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 estimates valuation ratios and aggregate wealth for the four major components of private business wealth: sole proprietorships, partnerships, S corporations, and private C corporations. We estimate aggregate private business wealth of $15.5 trillion in 2017, significantly more than the Financial Accounts estimates but less than the Survey of Consumer Finance.

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1 Introduction

The rise in the number and economic importance of private businesses in the United States raises important measurement challenges from a macroeconomic and distributional standpoint. In 2017, private companies sold $16.0 trillion of goods and services and made pre-tax profits of $1.8 trillion, similar in magnitude to the $15.2 trillion in sales and $1.4 trillion in profits of public corporations. The rise of pass-through businesses[1], and decline in public corporations, has lead 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 Financial Accounts (FA), the official compilation of wealth compiled by the Federal Reserve, values private companies largely using financial book values. While this may have made sense in the past, with the rise of intangible capital[2] there is an increasing divide between balance sheet statements and true economic value, which may lead these estimates to be inaccurate. The Survey of Consumer Finance (SCF), the main household survey of wealth in the US, values private businesses using self-reported values from private business owner/operators. While this estimate does not use book values, it relies upon a small sample of business owners, as well as the accuracy of business owners of knowing the market value of their companies. Business owners, while highly knowledgeable, may not have current up to date market transaction data for similar private businesses, and thus may not be in a position to accurately value their businesses.

Aside from their importance in aggregate measures of wealth, private businesses are also a crucial component of accurately measuring wealth inequality. Existing data sources, from either survey data or capitalized income tax data, estimate that the richest top 1% own 60-80% of all private business wealth. For the very top, private business wealth is a key asset class, making up a third to a half of the top .1%'s portfolio. Accurately measuring wealth inequality requires establishing the market value of private business wealth. In recent years, progressive politicians and economists have proposed two policies to combat wealth inequality: a wealth tax on families with wealth over $50 million, introduced by Senator Elizabeth Warren,[3] and a tax on unrealized capital gains, proposed by Senator Ron Wyden. The trickiest aspect of these plans is how to deal with private businesses: without a way to assess their market values, both plans will be difficult to implement.

In this paper, we use new data and new methods to this question in order to estimate the aggregate market 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, a firm that specializes in valuing private firms. The first

[1] Documented in Smith et al. (2019).

[2] See, for example, Bhandari and McGrattan (2021) in a small business context or Corrado, Hulten and Sichel (2009) overall.

[3] https://www.warren.senate.gov/newsroom/press-releases/warren-jayapal-boyle-introduce-ultra-millionaire-tax-on-fortunes-over-50-million.

dataset, Bizcomps, includes data on transactions of sole proprietorships, and has never been used before. The second dataset, Dealstats, contains larger transactions of S corporations, partnerships, and C corporations, and has not been used to estimate aggregate business wealth. The data contains transaction level data from tens of thousands of business sales, including detailed data on income statements, balance sheets, and transaction values. To this data we wed the practical methodology, commonly used by valuation professionals, of estimating market value by comparison to similar businesses that have previously sold.[4]

We find that private companies are valued at moderate to substantial discounts to public corporations. For example, in 2017 the average ratio of a company's Enterprise Value to EBITDA for public firms, as measured by Compustat, was 13.6, while the same ratio for private S corporations was 6.3, partnerships was 10.0, C corporations was 10.9, and sole-proprietorships was 2.3. Private company valuation ratios have different trends than public ones, and display less cyclicality over the business cycle. Sole proprietorships show very little trend in valuation ratios over time.

We examine three determinants of firm valuations: legal form of organization, industry, and firm size. Across private firms, C corporations have the highest valuations, followed by partnerships, S corporations and sole proprietorships. There is an economically significant size premium, with larger companies generally selling at higher multiples.

We compare transaction valuation ratios to self-reported ratios from the SCF. For corporate businesses and partnerships, valuation ratios are significantly higher than the SCF and follow divergent trends. For sole proprietorships, self-reported valuations are much higher than transacted valuations, providing evidence that these firm owners may overestimate the value of their business.

To estimate the aggregate value of private business wealth, we use the estimated valuation ratios to scale up aggregate data on sales, profits, and EBITDA from the IRS Statistics of Income. Our baseline estimate is an aggregate valuation for private corporations of \$15.5 trillion in 2017: \$4.7 trillion for S corporations, \$2.0 trillion for private C, \$8.3 trillion for partnerships, \$405.6 billion for sole proprietorships. This new time series on valuation serves as an independent estimate of the aggregate value of private business wealth, and can be in concert with other estimates from the FA, which uses mainly book values, and the Survey of Consumer Finance, which uses self-reported valuations.

Our estimates are substantially largely than the aggregates in the FA; for example, in 2017 our total for private businesses was more than double the aggregate value of \$6.8 trillion from the FA. The biggest differences were for partnerships (\$8.3 trillion in 2017 compared with \$721.0 billion in the FA) and S

[4]Formally, in the private business valuation profession, this is known as the "market approach": see Pratt, Niculita et al. (2000), chapters 11 and 12, or Goedhart, Koller and Wessels (2015), chapter 16. The American Society of Appraisers Business Valuation Standards recognizes the "market approach" as one of the three pillars of business valuation. This is also recognized in the Institute of Business Appraisers 'Business Appraisal Standards'. For a recent paper using this approach, see Smith et al. (2020).

corporations ($4.7 trillion in 2017 compared with $4.0 trillion in the FA). Our estimate wealth totals are quite close to the SCF; although the SCF has lower valuation ratios, the higher reported revenue and profits lead to similar overall valuations.

The results of this paper have direct implications for the measures of wealth inequality, as well as revenue estimates under a wealth or capital gains tax. The higher valuations of private businesses increase the top 1% wealth share from 34.9% to 38.9% in 2017, and top .1% from 18.2% to 21.2%. A 1% on wealth of the top .1% would raise a mechanical $75.3 billion ($824.7 billion over 10 years) from private businesses alone. A tax on unrealized capital gains for families in the top .1% would raise $922 billion from private business wealth alone over 10 years.

1.1 Literature

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 different 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. Two differences in our computation of valuation ratios are (i) the use of Bizcomps to compute valuation ratios for sole proprietorships (ii) the reweighting procedure we use. 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.[5] A subtle difference of our paper is that the

[5]Koeplin, Sarin and Shapiro (2000) compares private transactions from SDC platinum with 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).

previous literature is concerned with the *ceterus paribus* effect of being private on company valuations; i.e. finding private companies that look as similar as possible to pubic 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.

Our work is also related to the literature on the accuracy of equity valuation using multiplies. Liu, Nissim and Thomas (2002) finds that valuation of public companies using multiples is fairly precise using measures of forward earnings, while Kim and Ritter (1999) find the valuation of IPOS using forward P/E ratios has moderate predictive ability.

2 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.[6]

Table 1 provides summary statistics, broken down by legal form of organization. There are 13,094 S corporations 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 the valuation ratios to aggregate profit and sales data from the IRS, collected from business tax returns. The IRS Statistics of Income (SOI) has yearly data on the income statements and balance sheets of all US corporations, including pre-tax profits, EBITDA, sales, assets, book capital, and book equity. The data is aggregated into groups by legal form of organization, 2-digit NAICS industry, and firm sales bucket. As discussed below, we will construct

[6]For details, see appendix A.1.

Table 1: BIZCOMPS/Dealstats Summary Statistics

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

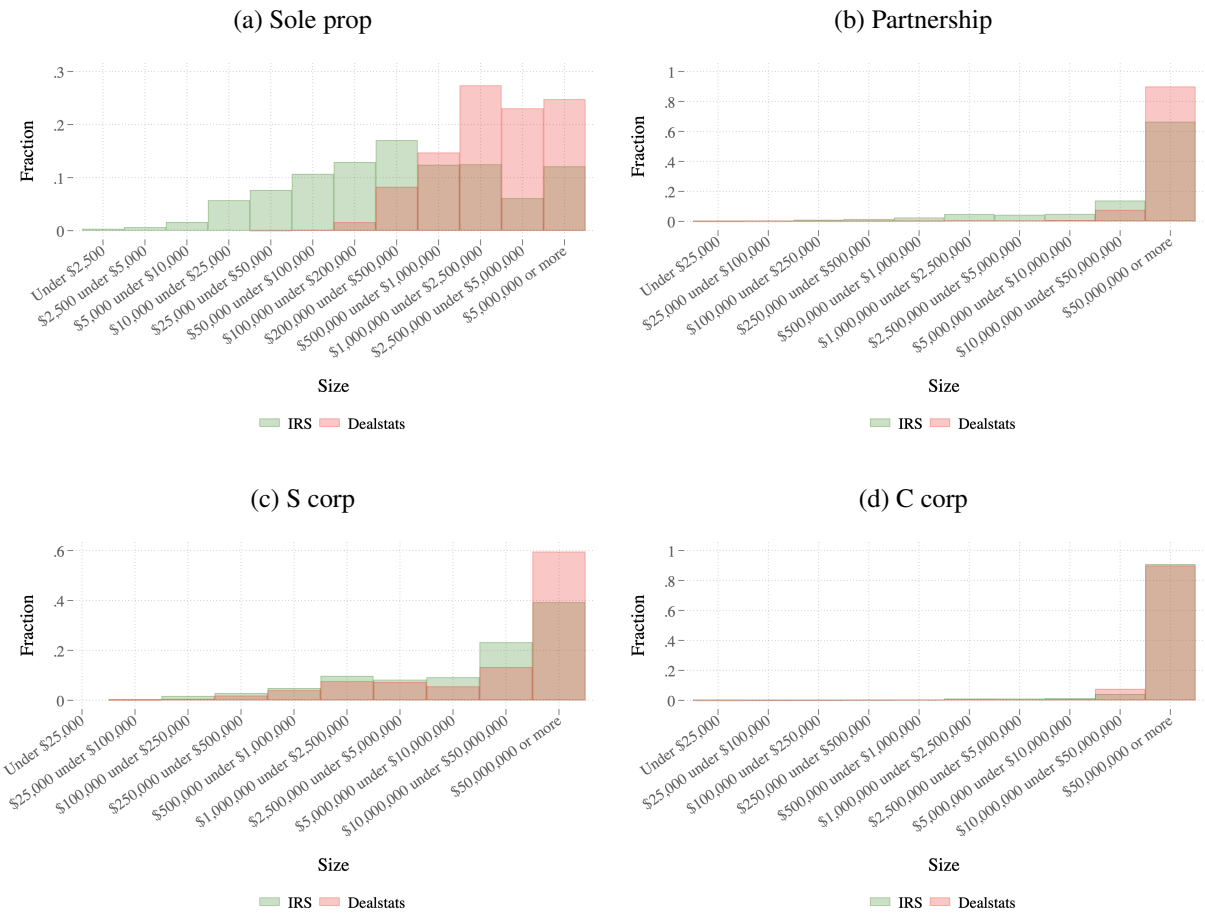
Notes: Data from Business Valuation Resources. Table values are means, with standard deviations in parentheses.

valuation ratios in the transaction data by cell-year in order to estimate aggregate valuations. Table A.2 gives per/return summary statistics.

