Federal Reserve Bank of Minneapolis
Research Department Staff Report 612

August 2020

Online Appendix: Sweat Equity in U.S. Private Business*

Anmol Bhandari
University of Minnesota

Ellen R. McGrattan
University of Minnesota
and Federal Reserve Bank of Minneapolis

*The main text is published as Federal Reserve Bank of Minneapolis, Staff Report 560. Bhandari acknowledges support from the Heller-Hurwicz Economic Institute, and McGrattan acknowledges support from the NSF (Award #1657891). Replication codes and data are available at www.econ.umn.edu/∼erm/data/sr560. The views expressed herein are those of the authors and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System. The views expressed herein are those of the authors and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.

Table of Contents

1. Introduction

In this appendix, we provide details on the underlying data referenced in the main text, and results from additional sensitivity tests of our model.

Codes are available online to load in raw data and construct all statistics reported below. The raw data are also available with two exceptions: data purchased from Pratt's Stats (currently DealStats) and the administrative Census data analyzed by Dyrda and Pugsley (2019).[1] Here, we report results for 2007 in order to have consistency between the microdata sample of business owners available that year and the data from the national accounts and tax authorities. When possible, users can edit the codes to generate statistics for other years. See Readme files for instructions.

In the sensitivity analysis, we describe alternative parameterizations of sweat accumulation and the private business tax schedule. In each case, we recalibrate the remaining model parameters to ensure that U.S. observations and model predictions are aligned. The main take-away is that our main results are hardly changed across these alternative baselines.

2. Data

2.1. Intangible Assets

Our paper is motivated by evidence from brokered business sales showing that a significant fraction of transferred assets are classified as intangible. In this section, we discuss the source of these data and the types of assets sold. We compute intangible intensities by legal form, industry, size, and terms of contracts when sold. We also show how we use the data to discipline parameters in the sweat capital production function and to check the model fit.

2.1.1. Asset categories

The evidence from brokered sales is based on Pratt's Stats (currently DealStats), which collects financial data on acquired companies, many of which are private businesses. Of particular interest is the allocation of the business purchase price less any liabilities into different asset categories. Under Internal Revenue Code section 1060, both the seller and purchaser of a group of assets that makes up a trade or business need to file Form 8594. This is done so that the Internal Revenue

[1] We can provide codes for users with access to the same data.

Service (IRS) knows the purchaser's basis in each acquired asset and the seller's gain or loss on its transfer.[2]

Pratt's Stats provides information on the following asset categories:

- *cash and equivalents*: all cash, marketable securities, and other near-cash items;
- *accounts receivable*: all accounts from trade, net of allowance for doubtful accounts;
- *inventory*: anything constituting inventory for the firm including raw material, work in progress, and finished goods; those items of tangible property which are held for sale in the normal course of business, are in the process of being produced for such purposes, or are to be used in the production of such items;
- *other current assets*: any other current assets, excluding cash and equivalents, account receivables, and inventory;
- *fixed assets*: all property, plant, leasehold improvements and equipment, net of accumulated depreciation or depletion;
- *real estate*: the value placed on any real estate acquired in the sale of the business;
- *customer relationships*: the value attributed to any customer relationships or customer lists;
- *backlog*: any purchase orders or booked sales on orders that have not been fully completed;
- *developed and existing technology*: any developed or completed technology, core technology, or purchased technology; technology that is in the process of being developed is included in in-process R&D;
- *in-process R&D*: intangible assets relating to any uncompleted or in-process research and development;
- *trade names and trademarks*: the value of trademarks or service marks to identify or differentiate goods and services or business trade names;
- *noncompete agreements*: the value placed on an agreement with the selling party not to compete with the purchaser, usually for a certain period of time and usually in a specified geographic area;

[2] The Pratt's Stats sample is nonrepresentative but for future work, it may be possible to obtain information for a representative sample directly from the IRS.

- *other identifiable intangibles*: any other intangible asset that is not listed in the preceding fields;
- *goodwill*: represents the excess of the aggregate purchase price over the fair value of net assets of the acquired business;
- *other non-current assets*: all other non-current assets not already identified elsewhere.

These asset categories can be compared to the seven asset categories listed on IRS Form 8594. Assets in cash and equivalents are included in IRS asset classes I and II. Accounts receivable is in IRS class III. Inventory is in class IV. Fixed assets, real estate, and those assets not elsewhere categorized are in class V. The identifiable intangible asset categories—customer relationships, backlog, developed and existing technology, in-process R&D, trade names and trademarks, non-compete agreements, and other—are included with IRS class VI, which the IRS refers to as *Section 197 intangibles*. Goodwill value is in class VII.

In addition to the purchase price allocation, the Pratt's Stats database also provides information on terms of noncompete agreements and consulting arrangements that are required to be filed along with Form 8594.[3] In Tables A1 and A2, we report on the key restrictions for the selling party that must refrain from competing with the buyer: period of time and the specified geographic area. Along with the summary statistics for terms of the agreements, we include business counts and the sales weight, which is the ratio of sales for each subgroup of businesses relative to all Pratt's Stats businesses that have a valid purchase price allocation. The total sample includes 10,854 businesses and Pratt's Stats reports that 8,730—roughly 80 percent—have noncompete agreements. That ratio rises if we exclude C corporations that tend to be larger businesses. Table A1 shows the period of time specified in the agreements. Across groups, we find them to be long: the typical contract is 5 years regardless of legal form and the averages range from 4 to 5 years. Table A2 reports estimates of the geographic restrictions in cases where the parties agreed on a circular radius in miles.[4] The average radius is around 40 miles for most legal forms, with the typical contract specifying the restriction to be a 20-mile radius.

From Pratt's Stats, we also have information on transitional consulting contracts. In Table A3, we report statistics for the company counts, sales weights, and contract lengths. Roughly half

[3] Although companies in the Pratt's Stats database could allocate part of the purchase price to Section 197 intangibles, we find that many include the contract values with goodwill. For example, 87 percent of the sales involving pass-through businesses included a noncompete agreement, but only 28 percent listed the contract value separately.

[4] For the remaining businesses, the restriction was specified in terms of a county, state, or country.

of the sales of the pass-through businesses list such a contract. From broker notes, we know that the seller's personal services were provided to the buyer as a transitional employee in some cases or as a consultant in others. The services include training the buyer and maintaining customer or client relationships. The average contract length is about 3 months, whereas the median is 2 months. Not surprisingly, contract lengths are shorter for sole proprietorships at an average 2.2 months than for S corporations or partnerships at 3.3 and 3.9 months, respectively. Clearly, the sellers are not just handing off the keys.

2.1.2. Intangible intensities

We use the database over the period 1994–2017 to estimate the ratio of intangible assets to total assets—what we call the *intangible intensity* of the business. In Table A4, we report the mean, median, and standard deviation of this statistic for different subsamples, along with business counts and net sales. For calibrating the model, we use the sample of 6,858 pass-through businesses, excluding limited liability companies (LLCs). For this subsample, we find an average intensity of 58 percent and a median of 64 percent. When computing these statistics, we excluded LLCs because Pratt's Stats does not provide details on the owner's legal status. However, adding LLCs or C corporations does little to change the intangible intensities. As the table shows, the results are also robust to conditioning on the legal form of organization.

We also investigated other cuts of the data. In the lower panel of Table A4, we condition on industry. We find some variation across industries but most are more intangible- than tangible-intensive. In Table A5, we split the sample and recompute the intangible intensity to see if there is any difference between businesses acquired with and without a noncompete agreement. We find little difference. For example, the ratio is 58 percent for pass-throughs sold with a noncompete agreement and 63 percent for those without. In Table A6, we show that the intangible intensities for businesses with a consulting contract are not that different for those without. For example, in the case of pass-through businesses, the average is 57.8 percent for those with a contract and 58.2 percent for those without. In Table A7, we report the intensities for pass-through businesses (including LLCs) and for all businesses after sorting them by total assets. We find that there is a positive correlation between intangible intensities and size, although the lowest bin is still high at 47 percent.

A potential issue with using the intangible intensity based on broker data is that we may encounter selection bias. For example, one might be concerned that our estimates are biased

because owners sell the businesses in distressed times, say, because the owners have health issues or have died. In Table A8, we report the intensities by reason for sale. We use the notes in the Pratt's Stats database and categorize those providing this information into groups: those pursuing other interests or opportunities; those retiring; those relocating; those with health issues; and all others. As the table shows, these data do not show any evidence of bias due to distressed selling, say, because the owners had health issues.

Another concern is that our estimates of intangible intensities may be too high relative to the true intensities in ongoing businesses since we are conditioning on those that were successful and eventually sold. In the paper, we extend our model to include brokered sales to check on the robustness of our calibration and main predictions. Here, we do another sensitivity check by constructing estimates of intangible intensities for ongoing S corporations using data from the SOI, Compustat, and NIPA. This is done in two steps. First, we compute the ratio of tangible assets to business receipts using SOI returns for active S corporations. Second, we multiply the tangible asset-to-receipt ratio by a proxy for the sales-to-market value ratio based on corporate data in Compustat. The idea is to use these ratios in order to estimate the ratio of tangible to total value, which can be subtracted from 1 to get the intangible intensity.

Table A9 shows these ratios for all industries for which we have at least 20 firms in Pratt's Stats. In the first column, we report our estimate of the tangible-to-asset ratio based on SOI data for S corporations filing Form 1120S, which is equal to 32 percent in the aggregate. Here, we use data for 2007 but this choice is not critical because there is little variation in the ratio over time. To compute total tangible assets, we sum the following: (*i*) accounts receivable net of bad debts and net of accounts payable; (*ii*) inventories; (*iii*) other current assets net of current liabilities; (*iv*) fixed assets net of depreciation; (*v*) land; and (*vi*) other assets. Because the IRS fixed assets are at historical cost, we inflate the IRS data using information from NIPA fixed asset tables to convert the historical-cost estimates to a current cost basis. The conversion factor is found by computing the ratio of current-cost gross capital stocks to historical-cost gross capital stocks. The sales estimate is business receipts reported on Form 1120S.

The last two columns of Table A9 are estimates of the ratio of sales to market value based on Compustat. Since we do not have market values for S corporations, we use estimates of sales and market values for C corporations as a proxy. Because S corporation shares are less liquid, we multiply the market value by 75 percent (as is done by the Federal Reserve when valuing S corporate shares). This procedure yields an estimate of roughly 1 for the sales-to-value ratio in the

aggregate. The estimates by industry are shown in column 2 of Table A9. The original ratio—with no liquidity adjustment—is shown in column 3.

Using the ratios in Table A9, we construct intangible intensities for ongoing businesses and report them in Table A10. In the aggregate, we find estimates for ongoing businesses between 67 percent and 75 percent—above the 58 percent for Pratt's Stats businesses that sold. This suggests that using brokered sales does not necessarily bias our estimates upward. We also find larger intensities in most industries, with a few exceptions—namely, construction; transportation and warehousing; and real estate, rental, and leasing—that had lower or negative estimates for the ongoing businesses.

Since ongoing businesses in construction, warehousing, and real estate, rental, and leasing rely on mortgage financing, we investigated netting out these liabilities when estimating the tangible-assets-to-sales ratios for both the SOI and Pratt's Stats data. It turns out that this is quantitatively important for the ongoing businesses in the SOI but not for businesses in Pratt's Stats. Thus, with mortgage liabilities netted, we find the intangible intensity estimates to be much closer.

