

THE VALUE OF PRIVATE BUSINESS IN THE UNITED STATES *

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Abstract

Private companies account for almost half of aggregate sales and profits of the US economy, but valuing them is difficult due to lack of public market data. This paper uses two databases of private business transactions to estimate valuation ratios and applies them to private business aggregates. We estimate aggregate private business wealth of \$14.1 trillion in 2018, twice as large as measured in the Financial Accounts. Our estimates of partnership wealth are six times larger than Financial Accounts estimates, which values partnerships at book value with no adjustment from market based multiples.

Keywords: private business, valuation, wealth inequality

JEL Classification: E21

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1 Introduction

Economic activity in the United States is increasingly concentrated in private businesses. In 2018, private companies sold \$16.8 trillion of goods and services, similar in magnitude to the \$16 trillion in sales of public corporations (Figure 1, red line). The rise of pass-through businesses¹ (and decline in public corporations) has led to a state in which one of the most important aspects of the macroeconomy and of household wealth is a highly opaque asset class, with no publicly released financial statements or market values from a stock exchange.

The primary existing estimate of private business wealth comes from the Financial Accounts (FA), the official compendium of wealth of the Federal Reserve. And according to the FA, U.S. private business wealth is relatively modest: an enterprise value of \$6.7 trillion in 2018, compared with \$39.8 T for public companies (Figure 1, blue line). The FA, following the System of National Accounts recommendation, values corporations using market-based multiples of book equity from public corporations, combined with a 25% discount for the illiquidity of private enterprises. For partnerships and sole proprietorships, however, a different method is used: wealth is estimated at book value.

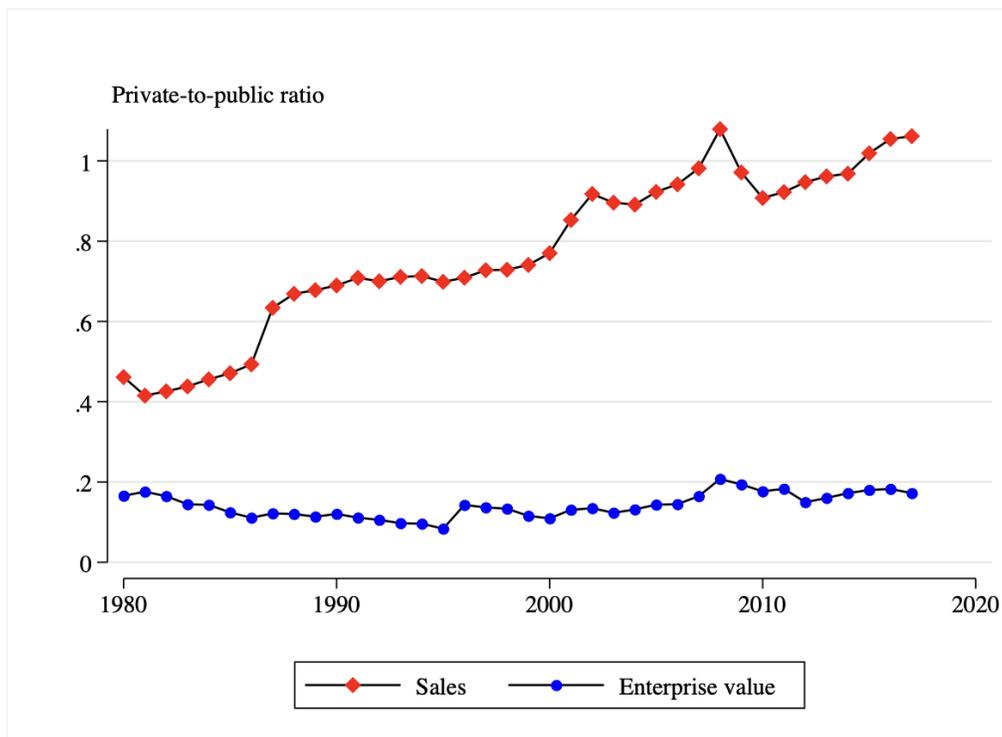
The use of unadjusted book values rather than market-based multiples for noncorporate business is a significant limitation of FA methodology. While this simplified approach to valuation wasn't a problem when partnerships were a small fraction of aggregate business income, over the past two decades partnership activity has exploded. As documented in Smith et al. (2022), the Tax Reform Act of 1986, combined with state-level legal initiatives that granted limited liability to partnerships, completely changed the character of partnerships income. Since 1980, partnership net income has grown from 13 percent to 35 percent of total business profits. Figure 1 shows that even as private firm sales have grown substantially since the 1980s as a percent of public sales, the value of Financial Accounts private to public enterprise value shows no trend.

In this paper, we bring new data and new methods to estimate the aggregate enterprise value of private business wealth in the United States. To do so, we use two data sets on non-public transactions from Business Valuation Resources, LLC, a firm that specializes in providing data, information, and tools to appraisers who value private firms. The data contains transaction level information from tens of thousands of business sales, including detailed data on income statements, balance sheets, and transaction values. We use the transaction data to estimate valuation multiples by industry and firm size, and apply them to aggregate measures of profits and sales from the IRS Statistics on Income.

We find that the value of private business is substantial: an aggregate enterprise value of \$14.1 trillion in 2018, almost twice as large as measured in the FA. This difference stems primarily from partnership wealth: we value partnerships at \$6.8 T in 2018, *more than six times* the FA's \$942.5 B. Our estimates for S-corps, private C-corps, and sole proprietorships while larger than FA values,

¹Documented in Smith et al. (2019) and Smith et al. (2022).

Figure 1: Private versus public sales, valuations



Notes: Red line plots the ratio of private company sales, from aggregated IRS business tax returns, to public company sales, from Compustat. Blue line plots the ratio of aggregate private business enterprise value from the Financial Accounts to the aggregate enterprise value of public corporations from Compustat. Private sales equal the sum of sales for S-corps, partnerships, estimated sole proprietorship businesses, and estimated private C-corps. Section 4 describes estimation procedure for sole proprietorship businesses and private C-corps. Financial Accounts enterprise value is described in Section 2.

are much closer in magnitude.

The primary threat to our analysis is selection bias on unobserved firm characteristics in the transaction data. Transactions are not random, and can generate biased valuation ratios, for example if high-multiple businesses are more likely to be sold. While we reweight our estimates for differences in firm size and industry composition between transacted firms and the overall distribution of firms, we are unable to adjust for selection on unobserved characteristics. To assess the potential magnitude of this bias, we conduct a robustness exercise where we estimate the impact of potential upward bias in valuation ratios on our estimated wealth totals. Even if we assume that our partnership and sole proprietorship multiples are upward biased by 100%, we would nevertheless find 2018 aggregate U.S. private wealth equal to \$9.0 T, which remains 34% above the Financial Accounts estimate – with partnerships equal to \$3.4 T, which remains 261% above the Financial Accounts estimate.²

²See section 6.4 for details. For this exercise, we assume that the *corporate* values in the

This new time series on valuation serves as an independent estimate of the aggregate value of private business wealth, and has direct implications for measures of wealth inequality, as well as revenue estimates under a wealth or capital gains tax. The primary estimates of wealth inequality in the US, including Piketty, Saez and Zucman (2016) and Smith et al. (2020), rely on Financial Accounts aggregates when estimating the distribution of private business wealth. The higher valuations of private businesses increase the top 1% wealth share from 34.7% to 37.9% in 2018, and top .1% from 18.1% to 20.3%. A 1% tax on the wealth of the top .1% would raise a mechanical \$67.0 billion (\$734.0 billion over 10 years) from private businesses alone. A tax on unrealized capital gains for families in the top .1% would raise \$639 billion from private business wealth alone over 10 years.

Our new estimates of private business wealth, while much higher than the FA, align quite closely with the Survey of Consumer Finance (SCF), which values businesses using self reported valuations from business owners. The main source of misalignment is the low FA value for partnerships, driven by the methodological decision to use unadjusted book values for partnerships. A key recommendation from our work is that the FA should move to a market based approach for valuing partnership businesses, in line with recommendations from the System of National Accounts 2025.

2 Financial Accounts Business Wealth

The primary existing estimate of private business wealth in the United States comes from the Financial Accounts of the Federal Reserve. The FA estimates serve as the baseline series for most studies of wealth inequality, including Piketty, Saez and Zucman (2016) and Smith et al. (2020).

The FA values private corporations using market based multiples from Compustat. For S-corporations, market value to book equity multiples are constructed by 2-digit NAICS industry, equal to the sum of public firm market values divided by the sum of book equity across firms in the industry: $\beta_t^{i,BE,FA} = \frac{\sum_{f \in i} MV_{ft}}{\sum_{f \in i} BE_{ft}}$, where i indexes industry and f firm.³ To estimate market values, the industry-specific valuation ratios are multiplied by aggregate S-corp book equity from the IRS Statistics of Income:

$$MV_t^{S-corps} = \frac{3}{4} \times \sum_i \text{IRS Book Equity}_t^i \cdot \beta_t^{i,FA} \quad (1)$$

FA are accurate, while only the *noncorporate* valuations are biased. Under this assumption, our transaction based estimates are 88% higher than FA totals.

³Financial Accounts series LM883164133. See Fed documentation. The Compustat data excludes international firms and subsidiaries as well as repeats in the data, and outliers are kept. IRS SOI Book Equity is available in Table 6.1: Returns of Active Corporations, Form 1120S, Balance Sheet and Income Statement Items. [Link here](#).

The total market value is adjusted downward by 25 percent to reflect the lack of liquidity of closely held shares. In Figure A.5 (a) we replicate the FA S-corp valuation using original source data and are able to match closely the published values.

For private C-corporations,⁴ a similar method is applied using market value to sales rather than book equity multiples. However, since the IRS SOI does not provide sales for *private* C-corporations, the FA instead applies these multiples to revenue data from the Forbes annual list of America's Largest Private Companies: $MV_t^{C-corps} = \frac{3}{4} \times \sum_{f \in Forbes} Sales_{ft}^i \cdot \beta_t^{i,SA,FA}$. Again, the total values are adjusted downwards by 25% to reflect a liquidity discount.

The FA values partnerships and sole proprietorships in Table B.104, Nonfinancial Noncorporate Business. This table combines together operating business value with noncorporate real estate holdings. Because our research specifically examines operating business value, we exclude real estate from FA totals. This restriction ensures a consistent comparison with our own estimates (described below) which exclude the value of real estate.

The FA values noncorporate operating businesses purely on the replacement value of the capital stock, without any grossing up using multiples like for S-corporations. The replacement value of the capital stock is estimated from the BEA Fixed Asset Accounts,⁵ who construct stocks using the perpetual inventory method. The total enterprise value of business assets is the sum of equipment, intellectual property products, and inventories.⁶ We replicate the FA noncorporate estimates using source data in Figure A.5 (b).

We highlight several potential limitations of the FA's approach to corporate valuation. First, valuing private companies using public company multiples introduces potential biases. Although the FA applies a 25% liquidity discount to account for public-private differences, as discussed below, this adjustment stems from a literature specifically studying private companies that closely resemble public firms. Such a standardized discount may significantly understate the appropriate adjustment for a typical private corporation, and hence overestimate value.

Second, as Smith et al. (2020) observe, the choice of net book equity as a scaling variable for S-corps may potentially understate value, as they frequently operate in asset light service sectors. This suggests that, *ceteris paribus*, the use of sales and/or EBITDA multiples would provide a higher valuation. To test this hypothesis, in Figure A.5 (a) we estimate S-corp valuations using identical source data and methodology as the FA, but substitute MV/EBITDA and MV/Sales multiples from Compustat instead of book equity ratios. Our analysis

⁴Financial Accounts series LM883164135.

⁵Thus unlike S-corps, it is not taken from the balance sheets reported to the IRS.

⁶See FA documentation here. Equipment is series LM115015205, IPP is series LM115013765, and inventories series LM115020005. The original tables do not separate out partnership and sole proprietorships. To get the partnership specific assets, we use the underlying BEA detail tables. Partnership equipment is BEA series k1ntot17eq00, and partnership IPP BEA series k1ntot17ip00.

reveals significantly higher valuations compared to the original FA series.

Finally, the reliance on the Forbes list for C-corps is problematic because of its limited coverage. The 2018 list contains just 225 firms, less than .03% of the 1,171,593 private C-corps tabulated in the Economic Census.⁷ This sample limitation may lead to an underestimation of private C-corp wealth.

A key drawback of the FA methodology for noncorporate businesses is its reliance on book value rather than market based multiples. As discussed in Section 1, while this simplified approach to valuation was less of a problem when partnerships were a small fraction of aggregate business income, over the past two decades pass through activity has exploded. The rise of pass-through business fundamentally altered the partnership landscape from predominantly small professional business to larger enterprises.⁸ In addition, the growing importance of intangible capital – as shown in Bhandari and McGrattan (2021) in a small business context and Corrado, Hulten and Sichel (2009) more generally – has widened the gap between book and market values, as many intangible assets remain unrecorded on balance sheets.

Several recent papers have also provided new estimates of private business wealth and valuation ratios. The closest paper to ours is Smith et al. (2020), who estimate private corporation valuations using a combination of (i) Compustat multiples for public firms (ii) private discounts from SDC platinum (iii) an additional discount reflecting the non-human capital contribution of pass-through specific profits. The main difference is the data source for private transactions; SDC platinum is a small data set of 187 transactions that captures public company acquisitions of large private companies. The BVR data allows the computation of valuation ratios by granular legal form of organization, industry, and size groups.

Bhandari et al. (2020) use Pratt’s stats, a previous version of DealStats, to compare business yields (the inverse of valuation ratios) in the transaction data with the SCF, but do not estimate aggregate private business wealth. The main difference in our computation of valuation ratios is our reweighting procedure. In computing aggregate valuation ratios we reweight the transaction data by industry, size, and legal form of organization to match aggregates from the IRS. This has a substantive effect on the estimated valuation ratios. Our work is also related to Moskowitz and Vissing-Jørgensen (2002), Kartashova (2014), and Bricker, Moore and Volz (2021) who estimate private return on equity and compare them to public returns. Compared with these papers, we provide a new estimate of the capital gains yield on private business equity that is not based on the SCF.

Our work is also related to the extensive literature on the ‘private company discount’, which broadly finds that private companies sell for discounts of 20-40% for similar public companies.⁹ A subtle difference of our paper is that the

⁷We estimate the number of private C-corp firms by taking the 2017 Economic Census for total C-corp employer firms (1,181,593) minus a generous estimate of the number of public firms (10,000).

⁸See Chrisman (2009) and Friedman (2004).

⁹Koeplin, Sarin and Shapiro (2000) compares private transactions from SDC platinum with

previous literature is concerned with the *ceteris paribus* effect of being private on company valuations; i.e. finding private companies that look as similar as possible to public companies and comparing valuations. Since we are using our valuation ratios to gross up aggregate private business sales, we are rather concerned with average differences in valuations. We often find more substantial private company discounts of up to 50%, depending on firm size and legal structure.

3 Data

We use two different data sets from Business Valuation Resources (BVR) to estimate valuation ratios: DealStats, which collects transaction information from larger transactions, and Bizcomps, which has data from smaller sole proprietorships. BVR is a company that provides deal and market data to valuation professionals. It obtains its financial information from business brokers, broker associations, and transaction intermediaries. BVR also obtains transaction information from SEC filings when public companies acquire private ones.

The company financials are either taken from financial statements or directly from tax returns. In practice business sales can be quite complicated, with transactions differing in the percent of the business that is sold and what is included in the sale price. To create an apples-to-apples comparison, BVR standardizes the transactions.¹⁰ Importantly, the value of any real estate, financial assets, and debt assumed that are included in the sale are carved out of the transaction. The sale price thus reflects the *enterprise value* of operating businesses.

The choice of business enterprise value as our primary measure is driven by our goal of estimating business wealth and the limitations of the transaction data. We note, however, that this methodological choice has the substantive effect of excluding from our valuations a variety of entities that file partnership tax returns but do not primarily generate ordinary business income, such as rental real estate firms and investment funds.¹¹ For consistent comparisons with sources that include these assets, such as the SCF, we adjust our totals by incorporating estimates of real estate and net financial wealth.

Our primary variables of interest are sales price, EBITDA,¹² sales, and NAICS

matched public transactions in Compustat, and finds private companies sell for a discount of 20-30%. Kooli, Kortas and L'her (2003) uses a database of private equity M&As, and finds discounts of 17-34%. De Franco et al. (2011) uses Pratt's stats and SDC platinum, restricted to public acquisitions of private targets, to estimate the private company discount, and finds a discount to 20-40%, similar to Officer (2007).

¹⁰For details, see Appendix A.1.

¹¹Hess et al. (2024) show that half of all partnerships are in the real estate industry. Smith et al. (2020) show that a substantial fraction of interest income flows through boutique investment partnership funds. Cooper et al. (2016) find 70.0% of allocated income goes to partnerships in finance or those that classify themselves as holding companies. Partnerships in real estate and finance hold an outsized share of financial assets, with these industries accounting for 77% of total partnership assets in 2018.

¹²Equal to operating profit plus depreciation plus amortization. Operating profit equals gross

industry. Table 1 provides summary statistics, broken down by legal form of organization. There are 13,094 S-corporation transactions, 6,734 for C-corps, 6,326 for partnerships, and 14,087 for sole proprietorships. C-corporations are the largest, with an average selling price of \$34 million, followed by partnerships with an average price of \$9.4 million, followed by S-corps with average sale price of \$4.1 million. Sole proprietorships are the smallest, selling for an average of \$351,000. The larger C-corporations likewise have higher sales (\$22 million) and employees (14.7) than partnerships (sales of \$6.4 million and 7.6 employees) and S-corps (sales of \$3.9 million and 9.8 employees).