One concern with using transaction data is that businesses that are sold may not be representative of the universe of firms. This could happen if businesses that are sold are fundamentally different than businesses that are not for sale, or if BVR transactions were non-representative of businesses that sold. Figure A.2 compares the size distribution of businesses of the transaction data from BVR to the IRS. In general, the businesses that are sold are larger than the typical business, and are concentrated in the upper tails of the distribution. Sole proprietorships have the largest discrepancy; while most tax returns report sales under $50,000, transactions report sales that are almost always greater than $50,000.[7] While the distribution of firm *size* for transactions is too rightly skewed, the distribution of firm *sales*, displayed in figure 1, is much closer. The firms in the transaction database are thus representative of the firms that embody the majority of economic activity and firm value, the right part of the distribution.

[7] As discussed in section 5.3, 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.

Figure 1: Distribution of firm sales, BVR vs IRS



Notes: Data from BVR and IRS SOI.

Figure A.1 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 produced an unbiased estimate of aggregate firm valuations.

3 Methodology

Aggregate data on sales and EBITDA is available from the IRS Statistics of Income at the industry, legal form of organization, and size (measured by business ceipts)[8] 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[9] of the the firms in the cell. To do so, we follow the methodology of many industry practitioners by estimating private firm value using "multiples" of sales or EBITDA.[10] We estimate multiples from our transaction data at the cell-year level, then scale up aggregate EBITDA and sales to get aggregate market values; our final valuations will be a mean of the these two estimated valuations.[11]

To form valuation ratios, industry practitioners and the finance literature compute centralized tendencies of firm level valuation ratios $\beta_{ft} = \frac{EV_{ft}}{EB_{ft}}$, here using EBITDA for our examples. A vexing question is *what* specific centralized tendency to use, as there are substantial differences between the mean, median, geometric mean, and weighted mean.[12] Figure A.3 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 different multiples 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 by year. 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, then collapse them to the cell level and calculate percent errors $\frac{\sum_{f \in \text{cell c}} e_{ft}}{\sum_{f \in \text{cell c}} EV_{ft}}$. We then compare the distribution of these cell-year level percent errors across different statistics.

[8] See section A.5.

[9] As noted above, the transactions in our database in general give enterprise rather than market values since they exclude financial assets and liabilities. To go from enterprise to aggregate market values, these financial assets/liabilities must be added back in.

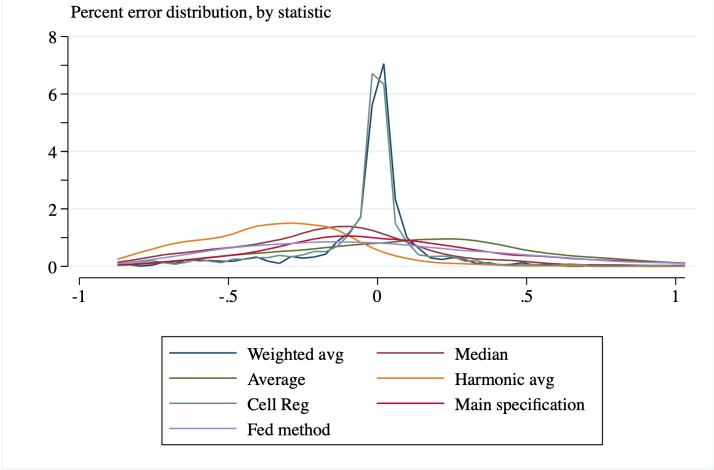
[10] This method of valuation is known as the "market approach', one of the most common methods used by business appraisers For details, see see Pratt, Niculita et al. (2000) , Aswath Damodaran (Damodaran (2016)) and the McKinsey company (see Goedhart, Koller and Wessels (2015)).

[11] We focus on scaling sales and EBITDA because these are the ratios that are most commonly used by practitioners. Appendix figures A.5 and table A.4 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.

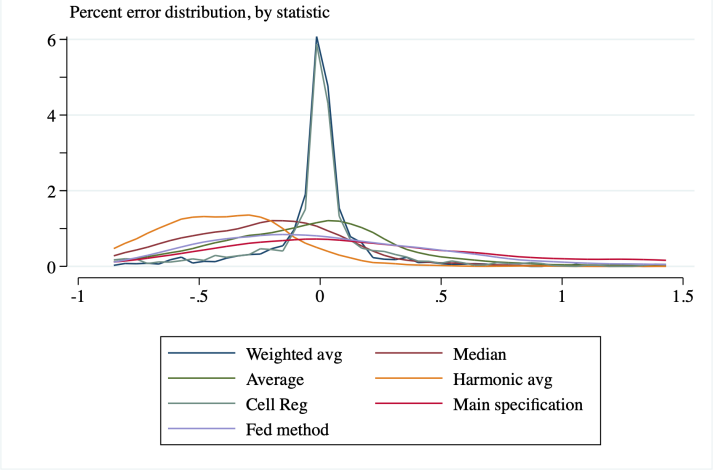
[12] Agrrawal et al. (2010) reviews the academic literature on how valuation ratios are summarized, and finds no consistent methodology between simple means, medians, and geometric means. Kim and Ritter (1999) value IPOS use medians and geometric means of comparable firm P/Es. Cheng and McNamara (2000) 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.

Figure 2: Comparing valuation multiples: percent error by statistic

(a) EBITDA



(b) Sales



Notes: Data from BVR. Figure shows aggregated 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 ways of aggregating firm level valuation multiples at the cell-year level. 'Cell reg' are separate regressions of enterprise value on sales by cell across years. Our 'Main specification' is estimated using equation 1. 'Fed method' is the Federal Reserve's methodology, using book value multiples from Compustat.

Figure 2 shows the percent error distribution for each of the statistics. A key statistic is the weighted average valuation ratio, with the weights being the size of the scale variable (EBTIDA and sales, respectively), which performs the best. For this statistic, errors 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%]. To note why this is so successful, note that this is equivalent to estimating a *ratio of means* of market value to the EBITDA $\beta_{ct}^{wavg} \equiv \frac{\overline{EV_{ct}}}{\overline{EB_{ct}}}$, where the bars represent sample means. It is straightforward to show this gives an unbiased estimate of cell level enterprise values[13] We also test the performance of our methodology in-sample by comparing our method to that used by the Financial Accounts, who uses public company data from Compustat to construct valuation ratios of market value to book value, along with a valuation discount.[14] Figure 2's "FED" line displays percent errors using this methodology, showing substantially more dispersed standard errors than the weighted average (25-75th percentile range of [-33%,35%]).

[13] $E_t[EV_t - (\mu^{EV}/\mu^{EB})\text{EB}_t] = 0$. As the number of observations in the cell-year increases, the sampling error decreases and the estimated valuations come closer to actual valuations. Figure A.4 displays mean absolute errors by the number of observations in the industry-legal-year, showing that our estimates of valuation get more and more accurate the more transactions are in a given cell.

[14] For details of the Financial Accounts methodology, see appendix A.4.

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. If our transaction data were representative of the overall distribution of firms this would not be a concern, however, as discussed above, our transaction data is overweight large firms. Instead, we estimate the size-industry-legal form-year 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

$$\beta_{ft} = \alpha_l + \delta_g + \theta_t + \gamma_i + \epsilon_{ft} \tag{1}$$

Here α_l are legal form of organization fixed effects, δ_g are size group fixed effects, γ_i are industry fixed effects and θ_t are year fixed effects. 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 main measure of valuation ratios. To allow the effects of industry, legal form, and size to change over time, we interact each of the dummy variables with four time period dummies.[15] Figure 2 displays the percent errors for this methodology in the "REGA" line. Percent errors are significantly more dispersed than the simple weighted average (25-75th percentile range of [-19%,24%]), but still more concentrated around zero than Federal Reserve's methodology.

There are a number of adjustments necessary before we apply the valuation ratios to the tax aggregates. For private C corporations, since the data from the IRS contains both private and public corporations, we have to net out any public corporation variable that is contained in the sample. 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). For sole proprietorships, a problem with applying our methodology that many tax returns from 'sole proprietorships' do not represent marketable businesses: they may also be independent contractors, freelancers, other gig economy workers, or other self-employed individuals.[16] In order to properly value sole proprietorships that are marketable businesses, we need to carve out these workers from the tax data. We will carve out marketable businesses from independent contractors using data from the SCF, County Business Patterns, and Economic Census.[17]

4 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

[15] See section A.5 for details.

[16] See, for example, Bhandari et al. (2020) and Abraham et al. (2017).

[17] This is described in Appendix A.6.

number of employees. We estimate the following model

$$\beta^{ft} = \alpha^s \mathbb{1}\{\text{S corp}\} + \alpha^p \mathbb{1}\{\text{Partnership}\} + \sum_{d=1}^{10} \delta_d \mathbb{1}\{\text{Size decile = d}\} + \theta_t + \gamma_i + \epsilon_{ft} \tag{2}$$

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.3 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.6 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.