Another issue with the comparison shown in Table A10 is the fact that we need to use sales-to-value ratios from large Compustat firms in order to compute our estimate for ongoing firms. Fortunately, in some cases, there is additional information that provides a more accurate estimate of the intangible intensity for ongoing businesses. A good example of this is transportation and warehousing. In Pratt's Stats, 32 percent of the businesses in this industry sold FedEx routes and a vehicle. It turns out that this is a highly liquid market with a lot of online listings. A typical price is \$100,000: \$75,000 for the route and \$25,000 for the truck. For these businesses, we would estimate an intangible intensity of 0.75.

Overall, we find little evidence of selection bias—either upward or downward—due to using the Pratt's Stats brokered business sale data.

2.1.3. Assets by age

In addition to the intangible intensities, the Pratt's Stats data is useful for estimating parameters of the sweat capital production function. When calibrating curvature in production of sweat capital, we compare model and data results for a regression of intangible assets (in logs) on age, age-squared, and fixed effects for sector and year. In Table A11, we report this regression for the Pratt's Stats data. Here, we see that the coefficients show a positive relation with age and an

economically small relation with age-squared. We used these statistics to discipline the curvature parameter in the sweat capital production function.

2.1.4. Asset-to-income Ratios

As an external check on the model, we compare its prediction for the ratio of the business sale value to income with that of Pratt's Stats. Specifically, we divide the purchase price allocated to intangible assets in Pratt's Stats by net income in the previous year, group the businesses by legal form and compute the median. The results are shown in Table A12 by legal form of organization.

2.2. Intangible Amortization

To estimate depreciation rates for sweat capital, we use information on intangible amortization rates from a General Accounting Office (GAO 1991) study. The GAO was asked by the Joint Committee on Taxation to gather information about types of deductible intangible assets, for example, the nature of the assets, the industries where used, the asset values, and the useful lives claimed by taxpayers. To do this, the GAO analyzed IRS tax data in open audit cases involving purchased intangible assets. Three units within the IRS—examination, appeals, and litigation—had separate information on such cases. In 70 percent of these analyzed by the GAO, the IRS claimed that the intangible assets did not have a determinable useful life and should be categorized as goodwill that is not amortizable. In the remaining 30 percent, the IRS agreed that the assets had a determinable useful life but sought to adjust the life claimed by the taxpayer. The cases were brought against businesses in nine different industries and covered tax years 1979 through 1987. In this section, we discuss these data and the GAO main findings.

The GAO sample included 2,166 filings and intangible assets in one of 175 different categories. In Table A13, we provide a list of these categories. In Table A14, we report the average taxpayer-claimed useful life for intangible assets in the 1,798 cases that had sufficient detail. The data shown in the table have been aggregated into seven broad asset categories. In the first row, we report information on customer-based intangible assets. This category is the largest with 36 percent of all cases and includes customer lists, mailing lists, and other market-based intangibles. The combined cases show an average claimed life of 8.8 years, with the different units reporting estimates in the range of 8.6 to 9.9 years. The second row is contract-based assets such as noncompete agreements and other intangible assets supported by a specific contract or lease. Taxpayers claimed useful lives of 6.3 years, with little variation across IRS units. Technology-based assets such as computer

software and information systems are reported in the third row and show an average claimed life of 6.4 years. Here, we see that the few in litigation claimed an average of 3 years, but this estimate was well below the average claims in the examination and appeals unit. Assets in the statutorily-defined category, like patents and copyrights, typically have longer lives. In the GAO sample, the average claim for the units combined was 10.6 years, with a range across units of 9.9 to 17 years. The fifth category is assets related to the existing workforce such as training and expertise of the business. The average claimed life for these assets was 6.6 years, with a range of 3.3 to 7 years across IRS units. The last identifiable category is organizational assets such as favorable financing or savings arrangements. Taxpayers claimed an average useful life of 7.5 years with a range of 6.9 to 15.3 across IRS units. The final asset category includes 42 unidentifiable assets with an average useful life of 8.9 years.

Averaging all cases, the GAO reports that taxpayers amortized intangible assets over a period of 8 years, which corresponds to a depreciation rate for non-goodwill assets of 15.9 percent. The taxpayer-claimed life can be thought of as a lower bound since the IRS challenged all of these claims. In Table A15, we show the adjustments in useful life proposed by the IRS in 357 cases. In these cases, the IRS considered the useful lives to be determinable. Consider the largest category of assets: customer-based. At the examination stage, the taxpayer claimed an average useful life of 9.4 years, while the IRS examiners proposed upward adjustments averaging 1.4 years.

2.3. National Accounts

In this section, we show how we remap the U.S. National Income and Product Accounts (NIPA) in order to be consistent with our theory. (See U.S. Department of Commerce, Bureau of Economic Analysis (BEA), *Survey of Current Business*, 1929–2020.) In Table A16, we start with the original data for domestic incomes and products. Gross domestic income was 14,434 billion dollars in 2007. The largest category is compensation, totaling 7,889 billion dollars, which we divide into corporate, noncorporate, and nonbusiness. The corporate sector includes both C and S corporations. The noncorporate sector includes sole proprietorships, partnerships, other private businesses, and government enterprises. The nonbusiness sector includes households, nonprofits, and general government. We report these subcategories of compensation because later we will report C- and S-corporate data separately and recategorize other private business and government enterprises with other nonbusiness entities.

The remaining income subcategories total 6,545 billion dollars and include corporate profits

(for both C and S corporations after inventory and capital consumption adjustments), proprietors' income from sole proprietorships and partnerships, rental income, net interest, profits from government enterprises, consumption of fixed capital, and a category we call *indirect business taxes* (IBT), which is the sum of taxes on production and imports and business current transfer payments less subsidies. On the product side, we report subcategories of GDP, namely, personal consumption expenditures, gross private domestic investment, government consumption and investment, and net exports. Here again, we report subcategories in the table because of our recategorizations described below.

In Tables A17 and A18, we report each step taken to make the accounts consistent with the theory. Consider first the incomes shown in Table A17. For total income, we start with the NIPA GDI of 14,434 billion (taken from Table A16). We make several adjustments. First, we add a very small statistical discrepancy to get to the total GDP of 14,452. Second, we add misreported S-corporate income using information from tax audits. The GAO estimates that 18 percent of income is not reported on Form 1120S. (See U.S. Department of the Treasury, *Statistics of Income*, 1918–2020, and GAO reports 10-195 and 14-454.) Third, because we will include consumer durables with investment, we add durable depreciation from the BEA fixed asset (FA) tables. With consumer durables included as an investment, we also need to include capital services. Here, the total capital services include imputed services for both consumer durables and for government capital, estimated to be 4 percent of the current net capital stocks in the fixed asset tables. Fourth, we have imputed a 12 percent share of GDP for total intellectual property products (IPP) investment and subtracted the share currently included in the accounts, which is now roughly 4 percent share of GDP. BEA estimates only include scientific research and development (R&D), mineral exploration and evaluation, computer software and databases, and entertainment, literary, and artistic originals. Excluded are investments in nonscientific R&D, brand equity, and organization capital that are estimated to be roughly twice as large as the included investments. (See Corrado et al. (2009) and McGrattan and Prescott (2010a, 2010b).) The final adjustment is the removal of sales tax.

We divide total adjusted income into sweat income, employee compensation, business capital income, and nonbusiness income. We start with sweat income, which is the labor income of pass-through businesses. For this, we need the post-audit S-corporate business income with expensed compensation added back. We use reported income and compensation and inflate these values using the GAO estimate of 18 percent of misreported income. In the table, we note that the income is

post-audit to distinguish it from reported income. We add the small statistical discrepancy here and subtract the even smaller category of proprietors' income for other private business because this is primarily income for tax-exempt cooperatives. We include the latter income with that of nonprofits serving households which is discussed later.

Next we subtract capital income from payments for sweat and include it with the business capital income category. The first category removed is the inventory and capital consumption adjustments for proprietors' income. The second category is imputed using data on real estate income, rents paid, and interest paid. These items are reported on IRS tax forms of pass-through businesses. In 2007, real estate income was slightly negative (roughly -12 billion). Interest and rent paid were 259 and 258 billion, respectively. If there are rent payments, then we assume the business does not own the capital being rented. If there are loan payments, then we must make an assumption about the business owners' current equity in the capital being leased. For this we compute the full range of possibilities; that is, at one extreme, the owner might be just starting to lease and has little to no ownership of the capital in use and, at the other extreme, the owner is making the final payment on a loan and has full ownership of the capital. Using the IRS flows and an estimate of the capital stock in use in pass-throughs for 2007 (at 11,311 billion dollars), we estimate the range of capital ownership to be between 21 percent to 76 percent. If we assume a return on capital of 4.2 percent and a depreciation rate of 5.1 percent, we estimate the capital income flow in pass-through businesses to be in the range of 0.2 to 0.7 percent of total adjusted income. This in turn implies that sweat income is in the range of 8.7 to 9.3 percent of total adjusted income. For our baseline, we set this at a midpoint of 9 percent of total income. This implies an adjustment of 74 billion dollars, which is subtracted from sweat income and added to business capital income. (Run the code accounts.m for three alternative methods of estimating the pass-through capital income.)

For the calculation of employee compensation shown in Table A17, we start with total NIPA compensation as in Table A16 and subtract the 224 billion of *reported* S-corporate compensation from the IRS tax forms and the 2,168 billion of compensation for the entities that we categorize as nonbusiness, namely, households, nonprofits, other private business, government enterprises, and general government. That leaves 5,496 billion in labor income for workers in business that are not pass-through business owners.

For the calculation of business capital income shown in Table A17, we start NIPA corporate profits with inventory and capital consumption adjustments. We add the proprietors' inventory

and capital consumption adjustment and the imputation for pass-through capital income that was subtracted earlier when computing sweat income. We subtract S-corporate business income *reported* to the IRS that is included by NIPA with corporate profits. Next, we add rental income, net interest and IBT, and in each case, subtract any payments to nonbusiness entities. Part of NIPA IBT is sales tax, which we remove from both income and product. The next adjustment to capital is the imputation for private IPP investment, which is offset by the NIPA estimate. The final adjustments to business capital income are the addition of consumer durable depreciation from the fixed asset tables—which is added to the NIPA total—and the subtraction of nonbusiness depreciation, which we include with nonbusiness incomes. Adding up all of the nonbusiness incomes subtracted elsewhere in Table A17, we compute a total for nonbusiness income of 4,401 billion dollars. The subcategories are shown at the end of the table.

Table A18 shows the revisions to the product side of the accounts. The first set of computations are the same as in Table A17, except that we start with GDP rather than GDI. The product categories are private consumption, public consumption, and investment and are defined as follows. Private consumption is NIPA personal consumption expenditure (PCE) on services and nondurables plus adjustments for for recategorizing durables as investment and for underreporting of S-corporate income. Public consumption is NIPA government consumption as shown in Table A16. Investment is NIPA gross private domestic investment plus durable PCE less sales tax plus the additional imputed IPP investment, and government investment. Sales tax is assessed pro-rata to services, nondurables, and durables. We also include net exports which we later include with nonbusiness income since we are modeling domestic production of U.S. businesses.