We multiply valuation ratios to aggregated profit and sales data from business tax returns. Our primary data source is the universe of business tax returns from 2002-2018, provided by the Internal Revenue Service through the Joint Statistical Research Program. This includes form 1120-S for S-corps, 1065 for partnerships, 1120 for C-corps, and Schedule C for sole proprietorships. Three key variables used for valuation are sales, net income (less deficit), and EBITDA, constructed as net income plus interest plus amortization plus depreciation.¹³ Our valuation thus scales up ordinary business income, and does not include portfolio income such as interest and rents. Table A.5 gives per-return summary statistics.

The primary threat to our methodology of using transaction data to estimate aggregate business value is nonrandom selection into transactions. If transacted businesses differ systematically from the general population, our wealth estimates will be biased.

Figure A.10 compares the size distribution of firms in the transaction data with the population of IRS business tax returns. The figure shows the fraction of firms in each size category for both data sets, where size is measured by business sales. Businesses involved in transactions tend to be larger and are concentrated in the highest size categories. The difference is especially notable among sole proprietorships. While most proprietorships tax returns report sales below \$50,000, transactions usually involve sales above \$50,000.¹⁴

Although the firm size distribution in transaction data is skewed toward larger firms, the distribution of aggregate sales across size categories, displayed in Figure 2, aligns more closely with the overall distribution. Figure 2 shows the fraction of total sales within each size category for transacted business and IRS tax returns. In both datasets, the majority of aggregate sales come from the large size categories.

profit minus operating expenses, without subtracting interest expense. Sales are net of returns and discounts.

¹³The specific construction differs by legal form of organization; see Section A.3.

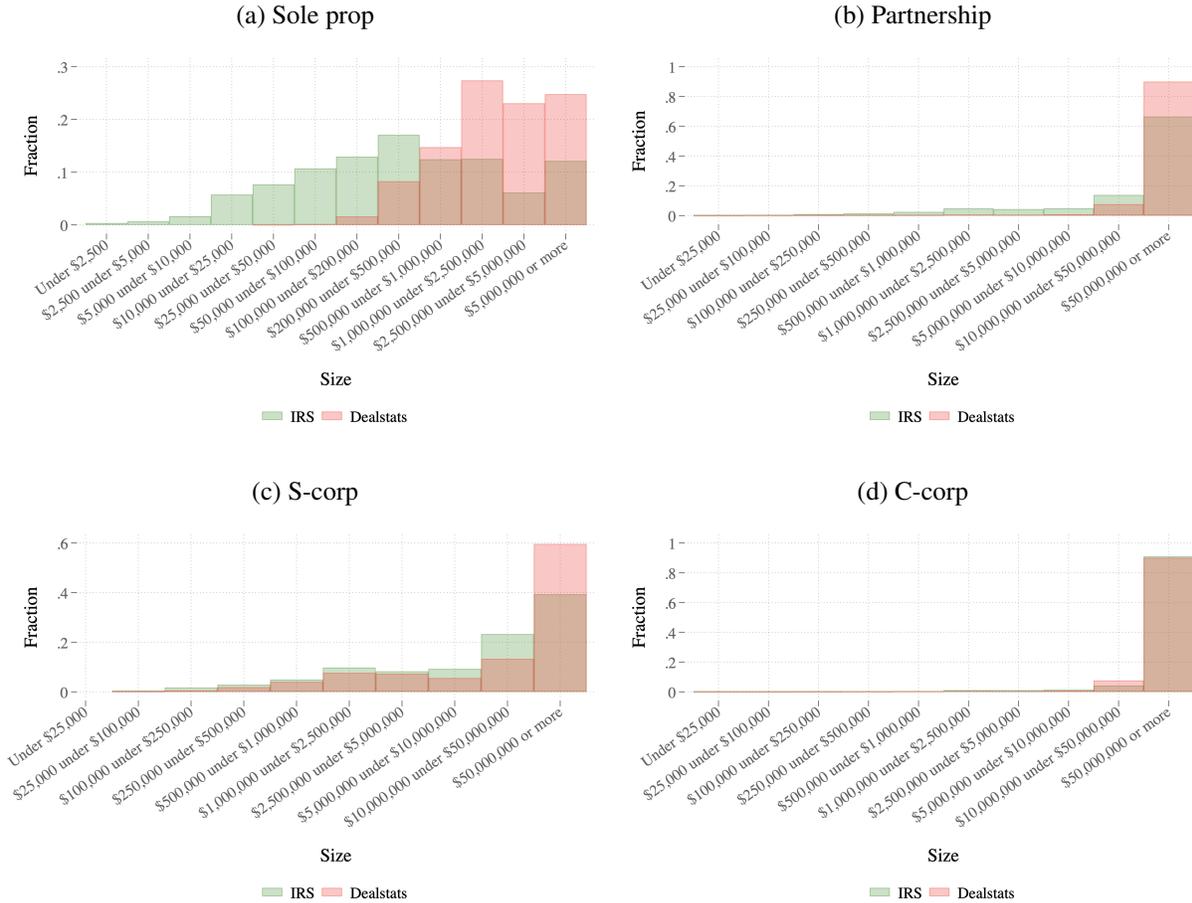
¹⁴As discussed in Section 4, part of this discrepancy is due to the fact that many sole proprietorship tax returns are independent contractors or gig economy workers and not businesses.

Table 1: BIZCOMPS/DealStats Summary Statistics

	<i>Bizcomps</i>		<i>DealStats</i>	
	Sole/part	C-Corporation	Partnership	S-Corporation
		<i>Book Variables</i>		
Net Sales	837.0 (1048.8)	21466.1 (49128.4)	6407.1 (27559.2)	3882.2 (16143.1)
Sale Price	351.8 (456.9)	33912.9 (81029.2)	9428.2 (45815.7)	4042.1 (22308.4)
Seller's Discretionary Earnings	161.5 (167.1)	282.3 (395.4)	183.7 (311.8)	236.6 (355.5)
EBITDA	. (.)	1401.4 (6128.9)	818.7 (3908.2)	426.5 (1933.2)
Owners Compensation	. (.)	122.6 (168.1)	55.9 (88.8)	77.1 (105.6)
Inventory	22.9 (58.5)	2954.4 (8728.8)	1710.2 (6716.7)	742.7 (3697.1)
Franchise	0.046 (0.21)	1.02 (0.14)	1.08 (0.27)	1.05 (0.22)
Days to Sell	229.0 (171.1)	226.5 (186.0)	227.4 (180.6)	235.9 (192.5)
Stock Transaction	. (.)	0.44 (0.50)	0.099 (0.30)	0.099 (0.30)
Asset Transaction	. (.)	0.56 (0.50)	0.90 (0.30)	0.90 (0.30)
Real Estate	. (.)	23751.5 (145419.7)	25428.1 (150738.4)	21799.0 (125826.2)
Real Estate Acquired	. (.)	0.044 (0.21)	0.041 (0.20)	0.055 (0.23)
		<i>Valuation Ratios</i>		
MV/Sales	0.52 (0.32)	0.98 (1.00)	0.67 (0.66)	0.64 (0.57)
MV/SDE	2.14 (1.32)	3.22 (2.42)	2.70 (1.89)	2.97 (2.06)
MV/EBITDA	. (.)	9.13 (7.80)	5.37 (6.05)	5.94 (6.18)
MV/Earnings Before Taxes	. (.)	9.92 (8.79)	5.45 (6.60)	6.21 (6.73)
		<i>Employment Variables</i>		
Number of Employees	8.2 (8.6)	13.8 (22.3)	7.6 (12.3)	9.7 (15.1)
Full-time	6.2 (6.8)	. (.)	. (.)	. (.)
Part-time	4.9 (6.2)	. (.)	. (.)	. (.)
Observations:	14087	6734	6326	13094

Notes: Data from Business Valuation Resources. Table values are means, with standard deviations in parentheses.

Figure 2: Distribution of firm sales, BVR vs IRS



Notes: Figure displays the fraction of aggregate sales within each size category for two data sets: BVR transaction data, and IRS tax returns. Data from BVR and IRS SOI.

Figure A.8 compares the industry composition of BVR and IRS data. The figure shows the fraction of transactions that are in each 2-digit NAICS industry minus the fraction of businesses in the tax data. There are significant differences in industry composition. C-corporation transactions are overweight manufacturing and finance compared with tax returns, and underweight construction. S-corporation transactions are overweight restaurants and manufacturing, and underweight construction and real estate. Partnerships are underweight real estate. Sole proprietorships are overweight restaurants and underweight construction.

To the extent that valuations ratios differ across industries or the firm size distribution, we will have to adjust our estimates of aggregate private business wealth to account for the fact that the transaction data is not representative of aggregate business data. We do so by estimating valuation ratios within industry-size cells. If average firm valuations are approximately constant within the cells, this method will produce an unbiased estimate of aggregate firm valuations. While this procedure accounts for selection on observed characteristics,

the potential for selection on unobservables remains, for example if businesses with greater liquidity (and thus higher multiples) are likely to be sold. In Section 6.4 we discuss the robustness of our results to selection on unobservables.

4 Methodology

Using internal IRS business tax return data, we aggregate sales and EBITDA at the industry, legal form of organization, and size (measured by business receipts) level – we will refer to this as the “cell” level, indexed by c . Our goal is to take this information and estimate the aggregate enterprise value of firms in the cell. To do so, we multiply the cell-level aggregates by valuation multiples estimated from our transaction data. Our final valuations will be a mean of the EBITDA valuation, estimated with EBITDA multiples, and the sales valuation, estimated using sales multiples.¹⁵

A significant challenge in profit-based business valuation is accounting for techniques that artificially reduce profits, sometimes resulting in negative taxable income. A growing body of literature on ‘accounting-driven losses’¹⁶ identifies several key drivers: expensing of firms’ internally generated intangible investment, large depreciation deductions, and goodwill amortization. While EBITDA does add back certain accounting deductions, our data still shows a large concentration of business activity amongst firms with negative EBITDA.

Table A.5 breaks down EBITDA into its positive and negative components. In 2018, partnerships had aggregate EBITDA of \$606 B, composed of \$758 B in positive values minus \$152 B of negative. Simply using the \$606 B figure would inappropriately assign negative values to firms with negative EBITDA, contradicting the principle that a firm’s minimum enterprise value is zero.

To address this issue, we further decompose each EBITDA cell into its positive and negative components, and base our valuations solely on positive EBITDA. This conservative approach, consistent with Smith et al. (2020), effectively values firms with negative EBITDA as the average of zero, their EBITDA valuation, and their (strictly positive) sales valuation. In Section 6.3, we provide alternative estimates valuing negative-EBITDA firms based exclusively on sales multiples — a less conservative method that assumes a greater fraction of losses stem from accounting practices rather than fundamental business weakness.

¹⁵We focus on scaling sales and EBITDA because these are the ratios that are most commonly used by practitioners. Appendix figures A.3 and Table A.7 compares the in-sample prediction errors of EBITDA, pre-tax profit, gross-profit, sales, and book value. All of the scale variables perform roughly equally, with the exception of book value, which has higher errors.

¹⁶See Joos and Plesko (2005), Darrough and Ye (2007), and Gu, Lev and Zhu (2023)).

Our final valuation, for each legal form l , is given by

$$\text{Sales EV}_t^l = \sum_c \text{Agg IRS Sales}_{ct}^l \cdot \beta_{ct}^{l,sale} (1 - \text{Carve out}_{ct}^l) \quad (2)$$

$$\text{EBITDA EV}_t^l = \sum_c \text{Agg Pos. IRS EBITDA}_{ct}^l \cdot \beta_{ct}^{l,EB} (1 - \text{Carve out}_{ct}^l) \quad (3)$$

$$\text{Final EV}_t^l = (\text{Sales EV}_t^l + \text{EBITDA EV}_t^l) / 2 \quad (4)$$

Here $\beta_{ct}^{l,X}$ denotes the valuation multiple for factor $X \in \{\text{sales}, \text{EBITDA}\}$, and Carve out_{ct}^l is a final adjustment factor that differs based on legal form.

There are a number of adjustments necessary in applying valuation ratios to the tax aggregates. For private C-corporations, since tax returns contain both private and public companies, we have to net out any public corporation amount from the totals. To do so, we use a conservative methodology of carving out private corporations with sales greater than \$50,000,000 (roughly the largest 10,000 firms each year). We set $\text{Carve out}_{ct}^{C-corp}$ equal to 1 for cells above the threshold, and 0 otherwise.

For sole proprietorships, a problem with applying our methodology is the fact that many tax returns do not represent marketable businesses: they may also be independent contractors, freelancers, gig economy workers, or other self-employed individuals.¹⁷ We carve out marketable businesses from independent contractors using data from the Nonemployer Survey of the Economic Census. The Nonemployer Survey provides revenue data for sole proprietorships by industry for firms without payroll employees, which are more likely to be independent contractors. For each industry-year, we estimate the *nonbusiness carve out* ratio as $\text{Carve out}_{it}^{sp} = \frac{\text{Nonemployer Sales}_{it}}{\text{IRS Sales}_{it}}$.¹⁸

For partnerships, a final adjustment is necessary to prevent any double counting of business value. Partnerships are passthrough entities that may have C-corp shareholders, some of which are publicly traded. The estimated value of these (separately filing) partnership subsidiaries are already embodied in the market value of public corporations. To prevent double counting, we carve out the value of corporate owned partnerships from our totals.

Prior work has shown that corporations receive a substantial fraction of partnership net income flows, ranging from 10-15%.¹⁹ These flows, however, include portfolio income, which largely reflects real estate, fixed income, and other financial wealth. For our purposes, we require the fraction of partnership *business value* owned by corporate partners. To estimate this, we use results from a companion paper, Campbell, Robbins and Wylde (2025), which uses internal IRS K-1 data to estimate the fraction of partnership business wealth ultimately held by corporate partners. Figure A.7 presents these results, showing that 12.5% of partnership business wealth was held by C-corp owners over our sample period. We set Carve out_t^{pa} equal to this ratio.

¹⁷See, for example, Bhandari et al. (2020) and Abraham et al. (2017).

¹⁸Figure A.6 displays these carve out ratios, which average around .5 over the sample period.

¹⁹See Cooper et al. (2016) and Love (2021).

To form our cell level valuation ratios, we must choose which centralized tendency of transaction level valuation ratio $\beta_{ct}^{l,X}$ to use. This is important because there are substantial differences between the mean, median, geometric mean, and weighted mean.²⁰ Figure A.1 displays for our transaction data each of these centralized tendencies for manufacturing S-corps, showing these can differ by a factor of two or more.

In Appendix B.1, we test the performance of the different multiples by comparing predicted valuations to the actual sales price in sample. The statistic which performs the best is the weighted average valuation ratio, with the weights being the size of the scale variable (EBTIDA and sales, respectively). For EBITDA, this is computed $\beta_{ct}^{l,EB} = \sum_{f \in c} w_{ft} \beta_{ft}^{EB}$, where β_{ft}^{EB} is the firm specific valuation ratio and $w_{ft} = \frac{EB_{ft}}{\sum_{f \in c} EB_{ft}}$.²¹ For this statistic, prediction errors at the cell level are closely centered around zero: the mean percent error for EBITDA is -2.3%, with a 25-75th percentile range of [-5.4%,3.5%].²²

Given the granularity of our cell definition, there are not sufficient observations in our transaction data to directly calculate weighted average valuation ratios by *size* as well as industry and legal form.²³ Instead, we estimate cell level valuation ratios by regressing observed valuation ratios on dummy variables for legal form of organization, industry, size, and year. We run regressions of the form

$$\beta_{ft} = \alpha_{lp} + \delta_{lp} + \theta_t + \gamma_{ip} + \epsilon_{ft}. \quad (5)$$

Here α are legal form of organization fixed effects, δ are size group fixed effects, γ are industry fixed effects and θ are year fixed effects. To allow the effects of industry, legal form, and size to change over time, we interact each of the dummy variables with four periods p .²⁴ An unweighted regression will give us the conditional mean of the valuation ratio for each cell; since we are interested in the weighted average valuation ratio, we weight each observation by the size of the scale variable. We then take the predicted valuation ratios $\widehat{\beta}_{ct}$ at the cell-year level as our primary measure.

²⁰Aggrawal et al. (2010) reviews the academic literature on how valuation ratios are summarized, and finds no consistent methodology between simple means, medians, and geometric means. Kim and Ritter (1999) value IPOs use medians and geometric means of comparable firm P/Es. Cheng and McNamara (2000) study the value of public firms, and uses median valuation ratios. Lie and Lie (2002) uses the simple arithmetic mean, while Liu, Nissim and Thomas (2002) uses the harmonic mean.

²¹Algebraically this is equivalent to the ratio of the sum of EV to the sum of EB: $\beta_{ct}^{l,EB} = \frac{\sum_{f \in c} EV_{ft}}{\sum_{f \in c} EB_{ft}}$.

²²We note that errors using the FA's method of book equity multiples from Compustat are significantly more dispersed, with a 25-75th percentile range of [-33%,35%].

²³Section A.2 discusses the fraction of business activity that occurs in cells with few or no observed transactions.

²⁴See Section A.2 for details.