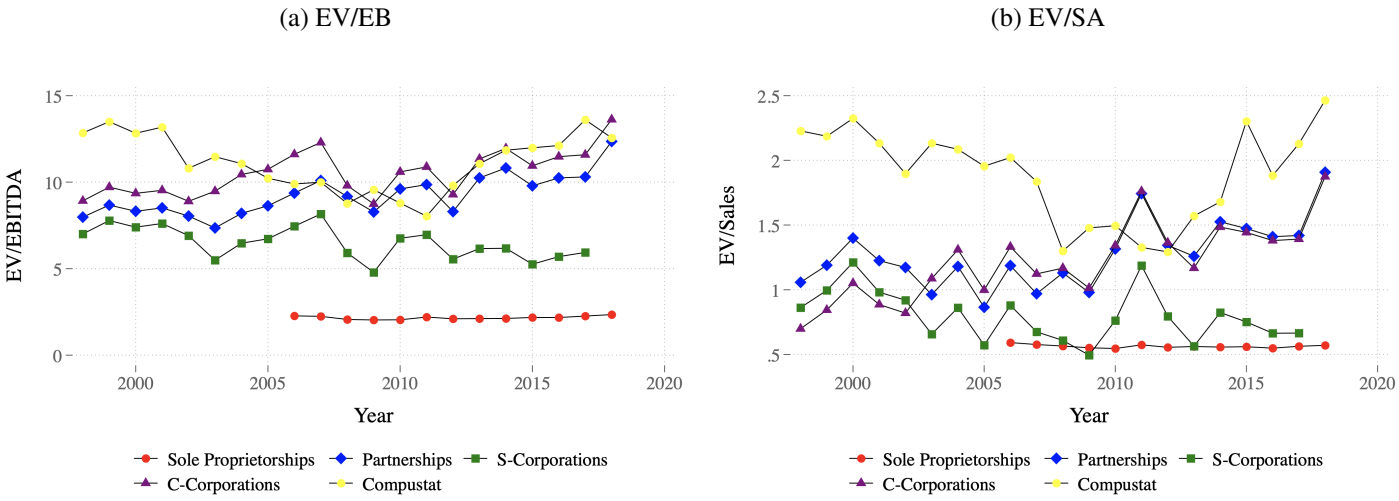
The regression results show a robust relationship between firm valuations and size, industry, and legal form of organization. They motivate our methodology of adjusting for these characteristics when estimating aggregate firm valuations.

Table 2: Valuation multiple regressions

	(1)	(2)	(3)	(4)
	Deal EB	Deal SA	Biz SDE	Biz Sa
Size dec 1	-1.168***	0.140***	-0.118	0.0246
	[0.232]	[0.0313]	[0.0904]	[0.0192]
Size dec 2	-0.740***	0.0425**	-0.0444	0.00766
	[0.218]	[0.0197]	[0.0638]	[0.0149]
Size dec 3	-0.377	0.0216	-0.365*	0.00383
	[0.242]	[0.0196]	[0.185]	[0.0316]
Size dec 4	-0.154	0.0239	-0.102	0.000851
	[0.208]	[0.0163]	[0.0647]	[0.0176]
Size dec 5	0	0	0	0
	[.]	[.]	[.]	[.]
Size dec 6	0.587**	-0.00183	-0.0100	0.0108
	[0.248]	[0.0133]	[0.102]	[0.0147]
Size dec 7	0.913***	0.0232	-0.203*	-0.0181
	[0.309]	[0.0154]	[0.104]	[0.0124]
Size dec 8	0.477*	0.00513	-0.0628	-0.0198*
	[0.251]	[0.0153]	[0.0736]	[0.0116]
Size dec 9	1.244***	0.0439*	0.106	0.00935
	[0.294]	[0.0249]	[0.120]	[0.0186]
Size dec 10	1.314***	0.106***	-0.163**	-0.00440
	[0.283]	[0.0403]	[0.0702]	[0.0181]
Part	-1.721***	-0.00850		
	[0.262]	[0.0212]		
S corp	-1.234***	-0.0190		
	[0.283]	[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 2. 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 12.6 public firms, 12.7 for private C corporations; 11.7 for partnerships; 6.3 for S corporations; and 2.3 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 dotcom 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.

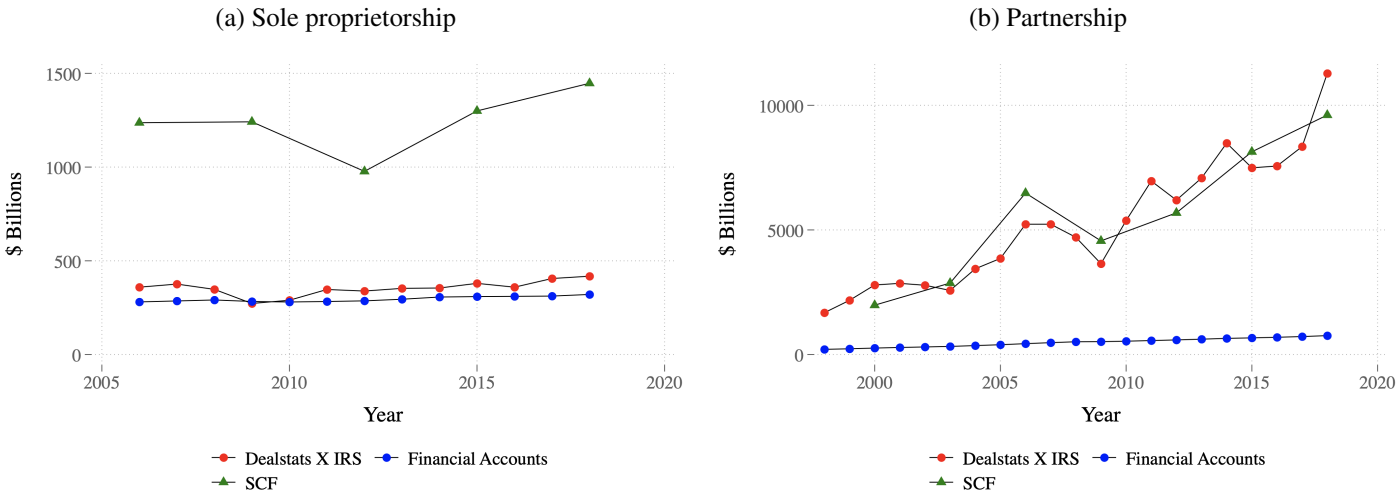
5 Aggregate private business wealth

5.1 Partnerships

Figure 4 (b) shows the aggregate enterprise value of partnership businesses in the US. Partnership wealth is substantial and has been growing rapidly. In 2018 the total value was $11.3 trillion, and has grown more than fourfold from its value of $1.7 trillion in 1998. Valuations using either EV/SA or EV/EB track

each other closely.[18]

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 (b) compares our valuation with the FA and display a large gap between the series. In 2018 the FA valued non-real estate partnership assets at $758.6 billion[19]— less than a tenth of our valuation.[20] Figure 4 (b) also compares our valuation with the SCF. Noting again that this is not quite an apples to apples comparison, as the SCF may concern real estate and debt, the total value of partnerships was $11.3 trillion in 2018, similar in magnitude to our methodology using transaction data.[21]

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 active businesses for sole proprietorships and partners, plus the value of nonactive partnerships,[22] plus the value of tenant occupied residential and nonresidential real estate, plus the value of farm businesses. To construct our aggregate valuation of

[18] See figure A.10.

[19] The FA values partnership assets using BEA data on the replacement value of the capital stock. This total includes equipment and intellectual property products, but excludes structures.

[20] There are several definitional differences in the comparison. First, the method using Dealstats X IRS measures the value of some businesses that are legally corporations but have chosen to be taxed as partnerships. Second, the FA includes the value of farm partnerships, while the Dealstats X IRS does not.

[21] For completeness, several other small aspects are not quite apples to apples. The SCF and Dealstats X IRS valuation do not include farms partnerships. while the FA does

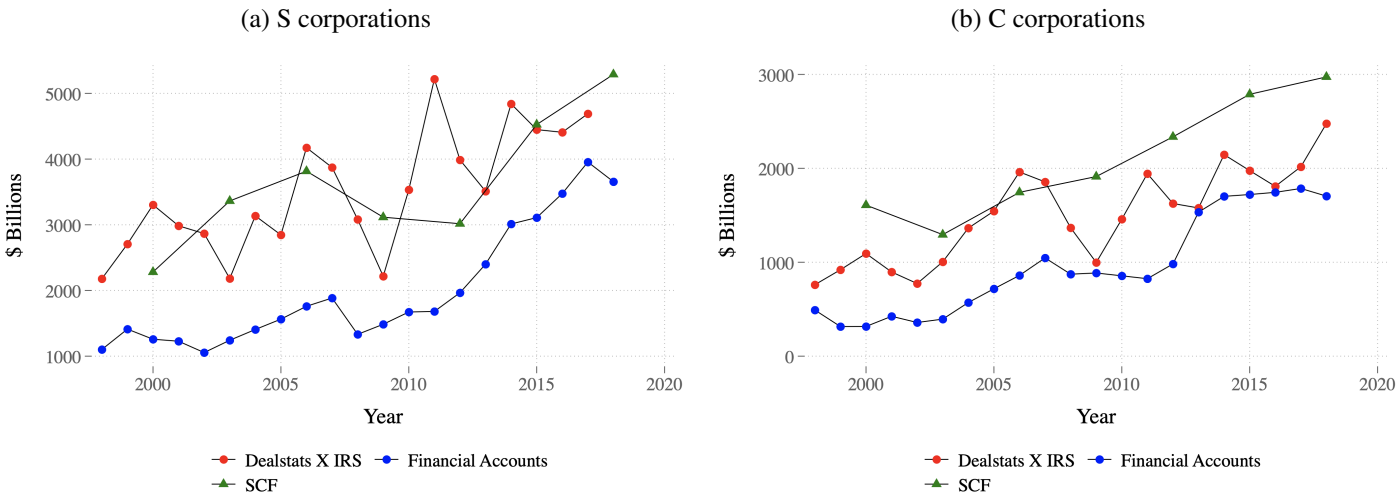
[22] The addition of nonactive businesses is potentially problematic as this may include financial partnerships such as hedge funds and private equity funds which would not be present in the FA.

non-corporate 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 B.104. For comparison purposes, we also plot the aggregate net worth of noncorporate business from the FA, taken directly from table B.104.

Figure A.8 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 \$21.9 trillion using our methodology. We thus see that our valuation of noncorporate business is substantially larger than the FA, but similar in magnitude to the SCF.

5.2 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 preferred estimation for aggregate S corporation wealth. In 2017, the aggregate value of S corporation wealth was \$4.7 trillion, higher than the FA value of \$4.0 trillion, but lower then the SCF value of \$5.3 trillion. Figure 5 (b) presents our valuation estimate of private C corporations. We estimate a total value of \$2.0 trillion, lower than the SCF value of \$3.0 trillion and similar to the FA total of \$1.8 trillion.

