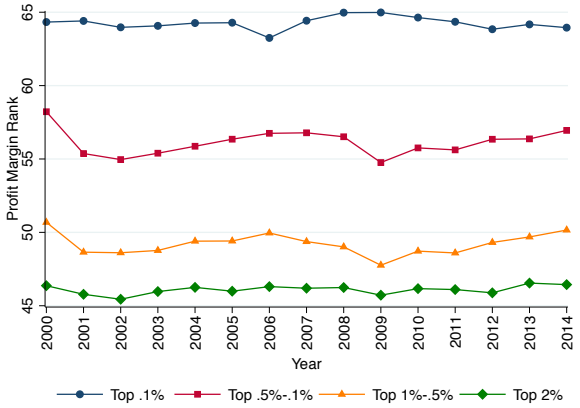
Notes: Panel A plots aggregate profits per worker in thousands of dollars by year and owner type. Panel B plots workers per firm by year and owner type. Panels C and D plot the time series of each component of our decomposition of S-corporation profit growth: scale components (number of workers per owner, number of owners per firm, and number of firms) and a profitability component (profits per worker). Panel C considers firms owned by individuals in the top 1%-0.1% of the personal income distribution. Panel D considers firms owned by individuals in the top 0.1% of the personal income distribution. See Appendix Figure A.8 for a version that measures workers using both employees and contractors rather than just employees, and Appendix Figure A.9 for similar results for profit margins.

Figure 9: Diverging Firm Profitability, Not Risk or Assortativeness

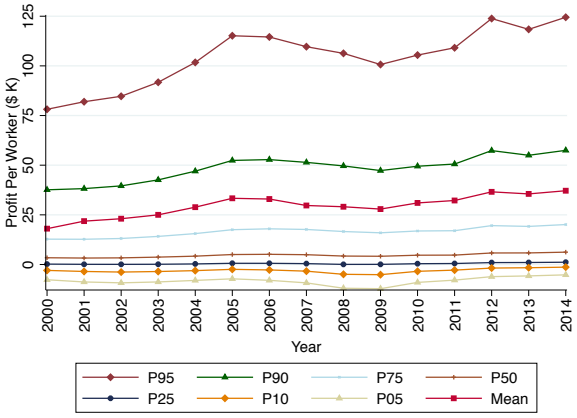
A. Risk Decreases with Owner Income Rank



B. Stable Assortative Matching of Firm Profitability Ranks to Owners

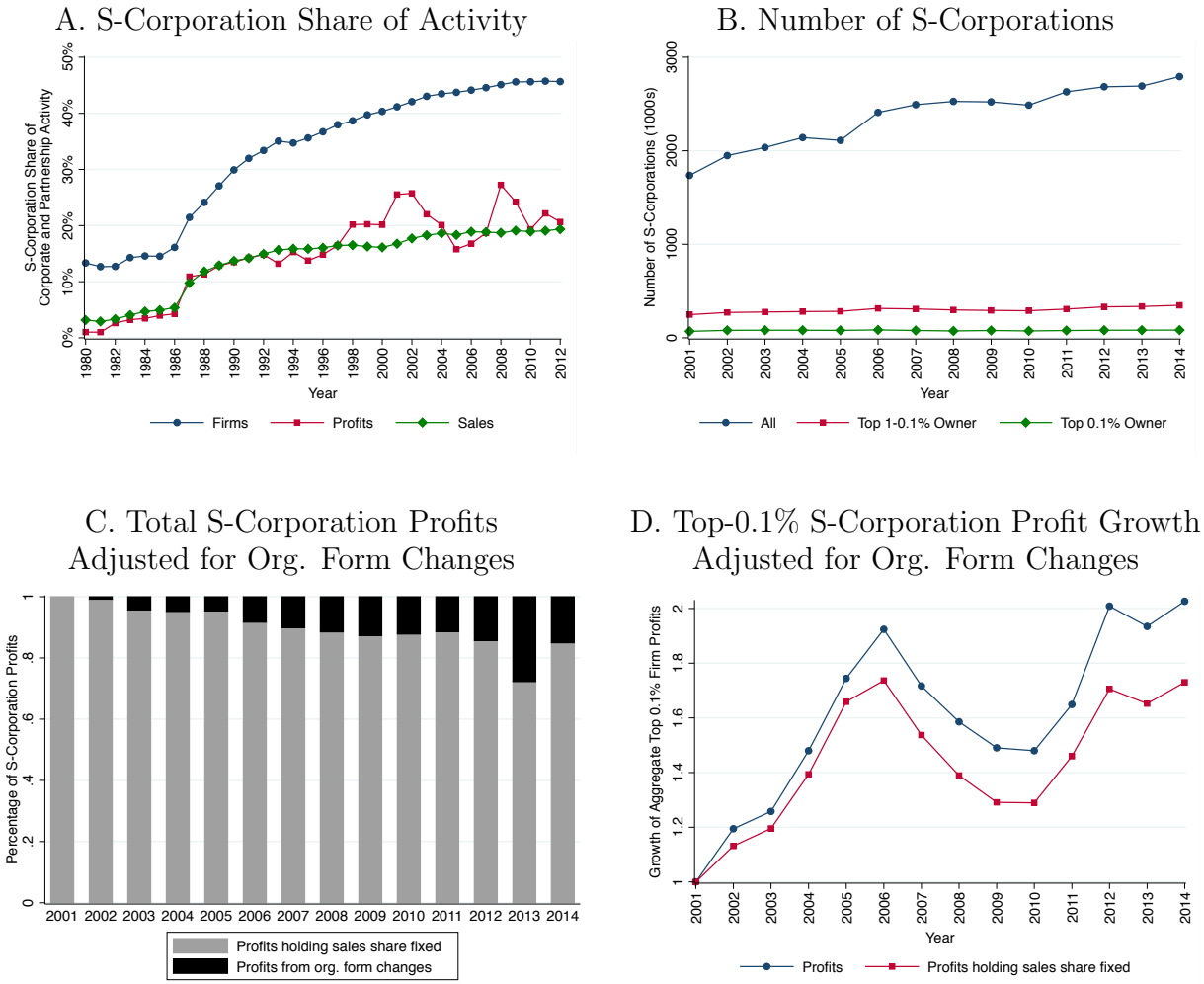


C. Widening Distribution of Firm-Level Profitability



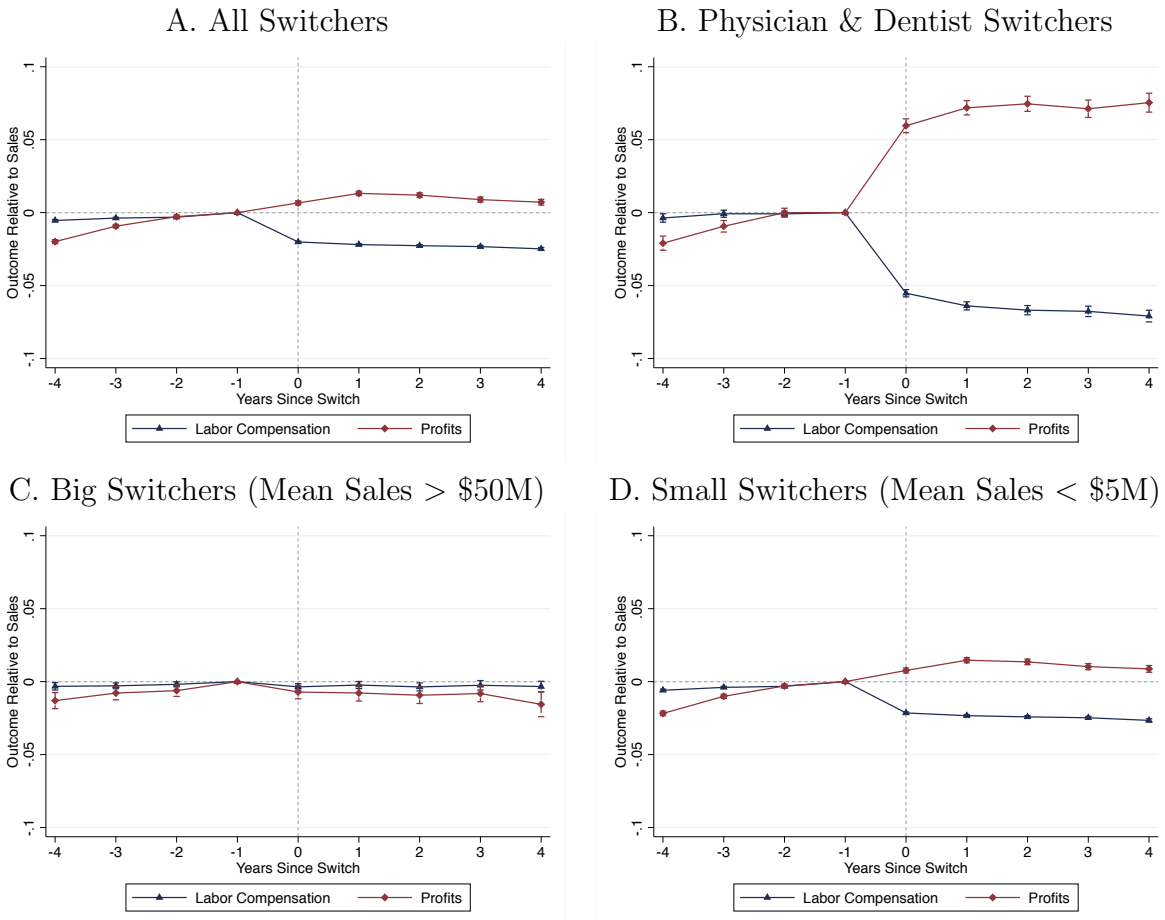
Notes: Panel A plots measures of risk in the main analysis sample by owner personal income rank. The circles plot the share of 2001 firms within each personal income rank that had exited the sample by 2014, weighting by the firm's 2001 number of employees. The squares and triangles plot a measure of the mean Sharpe ratio across firms. Our Sharpe ratio is defined as the average profits per worker at firms owned by individuals within the personal income bin divided by the standard deviation of profits per worker at those firms, weighting firms by their number of workers and then averaging ratios across the listed years. Panel B plots the average profitability rank of S-corporations for different groups of owners ranked by their personal income. Panel C plots percentiles of the distribution of profits per worker in a given year among S-corporations. Appendix Figure A.10 shows similar results for the ratio of sales to costs. See Section 6.3 for additional detail.

Figure 10: Growth in S-Corporation Profits Accounting for Organizational Form Changes



Notes: Panel A shows the S-corporation shares of total business activity since 1980 (measured as the sum of C-corporations, S-corporations, and partnerships). Panel B shows the number of S-corporations by owner income group since 2001, which is the period for which the US Treasury tax files enable us to link firms and owners. Panel C decomposes the level of S-corporation profits between 2001 and 2014 into actual S-corporation profits and the share attributed to organizational form changes. The decomposition assumes the level of S-corporation sales is a constant share of total business sales (including S-corporations, C-corporations, and partnerships) for each 4-digit NAICS industry. The top bars represent the share of S-corporation profits that are due to S-corporations having a higher share of total business sales relative to 2001. Panel D applies the same transformation to decompose the growth in S-corporation profits among those with top 0.1% owners. The first series shows how actual S-corporation profits increased since 2001. The second series shows a counterfactual series, which assumes that S-corporation sales are a constant share of total business sector activity equal to the initial S-corporation share in 2001.

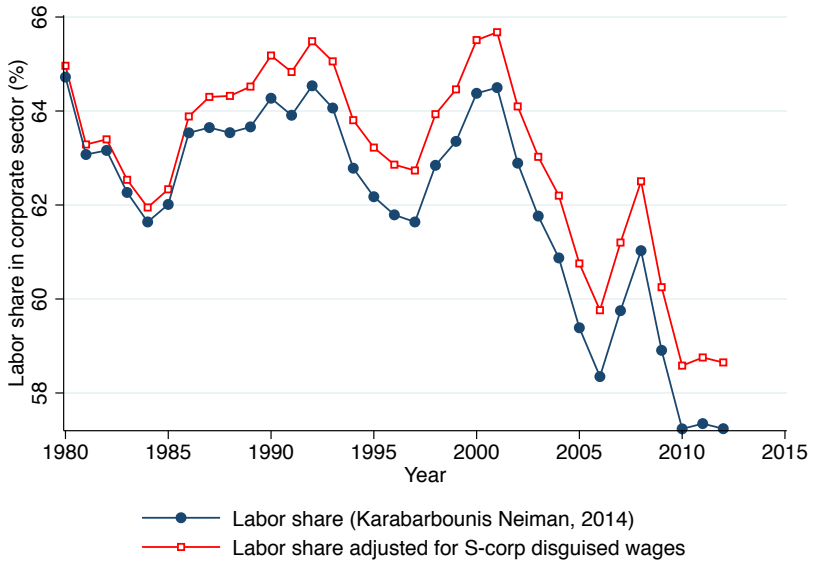
Figure 11: Impact of Organizational Form Switch on Labor Payments and Profits



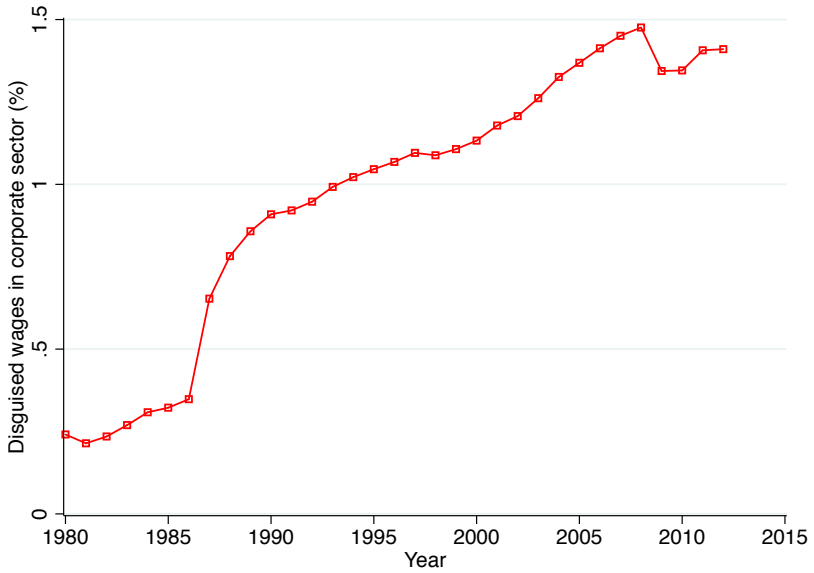
Notes: This figure shows how the allocation of value-added to labor compensation and profits responds when a firm switches organizational form from C-corporation to S-corporation. For each year in event time around a switching event, we plot the average of profits divided by sales and the average of labor compensation (including officer compensation) divided by sales, conditional on firm and calendar year fixed effects. Panel A shows the impact for all switch events between 2001 and 2014. The sample includes 259,957 S-corporations that have switched from C-corporate to S-corporate form between 2001-2014; are of non-trivial size, which we define as having at least $150,000 in sales in the best year they are alive from 2001-2014; and are active for at least 4 years prior to the switch event. Panel B shows the impact for the subsample of 19,539 switch events in the offices of physicians (NAICS 6211) and offices of dentists (NAICS 6212) industries. Panel C shows the impact for the sample of 3,159 switch events for firms with mean sales above $50M in 2014 dollars. Panel D shows the impact for the sample of 220,828 switch events for firms with mean sales below $5M in 2014 dollars. 95% confidence intervals are based on standard errors clustered at the firm level.

Figure 12: The Overstated Decline in the Labor Share and Disguised Wages

A. The Decline of the Labor Share is Overstated



B. Disguised Wages as a Share of Corporate Sector Value Added



Notes: In circles, Panel A plots the labor share in the corporate sector from Karabarbounis and Neiman (2014). In squares, we plot a adjusted series that accounts for disguised wages from S-corporations. We estimate the magnitude of disguised wages as follows. We use the point estimate from Figure 11A that labor payments decline 1.95% as a share of sales when C-corporations switch to S-corporations. We then assign 1.95% of aggregate S-corporation sales as disguised wages. This product generates an adjustment that grows with the size of the S-corporation sector. In 2012, the last year for which labor share data are provided by Karabarbounis and Neiman (2014), our estimate implies that roughly $116B of aggregate S-corporation profits are disguised wages. Our counterfactual series shows a decline of 6.3 percentage points, 16% smaller than in the raw data. Panel B plots our estimate of disguised wages as a share of corporate sector value added over time.