5 Valuation Analysis

We examine the relationship between firm valuation ratios β_{ft} and three factors: (i) industry (ii) legal form of organization (iii) firm size, as measured by the number of employees. We estimate the following model:

$$\beta_{ft} = \alpha^s \mathbb{1}\{\text{S-corp}\} + \alpha^p \mathbb{1}\{\text{Partnership}\} + \sum_{d=1}^{10} \delta_d \mathbb{1}\{\text{Size decile} = d\} + \theta_t + \gamma_i + \epsilon_{ft}. \quad (6)$$

Here γ_i are industry fixed effects and θ_t are year fixed effects. We run the regression for both EBITDA and sales multiples. Firm size is measured by ranking firms each years by their number of employees.

Table 2 columns (1) and (2) displays the results for DealStats, showing that S-corporations and partnerships are valued at a discount compared with private C-corporations, with a lower EV/EB of 1.2 and 1.7, respectively, although their EV/SA ratios are comparable. There is a positive relationship between firm size and firm valuations: being in the top decile of size is associated with an increase in EV/EB of 1.3 and EV/SA of .11 compared with being in the 5th decile. The positive relationship between size and valuations is robust to different measures of firm size. Appendix Table A.6 displays regression results for EV/EB and firm size deciles, where firms are ranked by sales, and for EV/SA , with firms ranked by EBITDA. In both cases, there continues to be a strong relationship between size and valuation. Columns (3) and (4) display results for Bizcomps, and show that for smaller sole proprietorships there is no longer a clear relationship between firm size and valuation ratios.

Appendix Figure A.9 reports regression coefficients for industry fixed effects, and shows there is a moderate to large amount of variation of valuation ratios across industries. Construction, accommodation, and food services tend to have lower valuations, while information, finance, and professional services have higher valuations.

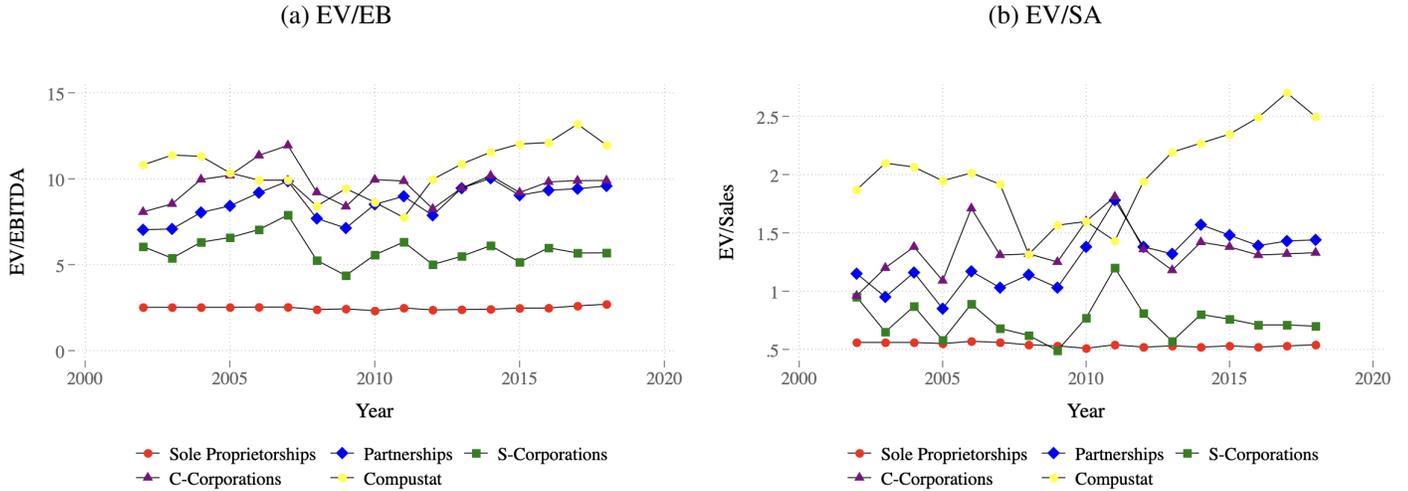
The regression results show a robust relationship between firm valuations and size, industry, and legal form of organization. They motivate our methodology of adjusting for these characteristics when estimating aggregate firm valuations.

Table 2: Valuation multiple regressions

	(1) Deal EB	(2) Deal SA	(3) Biz SDE	(4) Biz Sa
Size dec 1	-1.168*** [0.232]	0.140*** [0.0313]	-0.118 [0.0904]	0.0246 [0.0192]
Size dec 2	-0.740*** [0.218]	0.0425** [0.0197]	-0.0444 [0.0638]	0.00766 [0.0149]
Size dec 3	-0.377 [0.242]	0.0216 [0.0196]	-0.365* [0.185]	0.00383 [0.0316]
Size dec 4	-0.154 [0.208]	0.0239 [0.0163]	-0.102 [0.0647]	0.000851 [0.0176]
Size dec 5	0 [.]	0 [.]	0 [.]	0 [.]
Size dec 6	0.587** [0.248]	-0.00183 [0.0133]	-0.0100 [0.102]	0.0108 [0.0147]
Size dec 7	0.913*** [0.309]	0.0232 [0.0154]	-0.203* [0.104]	-0.0181 [0.0124]
Size dec 8	0.477* [0.251]	0.00513 [0.0153]	-0.0628 [0.0736]	-0.0198* [0.0116]
Size dec 9	1.244*** [0.294]	0.0439* [0.0249]	0.106 [0.120]	0.00935 [0.0186]
Size dec 10	1.314*** [0.283]	0.106*** [0.0403]	-0.163** [0.0702]	-0.00440 [0.0181]
Part	-1.721*** [0.262]	-0.00850 [0.0212]		
S corp	-1.234*** [0.283]	-0.0190 [0.0170]		
N	12200	18459	10850	11279
r2	0.0522	0.0122	0.00410	0.00527
dep_mean	5.350	0.590	2.300	0.540
cluster	Naics 3	Naics 3	Naics 3	Naics 3

Notes: Data from BVR. Table shows regression estimation of Equation 6. For the 10 size dummies, firms are ranked yearly on the number of employees. Columns 1 and 2 use DealStats data, while 3 and 4 use Bizcomps. Each column regresses a different multiple; column 1 regresses EV/EBITDA, 2 EV/Sales, 3 EV/Seller's discretionary earnings, 4 EV/Sales.

Figure 3: Valuation multiples, by legal form of organization.



Notes: Data from BVR, IRS SOI, and Compustat.

Figure 3 presents aggregated valuation ratios of EV/EB and EV/SA across different legal forms of organization, taking a weighted average across the industry-size-year cells, with the weights aggregate EBITDA/sales from the corresponding cell-year in the IRS aggregates. The results show large differences in multiples, and a distinct ordering by legal structure. Public companies and private C-corporations have the highest valuation ratios, then partnerships, then S-corporations, and finally sole proprietorships. In 2018 the mean MV/EB was 12.0 for public firms, 9.9 for private C-corporations; 9.6 for partnerships; 5.7 for S-corporations; and 2.7 for sole proprietorships. The ranking for EV/SA is similar, however the magnitudes of the differences are distinct.

There are also important differences in medium and short term trends across types of firms. Public corporations have high valuations leading up to the dot-com bust, then a decline in valuation ratios, followed by an increase after the great recession. S-corporations and partnerships have less of a pronounced peak during the dotcom boom and a more moderate increase post great recession. Sole proprietorships display a striking constancy over time.

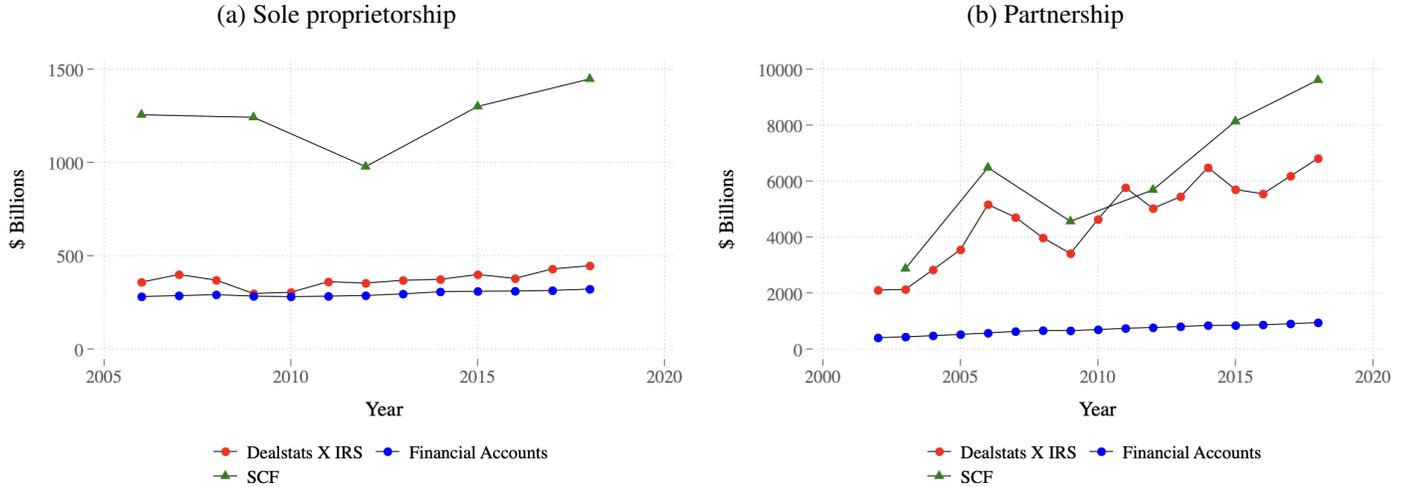
6 Aggregate Private Business Wealth

6.1 Noncorporate business

Figure 4 (b) shows the aggregate enterprise value of partnership businesses in the US. Our estimate of partnership wealth is substantial, both in absolute terms and in comparison to FA estimates. In 2018, we estimate an aggregate value of \$6.8 trillion, more than six times the FA's \$942.5 billion. Partnership wealth has

grown rapidly over our sample, more than tripling from its value of \$2.1 trillion in 2002. Valuations using either EV/SA or EV/EB track each other closely.²⁵

Figure 4: Comparison of aggregate valuations, noncorporate businesses



Notes: Data from BVR, the Survey of Consumer Finances, and the Financial Accounts of the Federal Reserve.

Figure 4 (a) presents our valuations for sole proprietorships. While our estimates exceed FA totals, the magnitude of this difference is smaller than observed for partnerships. We estimate an aggregate value of \$446.0 billion in 2018, about 34% larger than the FA's total of \$321 B. The relatively modest difference suggests that the FA methodology of using unadjusted book equity works reasonably well for sole proprietorships.

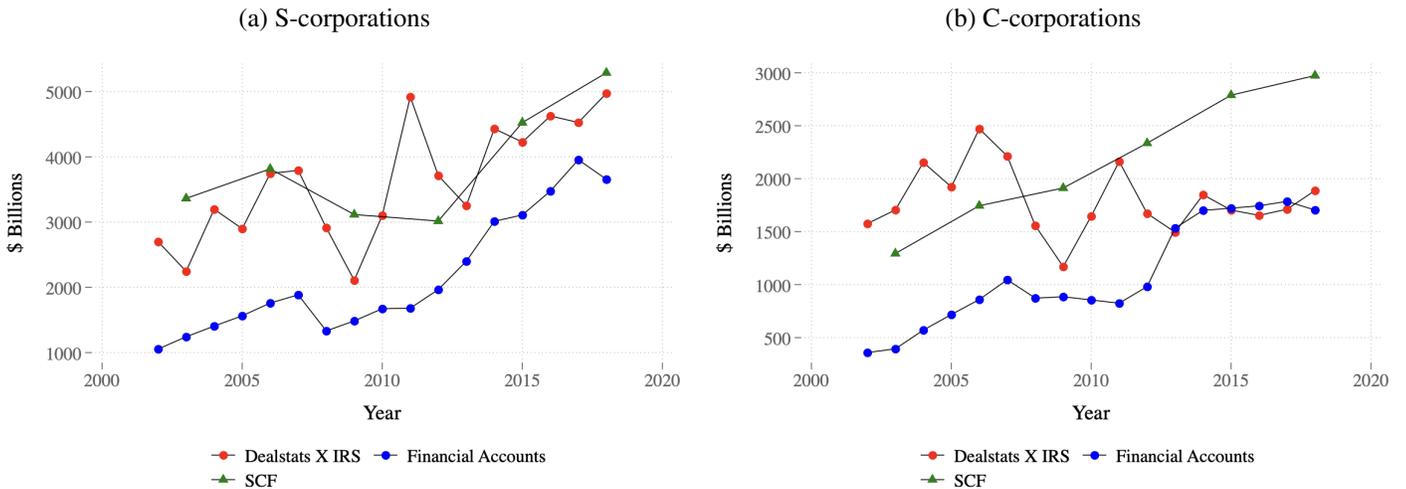
Figure 4 includes a direct comparison of our enterprise value estimates with SCF valuations, with the caveat that these unadjusted comparisons are not consistent, as the SCF may contain the value of real estate, financial assets, and debt. The closest comparison we can make between our valuation using IRS data and the SCF is to estimate the total value of noncorporate business (sole proprietorship + partnership), inclusive of residential and nonresidential real estate, financial assets, and debt. In the SCF, we add the total value of sole proprietorship and partnership businesses, plus the value of tenant occupied residential and nonresidential real estate, plus the value of farm businesses. To construct our aggregate valuation of noncorporate business wealth using IRS data, we start with our initial enterprise valuation of sole proprietorships and partnerships, and add the value of real estate, financial assets, and debt from the FA Table B.104. For comparison purposes, we also plot the aggregate net worth of noncorporate business from the FA, taken directly from table B.104.

²⁵See Figure A.19.

Figure A.11 displays the results of this exercise. In 2018, the aggregate market value of noncorporate business was \$11.3 trillion in the FA, \$20.2 trillion in the SCF, and \$17.2 trillion using our methodology. We thus see that our valuation of noncorporate business is substantially larger than the FA, but closer in magnitude to the SCF.

6.2 S and C-corporations

Figure 5: Comparison of aggregate valuations, corporate businesses



Notes: Data from BVR, the Survey of Consumer Finances, and the Financial Accounts of the Federal Reserve.

Figure 5 (a) presents our estimates for S-corporation wealth, which are moderately higher in magnitude than FA totals. In 2018, the aggregate value of S-corporation wealth was \$5.0 trillion, compared to an FA value of \$3.7 trillion. Throughout the sample period, our valuations closely match that of the SCF.

Figure 5 (b) presents our valuations for C-corporations. While our estimates align with SCF valuations in the early years of our sample period, by 2018 our series converges with FA estimates. We estimate a total valuation of \$1.9 trillion in 2018, similar to the FA total of \$1.7 trillion. Overall there is less of an upward trend in private C-corp valuations over our sample period, with only a modest increase from 2002 to 2018.²⁶

²⁶The difference in trend compared with FA and SCF estimates is likely due to our methodology of excluding firms with sales above \$50 million, an adjustment that grows in magnitude in the later years of our sample.

6.3 Alternative Estimates

In Figure A.22, we present estimates in which we value negative EBITDA firms based exclusively on their sales valuations, a less conservative estimate that imputes greater value to loss making firms. This has a moderate impact on business value for S-corps and partnerships, increasing valuations by an average of 6% and 8% respectively over the sample period. For C-corps, however, valuations increase by upwards of 20 percent, due to the large concentration of negative EBITDA amongst firms in our private corporation sample.

Figure A.22 also presents estimates in which we do not adjust for size via regression Equation 5, but form valuation ratios using weighted averages by industry cell only, where the weights are the scale variable, sales or EBITDA.²⁷ The results show that the size correction has a relatively modest impact on our estimated valuations, with the industry weighted average estimate closely following our baseline series. On the surface this is somewhat puzzling, considering that (a) the regression coefficients on size in Table 2 show that larger firms sell at substantial premiums, and (b) the fact that our transaction sample is overweight large firms (as seen in Figure A.10).

The explanation is straightforward: both approaches ultimately rely on valuation ratios from the largest firms. Figure 2 shows that the majority of economic activity is concentrated in the largest size categories in both our transaction data and the IRS data. When we use industry-only weighted averages, the weights naturally load on large firms. When we use regression-adjusted ratios that account for size, the estimates are still dominated by large firms since they contain most of the sales/EBITDA in the IRS data. Thus, both methods effectively use similar valuation multiples from the largest size bins. Ultimately the size correction, while methodologically important, does not substantially change our valuation results.