As the total value of the nonactive businesses is small relative to the other components, this is not a big driver of the differences between the series.

5.3 Sole proprietorships

Figure 4 (a) shows our primary estimate for the valuation of sole proprietorships. The aggregate value of sole proprietorships was $417.9 billion in 2018. Figure 4 (a) also compares our valuation to that of the FA. Although the methods and data sources are different, the aggregate values are surprisingly similar.[23]

Figure 4 (a) also compares our totals to that of SCF, with the SCF valuation significantly larger than either of the other sources. We note that the SCF comparison is not 'apples to apples' with the other two valuations. The SCF valuation includes the value of real estate owned by the business — this includes nonresidential real estate, but may also include residential real estate.[24] The SCF totals also includes the value of debt. [25] [26]

[23]The FA values assets using the replacement value of the capital stock, taken directly from the BEA.

[24]When the SCF initially asks for the value of real estate (question X1703) it explicitly excludes real estate owned by a business.(Question X1701: "How many properties that are not owned by a business do you (and your family living here) own or have an interest in?") Later when asking for the value of businesses, they exclude the value of only structures that were asked about before.

[25]"X3129: "the value should be net of all loans"

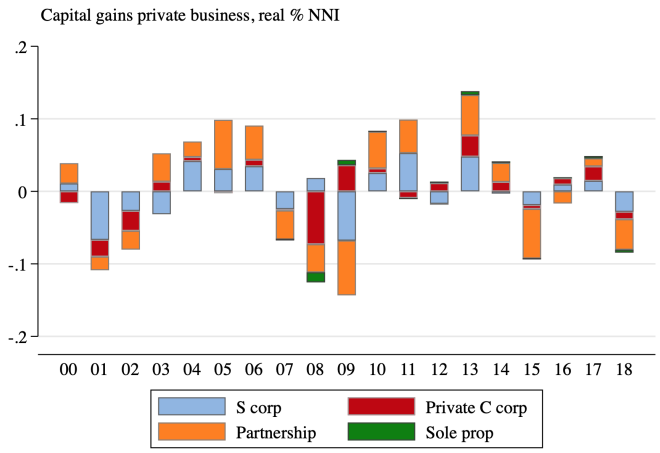
[26]There are at least three points which are imprecise about the question which makes a direct comparison difficult:

(i) Do individuals that own and rent real estate for a living include the value of these businesses, or do they include them in X1703? (ii) Do individuals include in the "value" of the businesses the financial assets held by the business? (iii) Does the market value include inventories?

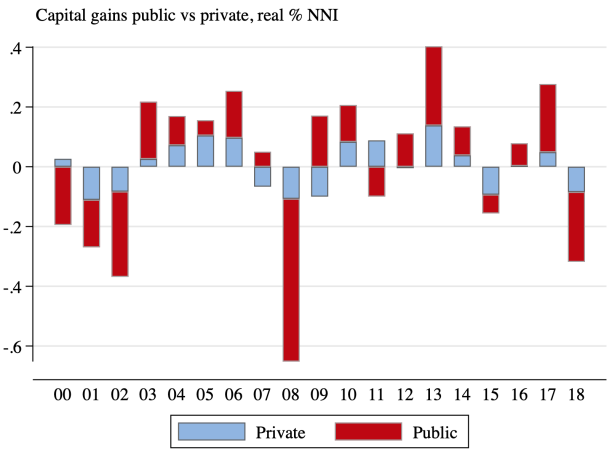
6 Capital gains on private private business wealth

Figure 6: 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 as changes in real valuations minus new equity issuance minus retained earnings. Real capital gains for C corp and sole proprietorship estimated using price indexes from public corporations.

The results of section 5 show a large increase in the value of private businesses. 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 increases in value may be driven by 'sweat equity' (Bhandari and McGrattan (2021)), technological innovation, changes in discount rates, or changes in market power.

For partnerships and S corporations, we estimate capital gains as the change in total value minus capital injections from additional paid in capital and/or retained earnings.[27] For private C corporations and sole proprietorships, there is no comparable data for basis changes, and thus we estimate nominal and real capital gains using prices indexes from public corporations, specifically the S&P 500.[28]

[27] Data from IRS SOI. For S corporations, the IRS SOI has data on aggregate paid in capital and retained earnings. For partnerships, the IRS SOI provides data on aggregate changes partner capital accounts. We estimate real capital gains as the change in real values, adjusted using the net national product deflator, minus capital injections.

[28] Data is from Robert Shiller. Capital gains are estimated as changes in the price index after netting out price changes due to retained earnings. Let 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 $\frac{P_t}{P_{t-1}} \frac{1}{(1+RE_t/P_{t-1})}$.

Figure 6 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 example, for 1998 to 2017, we find the aggregate value of S corporations increased from $2.18 trillion to $4.69 trillion— in real terms, from $3.28 trillion to $4.80 trillion in 2017 dollars. Over that same time period, capital injections into S corporations from additional paid in capital and retained earnings totaled $0.96 trillion nominal and $1.14 trillion real. Total nominal capital gains over the time period were thus $1.55 trillion, with real capital gains totaling $0.22 trillion.

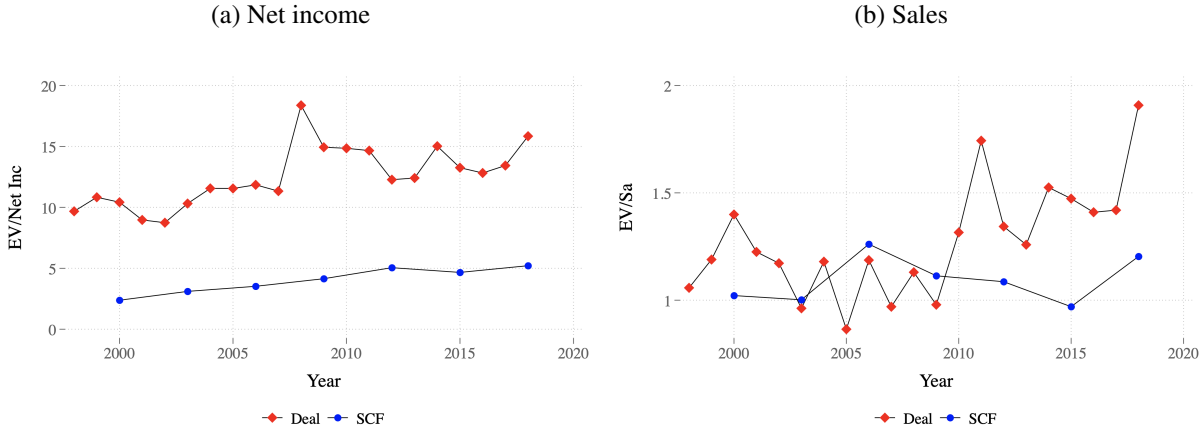
For partnerships, a similar calculation gives a total of $5.90 trillion in nominal capital gains and $3.84 trillion in real gains. For private C corporations, total aggregate nominal capital gains were $1.47 trillion, with $0.86 trillion of real capital gains. For sole proprietorships, nominal capital gains totaled $0.27 trillion, with $0.19 trillion of real capital gains.

Across all private business types, there were thus $9.19 trillion in nominal and $5.11 trillion in real capital gains.

7 Comparison with SCF valuations

The results of section 5 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 7: Comparison of partnership valuation ratios, Dealstats vs SCF



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

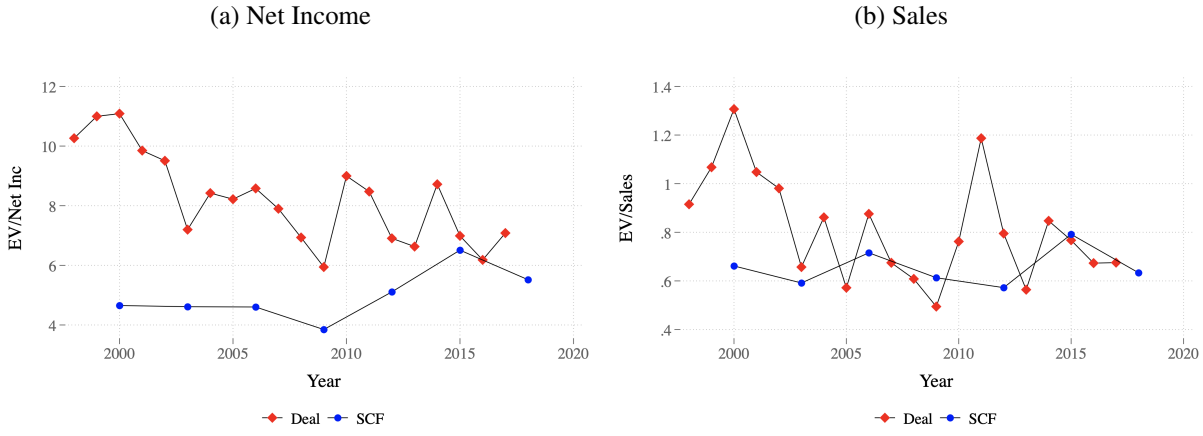
Figure 7 compares aggregate valuation ratios for partnerships,[29] and shows

[29] See section A.3 for details on the construction of the SCF valuation ratios.

that transaction based valuation ratios for net income are much higher than self reported SCF ones.[30] In 2018, the aggregate MV/(Net income) was 15.8 in Dealstats compared with 5.2 in the SCF. Sales valuations are closer between the two: the MV/Sales was 1.9 compared with 1.2 in the SCF. Figure A.11 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, Moore and Volz (2021) notes that the SCF concept of 'net income' may include sources other than 'ordinary business income' that we are including in the IRS measure, such as rent and interest.

Figure 8 compares valuation ratios for S corporations. These ratios, similar to partnerships, again show higher multiples for the transaction data than the self reported SCF. In 2018, the aggregate MV/Net income was 8.7 , compared with 5.5 in the SCF. The MV/Sales ratio was 0.9 compared to 0.6 in the SCF. Figure A.13 compares aggregate sales and profits between the two and again shows a much closer correspondence of sales than net income; the average ratio of SCF sales to IRS sales is .93, while the average ratio of SCF net income to IRS net income is 2.03. Figure 9 compares private C corporation valuation ratios across the two sources. Dealstats valuation ratios are significantly higher than the SCF for both MV/Net income and MV/Sales.