Table 1: Summary Statistics on S-Corporations and Their Owners

A. Firm Summary Statistics

	A. All Firms				B. Firms with Top 1-0.1% Owner				C. Firms with Top 0.1% Owner			
	Mean	p10	p50	p90	Mean	p10	p50	p90	Mean	p10	p50	p90
Sales	1,816	20.24	262.61	2,628	4,253	54.24	1,248	9,904	22,390	58.09	3,530	49,624
Profits	92.61	-26.53	13.90	181.73	232.90	-25.96	122.79	689.36	1,585	-79.58	275.01	3,662
Profit Margin	0.05	-0.19	0.05	0.40	0.11	-0.03	0.08	0.43	0.12	-0.02	0.08	0.46
Assets	928.74	0	53.90	918.73	1,873	11.41	308.45	3,731	14,080	37.56	1,407	21,941
Employees	13.84	0	2	25.23	32.68	0	6.84	70.40	102.59	0	10.41	189.70
Employees | Employees > 0	20.46	1	5	37.10	43.09	1.24	12.76	89.40	150.79	2.30	34.86	267.21
Number of owners	1.62	1	1	2.43	2.23	1	1.38	4	3.37	1	2	6.20
Sales per worker	194.93	22.62	88.25	361.95	323.28	31.22	139.69	646.62	864.84	29.20	190.26	1,239
Profits per worker	18.36	-5.55	4.19	47.52	39.59	-2	10.53	111.42	139	-4.84	11.69	186.02
Profits per worker, employees-weighted	5.51	-1.73	1	15.98	6.27	-0.38	1.52	17.52	12.23	-0.02	2.63	28.28
Profits per owner	56.74	-18.81	10.34	131.85	152.50	-14.14	72.39	462.50	818.04	-37.12	122.94	2,053
Owner payments	145.93	-13.96	37.16	309.65	398.65	-8.60	291.51	1,011	1,788	-45.97	453.51	4,373
Owner payments per owner	91.43	-10.12	27.67	217.93	247.61	-4.64	176.97	649.40	949.99	-21.23	199.59	2,407
Owner payments per worker	36.01	-1.18	13.42	84.85	72.66	0.38	25.22	208.46	190.35	-1.68	19.98	301.20
Owner payments / Profit	1.68	0.26	1	4.08	2.05	0.92	1.14	4.24	1.56	0.76	1	2.25
Owner payments / Sales	0.13	-0.19	0.13	0.60	0.20	-0.05	0.16	0.70	0.16	-0.12	0.11	0.78
Owner payments / Value added	0.18	-0.34	0.23	0.68	0.27	-0.09	0.31	0.78	0.25	-0.22	0.27	0.87
Number of firm-years	44,234,276				4,966,242				1,378,482			

B. Owner Summary Statistics

	A. All Owners				B. Top 1-0.1% Owners				C. Top 0.1% Owners			
	Mean	p10	p50	p90	Mean	p10	p50	p90	Mean	p10	p50	p90
Income	212.45	14.82	97.73	421.67	645.72	390.46	560.15	1,076	4,511	1,549	2,391	7,487
Age	49.99	34.64	49.77	66.37	52.11	38.77	51.53	66.89	54.94	40.90	54.37	70.94
Number of Firms Owned	1.15	1	1	1.72	1.34	1	1	2	1.82	1	1	3.18
Wage Income	70.49	0	30.52	157.15	204.73	0	147.79	489.49	743.90	0	248.93	1,753
S-Corporation Income	59.41	-15.52	8.46	130.93	196.88	-4.20	125.28	546.42	1,528	-4.49	739.29	3,344
Total Owner Payments	99.13	-8.23	26.33	227.38	320.07	-0.19	282.26	758.47	1,871	-0.43	1,160	3,935
Business Income	71.73	-18.79	9.96	162.93	259.47	-0.59	215.61	650.21	2,328	10.27	1,370	4,682
Scorp Income / Owner Pmt	0.68	0.03	1	1	0.71	0.12	0.86	1	0.82	0.33	1	1
Wage Income / Income	0.65	0	0.29	0.95	0.33	0	0.25	0.82	0.21	0	0.09	0.70
Owner Payment / Income	0.74	-0.08	0.38	1.01	0.49	0	0.50	1	0.48	0	0.48	0.98
Business Income / Income	0.22	-0.17	0.16	0.84	0.38	0	0.40	0.82	0.53	0	0.64	0.92
Only Earns Passive Income	0.08	0	0	0	0.07	0	0	0	0.05	0	0	0
Number of owner-years	62,434,916				6,008,571				1,110,122			

Notes to Table 1: This table presents summary statistics for our main sample of S-corporations linked to owners for 2001-2014. Dollar values are in thousands of 2014 dollars. The main sample comprises 71.8M firm-owner-year observations. Table A pools distinct firm-year observations. Table B pools distinct owner-year observations. All statistics are unweighted, unless otherwise specified. All variables are annual and are available in all years. Year refers to calendar year, which by law is also each S-corporation's fiscal year. *Sales* is the firm's operating revenue (gross sales minus returns) as listed on the 1120S. Passively earned income (e.g., interest on bank deposits) is excluded. *Profits* is the firm's ordinary business income, equal to operating revenue minus costs as listed on the 1120S. *Costs* equals the sum of inputs (cost of goods sold), employee and owner wage compensation, rent, interest, capital asset tax depreciation, and other deductions related to ordinary business. Profits are divided among owners pro rata according to ownership stakes on Forms K-1, which owners then include on their Form 1040, Schedule E. *Profits per worker* equals profits divided by the number of workers. *Number of workers* and *number of employees* equals the number of individuals who received a W-2 from the firm that year. *Value added* is sales minus cost of goods sold as itemized on the 1120S. Assets is the end-of-year book value of assets on the 1120S. *Income* is short for *personal income* is the main income concept used in Piketty and Saez (2003) and equals Form 1040 total income minus Form 1040 capital gains minus Form 1040 unemployment compensation minus Form 1040 taxable social security benefits. *Age* is age as of December 31, based on year of birth from Social Security records housed alongside tax records. An owner is a *top 1-0.1% owner* or a *top 0.1% owner* if her personal income lies in the top 1% but not the top 0.1% or the top 0.1% of all tax units in the year, respectively. *Wage income* equals W-2 income. *S-corporation income* equals the owner's share of the profits from all S-corporations she owns. *Total owner payments* equals S-corporation income plus wage income from the S-corporations she owns. *Business income* is total pass-through business income and equals total Form 1040, Schedule E income. An owner's S-corporation income is *active* if the owner reports she materially participates in the operations of any of her pass-through businesses (see the previous subsection) and is *passive* otherwise. For these summary statistics, two variables are winsorized in the underlying data at the unweighted first percentile and the unweighted ninety-ninth percentile of the annual distributions: Owner payments / Profit, and Business income / Income. Two variables are winsorized below at -1 and above at 1: Profit margin, Owner payments / Sales, and Owner payments / Value added. Assets is set to missing for the very few observations in which assets are over one trillion. 32.3% of all firm-year observations have zero employees; those figures are 24.3% and 32.1% for top-1-0.1%-owned firms top-0.1%-owned firms, respectively. Zero employees can reflect the inability to match firms to workers, when firms use special employer identification numbers on W-2 forms. See Sections 2-3 for more details.

Table 2: Industrial Composition of S-Corporation Profits (Top 1-0.1% vs. Top 0.1%, 2014)

	Top 0.1% Owners				Top 1-0.1% Owners		
Industry (NAICS)	Rank	Profits	Share of All	Industry (NAICS)	Rank	Profits	Share of All
Management of cos/enterprises (5511)	1	12870	1.018	Offices of physicians (6211)	1	8980	0.546
Other financial investment actvty (5239)	2	7815	0.893	Other professional/technical svc (5419)	2	4890	0.314
Automobile dealers (4411)	3	6482	0.853	Offices of dentists (6212)	3	4430	0.56
Other professional/technical svc (5419)	4	5157	0.389	Other specialty trade cntrctr (2389)	4	4300	0.33
Oil/gas extraction (2111)	5	4359	1.633	Legal svc (5411)	5	3540	0.352
Offices of physicians (6211)	6	4266	0.287	Architectural/engineering svc (5413)	6	2880	0.369
Misc. durable goods merch whlsl (4239)	7	4244	0.654	Restaurants (7225)	7	2850	0.425
Management/techncl consulting svc (5416)	8	3889	0.479	Building equipment cntrctr (2382)	8	2780	0.329
Computer sys design/related svc (5415)	9	3861	0.399	Computer sys design/related svc (5415)	9	2680	0.29
Other heavy constr (2379)	10	3835	0.75	Insurance agencies/brokerages (5242)	10	2680	0.315
Other specialty trade cntrctr (2389)	11	3815	0.372	Management/techncl consulting svc (5416)	11	2230	0.271
Other fabricated metal prod mfg. (3329)	12	3695	0.653	Offices of other health practitioners (6213)	12	1960	0.315
Other miscellaneous mfg. (3399)	13	3684	0.705	Nonresidential building constr (2362)	13	1920	0.343
Misc. nondrbl gds merch whlsl (4249)	14	3240	0.672	Misc. durable goods merch whlsl (4239)	14	1720	0.262
Legal svc (5411)	15	3048	0.332	Other fabricated metal prod mfg. (3329)	15	1680	0.269
Nonresidential building constr (2362)	16	2823	0.607	Building foundation/exterior cntrctr (2381)	16	1570	0.296
Activities related to real estate (5313)	17	2658	0.737	Activities related to real estate (5313)	17	1530	0.373
Plastics product mfg. (3261)	18	2573	0.808	Other financial investment actvty (5239)	18	1500	0.145
Restaurants (7225)	19	2457	0.356	Other miscellaneous mfg. (3399)	19	1460	0.249
Building equipment cntrctr (2382)	20	2438	0.347	Automobile dealers (4411)	20	1460	0.204
Insurance agencies/brokerages (5242)	21	2350	0.293	Residential building constr (2361)	21	1410	0.267
Architectural/engineering svc (5413)	22	2251	0.287	Offices of real estate agents/brokers (5312)	22	1290	0.278
Machinery/supply merch whlsl (4238)	23	2047	0.553	Management of cos/enterprises (5511)	23	1180	0.091
Building material/supp dealers (4441)	24	2011	0.665	Machinery/supply merch whlsl (4238)	24	1150	0.336
Residential building constr (2361)	25	1889	0.596	Misc. nondrbl gds merch whlsl (4249)	25	1090	0.228
Nondepository credit intrmd (5222)	26	1862	0.722	Health/personal care stores (4461)	26	1080	0.461
Other miscellaneous store retailers (4539)	27	1705	0.524	Accounting/bookkeeping svc (5412)	27	1030	0.241
Electric goods merch whlsl (4236)	28	1695	0.697	Oil/gas extraction (2111)	28	1030	0.438
Depository credit intrmd (5221)	29	1648	0.799	Other personal svc (8129)	29	1020	0.273
Grocery/related product whlsl (4244)	30	1585	0.643	Advertising, pr,/related svc (5418)	30	996	0.327

Notes: This table presents statistics on the level of S-corporation profits in 2014 by 4-digit industry. We present statistics for two groups of firms: S-corporations owned by the top 1-0.1% and S-corporations owned by the top 0.1%. The rows are sorted by the level of S-corporation profits for firms owned by the top 0.1% and top 1-0.1%, respectively. Rank columns indicate the rank of that 4-digit industry within a particular group of firms. Profits columns indicate the level of profits in millions of 2014 dollars. Share of All columns indicate the share of profits for a particular group of firms relative to profits in that industry for all S-corporations. This share can exceed one in the case of losses for non-top firms. See Appendix Table A.2 for statistics that apportion S-corporation profits pro rata to owners in either the top 0.1% or the top 1-0.1% and then aggregate those apportioned profits by 4-digit industry.

Table 3: Industrial Composition of Pass-Through Profits (S-Corporations vs. Partnerships, 2014)

	Top 0.1% Owners					Top 1-0.1% Owners			
Industry (NAICS)	S Rank	S Profits	P Rank	P Profits	Industry (NAICS)	S Rank	S Profits	P Rank	P Profits
Management of cos/enterprises (5511)	1	12870	5	5547	Offices of physicians (6211)	1	8980	2	4640
Other financial investment actvty (5239)	2	7815	1	40860	Other professional/technical svc (5419)	2	4890	7	1760
Automobile dealers (4411)	3	6482	16	1216	Offices of dentists (6212)	3	4430	13	709
Other professional/technical svc (5419)	4	5157	11	2721	Other specialty trade cntrctr (2389)	4	4300	18	544
Oil/gas extraction (2111)	5	4359	3	8825	Legal svc (5411)	5	3540	1	10400
Offices of physicians (6211)	6	4266	6	5210	Architectural/engineering svc (5413)	6	2880	15	603
Misc. durable goods merch whlsl (4239)	7	4244	23	814	Restaurants (7225)	7	2850	11	788
Management/techncl consulting svc (5416)	8	3889	10	2763	Building equipment cntrctr (2382)	8	2780	42	225
Computer sys design/related svc (5415)	9	3861	53	274	Computer sys design/related svc (5415)	9	2680	25	401
Other heavy constr (2379)	10	3835	46	341	Insurance agencies/brokerages (5242)	10	2680	16	601
Other specialty trade cntrctr (2389)	11	3815	33	516	Management/techncl consulting svc (5416)	11	2230	9	1140
Other fabricated metal prod mfg. (3329)	12	3695	41	390	Offices of other health practitioners (6213)	12	1960	12	728
Other miscellaneous mfg. (3399)	13	3684	24	793	Nonresidential building constr (2362)	13	1920	30	354
Misc. nondrbl gds merch whlsl (4249)	14	3240	22	906	Misc. durable goods merch whlsl (4239)	14	1720	33	345
Legal svc (5411)	15	3048	2	38600	Other fabricated metal prod mfg. (3329)	15	1680	44	211
Nonresidential building constr (2362)	16	2823	37	411	Building foundation/exterior cntrctr (2381)	16	1570	46	186
Activities related to real estate (5313)	17	2658	8	3761	Activities related to real estate (5313)	17	1530	10	1040
Plastics product mfg. (3261)	18	2573	54	272	Other financial investment actvty (5239)	18	1500	4	2580
Restaurants (7225)	19	2457	21	995	Other miscellaneous mfg. (3399)	19	1460	24	407
Building equipment cntrctr (2382)	20	2438	55	258	Automobile dealers (4411)	20	1460	23	423
Insurance agencies/brokerages (5242)	21	2350	17	1179	Residential building constr (2361)	21	1410	21	481
Architectural/engineering svc (5413)	22	2251	29	639	Offices of real estate agents/brokers (5312)	22	1290	27	390
Machinery/supply merch whlsl (4238)	23	2047	60	247	Management of cos/enterprises (5511)	23	1180	22	468
Building material/supp dealers (4441)	24	2011	96	109	Machinery/supply merch whlsl (4238)	24	1150	43	223
Residential building constr (2361)	25	1889	20	999	Misc. nondrbl gds merch whlsl (4249)	25	1090	37	268
Nondepository credit intrmd (5222)	26	1862	13	1789	Health/personal care stores (4461)	26	1080	40	231
Other miscellaneous store retailers (4539)	27	1705	61	245	Accounting/bookkeeping svc (5412)	27	1030	5	2270
Electric goods merch whlsl (4236)	28	1695	79	171	Oil/gas extraction (2111)	28	1030	3	3520
Depository credit intrmd (5221)	29	1648	47	337	Other personal svc (8129)	29	1020	32	345
Grocery/related product whlsl (4244)	30	1585	93	111	Advertising, pr,/related svc (5418)	30	996	28	382

Notes: This table presents statistics on the level of S-corporation and partnership profits in 2014 by 4-digit industry. We present statistics for two groups of firms: S-corporations and partnerships owned by the top 1-0.1%, and S-corporations and partnerships owned by the top 0.1%. The rows are sorted by the level of S-corporation profits for firms owned by the top 0.1% and top 1-0.1%, respectively. Rank columns indicate the rank of that 4-digit industry within a particular group of firms. Profits columns indicate the level of profits in millions of 2014 dollars. See Appendix Table A.3 for statistics that apportion S-corporation and partnership profits pro rata to owners in either the top 0.1% or the top 1-0.1% and then aggregate those apportioned profits by 4-digit industry.

Table 4: Impact of Owner Death on Firm Outcomes

A. Top 1% Owner Death

	Firm survival (pp)	Profits per pre-period worker ($/worker)				
	(1)	(2)	(3)	(4)	(5)	(6)
Owner death	-0.210	-12,307	-5,090	-5,291	-18,947	1,387
	(0.010)	(1,914)	(2,093)	(2,451)	(2,905)	(1,885)
Surviving firms only			X			
Dying minority owner				X		
Dying majority owner					X	
Owner death before 65	X	X	X	X	X	
Owner death after 75						X
Number of observations	2,717,748	2,717,748	1,076,256	1,030,275	1,687,473	137,277
Number of owner deaths	2,509	2,509	1,440	1,220	1,289	1,838
R^2	.072	.003	.000	.001	.008	.000
Outcome mean of coutnerfactual firms	0.852	24,015	26,071	22,149	25,781	15,109
Estimate/Outcome mean	-24.7%	-51.2%	-19.5%	-23.9%	-73.5%	9.2%
Ownership share of dying owners	60.2%	60.2%	49.3%	31.6%	87.3%	52.2%
Estimate/Outcome mean/Ownership share	-41.0%	-85.1%	-39.6%	-75.5%	-84.2%	17.6%
Preferred percentage impact	-29.3%	-60.7%	-39.6%	-53.9%	-60.1%	12.6%

B. Top 0.1% Owner Death

	Firm survival (pp)	Profits per pre-period worker ($/worker)				
	(7)	(8)	(9)	(10)	(11)	(12)
Owner death	-0.223	-32,646	-13,564	-6,511	-56,267	3,184
	(0.024)	(11,276)	(12,478)	(11,255)	(18,799)	(4,544)
Surviving firms only			X			
Dying minority owner				X		
Dying majority owner					X	
Owner death before 65	X	X	X	X	X	
Owner death after 75						X
Number of observations	221,004	221,004	101,700	97,947	123,057	48,195
Number of owner deaths	455	455	239	216	239	559
R^2	.068	.004	.001	.000	.012	.000
Outcome mean of coutnerfactual firms	0.825	45,253	55,528	40,127	49,886	21,704
Estimate/Outcome mean	-27.0%	-72.1%	-24.4%	-16.2%	-112.8%	14.7%
Ownership share of dying owners	61.3%	61.3%	50.3%	31.6%	88.1%	53.6%
Estimate/Outcome mean/Ownership share	-44.1%	-117.7%	-48.6%	-51.3%	-128.1%	27.4%
Preferred percentage impact	-33.8%	-90.2%	-48.6%	-39.3%	-98.1%	21.0%

Notes: The owner deaths analysis sample comprises 2,509 firms with dying non-elderly owners matched to 301,972 similar firms without an owner death. This table uses the owner deaths analysis sample to analyze the impact of owner deaths on firm performance four years after owner death relative to one year before owner death, relative to the matched counterfactual firms. Columns 1-2 report the right-most coefficients plotted in Figures 5A-B. See the notes to that figure for details. Column 3 repeats column 2 on the subset of matched pairs of owner-death firms and counterfactual firms that survived four years after the owner death. Column 4 repeats column 2 on the subset of matched pairs where the dying owner had 50% or less ownership in the owner-death firm; column 5 repeats column 2 on all other pairs. Column 6 repeats column 2 in an identically constructed sample of matched owner-death firms that is based on owners who died at age 75 or greater. The outcome mean of counterfactual firms is the weighted mean four years after owner death (see the text for the weight). The ownership share of dying owners is measured in the year before owner death. The final row multiplies the penultimate row by 71.4% except for the intensive margin columns 3 and 9, given our estimate that 28.6% of owner-death firm exits represent firm reorganizations. Panel B repeats Panel A for for the subset of owner-death and counterfactual firms with a top-0.1% owner, using an analogous 23.4% figure for the reorganization share when computing the final row. See Section 5 for more details.