6.4 Robustness to Selection

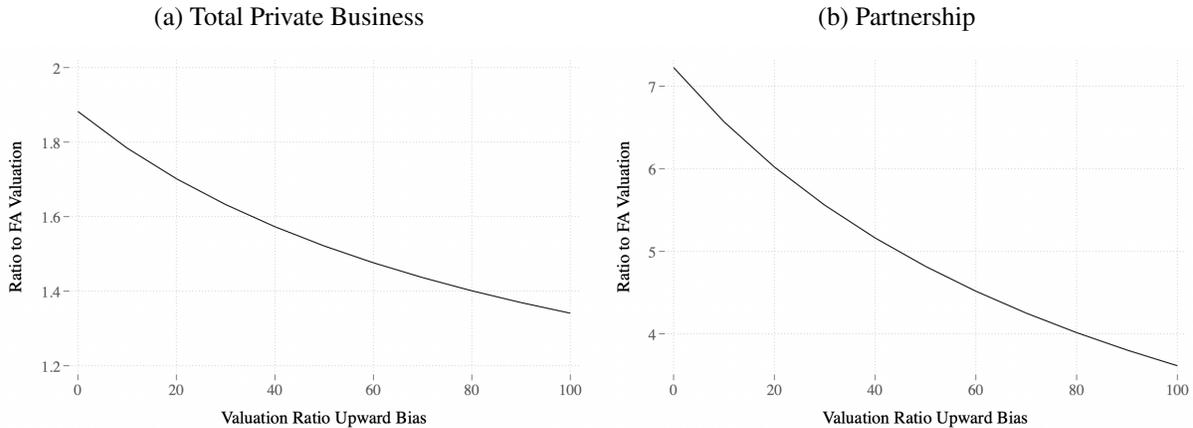
Our estimated valuations are large, and a natural concern is that the use of transaction data, which are nonrandom, can generate biased valuation ratios. While we reweight our estimates for differences in firm size and industry composition between transacted firms and the underlying distribution, we are unable to fully adjust for selection into transactions, for example if high-multiple businesses are more likely to be sold. Figure 3 shows that partnerships in particular have elevated valuation ratios in our transaction data, which translate into high estimated valuations.

To assess the potential magnitude of this selection bias, in Figure 6 we conduct an exercise where we estimate the impact of potential upward bias in valuation ratios on our estimated wealth totals. We focus on bias for noncorporate

²⁷We estimate valuation ratios $\beta_{ct}^X = \frac{\sum_{f \in c} w_{ft}^X \beta_{ft}^X}{\sum_{f \in c} X_{ft}}$, where $X \in \{sales, EBITDA\}$, $w_{ft} = \frac{X_{ft}}{\sum_{f \in c} X_{ft}}$, and c indexes industry cell.

valuations, which have the largest discrepancies with the FA, and thus assume for this analysis that corporate valuations in the FA are accurate.²⁸ We then re-estimate our noncorporate valuations under varying degrees of assumed upward bias: $\text{Private Business Value} = (\text{IRS X Dealstats Noncorporate Valuation}) / (\text{Assumed Bias}) + \text{FA S-corp Value} + \text{FA C-corp Value}$.

Figure 6: Estimated valuations under selection bias



Notes: Panel (a) shows the ratio of estimated total private business value to the Financial Accounts valuations under different degrees of assumed upward bias in valuation ratios for noncorporate business. For this exercise we take as given FA corporate valuations, and thus estimate $\text{Value} = (\text{IRS X Dealstats Noncorporate Valuation}) / \text{Bias} + \text{FA S-corp Value} + \text{FA C-corp Value}$. Panel (b) shows ratio of estimate partnership valuation to Financial Accounts partnership valuation under different degrees of assumed upward bias in valuation ratios.

Figure 6 shows that our estimates are robust to a large degree of selection bias. Even if we assume that our partnership and sole proprietorship multiples are upward biased by 100%, we would nevertheless find 2018 aggregate U.S. private wealth equal to \$9.0 T, which remains 34% above the Financial Accounts estimate – with partnership equal to \$3.4 T, which remains 261% above the Financial Accounts estimate.

As a second robustness exercise, we use the Financial Account’s own estimation methodology for S-corporations and apply them to partnerships. The choice of partnership versus S-corp status is a common decision point for businesses seeking pass-through taxation,²⁹ and a natural comparison is to estimate both business types using similar methods. We estimate partnership valuations using Equation 1, restricting our sample to nonfinancial, non real estate firms. Compustat MV/Book equity ratios are multiplied by net book equity³⁰ by two digit industry, along with a 25% discount for illiquidity. The results, displayed in

²⁸Under this assumption, our baseline transaction based estimates are 88% higher than FA totals, as seen by the Y intercept in Figure 6 (a).

²⁹See Blair and Marcum (2015) and Hamill (2021).

³⁰Partner’s capital accounts.

Figure A.5 (b), show substantially larger valuations than the FA baseline. Using the S-corp methods, the EV of partnerships is \$7.3 T in 2018, nearly 7 times that of the baseline. If we increase the liquidity discount to 50%, there is still a substantial gap between the series.

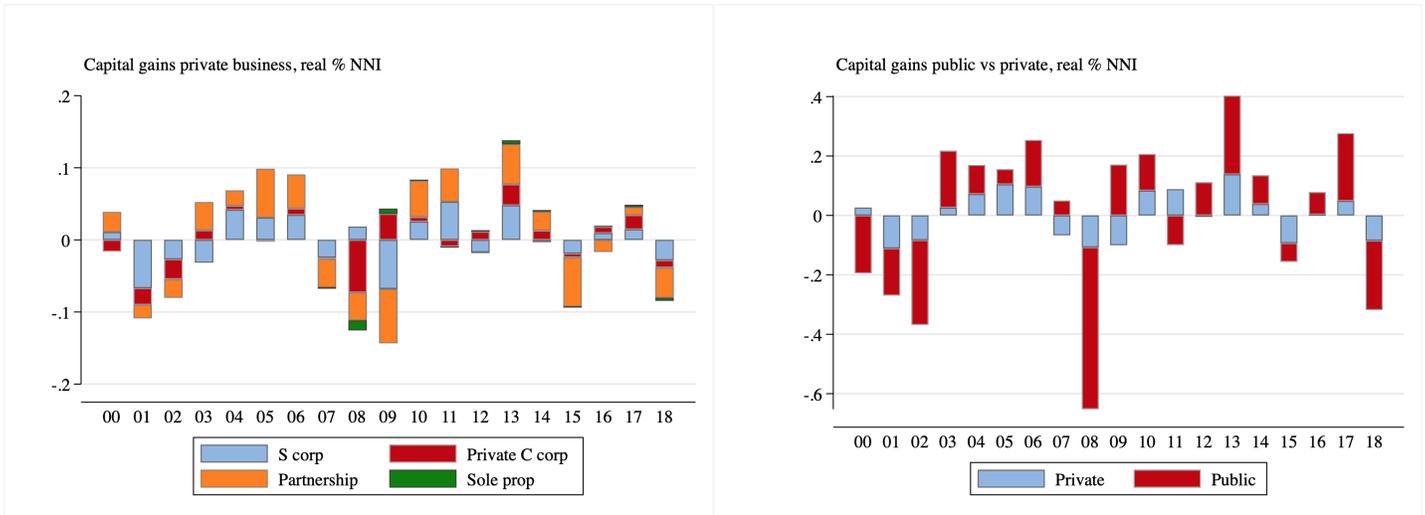
Finally, in Appendix D we explore several case studies for transactions in the BVR that may be less upwardly biased – sales that are forced by external events, such as illness, divorce, retirement, or relocation. We do so using the “transaction notes” field in the BVR data, which contains broker-written description of sales that occasionally mention a seller’s motivation. While not a random sample of transactions, these “forced” sales may be less selected on characteristics that increase business value. When compared to a matched sample of transactions, we find that forced sales have lower valuation ratios, on the order of 10-20%. While this reflects some indication that our valuation ratios are biased upwards, the magnitude is not sufficient to explain the substantial gaps with Financial Accounts totals.

7 Capital Gains on Private Business Wealth

Figure 7: Capital gains on private business wealth

(a) Private by type

(b) Private vs public directly held



Notes: Data from BVR, IRS SOI, Federal Reserve. Real capital gains for S-corp and partnership are calculated in Equation 7. Real capital gains for C-corp and sole proprietorship estimated using price indices from public corporations.

Our estimates show a large increase in the value of private business over our sample period. We now show that a substantial proportion of the increase in value came through revaluations, versus raising new capital from new or existing

investors. In principle, this increase in value may be driven by ‘sweat equity’ (Bhandari and McGrattan (2021)), technological innovation, changes in discount rates (Fagereng et al. (2024)), or changes in market power (Eeckhout (2024)).

For partnerships and S-corporations, we estimate nominal capital gains as the change in total value minus capital injections: equal to the change in paid in capital plus retained earnings for S-corps, and the change in capital account for partnerships:

$$KG_t^{Scorp} = \Delta EV_t - \Delta \text{Paid in capital}_t - \Delta \text{Retained earnings}_t \quad (7)$$

$$KG_t^{Part} = \Delta EV_t - \Delta \text{Partners Capital Accounts}_t \quad (8)$$

For private C-corporations and sole proprietorships, there is no comparable data for basis changes, and thus we estimate gains using price indexes from public corporations, specifically the S&P 500. The capital gain is estimated as the change in the price index after netting out price changes due to retained earnings.³¹ The real yield equals the nominal yield divided by net national product inflation.

Figure 7 displays our estimates for real capital gains over the time period. Capital gains are substantial in magnitude, often on the order of (+-) 5-10% of national income in a single year. For 2002 to 2018, we find the aggregate value of S-corporations increased from \$2.70 trillion to \$4.97 trillion— in real terms, from \$3.71 trillion to \$4.97 trillion in 2018 dollars. Over that same time period, capital injections into S-corporations from additional paid in capital and retained earnings totaled \$0.91 trillion nominal and \$1.03 trillion real. Total nominal capital gains over the time period were thus \$1.38 trillion, with real capital gains totaling \$0.26 trillion.

Across all private business types, there were \$5.29 trillion in nominal and \$2.01 trillion in real capital gains.

8 Discussion and Conclusion

Combining all legal forms of organization, we estimate an aggregate enterprise value of private business wealth of \$14.1 trillion in 2018. This is sizable in comparison to both public equity wealth and aggregate net worth. In 2018, individuals in the US held \$25.2 trillion in public equity wealth across directly held stocks, mutual funds, and pension funds; excluding equity in pension funds, this would be \$21.3 trillion.³²

Our valuations derived from private transaction data are substantially larger than the FA value of \$6.7 trillion. The discrepancy is driven by partnership

³¹Let P_t be the price index at the end of period t , and RE_t the retained earnings during period t . We estimate the ex-retained earnings price change as $\frac{P_t}{P_{t-1}} \frac{1}{(1+RE_t/P_{t-1})}$. Data is from Robert Shiller.

³²Data is from the FA. Holdings within mutual funds were separated between corporate equities and other assets.

wealth, which the FA values at unadjusted book value, which suggests the FA is systematically undervaluing private business wealth. To address this undervaluation, we recommend three methodological changes to the Financial Accounts. First, private transaction data should be incorporated when constructing valuation ratios, rather than exclusively relying on public company data. Second, partnerships should be valued using multiples, rather than unadjusted book values. Third, the universe of private C-corporations should be valued, rather than the limited sample of firms on the Forbes list.

While this paper focuses on the US context, a similar undervaluation of private businesses through the use of book valuation is present in many countries' national accounts.³³ These countries generally follow methodology from the 2008 System of National Accounts (SNA), which explicitly states that market values should be used for private businesses whenever possible.³⁴ In practice, however, most countries have yet to fully implement this principle. We recommend that future SNA guidance should emphasize the use of valuation multiples from private transactions data to value private corporations, and avoid the use of unadjusted book valuation whenever possible.

Our new estimates of private business wealth have direct implications for measures of wealth inequality in the US. The Distributional National Accounts of Piketty, Saez, and Zucman (2017) use the FA value of private business wealth in studying wealth inequality. Our new estimates of private business wealth are substantially higher than the Financial Accounts, and correspondingly increase the average wealth of the top percentiles. In 2018, the top 10% held 84.2% of private business wealth, the top 1% 60.9%. Adjusting for our value of private business wealth would increase the top 10% share of wealth from 69.4% to 71.3%. For the top 1%, the wealth share would increase from 34.7% to 37.9%. The top .1% wealth share would increase from 18.1% to 20.3%.

Our results also have important implications for estimates of revenue under a wealth tax, as well as the difficulties of implementing the tax in the presence of substantial private business wealth. A one percent tax on the top .1% would generate a mechanical tax revenue estimate of \$141.4 billion, or \$1547.9 billion over 10 years.³⁵ Of this total, \$67.0 billion (734.0 billion over 10 years) would come from private business wealth, which would have to be valued by tax authorities.

The large magnitude of private business wealth poses a challenge to the implementation of a tax on wealth or unrealized capital gains. In their wealth tax proposal, Saez and Zucman (2019) suggest that some private businesses could be valued using markets for pre-IPO securities that exist for very large compa-

³³See Albers, Bartels and Schularick (2022) for Germany, Acciari, Alvaredo and Morelli (2024) for Italy, or Advani, Summers and Tarrant (2022) for the UK, for example.

³⁴From the 2008 SNAs: "If the current market price is not directly observable, the decision about the method to adopt should take into account the availability of information as well as judgments as to which available method best approximates market values." (13.71) The draft 2025 SNA also emphasizes the use of market value (14.82.c).

³⁵Estimates from the Distributional Accounts, with updated private business wealth estimates.

nies such as Uber or Lyft. In practice, however, these larger private companies represent only a small fraction of aggregate private business wealth. An alternative option would be to pursue the methodology developed in this paper: to collect transaction data on private business sales, and apply the ratios to the data submitted by private corporations on tax returns in order to value them. The IRS already collects data on the universe of business transactions through forms 8594, 4797, and Schedule D. By linking this data to the tax data of the underlying businesses, the agency would have the data to construct valuation ratios for the universe of private business transactions.

Our results also have implications for the raising of revenue through a capital gains tax that is “marked-to-market”, as was proposed by Senator Ron Wyden,³⁶ or through realizations at death, as was proposed by the Biden administration. We estimate that over our sample there was a total of \$5.29 trillion in nominal capital gains. In principle this could also be estimated on a yearly basis as the change in the valuation in the minus the change in basis.

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³⁶We note that the Wyden plan does not plan to estimate calculate capital gains of private businesses on a yearly basis, but only when they are sold through a ‘lookback’ provision.

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Online Appendix for *The value of Private Business*

Cole Campbell and Jacob A. Robbins

A Data Description

A.1 BIZCOMPS

Bizcomps contains transaction information for 14,087 small business sales. The key variables available are sales price, firm profits, and firm sales.

In practice, there is substantial heterogeneity in what assets are included in a business transaction: Transactions may or may not include inventory, real estate, or short term assets. To ease in valuation comparisons between sales, BIZCOMPS standardizes the transactions as follows:

- The sale price includes only the value of fixtures, equipment, and goodwill. Cash, accounts receivable, loans receivable, real estate, and other assets are not included in the price, and all liabilities have been excluded. This exclusion of short term assets is in line with how businesses are generally listed in sold, as asset sales.³⁷
- Businesses are considered to be debt-free at close even if there are new loans coming on board from the seller or others.³⁸
- Real estate used by the business is not included.³⁹
- The value of inventory is also excluded from the ratios.⁴⁰
- In the case where there are multiple owners, each transaction in the data is converted to a 100% interest sale.

The three key variables used for the construction of valuation ratios are:

1. Seller's discretionary earnings (SDE): net income before taxes plus amortization, depreciation, interest, owner's compensation, owner's benefits, on-business related expenses, and onetime-only expenses. SDE differs

³⁷According to BVR, "the sellers of these businesses rarely are willing to part with the cash and accounts receivable and the buyers are rarely willing to pay for it."

³⁸From BVR: "Sellers usually are responsible for paying off all debt at the close of sale."

³⁹BVR: "Small businesses almost always lease the premises they occupy. Leasing is often a better use of capital, at least in the early stages of a business' life. Somewhere less than six percent of the transactions reported involve real estate. The value of the real estate is subtracted from the enterprise value."

⁴⁰Bizcomps excludes inventory because it is a volatile asset, and there are reasons to manipulate the amount of inventory at the time of closing.

from EBITDA in that it also includes any wage payments to the owner. According to BVR, SDE is the most common ways small businesses are valued in practice.

2. Sales: Annual gross sales, net of returns and discounts.
3. Sale price: standardized selling price.

We construct valuation ratios at the firm level f as:

$$\beta_{ft}^{SDE} = \frac{Price_{ft}}{SDE_{ft}}, \quad \beta_{ft}^{SA} = \frac{Price_{ft}}{Sales_{ft}}.$$

We exclude the following outliers: transactions with $\beta_{ft}^{SDE} > 40$, or $\beta_{ft}^{SA} > 10$. Weighted average valuation ratios at the industry-year cell are constructed as $\beta_{ct}^X = \sum_{f \in c} w_{ft}^X \beta_{ft}^X$, where $X \in \{sales, SDE\}$, $w_{ft} = \frac{X_{ft}}{\sum_{f \in c} X_{ft}}$, and c indexes cell. For industry-year cells with less than 5 transactions, we replace the cell with a simple industry average across all years. Valuation ratios prior to 2006 or after 2017 are imputed as the most recent available.

A.2 DealStats

DealStats contains transactions of 41,196 public and private companies. Similar to Bizcomps, deal information is reported by brokers, who receive as compensation free access to the transaction database. A second source of information is publicly available information from when public companies purchase private companies.⁴¹

Transactions and financial information are standardized so as to be comparable: real estate, financial assets and liabilities are excluded from the transaction price. Unlike in Bizcomps, however, the standardization procedure does not subtract the value of inventory.

The three key variables we use for the construction of valuation ratios are:

1. EBITDA: Equal to operating profit plus depreciation plus amortization. Operating profit is gross profit minus operating expenses, without subtracting interest expense.
2. Sales: Annual gross sales, net of returns and discounts allowed, if any.
3. Market Value of Invested Capital (MVIC): standardized selling price.

We then construct the ratios as:

$$\beta_{ft}^{EB} = \frac{MVIC_{ft}}{EBITDA_{ft}}, \quad \beta_{ft}^{SA} = \frac{MVIC_{ft}}{Sales_{ft}}.$$

⁴¹The transaction information is often released on firms' 8-K filings, which DealStats compiles.