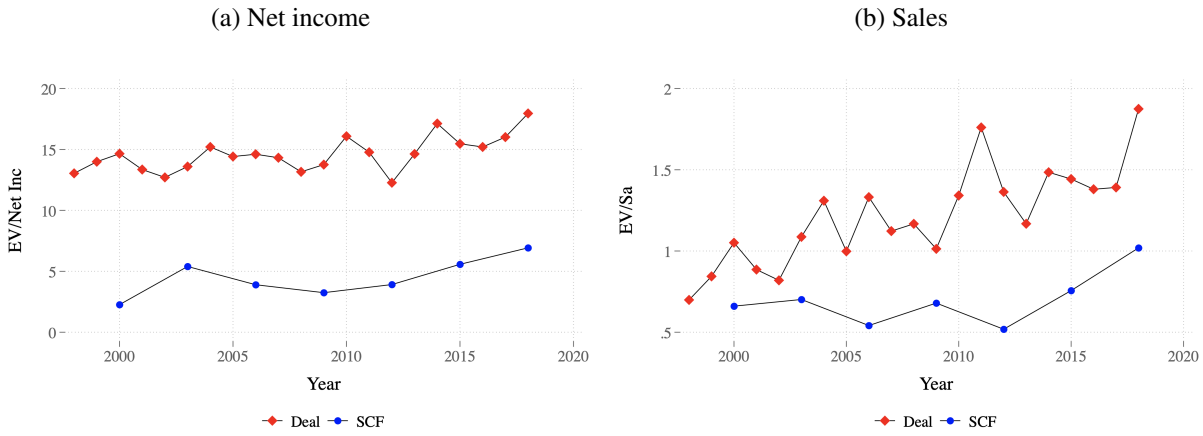
Figure 8: Comparison of S corporation valuation ratios, Dealstats vs SCF



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

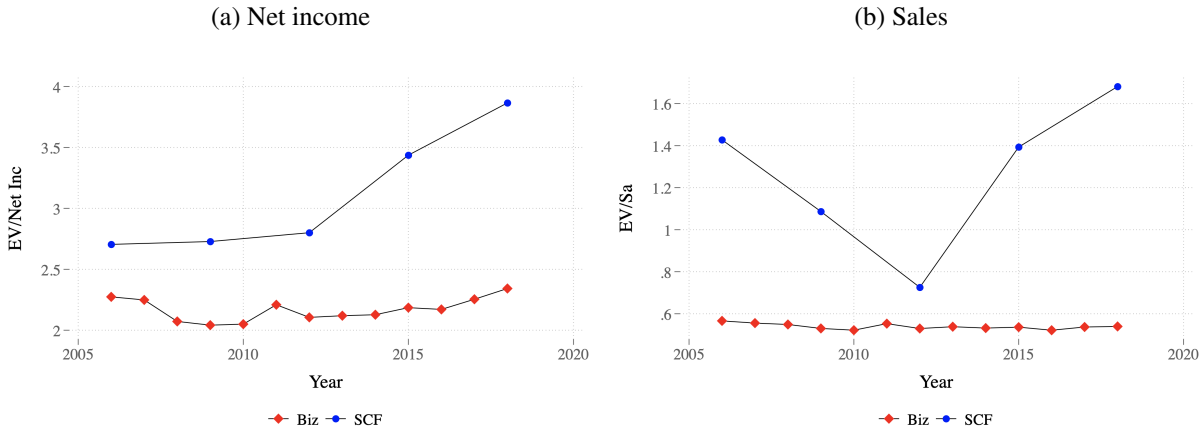
[30] Note that in this section we compare net income multiples rather than EBITDA for an apples to apples comparison between the sources.

Figure 9: Comparison of C corporation valuation ratios, Bizcomps vs SCF



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

Figure 10: Comparison of sole proprietorship valuation ratios, Bizcomps vs SCF



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

Figure 10 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 2.3 in Bizcomps. The aggregate MV/Sales in in the SCF was 1.7 in 2018, compared with an EV/SA of 0.5 in Bizcomps.[31] Overall, there is thus

[31] We 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

strong evidence that SCF owners have higher self-assessed valuations for their sole proprietorships than in the transaction data.

8 Discussion and conclusion

Combining all legal forms of organization, we estimate an aggregate enterprise value of private business wealth[32] of $15.5 trillion in 2017. This is sizable in comparison to both public equity wealth and aggregate net worth. In 2017, individuals in the US held $27.2 trillion in public equity wealth across directly held stocks, mutual funds, and pension funds; excluding equity wealth in pension funds, this would be $22.9 trillion.[33]

Our estimated valuations using private transaction data are substantially larger than the FA value of $6.0 trillion. The largest difference between the estimations is for partnerships and S corporations. For partnerships, the FA uses the replacement value of capital from the BEA, which greatly understates its importance compared with market values. For S corporations, the FA uses valuation ratios of market value to book value of public corporations, which produces relatively low values. There are also substantial differences for private C corporations. For these companies, the FA uses data from the Forbes largest private company list, which only includes a total of 500 companies, a small fraction of the over 1.5 million private C corporations in 2017.

These 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 2017, the top 10% held 83.9% of private business wealth, the top 1% 61.5%. Adjusting for our value of private business wealth would increase the top 10% share of wealth from 69.6% to 71.9%. For the top 1%, the wealth share would increase from 34.9% to 38.9%. The top .1% wealth share would increase from 18.2% to 21.2%.

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 $142.8 billion, or $1564.2 billion over 10 years.[34] Of this total, $75.3 billion ($824.7 billion over 10 years) would come from private business wealth, which would have to be valued by tax authorities.

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.

[32] Not including real estate wealth.

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

[34] Estimates from the Distributional Accounts, with updated private business wealth estimates.

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 companies 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 construction 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,[35] or through realizations at death, as proposed by the Biden administration. We estimate that over our sample there was a total of $9.19 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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[35] We 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 details

A.1 BIZCOMPS

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.[36] To create an apples-to-apples comparison between business 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, such that a SDE in the data goes to a single owner.

A.2 Dealstats

Dealstats contains transactions of 29,786 public and private companies from 1990 through 2020. Similar to Bizcomps, deal information is reported by brokers, who receive as compensation free access to the transaction database. A

[36] For example, transactions may or may not include inventory, real estate, or short term assets.

[37] According 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."

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

[39] BVR: "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."

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

second source of information is publicly available information from when public companies purchase private companies.[41]

Similar to Bizcomps, transactions and financial information are standardized so as to be comparable. There is also more detailed information on the corporations, including owner's compensation, EBITDA, and more balance sheet information.

A.3 Survey of Consumer Finance

The Survey of Consumer Finance asks respondents for detailed financial data up to two[42] of their closest controlled businesses: sales, profits, and their subjective valuation of what the business would sell for. Table A.1 presents summary statistics. The key variables from the SCF are:

- X3132: net income: "What was the business's total pre-tax net income in 2018?"[43]
- 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?"

To construct aggregate multiples, we take the sum of net income (or sales) of the businesses, multiplied by the ownership shares, divided by the aggregate firm values.

One concern with using the SCF to study breakdowns of private business wealth by legal form of organization is the relative small sample size. For example, in 2018 there were only 86 unique private C corporations. Coverage of other business types is somewhat better: there were 359 S corporations, 1,020 partnerships, and 391 sole proprietorships.

A.4 Financial Accounts

The Financial Accounts of the Federal Reserve compiles valuations of private businesses by legal form of organization.

For S corporations,[44], the Financial Accounts uses the following procedure to estimate valuations. Data on the networth of S-Corporations by two digit industry is taken from the IRS Statistics of Income (SOI), where networth is defined as assets minus liabilities. From Compustat, networth valuation ratios are constructed by industry, with the valuation ratio equal to the the following ratio:

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

[42] For 2007 and below, the SCF collected data on three businesses.

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

[44] Series LM883164133.

Table A.1: Survey of Consumer Finance summary statistics, $ millions

	(1) SP all	(2) SP 2018	(3) Part	(4) Part 2018	(5) S corp	(6) S corp 2018	(7) C corp	(8) 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: Data from the Federal Reserve Board.

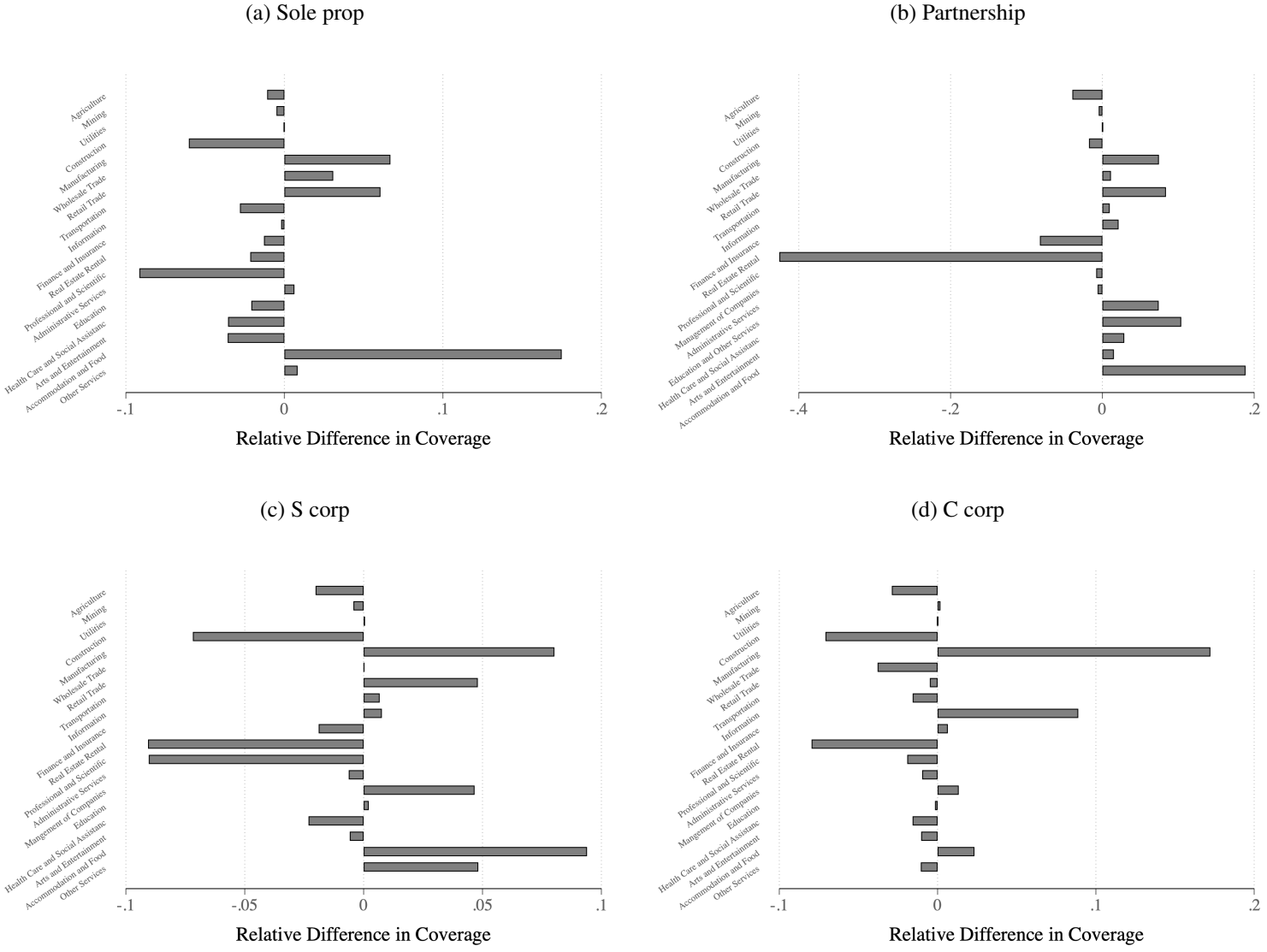
in the numerator, the total market value of public corporations for the industry, and the denominator, the total value of networth for the industry, where networth equals assets minus liabilities. The Compustat data excludes international firms and subsidiaries as well as repeats in the data, and outliers are kept. The total market value of S-corporations is adjusted downward by 25 percent to reflect the lack of liquidity of closely held shares.