Next, we impute separate estimates for C- and S-corporate incomes and investments. Using information from IRS filings, we infer shares of employee compensation—wages and salaries plus employee benefits—paid by C and S corporations and recorded on their Forms 1120 and 1120S, respectively. We take the estimate of the share and use it to split NIPA compensation of all corporations. We then add our estimate for compensation paid by S corporations to the NIPA estimate of compensation paid by sole proprietorships and partnerships reported by the BEA. This results in our estimate that 2/3 of employee compensation is paid by C corporations and 1/3 by pass-through entities. Similarly, we use IRS asset data from balance sheets on the 1120 and 1120S to infer shares of investment made by C corporations and S corporations, respectively. We use this estimate to split corporate investment from the BEA fixed asset tables into components for C and S corporations. The latter is added to investment data for other pass-through entities. We also use

NIPA fixed asset tables to compute estimates for investment by households and nonprofits, which are added to NIPA estimates of after-tax consumer durable expenditures, government investment, and net exports. Doing this, we find that 46 percent of investment is made by C corporations, 16 percent by pass-through entities, and 38 percent by entities we categorize as nonbusiness.

In Table A19, we summarize results reported in the main text, which is the revised NIPA table found by dividing the main categories in Tables A17 and A18 by total adjusted GDP.

2.4. Fixed Assets

In the main text, we also report estimates for fixed assets of C corporations and pass-through businesses relative to adjusted GDP. The data sources for these estimates are BEA's FA tables for fixed assets and consumer durable stocks, BEA's NIPA tables for inventories, and the Federal Reserve's flow of fund tables for land values that are residually determined from real estate values less values of structures. (See Board of Governors, *Flow of Funds Accounts of the United States*, 1945–2020.) Raw data for 2007 are shown in Table A20. In Tables A21 and A22, we start with the BEA estimate of fixed assets and consumer durables in Table A20, add inventories and land, and then impute a capital stock for the total IPP using our estimate of total IPP investment, a 5 percent estimate for depreciation, and a 2 percent estimate for growth. We follow exactly the same procedure used with investments to decompose total capital into stocks of C corporations, pass-throughs, and nonbusiness entities. The results for the levels are shown in Table A21. The results for the shares are shown in Table A22. Here, we see that the C-corporate share is roughly 2 times adjusted GDP and the pass-through share is roughly 1 times adjusted GDP as reported in the paper.

2.5. Population, Hours, and Employment

In Table A23, we report estimates for population, hours, and employment for different groups. Aggregate data is based on the BLS current population survey (CPS), which reports a noninstitutional population of 16 to 64 year olds that is roughly 197 million. Annual hours per capita for this group is 1,465. If we assume that there are 100 hours of discretionary time per week, then we estimate the fraction of available time at work is 28.2 percent for the total population. We can use data from the U.S. Census to count owners and estimate their annual hours. (See U.S. Department of Commerce, Census Bureau, *Survey of Business Owners* (SBO), 2007.) If we count all owners, we find 36 million who work an average of 1,634 hours per year. They account for 1/5 of all hours,

or 5.7 percent of available time. Most of these hours are provided by owners who report that the business is their primary source of income. There are 18.2 million such owners and they report roughly 2,290 hours per year. Adding this up, they account for 1/7 of all hours, or 4.1 percent of available time. We also use information on hours in nonbusiness entities available from the BEA. The BEA reports information on persons engaged either as paid employees in private industries and government or as self-employed proprietors and partners. Government full-time equivalent employees are 14.6 percent of all persons engaged. If they work the same annual hours per person as a typical employee, we would calculate that they contribute roughly 4.1 percentage points of hours (that is, 0.146×28.2). We do not have separate counts for households and nonprofits but can use information on compensation of those employees, If we assume similar wages per hour, we estimate that they account for 5.9 percent of all persons engaged and contribute 1.7 percentage points of hours (that is, 0.059×28.2.) Adding together government plus household and nonprofits, we find employees in nonbusiness entities contribute 5.8 percent of aggregate available time. The remainder (22.4 percent) is the labor input of business owners and their employees.

2.6. Lifecycle

We use the SBO to estimate the fraction of owners that acquired their share of the business this year, one year ago, two years ago and so on. In Table A24, we report these results for all owners and for those whose primary source of income is the business they own. For acquisitions over two years ago, the SBO uses ranges. In those cases, we take a per-year average when reporting the fraction of owners. In the paper, we report results for all owners but our main findings do not change if we condition only on the subset of owners with business as their primary source of income.

Because we study the lifecycle of a business owner, we also need information on the age of the owners, the age of the business, and the number of years an owner has been running the business in order to calibrate the model. In Table A25, we report this information for five age groups. As a point of reference, we first report the fractions of adults in these groups using the total adult population. The next column shows SBO fractions of business owners, which is more concentrated in the 35 to 64 age range when compared to estimates for all adults. Average ages of the businesses are reported next. We find that the business age increases with owner age, which is not too surprising given that most owners are the founders of their businesses. The final column is

the number of years that the owner has been running the business. This number is not necessarily the same as the business age since not all owners are founders.

2.7. Financing

In the baseline model, we assumed private business faced no financing constraints. We cited evidence from the SBO and the National Federation of Independent Business (NFIB, 2020).

The SBO asks owners if they used any external financing when starting their business, for example, loans from banks, venture capitalists, or the government. Conditioning on owners who report both sources and amounts of startup capital, we find that 14.3 percent used some form of external finance. Of those owners, 4.1 percent borrowed between 0 and $25,000, 4.3 percent borrowed between $25,000 and $100,000, and 5.9 percent borrowed more than $100,000. Most owners requiring capital relied on friends and family or their own savings. For owners that provided information on both the source and amount of startup capital, 88 percent used personal savings or family loans.

What we do not know from the SBO is how many owners are having problems with financing. For this information, we use the NFIB. The NFIB surveys its members monthly to find out, among other things, what is their single most important problem. In Table A26, we produce the findings for the period 1994–2019 using an annual frequency. Since our interest is financing constraints, we list this problem first. The table shows that few owners cite financing as most important. On average, only 3 percent of the NFIB members cited financing and interest rates as most important over the sample period. More often, the owners cite taxes, poor sales, government regulations, competition from big business, labor quality, and availability of insurance.

In Table A27, we report answers to the question: "During the last 3 months was your firm able to satisfy its borrowing needs?" On average, only 5.6 percent said "no." Most said either "yes" or "did not want to borrow." Another noteworthy feature of these data is the trends: the numbers of businesses that do not need borrowing has been growing over time—with no disruption during the downturn of 2008–2009. In 1994, roughly 42 percent did not need to borrow and that fraction grew to over 50 percent by the end of the sample.

2.8. Tax Schedules and Rates

In the main text, we report effective tax schedules for wages and salaries and for pass-through

business income in tax year 2007. The source data for our computations is publicly-available IRS data from the Statistics of Income, the BEA's Table 7.14 relating nonfarm proprietors' income in NIPA to IRS filings, and the U.S. flow of funds tables that provide equity detail of households and financial intermediaries managing pension funds, retirement accounts, and other equity holdings in untaxed accounts.

For the tax schedule of wage income, we estimate the federal marginal tax rate on an additional dollar of wages and salaries for each adjusted gross income (AGI) bracket in the SOI. Since we do not have information on taxable incomes conditional on both adjusted gross income (AGI) and marital status, we use a weighted average of marginal rates by marital status, with weights given by the fraction of returns filed by singles, married filing separately, married filing jointly, and head of household. After the averaging, we have one statutory federal rate per AGI bin. We add taxes under the Federal Insurance Contributions Act (FICA) for each bracket; in 2007, those with the lowest incomes paid 15.3 percent for Social Security and Medicare, while those above the Social Security cap paid 2.9 percent for Medicare. Additionally, we add a 4 percent tax rate for state and local taxes. This yields one marginal rate per SOI AGI bin.

In the model, the income of individuals is defined as per working-age person, while the SOI incomes are reported per return. Thus, we divide the SOI incomes per return by the number of adults per return. The number of adults is proxied by total exemptions less exemptions for children at home. We then normalize the SOI incomes per adult one more time by dividing the estimates by GDP per working age person, where the GDP estimate includes the additional intangible investments discussed earlier. At this point, we have a marginal rate and normalized income brackets per AGI bin. These estimates can be used to construct a piecewise linear function, where we use transfers to set the intercept. The IRS reports data for 20 AGI bins, but we find that the tax function is well approximated by a piecewise function with only seven. In Table A28, we show the income brackets and rates in the first two columns.

To estimate the tax schedule for business income, we follow the same procedure as above, except in this case we need additional information from tax audits to infer estimates of misreported income. To provide some sense of the extent of misreporting, we report the tax audit data reported by the BEA in Table A29. The table shows the misreported income that the BEA adds back to business incomes reported to the IRS before constructing incomes for the national accounts. The first two columns are based on filings of nonfarm proprietorships and partnerships. The reported income is net profit less loss plus payments to partners as reported to the IRS. The misreported

income is the income the BEA adds when constructing estimates of proprietors' income in the national accounts. This is only one of several adjustments made, but it is by far the largest. As the table shows, the misreported income is almost as much as the reported income. The last columns show the reported and misreported incomes for corporations—both Subchapter C and S. In this case the misreporting is not as severe, but the magnitudes are still large when compared to national income.

To compute the federal marginal rate for private business owners in a particular AGI interval, we estimate the tax paid on *reported* business income from all sources—namely, sole proprietorships, partnerships, and S corporations—for an additional dollar of *true* business income. As we discussed earlier, the GAO (2009, 2014) reviewed confidential findings from tax audits of S corporations and estimated that owners report 82 cents per dollar of business net income. Johns and Slemrod (2010), using data from the National Research Program for tax year 2001, report that sole proprietors report 43 cents per dollar of income. To infer partners' misreporting, we use the BEA estimate of total misreporting of unincorporated businesses (in Table 7.14) together with the estimate for sole proprietors from Johns and Slemrod (2010). With this information, we can infer that partners would have reported only 47 percent per dollar of income in the 2007 tax year. Once we have the federal rates, we add FICA and state and local and do the same normalization with SOI incomes as discussed above: put incomes on a per person basis and divide by adjusted GDP per working age person. We then construct a piecewise linear function with the intercept chosen so that transfers for the median household are the same regardless of whether they earned business or wage income. The results are shown in the last two columns of Table A28.

For the federal tax rate on dividends, we compute an average marginal rate using the same procedure as in Barro and Redlick (2011). Specifically, if a household with dividend income d_i pays τ_{di} on an additional dollar of income and earns $d_i / \sum_i d_i$ of the total dividend income, then the average marginal rate is $\tau_d = \sum_i \tau_{di} d_i / \sum_i d_i$. The tax rates τ_{di} are themselves weighted averages of rates on ordinary, qualified, and untaxed dividends, with weights equal to the fraction of dividends in each category. In 2007, owners of taxable accounts also paid roughly 5 percent in state and local taxes on dividend income. Untaxed dividends are held in pension funds and retirement accounts, which account for 44 percent of all equities owned by households. Adding federal, state, and local, we estimate a weighted marginal tax rate τ_d of 13.3 percent.