We estimate valuation ratios β_{ct} at the industry-year-size-legal cell using predicted values from regression Equation 5. The four time periods are (i) 1998-2002 (ii) 2003-2007 (iii) 2008-2012 (iv) 2013-2017. We exclude the following outliers: transactions with $\beta_{ft}^{EB} > 40$, or $\beta_{ft}^{SA} > 10$. For NAICS industries 11, 21, 22, and 55 we do not have sufficient observations to estimate Equation 5 with the interactions by time period. For these industries, we estimate simplified regression *without* interactions of industry, legal form, and size by time period:

$$\beta_{ft} = \alpha_l + \delta_l + \theta_t + \gamma_i + \epsilon_{ft} \quad (\text{A.1})$$

Here α are legal form of organization fixed effects, δ are size group fixed effects, γ are industry fixed effects and θ are year fixed effects.

To construct aggregated valuation ratios for Figure 3 by year and legal form l , we take the a weighted average across cells: $\beta_t^{l,X} = \sum_c w_{ct}^{l,X} \beta_{ct}^{l,X}$, where $X \in \{\text{sales}, \text{EBITDA}\}$, $w_{ct}^{l,X} = \frac{X_{ct}^l}{\sum_c X_{ct}^l}$.

A key question when comparing our transaction sample with the overall firm distribution is determining our data’s coverage at the cell level – specifically, what fraction of aggregate business activity occurs in cells with few or no observed transactions. Table A.4 summarizes this analysis. Across our dataset spanning 18 years, 3 legal forms,⁴² 19 industries, and 10 size groups, we have 11,970 cells and 26,154 observed transactions, yielding approximately 1.5 observations per cell. For S-corporations, 30% of returns fall in a cell with no coverage, although these represent only 12% of total sales. Similarly, for partnerships, the figures are 80% of returns but only 33% of sales, and for C-corporations, 48% of returns and 22% of sales. While our coverage appears sparse when measured by returns, we capture a substantially larger proportion of total business activity. Notably, partnership coverage gaps are concentrated in the smallest size categories which contain numerous returns but represent a small share of aggregate economic activity.

A.3 IRS Data Construction

Our goal is to construct a dataset of aggregate sales, net income, and EBITDA at the cell level, where a cell is defined by year, legal form of organization, 2-digit NAICS industry, 10-bins for firm size, and firms with positive versus negative EBITDA. The 10 bins for the size are separated by the value of business receipts: (i) Under \$25,000 (ii) \$25,000 to \$100,000 (iii) \$100,000 to \$250,000 (iv) \$250,000 to \$500,000 (v) \$500,000 to \$1,000,000 (vi) \$1,000,000 to \$2,500,000 (vii) \$2,500,000 to \$5,000,000 (viii) \$5,000,000 to \$10,000,000 (ix) \$10,000,000 to \$50,000,000 (x) \$50,000,000 and above.

Our primary data source is internal business tax records from 2002-2018, provided by the Internal Revenue Service through the Joint Statistical Research Program. This data provides us with the universe of business tax returns at the

⁴²For sole proprietorships we value only by industry/year cell, thus we have full coverage.

return level. The primary forms which we analyze are: 1120S for S-corps, 1065 for partnerships, 1120 for C-corps, and Schedule C of Form 1040 for sole proprietorships.

For each return, line item data are available, which we use to construct the following variables (with line-item numbers in brackets):

- S-corps: *Sales* = *Gross receipts less returns* [1c]. *Net income* = *Ordinary business income (less loss)* [22]. *EBITDA* = *Ordinary business income (less loss)* [22] + *interest paid* [13] + *amortization*⁴³ + *depreciation* [14].
- Partnerships: *Sales* = *Gross receipts less returns* [1c]. *Net income* = *Ordinary business income (less loss)* [23]. *EBITDA* = *Ordinary business income (less loss)* [23] + *interest paid* [15] + *depreciation* [16a] + (*imputed*) *amortization - net income received from other partnerships* [4].
- C-corp: *Sales* = *Gross receipts less returns* [1c]. *Net income* = *Total income* [11] - *total deductions* [27]. *EBITDA* = *Net income* + *interest* [18] + *depreciation* [20] + (*imputed*) *amortization*.
- Sole proprietorship: *Sales* = *Gross receipts less returns* [3]. *Net income* = *Net profit or loss* [31] *Seller's Discretionary Earnings* = *Net profit* [31] + *interest* [16] + *depreciation* [13].

We impute firm level amortization for C-corps and partnerships. For C-corps, aggregate amortization is available on SOI Table 5.3.⁴⁴ For partnerships, aggregate amortization is not available and must be estimated. We do so using information from Schedule L of 1065, which contains information on accumulated amortization⁴⁵ [12b], which is a stock variable that contains the flows of yearly amortization. We estimate $\text{Amort}_t = \text{Accum Amort}_t - \text{Accum Amort}_{t-1}$.

For both partnerships and C-corps, we impute amortization at the firm level by distributing aggregate amortization proportional to the total deductions of the firm: $\text{Amortization}_t^f = \frac{\text{Deductions}_t^f}{\text{Deductions}_t} \cdot \text{Amortization}_t$. This procedure ensures that imputed amortization sums to aggregate amortization across firms.

A.4 Compustat

We analyze valuations for public firms using annual data from Compustat North America. Our sample consists of all US firms, exclusive of subsidiaries and duplicates.

⁴³There is no specific line item on form 1120-S for amortization, however the IRS return data contains the variable, sourced from form 4562.

⁴⁴Available here. For data prior to 2013, the information is available on Table 16, which is no longer online but archived and available on request.

⁴⁵Aggregate accumulated amortization is source from SOI Table 3: All Partnerships: Balance Sheets by Industrial Group. Available here.

We construct valuation ratios using the same methodology and definition as in the BVR data: the enterprise value excludes financial assets and debt, and the value of real estate is excluded. We construct our variables as follows:

- Enterprise Value = Market value (mkvalt) + Debt in current liabilities (dlc) + Long term debt (dltt) + Preferred stock (pstkrv) - Cash and marketable securities (che) - Estimated real estate holdings
- EBITDA = Pre-tax income (pi) - Minority interest income (mii) + Interest Expense (xint) + Depreciation/amortization (dp).
- Sales (sale)

We estimate net corporate real estate holdings following the methodology of Zhao and Sing (2016) and Ambrose, Diop and Yoshida (2017). We construct gross real estate holdings (before depreciation) as the sum of three Property, Plant, and Equipment (PPE) components: buildings (fatb), land and improvements (fatc), and construction in progress (fatp). To estimate net holdings, we first calculate the ratio of gross real estate to gross PPE, then multiply this ratio by net PPE to yield our final estimate. Corporate real estate ownership is substantial, representing approximately 30% of gross PPE over our time period.

We construct aggregate valuation ratios by year as follows:

$$\beta_t^{EB,comp} = \frac{\sum_f EV_{ft}}{\sum_f EBITDA_{ft}}$$

$$\beta_t^{SA,comp} = \frac{\sum_f EV_{ft}}{\sum_f Sales_{ft}}$$

A.5 Survey of Consumer Finance

The Survey of Consumer Finance asks respondents for detailed financial data up to two⁴⁶ of their closest controlled businesses: sales, profits, and their subjective valuation of what the business would sell for. The key variables from the SCF are:

- X3132: net income: “What was the business’s total pre-tax net income in 2018?”⁴⁷
- X3131, sales: “What were the gross sales of the business as a whole in 2018?”
- X3129, firm value: “What is the net worth of (your share of) this business?”

⁴⁶For 2007 and below, the SCF collected data on three businesses.

⁴⁷Bricker, Moore and Volz (2021) emphasize the wording of this question may include not only ordinary business income, but also dividends, interest, and capital gains.

- X3128 “What percentage of the business do you (and your family living here) own?”
- X3119 legal form: “Is it a partnership, a sole-proprietorship, an LLC, a subchapter S-corporation, another type of corporation?”

Before constructing valuation ratios, we scale down sales and net income by the respondent’s share of the business, since $X3131$ and $X3132$ asks for the sales and net income of the business as a whole, while $X3129$ refers to the value of the respondent’s *share* of the business. We construct valuation ratios at the firm level f as:

$$\beta_{ft}^X = \frac{\text{MV Respondent's Share}_{ft}}{X_{ft} \cdot \text{Respondent's share of business}_{ft}}$$

Where $X \in \{\text{Sales, Net Income}\}$. We exclude the following outliers: transactions with $\beta_{ft}^{NI} > 30$, or $\beta_{ft}^{SA} > 15$. Table A.1 presents summary statistics at the business level.

We construct aggregate valuation ratios by year and legal form by dividing aggregate firm value by aggregate sales and net income. As noted in Section 4, this is algebraically equivalent to a weighted average valuation ratio, with the weights being the size of the scale variable (net income and sales, respectively).

$$\beta_t^{NI,SCF} = \frac{\sum_f \text{MV Respondent's Share}_{ft}}{\sum_f \text{Respondent's Share Net Income}_{ft}}$$

$$\beta_t^{SA,SCF} = \frac{\sum_f \text{MV Respondent's Share}_{ft}}{\sum_f \text{Respondent's Share Sales}_{ft}}$$

B Valuation Details

B.1 Valuation Ratio Aggregation

In aggregating valuation ratios β_{ft}^{SA} , β_{ft}^{EB} to the cell level, the choice of what central tendency to use is important because there are substantial differences between the mean, median, geometric mean, and weighted mean. Figure A.1 displays for our transaction data each of these centralized tendencies for manufacturing S-corps, showing these can differ by a factor of two or more.

We test the performance of the means, medians, harmonic means, and weighted averages in our transaction data by comparing predicted valuations from the multiples to the actual valuations. For each industry-legal form cell, we compute different centralized tendencies of the transaction level multiples. Then for each transaction, we use the cell-year specific estimated valuation ratio to predict firm value, leaving out a firm’s own observation in the computation of the valuation multiple. We estimate predictions errors $e_{ft} = EV_{ft} - \widehat{EV}_{ft}$ at the firm level,

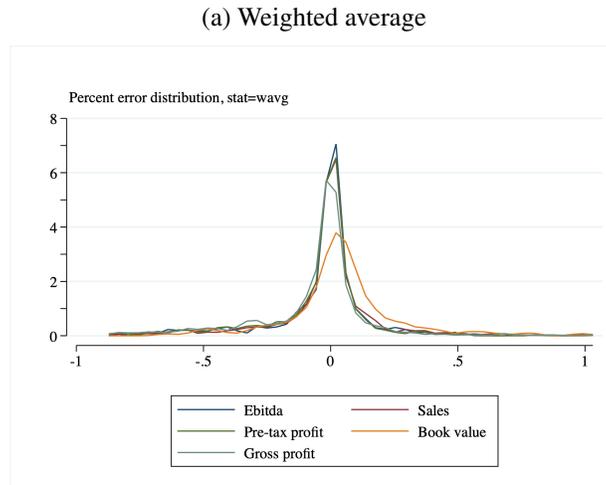
Table A.1: Survey of Consumer Finance summary statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	SP all	SP 2018	Part	Part 2018	S corp	S corp 2018	C corp	C corp 2018
Net income	0.036	0.037	0.13	0.12	0.17	0.28	0.14	0.16
Sales	0.33	0.11	0.76	0.87	2.08	4.82	2.63	1.54
Valuation	0.14	0.20	0.74	1.00	1.14	2.15	0.88	1.93
Employment	2.61	2.07	36.2	31.1	27.7	35.5	41.9	89.8
MV/Sales	1.56	1.61	2.25	2.34	1.37	1.74	1.49	1.50
MV/Netinc	3.36	3.11	5.44	5.37	5.48	5.16	5.99	7.08

Notes: Table presents means at the business level. Dollar amounts in millions. Data from the Federal Reserve Board.

then collapse them to the cell level and calculate percent errors $e_{ct} = \frac{\sum_{f \in c} e_{ft}}{\sum_{f \in c} EV_{ft}}$. We then compare the distribution of these cell level percent errors across different statistics.

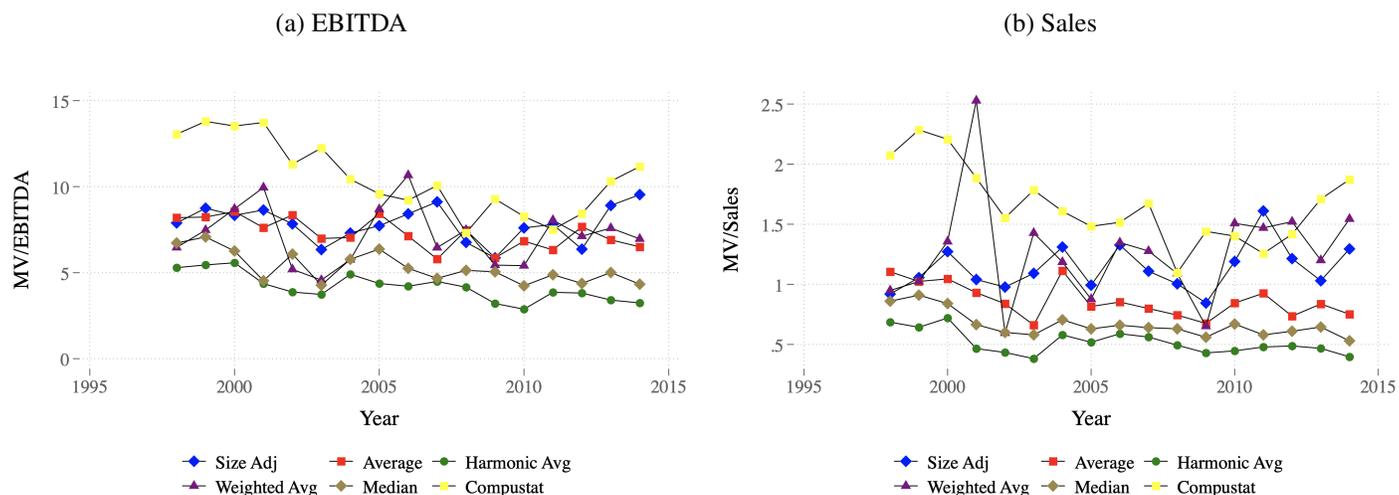
Figure A.3: Percent errors by scaling variable, weighted average



Notes: Data from BVR. Errors are aggregated percent errors between actual and predicted valuations at the industry-year-legal form level.

Figure A.2 displays the distribution of percent errors e_{ct} across statistical methods. The weighted average valuation ratio — where weights correspond to the scale variable’s size (EBITDA or sales) – performs the best. This approach produces errors tightly clustered around zero: the mean percent error

Figure A.1: Valuation ratios by statistic, manufacturing S-corporations



Notes: Data from BVR.

for EBITDA is -2.3%, with a narrow 25-75th percentile range of [-5.4%,3.5%]. Figure A.2 also displays prediction errors using the FA’s valuation approach.⁴⁸ Compared with our preferred specification, the FA valuation has a substantially greater error dispersion, with a 25-75th percentile range of [-33%,35%].

C Comparison with SCF Valuations

The results of Section 6 show a close correspondence between aggregate business valuations estimated with transaction data and in the SCF. While the aggregates generally agree, we now show the composition of the totals are different: valuation multiples are higher in the transaction data (with some exceptions), while aggregate net income is higher in the SCF.

Figure A.12 compares aggregate valuation ratios for partnerships,⁴⁹ and shows that transaction based valuation ratios for net income are much higher than self reported SCF ones.⁵⁰ In 2018, the aggregate EV/(Net income) was 12.7 in DealStats compared with 5.2 in the SCF. Sales valuations are closer between the two: the EV/Sales was 1.4 compared with 1.2 in the SCF. Figure A.16 compares aggregate net income and sales across the sources, and shows a much closer correspondence for sales as compared to profits. One possible explanation is that sales are easier to measure and less nebulous than “profits”, which may have conceptual differences between the two sources. For example, Bricker,

⁴⁸Described in Section 2.

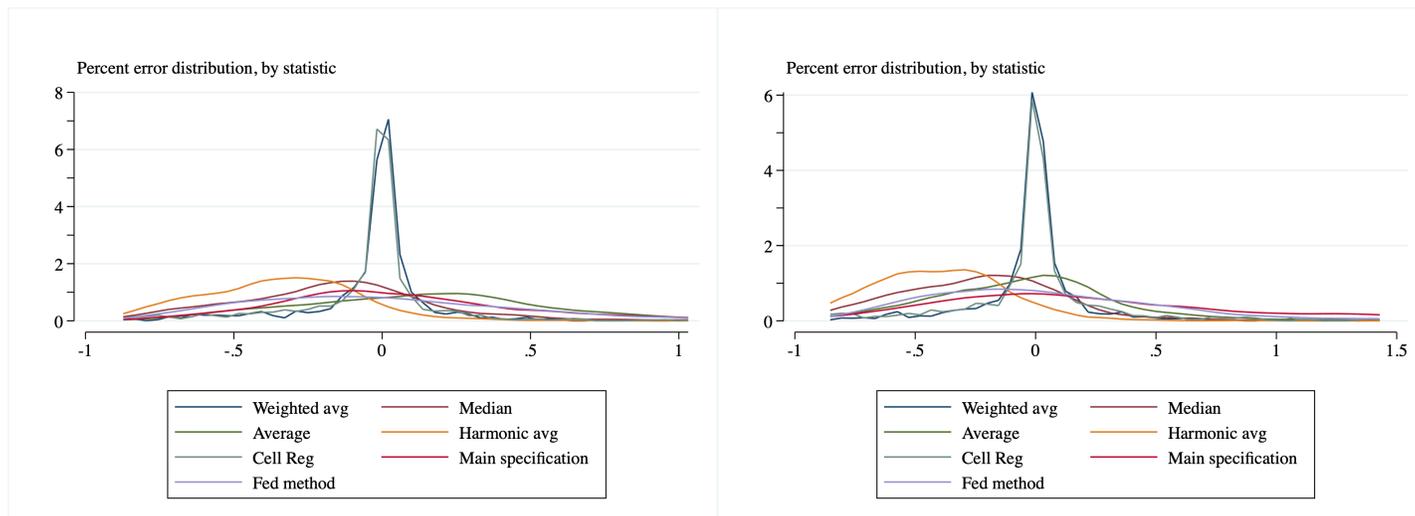
⁴⁹See Section A.5 for details on the construction of the SCF valuation ratios.