For private C corporations,[45] the market value of C-corporations is estimated by multiplying the revenue data of companies that appear on Forbes' annual list of America's Largest Private Companies by the ratio of total market value to total revenue of public companies from Compustat with similar industry, employment, and revenue profiles. The total market value of C-corporations is adjusted downward by 25 percent to reflect the lack of liquidity of closely held shares.

Sole proprietorship and partnership valuations are combined together in a single table, B.104 Nonfinancial Noncorporate Business. The largest asset/liability on this balance sheet is tenant occupied real estate / real estate mortgages, which are at market value. Other nonfinancial assets are at book value, with equipment, intellectual property products, and inventories taken directly from the BEA. Financial assets for partnerships are taken from IRS SOI tax returns, while sole proprietorship assets are estimated using the 2003 FRB Survey of Small Business Finance.

[45] Series LM883164135.

Figure A.1: Industry composition, BVR vs IRS



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

A.5 Construction of valuation ratios by cell

The IRS provides aggregate tax return data by legal form of organization, 2 digit NAICS code, and 10 bins for the size of the firm by the value of business receipts. The cells are as follows: (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. While ideally we would have enough data to construct weighted average valuation ra-

tios β_{ct}^{wavg} for each of the cells, due to limitations in the number of observations there would not be enough transactions in each cell. Instead, we estimate valuation ratios through estimating equation 1 on the Dealstats data through OLS. We interact the dummies for legal form, size group, and industry with four time period dummies, to allow the coefficients to vary across time. The four time periods are (i) 1998-2002 (ii) 2003-2007 (iii) 2008-2012 (iv) 2013-2019. For each cell, we then calculate predicted $\widehat{\beta}_{ct}$ to use as our primary multiples.

A.6 Sole proprietorship carve outs

A problem of estimating sole proprietorship wealth from tax return data is that many tax returns from 'sole proprietorships' do not represent marketable businesses: they may also be independent contractors, freelancers, gig economy workers, or other self-employed individuals.[46] In order to properly value sole proprietorships that are marketable businesses, we need to carve out these workers from the tax data. As seen in figure A.2, most marketable businesses in the transaction data have sales that at least $50,000, while most IRS tax returns have business receipts significantly less.

In order to better distinguish between marketable businesses and independent contractors / freelancers, we make two modifications to the IRS data. First, we subtract from the IRS totals those who filed Schedule C-EZ, a simplified tax return used by independent contractors.[47] In recent years, Schedule-C EZ filers were 20% of filings, but only 2% of sales.

Second, we use additional data from the Economic Census, County Business Patterns, and Nonemployers Statistics to estimate the percentage of Schedule C sales and profits that are likely due to freelancers / nonmarketable businesses. The Economic Census provides total revenue of sole proprietorships by industry in the US for firms with *at least one employee*, which are guaranteed to be businesses. We then take the ratio of revenue for businesses to total revenue in the industry, and then apply the ratio in our valuations: $Valuation =$ IRS SDE $*$ Carve out $*$ MV / SDE. Figure A.7 shows carve out ratios over time, which averages around .5 for the sample.

[46] See, for example, Bhandari et al. (2020) and Abraham et al. (2017).

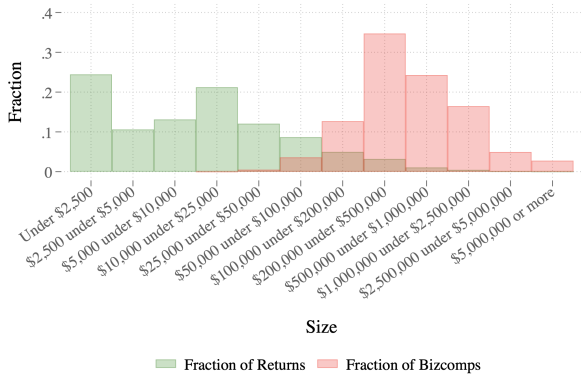
[47] Schedule C-EZ can be used by individuals that: (i) earned a profit (ii) have expenses are not greater than $5,000 (iii) have no employees, (iv) have no inventory, (v) are not using depreciation or deducting the cost of their home.

B Tables

C Appendix figures

Figure A.2: Distribution of firm size, BVR vs IRS

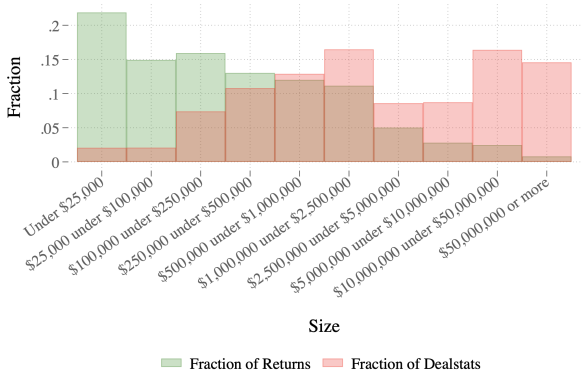
(a) Sole prop



(b) Partnership

(c) S corp

(d) C corp



Notes: Data from BVR and IRS SOI.

Table A.2: IRS SOI Summary Statistics

	Mean per Return	Mean 2017	% of GDP	% of GDP 2017
		Sole Proprietorships		
Sales	70,016.7	73,221.4	8.2	7.8
Profits	15,503.2	16,555.6	1.8	1.8
EBITDA	19,046.5	20,032.5	2.2	2.1
Interest Expenses	574.0	462.5	0.1	0.0
Taxes Paid	972.6	1,002.6	0.1	0.1
Depreciation	1,996.7	2,011.7	0.2	0.2
Average Num of Returns:		19292854		
		Partnerships		
Sales	1,319,377.6	1,397,987.8	27.6	27.9
Profits	91,084.7	91,911.5	1.9	1.8
EBITDA	203,406.4	221,742.2	4.3	4.4
Interest Expenses	31,271.5	28,424.7	0.7	0.6
Taxes Paid	21,270.4	24,450.5	0.4	0.5
Depreciation	42,946.0	58,031.5	0.9	1.2
Average Num of Returns:		3394666		
		S-Corporations		
Sales	1,414,270.3	1,679,930.9	38.2	40.6
Profits	71,162.8	101,969.2	1.9	2.5
EBITDA	108,510.6	141,250.9	2.9	3.4
Interest Expenses	12,797.7	10,251.4	0.4	0.2
Taxes Paid	28,903.0	34,453.5	0.8	0.8
Depreciation	22,421.3	26,463.7	0.6	0.6
Average Num of Returns:		3790053		
		C-Corporations		
Sales	9,601,200.6	13,465,835.0	115.5	108.7
Profits	392,894.2	332,615.9	4.5	2.7
EBITDA	1,319,092.2	1,535,681.5	15.8	12.4
Interest Expenses	502,851.1	527,950.2	6.3	4.3
Taxes Paid	203,200.5	271,393.8	2.5	2.2
Depreciation	337,725.8	527,822.5	3.9	4.3
Average Num of Returns:		1751110		

Notes: Data from the IRS Statistics of Income.

Table A.3: Dealstats and Bizcomps, valuation multiple regression coefficients

	(1)	(2)	(3)	(4)
	Deal EB	Deal SA	Biz SDE	Biz Sa
Size dec 1	-1.435***	-0.0986***	-0.0472	0.0109
	[0.366]	[0.0199]	[0.115]	[0.0151]
Size dec 2	-1.270***	-0.0530**	-0.200***	-0.0135
	[0.258]	[0.0208]	[0.0742]	[0.0118]
Size dec 3	-0.975***	-0.0354*	-0.147*	-0.00882
	[0.214]	[0.0193]	[0.0829]	[0.0145]
Size dec 4	-0.791***	-0.0116	-0.0990	-0.00762
	[0.230]	[0.0227]	[0.0774]	[0.0118]
Size dec 5	0	0	0	0
	[.]	[.]	[.]	[.]
Size dec 6	0.273	0.0452**	0.0221	-0.0200**
	[0.208]	[0.0204]	[0.0976]	[0.00969]
Size dec 7	0.186	0.0569**	0.0835	0.0136
	[0.252]	[0.0279]	[0.0696]	[0.0110]
Size dec 8	0.800**	0.0796***	0.159**	0.0174
	[0.310]	[0.0244]	[0.0792]	[0.0112]
Size dec 9	0.939***	0.223***	0.369***	0.0254*
	[0.279]	[0.0430]	[0.105]	[0.0144]
Size dec 10	2.132***	0.669***	0.758***	0.111***
	[0.365]	[0.0750]	[0.136]	[0.0155]
Part	-1.806***	0.0420*		
	[0.231]	[0.0244]		
S corp	-1.484***	-0.00822		
	[0.270]	[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 2, 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.4: 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.5: 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 1. 'Fed method' is the Federal Reserve's methodology, using book value multiples from Compustat.