For taxes on consumption and profits, we use data from NIPA and SOI. The tax rate on consumption, $\tau_c = 0.065$, is found by dividing total sales and excise taxes in NIPA by personal

consumption expenditures. To compute the corporate income tax rate, we construct the marginal rate of an additional dollar. Domestically, firms pay 35 percent at the federal level but can take a 9 percent deduction if they qualify for the domestic production deduction. For state taxes, we use information from national accounts to compute the additional taxes paid to state and local governments. Added together, we estimate a 40 percent rate on domestic profits for 2007. The rate on foreign profits was found by using a weighted average of corporate tax rates compiled by accounting firm KPMG, with weights given by the direct investment shares. We use information for three regions that are most relevant for U.S. firms: Europe, Latin America, and Asia. In 2007, KPMG reports rates of 23 for Europe and 28.3 for both Latin America and Asia. The direct investment shares for these regions are 56, 23, and 21 percent, respectively. Based on these data, our average foreign rate is 25 percent. Foreign profits are 27 percent of profits and thus we estimate an effective rate of 36 percent.

As a check on the corporate rate calculation, we also use C-corporate 10-K filings to compute average tax rates. First, we compute the ratio of total income tax provision (variable *txt* in Compustat) to the total pre-tax income (variable *pi* in Compustat). These data cover operations at all levels domestically—that is, federal, state, and local—and abroad. In Table A30, we report these ratios for 2007, 2016, and take an average for the period 2000–2016. In 2007, the ratio is 36 percent. In 2016, just before the Tax Cuts and Jobs Act, this ratio is 27 percent. The average over the 2000–2016 period is 37.5 percent, with a standard deviation of 18.7 percent. We also report the ratio for 2-digit industries to see how much sectoral variation there is. There are some outliers such as mining and transportation and warehousing on the low side and professional and educational services on the high side, but many sectors have average rates around 36 percent.

If we instead use taxes paid (variable txpd in Compustat) when computing the average tax rate, we find more variability—both across time and sector. The average tax rate over the period 2000–2016 with taxes paid is not much different than the tax provision—in this case, 35 percent—but the standard deviation is 25.8 percent. As before, we find the 2007 rate equal to the average at 35 percent and a lower rate of 23 percent in 2016.

2.9. Legal Form Transitions

In the paper, we assume that working-age individuals have a choice run a private business or work for someone else, but we abstract from legal form switches. These switches occur, for example, if C corporations want to avoid double taxation by choosing pass-through status or if pass-throughs

want to pursue better financing opportunities by choosing C-corporate status. Here, we provide evidence from the Kauffman Firm Survey (KFS) and the U.S. Census Longitudinal Business Data (LBD) that shows few firms switch between pass-through and C-corporate status. The evidence suggests that allowing the choice to switch in the model, if calibrated to these data, would have a small impact on our results.

In Table A31, we report estimates of the probability of switching legal form. Panel A shows results based on the KFS sample and Panel B shows results based on the LBD sample. The KFS is a panel of 4,928 businesses founded in 2004 and tracked through 2011. In each year t of the sample, we identified all businesses that were continuing into the next sample year $t+1$.[5] For this group, we counted all transitions across the following business types: sole proprietorship, partnership, S corporation, C corporation, or LLC.[6] To compute the estimates in Table A31, we weighted the counts using KFS cross-sectional weights in year t times the revenues in year t. In Panel B of Table A31, we report comparable results for the LBD sample of firms studied by Dyrda and Pugsley (2019). This sample covers employer businesses from 1980 to 2011. Dyrda and Pugsley use payroll for weighting the transitions.

Despite the differences in the universe of firms, the results reveal little switching between pass-through businesses (proprietorships, partnerships, and S corporations) and C corporations. In the case of KFS start-ups, the probabilities of switching from a proprietorship, partnership, or S corporation to a C corporation are all less than 1 percent. The probability of a C corporation switching to a non-LLC pass-through is 1.3 percent. In the case of LBD employers, the probabilities of switching from a proprietorship or partnership to a C corporation is less than 1 percent. S corporations are more likely to switch to C status, but the probability is still relatively small at 2.7 percent. If we consider switches of C corporations to pass-throughs, we again see that the main avenue is within the corporate sector. The probabilities of switching from C corporate status to proprietorship or partnership is 0.2 percent. There is some switching to S-corporate status, but it is only 2.3 percent.

Other evidence about legal form transitions is based on studies of tax elasticities. For example, in their empirical analysis of business taxation, Giroud and Rauh (2019) estimate the impact of corporate or personal tax changes on business activity by quantifying the differential responses

[5] There were two types of nonresponses. In some cases, there was no responses of the business in a survey year. These observations were dropped. In come cases, the business was located but no response was provided for the question about the current legal form. Here, we used the legal form from the prior year.

[6] Ideally, we would include LLCs in one of the other categories based on their federal tax filings, but we do not have that information from the KFS.

of C corporations and pass-through entities within the same state. This identification strategy depends crucially on whether businesses change their legal form of organization in response to the tax change. Giroud and Rauh (2019) find that firms respond only to tax changes relevant for their legal form at the time of the change. In other words, if corporate tax rates change, pass-throughs do not respond. If personal tax rates change, C corporations do not respond.

3. Additional Sensitivity Analysis

In this section, we discuss results for alternative baseline parameterizations. First, we do sensitivity analysis related to the accumulation of sweat capital κ:

$$\kappa' = (1 - \delta_\kappa)\,\kappa + \left(h_\kappa^{\vartheta} e^{1-\vartheta}\right)^{\varphi},$$

where investment depends on owner hours h_κ and expenses e. The parameters we vary are the depreciation rate δ_κ and the parameters governing the share ϑ and curvature φ of inputs in sweat investment. In each alternative baseline, we must vary other parameters in order to match key U.S. statistics. Specifically, we vary the deterioration rate upon exit λ and the private business production parameters ϕ and ω:

$$y_p = z\kappa^{\phi} k_p^{\alpha} \left(\omega h_p^{\rho} + (1-\omega)\, n_p^{\rho}\right)^{\frac{\nu}{\rho}},$$

where y_p is the output of private business and the inputs are fixed assets k_p, owner hours h_p, and employee hours n_p. We also vary η in the consumption composite, $c = c_c^{\eta} c_p^{1-\eta}$, where c_c is C-corporate goods and services and c_p is private goods and services. These additional changes are necessary if we want to match the business age profile, the intangible intensity of private business, owner hours in business, and the sweat income share in GDP. Additionally, we investigate the hypothesis that there is greater tax compliance by private business owners by increasing the marginal tax rates on the business net income before running our tax experiments. The parameters that change in the recalibrations are summarized in Table A30 along with the baseline estimates. The main results are summarized in Table A31.

3.1. Increase sweat capital depreciation

In the first experiment, we increase the depreciation rate δ_κ to 15.9 percent. The benchmark value was based on evidence from the GAO (1991) that taxpayers on average claimed useful lives of 8 years for amortizable intangible assets. This estimate excluded goodwill, which was not

amortizable. Our benchmark estimate used information from Pratt's Stats on the fraction of intangible assets that are in the amortizable category and the fraction that is goodwill. In this alternative parameterization shown in Table A32, we assume all sweat capital has a useful life of 8 years. In order to match U.S. statistics, we made several other changes. We increased the sweat capital deterioration rate to 70 percent, increased the share of sweat capital in production ϕ to 20 percent, lowered the share of private business owner hours in production ω to 0.408. and lowered the share of C-corporate goods in consumption η to 43.7 percent.

The main results for higher δ_κ are shown in the second column of Table A33, with the baseline results reported in the first column. The main difference is a higher estimate of the average sweat equity relative to per capita GDP in the alternative baseline. Because we increased the sweat capital share ϕ in production, the share of revenues to owners and employees is lower and, thus, the mutual fund investors reap a larger dividend. On the other hand, the transferable sweat capital values and business returns change little. Results for the tax policy experiment of lowering taxes on private business are also little changed. We find a slightly smaller increase in the sweat capital stock (4.3 percent versus 6 percent in the baseline) and a slightly larger increase in self-employment rate (7.3 percent versus 6.6 percent in the baseline).

3.2. Lower curvature on sweat investment

The second experiment involves changing the curvature parameter φ, which is equal to 1 in the baseline. For the alternative, we chose 0.5. To match U.S. statistics, we lowered ω to 0.390 (from 0.425) and increased η to 0.471 (from 0.449). These changes help us match predictions for owners hours and sweat income in the national accounts. The main results for this alternative parameterization are reported in the third column of Table A32. Here, we find a larger average sweat equity value than in the baseline (1.66 times per capita GDP versus 1.22 in the baseline), in part because there is a lower share of revenues going to owner hours and more to the mutual fund investors. The sale value is slightly lower (0.29 times per capita GDP versus 0.33 in the baseline) because of the decreasing returns to scale, which acts like an adjustment cost on accumulating sweat capital. Gross returns to business are also slightly lower. In response to a lowering of private business taxes, we find some differences in magnitudes but no change in the overall message. The change in private output is 1.7 percent, slightly less than the 2.2 percent prediction in the baseline. The change in sweat capital is 8.4 percent, slightly higher than the 6 percent prediction

in the baseline. The higher effective cost of accumulating sweat capital implies fewer become self-employed and labor inputs change by less following a tax change. But comparing the model with and without sweat would still reveal large differences.

3.3. Lower share of owner time in sweat investment

In the third experiment, we lower the share ϑ on owner hours in the building of sweat capital. As we noted in the main text, we do not have direct information on cost shares by activity within the firm. Therefore, we investigate a large range of values for ϑ.

In column four of Table A32, we divide the baseline value by 2. To ensure consistency between theory and data, we also adjust the rate of deterioration λ, the owner hours share in production ω, and the consumption share η. As in the other experiments, the sweat equity value depends on how revenues are split between mutual fund investors and the owners' labor input. For a low value of ϑ, owner hours are primarily in production and thus the mutual fund investors receive less of the dividend payout. However, even with the value of ϑ equal to half of the baseline value, we find a large sweat equity value for business owners—close to 1 times per capita GDP. The sale value in this case is 0.36 times per capita GDP—roughly 38 percent of the total equity value. The average gross return on business is slightly higher at 7.8 percent.

For the tax experiments, we find little difference in the impacts on output, the self-employment rate, and hours. The main difference is in the response of sweat capital, which is 4 percent for the lower value of ϑ, down from 6 percent in the baseline.

3.4. Higher share of owner time in sweat investment

In the fourth experiment, we double ϑ relative to the baseline value and, again, recalibrate the rate of deterioration λ, the owner hours share in production ω, and the consumption share η.

For a high value, owners devote more time to building sweat capital and create more value for the mutual fund investors. In this case, the sweat equity value is higher at 1.8 times per capita GDP and the transferable assets similar in magnitude at 0.3 times per capita GDP. As we noted above, the response of sweat capital is affected the most when business tax rates are lowered. The estimates in Table A33 give us a sense of the range: varying ϑ between 0.2 and 0.8 implies a response of κ between 4 to 9 percent.

3.5. Lower business tax evasion

Our final robustness check is reported in the last columns of Tables A32 and A33. In this case, we report results for the case with the baseline marginal rates $(T^b)'(y)$ replaced by an average of the marginal rates for owners and workers shown in Table A28—yielding an average marginal tax rate that is roughly 7 percentage points higher than our baseline model. Not surprisingly, the main differences in model predictions are the responses of lowering the private business tax rates T^b on employment and hours. Starting at higher rates, a lowering of the tax on private business income implies larger labor responses and higher tax elasticities than in our baseline, but the differences are quantitatively modest. For example, owner hours rise 17.5 percent when there is greater compliance as compared to 14 percent in the baseline. These results strengthen our main claim that adding sweat capital in the model significantly changes the theoretical predictions of the effects of lowering business tax rates.