Table 5: Decomposition of Profit Growth

		Share of Profit Growth (%)				
Industry	Profit Growth Rate	Profitability	Workers per Owner	Owners per Firm	Firms	% Total Profits (2014)
Panel A: All Owners						
Overall	131.53	80.96	-26.60	-12.87	58.51	100.00
Agriculture & Forestry	942.78	84.46	2.20	-4.46	17.79	1.82
Construction & Mining	66.02	77.75	-46.40	-14.38	83.03	13.34
Manufacturing	136.92	116.88	-23.72	-12.46	19.30	14.05
Retail & Wholesale Trade	110.01	91.82	-28.11	-13.51	49.79	21.87
Info & Professional Svcs	159.53	77.95	-25.61	-11.28	58.94	30.76
Health Care	179.33	42.48	-18.70	-10.07	86.29	10.31
Entertnmt, Food & Hotels	196.05	86.13	-20.59	-9.13	43.59	4.53
Other Svcs	131.48	74.94	-28.66	-9.17	62.89	3.16
Panel B: Top 1-0.1% Owners						
Overall	115.10	84.46	-14.47	-15.77	45.77	100.00
Agriculture & Forestry	505.15	85.47	-7.71	-5.98	28.23	1.92
Construction & Mining	70.82	83.34	-2.02	-5.86	24.54	13.90
Manufacturing	115.95	124.11	-17.32	-17.61	10.82	11.10
Retail & Wholesale Trade	84.60	104.17	-20.10	-19.58	35.52	19.46
Info & Professional Svcs	134.20	79.96	-9.99	-12.08	42.11	29.39
Health Care	168.47	45.88	-9.33	-9.32	72.78	16.49
Entertnmt, Food & Hotels	129.43	87.38	-18.16	-15.03	45.80	4.82
Other Svcs	104.32	77.61	-8.33	-16.32	47.05	2.81
Panel C: Top 0.1% Owners						
Overall	93.16	81.69	-3.80	-5.87	27.98	100.00
Agriculture & Forestry	231.54	86.42	-22.78	7.74	28.62	1.32
Construction & Mining	30.73	168.60	-23.67	-20.72	-24.21	11.18
Manufacturing	88.33	110.47	-20.49	-10.34	20.37	21.45
Retail & Wholesale Trade	80.39	86.50	-4.15	-12.66	30.30	26.62
Info & Professional Svcs	146.05	71.17	4.41	6.16	18.26	29.49
Health Care	138.28	52.57	3.67	-16.23	59.99	5.06
Entertnmt, Food & Hotels	103.74	73.56	9.21	-24.11	41.35	3.72
Other Svcs	86.10	115.34	-18.30	-28.52	31.48	1.12

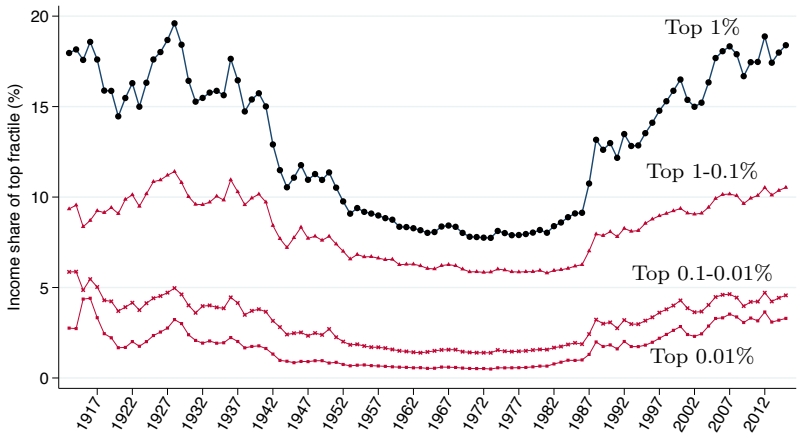
Notes: This table decomposes the share of growth in business income by profitability and scale metrics. The growth rate for profits and each of its profitability and scale components is $g^x = 100 * (\frac{x_{14}}{x_{01}} - 1)$, where x is the variable in question. The log growth of profits can be decomposed into $log(1+g^{\Pi}) = log(1+g^{\pi/L}) + log(1+g^{L/Owner}) + log(1+g^{Owner/Firms}) + log(1+g^{Firms})$. We calculate $100 * log(1+g^{(\cdot)})/log(1+g^{\Pi})$, the percent contribution of each component to growth in profits. Decompositions of profit levels for 2001 and 2014 are presented in Appendix Tables A.6 and A.7, respectively. Growth decompositions by state for top-1-0.1% and top 0.1% firms are presented in Appendix Tables A.8 and A.9, respectively.

For Online Publication

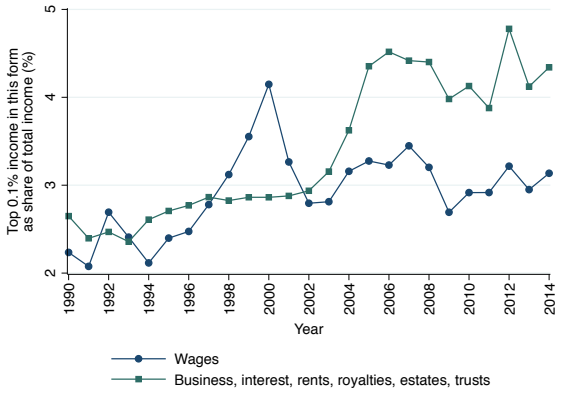
A Data Appendix

Figure A.1: Rising U.S. Income Inequality and Business Income

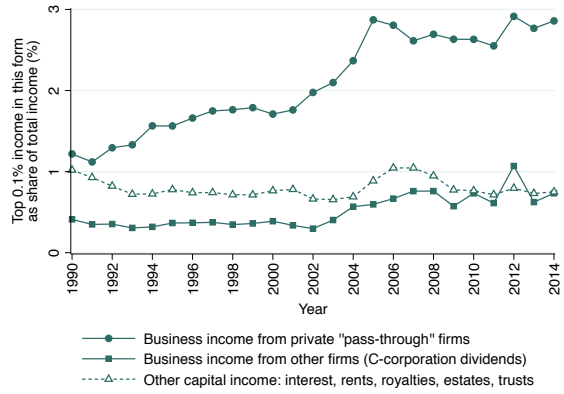
A. The Rise in Income Inequality



B. Wage Income vs. Capital Income

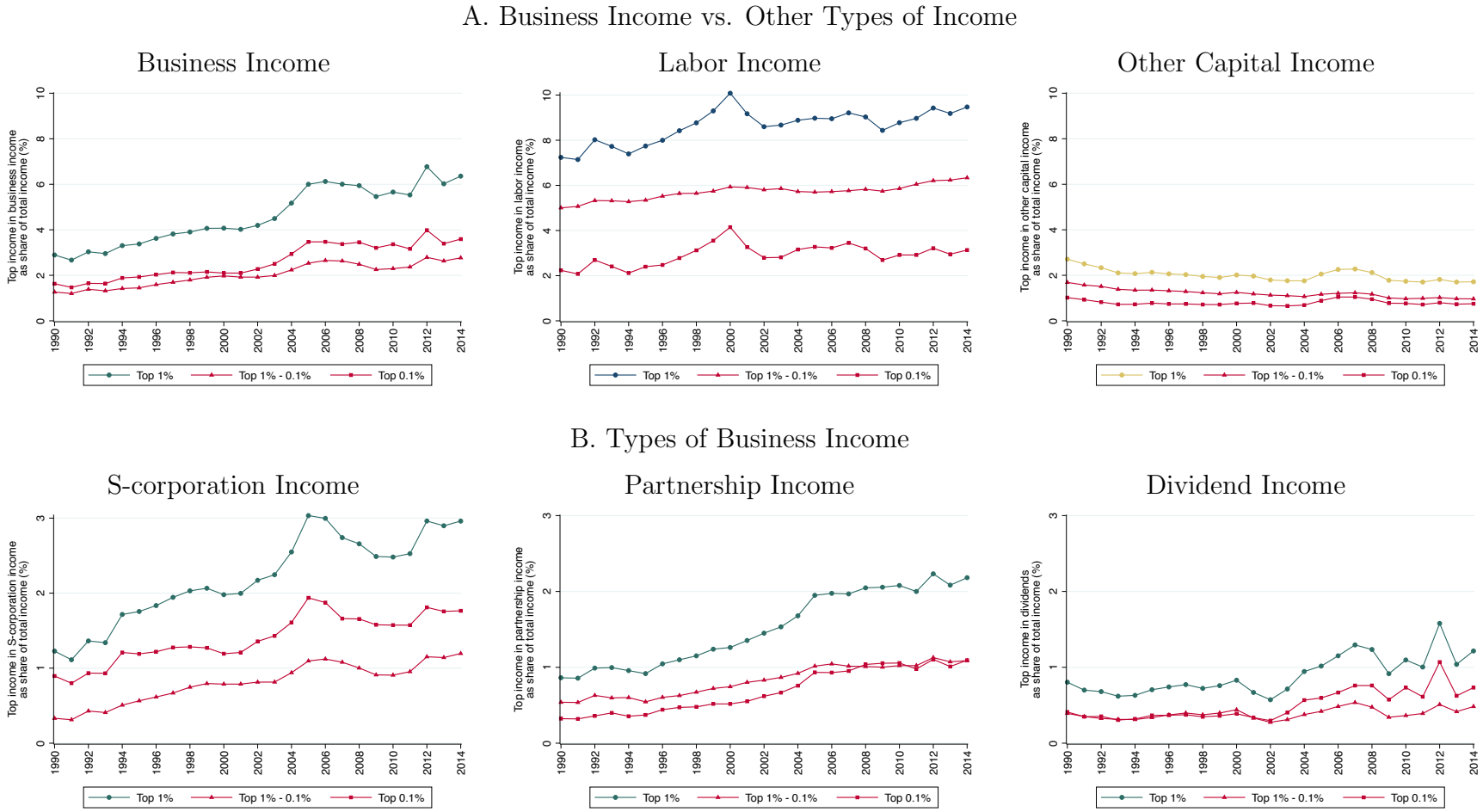


C. Types of Capital Income



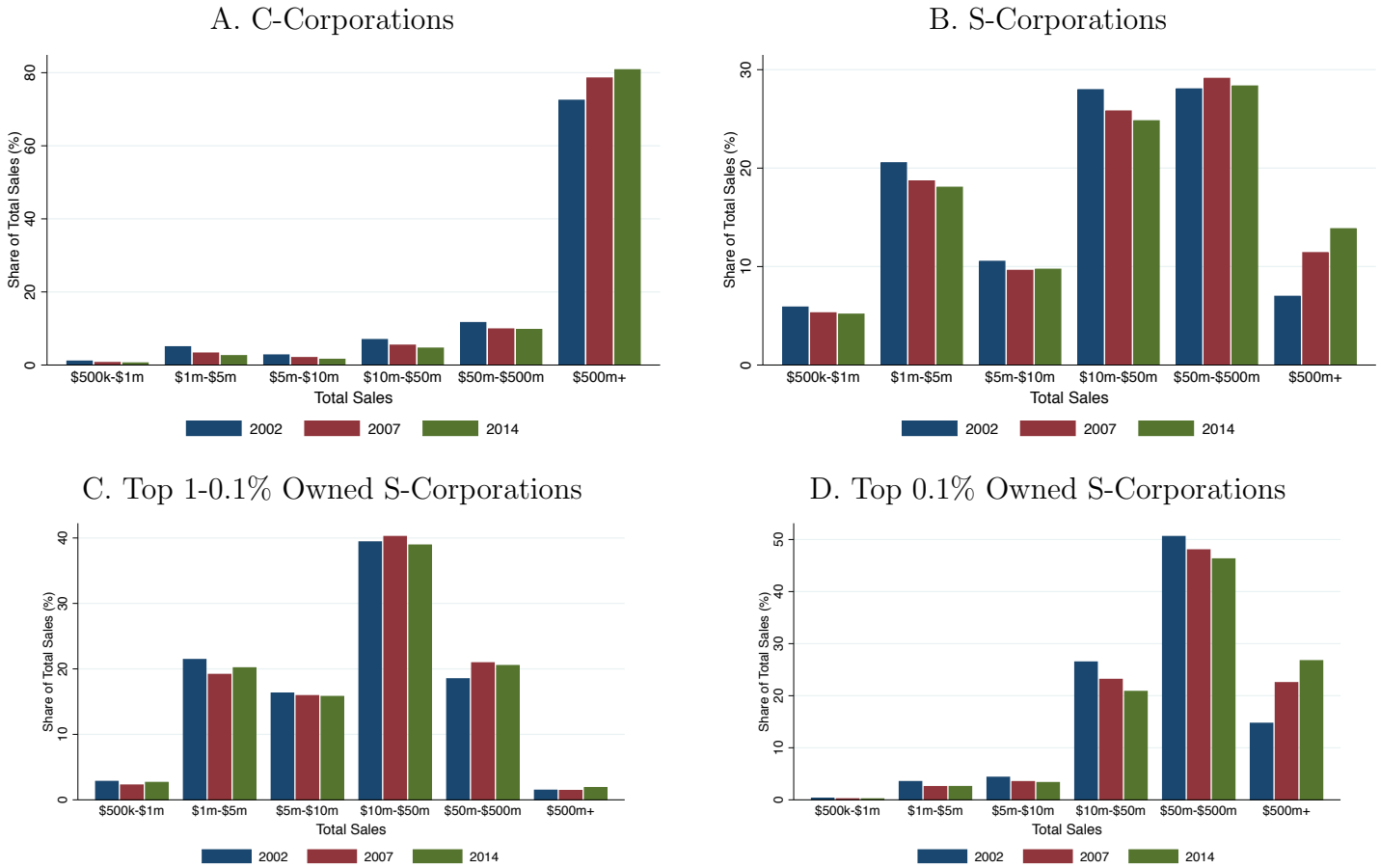
Notes: Panel A uses data from Piketty and Saez (2003) to plot the share of personal income earned by the top 1%, top 1-0.1%, top 0.1-0.01%, and top 0.01%, respectively. Panel B uses the underlying source of Panel A (see Section 2.4) to decompose the top 0.1% income share into two components: labor income (i.e. wages, salaries, and tips and pensions and annuities, as done in Piketty and Saez) and capital income (i.e., business income, interest, rents, royalties, estates, and trusts) since 1990. Panel C decomposes capital income into income from different business entity types: pass-through firms, C-corporations (in the form of dividends) and other capital income.