Table A.6: Mean percent prediction errors by statistic, sales

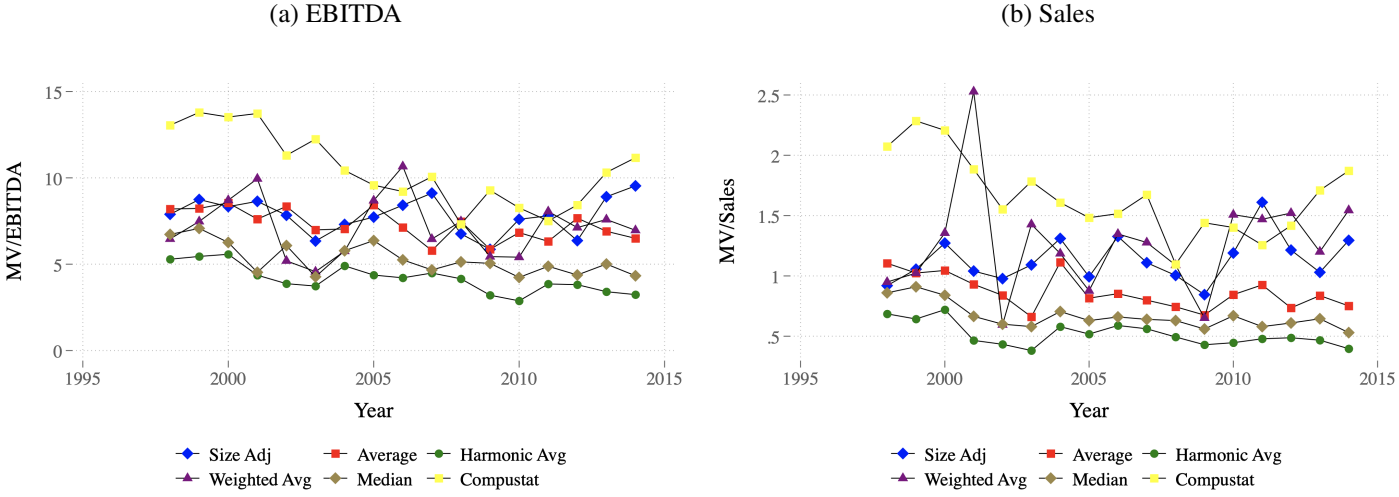
(1)

	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 1. 'Fed method' is the Federal Reserve's methodology, using book value multiples from Compustat.

C.1 Comparing valuation ratios

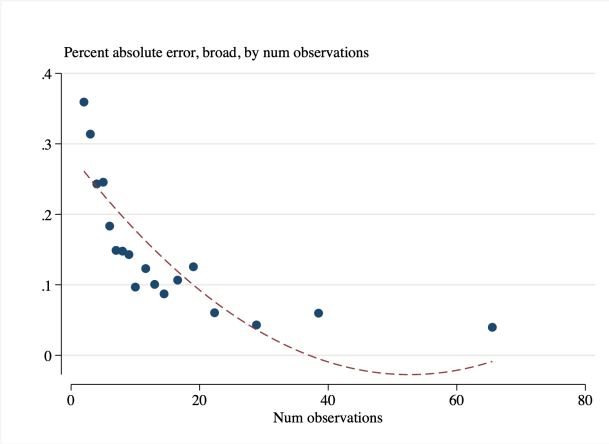
Figure A.3: Valuation ratios by statistic, manufacturing S corporations



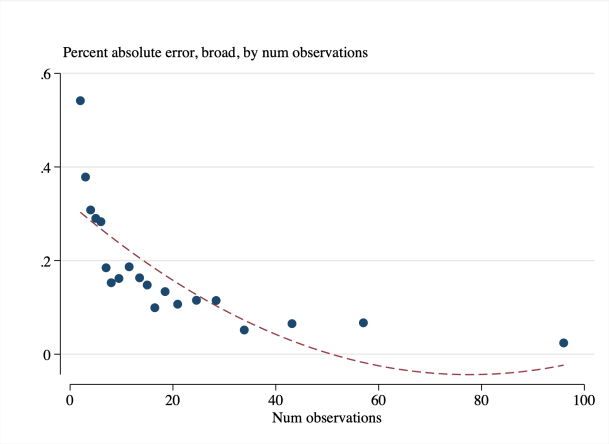
Notes: Data from BVR.

Figure A.4: Percent absolute errors by number of industry-legal-year observations

(a) EBITDA



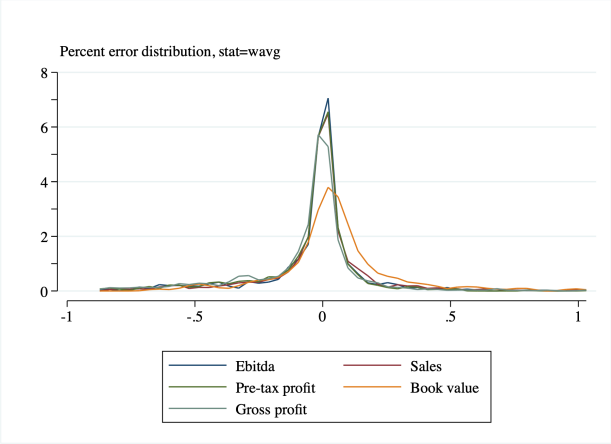
(b) Sales



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

Figure A.5: Percent errors by scaling variable, weighted average

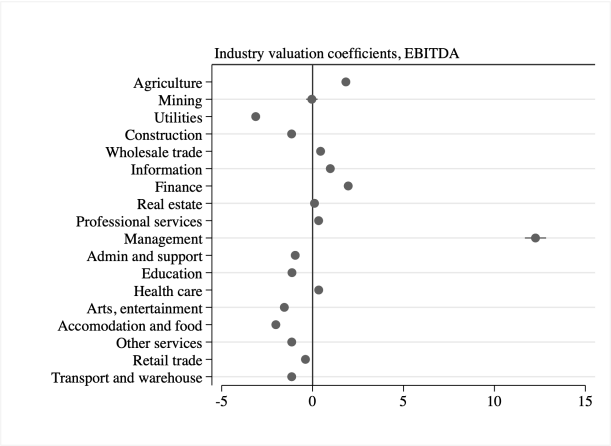
(a) Weighted average



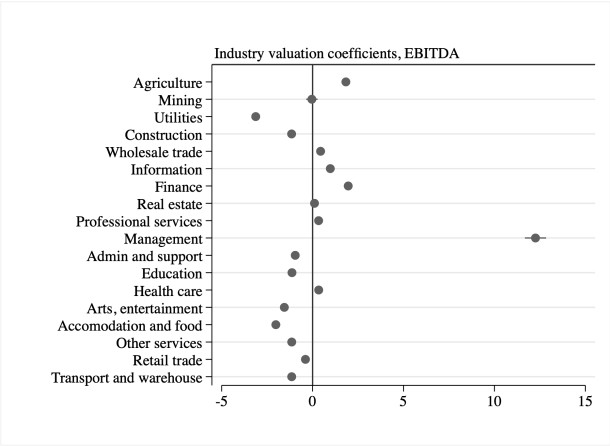
Notes: Data from BVR. Errors are aggregated percent errors between actual and predicted valuations at the industry-year-legal form level.

Figure A.6: Industry regression coefficients, valuation ratios

(a) Ebitda



(b) Sales



Notes: Data from BVR. Industry-fixed effects from estimating equation 2.

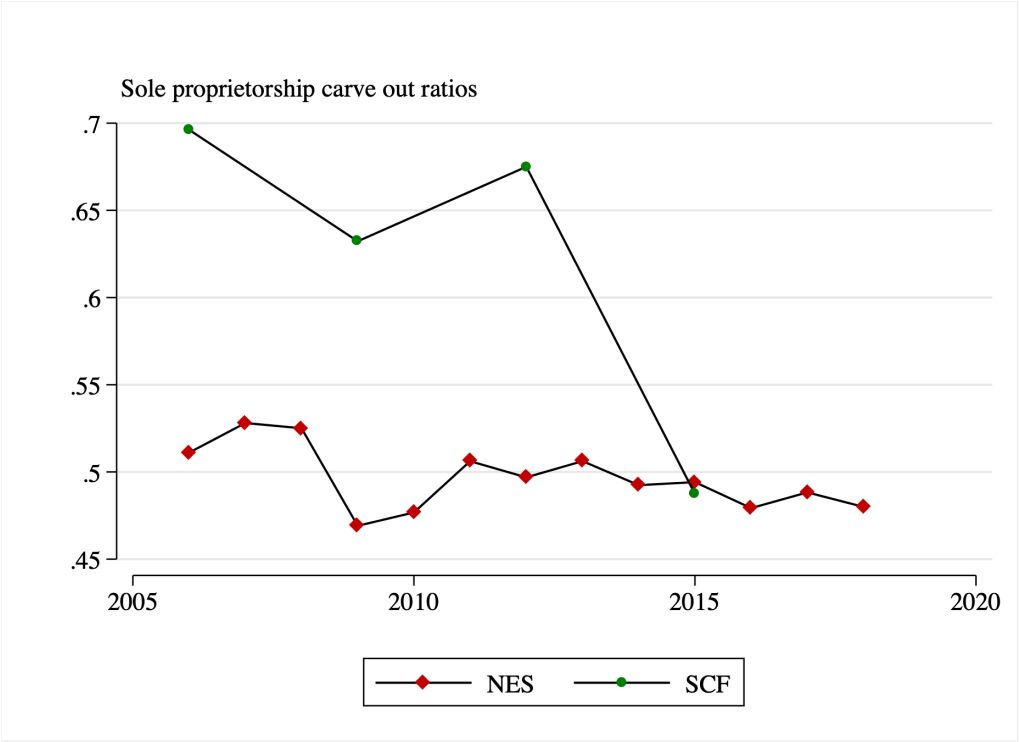


Figure A.7: Sole proprietorship carve out ratios: the proportion of aggregate sales/EBITDA that are attributable to marketable businesses. Data from Economic Census, County Business Patterns, and Nonemployers Statistics of the US Census Bureau. See section A.6.