⁵⁰Note that in this section we compare net income multiples rather than EBITDA for an apples to apples comparison between the sources.

Figure A.2: Comparing valuation multiples: percent error by statistic

(a) EBITDA

(b) Sales



Notes: Figure shows cell level percent errors between actual and predicted valuations at the cell-year level, where a cell is an industry-legal form group. The predictions are formed using various aggregations of firm level multiples. 'Cell reg' are separate regressions of enterprise value on sales by cell across years. Our 'Main specification' is estimated using Equation 5. 'Fed method' is the Federal Reserve's methodology, using book value multiples from Compustat, described in section 2. Data from BVR.

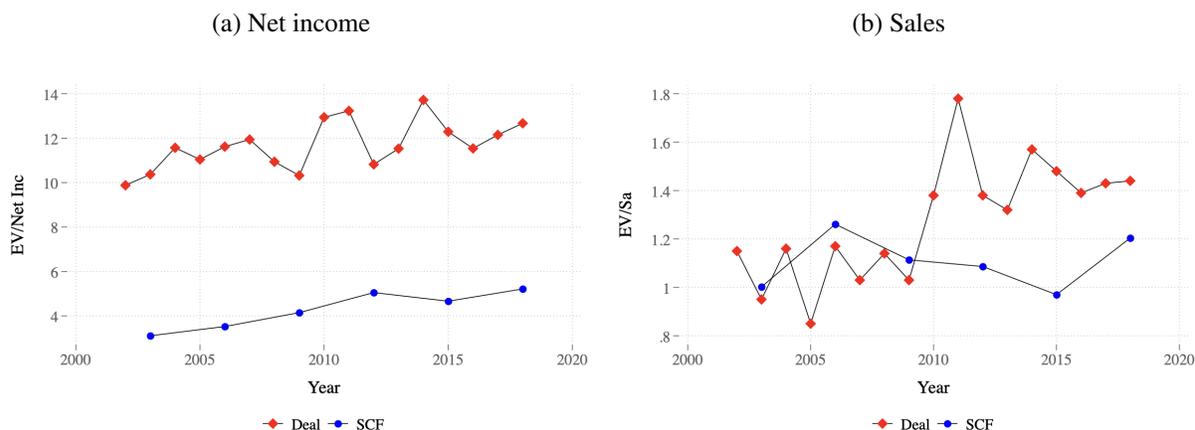
Moore and Volz (2021) notes that the SCF concept of 'net income' may include sources other than 'ordinary business income' that we are excluding in the IRS measure, such as rent and interest.

Figures A.13-A.14 compares ratios for corporations across data sources. For S-corporations, the pattern closely mirrors that of partnerships: the sales multiples show similar magnitudes between data sources, while net income multiples are higher in the transaction data. However, for C-corporations, both sales and net income valuation ratios are higher in DealStats than the SCF.

Figure A.15 compares sole proprietorship valuation ratios, and unlike other legal forms displays *higher* multiples in the SCF than in the transaction data. The aggregate MV/(Net income) from the SCF was 3.9 in 2018, compared with an EV/SDE of 2.7 in Bizcomps. The aggregate MV/Sales in the SCF was 1.7 in 2018, compared with an EV/SA of 0.5 in Bizcomps.⁵¹ The discrepancy in valuation ratios for sole proprietorships is puzzling. It may reflect selection bias

⁵¹We note that the comparisons are not precisely apples to apples: the SCF reported market values (net of debt), while Bizcomps is an enterprise value, however this would tend to increase the Bizcomps valuation and cannot explain the large difference. On the other hand, if proprietors do not include owners' salary as a part of net income, this would tend to bias the SCF valuation ratio upwards and could potentially explain part of the difference. However, this problem is not present in the sales comparison where the only source of bias is the upward bias in Bizcomps EV.

Figure A.4: Comparison of partnership valuation ratios, DealStats vs SCF



Notes: Data from BVR and the Survey of Consumer Finances.

in the transaction data, if (for example) SCF proprietors represent larger, more established businesses than BizComps transactions. Alternatively, it is possible SCF respondents over-estimate the value of their businesses due to overconfidence about business prospects or market conditions. Ultimately, reconciling conflicting evidence between survey based and transaction data remains an important area for future research, likely requiring matched survey-administrative data.

D Case Studies: Seller's Motivation and Valuation Multiples

As noted in Section 1, a key challenge for our empirical strategy is selection bias in transaction data: the fact that businesses with higher multiples might be overrepresented in our data. While we reweight our estimates for differences in firm size and industry composition between transacted firms and the overall distribution, we are unable to fully adjust for selection into transactions (for example if high-multiple businesses are more likely to be sold).

To explore the magnitude of this bias, we identify transactions that may be less selected on aspects that would increase business valuations. In particular, we identify transactions in which the broker's text description of the sale mentions four motivations for selling: illness/death, retirement, relocation, and divorce. While not a random sample of transactions, these "forced" transactions may be less selected on characteristics that increase business value.

We identify "forced" sales using the "Transaction Notes" field, which contains broker-written description of sales that sometime mention seller motivation. We searched all 26,000 transaction notes for relevant terms ("reason",

Table A.2: Summary statistics by seller's motivation

	<i>Reason for sale</i>			
	Retirement	Illness/Death	Relocation	Divorce
Sales price	397.2 (965.8)	157.7 (173.0)	279.9 (615.1)	136.0 (118.7)
EBITDA	97.1 (275.2)	47.6 (69.0)	94.3 (199.5)	44.6 (43.3)
Net Sales	915.4 (2021.7)	455.5 (689.2)	712.9 (2028.1)	322.8 (320.8)
DaysToSell	229.2 (199.3)	232.8 (201.9)	245.1 (204.8)	320.9 (227.5)
EV/EBITDA	8.54 (16.7)	7.50 (15.0)	5.15 (9.12)	4.01 (4.35)
EV/Sales	0.59 (0.80)	0.49 (0.35)	0.55 (0.41)	0.48 (0.26)
Observations	444	115	246	14

Notes: Data from Business Valuation Resources. Table values are means, with standard deviations in parentheses. Values in thousands of dollars.

“death”, “illness”, “health”, “divorce”, “relocation”, “moving”) and manually categorized matching entries. Table A.2 provides summary statistics for forced sales: 444 retirements, 115 illness/death, 246 relocations, and 14 divorces.

To test whether “forced” transactions are valued differently than non-forced sales, we use a matching strategy, linking each “forced” transaction with similar control firms that contain no motivation listed in the transaction notes.⁵² We employ coarsened exact matching (Iacus, King and Porro (2012)) to match on 3-digit NAICS codes, legal form of organization, and binned values for sale year, number of employees, and firm size.⁵³ Size is measured by EBITDA for sales regressions and sales for the EBITDA regressions.

The matching procedure serves the purpose of ensuring that the sample of “forced” transactions is compared to a control sample of firms that have similar industry and size characteristics. As shown in Table A.2, the smaller size of the “forced” sales is a primary concern.

We then regress log valuation ratios on dummy variables for each motivation category for the matched sample. We run a separate matching procedure / regression for each category. The results of these regressions are reported in Table A.3.

⁵²Ideally we would be able to find control firms that do have a listed motivation (“sold to spend more time on the beach”, “sold because we got a great offer”), but these examples are rare. In practice, motivation descriptions are restricted to the above four categories.

⁵³A similar strategy was employed in Smith et al. (2019) to study the impact of owner deaths/retirements on private business profits.

Table A.3: Seller's Motivation and Valuation Multiple

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	EV/SA	EV/SA	EV/SA	EV/SA	EV/EB	EV/EB	EV/EB	EV/EB
retirement	-0.0952** [0.0469]				0.0594 [0.0695]			
illnessdeath		-0.0809 [0.0823]				-0.143 [0.133]		
relocation			-0.0371 [0.0562]				-0.311*** [0.0839]	
divorce				-0.102 [0.132]				-0.265 [0.448]
N	3397	1433	1877	431	2894	1240	1606	383
r2	0.00147	0.000661	0.000277	0.000484	0.000291	0.000985	0.00796	0.00115

Notes: Data from BVR. Table presents regression estimates of log valuation multiple on seller's motivation, using a matched sample of comparable businesses. For each category of motivation, matching sales are identified using coarsened exact matching. Firms are matched on exact 3-digit NAICS codes and legal form of organization, along with binned values for year of sale, number of employees, and firm size. Size is measured by EBITDA for the sales regressions and sales for the EBITDA regressions.

Our results, though noisy, suggest that sales triggered by these life events are indeed valued lower than their matched counterparts:

- Illness/death: -8% (EV/Sales) and -14% (EV/EBITDA)
- Retirement: -10% and +6%
- Relocation: -3.7% and -31%
- Divorce: -10% and -27%

While these estimates provide some evidence that our valuations may be overestimated, we emphasize that they do not necessarily represent the overall degree of selection bias:

- Most transactions don't report seller motivation, and those that do may represent itself a selected sample of transactions
- Self-reported motivations may not be entirely trustworthy, as sellers might disguise their true reasons for selling
- Even assuming random reporting and honest sellers, these "exogenous" events themselves may introduce bias. For example, declining health may lead to decreased business performance prior to a sale, which in turn leads to lower multiples.

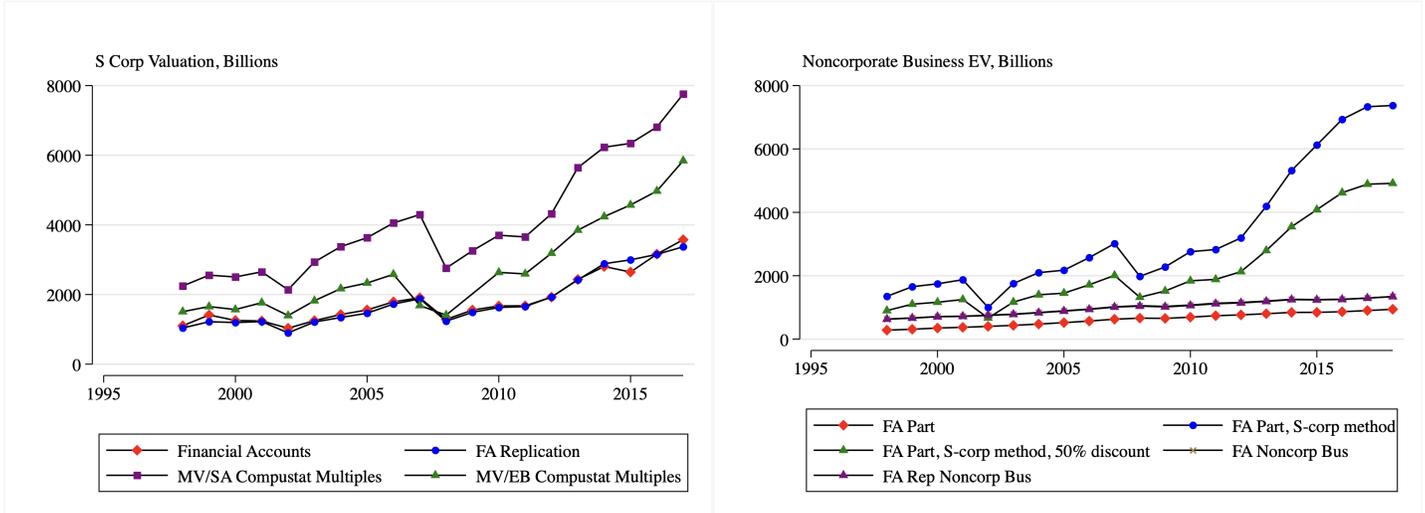
For these reasons, we do not use the exploratory results of this section to adjust our primary estimates of business value. Instead, in Section 6.3, we provide robustness of our results to various degrees of selection bias.

E Appendix Figures

Figure A.5: Federal Reserve Valuations

(a) S-corps

(b) Partnerships



Notes: (a) Red line shows actual FA S-corp series, blue line our replication with original source data. Purple and green lines show estimates of S-corp wealth using FA methodology, but with EBITDA and sales multiples from Compustat rather than book equity multiples (b) Purple triangles show FA noncorporate business enterprise value, grey X series our replication. Red line shows FA partnership enterprise value series. Blue line shows estimation of FA partnership wealth using the FA's methodology for estimating S-corp wealth. Green line applies an additional 25% illiquidity discount to blue series. Data from the Financial Accounts, IRS, and Compustat.

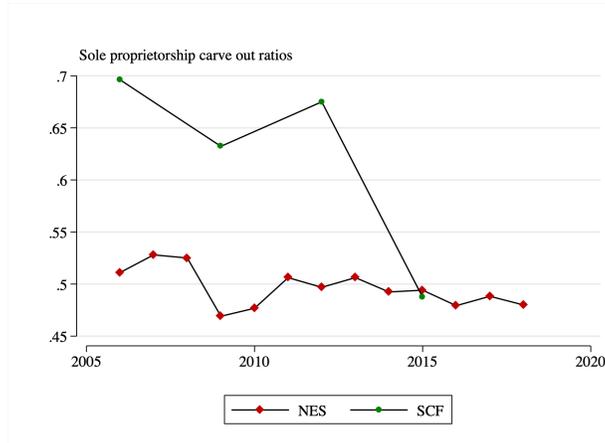


Figure A.6: Red line shows fraction of aggregate IRS sales attributable to marketable businesses. Constructed as $1 - \text{Soleprop Nonemployer Sales} / \text{IRS sales}$. Data from IRS SOI, Economic Census, County Business Patterns, and Nonemployers Statistics of the US Census Bureau.

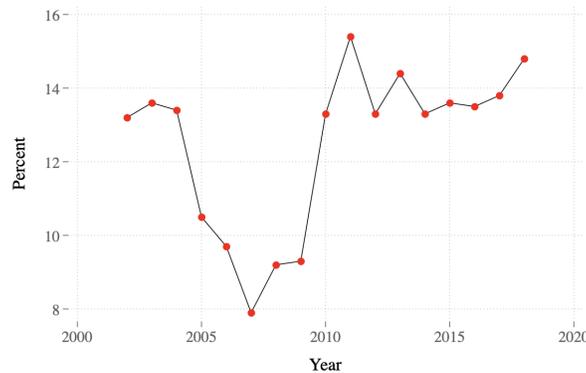
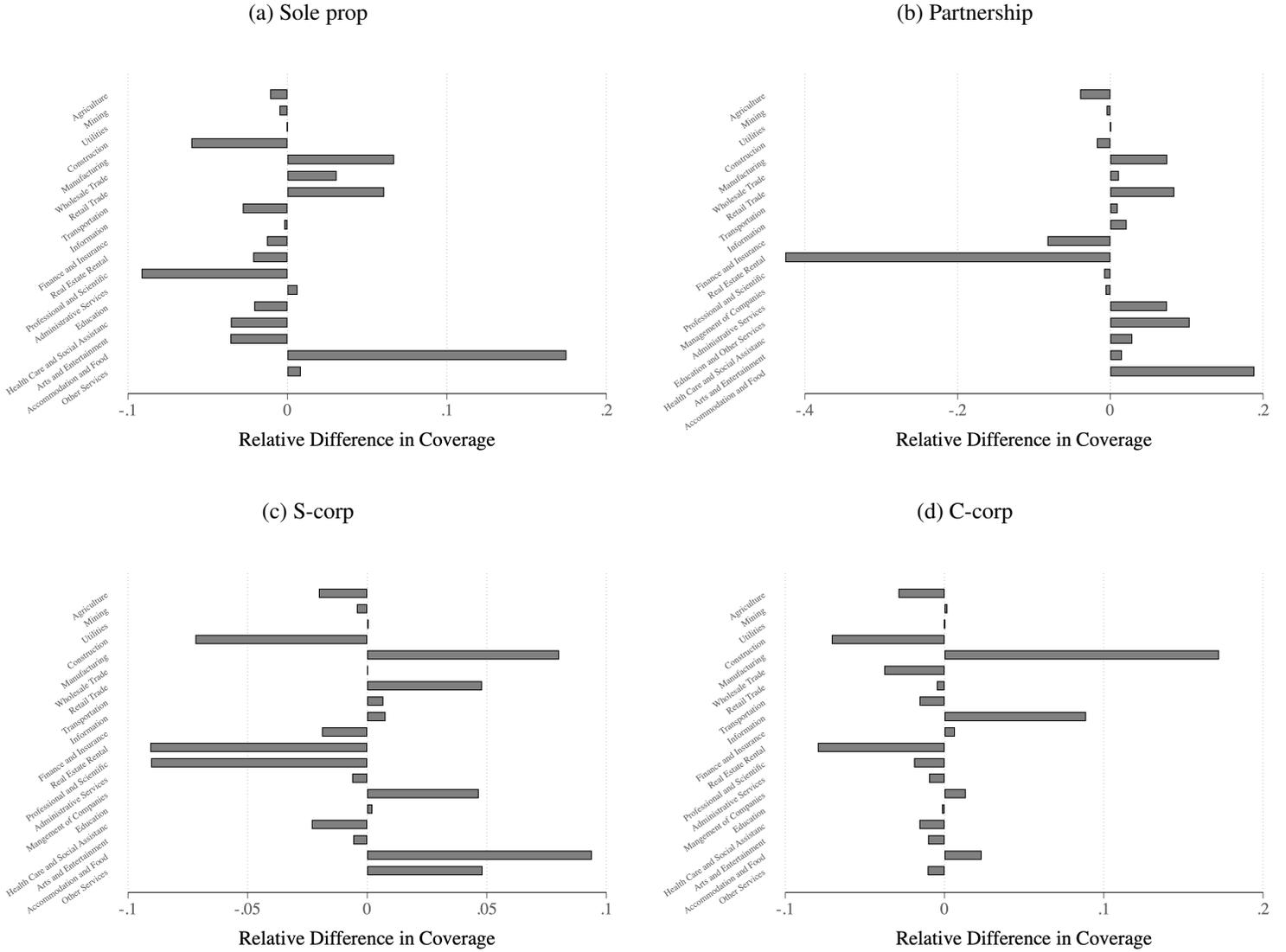


Figure A.7: Percentage of partnership wealth owned by C-corporations. Results from Campbell, Robbins and Wylde (2025).