Figure A.2: Income Inequality for the Top 1-0.1% versus the Top 0.1%



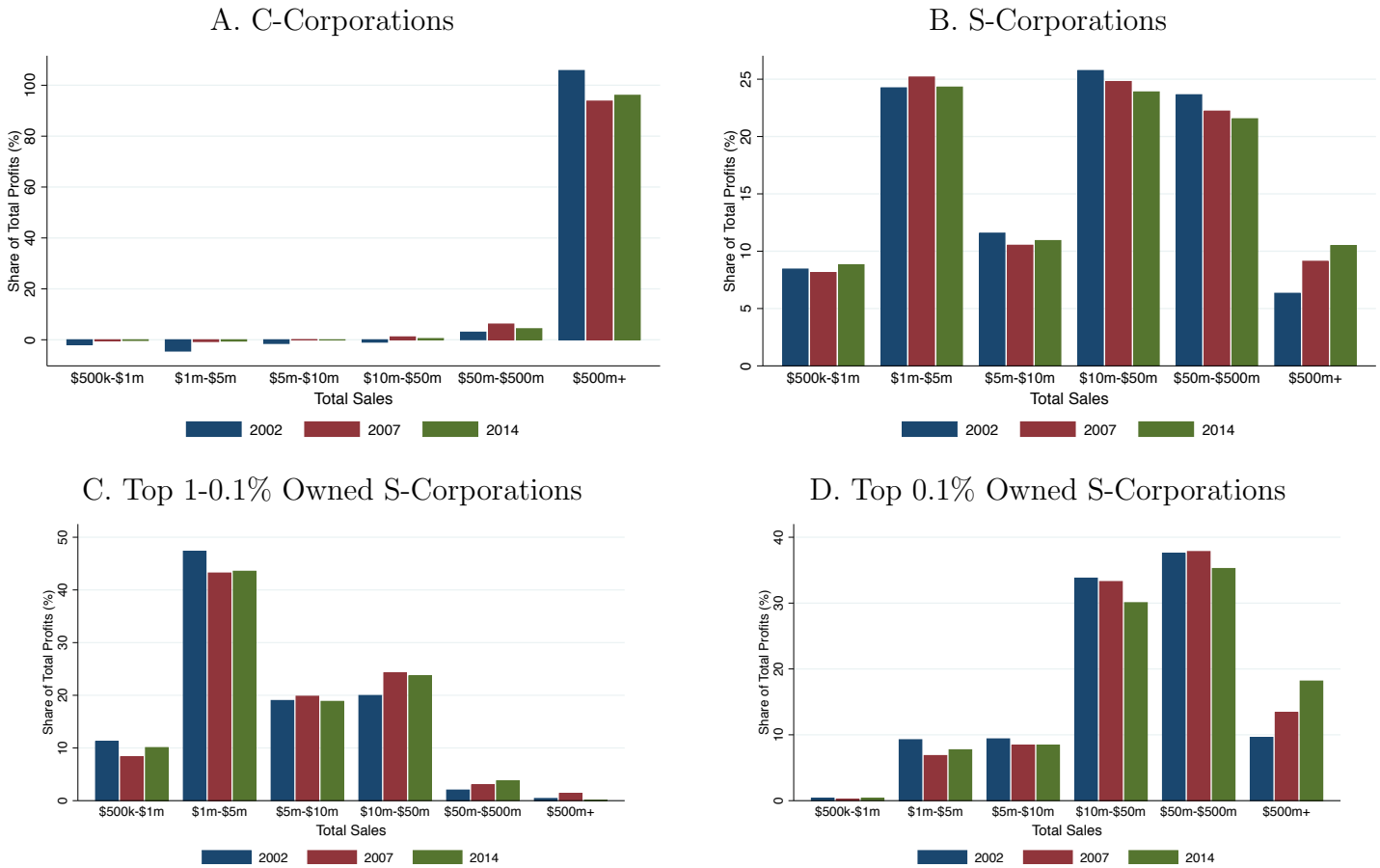
Notes: Panel A uses data from Piketty and Saez (2003) to decompose the share of personal income earned by the top 1% into shares earned by the top 1-0.1% and top 0.1%, respectively, into components from labor income, business income, and other capital income (i.e., interest, rents, royalties, estates, and trusts) since 1990. Panel B decomposes business income into income from different business entity types: S-corporations, partnerships, and C-corporations (in the form of dividends).

Figure A.3: Distribution of Firm Sales by Corporate Form and Ownership Status



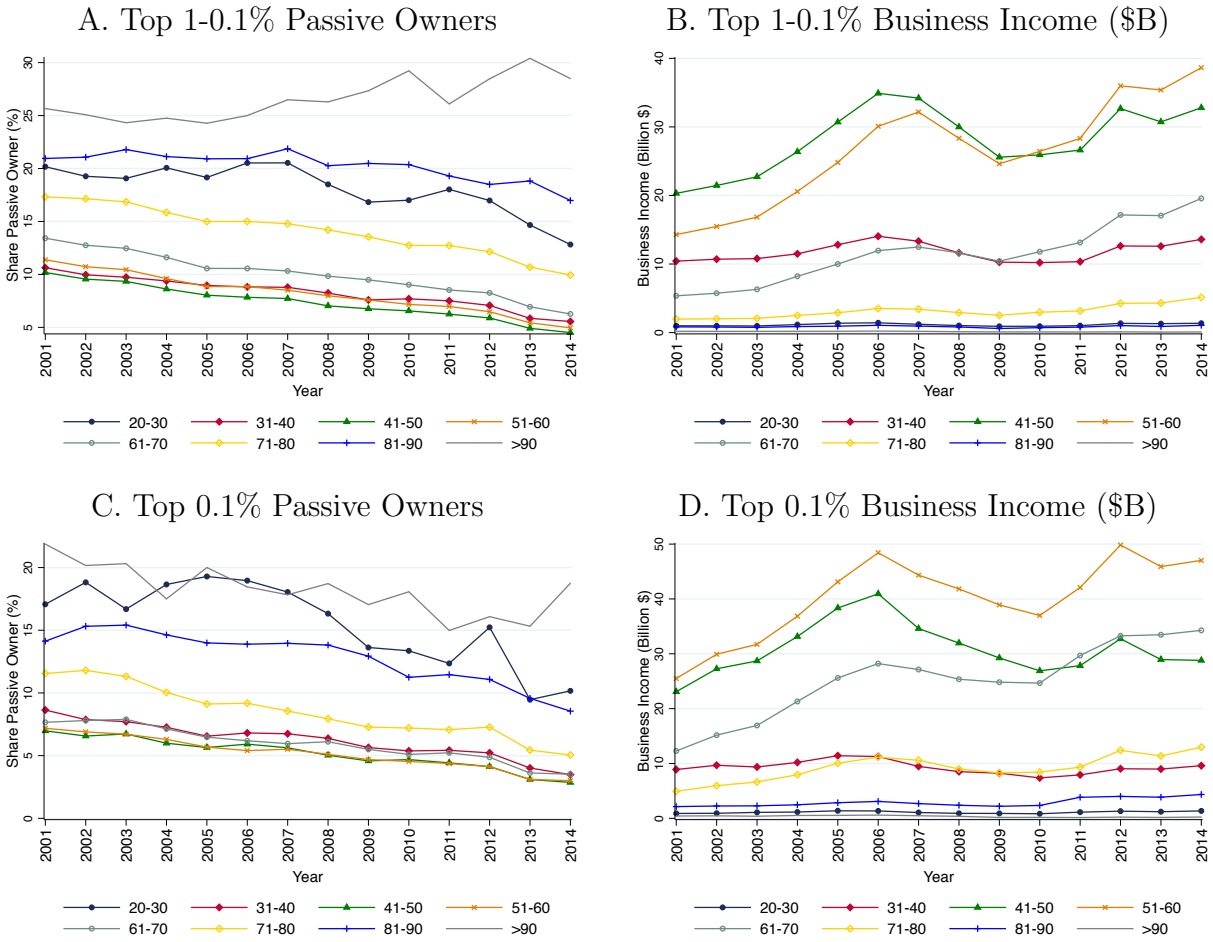
Notes: Panel A, B, C and D show the distribution of firms by share of total sales across time using the SOI corporate sample for A and B and the linked owner data for C and D. Panel A shows the distribution of C-corporations by sales bin in 2002, 2007 and 2014. Panel B is similar and plots the distribution of S-corporations by sales bin for the same set of years. Panel C shows the distribution of top 1-0.1% owned S-corporations in 2002, 2007 and 2014 by sales bin. Panel D is similar and shows the distribution of top 0.1% owned S-corporations, for the same set of years.

Figure A.4: Distribution of Firm Profits by Corporate Form and Ownership Status



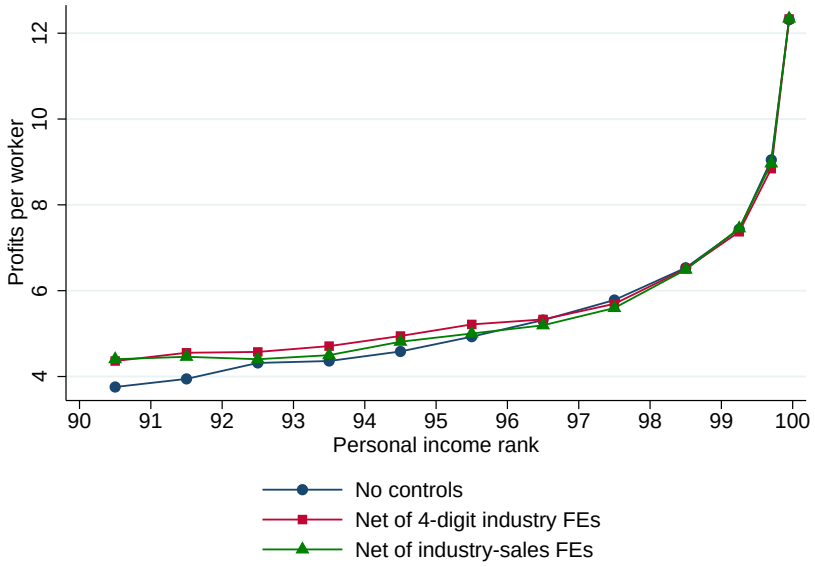
Notes: Panel A, B, C and D show the distribution of firms by share of total profits across time using the SOI corporate sample for A and B and the linked owner data for C and D. These Panels show the same statistics as Appendix Figure A.3 for firm sales.

Figure A.5: Share of Passive Owners and Business Income by Age Group



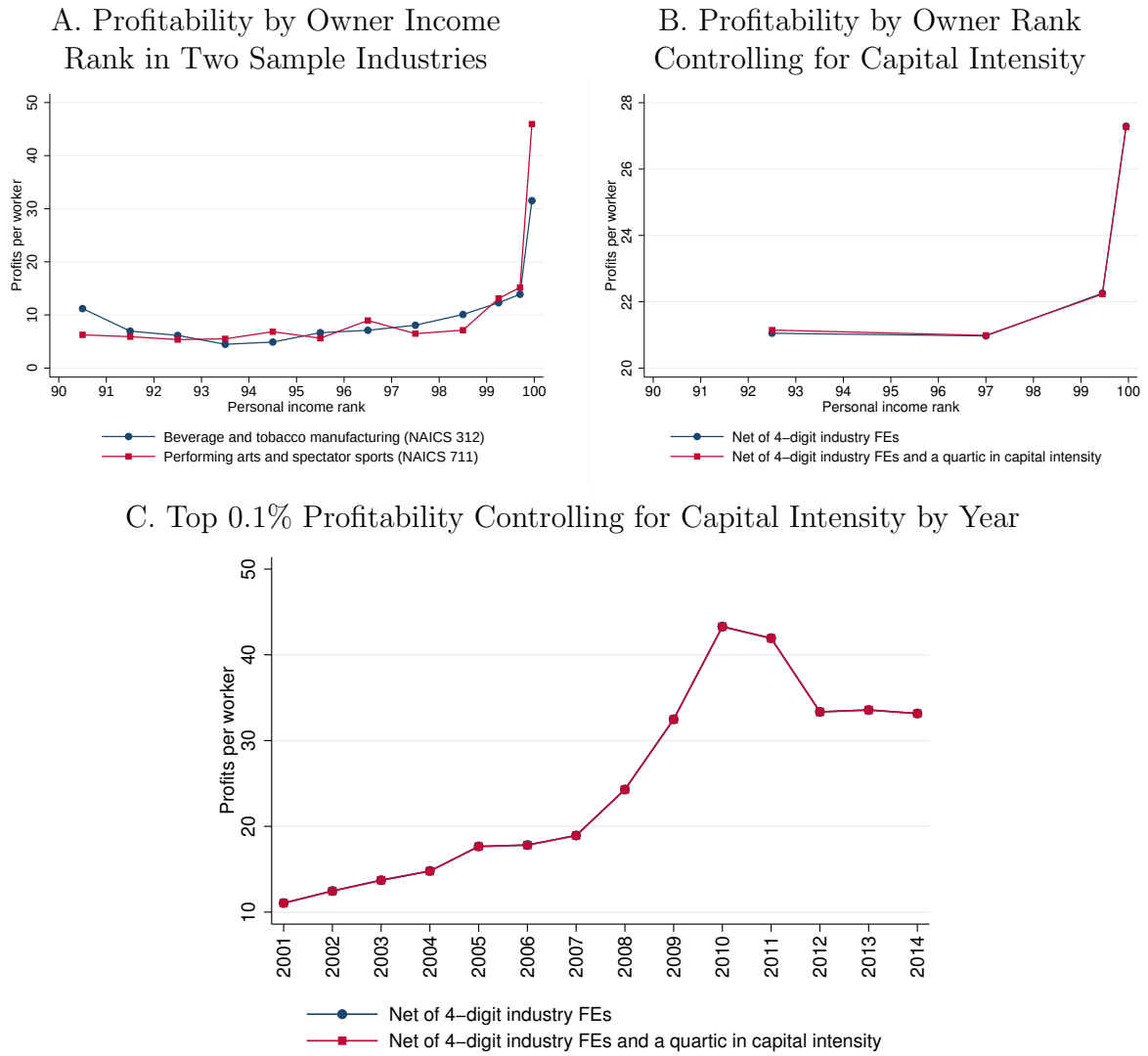
Notes: This figure shows the evolution of passive ownership and business income over time, by age group. Panel A and C plot passive owners as a share of total. Passive owners report that they do not materially participate in the firm's operation. Panel B and D plot total business income in billions of current dollars. Panel A and B show share of passive owners and total business income for firm owners with personal income in the top 1-0.1% of the distribution. Panel C and D show share of passive owners and total business income for firm owners with personal income in the top 0.1% of the distribution. Owners under age 20 were omitted because the number of owners in this age group in the top 1% and top 0.1% is zero or close to zero.

Figure A.6: Profitability-Income Gradient with Profit and Workers Apportionment



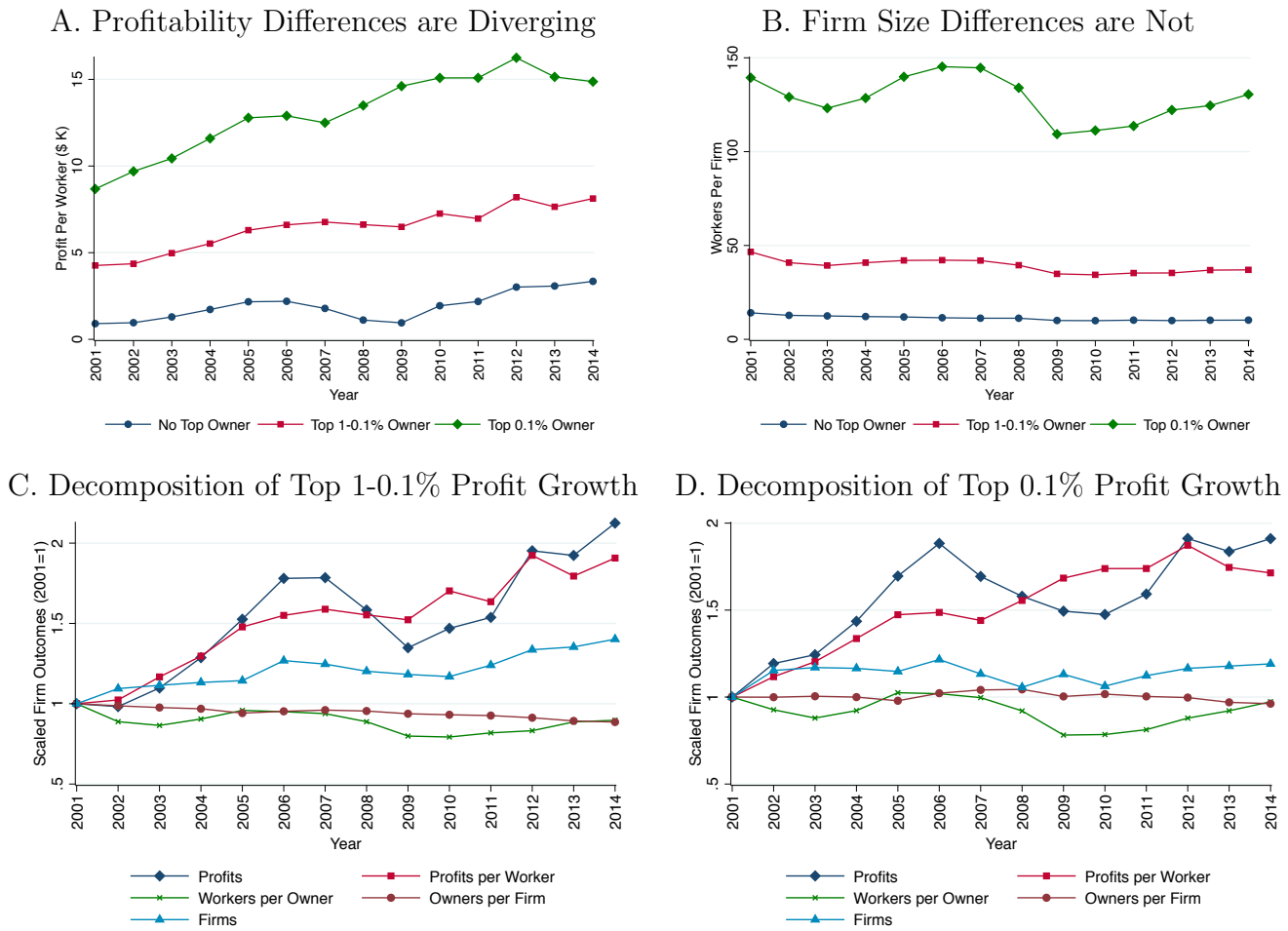
Notes: This figure replicates Figure 6A when apportioning profits and workers to owners according to their ownership shares. Each firm-owner observation underlying Figure 6A uses the firm's profits and number of workers when computing profitability, regardless of how much of the firm the owner owns. Each firm-owner observation underlying this figure's alternative to Figure 6A uses apportioned profits and workers using the owner's ownership share, defined as the owner's 2014 profits from the firm divided the firm's total 2014 profits. Profit shares at S-corporations equals ownership shares by law. See the notes to Figure 6A for further details.