Overall, we find that the main take-aways from the paper are robust to changing key parameters of the sweat accumulation technology and recalibrating the model.

References

Barro, Robert J. and Charles J. Redlick. 2011. "Macroeconomic Effects from Government Purchases and Taxes." *The Quarterly Journal of Economics* 126(1): 51–102.

Board of Governors. 1945–2020. *Flow of Funds Accounts of the United States*, Statistical Release Z.1 (Washington, DC: Board of Governors of the Federal Reserve System).

Corrado, Carol, Charles Hulten, and Daniel Sichel. 2009. "Intangible Capital and U.S. Economic Growth." *Review of Income and Wealth* 55(3): 661–685.

Dyrda, Sebastian and Benjamin Pugsley. 2019. "Taxes, Private Equity, and Evolution of Income Inequality in the US." Working paper, University of Toronto.

General Accounting Office. 2009. "Tax Gap: Actions Needed to Address Noncompliance with S Corporation Tax Rules." GAO-10-195.

General Accounting Office. 2014. "Partnerships and S Corporations: IRS Needs to Improve Information to Address Tax Noncompliance." GAO-14-453.

Giroud, Xavier and Joshua Rauh. 2019. "State Taxation and the Reallocation of Business Activity: Evidence from Establishment-Level Data" *Journal of Political Economy* 127(3): 1262–1316.

Johns, Andrew and Joel Slemrod. 2010,. "The Distribution of Income Tax Noncompliance." *National Tax Journal* 63(3): 397–418.

McGrattan, Ellen R. and Edward C. Prescott. 2010a. "Unmeasured Investment and the Puzzling U.S. Boom in the 1990s." *American Economic Journal: Macroeconomics* 2(4): 88–123.

McGrattan, Ellen R. and Edward C. Prescott. 2010b. "Technology Capital and the US Current Account." *American Economic Review* 100(4): 1493–1522.

National Federation of Independent Business, 2020, "Small Business Economic Trends," nfibsbet.org/micro-data.

U.S. Department of Commerce, Census Bureau. 2007. "Public Use Microdata Sample, Data Users Guide," *Survey of Business Owners* (Washington, DC: U.S. Government Printing Office).

U.S. Department of Commerce, Bureau of Economic Analysis. 2007. "Comparison of BEA Estimates of Personal Income and IRS Estimates of Adjusted Gross Income: New Estimates for 2005 and Revised Estimates for 2004." *Survey of Current Business* (Washington, DC: U.S. Government Printing Office).

U.S. Department of Commerce, Bureau of Economic Analysis. 1929–2020. *Survey of Current Business* (Washington, DC: U.S. Government Printing Office).

U.S. Department of Labor, Bureau of Labor Statistics. 1962–2020. *Current Population Survey, March Supplement* (Washington, DC: U.S. Government Printing Office).

U.S. Department of the Treasury, Internal Revenue Service. 1918–2020. *Statistics of Income* (Washington, DC: U.S. Government Printing Office).

Table A1. Noncompete Contract Length for Pratt's Stats Sales, 1994–2017
By Legal Form of Organization

Legal form	Count	Sales Weight	Contract Length (Months) Mean	Median	Std. Dev.
Sole Proprietors	971	0.2	55.1	60.0	31.6
Partnerships	150	0.1	57.5	60.0	53.2
S Corporations	4,817	2.5	53.4	60.0	43.1
LLCs	1,677	1.9	50.2	60.0	46.2
C Corporations	1,115	2.0	54.5	60.0	40.1
Pass-throughs, excluding LLCs	5,938	2.9	53.8	60.0	41.7
Pass-throughs, including LLCs	7,615	4.8	53.0	60.0	42.8
All business forms	8,730	6.8	53.2	60.0	42.4

Note: Terms are reported for the subset of businesses with noncompete agreements that had a specified length of contract in Pratt's Stats. The sales weight is the fraction of net sales (in constant dollars). Results in the table can be replicated by running code Pratts.ipynb.

Table A2. Noncompete Geographic Restrictions for Pratt's Stats Sales, 1994–2017
By Legal Form of Organization

Legal Form	Count	Sales Weight	Noncompete Radius (Miles) Mean	Median	Std. Dev.
Sole Proprietors	771	0.2	37.4	20.0	61.2
Partnerships	119	0.0	28.5	20.0	43.9
S Corporations	3,999	1.6	40.7	20.0	65.3
LLCs	1,437	0.4	37.1	20.0	70.5
C Corporations	837	0.3	40.4	20.0	71.0
Pass-throughs, excluding LLCs	4,889	1.8	39.9	20.0	64.2
Pass-throughs, including LLCs	6,326	2.2	39.2	20.0	65.7
All business forms	7,163	2.5	39.4	20.0	66.3

Note: Terms are reported for the subset of businesses with noncompete agreements that had a specified geographic distance recorded in Pratt's Stats. The sales weight is the fraction of net sales (in constant dollars). Results in the table can be replicated by running code Pratts.ipynb.

Table A3. Consulting Contract Length for Pratt's Stats Sales, 1994–2017
By Legal Form of Organization

Legal Form	Count	Sales Weight	Contract Length (Months)		
			Mean	Median	Std. Dev.
Sole Proprietors	520	0.1	2.2	2.0	4.3
Partnerships	83	0.0	3.9	2.0	9.7
S Corporations	3,129	1.8	3.3	2.0	8.1
LLCs	1,294	0.4	2.3	2.0	3.6
C Corporations	701	0.5	4.5	2.0	11.1
Pass-throughs, excluding LLCs	3,732	1.9	3.1	2.0	7.8
Pass-throughs, including LLCs	5,026	2.3	2.9	2.0	6.9
All business forms	5,727	2.8	3.1	2.0	7.6

Note: Terms are reported for the subset of businesses with consulting agreements that had a specified length of contract in Pratt's Stats. The sales weight is the fraction of net sales (in constant dollars). Results in the table can be replicated by running code Pratts.ipynb.

Table A4. Intangible Intensities Pratt's Stats Companies, 1994–2017
By Legal Form and Industry

Universe	Count	Sales Weight	Intangible Intensity (%) Mean	Median	Std. Dev.
Aggregates					
Pass-throughs, excluding LLCs	6,858	8.9	58.0	64.0	31.8
Pass-throughs, including LLCs	8,863	25.0	57.5	63.2	32.1
All businesses	10,854	100.0	57.6	63.2	32.1
All businesses by legal form					
Sole Proprietors	1,140	0.2	57.5	63.8	30.7
Partnerships	197	1.3	56.6	66.6	32.2
S Corporations	5,521	7.4	58.1	63.9	32.0
LLCs	2,005	16.0	55.7	61.1	33.3
C Corporations	1,916	75.0	58.0	63.1	32.1
Pass-throughs by industry (NAICs)					
Agriculture (11)	16	0.7	30.4	35.2	24.9
Mining (21)	16	6.5	43.1	41.8	29.0
Utilities (22)	10	0.1	60.8	66.6	33.5
Construction (23)	383	5.7	69.2	74.3	37.9
Manufacturing (31–33)	797	40.3	54.5	59.0	29.3
Wholesale trade (42)	17	0.0	54.8	52.1	28.9
Retail trade (44–45)	1,569	6.6	54.2	58.8	30.0
Transportation, warehousing (48–49)	327	5.0	66.2	73.9	25.4
Information (51)	189	10.3	80.8	89.5	22.5
Finance and insurance (52)	155	2.8	85.5	95.7	25.2
Real estate and rental (53)	268	1.8	76.3	92.7	31.0
Professional, scientific, technical (54)	462	4.9	81.3	89.5	21.0
Management of companies (55)	12	5.3	56.3	64.0	33.4
Administrative services (56)	1,030	2.8	73.2	79.8	24.7
Educational services (61)	115	0.5	59.1	72.0	34.3
Health care and social assistance (62)	450	2.8	62.8	68.9	29.4
Arts, entertainment, recreation (71)	168	0.9	45.7	44.4	30.9
Accommodation and food (72)	1,689	1.8	41.8	41.9	30.2
Other services (81)	1,187	1.3	45.5	45.4	31.3

Note: The sample includes all businesses in Pratt's Stats with a valid entry for total intangibles in the purchase price allocation ("TotalIntangiblesPPA" in the database) and a valid entry for total assets in the purchase price allocation ("TotalAssetsPPA"). The intangible intensity is the ratio of intangible assets to total assets in the purchase price. The sales weight is the fraction of net sales (in constant dollars). Statistics for pass-throughs by industry include data for LLCs. Results in the table can be replicated by running code Pratts.ipynb.

Table A5. Intangible Intensities Pratt's Stats Companies, 1994–2017
By Legal Form and Noncompete Agreements

Universe	Count	Sales Weight	Intangible Intensity (%) Mean	Median	Std. Dev.
With noncompete agreements					
Sole Proprietors	971	0.2	57.6	63.1	30.2
Partnerships	150	0.1	54.3	64.6	33.0
S Corporations	4,817	2.5	58.0	64.0	32.3
LLCs	1,677	1.9	55.2	60.5	33.5
C Corporations	1,115	2.0	54.3	57.5	32.2
Pass-throughs, excluding LLCs	5,938	2.9	57.9	63.8	32.0
Pass-throughs, including LLCs	7,615	4.8	57.3	63.1	32.4
All businesses with noncompetes	8,730	6.8	56.9	62.5	32.4
Without noncompete agreements					
Sole Proprietors	97	0.0	50.6	60.0	34.1
Partnerships	28	1.2	58.7	70.4	29.7
S Corporations	456	3.7	58.3	62.2	30.8
LLCs	253	13.9	58.2	64.4	32.2
C Corporations	744	71.0	62.7	70.7	31.8
Pass-throughs, excluding LLCs	314	1.2	62.5	67.8	27.3
Pass-throughs, including LLCs	379	1.4	62.0	67.4	28.0
All businesses without noncompetes	502	3.4	62.1	68.3	28.2

Note: The sample includes all businesses in Pratt's Stats that included a noncompete agreement as part of the purchase price and had a valid entry for total intangibles in the purchase price allocation ("TotalIntangiblesPPA" in the database) and a valid entry for total assets in the purchase price allocation ("TotalAssetsPPA"). The intangible intensity is the ratio of intangible assets to total assets in the purchase price. The sales weight is the fraction of net sales (in constant dollars). Results in the table can be replicated by running code Pratts.ipynb.

Table A6. Intangible Intensities, Pratt's Stats Companies, 1994–2017
By Legal Form and Consulting Contracts

Universe	Count	Sales Weight	Intangible Intensity (%) Mean	Median	Std. Dev.
With consulting contracts					
Sole Proprietors	520	0.1	56.5	62.5	31.9
Partnerships	83	0.0	49.5	50.5	34.5
S Corporations	3,129	1.8	58.3	64.0	33.1
LLCs	1,294	0.4	53.8	58.5	34.1
C Corporations	701	0.5	54.8	58.2	32.7
Pass-throughs, excluding LLCs	3,732	1.9	57.8	63.6	33.0
Pass-throughs, including LLCs	5,026	2.29	56.8	62.4	33.34
All businesses with contracts	5,727	2.8	56.6	61.8	33.3
Without consulting contracts					
Sole Proprietors	620	0.1	58.3	64.8	29.6
Partnerships	114	1.3	61.7	71.0	29.6
S Corporations	2,392	5.6	58.0	63.6	30.4
LLCs	711	15.6	59.2	65.8	31.5
C Corporations	1,290	74.5	59.7	65.9	31.6
Pass-throughs, excluding LLCs	3,126	7.0	58.2	64.2	30.3
Pass-throughs, including LLCs	3,837	22.7	58.4	64.7	30.5
All businesses without contracts	5,127	97.2	58.7	64.9	30.8

Note: The sample includes all businesses in Pratt's Stats that included a consulting contract as part of the purchase price and had a valid entry for total intangibles in the purchase price allocation ("TotalIntangiblesPPA" in the database) and a valid entry for total assets in the purchase price allocation ("TotalAssetsPPA"). The intangible intensity is the ratio of intangible assets to total assets in the purchase price. The sales weight is the fraction of net sales (in constant dollars). Results in the table can be replicated by running code Pratts.ipynb.