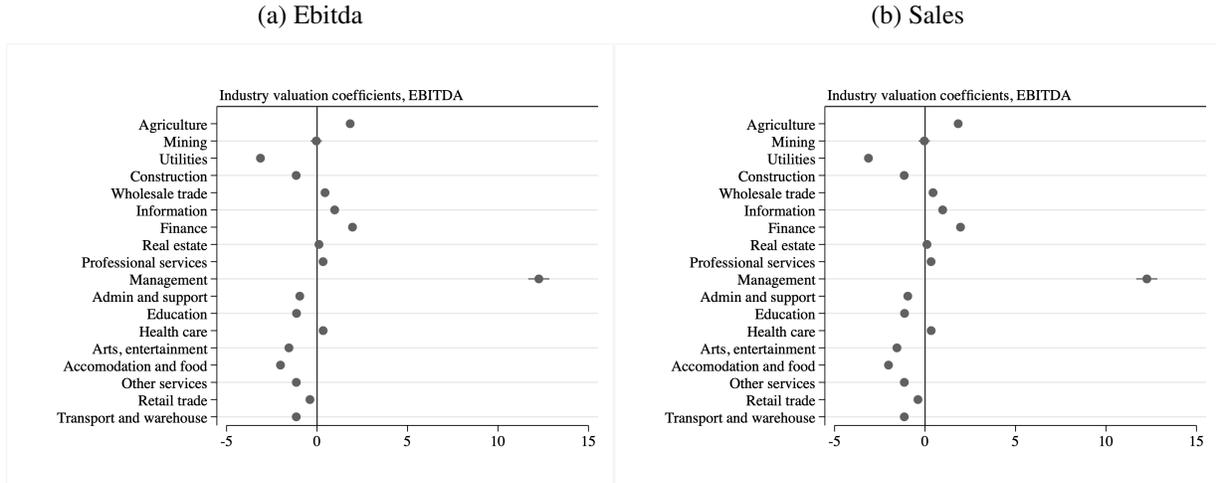
E.1 BVR vs IRS Comparison

Figure A.8: Industry composition, BVR vs IRS



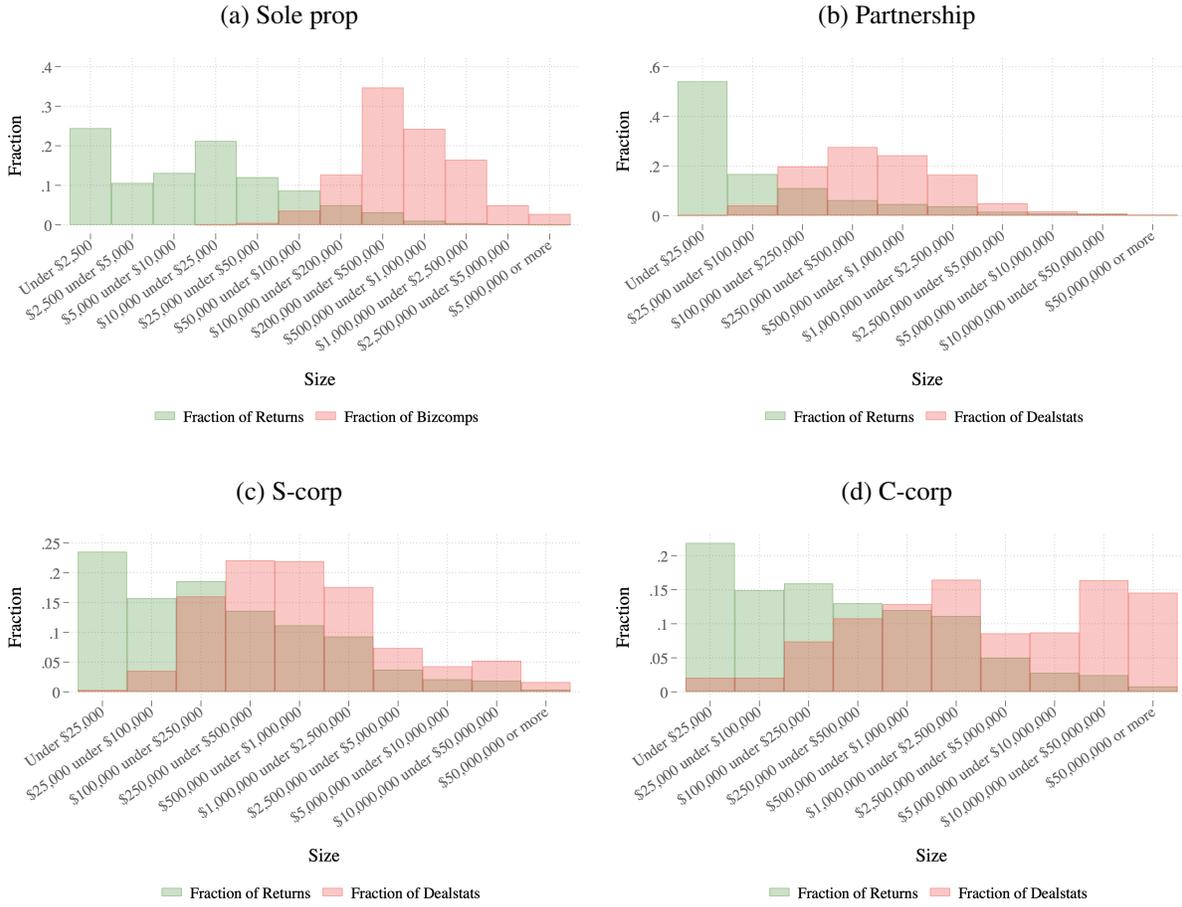
Notes: Figure shows the fraction of businesses in BVR transaction data for each industry minus the fraction of business tax returns for the industry. Data from BVR and IRS SOI.

Figure A.9: Industry regression coefficients, valuation ratios



Notes: Data from BVR. Industry-fixed effects from estimating Equation 6.

Figure A.10: Distribution of firm size, BVR vs IRS



Notes: Figure shows, for each category of firm size, the fraction of firms in the BVR transactions data, compared with the fraction of IRS tax returns. Data from BVR and IRS SOI.

E.2 SCF Comparison

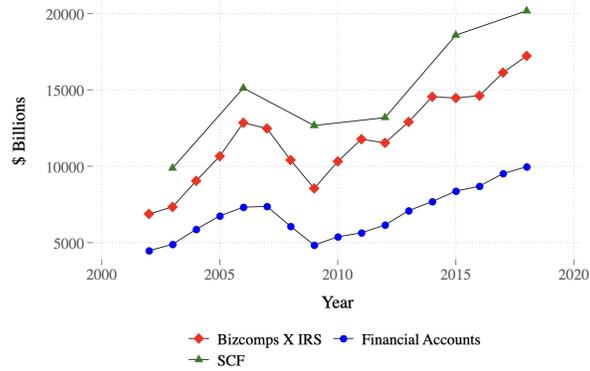
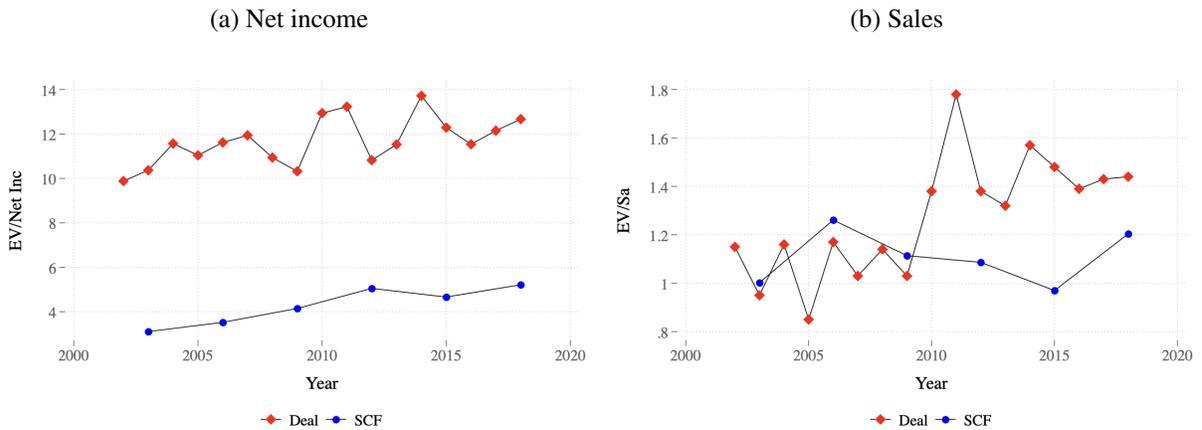


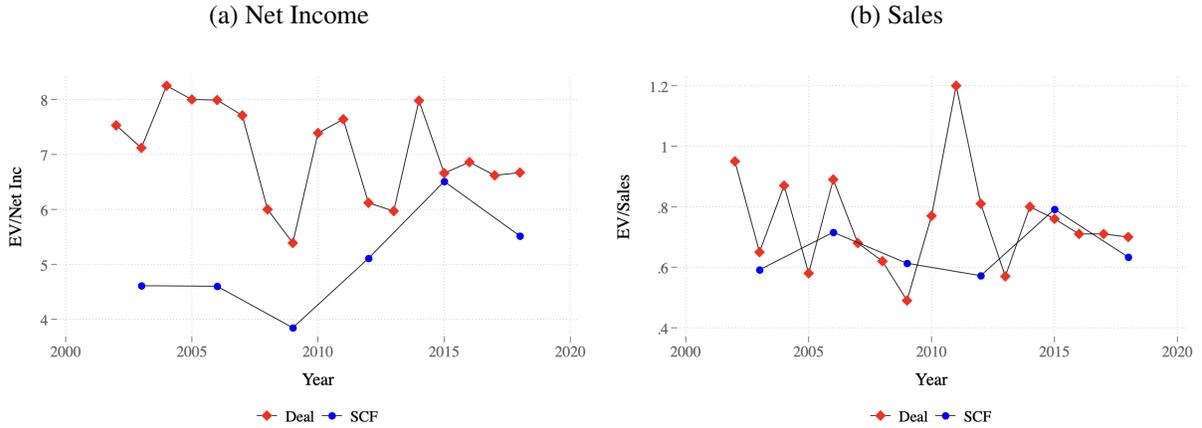
Figure A.11: Comparison of noncorporate business wealth. Our estimates (Bizcomps X IRS) compared with the Survey of Consumer Finances (SCF) compared with the Financial Accounts

Figure A.12: Comparison of partnership valuation ratios, DealStats vs SCF



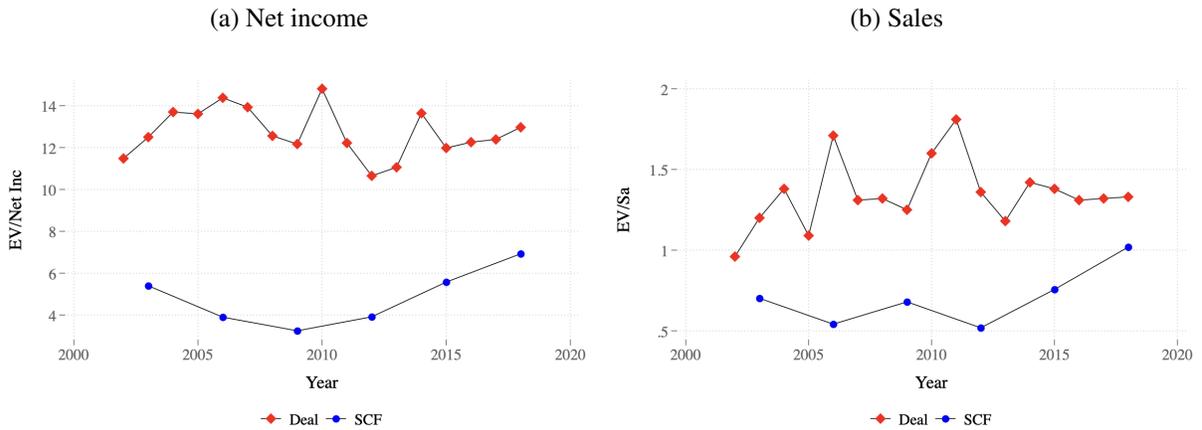
Notes: Data from BVR and the Survey of Consumer Finances.

Figure A.13: Comparison of S-corporation valuation ratios, DealStats vs SCF



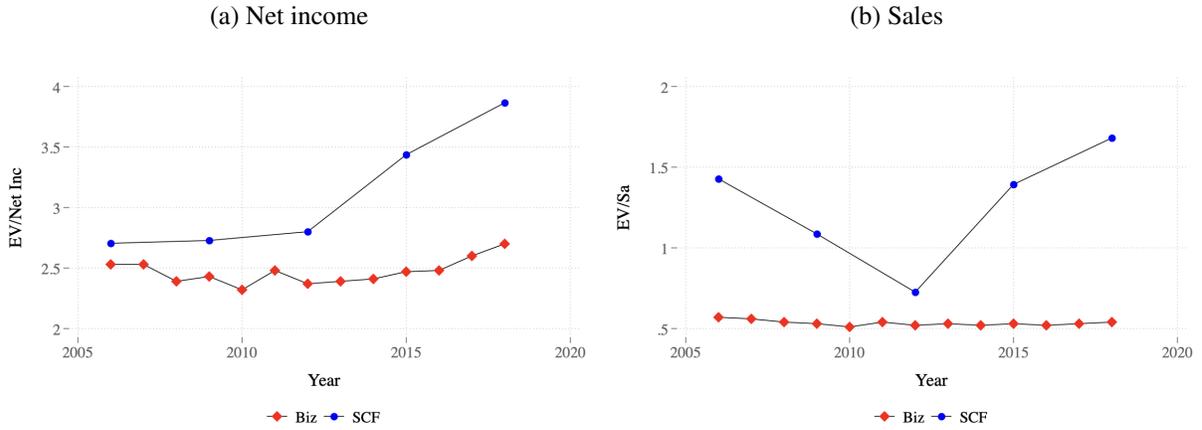
Notes: Data from BVR and the Survey of Consumer Finances.

Figure A.14: Comparison of C-corporation valuation ratios, DealStats vs SCF



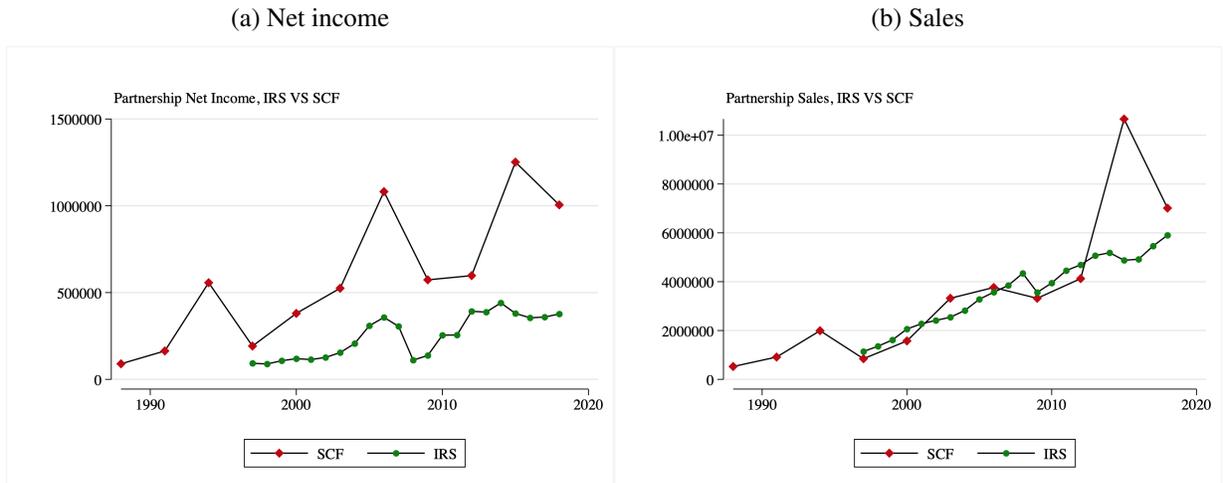
Notes: Data from BVR and the Survey of Consumer Finances.