Figure A.7: Top-Owned Firms Superior Profitability Is Not Due to Higher Capital Intensity



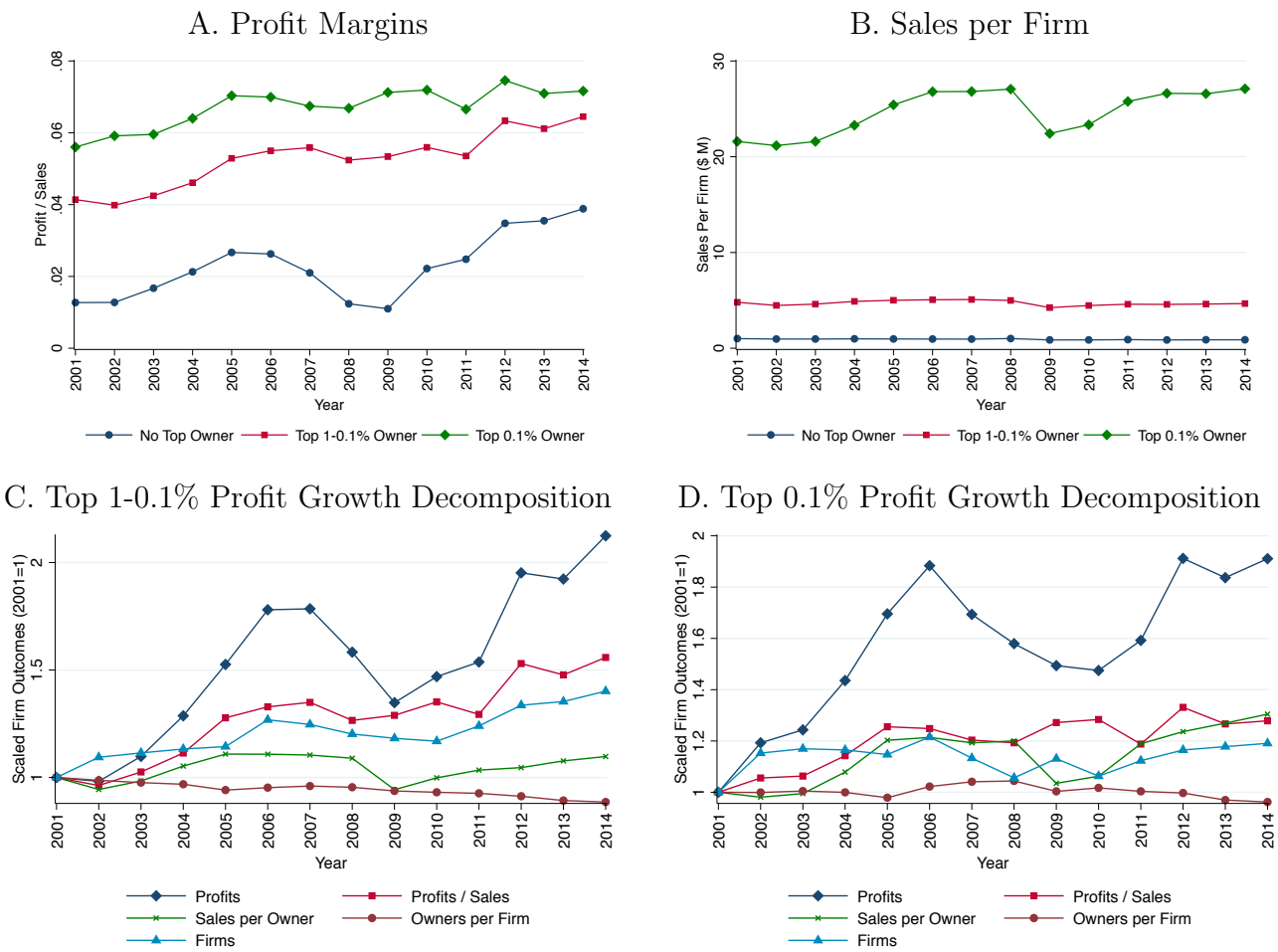
Notes: Panel A repeats the 2014 within-industry profitability series of Figure 6A for two large industries with different capital intensities: the highly capital intensive Beverage and tobacco manufacturing industry (NAICS 312) and the lightly capital intensive Performing arts and spectator sports industry (NAICS 711). See the notes to 6A for additional detail. Panel B repeats the 2014 within-industry series of Figure 6A in the sample of S-corporation owners whose firms can be matched to capital stock information in the SOI S-corporation sample. One series controls only for industry fixed effects while the second series controls additionally for capital intensity, equal to the firm's capital stock divided by its costs, winsorized at the 99th percentile. Panel C plots the time series of top-0.1% profitability in the sample of owners whose firms can be matched to the SOI sample, controlling for industry fixed effects and additionally for capital intensity in a pooled regression using all years.

Figure A.8: Profitability versus Scale (Including Contractors)



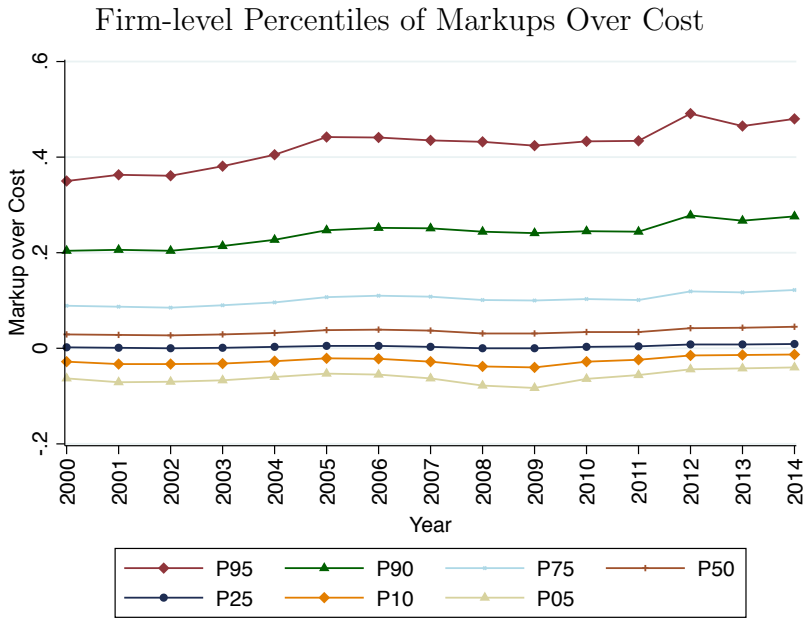
Notes: This figure is similar to Figure 8, but it defines total employment is the sum of total W-2 payees and 1099 recipients (contractors). Panel A plots aggregate profits per worker in thousands of dollars by year and owner personal income relative to total distribution. Panel B plots workers per firm by year and owner personal income. Panel C decomposes the growth in S-corporation profits of firms with top 1-0.1% owners into a scale (number of workers per owner, number of owners per firm and number of firms) and a profitability (profits per worker) component. Panel D decomposes the growth in S-corporation profits of firms with top 0.1% owners into the same components as Panel C.

Figure A.9: Profit Margins versus Sales Decomposition



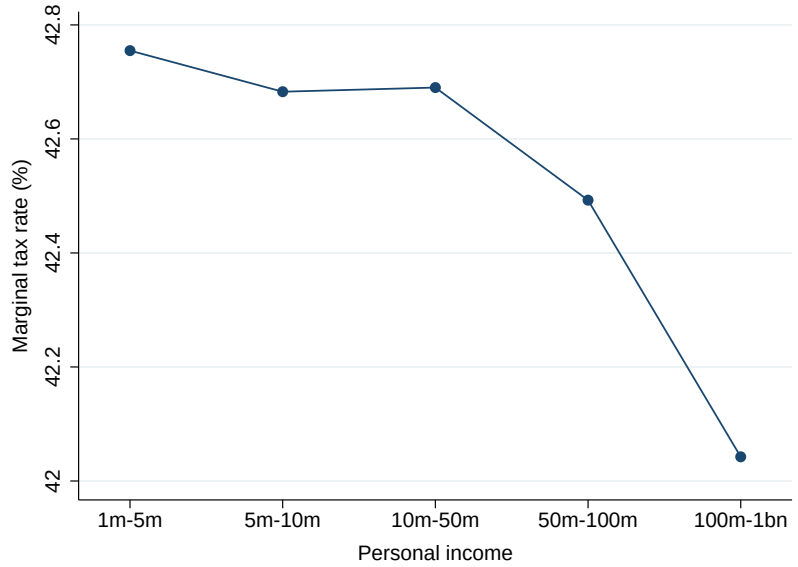
Notes: This figure is similar to Figure 8, but assesses different metrics of profitability and scale. Profitability is proxied by profit margins, calculated as the ratio of aggregate profits to aggregate sales, and scale is measured by sales per firm. Panel A plots profit margins by year and owner type. Panel B plots sales per firm by year and owner type. Panel C decomposes the growth in S-corporation profits of firms with top 1-0.1% owners into profit margins and sales components (sales per owner, number of owners per firm and number of firms). Panel D decomposes the growth in S-corporation profits of firms with top 0.1% owners into the same components as Panel C.

Figure A.10: The Distribution of S-Corporation Profitability by Year



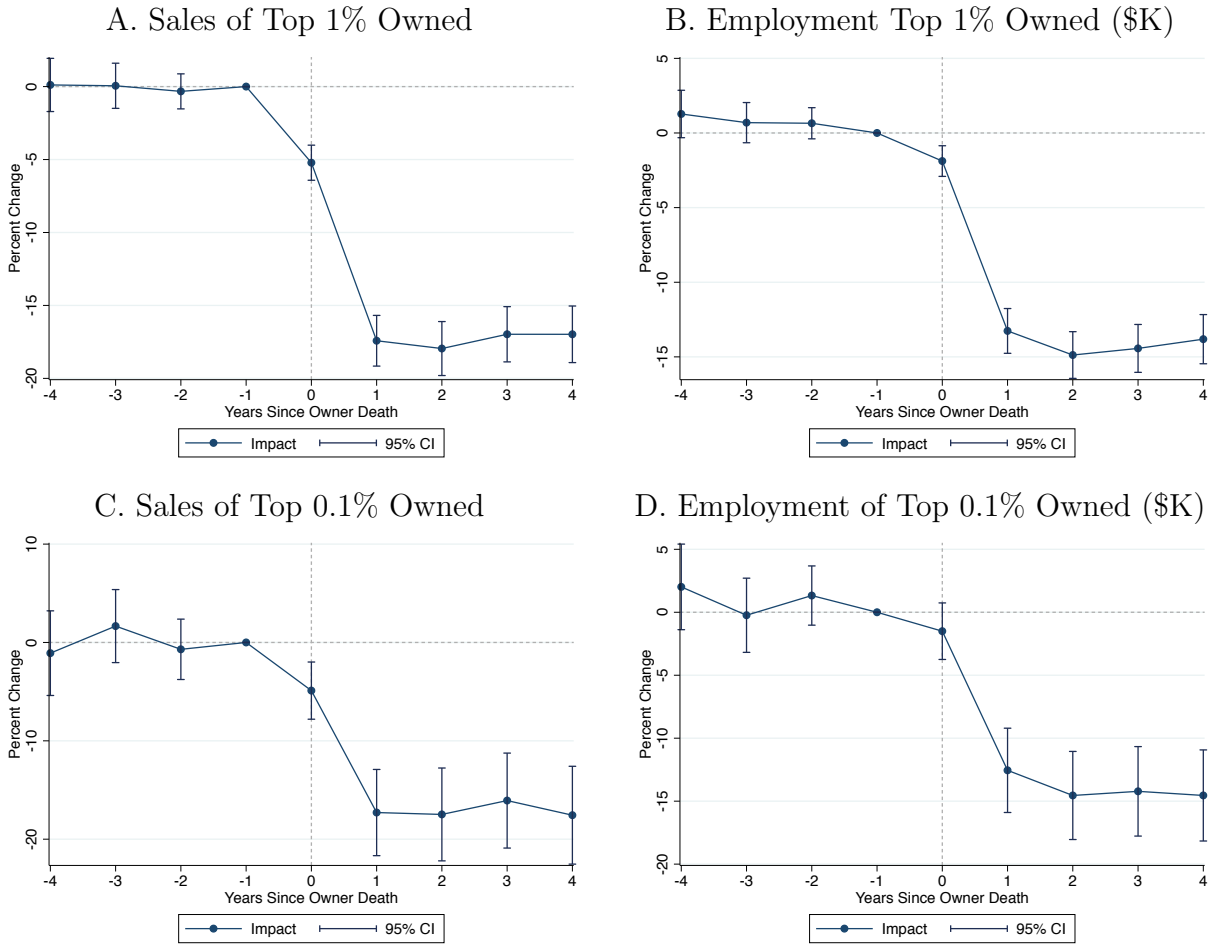
Notes: This figure plots how percentiles of S-corporation aggregate markups of sales over costs evolved from 2000 to 2014.

Figure A.11: The Marginal Labor Income Tax Rate Falls at the Top



Notes: This figure plots our estimate of the 2014 marginal federal tax rate on labor income—wage income plus the labor component of S-corporation income—implied by our results. The marginal tax rate falls at the top because active S-corporation income is a larger share of total labor income at the top but is not subject to the 2.9% Medicare tax and 0.9% ACA Additional Medicare Tax. See Section 7 for additional details.

Figure A.12: Impact of Top 1% and Top 0.1% Owner Death on Firm Performance



Notes: This figure repeats Figure 5 for two alternative outcomes. See the notes to that figure for details. Panels A and C analyze the outcome of annual firm sales divided by the firm's mean annual sales $[t-4, t-1]$ relative to the owner death year t. Panels B and D analyze the outcome of annual firm number of workers divided by the firm's mean annual number of workers $[t-4, t-1]$. Each outcome is winsorized among owner-death firms and counterfactual firms at the unweighted first and ninety-ninth percentiles of its pooled $[t-4, t-1]$ distribution among owner-death firms. Firms that exit are assigned zero sales, zero profits, and zero workers following exit.

Table A.1: Summary Statistics on Partnerships and Their Owners

A. Firm Summary Statistics

	A. All Firms				B. Firms with Top 1-0.1% Owner				C. Firms with Top 0.1% Owner			
	Mean	p10	p50	p90	Mean	p10	p50	p90	Mean	p10	p50	p90
Sales	1,879	4.28	135.03	2,042	2,503	4.98	360.33	4,902	11,830	7.20	625.34	14,402
Profits	-149.46	-47.74	5.26	236.01	233.24	-80.02	22.16	785.98	1,567	-261.62	36.68	2,571
Profit Margin	0.06	-0.80	0.05	0.85	0.14	-0.57	0.10	0.96	0.16	-0.57	0.11	0.99
Employees	10.29	0	0	17.80	17.74	0	0	38.11	38.34	0	0	73.13
Employees | Employees > 0	30.78	1.27	7.71	58.82	45.45	2	13.55	93.45	113.36	2.81	28.51	208.23
Number of owners	5.55	1.29	2	4.31	4.18	2	2	7.50	42.70	1.64	3	22.97
Sales per worker	202.64	12.43	71.73	369.65	280.03	16.28	109	523.09	502.75	14.87	97.79	779.29
Profits per worker	2.14	-12.06	1.98	59.74	37.72	-11.80	5.55	116.59	74.94	-36.16	2.53	155.53
Profits per worker, employees-weighted	-21.36	-3.91	0.65	29.60	8.74	-2.52	0.98	31.14	23.91	-2.82	2.03	78.02
Profits per owner	-108.91	-20.85	2.26	100.94	83.89	-26.85	7.40	306.14	340.64	-58.41	7.32	738.73
Owner payments	130.28	-34.01	5.17	211.09	206.23	-51.44	18.66	698.52	1,133	-151.72	23.70	1,817
Owner payments per owner	34.23	-14.79	2.23	89.06	66.47	-17.36	6.20	273.71	213.51	-33.73	4.61	527.90
Owner payments per worker	20.26	-7.97	2.96	60.74	38.51	-6.93	6.38	115.21	67.56	-19.50	2.49	143.41
Owner payments / Profit	0.91	0.43	1	1	0.88	0.30	1	1	0.78	0.16	0.98	1
Owner payments / Sales	0.06	-0.79	0.05	0.79	0.13	-0.63	0.09	0.93	0.12	-0.77	0.08	0.94
Owner payments / Value added	0.09	-0.96	0.10	0.87	0.17	-0.81	0.16	0.97	0.16	-0.90	0.14	0.97
Number of firm-years	15,520,662				2,527,146				1,133,058			

B. Owner Summary Statistics

	A. All Owners				B. Top 1-0.1% Owners				C. Top 0.1% Owners			
	Mean	p10	p50	p90	Mean	p10	p50	p90	Mean	p10	p50	p90
Income	250.18	11.01	95.13	517.45	659.93	395.21	576.59	1,096	4,782	1,567	2,455	8,127
Age	53.21	33.67	52.95	74.81	52.81	39.01	52.11	68.21	54.04	40.33	53.31	69.92
Number of Firms Owned	1.56	1	1	2.81	1.94	1	1	3.73	3.03	1	2	6.55
Wage Income	80.83	0	1.62	174.78	205.46	0	79.05	593.62	1,113	0	186.50	2,779
Partnership Income	33.47	-6.01	0.03	58.16	117.98	-5.07	2.83	476.25	608.29	-18.22	5.55	1,867
Total Owner Payments	35.96	-5.48	0.05	68.04	123.55	-4.80	3.22	490.59	620.40	-17.83	5.90	1,898
Business Income	72.04	-10.23	0.12	175.26	235.57	-4.80	121.25	689.85	1,835	-31.47	974.67	4,028
Partnership Income / Owner Pmt	0.98	1	1	1	0.98	1	1	1	0.99	1	1	1
Wage Income / Income	0.62	0	0	0.96	0.32	0	0.13	0.94	0.27	0	0.06	0.95
Owner Payment / Income	3.27	-0.05	0	0.69	0.19	-0.01	0	0.87	0.16	-0.01	0	0.84
Business Income / Income	0.20	-0.07	0.01	0.95	0.34	-0.01	0.21	0.96	0.41	-0.01	0.42	0.96
Only Earns Passive Income	0.15	0	0	1	0.14	0	0	1	0.09	0	0	0.39
Number of owner-years	55,229,572				6,526,191				1,324,245			

Notes: This table replicates Table 1 for partnerships. The underlying sample are the 86.2M partnership-owner-year observations in the full sample, which comprises all partnership-owner-year observations 2001-2014 in which the owner is a U.S. individual. See the notes to Table 1 for definitions, replacing "S-corporation" with "partnership", and see Sections 2-3 for more details.