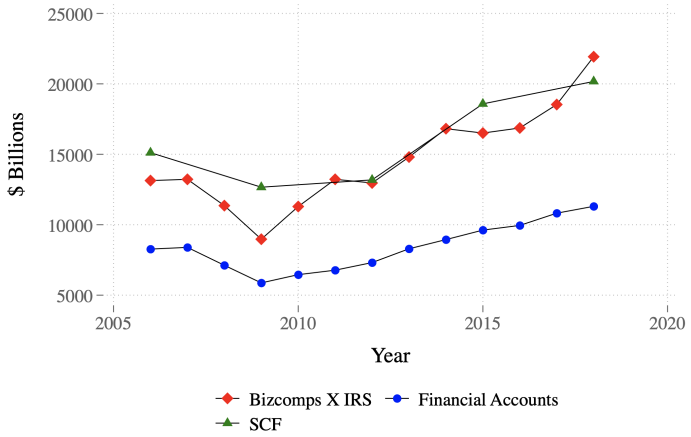


Figure A.8: Comparison of noncorporate business wealth. Our estimates (Bizcomps X IRS) compared with the Survey of Consumer Finances (SCF) compared with the Financial Accounts

C.2 Sole proprietorships

Figure A.9: Comparison of Sole Proprietorship Valuations using Sales/SDE multiples. Data from BVR.

C.3 Partnerships

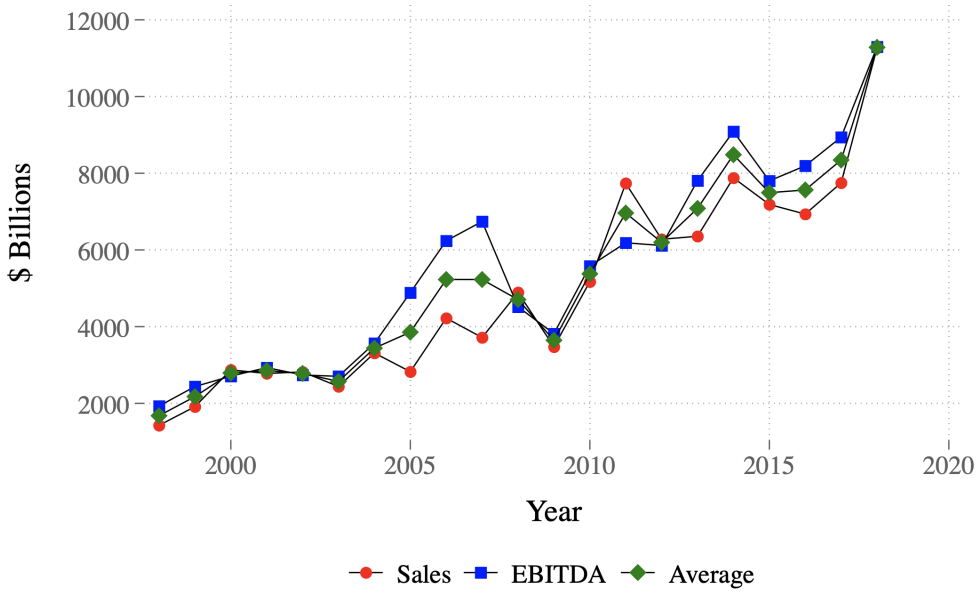
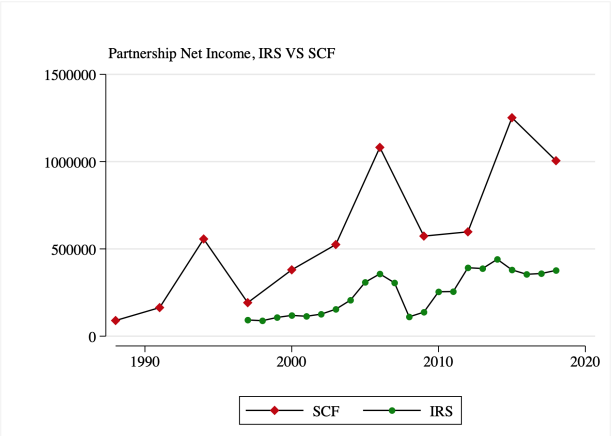


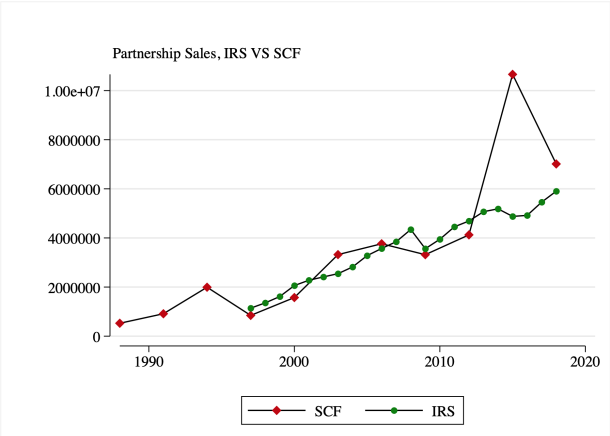
Figure A.10: Comparison of Partnership Valuations using Sales/EBITDA multiples. Data from BVR.

Figure A.11: Comparison of aggregate net income, partnerships, SCF vs IRS

(a) Net income



(b) Sales



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

C.4 S corps

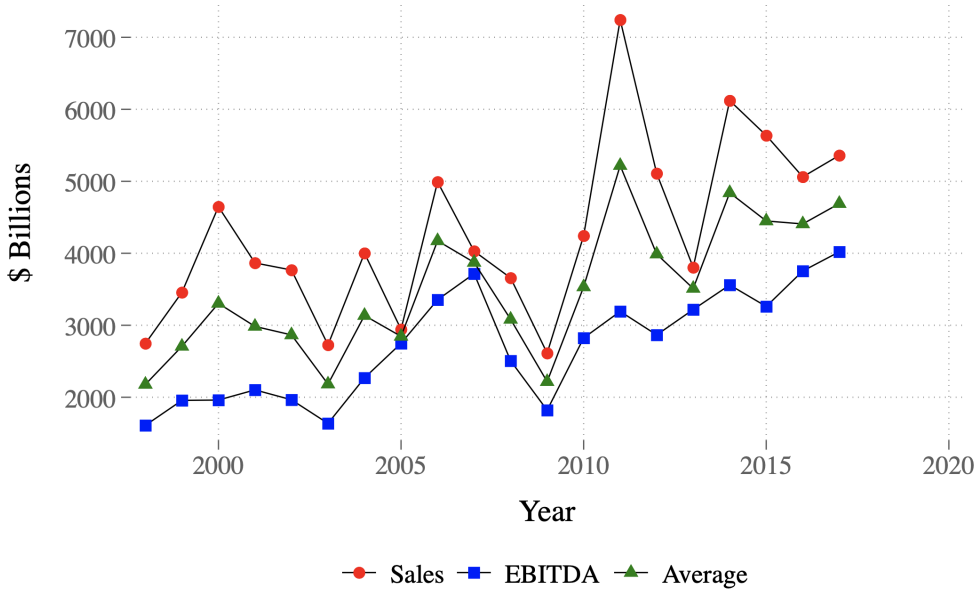
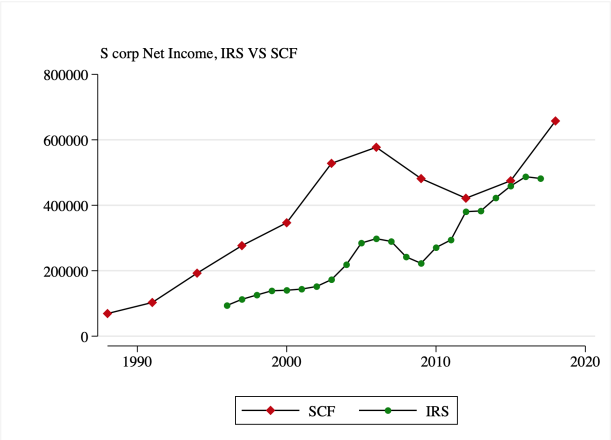


Figure A.12: Comparison of S corp Valuations using Sales/EBITDA multiples.

Figure A.13: Comparison of aggregate net income, S corps, SCF vs IRS

(a) Net income



(b) Sales

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

C.5 C corps

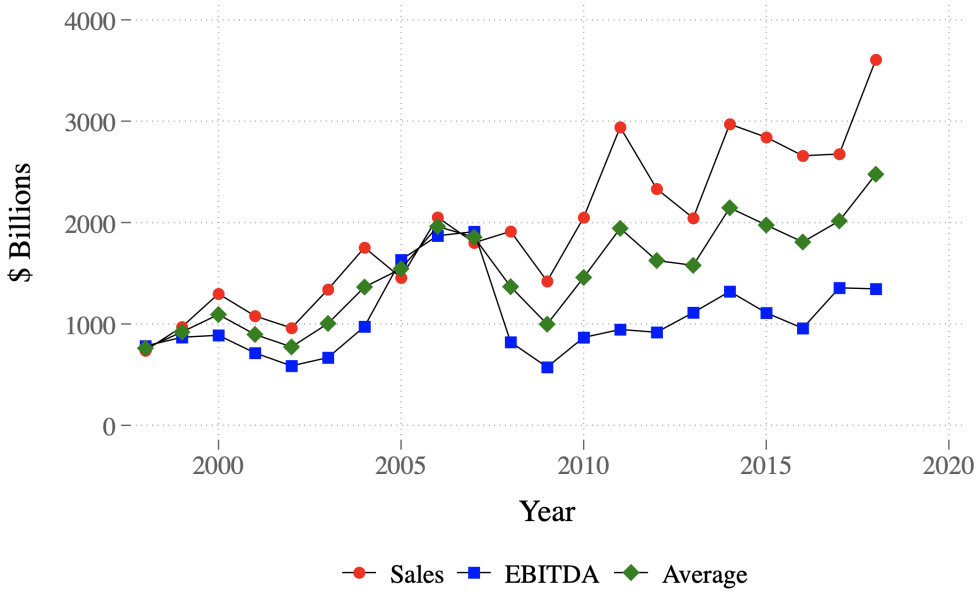


Figure A.14: Comparison of C corp Valuations using Sales/EBITDA multiples. Data from BVR.