Table A7. Intangible Intensities, Pratt's Stats Companies, 1994–2017
By Legal Form and Total Assets

Universe	Count	Sales Weight	Intangible Intensity (%) Mean	Median	Std. Dev.
Pass-through businesses					
[1,000–77,500]	1,774	0.2	47.1	46.7	34.8
[77,500–145,000]	1,812	0.3	54.3	57.9	32.1
[145,000–256,131]	1,731	0.4	58.4	63.2	33.1
[256,131–575,000]	1,773	0.8	62.9	69.2	28.3
[575,000–21,824,700,000]	1,772	23.3	64.8	64.8	28.7
All businesses					
[1,000–85,000]	2,275	0.2	47.6	47.8	34.8
[85,000–160,000]	2,158	0.4	54.9	59.0	31.9
[160,000–300,000]	2,092	0.6	59.9	64.7	32.1
[300,000–850,000]	2,173	1.2	61.8	68.9	29.1
[850,000–153,000,000,000]	2,155	97.6	64.2	70.9	29.6

Note: The sample includes all businesses in Pratt's Stats with a valid entry for total intangibles in the purchase price allocation ("TotalIntangiblesPPA" in the database) and a valid entry for total assets in the purchase price allocation ("TotalAssetsPPA"). The intangible intensity is the ratio of intangible assets to total assets in the purchase price. The sales weight is the fraction of net sales (in constant dollars). Results in the table can be replicated by running code Pratts.ipynb.

Table A8. Intangible Intensities, Pratt's Stats Companies, 1994–2017
By Reason for Sale

Reason for Sale	Count	Sales Weight	Intangible Intensity (%) Mean	Median	Std. Dev.
Reason not provided	9,831	57.8	57.3	63.0	32.2
Other interests/opportunities	465	29.2	60.8	67.8	31.5
Health	238	13.1	62.1	71.2	31.6
Retirement	154	3.8	52.2	55.4	28.8
Relocation	146	0.1	63.3	67.3	42.5
Other reason	20	0.0	52.1	57.2	27.2

Note: The sample includes all businesses in Pratt's Stats with a valid entry for total intangibles in the purchase price allocation ("TotalIntangiblesPPA" in the database) and a valid entry for total assets in the purchase price allocation ("TotalAssetsPPA"). The intangible intensity is the ratio of intangible assets to total assets in the purchase price. The sales weight is the fraction of net sales (in constant dollars). Results in the table can be replicated by running code Pratts.ipynb.

Table A9. Tangible Assets-to-Sales and Sales-to-Value Ratios By Industry

Industry	Tangible Assets-to-Sales	Sales-to-Value	
		With Liquidity Adjustment	Without Liquidity Adjustment
All industries	0.32	1.03	0.77
Construction (23)	0.24	2.51	1.88
Manufacturing (31–33)	0.44	0.84	0.63
Retail trade (44–45)	0.21	1.93	1.45
Transportation, warehousing (48–49)	0.61	1.93	1.45
Information (51)	0.21	0.59	0.44
Finance and insurance (52)	0.07	0.80	0.60
Real estate and rental (53)	3.58	0.49	0.37
Professional, scientific, technical (54)	0.02	0.93	0.70
Administrative services (56)	0.09	1.20	0.90
Educational services (61)	0.25	0.73	0.55
Health care and social assistance (62)	0.15	1.80	1.35
Arts, entertainment, recreation (71)	0.25	1.03	0.77
Accommodation and food (72)	0.62	0.91	0.68
Other services (81)	0.33	1.33	1.00

Note: The tangible assets-to-sales ratio is constructed with SOI data for S-corporate tax filings. The tangible assets include accounts receivable net of bad debts and accounts payable; inventories; other current assets net of current liabilities; fixed assets net of depreciation; land; and other assets. The fixed assets are converted to a current cost basis by multiplying IRS fixed assets at historical cost by the ratio of current-cost gross fixed assets to historical-cost gross fixed assets in NIPA. The S-corporate sales is business receipts reported in tax filings. The sales-to-value ratio is constructed with Compustat data for C-corporate 10K filings. The ratio without adjustment uses the reported market values. The ratio with adjustment assumes the market value is 75 percent lower than that reported to account for the fact that shares in smaller firms are less liquid. Results in the table can be replicated by running codes Intangible_SCorpTaxdata.ipynb and PriceSalesMultiples.ipynb.

Table A10. Average Intangible Intensities of Pratt's and Ongoing Businesses By Industry

Industry	Pratt's Stats	Ongoing Business: With Adjustment	Ongoing Business: Without Adjustment
All industries	57.5	67.1	75.4
Construction (23)	69.2	39.8	54.9
Manufacturing (31–33)	54.5	63.0	72.3
Retail trade (44–45)	54.2	59.4	69.6
Transportation, warehousing (48–49)	66.2	−17.9	11.6
Information (51)	80.8	87.6	90.8
Finance and insurance (52)	85.5	94.4	95.8
Real estate and rental (53)	76.3	−76.6	−32.5
Professional, scientific, technical (54)	81.3	98.1	98.6
Administrative services (56)	73.2	89.2	91.9
Educational services (61)	59.1	81.6	86.3
Health care and social assistance (62)	62.8	73.0	79.8
Arts, entertainment, recreation (71)	45.7	74.3	80.8
Accommodation and food (72)	41.8	43.8	57.8
Other services (81)	45.5	56.0	67.0

Note: The Pratt's Stats data are taken from Table A4. The estimates for ongoing business are computed as 1 less the ratios in column 1 of Table A9 times the ratios in column 2 or 3 in Table A9, all multiplied by 100.

Table A11. Variation in Pratt's Stats Intangible Assets by Age

Coefficients	Estimate
Constant	11.2 (0.960)
Age	0.0169 (0.002)
Age-squared	-4.64×10^{-5} (1.42×10^{-5})
Year-Sector fixed effects	Yes
Number of observations	8,607

Note: The table shows results for an ordinary least squares regression. The sample includes all pass-through businesses in Pratt's Stats that have a valid entry for age ("TargetAge" in the database) and a positive value for total intangibles in the purchase price allocation ("TotalIntangiblesPPA" in the database). The regression specification has independent variable log(TotalIntangiblesPPA) and dependent variables: TargetAge, TargetAge^2, sector fixed effects and year fixed effects. Results in the table can be replicated by running code Pratts.ipynb.

Table A12. Intangible Asset Valuation Relative to Net Income

Legal Form	Median
Sole Proprietorships	1.23
Partnerships	1.52
S Corporations	1.60
LLCs	1.23

Note: The sample includes all pass-through and LLC businesses in Pratt's Stats with a valid entry for total intangibles in the purchase price allocation ("TotalIntangiblesPPA" in the database) and a valid entry for net income ("NetIncome" in the database) in the previous year. Results in the table can be replicated by running code Pratts.ipynb.

Table A13. Taxpayer-claimed Intangible Assets, GAO 1991

Accelerated market growth	Access programming	Accounts receivable
Accounts and vendors	Acquisition costs	Advertising lists
Advertising contracts	Agreements	Assembled workforce
Backlog	Bargain leases	Broadcasting rights
Brochures and catalogs	Cable franchises	Capital grants expensed
Competitive advantage	Computer programs	Computer software
Computer software license	Computer software manuals	Concessions/scoreboards
Construction contracts	Construction permit	Consulting agreements
Consumer franchises	Contracts, general	Contracts, related cos.
Copyrights	Core deposits	Course material
Covenant not to compete	Credit files	Customer base
Customer contracts	Customer lists	Customer relations
Customer routes	Customer structure	Data base
Dealer network	Deferred financing costs	Deferred organization
Delivery system	Deposit base	Development rights
Diminishing network comp.	Disadvantage competition	Distributions
Drawings	Employment contracts	Equipment leases
Equity, unearned premium	Equity, government property	Favorable financing
Favorable leases	Favorable wage rates	FCC license
Field staff	Film contracts	Formulas
Franchises	Gas allocation rights	Gas purchase contracts
Income agreement	Information systems	Insurance client list
Insurance contracts	Insurance expirations	Insurance-in-force
Key employee	Lease rights	Leasehold improvements
Leasehold interests	Leases, general	Legal and auditing
Library	Licensing agreements	Lists, dealers
Loan portfolio premium	Loan portfolio premium	Local media contracts
Location value	Long-term leases	Mailing list
Maintenance contracts	Make-ready costs	Management contracts
Manufacturing agreements	Manufacturing process	Manufacturing reps.
Market service	Marketing contracts	Medical records
Miscellaneous expenses	Morgue	Mortgage servicing lists
Mortgage servicing rights	Negative asset base	Newspaper masters
Nonunion status	Novelty rights	Nurse files
Nurse procedures/manuals	On-air talent contracts	Other advertising relations
Patent application	Patents	Patient files/records
Physician/dental referrals	Player contracts	Premium, loan
Premium, market population	Premium, market revenue	Premium, early delivery
Premium, investments	Prepaid leases	Presold contracts
Product line	Profit and loss revenue	Program format
Proposal contracts	Purchase order contracts	Radio franchises
Rate and photo files	Real estate option leases	Recipes

See notes at end of table.

Table A13. Taxpayer-claimed Intangible Assets, GAO 1991 (cont.)

Recruitment assets	Research and development	Right to solicit customers
Rights, general	Safe deposit box contracts	Savings value, escrow fund
Service contracts	Servicing rights	Specialty program contracts
Standstill agreements	Stock of first bank	Student files
Studio space/site leases	Subscription lists	Supply contracts
Technical expertise	Technical manuals	Technician files
Technology	Television franchises	Timber cutting rights
Timber leasehold	Trademarks	Trade names
Trained staff	Training programs	TV network affiliation
Television spots	Underdeveloped mkt. competition	Unfilled purchase orders
Unpatented know-how	Value of loans receivable	Vehicles in service
Water rights		

Note: The table reports all taxpayer-claimed intangible asset categories in the audited tax filings analyzed by the GAO (1991, Appendix I).

Table A14. Average Taxpayer-Claimed Life for Intangible Assets

Asset Category	Examination		Appeals		Litigation		Combined	
	Cases	Average Claimed Life	Cases	Average Claimed Life	Cases	Average Claimed Life	Cases	Average Claimed Life
Customer-based	493	8.6	144	9.9	40	8.6	677	8.8
Contracts	362	6.2	70	6.4	9	6.1	441	6.3
Technology	185	6.4	23	6.4	3	2.3	211	6.4
Statutorily-defined	130	9.9	26	17.0	190	14.4	175	10.6
Workforce-related	130	7.0	16	3.3	1	7.0	147	6.6
Organizational	98	6.9	7	15.3	—	—	105	7.5
Unidentifiable	36	8.8	6	9.3	—	—	42	8.9
Total	1,434		292		72		1,798	7.8

Note: This table reports the average useful life claimed by taxpayers for intangible assets in open cases with three different units at the IRS. The source of the data is the GAO (1991, Table 3.4). Of the 2,166 open issue cases at the IRS, 1,798 had sufficient detail on the claimed useful life of the intangible asset. Claimed life is in years. See the text for more details on the asset categories shown in the table.