Table A.2: Industrial Composition of S-Corporation Profits (Total vs. Top 1-0.1% vs. Top 0.1%, Apportioned 2014)

	Top 0.1% Owners				Top 1-0.1% Owners		
Industry (NAICS)	Rank	Profits	Share of All	Industry (NAICS)	Rank	Profits	Share of All
Management of cos/enterprises (5511)	1	10100	1.018	Offices of physicians (6211)	1	9270	0.546
Other financial investment actvty (5239)	2	8270	0.893	Other professional/technical svc (5419)	2	4980	0.314
Automobile dealers (4411)	3	5930	0.853	Offices of dentists (6212)	3	4380	0.56
Other professional/technical svc (5419)	4	4780	0.389	Other specialty trade cntrctr (2389)	4	4210	0.33
Oil/gas extraction (2111)	5	3970	1.633	Legal svc (5411)	5	3560	0.352
Misc. durable goods merch whlsl (4239)	6	3920	0.654	Building equipment cntrctr (2382)	6	2850	0.329
Offices of physicians (6211)	7	3730	0.287	Insurance agencies/brokerages (5242)	7	2810	0.315
Other heavy constr (2379)	8	3700	0.75	Computer sys design/related svc (5415)	8	2800	0.29
Computer sys design/related svc (5415)	9	3580	0.399	Architectural/engineering svc (5413)	9	2780	0.369
Other specialty trade cntrctr (2389)	10	3490	0.372	Restaurants (7225)	10	2750	0.425
Management/techncl consulting svc (5416)	11	3350	0.479	Management/techncl consulting svc (5416)	11	2260	0.271
Other fabricated metal prod mfg. (3329)	12	3270	0.653	Nonresidential building constr (2362)	12	2140	0.343
Other miscellaneous mfg. (3399)	13	3250	0.705	Management of cos/enterprises (5511)	13	2000	0.091
Legal svc (5411)	14	2900	0.332	Misc. durable goods merch whlsl (4239)	14	1930	0.262
Misc. nondrbl gds merch whlsl (4249)	15	2770	0.672	Offices of other health practitioners (6213)	15	1920	0.315
Activities related to real estate (5313)	16	2500	0.737	Other fabricated metal prod mfg. (3329)	16	1870	0.269
Nonresidential building constr (2362)	17	2400	0.607	Automobile dealers (4411)	17	1850	0.204
Plastics product mfg. (3261)	18	2300	0.808	Other financial investment actvty (5239)	18	1700	0.145
Building equipment cntrctr (2382)	19	2120	0.347	Other miscellaneous mfg. (3399)	19	1700	0.249
Restaurants (7225)	20	2110	0.356	Activities related to real estate (5313)	20	1580	0.373
Insurance agencies/brokerages (5242)	21	2020	0.293	Building foundation/exterior cntrctr (2381)	21	1550	0.296
Architectural/engineering svc (5413)	22	1960	0.287	Misc. nondrbl gds merch whlsl (4249)	22	1450	0.228
Building material/supp dealers (4441)	23	1930	0.665	Residential building constr (2361)	23	1440	0.267
Nondepository credit intrmd (5222)	24	1800	0.722	Machinery/supply merch whlsl (4238)	24	1270	0.336
Machinery/supply merch whlsl (4238)	25	1780	0.553	Offices of real estate agents/brokers (5312)	25	1260	0.278
Residential building constr (2361)	26	1740	0.596	Oil/gas extraction (2111)	26	1140	0.438
Other miscellaneous store retailers (4539)	27	1570	0.524	Health/personal care stores (4461)	27	1090	0.461
Electric goods merch whlsl (4236)	28	1560	0.697	Advertising, pr,/related svc (5418)	28	1030	0.327
Indie artists, writers, performers (7115)	29	1520	0.606	Other heavy constr (2379)	29	1020	0.215
Employment svc (5613)	30	1460	0.575	Other miscellaneous store retailers (4539)	30	1000	0.32
Building foundation/exterior cntrctr (2381)	54	789	0.238	Nondepository credit intrmd (5222)	54	510	0.194

Notes: This table presents analogous statistics on the level of S-corporation profits by 4-digit industry, as in Table 2. We apportion S-corporation profits pro rata to owners in either the top 0.1% or the top 1-0.1% and then aggregate those apportioned profits by industry.

Table A.3: Industrial Composition of S-Corporation Profits (S-Corp vs Partnerships, Apportioned 2014)

	Top 0.1% Owners					Top 1-0.1% Owners			
Industry (NAICS)	S Rank	S Profits	P Rank	P Profits	Industry (NAICS)	S Rank	S Profits	P Rank	P Profits
Management of cos/enterprises (5511)	1	10100	4	4280	Offices of physicians (6211)	1	9270	2	6930
Other financial investment actvty (5239)	2	8270	1	33800	Other professional/technical svc (5419)	2	4980	7	1970
Automobile dealers (4411)	3	5930	14	1050	Offices of dentists (6212)	3	4380	16	642
Other professional/technical svc (5419)	4	4780	8	2500	Other specialty trade cntrctr (2389)	4	4210	23	526
Oil/gas extraction (2111)	5	3970	3	4660	Legal svc (5411)	5	3560	1	23700
Misc. durable goods merch whlsl (4239)	6	3920	20	722	Building equipment cntrctr (2382)	6	2850	44	237
Offices of physicians (6211)	7	3730	10	1270	Insurance agencies/brokerages (5242)	7	2810	13	816
Other heavy constr (2379)	8	3700	57	209	Computer sys design/related svc (5415)	8	2800	20	577
Computer sys design/related svc (5415)	9	3580	25	633	Architectural/engineering svc (5413)	9	2780	18	624
Other specialty trade cntrctr (2389)	10	3490	31	444	Restaurants (7225)	10	2750	11	942
Management/techncl consulting svc (5416)	11	3350	9	2060	Management/techncl consulting svc (5416)	11	2260	9	1570
Other fabricated metal prod mfg. (3329)	12	3270	42	335	Nonresidential building constr (2362)	12	2140	30	397
Other miscellaneous mfg. (3399)	13	3250	32	442	Management of cos/enterprises (5511)	13	2000	8	1740
Legal svc (5411)	14	2900	2	20900	Misc. durable goods merch whlsl (4239)	14	1930	32	358
Misc. nondrbl gds merch whlsl (4249)	15	2770	18	841	Offices of other health practitioners (6213)	15	1920	12	870
Activities related to real estate (5313)	16	2500	5	3700	Other fabricated metal prod mfg. (3329)	16	1870	43	237
Nonresidential building constr (2362)	17	2400	45	316	Automobile dealers (4411)	17	1850	22	560
Plastics product mfg. (3261)	18	2300	54	220	Other miscellaneous mfg. (3399)	18	1700	26	497
Building equipment cntrctr (2382)	19	2120	56	218	Other financial investment actvty (5239)	19	1700	3	6600
Restaurants (7225)	20	2110	22	698	Activities related to real estate (5313)	20	1580	10	1510
Insurance agencies/brokerages (5242)	21	2020	19	824	Building foundation/exterior cntrctr (2381)	21	1550	53	184
Architectural/engineering svc (5413)	22	1960	27	536	Misc. nondrbl gds merch whlsl (4249)	22	1450	40	259
Building material/supp dealers (4441)	23	1930	106	76	Residential building constr (2361)	23	1440	21	562
Nondepository credit intrmd (5222)	24	1800	12	1240	Machinery/supply merch whlsl (4238)	24	1270	47	229
Machinery/supply merch whlsl (4238)	25	1780	51	242	Offices of real estate agents/brokers (5312)	25	1260	33	352
Residential building constr (2361)	26	1740	16	978	Oil/gas extraction (2111)	26	1140	5	3520
Other miscellaneous store retailers (4539)	27	1570	55	220	Health/personal care stores (4461)	27	1090	42	243
Electric goods merch whlsl (4236)	28	1560	69	171	Advertising, pr,/related svc (5418)	28	1030	27	469
Indie artists, writers, performers (7115)	29	1520	50	245	Other heavy constr (2379)	29	1020	51	200
Employment svc (5613)	30	1460	64	176	Other miscellaneous store retailers (4539)	30	1000	61	144
Building foundation/exterior cntrctr (2381)	54	789	91	113	Nondepository credit intrmd (5222)	54	510	17	640

Notes: This table presents analogous statistics on the level of S-corporation and partnership profits by 4-digit industry, as in Table 3. We apportion profits pro rata to owners in either the top 0.1% or the top 1-0.1% and then aggregate those apportioned profits by industry.

Table A.4: Firm and Owner Counts by Industry for S-Corporations and Partnerships

	Top 0.1% Owners					Top 1-0.1% Owners			
Industry (NAICS)	S Firms	S Owners	P Firms	P Owners	Industry (NAICS)	S Firms	S Owners	P Firms	P Owners
Management of cos/enterprises (5511)	3636	6245	7623	56675	Offices of physicians (6211)	41975	63386	7464	36958
Other financial investment actvty (5239)	4030	6215	61491	349631	Other professional/technical svc (5419)	22841	32287	13013	32311
Automobile dealers (4411)	5236	7927	1418	2287	Offices of dentists (6212)	18413	21199	2119	3736
Other professional/technical svc (5419)	4291	5672	4444	8180	Other specialty trade cntrctr (2389)	10232	15169	2316	4027
Oil/gas extraction (2111)	1394	2045	7007	43209	Legal svc (5411)	13240	16808	8987	52849
Offices of physicians (6211)	4711	5817	1333	2440	Architectural/engineering svc (5413)	7516	11811	1900	3851
Misc. durable goods merch whlsl (4239)	1787	2522	877	1364	Restaurants (7225)	17683	29359	11202	31878
Management/techncl consulting svc (5416)	2785	3684	3116	5659	Building equipment cntrctr (2382)	5922	9185	768	1437
Computer sys design/related svc (5415)	1760	2444	1432	2404	Computer sys design/related svc (5415)	9607	14422	4502	10613
Other heavy constr (2379)	553	917	156	293	Insurance agencies/brokerages (5242)	9753	14568	3172	7383
Other specialty trade cntrctr (2389)	2046	2792	674	967	Management/techncl consulting svc (5416)	11746	16754	8530	22151
Other fabricated metal prod mfg. (3329)	1171	1821	212	379	Offices of other health practitioners (6213)	9978	13583	3185	10285
Other miscellaneous mfg. (3399)	1341	1999	777	1376	Nonresidential building constr (2362)	4591	7636	2076	4291
Misc. nondrbl gds merch whlsl (4249)	1131	1706	563	991	Misc. durable goods merch whlsl (4239)	5742	9096	2247	4543
Legal svc (5411)	1929	2241	1615	9871	Other fabricated metal prod mfg. (3329)	2843	5447	497	1089
Nonresidential building constr (2362)	1284	1937	726	1163	Building foundation/exterior cntrctr (2381)	3795	5458	682	1151
Activities related to real estate (5313)	10911	14973	47822	92816	Activities related to real estate (5313)	25314	39844	96524	258540
Plastics product mfg. (3261)	526	895	172	333	Other financial investment actvty (5239)	9022	15163	60591	579903
Restaurants (7225)	4991	6850	6401	11887	Other miscellaneous mfg. (3399)	3569	6448	1706	4831
Building equipment cntrctr (2382)	1115	1566	209	287	Automobile dealers (4411)	4504	9005	1278	2759
Insurance agencies/brokerages (5242)	1832	2434	951	1531	Residential building constr (2361)	6561	9172	6547	12319
Architectural/engineering svc (5413)	1085	1581	435	743	Offices of real estate agents/brokers (5312)	6397	8230	2797	5592
Machinery/supply merch whlsl (4238)	832	1228	217	333	Management of cos/enterprises (5511)	4866	14738	10637	169427
Building material/supp dealers (4441)	428	680	136	181	Machinery/supply merch whlsl (4238)	2761	4440	687	1329
Residential building constr (2361)	1629	2315	2868	4505	Misc. nondrbl gds merch whlsl (4249)	3596	5928	1372	3100
Nondepository credit intrmd (5222)	1163	1667	1748	3708	Health/personal care stores (4461)	4758	7120	1560	3780
Other miscellaneous store retailers (4539)	991	1363	609	891	Accounting/bookkeeping svc (5412)	4968	7101	2956	14985
Electric goods merch whlsl (4236)	498	744	150	270	Oil/gas extraction (2111)	3042	5100	10131	156560
Depository credit intrmd (5221)	408	1204	52	162	Other personal svc (8129)	6599	9188	5271	10474
Grocery/related product whlsl (4244)	671	1046	283	558	Advertising, pr,/related svc (5418)	3922	5529	2162	4488

Notes: This table presents counts of the number of firms and owners by 4-digit industry, ranked by the level of S-corporation profits for firms owned by the top 0.1% and the top 1-0.1% respectively. The first column shows the number of S-corporations in 2014. The second column shows the number of S-corporation owners in 2014. The third and fourth columns show the same statistics, but for partnerships.

Table A.5: Construction of the Owner Deaths Analysis Sample

Step	Sample Size at End of Step
Distinct firms 2005-2010	5,680,063
Restrict to firms with one owner death 2005-2010	139,391
Restrict to dying owners in the top 1%	22,753
Restrict to dying owners under age 65	7,718
Restrict to firms with substantial pre-period economic activity	2,627
Restrict to observations with valid industry	2,552
Match to at least one counterfactual firm	2,509

Notes: This table lists the sample sizes at each of seven steps in the construction of the owner deaths analysis sample, detailed in Section 5.1. The sample construction begins with all distinct S-corporations in the 2005-2010 subset of our paper's main sample. The second step further restricts to "owner-death" firms: those with exactly one firm-owner-year observation in our main sample 2001-2014 in which the owner died in the year of or immediately following the observation, as well as to firm in which that one firm-owner-year observation lies in a year $t \in 2005 - 2010$. The third step further restricts to firms with dying owners in the top 1% of the $t-1$ U.S. personal income distribution. The fourth step further restricts to dying owners aged under 65 on December 31 of year t. The fifth step further restricts to firms with at least \$100,000 in sales in 2014 dollars in at least one year in $[t-4, t-1]$, positive sales in all years $[t-4, t-1]$, and positive employment in some year $[t-4, t-1]$. The sixth step further restricts to firms with a three-digit NAICS industry code strictly greater than 0 and strictly less than 999. The seventh step further restricts attention to owner-death firms with at least one match to a "counterfactual" firm that met the same $[t-4, t-1]$ firm requirements, match the owner-death firm on three-digit industry and $t-1$ sales decile, and have a year-t owner who matches the dying owner on $t-1$ income fractile and five-year age bin. The owner deaths analysis sample comprises 2,509 owner-death firms matched to 315,039 counterfactual firms, each observed for the nine years $[t-4, t+4]$.