Figure A.15: Comparison of sole proprietorship valuation ratios, Bizcomps vs SCF



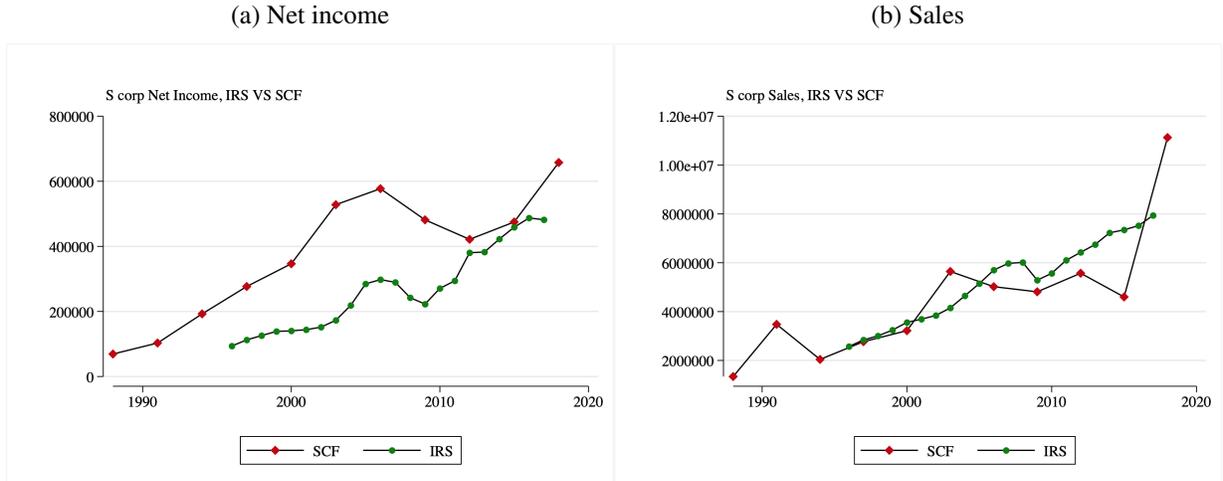
Notes: Data from BVR and the Survey of Consumer Finances.

Figure A.16: Comparison of aggregate net income, partnerships, SCF vs IRS



Notes: Data from the Survey of Consumer Finances of the Federal Reserve and IRS SOI.

Figure A.17: Comparison of aggregate net income, S-corps, SCF vs IRS



Notes: Data from the Survey of Consumer Finances of the Federal Reserve and IRS SOI.

E.3 Sales Versus EBITDA Valuation

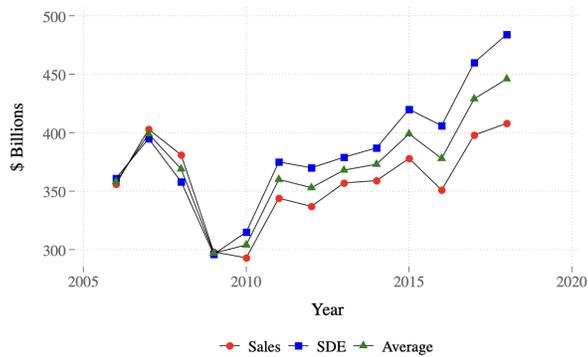


Figure A.18: Comparison of Sole Proprietorship Valuations using Sales/SDE multiples. Data from BVR.

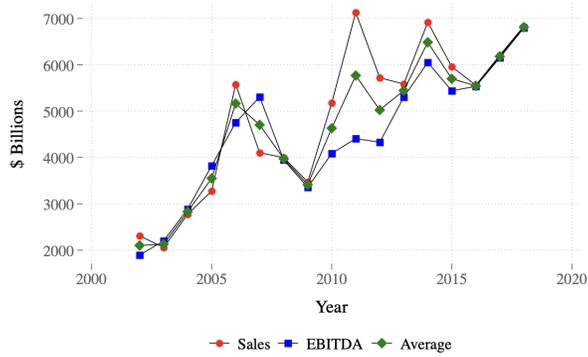


Figure A.19: Comparison of Partnership Valuations using Sales/EBITDA multiples. Data from BVR.

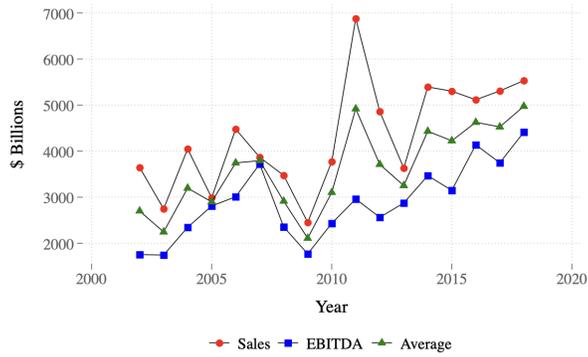


Figure A.20: Comparison of S-corp Valuations using Sales/EBITDA multiples.

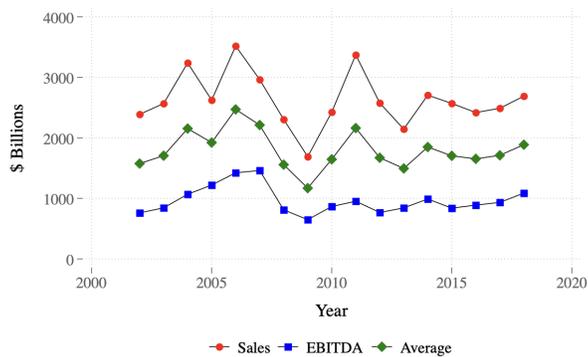
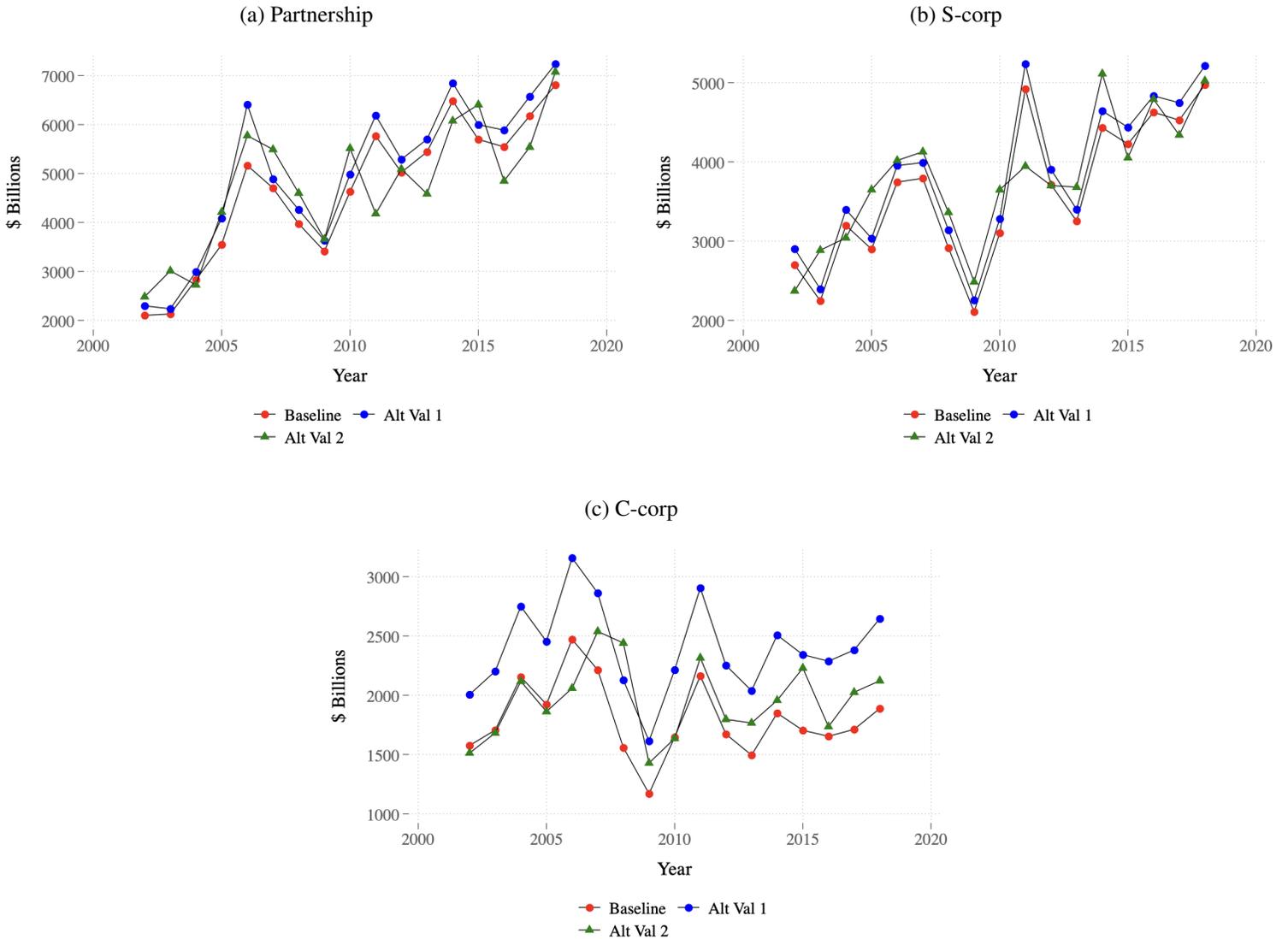


Figure A.21: Comparison of C-corp Valuations using Sales/EBITDA multiples. Data from BVR.

Figure A.22: Additional Valuation Estimates



Notes: Figure compares baseline valuation estimate with two additional series. ‘Alt Val 1’ values firms with negative EBITDA using their sales valuation only. ‘Alt Val 2’ values firms using weighted average valuation multiples by industry cell (and not size).

F Appendix Tables

Table A.4: Share of aggregate business activity by number of transactions in cell

	<i># Transactions</i>			
	0	1	2-5	> 5
	<i>S-corporations</i>			
Share returns	.30	.06	.20	.44
Share sales	.12	.21	.38	.29
	<i>Partnerships</i>			
Share returns	.80	.02	.10	.09
Share sales	.33	.15	.30	.22
	<i>C-Corporations</i>			
Share returns	.48	.16	.28	.08
Share sales	.22	.17	.47	.15

Notes: Table shows percent of IRS returns and sales by number of transactions in the industry-size-legal form-year cells. Data from the IRS Statistics of Income and BVR.

Table A.5: IRS SOI Summary Statistics

	Mean per Return	Mean 2018	% of GDP	% of GDP 2018
<i>Sole Proprietorships</i>				
Sales	31,089	58,662	8.5	7.7
Profits	7,003	12,861	1.9	1.7
EBITDA	8,107	15,119	2.2	2.0
Interest Expenses	224	386	0.1	0.0
Depreciation	879	1,871	0.3	0.2
Average Num of Returns:		24112215		
<i>Partnerships</i>				
Sales	1,330,367	1,414,252	27.3	27.0
Profits	86,603	90,373	1.8	1.7
EBITDA	146,354	169,612	3.0	3.2
+ EBITDA	182,378	211,269	3.7	4.0
- EBITDA	-36,024	-41,656	-7	-8
Interest Expenses	28,698	24,976	0.6	0.5
Depreciation	39,047	62,803	0.8	1.2
Average Num of Returns:		3163905		
<i>S-Corporations</i>				
Sales	1,377,424	1,589,136	37.2	38.0
Profits	72,729	106,626	1.9	2.5
EBITDA	103,041	143,735	2.8	3.4
+ EBITDA	117,232	157,531	3.2	3.8
- EBITDA	-14,191	-13,795	-4	-3
Interest Expenses	10,772	9,423	0.3	0.2
Depreciation	17,288	24,932	0.5	0.6
Average Num of Returns:		4155206		
<i>C-Corporations</i>				
Sales	13,631,934	17,491,480	161.7	149.2
Profits	482,081	1,220,380	5.7	10.4
EBITDA	1,248,260	2,182,150	15.2	18.6
+ EBITDA	1,350,148	2,329,673	16.4	19.9
- EBITDA	-101,888	-147,523	-1.2	-1.3
Interest Expenses	407,861	409,373	5.2	3.5
Depreciation	268,251	429,296	3.2	3.7
Average Num of Returns:		1860844		

Notes: Data from the IRS Statistics of Income.

Table A.6: DealStats and Bizcomps, valuation multiple regression coefficients

	(1) Deal EB	(2) Deal SA	(3) Biz SDE	(4) Biz Sa
Size dec 1	-1.435*** [0.366]	-0.0986*** [0.0199]	-0.0472 [0.115]	0.0109 [0.0151]
Size dec 2	-1.270*** [0.258]	-0.0530** [0.0208]	-0.200*** [0.0742]	-0.0135 [0.0118]
Size dec 3	-0.975*** [0.214]	-0.0354* [0.0193]	-0.147* [0.0829]	-0.00882 [0.0145]
Size dec 4	-0.791*** [0.230]	-0.0116 [0.0227]	-0.0990 [0.0774]	-0.00762 [0.0118]
Size dec 5	0 [.]	0 [.]	0 [.]	0 [.]
Size dec 6	0.273 [0.208]	0.0452** [0.0204]	0.0221 [0.0976]	-0.0200** [0.00969]
Size dec 7	0.186 [0.252]	0.0569** [0.0279]	0.0835 [0.0696]	0.0136 [0.0110]
Size dec 8	0.800** [0.310]	0.0796*** [0.0244]	0.159** [0.0792]	0.0174 [0.0112]
Size dec 9	0.939*** [0.279]	0.223*** [0.0430]	0.369*** [0.105]	0.0254* [0.0144]
Size dec 10	2.132*** [0.365]	0.669*** [0.0750]	0.758*** [0.136]	0.111*** [0.0155]
Part	-1.806*** [0.231]	0.0420* [0.0244]		
S corp	-1.484*** [0.270]	-0.00822 [0.0188]		
N	16307	16307	13343	13343
r2	0.0668	0.0857	0.0145	0.0121
dep_mean	6.330	0.740	2.300	0.540
cluster	Naics 3	Naics 3	Naics 3	Naics 3

Notes: Data from BVR. Estimation of Equation 6, with different multiples, firm size ranking, and data sources. Columns (1) and (2) use DealStats data. Column (1) regresses EBITDA multiples, and ranks firms by deciles of sales. Column (2) regresses sales multiples, and ranks firms by deciles of EBITDA. Columns (3) and (4) use BIZCOMPS data. Column (3) regresses Seller's Discretionary Earnings (SDE) multiples, and ranks firms by deciles of sales. Column (4) regresses sales multiples and ranks firms by deciles of SDE.

Table A.7: Mean percent prediction errors of valuation ratios by scale variable, weighted average

(1)

	mean	sd	p50	p25	p75
EBITDA	-0.00076	0.34	0.0021	-0.065	0.045
Sales	0.014	0.27	0.0023	-0.050	0.049
Pre-tax profit	-0.026	0.29	-0.00027	-0.083	0.032
Book value	0.19	0.65	0.027	-0.038	0.19
Gross profit	-0.016	0.32	-0.0060	-0.084	0.023

Notes: Data from BVR. Table shows aggregated percent errors between actual and predicted valuations using multiples at the industry-year-legal form level, using valuations constructed through a weighted average of firm level multiples.

Table A.8: Mean percent prediction errors by statistic, EBITDA

(1)

	mean	sd	p50	p25	p75
Weighted avg	-0.020	0.19	0.00064	-0.051	0.027
Median	-0.15	0.36	-0.15	-0.38	0.024
Average	0.15	0.44	0.13	-0.16	0.38
Harmonic average	-0.35	0.26	-0.36	-0.53	-0.19
Cell reg	-0.041	0.30	0	-0.086	0.026
Main specification	0.093	0.47	0.015	-0.19	0.24
Fed method	0.085	0.64	-0.018	-0.33	0.35

Notes: Data from BVR. Table shows aggregated percent errors between actual and predicted valuations at the industry-year-legal form level. The predictions are formed using various ways of aggregating firm level valuation multiples at the cell-year level. 'Cell reg' are separate regressions of enterprise value on EBITDA by cell across years. Our 'Main specification' is estimated using Equation 5. 'Fed method' is the Federal Reserve's methodology, using book value multiples from Compustat.

Table A.9: Mean percent prediction errors by statistic, sales
(1)

	mean	sd	p50	p25	p75
Weighted avg	0.013	0.21	0.0023	-0.034	0.039
Median	-0.23	0.33	-0.24	-0.45	-0.051
Average	-0.0057	0.38	-0.021	-0.26	0.18
Harmonic average	-0.41	0.25	-0.43	-0.58	-0.27
Cell reg	0.016	0.34	0.0014	-0.064	0.057
Main specification	0.18	0.66	0.084	-0.23	0.46
Fed method	0.10	0.66	-0.0086	-0.31	0.37

Notes: Data from BVR. Table shows aggregated percent errors between actual and predicted valuations at the industry-year-legal form level. The predictions are formed using various ways of aggregating firm level valuation multiples at the cell level. 'Cell reg' are separate regressions of enterprise value on sales by cell across years. Our 'Main specification' is estimated using Equation 5. 'Fed method' is the Federal Reserve's methodology, using book value multiples from Compustat.