Table A15. Comparison of IRS and Taxpayer Useful Life Determination

Asset Category	Examination		Appeals		Litigation	
	Average Claimed Life	Average Adjusted Life	Average Claimed Life	Average Adjusted Life	Average Claimed Life	Average Adjusted Life
Customer-based	9.4	10.8	8.6	9.3	12.0	12.0
Contracts	6.7	7.2	7.0	7.0	8.5	8.5
Technology	5.5	6.8	6.1	6.7	1.0	5.0
Statutorily-defined	11.2	11.9	11.8	11.6	—	—
Workforce-related	—	—	3.6	5.4	—	—
Organizational	5.9	9.1	14.8	14.3	—	5.0
Unidentifiable	7.6	7.6	5.3	5.3	—	—

Note: This table reports the average useful life in 357 open cases in which the IRS eventually allowed the taxpayer to amortize an intangible asset under dispute. The source of the data is the GAO (1991, Table 3.8).

Table A16. National Income and Product Accounts, 2007
(Billions of dollars)

Domestic Income	14,434
Compensation	7,889
Corporate	4,894
Noncorporate	1,004
Proprietors and partners	827
Other private	32
Government enterprise	145
Nonbusiness	1,991
Households	18
Nonprofits	598
Government	1,375
Corporate profits	1,195
Proprietors' income	994
Rental income	184
Net interest	852
Government enterprise profits	−14
Consumption of fixed capital	2,253
Indirect business taxes	1,081
Domestic Product	14,452
Personal consumption expenditure	9,706
Services	6,339
Nondurable	2,179
Durable	1,188
Gross private domestic investment	2,673
Nonresidential structures	510
Nonresidential equipment	893
Nonresidential IPP	545
Residential	690
Change in inventories	34
Government consumption and investment	2,791
Consumption	2,199
Investment	592
Net exports	−718

Note: The source for NIPA data is *Survey of Current Business*. Results in the table can be replicated by running code accounts.m.

Table A17. Revised Income, 2007
(Billions of dollars)

Total Adjusted Income	16,593
NIPA GDI	14,434
+ NIPA statistical discrepancy	18
+ FA consumer durable depreciation	880
+ Imputed capital services	593
+ Misreported S-corporate income	112
+ Imputed private IPP investment	1,734
− NIPA private IPP investment	545
− NIPA sales tax	633
Sweat income	1,491
NIPA proprietors' income	994
+ IRS S-corporate business income (post-audit)	350
+ IRS S-corporate compensation (post-audit)	274
+ NIPA statistical discrepancy	18
− Other private business proprietors' income	3
− Proprietors' IVA, CCadj	67
− Imputed pass-through capital income	74
Employee compensation	5,496
NIPA compensation	7,889
− IRS S-corporate compensation (reported)	224
− NIPA nonbusiness compensation:	2,168
Households	18
Nonprofits	598
Other private business	32
Government enterprises	145
General government	1,375
Business capital income	5,204
NIPA corporate profits	1,195
+ Proprietors' IVA, CCadj	67
+ Imputed pass-through capital income	74
− IRS S-corporate business income (reported)	287
+ NIPA rental income	184
− NIPA nonbusiness rental income:	184
Households	98
Nonprofits	5
Other private business	82
+ NIPA net interest	852

See notes at end of table.

Table A17. Revised Income, 2007 (Cont.)
(Billions of dollars)

Business capital income (cont.)	5,204
− NIPA nonbusiness net interest:	503
Households	449
Nonprofits	12
Other private business	42
+ NIPA indirect business taxes	1,081
− NIPA nonbusiness indirect business taxes	157
Households	136
Nonprofits	8
Other private business	13
− NIPA sales tax	633
+ Imputed private IPP investment	1,734
− NIPA private IPP investment	545
+ NIPA consumption of fixed capital	2,253
+ FA consumer durable depreciation	880
− NIPA nonbusiness depreciation	805
Residential	405
Government	400
Nonbusiness income	4,401
NIPA household income	700
+ NIPA nonprofit income	624
+ NIPA other private business income	173
+ NIPA government enterprise income	131
+ NIPA general government income	1,375
+ NIPA nonbusiness depreciation	805
+ Imputed capital services	593
Consumer durables	179
Government	414

Note: NIPA source data are shown in Table A16. See text for details on the adjustments. Results in the table can be replicated by running code accounts.m.

Table A18. Revised Product, 2007
(Billions of dollars)

Total Adjusted Product	16,593
NIPA GDP	14,452
+ FA consumer durable depreciation	880
+ Misreported S-corporate income	112
+ Imputed capital services	593
+ Imputed private IPP investment	1,734
− NIPA private IPP investment	545
− NIPA sales tax	633
Private consumption	9,548
NIPA personal consumption expenditures	9,706
− NIPA durable consumption	1,188
− NIPA pro-rata sales tax	556
+ FA consumer durable depreciation	880
+ Imputed capital services	593
+ Misreported S-corporate income	112
Public consumption	2,199
NIPA government consumption	2,199
Investment	4,847
NIPA gross private domestic investment	2,673
+ NIPA durable consumption	1,188
− NIPA pro-rata sales tax	77
+ Imputed private IPP investment	1,734
− NIPA private IPP investment	545
+ NIPA government investment	592
+ NIPA net exports	−718

Note: NIPA source data are shown in Table A16. See text for details on the adjustments. Results in the table can be replicated by running code accounts.m.

Table A19. Revised National Income and Product Accounts, 2007
(Averages Relative to Adjusted GDP)

Total Adjusted Income	1.000
Sweat income	0.090
Employee compensation	0.331
C corporations	0.220
Pass-through businesses	0.110
Business capital income	0.314
Nonbusiness income	0.265
Total Adjusted Product	1.000
Private consumption	0.575
Public consumption	0.133
Investment	0.292
C corporations	0.134
Pass-through businesses	0.048
Nonbusiness	0.110

Note: Shares are found by dividing the corresponding rows in Tables A17 and A18 by adjusted GDP. Results in the table can be replicated by running code accounts.m.

Table A20. Fixed Asset Tables, 2007
(Billions of dollars)

Current-cost Net Capital Stock	67,971
Fixed assets and consumer durables	48,983
Corporate	13,692
Structures	7,677
Equipment	4,104
IPP	1,742
Residential	168
Sole proprietors	2,290
Structures	669
Equipment	239
IPP	48
Residential	1,333
Partnerships	1,408
Structures	926
Equipment	342
IPP	140
Nonbusiness	31,594
NIPA inventories	2,103
Corporate	1,933
Noncorporate	170
FOF land	16,885
Corporate	3,286
Noncorporate	5,055
Households and nonprofits	8,544

Note: The sources for fixed asset data are the *Survey of Current Business* and the *Flow of Funds Accounts*. Results in the table can be replicated by running code accounts.m.

Table A21. Revised Fixed Asset Tables, 2007
(Billions of dollars)

Total Adjusted Capital Stock	90,516
FA current cost net stock	48,983
+ NIPA inventories	2,103
+ Land	16,885
+ Imputed private IPP capital	24,568
− FA IPP current cost net stock	2,023
= C-corporate capital stock	32,982
Fixed assets and inventories	29,696
Land	3,286
+ Pass-through capital stock	16,367
S-corporate fixed assets and inventories	5,343
Sole proprietors fixed assets and inventories	2,997
Partnership fixed assets and inventories	2,971
Noncorporate land	5,055
+ Nonbusiness capital stock	41,168

Note: Fixed asset source data are shown in Table A20. See text for details on the adjustments. Results in the table can be replicated by running code accounts.m.

Table A22. Revised Fixed Asset Tables, 2007
(Averages Relative to Adjusted GDP)

Total Adjusted Capital Stock	5.455
FA current cost net stock	2.952
+ NIPA inventories	0.127
+ Land	1.018
+ Imputed private IPP capital	1.481
− FA IPP current cost net stock	0.122
= C-corporate capital stock	1.988
Fixed assets and inventories	1.790
Land	0.198
+ Pass-through capital stock	0.986
S-corporate fixed assets and inventories	0.322
Sole proprietors fixed assets and inventories	0.198
Partnership fixed assets and inventories	0.198
Noncorporate land	0.305
+ Nonbusiness capital stock	2.481

Note: Shares are found by dividing the corresponding rows in Table A21 by adjusted GDP. Results in the table can be replicated by running code accounts.m.

Table A23. Population, Hours, and Employment, 2007

BLS-CPS Population and Hours	
Noninstitutional population, 16-64 (millions)	197.0
Annual hours per person	1,464.8
SBO Population and Hours	
All owners	
Number (millions)	36.0
Annual hours per owner	1,633.8
Owners, business is primary income	
Number (millions)	18.2
Annual hours per owner	2,289.5
BEA Persons Engaged	
Total Persons Engaged (millions)	138.6
Full-time equivalent employees	128.2
Private	108.7
Government	20.3
Full-time equivalent proprietors and partners	10.4

Note: The sources for these data are the BLS *Current Population Survey*, Census *Survey of Business Owners*, and BEA *Survey of Current Business*. Results in the table can be replicated by running code accounts.m.

Table A24. Owners by Years Since Acquiring Business, 2007

Years since Acquisition	Percent of Owners: All Owners	Percent of Owners: Business is Primary Income
0	11.40	8.84
1	8.50	7.29
2	7.87	7.03
3–7	5.10	4.93
8–17	2.42	2.62
18–27	1.35	1.58
28–47	0.45	0.51

Note: The source for these data is the Census *Survey of Business Owners*. Results in the table can be replicated by running code accounts.m.

Table A25. Business Statistics by Owner Age, 2007

Age Bracket	US Adults (%)	SBO Owners (%)	Age of Business (average)	Years in Business (average)
25–34	19	10	5.1	3.5
35–44	18	21	8.6	6.3
45–54	20	30	12.8	10.3
55–64	18	25	16.4	14.6
65+	24	13	21.8	20.5

Note: The source for these data is the Census *Survey of Business Owners*. Results in the table can be replicated by running code accounts.m.