Table A.6: Profit Components in 2001 levels

Industry	Profits ($ B)	Profitability	Workers per Owner	Owners per Firm	Firms	% Total Profits
Panel A: All Owners						
Overall	148.89	3.67	13.55	1.77	1,695,647	100.00
Agriculture & Forestry	0.60	0.77	8.88	2.37	37,195	0.40
Construction & Mining	27.71	5.92	11.54	1.62	250,637	18.61
Manufacturing	20.44	4.98	18.37	2.30	97,064	13.73
Retail & Wholesale Trade	35.90	4.28	12.51	1.79	374,865	24.11
Info & Professional Svcs	40.86	3.89	11.96	1.74	505,454	27.44
Health Care	12.73	4.70	14.39	1.50	125,059	8.55
Entertnmt, Food & Hotels	5.28	0.74	24.49	1.99	147,020	3.54
Other Svcs	4.71	2.32	9.28	1.56	140,325	3.16
Panel B: Top 1-0.1% Owners						
Overall	48.38	4.25	19.68	2.37	243,682	100.00
Agriculture & Forestry	0.33	1.73	14.38	3.48	3,811	0.68
Construction & Mining	8.47	7.00	21.61	2.10	26,719	17.50
Manufacturing	5.35	4.37	19.98	3.15	19,478	11.05
Retail & Wholesale Trade	10.97	5.02	18.69	2.36	49,515	22.68
Info & Professional Svcs	13.06	4.05	16.57	2.41	80,817	26.99
Health Care	6.39	6.87	15.62	1.76	33,902	13.21
Entertnmt, Food & Hotels	2.19	1.13	35.83	2.82	19,190	4.52
Other Svcs	1.43	3.30	22.56	2.16	8,913	2.96
Panel C: Top 0.1% Owners						
Overall	83.03	8.68	42.14	3.31	68,707	100.00
Agriculture & Forestry	0.64	5.19	25.36	4.21	1,156	0.77
Construction & Mining	13.71	13.46	46.48	2.84	7,704	16.51
Manufacturing	18.27	13.25	43.30	4.12	7,740	22.00
Retail & Wholesale Trade	23.67	10.05	48.95	2.86	16,813	28.51
Info & Professional Svcs	19.22	6.95	35.60	3.50	22,179	23.15
Health Care	3.40	6.41	38.99	2.88	4,733	4.10
Entertnmt, Food & Hotels	2.93	2.65	47.69	3.65	6,346	3.53
Other Svcs	0.96	3.74	51.36	2.91	1,718	1.16

Notes: This table follows the decomposition of profits into its elements as defined in Table 5. Table A.6 shows the levels of profitability and scale metrics in 2001.

Table A.7: Profit Components in 2014 levels

Industry	Profits ($ B)	Profitability	Workers per Owner	Owners per Firm	Firms	% Total Profits
Panel A: All Owners						
Overall	344.72	7.24	10.84	1.58	2,771,211	100.00
Agriculture & Forestry	6.28	5.58	9.35	2.13	56,445	1.82
Construction & Mining	46.00	8.78	9.12	1.50	381,801	13.34
Manufacturing	48.44	13.64	14.97	2.07	114,645	14.05
Retail & Wholesale Trade	75.40	8.45	10.15	1.62	542,409	21.87
Info & Professional Svcs	106.04	8.17	9.37	1.56	886,754	30.76
Health Care	35.56	7.28	11.88	1.36	303,440	10.31
Entertnmt, Food & Hotels	15.63	1.88	19.59	1.80	235,959	4.53
Other Svcs	10.90	4.34	7.30	1.44	237,892	3.16
Panel B: Top 1-0.1% Owners						
Overall	104.07	8.12	17.62	2.10	346,006	100.00
Agriculture & Forestry	1.99	8.04	12.52	3.13	6,335	1.92
Construction & Mining	14.46	10.93	21.38	2.03	30,471	13.90
Manufacturing	11.55	11.36	17.48	2.75	21,170	11.10
Retail & Wholesale Trade	20.25	9.51	16.53	2.09	61,559	19.46
Info & Professional Svcs	30.58	7.99	15.22	2.17	115,647	29.39
Health Care	17.16	10.81	14.24	1.60	69,559	16.49
Entertnmt, Food & Hotels	5.02	2.33	30.81	2.49	28,072	4.82
Other Svcs	2.92	5.74	21.26	1.92	12,474	2.81
Panel C: Top 0.1% Owners						
Overall	160.38	14.86	41.10	3.18	82,605	100.00
Agriculture & Forestry	2.12	14.62	19.30	4.62	1,629	1.32
Construction & Mining	17.93	21.15	43.63	2.69	7,220	11.18
Manufacturing	34.41	26.66	38.04	3.85	8,805	21.45
Retail & Wholesale Trade	42.70	16.74	47.77	2.66	20,104	26.62
Info & Professional Svcs	47.30	13.19	37.04	3.70	26,142	29.49
Health Care	8.11	10.11	40.26	2.50	7,968	5.06
Entertnmt, Food & Hotels	5.96	4.47	50.92	3.08	8,517	3.72
Other Svcs	1.79	7.66	45.84	2.44	2,089	1.12

Notes: This table follows the decomposition of profits into its elements as defined in Table 5. Table A.7 shows the levels of profitability and scale metrics in 2014.

Table A.8: Decomposition of Profit Growth by State, Top 1-0.1% Owners

		Share of Profit Growth (%)				
State	Profit Growth Rate	Profitability	Workers per Owner	Owners per Firm	Firms	% Total Profits (2014)
Overall	120.68	80.19	-11.51	-14.62	45.94	100.00
AK	119.89	50.01	-21.34	-3.75	75.09	0.38
AL	124.86	58.19	-1.57	-3.42	46.80	1.33
AR	155.50	72.10	-3.83	-25.51	57.24	0.88
AZ	130.88	76.97	-31.54	-14.35	68.92	1.66
CA	183.50	74.13	-31.28	-13.95	71.10	12.35
CO	123.08	73.59	-11.89	-15.58	53.88	2.51
CT	172.88	98.51	8.00	-11.46	4.96	0.90
DE	75.80	190.51	-108.36	-17.09	34.95	0.28
FL	86.12	87.48	-21.34	-17.14	51.00	8.42
GA	100.51	53.30	12.06	-14.34	48.98	3.30
HI	113.90	51.77	13.73	-19.26	53.76	0.25
IA	185.36	77.31	-21.70	-10.26	54.65	1.20
ID	201.18	44.15	6.14	-9.49	59.20	0.64
IL	80.27	95.91	-13.49	-16.07	33.65	4.37
IN	51.45	126.57	-14.60	-35.64	23.67	2.19
KS	141.89	86.29	-24.97	-16.26	54.94	1.10
KY	45.93	125.11	-43.29	-13.82	32.00	1.06
LA	142.80	84.32	-37.51	-10.21	63.40	1.77
MA	66.40	67.72	16.76	-16.81	32.33	2.29
MD	87.33	84.05	-12.34	-14.87	43.16	1.73
ME	78.75	48.97	39.66	-9.37	20.74	0.39
MI	113.27	86.21	-2.38	-19.70	35.87	2.81
MN	121.67	75.75	4.00	-13.58	33.84	2.48
MO	128.22	78.79	-0.83	-15.98	38.02	1.80
MS	143.14	47.35	31.05	-24.17	45.77	0.65
MT	181.95	44.42	6.55	-15.83	64.86	0.48
NC	116.94	70.97	2.11	-16.12	43.04	2.69
ND	466.14	54.49	-12.62	-7.84	65.97	0.64
NE	216.37	54.22	4.64	-16.40	57.54	0.85
NH	105.30	72.28	34.41	-9.95	3.27	0.17
NJ	59.83	140.35	-9.94	-21.36	-9.05	2.34
NM	93.29	88.00	-23.14	-12.31	47.45	0.46
NV	130.58	79.60	-23.92	-16.49	60.80	1.02
NY	67.41	100.52	-2.26	-17.18	18.92	4.80
OH	95.06	119.29	-32.10	-14.21	27.03	3.42
OK	146.22	72.78	-11.52	-24.67	63.41	1.55
OR	233.35	77.41	-12.20	-12.24	47.03	1.34
PA	122.87	94.12	-4.71	-12.05	22.63	3.90
RI	30.17	190.46	-75.78	-22.75	8.07	0.38
SC	71.50	69.68	-6.88	-18.58	55.78	1.17
SD	187.67	61.15	-1.12	-11.41	51.38	0.54
TN	193.03	71.19	14.43	-8.80	23.18	0.42
TX	255.55	59.76	-1.02	-13.46	54.71	7.77
UT	262.24	38.11	11.27	-14.24	64.86	1.25
VA	116.57	68.08	1.13	-13.56	44.35	2.46
VT	127.28	118.76	-33.82	3.85	11.21	0.22
WA	162.73	71.03	-20.92	-6.36	56.25	2.68
WI	104.49	64.56	7.14	-11.97	40.27	1.98
WV	76.54	100.36	-5.80	-21.68	27.12	0.33
WY	179.99	67.70	-32.07	-2.86	67.23	0.38

Notes: See Table 5 for a description of the calculations.

Table A.9: Decomposition of Profit Growth by State, Top 0.1% Owners

		Share of Profit Growth (%)				
State	Profit Growth Rate	Profitability	Workers per Owner	Owners per Firm	Firms	% Total Profits (2014)
Overall	107.43	72.74	2.45	-4.84	29.65	100.00
AK	229.13	39.88	-6.41	9.60	56.93	0.26
AL	77.62	16.05	33.78	9.63	40.54	0.95
AR	141.65	43.36	-7.17	-6.70	70.51	0.70
AZ	25.64	362.11	-332.38	-16.53	86.81	1.04
CA	78.77	68.26	-32.06	-5.42	69.22	12.46
CO	62.25	67.31	8.14	-12.51	37.05	1.76
CT	98.84	123.76	-6.80	2.78	-19.74	1.55
DE	70.01	-319.39	418.72	18.29	-17.61	0.33
FL	64.67	78.95	8.22	-25.39	38.22	6.15
GA	93.49	85.02	-15.73	3.24	27.47	2.62
HI	155.36	69.99	37.85	-38.90	31.06	0.17
IA	168.33	56.67	-2.79	7.20	38.91	0.99
ID	219.23	44.66	30.66	-11.10	35.77	0.48
IL	51.85	137.14	-42.10	7.26	-2.31	5.12
IN	87.39	3.66	109.90	-31.88	18.32	1.97
KS	156.00	75.24	-19.73	9.28	35.21	1.22
KY	43.55	48.68	55.24	-0.01	-3.91	0.72
LA	165.56	25.16	-11.20	22.19	63.85	1.86
MA	308.95	77.52	27.77	-14.70	9.40	3.38
MD	5.40	-190.80	182.74	-98.75	206.81	1.33
ME	19.91	211.78	-27.59	-17.64	-66.55	0.21
MI	141.12	49.05	24.39	-4.02	30.58	3.38
MN	74.98	141.84	-65.38	10.57	12.98	2.55
MO	-620.35					1.90
MS	72.99	123.87	-88.05	17.23	46.95	0.50
MT	294.39	71.43	-30.13	-1.95	60.64	0.36
NC	93.47	96.69	-21.39	-7.70	32.41	2.01
ND	861.41	48.95	-4.59	-1.77	57.41	0.76
NE	151.91	71.59	-42.50	7.50	63.41	0.84
NH	96.93	117.24	26.51	0.55	-44.31	0.14
NJ	48.29	146.92	-4.70	-13.87	-28.35	3.06
NM	113.40	86.43	-26.63	19.52	20.68	0.54
NV	58.39	114.95	-14.73	-30.00	29.77	1.13
NY	96.95	101.28	24.67	-19.64	-6.30	6.92
OH	91.17	71.15	18.15	-8.38	19.09	3.33
OK	171.94	32.52	24.21	-12.38	55.65	2.07
OR	117.32	67.44	-3.37	-11.14	47.07	0.91
PA	102.96	82.84	8.25	-1.88	10.80	3.73
RI	40.65	89.49	-64.68	70.85	4.34	0.25
SC	76.68	0.45	141.52	-67.17	25.20	0.63
SD	379.15	54.81	7.10	-6.69	44.77	0.57
TN	234.40	113.00	-29.43	2.86	13.57	0.69
TX	227.57	71.97	-15.31	-8.58	51.92	8.94
UT	83.80	29.14	-12.65	-3.85	87.36	0.88
VA	62.00	59.40	-7.46	6.56	41.50	1.70
VT	62.30	70.02	63.26	-14.64	-18.64	0.11
WA	120.71	57.24	-9.98	6.18	46.56	2.02
WI	231.27	41.36	29.01	7.79	21.83	4.15
WV	62.47	84.45	-161.66	115.77	61.44	0.24
WY	99.51	89.46	-2.87	-85.78	99.19	0.41

Notes: See Table 5 for a description of the calculations. Top 0.1% owned S-Corporations in Missouri witnessed decreases in all components of the profit decomposition. Log calculations dropped negative growth rates for this segment of the sample.

B Model Appendix

B.1 Firm Scale and Profitability

B.1.1 Determinants of Firm Scale

Firm scale for firm j is determined by equating marginal revenue and marginal costs. After cost minimization, cost is $C_j = S'_j y^{\frac{1}{\gamma}}$, where $S'_j = A_j^{\frac{-1}{\gamma}} \theta_j^{\frac{-\alpha_E}{\gamma}} w^{\frac{\alpha_L}{\gamma}} r^{\frac{\alpha_K}{\gamma}} \kappa$ is related to terms that shift firm supply, $\kappa = \gamma \left[\alpha_L^{-\alpha_L} \alpha_K^{-\alpha_K} \left(\alpha_E \left(\frac{\varepsilon}{1+\varepsilon} \right) \right)^{\frac{-\alpha_E}{1+\frac{1}{\varepsilon}}} \right]^{\frac{1}{\gamma}}$ is a constant, and $\gamma = \alpha_L + \alpha_K + \frac{\alpha_E}{1+\frac{1}{\varepsilon}}$ are the effective returns to scale.

The firm problem (abstracting from fixed costs) is:

$$\max_y \pi(y) = D_j^{\frac{-1}{\eta}} y^{1+\frac{1}{\eta}} - S'_j y^{\frac{1}{\gamma}} \tag{7}$$

FOC:

$$\underbrace{\left(1 + \frac{1}{\eta}\right) D_j^{\frac{-1}{\eta}} y^{\frac{1}{\eta}}}_{\text{MR}} = \underbrace{\frac{1}{\gamma} S'_j y^{\frac{1}{\gamma}-1}}_{\text{MC}}$$

$$\Rightarrow y^* = \left[D_j^{\frac{1}{\eta}} S'_j \left(\frac{\eta}{\eta+1} \right) \frac{1}{\gamma} \right]^{\frac{1}{\frac{1}{\eta}+\frac{\gamma-1}{\gamma}}} \tag{8}$$

Thus, profits are:

$$\pi(y^*) = D_j^{\frac{-1}{\eta}} \left(\left[D_j^{\frac{1}{\eta}} S'_j \left(\frac{\eta}{\eta+1} \right) \frac{1}{\gamma} \right]^{\frac{1}{\frac{1}{\eta}+\frac{\gamma-1}{\gamma}}} \right)^{1+\frac{1}{\eta}} - S'_j \left(\left[D_j^{\frac{1}{\eta}} S'_j \left(\frac{\eta}{\eta+1} \right) \frac{1}{\gamma} \right]^{\frac{1}{\frac{1}{\eta}+\frac{\gamma-1}{\gamma}}} \right)^{\frac{1}{\gamma}} \tag{9}$$

We can also express profits as a markup over costs:

$$\pi_j = \left[\left(\frac{\eta}{1+\eta} \right) \frac{1}{\gamma} - 1 \right] C_j \tag{10}$$

where $C_j = \left[D_j^{\frac{1}{\eta}} \left(\frac{\eta}{\eta+1} \right) \frac{1}{\gamma} \right]^{\frac{\frac{1}{\gamma}}{\frac{1}{\eta}+\frac{\gamma-1}{\gamma}}} S'^{\frac{1+\frac{1}{\eta}}{\frac{1}{\eta}+\frac{\gamma-1}{\gamma}}}_j$.[48]

[48] The first order conditions for each factor show that factor payments will be a fixed share of sales (e.g., $\alpha_L \left(\frac{1}{\eta} + 1 \right) \frac{p_j y_j}{L_j} = w \Rightarrow \alpha_L \left(\frac{1}{\eta} + 1 \right) Sales_j = wL_j$).

B.1.2 Determinants of Firm Profitability

The gross markup of sales over costs μ_j is determined by demand elasticity and output elasticities α_K, α_L and α_E:

$$\mu_j = \frac{p(y_j^*)y_j^*}{C(y_j^*)} = \frac{1}{\gamma}\left(\frac{\eta}{\eta+1}\right) \tag{11}$$

Generally, firms are more profitable when the gap between prices and average total costs is large. Costs are $C_j = S_j' y_j^{\frac{1}{\gamma}}$, so average costs are $c_j = S_j' y_j^{\frac{1}{\gamma}-1}$. Hence, the gap between prices and average total costs is $D_j^{\frac{-1}{\eta}} y^{\frac{1}{\eta}} - S_j' y_j^{\frac{1}{\gamma}-1}$. Additionally, equation 7 abstracted from fixed costs, but costs can easily be redefined to add fixed costs. With fixed costs, the gap between price and average total cost can grow as fixed costs are spread over larger quantities, which can increase firm profitability.

B.1.3 Factor payments and factor shares

From the FOCs, it follows that factor payments are:

- Non-owner labor: $wL_{j(i)} = \alpha_L \left(\frac{1}{\eta_{j(i)}} + 1\right) p_{j(i)} y_{j(i)}$
- Capital: $rK_{j(i)} = \alpha_K \left(\frac{1}{\eta_{j(i)}} + 1\right) p_{j(i)} y_{j(i)}$
- Owner payments are the sum of:
  - Compensation for owner effort: $\frac{\alpha_E}{1+\frac{1}{\varepsilon_{j(i)}}} \left(\frac{1}{\eta_{j(i)}} + 1\right) p_{j(i)} y_{j(i)}$.
  - Profits: $\pi_{j(i)} = \left[1 - \left(\alpha_L + \alpha_K + \frac{\alpha_E}{1+\frac{1}{\varepsilon_{j(i)}}}\right)\left(\frac{1}{\eta_{j(i)}} + 1\right)\right] p_{j(i)} y_{j(i)}$

Thus, factor shares are:

$$s_L = \alpha_L \left(1 + \frac{1}{\eta_{j(i)}}\right) \tag{12}$$

$$s_K = \alpha_K \left(1 + \frac{1}{\eta_{j(i)}}\right) \tag{13}$$

$$s_E = \frac{\alpha_E}{1 + \frac{1}{\varepsilon_{j(i)}}} \left(1 + \frac{1}{\eta_{j(i)}}\right) \tag{14}$$

$$s_\pi = 1 - s_L - s_E - s_K \tag{15}$$

where s_L is the non-owner labor share, s_K is the capital share, s_E is the owner labor share, s_π is the owner profit share, and $s_{owner} = s_E + s_\pi$ is the total share of payments accruing to owner(s).