Table A26. Single Most Important Problems
(Percent)

Year	Financing	Taxes	Poor Sales	Red Tape	Big Business	Labor Quality	Insurance Costs	Other
1994	4.4	25.5	9.3	23.4	8.2	7.8	9.9	11.5
1995	5.4	26.1	8.4	19.7	10.4	9.9	8.5	11.6
1996	3.8	27.4	8.4	17.9	10.7	12.4	7.2	12.2
1997	3.6	27.7	7.3	16.7	11.2	14.5	5.9	13.1
1998	3.0	26.1	7.0	15.7	11.7	18.2	5.8	12.5
1999	2.8	26.0	7.6	14.2	12.2	18.9	6.5	11.8
2000	4.0	24.1	7.1	12.9	10.7	21.9	7.3	12.0
2001	3.0	22.6	13.0	11.5	10.5	16.5	10.9	12.0
2002	2.6	21.1	15.8	10.9	10.5	11.2	17.7	10.2
2003	1.9	18.3	16.9	10.6	9.7	8.3	24.5	9.8
2004	1.9	17.4	12.3	10.4	10.1	9.5	26.1	12.3
2005	2.5	18.6	10.0	9.6	8.9	9.9	24.8	15.7
2006	3.8	17.8	9.9	10.5	8.5	12.2	20.5	16.8
2007	3.2	21.6	11.6	10.4	8.5	13.3	17.3	14.1
2008	3.2	18.2	18.5	8.6	6.9	9.2	11.8	23.6
2009	4.2	20.6	31.7	11.4	5.7	4.2	8.2	14.0
2010	4.1	21.3	30.6	14.3	6.3	3.7	7.7	12.0
2011	3.5	18.8	25.4	17.6	6.7	5.3	7.5	15.2
2012	3.0	20.2	21.1	19.9	6.9	5.9	7.7	15.3
2013	2.3	21.3	16.8	21.4	7.0	7.0	8.5	15.7
2014	1.9	22.2	13.3	21.1	8.2	9.8	8.1	15.4
2015	1.8	21.4	11.5	21.7	7.3	12.8	8.4	15.1
2016	1.8	20.9	11.8	19.8	8.0	14.1	8.5	15.1
2017	1.6	21.3	9.8	16.2	8.3	17.6	9.3	15.9
2018	2.0	16.5	8.0	14.0	9.4	22.8	10.0	17.3
2019	1.8	15.5	8.3	13.3	9.2	24.1	9.2	18.6

Note: The source for these data is the NFIB Small Business Economic Trends. Fractions may not sum to 100 due to rounding. Results in the table can be replicated by running code nbif.m.

Table A27. Businesses with Borrowing Needs Satisfied
(Percent)

Year	Was Satisfied	Was Not Satisfied	Didn't Want to Borrow	Didn't Reply to Survey
1994	34.8	7.0	41.8	16.4
1995	36.4	6.2	41.4	16.0
1996	36.8	6.1	41.7	15.3
1997	37.2	5.5	41.6	15.7
1998	36.8	5.2	41.7	16.3
1999	37.2	4.7	42.0	16.1
2000	37.3	4.6	42.9	15.2
2001	36.2	5.5	42.8	15.5
2002	35.3	5.7	43.3	15.6
2003	35.6	6.0	44.3	14.1
2004	36.1	5.6	43.7	14.5
2005	36.9	4.7	43.2	15.2
2006	37.9	5.3	44.0	13.8
2007	36.6	4.9	44.7	13.8
2008	33.0	5.7	47.4	13.9
2009	30.0	8.8	49.6	11.5
2010	27.3	9.4	51.5	11.9
2011	28.0	8.0	51.2	12.8
2012	29.5	7.1	51.0	12.3
2013	29.9	5.8	52.0	12.3
2014	29.8	5.1	52.6	12.5
2015	31.8	3.8	51.8	12.6
2016	31.0	3.9	51.6	13.5
2017	31.1	3.4	51.3	14.2
2018	31.6	3.3	50.6	14.5
2019	31.0	3.0	53.4	12.6

Note: The source for these data is the NFIB Small Business Economic Trends. Fractions may not sum to 100 due to rounding. Results in the table can be replicated by running code nbif.m.

Table A28. Tax Schedules

Wage Income		Business Income	
Brackets	Rates(%)	Brackets	Rates(%)
$[-\infty,\ \ 0.173]$	29.3	$[-\infty,\ \ 0.153]$	14.0
$[0.173, 0.262]$	32.4	$[0.153, 0.304]$	18.3
$[0.262, 0.404]$	34.3	$[0.304, 0.912]$	20.1
$[0.404, 0.732]$	39.0	$[0.912, 2.667]$	23.5
$[0.732, 1.409]$	40.0	$[2.667, 5.727]$	26.2
$[1.409, 3.138]$	40.8	$[5.727, 9.104]$	26.9
$[3.138, \infty]$	41.9	$[9.104, \infty]$	28.0

Note: See Section 2.8 for details on construction of these tax schedules. Results in the table can be replicated by running code taxfn07.m.

Table A29. Misreported Business Incomes
(Billions of dollars)

	Unincorporated Businesses		Incorporated Businesses	
Year	Reported	Misreported	Reported	Misreported
2000	393.2	367.1	914.2	146.8
2001	401.7	386.2	590.0	168.2
2002	414.8	423.0	550.5	186.5
2003	443.2	439.6	749.0	187.1
2004	514.6	465.3	1075.7	217.1
2005	636.4	479.4	1892.0	264.9
2006	694.5	551.9	1900.3	300.0
2007	628.2	529.2	1788.7	287.5
2008	410.5	376.4	903.0	286.8
2009	431.9	413.7	828.8	313.5
2010	578.6	566.2	1254.2	401.5
2011	600.2	580.5	1242.9	366.5
2012	786.6	636.7	1690.9	371.6
2013	795.8	639.8	1835.1	386.2
2014	863.7	688.8	2040.4	388.9
2015	831.7	672.3	1927.5	367.3
2016	814.5	658.6	1813.1	400.7
2017	825.1	672.7	1577.8	411.5

Note: The source of these data are NIPA Table 7.14 for unincorporated businesses and NIPA Table 7.16 for incorporated businesses. The NIPA tables reconcile incomes reported in tax filings and incomes in the national accounts.

Table A30. Average Corporate Tax Rates: Provision versus Paid
(Percent)

	Provision			Paid		
Industry (NAICS)	2007	2016	2000–16	2007	2016	2000–16
All industries	35.7	27.1	37.5	34.7	23.0	34.8
Agriculture (11)	35.7	27.1	37.5	34.7	23.0	34.8
Mining (21)	30.5	118.8	29.7	51.5	46.0	18.3
Utilities (22)	35.6	3.9	4.0	29.8	−4.1	−37.4
Construction (23)	34.1	32.3	33.9	27.2	−4.2	15.1
Manufacturing (31–33)	13.7	32.8	21.4	−19.8	26.3	12.5
Wholesale trade (42)	32.2	23.9	36.4	32.2	25.9	34.0
Retail trade (44–45)	33.1	28.0	37.3	24.2	22.5	32.0
Transportation, warehousing (48–49)	37.0	34.7	38.0	35.4	31.3	35.4
Information (51)	31.1	33.1	−6.9	23.4	13.7	10.5
Finance and insurance (52)	43.7	59.0	21.5	33.9	22.6	18.8
Real estate and rental (53)	26.2	28.9	21.0	46.0	20.6	6.8
Professional, scientific, technical (54)	11.8	8.2	11.0	10.3	5.1	−2.0
Management of companies (55)	40.0	34.7	81.8	28.2	37.1	55.9
Administrative services (56)	39.2	27.6	62.9	30.8	30.4	62.4
Educational services (61)	36.9	32.7	80.1	33.5	40.5	99.8
Health care and social ass. (62)	31.8	44.3	40.6	27.9	38.4	33.3
Arts, entertainment, recreation (71)	55.6	46.2	42.8	55.1	21.3	32.2
Accommodation and food (72)	33.9	38.7	37.5	35.4	34.3	37.8
Other services (81)	37.3	43.6	37.4	21.5	32.0	24.5

Note: The source of these data is Compustat tax provision (variable "txt"), tax paid (variable "txpd") and pre-tax income (variable "pi"). Results in the table can be replicated by running code TaxAnalysis.ipynb.

Table A31. Transitions by Legal Form of Organization
(Percent)

In t:	In $t+1$: Proprietorship	Partnership	S Corporation	C Corporation	LLC
A. KFS Start-ups					
Proprietorship	94.7	0.2	2.2	0.5	2.4
Partnership	0.7	95.8	1.7	0.2	1.5
S Corporation	0.0	0.1	99.0	0.6	0.3
C Corporation	0.2	0.0	1.1	98.4	0.3
LLC	0.2	0.3	3.2	0.5	95.7
B. LBD Employers					
Proprietorship	98.0	0.6	0.4	0.9	–
Partnership	0.3	99.0	0.3	0.4	–
S Corporation	0.0	0.2	97.1	2.7	–
C Corporation	0.1	0.1	2.3	97.5	–

Note: KFS is the Kauffman Firm Survey that follows a representative sample of new firms in 2004 until 2011. Transitions are annual counts of continuing businesses with a particular legal form of organization in year t and the same or different in $t+1$, weighted by the cross-sectional weights times revenues in t. LLCs are shown separately because the survey does not include information about the federal tax form filed. LBD is the Longitudinal Business Dynamics employer firms over the period 1980–2011. Transitions are annual counts of continuing businesses with a particular legal form of organization in year t and the same or different in $t+1$, weighted by the cross-sectional weights times payroll in t. Results can be replicated by running codes kfs.m and lbd.m.

Table A32. Alternative Parameterizations of Sweat Accumulation

Parameters	Baseline	Impose:				
		$\delta_\kappa = 0.159$	$\varphi = 0.5$	$\vartheta = 0.204$	$\vartheta = 0.816$	Higher $T^{b'}$
δ_κ	0.058	0.159	0.058	0.058	0.058	0.058
φ	1.000	1.000	0.500	1.000	1.000	1.000
ϑ	0.408	0.408	0.408	0.204	0.816	0.408
λ	0.600	0.700	0.600	0.500	0.700	0.600
ϕ	0.150	0.200	0.150	0.150	0.150	0.150
ω	0.425	0.408	0.390	0.435	0.393	0.425
η	0.449	0.437	0.471	0.403	0.481	0.449

Note: The parameters listed in column 1 are as follows: the sweat capital depreciation rate δ_κ, the curvature parameter for investment in sweat capital φ, the share of owner hours in sweat capital investment ϑ, the rate of sweat capital deterioration when inactive λ, the share of sweat capital in production of goods and services ϕ, the share of owner hours in production of goods and services ω, and the share of C-corporate goods and services in the consumption composite η. See Section 3 of the main text for details on the baseline parameterization. Results can be replicated by running codes in the main Codes directory ./SweatCodes.

Table A33. Main Results for Alternative Parameterizations

All Private Businesses

Statistics (%)	Baseline	Impose: $\delta_\kappa = 0.159$	$\varphi = 0.5$	$\vartheta = 0.204$	$\vartheta = 0.816$	Higher $T^{b\prime}$
Sweat equity	1.22	1.58	1.66	0.96	1.81	1.23
Sale value	0.32	0.35	0.29	0.36	0.30	0.30
Gross return	7.5	7.6	6.9	7.8	7.3	7.6
Effects of lower taxes:						
Output	2.2	2.0	1.7	2.0	2.2	2.1
Sweat capital	6.0	4.3	8.4	4.1	8.8	3.5
Self-employment rate	6.6	7.3	3.5	6.3	6.3	8.1
Owner hours	14.0	14.8	12.6	14.7	12.7	17.5
Total hours	4.2	4.5	3.3	4.2	3.9	4.6

Note: Estimates for sweat equity, sale value, and gross return are averages across all business owners. Sweat equity and sale values are constructed only for business owners and are divided by per capita GDP. The gross return on the business is the sum of the capital gain to sweat equity plus the dividend yield and is reported in percentage terms. Effects of lowering tax rates are percent changes for private business activities in response to lowering taxes on private businesses. Results can be replicated by running codes in the main Codes directory ./SweatCodes.