B.2 Product Demand Elasticity and Firm Scale

Inelastic product demand elasticity η may be a function of firm scale, as in the case of dominant local firms.[49] Suppose $D^M(p)$ is the market demand for a given product, and let $S^0(p)$ be the supply from the non-dominant firms in the market. If the firm j faces a residual market demand curve $y(p) = D^M(p) - S^0(p)$, then differentiation and expressing terms as elasticities yields:

$$|\eta_j| = \frac{|\eta^M|}{s_j} + \frac{1 - s_j}{s_j}\varepsilon^S \tag{16}$$

where η^M is the market product demand elasticity, s_j is the market share for firm j and ε^S the elasticity of supply for non-dominant firms. Equation 16 shows the product demand elasticity facing the firm will be more inelastic when (i) the market demand elasticity η^M is less elastic, (ii) the firm's market share s_j is larger, and (iii) the supply elasticity of other firms ε^S is less elastic. Note that the relationship between market share and market power is non-linear — small changes in market share can cause large changes in markups, especially for firms with large initial market shares. Also note that, with firm entry, $\varepsilon^S = \infty$, which corresponds to a perfectly competitive output market.

[49] Our discussion of η and scale in this appendix subsection draws heavily on Kevin Murphy's price theory lecture discussion of dominant local firms, in which Murphy highlights these points. See Kaplow and Shapiro (2007) for a derivation of equation 16 and additional analysis.

B.3 Identifying α_E accounting for changes to other inputs

If owner effort E also affects factor demand, then identifying α_E requires adjusting for changes in factor inputs. Totally differentiating sales yields,

$$\begin{aligned}\frac{d\text{Sales}}{dE} &= \frac{dD^{\frac{-1}{\eta}}\left(AL^{\alpha_L}K^{\alpha_K}E^{\alpha_E}\right)^{\frac{1}{\eta}+1}}{dE} \\ &= -\frac{1}{\eta}\frac{dD}{dE}\frac{Sales}{D} + \left(1+\frac{1}{\eta}\right)\frac{dA}{dE}\frac{Sales}{A} + \alpha_E\left(1+\frac{1}{\eta}\right)\frac{Sales}{E} \\ &+ \alpha_L\left(1+\frac{1}{\eta}\right)\frac{dL}{dE}\frac{Sales}{L} + \alpha_K\left(1+\frac{1}{\eta}\right)\frac{dK}{dE}\frac{Sales}{K}\end{aligned}$$

where the first three terms are the effects of owners on the demand shifter D, TFP A and owner effort E, and the last two terms are the factor adjustment terms. Multiplying by $\frac{E}{Sales}$ to convert terms into elasticities, we have

$$\beta^{Sales,E} = -\frac{1}{\eta}\beta^{D,E} + \left(1+\frac{1}{\eta}\right)\beta^{A,E} + \alpha_E\left(1+\frac{1}{\eta}\right) + \alpha_L\left(1+\frac{1}{\eta}\right)\beta^{L,E} + \alpha_K\left(1+\frac{1}{\eta}\right)\beta^{K,E} \tag{17}$$

where $\beta^{X,E}$ denotes the elasticity of X with respect to E. The labor and capital elasticities are closely related (since $K = \frac{\alpha_K w}{\alpha_L r}L$), so we can combine the factor adjustment terms:

$$\beta^{Sales,E} = -\frac{1}{\eta}\beta^{D,E} + \left(1+\frac{1}{\eta}\right)\beta^{A,E} + \alpha_E\left(1+\frac{1}{\eta}\right) + (\alpha_L+\alpha_K)\left(1+\frac{1}{\eta}\right)\beta^{L,E} \tag{18}$$

This step is useful because of difficulties associated with measuring capital well in the data. Therefore, we can identify each component of the factor adjustment term as follows:

1. The coefficient on $\beta^{L,E}$ is the sum of the non-owner labor share $\alpha_L\left(1+\frac{1}{\eta}\right)$ and capital share $\alpha_K\left(1+\frac{1}{\eta}\right)$, which we can identify from the non-owner factor share, which equals $\frac{wL+rK}{py} = (\alpha_L+\alpha_K)(1+\frac{1}{\eta})$ where y represents net output so that py represents value added (rather than value added plus intermediate inputs).[50] Note that owner payments as a share of sales represent two components: the entrepreneur labor share $s_E = \frac{(E/\theta)^{1+\frac{1}{\varepsilon}}}{py} = \frac{\alpha_E}{1+\frac{1}{\varepsilon}}(1+\frac{1}{\eta})$ and the profit share $s_\pi = 1 - s_L - s_E - s_K$.

[50] For example, if owner payments are roughly 40% of overall payments, then the term $(\alpha_L+\alpha_K)(1+\frac{1}{\eta})$ equals 1-0.4=0.6.

2. $\beta^{L,E}$ is the estimated elasticity of employment, which we estimate from the effect of owner death on employment.

In short, we quantify the factor adjustment term by multiplying the non-owner factor share by the employment elasticity estimate. If there are no effects of the owner on appeal D or TFP A, then the difference between the sales elasticity $\beta^{Sales,E}$ and this factor adjustment term represents $\alpha_E \left(1 + \frac{1}{\eta}\right)$. Therefore, dividing this difference by $\left(1 + \frac{1}{\eta}\right)$ yields an estimate of α_E. In terms of implementing these steps empirically, we have:

$$\alpha_E = \frac{\beta^{Sales,E} - (1 - s_{owner})\beta^{L,E}}{\left(1 + \frac{1}{\eta}\right)} \tag{19}$$

where $\beta^{Sales,E}$ is the effect of an owner death on log sales, $s_{owner} = s_E + s_\pi$ is the owner share of payments, $\beta^{L,E}$ is effect of an owner death on log employment, and η is the product demand elasticity, which is typically calibrated to take values between -10 to -4, see for example, Suárez Serrato and Zidar (2016) who estimate $\eta = -4.5$ and Coibion, Gorodnichenko and Wieland (2012) who use $\eta = -7$. Less elastic product demand elasticities are also possible for certain types of firms. Finally, note that in the perfect competition case (i.e., $\eta = -\infty$), no adjustment for the product demand elasticity term is required as $\left(1 + \frac{1}{\eta}\right) \approx 1$.

Table B.1: Parameters to quantify α_E

Parameter	**Value**	**Source**
$\beta^{Sales,E}$	.30	Appendix Figure A.12A
Average owner share s_{owner}	.45	Main sample
$\beta^{Sales,L}$	.23	Appendix Figure A.12B
Product demand elasticity η	-4.5	Suárez Serrato and Zidar (2016)

Notes: This table shows the values and sources for parameters used to quantify α_E in section 5.2. Since the average dying owner owned only 60.2% of the owner-death firm, we scale the estimates Appendix Figure A.12A and Figure A.12B by 1/.602 as in the main analysis to obtain estimates in elasticity terms for a 100% change in owner effort. The average owner share s_{owner} is the ratio of aggregate owner payments (i.e., profits plus owner wages) to aggregate profits plus all W-2 payments (including owner wages) among the top 1% owned firms. Estimates that include interest payments in the denominator or alternative definitions of the numerator (e.g., officer compensation plus profits) result in fairly similar aggregate owner share estimates for top 1% owners. On an unweighted basis, the average owner share of top 1% firms is roughly two-thirds, which results in a higher estimate of $\hat{\alpha}_E \approx .33$.

B.4 Scarcity versus Accumulation (Prices versus Quantities)

Log linearizing demand yields:

$$\hat{y}_j^D = \hat{D}_j + \eta \hat{p}_j \tag{20}$$

where $\hat{y}_j^D$ is the percent change in the quantity demanded, $\hat{D}_j$ is the shift in demand, and $\eta\hat{p}_j$ is movement along the demand curve where η is the demand elasticity and $\hat{p}_j$ is the percentage change in price. Similarly, the percent change in the quantity supplied is,

$$y_j^S = \hat{S}_j + \epsilon^S \hat{p}_j \tag{21}$$

where

$$\begin{aligned} S_j &= \mu_j^{-\frac{\gamma}{1-\gamma}} A_j^{\frac{1}{1-\gamma}} \theta_j^{\frac{\alpha_E}{1-\gamma}} w^{\frac{-\alpha_L}{1-\gamma}} r^{\frac{-\alpha_K}{1-\gamma}} \kappa^{-\frac{\gamma}{1-\gamma}} \\ &= \left(\frac{\eta}{\eta+1}\right)^{-\frac{\gamma}{1-\gamma}} \gamma^{\frac{\gamma}{1-\gamma}} \left[A_j \theta_j^{\alpha_E} \left(\frac{\alpha_L}{w}\right)^{\alpha_L} \left(\frac{\alpha_K}{r}\right)^{\alpha_K} \left[\alpha_E \left(\frac{\varepsilon}{1+\varepsilon}\right)\right]^{\frac{\alpha_E}{1+\frac{1}{\varepsilon}}} \right]^{\frac{1}{1-\gamma}} \end{aligned}$$

is a supply shifter, which is a function of the markup μ_j (see equation 11), TFP A_j, owner talent θ_j, and factor prices, and $\epsilon^S = \frac{\gamma}{1-\gamma}$ is the supply elasticity, where $\gamma = \alpha_L + \alpha_K + \frac{\alpha_E}{1+\frac{1}{\varepsilon}}$ are the effective returns to scale.[51]

In equilibrium, the product market clears and the change in quantity demanded and the quantity supplied have to be the same.

$$\begin{aligned} \hat{y}_j^D &= \hat{y}_j^S \\ \hat{D}_j + \eta\hat{p}_j &= \hat{S}_j + \epsilon^S \hat{p}_j \end{aligned}$$

[51] Supply from other firms could affect market level supply, which would work through the firm's product market elasticity being more elastic (due to higher ε^S in equation 16). Similarly, firm entry could affect supply, and market supply would be the product of the number of firms and average firm supply. We discuss the forces governing entry in section B.5.

Thus, the percentage change in prices is:

$$\hat{p}_j = \frac{\hat{D}_j - \hat{S}_j}{\epsilon^S - \eta} \tag{22}$$

We can use this price change to determine the quantity change:

$$\hat{y}_j = \hat{S}_j + \epsilon^S \left(\frac{\hat{D}_j - \hat{S}_j}{\epsilon^S - \eta} \right)$$
$$\hat{y}_j = \left(\frac{-\eta \hat{S}_j + \epsilon^S \hat{D}_j}{\epsilon^S - \eta} \right) \tag{23}$$

which shows that the quantity change is an elasticity-weighted average of shifts in supply and demand. The sales change is the sum of price and quantity changes:

$$\widehat{Sales}_j = \hat{p}_j + \hat{y}_j = \frac{(1+\epsilon^S)\hat{D}_j - (1+\eta)\hat{S}_j}{\epsilon^S - \eta} \tag{24}$$

Since sales are a markup μ_j over costs, we have the following expression for profit changes:

$$\hat{\pi}_j = \widehat{Sales}_j + \widehat{\left(1 - \frac{1}{\mu_j}\right)} \tag{25}$$

Finally, note that the relative importance of price and quantity changes are:

$$\frac{\hat{p}_j}{\widehat{Sales}_j} = \frac{\hat{D}_j - \hat{S}_j}{(1+\epsilon^S)\hat{D}_j - (1+\eta)\hat{S}_j} \tag{26}$$
$$\frac{\hat{y}_j}{\widehat{Sales}_j} = \frac{-\eta \hat{S}_j + \epsilon^S \hat{D}_j}{(1+\epsilon^S)\hat{D}_j - (1+\eta)\hat{S}_j} \tag{27}$$

Therefore, if there is a net demand increase (i.e., $\hat{D}_j - \hat{S}_j > 0$), most of the change in sales (and thus profits via higher sales in equation 25) will be due to higher prices rather than higher quantities when ϵ^S is small. Recall that $\epsilon^S = \frac{\gamma}{1-\gamma}$, where $\gamma = \alpha_L + \alpha_K + \frac{\alpha_E}{1+1/\varepsilon}$ and ε may vary by scale.

B.5 Firm Entry

This section describes a simple model for considering how much firm entry will respond to firm profit increases. People can decide to be entrepreneurs or workers. A person will choose to be an entrepreneur if their utility of being an entrepreneur $v_e + \nu_{ie}$ exceeds their utility of being a worker $v_w + \nu_{iw}$. The utility of being an entrepreneur is the sum of the systematic component enjoyed by all entrepreneurs v_e and an idiosyncratic component ν_{ie}, which varies across people and can reflect non-pecuniary tastes for entrepreneurship, location-specific tastes (e.g., a person would have to move to a different location to start a physician practice if it is profitable there), person-specific fixed costs for setting up business, or other factors. Similarly, the systematic and idiosyncratic components of the utility of being a worker are v_w and ν_{iw}, respectively.

Suppose that ν_{ik} for $k \in \{e, w\}$ is i.i.d., mean zero, and type I extreme value with scale σ, which means that the relative tastes of person i for being a worker $\xi_i = e_{iw} - e_{ie}$ are distributed according to a logistic distribution: $\xi_i/\sigma \sim$ logistic(0,1).[52] The share of people who choose to be entrepreneurs S_e is

$$S_e = \Lambda(\frac{v_e - v_w}{\sigma}) \tag{28}$$

where $\Lambda(\cdot) \equiv \frac{\exp(.)}{1+\exp(.)}$ is the standard logistic c.d.f. Rearranging this expression yields,

$$\sigma\Lambda^{-1}(S_e) = v_e - v_w \tag{29}$$

which shows that the supply of entrepreneurs is closely linked to premium people receive from entrepreneurship relative to working. Specifically, $\sigma\Lambda^{-1}(S_e)$ is effectively the supply curve of entrepreneurs. The parameter σ, which governs the importance of idiosyncratic preferences and scales a weakly increasing function $\Lambda^{-1}(\cdot)$, determines both the level of entrepreneurship S_e^* and how responsive new entrepreneurship is to changes in entrepreneurial payoffs.

The premium to entrepreneurship $v_e - v_w$ depends on how profits and counterfactual entrepreneur wages are modeled. For a person with talent θ and a market price per efficiency

[52] We follow the mathematical setup of the two city residential choice model of Kline and Moretti (2014) since the analytical structure of a binary discrete choice is quite similar to our setting.

unit w, let the difference between the profits from entrepreneurship and labor compensation be $\pi(w,\theta) - w\theta$, where $\pi(w,\theta)$ is the expression from equation 10 and the person's compensation as a worker is the product of wages and talent, as in Murphy, Shleifer and Vishny (1991).[53]

$$\sigma\Lambda^{-1}(S_e) = \pi(w,\theta) - w\theta \tag{30}$$

Thus, if idiosyncratic factors ξ_i are quite important (i.e., large σ), then firm entry won't be very responsive to a given increase in firm profits.[54] There are other ways to model the outside labor market options of firm owners besides $w\theta$, but the qualitative forces shaping the level and responsiveness of firm entry, such as the importance of ξ_i and the relative returns to talent, will remain important.

[53]Murphy, Shleifer and Vishny (1991) model talent as determining firm TFP, notice that in the expression for profits $\pi_j = \left[\left(\frac{\eta}{1+\eta}\right)\frac{1}{\gamma} - 1\right]\left[D_j^{\frac{1}{\eta}}\left(\frac{\eta}{\eta+1}\right)\frac{1}{\gamma}\right]^{\frac{\frac{1}{\gamma}}{\frac{1}{\eta}+\frac{\gamma-1}{\gamma}}}\left[A_j^{\frac{-1}{\gamma}}\theta_j^{\frac{-\alpha_E}{\gamma}} w^{\frac{\alpha_L}{\gamma}} r^{\frac{\alpha_K}{\gamma}}\kappa\right]^{\frac{1+\frac{1}{\eta}}{\frac{1}{\eta}+\frac{\gamma-1}{\gamma}}}$, firm TFP A and owner talent θ enter the profit expression very similarly. The only difference is that θ is scaled differently as higher talent is raised to the exponent $\frac{-\alpha_E}{\gamma}$ rather than $\frac{-1}{\gamma}$. However, the feature that higher talent generates increasing returns for entrepreneurs remains, and shapes how the allocation of talent is determined.

[54]Equation 30 treats wages as exogenous, so the implied equilibrium share of people who are entrepreneurs S_e^* is determined by where threshold value $\pi(w,\theta) - w\theta$ intersects the σ-scaled supply curve, i.e., $\sigma\Lambda^{-1}(S_e)$. Extending the model to allow for wages to depend on the share of the population who works, i.e., $w(S_e)$, would provide a congestion force and result in similar analytics to the role of rental prices in the two city model of Kline and Moretti (2014).